Quantum

Man Pages Reference Guide

StorNext 5.4.1

6-68040-01 Rev. M

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6-68040-01 Rev. M
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Introduction

Quantum recommends using the GUI to complete most StorNext tasks, but there might be situations where you prefer or need to use the command line interface (CLI) instead.

This document is a printed version of the man pages as they currently exist in StorNext.

For each command, information similar to the following is provided:

- name
- synopsis
- description
- options
- examples
- see also

Note: Storage Manager commands are only available on Linux MDC systems.

Note: On a Windows Vista system, when you run applications from the command line that require administrative privileges (such as those provided by **cygwin**), you can start the CLI application either from an elevated shell environment or a DOS shell. If you do not, CLI commands requiring administrative privileges will fail and you will receive an error message indicating that you do not have sufficient privileges to run the command.

To start the shell in elevated mode, right-click the icon for Command Prompt or Cygwin and select Administrative Mode.

Using Commands or Viewing man Pages

The **man** pages are contained within this document, and can also be accessed via the command line.

Use the following procedure to view the **man** page for a command.

1. Source the StorNext profile. Do one of the following:
   - If using the **bash** shell, at the command prompt, type:

     source /usr/adic/.profile
   - If using the **csh** or **tcsh** shell, at the command prompt, type:

     source /usr/adic/.cshrc
2. View the **man** page for a command. At the command prompt, type:

man <command>

where **<command>** is the command for which you want to view the **man** page.

3. Press **<Spacebar>** to page through the **man** page.
4. When you are finished, type **q** and press **<Enter>** to exit the **man** page.

Paging through **man** pages may work differently depending on the viewer specified by the **$PAGER** environmental variable.

Contacting Quantum

More information about StorNext is available on the Quantum Service and Support website at http://www.quantum.com/ServiceandSupport. The Quantum Service and Support website contains a collection of information, including answers to frequently asked questions (FAQs).

StorNext Appliance Upgrades

To request a StorNext software upgrade for non-Quantum MDCs , visit http://www.quantum.com/ServiceandSupport/Upgrade/Index.aspx. To request a StorNext software upgrade for StorNext Appliances, open a support ticket at: www.quantum.com/customercenter/. For further assistance, or if training is desired, contact the Quantum Technical Assistance Center.

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StorNext Filesystem Commands

StorNext Storage Manager Commands

NAME

/usr/adic/util/cnvt2ha.sh − Conversion script for StorNext High Availability Servers (Linux only)

SYNOPSIS

cnvt2ha.sh primary

cnvt2ha.sh secondary *shared_FS peer_IP_addr*

DESCRIPTION

StorNext High Availability (HA) Server configurations that include Storage Manager (SNSM) software must have their operational data moved to a shared location. The *cnvt2ha.sh* script performs this function. It runs in different modes for the first server to be converted (Primary) versus all subsequent server conversions (Secondary). All file systems should be configured before starting the Primary conversion. The Secondary conversion is done on a fresh installation of SNSM with no file systems configured.

The *cnvt2ha.sh* script status and operations are written to the log file */usr/adic/HA/cnvt2ha.sh.log*.

Before starting conversion of the **Primary** server, the following steps must be completed:

/usr/cvfs/config/.cfgx*
: Every file-system configuration must contain one of the **HaFsType** configuration items (see **snfs_config**(5)). One and only one of them must be **HaShared** type.

SNSM Features
: Storage Manager elements should be configured including policies, libraries etc.

/usr/cvfs/config/fsmlist
: Lists all the configured CVFS file systems to be started. See **fsmlist**(4).

/usr/cvfs/config/fsnameservers
: It is recommended, but not required, that the HA Cluster Servers be the nameservers. The only requirement is that at least one nameserver is available when either of the cluster servers is powered down. See **fsnameservers**(4).

/usr/cvfs/config/ha_peer
: Contains the IPv4 or IPv6 numerical address of the peer server. See **ha_peer**(4).

/usr/cvfs/config/license.dat
: Licenses for both servers must be in this file.

User and Group IDs
: The users **tdlm** and **www**, and the group **adic** must exist on both servers with the same ID numbers.

Synchronized System Clocks
: This recommendation is to aid in log-file analysis.

No Processes in File Systems
: The CVFS file systems will be unmounted during conversion.

Before starting conversion of the **Secondary** server, the following steps must be completed:

/usr/cvfs/config/fsnameservers
: Configure the */usr/cvfs/config/fsnameservers* file identical to the Primary server. This will allow the Secondary server to mount the shared file system and copy in all the other configuration data.

OPTIONS

primary
: Perform Primary server conversion.

secondary
: Perform Secondary server conversion.

shared_FS
Name of the shared file system.

peer_IP_addr
The numerical IPv4 or IPv6 address of the Primary server.

FILES

/usr/adic/util/cnvt2ha.sh
/usr/adic/HA/cnvt2ha.sh.log
*/usr/adic/HAM/shared/**
*/usr/adic/HAM/shared/mirror/**

ENVIRONMENT VARIABLES

SNSM_HA_CONFIGURED

SEE ALSO

mount(8), **snhamgr**(8), **fsmlist**(4), **vfstab**(4), **fstab**(5), **snfs_config**(5), **init.d**(7), **chkconfig**(8)

NAME

cvadmin − Administer a StorNext File System

SYNOPSIS

cvadmin [**−H** *FSMHostName*] [**−F** *FileSystemName*] [**−M**] [**−f** *filename*] [**−e** *command1* **-e** *command2...*] [**-x**]

DESCRIPTION

cvadmin is an interactive command used for general purpose administration of a StorNext File System including:

1. displaying file system and client status
2. activating a file system currently in stand-by mode
3. viewing and modifying stripe group attributes
4. enabling File System Manager (FSM) tracing
5. displaying disk and path information for the local system
6. forcing FSM failover
7. fetching FSM usage and performance statistics
8. temporarily enabling or disabling global file locking
9. generating a report of open files
10. listing currently held file locks
11. starting, restarting and stopping of daemon processes
12. resetting RPL information

OPTIONS

Invoke **cvadmin** to start the interactive session and list the running File System Managers (FSMs). (Note: StorNext system services must be started prior to running **cvadmin**. In particular, the local **fsmpm**(8) process must be active.)

Then (optionally) use the **select** command described below to pick an FSM to connect to. Once connected, the command will display basic information about the selected file system and prompt for further commands.

Note that a few commands such as **paths**, **disks**, **start**, and **stop** require information obtained from the local **fsmpm**(8) only, so there is is no need to select an FSM prior to using them.

USAGE

−H *FSMHostName*
: Connect to the FSM located on the machine FSMHostName. By default cvadmin will attempt to connect to an FSM located on the local machine.

−F *FileSystemName*
: Automatically set the file system *FileSystemName* as the active file system in cvadmin.

-M
: When listing file systems with the **select** command, display [managed] next to each file system with DataMigration enabled. This option is currently only intended for use by support personnel.

−f *filename*
: Read commands from *filename*

−e *command*
: Execute command(s) and exit

−x
: Enable extended commands.

COMMANDS

The **cvadmin** commands can be used to display and modify the SNFS active configuration. When a modification is made, it exists only as long as the **FSM** is running. More permanent changes can be made in the

configuration file. Refer to the **snfs_config**(5) man page for details. The following commands are supported.

activate *file_system_name* [*hostname_or_IP_address*]
Activate a file system *file_system_name*. This command may cause an FSM to activate. If the FSM is already active, no action is taken.

activate *file_system_name number_of_votes*
Quantum Internal only. Bypass the election system and attempt to activate the fsm on this node.

debug [[+|-] *flag* [...]]
View or set the File System Manager's debugging flags. Entering the command with no *flag* will return current settings, the location of the **FSM** log file and a legend describing what each setting does. By entering the command with a *flag* list, the **FSM** Debugging Flags will be set accordingly. Each *flag* can be either a name or numeric value. Names will be mapped to their numeric value, and may be abbreviated as long as they remain unique. Numeric values are specified using a standard decimal or hexadecimal (0x) value of up to 32 bits. Using '+' or '-' enables ('+') or disables ('-') only the selected flags, leaving all other flags unchanged.

NOTE - Setting Debugging Flags will severely impact the **FSM**'s performance! Do this only when directed by an Quantum specialist.

disks [**refresh**]
Display the StorNext disk volumes local to the system that cvadmin is attached to. Using the optional **refresh** argument will force the fsmpm to re-scan all volumes before responding. If the fsmpm's view of the disks in any file system changes compared with the FSM's view of that client's disks as a result of the refresh, a disconnect and reconnect to the FSM will take place to resynchronise the file system state.

disks [**refresh**] *fsm*
Display the StorNext meta-data disk volumes in use by the *fsm*. If the optional **refresh** argument is used, additional paths to these volumes may be added by the fsm.

down *groupname*
Down the stripe group *groupname*. This will down any access to the stripe group.

fail *[file_system_name|index_number]*
Initiate an FSM Failover of file system *file_system_name*. This command may cause a stand-by FSM to activate. If an FSM is already active, the FSM will shut down. A stand-by FSM will then take over. If a stand-by FSM is not available the primary FSM will re-activate after failover processing is complete.

files Report counts of files, directories, symlinks and other objects which are anchored by a user type inode. These include named streams, block and character device files, fifos or pipes and named sockets. If the file system is undergoing conversion to StorNext 5.0, conversion progress is displayed and counters reflect the count of converted objects.

fsmlist [*file_system_name*] [**on** *hostname_or_IP_address*]
Display the state of FSM processes, running or not. Optionally specify a single *file_system_name* to display. Optionally specify the host name or IP address of the system on which to list the FSM processes.

filelocks
Query cluster-wide file/record lock enforcement. Currently cluster-wide file locks are automatically used on Unix. Windows file/record locks are optional.

If enabled, byte-range file locks are coordinated through the FSM, allowing a lock set by one client to block overlapping locks by other clients. If disabled, then byte-range locks are local to a client and do not prevent other clients from getting byte-range locks on a file, however they do prevent overlapping lock attempts on the same client.

help (**?**)

The **help** or **?** command will display a command usage summary.

latency-test [*index_number*|**all**] [*seconds*]

Run an I/O latency test between the FSM process and one client or all clients. The default test duration is 2 seconds.

metadata

Report metadata usage. Also provide an estimate on the value of bufferCacheSize that will allow all metadata to be cached.

metadump { status | rebuild | suspend | resume }

Manage the metadump functionality of the selected FSM.

The **status** command prints the progress of the current metadump activity, if any. If capturing a new metadump or restoring an existing one, the percentage complete will be displayed. Otherwise, the current update backlog is displayed.

The **rebuild** command will force the FSM to discard the existing metadump and capture a new one. This is performed online.

The **suspend** and **resume** commands are used internally to facilitate backups of the metadump files. They should not be invoked manually except under direction from support.

multipath *groupname* {**balance**|**cycle**|**rotate**|**static**|**sticky**}

StorNext has the capability of utilizing multiple paths from a system to the SAN disks.

This capability is referred to as "multi-pathing", or sometimes "multi-HBA support". (HBA := Host Based Adaptor).

At "disk discovery" time, for each physical path (HBA), a scan of all of the SAN disks visible to that path is initiated, accumulating information such as the SNFS label, and where possible, the disk (or LUN) serial number.

At mount time, the visible set of StorNext labeled disks is matched against the requested disks for the file system to be mounted.

If the requested disk label appears more than once, then a "multi-path" table entry is built for each available path.

If the disk (or LUN) device is capable of returning a serial number, then that serial number is used to further verify that all of the paths to that StorNext labeled device share the same serial number.

If the disk (or LUN) device is not capable of returning a serial number then the device will be used, but StorNext will not be able to discern the difference between a multi-path accessible device, and two or more unique devices that have been assigned duplicate StorNext labels.

The presence of serial numbers can be validated by using the "cvlabel -ls" command. The "-s" option requests the displaying of the serial number along with the normal label information.

There are five modes of multi-path usage which can also be specified in the filesystem config file. In cases where there are multiple paths and an error has been detected, the algorithm falls back to the **rotate** method. The **balance** and **cycle** methods will provide the best aggregate throughput for a cluster of hosts sharing storage.

balance

The **balance** mode provides load balancing across all the available, active, paths to a device. At I/O submission time, the least used HBA/controller port combination is used as the preferred path. All StorNext File System I/O in progress at the time is taken into account.

cycle The **cycle** mode rotates I/O to a LUN across all the available, active, paths to it. As each new I/O is submitted, the next path is selected.

rotate The **rotate** mode is the default for configurations where the operating system presents multiple paths to a device.

In this mode, as an I/O is initiated, an HBA controller pair to use for this I/O is selected based on a load balance method calculation.

If an I/O terminates in error, a "time penalty" is assessed against that path, and another "Active" path is used. If there are not any "Active" paths that are not already in the "error penalty" state, then a search for an available "Passive" path will occur, possibly triggering an Automatic Volume Transfer to occur in the Raid Controller.

static The "default" mode for all disks other than Dual Raid controller configurations that are operating in Active/Active mode with AVT enabled.

As disks (or LUNs) are recognized at mount time, they are statically associated with an HBA in rotation.

i.e. given 2 HBA's, and for disks/LUNs:

```
disk 0 -> HBA 0
disk 1 -> HBA 1
disk 2 -> HBA 0
disk 3 -> HBA 1

and so on...
```

sticky In this mode, the path to use for an I/O is based on the identity of the target file. This mode will better utilize the controller cache, but will not take advantage of multiple paths for a single file.

The current mode employed by a stripe group can be viewed via the "cvadmin" command "show long", and modified via the "cvadmin" command "multipath".

Permanent modifications may be made by incorporating a "MultiPathMethod" configuration statement in the configuration file for a stripe group.

In the case of an I/O error, that HBA is assessed an "error penalty", and will not be used for a period of time, after which another attempt to use it will occur.

The first "hard" failure of an HBA often results in a fairly long time-out period (anywhere from 30 seconds to a couple of minutes).

With most HBA's, once a "hard" failure (e.g. unplugged cable) has been recognized, the HBA immediately returns failure status without a time-out, minimizing the impact of attempting to re-use the HBA periodically after a failure. If the link is restored, most HBA's will return to operational state on the next I/O request.

paths Display the StorNext disk volumes visible to the local system. The display is grouped by *<controller>* identity, and will indicate the "Active" or "Passive" nature of the path if the Raid Con-

troller has been recognized as configured in Active/Active mode with AVAT enabled.

proxy [**long**]
Display Disk Proxy servers and optionally display the disks they serve for this file system.

proxy who *hostname*
The "who" option displays all proxy connections for the specified host.

qos Display per-stripe group QOS statistics. Per-client QoS statistics are also displayed under each qos-configured stripe group.

quit This command will disconnect **cvadmin** from the **FSM** and exit.

ras enq *event "detail string"*
Generate an SNFS RAS event. For internal use only.

ras enq *event reporting_FRU violating_FRU "detail string"*
Generate a generic RAS event. For internal use only.

repfl Generate a report that displays the file locks currently held. Note: this command is only intended for debugging purposes by support personnel. In future releases, the format of the report may change or the command may be removed entirely. Running the repfl command will write out a report file and display the output filename.

repof Generate a report that displays all files that are currently open on each StorNext client. Only file inode numbers and stat information are displayed, filenames are not displayed. Running the repof command will write out a report file and display the output filename. In future releases, the format of the report may change.

resetrpl [**clear**]
Repopulate Reverse Path Lookup (RPL) information. The optional *clear* argument causes existing RPL data to be cleared before starting repopulation. Note: **resetrpl** is only available when cvadmin is invoked with the **-x** option. Running **resetrpl** may significantly delay FSM activation. This command is not intended for general use. Only run **resetrpl** when recommended by Technical Support.

restartd *daemon* [**once**]
Restart the *daemon* process. For internal use only.

select [*file_system_name*|*N*]
Select an active FSM to view and modify. If no argument is specified, a numbered list of FSMs and running utilities will be displayed. If there is only one active file system in the list, it will automatically be selected.

When a running utility is displayed by the select command, it will show the following information. First the name of the file system is displayed. Following that, in brackets "[]", is the name of the utility that is running. Third, a letter indicating the access type of the operation. The options here are (W) for read-write access, (R) for read-only access and (U) for unique access. Finally, the location and process id of the running utility is displayed.

If *file_system_name* is specified, then **cvadmin** will connect to the current active FSM for that file system. If *N* (a number) is specified, cvadmin will connect to the *N*th FSM in the list. However, only active FSMs may be selected in this form.

show [*groupname*] [**long**]
Display information about the stripe groups associated with the selected file system. If a stripe group name *groupname* is given only that stripe group's information will be given. Omitting the *groupname* argument will display all stripe groups associated with the active file system. Using the **long** modifier will additionally display detailed information about the disk units associated with displayed stripe groups.

start *file_system_name* [**on** *hostname_or_IP_address*]
Start a File System Manager for the file system *file_system_name*. When the command is running on an MDC of an HA cluster, the local FSM is started, and then an attempt is made to start the FSM on the peer MDC as identified by the */usr/cvfs/config/ha_peer* file. When the optional *hostname_or_IP_address* is specified, the FSM is started on that MDC only. The file system's configuration file must be operational and placed in */usr/cvfs/config/<file_system_name>.cfgx* before invoking this command. See **snfs_config**(5) for information on how to create a configuration file for an SNFS file system.

startd *daemon* [**once**]
Start the *daemon* process. For internal use only.

stat Display the general status of the file system. The output will show the number of clients connected to the file system. This count includes any administrative programs, such as **cvadmin**. Also shown are some of the static file-system-wide values such as the block size, number of stripe groups, number of mirrored stripe groups and number of disk devices. The output also shows total blocks and free blocks for the entire file system.

stats *client_IP_address* [**clear**]
Display read/write statistics for the selected file system. This command connects to the host FSMPM who then collects statistics from the file system client. The ten most active files by bytes read and written and by the number of read/write requests are displayed. If clear is specified, zero the stats after printing.

stop *file_system_name* [**on** *hostname_or_IP_address*]
Stop the File System Manager for *file_system_name*. This will shut down the FSM for the specified file system on every MDC. When the optional hostname or IP address is specified, the FSM is stopped on that MDC only. Further operations to the file system will be blocked in clients until an FSM for the file system is activated.

stopd *daemon*
Start the *daemon* process. For internal use only.

up *groupname*
Up the stripe group *groupname*. This will restore access to the stripe group.

who Query client list for the active file system. The output will show the following information for each client.

SNFS I.D. - Client identifier
Type - Type of connection. The client types are:
FSM - File System Manager(FSM) process
ADM - Administrative(cvadmin) connection
CLI - File system client connection. May be followed by a CLI type character:
S - Disk Proxy Server
C - Disk Proxy Client
H - Disk Proxy Hybrid Client. This is a client that has been configured as a proxy client but is operating as a SAN client.
Location - The clients hostname or IP address
Up Time - The time since the client connection was initiated
License Expires - The date that the current client license will expire

EXAMPLES

Invoke the **cvadmin** command for **FSM** host **cornice**, file system named **default**.

```
spaceghost% cvadmin -H k4 -F snfs1
StorNext File System Administrator
```

```
Enter command(s)
For command help, enter "help" or "?".

List FSS

File System Services (* indicates service is in control of FS):
 1>*snfs1[0]         located on k4:32823 (pid 3988)

Select FSM "snfs1"

 Created           :    Fri Jul 25 16:41:44 2003
 Active Connections:    3
 Fs Block Size     :    4K
 Msg Buffer Size   :    4K
 Disk Devices      :    1
 Stripe Groups     :    1
 Mirror Groups     :    0
 Fs Blocks         :    8959424 (34.18 GB)
 Fs Blocks Free    :    8952568 (34.15 GB) (99%)
```

Show all the stripe groups in the file system;

```
snadmin (snfs1) > show
Show stripe group(s) (File System "snfs1")

Stripe Group 0 [StripeGroup1]  Status:Up,MetaData,Journal
  Total Blocks:8959424 (34.18 GB)  Free:8952568 (34.15 GB) (99%)
  MultiPath Method:Rotate
    Primary  Stripe 0 [StripeGroup1]  Read:Enabled  Write:Enabled
```

Display the **long** version of the **RegularFiles** stripe group;

```
snadmin (snfs1) > show StripeGroup1 long
Show stripe group "StripeGroup1" (File System "snfs1")

Stripe Group 0 [StripeGroup1]  Status:Up,MetaData,Journal
  Total Blocks:8959424 (34.18 GB)  Free:8952568 (34.15 GB) (99%)
  MultiPath Method:Rotate
  Stripe Depth:1  Stripe Breadth:16 blocks (64.00 KB)
  Affinity Set:
  Realtime limit IO/sec:0 (~0 mb/sec) Non-Realtime reserve IO/sec:0
    Committed RTIO/sec:0 Non-RTIO clients:0 Non-RTIO hint IO/sec:0
  Disk stripes:
    Primary  Stripe 0 [StripeGroup1]  Read:Enabled  Write:Enabled
      Node 0 [disk002]
```

Down the stripe group named **stripe1**;

```
snadmin (snfs1) > down stripe1
Down Stripe Group "stripe1" (File System "snfs1")

Stripe Group 0 [stripe1]  Status:Down,MetaData,Journal
  Total Blocks:2222592 (8682 Mb)  Free:2221144 (8676 Mb) (99%)
```

```
  Mirrored Stripes:1  Read Method:Sticky
    Primary  Stripe 0 [stripe1]  Read:Enabled  Write:Enabled
```

Disable reads on the mirrored stripe group **stripe1m**.

```
snadmin (snfs1) > disable stripe1m read
Disable Stripe Group "stripe1m" (File System "snfs1")

Stripe Group 0 [stripe1]  Status:Down,MetaData,Journal
  Total Blocks:2222592 (8682 Mb)  Free:2221144 (8676 Mb) (99%)
  Mirrored Stripes:1  Read Method:Sticky
    Primary  Stripe 0 [stripe1]  Read:Enabled  Write:Enabled
```

FILES

/usr/cvfs/config/.cfgx*

SEE ALSO

cvfs(8), **snfs_config**(5), **fsmpm**(8), **fsm**(8), **mount_cvfs**(8)

NAME

cvaffinity − Set a session affinity type

SYNOPSIS

cvaffinity -s *key filename*

cvaffinity -l *filename*

cvaffinity -d *filename*

cvaffinity -k *key filename*

cvaffinity *filename*

DESCRIPTION

cvaffinity can be used to establish an affinity to a specific stripe group for a session, for a specific file or directory, or list the current affinity for a file. An affinity is created in a stripe group through the file system configuration (see **snfs_config**(5).) It is a name, up to eight (8) characters, describing a special media type. Use **cvadmin**(8) to see what affinity sets are assigned to the configured stripe groups.

Once a stripe group affinity is established for a session, all allocations of files associated with the session will be made on stripe groups that have the specified affinity in its affinity set list. If the affinity does not exist for any of the stripe groups, then the allocation will occur on the non-exclusive data pool. If there is no non-exclusive data pool, an **ENOSPC** is returned.

To turn off a stripe group affinity for a session, use the command without a **−k** option present. This will reset the session to normal.

Only one affinity can be established for a session.

Note - The ability to establish an affinity for a session may be removed in a future release.

Note - Any directories or files created during an affinity session will retain the affinity for the life of the file or directory. This means that if a file was created with an affinity active then the file will always have that affinity. If a directory is created with an affinity active then any files or sub-directories within the directory will inherit the affinity and persistence to the storage that is defined by the affinity type.

On Windows, a session lasts until the machine is rebooted. Once an affinity is set for a session, that affinity will persist until it is explicitly cleared or the machine is rebooted.

OPTIONS

-s *key* *Key* is the Affinity Key to associate with the file or directory and is defined as a the affinity keyword in the stripe group section of the file system configuration. Use the program 'cvadmin' to see the Affinity Keys active in this file system. For files with an Affinity, new blocks allocated to that file are placed on a storage pool with the specified Affinity. For directories with an Affinity new files created in that directory inherit the Affinity from the directory.

-l This option says to just list the affinity for the specified file and exit.

-d This option says to delete the affinity from the specified file or directory, if one exists.

-k *key* This option tells the file system where to place the data file for the remainder of this session. If the Affinity Key is specified, then the file is placed on stripe groups that are specified to support this key. If there is no stripe group with the key specified, then the file is placed in non-exclusive data pools. If there are no non-exclusive data pools, then **ENOSPC** (no space) is returned. Absence of this parameter and the absence of **-s**, **-d**, and **-l** resets the session to normal.

filename

Specifies any file or directory on the targeted file system. When the **-k** option (set session affinity) is specified, or no other option is specified, the *filename* option is used as a **read−only** reference handle in order to access the file system. When the **-s**, **-d**, or **-l** options are used, the *filename* option specifies the file or directory operated on.

EXAMPLES

List the affinity on the file */usr/clips/foo*.

```
rock # cvaffinity -l /usr/clips/foo
```

Set this session to use the stripe group that has the **jmfn8** affinity type. Use the file system mount point as the reference handle.

```
rock # cvaffinity -k jfmn8 /usr/clips
```

Set this file or directory to use the stripe group that has the **jmfn8** affinity type.

```
rock # cvaffinity -s jmfn8 /usr/clips/filename
```

Remove the affinity from the */usr/clips/mydir*, if one is currently assigned.

```
rock # cvaffinity -d /usr/clips/mydir
```

Turn off the stripe group affinity for this session. Again, use the file system mount point as the reference handle.

```
rock # cvaffinity /usr/clips
```

SEE ALSO

snfs_config(5), **cvadmin**(8)

NAME

cvcp − StorNext Copy Utility

SYNOPSIS

cvcp [*options*] *Source Destination*

DESCRIPTION

cvcp provides a high speed, multi-threaded copy mechanism for copying directories and **tar** images onto and off of a StorNext file system. The utility uses IO strategies and multi-threading techniques that exploit the SNFS IO model.

cvcp can work in many modes;

Directory-to-directory copies of regular files.
Directory copy of regular files to a Vtape virtual sub-directory.
Single File-to-File copy.

Tar formatted data stream to a target directory.
Tar formatted data stream to a target Vtape virtual sub-directory.
Single file or directory copy to a tar formatted output stream.

In terms of functionality for regular files, **cvcp** is much like the **tar**(1) utility. However, when copying a directory or **tar** stream to a **Vtape** virtual directory, **cvcp** can rename and renumber the source images as they are being transferred. The files in the *Source* directory must have a decipherable numeric sequence embedded in their names.

The **cvcp** utility was written to provide high performance data movement, therefore, unlike utilities such as rsync, it does not write data to temporary files or manipulate the target files' modification times to allow recovery of partially-copied files when interrupted. Because of this, **cvcp** may leave partially-copied files if interrupted by signals such as SIGINT, SIGTERM, or SIGHUP. Partially-copied target files will be of the same size as source files; however, the data will be only partially copied into them.

OPTIONS

The *Source* parameter determines whether to copy a single file , use a directory scan or to use **stdin** for a **tar** extraction. If *Source* is a dash (-), then the standard input will be interpreted as a **tar** stream. Any other *Source* must be a directory or file name.

Using **cvcp** for directory copies is best accomplished by **cd**'ing to the *Source* directory and using the dot (.) as the *Source*. This has been shown to improve performance since fewer paths are searched in the directory tree scan.

The *Destination* parameter determines the target file, directory, or tar stream. If *Destination* is a dash (-), then all data will be sent to the standard output of the program in a standard **tar** stream. This stream can be directed, using the '>' parameter, to a regular file or to an output device such as a tape. Note that only one of *Source* or *Destination* may be a **tar** stream, not both.

USAGE

-a Archive mode. Preserve the original permissions, owner/group, modification times and links. This is the same as options w, x, y and z.

-A If specified, will **turn off** the pre-allocation feature. This feature looks at the size of the source file and then makes an ALLOCSPACE call to the file system. This pre-allocation is a performance advantage as the file will only contain a single extent. It also promotes file system space savings since files that are dynamically expanded do so in a more coarse manner. Up to 30% savings in physical disk space can be seen using the pre-allocation feature. **NOTE:** Non-SNFS file systems that do not support pre-allocation will turn pre-allocation off when writing. The default is to have the pre-allocation feature **on**.

-b *buffers*

Set the number of IO buffers to *buffers*. The default is two times the number of copy threads started(see the **-t** option). Experimenting with other values between 1 and 2 times the number of copy

threads may yield performance improvements.

-B When specified, this option disables the bulk create optimization. By default, this optimization is used in certain cases to improve performance. In some circumstances, the use of bulk create can cause cvcp to return errors if the destination file system is StorNext and the FSM process exits ungracefully while a copy is in progress. The use of the **-B** option avoids this potentiality at the cost of performance. The effect on performance will depend on whether bulk create is being disabled for other reasons as well as the size of the files with the impact being more observable when small files are copied.

-d Changes directory-to-directory mode to work more like **cp -R**. Without **-d**, **cvcp** copies the files and sub-directories under *Source* to the *Destination* directory. With **-d**, **cvcp** first creates a sub-directory called *Source* in the *Destination* directory, then copies the files and sub-directories under *Source* to that new sub-directory.

-k *buffer_size*
Set the IO buffer size to *buffer_size* bytes. The default buffer size is 4MB.

-l If set, when in directory to directory mode, follow symbolic links instead of copying the symbolic link.

-n If set, do not recurse into any sub-directories.

-p *source_prefix*
If set, only copy files whose beginning file name characters match *source_prefix*. The matching test only checks starting at character one.

-s The **−s** option forces allocations to line up on the beginning block modulus of the stripe group. This can help performance in situations where the I/O size perfectly spans the width of the stripe group's disks.

-t *num_threads*
Set the number of copy threads to *num_threads*. The default is 4 copy threads. This option may have a significant impact on speed and resource consumption. The total copy buffer pool size is calculated by multiplying the number of buffers(**-b**) by the buffer size(**-k**). Experimenting with the **-t** option along with the **-b** and **-k** options are encouraged.

-u Update only. If set, copies only when the source file is newer than the destination file or the destination file does not exist. Note that file access times have a granularity of only one second, so it is possible for a newer source file to not be copied over an older destination file even though **-u** is used. **-u** cannot be used with tar files.

-v Be verbose about the files being copied. May be specified twice for extreme verbosity.

-w If set, when in file to file mode, copy a symbolic link instead of following the link.

-x If set, ignore **umask**(1) and retain original permissions from the source file. If the super-user, set sticky and setuid/gid bits as well.

-y If set, preserve ownership and group information if possible.

-z If set, retain original modification times.

EXAMPLES

Copy directory *abc* and its sub-directories to directory */usr/clips/foo*. This copy will use the default number of copy threads and buffers. The total buffer pool size will total 32MB (8 buffers @ 4MB each).

Retain all permissions and ownerships. Show all files being copied.

```
rock% cvcp -vxy abc /usr/clips/foo
```

Copy the same directory the same way, but only those files that start with **mumblypeg**.

```
rock# cvcp -vxy -p mumblypeg abc /usr/clips/foo
```

Copy a single file *def* to the directory */usr/clips/foo/*

```
rock# cvcp def /usr/clips/foo
```

Copy from a **DLT** tar tape into */usr/clips/testdump*.

```
mt -f /dev/dlt rewind
rock% cvcp - /usr/clips/testdump </dev/dlt
```

Copy a file sequence in the current directory prefixed with **secta**. Place the files into the **Vtape** */usr/clips/n8 yuv* sub-directory. Use the verbose option.

```
rock% cvcp -v -p secta . /usr/clips/n8/yuv
```

Do the same thing but from a tar file.

```
rock% cvcp -p secta - /usr/clips/n8/yuv < /usr/clips/pic.tar
```

Copy directory */usr/clips/pictures* to a **tar** file named */usr/clips/pic.tar*

```
rock# cd /usr/clips/pictures
rock# cvcp . - > /usr/clips/pic.tar
```

Copy the file **HugeFile** to a DLT device as a **tar** stream.

```
rock# mt -f /dev/dlt rewind
rock# cvcp HugeFile - >/dev/dlt
```

CVCP TUNING

cvcp can be tuned to improve performance and resource utilization. By adjusting the **-t**, **-k** and **-b** options cvcp can be optimized for any number of different environments.

-t *num_threads*

Increasing the number of copy threads will increase the number of concurrent copies. This option is useful when copying large directory structures. Single file copies are not affected by the number of copy threads.

-b *buffers*

The number of copy buffer should be set to a number between 1 and 3 times the number of copy threads. Increasing the number of copy buffers increases the amount of work that is queued up waiting for an available copy thread, but also increases resource consumption.

-k *buffer_size*

The size of the copy buffer may be tuned to fit the I/O characteristics of a copy. If files smaller than 4MB are being copied performance may be improved by reducing the size of copy buffers to more closely match the source file sizes.

NOTE: It is important to ensure that the resource consumption of **cvcp** is tuned to minimize the effects of system memory pressure. On systems with limited available physical memory, performance may be increased by reducing the resource consumption of **cvcp**.

SEE ALSO

cvfs(8) **tar**(1)

NAME

cvdb − StorNext Client File System Debugger

SYNOPSIS

cvdb [*options*]

DESCRIPTION

cvdb provides a mechanism for developers and system administrators to extract debugging information from the *StorNext File System* (*SNFS*) client filesystem. It can be used by system administrators to change the level of system logging that the client filesystem performs. There is also a switch to retrieve various statistics.

USAGE

cvdb is a multi-purpose debugging tool, performing a variety of functions. A rich set of options provide the user with control over various debug and logging functions. The main features of **cvdb** are as follows:

Control debug logging.
Control level and verbosity of *syslog* **logging.**
Retrieve statistics.

OPTIONS

-G unix=*unixfile* **core=***corefile* [**ptrsize=**{**32**|**64**}]
Extract the debug log from a crashdump. The **ptrsize** keyword is optional, and defaults to the pointer size of the machine. Note: the **-G** option is not available on all platforms.

−g Retrieve the debug log from a running system. The log pointers are reset after this command, so that the next invocation of **cvdb -g** will retrieve new information from the buffer.

−C Continuously snap the trace. (Only useful with the **-g** option.)

−S *stopfile*
Stop snapping the trace when the file *stopfile* appears. (Only useful when also using the **-g** and **-C** options.)

-D *msec*
Delay *msec* milliseconds between trace snaps. The default is 1000 msec or one second. (Only useful when also using the **-C** and **-g** options.)

−F Save the trace output to files named *cvdbout.000000*, *cvdbout.000001*, etc. instead of writing to standard output. These files will appear in the current working directory. (Only useful when also using the **-C** and **-g** options.)

−n *cnt* After writing *cnt* files, overwrite the cvdbout out files starting with *cvdbout.000000*. This will essentially "wrap" the trace output.

−N *name*
Use *name* instead of **cvdbout** for the cvdb output files. (Only useful when also using the **-C**, **-g**, and **-F** options.)

−d Disable debug logging. This is the initial (start-up) default.

−e Enable debug logging. Disabled by default. Note: care should be taken when enabling logging in a production environment as this can significantly reduce file system performance.

-m modules=*bitvector* **logmask=***bitvector*
Specify the trace points for a given module or modules.

−l List the current trace points and their mask values.

-L List the available trace/debug points.

-s syslog={**none**|**notice**|**info**|**debug**}
Set the *syslog* logging value. The default at mount time is **notice**. See **mount_cvfs**(8) for more information.

-R size=[*nbytes*[**k**|**m**|**g**]]
Resize the the debug log. By default, the size of the log is 4MB. The minimum allowed size is 32768 bytes.

-p Get profile information. (Windows only.)

-P Toggle enabling/disabling of performance monitoring. (Windows only.)

-Q Set QOS callback failure test mode. (Windows only.)

-v Be verbose about the operations.

-i Print various statistics about the directory cache. If enabled and configured, the directory cache contains a number of buffers of directory contents. This cache is shared by all mounted StorNext file systems. Without **-v**, the following are printed:

The number of directory buffers currently cached and the maximum number allowed.

The number of times a buffer has been "hit" in the cache.

The number of times a cache search missed and required an RPC to the MDC.

The number of times a read of the directory re-used the LAST buffer that was used on the previous read of the same directory (similar to a cache hit but doesn't probe the cache).

The number of times a read of a directory specified the EOF offset.

The number of times the directory cache for a specific directory was invalidated. For example, if the directory contents changed after it was read and a subsequent read directory was done thereby causing the invalidation.

If **-v** is also specified, **-i** displays more statistics. Note that there are 2 hashes in the directory cache: one for all buffers and one by directory and file system.

The number of entries in the hash used to find dir cache buffers.

The # of searches using the directory cache buffer hash.

The total # of probes searching the directory cache for buffers. This can be larger than searches in the hash since multiple buffers may hit the same hash bucket.

The maximum probes after hitting a particular hash bucket (for buffers).

The maximum probes in the hash by directory and file system.

-b Print various statistics about each buffer cache. The only other option that can be used with this is **-v**. There are buffer caches per **cachebufsize**, see **mount_cvfs**(8). For each buffer cache, the following is printed:

# of mounted file systems using this buffer cache

# of buffers and total memory used

# of cache hits (and percentage)

# of cache misses (and percentage)

# of checks for write throttling to prevent over use by one file system. Write throttles only occur when more than 1 file system is using the cache.

# of times writes were throttled

If the **-v** option is also used with **-b**, the following additional statistics are printed for each buffer cache:

buffercachecap, see **mount_cvfs**(8)

buffercachewant (internal, means thread is waiting for a buffer)

bufhashsize (internal, # of entries in hash used to search buffers)

bcdirtycnt (internal, # of buffers with "dirty" data queued in cache)

dirty_ndone (internal, bcdirtycnt + buffers being written)

flusheractive (internal, flag indicating buffer flusher is active)

deferredflush (internal, # of buffers deferred after files are closed)

dirtywaiters (internal, # of threads waiting due to throttling)

rsvd max (internal, maximum amount of reserved space seen)

non-zero rsvd min (internal, minimum amount of reserved space seen > 0)

successful rsvd requests (internal, # of times reserved space was needed)

failed rsvd requests (internal, # of times reserved space not available)

-B Print buffer cache statistics using a curses based display that refreshes every second. Statistics are maintained separately for reads and writes, for each cache segment, and each mount point. Statistics labeled **Cumulative** are those representing the totals since the command was invoked or since the last reset. Those labeled **Current** represent the change in the last one second, roughly corresponding to the display refresh interval.

Two keystrokes are interactively recognized on systems supporting curses. A **q**, quit, will cause the display to terminate. An **r**, reset, will reset the cumulative counters to zeros.

The **-B** option is intended to be used to to analyze performance of the buffer cache with various applications, I/O subsystems, and various configuration parameters.

The refreshing display is supported on clients that have a curses capability. Other clients will produce a line oriented output with similar content.

A deadman timer will terminate the display after 30 seconds with no file systems mounted. This is to avoid hanging during file system shutdown.

-x Print distributed LAN proxy client and server statistics. The only other options that can be used with this are **-X** and **-f**. The proxy statistics are collected at both the client and server ends of each proxy connection. The client will have a connection entry for each path to a proxy server for each proxy client file system. A proxy server will have a connection entry for each path to each client which has the file sytem mounted.

Note: The distributed LAN proxy options are only available on platforms which support the distributed LAN client or server.

The following information is displayed for each proxy connection:

Client/Server System ID This IP address identifies the remote host.

Client IP Addr The IP address of the Client side of the connection.

Server IP Addr The IP address of the Server side of the connection.

Read Bytes/Sec Measured recent read performance of the connection.

Write Bytes/Sec Measured recent write performance of the connection.

FS Read Bytes/Sec Measured recent read performance for all connections for this file system.

FS Write Bytes/Sec Measured recent write performance for all connections for this file system.

Queued I/O Outstanding I/O (backlog) for this connection. The backlog is meaningful for client side connections only.

-X *option*

Dump statistics for each path in comma separated value (CSV) format. (Only useful with the **-x** option.) The following *options* are available:

1 Dump remote endpoint IP address and backlog in bytes. This option is only relevant for client mounts.

2 Dump remote endpoint IP address and read bytes per second.

3 Dump remote endpoint IP address and write bytes per second.

-f *fsname*

Specifies the file system name associated with an action option. For proxy statistics(**-x** option), filter on connections for the given file system. This parameter is required for the read/write statistics (**-y** or **-Y**) option.

-y, **-Y** Display the read/write statistics for the file system specified with the **-f** option (required). If **-Y**, also clear the stats.

-z **NOTE: Not intended for general use. Only use when recommended by Quantum Support as a performance measuring tool. Setting this option could result in data corruption, loss of data, or unintended exposure of uninitialized disk data!!**

This option turns on the DEVNULL capability and only applies to linux clients. Once enabled this option will continue to be enabled until reboot. When this option is enabled, all I/O for files with the DEVNULL affinity is not performed at the lowest level. The code paths are all executed including the allocation of space, but the data is not read or written to disk. Instead, writes simply complete the I/O and return and reads zero out the "read" buffer and complete the I/O.

Files without the DEVNULL affinity are unaffected by this setting.

Before attempting to use this capability, make sure no one is already using DEVNULL as an affinity on any file system the client has access too. Then, modify the file system configuration file, **snfs_config(5)**, for the file system under test to contain DEVNULL as an affinity on at least one stripe group that can hold data. Next, restart the fsm. Then, use **cvmkdir(1)** with -k DEVNULL to create a directory to hold files to be used for this test. Finally, enable the feature with this option, **cvdb -z**.

DEBUG LOGGING

Developing code that runs in the kernel is very different than programming a user-level application. To assist plugin developers who may not be familiar with the kernel environment, SNFS provides a simple "tracepoint like" debugging mechanism. This mechanism allows developers to use printf-like statements to assist in debugging their code.

To use the debugging facility, each module (typically a ".c" file), must declare a structure of type *ModuleLogInfo_t*. This structure is defined in *include/sys/irix/log.h*. This structure defines the name of the module as it will appear in the debug statements, and indicates the debug level that is in effect for that module.

```
ModuleLogInfo_t  MyLogModule =
        { "mymodule_name", DEBUGLOG_NONE};
```

To use the facility, each module must call the *AddLogModule()* routine. This is typically done when the module is first initialized (in the xxx_start() routine for a plugin). When logging is no longer required (as when the plugin is unloaded), the module should call *RemoveLogModule()* to free up the system resources.

Logging is not enabled by default. To enable logging at any time, specify the **enable** flag (**-e**)

```
shrubbery %h: cvdb -e
```

To disable logging, specify the **disable** flag.

```
shrubbery %h: cvdb -d -v
Disabling debug logging
```

The level of debugging is controlled via a 64-bit mask. This allows each module to have 64 different, discrete trace/log points. If the log point is enabled when the code is executed, the trace point will be dumped to the circular buffer.

A complete listing of all the pre-defined trace points can be obtained via:

```
rabbit %h:   cvdb -L
Trace points:
    cvENTRY      0x0001
    cvEXIT       0x0002
    cvINFO       0x0004
    cvNOTE       0x0008
    cvWARN       0x0010
    cvMEM        0x0020
    cvNUKE       0x0040
    cvLOOKUP     0x0080
    cvGATE       0x0100
    cvSTRAT      0x0200
    cvRWCVP      0x0400
```

These trace points would then be used to control the verbosity of logging. Using the example above, if the cvEXIT and cvINFO trace points are enabled, then only those trace points would be dumped to the log.

To enable the trace points, the first step is to determine the ID of the module. This is done with the **list** command.

```
shrubbery %h: cvdb -l
Module 'cvfs_memalloc'  module 0x000001 logmask 0x0000000000000000
Module 'cvfs_fsmsubr'   module 0x000002 logmask 0x0000000000000000
Module 'cvfs_fsmdir'    module 0x000004 logmask 0x0000000000000000
Module 'cvfs_fsmvfsops' module 0x000008 logmask 0x0000000000000000
Module 'cvfs_fsmvnops'  module 0x000010 logmask 0x0000000000000000
Module 'cvfs_sockio'    module 0x000020 logmask 0x0000000000000000
Module 'cvfs_subr'      module 0x000040 logmask 0x0000000000000000
Module 'cvfs_vfsops'    module 0x000080 logmask 0x0000000000000000
Module 'cvfs_vnops'     module 0x000100 logmask 0x0000000000000000
Module 'cvfs_dmon'      module 0x000200 logmask 0x0000000000000000
Module 'cvfs_rwlock'    module 0x000400 logmask 0x0000000000000000
Module 'cvfs_rw'        module 0x000800 logmask 0x0000000000000000
Module 'cvfs_fsmtokops' module 0x001000 logmask 0x0000000000000000
Module 'cvfs_extent'    module 0x002000 logmask 0x0000000000000000
Module 'cvfs_plugin'    module 0x004000 logmask 0x0000000000000000
Module 'cvfs_disk'      module 0x008000 logmask 0x0000000000000000
```

To enable the cvENTRY and cvEXIT trace points of the plugin, rwlock, vnops, and memalloc routines, use the **modules** command.

```
shrubbery %h: cvdb -m modules=0x4501 logmask=3
```

The bit masks are additive, not replacement. This means that modules and trace points you do not specify are unaffected. To turn on all debugging on all trace points, specify minus one (-1).

```
shrubbery %h: cvdb -m modules=-1 logmask=-1
```

Once the module has been added to the system, log messages will then be dumped into a 1 meg circular buffer. Modules may find it convenient to declare a macro in each file so that the form of log messages will

be the same in each file. For example, the following macro definition and following log function would dump information to the log buffer if the trace point is enabled:

```
#define LOGINFO         (&MyLogModule)

LogMsg(LOGINFO, cvEXIT, "Plugin read return error %d bytes %llx",
            error, num_bytes);
```

To extract the messages from the log on a running system, use the **-g** option of **cvdb**.

To extract the messages from the log from a crashdump, you must use the **-G** option, and specify the name of the *unix* file and the name of the memory core file.

```
cvdb -G unix=unix.21 core=vmcore.21.comp > /tmp/logbuf
```

Note: The **-G** option is not available on all platforms and the location and names of the "unix" and "core" files will vary.

SYSLOG

The StorNext client file system can log certain events so that they show up on the system console and in the system log, */var/adm/SYSLOG*. The verbosity of messages can be controlled via the *syslog* parameter. The default is to log all messages. See **syslogd**(1M) for more information of setting up system logging.

There are four log levels: *none, notice, info,* and *debug* . The levels are prioritized so that the **debug** level is the most verbose; setting the level to **none** will turn off logging completely. The events that are logged at each level are as follows:

notice

- reconnection with the FSM.

info

- all **notice** messages, plus
- socket daemon termination

debug

- Currently unused

The log level is set to *debug* by default.

BUSY UNMOUNTS

Occasionally, it will be impossible to unmount the SNFS file system even when it appears that all processes are no longer using the file system. The problem is that the processes are most likely in the *zombie* state; while they do not show up in **ps**, then can be found using **icrash**. Usually, these processes are waiting on a lock in the SNFS file system, or waiting for a response from the FSM.

DEBUG LOGGING EXAMPLES

To enable logging:

cvdb -e

To disable logging:

cvdb -d

To retrieve (get) log information on a running system:

cvdb -g > cvdbout

To continuously retrieve log information on a running system, snapping the trace once per second:

cvdb -g -C > cvdbout

To continuously retrieve log information on a running system, snapping the trace once every two seconds and stopping when the file named **STOP** appears:

cvdb -g -C -D 2000 -S STOP > cvdbout

To continuously retrieve log information on a running system, and save the output to files named *cvdbout.000000*, *cvdbout.0000001*, etc. and wrapping after 100 files have been written:

cvdb -g -C -F -n 100

To continuously snap traces named */tmp/snap.000000*, */tmp/snap.000001*, etc.:

cvdb -g -C -F -N /tmp/snap

To retrieve log information from a crashdump:

cvdb -G unix=*name_of_unix_file* **core=***name_of_core_file*

To list all the modules and their enabled trace points:

cvdb -l

To set trace points in individual modules:

cvdb -m modules=*bitmask_of_modules* **logmask=***tracepoints***.**

To resize the log to 12 megabytes:

cvdb -R 12m

To dump out all the pre-defined trace points:

cvdb -L

SEE ALSO

syslogd(1M), **umount**(8), **cvdbset**(8)

NAME

cvdbset − A program to control cvdb tracing.

SYNOPSIS

cvdbset [*options*]

DESCRIPTION

cvdbset is a tool for system administrators to control **cvdb**(8) tracing information from the *StorNext File System* (SNFS) client file system.

The level of tracing emitted can be controlled on a per module basis. The set of modules for which tracing is enabled is called the trace set. The level of tracing can be refined further by specifying a set of tracepoints (such as entry/exit points). The set of enabled tracepoints is called the logmask.

Warning: enabling tracing can have a substantial performance impact.

cvdbset can be used to:

List all the current client modules in the trace set.

Add all modules to the trace set.

Define the trace set.

Add selected modules to trace set

Remove selected modules from the trace set

Set the logmask for a set of modules in the trace set.

Resize the logging buffer

Start/stop continuous tracing

Disable tracing

OPTIONS

no options

Display the whether tracing is enabled/disabled, the size of the logging buffer, the modules in the trace set, and their corresponding logmasks.

all Enable tracing of all modules. Once cvdbset with a list of modules is invoked, some modules are turned off. **cvdbset all** sets all modules for tracing. When used with **+** or **-**, add or remove all modules.

[**:**]*module1* [**:**]*module2 ...*

When invoked with a list of modules, cvdbset first disables all modules. Then, it enables exactly the given list of modules. To see all modules that can be enabled, use the **cvdbset -l** command/option. If the module name is preceded by a **:**, all modules containing the module name will be affected.

+ [**:**]*module1* [**:**]*module2 ...*

When invoked with a plus sign (+) as the first argument followed by a list of modules, the given list of modules is added to the current trace set. If the module name is preceded by a **:**, all modules containing the module name will be affected.

− [**:**]*module1* [**:**]*module2 ...*

When invoked with a minus sign (-) as the first argument followed by a list of modules, the given list of modules is removed from the current trace set. If the module name is preceded by a **:**, all modules containing the module name will be affected.

-h Display a help message and exit.

-c Enable continuous cvdb tracing. The trace log will be retrieved once per second and placed in files named cvdbout.000001, ...

-d Disable cvdb tracing.

-g Dump the current trace buffer to standard out.

-l Display whether logging is enabled, the buffer size, and the logmask for all modules.

-L Display the list of all available tracepoints for use with the -t option.

-r *mb* Resize the trace buffer to *mb* megabytes.

-t *tracepoint*
For the indicated modules, enable tracing only for the indicated tracepoints. Multiple **-t** options can be supplied. Use the **-L** option to **cvdbset** to see a listing of tracepoints.

EXAMPLES

To see what modules are in the trace set and their logmasks, the command **cvdbset** with no parameters is used. Here is the output from this command at start-up.

```
Debug logging is DISABLED, Bufsize 4194304
Currently set masks:
Module '   proxy_clnt' module 0x0000000000000001   logmask 0xffffffffffffffff
Module '        cvdir' module 0x0000000000000002   logmask 0xffffffffffffffff
Module '       cvdisk' module 0x0000000000000004   logmask 0xffffffffffffffff
Module '         cvnc' module 0x0000000000000008   logmask 0xffffffffffffffff
Module '       cvpath' module 0x0000000000000010   logmask 0xffffffffffffffff
Module '      portmap' module 0x0000000000000020   logmask 0xffffffffffffffff
Module '       cvsock' module 0x0000000000000040   logmask 0xffffffffffffffff
Module '       cvsubr' module 0x0000000000000080   logmask 0xffffffffffffffff
Module '       dmigfs' module 0x0000000000000100   logmask 0xffffffffffffffff
Module '         dmig' module 0x0000000000000200   logmask 0xffffffffffffffff
Module '         dmon' module 0x0000000000000400   logmask 0xffffffffffffffff
Module '       extapi' module 0x0000000000000800   logmask 0xffffffffffffffff
Module '       extent' module 0x0000000000001000   logmask 0xffffffffffffffff
Module '        fsmat' module 0x0000000000002000   logmask 0xffffffffffffffff
Module '       fsmcom' module 0x0000000000004000   logmask 0xffffffffffffffff
Module '      fsmdmig' module 0x0000000000008000   logmask 0xffffffffffffffff
Module '     fsmproxy' module 0x0000000000010000   logmask 0xffffffffffffffff
Module '      fsmrtio' module 0x0000000000020000   logmask 0xffffffffffffffff
Module '     fsmtoken' module 0x0000000000040000   logmask 0xffffffffffffffff
Module '       fsmvfs' module 0x0000000000080000   logmask 0xffffffffffffffff
Module '     fsmvnops' module 0x0000000000100000   logmask 0xffffffffffffffff
Module '     memalloc' module 0x0000000000200000   logmask 0xffffffffffffffff
Module '    proxy_con' module 0x0000000000400000   logmask 0xffffffffffffffff
Module '       quotas' module 0x0000000000800000   logmask 0xffffffffffffffff
Module '        recon' module 0x0000000001000000   logmask 0xffffffffffffffff
Module '         rtio' module 0x0000000002000000   logmask 0xffffffffffffffff
Module '        rwbuf' module 0x0000000004000000   logmask 0xffffffffffffffff
Module '      rwproxy' module 0x0000000008000000   logmask 0xffffffffffffffff
Module '       rwlock' module 0x0000000010000000   logmask 0xffffffffffffffff
Module '           rw' module 0x0000000020000000   logmask 0xffffffffffffffff
Module 'slidingbucket' module 0x0000000040000000   logmask 0xffffffffffffffff
Module '    sockinput' module 0x0000000080000000   logmask 0xffffffffffffffff
Module '    proxy_srv' module 0x0000000100000000   logmask 0xffffffffffffffff
Module '   proxy_subr' module 0x0000000200000000   logmask 0xffffffffffffffff
Module '       vfsops' module 0x0000000400000000   logmask 0xffffffffffffffff
Module '        vnops' module 0x0000000800000000   logmask 0xffffffffffffffff
Module '         perf' module 0x0000001000000000   logmask 0xffffffffffffffff
Module '     md_cvdir' module 0x0000002000000000   logmask 0xffffffffffffffff
Module '    md_cvsock' module 0x0000004000000000   logmask 0xffffffffffffffff
```

```
Module '    md_cvsubr' module 0x0000008000000000   logmask 0xffffffffffffffff
Module '      md_dmon' module 0x0000010000000000   logmask 0xffffffffffffffff
Module '    md_fsmcom' module 0x0000020000000000   logmask 0xffffffffffffffff
Module '  md_memalloc' module 0x0000040000000000   logmask 0xffffffffffffffff
Module '    md_rwlock' module 0x0000080000000000   logmask 0xffffffffffffffff
Module '        md_rw' module 0x0000100000000000   logmask 0xffffffffffffffff
Module '   md_rwproxy' module 0x0000200000000000   logmask 0xffffffffffffffff
Module '  md_socksubr' module 0x0000400000000000   logmask 0xffffffffffffffff
Module '    md_vfsops' module 0x0000800000000000   logmask 0xffffffffffffffff
Module '     md_vnops' module 0x0001000000000000   logmask 0xffffffffffffffff
Module '    sh_cvsubr' module 0x0002000000000000   logmask 0xffffffffffffffff
Module '    sh_fsmcom' module 0x0004000000000000   logmask 0xffffffffffffffff
Module ' sh_sockinput' module 0x0008000000000000   logmask 0xffffffffffffffff
Module '     sh_vnops' module 0x0010000000000000   logmask 0xffffffffffffffff
```

To enable tracing for selected modules:

cvdbset md_vnops rw fsmvnops fsmtoken fsmdmig

This enables tracing for only these five modules and prints the output:

```
Setting md_vnops.
Setting rw.
Setting fsmvnops.
Setting fsmtoken.
Setting fsmdmig.
cvdb -m modules=0x0001000020148000 logmask=0xffffffffffffffff
```

If an argument is preceded by a colon (:), then any module whose name contains the argument as a substring is included.

To enable the md_vnops tracing module and all of the proxy-related modules:

cvdbset md_vnops :proxy

This displays the following output:

```
Setting md_vnops.
Setting proxy_clnt.
Setting fsmproxy.
Setting proxy_con.
Setting rwproxy.
Setting proxy_srv.
Setting proxy_subr.
Setting md_rwproxy.
cvdb -m modules=0x0001200308410001 logmask=0xffffffffffffffff
```

To add rwbuf and vnops modules to the current tracing set with the cvENTRY and cvEXIT tracepoints enabled:

cvdbset -t cvENTRY -t cvEXIT + rwbuf vnops

This displays the following output:

```
Adding rwbuf.
Adding vnops.
cvdb -m modules=0x0000000804000000 logmask=0x0000000000000003
```

To remove rwbuf and vnops from the current tracing set:

cvdbset - rwbuf vnops

This displays the following output:

```
Clearing rwbuf.
Clearing vnops.
cvdb -m modules=0x0000000804000000 logmask=0x0000000000000000
```

The special module **all** can be used with both the + and - options to add/remove all modules from the trace.

After tracing is enabled, **cvdbset -g** can be used to retrieve the trace. When desired, **cvdbset -d** can be used to disable tracing.

Various **cvdb**(8) command/options can be used for even finer control of tracing. See **cvdb**(8) for more details.

I/O PERFORMANCE ANALYSIS

The 'perf' trace module is very useful to analyze I/O performance, for example:

cvdbset perf

Then **cvdbset -g** will display info like this:

```
PERF: Device Write 41 MB/s IOs 2 exts 1 offs 0x0 len 0x400000 mics 95589 ino
PERF: VFS Write EofDmaAlgn 41 MB/s offs 0x0 len 0x400000 mics 95618 ino 0x5
```

The 'PERF: Device' trace shows throughput measured for the device I/O. It also shows the number of I/O's that it was broken into and number of extents (sequence of consecutive filesystem blocks).

The 'PERF: VFS' trace shows throughput measured for the read or write system call and significant aspects of the I/O including:

```
Dma  - DMA
Buf  - Buffered
Eof  - File extended
Algn - Well formed DMA I/O
Shr  - File is shared by another client
Rt   - File is real time
Zr   - Hole in file was zeroed
```

Both traces also report file offset, I/O size, latency (mics), and inode number.

Sample use cases:

1) Verify I/O properties are as expected.

The VFS trace can be used to ensure that the displayed properties are consistent with expectations, for example, well formed, buffered vs. DMA, shared/non-shared, or I/O size. If a small I/O is being performed DMA then performance will be poor. If DMA I/O is not well formed then it requires an extra data copy and may even be broken into small chunks. Zeroing holes in files has a performance impact.

2) Determine if metadata operations are impacting performance.

If VFS throughput is inconsistent or significantly less than Device throughput then it may be caused by metadata operations. In that case it would be useful to display 'fsmtoken', 'fsmvnops', and 'fsmdmig' traces in addition to 'perf'.

3) Identify disk performance issues.

If Device throughput is inconsistent or less than expected then it may indicate a slow disk in a stripe group or that RAID tuning is necessary.

4) Identify file fragmentation.

If the extent count 'exts' is high then it may indicate a fragmentation problem. This causes the device I/O's to broken into smaller chunks which can significantly impact throughput.

5) Identify read/modify/write condition.

If buffered VFS writes are causing Device reads then it may be beneficial to match I/O request size to a multiple of the 'cachebufsize' (default 64KB, see **mount_cvfs**(8)). Another way to avoid this is by truncating the file before writing.

SEE ALSO

cvdb(8)

NAME

/etc/init.d/cvfs − Initialization script for StorNext File System components (Unix only)

SYNOPSIS

service cvfs {**start**|**stop**|**restart**|**fullstop**}

DESCRIPTION

The StorNext File System (SNFS) can be controlled by the system **init**(8) mechanism. For more information on the init.d services reference the **init**(8) and **chkconfig**(8) man pages.

This initialization script responds to the normal **start**, **stop** and **restart** commands. This allows the StorNext File System to be started and stopped at any time, and the **fullstop** option unloads CVFS kernel modules.

Note: Take care not to trigger an HA reset action on a server when it has been configured for High Availability (HA). For more information about HA reference the **snhamgr**(8) man page.

See the **init**(8) or **chkconfig**(8) man pages for additional startup and shutdown options.

On Solaris clients, StorNext File System Services have been integrated into the Solaris service management facility, **smf**. The **cvfs** script is located in */usr/cvfs/bin*.

Starting SNFS Services

The **service cvfs start** command should be executed only after local file systems are mounted and the network is initialized. The following steps are executed:

- CVFS kernel modules are loaded.
- Base SNFS services are started. This includes the SNFS portmapper service and any needed HBA drivers.
- Any SNFS metadata servers included in the **fsmlist**(4) file are started automatically.
- SNFS file systems included in the systems **fstab**(5) or **vfstab**(4) file are mounted.
- StorNext Storage Manager (SNSM) components are started if they are installed.

Stopping SNFS Services

The **service cvfs stop** command should be executed before the network is brought down and before the local filesystems are unmounted. The following steps are executed:

- SNSM components are stopped.
- All SNFS file systems are unmounted.
- All SNFS server components are shut down.

The kernel modules are not unloaded unless the **fullstop** option is used.

FILES

/etc/init.d/cvfs

SEE ALSO

mount(8), **snhamgr**(8), **fsmlist**(4), **vfstab**(4), **fstab**(5), **init.d**(7), **chkconfig**(8)

NAME

cvfsck − Check and Recover a StorNext File System

SYNOPSIS

cvfsck [*options*] [*FsName*] [*FsPath*]

DESCRIPTION

The **cvfsck** program can check and repair StorNext file system metadata corruption due to a system crash, bad disk or other catastrophic failure. This program also has the ability to list all of the existing files and their pertinent statistics, such as inode number, size, file type and location in the file system.

If the file system is active, it may only be checked in a *Read-only* mode. In this mode, modifications are noted, but not committed. The **−n** option may be used to perform a read only check as well.

The file system checking program must be run on the machine where the File System Services are running.

cvfsck reads the configuration file and compares the configuration against a saved copy that is stored in the metadata. It is important that the configuration file (see **snfs_config**(5)) accurately reflects the current state of the file system. If you need to change a parameter in a current configuration, save a copy of the configuration first or make sure */usr/cvfs/data/*FsName*/config_history/*.cfgx.*<TIMESTAMP> already has a recent copy. Once the configuration file has been validated with the metadata version, if the configuration file is different and **cvfsck** is not in read-only mode, the new configuration is stored in the metadata and the previous version is written to */usr/cvfs/data/*FsName*/config_history/*.cfgx.*<TIMESTAMP>.

After validating the configuration file, **cvfsck** reads all of the metadata, checks it for any inconsistencies, and the file system is repaired to resolve these issues or if in read-only mode, any problems are reported.

By default, modifications are first written to a file in the local file system instead of the SNFS disks. All fixes are made to this local file, including journal replay. When all problems are fixed and the run is complete, the user is asked if the changes should be copied to the actual SNFS disks. If the user responds "y", the changes are made. An answer of "n" indicates that the file system should not be changed. This allows the user to easily gauge the extent of problems with a file system before commiting to the repair. The user can overide this behavior with the **−n**, **−y**, and **-−T** options.

OPTIONS

-4 If there are files with unconverted or partially converted xattr chains that contain xattrs greater than 4KiB in length, destroy the oversized xattrs so conversion can continue. Use with caution.

-A Scan directories for name collisions that would occur on a case-insensitive file system.

−a This option can only be used with **−f** and is used to tell **cvfsck** to print totals (all). When used, a line is printed after each stripe group showing how many free space fragments exist for that stripe group. In addition, at the end of the run, this options prints the grand total of free space fragments for all stripe groups.

−c *pathname*
Provide a specific path to a configuration file that is to be used, overriding the implicit location. This option is used when **cvupdatefs** invokes **cvfsck** as a sub-process to insure that the file system meta data is consistent prior to doing a capacity or stripegroup expansion.

−d Internal debug use. This option dumps a significant amount of data to the standard output device.

−e Report statistics for extents in each file. This reporting option enables all the same file statistics that the **-r** flag enables. In addition, the **-e** flag enables statistic reporting for each extent in a file. All extent data is displayed immediately following the parent file's information. See the **-r** flag description for file statistics output. The extent stats are output in the following order; *Extent#, Stripe group, File relative block, Base block, End block* No checking is done. This flag implies **-r** and **-n** flags. No tracing is enabled for this report option.

−E Erase i.e. "scrub" on disk free space. Cvfsck will write zeros over all free space on the disk. It works in conjunction with the **-P** option that reports the last block actually scrubbed in case of a crash during a scrub operation. This is intended for Linux.

−f Report free space fragmentation. Each separate chunk of free allocation blocks is tallied based on the chunk's size. After all free chunks are accounted for, a report is displayed showing the counts for each unique sized free space chunk. Free space fragmentation is reported separately for each stripe group. The free space report is sorted from smallest contiguous allocation chunk to largest. The "Pct." column indicates percentage of the stripe group space the given sized chunks make up. The "(sum)" column indicates what percentage of the total stripe group space is taken up by chunks smaller than, and equal to the given size. The "Chunk Size" gives the chunk's size in file system blocks, and the "Chunk Count" column displays how many instances of this sized chunk are located in this stripe group's free space. For more information on fragmentation see the **snfsdefrag**(1) page. No checking is done. Implies **-n** flag. See also **-a** that is used to get more output.

−F This option causes **cvfsck** to make use of the compressed cache even when the configured value of bufferCacheSize is less than or equal to 1GB. It also sizes the cache to hold all metadata which can dramatically improve performance for aged file systems having large file counts. This option can cause **cvfsck** to use a lot of memory, so it is advisable to first obtain an estimate using the **−q** option.

−g Print journal recovery log. With this flag cvfsck reports contents of the metadata journal. For debugging use only. Implies **-n** flag.

−i Print inode summary report. With this flag cvfsck scans the inode list and reports inode statistics information then exits. This includes a breakdown of the count of inode types, hard links, and size of the largest directory. This is normally reported as part of the 'Building Inode Index Database' phase anyway but with this flag cvfsck exits after printing the inode summary report and skips the rest of the operations. This allows the inode summary report to run pretty fast. Implies **-n** flag.

−G Exit immediately after cvfsck completes on Windows systems. Without this flag the Windows command terminal will wait for a key to be pressed before exiting. This flag has no effect on non-Windows systems.

−j Execute journal recovery and then exit. Running journal recovery will ensure all operations have been committed to disk, and that the metadata state is up to date. It is recommended that cvfsck is run with the **-j** flag before any read-only checks or file system reports are run.

−J Dump raw journal to a file named jrnraw.dat and then exit. For debugging use only.

−K Forces the journal to be cleared and reset. **WARNING:** Resetting the journal may introduce metadata inconsistency. After the journal reset has been completed, run cvfsck to verify and repair any metadata inconsistency. Use this option with extreme caution.

−l This option will log any problems to the system log. **NOTE**: This flag may be deprecated in future releases.

−M Performs simple checks that attempt to determine whether a new metadata dump is needed. If the checks find that a dump is needed, cvfsck will exit with status 1 and print an explanation. If the checks do not find that a dump is needed, cvfsck will exit with status 0. If an error occurs while performing the checks, cvfsck will print an explanation and exit with status 2. This option is useful only on managed file systems. Note: these checks are not exhaustive, and, in some cases, cvfsck will exit with status 0 when a new dump is actually required.

−m *size*

This option is used to specify the amount of memory in bytes to be used for the internal cache used to hold inode information. For larger file systems, this can improve the peformance of **cvfsck**. The 'k', 'm', and 'g' extensions are recognized for this option. For example, **-m 2g** can be used to specify 2GB.

−n This option allows a file system to be checked in a **read-only** mode. Modifications are written to a file in the local file system instead of the SNFS disks. All fixes that would be made if **cvfsck** was run without the **−n** option are made to this local file, including journal replay. When the run is complete, the local file is thrown away. The file system itself is never changed.

−O If cvfsck is run on a file system while the FSM for that file system is active, cvfsck runs in shared mode. This means that it runs in read-only mode and only a small subset of the usual checking is performed. This is because the FSM changing the file system may confuse a full cvfsck and cause problems. The **−O** option causes cvfsck to perform full (read-only) checking anyway. Strange behavior may be observed.

−p *StripeGroupName*
This option provides a method for deleting all files that have blocks allocated on the given stripe group. All files that have at least one data extent on the given stripe group will be deleted, even if they have extents on other stripe groups as well. *WARNING:* Use this option with extreme caution. This option could remove files that the user did not intend to remove, and there are no methods to recover files that have been deleted with this option.

−q This option causes cvfsck to generate and estimate for disk and memory requirements and then exit. Any other options that will get used when performing the actual check should also be specified to improve estimate accuracy. For example, if the intent is to run **cvfsck -m2g -F** *FsName*, then to generate the estimate, run **cvfsck -q -m2g -F** *FsName*

−P Report progress of an Erase operation. This flag enables the writing of a file in */usr/cvfs/debug* of the last block on a given strip group that has been scrubbed. The files are created on a stripe group by stripe group basis as */usr/cvfs/data/cvfsck_*<FsName>*_sg*<StripeGroupOrdinal>. This is intended for Linux use.

−r This report option shows information on file state. Information for each file is output in the following order. *Inode#, Mode, Size, Block count, Extent count, Stripe groups, Affinity, Path* No tracing is enabled for this report option.

−R This option helps repair a file system which had cvmkfs accidentally run on it. First, cvfsck restores file system state which was saved by cvmkfs in */usr/cvfs/debug/*FsName.*cvmkfs*. Then, it continues as usual to fix any other problems it may encounter. The COW layer treats the restoration of saved state the same as any other file system modification. This option is only useful if the accidental cvmkfs is detected before the file system is mounted and changed. Using it at any other time is not advised. If unsure, please contact customer support.

−s *StripeGroupName*
THIS FUNCTIONALITY IS ONLY SUPPORTED ON MANAGED FILE SYSTEMS
Provides a method for restoring data on the given stripe group. After cvfsck completes in this mode all files on the given stripe group will be set to TAPE ONLY. All data blocks on the given stripe group will be gone and subsequent access of these file will trigger a retrieve from tape. *NOTE:* Running this command may result in data loss. Please refer to the StorNext documentation before executing this command.

−T *directory*
This option specifies the directory where all temporary files created by cvfsck will be placed. If this option is omitted all temporary files will be placed in the system's default temporary folder. NOTE: cvfsck does honor the use of TMPDIR/TEMP environment variables.

−v Use verbose reporting methods.

−W This option causes cvfsck to always clean up any orphaned "Wopens" inodes that may have been generated when an earlier metadump restore was performed using an older version of StorNext. Normally, cvfsck will only clean up these inodes if other metadata inconsistencies are detected prior to the orphan inode phase.

−x Report statistics for input to a spread sheet. No checking is done. Implies **-e**,**-r** and **-n** flags. All values are in decimal. Data is comma separated and in this order: *Inode#, Mode, Size, Block Count, Affinity, Path, Extent Count, Extent Number, Stripe group, File Relative Block, Base, End, Depth, Breadth* No tracing is enabled for this report option.

−X (Engineering use only.) Free all inodes in extended attribute chains. Extended attributes present in these inodes will be deleted.

−y Fix any problems found in the file system without prompting for confirmation. The default behavior is to display the extent of the changes that will be made and prompt for whether or not to make the changes. The fixes are first made to a file in a file on the local file system (specified by **−T**). When all fixes are complete, they are copied into the actual SNFS disks.

−Y Same behavior as **-y** except that the changes are not buffered through the local file system as they are by default.

FsName

Specifies a file system to check. Otherwise all file systems on this system will be displayed for selection.

FsPath Forces the program to use *FsPath/data* instead of */usr/cvfs/data* to locate the file systems.

EXIT VALUES

cvfsck will return one of the following condition codes upon exit.

```
0 - No error, no changes made to the file system
1 - Inconsistencies encountered, changes have been
    made to the file system
  - A read-only cvfsck will return 1 if journal replay is needed.
  - A read-only cvfsck will only print the needed fixes and not
    commit changes to the metadata.
2 - Fatal error, cvfsck run aborted
3 - Name collisions found, no repair needed
4 - Name collisions found, file system successfully repaired
```

NOTES

It is strongly recommended that the user should not run cvfsck with the **−y** or **−Y** options until the extent of any metadata corruption is known.

Unless running **cvfsck** in read-only mode, the file system should be unmounted from all machines before a check is performed. In the event that repairs are required and **cvfsck** modifies metadata, it will report this at the end of the check. If this occurs, any machines that continue to mount the file system should be rebooted before restarting the file system.

In order to ensure minimum run-time **cvfsck** should be run on an idle FSS server. Extraneous I/O and processor usage will severely impact the performance of **cvfsck**.

CRC checks are now done on all Windows Security descriptors. Windows Security Descriptors with inconsistent CRC's are removed causing affected files to inherit permissions from the parent folder.

Cvfsck limits the number of trace files to 100. It starts removing the oldest trace file if the max number of trace files in */usr/cvfs/data/*FsName*/trace* is exceeded before a new file is created.

NOTE: On large file systems cvfsck may requires 100s of megabytes or more of local system disk space for working files. Please refer to the StorNext documentation to ensure minimum system requirements are met.

FILES

*/usr/cvfs/data/**
*/usr/cvfs/data/*FsName*/config_history/*.cfgx.*<TIMESTAMP>
/usr/cvfs/config/.cfgx*

SEE ALSO

snfs_config(5) **cvmkfile**(1), **cvupdatefs**(8), **cvadmin**(8), **snfsdefrag**(1)

NAME

cvfsd − StorNext File System Daemon

SYNOPSIS

Internal Kernel Thread

DESCRIPTION

Cvfsd is a server daemon that is launched by the *StorNext File System* (*SNFS*) **mount_cvfs**(8) command. It is an internal kernel thread and is used for network communication to the *File System Manager*. Multiple **cvfsd** threads are launched for each SNFS file system. The number of **cvfsd** threads can be modified. See **mount_cvfs**(8) for details.

ENVIRONMENT

Quantum Internal Use Only - only on Solaris.

WATCHER_NODETACH

If set, **cvfsd** will not detach from its parent process. Used start **cvfsd** under the control of a debugger.

WATCHER_NORESTART

If set, **cvfsd** will not be restarted automatically after an unsuccessful exit or crash.

SEE ALSO

cvfs(8), **mount_cvfs**(8)

NAME

cvfsdb − StorNext File System debugging tool

SYNOPSYS

cvfsdb *FsName*

DESCRIPTION

The **cvfsdb** command is a tool for debugging a StorNext file system.

WARNING: Quantum Internal use only. The **cvfsdb** command can easily damage a StorNext file system, and should only be used under the direction of customer support.

OPTIONS

FsName

The file system to debug.

COMMANDS

The **cvfsdb** command is an interactive program, that contains builtin help on commands and usage.

help [*command*]

Display help information. If *command* is omitted, the **help** command will display a list of commands that **cvfsdb** can understand. If *command* is provided, command specific help will be given.

exit, **q**, **quit**

Exit **cvfsdb**.

The output of any command can be redirected using:

command **|** *shell_command*

Redirect the output of *command* to *shell_command* using **popen**(3).

command **>** *file*

Redirect the output of *command* into *file*, which will be overwritten if it exists.

command **>>** *file*

Append the output of *command* to *file*.

SEE ALSO

popen(3)

NAME

cvfsid − Display SNFS System Identifier

SYNOPSIS

/usr/cvfs/bin/cvfsid [**-?Ghnl**]

DESCRIPTION

cvfsid provides a mechanism for displaying the SNFS identifier for the executing system. For customers using client-based licensing, SNFS identifiers are used to generate individual client licenses. This identifier string is submitted to Quantum Technical Support for license authorization keys. See the installation instructions for additional information on SNFS licensing.

OPTIONS

−h, **−?** Display help

−G Gather mode. *NOTE*: Not intended for general use. Only use when recommended by Quantum Support.

−l List the local host's Authorizing IDs, IP addresses, and MACs. (Linux only.)

−n Display the network interface information in a compact, machine readable form. (Linux only.)

When executed without options, cvfsid prints the information required to generate a license for the host on which it is executed. Simply execute the program on each participating system, and either Email or Fax the identifiers to Quantum Technical Support for authorization keys.

After the license keys are received cut-and-paste them into the file */usr/cvfs/config/license.dat* on the system that runs the CVFS File System Manager.

FILES

/usr/cvfs/config/license.dat

SEE ALSO

cvfs(8), **snfs_config**(5), **SNFS Installation Instructions**

NAME

cvfs_config − StorNext File System Configuration File

DESCRIPTION

This man page is deprecated - see **snfs_config**(5) for details on the StorNext File System Configuration File

SEE ALSO

snfs_config(5), **snfs.cfgx**(5), **snfs.cfg**(5),

NAME

StorNext File System Failover - How To Configure and Operate

DESCRIPTION

The StorNext File System uses a single File System Manager (*FSM*) process per file system to manage metadata. Since this is a single point of failure, the ability to configure an additional hot-standby FSM is supported. This redundant configuration is called High Availability (HA). An HA cluster comprises two identically configured server-class computers operating as metadata controllers (MDC). Either MDC in an HA cluster can serve as the *primary* MDC for the purposes of configuring the cluster and for running the processes that provide the Stornext Storage Manager (SNSM) features. The alternate MDC is called *secondary*.

All SNSM HA clusters must have one (HaShared) unmanaged Stornext file system dedicated to configuration and operational data that is shared between the MDCs. The MDC running the active HaShared FSM is the *primary* MDC by definition. The *primary* MDC runs the active FSMs for all the managed file systems (HaManaged), as well as the HaShared file system, and it runs all the management processes together on one MDC. In the event that an HaManaged FSM process fails, another FSM process for that file system will be started and activated on the primary. There are no redundant FSM processes on the secondary MDC for HaManaged file systems. Non-managed file systems (HaUnmanaged) can be active on either MDC. There is a redundant standby FSM ready to take control through the activation protocol for each HaUnmanaged file system.

HA cluster configurations guard against data corruption that could occur from both MDCs simultaneously writing metadata or management data by resetting one of the MDCs when failure conditions are detected. HA resets allow the alternate MDC to operate without risk of corruption from multiple writers. HA reset is also known as *Shoot Myself in the Head* (SMITH) for the way that resets are triggered autonomously. HA resets occur when an active FSM fails to update the arbitration control block (ARB) for a file system, which prevents the standby from attempting a takeover, but also fails to relinquish control. HA reset also occurs when the active HaShared FSM stops unless the file system is unmounted on the local server, which ensures that management processes will only run on a single MDC.

There are three major system components that participate in a failover situation. First, there is the FSM Port Mapper daemon, **fsmpm**(8). This daemon resolves the TCP access ports to the server of the file system. Along with this daemon is the Node Status Server daemon (*NSS*). This daemon monitors the health of the communication network and the File System Services. The third component is the *FSM* that is responsible for the file system metadata.

Whenever a file system driver requests the location of a file system server, the *NSS* initiates a quorum vote to decide which of the FSMs that are standing by should activate. The vote is based on an optional priority specified in the FSM host configuration list, **fsmlist**(4), and the connectivity each server has to its clients. When an elected FSM is given the green light, it initiates a failover protocol that uses an arbitration block on disk (ARB) to take control of metadata operations. The activating server *brands* the file system by writing to ARB block, essentially taking ownership of it. It then re-checks the brand twice to make sure another server has not raced to this point. If all is correct, it lets the server take over. The new server re-plays the file system journal and publishes its port address to the local FSM Port Mapper. Once these steps are taken, clients attempting connection will recover their operations with the new server.

SITE PLANNING

In order to correctly configure a failover capable StorNext system, there are a number of things to consider. First, hardware connectivity must be planned. It is recommended that servers have redundant network connections. In order to failover, the metadata must reside on shareable storage.

CONFIGURATION

This section will show how to set up a StorNext configuration in a way that will support failover.

File System Name Server Configuration

The **fsnameservers**(4) files should have two hosts described that could manage the File System Name Services. This is required to ensure that the name service, and therefore the NSS voting capabilities, do not have a single point of failure. It is recommended that these server machines

also be named as the name servers. It is important to note that the **fsnameservers** list be consistent and accurate on all of the participating SAN clients. Otherwise some clients may not correctly acquire access to the file system. In other words, be sure to replicate the **fsnameservers** list across all SNFS clients.

FSM List

Each line in the FSM list file **fsmlist**(4) describes a single file system name. An entry in this file directs the **fsmpm** process to start an **fsm** process with a configuration file of the same name.

File System Configuration

GUI supported configuration is done by completely configuring a single MDC, and then the configuration is copied to the other MDC through the HaShared file system. By-hand configurations must be exactly the same on both MDCs.

License Files

License files must also be distributed to each system that may be a server.

OPERATION

Once all the servers are up and running they can be managed using the normal **cvadmin**(8) command. The active servers will be shown with an asterisk (*****) before it. Server priorities are shown inside brackets. DO NOT start managed FSMs on the secondary server by hand as this violates the management requirement for running all of them on a single MDC. When a managed FSM will not start reliably, a failover can be forced by the snhamgr command on the primary MDC as follows:

```
snhamgr force smith
```

FILES

/usr/cvfs/config/license.dat
/usr/cvfs/config/fsmlist
/usr/cvfs/config/fsnameservers

SEE ALSO

cvadmin(8), **snfs_config**(5), **cvfsck**(8), **fsnameservers**(4), **fsm**(8), **fsmpm**(8)

NAME

cvgather − Compile debugging information for a StorNext File System

For cvgather on Windows, see "All Programs/StorNext/StorNext/Help" and click on "Gather Debugging Info (cvgather)".

SYNOPSIS

cvgather -f *FsName* [**-sukx**] [**-o** *OutputFile*] [**-n** *NumberOfCvlogs*] [**-U** *UserCore*] [**-K** *KernelCore*] [**-p** *SnfsPath*]

DESCRIPTION

The **cvgather** program is used to collect debug information from a file system. This creates a tar file of the system's *StorNext File System* debug logs, configuration, version information and disk devices.

The **cvgather** program will collect client debug information on client machines and server information on server machines, as well as portmapper information from all machines. System log files as well as SNFS log files are included. At the users option, **cvgather** also collects core files from user space utilities, such as the fsm, and also from the operating system kernel, when available. This information provides Quantum technical support staff with enough information to deal with most problems encountered by SNFS users.

USAGE

When the operator encounters an error using SNFS and wishes to send debugging information to Quantum technical support, the **cvgather** utility may be run. The following command arguments and options affect the behavior of **cvgather**.

-f *FsName*
: Specify the name of the file system for which debugging information should be collected. Some information is universal to all installed file systems, while some is unique to each file system.

-k
: Collect the core file from the operating system kernel. This option is not supported on Linux. The **-k** option collects the kernel core from the default location for the machine's operating system. To collect the kernel core from another location use **-K**.

-K *KernelCore*
: Collect the kernel core file from any file. You must specify the full filename as well as the path.

-n *NumberOfCvlogs*
: Specify the number of cvlog files to include in the tarball. If this option is not selected, 4 will be used. This is the default number of cvlogs used by the fsm.

-o *OutputFile*
: Specify the name of the output file. This name is appended with the suffix '.tar'. If this option is not selected, the name of the file system will be used as a default.

-p *SnfsPath*
: Specify the file path to the SNFS install directory. If this option is not selected, the path */usr/cvfs* will be used as a default.

-s
: Gather symbol information without core files.

-u
: Collect the core file from user executables, such as the fsm. By default, if they exist, cvgather will pick up a file named "core" and the the most recently modified "core.*" file on systems that support core file names with extensions. The **-u** option collects core files from the 'debug' directory in the SNFS directory. To collect user core files from another location or core files with with non-standard names use **-U**.

-U *UserCore*
: Collect the user core file from any file. You must specify the full filename as well as the path.

-x
: Exclude files that are collected by pse_snapshot. Note that this option is intended to be used by pse_snapshot only and not for general use. The behavior of this option may change without warning.

When **cvgather** is run it will create a tar file, that can be simply e-mailed to Quantum technical support for evaluation. It is recommended that the tar file be compressed into a standard compression format such as compress, gzip, or bzip2.

NOTES

IMPORTANT: **cvgather** creates a number of temporary files, thus must have write privileges for the directory in which it is run. These files, as well as the output tar file can be very large, especially when the kernel core file is included, thus adequate disk space must be available.

Several important log files are only accessible by the root user, thus it is important that **cvgather** be run with root privileges to gather the entire range of useful information.

FILES

/usr/cvfs/config/.cfgx*
/usr/cvfs/debug/cvfsd.out
/usr/cvfs/debug/nssdbg.out
/usr/cvfs/debug/fsmpm.out
/usr/cvfs/data/<file_system_name>*/log/cvlog**

SEE ALSO

cvdb(8), **cvversions**(1), **cvfsid**(8) **cvlabel**(8)

NAME

cvlabel − Label StorNext Disk Devices (LUNs)

SYNOPSIS

cvlabel -l [**−agsv**] [**−F** *filter*]

cvlabel -L [**−agv**] [**−F** *filter*]

cvlabel -j [**−av**] [**−F** *filter*]

cvlabel -c [**−T**] [**−F** *filter*]

cvlabel -C *format* [**−F** *filter*]

cvlabel -x

cvlabel [**−ifrRvw**] [**−q** *tag_q_depth*] *label_list*

cvlabel [**−fw**] **−u** *VolumeName*

cvlabel [**−fw**] **−U** *DeviceName*

cvlabel −D *VolumeName*

DESCRIPTION

cvlabel is used when configuring the *StorNext File System* disks. One host that has visibility to all the storage area network disk devices must create a list of disk labels, their associated device names and optionally the sectors to use. The **mount_cvfs**(8) process uses the volume labels to determine which disk drive is to be used for *SNFS* stripe group nodes. The label name that is written to a disk device must match the **[Disk ...]** name in the *File System Manager (FSM)* configuration. See **snfs_config**(5) for details of the FSM configuration file.

It is recommended to first use **cvlabel** with the **−l** or **−L** option. This option will present all of the usable disk devices found on the system. It will try to identify the volume label and display the results. This will help determine what disk drives are visible to the client.

The next step is to create the *label_list* file. Use */usr/cvfs/examples/cvlabels.example* as a template for your file. Or, use **cvlabel** with the **−c** option, in which case **cvlabel** will write on stdout the list of all devices found in a format compatible with a *label_list* file.

Once a *label_list* file has been generated it must be edited to match the desired SNFS label updates. All LUNs included in the *label_list* file that are not allocated to the *StorNext File System* should be removed from the *label_list* file to prevent accidental overwriting of existing data. Once all updates to the *label_list* are complete cvlabel should be run using this file to apply label changes to the indicated LUNs.

A final option for creating a label file is to use the **−C** option with a format string. This behaves the same as the **−c** option, except the format string is used to build template labels. The format string uses a printf like syntax where % followed by a letter is replaced by information obtained from the storage. The available format strings are **%B** size in sectors, **%L** lun number, **%C** controller id and **%S** serial number. Care should be taken to use a format which generates unique names for devices before using the output to label them.

Certain RAID devices require special handling. Cvlabel uses the raid strings inquiry table to determine which devices require special handling. The default table (displayed with the **-R** option), can be overridden by a user supplied file */usr/cvfs/config/raid-strings.* Note: the **-R** option is not intended for general use and may be deprecated in the future. Only use when recommended by Quantum Support.

OPTIONS

-l, **-L** Use the **−l** option (short format) or the **−L** option (long format) to list usable disk devices on the system.

-j Use the **−j** option (JSON format) to list usable disk devices on the system in a machine and human readable format.

−u *VolumeName*
Use the **−u** *VolumeName* option to unlabel the specified volume.

−U *DeviceName*
The **−U** *DeviceName* option is similar to the **-u** option, except that the path to the device special file is used instead of the label name.

-s When used in conjunction with the **−l** option, the **−s** option prints the disk device **serial #**, which can be used to distinguish the difference between **duplicate labels** and **multiple paths**.

-g When used in conjunction with the **-l** or **-L** options, the **-g** option also prints GUID information for EFI-labeled disks. The GUID includes a timestamp and the MAC address of the node that created the label.

-a When used in conjunction with the **−l** or **−L** options, the **−a** option also prints unusable disk devices, along with a description of why they are unusable. This is usually due to a lack of OS support for large LUNs or an unsupported disk label format.

−F *filter*
When used in conjunction with the **−c**, **−C**, **−l** or **−L** options, the **−F** *filter* option will only list devices whose inquiry string contains the *filter* string.

-v The **-v** option prints more information about the labeling process. Multiple **−v** options accumulate, providing more information often used for debugging the label process.

-q The **-q** option can be used during labeling to set the Command Tag Queue Depth for Irix systems. By default, the Depth is set to 16.

-f The **−f** option forces labeling and you will not be asked for confirmation before labeling (or unlabeling) a disk device. **WARNING:** errors in the SNFS label_list file can cause data loss.

-c The **−c** option outputs a cvlabel format template file to stdout. This template file will reflect all disk devices visible to the local system. Use this template to build a cvlabel file. **WARNING: Be sure to edit the template file to remove all devices which you do not want labeled.**

−T The **−T** option can be used in conjunction with the **−c** option to facilitate conversion of labels from the old VTOC format to the new EFI format. The output will be similar to the ordinary **−c** output, but devices that do not need conversion or cannot be safely converted will be output as comment lines, along with explanatory text. Only convertible devices are output normally.

−D *VolumeName*
The **−D** *VolumeName* option can be used to dump the label for *VolumeName* in ascii to stdout. Examining this output is useful when debugging labels.

−r The **−r** option can be used to force a disk to be relabeled, even if there are no changes to the label information. Normally such disks are skipped.

−R The **−R** option can be used to display the default raid strings inquiry table. Note that EFI labels are not supported on IRIX systems for older releases of the Xsan File System.

−i The **−i** option controls the style of VTOC label written. **NOTE:** The VTOC format previously generated by including the **−I** flag is now the default VTOC format. Thus, usage of the **−I** flag has been deprecated. The **−i** option can be used to write a legacy style CVFS VTOC label. However the legacy VTOC format may become obsolete in a future release. The new default VTOC format allows for greater compatibility in modern StorNext releases. The legacy VTOC format will not work with the Solaris 10 operating system and beyond. Unless the *−i* flag is specified, cvlabel will use the new format for VTOC labels.

−w The **−w** option tells cvlabel to wait for the completion of the disk scan that is requested after a disk label has been written or a volume has been unlabeled. The disk scan requests that the file system server update its internal device tables and the **−w** option ensures that the operation has been completed. Note that a disk scan may take a number of seconds on a large SAN or a SAN that is experiencing device errors.

***WARNING* Use this program with extreme caution! Modifying a system disk's volume label may result in irreparable harm to your system. It may render the system inoperable and force you to repair the volume using the boot maintenance program. Only label disk devices which you are sure are to be used for the StorNext File System's storage area network.**

FILE FORMAT

You may use the */usr/cvfs/examples/cvlabels.example* file as a template.

A label entry consists of two or three parameters on a single line. White space and comment lines are allowed. Comment lines are designated by using a pound sign (**#**) as the first non−white space character of the line.

The *label_list* file format is as follows:

<SNFS_label_name> <operating_system_device_name> [<sectors> [<type>]]

Where:

<SNFS_label_name>

The **<SNFS_label_name>** parameter is the name of the disk as described in the **FSM** configuration file. The parameter must match a **[Disk <SNFS_label_name>]** entry.

<operating_system_device_name>

The **<operating_system_device_name>** is the device name of the complete disk device.

NOTE: operating system device names may change after reboots and will differ per system. Always configure SNFS label files, and label devices in the same session.

On **Irix** systems, the device names are found in the directory **/dev/rdsk** and have the **vol** suffix. An example would be **fsd0vol**.

On **Windows** systems, the devices start as **PhysicalDrive0** and increment up to the number of drives configured.

<sectors>

The **<sectors>** parameter is the number in 512-byte sectors that matches the **[DiskType ...]** configuration in the FSM configuration file. This is required for disks that must be configured smaller than their actual size. For example, MPIRE video disks must be under−configured to eliminate using the last zone of the disk. If **<sectors>** is not specified or is specified as **−**, then the **cvlabel**(8) program will use the entire available volume.

Some systems (and earlier releases of StorNext) can only use the first 2TB of disks that are larger than 2TB. To put a "short" VTOC label on such a disk (truncating it to 2TB), specify **short32** for **<sectors>**.

<type>

The **<type>** parameter is used to override the default label type, or to change the label type for a disk that already has a label. The value can be either **VTOC** or **EFI**. The default is **EFI**; **VTOC** can be used for compatibility with older StorNext releases.

EXAMPLES

List all the disk devices in a system.

```
rock # cvlabel -L
/dev/rdsk/dks0d1vol [SGI     IBM DDRS-34560W S96A] SGI_IRIX  Controller 'RDGX6289
```

```
[...]
/dev/rdsk/20000004cf733161/lun0vol/c2p1 [SEAGATE ST336752FC      0002] unknown  C
```

Then create a template label file:

```
rock # cvlabel -c >label_list
```

The output file will include an entry for the 'unknown' disk:

```
CvfsDisk_UNKNOWN /dev/rdsk/20000004cf733161/lun0vol/c2p1    # host 2 lun 0 sector
```

Edit the *label_list* file, changing **CvfsDisk_UNKNOWN** to the desired label name:

```
CvfsDisk_39 /dev/rdsk/20000004cf733161/lun0vol/c2p1
```

Now label the disk devices. Your *label_list* file must be specified on the command line.

```
rock # cvlabel label_list
```

WARNING This program will over-write volume labels on the
devices specified in the file *label_list*.

After execution, the devices will only be usable by the
StorNext File System. You will have to re-partition the
devices to use them on a different file system.

Do you want to proceed? (Y / N) -> y

/dev/rdsk/20000004cf733161/lun0vol/c2p1 [SEAGATE ST336752FC 0002] unknown Controller 'Port A', Serial '20
Do you want to label it SNFS-VTOC - Name: CvfsDisk_39 Sectors: 71675392 (Y / N) -> y
New Volume Label -Device: /dev/rdsk/20000004cf733161/lun0vol/c2p1 SNFS Label: CvfsDisk_39 Sectors: 7167539

Done. 1 source lines. 1 labels.

The labels are done. List the disk devices again.

```
rock # cvlabel -L
/dev/rdsk/dks0d1vol [SGI     IBM DDRS-34560W S96A] SGI_IRIX  Controller 'RDGX6289
[...]
/dev/rdsk/20000004cf733161/lun0vol/c2p1 [SEAGATE ST336752FC      0002] SNFS-VTOC
```

Generate a label file of all LSI storage which uses the controller serial number and lun numbers as components of the labels.

```
rock # cvlabel -C CVFS_%S_%L -F LSI > label_list
```

Display to stdout the default raid strings inquiry table.

```
rock # cvlabel -R
# Raid inquiry string table
# Controls interpretation of raid mode pages based on inquiry strings
#
# Allowed types:
# LSI           LSI (Engenio) Raid in AVT mode
# Clariion      Clariion (EMC) Raid in Auto trespass mode
# Seagate       Dual port Seagate JBODs
# JBOD          No special handling (Real JBOD or RDAC driver)

# String 1       String 2            Raid Type
```

```
"DGC"          ""                    Clariion
"ENGENIO"      ""                    LSI
"IBM"          "1722-600"            LSI
"IBM"          "1742-900"            LSI
"IBM"          "1814"                LSI
"IBM"          "Universal Xport"     LSI
"LSI"          "VirtualDisk"         JBOD
"LSI"          "MegaRAID"            JBOD
"LSI"          "ProFibre"            JBOD
"LSI"          "Universal Xport"     LSI
"LSI"          ""                    LSI
"SGI"          "TP9300"              LSI
"SGI"          "TP9400"              LSI
"SGI"          "TP9500"              LSI
"SGI"          "TP9700"              LSI
"SGI"          "IS500"               LSI
"SGI"          "IS400"               LSI
"SGI"          "IS300"               LSI
"STK"          "FLEXLINE"            LSI
"STK"          "OPENstorage"         LSI
"STK"          "Universal Xport"     LSI
"STK"          "BladeCtlr"           LSI
"SEAGATE"      ""                    Seagate
"XYRATEX"      ""                    Xyratex
```

Use the default rate strings inquiry table to seed a user-defined table.

```
rock # cvlabel -R > $/usr/cvfs/config/raid-strings
```

NOTES

Due to conflicts between Solaris VTOC format and Irix VTOC format the partition output from the Irix **fx**(1M) utility may contain incorrect values. This will not affect StorNext.

Some operating systems require a reboot after a disk is labeled or relabeled. It is recommended that SNFS nodes are rebooted after new labels are written or existing labels are updated.

FILES

/usr/cvfs/examples/config.example
/usr/cvfs/examples/cvlabels.example
/usr/cvfs/config/raid-strings

SEE ALSO

cvfs(8), **snfs_config**(5), **mount_cvfs**(8)

NAME

cvmkdir − Create a StorNext Directory with an Affinity

SYNOPSIS

cvmkdir [**−k** *key*] *dirname*

DESCRIPTION

The **cvmkdir** command creates a *StorNext File System* directory and attaches an affinity parameter (*key*) to it. If no option is used and the directory exists, the **cvmkdir** command displays the assigned affinity. Once an affinity is assigned to a directory, it cannot be altered. If no *key* is specified and the directory does not exist, the directory will not be created.

An affinity may be dissociated from a directory by specifying an empty key (e.g., "").

See **snfs_config**(5) for details about affinities to stripe groups.

OPTIONS

−k *key* Specify to the file system what affinity (*key*) to associate with the directory. All new sub-directories and files created beneath this directory inherit its affinity. If the affinity is changed or removed only files or directories created after the change are affected.

dirname

The path of the directory to be created.

SEE ALSO

cvmkfile(1), **cvaffinity**(1), **snfs_config**(5)

NAME

cvmkfile − Create a pre-allocated file

SYNOPSIS

cvmkfile [**-epswz**] [**−k** *key*] *size*[**k**|**m**|**g**|**t**] *filename*

DESCRIPTION

cvmkfile can be used to pre-allocate a file on the StorNext file system. This is useful and preferable when preparing a file for use in a real-time or streaming environment as the entire file is represented in only one file system extent. Additionally, a file can be placed onto a specific stripe group by specifying the *key* value, which is used as the affinity locator. See **snfs_config**(5) for more details about affinities.

WARNING: This will destroy all existing data for the specified file unless the **−e** option is used.

OPTIONS

−e The **−e** option tells cvmkfile not to clobber an existing file, just expand or verify the requested space. The default behavior is to unlink and re-create an existing file (see **WARNING** above).

−k *key* The **−k** *key* optionally tells the file system where to place the data file. If an Affinity Key is specified, the file is placed on stripe groups that are specified to support this key. If there is no stripe group with the key specified, then the file is placed in non-exclusive data pools. If there are no non-exclusive data pools, then ENOSPC (no space) is returned.

−p The **−p** option forces the allocation and any subsequent expansions to be fitted "perfectly" as multiples of the **PerfectFitSize** configuration parameter. The allocation extent will always line up on and be a perfect multiple of the number of blocks specified in **PerfectFitSize**.

−s The **−s** option forces the allocation to line up on the beginning block modulus of the stripe group. This can help performance in situations where the I/O size perfectly spans the width of the stripe group's disks.

−w The **−w** option sets the file size to be equal to *size*. Without this option the blocks are allocated but the size is set to zero. **NOTE:** Unless the -z option is used, the new file will contain undefined data. Using the -w option is not recommended unless absolutely needed, and beware that it could cause some write operations to become read-modify-write operations.

−z The **−z** option causes the file to be physically zeroed out. This can take a significant amount of time.

size[**k**|**m**|**g**|**t**]

The *size* argument specifies the number of bytes, kilobytes(**k**), megabytes(**m**), gigabytes(**g**), terabytes(**t**) to allocate for the file. Multiple extents will be allocated if there is insufficient contiguous available space to satisfy the requested amount. In the event that there is not enough space to satisfy the request, the file size will still reflect the requested *size* value if the **−w** option is specified.

filename

The file to be created.

EXAMPLES

Make a file of one gigabyte with zero length. Allocate it on a stripe group that has specified the affinity key **6100_n8**.

```
rock # cvmkfile -k 6100_n8 1g foobar
```

SEE ALSO

snfs_config(5), **cvmkdir**(1)

NAME

cvmkfs − Initialize a StorNext File System

SYNOPSIS

cvmkfs [**-GF**] [**-a** *key*] [**-n** *ninode*[**k**|**m**|**g**]] [**-r**[**-e**][-m**]] [**-X]** [*file_system_name*]

DESCRIPTION

cvmkfs will initialize a *StorNext* (SNFS) file system optionally using *file_system_name* as the name. If no name is supplied, a list of file systems configured will be presented. Active file systems may not be re−initialized. The user will be prompted for a confirmation before initializing the file system.

WARNING: This will destroy **ANY** existing file system data for the named *SNFS* file system!

OPTIONS

-a *key* Set the affinity of the root directory to *key*.

-e When remaking a managed file system in preparation for restoring all metadata from a metadump, the -e option specifies that the FSM should restore all user file extents. When this option is not specified, files are truncated which results in them being restored from backup. Use this option when the metadata disks must be restored but all disks containing user data are intact. This option can only be used in conjunction with the -r option and is ignored when restoring unmanaged file systems.

-G Bypass "Press return to continue..." type prompts. These prompts are useful on Windows systems to give the user a chance to read the error message before the window disappears.

-F Force. This option has been deprecated and replaced with **-X**. It will cause the same action as that option.

-f Failure mode - do not fail if there is a configuration mismatch or other serious abnormal condition detected. Note: This option is **not** intended for general use. Use only if instructed by Quantum support. Incorrect use may result in an unusable file system.

-m When using the -r option to remake a file system in preparation for a metadump restore, cvmkfs will issue an error message and exit without modifying the file system if the stripe groups are defined to hold both metadata and user data. It does this because it is possible for the metadump restore procedure to inadvertantly allocate disk space for metadata that conflicts with user data, resulting in file corruption. The -m option can be used in conjunction with the -r option to override this behavior and force cvmkfs to remake the file system despite the risk of corruption. Use this option only if instructed by Quantum support.

-n *ninode*[**k**|**m**|**g**]]
Pre-allocate *ninode* inodes.
NOTE: This option has been deprecated.

-r Remake the file system in preparation for restoring all metadata from a metadump. This option can only be used when *restoreJournal* is set to true in the configuration file and a metadump exists that is current as of the last time the corresponding FSM was stopped.

The remake option can be useful for disaster recovery or for metadata and journal stripe group reconfiguration.

For a managed file system, the default behavior is to truncate all of the user data files with the expectation that they have been backed up to another media such as tape. The files will be reloaded when next accessed or through other storage manager actions. It is possible to override this behavior by specifying -e on a managed file system. In this case the same cautions as specified below for unmanaged file systems apply.

For an unmanaged file system, there is no backup copy of the user data. The -e option can be specified, but it is ignored and is forced on. The metadata that is restored contains the disk addresses of the user data. This means that all stripe groups that contain user data must be left completely intact.

The following statements apply to both managed and unmanaged file systems. The metadata and journal stripe groups are remade from scratch. This allows the underlying storage on these stripe groups to be replaced and stripe group attributes to be changed. Metadata stripe groups can be converted to data stripe groups. New stripe groups can be added. The journal stripe group can change.

WARNING: It is highly recommended that Quantum Technical Support be contacted before using this option. If used improperly, data could be lost or corrupted.

-X Use expert mode to automatically answer all prompts for verification. This is useful for running cvmkfs as part of a script or automated test. The failure option can be used instead, but with the failure option no configuration transformation validatation is done and is therefore not recommended. With the *-X* option, all of the normal checks are performed and if an error is detected, the command exits with appropriate message and status.

FILES

*/usr/cvfs/data/**

SEE ALSO

cvfs(8), **snfs_config**(5)

NAME

cvpaths − StorNext File System Disk Discovery Filter

SYNOPSIS

/usr/cvfs/config/cvpaths

DESCRIPTION

The *StorNext File System* (SNFS) *cvpaths* file is an optional configuration file used to control and/or override the normal SNFS behavior of scanning system standard directory locations during the *disk discovery* phase that occurs during a **cvlabel** run, or from the **fsmpm** at boot/initialization time.

Normally, the directories scanned are:

```
Irix     /dev/rdsk
Solaris  /dev/rdsk
Linux    /dev           (only /dev/sd[a-z] and /dev/sd[a-z][a-z])
AIX      /dev           (looking for rhdisk*)
```

If a *cvpaths* file exists in */usr/cvfs/config*, then the contents of the *cvpaths* file will explicitly control which devices and/or directories will be evaluated during disk discovery. On Unix systems, if the *cvpaths* file is executable, then it will be executed expecting it to be a shell script that will produce the *cvpaths* syntax on standard output, otherwise it will simply be read as input.

SYNTAX

The format rules for a line in the *cvpaths* file is:

Any line beginning with "#" is considered a comment line.

Any token beginning with "#" is considered to be a comment up to the end of the line.

Blank/empty lines are ignored.

A keyword=value syntax is used.

Groups of related keyword phrases can span multiple lines.

Note, the parser capability is limited, and does not allow for any white space around the equal ("=") operator, although white space, and commas, are tolerated in all other places.

There are several keywords:

```
directory=
wildcard=
device=
usage=
hba=
lun=
capacity=
geometry=
verify=
blockdev
```

The **directory=***path* and **wildcard=***glob* directives do not require any of the other keywords.

The directory specified by the **directory=***path* directive will be traversed in a manner similar to the default **disk discovery** scan mechanism.

The following one-line example would describe the normal default behavior on an Irix or Solaris system:

directory=/dev/rdsk

The **wildcard=***glob* directive is used to specify a glob pattern, see **glob**(7), to match and scan for device pathnames which are then examined in the same manner as the default disk discovery scan mechanism. The wildcard directive is not supported on Windows or Apple OSX platforms.

On linux, the default disk discovery mechanism is to scan paths which match /dev/sd[a-z] /dev/sd[a-z][a-z].

The following example would add EMC powerpath devices to the linux device scan:

wildcard=/dev/sd[a-z]
wildcard=/dev/sd[a-z][a-z]
wildcard=/dev/emcpower*

A **device=***path* directive begins a group of keywords related to the device located at **path**.

for example:

device=/dev/rdsk/c2t39d0s2

would describe exactly one disk/raid device to be scanned during disk discovery.

The device **path** is the **character special** device name.

NOTE!

Enumerating specific device paths presumes that the same disk/raid will always appear in the host system's hardware/device graph with the same exact name.

In most cases, this can only be accomplished by utilizing **persistent binding** methods related to the specific disk driver package.

A **verify=***labelname* keyword may be used to verify that the device located at **path** contains the SNFS label *labelname*, for example:

device=/dev/rdsk/c2t39d0s2 verify=CvfsDisk9

The device named must describe a device path that describes the entire disk.

For example, on Solaris systems, it must describe **slice 2**, which means the final component of the path would end with **s2**.

On Linux systems, you should use **/dev/sdc** rather than **/dev/sdc1**.

On AIX systems, you should use the **/dev/rhdisk..** name.

On Irix systems, you should use a path name that includes all of the necessary sub-directories needed to describe the controller and port, for example:

```
        device=/dev/rdsk/20000004cf7331aa/lun0vol/c2p1
    -or-
        directory=/dev/rdsk/20000004cf7331aa
```

Normally, SNFS determines from the raid controller whether a path should be considered **Active**, or **Pas-**

sive.

The **usage=**[**Active**|**Passive**] keyword may be used to override the normal determination of **Active** or **Passive** path usage. The default mode is **Active**.

The **capacity=***sectors* keyword may be used to override the normal determination of the number of sectors supported by the device.

The **geometry=***cyl/tpc/spt/bps* keyword may be used to override the normal determination of the physical geometry of the device where:

```
cyl          is the total # of cylinders
tpc          is the # of tracks per cylinder
spt          is the # of sectors per track
bps          is the # of bytes per sector
```

Certain device drivers use non-conventional names, or, do not support standard methods of HBA & LUN identification.

If the device driver name, (e.g. /dev/rdsk/emcpowera1) does not follow the host system's convention of providing HBA & LUN information, then the **hba=**# and **lun=**# keywords may be used to provide that information.

For example:

device=/dev/emcpower3 verify=CvfsDisk_30 usage=Active hba=6 lun=2

would configure a Linux device driver path externalized as **/dev/emcpower3**, assigning the HBA id of 6, and LUN # 2.

This line could also be written as:

```
device=/dev/emcpower3, verify=CvfsDisk_30, usage=Active, hba=6, lun=2

-or-

device=/dev/emcpower3
                verify=CvfsDisk_30,
                usage=Active,
                hba=6,
                lun=2
```

The HBA id is used by the multi-path code to collect devices together according to which host HBA is used for access.

The actual value of the number is not critical, what is important is that all disks/raids configured through a specific host HBA should be assigned a consistent number that is unique to that host HBA path.

The LUN number is important if the raid controller is one of the controllers recognized by SNFS as capable of Automatic Volume Transfer, and Active/Passive path declaration. The LUN # is used to index into specific raid controller mode pages.

A Solaris example, forcing certain paths to be held back for **Standby** usage:

```
device=/dev/rdsk/c2t39d0s2    usage=Active      verify=CvfsDisk_30
```

```
device=/dev/rdsk/c2t40d0s2    usage=Passive     verify=CvfsDisk_31
```

A Solaris example, restricting the search to a non-standard directory

```
directory=/dev/rdcs                        # DataCore
```

A Linux example, providing HBA & LUN information:

```
device=/dev/emcpowerf   hba=4 lun=2 verify=CvfsDisk_30
device=/dev/emcpowerg   hba=4 lun=3 verify=CvfsDisk_31
```

Generally, a SCSI interface is required for StorNext. On linux, however, some devices with only a block device interface can be used. The keyword **blockdev** can be added to a line to force the block device interface to be used instead of the raw SCSI interface.

```
device=/dev/vgca0_vha1 blockdev
```

For linux, StorNext also supports ram disk devices. Ram disk devices use the block interface but have additional special handling requirements. A linux ram disk device can only be used as a local disk. Because it cannot be shared, a linux ram disk device may only be useful as a metadata device. Because the data in a ramdisk is not persistent across boots, a linux ram disk may only have practical application for development.

A linux ram disk is identified by its path name starting with **/dev/ram**. The following example shows two ways to configure a linux ram disk.

```
device=/dev/ram0

-or-

wildcard=/dev/ram*
```

Linux also supports Ceph Rados block devices and XEN virtual disks, XEN vitual disks are the presentation used by Amazon Elastic Block Storage (EBS). Note that EBS volumes are not sharable and can only be accessed from a single EC2 instance at once. Ceph Rados block devices can in theory be shared between hosts if configured without caching.

Ceph devices are recognized based on the device special file starting with **/dev/rdb**. XEN virtual disks are recognized by the name **/dev/xvd**. As with ram devices the device or wildcard specifiers can be used to include them in the device scan.

FILES

/usr/cvfs/config/cvpaths
/usr/cvfs/examples/cvpaths.example

SEE ALSO

cvfs(8), **snfs_config**(5), **fsm**(8), **fsmpm**(8)

NAME

cvupdatefs − Commit a StorNext File System configuration change

SYNOPSIS

cvupdatefs [**-bdfFGhlnv**] [**-c** *pathname*] [**-R** *NewFsName*] [*FsName*] [*FsPath*]

DESCRIPTION

The **cvupdatefs** program is used to commit a configuration change to a StorNext file system. Possible configuration changes include stripe group list modification as well as file system journal modification.

The file system update program must be run on the machine that the File System Manager (FSM) is running on. This utility reads the configuration file and compares the configuration file against the current on-disk metadata configuration. If there are differences between the configuration and the on-disk metadata, the utility will display what changes need to be made to bring the file system metadata up to date.

NOTE: All metadata modification must be made on a stopped file system. It is recommended that the file system is stopped and **cvfsck**(8) has been run before making any changes to a file system configuration. Maintaining a backup of the original file system configuration file is also strongly recommended.

When a successful update is completed, the new configuration file is stored in the on-disk metadata and the previous one is saved in */usr/cvfs/data/*<file_system_name>*/config_history/*.*cfgx.*<TIMESTAMP>

OPTIONS

−b Build info - log the build information.

-c *pathname*
Provide a specific path to the previous configuration file that is to be used. This option is used to force **cvfsck** to be run as a sub-process to insure that the file system meta data is consistent prior to doing a capacity or stripegroup expansion, or any journal changes.

−C <*pathname*>
Like the **-c** option, but also instructs **cvfsck** to check the file system for name collisions that would occur on a case-insensitive file system.

-d Debug - use to turn on internal debugging only.

-F Force. This option has been deprecated and replaced with **-y**. It will cause the same action as that option.

-f Failure mode - do not fail if there is a configuration mismatch or other serious abnormal condition detected. Note: This option is **not** intended for general use. Use only if instructed by Quantum support. Incorrect use may result in an unusable file system.

−G Pause - pause the program after displaying the exit status (Windows only.)

−h Help - print the synopsis for this command.

-l Log - log when the update finished.

-n Read-only - set metadata to read-only mode.

-R *NewFsName*
Rename - Provide a new file system name to rename an existing unmanaged file system. The existing config file will be renamed, and the existing data directory containing logs will be migrated to the new name. See the section below for further details about using this option.

−v Verbose - turn on verbose reporting methods.

−y Yes - Bypass the prompt and answer yes to the basic warning about proceeding. If the prompt warning is for an unusual condition, this option will not bypass that prompt.

Once the file system configuration has been changed to reflect the stripe group or journal changes the **cvupdatefs** utility may be run. When **cvupdatefs** is run it will display a listing of stripe groups which will be modified, followed by a prompt. If this list accurately reflects the changes made to the configuration file then answering 'yes' at the prompt will allow the utility to make the needed changes.

Once the utility has completed, the file system may be started again. After starting the file system, the 'show' command in **cvadmin**(8) may be used to verify the new stripe groups. The 'show' command will list all of the stripe groups on the file system, including the newly created stripe group(s). Also, if the location of the file system journal has changed this too will be reflected by the cvadmin command 'show'.

WARNINGS

It is very important that the consistency of the file system be correct before cvupdatefs is run. If the file system has a bad state cvupdatefs could introduce data corruption. It is recommended that cvfsck is executed on the file system before any changes are made. If cvfsck does not finish with a clean file system do not make any configuration changes until the file system is clean.

ADDING A STRIPE GROUP

The first step in adding stripe groups is to modify the file system's configuration file to reflect the desired changes. For notes on file system configuration format refer to **snfs_config**(5). In addition to adding StripeGroup configuration entries, associated Disk and DiskType entries for any new disks must be included.

Currently the ordering of stripe groups in the configuration file and in the metadata must match. Thus, when adding new stripe group configuration entries to the configuration file they must always be added to the end of the StripeGroup configuration section. **cvupdatefs** will abort if a new stripe group is detected anywhere but the end of the file.

INCREASING THE STRIPE DEPTH OF AN EXISTING STRIPE GROUP

Warning: This option is not recommended and its use is deprecated. Adding a new stripe group is the recommended way to expand capacity of a file system.

The stripe depth is the number of disks in the stripe group and is a key factor in the amount of parallel I/O that can be accomplished. This choice should ideally be made before the file system is created, thus eliminating the need for cvupdatefs to modify this value by adding disks to the stripe group. Consult the StorNext File System Tuning Guide for information on configuring for optimal file system performance.

Warning: When a stripe group is populated with file data, adding disks will increase free space fragmentation of the stripe group proportional to the amount of pre-existing file data. It is important to avoid fragmentation, which severely impacts performance and functionality of the file system. If the stripe group contains little or no file data, expansion will not result in free space fragmentation. The snfsdefrag utility can be used to relocate pre-existing file data to a different stripe group.

When new disks are added to an existing stripe group the new disks must exactly match the existing disks in size. All new disks must be added to the end in the disk list in the configuration file StripeGroup section.

New disks cannot be added to a stripe group containing metadata or journal. A new stripe group must be added if additional capacity or performance is needed for metadata or journal operations. The cvupdatefs utility can be used to relocate the journal to a new stripe group.

MODIFYING FILE SYSTEM JOURNAL CONFIGURATION

cvupdatefs will also detect changes in the journal configuration and modify the metadata accordingly. Journal changes include moving the journal to a new stripe group and increasing or decreasing the size of the journal.

JournalSize
: (Located in the Global section) Modifying this value will change the size of the on-disk journal.

Journal
: (Located in the Stripe Group section) Setting this entry to yes will place the on-disk journal on the given stripe group.

NOTE:

There may only be one journal stripe group per file system.

REMOVING A JOURNAL-ONLY STRIPE GROUP

For Linux MDCs, if a stripe group has only the journal attribute, i.e. no metadata and no userdata, and the journal is moved to another stripe group, the former journal-only stripe group is left with no attributes pertaining to content type. If it is desired that this stripe group be retired and the disks used for other purposes,

you can set the status to down after the journal is moved. Note that the status must be up during the journal move operation because the journal recovery must be executed prior to moving the journal.

The behavior is similar on Windows MDCs, execpt that there is no explicit userdata attribute in the ASCII config file. This means that with no journal and no metadata, userdata is assumed. If the desire is to retire the former journal-only stripe group, care should be taken to not run the file system after moving the journal off of the stripe group. Set the status to down immediately after moving the journal and before starting the FSM.

CORRECTING MISCONFIGURED STRIPE GROUPS

cvupdatefs has a limited ability to address configuration errors. For example, if a stripe group was added but the configuration file shows incorrect disk sizes, this option could be used to rewrite that stripe group. Metadata and Journal stripe groups cannot be rewritten. In addition, data only stripe groups that may be overwritten must be empty.

The types of changes that can be made to a stripe group are as follows

```
1) Resize disk definitions in a stripe group
2) Modify stripe breadth in a stripe group
3) Modify the disk list in a stripe group
```

Warning: Always use this option with extreme caution. Configuration errors could lead to data loss.

RENAMING A FILE SYSTEM

Warning: Renaming a file system is only allowed on an unmanaged file system. If **cvupdatefs**(8) detects that the file system is managed, it will print an error message and exit without doing the rename.

The **-R** option for renaming an unmanaged file system should be used with care, as there are several things that get modified as part of this process. Before renaming a file system, it is highly recommended that **cvfsck**(8) be run prior to renaming the file system. The file system must be unmounted on all SAN and DLAN clients, and the file system stopped, see **cvadmin**(8). If a client has the file system mounted when it is renamed, the client might need to be rebooted in order to unmount the old file system name. On Windows, use the Client Configuration Tool to unmount file system before renaming it.

The unmanaged file system that is being renamed will have been configured in one of three modes: non-HA, HA or manual HA, and how it was configured will change how to rename the file system.

Non-HA mode

There are no extra steps needed when renaming an unmanaged file system that is not in HA mode.

HA mode

When the unmanaged file system is being used in HA mode, prior to running the rename command on the primary, on the secondary the */usr/cvfs/data/*FsName directory should be manually renamed to */usr/cvfs/data/*NewFsName. When the rename command is then run on the primary, the HA sync processes will propagate all the other configuration changes to the secondary. Wait for the HA sync to complete before continuing.

Manual HA mode

In manual HA mode, the rename command should be run on both MDCs. When run on the second MDC, **cvupdatefs**(8) will recognize that the name in the ICB has been changed, but will proceed if *NewFsName* is the same as the name in the ICB. In manual HA mode there is no need to manually rename */usr/cvfs/data/*FsName since that will happen as part of running **cvupdatefs -R** on the second MDC.

After changing the name of a file system, the change will need to be manually reflected in the */etc/fstab*, */etc/vfstab* or */etc/vstab* files on all the clients before they remount the file system. Windows StorNext SAN and DLAN Clients mounts will need to be remapped. Run the Client Configuration Tool to re-map the mount with new file system name.

For any client that is operating as a StorNext File System Proxy Client, check to see if it has a */usr/cvfs/config/dpserver.*FsName file. If it does, it will need to be renamed to */usr/cvfs/config/dpserver.*NewFsName.

If something goes wrong during the rename operation, **cvupdatefs**(8) will revert any partial changes, but it is still possible that in some corner cases it will not be able to fully revert the changes, and manual intervention will be required. Files that are modified and/or renamed during the rename operation include:

*/usr/cvfs/data/*FsName
*/usr/cvfs/data/*NewFsName
*/usr/cvfs/config/*FsName.*cfgx*
*/usr/cvfs/config/*NewFsName.*cfgx*
/usr/cvfs/config/fsmlist

as well as the ICB in the file system itself. The OS dependent files that need to be manually updated include:

/etc/fstab
/etc/vfstab
/etc/vstab
Windows registry via the Windows Client Configuration Tool

EXIT VALUES

cvupdatefs will return one of the following condition codes upon exit.

```
0 - No error, no changes made to the file system
1 - No error, changes have been made to the file system
2 - Configuration or file system state error, no changes made
3 - ICB error, improper file system found, no changes made
4 - Case conversion found name collisions, no changes made
```

NOTES

IMPORTANT: It is highly recommended to run **cvfsck**(8) prior to making any configuration changes.

FILES

/usr/cvfs/config/.cfgx*
/usr/cvfs/data/<file_system_name>*/config_history/*.cfgx.*<TIMESTAMP>

SEE ALSO

snfs_config(5), **cvfsck**(8), **cvadmin**(8)

NAME

cvversions − Display StorNext client/server versions

SYNOPSIS

cvversions

DESCRIPTION

cvversions will display the revision, build level and creation date for the *File System Manager (FSM)* and client subsystems of the *StorNext File System*.

This information should be submitted to Quantum Technical Support when contacting them about any problems found in the file system.

USAGE

Simply execute the program and record the information shown.

SEE ALSO

StorNext File System Release Notes

NAME

deviceparams − StorNext Linux device turning parameters

SYNOPSIS

/usr/cvfs/config/deviceparams

DESCRIPTION

The StorNext File System (SNFS) **deviceparams** file provides a way to tune the various queueing parameters of the linux block devices which are available from 2.6.16 onwards. The file can specify values to override the default maximum I/O size submitted to devices and to select the elevator algorithm used.

Note: Changing Linux elevator parameters can have a severe negative performance impact when inappropriate values are specified. Only use this file only when recommended by Quantum Support.

SYNTAX

If an **deviceparams** file exists in the SNFS 'config' directory it is used to tune the various queueing parameters of the devices used for SNFS disk I/O. The format of the **deviceparams** file consists <parameter>=<value> pairs that can be prefixed with the ssd=1 if the paramter is specific to SSD devices or ssd=0 if the parameter is for regular disk devices. Comments starting with pound-sign (#) are skipped.

```
[ssd=[0|1]] scheduler=[noop|anticipatory|deadline|cfq]
[ssd=[0|1]] nr_requests=<depth>
[ssd=[0|1]] max_sectors_kb=<value>
```

Where <*depth*> is the maximum depth of the request queue for each block device and <*value*> is the maximum size of I/O the elevator should send to the device in kbytes. Note that other factors such as the physical fragmentation of memory buffers may restrict I/O to a lower limit than that specified. Using hugetlb pages in an application is one way to overcome this.

The parameters in the **deviceparams** file are applied when the disk devices are scanned. A **cvadmin** -e "disks refresh" command is needed to apply new parameters to a running StorNext client. Because these parameters change the Linux block device characteristics, each Linux StorNext client will need a **deviceparams** file.

The I/O scheduler choices may vary by Linux distribution. Currently, the more popular Linux distributions have four choices for I/O schedulers; they are **noop, anticipatory, deadline**, and **cfq**. Each scheduler then has additional tunable parameters that can affect I/O performance. There is no guarantee that the schedulers and their tunable parameters will be available in future releases.

There are no Linux man pages describing these tunable parameters. There are however documents included with the Linux source (Documentation/block) and many papers that can be found online which discuss various attributes of the "Linux IO Scheduler". Again, the **deviceparams** file should be used only when working with Quantum Support.

EXAMPLE

In many instances Quantum has found improved performance when switching the I/O scheduler from the default **cfq** scheduler to the **deadline** scheduler. In addition, increasing the block queue depth has been seen to improve performance.

scheduler=deadline
nr_requests=4096

To select different parameters for SSD drive you can use the ssd=[0|1] prefix. The following example does apply these changes:

```
# Set scheduler to noop on SSD and deadline on regular disks.
# Set the max_sectors_kb to 1024 on SSD.
# Set the nr_requests to 4096 on all label disks.
```
ssd=1 scheduler=noop max_sectors_kb=1024

ssd=0 scheduler=deadline
nr_requests=4096

FILES

/usr/cvfs/config/deviceparams
/usr/cvfs/examples/deviceparams.example

NAME

disk_license − Disk License Tool

SYNOPSIS

disk_license [**−hHqrsvX**] [**−d**n][**−f***filename*][**−H**][−F*format*]

disk_license [**−i***diskcatalog***]**

DESCRIPTION

disk_license is used to interrogate disk drives, StorNext disk licenses and the Quantum Disk Catalog. It can report current disk licensing status and create reports for manually requesting disk licenses on an MDC.

All the disks in all of an MDC's file systems are categorized into Quantum Branded, Quantum Certified, and Uncertified (all other) as defined in the quantum_disk_catalog.dat database.

The Disk Usage licenses are free, but aid Quantum support in understanding the usage and requirements of a site.

OPTIONS

-h Print the command's usage message and quit.

-H Display capacity values in human readable, terabyte values (available in ASCII only).

-r Print a Disk License Request report.

-s Print a Disk Usage Summary report.

-q Quiet mode - no output for normal operations. Currently only applies to importing new disk catalogs (**-i**).

-u Update the XML file specified with the **-R** option to the current version and format.

-v Print additional internal details as the command collects the information to categorize the MDC's disks. Additional **v** options increase the amount of details.

-X Update the default Disk License Request file and create a periodic RAS message if Disk Usage is over licensed capacity.

-d *n* Print additional details on a per−filesystem basis. Larger values for *n* yield more details up to a point.

-f *filename*
Send output to the file *filename*.

-F *format*
Print the output in format *format*. Choices are *ascii*, *xml* and *json*.

-i *diskcatalog*
Import the specified disk catalog if it has a newer generation number that the currently installed disk catalog.

-R *filename*
Parse a Disk License Request report. Not available on all platforms.

FILES

/usr/cvfs/config/quantum_disk_catalog.dat
/usr/cvfs/config/license.dat
/usr/cvfs/config/.cfgx*
/usr/cvfs/debug/quantum_disk_license_report.xml

SEE ALSO

NAME

domainsid − StorNext File System Domain SID File

SYNOPSIS

/usr/cvfs/config/domainsid

DESCRIPTION

The *StorNext File System* (SNFS) *domainsid* file is an optional MDC configuration file used to set the domain SID to be used with ACLs when the Security Model is set to "acl" in a file system configuration file and Unix Identity Mapping is set to "algorithmic"

Note that this file should only be deployed in very specific use cases. For example, if an environment uses Open Directory, the *domainsid* file should contain the assigned Domain SID. This can be determined by running the following command on a Mac:

$ dsmemberutil getsid -U *username*

where *username* is the name of any regular user account in Open Directory. This will return a string such as the following:

S-1-5-21-2553502104-2799725507-638401443-3106

The Domain SID is the string without the trailing RID so in this example, it has the value **S-1-5-21-2553502104-2799725507-638401443** The following command may be run on the MDC to set this domain SID.

mdc# echo S-1-5-21-2553502104-2799725507-638401443 > /usr/cvfs/config/domainsid

After configuring the *domainsid*, file systems must be restarted on the FSM to have it take effect.

Note: Improper configruation of this file may lead to files having invalid ACLs and permissions not being enforced properly.

FILES

/usr/cvfs/config/domainsid

SEE ALSO

cvfs(8), **snfs_config**(5),

NAME

dpserver − StorNext File System Proxy Client Configuration

SYNOPSIS

/usr/cvfs/config/dpserver

/usr/cvfs/config/dpserver.*FsName*

DESCRIPTION

The StorNext File System (SNFS) **dpserver** file is a configuration file used to control the SNFS Stornext Distributed LAN Server (also called Proxy Server or Gateway) on Linux systems. This file is required in order to start a Proxy Server and is consulted when a **mount** command specifies the Proxy Server option.

The **sndpscfg** command is normally used to generate and maintain **dpserver** files on non-Windows systems - see **sndpscfg**(8) for details. To view and adjust the Proxy Server settings on Windows systems, use the LAN Client/Gateway tab in the Client Configuration tool instead.

SYNTAX

At minimum, the **dpserver** file specifies the network interfaces to use for Proxy Server. It can also be used to override various Proxy Server tuning parameters.

There can be both file-system-specific **dpserver.***FsName* files and a default **dpserver** file. If a file-system-specific **dpserver.***FsName* file exists, it will be used in preference to the default **dpserver** file.

The format rules for a line in the **dpserver** file are:

Any line beginning with "#" is considered a comment line.

Blank/empty lines are ignored.

There are several keywords:

```
interface ifname [address ipaddr]
transfer_buffer_size_kb n
transfer_buffer_count n
server_buffer_count n
tcp_window_size_kb n
daemon_threads n
```

The keywords are interpreted as follows:

The **interface** keyword specifies the name of a network interface (e.g., **eth0**) to use for Proxy Client traffic. If the interface has only one IP or IPv6 address, then only the interface name needs to be specified. If the interface has more than one address (multiple IP addresses, multiple IPv6 addresses, or both IP and IPv6 addresses), then the **address** keyword and one IP or IPv6 address must also be specified.

At least one **interface** keyword must be specified in the file in order for a Disk Proxy Client Server to be started.

The remaining keywords are used to override the default values for tunable parameters. Note that these values are propagated from the Proxy Servers to the Proxy Clients , and thus can affect the behavior of both. Note also that not all tuning parameters affect all platforms.

The optional **transfer_buffer_size_kb** keyword specifies the size in Kilobytes of the socket transfer buffers used for Proxy Client I/O. The default value is 256 and values between 32 and 1024 are allowed.

The optional **transfer_buffer_count** keyword specifies the number of socket transfer buffers used per connection for Proxy Client I/O. Note that this parameter is not used on Linux Proxy Servers or Clients. However, it is used by Windows Proxy Clients, and the value is passed to them by Linux Proxy Servers. The default value is 16 and values between 4 and 128 are allowed.

The optional **server_buffer_count** keyword specifies the number of I/O buffers that will be allocated per network interface on the Proxy Server. The default value is 24 and values between 4 and 512 are allowed.

The optional **tcp_window_size** keyword specifies the size in Kilobytes of the TCP window used for Proxy Client I/O connections. The default value is 0 and values between 0 and 16384 are allowed. The setting of 0 has a special meaning, which is that no change is made to the default system value. This allows Linux autotuning to adjust the receive buffer size and TCP window size dynamically for each connection. Quantum recommends this setting when autotuning is enabled, which is the default for recent Linux versions.

The optional **daemon_threads** keyword specifies the number of kernel threads on the server that will be used to service Proxy Client I/O requests. The default value is 8 and values between 2 and 256 are allowed.

HA ENVIRONMENTS

If you choose to configure the Distributed LAN Server on a StorNext cluster running in High Availability (HA) mode, each HA node must have its own dpserver files detailing the NICs on that node. The **dpserver** files are not synchronized between HA pairs.

If the Distributed LAN Server is configured after converting to HA, the file system(s) running as Distributed LAN servers must be unmounted and mounted again to service DLC requests.

When deduplication/replication is enabled, one or more Virtual IP Addresses (VIPs) provides access to the Primary MDC (where the blockpool server is running). In StorNext startup and failover situations, the VIP is dynamically associated with a physical address on the Primary server. Do not use VIP interfaces when setting up the dpserver configuration file, or it will not be available when the node is running as Secondary. The physical interface and IP address should be used in this situation.

EXAMPLE CONFIGURATION FILE

A very basic dpserver configuration file

```
interface eth0
```

A basic multi-interface dpserver configuration file

```
interface eth0
interface eth1
interface eth2
interface eth3
```

A more complex dpserver configuration file

```
interface eth1 address 10.3.21.2
tcp_window_size_kb 64
transfer_buffer_size_kb 256
transfer_buffer_count 16
server_buffer_count 8
daemon_threads 8
```

FILES

/usr/cvfs/config/dpserver
*/usr/cvfs/config/dpserver.*FsName

SEE ALSO

mount_cvfs(8), **sndpscfg**(8)

NAME

fsforeignservers − StorNext File System Foreign Server List

SYNOPSIS

/usr/cvfs/config/fsforeignservers

DESCRIPTION

The *StorNext File System* (*SNFS*) **fsforeignservers** file contains a list of systems acting as *File System Foreign Server(s)*. The file system *Foreign Servers* provide StorNext File System Services (*FSS*) to computers that do not belong to the *SNFS* cluster of the nodes acting as *Foreign Servers*. A **fsforeignservers** file is not required, and can be used in place of or in addition to the **fsnameservers** file.

In contrast to *Name Servers*, a *Foreign Server* will present only those file systems that are hosted locally.

A *Foreign Client* is a computer that is accessing a StorNext File System via a Foreign Server. Foreign Clients do not belong to the *SNFS* cluster per se, meaning that they cannot activate a file system or vote in elections.

Typically, a **fsforeignservers** file entry is created on the client to provide the client computer access to a specific StorNext File System on a specific host. This connection is limited to the StorNext File Systems local to that host. If additional *SNFS* access is desired, an entry for the machine(s) hosting the desired file system must be added to the **fsforeignservers** file. For failover configurations, both primary and secondary systems must be specified. This file is needed only on the *Foreign Client*, it is not needed on the *Foreign Server*. To determine what *SNFS* services are available, use the **cvadmin**(8) command with the **-H** *host* option to view active file systems for each host specified in the **fsforeignservers** file.

The *Foreign Client* will use the IP address of the node that returns the address of the active FSM as the address to connect to for meta data traffic for that file system.

SYNTAX

The format for the **fsforeignservers** is simple. A **fsforeignservers** file contains one entry per line. It contains the IP address or hostname to use as a *Foreign Server*. The use of IP addresses is preferred to avoid problems associated with lookup system (eg., DNS or NIS) failures. The format of an **fsforeignservers** line is:

```
IP address
```

or

```
HostName
```

Where *HostName* is a host name or *IP address* of a host that can service queries for File System Services for file systems hosted directly on that host.

Lines that contain white space only or that contain the comment token as the first non-white space character are ignored.

FILES

/usr/cvfs/config/fsforeignservers

SEE ALSO

cvadmin(8), **cvfs**(8), **dpserver**(4), **fsm**(8), **fsmpm**(8), **fsnameservers**(4), **mount_cvfs**(8)

NAME

fsm − StorNext File System Manager

SYNOPSIS

fsm [*file_system_name* [*host_name*]]

DESCRIPTION

The **fsm** is the server daemon that manages a StorNext File System (SNFS) The File System Manager (FSM) manages the file system's name space, allocations, and metadata coherency. It is also used for I/O bandwidth and stripe group management functions. The default SNFS file system name is *default*, and the default host name is the system's hostname as found by the **gethostname**(2) library call.

Multiple FSM processes may co-exist on one system, as long as they have unique file system names. The file system name is used by the **mount**(8) command, along with the hostname separated by a colon (:). For example, if an FSM process was started on host *fsmhost* and the file system name was declared *projecta* and the mount point was */usr/clips*, then the mount command would be:

```
mount -t cvfs fsmhost:projecta /usr/clips
```

This process runs in the background and is started at boot time. It is enabled or disabled via **chkconfig**(8) or **init.d**(7) using the *cvfs* key word.

To start multiple FSM daemons (therefore multiple file systems) on a single system the **fsmlist** file must be created to describe which FSM daemons to start. See **fsmpm**(8) and **fsmlist**(4) for details.

ENVIRONMENT

FSM_KEEP_ALIVE_TIME

This variable can be used to change the rate that the FSM process sends a keep alive message to each connected client. The value is in seconds, with a default of 5 seconds. It can be set between 1 and 7200 seconds (2 hours).

Note: This variable is not intended for general use, and should only be used when recommended by Quantum Support.

FSM_KEEP_ALIVE_TIMEOUT

This variable can be used to change the timeout value that the FSM process uses after sending a keep alive to a client. The value is in seconds, with a default of 3 seconds. It can be set between 1 and 30 seconds. Note that there are other factors that are also considered by the FSM process before timing out a client, so the actual timeout may be somewhat longer.

Note: This variable is not intended for general use, and should only be used when recommended by Quantum Support.

FILES

/usr/cvfs/config/.cfgx*
/usr/cvfs/config/fsmlist
/usr/cvfs/config/license.dat
/usr/cvfs/data/<file_system_name>*/config_history/*.cfgx.*<TIMESTAMP>

SEE ALSO

cvfs(8), **snfs_config**(5), **fsmlist**(4), **fsmpm**(8), **fstab**(5), **mount**(8)

NAME

fsmlist − StorNext File System FSM Auto-Start List

SYNOPSIS

/usr/cvfs/config/fsmlist

DESCRIPTION

The *StorNext File System* (*SNFS*) **fsmlist** file defines for the **fsmpm**(8) daemon the *File System Manager* (*FSM*) daemons to start. When the file does not exist, the **fsmpm** will not start any *FSM* daemons.

SYNTAX

The format for the **fsmlist** is simple. On each line is the name of one file system to start, and an optional priority number from zero (0) to nine (9).

The optional priority number is used when there is a redundant metadata controller (MDC). A priority of zero makes the specified *FSM* top priority and any number greater than zero means lower priority. See **cvfs_failover**(8) for details about setting up a failover-capable file system service.

The format of an **fsmlist** line is:

```
<File_System_Name> [ . <priority>]
```

File_System_Name is the public name of the file system used in the **mount**(8) command, and as the prefix for the configuration file (see **snfs_config**(5)).

The dot (.) character is required when the *priority* field is specified. It takes the place of a deprecated parameter and is required for compatibility with old **fsmlist** files. (This parameter was formerly used to specify the IP address to associate with the **FSS** when a host had multiple network interfaces. This functionality is now subsumed by the **fsnameservers** file.)

The *priority* field is used to designate a priority when there are redundant **fsm** daemons for a file system. Only one may be active at a time and the **fsmpm** daemon executes failover votes to determine the daemon to activate. The priority value helps the **fsmpm** determine, all other things being equal, which service to activate.

Lines that contain white space only or that contain the comment token as the first non-white space character are ignored.

FILES

/usr/cvfs/config/fsmlist

SEE ALSO

cvfs(8), **snfs_config**(5), **fsnameservers**(4), **fsm**(8), **fsmpm**(8), **cvfs_failover**(8), **mount**(8)

NAME

fsmpm − StorNext File System Port Mapper daemon

SYNOPSIS

fsmpm [*host-ip* [*debug* [*sync* [*diskscan* [*extHA*]]]]]

DESCRIPTION

The *FSM Portmapper* is a server daemon residing on each StorNext File System client and server. It registers an RPC identifier to the system's *portmap* daemon. The **fsmpm** publishes a well known port where the SNFS File System Manager (FSM) daemons can register their file system name and port access number. All clients then talk to their local FSS port mapper to discover access information for their associated service. This process runs in the background and is started at boot time. It is enabled or disabled (along with the file system) via **chkconfig**(8) or **init.d** using the **cvfs** key word.

OPTIONS

Quantum Internal Use Only - contact support before adding or modifying command line arguments to **fsmpm**. Changes from the defaults may result in intermittent or total failure of StorNext. Options may change abruptly between releases.

host-ip The IP address used to access this host. The default is to try to resolve the system's hostname to an address. If set to 127.1, no nameserver will be used and no heartbeats will be sent. (default: no hostname)

debug Bitmask specifying which debug messages to print. (default: 0)

sync The name of a file whose creation is used to detect when the fsmpm has successfully started. (default: no file)

diskscan
How often (in seconds) to rescan for changed paths. 0 disables the disk scan. (default: 0)

extHA External HA mode prevents the fsmpm from automatically starting FSMs in the fsmlist, as well as disabling calls for elections. 1 enables external HA mode; 0 disables it. (default: 0)

NOTE: Defaults specified with '--'.

FSNAMESERVERS

The **fsmpm** reads the file */usr/cvfs/config/fsnameservers* to establish file system name servers for the StorNext file system services. This list is used to coordinate the whereabouts of StorNext file system servers.

A name server list must be established on each client that has StorNext installed so that all clients can discover the location of the StorNext FSM servers. It is important that this list is consistent across the SAN. Inconsistent *fsnameservers* configuration may result in the inability for some clients to find a file system service. See **fsnameservers**(4) for specifics of the file format.

FSMLIST

The **fsmpm** is responsible for launching the FSM daemon(s). If */usr/cvfs/config/fsmlist* exists then the **fsmpm** reads from the list file and starts the FSM daemons that are specified. If no */usr/cvfs/config/fsmlist* file exists then the **fsmpm** tries to launch the FSM daemon for the file system named **default**. See **fsmlist**(4) for specifics of the file format.

ENVIRONMENT

These variables are for use by Quantum support personnel only.

FSMPM_MAX_LOGFILES
Controls the number of old **nssdbg.out** log files that will be saved by **fsmpm** when the current log file reaches its maximum size. The default is 4.

FSMPM_MAX_LOGSIZE
Controls the maximum size that the **nssdbg.out** file can grow to before a new log file will be started. The value is a number followed by an optional suffix (**K** for Kilobytes, **M** for Megabytes, **G** for Gigabytes), or the string **unlimited**, indicating that the file can grow without bound. The default is 1M and

the minimum is 64K.

WATCHER_NODETACH
: If set, **fsmpm** will not detach from its parent process. Used start **fsmpm** under the control of a debugger. Does not apply to Windows platforms.

WATCHER_NORESTART
: If set, **fsmpm** will not be restarted automatically after an unsuccessful exit or crash. Does not apply to Windows platforms.

DEBUG

Debugging traces are written to the file */usr/cvfs/debug/nssdbg.out*. The amount of debug information is controlled by the */usr/cvfs/debug/verbose* file. This file contains the list of debug traces to turn on. If the file does not exist, none of the optional debug traces are enabled. Blank lines and comments that begin with a **#** are ignored. Everything else is treated as a name for what debug traces to turn on. Names are separated by whitespace or commas, and may be listed on multiple lines. Unknown names are silently ignored.

general
: Print general trace information. This include information about acquiring port numbers for coordinators, listing FSMs, mapping IDs hostnames, disk requests, portmap inquiries, device event handlers, and other events.

input Print a trace for every NSS packet received.

output Print a trace for every NSS packet sent.

mbr Print traces about Heartbeat Membership changes.

vote Print traces about FSM elections.

ldap_cred
: Print traces for LDAP credential processing.

hamon_reset
: Print traces for HAMON resets.

helper Print traces about starting and stoping helper processes.

all Enable all debug tracing

Numeric values are also recognized as specific debug bits to set. This is mainly for backwards compatibility. A value of **-1** or **0xffffffff** is the same as specifying **all**.

If there are no recognized names or numeric values in the *verbose* file, e.g. if it exists but is empty, then the **mbr** and **vote** traces will be enabled.

An example of a *verbose* file:

```
# Comments are ignored
vote, mbr # Turn on the vote and membership traces
   general
foo bar # Unknown items are silently ignored

# These are very noisy
#input
#output

0x1000 # turn on an undefined bit
```

FILES

/etc/init.d/cvfs
/usr/cvfs/config/fsnameservers
/usr/cvfs/config/fsforeignservers
/usr/cvfs/config/fsmlist

/usr/cvfs/debug/nssdbg.out
/usr/cvfs/debug/verbose

NOTES

When a **SIGHUP** signal is received, the configuration files will be re-read. This allows, for example, the FSM list to be modifed, or debugging levels to be changed.

SEE ALSO

chkconfig(8), **cvfs**(8), **fsm**(8), **fsnameservers**(4), **fsmlist**(4), **portmap**(8), **rpcinfo**(8)

NAME

fsnameservers − StorNext File System Name Server List

SYNOPSIS

/usr/cvfs/config/fsnameservers

DESCRIPTION

The *StorNext File System* (*SNFS*) **fsnameservers** file describes to the **fsmpm**(8) daemon which machines are serving as *File System Name Server* coordinator(s). The file system name coordinators are a critical component of the StorNext File System Services (*FSS*). One of the principal functions of the coordinator is to manage failover voting in a high availability configuration. Therefore it is crucial to choose highly reliable systems as the coordinators. Redundancy is provided by listing multiple entries in fsnameservers, one entry per line. The first host in the list is the primary coordinator and any subsequent entries are backup coordinators. It is recommended to list two systems to utilize this redundancy benefit. Typically the systems chosen are also configured for the File System Manager (*FSM*) services as well. However, this is not required.

If **fsnameservers** does not exist then the system will operate as a "local" filesystem requiring both client and server. It will not communicate with any other *SNFS* product on the network. This may be desired when no SAN sharing is required.

The **fsnameservers** file is also used to specify the dedicated metadata network(s) used for SNFS. That is, if an address in the **fsnameservers** file is on IP network *x*, then IP network *x* will be used to carry SNFS metadata traffic. Multiple, redundant metadata networks can be created by using additional network interfaces on every system; each coordinator is then specified in **fsnameservers** multiple times, once for each of its metadata-network addresses.

It is extremely important that all copies of fsnameservers in a SAN are identical. A stale configuration on a system not even in use can cause election problems if fsmpm processes are running with mismatched fsnameservers.

It is also crucial to ensure that complete network connectivity exists between all systems running *SNFS* whether client or server. This is important because all *SNFS* systems participate in failover voting so any connectivity gaps will cause erroneous elections.

After you put the IP addresses of two reliable machines on your network in your fsnameservers, copy fsnameservers to every machine running *SNFS*. Always reboot or stop and restart *SNFS* after changing fsnameservers.

SYNTAX

The format for the **fsnameservers** is simple. It contains the name of the IP address or hostname to use as either a primary or a secondary coordinator. The use of IP addresses is preferred to avoid problems associated with lookup system (eg., DNS or NIS) failures. The format of an **fsnameservers** line is:

```
<IP address>
```

or

```
<HostName>
```

Where *HostName* is a host name or *IP address* of a host that can coordinate queries and failover votes for the File System Services.

Lines that contain white space only or that contain the comment token as the first non-white space character are ignored.

FILES

/usr/cvfs/config/fsnameservers

SEE ALSO

cvfs(8), **snfs_config**(5), **fsm**(8), **fsmpm**(8), **mount_cvfs**(8)

NAME

fsports − StorNext File System Port Restrictions

SYNOPSIS

/usr/cvfs/config/fsports

DESCRIPTION

The StorNext File System (SNFS) **fsports** file provides a way to constrain the TCP and UDP ports used by core SNFS server processes consisting of the FSMs, the FSMPM, and any Distributed LAN servers. This file can also be used to redefine the port used by the SNFS Alternate Portmapper service. The **fsports** file is usually only necessary when the SNFS control-network configuration must pass through a firewall. Use of the **fsports** file permits firewall pinholing for improved security. If no **fsports** file is used then port assignment is operating-system dependent.

SYNTAX

When an **fsports** file exists in the SNFS 'config' directory, it restricts the TCP and UDP port bindings to the user-specified range. The format of the **fsports** file has two required lines, one optional line, and comments starting with pound-sign (#) in column one as follows:

```
MinPort value
MaxPort value
AltPmap value
```

The *value* fields are port numbers that define an inclusive range of ports that the SNFS server processes can use. Be careful to choose port range values that are appropriate for your operating system. Note that the Internet Assigned Numbers Authority (IANA) suggests a dynamic client port range for outgoing connections of 49152 through 65535. With that in mind, most Linux kernels use a port range of 32768 through 61000, Microsoft Windows operating systems through XP use the range 1025 to 5000 by default, Windows Vista, Windows 7, and Server 2008 use the IANA range by default, and Windows Server 2003 uses the range 1025 to 5000 by default, until Microsoft security update MS08-037 from 2008 is installed, after which it uses the IANA range by default.

The optional **AltPmap** value changes the TCP port used for the SNFS Alternate Portmapper service, which defaults to port 5164. When SNFS is used with a firewall, you can either configure the firewall to allow port 5164 or change the SNFS port number via the **AltPmap** keyword to a port that is allowed to pass through the firewall.

The **AltPmap** value must be defined the same way on all SNFS server and client nodes in order for SNFS to function properly. When using **AltPmap** to change the SNFS Alternate Portmapper service port number, you must include an fsports file on every SNFS client and server with the same **AltPmap** value. When the **AltPmap** keyword is not used, the **fsports** file is not necessary on SNFS clients.

The minimum number of ports needed on a given node can be computed as follows: one port for the FsmPm process, plus one port for each FSM process, plus one port for each file system served by this node as a Distributed LAN server.

EXAMPLE

To restrict SNFS Server processes to using ports 52,000 through 52,100 the **fsports** file would contain the following lines:

```
MinPort 52000
MaxPort 52100
```

This **fsports** file is only needed on SNFS servers.

To restrict SNFS Alternate Portmapper service to a specific port, select a port number outside the range of the **MinPort** and **MaxPort** values. For example if **MinPort** is 52000 and **MaxPort** is 52100 then select a value outside that range.

```
MinPort 52000
MaxPort 52100
AltPmap 52101
```

This **fsports** file is required on all SNFS clients and servers.

COMMON FSPORTS COOKBOOK

The primary use case for fsports is allowing StorNext SAN and LAN clients outside of a firewall to access the services provided by StorNext servers inside of a firewall. While other use cases exist, and more complex and restrictive configurations are possible, the following "cookbook" steps describe how to produce a common fsports file for all servers inside of a firewall. The resultant file provides security without sacrificing ease of deployment.

Step 1.
Determine the set of servers inside of the firewall that need to be accessed. This may include primary and standby MDCs and Distributed LAN servers.

Step 2.
For the list of servers from Step 1, determine the maximum number of StorNext ports used by any one server. The following equation can be used for this calculation:

ports required for a given server = (
Number of file systems in the "fsmlist" file +
Number of file systems for which this server is acting as a Distributed LAN server +
1 port for the NSS protocol) * *Multiplier*

where *Multiplier* is 2 for Windows servers and 1 for non-Windows servers.

For example, consider the following configuration of servers inside of a firewall that need to be accessed by clients outside of the firewall:

A Linux MDC hosting 4 file systems
ports: (4 + 0 + 1) * 1 = 5

A second Linux MDC hosting 6 file systems
ports: (6 + 0 + 1) * 1 = 7

A Windows MDC hosting 1 file system and acting as a Distributed LAN server for just that file system:
ports: (1 + 1 + 1) * 2 = 6

A dedicated Linux Distributed LAN server that serves 9 file systems from the various MDC pairs:
ports: (0 + 9 + 1) * 1 = 10

The maximum number of StorNext ports needed by any one server is:
MAX(5, 7, 6, 10) = 10 ports

Step 3.
Based on the maximum port count determined in step 2, pick a range of unused ports on the firewall and open them up. For example, for a maximum port count of 10, ports 52000 through 52009 could be chosen if they are available. The firewall should be configured to allow outside UDP and TCP connections using any source port to connect to StorNext servers inside the firewall having the restricted range of ports. Port 5164 should also be opened up for TCP for the AltPortMap service. (See NOTES below if this is not possible.)

Step 4.
Configure the common fsports file. Using the example from step 3 of where 10 ports are needed starting at 52000. The configuration is as follows:

```
MinPort 52000
MaxPort 52009
```

Step 5.
Install the resulting file on all servers from Step 1. Also install the file on all clients if the **AltPmap** directive was used. Then restart StorNext.

NOTES

Servers having common fsports files will use the same range of network ports for core StorNext file system services. This does not result in conflicts since each network address is comprised of an IP address and a port number and is therefore unique even when using the same port number as another network address.

As mentioned under EXAMPLES, when port 5164 cannot be opened on the firewall for the AltPortMap service, it is possible to use the **AltPmap** directive in the fsports file so that a different port is used. This also requires that clients outside of the firewall use an fsports file.

The fsports file does not constrain the ports used by the client end of connections. Ephemeral ports are used instead. Therefore, the fsports file is only useful on clients when the **AltPmap** directive is used.

When using fsports files, if services fail to start or clients fail to connect, to debug the problem, try slightly increasing the range of open StorNext ports on the firewall and, correspondingly, in the fsports files. Running netstat on the servers may reveal that unexpected processes are binding to ports within the range specified in the fsports file. Also, if services are restarted on Windows servers, in some cases ports may not be reusable for several minutes. Using an expanded port range will work around this.

The information above covers the ports used by the core StorNext file system services. If firewall pinholing is needed for other StorNext services (for example, replication), additional hard-wired ports may need to be opened on the firewall outside of the domain of the fsports file. Refer to the "Port Used by StorNext" section in the StorNext File System Tuning Guide.

When an environment includes Windows clients running StorNext 2.7, or earlier, and fsports is in use, the clients must be configured to not register with the ONC portmapper. This setting is adjusted by selecting the "do not register with the ONC" checkbox in the General tab of the client configuration tool.

FILES

/usr/cvfs/config/fsports
/usr/cvfs/examples/fsports.example

SEE ALSO

cvfs(8), **snfs_config**(5), **fsm**(8), **fsmpm**(8)

NAME

fs_scsi − Send SCSI commands to a device.

SYNOPSIS

fs_scsi -h

fs_scsi [**-ad**] [**-sxirtecS**] *device*

fs_scsi [**-ad**] [**-s**] **-l**|**-m** *page device*

fs_scsi [**-ad**] **-p**

fs_scsi [**-ad**] **-f** *serial_number*

fs_scsi [**-ad**] [**-O** *file*]

fs_scsi [**-ad**] **-R**

DESCRIPTION

This utility can be used to get device information using SCSI commands. Some commands have corresponding command line options. Others must be invoked from the menu mode. This mode is entered if *device* and the -p option are not specified.

fs_scsi(1) can also be used to verify drive functionality.

OPTIONS

-h Help. Shows usage.

-a Enable support for all known device types instead of just supported types.

-d Debug enables logging in /tmp/logs. A trace log of all SCSI commands is generated in /tmp/logs/trace/trace_02.

-s Treats *device* as standard tape device path and attempts to convert it to the corresponding SCSI device path.

-x Translates specified *device* from a standard tape device path to the corresponding SCSI device path.

-i Displays the results of the SCSI inquiry command sent to the specified device.

-r Displays the results of the SCSI request sense command sent to the specified device.

-c Issues the appropriate SCSI commands to determine the capacity of the media currently mounted in the specified device. If no media is mounted, the capacity will be reported as 0.

-t This generates a summary of some device information. The output contains the following fields. Scsi Path, Drive Type, Product Id, Device type, Scsi Id, Serial Number.

-S This will report status of the drive by indicating if it is ready or not ready. Multiple SCSI test unit ready commands will be executed until the drive becomes ready or an error is encountered.

-e The will eject (unload) a media from the specified device if a media is loaded.

-l Displays the page results of the SCSI log sense command sent to the specified device. The page value should be entered in hex.

-m Displays the page results of the SCSI mode sense command sent to the specified device. The page value should be entered in hex.

-p This will probe scsi devices sending an inquiry command to each device and then display its Serial Number, Product Id, Device Type, and Device Path.

-R Query the state of persistent reservations and registrations. Lists all the reservation keys registered and information about the current holder of the reservation on the device. If there is no current reservation this will be noted.

-f *serial number*
This will attempt to find the device path associated with the the specified serial number.

-O *file* This will log performance statistics to the specified file for read and write operations performed from menu mode.

device The device path to operate on.

WARNINGS

This command is installed and available on the MDC as well as client machines where DDM is to be run. For this reason the command includes libraries that are required for access to the database on the MDC. The database however is not accessible from the client machines so some run-time warnings occur when the command is issued on those clients. For example:

... Cannot find installation location for MySQL ...
... Parameter FS_HOME not defined ...

These warnings are not fatal and the output for reporting options (like: **-p**) should be considered correct.

EXIT STATUS

This will exit with 0 upon successful execution. Anything else indicates failure.

NAME

has_snfs_label − Check for StorNext Disk Label

SYNOPSIS

has_snfs_label *device_path*

DESCRIPTION

The StorNext File System (SNFS) **has_snfs_label** utility used to test a device for a SNFS formatted label.

EXIT VALUE

```
0 - Device does not have a SNFS label
1 - Device has a SNFS label
```

SEE ALSO

cvlabel(8)

NAME

ha_peer − StorNext HA Peer Server IP Address

SYNOPSIS

/usr/cvfs/config/ha_peer

DESCRIPTION

The StorNext File System (SNFS) */usr/cvfs/config/ha_peer* file provides the IP address of the peer server in a StorNext High Availability (HA) cluster configuration to the *snhamgr_daemon* and *fsmpm* processes. It must be configured on both servers. The **ha_peer** file may also be used to change the default IP port (5189) used by the *snhamgr_daemon* and *snhamgr* processes.

The **ha_peer** IP address allows the fsmpm processes to negotiate the restarting of HA Timers to avoid unnecessary HA Reset incidents when metadata writes are delayed by heavy disk activity, and to detect misconfigured */usr/cvfs/config/ha_smith_interval* HA Timer override values. For HA clusters with an *HaShared* file system, the address also allows communication between the *snhamgr_daemon* processes running on the metadata controllers to collect operational status for the *snhamgr* command.

SYNTAX

Any entry that does not begin with # is assumed to be the peer IP address and optional port number. The address should be in IPv4 or IPv6 numerical format. The address and port entries are specified as follows:

```
<address>
```

or

```
<address>:<port>
```

For IPv6, enclose the address portion in square brackets if also specifying a port.

EXAMPLE

To set the peer address, the **ha_peer** file would contain the following line:

```
192.168.10.1
```

To set the peer address and port, the **ha_peer** file would contain the following line:

```
192.168.10.1:8888
```

To set an IPv6 address or address and port, the following lines could be specified:

```
fe80::250:56ff:fe9b:74b8
```

or

```
[fe80::250:56ff:fe9b:74b8]:4600
```

FILES

/usr/cvfs/config/ha_peer

SEE ALSO

snhamgr(8), **fsmpm**(8), *Quantum StorNext User's Guide*

NAME

mdt − Metadata performance test

SYNOPSIS

mdt [*options*] *path* [*path*...]

DESCRIPTION

mdt is a utility that can be used to measure the relative metadata performance of a given file system(s). By default, **mdt** measures creates/second and removes/second. Optionally **mdt** will also measure the per second rates for stat, chmod, and move (rename) operations.

Each path specified on the command line corresponds to a mount point for a file system to be tested. By default, **mdt** will start 8 pthreads. Each pthread will make a directory and create 16384 files in the directory. The number of pthreads (direectories) can be specified via the -n option, and the number of file per directory can be specified via the -f option.

mdt is a metadata only test and no writes or reads are done. By default files are zero length. For a StorNext file system, space may be allocated to the file via the -b option which performs a StorNext API CvApi_VerifyAlloc call. Be aware that allocating space to files in this manner is not reflected in the file size.

On completion, **mdt** will print the number of files and rates for the specified metadata requests in the form of operations/second. The -v option will expand output listing per stream detail.

Unless the -R option is specified, **mdt** will remove all created files and directories in the remove test section.

For StorNext file systems, **mdt** will unmount and then mount the target file systems between test sections in order to clear the client metadata cache. Targeted file systems should not be busy as to prevent remounting. The -U option will cause **mdt** to bypass remounting between test sections.

OPTIONS

-? Display usage.

-a Run all test sections. In addition to create and remove, rates for stat, chmod, move (rename) are also measured.

-b *prealloc_size_in_bytes*

Specify the size in bytes to preallocate after creating a file. The default is 0 bytes and no preallocate.

Optionally, a single letter suffix can represent bytes in units. **mdt** single letter unit suffixes are as follows.

```
k     KB    10^3                1,000
m     MB    10^6            1,000,000
b     GB    10^9        1,000,000,000
K     KiB   2^10                1,024
M     MiB   2^20            1,048,576
B     GiB   2^30        1,073,741,824
```

-C Do not create files. This option requires that a create run was done at some previous time and the files were not removed. See the -R option.

-c Run the chmod test section.

-d[**dd**] Run in debug mode. The more "d's" specified, the more debug information is printed.

-E *csv_file*
Create and write results to the specified .csv file. A .csv file, (comma separated value) is a file that can be consumed by a spreadsheet application like Microsoft Excel.

-e *csv_file*
Write results to the specified .csv file; one that can be read by Microsoft Excel or other spreadsheet application. Data is appended to the specified csv file which must exist. See the -E option.

-f *number_of_files*
Specify the number of files per directory. Optionally a single letter suffix can be provided. See the -b option for suffix detail.

-F *fsname*
Specify the name of the file system to use on the remount. The file system name returned by the mount command varies by operating system. If you have trouble with remounts, you may have to specify the file system name.

-m Run the move/rename test section. Files are renamed in within their parent directories.

-n *number_of_directories*
The specified number of directories are created. Each will contain the number of files specified by the -f option. A pthread is created for each directory to execute the designated operations.

-R Skip the remove section and leave the files in place.

-s Run the stat test section. This section will execute readdir operations and stat each file in each directory; the equivalent of an ls -l command.

-T *tag_string*
Write the specified tag string to the standard output and to the csv file if the option to write a csv file is selected. This can be used to stamp results with a name identifying a given test scenario.

-U Do not unmount and remount the file system between test sections.

-v Print verbose output. The result for each stream is reported.

-V Print the **mdt** version information and exit.

EXAMPLES

Run the create and remove test sections on a single file system:

```
per1-# mdt /jhb10
mdt: Timing metadata ops/second on 8 streams of 16384 files on 1 file system(s)
    mount point        #files    creates  removes
    /jhb10             131072      18441    23792
```

Run the create and remove test sections on four file systems:

```
per1-# mdt /jhb10 /jhb11 /jhb12 /jhb13
mdt: Timing metadata ops/second on 8 streams of 16384 files on 4 file system(s)
    mount point        #files    creates  removes
    /jhb10             131072      13818    12134
    /jhb11             131072      13772    11821
    /jhb12             131072      13839    12117
    /jhb13             131072      13726    12098
mdt: Aggregate:        524288      54901    47283
```

Run all test sections on four file systems:

```
per1-# mdt -a /jhb10 /jhb11 /jhb12 /jhb13
mdt: Timing metadata ops/second on 8 streams of 16384 files on 4 file system(s)
    mount point        #files    creates    stats   chmods    moves  removes
    /jhb10             131072      14105    32904    16721     8366    12072
```

```
    /jhb11             131072      14135    32912    16616     8375    11969
    /jhb12             131072      14175    32883    16659     8436    11895
    /jhb13             131072      14003    33917    17092     8411    12131
mdt: Aggregate:        524288      56005   131510    66462    33465    47578
```

Run the create and remove test sections on four file systems. Create 32 directories using 32 threads with 8192 files in each.

```
per1-# mdt -f8K -n32 /jhb10 /jhb11 /jhb12 /jhb13
mdt: Timing metadata ops/second on 32 streams of 8192 files on 4 file system(s)
    mount point        #files    creates  removes
    /jhb10             262144      12149    10683
    /jhb11             262144      12292    10730
    /jhb12             262144      11859    10780
    /jhb13             262144      11782    10806
mdt: Aggregate:       1048576      47123    42732
```

NOTES

The number of files (-f) and directories (-n) are per file system.

The number of pthreads (streams) that are run in each file systems corresponds to the number of directories specified.

Other than #files, the output values represent metadata operations/second.

FILES

/usr/cvfs/bin/mdt

SEE ALSO

cvfs(8)

NAME

Mio − Multi-stream streaming I/O test

SYNOPSIS

Mio [*options*] *filename* [*filename*...]

DESCRIPTION

Mio is a utility that can be used to measure the I/O performance, in terms of bandwidth, of a system, I/O infrastructure, disk subsystem, disk device and/or file system. **Mio** uses pthreads to asynchronously queue requests to a stream or streams.

Each file name specified on the command line corresponds to a stream. The -q option defaults to 2 as described below, and specifies the number of asynchronous read or write requests that are queued to each stream. A file name can represent a regular file, or a block or character device (see NOTES). By default, **Mio** will issue read requests, with a -w option required for writes.

Upon completion, **Mio** will print a summary of I/O performance for each stream as well as the aggregate performance off all streams. Because the aggregate performance is the performance of all streams over the test run time, it may not reflect the sum of the individual streams.

OPTIONS

-? Display usage.

-b *buffer_size*

Specify the I/O buffer size to use. This value represents the size of each I/O request in bytes. The default buffer size value is 1048576 bytes. Optionally, a single letter suffix can represent bytes in units. **Mio** single letter unit suffixes are as follows.

k	KB	10^3	1,000
m	MB	10^6	1,000,000
b	GB	10^9	1,000,000,000
K	KiB	2^10	1,024
M	MiB	2^20	1,048,576
B	GiB	2^30	1,073,741,824

-B Do buffered I/O. By default, **Mio** will open files for direct I/O. See NOTES below for more information on direct I/O.

-c Create the file(s). This is useful and necessary for regular files, as they must be created before they can be read or written. The -c option is valid only when specified with the -w option.

-d[**dd**] Run in debug mode. The more "d's" specified, the more debug information is printed.

-e *csv_file*

Write results to the specified .csv file; one that can be read by Microsoft Excel or other spreadsheet application. Data is appended to the specified csv file which must exist. See the -E option.

-E *csv_file*

Create and write results to the specified .csv file. A .csv file, (comma separated value) is a file that can be consumed by a spreadsheet application like Microsoft Excel. The maximum number of streams that can be recorded in a .csv file is limited to 16 unless the -u option is specified.

-f Fsync on close. The default is no fsync.

-I *file_offset_increment*

Set the file offset increment for each I/O. For example, when set to zero, we repetitively do I/O to the same file location. The default is to use the buffer size. An **Mio** single letter unit suffix may be specified.

-n *nios* Specifies the number of I/O requests. The default is 1024.

-O *file_offset*
Start the I/O at the given file offset. An **Mio** single letter unit suffix may be specified. The default starting file offset for a regular file is zero. The default starting file offset for a block device is two times the I/O buffer size. This allows writing to a block device without destroying StorNext labels (writing to the block device will, however, destroy the file system).

-p Preallocate the file using the StorNext CvApi_VerifyAlloc API call. The file size will correspond to the number of I/Os times the buffer size. This option is supported only for regular files on a StorNext file system.

-q *queue_depth*
Queue the specified number of I/O requests on each stream. The default is 2. The maximum is currently 256.

-r *rtios* Set realtime mode by setting the number of I/O's per second to the specified value. Realtime mode is available only for regular files on the StorNext file system. An Mio single letter unit suffix may be specified.

-R Record I/O response times. **Mio** will record the I/O response time for each I/O request and increment a counter in the corresponding response time bucket. I/O response time buckets are then printed for each stream along with the transfer rate summary.

-S *seconds*
Run the test for the maximum number of seconds specified. This only has an effect as a maximum, in that, if the test has not completed the specified number of requests after the specified time.

-t *total_data*
Terminate the test after the specified amount of data has been moved rather than a given number of requests. This option is not compatible with the -n option. An **Mio** single letter unit suffix may be specified.

-T *tag string*
Specify a tag string that will be written to the output. An additional line containing the specified tag string will be written in the test summary. If the -E option is specified, the tag string will also be written to the .csv file.

-u Specify that the unlimited streams format be used for csv files. Each stream's data is written to a new line in the file allowing for greater than 16 streams.

-w Specify that writes are done. A regular file must exist, or the -c option must be specified to create the file. The default is to read.

-W *write_mask*
The specified write mask will result in writes on streams where bits are set and reads on streams where bits are clear. The write mask may be specified in hexadecimal, octal, or decimal but is limited to 64 bits, hence 64 streams. The -W option is incompatible with the -c option and all files must exist.

EXAMPLES

Create and issue the default number of writes to four files/streams:

```
per1-# Mio -cw /jhb/f0 /jhb/f1 /jhb/f2 /jhb/f3
Mio: Timing 4 stream(s) of 1024 x 1M direct writes queued 2 deep
    stream[0]:           f0: write  1073.74 MBytes @   256.44 MBytes/Second
    stream[1]:           f1: write  1073.74 MBytes @   228.43 MBytes/Second
    stream[2]:           f2: write  1073.74 MBytes @   265.04 MBytes/Second
    stream[3]:           f3: write  1073.74 MBytes @   242.18 MBytes/Second
Mio: Aggregate:  4294.97 Mbytes @ 913.72 MBytes/Second
```

Issue the default number of reads to the four previously created files:

```
per1-# Mio /jhb/f0 /jhb/f1 /jhb/f2 /jhb/f3
Mio: Timing 4 stream(s) of 1024 x 1M direct reads queued 2 deep
    stream[0]:           f0: read   1073.74 MBytes @  1329.16 MBytes/Second
    stream[1]:           f1: read   1073.74 MBytes @  1334.83 MBytes/Second
    stream[2]:           f2: read   1073.74 MBytes @  1316.28 MBytes/Second
    stream[3]:           f3: read   1073.74 MBytes @  1329.92 MBytes/Second
Mio: Aggregate:  4294.97 Mbytes @ 5265.12 MBytes/Second
```

Issue the default number of reads to two block devices:

```
per1-# Mio /dev/sdd /dev/sdf
Mio: Timing 2 stream(s) of 1024 x 1M direct reads queued 2 deep
    stream[0]:          sdd: read   1073.74 MBytes @   408.38 MBytes/Second
    stream[1]:          sdf: read   1073.74 MBytes @   407.78 MBytes/Second
Mio: Aggregate:  2147.48 Mbytes @ 815.57 MBytes/Second
```

Create and do 10000 writes to four files via four streams:

```
per1-# Mio -cw -n10000 /jhb/f0 /jhb/f1 /jhb/f2 /jhb/f3
Mio: Timing 4 stream(s) of 10000 x 1M direct writes queued 2 deep
    stream[0]:           f0: write 10485.76 MBytes @   488.97 MBytes/Second
    stream[1]:           f1: write 10485.76 MBytes @   448.84 MBytes/Second
    stream[2]:           f2: write 10485.76 MBytes @   458.36 MBytes/Second
    stream[3]:           f3: write 10485.76 MBytes @   497.57 MBytes/Second
Mio: Aggregate:  41943.04 Mbytes @ 1795.35 MBytes/Second
```

Issue 10000 reads, queued 8 deep to four streams:

```
per1-# Mio -q8 -n10000 /jhb/f0 /jhb/f1 /jhb/f2 /jhb/f3
Mio: Timing 4 stream(s) of 10000 x 1M direct reads queued 8 deep
    stream[0]:           f0: read  10485.76 MBytes @   898.16 MBytes/Second
    stream[1]:           f1: read  10485.76 MBytes @  1075.04 MBytes/Second
    stream[2]:           f2: read  10485.76 MBytes @  1050.13 MBytes/Second
    stream[3]:           f3: read  10485.76 MBytes @   869.96 MBytes/Second
Mio: Aggregate:  41943.04 Mbytes @ 3479.83 MBytes/Second
```

Issue 240 x 12746752 reads to four streams and "tag" the summary:

```
per1-# Mio -b12746752 -n240 -T full_aperture_2K /jhb/f0 /jhb/f1 /jhb/f2 /jhb/f3
Mio: full_aperture_2K
Mio: Timing 4 stream(s) of 240 x 12448K direct reads queued 2 deep
    stream[0]:           f0: read   3059.22 MBytes @   884.50 MBytes/Second
    stream[1]:           f1: read   3059.22 MBytes @   726.70 MBytes/Second
    stream[2]:           f2: read   3059.22 MBytes @   808.67 MBytes/Second
    stream[3]:           f3: read   3059.22 MBytes @   656.74 MBytes/Second
Mio: Aggregate:  12236.88 Mbytes @ 2626.95 MBytes/Second
```

Issue 10000 reads to four streams and report the response times:

```
per1-# Mio -R -n10000 /jhb/f0 /jhb/f1 /jhb/f2 /jhb/f3
Mio: Timing 4 stream(s) of 10000 x 1M direct reads queued 2 deep
    stream[0]:           f0: read  10485.76 MBytes @   536.02 MBytes/Second
    stream[1]:           f1: read  10485.76 MBytes @   688.96 MBytes/Second
    stream[2]:           f2: read  10485.76 MBytes @   856.74 MBytes/Second
    stream[3]:           f3: read  10485.76 MBytes @   841.03 MBytes/Second
Mio: Aggregate:  41943.04 Mbytes @ 2144.08 MBytes/Second
```

```
I/O response time buckets:      0ms    5ms    10ms    20ms    50ms   100ms   500m
    stream[0]:           f0:     7632    1459     768     137       4       0
    stream[1]:           f1:     8570     928     395     103       4       0
    stream[2]:           f2:     9240     491     197      68       4       0
    stream[3]:           f3:     9196     494     234      76       0       0
```

NOTES

Writing to a device that contains data can result in data loss. Do not write to drives that contain any useful information.

Character devices - Some platforms have character device representations of disk devices and/or disk partitions that support read/write and some do not.

Direct I/O - Direct I/O is not supported on all platforms, although it is pretty well tested on Linux and Windows. Direct I/O support for specific files on other platforms is schizophrenic at best, and may not be supported on a particular file system, block device, character special device, or without appropriate mount options.

Windows - **Mio** on Windows can be used from either a cygwin environment or a DOS shell environment. File names are specified using the drive letter format. Use of a leading slash is recommended to avoid interpretation of the path based on the last relative location in that drive. A Windows physical drive is specified using the \\.\ notation. For example, PhysicalDrive9 is specified as \\.\PhysicalDrive9.

The Windows cygwin environment requires escaping the backslash resulting in 4 backslashes, period, 2 backslashes. Failure to escape the backslash cygwin can cause writing to the root directory as the name is changed to \.PhysicalDrive9.

FILES

/usr/cvfs/bin/Mio

SEE ALSO

cvfs(8)

NAME

mount_cvfs − mount a StorNext client file system

SYNOPSIS

Solaris:

mount [**-F cvfs**] [**-o** *options*] *filesystem dir*

Linux:

mount [**-fnv**] [**-t cvfs**] [**-o** <*options*>] <*filesystem*> <*dir*>

Irix:

mount [**-v**] [**-t cvfs**] [**-o** *options*] *filesystem dir*

AIX:

mount [{**-v**|**-V**} **cvfs**] [**-o** *options*] *filesystem dir*

HP-UX:

mount [**-F cvfs**] [**-o** *options*] *block_device_or_dir dir*

Direct Execution:

mount_cvfs *filesystem dir* **cvfs** *options*
mount_cvfs *server***:** *filesystem dir* **cvfs** *options*

Direct Execution (Linux)

mount_cvfs *control_device filesystem dir* **cvfs** *options*

DESCRIPTION

mount_cvfs is a *mount helper* utility that mounts a StorNext file system on client machines. On Irix, Linux, HP-UX, Solaris & AIX these utilities are called by the **mount**(8) utility to mount file systems of type **cvfs**. These helper utilities are designed to be invoked only by the **mount**(8) utility; if they are invoked directly on the command line, the option and argument location is strictly positional.

Each client file system must communicate with a File System Manager (FSM) running either locally or on a remote host. The FSM manages all the activity for the client in terms of storage allocation and metadata. Data transfers go directly between disks and the client. In the second form of the **mount_cvfs** command, the hostname of the FSM server is explicitly given in a syntax similar to NFS.

The FSM can manage a number of different StorNext file systems. Each different file system is specified in a configuration file on the FSM host. For example, a sample file system configuration is provided in the FSM configuration file */usr/cvfs/examples/example.cfgx*.

OPTIONS

Options supported by the mount command:

-f **LINUX ONLY**

Fakes the mount process but updates the */etc/mtab* file. The mount call will fail if the mtab entry already exists.

-n **LINUX ONLY**

Mounts the filesystem without updating the */etc/mtab* file.

-v Verbose mode.

Additional options may be specified in the */etc/fstab* file or on the **mount**(8) command line via the **-o** parameter. The **-o** parameter should be specified only once. If multiple options are needed, they should follow the **-o** in a comma-separated list.

ro Default: rw

Mount the file system read-only.

rw Default: rw

Mount the file system read/write.

noatime
Default: off

Do not update inode access times on this file system. Silently disabled on a managed filesystem.

nodiratime
Default: off

Do not update directory access times on this file system.

compat32
Default: off

When set, force directory offsets to fit into 31 bits and inode numbers to 32 bits. This should only be used when a problem has been identified with using the full size of the struct dirent d_off field from **readdir(2)** or older clients that are unable to handle large inode numbers.

noexec Default: off

Do not allow the execution of programs resident on this file system.

nosuid Default: off

When executing programs resident on this file system, do not honor the set-user-ID and set-group-ID bits.

threads=*n*
Default: **12**

Determines the number of kernel threads that are created. On some platforms these threads will show up as **cvfsiod** processes in the output of **ps**.

This setting does not affect other kernel threads, for example, **cvfsd**, **cvfsbufiod**, **cvfsflusher**, **cvfs_dputter**.

The minimum value allowed is 12.

stripeclusters=*n*
Default: **8**

In certain cases, such as with using JBOD devices it may be possible to over-load their command queues using SNFS. If this occurs, the I/O concurrency can be reduced by reducing the number of concurrent *stripeclusters* the file system uses. The reduction is at the cost of performance.

buffers={**yes**|**no**}
Default: **yes**

When set to **yes**, the file system will use buffer caching for unaligned I/O.

protect_alloc={**yes**|**no**}
Default: **no**

When set to **yes**, non-root users are unable to use the preallocation ioctl. Note: protect_alloc=yes also (silently) implies sparse=yes. **diskless=**{**yes**|**no**} Default: **no**

If the diskless option is set to **yes** then the mount will succeed, even if the file system's disks are

unavailable. Any subsequent I/O will fail until the file system's disks are visible through the SNFS portmapper.

diskproxy={server|client}

If the diskproxy option is set to **client**, then the mount will use a Proxy Server to do its data I/O.

If the diskproxy option is set to **server**, then this system will become a Proxy Server for this file system. A **dpserver** configuration file must exist to define the operating parameters for the Server. See **dpserver**(4) and **sndpscfg**(8) for details.

A set of proxy servers may be configured in a sparse manner where each server sees only a subset of the disks in the file system. The servers make use of the "diskless" mount option. The proxy client will issue disk i/o requests to the appropriate server. No special configuration is needed on the client.

Note: The diskproxy option is available only on Linux and Solaris systems, and the server option is available on Linux systems. The diskproxy selection on Windows clients is made through the Client Configuration utility.

proxypath={balance|rotate|sticky|filestickybalance|filestickyrotate}

Only used if the diskproxy option is set to **client**, controls the algorithm used to balance I/O across Proxy Server connections.

The proxy client keeps track of bytes of I/O pending, bytes of I/O completed and the elapsed time for each I/O request. It uses these values and certain rules to determine the server that is used for subsequent I/O requests. These collected counters are decayed over time so that only the most recent (minute or so) I/O requests are relevant.

There are two main components of the selection - the algorithm itself and the use of file sticky behavior. The algorithms are balance, rotate and sticky.

The **balance** algorithm attempts to keep the same amount of time's worth of I/O outstanding on each connection. i.e. Faster links will tend to get more of the I/O. A link could be faster because a given server is more efficient or less busy. It also may be the case that network traffic over a given link uses higher speed interconnects such as 10G ethernet.

The **rotate** algorithm attempts to keep the same number of bytes of I/O pending on each Proxy Server connection. This is similar to balance in that servers which respond more quickly to I/O requests will have the outstanding I/O bytes reduced at a more rapid pace than slower servers and will thus be used more often than slower links.

The difference between balance and rotate is that with balance, higher speed links will have more bytes of I/O outstanding than slower links.

In both balance and rotate, if more than one path has the best score, a pseudo-random selection among the winning paths is made to break the tie.

The **sticky** algorithm assigns I/O to specific luns to specific Proxy Server connections.

Filesticky behavior attempts to assign I/O for a given file to a specific proxy server. It does this by using the file's inode number modulo the number of servers to select a server index. Since all clients see the same inode number for a given file, all clients will select the same server. If there is more than one path to that server, then the algorithm (balance or rotate) will be used to select among the paths.

Filesticky behavior is controlled through a mount option.

When no proxypath mount option is specified, the balance algorithm is used and filesticky behavior is selected.

For mount options balance and rotate, filesticky is not selected. For filestickybalance and filestickyrotate filesticky is selected.

Note: The proxypath mount option is available only on Linux and Solaris systems. The proxypath options are selected on Windows clients through the Client Configuration utility.

proxyclient_rto=*n*

Only used if the diskproxy option is set to **client**. Defines the starting value in seconds to wait for a Proxy Client I/O read request to complete before disconnecting from the Proxy Server and resubmitting the request to a different Proxy Server. If reads are completing but coming close to the configured timeout, the timeout will be increased.

The minimum value is 1 second, maximum is 3600 and the default value is 15.

Note: This option is available only on Linux and Solaris systems.

proxyclient_wto=*n*

Only used if the diskproxy option is set to **client**. Defines the starting value in seconds to wait for a Proxy Client I/O write request to complete before disconnecting from the Proxy Server and resubmitting the request to a different Proxy Server. If writes are completing but coming close to the configured timeout, the timeout will be increased.

The minimum value is 1 second, maximum is 3600 and the default value is 30.

Note: This option is available only on Linux and Solaris systems.

atimedelay={**yes**|**no**}

Default: **no**

Perform lazy atime updates. This option improves performance by waiting until closing a file before updating the atime value of the file. This reduces extra network traffic and latency linked to atime updates.

nrtiotokenhold=*n*

Default: **60**

The QOS Token Hold Time (nrtiotokenhold) parameter is only applicable when using the SNFS Quality of Service (QOS) feature for real-time I/O. The parameter determines the number of seconds that a client stripe group will hold on to a non-realtime I/O token during periods of inactivity. If no I/O is performed on a stripe group within the specified number of seconds, the token will be released back to the FSM.

The parameter should be specified in five second increments; if the parameter is not a multiple of five, it will be rounded up automatically.

auto_concwrite={**yes**|**no**}

Default: **no**

When set to **yes**, allows multiple threads to write to files concurrently.

Note: setting auto_concwrite=yes requires that sparse=no also be specified. Also, protect_alloc=yes is disallowed with auto_concwrite=yes.

cachebufsize=*size*

Default **64 K** (bytes)

This option sets the size of each cache buffer. This determines the I/O transfer size used for the buffer cache. For optimal performance, cachebufsize should match the RAID stripe size. If cachebufsize is less than the RAID stripe size write performance may be severely degraded.

The maximum value allowed is 2048k and the minimum value allowed is 1. The value is rounded up to be a multiple of file system blocks. For example, if the file system block size is 4k and a value of 1 is used, the cachebufsize will be 4k and a value of 2047k would be rounded up to 2048k.

Can be specified in bytes (e.g. 131072) or kilobytes (e.g. 128k).

buffercachecap=*n*

Depicted in megabytes (MB).

Default: varies by hardware, OS, and memory:

32bit windows with <= 2GB of memory => **32MB**
32 bit windows with > 2GB of memory => **64MB**
32 bit linux with <= 2GB of memory => **64MB**
32 bit linux with > 2GB of memory => **128MB**
all others with <= 2GB of memory => **64MB**
all others with > 2GB of memory => **256MB**

Tell the system how much memory in MB units to use for the **cachebufsize** associated with this mount. All mounted file systems with the same **cachebufsize** share this amount of memory. If a subsequent mount with the same **cachebufsize** increases **buffercachecap**, an attempt is made to allocate more buffers. If **buffercachecap** is less than or equal to a previously mounted file system already mounted with the same **cachebufsize**, the value is ignored. If the number of buffers already allocated for this **cachebufsize** is less than **buffercachecap**, an attempt is made to allocate more buffers. If any allocation fails, mount stops trying to allocate and the mount succeeds unless not even 10 buffers could be allocated. In this last case, mount fails with ENOMEM.

If the total amount of memory on the system is 4GB or less, the value of **buffercachecap** must be between 1 and 1/2 the memory size (in MB). For example, if the machine has 2GB of memory, **buffercachecap** can be a value from 1 up to and including 1024.

If the total amount of memory on the system is greater than 4GB, the maximum value for **buffercachecap** is given by:

MINIMUM(memory_size_in_MB - 2048, .9 * memory_size_in_MB)

Note that some operating systems reserve a percentage of memory for special purposes making the available memory somewhat smaller than the physical capacity of the installed RAM.

Also note that while a maximum value exists for **buffercachecap** that attempts to prevent having a single mount consume too much memory, no checks are made across other caches or other memory consumers including user processes. For example, it is possible to oversubscribe memory by configuring different values of **cachebufsize** across mounts and specifying large values of **buffercachecap**. Oversubscription is also possible when specifying very large values of **dircachesize** and **buffercachecap** for a particular mount.

The **cvdb**(8) command can be used with the **-b** option to see how many buffers have been allocated for each **cachebufsize**.

bufferlowdirty=*n*
bufferhighdirty=*n*

These options set the low and high watermarks for background buffer flushing and values are depicted in megabytes (MB). Note: these options are not intended for general use. Only use when recommended by Quantum Support.

buffercachemin=*n*

See **buffercachecap**. This option has been deprecated and is ignored. Depicted in megabytes (MB).

buffercachemax=*n*

See **buffercachecap**. This option has been deprecated and is ignored. Depicted in megabytes (MB).

verbose={**yes**|**no**}

Default: **no**

When set to **yes**, **mount_cvfs** will display configuration information about the file system being mounted.

debug={**yes**|**no**}

Default: **no**

When set to **yes**, **mount_cvfs** will display debugging information. This can be useful in diagnosing configuration or disk problems.

mnt_retrans=*n*

Default: **1**

Indicates the number of retransmission attempts the file system will make during the execution of the **mount**(2) system call. Until the file system is mounted, the kernel will only retransmit messages to the FSM **mnt_retrans** times. This parameter works in conjunction with the **mnt_recon** parameter. This can help reduce the amount of time a mount command will hang during boot; see the **mnt_type** option.

mnt_recon={**hard**|**soft**}

Default: **soft**

Controls whether after *mnt_retrans* attempts at contacting the FSS during the mounting and unmounting of a file system, the kernel will either give up or continue retrying forever. It is advisable to leave this option at **soft** so that an unresponsive FSS does not hang the client during boot.

mnt_type={**bg**|**fg**}

Default: **fg** (foreground)

Setting **mnt_type** to **bg** will cause the mount to run in the background if the mount of the indicated file system fails. **mount_cvfs** will retry the mount **mnt_retry** number of times before giving up. Without this option, an unresponsive FSM could cause a machine to hang during boot while attempting to mount StorNext file systems.

During background mounts, all output is re-directed to **/var/adm/SYSLOG**.

mnt_retry=*n*

Default: **100**

If a mount attempt fails, retry the connection up to *n* times.

retrans=*n*

Default: **5**

Indicates the number of attempts that the kernel will make to transmit a message to the FSM. If no response to a transmitted message arrives in the amount of time indicated by the **timeout** parameter, the request will be retransmitted. If the file system was mounted with the **recon=soft** parameter, the file system will give up after *retrans* attempts at sending the message to the FSM and will return an error to the user.

recon={**hard**|**soft**}
Default: **hard**

This option controls whether after *retrans* attempts at sending a message to the FSM, the file system will give up or continue retrying forever. For **hard** mounted file systems, the kernel will retry the connection attempt forever, regardless of the value of the *retrans* field. For **soft** mounted file systems, the kernel will only try *retrans* number of times before giving up and returning an error of **ETIME** (62). This is analogous to the *hard* and *soft* options to NFS (see **fstab**(5)).

timeout=*n*
Default: **100** (ten seconds)

The timeout value, in tenths of a second (0.1 seconds) to use when sending message to the FSM. This timeout parameter is similar to the one used by NFS (see **fstab**(5) for more information on NFS timeouts). If no response is received from the FSM in the indicated period the request is tried again. On heavily loaded systems, you may want to adjust the timeout value higher.

syslog={**none**|**notice**|**info**|**debug**}
Default: **notice**

During normal operations, certain messages will be logged to the system console using the *syslog* facility. **debug** is the most verbose, with **notice** being reserved for critical information. It is important to note that the syslog level is **global** per system, not unique to each file system. Changing the level for one file system will affect all other SNFS file systems.

blkbufsize=*n*
Default: **64 K**

This option sets the maximum buffer size, in bytes, for the unaligned I/O transition buffer. Use caution when setting this option since values that are too small may degrade performance or produce errors when performing large unaligned I/O.

dircachesize=*n*
Default: **10 MB**

This option sets the size of the directory cache. Directory entries are cached on the client to reduce client-FSM communications during directory reads. Note: the directory cache on a client is shared across all mounted SNFS file systems. If different values of dircachesize are specified for multiple file systems, the maximum is used. When applying this setting, ensure that the system has sufficient kernel memory.

Can be specified in bytes (e.g. 2097152), kilobytes (e.g. 2048k), or megabytes (e.g. 2m).

auto_dma_read_length=*n*
Default: **1048577 Bytes (1MB + 1)**

The minimum transfer size used for performing direct DMA I/O instead of using the buffer cache for well-formed reads. All well-formed reads equal to, or larger than this value will be transferred with DMA. All read transfers of a smaller size will use the buffer cache. Reads larger than this value, that are not well-formed will use a temporary memory buffer, separate from the buffer cache.

The minimum value is the cachebufsize. By default, well-formed reads of greater than 1 Megabyte will be transferred with DMA; smaller reads will use the buffer cache.

Auto_dma_read_length can be specified in bytes (e.g. 2097152), kilobytes (e.g. 2048k), or megabytes (e.g. 2m).

auto_dma_write_length=*n*

Default: **1048577 Bytes (1MB + 1)**

The minimum transfer size used for performing direct DMA I/O instead of using the buffer cache for well-formed writes. All well-formed writes equal to, or larger than this value will be transferred with DMA. All write transfers of a smaller size use the buffer cache.

The minimum value is the cachebufsize. By default, well-formed writes of greater than 1 Megabyte will be transferred with DMA; smaller writes will use the buffer cache. Writes larger than this value, that are not well-formed will use a temporary memory buffer, separate from the buffer cache.

Auto_dma_write_length can be specified in bytes (e.g. 2097152), kilobytes (e.g. 2048k), or megabytes (e.g. 2m).

buffercache_readahead=*n*

Default: **16**

This option modifies the size of the read-ahead window, represented in cache buffers. Setting this value to 0 disables read-ahead.

buffercache_iods=*n*

Default: **8**, Minimum: **1**, Maximum: **100**

The number of background daemons used for performing buffer cache I/O.

cvnode_max=*n*

Default: varies by platform.

This option sets the maximum number of cvnode entries cached on the client. Caching cvnode entries improves performance by reducing Client-FSM communication. However, each cached cvnode entry must be maintained by the FSM as well. In environments with many SNFS clients the FSM may be overloaded with cvnode references. In this case reducing the size of the client cvnode cache will alleviate this issue.

max_dma=*n*

AIX AND LINUX ONLY

Default: varies by platform.

This option tells the kernel the maximum DMA size a user process can issue. This can impact the number of concurrent I/Os the file system issues to the driver for a user I/O. There are other factors that can also limit the number of concurrent I/Os. The default is 256m on AIX and 512m on Linux. WARNING: Incorrectly setting this value may degrade performance or cause a crash/hang.

max_dev=*n*

AIX AND LINUX ONLY

Default: **AIX: I/O driver IOCINFO max_transfer.**
Default: **Linux: 512M with Linux DM/Multipath. 512K with StorNext multipath.**

This option tells the kernel the maximum I/O size to use when issuing I/Os to the underlying disk driver handling a LUN. The file system attempts to get the maximum I/O size using the IOCINFO ioctl. Since the ioctl is not always reliable, this mount option exists to override the ioctl return value. Example usage max_dev=1m or max_dev=256k. WARNING: Incorrectly setting this value may result in I/O failures or cause a crash/hang. For Linux clients, only use when recommended by Quantum Support.

sparse={**yes**|**no**}
Default: varies by platform.

Some utilities detect "holes" in a file and assume the file system will fill the hole with zeroes. To ensure that SNFS writes zeroes to allocated, but uninitialized areas on the disk, set *sparse=yes*.

max_dma_ios=*n*
LINUX ONLY Default: **0** (disabled)

This option controls the amount of dma based I/O which is can be queued while there is buffer cache based I/O pending. The numerical value is multiplied by the cachebufsize (64K default), once this amount of buffered I/O is pending, all DMA I/O will be suspended until some of the buffered I/O completes. This gives buffered I/O some priority over heavy DMA loads. If you do not understand how to use this for your workload, do not use it.

io_penalty_time=*n*
Default: **300** *(seconds)*

This option controls the Multi-Path I/O penalty value, where *n* is expressed in seconds with a minimum value of *1* and a maximum value of 4294967295 (*0xFFFFFFFF*). This parameter establishes the amount of time that a *Path_In_Error* will be bypassed in favor of an *Operational Path* during a Multi-Path selection sequence. If all paths are currently in the *Path_In_Error* state, then the first available path will be selected, independent of the *Path_In_Error* state.

io_retry_time=*n*
Default: **0** *(Forever)*

This option controls the I/O retry behavior. *n* is expressed in seconds (**0** is no time limit), and establishes the amount of time that may elapse during an I/O retry sequence. An I/O retry sequence consists of:

1. Retry an I/O request across all available paths that are currently present.
2. Compare the current time to the *Instantiation* time of the I/O request, if at least *n* seconds have elapsed, return the I/O request in error, otherwise reset the paths used, and retry again.

iso8859={**1**|**15**}
Default: disabled

This option provides conversion of file and directory names from legacy ISO-8859-1 and ISO-8859-15 to SNFS native UTF8 format. This may be needed in environments where a critical application does not yet support UNICODE and the required locale is ISO-8859-1 or ISO-8859-15.

This option is supported on Linux, HP-UX, Solaris, Irix, and AIX.

Limitations:

1. cannot be enabled on SNSM metadata server (clients only).
2. filesystem names must be plain ascii.
3. pre-existing filesystems with erroneous ISO-8859 object names must be manually converted to UTF8 before using this feature. Note, this can be easily accomplished with a perl script using Encode::from_to().
4. does not solve issues surrounding composed versus decomposed presentation.

caseinsensitive={**yes**|**no**}
LINUX ONLY Default: **0** (no)

Causes a Linux client to evaluate path names in a case insensitive, case preserving mode. This is intended for use in SMB environments to reduce the overhead of emulating the behavior of a Windows file system on Linux in user space.

allowdupmount={**yes**|**no**}
Default: **no**

UNSUPPORTED - reserved for Quantum internal usage. Not intended for production use. When set to **yes**, **mount_cvfs** will allow multiple mounts for the same file system.

dmnfsthreads=*n*
Linux ONLY Default: 0.

Determines the number of threads used for servicing retrieves of off-line files initiated as a side effect of NFS activity. This option should only be used on Linux systems acting as NFS servers and is only useful for managed file systems. *dmnfsthreads* should be set to a value as least as large as the maximum number of concurrent retrieves possible for the file system. For example, with tape-based configurations, this will be equal to the number of tape drives configured for retrieval.

loopdev={**on**|**off**}
Linux ONLY

Default: off.

Enable support for loopback devices on top of Stornext. This causes heavy use of the linux page cache when loop devices are used, it will also change how an NFS server interacts with Stornext. Use of the option is not recommended unless loopback device or sendfile support is required.

ingest_max_seg_size=*n*
Default: 0.

Set the maximum size of ingest segments to *n* (bytes).

ingest_max_seg_age=*n*
Default: 0.

Set the maximum time to wait before sending ingest segment to *n* (seconds).

memalign=*n*
bufalign=*n*
Default: varies by platform.

Set the required memory alignment for dma transfers to *n*. Use of the option is not intended for general use and may be deprecated in the future. Only use when recommended by Quantum Support.

fsname= *filesystem*
HP-UX ONLY

Default is the last component of the mount point, **dir**.

On HP-UX, the first required argument to the mount command must be a directory or a block device. Any block device or directory may be used that is not already mounted. It is simplest to reuse the mount point. If one wishes to have a mount point that does not end in the file system name, this option must be used to specify the file system name. For example,

mount -F cvfs /stornext/snfs1 /stornext/snfs1

mount -F cvfs -o fsname=snfs1 /base /base

bcacheprefersreaders=<*type*>
Linux ONLY Default: none

Enable special buffer cache ingest throttling and LRU handling. This option is not intended for general use and incorrect use may lead to poor performance and system instability. Only use when recommended by Quantum Support.

AUTOMATIC MOUNTING

On Irix & Linux, the initialization of SNFS can be controlled by the **chkconfig**(8) mechanism. If the **cvfs** chkconfig flag is set to **on**, then all SNFS file systems specified in the */etc/fstab* file will be mounted when the system is booted to multi-user state. When the system is being shut down, the file systems will be unmounted. See the **cvfs** man page for more information.

On Solaris, the installation of CVFS adds a startup script to */etc/init.d/* that will automatically mount CVFS file systems present in the */etc/vfstab* file with a "yes" keyword in the "mount at boot" column.

On AIX, the installation of SNFS adds the */etc/rc.cvfs* startup script. This script is then called at startup per the */etc/inittab* file. The rc.cvfs script will automatically mount and SNFS file systems included in the */etc/vfs* file.

DISK DEVICES

mount_cvfs will query the local portmapper for the list of all accessible SNFS disk devices. SNFS disks are recognized by their label. This list is matched with the list of devices for each stripe group in the file system. If any disk is missing, I/O will be prohibited, and you will receive I/O errors.

RECONNECT

A socket is maintained for each unique SNFS client file system for sending and receiving commands to and from the FSM. If the socket connection is lost for any reason, it must be reconnected.

There are two daemons involved in re-establishing the connection between an SNFS client and the FSM. The first is the socket input daemon, which is a dedicated daemon that handles all input from the FSM. The second is the reconnect daemon, which handles the work of re-establishing the logical connection with the FSM. Both of these daemons appear as **cvfsd** in the output from **ps**.

Messages will be printed on the system console and to *syslog* during reconnect processing; the verbosity of the messages displayed can be controlled via the **syslog=** parameter and **cvdb**(8).

When the socket input daemon detects that the connection has been lost, it will attempt to first connect to the fsm portmapper process, **fsmpm**(8). Once it has succeeded and has the port number of the **fsm**(8) to use, it attempts to create a new socket to the FSM using the port number returned by fsmportmapper.

If no response is received from either the SNFS portmapper or the FSM, the daemon will pend for the amount of time specified by the **timeout=** parameter. The socket input daemon will attempt to reconnect to the FSM forever.

If any of the configuration parameters in the FSM configuration file changed, then the connection will be terminated, and no further I/O will be allowed. The only recourse will be to unmount and remount the file systems. See **snfs_config**(5) (part of the *cvfs_server* product) for more information on configuring the FSM.

INTERRUPTIBLE SLEEPS

Whenever a process must go to sleep in the SNFS file system, the sleep is interruptible, meaning that the process can be sent a signal and the operation will fail with an error (usually **EINTR**). The only exceptions are when a process is executing the **exit**(2) system call and is closing out all open files; due to Unix limitations, processes are immune to signals at that point.

EXAMPLES

File systems can be specified either on the command line or in */etc/fstab*. To mount the default file system that is served by a host in the SAN, the entry in */etc/fstab* would be:

```
default /usr/tmp/cvfs cvfs verbose=yes
```

If this is the only SNFS file system in */etc/fstab*, it could be mounted with the command:

```
# mount -at cvfs
```

To mount the same file system, but specifying a soft connection with a retransmit count of two, and a soft background mount with a retry count of two, the entry in */etc/fstab* would be (line is shown broken up for readability; in practice, it would wrap):

```
default /usr/tmp/foo cvfs verbose=yes,recon=soft,retrans=2,
      mnt_recon=soft,mnt_retry=2,mnt_type=bg
```

Filesystems can also be specified on the command line, without an entry in */etc/fstab*. To mount the default file system on mount point */usr/tmp/foo*:

```
mount -t cvfs default /usr/tmp/foo
```

To mount a file system verbosely that is described by the FSS configuration file *mycvdr.cfgx* on that host:

```
mount -o verbose=yes -t cvfs mycvdr /usr/tmp/foo
```

FILES

/etc/config/cvfs (Irix Only)

SEE ALSO

cvfsd(8), **cvdb**(8), **mount**(8), **chkconfig**(8) , **sndpscfg**(8), **dpserver**(4)

NAME

nss_cctl − StorNext Cluster-Wide Central Control File

SYNOPSIS

/usr/cvfs/config/nss_cctl.xml

DESCRIPTION

The **StorNext File System** supports cluster-wide central control to restrict the behaviour of SNFS cluster nodes (fsm server, file system client and cvadmin client) from a central place. A central control file **nss_cctl.xml** is used to specify the desired controls on the cluster nodes. This file resides under */usr/cvfs/config* on a **nss coordinator server**.

This control file is in **xml** format and has hierarchical structure. The top level element is "**snfsControl**". It contains control element "**securityControl**" for certain file systems. If you have different controls for different file systems, then each file system should have its own control definition. A special virtual file system "**#SNFS_ALL#**" is used as the default control for file systems not defined in this control file. It is also the required file system name when configuring the **snfsAdmin** and **snfsAdminControl** options. *Note*: you cannot have a real file system named as "**#SNFS_ALL#**".

Each file system related control element (e.g. **securityControl**) has a list of "**controlEntry**". Each "**controlEntry**" defines the client and the intended controls. A client can be of type "**host**" or "**netgrp**". For "**host**" type, its "**hostName**" can be either its ip address or its host name. Both IP V4 and IP V6 are supported. "**netgrp**" specifies a group of consecutive ip addresses. "**netgrp**" has two sub-elements: "**network**" defines the ip address (either V4 or V6) of the network group, "**maskbits**" defines the network mask bits. It is possible that there is overlap between the ip addresses in the host section and netgrp section, and the "host" entries should be defined before the "netgrp" entries.

In this case, the netgrp control is considered to be a generic case, while the controls for a individual is considered to be a special case. A special case takes precedence.

Controls

Currently **seven** controls are supported. Each control has this format:

<*control* **value="***value***"/>**

The *value* can be either "**true**" or "**false**". The *control* is one of the following controls:

mountReadOnly

Controls whether the client should mount the given file system as readonly. Value "**true**"("**false**") means the file system is mounted as readonly (read/write). If this control is not specified, the default is read/write.

mountDlanClient

Controls whether the client can mount the given file system via proxy client. Value "**true**"("**false**") means the file system is (not) allowed to mount via proxy client. The default is "mount via proxy client not allowed".

takeOwnership

Controls whether users on a windows client are allowed to take ownership of file or directory of a stornext file system. Value "true" ("false") means that taking ownership is (not) allowed. The default is that "take ownership is not allowed". *Note*: this control only applies to the clients running on Windows platforms.

snfsAdmin

Controls whether **cvadmin** running on a host is allowed to have **super admin** privilege to run **privileged** commands such as start/stop fs. Value "**true**"("**false**") means users with **superadmin** privilege is (not) allowed to run privileged commands. The default value is "false". This option can only be defined under the **#SNFS_ALL#** file system name.

snfsAdminConnect

Controls whether **cvadmin** running on a client is allowed to connect to other fsm host via "-H" option. Value "**true**"("**false**") means **cvadmin** is (not) allowed to connect to other fsm host via "-H"

option. The default value is "false". This option can only be defined under the **#SNFS_ALL#** file system name.

exec Controls whether binary executable files on the file system are allowed to be executed. Value "**true**"("**false**") means binary executable files are (not) allowed to be executed. The default value is "**true**", i.e. the execution is allowed.

suid Controls whether setuid bit is allowed to take effect. Value "**true**"("**false**") means setuid bit is (not) allowed to take effect. The default value is "**true**".

Note: If no match is found for a given client's ip address, then the client has no privilege to access a SNFS cluster. If a file system has been defined but the client is not defined in that file system's control (securityControl), then the client has no access privilege to the specified file system.

LIMITATIONS:

Currently only **Linux** platform is supported to be a nss coordinator server capable of parsing this xml file. If you have a Solaris machine as the fsm server, in order to enforce this cluster-wide central control, you need to use a **Linux** machine as your nss coordinator with this central control file in place.

EXAMPLE

The following is an example of nss_cctl.xml file. It defines the control of file system "snfs1", and also the special virtual file system "#SNFS_ALL#".

```
<snfsControl xmlns="http://www.quantum.com/snfs/cctl/v1.0">
  <securityControl fileSystem="snfs1">
        <controlEntry>
          <client type="host">
                <hostName value="192.168.230.132"/>
          </client>
          <controls>
                <mountReadOnly value="true"/>
                <mountDlanClient value="true"/>
                <takeOwnership value="false"/>
                <exec value="true"/>
                <suid value="false"/>
          </controls>
        </controlEntry>
        <controlEntry>
          <client type="netgrp">
                <network value="192.168.1.0"/>
                <maskbits value="24"/>
          </client>
          <controls>
                <takeOwnership value="true"/>
                <mountReadOnly value="true"/>
          </controls>
        </controlEntry>
  </securityControl>
  <securityControl fileSystem="#SNFS_ALL#">
        <controlEntry>
          <client type="host">
                <hostName value="linux_ludev"/>
          </client>
          <controls>
                <snfsAdmin value="true"/>
                <snfsAdminConnect value="true"/>
          </controls>
        </controlEntry>
```

```
    </securityControl>
</snfsControl>
```

FILES

/usr/cvfs/config/nss_cctl.xml
/usr/cvfs/examples/nss_cctl.example

NAME

objs.conf − StorNext File System Object Storage Configuration

SYNOPSIS

/usr/cvfs/config/objs.conf

DESCRIPTION

The StorNext File System (SNFS) *objs.conf* file defines the configuration information for **Object Storage (OBJS)** that is used by **snpolicyd** and other StorNext components.

SYNTAX

The **objs.conf** file exists in the SNFS 'config' directory. It contains parameters specifying various aspects of **Object Storage** including the Object Storage accesser hosts and the communication ports, authentication method and credentials for authentication, etc. A parameter has a name and a typed value.

Multiple **Object Storage** configurations can be defined in this configuration file. Each configuration starts with parameter **objs_id**.

Blank lines and lines starting with a pound-sign (#) are skipped.

If any error occurs during parsing, the parsing stops and the remaining fields in the config file are skipped. The current **Object Storage** configuration is discarded. A RAS message is sent when a parsing error occurs.

Parameter Types

Every parameter has a *type*. Parameter types are: *boolean*, *decimal integer*, *scaled integer*, *interval*, *enumerated type*, or *string*.

Boolean

Boolean attributes may take on the values of **true** or **false**, or equivalently **1** or **0**, **yes** or **no**, or **on** or **off**.

Decimal Integer

Decimal integer attributes take on integer values. They must be specified as decimal numbers and may be constrained to a range of acceptable values.

Scaled Integer

Scaled integer attributes are similar to decimal integer values, but may be specified in octal (leading 0) or hexadecimal (leading 0x), and may optionally be given scaling factors (K=1024, M=(1024*1024), G=(1024*1024*1024). They too may be constrained to a range of acceptable values.

Enumerated Type

Enumerated type attributes may be given any one of a specified set of values pertaining to the specific attribute.

String

String String parameters are terminated by end−of−string, or, if the attribute value begins with a double quote, by a matching double−quote.

Parameters

The following are the parameters supported in **objs.conf** file:

```
objs_id=<value>
```

where <**value**> is a string. This parameter must appear as the first parameter in an **Object Storage**

configuration. You may define multiple **Object Storage** configurations in **objs.conf**. The occurrence of this parameter indicates the end of the prior configuration and the start of a new configuration. If there are multiple configurations, the value of **objs_id** must be unique. This parameter is referenced by attribute **objs_id** in a **snpolicy** named policy. This parameter is required.

```
provider=<value>
```

where <**value**> is a enumerated type. Currently we support: "Lattus" and "LattusS3". "Lattus" represents AXR protocol implemented by Lattus. "LattusS3" represents the AWS S3 protocol implemented by Lattus. This parameter is required.

```
access_host_ports=<value>
```

where <**value**> is a pair or multiple pairs of the access host and the TCP port(s). a pair of host and TCP port(s) are separated by a colon ":". A host can be a host name or its IP address. TCP port can be one valid port number, e.g. 8080, or it can be a range of port numbers. "-" is used to specify a range of ports, e.g. 8080-8090. If multiple pairs are specified, "|" is used as the separator. For example, to use host 192.168.1.1 with ports from 8080 to 8085, and host 192.168.1.2 with ports from 8088 to 8090, the parameter **access_host_ports** is set as follows:

```
access_host_ports=192.168.1.1:8080-8085|192.168.1.2:8088-8090
```

Currently the parameter allows up to 256 pairs of access host and port(s). This parameter is required.

```
s3_virtual_hosting=<value>
```

where <**value**> is a boolean. This parameter specifies whether AWS Virtual Host Style URL is used. By default, this value is false, meaning that Path Style URL is used. This parameter only makes sense when AWS S3 protocol is used, i.e. the value of parameter **provider** is LattusS3.

```
namespaces=<value>
```

where <**value**> is a list of namespaces for this configuration. For AWS S3 protocol, this refers to S3 bucket. Namespaces are separated by "|". For example, if namespaces NS1, NS2, NS3 are used in this configuration, the parameter **namespaces** is set as follows:

```
namespaces=NS1|NS2|NS3
```

Currently the parameter allows up to 16 namespaces. This parameter is required.

```
authentication=<value>
```

where <**value**> is an enumerated type. This parameter specifies the authentication method used to communicate with the access host. The possible values are "None", "Digest" and "AWSV2". If this parameter is not specified, "None" is assumed. Currently **Lattus AXR** supports "None" and "Digest" authentication. "AWSV2" is Signature Version 2 authorization that is used in AWS S3 REST interface. For Lattus S3, "AWSV2" should be used.

```
username=<value>
```

where <**value**> is a string. This parameter specifies the username used in authentication.

```
password=<value>
```

where <**value**> is a string. This parameter specifies the password for the configured **username** used in authentication.

```
max_seg_size=<value>
```

where <**value**> is a scaled integer. Values representing sizes can be postfixed by k, m or g to represent

multipliers of 1024, 1024*1024 and 1024*1024*1024. This parameter specifies the maximum segment size for objects stored in the **Object Storage**. If the value is not power of 2, internally it is rounded up to next power of 2. For example, if it is set to 10GB, internally it is converted to 16GB. If a file's size is greater than the segment size, it is broken down to multiple segments to be stored. If this is not configured, the whole file is stored as one object in **Object Storage**. Note, the provider may have limits on the maximum size for an object stored in the **Object Storage**. If your file size can be greater than the maximum object size, you need to configure this parameter. The default value is 0, meaning no segmentation of files.

Note, snpolicy-managed policy also defines a similar parameter **objs_seg_size**. If **objs_seg_size** is defined (a positive number) in a policy, its value is rounded up to next power of 2, and is used as the segment size no matter whether max_seg_size is defined in **OBJS** config. This offers the flexibility to specify different segment sizes for different policies on the same **OBJS** config.

`manager_host=<value>`

where <**value**> is a string. This parameter specifies the IP address or host name of the Object Storage manager host. When used in **lattus** storage, this parameter should be the virtual IP address for the management interface.

`manager_port=<value>`

where <**value**> is a decimal integer. This parameter specifies the port number of the Object Storage manager GUI interface.

`manager_https=<value>`

where <**value**> is a boolean. This parameter specifies whether https is used for the Object Storage manager GUI interface. If this parameter is not configured, http is assumed to access Object Storage manager GUI interface.

`manager_username=<value>`

where <**value**> is a string. This parameter specifies the user name for the Object Storage manager GUI interface.

`manager_password=<value>`

where <**value**> is a string. This parameter specifies the password for the Object Storage manager GUI interface.

`use_https=<value>`

where <**value**> is a boolean. This parameter specifies whether https is used for accessing objects in the Object Storage. If this parameter is not configured, http is assumed to access objects in the Object Storage.

`use_zlib=<value>`

where <**value**> is a boolean. This parameter specifies whether zlib compression support is used in https transfer. If this parameter is not configured, zlib compression is not used in https transfer.

`server_auth=<value>`

where <**value**> is a scaled integer. This parameter specifies whether to verify peer's certificate when https is used to access objects in the Object Storage. If the value is 0, the peer certificate verification is skipped during SSL handshaking time. A value of 1 means that only the peer's certificate is verified. A value of 2 means that both the peer's certificate and hostname are verified. This parameter only makes sense when parameter **use_https** is set to true. By default, the value is set to 2 (i.e. both peer's certificate and hostname are verified) when the parameter **use_https** is set to true.

`cacertfile=<value>`

where **<value>** is a string. This parameter specifies the pathname of the file that holds one or more certificates to verify the peer with. This parameter only makes sense when parameter **use_https** is set to true and parameter **server_auth** is set to 1 or 2.

`capath=<value>`

where **<value>** is a string. This parameter specifies the pathname of a directory that holds multiple certificates to verify the peer with. Note, the directory should be processed by the openssl utility c_rehash. This parameter only makes sense when parameter **use_https** is set to true and parameter **server_auth** is set to 1 or 2.

`objs_transfertimeout=<value>`

where **<value>** is a scaled integer. This parameter specifies the timeout value in seconds. StorNext will abort data transfer operation (get or put) between StorNext and Object Storage if there is no data transfer activity during the given timeout period. If it is set to 0, the data transfer activity checking is disabled. By default, the value is set to 180.

EXAMPLE

Here is a simple example for one **OBJS** configuration:

objs_id=os1
provider=lattus
access_host_ports=192.168.1.1:8080-8083|192.168.1.2:8090
namespaces=ns1|ns2

Here is a simple example for one **OBJS** configuration using https:

objs_id=os1
provider=lattus
access_host_ports=192.168.1.1:444-445|192.168.1.2:444
namespaces=ns1|ns2
manager_host=10.65.166.97
manager_port=443
manager_https=true
use_https=true
server_auth=1
cacertfile=/usr/cvfs/config/cacert.pem
max_seg_size=64g

Here is another example of two **OBJS** configurations:

objs_id=os1
provider=lattus
access_host_ports=192.168.1.1:8080-8089
namespaces=ns1
objs_id=os2
provider=lattus
access_host_ports=10.10.1.1:8080-8089|10.10.1.2:8080-8089
namespaces=ns2|ns3
authentication=digest
username=stornext
password=password
max_seg_size=1024g
manager_host=10.10.2.1
manager_port=80

manager_https=false

SEE ALSO

snpolicy(8)

NAME

qos − StorNext File System FSM QoS Central Config File

SYNOPSIS

/usr/cvfs/config/*_rvio.opt

DESCRIPTION

The *StorNext File System* (*SNFS*) **qos** config file defines the bandwidth reservation for non-rtio (rvio) on certain clients from a central place, i.e. the fsm server. The allocated rvio bandwidth is used for non-rtio IOs on the client. The config file has the name of the designated file system's name appended by "_rvio.opt". So if the file system is "default", the QoS config file will be "default_rvio.opt". If this file does not exist, there will be no rvio bandwidth reservation for any client.

non-rtio reservation (rvio) provides a second priority bandwidth reservation mechanism for certain clients, while rtio request has the highest priority and will be satisfied first. All rvio requests share the remaining bandwidth after rtio requests are satisfied. If all rvio requests cannot be satisfied, then each rvio client is allocated the bandwidth directly proportional to its request amount. With dynamic changes of rtio requests, the allocated rvio bandwidths for clients are dynamically adjusted.

SYNTAX

A QoS central config file has multiple lines, each line defines the rvio reservation for a client. If a client has multiple IP addresses, the rvio reservation should be defined for each ip address.

The format of an line in QoS central config file is:

```
<host> <bw-type> <sg=yy>[,sg=yy]
```

<**host**> is the client host name. This can be the IP address (either V4 or V6), host name or FQDN of the client. Note: the host name should be able to be resolved (converted to a valid IP address) by the fsm server.

The <**bw-type**> is the type of bandwidth to be specified. Two types exists:

```
qosios            the bandwidth unit is IOs per second
qosmb       the bandwidth unit is mega bytes per second
```

If "qosios" is used, you may also append multiplier suffix to the amount of bandwidth:

```
Suffix    Name    Multiplier
------    ----    ----------
  K       kilo    1,024
  M       mega    1,048,576
```

The <**sg=yy**> defines the bandwidth on the designated stripe group. **sg** is the designated stripe group, **yy** is the reserved bandwidth. You can only reserve bandwidth on stripe groups whose QoS parameters have been configured in the file system config file. There are three ways to specify a stripe group:

```
*       the wildcard for stripe group, applies to all stripe group
sgname  the name of a stripe group
sgnum   the number of a stripe group, stripe group starts from 0.
```

Lines that contain white space only or that contain the comment token as the first non-white space character are ignored. An example on how to configure QoS central config file can be found:

/usr/cvfs/examples/rvio.example

FILES

*/usr/cvfs/config/*_rvio.opt*

SEE ALSO

cvfs(8), **snfs_config**(5), **fsm**(8), **mount**(8)

NAME

qustat − StorNext Statistics Utility

SYNOPSIS

qustat *command* [*Object_Identifiers*] [*Formatting*]

qustat Manage and View StorNext Statistics

Print:	**qustat -g** *FS_name* [**-h** *host*] [**-t** *tbl*] [**-F** *opt*]
Print CSV File:	**qustat -c** *csv_file*
Print + Reset:	**qustat -P -R -g** *FS_name* [*Print_Options*]
Reset:	**qustat -R -g** *FS_name*
Version:	**qustat -V**
Description:	**qustat** [*Object Identifiers*] **-D** *Search_String*
Help:	**qustat -H**

Commands

-P, --print	Print tables (default command)
-I, --interval	Set collection interval
-A, --archive	Forward stats to central archive
-R, --reset	Reset table or group if no table
-S, --selftest	Run Self Test
-V, --version	Print qustat version information
-H, --help	Print qustat help information
-D, --description *str*	Print table or stat description

Object Identifiers

-c, --csv *file*	Specify a .csv file to load
-h, --host *opt*	Host name or IP address
-m, --module *opt*	Module name
-g, --group *opt*	Group name
-t, --table *opt*	Table Number
-f, --fs *opt*	File system name (same as -g)

Formatting

-F, --format all	Show all records (including zeros)
-F, --format csv	Output in .csv format
-F, --format graphite	Output graphite format data
-F, --format protobuf	Output protobuf format data (with -A only)

* HPUX and AIX do not support the long **--***opt* format.

COMMANDS

-P, --print

This is the default command if no other commands are specified. To use the print command, you must also supply a group (file system) name with the **-g** option.

The **print** command fetches the statistics table(s) from the specified **group** (e.g. the FSM) and prints them to standard output. The output is described below.

-I, --interval

The **interval** command controls the rate at which statistics are forwarded from running processes to the snstatd process. The interval parameter is in seconds. The value must be -1 (turn off) or between 5 and 2147483 inclusive.

-A, --archive

The **archive** command specifies the location that the snstatd process should periodically send statistics to. The target is in terms of a hostname and tcp port number. A TCP/IP connection is opened ever **interval** seconds and any new statistics are send in graphite format down the connection. The connection is then closed. Use -F with this command to switch between graphite and

protobuf output.

-R, --reset

WARNING! Resetting statistics affects hourly reports and anybody else using qustats.

This command resets the internal statistics tables for the specified **Object Identifier**.

-S, --selftest

Runs self-test to verify that internal functions are working properly. If your system is busy, it may be normal for the timing tests to fail.

-V, --version

Display version information for the qustat command.

-D, --description

Use the -D command to find the description for tables and stats. The -D search string may contain the wildcard '*'. Note that strings with an asterisk should be quoted to avoid globbing. You must provide object identifiers for at least one table.

Search Examples:

```
qustat -g myFileSys -D "*"
qustat -g myFileSys -D "VOP Lookup"
qustat -g myFileSys -t 1 -D "VOP Lookup"
qustat -g myFileSys -t 1 -D "VOP *"
qustat -g myFileSys -t 1 -D "*"
```

-H, --help

Displays help information.

OBJECT IDENTIFIERS

-c *csv_file*, **--csv** *csv_file*

Specify a .csv file to load.

-h *host*, **--host** *host*

The host or IP address where the **Module** (e.g. FSM) is located. This option is normally not needed when displaying FSM statistics if your computer is joined to the cluster.

-m *module*, **--module** *module*

Specifies the module (process or service) from which to extract statistics. The module specifier **all** can be used to select all types of modules.

The default module is **FSM** if not specified.

-g *group*, **--group** *group*

Identifies the group of tables. For **FSM** modules, the **group** specifies the file system name.

This is the same as the **-f** option.

-t *table_number*, **--table** *table_number*

Use **-t** to print a single table. If you print all statistics, the table numbers are displayed in the table header. See **TABLES** below.

If you do not specify a table, all tables for the group are displayed.

-f *file_system*, **--fs** *file_system*

This is the same as the **-g** option.

FORMATTING

-F *option*, **--format** *option*

You may specify the **-F** option multiple times. The **all** option will print all statistics including those with all zero values. The **csv** option will display output in comma-separated-values format.

OUTPUT

The Group header includes revision, host, module, group and time recorded. The time_t value is the output of the **time**(2) function call.

Columns include:

NAME	The name of the statistic being gathered.
TYP	The type of statistic.
CNT	The number of times something occurred.
LVL	The current *level* of something (e.g. number of free buffers).
SUM	The accumulated sum such as the amount of data written.
TIM	The amount of time consumed (in microseconds).
COUNT	Number of times the operation was performed.
MIN/MAX	Minimum and maximum values.
TOT/LVL	Total or current level (depending on TYP)
AVG	The average (TOT divided by COUNT)

TABLES

A **Group** is normally split into multiple tables. Each table is identified by a unique *table number*.

Table numbers are guaranteed to identify a single unique object throughout the lifespan of the given group, but not across reboots/restarts for the group.

For the FSM, the main table numbers will remain consistent across restarts, but the per-client statistics will vary depending on connection order.

ACCURACY

Statistics are not guaranteed to be 100% accurate.

For performance reasons, the implementation does not explicitly lock the code when gathering statistics. However most operations are already protected by other multi-thread locking and therefore inaccuracies should be minimal.

In addition, operations are not halted or locked when resetting or gathering statistics. It is possible to have a statistic dropped during a reset or snap of statistics.

CVLOG HOURLY STATISTICS DUMPS

In prior releases, the FSM dumped statistics on an hourly basis to the cvlogs which were located under the data directory. These statistics dumps have been moved to a separate directory called **qustats**. The format has also been changed to .csv files which can be opened in most spreadsheets and databases. They can also be easily parsed by most programming languages and utilities.

NAME

qustat.conf − StorNext snstatd configuration file

SYNOPSIS

/usr/cvfs/config/qustat.conf

DESCRIPTION

The *StorNext File System* (*SNFS*) **qustat.conf** file provides a way to configure snstatd as well as providing debugging levels for qustat commands. Refer to this man page's **EXAMPLE** section for a visual representation of the described format. If the file is not present at snstatd start time, a file will be written with default values.

The default log level is Warn. The default archive age is 31536000 seconds (1 year). The default archive rate is 3600 seconds (1 hour).

WARNING: It is highly recommended that Quantum Technical Support be contacted before changing the default configuration. In normal usage, the default values are adequate and this file should not be changed.

EXAMPLE

The following is an example of the **qustat.conf** file.

```
# Maximum age of .csv files in seconds or 'infinite'
archive_age_max_secs=31536000
# Rate to dump .csv files in seconds or 'off'
archive_dump_rate_secs=3600
# Debug logging levels (0=Crit, 1=Err, 2=Warn, 3=Inf, 4-6=Dbg
dbg_default=2
# Debug logging levels (0=Crit, 1=Err, 2=Warn, 3=Inf, 4-6=Dbg
dbg_api=2
# Debug logging levels (0=Crit, 1=Err, 2=Warn, 3=Inf, 4-6=Dbg
dbg_protobufs=2
# Debug logging levels (0=Crit, 1=Err, 2=Warn, 3=Inf, 4-6=Dbg
dbg_net=2
# Debug logging levels (0=Crit, 1=Err, 2=Warn, 3=Inf, 4-6=Dbg
dbg_help_hash=2
```

FILES

/usr/cvfs/config/qustat.conf
/usr/cvfs/debug/snstatd.log
/usr/cvfs/debug/qustat_cmd.log
/usr/cvfs/debug/qustat_lib.log

SEE ALSO

snstatd(8)

NAME

snacl − Display and modify ACLs

SYNOPSIS

snacl [-D] [-R] [-r] [-x] -l *file...*

snacl [-D] [-R] { +a | +ai | +a# *index* **| +ai#** *index* **}** *ACE file...*

snacl [-D] [-R] { -a *ACE* **| -a#** *index* **}** *file...*

snacl [-D] [-R] { =a# | =ai# } *index ACE file...*

snacl [-D] [-R] { -E | -C | -i | -I | -N } *file...*

DESCRIPTION

snacl is used to display and modify Windows-style ACLs for files and directories on a StorNext file system.

OPTIONS

-l *file* The **-l** option is used to display sercurity information including file ownership, Posix permission bits, and ACLs. Use of **-l** requires read permission on the specified *file* which may be a file or directory.

+a *ACE file*

The **+a** option is used to add an ACE to an ACL while maintaining canonoical order. If the ACL for the file is not currently in canonical order, the use of **+a** is not allowed and **+a#** must be used instead when adding ACEs. See the section CANONICAL ORDERING below.

+ai *ACE file*

The **+ai** option behaves the same as the **+a** option except that added ACEs are marked with the inherited bit.

+a# *index ACE file*

The **+a#** option is used to add an ACE to an ACL at the specified index.

+ai# *index ACE file*

The **+ai#** option behaves the same as the **+a#** option except that added ACEs ae marked with the inherited bit.

-a *ACE file*

The **-a** option is used to delete ACEs. Existing DACL entries matching *ACE* are deleted if they match exactly. If an existing entry contains a superset of the rights specified by *ACE* only, the listed rights are removed. When using **-a** on a directory, ACEs for the directory's descendants are not affected unless the **-R** option is also specified.

-a# *index file*

The **-a#** option is used to delete an ACE at the specified index.

=a# *index ACE file*

The **=a#** option is used to replace an ACE at the specified index.

=ai# *index ACE file*

The **=ai#** option behaves the same as the **=a#** option except that added ACEs are maked with the inherited bit.

−E The **−E** option is used to assign ACEs to a file by reading values from stdin separated by newlines. If the file has an existing ACL, it is first removed.

−C The **−C** option is used to determine whether files contain ACLs in non-canonical order. When **-C** is used, *snacl* exits with a value of 0 if any of the specified files contains an ACL in non-canonical order. Otherwise, non-zero is returned.

−D The **−D** option enables debugging.

−i The **−i** option is used to remove the inherited bit from all ACEs in the specified files.

−I The **−I** option is used to remove all inherited ACEs from specified files.

−N The **−N** option is used to completely remove the ACL (all ACEs) from the specified files.

−r The **−r** option forces snacl to display raw SIDs when listing ACEs instead of mapping them to user and group names.

−R The **−R** option causes snacl to perform the requested operation recursively.

−x The **−x** option causes snacl to operate in "expert" mode when displaying security information so that additional, low-level information about the security descriptor is shown. This option may be removed in a future release or its output format changed.

ACE FORMAT

ACEs are specified using the following syntax:

principal { allow | deny } *permissions_and_inhertance_flags*

The *principal* is the name of a user or group. In cases where a user and group exist with the same name, it must be prefixed with "user:" or "group:" to remove ambiguity. If a user or group name contains spaces, the spaces should be replaced with plus (+) signs. For example, for the group "Domain Users", specify "domain+users" Alternatively, spaces are allowed in principal names if colons (:) are used as a delimiter. For example: **"user:fred flintstone:allow:read"**

The *permissions_and_inhertance_flags* field is a comma-separated list of permissions and inheritance flags that may be mixed. Each ACE must have at least one permission specified.

The following section provides all the permission keywords and a description of the actions they grant.

The following permissions apply to both files and directories:

delete Remove the file or directory. Deletion is granted either by this permssion or the delete_child on the parent directory.

readattr Read the basic attributes from a file or directory. This is implictly granted if the file or directory can be looked up and it is not explicitly denied.

writeattr Update basic attributes for a file or directory.

readextattr List or read the extended attributes for a file or directory.

writeextattr Update extended attributes for a file or directory.

readsecurity Read the security information for a file or directory.

writesecurity Write the security information for a file or directory.

chown Change the ownership of a file or directory.

The following permissions apply only to directories:

list List entries (readdir).

search Look up files by name. In addition to stat(2), this permission is required for name space operations such as file creation, deletion, and rename.

add_file Create a file

add_subdirectory
Create a subdirectory

delete_child Delete a file or subdirectory. Deletion is granted either by this permission on the parent or delete permission on the target.

The following permissions apply to files only:

read Open for reading.

write Open for writing.

append Open a file for appending writes.

execute Execute the file.

The following are inheritance flags which only apply to directories:

file_inherit ACE should inherit to (non-directory) files.

directory_inherit ACE should inherit to directories.

limit_inherit This flag prevents newly created subdirectories which inherited the specified ACE from its parent from further propagating the ACE to its children.

only_inherit This flag caues the ACE to be inherited to files and subdirectories but not used for permission processing on the directory. Note that the only_inherit flag is never inherited.

There is also a special flag:

full_access
This is shorthand for: list,add_file,search,delete,add_subdirectory,delete_child,readattr,writeattr,readextattr,writeextattr,readsecurity,writesecurity,chown,file_inherit,directory_inherit

CANONICAL ORDERING

ACEs are always processed in the order they are listed in the ACL. However, there is a preferred order for ACEs that typically results in the simplest ACL that achives the desired result. This is called canonical order and its use is a best practice. The order is:

1. Explict Denied ACEs (if any)
2. Explict Allowed ACEs (if any)
3. Inherited Denied ACEs (if any)
4. Inherited Allowed ACEs (if any)

When ACEs are always added using **snacl +a**, canonical ordering is preserved. If ACEs are added using **snacl +a#** or **snacl +ai#** or if they are modified using **snacl =a#**, canonical ordering may be broken. Also, ACEs are inherited in the same order as the parent so if the ACL on the parent directory does not use canonical ordering, the child may inherit ACEs in non-canonical order. The ACL on a file can be tested for canonical order using **snacl -C**.

EXAMPLES

List the ACL for a file.

```
$ snacl -l foo
-rw-r--r-- joe staff foo
 0: user:jane allow write
 1: group:staff allow write,delete
```

Add an ACE to the ACL of a file, maintaining canonical order:

```
$ snacl -l foo
-rw-r--r-- joe staff foo
 0: user:jane allow write
$ snacl +a "user:fred deny read,write" foo
$ snacl -l foo
-rw-r--r-- joe staff foo
 0: user:fred deny read,write
 1: user:jane allow write
```

Add an ACE to the ACL of a file, maintaining canonical order.

```
$ snacl -l foo
-rw-r--r-- joe staff foo
 0: user:jane allow write
```

```
$ snacl +ai "user:fred allow write" foo
 0: user:jane allow write
 1: user:fred inherited allow write
```

Add an ACE to the ACL of a file at a particular index disregarding canonical ordering:

```
$ snacl -l foo
-rw-r--r-- joe staff foo
 0: user:jane allow write
$ snacl +a# 1 "user:fred deny write" foo
 0: user:jane allow write
 1: user:fred deny write
```

Remove read permission for a user. Note that since the ACE contains other permissions, it is not removed completely.

```
$ snacl -l foo
-rw-r--r-- joe staff foo
 0: user:jane allow write,delete
$ snacl -a "user:jane allow delete" foo
$ snacl -l foo
-rw-r--r-- joe staff foo
 0: user:jane allow write
```

Remove a particular ACE from an ACL.

```
$ snacl -l foo
-rw-r--r-- joe staff foo
 0: user:jane allow write,delete
 1: user:fred allow delete
 2: user:wendy allow write,delete
$ snacl -a# 1 foo
$ snacl -l foo
 0: user:jane allow write,delete
 1: user:wendy allow write,delete
```

Replace an ACE:

```
$ snacl -l foo
-rw-r--r-- joe staff foo
 0: user:jane allow write,delete
 1: user:fred allow delete
 2: user:wendy allow write,delete
$ snacl =a# 1 "john allow write" foo
$ snacl -l foo
-rw-r--r-- joe staff foo
 0: user:jane allow write,delete
 1: user:john allow write
 2: user:wendy allow write,delete
```

Assign ACE values from stdin:

```
$ cat myacl.txt
user:jane allow write
user:joe deny read
$ snacl -E foo < myacl.txt
$ snacl -l foo
-rw-r--r-- joe staff foo
 0: user:jane allow write
 1: user:joe deny read
```

Check for canonical order:

```
$ snacl -l foo
-rw-r--r-- joe staff foo
 0: user:joe deny write
 1: user:jane allow write
$ snacl -C foo
$ echo $?
1
$ snacl -l bar
-rw-r--r-- joe staff foo
 0: user:jane allow write
 1: user:joe deny write
$ snacl -C bar
$ echo $?
0
```

Remove inherited bit from ACEs.

```
$ snacl -l foo
-rw-r--r-- joe staff foo
 0: user:jane inherited allow write
 1: user:joe allow write
$ snacl -i foo
$ snacl -l foo
-rw-r--r-- joe staff foo
 0: user:jane allow write
 1: user:joe allow write
```

Remove inherited ACEs:

```
$ snacl -l foo
-rw-r--r-- joe staff foo
 0: user:jane inherited allow write
 1: user:joe allow write
$ snacl -I foo
$ snacl -l foo
-rw-r--r-- joe staff foo
 0: user:joe allow write
```

Remove entire ACL:

```
$ snacl -l foo
-rw-r--r-- joe staff foo
 0: user:jane inherited allow write
 1: user:joe allow write
$ snacl -N foo
$ snacl -l foo
-rw-r--r-- joe staff foo
```

SEE ALSO

NAME

sncfgconvert − Convert StorNext File System configuration file format

SYNOPSIS

sncfgconvert -n *fsname* [**-F** *output_format*] [**-v**] **-f** *ConfigFile*

sncfgconvert -n *fsname* [**-F** *output_format*] [**-v**] *ConfigFile*

sncfgconvert -h

DESCRIPTION

The **sncfgconvert** program will convert a StorNext file system configuration file between the old pre-4.0 config and the new XML config file formats (on supported platforms).

The input file need not have a .cfg or .cfgx suffix - the converter will automatically figure out the format of the input file. Converted output is displayed on stdout.

Old format output files should have the .cfg suffix and XML formatted files should have the .cfgx suffix when writing them to the */usr/cvfs/config* directory. See **snfs_config**(5) for more information.

OPTIONS

−F *output_format*
: The format to convert to. See **-h** for applicable formats. This can also be used to "convert" from one format to the same format. Defaults to the latest format available for the system.

−h Display usage, including available formats to convert to.

−n *fsname*
: Required. The name of the file system whose config is to be converted.

−f *ConfigFile*
: Specify the config file.

−v Increase verbosity of messages from conversion process

EXIT VALUES

sncfgconvert will return 0 on success and non-zero on failure.

EXAMPLES

List usage:

```
# sncfgconvert -h
Usage: sncfgconvert -n <fsname> [-F <output_format>] ([-f <filename>] | <filename
  -F <output_format>    Valid formats:
                        XML (default)
                        ASCII
  -f <filename> Config file to convert
  -n <fsname>   File system name
  -v            increase verbosity (specify multiple -v's for more verbosity)
```

This also displays that the default format is XML.

Convert a config in a temporary location to XML and write it to a different tempfile (see **sncfginstall**(8) for details on installing the config to the proper location.

```
# sncfgconvert -F XML -n snfs1 -f /tmp/fs1.copy > /tmp/fs1.xml
```

Convert a config in a temporary location to the old ASCII format and display it on stdout:

```
# sncfgconvert -F ASCII -n test /tmp/test.cfgx
# Globals

AllocationStrategy Round
HaFsType HaUnmonitored
```

```
        FileLocks No
        BrlResyncTimeout 20
         ...
        RtTokenTimeout 0
        MultiPathMethod Rotate
        Node CvfsDisk_jbod0203 0
```

SEE ALSO

sncfginstall(8), **snfs_config**(5)

NAME

sncfgedit − Edit StorNext File System configuration file

SYNOPSIS

sncfgedit -n *FsName* [**-f** *FailedTemporaryConfigFile*]

sncfgedit -h

DESCRIPTION

The **sncfgedit** program provides convenient method to edit the StorNext file system configuration file for the named file system and validate the new configuration file before overwriting the old one. To do so, **sncfgedit** creates a temporary copy of the configuration file, and then opens it in an editor.

sncfgedit uses the the EDITOR environment variable to choose the program used to edit the configuration file, or **vi** if EDITOR is not set.

Validation includes standalone validation of the new configuration file as well as validation of changes between original configuration file and edited file if a configuration file previously existed. If no previous configuration file exists, a template will be loaded into the editor using default settings for all values.

Before an existing configuration file is overwritten, it is copied to */usr/cvfs/data/*FsName*/config_history/* for future reference. A timestamp is appended to the filename to allow for the existence of multiple backup copies.

OPTIONS

−h Display usage.

−n *FsName*
Required. The name of the file system whose config is to be edited or created.

−f *FailedTemporaryConfigFile*
Specify the path to the temporary config file from a previous run where the proposed changes were disallowed. This gives you another chance without throwing away all of the previous changes.

EXIT VALUES

sncfgedit will return 0 on success and non-zero on failure.

ENVIRONMENT VARIABLES

EDITOR
Allows the user to choose which editor is used to modify the configuration file. (default: vi)

FILES

*/usr/cvfs/data/*FsName*/config_history/**

SEE ALSO

snfs_config(5)

NAME

sncfggen − Generate a StorNext File System configuration file from a reference configuration and a json input file

SYNOPSIS

sncfggen -f *json_file* **-n** *FsName* **-r** *refconfig* **-p** *refpath* [**-d**]

sncfggen -h

DESCRIPTION

The **sncfggen** program will generate a StorNext file system configuration file from a reference configuration file system and a json input file. The json file is written in JSON which is an open standard light weight data exchange language.

The json file is required to contain a **fileSystems** section which contains an entry with a name that matches the file system name. Global variables are specified as key/value pairs. These will replace the settings of those variables in the reference configuration. The json file must also contain a **stripeGroups** section. The **stripeGroups** array contains one entry for each stripe group and must contain the name of the stripe group. In each stripe group the **sgDisks** array of disk labels must be present. **Sncfggen** will generate a configuration file with the file system name filled in, changes made to global variables and disk labels updated for the disks in the stripe groups.

The new config file will be written to */usr/cvfs/config.*

OPTIONS

−h Display usage.

−f *json_file*
Required. Specify the json input file.

−r *refconfig*
Required. Specify the fs name of the reference configuration file system.

−p *refpath*
Required. Specify the file path to reference configuration file system.

−n *FsName*
Required. The name of the file system whose config is to be generated.

-d Optional. Turn on debug mode.

EXIT VALUES

sncfggen will return 0 on success and non-zero on failure.

EXAMPLES

List usage:

```
# sncfggen -h
usage sncfggen -h
      sncfggen -f json file -r refconfig -p refpath -n fsname -d
               -h              # display usage
               -f json_file    # json file to load
               -r refconfig    # refconfig fs name
               -p refpath      # refconfig file path
               -n fsname       # new file system name
               -d              # turn on debug mode
#
```

Generate */usr/cvfs/config/sl1.cfgx* from */tmp/refconfig.cfgx* and json input file *json_file.*

```
# sncfggen -f /tmp/json_file -r refconfig -p /tmp/refconfig.cfgx -n sl1
Successfully generated configuration file /usr/cvfs/config/sl1.cfgx.
#
```

Example json file.

```
# cat json_file
{
    "fileSystems": [
        {
            "name": "sl1",
            "bufferCacheSize": 4294967296,
            "fileLocks": false,
            "quotas": true,
            "stripeGroups": [
                {
                    "sgName": "sg0",
                    "sgDisks": [
                        "sl_0005"
                    ]
                },
                {
                    "sgName": "sg1",
                    "sgDisks": [
                        "sl_0006"
                    ]
                },
                {
                    "sgName": "sg2",
                    "sgDisks": [
                        "sl_0007",
                        "sl_0008"
                    ]
                }
            ]
    }
    ]
}
#
```

SEE ALSO

snfs_config(5)

NAME

sncfginstall − Install StorNext File System configuration file

SYNOPSIS

sncfginstall -n *FsName* **-f** *config_file* [**-M** *msg_format*]

sncfginstall -h

DESCRIPTION

The **sncfginstall** program will install a StorNext file system configuration file into the proper location, after validating that it is a valid config file, and comparing it against an already existing config file for the named file system if one exists.

The input file need not have a .cfg or .cfgx suffix - the converter will automatically figure out the format of the input file.

OPTIONS

−h Display usage.

−n *FsName*
Required. The name of the file system whose config is to be installed.

−f *config_file*
Specify the config file to install.

−M *msg_format*
Specify *XML* if you want messages to come back in XML format. This defaults to ASCII.

EXIT VALUES

sncfginstall will return 0 on success and non-zero on failure.

EXAMPLES

List usage:

```
# sncfginstall -h
Usage: sncfginstall -f <config_path> -n <fs_name> [-M <fmt>]
  -f            Path to file to install
  -n            Name of file system to install
  -M            Message format: ASCII, XML (default ASCII)
  -h            This usage
```

Install a config in a temporary location to the StorNext configuration directory:

```
# sncfginstall -n snfs1 -f /tmp/fs1.copy
'snfs1' installed
```

FILES

*/usr/cvfs/data/*FsName*/config_history/*

SEE ALSO

snfs_config(5)

NAME

sncfgquery − Query StorNext File System configuration files

SYNOPSIS

sncfgquery -d -f *config_path*

sncfgquery -d -n *fsname*

sncfgquery -l [**-s** *section*]

sncfgquery -q -s *section* **-k** *keyword* **-f** *config_path*

sncfgquery -q -s *section* **-k** *keyword* **-n** *fsname*

sncfgquery -h

DESCRIPTION

Query a given file system for configuration file settings. Only a subset of configuration file settings are supported.

ACTION OPTIONS

-d Dump configuration

-l List recognized keywords. Without any query options, this returns the recognized sections. If the **-s** flag is specified, it lists the recognized keywords within that section.

-q Query configuration

-h Print usage

QUERY OPTIONS

-s *section*
Select the specified section

-k *keyword*
Select the specified keyword within a section

LOCATION OPTIONS

-f *config_path*
Find information based on config file path

-n *fsname*
Find information based on file system name

EXIT VALUES

sncfgquery will return 0 on success and non-zero on failure.

EXAMPLES

List usage:

```
# sncfgquery -h
Usage: sncfgquery <actions> <query>

Locate config:
 -f <config>    Find information based on config file location
 -n <fsname>    Find information based on file system name
actions:
 -d             Dump config
 -l             List keywords
 -q             Query config
 -h             Print this help info
options:
 -k <keyword>   keyword
 -s <section>   section
```

List the keywords in the *globals* section:

```
# sncfgquery -l -s globals
Valid keywords for the globals section:
        BrlResyncTimeout
        EventFileDir
        GlobalSuperUser
        HaFsType
        RenameTracking
        RestoreJournal
        SNPolicy
        StorageManager
```

Query the HaFsType of a filesystem

```
# sncfgquery -q -s globals -k HaFsType -n snfs1
HaFsType HaUnmonitored
```

SEE ALSO

snfs_config(5)

NAME

sncfgremove − Remove a StorNext File System configuration file

SYNOPSIS

sncfgremove -n *FsName* [**-M** *output_format*]

sncfgremove -h

DESCRIPTION

The **sncfgremove** program will remove a StorNext file system configuration file, archiving it to */usr/cvfs/data/*FsName*/config_history/* in the process.

OPTIONS

−h Display usage.

−n *FsName*
Required. The name of the file system whose config is to be removed.

−M *msg_format*
Specify *XML* if you want messages to come back in XML format. This defaults to ASCII.

EXIT VALUES

sncfgremove will return 0 on success and non-zero on failure.

EXAMPLES

List usage:

```
# sncfgremove -h
Usage: sncfgremove -n <fs_name> [-M <fmt>]
  -n            Name of file system to remove
  -M            Message format: ASCII, XML (default ASCII)
  -h            This usage
```

Remove a config:

```
# sncfgremove -n snfs1
'snfs1' successfully removed
```

FILES

*/usr/cvfs/data/*FsName*/config_history/*

SEE ALSO

snfs_config(5)

NAME

sncfgtemplate − Output a StorNext File System configuration file

SYNOPSIS

sncfgtemplate -n *FsName* [**-M** *output_format*]

sncfgtemplate -h

DESCRIPTION

The **sncfgtemplate** program will output a template StorNext file system configuration file with the given name to stdout. This can be redirected to a file and edited. When the configuration file is correct for the file system being created, it can be installed using **sncfginstall**(8), and made with **cvmkfs**(8).

Note: the standard way to create a new configuration file on the commandline is via **sncfgedit**(8).

OPTIONS

−h Display usage.

−n *FsName*
Required. The name of the file system whose config is to be created.

−M *msg_format*
Specify *XML* if you want messages to come back in XML format. This defaults to ASCII.

EXIT VALUES

sncfgtemplate will return 0 on success and non-zero on failure.

EXAMPLES

List usage:

```
# sncfgtemplate -h
Usage: sncfgtemplate -n <fs_name>
  -n            Name of file system
  -M            Message format (default ASCII)
  -h            This usage
```

Dump a template config to a temporary file:

```
# sncfgtemplate -n snfs1 > /tmp/myconfig
```

SEE ALSO

sncfginstall(8), **cvmkfs**(8), **snfs_config**(5)

NAME

sncfgtransform − Check two StorNext File System configuration files for a valid transformation

SYNOPSIS

sncfgtransform [-h] -n *FsName caller file1 file2*

DESCRIPTION

The **sncfgtransform** program will validate the transformation between two StorNext file system configuration files for the given "caller" and file system.

The valid *caller* values are:

fsm The transform is checked for a file system manager (fsm) restart. This is the usual transform that administrators are looking for since a change in the config file is usually followed by a file system restart.

cvupdatefs
The transform is checked for a run of the cvupdatefs command. This can be used when adding a stripe group or for stripe group expansion.

updatefs
Same as cvupdatefs.

cvfsck The transform is checked for a run of cvfsck.

dbg The transform is checked for the cvfsdb command.

cvmkfs The transform is checked for the cvmkfs command.

cvmkfsr
The transform is checked for the cvmkfs command with the -r option which means that the file system meta data is being restored from a database created because the restore journal was configured.

Two configurations files must be given and the transformation is assumed to be from *file1* to *file2.*

Each configuration file is parsed and may fail. If they both succeed parsing, the transformation is checked with any errors being displayed.

OPTIONS

−h Display usage.

−n *FsName*
Required. The name of the file system whose config files are given.

EXIT VALUES

sncfgtransform will return 0 on success and non-zero on failure.

EXAMPLES

List usage:

```
# sncfgtransform -h
Usage: sncfgtransform [-h] -n <fsname> <caller> <file1> <file2>
  -h        This usage
  -n        Name of file system to validate
  caller
        fsm
        cvfsck
        cvmkfs
        cvmkfsr
        dbg
        cvntfscfg
        snadmin
        cvupdatefs
```

```
            updatefs
      file1     file being changed
      file2     new file transforming config too
```

Check a new config file under consideration for snfs1 with a copy in /tmp (OK):

```
# sncfgtransform -n snfs1 fsm /tmp/snfs1.cfgx /tmp/snfs1.new.cfgx
'snfs1' transformation OK
```

Check a new config file under consideration for cvupdatefs of snfs1 (OK):

```
# sncfgtransform -n snfs1 updatefs /tmp/snfs1.cfgx /tmp/snfs1.new.cfgx
'snfs1' transformation OK
```

Check a modified config against the installed config (with a valid change for cvupdatefs))

```
# sncfgtransform -n snfs1 updatefs /usr/cvfs/config/snfs1.cfgx /tmp/cfgx
'snfs1' transformation OK
```

Check a modified config against the installed config (with an invalid change)

```
# sncfgtransform -n snfs1 fsm /tmp/snfs1.cfgx /tmp/snfs1.new.cfgx
transformation failed for /tmp/snfs1.cfgx -> /tmp/snfs1.new.cfgx with -1
transformation for /tmp/snfs1.cfgx -> /tmp/snfs1.new.cfgx -- error: Stripe group
```

SEE ALSO

snfs_config(5)**sncfgvalidate**(1)

NAME

sncfgvalidate − Validate a StorNext File System configuration file

SYNOPSIS

sncfgvalidate -n *FsName* [**-f** *config_file*] [**-M** *msg_format*]

sncfgvalidate -h

DESCRIPTION

The **sncfgvalidate** program will validate a StorNext file system configuration file.

If only an *FsName* is specified, **sncfgvalidate** looks for an already installed configuration file for the named file system, and validates its syntax if it exists.

If an *FsName* and a *config_file* are specified, the specified config file's internal syntax is validated, and it is compared against the currently installed configuration file for the named file system (if it exists).

OPTIONS

−h Display usage.

−n *FsName*
Required. The name of the file system whose config is to be validated.

−f *config_file*
Specify the config file to validate.

−M *msg_format*
Specify *XML* if you want messages to come back in XML format. This defaults to ASCII.

EXIT VALUES

sncfgvalidate will return 0 on success and non-zero on failure.

EXAMPLES

List usage:

```
# sncfgvalidate -h
Usage: sncfgvalidate -n <fs_name> [-f <config_path>] [-M <fmt>]
  -f            Path to file to validate
  -n            Name of file system to validate
  -M            Message format: ASCII, XML (default ASCII)
  -h            This usage
```

validate an installed config:

```
# sncfgvalidate -n snfs1
'snfs1' validated
```

validate a new config

```
# sncfgvalidate -n snfs2 -f /tmp/mysnfs2
'snfs' validated
```

validate a modified config against the installed config (with an invalid change)

```
# sncfgvalidate -n snfs1 -f /tmp/mysnfs1
warning: Journal Size of 16M is less than recommended minimum value; It must be a
warning: new fsBlockSize (32768) does not match existing fsBlockSize (16384), fi
```

SEE ALSO

snfs_config(5)

NAME

sndiskmove − StorNext File System Disk Mover Utility

SYNOPSIS

sndiskmove [**-fqv**] [**-s** *suffix*] [**-b** *bufMB*] [**-S** *file*] *SourceVolume DestinationVolume*

DESCRIPTION

sndiskmove is a utility for migrating the contents of a disk to a new disk. This is accomplished by copying the data from the disk and relabeling the destination disk with the name of the source disk. The source disk is also relabeled with its original name with a suffix added (this is ".old" by default but this can be changed with the **-s** option.

WARNING: Using this command incorrectly can cause loss of data. Please ensure that you understand the procedures to safely execute this command completely. Also, this command is not supported for filesystem disks that contain data, it must be used for Exclusive Metadata or Journal disks only.

Attempting to run this command on a disk that is being used on an actively running filesystem will cause data corruption. All referencing filesystems must be stopped and remain stopped during the processing of this command.

If successful, the command will cause the local **fsmpm** process to rescan the disks on the host where the command is executed. If there are any **FSMs** configured on other hosts, it is critical to request a rescan of the disks before reenabling the **FSM** on those servers by invoking

cvadmin -e 'disks refresh'

on those hosts.

OPTIONS

-f Forces the disk data to be moved without confirmation from the user. **WARNING: Use this flag with extreme caution!**

-q Run in quiet mode. This disables the progress display.

-v Causes **sndiskmove** to be verbose.

-s *suffix* Uses the supplied *suffix* to relabel the source disk.

-b *bufsizeMB*
Specifies the buffer size to use for the copying of disk data (in megabytes). The default value is 4MB.

-S *file* Writes status monitoring information in the supplied file. This is used internally by StorNext and the format of this file may change.

SEE ALSO

cvadmin(8)

NAME

sndpscfg − StorNext File System Proxy Server Configuration Utility

SYNOPSIS

sndpscfg -e

sndpscfg -E *FsName*

sndpscfg -a

DESCRIPTION

The StorNext File System (SNFS) **sndpscfg** command is a utility used to generate and modify SNFS Proxy Server configuration files on Linux systems. (NOTE: to view and adjust the Proxy Server settings on Windows systems, use the LAN Client/Gateway tab in the Client Configuration tool instead.)

SYNTAX

The **-e** option is used to edit the default **dpserver** configuration file. If no default **dpserver** file exists, a template file will be generated. The template file contains commented-out entries for each of the network interfaces on the system, and commented-out entries for each of the tunable parameters, specifying default values.

The **-E** *FsName* option is used to edit the file-system-specific **dpserver** configuration file for the specified file system. As with **-e**, a template file will be generated if no file-system-specific **dpserver** file exists.

The **-a** option is used to print a template **dpserver** configuration file to standard output.

FILES

/usr/cvfs/config/dpserver
*/usr/cvfs/config/dpserver.*FsName

SEE ALSO

mount_cvfs(8), **dpserver**(4)

NAME

snfs.cfg − StorNext File System Configuration File

SYNOPSIS

This page describes the old File System configuration file format, used prior to StorNext 4.0.

A file system name is associated to its configuration file by the file's prefix. For example, if the file system were named **projecta**, then its configuration file would be */usr/cvfs/config/projecta.cfg*. There may be multiple file systems simultaneously mounted, with an FSM program running for each active file system. Configuration files must reside on the same system as the FSM processes that use them.

DEPRECATED

This format has been deprecated in favor of the cfgx format on all platforms except Windows - see **snfs.cfgx**(5) for details on the new format.

SYNTAX

Each configuration file has several section headers and section bodies. A section header is enclosed by square brackets as follows:

```
[ Keyword Name ]
```

A section body is the non-bracketed lines of configuration between section headers.

Every configuration file begins with a **Global** section body; a **Global** section header is implied. In addition to the implicitly named **Global** section, other section-header keyword values are **AutoAffinity**, **NoAffinity**, **DiskType**, **Disk** and **StripeGroup**. Section-header keywords are case insensitive.

Section names consist of case-sensitive letters, numbers, underscores (_), and dashes (-).

Each line of a section body has the following syntax:

```
Keyword Value
```

Section-body keyword names are section dependent as described below.

Section-body values can be a number, name or any combination of characters enclosed by double quotes ("). A number can be in octal, decimal or hexadecimal. Octal numbers are represented by prefixing the number with **0**, and hexadecimal numbers are represented by prefixing the number with **0x**.

A suffix of **m** or **M** indicates a **mega** multiplier, which is 2^20 = 1,048,576. For example the value **3M** results in an integer value of 3,145,728.

Following is the list of case-insensitive multiplier suffixes:

```
Suffix    Name    Multiplier
------    ----    ----------
  K       kilo    1,024
  M       mega    1,048,576
  G       giga    1,073,741,824
  T       tera    1,099,511,627,776
```

In some cases of specifying disk space, a suffix changes the meaning of the parameter. A number alone implies blocks while a number with a suffix implies bytes. Following are the keywords configured in blocks by default, or bytes when a multiplier suffix is used:

```
Keyword
-------
InodeExpandMin
InodeExpandInc
InodeExpandMax
InodeStripeWidth
PerfectFitSize
```

```
StripeAlignSize
StripeBreadth
```

Comments start anywhere a pound sign (#) occurs, and continue to the end of that line. The following are valid comment strings:

```
# This is a comment line
#     Text after and including a # sign on any line is ignored.
#               vvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvvv
FsBlockSize 4k  # The file system block size is 4096 bytes.
```

SECTIONS SUMMARY

The configuration file has six section types that are delimited by square-bracketed section-header lines as described above. The first section type is the **Global** section, which does not have a section-header line. It occurs only once, at the start of the file, and ends with the first bracketed section-header line. The Global section defines configuration attributes that affect table sizes, file system caches and performance factors for the file system.

The remaining sections are **AutoAffinity**, **NoAffinity**, **DiskTypes**, **Disk** and **StripeGroup**. These may occur any number of times and in any order.

Each **AutoAffinity** section defines a mapping of extensions to the given **Affinity**.

Each **NoAffinity** section defines a mapping of extensions to no affinity, i.e. an affinity value of 0.

Each **DiskTypes** section defines an instance of a valid disk type. This is simply a category of disk device and the disk device's size in sectors.

The **Disk** section describes individual disk devices that are configured in the file system. The name of the disk device must be placed in the volume header label using **cvlabel**(8). This is how the disk devices become associated with an **SNFS** disk name.

The **StripeGroup** section describes a group of **Disk** entities that comprise a stripe group. One or more stripe groups describe the entire file system. A stripe group is the smallest entity that can be manipulated by administration commands, such as **cvadmin**(8). Even though disk devices may be brought up or down, this has the effect of upping or downing the entire stripe group. The **StripeGroup** can be either read or write disabled. The stripe group is still up, but one or more of the related group's disks are disabled. When a stripe group is write disabled, no further allocations are permitted on the group.

NOTE: Several releases ago, there was a section called **MediaType** that defined **Affinity** names before they were used in a **StripeGroup** section. **Affinities** no longer need to be defined separately from the **StripeGroup**, and if upgrading from a file system that used the **MediaType** section, it must be removed or it will cause parser errors.

DEFAULT GLOBAL VALUES

The following defaults, minimums, and maximums are allowed for modifiable global variables. *NOTE:* the Default Value is in effect when the global variable is absent from the configuration file. Graphical user interfaces and command-line tools such as sncfgedit may create configuration files containing globals variables with initial values that differ from the Default Value below.

Variable Name	Default	Min	Max
AffinityPreference	NO	NO	YES
AllocationStrategy	Round		Round, Fill, Balance
AllocSessionReservationSize	0	128M	1048576M
BrlResyncTimeOut†	20	0	60
BufferCacheSize	256M	32M	500G
CaseInsensitive	NO	NO	YES
CvRootDir†	"/"	valid dir with < 1024 chars	
Debug	0	0	0xFFFFFFFF
DirWarp°	YES	NO	YES

EnableSpotlight	NO	NO	YES
EventFiles†	YES	NO	YES
EventFileDir†	special		valid dir with < 1024 chars
ExtentCountThreshold	49152	0	0x1FFFC00
FileLocks	NO	NO	YES
ForcePerfectFit†	NO	NO	YES
FsCapacityThreshold	0	0	100
FSMRealtime	NO	NO	YES
FSMMemlock	NO	NO	YES
GlobalShareMode	NO	NO	YES
GlobalSuperUser	NO	NO	YES
HaFsType	HaUnmonitored (values in snfs_config(5))		
InodeCacheSize	128K	4K	512K
InodeDeleteMax	special	10	0xFFFFFFFF
InodeExpandInc°	0	1	32767
InodeExpandMax°	0	1	32768
InodeExpandMin°	0	1	32768
InodeStripeWidth	0	0	1099511627776
JournalSize	64M	16M	512M
MaintenanceMode	NO	NO	YES
MaxLogs	4	1	0xFFFFFFFF
MaxLogSize	1M	1M	0xFFFFFFFF
NamedStreams	NO	NO	YES
OpHangLimitSecs	180	0	0xFFFFFFFF
PerfectFitSize	8	1	32768
Quotas	NO	NO	YES
QuotaHistoryDays	7	0	3650
RemoteNotification†	NO	NO	YES
RenameTracking	NO	NO	YES
ReservedSpace†	YES	NO	YES
RestoreJournal†	NO	NO	YES
RestoreJournalDir†	special		valid dir with < 1024 chars
RestoreJournalMaxHours†	0	0	102400
RestoreJournalMaxMB†	0	0	168
SecurityModel	legacy	legacy	legacy, acl, unixpermbits
StripeAlignSize	-1	-1	0xFFFFFFFF
TrimOnClose†	0	0	(2^64)-1
UnixDirectoryCreationModeOnWindows	0755	0	0777
UnixFileCreationModeOnWindows	0644	0	0777
UnixIdMapping	none		none, algorithmic, winbind
UnixIdFabricationOnWindows	*	NO	YES
UnixNobodyGidOnWindows	60001	0	0x7FFFFFFF
UnixNobodyUidOnWindows	60001	0	0x7FFFFFFF
UseL2bufferCache	YES	NO	YES
WindowsIdMapping	ldap		ldap, mdc, none
Security Model Variables			
UseActiveDirectorySFU	YES	NO	YES
WindowsSecurity	YES	NO	YES
XSan Only Variables			
EnforceACLs	NO	NO	YES

* -- UnixIdFabricationOnWindows default value is YES on Xsan and NO for all other platforms.

† *NOTE*: Not intended for general use. Only use when recommended by Quantum Support.

° *NOTE:* Deprecated and will no longer be valid in a future release

AUTOAFFINITY SECTION

Following is the format for a **AutoAffinity** section:

[AutoAffinity <Affinity>]

Extension <extension name>
[One Extension per extension in this mapping]

NOAFFINITY SECTION

Following is the format for a **NoAffinity** section:

[NoAffinity]

Extension <extension name>
[One Extension per extension in this mapping]

DISKTYPE SECTION

Following is the format for a **DiskType** section:

[DiskType <name>]

Sectors <sectors_per_disk>

SectorSize <sector_size>

DISK SECTION

The **Disk** section syntax is as follows:

[Disk <name>]

Status <UP | DOWN>

Type <disktype_name>

STRIPEGROUP SECTION

The **StripeGroup** section format is as follows:

[StripeGroup <name>]

Status <UP | DOWN>

Exclusive <Yes | No>

Metadata <Yes | No>

Journal <Yes | No>

Affinity <eight_character_string>
[Zero or more affinity entries are allowed]

Read <Enabled | Disabled>

Write <Enabled | Disabled>

StripeBreadth <number_of_blocks_per_disk>

MultiPathMethod <Rotate|Static|Sticky|Balance|Cycle>

Node <disk_name> <stripe_group_unit_number>
[One Node per disk in stripe group]

- **Status**
  If **Up**, the stripe group is available, if **Down** it is not.

- **StripeBreadth**
  Describes the number of file system blocks or bytes that are appended to a file before switching to the next disk in the group. When the value is specified without a multiplier suffix, it is a number of file system blocks. When specified with a multiplier, it is bytes.

- **Metadata**
  If **Yes**, this stripe group contains metadata. If **No**, it does not.

- **Journal**
  If **Yes**, this stripe group contains the journal. If **No**, it does not. Only one stripe group may contain a journal per file system.

- **Exclusive**
  When the **Exclusive** variable is set to **YES** on a stripe group that has **Metadata** or **Journal** set to YES, no userdata may reside on that stripe group.

  When the **Exclusive** variable is set to **YES** on a stripe group that does not have either **Metadata** or **Journal** set to **YES**, and does have **Affinity** values declared, only the **Affinities** declared in its **StripeGroup** section are allowed to reside on this stripe group. This may be preferable for high-bandwidth applications. Because **Exclusive** is used in two ways, a stripe group cannot have both exclusive **Affinity** declarations and metadata.

  The **Exclusive** helps to optimize disk striping strategies. For example, in a broadcast video application, an NTSC field is blocked out at 352,256 bytes per field. The optimal and required stripe breadth for a 525 line (NTSC broadcast) stripe group is two fields (a frame), or 43, 16k file system blocks. However, a 625 line (PAL broadcast) stripe group uses 417,792 bytes per field, and the optimal stripe breadth is 51, 16k file system blocks per disk. In order for allocation to work in a mixed mode environment, it is necessary to have one stripe group set up for 525 (NTSC) and another set up for 625 (PAL). See the configuration file example below to see two stripe groups, each configured optimally for NTSC and PAL modes.

- **Affinity**
  In conjunction with the **Exclusive** variable, the **Affinity** variable helps the FSM determine what type of allocation may occur on a stripe group. When **Exclusive** is **YES**, only files with matching **Affinity** values can be allocated. When **Exclusive** is **NO**, it is possible that other file types would be allocated on the stripe group. This could have fragmenting effects over time and eventually cause high-bandwidth performance problems. It is recommended that stripe groups are developed to be specialized for each file type used.

  The **Affinity** value can be any string of 8 characters or less.

- **Rtios**
  The **Rtios** variable defines the maximum number of disk I/O operations per second (IOs/s) available to real-time applications for the stripe group using the **Quality of Service (QoS)** API. If both **Rtios** and **Rtmb** are set to **0** (the default value), **QoS** is disabled. If both **Rtios** and **Rtmb** are defined, the smaller value (after **Rtmb** is converted to IOs/s internally) is used. This value should be obtained by real measurement using IO benchmark tool.

- **RtiosReserve**
  The **RtiosReserve** variable defines the minimum number of disk I/O operations per second reserved for non-realtime applications when realtime operations have been enabled using the **QoS** API. This prevents

non-realtime clients from IO starvation. If both **RtiosReserve** and **RtmbReserve** are set to **0** (the default value), the actual bandwidth reserved is 1MB/s (converting to IO/s), at least 1 IO/s is reserved. If both parameters are defined, the smaller value (**RtmbReserve** is converted to IOs/s internally) is used. This value should not be greater than **Rtios** or **Rtmb** (after being converted to IOs/s).

- **Rtmb**

  The **Rtmb** variable defines the maximum number of MBs per second available to real-time applications for the stripe group using the **QoS** API. Internally the bandwidth is converted to IOs/s based on the size of a well-formed I/Os, i.e. the size of a stripe width. If both **Rtios** and **Rtmb** are set to **0** (the default value), **QoS** is disabled. If both are defined, the smaller value (**RtmbReserve** is converted to IOs/s internally) is used. This value should be obtained through real measurement using I/O benchmark tools. Note: since the system uses IOs/s internally to throttle I/Os, it is recommended to specify **Rtmb** only if all I/Os are well formed. Otherwise, the conversion between MB/s and IOs/s using well-formed IOs could lead to unexpected results.

- **RtmbReserve**

  The **RtmbReserve** variable defines the minimum number of MBs per second reserved for non-realtime applications when realtime operations have been enabled using the **QoS** API. This prevents non-realtime clients from IO starvation. Internally this parameter is converted to IOs/s based on the size of a well-formed IO. If both **RtiosReserve** and **RtmbReserve** are set to **0** (the default value), the actual bandwidth reserved is 1MB/s (converting to IOs/s), at least 1 IO/s is reserved. If both parameters are defined, the smaller value (**RtmbReserve** is converted to IOs/s internally) is used. This value should not be greater than the value of **Rtmb**.

- **RtTokenTimeout**

  The **RtTokenTimeout** variable defines the number of seconds for the **FSM** server to wait for clients to respond to a **QoS** token callback before timeout. If this parameter is not set or it is set to 0, the default value is 1.5 (seconds). This value may need to be changed for a SAN that has a mixture of client machine types (Linux, Windows, IRIX, etc.) that all have different TCP/IP characteristics. Also, large numbers of clients (greater than 32) may also require increasing the value of this parameter.

EXAMPLE CONFIGURATION FILE

The following is an example of a fairly complex SNFS file system that supports multiple broadcast video/audio file formats, seven stripe groups and eighteen disk drives.This file system is set up to support both 525 and 625 real-time broadcast formats.

```
#
# StorNext File System Configuration File Example
#
#
# Names can be of [A-Z][a-Z][0-9] hyphen (-) and a under-bar (_)
#
# Other things, like user defined strings and pathnames must be enclosed
# by double quotes (").
#
# The comment character (#) may start anywhere and persists to the end
#  of line.
#

# ********************************************************************
# A global section for defining file system-wide parameters.
#
# For Explanations of Values in this file see the following:
#
# UNIX Users:    man snfs_config
#
```

```
# Windows Users: Start > Programs >
#                     StorNext File System > Help >
#                         Configuration File Format
#
# ***************************************************************************

AffinityPreference      No
AllocationStrategy      Round
BufferCacheSize         256M
DataMigration           No      # SNMS Managed File Systems Only
Debug                   0x0
FileLocks               No
FsBlockSize             4K
GlobalShareMode         No
GlobalSuperUser         Yes     # Set to Yes for SNMS Managed File Systems
InodeCacheSize          128K    # 800-1000 bytes each
JournalSize             64M
MaxLogs                 4
MaxLogSize              16M
OpHangLimitSecs         300     # Default is 180 secs
Quotas                  No
QuotaHistoryDays        7
UnixDirectoryCreationModeOnWindows  0755
UnixFileCreationModeOnWindows       0644
UnixIdFabricationOnWindows          No
UnixIdMapping           none
UnixNobodyGidOnWindows  60001
UnixNobodyUidOnWindows  60001
WindowsSecurity         Yes
SecurityModel           legacy
WindowsIdMapping        ldap
UseActiveDirectorySFU   Yes

[AutoAffinity NTSC]
Extension mov
Extension dpx

[AutoAffinity PALAud]
Extension mp3
Extension WAV

[NoAffinity]
Extension html
Extension txt

# ***************************************************************************
# A disktype section for defining disk hardware parameters.
# ***************************************************************************
[DiskType MetaDrive] ##1+1 Raid 1 Mirrored Pair##
Sectors    99999999      ## Sectors Per Disk From Command "cvlabel -l" ##
SectorSize 512

[DiskType JournalDrive] ##1+1 Raid 1 Mirrored Pair##
Sectors    99999999      ## Sectors Per Disk From Command "cvlabel -l" ##
```

```
SectorSize 512

[DiskType VideoDrive] ##8+1 Raid 5 LUN for Video##
Sectors    99999999      ## Sectors Per Disk From Command "cvlabel -l" ##
SectorSize 512

[DiskType AudioDrive] ##4+1 Raid 3 LUN for Audio##
Sectors    99999999      ## Sectors Per Disk From Command "cvlabel -l" ##
SectorSize 512

[DiskType DataDrive] ##4+1 Raid 5 LUN for Regular Data##
Sectors    99999999      ## Sectors Per Disk From Command "cvlabel -l" ##
SectorSize 512




# ****************************************************************************
# A disk section for defining disks in the hardware configuration.
# ****************************************************************************

[Disk CvfsDisk0]
Status UP
Type MetaDrive

[Disk CvfsDisk1]
Status UP
Type JournalDrive

[Disk CvfsDisk2]
Status UP
Type VideoDrive

[Disk CvfsDisk3]
Status UP
Type VideoDrive

[Disk CvfsDisk4]
Status UP
Type VideoDrive

[Disk CvfsDisk5]
Status UP
Type VideoDrive

[Disk CvfsDisk6]
Status UP
Type VideoDrive

[Disk CvfsDisk7]
Status UP
Type VideoDrive

[Disk CvfsDisk8]
```

```
Status UP
Type VideoDrive

[Disk CvfsDisk9]
Status UP
Type VideoDrive

[Disk CvfsDisk10]
Status UP
Type AudioDrive

[Disk CvfsDisk11]
Status UP
Type AudioDrive

[Disk CvfsDisk12]
Status UP
Type AudioDrive

[Disk CvfsDisk13]
Status UP
Type AudioDrive

[Disk CvfsDisk14]
Status UP
Type DataDrive

[Disk CvfsDisk15]
Status UP
Type DataDrive

[Disk CvfsDisk16]
Status UP
Type DataDrive

[Disk CvfsDisk17]
Status UP
Type DataDrive



# ****************************************************************************
# A stripe section for defining stripe groups.
# ****************************************************************************

[StripeGroup MetaFiles]
Status UP
MetaData Yes
Journal No
Exclusive Yes
Read Enabled
Write Enabled
StripeBreadth 256K
```

```
MultiPathMethod Rotate
Node CvfsDisk0 0


[StripeGroup JournFiles]
Status UP
Journal Yes
MetaData No
Exclusive Yes
Read Enabled
Write Enabled
StripeBreadth 256K
MultiPathMethod Rotate
Node CvfsDisk1 0


[StripeGroup NTSCFiles]
Status UP
Exclusive Yes                       ##Exclusive StripeGroup for Video Files Only##
Affinity NTSC                       ##8 character limit##
Read Enabled
Write Enabled
StripeBreadth 688k          ## NTSC frame size
MultiPathMethod Rotate
Node CvfsDisk2 0
Node CvfsDisk3 1
Node CvfsDisk4 2
Node CvfsDisk5 3


[StripeGroup PALFiles]
Status UP
Exclusive Yes                       ##Exclusive StripeGroup for Video Files Only##
Affinity PAL                        ##8 character limit##
Read Enabled
Write Enabled
StripeBreadth 816k      ## PAL frame size
Node CvfsDisk6 4
Node CvfsDisk7 5
Node CvfsDisk8 6
Node CvfsDisk9 7


## CCIR-601 525 Audio is read/written in 65536 byte blocks
[StripeGroup AudioFiles1]
Status UP
Exclusive Yes                       ##Exclusive StripeGroup for Audio File Only##
Affinity NTSCAud            ##8 character limit##
Read Enabled
Write Enabled
StripeBreadth 64k
MultiPathMethod Rotate
Node CvfsDisk10 0
Node CvfsDisk11 1
```

```
## CCIR-601 625 Audio is read/written in 61440 byte blocks
## We put 4 blocks per stripe so that it’s divisible by 16k fs block size
[StripeGroup AudioFiles2]
Status UP
Exclusive Yes                       ##Exclusive StripeGroup for Audio File Only##
Affinity PALAud                     ##8 character limit##
Read Enabled
Write Enabled
StripeBreadth 240k
Node CvfsDisk12 2
Node CvfsDisk13 3


[StripeGroup RegularFiles]
Status UP
Exclusive No                        ##Non-Exclusive StripeGroup for all Files##
Read Enabled
Write Enabled
StripeBreadth 256K
MultiPathMethod Rotate
Node CvfsDisk14 0
Node CvfsDisk15 1
Node CvfsDisk16 2
Node CvfsDisk17 3

#
# End
#
```

FILES

/usr/cvfs/config/.cfg*
/usr/cvfs/data/<file_system_name>*/config_history/*.cfg.*<TIMESTAMP>

SEE ALSO

snfs_config(5), **snfs.cfgx**(5)

NAME

snfs.cfgx − StorNext File System Configuration File

SYNOPSIS

This page describes the XML-format file system configuration file first introduced in StorNext 4.0 (the configDoc element will have a version attribute of "1.0"). It is an XML 1.0 compliant format, and is hierarchical in nature. All elements and attributes are case-sensitive.

See **snfs_config**(5) for details and descriptions of specific fields in this file and for a more general overview of file system configuration.

See **sncfgedit**(8) for the best way to edit a configuration file from the commandline.

A file system name is associated to its configuration file by the file's prefix. For example, if the file system were named **projecta**, then its configuration file would be */usr/cvfs/config/projecta.cfgx*. There may be multiple file systems simultaneously mounted, with an FSM program running for each active file system. Configuration files must reside on the same system as the FSM processes that use them.

ELEMENTS

The following describes the elements in hierarchical depth-first order. See EXAMPLE CONFIGURATION FILE to see all the elements together.

configDoc

The main element of the config is a **configDoc**. This sets up the XML namespace via the *xmlns* attribute and specifies the version of the configuration format via the *version* attribute. The configDoc contains all configuration information for the StorNext File System described by the file.

- *xmlns*

  Setup the xml namespace. If this is set to "snfs", no additional work is required. If it is setup like this:

  ```
  xmlns:snfs="http://www.quantum.com/snfs"
  ```

  each element in the document must be prefixed with "snfs:" to explicitly add them to the snfs namespace.

- *version*

  The format version. Currently must be "1.0".

  Currently, the only element the **configDoc** contains is a single **config** element.

config

Each **config** element contains one **globals** element, one **diskTypes** element, and one **stripeGroups** element. It also contains the following attributes:

- *configVersion*

  A generation number for the configuration file. This typically increases by one every time a changed version of the configuration is written to disk.

- *fsMade*

  Not used in this release

- *requestType*

  Not used in this release

- *name*

  A string denoting the name of the file system

- *fsBlockSize*

  The block size of the file system. As of StorNext 5, the block size is fixed at 4096. A value other than 4096 may be specified for a file system that has been upgraded, in which case the size when the file system was created is used.

- *journalSize*
  The size of the file system's journal. Must be at least 1024 times larger than the fsBlockSize.

globals

The **globals** element contains all global variable elements.

The following table lists the globals, their default values, and the valid range of values for each:

Variable Name	Default	Min	Max
affinityPreference	false	false	true
allocationStrategy	round		round, fill, balance
allocSessionReservationSize	0	134217728	1099511627776
bufferCacheSize	256M	32M	500G
caseInsensitive	false	false	true
cvRootDir†	"/"	valid dir with < 1024 chars	
debug	00000000	00000000	FFFFFFFF
dirWarp°	true	false	true
enableSpotlight	false	false	true
eventFiles†	true	false	true
eventFileDir†	special		valid dir with < 1024 chars
extentCountThreshold	49152	0	0x1FFFC00
fileLockResyncTimeOut†	20	0	60
filelocks	false	false	true
forcePerfectFit†	false	false	true
fsCapacityThreshold	0	0	100
fsmRealTime	false	false	true
fsmMemlock	false	false	true
globalShareMode	false	false	true
globalSuperUser	false	false	true
haFsType	HaUnmonitored (values in snfs_config(5))		
inodeCacheSize	131072	4096	524288
inodeDeleteMax	special	10	0xFFFFFFFF
inodeExpandInc°	0	1	17179869184
inodeExpandMax°	0	1	17179869184
inodeExpandMin°	0	1	17179869184
inodeStripeWidth	0	0	1099511627776
maintenanceMode	false	false	true
maxLogs	4	1	0xFFFFFFFF
maxLogSize	1048576	1048576	0xFFFFFFFF
namedStreams	false	false	true
opHangLimitSecs	180	0	0xFFFFFFFF
perfectFitSize	32768	4096	17179869184
quotas	false	false	true
quotaHistoryDays	7	0	3650
remoteNotification†	false	false	true
renameTracking	false	false	true
reservedSpace†	true	false	true
restoreJournal†	false	false	true
restoreJournalDir†	special		valid dir with < 1024 chars
restoreJournalMaxHours†	0	0	102400
restoreJournalMaxMB†	0	0	168
securityModel	legacy	legacy	legacy, acl, unixpermbits
spotlightUseProxy	false	false	true
storageManager	false	false	true
stripeAlignSize	-1	-1	0xFFFFFFFF

trimOnClose†	0	0	(2^64)-1
unixDirectoryCreationModeOnWindows	0755	0	0777
unixFileCreationModeOnWindows	0644	0	0777
unixIdFabricationOnWindows	*	false	true
unixIdMapping	algorithmic		none, algorithmic, winbind
unixNobodyGidOnWindows	60001	0	0x7FFFFFFF
unixNobodyUidOnWindows	60001	0	0x7FFFFFFF
useL2bufferCache†	true	false	true
windowsIdMapping	ldap		ldap, mdc, none
Legacy Windows Security Model Variables			
useActiveDirectorySFU	true	false	true
windowsSecurity	true	false	true
XSan-specific Variables			
enforceACLs	false	false	true
spotlightSearchLevel	ReadWrite	FsSearch	ReadWrite

* -- UnixIdFabricationOnWindows default value is YES on Xsan and NO for all other platforms.

† *NOTE*: Not intended for general use. Only use when recommended by Quantum Support.

° *NOTE:* Deprecated and will no longer be valid in a future release

Deprecated global options

The following global option has been deprecated:

The **AllocSessionReservation** parameter has been replaced by the **AllocSessionReservationSize** parameter. The old parameter is supported but will be eliminated in a future release.

autoAffinities
The **autoAffinities** element contains one or more **autoAffinity** and/or **noAffinity** elements.

autoAffinity
The **autoAffinity** element defines a mapping of extensions to the given affinity. It contains one or more **extension** elements and has one attribute:

- *affinity*
  The **Affinity** for this mapping.

extension
Each extension element within the **autoAffinity** element contains a file name extension to map to this **Affinity**. The extension string is case insensitive. The extension string can be empty which means all files not matching any extension in any mapping.

Put together it looks like this:

```
<autoAffinity affinity="Video">
   <extension>dpx</extension>
   <extension>mov</extension>
</autoAffinity>
<autoAffinity affinity="Audio">
   <extension>mp3</extension>
   <extension>wav</extension>
</autoAffinity>
<autoAffinity affinity="Other">
   <extension></extension>
</autoAffinity>
```

noAffinity
The **noAffinity** element defines a mapping of extensions to no affinity, i.e. an affinity value of 0. It contains one or more **extension** elements in the same format as **autoAffinity**.

Put together it looks like this:

```
<noAffinity>
   <extension>txt</extension>
   <extension>html</extension>
</noAffinity>
```

diskTypes
The **diskTypes** element contains one or more **diskType** elements.

diskType
The **diskType** element defines a single disk type. It has three attributes:

- *typeName*
  The name by which this disk type will be referenced in subsequent **disk** elements

- *sectors*
  The number of sectors this disk type contains

- *sectorSize*
  The size of each sector for this disk type

Put together it looks like this:

```
<diskType typeName="MetaDrive" sectors="99999999" sectorSize="512"/>
```

stripeGroups
The **stripeGroups** element contains one or more **stripeGroup** elements.

stripeGroup
The **stripeGroup** element contains a stripe group definition. A stripegroup element contains an optional **affinities** element and one or more **disk** elements. It also has several attributes associated with it:

- *index*
  A non-negative integer denoting the order of the stripe group within the file system.

- *name*
  A string containing the name of the stripe group

- *status*
  up or **down**

- *metadata*
  true if the stripe group contains metadata, **false** otherwise.

- *journal*
  true if the stripe group contains the journal, **false** otherwise. Only one stripe group per file system may contain a journal.

- *userdata*
  true if the stripe group contains userdata, **false** otherwise.

- *stripeBreadth*
  The number of bytes to write to each disk in the stripe group before moving to the next disk.

- *multipathMethod*
  One of the following multipath methods: rotate|static|sticky|balance|cycle

- *read*
  true or **false**.

- *write*
  true to enable new allocations to the stripe group, or **false** to disable allocations.

- *realTimeIOs*
  Maximum number of I/O operations per second available to real-time applications for the stripe group using the **Quality of Service (QoS)** API.

- *realTimeIOsReserve*
  I/Os that should be reserved for applications not using the QoS API.

- *realTimeMB*
  Maximum number of MBs per second available to real-time applications for the stripe group using the **QoS** API.

- *realTimeMBReserve*
  MBs per second that should be reserved for applications not using the QoS API.

- *realTimeTokenTimeout*
  A non-negative integer indicating the number of seconds for the **FSM** server to wait for clients to respond to a **QoS** token callback before timeout.

  A stripegroup element looks like the following:

```
<stripeGroup index="0" name="MyStripeGroup" status="up" stripeBreadth="4194304" r
  </stripeGroup>
```

affinities
The **affinities** element is only valid in stripe groups that have *userdata*="true". It contains one or more **affinity** elements. It has one attribute.

- *exclusive*
  If *exclusive* is **true**, only files that have the affinities defined for the stripe group associated with them will be allocated in the stripe group. If *exclusive* is **false**, file with the associated affinities will be steered to this stripe group but other files may be allocated in this stripe group as well.

affinity
The **affinity** element defines an affinity to be associated with the stripe group. An affinity is a sequence of up to 8 characters. Any characters past 8 will be truncated.

For example:

```
<affinity>MyAff1</affinity>
```

disk
A **disk** element defines a disk to use in the stripe group. It contains the following attributes:

- *index*
  Defines the order within the stripe group. Cannot be changed after the file system is made.

- *diskLabel*
  The label of the disk. See **cvlabel**(8) for details on how to create labels.

- *diskType*
  The name of a defined disk type

- *ordinal*
  The global order of the disks in the file system configuration. Cannot be changed after the file system is made.

  For example:

```
<disk index="0" diskLabel="CvfsDisk2" diskType="VideoDrive" ordinal="0"/>
```

EXAMPLE CONFIGURATION FILE

```
<?xml version="1.0" encoding="UTF-8"?>
<configDoc xmlns="http://www.quantum.com/snfs" version="1.0">
  <config configVersion="0" name="example" fsBlockSize="4096" journalSize="16777216">
    <globals>
      <affinityPreference>false</affinityPreference>
      <allocationStrategy>round</allocationStrategy>
      <haFsType>HaUnmonitored</haFsType>
      <bufferCacheSize>268435456</bufferCacheSize>
      <cvRootDir>/</cvRootDir>
      <storageManager>false</storageManager>
      <debug>00000000</debug>
      <dirWarp>true</dirWarp>
      <extentCountThreshold>49152</extentCountThreshold>
      <enableSpotlight>false</enableSpotlight>
      <spotlightUseProxy>false</spotlightUseProxy>
      <enforceAcls>false</enforceAcls>
      <fileLocks>false</fileLocks>
      <fileLockResyncTimeOut>20</fileLockResyncTimeOut>
      <forcePerfectFit>false</forcePerfectFit>
      <fsCapacityThreshold>0</fsCapacityThreshold>
      <globalSuperUser>true</globalSuperUser>
      <inodeCacheSize>131072</inodeCacheSize>
      <inodeExpandMin>0</inodeExpandMin>
      <inodeExpandInc>0</inodeExpandInc>
      <inodeExpandMax>0</inodeExpandMax>
      <inodeDeleteMax>0</inodeDeleteMax>
      <inodeStripeWidth>0</inodeStripeWidth>
      <maintenanceMode>false</maintenanceMode>
      <maxLogs>4</maxLogs>
      <namedStreams>false</namedStreams>
      <remoteNotification>false</remoteNotification>
      <renameTracking>false</renameTracking>
      <reservedSpace>true</reservedSpace>
      <fsmRealTime>false</fsmRealTime>
      <fsmMemLocked>false</fsmMemLocked>
      <opHangLimitSecs>180</opHangLimitSecs>
      <perfectFitSize>131072</perfectFitSize>
      <quotas>false</quotas>
      <quotaHistoryDays>7</quotaHistoryDays>
      <restoreJournal>false</restoreJournal>
      <restoreJournalDir></restoreJournalDir>
      <restoreJournalMaxHours>0</restoreJournalMaxHours>
      <restoreJournalMaxMb>0</restoreJournalMaxMb>
      <stripeAlignSize>-1</stripeAlignSize>
      <trimOnClose>0</trimOnClose>
      <useL2BufferCache>true</useL2BufferCache>
      <unixDirectoryCreationModeOnWindows>755</unixDirectoryCreationModeOnWindows>
```

```
    <unixIdFabricationOnWindows>false</unixIdFabricationOnWindows>
    <unixFileCreationModeOnWindows>644</unixFileCreationModeOnWindows>
    <unixNobodyUidOnWindows>60001</unixNobodyUidOnWindows>
    <unixNobodyGidOnWindows>60001</unixNobodyGidOnWindows>
    <windowsSecurity>true</windowsSecurity>
    <unixIdMapping>none</unixIdMapping>
    <securityModel>legacy</securityModel>
    <windowsIdMapping>ldap</windowsIdMapping>
    <globalShareMode>false</globalShareMode>
    <useActiveDirectorySFU>true</useActiveDirectorySFU>
    <eventFiles>true</eventFiles>
    <eventFileDir></eventFileDir>
    <allocSessionReservationSize>0</allocSessionReservationSize>
  </globals>
  <autoAffinities>
   <autoAffinity affinity="Video">
      <extension>dpx</extension>
      <extension>mov</extension>
   </autoAffinity>
   <autoAffinity affinity="Audio">
      <extension>mp3</extension>
      <extension>wav</extension>
   </autoAffinity>
   <noAffinity>
      <extension>txt</extension>
      <extension>html</extension>
   </noAffinity>
  </autoAffinities>
  <diskTypes>
    <diskType typeName="MetaDrive" sectors="99999999" sectorSize="512"/>
    <diskType typeName="JournalDrive" sectors="99999999" sectorSize="512"/>
    <diskType typeName="VideoDrive" sectors="99999999" sectorSize="512"/>
    <diskType typeName="AudioDrive" sectors="99999999" sectorSize="512"/>
    <diskType typeName="DataDrive" sectors="99999999" sectorSize="512"/>
  </diskTypes>
  <stripeGroups>
    <stripeGroup index="0" name="MetaFiles" status="up" stripeBreadth="262144" read="tru
      <disk index="0" diskLabel="CvfsDisk0" diskType="MetaDrive" ordinal="0"/>
    </stripeGroup>
    <stripeGroup index="1" name="JournFiles" status="up" stripeBreadth="262144" read="tr
      <disk index="0" diskLabel="CvfsDisk1" diskType="JournalDrive" ordinal="1"/>
    </stripeGroup>
    <stripeGroup index="2" name="VideoFiles" status="up" stripeBreadth="4194304" read="t
      <affinities exclusive="true">
        <affinity>Video</affinity>
      </affinities>
      <disk index="0" diskLabel="CvfsDisk2" diskType="VideoDrive" ordinal="2"/>
      <disk index="1" diskLabel="CvfsDisk3" diskType="VideoDrive" ordinal="3"/>
      <disk index="2" diskLabel="CvfsDisk4" diskType="VideoDrive" ordinal="4"/>
      <disk index="3" diskLabel="CvfsDisk5" diskType="VideoDrive" ordinal="5"/>
      <disk index="4" diskLabel="CvfsDisk6" diskType="VideoDrive" ordinal="6"/>
      <disk index="5" diskLabel="CvfsDisk7" diskType="VideoDrive" ordinal="7"/>
      <disk index="6" diskLabel="CvfsDisk8" diskType="VideoDrive" ordinal="8"/>
      <disk index="7" diskLabel="CvfsDisk9" diskType="VideoDrive" ordinal="9"/>
```

```
      </stripeGroup>
      <stripeGroup index="3" name="AudioFiles" status="up" stripeBreadth="1048576" read="t
        <affinities exclusive="true">
          <affinity>Audio</affinity>
        </affinities>
        <disk index="0" diskLabel="CvfsDisk10" diskType="AudioDrive" ordinal="10"/>
        <disk index="1" diskLabel="CvfsDisk11" diskType="AudioDrive" ordinal="11"/>
        <disk index="2" diskLabel="CvfsDisk12" diskType="AudioDrive" ordinal="12"/>
        <disk index="3" diskLabel="CvfsDisk13" diskType="AudioDrive" ordinal="13"/>
      </stripeGroup>
      <stripeGroup index="4" name="RegularFiles" status="up" stripeBreadth="262144" read="
        <disk index="0" diskLabel="CvfsDisk14" diskType="DataDrive" ordinal="14"/>
        <disk index="1" diskLabel="CvfsDisk15" diskType="DataDrive" ordinal="15"/>
        <disk index="2" diskLabel="CvfsDisk16" diskType="DataDrive" ordinal="16"/>
        <disk index="3" diskLabel="CvfsDisk17" diskType="DataDrive" ordinal="17"/>
      </stripeGroup>
    </stripeGroups>
  </config>
</configDoc>
```

FILES

/usr/cvfs/config/.cfgx*
/usr/cvfs/data/<file_system_name>*/config_history/*.cfgx.*<TIMESTAMP>

SEE ALSO

snfs_config(5), **snfs.cfg**(5)

NAME

snfsdefrag − StorNext File System Defrag Utility

SYNOPSIS

snfsdefrag [**-DdPqsv**] [**-G** *group*] [**-K** *key]* [**-k** *key*] [**-m** *count*] [**-r**] [**-S** *file*] *Target* [*Target*...]

snfsdefrag -e [**-b**] [**-G** *group*] [**-K** *key]* [**-r**] [**-t**] [**-S** *file*] *Target* [*Target*...]

snfsdefrag -E [**-b**] [**-G** *group*] [**-K** *key]* [**-r**] [**-t**] [**-S** *file*] *Target* [*Target*...]

snfsdefrag -c [**-G** *group*] [**-K** *key*] [**-r**] [**-t**] [**-T**] [**-S** *file*] *Target* [*Target*...]

snfsdefrag -p [**-DvPq**] [**-G** *group*] [**-K** *key]* [**-m** *count*] [**-r**] [**-S** *file*] *Target* [*Target*...]

snfsdefrag -l [**-Dv**] [**-G** *group*] [**-K** *key*] [**-m** *count*] [**-r**] [**-S** *file*] *Target* [*Target*...]

DESCRIPTION

snfsdefrag is a utility for defragmenting files on a StorNext file system by relocating the data in a file to a smaller set of extents. Reducing the number of extents in a file improves performance by minimizing disk head movement when performing I/O. In addition, with fewer extents, StorNext File System Manager (FSM) overhead is reduced.

snfsdefrag can be used to migrate files off of an existing stripe group and on to other stripe groups by using the **-G** option and setting the **-m** option to 0. If affinities are associated with a file that is being defragmented, new extents are created using the existing file affinity, unless being overridden by the **-k** option. If the **-k** option is specified, the files are moved to a stripe group with the specified affinity. Without **-k**, files are moved to any available stripe group. This migration capability can be especially useful when a stripe group is going out of service. See the use of the **-G** option in the EXAMPLES section below.

In addition to defragmenting and migrating files, **snfsdefrag** can be used to list the extents in a file (see the **-e** option) or to prune away unused space that has been preallocated for the file (see the **-p** option).

OPTIONS

-b Show extent size in blocks instead of kilobytes. Only useful with the **-e** and **-E** (list extents) options.

-c This option causes **snfsdefrag** to just display an extent count instead of defragmenting files. See also the **-t** and **-T** options.

-D Turns on debug messages.

-d Causes **snfsdefrag** to operate on files containing extents that have depths that are different than the current depth for the extent's stripe group. This option is useful for reclaiming disk space that has become "shadowed" after cvupdatefs has been run for stripe group expansion. Note that when **-d** is used, a file may be defragmented due to the stripe depth in one or more of its extents OR due to the file's extent count.

-e This option causes **snfsdefrag** to not actually attempt the defragmentation, but instead report the list of extents contained in the file. The extent information includes the starting file relative offset, starting and ending stripe group block addresses, the size of the extent, the depth of the extent, and the stripe group number. See also the **-t** option.

-E This option has the same effect as the **−e** option except that file relative offsets and starting and ending stripe group block addresses that are stripe-aligned are highlighted with an asterisk (*). Also, starting stripe group addresses that are equally misaligned with the file relative offset are highlighted with a plus sign (+). See also the **-t** option.

-G *stripegroup*
This option causes **snfsdefrag** to only operate on files having at least one extent in *stripegroup*, which is the stripe group index obtained by running the **show** subcommand from the **cvadmin** utility. Note that multiple **-G** options can be specified to match files with an extent in at least one of the specified stripe groups.

-K *key* This option causes **snfsdefrag** to only operate on source files that have the supplied affinity *key*. If *key* is preceded by '!' then **snfsdefrag** will only operate on source files that do **not** have the affini-

ty *key*. See EXAMPLES below.

-k *key* Forces the new extent for the file to be created on the stripe group specified by *key*.

-l This option causes **snfsdefrag** to just list candidate files.

-m *count*
This option tells **snfsdefrag** to only operate on files containing more than *count* extents. By default, the value of *count* is 1. A value of zero can be specified to operate on all files with at least one extent. This is useful for moving files off a stripe group.

-p Causes **snfsdefrag** to perform a prune operation instead of defragmenting the file. During a prune operation, blocks beyond EOF that have been preallocated either explicitly or as part of inode expansion are freed, thereby reducing disk usage. Files are otherwise unmodified. Note: While prune operations reclaim unused disk space, performing them regularly can lead to free space fragmentation.

-P Lists skipped files.

-q Causes **snfsdefrag** to be quiet.

-r [*TargetDirectory*]
This option instructs **snfsdefrag** to recurse through the *TargetDirectory* and attempt to defragment each fragmented file that it finds. If *TargetDirectory* is not specified, the current directory is assumed.

-s Causes snfsdefrag to perform allocations that are block-aligned. This can help performance in situations where the I/O size perfectly spans the width of the stripe group's disks.

-S *file* Writes status monitoring information in the supplied file. This is used internally by StorNext and the format of this file may change.

-t This option adds totals to the output of the **−c**, **−e**, or **−E** options. Output at the end indicates how many regular files were visited, how many total extents were found from all files, and the average # of extents per file. Also shown are the number of files with one extent, the number of files with more than one extent, and the largest number of extents in a single file.

-T This option acts like -t, except that with -c, only the summary output is presented. No information is provided for individual files.

-v Causes **snfsdefrag** to be verbose.

EXAMPLES

Count the extents in the file foo.

```
rock% snfsdefrag -c foo
```

Starting in directory, dir1, recursively count all the files and their extents and then print the grand total and average number of extents per file.

```
rock% snfsdefrag -r -c -t dir1
```

List the extents in the file foo.

```
rock% snfsdefrag -e foo
```

Defragment the file foo.

```
rock% snfsdefrag foo
```

Defragment the file foo if it contains more than 2 extents. Otherwise, do nothing.

```
rock% snfsdefrag -m 2 foo
```

Traverse the directory abc and its sub-directories and defragment every file found containing more than one

extent.

```
rock% snfsdefrag -r abc
```

Traverse the directory abc and its sub-directories and defragment every file found having one or more extents whose depth differs from the current depth of extent's stripe group OR having more than one extent.

```
rock% snfsdefrag -rd abc
```

Traverse the directory abc and its sub-directories and only defragment files having one or more extents whose depth differs from the current depth of extent's stripe group. This situation would arise after cvupdatefs has been used to expand the depth of a stripe group. The high value for -m ensures that only extents with different depth values are defragmented.

```
rock% snfsdefrag -m 9999999999 -rd abc
```

Traverse the directory abc and recover unused preallocated disk space in every file visited.

```
rock% snfsdefrag -rp abc
```

Force the file foo to be relocated to the stripe group with the affinity key "fast"

```
rock% snfsdefrag -k fast -m 0 foo
```

If the file foo has the affinity **fast**, then move its data to a stripe group with the affinity **slow**.

```
rock% snfsdefrag -K fast -k slow -m 0 foo
```

If the file foo does NOT have the affinity **slow**, then move its data to a stripe group with the affinity **slow**.

```
rock% snfsdefrag -K '!slow' -k slow -m 0 foo
```

Traverse the directory abc and migrate any files containing at least one extent in stripe group 2 to any non-exclusive stripe group.

```
rock% snfsdefrag -r -G 2 -m 0 abc
```

Traverse the directory abc and migrate any files containing at least one extent in stripe group 2 to stripe groups with the affinity **slow**. It is advised that the source stripe group be marked as read-only before running the following command, if you wish to retire the source stripe group.

```
rock% snfsdefrag -r -G 2 -k slow -m 0 abc
```

Traverse the directory abc list any files that have the affinity **fast** and having at least one extent in stripe group 2. It is advised that the source stripe group be marked as read-only before running the following command, if you wish to retire the source stripe group.

```
rock% snfsdefrag -r -G 2 -k fast -l -m 0 abc
```

NOTES

If **snfsdefrag** is run on a Windows client, the user must have read and write access to the file. If **snfsdefrag** is run on a Unix client, only the owner of a file or superuser is allowed to defragment a file. (To act as superuser on a StorNext file system, in addition to becoming the user **root**, the configuration option GlobalSuperUser must be enabled. See **snfs_config(5)** for more information.)

snfsdefrag will not operate on open files, files that have been modified in the past 10 seconds and files with modification times in the future. If a file is modified while defragmentation is in progress, **snfsdefrag** will abort and the file will be skipped.

snfsdefrag skips special files and files containing holes.

snfsdefrag does not follow symbolic links.

When operating on a file marked for PerfectFit allocations, **snfsdefrag** will "do the right thing" and preserve the PerfectFit attribute.

While performing defragmentation, **snfsdefrag** creates a temporary file named *TargetFile*__**defragtmp**. If the command is interrupted, **snfsdefrag** will attempt to remove this file. However, if **snfsdefrag** is killed or a power failure occurs, the temporary file may be left behind. If snfsdefrag is subsequently re-run and attempts defragmentation, it will clean up any stale temporary files encountered. But if snfsdefrag is not run again, it will be necessary to find and remove the temporary file as it will continue to consume space. Note that user files having the **__defragtmp** extension should not be created if **snfsdefrag** is to be run.

snfsdefrag will fail if it cannot locate a set of extents that would reduce the current extent count on a file.

When files being defragmented reside in a managed file system with stub files enabled and CLASS_STUB_READ_AHEAD is set in the fs_sysparams file, the operation could cause file retrieval.

ADVANCED FRAGMENTATION ANALYSIS

There are two major types of fragmentation to note: file fragmentation and free space fragmentation. File fragmentation is measured by the number of file extents used to store a file. A file extent is a contiguous allocation unit within a file. When a large enough contiguous space cannot be found to allocate to a file, multiple smaller file extents are created. Each extent represents a different physical spot in a stripe group. Requiring multiple extents to address file data impacts performance in a number of ways. First, the file system must do more work looking up locations for a file's data. Also, having file data spread across many different locations in the file system requires the storage hardware to do more work while reading a file. On a disk there will be increased head movements, as the drive seeks around to read in each data extent. Many disks also attempt to optimize I/O performance, for example, by attempting to predict upcoming read locations. When a file's data is contiguous these optimizations work well. However, with a fragmented file the drive optimizations are not nearly as efficient.

A file's fragmentation should be viewed more as a percentage than as a hard number. While it's true that a file of nearly any size with 50000 fragments is extremely fragmented and should be defragmented, a file that has 500 fragments that are mostly one or two file system blocks (4096 bytes) in length is also very fragmented. Keeping files to under 10% fragmentation is the ideal, and how close you come to that ideal is a compromise based on real-world factors (file system use, file sizes and their life span, opportunities to run **snfsdefrag**, etc.).

In an attempt to reduce fragmentation (file and free space), Adminstrators can try using the Allocation Session Reservation feature. This feature is managed using the GUI or by modifying the **AllocSessionReservationSize** parameter, see **snfs_config**(5). See also the StorNext Tuning Guide.

Some common causes of fragmentation are having very full stripe groups (possibly because of affinities), a file system that has a lot of fragmented free space (deleting a fragmented file produces fragmented free space), heavy use of CIFS or NFS which typically use out-of-order allocations resulting in unoptimized (uncoalesced) allocations, or an application that writes files in a random order.

snfsdefrag is designed to detect files which contain file fragmentation and coalesce that data onto a minimal number of file extents. The efficiency of **snfsdefrag** is dependent on the state of the file system's free data blocks, or free space.

The second type of fragmentation is free space fragmentation. The file system's free space is the pool of unallocated data blocks. Space allocation for new files, as well as allocations for extending existing files, comes from the file system's free space. Free space fragmentation is measured by the number of fragments of contiguous free blocks. Fragmentation in the file system's free space affects the file system's ability to allocate large extents. A file can only have an extent as large as the largest contiguous block of free space. Thus free space fragmentation can lead to file fragmentation in larger files. As **snfsdefrag** processes fragmented files it attempts to use large enough free space fragments to create a new defragmented file space. If free space is too fragmented **snfsdefrag** may not be able to allocate a large enough extent for the file's data. In the case that **snfsdefrag** must use multiple extents in the defragmented file, it will only proceed if the processed file will have fewer extents than the original. Otherwise **snfsdefrag** will abort that file's defrag process and move on to remaining defrag requests.

FRAGMENTATION ANALYSIS EXAMPLES

The following examples include reporting from **snfsdefrag** as well as **cvfsck**. Some examples require additional tools such as **awk** and **sort**.

Reporting a specific file's fragmentation (extent count).

```
# snfsdefrag -c <filename>
```

Report all files, their extents, the total # of files and extents, and the average number of extents per files. Beware that this command walks the entire file system so it can take a while and cause the performance of applications to degrade while running.

```
# snfsdefrag -r -c -t <mount point>
```

The following command will create a report showing each file's path, followed by extent count, with the report sorted by extent count. Files with the greatest number of extents will show up at the top of the list.

Replace <fsname> in the following example with the name of your StorNext file system. The report is written to stdout and should be redirected to a file.

```
# cvfsck -x <fsname> | awk -F, '{if (NF == 14) \
  print($6", "$7)}' | sort -uk1 -t, | sort -nrk2 -t,
```

This next command will display all files with at least 10 extents and with a size of at least 1MB. Replace <fsname> in the following example with the name of your StorNext file system. The report is written to stdout and can be redirected to a file.

```
# echo "#extents  file size  av. extent size  filename"; \
  cvfsck -r <fsname> | awk '{if (NF == 8 && $03 > 1048576 && \
  $05 > 10) printf("%8d %10d %16d %10s\n", $5, $3, $03/$05, $8)}' \
  | sort -nr
```

The next command displays a report of free space fragmentation. This allows an administrator to see if free space fragmentation may affect future allocation fragmentation. See **cvfsck**(8) man page for description of report output.

```
# cvfsck -a -t -f <fsname>
```

The fragmentation detected RAS warning message may sometimes refer to an inode number instead of a file name. To find the file name associated with the inode number on non-Windows clients, fill the file system mount point and the decimal inum from the RAS message into the following find command. The file name can then be used to defragment the file. There may be more than one file that matches the 32-bit inode number.

```
# find <mount_point> -inum <decimal_inum>

# snfsdefrag <filename>
```

For Windows clients:

Using a DOS shell, CD to the directory containing the StorNext binaries and run the cvstat command as follows: The <fname> parameter is the drive letter:/mount point and the <inum> parameter has either the decimal or hexidecimal 64-bit inode number from the RAS message. For example:

```
c:\> cd c:\Program Files\StorNext\bin

c:\> cvstat fname=j:\ inum=0x1c0000004183da
```

FILES

/usr/cvfs/config/.cfgx*

SEE ALSO

cvfsck(8), **cvcp**(1), **cvmkfile**(1), **snfs_config**(5), **cvaffinity**(1)

NAME

snfs_config − StorNext File System Configuration File

SYNOPSIS

/usr/cvfs/config/*.cfgx

DESCRIPTION

The **StorNext File System** (**SNFS**) configuration file describes to the **File System Manager** (**FSM**) the physical and logical layout of an individual file system.

FORMAT OPTIONS

The StorNext File System uses the XML format for the configuration file (see **snfs.cfgx.5**). This is supported on linux MDCs and is required when using the Storage Manager web-based GUI. If the GUI is not used or not available, the **sncfgedit(8)** utility should be used to create or change the XML configuration file.

The old non-XML format (see **snfs.cfg.5**) used in previous versions of StorNext is required on Windows MDCs and is valid on linux MDCs, but the Storage Manager GUI will not recognize it.

Linux MDCs will automatically have their file system configuration files converted to the XML format on upgrade, if necessary. Old config files will be retained in the */usr/cvfs/data/*<file_system_name>*/config_history* directory.

When a file system system is created, the configuration file is stored in a compressed format in the metadata. Some StorNext components validate that if the configuration file has changed, it is still valid for the operation of that component. The components that do this are: **fsm(8)**, **cvupdatefs(1)**, and **cvfsck(1)**. If the configuration is invalid, the component terminates. If the configuration has changed and is valid, the old configuration is saved in */usr/cvfs/data/*<file_system_name>*/config_history/*.cfgx.<TIMESTAMP> and the new one replaces the old one in metadata.

This manpage seeks to describe the configuration file in general. Format specific information can be found in **snfs.cfgx.5** and **snfs.cfg.5**.

GLOBAL VARIABLES

The file system configuration has several global variables that affect the size, function and performance of the **StorNext File System Manager** (**FSM**). (The **FSM** is the controlling program that tracks file allocation and consistency across the multiple clients that have access to the file system via a Storage Area Network.) The following global variables can be modified. **cvupdatefs**(8) to fail when a bitmap fragmentation threshold is exceeded. When that limit is exceeded, FSM memory usage and startup time may be excessive under the older method.

- XML: **affinityPreference** <true/false>

  Old: **AffinityPreference** <Yes|No>

  The **AffinityPreference** variable instructs the FSM how to allocate space to a file with an **Affinity** in low space conditions. If space cannot be allocated on a stripe group with a matching **Affinity**, the system normally fails with ENOSPC. This occurs even if the file system has remaining space that could satisfy the allocation request. If this variable is set to true (Yes), instead of returning ENOSPC, the system attempts to allocate space on another stripe group with an **Affinity** of 0.

  With this preference mechanism, the file's **Affinity** is not changed so a subsequent allocation request will still try to use the original **Affinity** before retrying with an **Affinity** of 0.

  The default value of false (No) retains the behaviour of returning ENOSPC instead of retrying the allocation request.

- XML: **allocationStrategy** <strategy>

  Old: **AllocationStrategy** <strategy>

  The **AllocationStrategy** variable selects a method for allocating new disk file blocks in the file system. There are three methods supported: **Round**, **Balance**, and **Fill**. These methods specify how, for each file, the allocator chooses an initial stripe group to allocate blocks from, and how the allocator chooses a new

stripe group when it cannot honor an allocation request from a file's current stripe group.

The default allocation strategy is **Round**. **Round** means that when there are multiple stripe groups of similar classes (for example two stripe groups for non-exclusive data), the space allocator should alternate (round robin) new files through the available stripe groups. Subsequent allocation requests for any one file are directed to the same stripe group. If insufficient space is available in that stripe group, the allocator will choose the next stripe group that can honor the allocation request.

When the strategy is **Balance**, the available blocks of each stripe group are analyzed, and the stripe group with the most total free blocks is chosen. Subsequent requests for the same file are directed to the same stripe group. If insufficient space is available in that stripe group, the allocator will choose the stripe group with the most available space.

When the strategy is **Fill**, the allocator will initially choose the stripe group that has the least amount of total free space. After that it will allocate from the same stripe group until the stripe group cannot honor a request. The allocator then reselects a stripe group using the original criteria.

If the Allocation Session Reservation feature is enabled, the strategy is forced to **Round** if configured otherwise.

- XML: **fileLockResyncTimeOut** <value>

  Old: **BRLResyncTimeout** <value>

  NOTE: Not intended for general use. Only use when recommended by Quantum Support.

- XML: **allocSessionReservationSize** <value>

  Old: **AllocSessionReservationSize** <value>

  The Allocation Session Reservation feature allows a file system to benefit from optimized allocation behavior for certain rich media streaming applications, and potentially other workloads. The feature also focuses on reducing free space fragmentation.

  This feature is disabled by default.

  An old, deprecated parameter, **AllocSessionReservation**, when set to yes used a 1 GB segment size with no rounding.

  The new parameter, **AllocSessionReservationSize**, allows you to specify the size this feature should use when allocating segments for a session. The value is expressed in bytes so a value of 1073741824 is 1 GB and is a well tested value. The value must be a multiple of MBs. The XML file format must be in bytes. The old configuration file format can use multipliers such as **m** for MBs or **g** for GBs. If the multiplier is omitted in the old configuration file, the value is interpreted as bytes as in the XML format.

  A value of 0 is the default value, which means the feature is turned off. When enabled, the value can range from 128 MB (134217728) to 1 TB (1099511627776). (The largest value would indicate segments are 1 TB in size, which is extremely large.) The feature starts with the specified size and then may use rounding to better handle user's requests. See also **InodeStripeWidth**.

  There are 3 session types: small, medium, and large. The type is determined by the file offset and requested allocation size. Small sessions are for sizes (offset+allocation size) smaller than 1MB. Medium sessions are for sizes 1MB through 1/10th of the **AllocSessionReservationSize**. Large sessions are sizes bigger than medium.

  Here is another way to think of these three types: small sessions collect or organize all small files into small session chunks; medium sessions collect medium sized files by chunks using their parent directory; and large files collect their own chunks and are allocated independently of other files.

  All sessions are client specific. Multiple writers to the same directory or large file on different clients will use different sessions. Small files from different clients use different chunks by client.

  Small sessions use a smaller chunk size than the configured **AllocSessionReservationSize**. The small chunk size is determined by dividing the configured size by 32. For 128 MB, the small chunk size is 4 MB. For 1 GB, the small chunk size is 32 MBs.

Files can start using one session type and then move to another session type. If a file starts in a medium session and then becomes large, it "reserves" the remainder of the session chunk it was using for itself. After a session is reserved for a file, a new session segment will be allocated for any other medium files in that directory.

When allocating subsequent pieces for a session, they are rotated around to other stripe groups that can hold user data unless **InodeStripeWidth** is set to 0. When **InodeStripeWidth** is set, chunks are rotated in a similar fashion to **InodeStripeWidth**. The direction of rotation is determined by a combination of the session key and the index of the client in the client table. The session key is based on the inode number so odd inodes will rotate in a different direction from even inodes. Directory session keys are based on the inode number of the parent directory.

If this capability is enabled, **StripeAlignSize** is forced to 0. In fact, all stripe alignment requests are disabled because they can cause clipping and can lead to severe free-space fragmentation.

The old **AllocSessionReservation** parameter is deprecated and replaced by **AllocSessionReservationSize.**

If any of the following "special" allocation functions are detected, **AllocSessionReservationSize** is turned off for that allocation: **PerfectFit**, **MustFit**, or **Gapped files**.

When this feature is enabled, if **AllocationStrategy** is not set to **Round**, it will be forced to **Round**.

- XML: **bufferCacheSize** <value>

  Old: **BufferCacheSize** <value>

  This variable defines how much memory to use in the FSM program for general metadata information caching. The amount of memory consumed is up to 2 times the value specified but typically less.

  Increasing this value can improve performance of many metadata operations by performing a memory cache access to directory blocks, inode info and other metadata info. This is about 10 - 1000 times faster than performing I/O.

  There are two buffer caches: the L1 cache and the L2 cache. If bufferCacheSize is configured as 1G or smaller, only the L1 cache is used. If bufferCacheSize is configured greater than 1G, the first 512M is used by the L1 cache and the remainder is used by the L2 cache. Blocks may reside in both caches. Blocks in the L2 cache are compressed by about a factor of 2.4, allowing for better memory utilization. For example, if bufferCacheSize is set to a value of 8G, the FSM will actually be able to cache about 7.5 * 2.4 = 18 G of metadata. Depending on the amount of RAM in the MDC and the number of allocated metadata blocks, in some cases it may be possible to keep all used metadata in cache which can dramatically improve performance for file system scanning. Cvfsck also uses the buffer cache and specifying a large engough value of bufferCacheSize to cover all metadata will result in a large speed increase. The cvadmin "metadata" command can be used to determine the value of bufferCacheSize required to cache all metadata.

  Also see the useL2BufferCache configuration parameter.

- XML: **caseInsensitive** <true|false>

  Old:

  The **caseInsensitive** variable controls how the FSM reports case sensitivity to clients. Windows clients are always case insensitive, Mac clients default to case insensitive, but if the FSM is configured as case sensitive then they will operate in case sensitive mode. Linux clients will follow the configuration variable, but can operate in case insensitive mode on a case sensitive filesystem by using the caseinsensitive mount option. Linux clients must be at the 5.4 release or beyond to enable this behavior.

- XML: **cvRootDir** <path>

  Old: **CvRootDir** <path>

  NOTE: Not intended for general use. Only use when recommended by Quantum Support.

  The **CvRootDir** variable specifies the directory in the StorNext file system that will be mounted by clients.

The specified path is an absolute pathname of a directory that will become the root of the mounted file system. The default value for the **CvRootDir** path is the root of the file system, "/". This feature is available only with Quantum StorNext Appliance products.

- XML: **storageManager** <true|false>

  Old: **DataMigration** <Yes|No>

  The **storageManager/DataMigration** statement indicates if the file system is linked to the **Stornext Storage Manager**, which provides hierarchical storage management capabilities to a Stornext Filesystem. Using the **Stornext Storage Manager** requires separately licensed software.

- XML: **debug** <debug_value>

  Old: **Debug** <debug_value>

  The **Debug** variable turns on debug functions for the FSM. The output is sent to */usr/cvfs/data/*<file_system_name>*/log/cvfs_log*. These data may be useful when a problem occurs. A Quantum Technical Support Analyst may ask for certain debug options to be activated when they are trying to analyze a file system or hardware problem. The following list shows which value turns on a specific debug trace. Multiple debugging options may be selected by calculating the bitwise OR of the options' values to use as debug_value. Output from the debugging options is accumulated into a single file.

```
0x00000001     General Information
0x00000002     Sockets
0x00000004     Messages
0x00000008     Connections
0x00000010     File system (VFS) requests
0x00000020     File system file operations (VOPS)
0x00000040     Allocations
0x00000080     Inodes
0x00000100     Tokens
0x00000200     Directories
0x00000400     Attributes
0x00000800     Bandwidth Management
0x00001000     Quotas
0x00002000     Administrative Tap Management
0x00004000     I/O
0x00008000     Data Migration
0x00010000     B+Trees
0x00020000     Transactions
0x00040000     Journal Logging
0x00080000     Memory Management
0x00100000     QOS Realtime IO
0x00200000     External API
0x00400000     Windows Security
0x00800000     Journal Tail Activity
0x40000000     Xattr manipulation
0x20000000     Metadump
0x01000000     Dump Statistics (Once Only)
0x02000000     Extended Buffers
0x04000000     Extended Directories
0x08000000     Queues
0x10000000     Extended Inodes
0x80000000     Development debug
```

  NOTE: The performance of the file system is dramatically affected by turning on debugging traces.

- XML: **dirWarp** <true|false>

Old: **DirWarp** <Yes|No>

NOTE: This setting has been deprecated and is no longer supported. It will be ignored.

- XML: **enforceAcls** <true|false>

  Old: **EnforceACLs** <Yes|No>

  Enables Access Control List enforcement on XSan clients. On non-XSan MDCs, WindowsSecurity should also be enabled for this feature to work with XSan clients.

  This variable is only applicable when **securityModel** is set to **legacy**. It is ignored for other **securityModel** values. See **securityModel** for details.

- XML: **enableSpotlight** <true|false>

  Old: **EnableSpotlight** <Yes|No>

  Enable Spotlight indexing.

- XML: **eventFiles** <true|false>

  Old: **EventFiles** <Yes|No>

  NOTE: Not intended for general use. Only use when recommended by Quantum Support.

  Enables event files processing for Data Migration

- XML: **eventFileDir** <path>

  Old: **EventFileDir** <path>

  NOTE: Not intended for general use. Only use when recommended by Quantum Support.

  Specifies the location to put Event Files

- XML: **extentCountThreshold** <value>

  Old: **ExtentCountThreshold** <value>

  When a file has this many extents, a RAS event is triggered to warn of fragmented files. The default value is 49152. A value of 0 or 1 disables the RAS event. This value must be between 0 and 33553408 (0x1FFFC00), inclusive.

- XML: **fileLocks** <true|false>

  Old: **FileLocks** <Yes|No>

  The variable enables or disables the tracking and enforcement of file-system-wide file locking. Enabling the **File locks** feature allows file locks to be tracked across all clients of the file system. The FileLocks feature supports both the POSIX file locking model and the Windows file locking model.

  If enabled, byte-range file locks are coordinated through the FSM, allowing a lock set by one client to block overlapping locks by other clients. If disabled, then byte-range locks are local to a client and do not prevent other clients from getting byte-range locks on a file, however they do prevent overlapping lock attempts on the same client.

- XML: **forcePerfectFit** <true|false>

  Old: **ForcePerfectFit** <Yes|No>

  NOTE: Not intended for general use. Only use when recommended by Quantum Support.

  Enables a specialized allocation mode where all files are automatically aligned and rounded to **PerfectFitSize** blocks. If this is enabled, **AllocSessionReservationSize** is ignored.

- XML: **fsBlockSize** <value>

  Old: **FsBlockSize** <value>

  The File System Block Size defines the granularity of the file system's allocation size. The block size is fixed at 4K. When an older file system is upgraded to StorNext 5, if the block size is other than 4k, the file

system is converted to a 4K block size. For these file systems, the original block size value remains in the config file. If a file system is remade that had a file system block size other than 4K, the config file is rewritten, changing the file system block size parameter value to 4K.

- XML: **fsCapacityThreshold** <value>

  Old: **FsCapacityThreshold** <value>

  When a file system is over **Fs Capacity Threshold** percent full, a RAS event is sent to warn of this condition. The default value is 0, which disables the RAS event. This value must be between 0 and 100, inclusive.

- XML: **fsmMemLocked** <true|false>

  Old: **FSMMemlock** <Yes|No>

  The **FSM Memory lock** variable instructs the FSM to ask the kernel to lock it into memory on platforms that support this. This prevents the FSM from getting swapped or paged out and provides a more responsive file system. Running with this option when there is insufficient memory for the FSM to run entirely in core will result in the FSM terminating. The default value is **No**. This is only supported on POSIX conforming platforms.

- XML: **fsmRealTime** <true|false>

  Old: **FSMRealtime** <yes|no>

  The **FSM Realtime** variable instructs the FSM to run itself as a realtime process on platforms that support this. This allows the FSM to run at a higher priority than other applications on the node to provide a more responsive file system. The default value is **No**. This is only supported on POSIX conforming platforms.

- XML: **globalShareMode** <true|false>

  Old: **GlobalShareMode** <Yes|No>

  The **GlobalShareMode** variable enables or disables the enforcement of Windows Share Modes across StorNext clients. This feature is limited to StorNext clients running on Microsoft Windows platforms. See the Windows CreateFile documentation for the details on the behavior of share modes. When enabled, sharing violations will be detected between processes on different StorNext clients accessing the same file. Otherwise sharing violations will only only be detected between processes on the same system. The default of this variable is **false**. This value may be modified for existing file systems.

- XML: **globalSuperUser** <true|false>

  Old: **GlobalSuperUser** <Yes|No>

  The **Global Super User** variable allows the administrator to decide if any user with super-user privileges may use those privileges on the file system. When this variable is set to **true**, any super-user has global access rights on the file system. This may be equated to the **maproot=0** directive in NFS. When the **Global Super User** variable is set to **false**, a super-user may only modify files where it has access rights as a normal user. This value may be modified for existing file systems.

- XML: **haFsType** <HaShared|HaManaged|HaUnmanaged|HaUnmonitored>

  Old: **HaFsType** <HaShared|HaManaged|HaUnmanaged|HaUnmonitored>

  The **HaFsType** configuration item turns on StorNext High Availability (HA) protection for a file system, which prevents split-brain scenario data corruption. HA detects conditions where split brain is possible and triggers a hardware reset of the server to remove the possibility of split brain scenario. This occurs when an activated FSM is not properly maintaining its brand of an arbitration block (ARB) on the metadata LUN. Timers on the activated and standby FSMs coordinate the usurpation of the ARB so that the activated server will relinquish control or perform a hardware reset before the standby FSM can take over. It is very important to configure all file systems correctly and consistently between the two servers in the HA cluster.

  There are currently three types of HA monitoring that are indicated by the **HaShared**, **HaManaged, and HaUnmanaged** configuration parameters.

The **HaShared** dedicated file system holds shared data for the operation of the **StorNext File System** and **Stornext Storage Manager** (SNSM). There must be one and only one **HaShared** file system configured for these installations. The running of SNSM processes and the starting of managed file systems is triggered by activation of the **HaShared** file system. In addition to being monitored for ARB branding as described above, the exit of the **HaShared** FSM triggers a hardware reset to ensure that SNSM processes are stopped if the shared file system is not unmounted.

The **HaManaged** file systems are not started until the **HaShared** file system activates. This keeps all the managed file systems collocated with the SNSM processes. It also means that they cannot experience split-brain corruption because there is no redundant server to compete for control, so they are not monitored and cannot trigger a hardware reset.

The **HaUnmanaged** file systems are monitored. The minimum configuration necessary for an HA cluster is to: 1) place this type in all the FSMs, and 2) enter the peer server's IP address in the **ha_peer**(4) file. Unmanaged FSMs can activate on either server and fail over to the peer server without a hardware reset under normal operating conditions.

On non-HA setups, the special **HaUnmonitored** type is used to indicate no HA monitoring is done on the file systems. It is only to be used on non-HA setups. Note that setting HaFsType to HaUnmonitored disables the HA monitor timers used to guarantee against split brain. When two MDCs are configured to run as an HA pair but full HA protection is disabled in this way, it is possible in rare situations for file system metadata to become corrupt if there are lengthy delays or excessive loads in the LAN and SAN networks that prevent an active FSM from maintaining its branding of the ARB in a timely manner.

- XML: **inodeCacheSize** <value>

  Old: **nodeCacheSize** <value>

  This variable defines how many inodes can be cached in the FSM program. An in-core inode is approximately 800 - 1000 bytes per entry.

- XML: **inodeDeleteMax** <value>

  Old: **InodeDeleteMax** <value>

  NOTE: Not intended for general use. Only use when recommended by Quantum Support.

  Sets the trickle delete rate of inodes that fall under the **Perfect Fit** check (see the **Force Perfect Fit** option for more information. If **Inode Delete Max** is set to 0 or is excluded from the configuration file, it is set to an internally calculated value.

- XML: **inodeExpandMin** <file_system_blocks>

  Old: **InodeExpandMin** <file_system_blocks>

- XML: **inodeExpandInc** <file_system_blocks>

  Old: **InodeExpandInc** <file_system_blocks>

- XML: **inodeExpandMax** <file_system_blocks>

  Old: **InodeExpandMax** <file_system_blocks>

  The **inodeExpandMin**, **inodeExpandInc** and **inodeExpandMax** variables configure the floor, increment and ceiling, respectively, for the block allocation size of a dynamically expanding file. The new format requires this value be specified in bytes and multipliers are not supported. In the old format, when the value is specified without a multiplier suffix, it is a number of file system blocks; when specified with a multiplier, it is bytes.

  The first time a file requires space, **inodeExpandMin** blocks are allocated. When an allocation is exhausted, a new set of blocks is allocated equal to the size of the previous allocation to this file plus **inodeExpandInc** additional blocks. Each new allocation size will increase until the allocations reach **inodeExpandMax** blocks. Any expansion that occurs thereafter will always use **inodeExpandMax** blocks per expansion.

  NOTE: when **inodeExpandInc** is not a factor of **inodeExpandMin**, all new allocation sizes will be rounded up to the next **inodeExpandMin** boundary. The allocation increment rules are still used, but the actual

allocation size is always a multiple of **inodeExpandMin**.

NOTE: The explicit use of the configuration variables **inodeExpandMin**, **inodeExpandInc** and **inodeExpandMax** are being deprecated in favor of an internal table driven mechanism. Although they are still supported for backward compatibility, there may be warnings during the conversion of an old configuration file to an XML format.

- XML: **inodeStripeWidth** <value>

  Old: **InodeStripeWidth** <value>

  The **Inode Stripe Width** variable defines how a file is striped across the file system's data stripe groups. After the initial placement policy has selected a stripe group for the first extent of the file, for each **Inode Stripe Width** extent the allocation is changed to prefer the next stripe group allowed to contain file data. Next refers to the next numerical stripe group number going up or down. (The direction is determined using the inode number: odd inode numbers go up or increment, and even inode numbers go down or decrement). The rotation is modulo the number of stripe groups that can hold data.

  When **Inode Stripe Width** is not specified, file data allocations will typically attempt to use the same stripe group as the initial allocation to the file.

  When used with an **Allocation Strategy** setting of **Round**, files will be spread around the allocation groups both in terms of where their initial allocation is and in how the file contents are spread out.

  Inode Stripe Width is intended for large files. The typical value would be many times the maximum **Stripe Breadth** of the data stripe groups. The value cannot be less than the maximum **Stripe Breadth** of the data stripe groups. Note that when some stripe groups are full, this policy will start to prefer the stripe group logically following the full one. A typical value is 1 GB (1073741824) or 2 GBs (2147483648). The size is capped at 1099511627776 (1TB).

  If this value is configured too small, fragmentation can occur. Consider using a setting of 1MB with files as big as 100 GBs. Each 100 GB file would have 102,400 extents!

  The new format requires this value be specified in bytes, and multipliers are not supported. In the old format, when the value is specified without a multiplier suffix, it is a number of file system blocks; when specified with a multiplier, it is bytes.

  When **AllocSessionReservationSize** is non-zero, this parameter is forced to be >= **AllocSessionReservationSize**.

  If **Inode Stripe Width** is greater than **AllocSessionReservationSize**, files larger than **AllocSessionReservationSize** will use **Inode Stripe Width** as their **AllocSessionReservationSize** for allocations with an offset beyond **AllocSessionReservationSize**.

- XML: **journalSize** <value>

  Old: **JournalSize** <value>

  Controls the size of the file system journal. **cvupdatefs**(8) must be run after changing this value for it to take effect. The FSM will not activate if it detects that the journal size has been changed in the config file, but the metadata has not been updated.

- XML: **maintenanceMode** <true|false>

  Old: **MaintenanceMode** <Yes|No>

  The **maintenanceMode** parameter enables or disables maintenance mode for the file system. In maintenance mode, all client mount requests are rejected by the FSM except from the client running on the same node as the FSM.

  NOTE: Not intended for general use. Only use when recommended by Quantum Support.

- XML: **maxLogs** <value>

  Old: **MaxLogs** <value>

  The **maxLogs** variable defines the maximum number of logs a FSM can rotate through when they get to

MaxLogSize. The current log file resides in */usr/cvfs/data/*<file_system_name>*/log/cvlog*.

- XML: **maxLogSize** <value>

  Old: **MaxLogSize** <value>

  The **maxLogSize** variable defines the maximum number of bytes a FSM log file should grow to. The log file resides in */usr/cvfs/data/*<file_system_name>*/log/cvlog*. When the log file grows to the specified size, it is moved to **cvlog_<number>** and a new **cvlog** is started. Therefore, **maxLogs** the space will be consumed as specified in **<value>**.

- XML: **namedStreams** <true|false>

  Old: **NamedStreams** <Yes|No>

  The **namedStreams** parameter enables or disables support for Apple Named Streams. Named Streams are utilized by Apple Xsan clients. If Named Streams support is enabled, **storageManager** and **snPolicy** must be disabled. Enabling Named Streams support on a file system is a permanent change. It cannot be disabled once enabled. Only Apple Xsan clients should be used with named streams enabled file systems. Use of clients other than Apple Xsan may result in loss of named streams data.

- XML: **opHangLimitSecs** <value>

  Old: **OpHangLimitSecs** <value>

  This variable defines the time threshold used by the FSM program to discover hung operations. The default is 180. It can be disabled by specifying 0. When the FSM program detects an I/O hang, it will stop execution in order to initiate failover to backup system.

- XML: **perfectFitSize** <value>

  Old: **PerfectFitSize** <value>

  For files in perfect fit mode, all allocations will be rounded up to the number of file system blocks set by this variable. Perfect fit mode can be enabled on an individual file by an application using the SNFS extended API, or for an entire file system by setting **forcePerfectFit**.

  If **InodeStripeWidth** or **AllocSessionReservationSize** are non-zero and Perfect fit is not being applied to an allocation, this rounding is skipped.

- XML: **quotas** <true|false>

  Old: **Quotas** <Yes|No>

  The **quotas** variable enables or disables the enforcement of the file system quotas. Enabling the quotas feature allows storage usage to be tracked for individual users and groups. Setting hard and soft quotas allows administrators to limit the amount of storage consumed by a particular user/group ID. See **cvadmin**(8) for information on quotas feature commands.

  NOTE: When **securityModel** is set to legacy, enabling the quotas feature automatically enables legacy **windowsSecurity**. Enabling **windowsSecurity** cannot be reversed without re-making the file system.

  NOTE: Quotas are calculated differently on Windows and Linux systems. It is not possible to migrate a meta data controller running quotas between these different types.

  NOTE: Quotas are not allowed when **securityModel** is set to unixpermbits.

- XML: **quotaHistoryDays** <value>

  Old: **QuotaHistoryDays** <value>

  When the **quotas** variable (see above) is turned on, there will be nightly logging of the current quota limits and values. The logs will be placed in the */usr/cvfs/data/*<file_system_name>*/quota_history* directory. This variable specifies the number of days of logs to keep. Valid values are 0 (no logs are kept) to 3650 (10 years of nightly logs are kept). The default is 7.

- XML: **remoteNotification** <true|false>

  Old: **RemoteNotification** <Yes|No>

The **remoteNotification** variable controls the Windows Remote Directory Notification feature. The default value is no which disables the feature. Note: this option is not intended for general use. Only use when recommended by Quantum Support.

- XML: **renameTracking** <true|false>

  Old:

  The **renameTracking** variable controls the **Stornext Storage Manager** (SNSM) rename tracking feature. This replaces the (global) Storage Manager configuration variable MICRO_RENAME. Its default is 'false'. During normal operation, Storage Manager records the name of each file in the database when the file is initially stored. The name is not normally updated in the Storage Manager database when a stored file is renamed. Setting this variable causes any rename of files managed by **Stornext Storage Manager** on the associated file system to update the associated entry's name in the database. This will slow down renames on the file system, but may avoid confusion when SNSM is used with applications that rename temporary files to replace working files.

- XML: **reservedSpace** <true|false>

  Old: **ReservedSpace** <Yes|No>

  NOTE: Not intended for general use. Only use when recommended by Quantum Support.

  The **reservedSpace** parameter allows the administrator the ability to control the use of delayed allocations on clients. The default value is **Yes**. **reservedSpace** is a performance feature that allows clients to perform buffered writes on a file without first obtaining real allocations from the FSM. The allocations are later performed when the data are flushed to disk in the background by a daemon performing a periodic sync.

  When **reservedSpace** is **true**, the FSM reserves enough disk space so that clients are able to safely perform these delayed allocations. The meta-data server reserves a minimum of 4GB per stripe group and up to 280 megabytes per client per stripe group.

  Setting **reservedSpace** to **false** allows slightly more disk space to be used, but adversely affects buffer cache performance and may result in serious fragmentation.

- XML: **restoreJournal** <true|false>

  Old: **RestoreJournal** <Yes|No>

  NOTE: Not intended for general use. Only use when recommended by Quantum Support.

  The **restoreJournal** statement is used to enable or disable restore journal (a.k.a. metadump or metadata dump) creation by the FSM process. A restore journal logs file system operations and is a key piece of restoring a file system after a disaster on non-managed or managed file systems. By default, restore journal creation is disabled on non-managed file systems, and enabled on managed file systems.

- XML: **restoreJournalDir** <path>

  Old: **RestoreJournalDir** <path>

  NOTE: Not intended for general use. Only use when recommended by Quantum Support.

  The **restoreJournalDir** statement is used to change the path in which restore journals are created. The default path is */usr/adic/database/metadumps/* for all file systems except non-managed file systems not running in an HA environment where the path is then */usr/cvfs/data/*<file_system_name>/.

- XML: **restoreJournalMaxHours** <value>

  Old: **RestoreJournalMaxHours** <value>

- XML: **restoreJournalMaxMb** <value>

  Old: **RestoreJournalMaxMB** <value>

  The **restoreJournalMaxMB** and **restoreJournalMaxHours** statements are obsolete and are only included for backward compatibility. Setting these global variables does not affect the file system in any way.

- XML: **securityModel** <legacy|acl|unixpermbits>

  Old: **SecurityModel** <legacy|acl|unixpermbits>

  The **securityModel** variable determines the security model to use on SNFS clients. **legacy** is the default value.

  When set to **legacy**, the **windowsSecurity** variable is checked to determine whether or not Windows clients should make use of the Windows Security Reference Monitor (ACLs). The **windowsIdMapping** variable is ignored for this security model.

  When set to **acl**, all SNFS clients (Windows and Unix) will make use of the Windows Security Reference Monitor (ACLs). The **windowsSecurity**, **windowsIdMapping**, and **enforceAcls** variables are ignored for this security model. When **acl** is specified, an additional variable, **unixIdMapping**, is used to control the method used to perform the Unix user id to Windows user mapping. See the **unixIdMapping** variable for additional information.

  When set to **unixpermbits**, all SNFS clients (Unix and Windows) will use Unix permission bit settings when performing file access checks. When **unixpermbits** is specified, an additional variable, **windowsIdMapping**, is used to control the method used to perform the Windows User to Unix User/Group ID mappings. See the **windowsIdMapping** variable for additional information. The **windowsSecurity**, **useActiveDirectorySFU**, **enforceAcls**, and **unixIdFabricationOnWindows** variables are ignored for this security model.

  NOTE: The **unixpermbits** setting does not support the Windows NtCreateFile function FILE_OPEN_BY_FILE_ID option, which opens a file by inode number versus file name.

- XML: **spotlightSearchLevel** <FsSearch|ReadWrite>

  Old: **SpotlightSearchLevel** <FsSearch|ReadWrite>

  Set the SpotlightSearchLevel. This option only applies when Xsan MDCs are used and should not be used elsewhere as it can interfere with Spotlight Proxy functionality.

- XML: **spotlightUseProxy** <true|false>

  Old: **SpotlightUseProxy** <Yes|No>

  Enable properly configured Xsan clients to act as proxy servers for OS X Spotlight Search on SNFS.

- XML: **stripeAlignSize** <value>

  Old: **StripeAlignSize** <value>

  The **stripeAlignSize** statement causes the allocator to automatically attempt stripe alignment and rounding of allocations greater than or equal to this size. The new format requires this value be specified in bytes and multipliers are not supported. In the old format, when the value is specified without a multiplier suffix, it is a number of file system blocks; when specified with a multiplier, it is bytes. If set to default **value** (-1), it internally gets set to the size of largest **stripeBreadth** found for any **stripeGroup** that can hold user data. A value of 0 turns off automatic stripe alignment. Stripe-aligned allocations are rounded up so that allocations are one stripe breadth or larger.

  If an allocation fails with stripe alignment enabled, another attempt is made to allocate the space without stripe alignment.

  If **AllocSessionReservationSize** is enabled, **stripeAlignSize** is set to 0 to reduce fragmentation within segments which occurs when clipping within segments.

- XML: **trimOnClose** <value>

  Old: **TrimOnClose** <value>

  NOTE: Not intended for general use. Only use when recommended by Quantum Support.

- XML: **useL2BufferCache** <true|false>

  Old: **UseL2BufferCache** <yes|no>

The **useL2BufferCache** variable determines whether the FSM should use the compressed L2 metadata block cache when the bufferCacheSize is greater than 1GB. The default is true. Setting this variable to false may delay FSM startup when using a very large value for bufferCacheSize.

NOTE: This variable may be removed in a future release.

NOTE: Not intended for general use. Only use when recommended by Quantum Support.

- XML: **unixDirectoryCreationModeOnWindows** <value>

  Old: **UnixDirectoryCreationModeOnWindows** <value>

  The **unixDirectoryCreationModeOnWindows** variable instructs the FSM to pass this value back to Microsoft Windows clients. The Windows SNFS clients will then use this value as the permission mode when creating a directory. The default value is 0755. This value must be between 0 and 0777, inclusive.

- XML: **unixFileCreationModeOnWindows** <value>

  Old: **UnixFileCreationModeOnWindows** <value>

  The **unixFileCreationModeOnWindows** variable instructs the FSM to pass this value back to Microsoft Windows clients. The Windows SNFS clients will then use this value as the permission mode when creating a file. The default value is 0644. This value must be between 0 and 0777, inclusive.

- XML: **unixIdFabricationOnWindows** <true|false>

  Old: **UnixIdFabricationOnWindows** <yes|no>

  The **unixIdFabricationOnWindows** variable is simply passed back to a Microsoft Windows client. The client uses this information to turn on/off "fabrication" of uid/gids from a Microsoft Active Directory obtained GUID for a given Windows user. A value of yes will cause the client for this file system to fabricate the uid/gid and possibly override any specific uid/gid already in Microsoft Active Directory for the Windows user. This setting should only be enabled if it is necessary for compatibility with Apple MacOS clients. The default is false, unless the meta-data server is running on Apple MacOS, in which case it is true.

- XML: **unixIdMapping** <value>

  Old: **UnixIdMapping** <value>

  When **securityModel** is set to **acl**, the **unixIdMapping** variable determines the method Linux and Unix clients use to perform Unix User/Group ID to Windows User mappings used by ACLs. This setting has no effect on Windows or Xsan clients.

  The default value of this variable is **none** which is incompatible with setting **serurityModel** to **acl**.

  A value of **winbind** should be used when the environment contains Linux and/or Unix clients that are bound to Active Directory using Winbind.

  When **unixIdMapping** is set to **algorithmic**, UIDs are mapped to SIDs using the following method:
  RID(uid) = (2 * uid) + 1000
  The RID is then appended to the Domain SID. For the **algorithmic** unixIdMapping, the default value of the Domain SID is:
  S-5-21-3274805877-1740924817-4269325941
  For example, a user having a UID of 400, will have the SID:
  S-5-21-3274805877-1740924817-4269325941-1800
  GIDs are mapped to SIDs using the following method:
  RID(gid) = (2 * gid) + 1001
  The RID is then appended to the Domain SID. For example, a group having a GID of 300 will have the SID:
  S-5-21-3274805877-1740924817-4269325941-1601
  Note: while commonly only required when using Open Directory, the Domain SID can be overridden using the StorNext domainsid (4) configuration file.

- XML: **unixNobodyGidOnWindows** <value>

Old: **UnixNobodyGidOnWindows** <value>

The **unixNobodyGidOnWindows** variable instructs the FSM to pass this value back to Microsoft Windows clients. The Windows SNFS clients will then use this value as the gid for a Windows user when no gid can be found using Microsoft Active Directory. The default value is 60001. This value must be between 0 and 2147483647, inclusive.

- XML: **unixNobodyUidOnWindows** <value>

  Old:

  The **unixNobodyUidOnWindows** variable instructs the FSM to pass this value back to Microsoft Windows clients. The Windows SNFS clients will then use this value as the uid for a Windows user when no uid can be found using Microsoft Active Directory. The default value is 60001. This value must be between 0 and 2147483647, inclusive.

- XML: **useActiveDirectorySFU** <true|false>

  Old: **useActiveDirectorySFU** <Yes|No>

  The **useActiveDirectorySFU** variable enables or disables the use of Microsoft's Active Directory Services for UNIX (SFU) on Windows based SNFS clients. (Note: Microsoft has changed the name "Services for UNIX" in recent releases of Windows. We are using the term SFU as a generic name for all similar Active Directory Unix services.) This variable does not affect the behavior of Unix clients. Active Directory SFU allows Windows-based clients to obtain the Windows user's Unix security credentials. By default, SNFS clients running on Windows query Active Directory to translated Windows SIDs to Unix uid, gid and mode values and store those credentials with newly created files. This is needed to set the proper Unix uid, gid and permissions on files. If there is no Active Directory mapping of a Windows user's SID to a Unix user, a file created in Windows will have its uid and gid owned by **NOBODY** in the Unix view (See **unixNobodyUidOnWindows**.)

  Always use Active Directory SFU in a mixed Windows/Unix environment, or if there is a possibility in the future of moving to a mixed environment. If **useActiveDirectorySFU** is set to **false**, files created on Windows based SNFS clients will always have their uid and gid set to **NOBODY** with default permissions.

  However, if it is unlikely a Unix client will ever access the SNFS file system, then you may get a small performance increase by setting **useActiveDirectorySFU** to **false**. The performance increase will be substantial higher only if you have more than 100 users concurrently access the file system via a single Windows SNFS client.

  The default of this variable is **true**. This value may be modified for existing file systems.

- XML: **windowsIdMapping** <ldap|mdc|none>

  Old: **WindowsIdMapping** <ldap|mdc|none>

  The **windowsIdMapping** variable determines the method Windows clients should use to perform the Windows User to Unix User/Group ID mappings. **ldap** is the default value.

  This variable is only applicable when **securityModel** is set to **unixpermbits**. It is ignored for other **securityModel** values. See **securityModel** for details.

  When set to **ldap**, Microsoft Active Directory is queried to obtain uid/gid values for the Windows User, including support for up to 32 supplemental GIDs.

  When set to **mdc**, the SNFS MDC is queried to obtain uid/gid values for the Windows User, including support for an unlimited number of supplemental GIDs. The **mdc** setting is not valid on Windows MDCs.

  When set to **none**, then there is no specific Windows User to Unix User mapping (see the Windows control panel). In this case, files will be owned by NOBODY in the Unix view.

- XML: **windowsSecurity** <true|false>

Old: **WindowsSecurity** <Yes|No>

The **WindowsSecurity** variable enables or disables the use of the Windows Security Reference Monitor (ACLs) on Windows clients. This does not affect the behavior of Unix clients. In a mixed client environment where there is no specific Windows User to Unix User mapping (see the Windows control panel), files under Windows security will be owned by **NOBODY** in the Unix view. The default of this variable is **false** for configuration files using the old format and **true** when using the new XML format. This value may be modified for existing file systems.

This variable is only applicable when **securityModel** is set to **legacy**. It is ignored for other **securityModel** values. See **securityModel** for details.

NOTE: Once windowsSecurity has been enabled, the file system will track Windows access lists for the life of the file system regardless of the **windowsSecurity** value.

AUTOAFFINITY DEFINITION

A **autoAffinity** defines a mapping of file extension(s) to an **Affinity**. A **noAffinity** defines a mapping of file extensions to an affinity of 0. The **Affinity** must exist in the stripe group section (see below). At file creation time, if the file has an extension in the list specified, it will be assigned the **Affinity** or 0. This is only done for regular files and not other types of files such as directories, devices, symbolic links, etc. An extension can only exist once for all **autoAffinity** and **noAffinity** mappings.

Extensions in a file name are defined by all the characters following the last "." in the file name. The **extension** tag in the configuration file is followed by the characters in the extension without the ".". There is one special extension that is defined by not specifying an extension. This is the "empty" extension and tells file creation to map all files not matching another extension to the **autoAffinity** or **noAffinity** mapping it is in.

For example, an administrator can map all files ending in .dpx to an affinity of **Movies**. Or, all remaining files could be mapped to an affinity of **Other**.

Customers can explicitly assign affinities to files and directories using the cvmkdir, cvmkfile, or cvaffinity commands. Or, files can be assigned affinities with library API calls from within applications. The automatic affinities defined in this section take precedence and override affinities set with cvmkdir/cvmkfile or via a library function. For example, if a directory exists with an affinity of **Audio** and a file is created in that directory with a dpx extension with the above autoAffinity mapping. The *.dpx files gets assigned the **Movies** affinity overriding **Audio**.

The cvaffinity command can be used to later change the affinity of a file toi some other value.

Some applications create temporary files before renaming them to their final name. Mappings of extension to affinity take effect only on the create call. So for these applications, the temporary file name determines the file's affinity. If the temporary file name has a different extension or no extension, the temporary's extension is used for the mapping. If the file is renamed to a different extension, the mapping is not affected. A typical example of this is Microsoft Word.

DISKTYPE DEFINITION

A **diskType** defines the number of sectors for a category of disk devices, and optionally the number of bytes per disk device sector. Since multiple disks used in a file system may have the same type of disk, it is easier to consolidate that information into a disk type definition rather than including it for each disk definition.

For example, a 9.2GB Seagate Barracuda Fibre Channel ST19171FC disk has **1778311** total sectors. However, using most drivers, a portion of the disk device is used for the volume header. For example, when using a **Prisa** adapter and driver, the maximum number of sectors available to the file system is **11781064**.

When specified, the sector size must be 512 or 4096 bytes. The default sector size is 512 bytes.

DISK DEFINITION

Note: The XML format defines disks in the stripeGroup section. The old format defines disks in a separate section and then links to that definition with the **node** variable in the stripe group. The general description below applies to both.

Each **disk** defines a disk device that is in the Storage Area Network configuration. The name of each disk

device must be entered into the disk device's volume header label using **cvlabel**(8). Disk devices that the client cannot see will not be accessible, and any stripe group containing an inaccessible disk device will not be available, so plan stripe groups accordingly. Entire disks must be specified here; partitions may not be used.

The disk definition's **name** must be unique, and is used by the file system administrator programs.

A disk's status may be up or down. When down, this device will not be accessible. Users may still be able to see directories, file names and other meta-data if the disk is in a stripe group that only contains userdata, but attempts to open a file affected by the downed disk device will receive an **Operation Not Permitted (EPERM)** failure. When a file system contains down data stripe groups, space reporting tools in the operating system will not count these stripe groups in computing the total file system size and available free blocks. *NOTE*: when files are removed that only contain extents on **down** stripe groups, the amount of available free space displayed will not change.

Each disk definition has a type which must match one of the names from a previously defined **diskType**.

NOTE: In much older releases there was also a **DeviceName** option in the **Disk** section. The **DeviceName** was previously used to specify a operating system specific disk name, but this has been superseded by automatic volume recognition for some time and is no longer supported. This is now for internal use only.

STRIPEGROUP DEFINITION

The **stripeGroup** defines individual stripe groups. A stripe group is a collection of disk devices. A disk device may only be in one stripe group.

The **stripeGroup** has a name **name** that is used in subsequent system administration functions for the stripe group.

A stripe group can be set to have it's status up or down. If down, the stripe group is not used by the file system, and anything on that stripe group is inaccessible. This should normally be left up.

A stripe group can contain a combination of **metadata**, **journal**, or **userdata**. There can only be one stripe group that contains a **journal** per file system. Typically, metadata and journal are kept separate from user-data for performance reasons. Ideally, the journal will be kept on its own stripe group as well.

When a collection of disk devices is assembled under a stripe group, each disk device is logically striped into chunks of disk blocks as defined by the **stripeBreadth** variable. For example, with a 4k-byte block-size and a stripe breadth of 86 file system blocks, the first 352,256 bytes would be written or read from/to the first disk device in the stripe group, the second 352,256 bytes would be on the second disk device and so on. When the last disk device used its 352,256 bytes, the stripe would start again at drive zero. This allows for more than a single disk device's bandwidth to be realized by applications.

The allocator aligns an allocation that is greater than or equal to the largest **stripeBreadth** of any stripe group that can hold data. This is done if the allocation request is an extension of the file.

A stripe group can be marked up or down. When the stripe group is marked down, it is not available for data access. However, users may look at the directory and meta-data information. Attempts to open a file residing on a downed stripe group will receive a **Permission Denied** failure.

There is an option to turn off reads to a stripe group. *NOTE*: Not intended for general use. Only use when recommended by Quantum Support.

A stripe group can have write access denied. If writes are disabled, then any new allocations are disallowed as well. When a file system contains data stripe groups with writes disabled, space reporting tools in the operating system will show all blocks for the stripe group as **used**. Note that when files are removed that only contain extents on write-disabled stripe groups, the amount of available free space displayed will not change. This is typically only used during *Dynamic Resource Allocation* procedures (see the StorNext User Guide for more details).

Affinities can be used to target allocations at specific stripe groups, and the stripe group can exclusively contain affinity targeted allocations or have affinity targeted allocations co-existing with other allocations. See **snfs.cfg**(5) and **snfs.cfgx**(5) for more details.

Each stripe group can define a multipath method, which controls the algorithm used to allocate disk I/Os on paths to the storage when the file system has multiple paths available to it. See **cvadmin**(8) for details.

Various realtime I/O parameters can be specified on a per stripe group basis as well. These define the maximum number of I/O operations per second available to real-time applications for the stripe group using the **Quality of Service (QoS)** API. There is also the ability to specify I/Os that should be reserved for applications not using the QoS API. Realtime I/O functionality is off by default.

A stripe group contains one or more disks on which to put the metadata/journal/userdata. The disk has an **index** that defines the ordinal position the disk has in the stripe group. This number must be in the range of zero to the number of disks in the stripe group minus one, and be unique within the stripe group. There must be one disk entry per disk and the number of disk entries defines the stripe depth. For more information about disks, see the DISK DEFINITION section above.

NOTE: The **StripeClusters** variable has been **deprecated**. It was used to limit I/O submitted by a single process, but was removed when asynchronous I/O was added to the file system.

NOTE: The **Type** variable for Stripe Groups has been **deprecated**. Several versions ago, the **Type** parameter was used as a very course-grained affinity-like control of how data was laid out between stripe groups. The only valid value of **Type** for several releases of SNFS has been **Regular**, and this is now deprecated as well for the XML configuration format. **Type** has been superceded by **Affinity**.

FILES

/usr/cvfs/config/.cfgx*
/usr/cvfs/config/.cfg*

SEE ALSO

snfs.cfgx(5), **snfs.cfg**(5), **sncfgedit**(8), **cnvt2ha.sh**(8), **cvfs**(8), **cvadmin**(8), **cvlabel**(8), **cvmkdir**(1), **cvmkfile**(1), **domainsid**(4), **ha_peer**(4), **mount_cvfs**(8)

NAME

snfs_ras − StorNext File System RAS Events

DESCRIPTION

The StorNext File System supports logging and delivery of specific Reliability/Availability/Serviceability (RAS) events. When a RAS event occurs, an entry is added to the event log (*/usr/cvfs/ras/raslog*) on the Name Server coordinators (see **fsnameservers**(4)). It is also possible to configure the coordinators to automatically send e-mail for RAS events or pass the RAS event to any script or executable as described in the NOTES section below. In an environment that includes the StorNext Management Suite (SNMS), RAS events also generate Service Request RAS tickets that can be viewed through the SNMS GUI by selecting "System Status" from the Service menu.

EVENTS

The following list contains the currently supported events.

Event:

SL_EVT_NO_RESPONSE (Not responding)

Occurs:

When a reply from the FSM is delayed.

Example detail:

client2.foo.com (kernel): Timeout while attempting to force data flush for file ´file1´ (inode "895468127") for file system ´snfs1´ on host client1. Allowing host client2 to open file. This may cause data coherency issues. The data path for host client1 should be inspected to confirm that I/O is working correctly.

Suggested Action(s):

Confirm that the data path is working properly on the system specified in the event detail.

Event:

SL_EVT_INVALID_LABEL (Label validation failure)

Occurs:

When client-side label verification fails.

Example detail:

wedge.foo.com (kernel): fs snfs1: disk label verification for ’CvfsDisk0’ failed on rawdev /dev/rhdisk0 blkdev /dev/hdisk0 (HBA:2 LUN:0)

Suggested Action(s):

Check for corrupt, incorrect, or missing labels using the cvlabel command. Also inspect system logs for I/O errors and check SAN integrity.

Event:

SL_EVT_DISK_ALLOC_FAIL (Failed to allocate disk space)

Occurs:

When a disk allocation fails due to lack of space.

Example detail:

fsm[PID=1234]: fs snfs1: Disk Allocation failed

Suggested Action(s):

Free up disk space by removing unnecessary disk copies of files, or add disk capacity.

Event:

SL_EVT_COMM_LUN_FAIL (LUN communication failure)

Occurs:

When an I/O error occurs in a multi-path environment, causing a path to become disabled.

Example detail:
wedge.foo.com (kernel): Disk Path '/dev/rdisk0' (HBA:2 LUN:0) used by file system snfs1 temporarily disabled due to I/O error

Suggested Action(s):
Check system and RAID logs for SAN integrity.

Event:
SL_EVT_IO_ERR (I/O Error)

Occurs:
When an I/O error is detected by the FSM or a client.

Example detail:
wedge.foo.com (kernel): fs snfs1: I/O error on cookie 0x12345678 cvfs error 'I/O error' (0x3)

Suggested Action(s):
Check LUN and disk path health, as well as overall SAN integrity. Also inspect the system logs for driver-level I/O errors.

Event:
SL_EVT_SHUTDOWN_ERR (Error shutting down)

Occurs:
When a problem occurs when unmounting or shutting down a file system.

Example detail:
wedge.foo.com cvadmin[PID=1234]: fs snfs1: could not unmount all cvfs file systems

Suggested Action(s):
Inspect the file system and system logs to determine the root cause.

Event:
SL_EVT_INITIALIZATION_FAIL (Initialization failure)

Occurs:
When the FSM or fsmpm process fails to start up or a mount fails.

Example detail:
wedge.foo.com fsm[PID=1880]: fs snfs1: FSM Initialization failed with status 0x14 (missing disk(s))

Suggested Action(s):
Correct the system configuration as suggested by the event detail, or examine the system logs to determine the root cause. If the detail text suggests a problem with starting the fsmpm process, run "cvlabel -l" to verify that disk scanning is working properly.

Event:
SL_EVT_LICENSE_FAIL (License failed)

Occurs:
When a StorNext license expires.

Example detail:
wedge.foo.com fsm[PID=2588]: fs snfs1: StorNext Client lady.foo.com (1372A4B126) license has expired. All further client operations not permitted.

Suggested Action(s):
Contact the Quantum Technical Assistance Center to obtain a valid license.

Event:
SL_EVT_LICENCE_REQUIRED (License Required)

Occurs:
When a StorNext license will expire within 48 hours.

Example detail:
wedge.foo.com fsm[PID=3325]: fs snfs1: Please update license file! StorNext File System license will expire on Tue Dec 12 11:28:26 CST 2006

Suggested Action(s):
Contact the Quantum Technical Assistance Center to obtain a valid license.

Event:
SL_EVT_FAIL_OVER (Fail-over has occurred)

Occurs:
During during FSM fail-over.

Example detail:
wedge.foo.com fsm[PID=3325]: fs snfs1: Fail-over has occurred: Previous MDC ’172.16.82.71’ Current MDC ’172.16.82.78’

Suggested Action(s):
Inspect the system log and the FSM cvlog to determine the root cause.

Event:
SL_EVT_META_ERR (Metadata error)

Occurs:
When the FSM detects a metadata inconsistency.

Example detail:
wedge.foo.com fsm[PID=3325]: Invalid inode lookup: 0x345283 markers 0x3838/0x3838 gen 0x2 next iel 0x337373

Suggested Action(s):
Check SAN integrity and inspect the system logs for I/O errors. If the SAN is healthy, run cvfsck on the affected file system at the earliest convenient opportunity.

Event:
SL_EVT_BADCFG_NOT_SUP (Configuration not supported)

Occurs:
When an FSM configuration file is invalid or missing. Also occurs when the total number of FSMs running on metadata controllers under a fsnameservers domain exceeds the capacity limit of the heartbeat protocol.

Example detail:
wedge.foo.com fsm[PID=3832]: fs snfs1: Problem encountered parsing configuration file ’snfs1.cfgx’: There were no disk types defined

Example detail:
wedge.foo.com fsm[PID=3832]: fs snfs1: Problem encountered parsing configuration file ’snfs1.cfgx’: There were no disk types defined

Suggested Action(s):
Verify that a valid file system configuration file exists for the specified file system. Also check the system logs for additional configuration file error details. The capacity of the heartbeat protocol is a function of the number of FSMs and the length of the file-system names. The maximum number of FSMs can be configured by limiting file-system names to seven characters or fewer, and by ensuring that all clients are upgraded to use the expanded heartbeat-protocol packet size.

Event:
SL_EVT_TASK_DIED (Process/Task died, not restarted)

Occurs:
When the FSM or fsmpm unexpectedly exists.

Example detail:

wedge.foo.com fsm[PID=5543]: fs snfs1: PANIC: Alloc_init THREAD_MUTEX_INIT alloc_space lock

Suggested Action(s):

Check the FSM logs and system logs to determine the root cause. If possible, take corrective action. If you suspect a software bug, contact the Quantum Technical Assistance Center.

Event:

SL_EVT_SYS_RES_FAIL (System resource failure)

Occurs:

When a memory allocation fails.

Example detail:

wedge.foo.com fsm[PID=9939]: Memory allocation of 65536 bytes failed: file 'disks.c' line 256

Suggested Action(s):

Determine the cause of memory depletion and correct the condition by adding memory or paging space to your system. If SNFS is using excessive amounts of memory adjusting the configuration parameters might resolve the problem. For information about adjusting parameters, refer to the Release Notes, the **snfs_config**(5) and **mount_cvfs**(8) man pages, and the SNFS Tuning Guide.

Event:

SL_EVT_SYS_RES_CRIT (System resource critical)

Occurs:

When the filesystem is running out of space.

Example detail:

wedge.foo.com fsm[PID=3947]: fs 'snfs1': System over 10% full

Suggested Action(s):

Add additional storage or reduce file system usage. If the message indicates metadata stripe groups are full, add additional metadata storage.

Event:

SL_EVT_SYS_RES_WARN (System resource warning)

Occurs:

When a fragmented file is detected or a user's hard quota limit is reached

Example detail:

wedge.foo.com fsm[PID=5213]: fs 'snfs1': Quota hard limit reached for user jdoe

Suggested Action(s):

If a hard quota limit is reached, increase the user's quota or notify the user. If fragmentation has been detected, consult the **snfsdefrag**(1) man-page for instructions on performing fragmentation analysis and defragmenting files.

Event:

SL_EVT_CONNECTION_FAIL (Connection rejected)

Occurs:

When the FSM rejects a client connection attempt (other than for a licensing issue).

Example detail:

wedge.foo.com fsm[PID=9939]: The client node [Node 13] does not support cluster-wide central control feature, please upgrade the client to a newer version

Suggested Action(s):

Check the system logs to determine the root cause.

Event:

SL_EVT_LUN_CHANGE (LUN mapping changed)

Occurs:

When an fsmpm disk scan detects a change in an existing path.

Example detail:

wedge.foo.com fsmpm[4872]: Disk ’CvfsDisk0’ is no longer accessible as ’/dev/hdisk0’ -- path may have been assigned to another device.

Suggested Action(s):

If the LUN mapping change is unexpected, run the cvadmin "disks" and "paths" commands to confirm that all LUN paths are present. Also check SAN integrity and inspect the system logs to determine the root cause.

Event:

SL_EVT_JOURNAL_ERR (Journaling error)

Occurs:

When journal recovery fails.

Example detail:

wedge.foo.com fsm[5555]: fs snfs1: Journal error: Journal_recover: Journal_truncate failed

Suggested Action(s):

Contact the Quantum technical assistance center and open a service request.

NOTES

To reduce overhead, some types of RAS events are throttled so that only one event is generated per hour per system.

To quickly set up RAS event e-mail notification, use the following steps on each of the Name Server coordinators:

1. copy */usr/cvfs/examples/rasexec.example* to */usr/cvfs/config/rasexec*

2. edit */usr/cvfs/config/rasexec* and modify RAS_EMAIL as appropriate.

After setting up notification, you may prefer to exclude certain events to reduce the number of e-mail messages you receive. This can be accomplished by adding events that you wish to skip to the RAS_EXCLUDE variable in */usr/cvfs/config/rasexec*.

To call an arbitrary executable for each RAS event, simply invoke a command from */usr/cvfs/config/rasexec*. The first argument passed to rasexec is the event (e.g. SL_EVT_IO_ERR) and the second is the detail string and these can be passed into your program. Be careful when choosing the command to run so that it does not hang or cause other ill effects.

FILES

/usr/cvfs/ras/raslog
/usr/cvfs/ras/OLDraslog
/usr/cvfs/config/rasexec
/usr/cvfs/examples/rasexec.example

SEE ALSO

fsnameservers(4), **fsm**(8), **cvfs_failover**(8)

NAME

snhamgr − StorNext High Availability Manager

SYNOPSIS

snhamgr [**-m**|**-v**] **--primary**

snhamgr [**-m**|**-v**] **status**

snhamgr [**-m**|**-v**] **start**

snhamgr [**-m**|**-v**] **stop**

snhamgr [**-m**|**-v**] **config**

snhamgr [**-m**|**-v**] **peerdown**

snhamgr [**-m**|**-v**] **peerup**

snhamgr [**-m**|**-v**] **force smith**

snhamgr [**-m**|**-v**] **clear**

snhamgr [**-m**|**-v**] **mode=**{**default**|**single**|**config**|**locked**}

DESCRIPTION

The StorNext High Availability System (HA) protects against data corruption from so-called *Split Brain Scenario*, which is when redundant servers are writing to common storage in an uncontrolled way. In normal operation, the StorNext product will not allow uncontrolled writes, but some types of hardware or software failures can make the system vulnerable. HA provides protection against *split-brain scenario* by: 1) monitoring for situations where the Primary server must relinquish control according to strict timing rules and, 2) resetting the primary server before the secondary server could complete usurpation of control. Adding an HA option to the configuration of each SNFS file system activates the HA protections. Creating the */usr/cvfs/config/ha_peer* file with the numerical IP address of the peer metadata servers (MDC) allows communication between fsmpm processes on the HA MDCs that reduces the chance of unnecessary HA Reset incidents. These configuration changes are sufficient to establish HA protected redundant-server configurations that: 1) do not include the Storage Manager, and 2) do not use the StorNext GUI. Configurations that use those features have more complex management requirements that are met by the HA Manager Subsystem.

The HA Manager Subsystem automates operation of the HA system for configurations that include the HaShared file system. It manages the HA operating *mode* and *status* on each of the two servers. These two pairs of values describe the cluster state, which is essential for controlling the HA system so that StorNext can be started, operated, and stopped for administrative activities while continuously maintaining protection against *split-brain scenario*. Rules built into the HA Manager prevent combinations of modes that could put the cluster at risk. Rules built into StorNext components' control scripts allow their components to start only when it is safe.

Warning: Modifications to StorNext software that compromise the HA operating rules could result in data corruption from *split-brain scenario*.

Modes are set on the local server, and can be queried by either server. They are stored in a file to allow the modes to continue across reboots. The following are the modes and capabilities they allow:

default HA reset capability is enabled. When the conditions for a potential *split-brain scenario* are detected, system-kernel software performs a software-driven hardware reset, so-called *Shoot Myself In The Head* (SMITH). It has this name because of the way that resets are invoked autonomously. When a server cannot communicate with its peer, the peer is assumed to be running in *default* mode. StorNext configurations without the HaShared file system operate without the HA Manager in *default* mode at all times.

CAUTION: When transitioning the primary server from *single* mode to *default* mode, verify that the HA shared file system is activated and that it has access to all of its disks. To do this, run the cvadmin *fsmlist* command and verify that the state is not BLOCKED for the HA shared file system FSM. If it is, then attempt to refresh the network paths to the meta-data disks using the cvadmin

disks refresh command. See the cvadmin man page for more detailed information on cvadmin commands.

locked HA reset capability is disabled. StorNext components are prevented from running. This mode can be entered and exited automatically by scripts, so the server must continue running and communicating while it is in this mode. It allows the peer server to operate StorNext with HA reset capability disabled in *single* or *config* mode to allow administrative tasks without the risk of *split-brain scenario*. When requested, the *locked* server must communicate its status, so *locked* mode is not effective for servers that are rebooting or powered down.

CAUTION: If a secondary MDC in *locked* mode is rebooted or powered down while the primary MDC is in *config* or *single* mode, snhamgr may detect that the HA cluster is in an invalid state. If it does, it will attempt to safeguard the HA cluster by stopping StorNext on the primary MDC and putting it into *default* mode. To return the HA cluster back to the config state, check to ensure that the secondary MDC is either powered off and peerdown is set on the primary MDC or that the secondary MDC is running and its snhamgr mode is set to *locked*. Once this is verified, restart StorNext on the primary MDC and then set its snhamgr mode back to *config*.

peerdown

The peer server is out of service. This mode is equivalent to *locked*, but is certified by an administrator rather than reported by a server to its peer. The attribute is stored locally. This mode is used when the peer server is powered down.

In the event that the peer returns to service and begins to communicate, the assertion that the peer is down becomes false. Immediate action may be taken by the local server to transition itself to a safe operating mode, which could trigger an HA reset. The best practice is to power off the server or deinstall StorNext before setting *peerdown* mode, and to unset the mode before powering on the server.

Note: Issuing the *peerdown* command should only be done interactively, not by scripts, which might lead to an operational mistake that produces an avoidable HA reset.

single HA reset capability is disabled. The peer server must be *peerdown* (recommended) or *locked*. The *single* mode is useful when an HA reset would be unhelpful because there is no peer server to take over the cluster. The peer server must be *peerdown* (recommended) or *locked*. An HA cluster can be operated non-redundantly for an indefinite period in the *single* mode. A server can transition from default to single and from single to default without restarting StorNext.

config HA reset capability is disabled. The peer server must be *peerdown* or *locked*. The *config* mode is meant for use when: 1) making changes to configuration files, and 2) stopping and starting StorNext processes to apply those changes. When transitioning out of *config* mode into *default* mode, StorNext must be stopped, which ensures that all processes are started in the correct sequence.

OPTIONS

-m Output status in a format that may be easier to use in scripts.

-v Increase the verbosity.

COMMANDS

--primary

Set the primary status for the local server. This is used by the */usr/cvfs/lib/snactivated* script after activating the *HaShared* file system. **Note: This command is exclusively for internal use by HA system software.** Use of this command outside of that context could undermining HA protection and allow corruption of the SNSM database. The command cannot be run from a terminal as a precaution.

status Return cluster modes and operating statuses. All commands return status; this one does nothing else.

start Stop each server when there is a need and transition both servers to default mode, then bring up the local server first followed by the peer server so that the local server becomes *primary* and the

peer server becomes *secondary*.

stop Safely stop both servers in the cluster without incurring a HA reset. The secondary server is placed in *locked* mode, which stops StorNext on that server, then the *primary* server is placed in *config* mode and stopped, and then both servers are put in *default* mode with StorNext stopped.

config First, check that the peer server is in *locked* or *peerdown* mode. Then, place the local server in *config* mode. The command must be run on the *primary* server or either server when CVFS is stopped on both.

peerdown
Certify that the peer server is powered off. **Note: This command should never be run from a script.** Misuse could lead to an unnecessary HA reset or data corruption.

peerup Undo the *peerdown* mode. The command will fail if the local mode is *config* or *single*. Run this command before powering on the peer server. The local server will assume the peer is in *default* mode until the peer starts *snhamgr_daemon* communications.

force smith
Trigger an immediate HA reset if the local server is in *default* mode. This command is meant for use in health-monitoring scripts or in testing the capability of a system to issue the HA reset. The command is two words to make accidental firing less likely.

Note: It is not recommended to use this command to administratively failover a system in a production environment. The preferred method to gracefully failover the primary system to its peer node is to simply stop CVFS and restart it after the peer has become primary. For example, on the node that is primary run:

```
# service cvfs stop
```

Wait for the peer to become primary, then run:

```
# service cvfs start
```

clear Remove the file referenced by the HA_IDLE_FAILED_STARTUP environment variable. Run this after correcting any conditions that caused the previous failure of StorNext startup scripts.

mode=<*modeval*>
Set the mode of the local server to *modeval*. The mode is stored on the local server so that it persists across reboots.

config Set the mode to *config*. The peer server must be in *locked* or *peerdown* mode.

default Set the mode to *default*. The peer server can be in any mode.

locked Set the mode to *locked*. The peer server can be in any mode.

single Set the mode to *single*. The peer server must be in *locked* (recommended) or *peerdown* mode.

USAGE

The *snhamgr* command can be used in scripts or interactively. It is multi-threaded to allow simultaneous invocations. A simple status command takes about one second to complete, and involves running a StorNext script on each server to collect operational status. The stop, start, and config cluster commands can take several minutes to complete, and involve running several StorNext scripts on each server. Interrupting the *snhamgr* command during the execution of one of these commands does not stop the command, which may continue to completion in the *snhamgr_daemon*.

Care should be taken to avoid simultaneous contradictory actions that could leave one or both servers in need of manual intervention to restore proper StorNext production operation.

After completing a command, *snhamgr* prints out cluster status in one of two formats. The default format is easier for humans to read. The *-m* option produces a one-line output that may be easier to use in scripts.

In the unlikely event that the *snhamgr_daemon* is not running, the status output displays *error* for all of its

fields. The best action in that event is to determine the reason for the stoppage of the *snhamgr_daemon*, to correct the problem, and to restart the daemon with: **service snhamgr start**.

SEE ALSO

cvfs(8), **ha_peer**(4), **snhamgr_daemon**(8)
Quantum StorNext User's Guide

Code start macro

NAME

snhamgr_daemon − StorNext HA Manager daemon

SYNOPSIS

service snhamgr {**start**|**stop**|**restart**|**status**}

DESCRIPTION

The *snhamgr_daemon*, together with its **snhamgr**(8) command-line interface (CLI), automates some operations of high-availability (HA) redundant StorNext HA servers. It enforces rules of the HA Reset system for preserving the HA protections against *Split Brain Scenario* while allowing HA resets to be disabled during administrative activities.

The *snhamgr_daemon* process runs continuously on servers after they have been converted to HA with the **cnvt2ha.sh**(8) script. These daemons provide a distributed multi-tasking system that measures the state of the cluster and communicates with the *snhamgr* CLI to report and optionally change the state of the cluster. StorNext component scripts make calls to the *snhamgr* CLI at control points so that HA operating rules are upheld.

The *snhamgr_daemon* is started by the **init.d**(7) mechanism before any other StorNext software. Likewise, it is stopped after all other StorNext software on shutdown of the server operating system. This allows it to communicate status to its peer and be called by StorNext scripts whether StorNext is running or stopped. The daemon has a companion *watcher* process that attempts to restart the daemon if it stops.

At startup, the *snhamgr_daemon* reads the */usr/cvfs/install/.ha_mgr* file to determine the operational mode of the local server and to determine if the peer server has been certified as *peerdown* by an administrator. The file is updated when commands are issued to change the server's modes. This allows the HA modes to persist across reboots and StorNext restarts.

The daemon runs StorNext component scripts to measure or change the operational status of the server at startup, when a request arrives from the *snhamgr* CLI, or when a request arrives from the peer server's *snhamgr_daemon*. The *snhamgr_daemon* can take actions to at these junctures to enforce the HA operating rules. Otherwise, the *snhamgr_daemon* is idle.

Output traces for commands run by StorNext are captured in the */usr/cvfs/debug/hamgr_cmds_trace* file. Information in the file can be difficult to read because scripts are often run in parallel and the output of several commands can be interlaced. When the file is two megabytes at the start of a command, the file is moved to */usr/cvfs/debug/hamgr_cmds_trace.old* and a new file is created.

ENVIRONMENT

The following environment variables are defined in */usr/adic/.profile* and regulate the operation of *snhamgr_daemon*.

SNSM_HA_CONFIGURED

The *cnvt2ha.sh* script creates the file referenced by the *SNSM_HA_CONFIGURED* variable. When the file does not exist, the *snhamgr_daemon* exits, which means that the daemon only operates on systems having an *HaShared* file system (see the **snfs_config**(5) and **cnvt2ha.sh**(8) man pages for details). The *snhamgr* command-line interface is still used by component scripts in HA configurations without an **HaShared** file system, but it: 1) does not communicate between servers, 2) reports both servers as being in *default* mode, and 3) always reports the statuses of the local server as *unconfigured* and the peer server as *unknown*.

The value of SNSM_HA_CONFIGURED is */usr/adic/install/.snsm_ha_configured*. **The file should not be modified except by Quantum support personnel.**

HA_IDLE_FAILED_STARTUP

When an algorithm in the startup scripts detects a failure to complete the previous startup, it creates the file referenced by this variable to prevent the looping of failed startups. When this file exists, StorNext will not start and the *snhamgr_daemon* reports the server mode as *failed_startup* and the status as *unknown* for both local and peer servers. The value of HA_IDLE_FAILED_STARTUP is */usr/cvfs/install/ha_idle_failed_startup*.

HAMGR_MAX_LOGSIZE

Controls the maximum size that the **ha_mgr.out** file can reach before a new log file will be started. The value is a number followed by an optional suffix (**K** for Kilobytes, **M** for Megabytes, **G** for Gigabytes), or the string **unlimited**, indicating that the file can grow without bound. The default is 1M and the minimum is 64K.

HAMGR_MAX_LOGFILES

Controls the number of old **ha_mgr.out** log files that will be saved by **fsmpm** when the current log file reaches its maximum size. There must be at least one, and the default is 4.

FILES

/usr/cvfs/install/.ha_mgr

Machine-written, human-readable value and timestamp for the local server mode and the remote server's potential *peerdown* mode. The timestamps tell when the modes were last changed.

/var/lock/subsys/snhamgr

This file prevents the running of more than one daemon, and provides an open-file link for stopping the daemon and checking its status.

/usr/cvfs/debug/ha_mgr.out

Log file for the *snhamgr_daemon*.

/usr/cvfs/debug/hamgr_cmds_trace

Trace file for commands and scripts invoked by the *snhamgr_daemon*.

SEE ALSO

cvfs(8), **snhamgr**(8), **cnvt2ha.sh**(8), **snfs_config**(5), **chkconfig**(8), **init**(8)

NAME

snlatency − Measure StorNext File System network latency

SYNOPSIS

snlatency *pathname* [*repeat*]

DESCRIPTION

The **snlatency** program allows measuring the round trip latency from the StorNext client to the FSM process on the MDC host. The file system to measure is selected via the *pathname* parameter.

snlatency uses a special RPC to the MDC in a loop to measure the time to send the message, the time for the FSM process to service the request, and the time to send the response back up to the system call level. The average of *repeat* calls is averaged and the latencies printed out in micro seconds.

If the MDC is not local, then the NTP clock algorithm is used to adjust for the difference between the two host's clocks before calculating the results, it is not used when the MDC the same host. The reason for this is that the NTP algorithm assumes the latency in both directions is the same and in effect averages them out. Comparing the latencies seen between the client local to the MDC and remote clients will show how much of the latency is caused by network infrastrucure.

EXIT VALUES

snlatecy will return 0 on success and non-zero on failure.

NAME

snlicense − Report StorNext license status

SYNOPSIS

snlicense [**-t**] [**-v**|**-m**|**-h**] [**-f** *license-file***]** *license_type* [**nocap**]

DESCRIPTION

snlicense will report on the current license status for the license type indicated. It will report if the license is missing. It will also report on the expiration date and capacity for the license if it is present. The currently supported license types can be displayed by typing **snlicense -h**.

The optional **nocap** argument is for internal use only to prevent a hang when certain components are not fully initialized.

This information should be submitted to Quantum Technical Support when contacting them about license issues.

OPTIONS

-t Will create temporary licenses if license.dat does not exist

-v Will cause more license info to be reported

-m Will cause the output to be printed in a machine readable format

-f *license-file*
Will use an alternative license file. The default license file is */usr/cvfs/config/license.dat*.

USAGE

Simply execute the program with the desired license type. See examples below for more info.

LICENSE EXPIRATION

When one license has expired all access to licensed features is suspended with the exception of the **maintenance** and **proxy** licenses. The **-v** option can be used to determine the expiration date of the feature and the expiration date of all the licenses as a group. The "License expiration" is when the feature will become unusable due to one or more licenses expiring and is derived from the contents of the entire license file. The "Actual expiration" is when the feature will become unusable if there are no other expired licenses and is decoded from the license string for that feature.

Note: It is invalid to mix expiring licenses with non-expiring licenses with the exception of the **maintenance** and **proxy** licenses.

EXAMPLES

When the command is run the license info for the indicated StorNext feature is reported. Note that if license status cannot be determined for a feature it is treated as NOT licensed. Also note some features have an associated capacity and some do not.
Some examples:

Feature **dedup** is properly licensed for 10 terabytes and has no expiration:

```
% snlicense dedup
- The dedup license status is: Good

% snlicense -v dedup
- Found existing license: dedup
- License expiration:    None
- Actual expiration:     None
- Licensed capacity:     10T
- Current used capacity: 2T
- The dedup license status is: Good
```

Feature **replication** is properly licensed and has no expiration:

```
% snlicense replication
- The replication license status is: Good
```

```
% snlicense -v replication
- Found existing license: replication
- License expiration:     None
- Actual expiration:      None
- The replication license status is: Good
```

Feature **failover** is not properly licensed, no license string in the license file:

```
% snlicense failover
- The failover license status is: License Missing

% snlicense -v failover
- The failover license status is: License Missing
```

Feature **dedup** has a valid license but the capacity has been reached:

```
% snlicense dedup
- The dedup license status is: Over Capacity

% snlicense -v dedup
- Found existing license: dedup
- License expiration:     None
- Actual expiration:      None
- Licensed capacity:      10T
- Current used capacity:  11T
- The dedup license status is: Over Capacity
```

Feature **dedup** has a valid license but the capacity could not be determined:

```
% snlicense dedup
- The dedup license status is: Capacity Undetermined

% snlicense -v dedup
- Found existing license: dedup
- License expiration:     None
- Actual expiration:      None
- Licensed capacity:      10T
- Current used capacity:  UNKNOWN
- The dedup license status is: Capacity Undetermined
```

Feature **snfs_was** has a valid temporary license that has not expired yet:

```
% snlicense -v snfs_was
- Found existing license: snfs_was
- License expiration:     Thu Nov  1 23:59:59 2012
- Actual expiration:      Thu Nov  1 23:59:59 2012
- The snfs_was license status is: Good
```

Feature **gateway** has a valid license with no expiration:

```
% snlicense -v gateway
- Found existing license: gateway
- License expiration:     None
- Actual expiration:      None
- The gateway license status is: Good
```

Feature **failover** has a license but it has expired:

```
% snlicense failover
- The failover license status is: Expired

% snlicense -v failover
```

- Found existing license: failover
- License expiration: Thu Jan 1 23:59:59 2009
- Actual expiration: Thu Jan 1 23:59:59 2009
- The failover license status is: Expired

Feature **server** has a valid license that does not expire but there is a license for feature **failover** that expires. This is an invalid combination of expiring and non-expiring licenses:

% snlicense server
- Having both permanent and temporary licenses is not allowed
(except for 'maintenance' and DLAN 'proxy' licenses).

% snlicense -v server
- Found existing license: server
- License expiration: Jan 1 23:59:59 2009
- Actual expiration: None
- Licensed capacity: 10 connections
- Current used capacity: NA
- Having both permanent and temporary licenses is not allowed
(except for 'maintenance' and DLAN 'proxy' licenses).

% snlicense failover
- Having both permanent and temporary licenses is not allowed
(except for 'maintenance' and DLAN 'proxy' licenses).

% snlicense -v failover
- Found existing license: failover
- License expiration: Jan 1 23:59:59 2009
- Actual expiration: Jan 1 23:59:59 2009
- Having both permanent and temporary licenses is not allowed
(except for 'maintenance' and DLAN 'proxy' licenses).

EXIT VALUES

snlicense will return one of the following upon exit.

```
0 - No error, feature licensed and usable
1 - Feature not licensed but not in use
2 - Current feature capacity undetermined but feature not in use
3 - Feature has no license string in the license file
4 - Feature has a license but the expiration date has been reached
5 - Feature has a license but the capacity has been reached
6 - Feature has a license but the current capacity could not be determined
7 - Feature license status could not be determined
8 - Invalid mixture of temporary and permanent licenses detected
```

SEE ALSO

StorNext File System Release Notes

NAME

snpolicy − View and Administer StorNext Policy and Event Information

SYNOPSIS

Linux only.

Help Commands

snpolicy -help
snpolicy -helpdebugflags

List/Report Commands

snpolicy −backlog=*pathname* [**−event=**{**delete**|**ingest**|**source**|**target**|**trunc**|**objs_delete**}]
snpolicy −bpstats=*pathname*
snpolicy −dump=*pathname* [**−event=**{**delete**|**ingest**|**source**|**target**|**trunc**|**objs_delete**}]
snpolicy −listactive=*pathname* [**−progress**] [**−interval=***seconds*]
snpolicy −listbacklog=*pathname* [**−event=**{**delete**|**ingest**|**source**|**target**|**trunc**|**objs_delete**}]
snpolicy −listfilesystems=*host*
snpolicy −policystate=*pathname* [**−interval=***seconds*]
snpolicy −policystates=*pathname* [**−interval=***seconds*]
snpolicy −report=*pathname*
snpolicy −reporthole=*pathname*
snpolicy −reportrep=*pathname*
snpolicy −repstatus=*pathname* [**−interval=***seconds*]

Policy Manipulation Commands

snpolicy −assignpolicy=*pathname* {**−inherit**|**−name**}*=policy*
snpolicy −createpolicy=*mount_path* **−name=***policy* [**−policy=***policy_attrs*]
snpolicy −deletepolicy=*mount_path* **−name=***name*
snpolicy −dumppolicy=*pathname* [**−name=***policy*] [**−key=***key*]
snpolicy −listpolicies=*mount_path*
snpolicy −reconcilepolicy=*pathname* {**−inherit**|**−name**}*=policy*
snpolicy −removepolicy=*pathname*
snpolicy −updatepolicy=*mount_path* **−name=***policy* [**−policy=***policy_attrs*]
snpolicy −updatereppolicy=*mount_path* **−key=***key* {**−inherit**|**−name**}*=policy*

Replication Execution Commands

snpolicy −replicate=*pathname* [**−wait**]
snpolicy −replicateforce=*pathname* [**−wait**]
snpolicy −replicatetest=*pathname* [**−wait**]
snpolicy −repreconcile=*pathname* [**−wait**]

Replication Namespace Management Commands

snpolicy −exportrepcopy=*mount_path* **−key=***key* **−copy=***copy* [**−path=***pathname*]
snpolicy −listrepcopies=*mount_path* [**−key=***key*]
snpolicy −mvrepcopy=*mount_path* **−key=***key* **−copy=***copy* **−path=***pathname*
snpolicy −repcleanup=*mount_path* **−key=***key* [**−copy=***copy*] [**−path=***path*]
snpolicy −rmrepcopy=*mount_path* **−key=***key* [**−copy=***copy*|**-allcopies**]

Replication History Commands

snpolicy −listrephistory=*pathname* [**−count=***number*]
snpolicy −rephistory=*pathname* [**−count=***number*]
snpolicy −rmrephistory=*pathname* [**−count=***number*]

Administrative Commands

snpolicy −compact=*mount_path* [**-suspend**|**-resume**|**-wait**]

snpolicy −debug=*mount_path* [**−dflags=***value*]

snpolicy −reconcilerefs=*mount_path* [**−force**] [**−wait**]
This command should be used VERY carefully and only under the guidance of Quantum technical assistance.

snpolicy −reloadconfig=*mount_path* [**-config=objs**]
snpolicy −rundelete=*mount_path* [**-suspend**|**-resume**|**-wait**]
snpolicy −rundeleteobjs=*mount_path* [−{**suspend**|**resume**|**wait**}]
snpolicy −runingest=*mount_path* [**−key=***key*] [**−atime=***age*] [**-suspend**|**-resume**|**-wait**]
snpolicy −runreplicate=*mount_path* [**-suspend**|**-resume**|**-wait**]
snpolicy −runtruncate=*mount_path* [**−key=***key*] [**−atime=***age*] [**−space=***size*] [**-suspend**|**-resume**|**-wait**]

Miscellaneous Commands
snpolicy −dumpstream= *file*
snpolicy −regen=*mount_path*
snpolicy −reingest= *pathname*
snpolicy −repcancel= *pathname*
snpolicy −retrieve= *pathname*
snpolicy −skip= *pathname* [**−event=**{**none**|**dedup**|**replicate**|**trunc**|**objs**} ...]
snpolicy −truncate= *pathname*
snpolicy −update=*mount_path*

DESCRIPTION

snpolicy provides the primary command line interface for viewing and managing StorNext File System policies. Each **snpolicy** command requires exactly one command directive. Many have additional required directives (listed), most have optional directives (also listed), and all are allowed additional options (below).

The **snpolicy** command provides directives to create, examine, and modify file system policies, to attach and detach policies to and from file system directories, to obtain statistics about policy−driven file system operations, and to monitor and initiate policy−driven file system operations.

OPTIONS

The following options may be used with any of the commands listed above.

−dflags=*value***[,***value***...]**

The *−dflags* option sets the specified internal flags enabling tracing of operations during the execution of **snpolicy**. Multiple flags may be specified by separating the flags with commas. The command

snpolicy −helpdebugflags

will print information on the recognized flags, which include:

general	General Information
bfst	Blockpool communication
events	Event Processing
thread	Thread tracing
policy	Policy tracing
replicate	Replication tracing
truncate	Truncation tracing
dmapi	Dmapi tracing
stream	Replication stream tracing

deepstream	Detailed Replication stream tracing
inode	Replication inode tracing
sched	Scheduled replication tracing
ingest	Ingest event processing
api	Snpolicy api
stats	Statistics generation
perfs	Performance reporting
objs	Object Storage processing
objscurl	Object Storage curl tracing, this sets CURLOPT_VERBOSE in libcurl

Note, when the debug flag **perfs** is enabled, replication performance data is not written to log file snpolicy.out, instead, it is written to a file under */usr/cvfs/data/*FsName*/rep_performance*.

−verbose

Most **snpolicy** commands will also print additional information if the **−verbose** option is specified.

DIRECTIVES

Directives are used in conjunction with commands per the synopses, and may be either mandatory or optional. Directives other than those listed in the individual synopses above will be either ignored or rejected by **snpolicy**.

−atime=*age*

Declares that files accessed during the last *age* seconds are ineligible for selection. *Age* must be specified in seconds.

−copy=*copynum*

Defines the namespace copy to be managed by target namespace administration.

−event={**delete**|**ingest**|**source**|**target**|**trunc**}

For the **dump**, **backlog**, and **listbacklog** commands, print or dump only statistics associated with the particular event type. Only one event type may be specified.

For **dump**, if no event type is specified, *pathname* must be a regular file containing events. Otherwise, *pathname* must be a directory in the file system or policy being "dumped." The **dump** command is primarily for internal or debug use.

−event={**none**|**dedup**|**replicate**|**trunc**}

For the **skip** command, the −event option specifies an event type or types of interest. The default is **none**. Multiple types (other than *none*) are specified by using the option more than once. For instance:

$ snpolicy −skip=*path* **−event=dedup −event=trunc**

−inherit=*policy*

Every *policy* must have have a **parent** policy. Policies dynamically inherit unset attributes from their parent policy. By default any new policy's parent is the *global* policy, but others may be declared.

−interval=*seconds*

This directive is meaningful only for commands that monitor and report status. The command will

be repeated at the specified *interval* (in seconds), allowing the monitoring of ongoing activity with a single command.

−key=*key*

Each file or directory in a filesystem that has an associated policy also has an inheritance chain that makes up its effective policy. If a key is specified, the command will refer to only the attributes/policy specified in the keyed policy (omitting attributes and policies obtained from the inheritance chain) rather than the cumulative policy, which may have components from a variety of individual policy specifications.

−name=*policy*

The name of a policy. Every filesystem has a default policy named *global* and one named *target*. Administrators may create additional policies, name them, and assign them to files and directories. With the inheritance of policies, individual files and directories may have a number of policies that contribute attributes to their effective policy.

−path=*pathname*

This directive is meaningful only for the **mvrepcopy**, **exportrepcopy** and **repcleanup** commands. It specifies an absolute pathname to rename the specified replication copy to.

−progress

This directive is meaningful only for command **listactive**. It collects and displays detailed replication progress information for an active replication stream.

−space=*size*

Specific to the **runtruncate** command, the **−space**=*size* directive allows the user to request that the given amount of space be freed up. *size* is in units of 1024−byte blocks; multipliers may be used (K=1024, M=(1024*1024), G=(1024*1024*1024). The **runingest** command also accepts this directive but ignores it.

−resume

Resume a previously suspended processing task, used with the various **-run** commands.

−suspend

Suspend a processing task, used with the various **-run** commands.

−wait

A **wait** directive will cause the snpolicy command to wait (block) until the process completes before exiting. Only one of these options may be used in any command; if more than one is specified, only the last has effect.

Target Namespace Administration

On a replication target, the **listrepcopies** command will list all of the available copies of data from all sources. These can be manipulated using the **exportrepcopy**, **mvrepcopy** and **rmrepcopy** commands. **exportrepcopy** will remove a namespace from administration by the system; it can then be used without the possibility of the underlying data being removed by the system. **mvrepcopy** renames a namespace to a different location while still keeping it under management of the system. **rmrepcopy** will remove a namespace from the system. The **allcopies** option will remove all namespaces.

In each of these commands, the *key* parameter is the target key displayed by **listrepcopies** and the *copy* parameter is the copy number displayed in the output.

Converting a Target Namespace into a New Policy

If a replication target needs to be used for recovery purposes, then a namespace needs to be selected and converted into a normal policy directory. This directory can then have a new policy assigned to it and used locally, or replicated to another system. The **repcleanup** command can be used to achieve this.

First select the directory to be converted into a new policy, use **snpolicy -listrepcopies** for this, select the local policy key and copy number to use. Next, use the **snpolicy -repcleanup=/mount -key=key -copy=copy** command to clean up the replication state and promote the namespace to be the new base of the policy directory tree. The option -path=**path** can be used to rename it to a new location. This directory may now have a new policy assigned to it using **reassignpolicy**, or have the policy removed using **remove-policy**.

Note that if the **-path** option is used and the policy is within a storage manager relation point, the new path must be within the same relation point.

Policy Attributes

Policies are comprised of sets of named and typed attributes. By setting attributes in policies and assigning policies to directories and files, administrators direct the operation of file systems, replication, and deduplication.

Attribute Types

Every attribute has a *type*. Attribute types are: *boolean*, *decimal integer*, *scaled integer*, *interval*, *enumerated type*, or *string*. String attributes may require particular formats.

Boolean

Boolean attributes may take on the values of **true** or **false**, or equivalently **1** or **0**, **yes** or **no**, or **on** or **off**.

Decimal Integer

Decimal integer attributes take on integer (positive or negative) values. They must be specified as decimal numbers and may be constrained to a range of acceptable values.

Scaled Integer

Scaled integer attributes are similar to decimal integer values, but may be specified in octal (leading 0) or hexadecimal (leading 0x), and may optionally be given scaling factors (K=1024, M=(1024*1024), G=(1024*1024*1024). They too may be constrained to a range of acceptable values.

Interval

Interval attributes may be assigned values in any of several formats. An interval is a (non−negative) number of seconds and may be specified as a decimal number. Alternatively, they may be specified in a "clock" format separated by colons where each subsequent leftward field is multiplied by an additional 60. Thus, ninety minutes might be specified "1:30:00" (1*3600 + 30*60 + 0) or "5400" (seconds). Or they may be specified with postfix time unit signifiers 's' (seconds), 'm' (minutes), 'h' (hours), and 'd' (days), and 'w' (weeks). Ordering is not critical. The example above could also be specified "1h30m" or "90m" or "30m1h".

Enumerated Type

Enumerated type attributes may be given any one of a specified set of values pertaining to the specific attribute.

String

String attributes may require particular formats (e.g., pathnames, schedules, regular expressions, ...) according to the particulars of the attribute. String attributes are terminated by end−of−string,

a comma (preceding another attribute specification), or, if the attribute value begins with a double quote, by a matching double−quote. There is no method for escaping a literal double−quote symbol. Within an unquoted string value, there is no method for escaping a comma.

Be aware that shells will generally strip off the outermost quotes in expressions. E.g., to put a comma in a string value:

```
snpolicy −updatepolicy /stornext/test −name target \
  −policy rep_target='"'target://stornext/2008,09@mach−dst:'"'
```

Note that the paired single−quotes are swallowed by the shell, leaving the double−quotes intact.

STANDARD ATTRIBUTES

ATTRIBUTE−NAME	TYPE	
name	string	(this policy's name)
inherit	string	(this policy's parent's name)
key	decimal integer	
root	string	(policy's root directory)
affinity	string	
ingest_off	string	(crontab−format schedule string)
dedup	boolean	
dedup_filter	boolean	
fencepost_gap	scaled integer	
max_seg_size	scaled integer	
max_seg_age	interval	
dedup_age	interval	
dedup_min_size	scaled integer	
dedup_seg_size	scaled integer	
dedup_min_round	scaled integer	
dedup_max_round	scaled integer	
dedup_skip	string	(regex; files not to dedup)
dedup_pri	decimal integer	(dedup_pri in [0..999])
dedup_bfst	string	(name/address of blockpool server)
objs	boolean	
objs_id	string	(the id in objs.conf)
objs_namespace	string	(the namespace in Object Storage)
objs_age	interval	
objs_min_size	scaled integer	
objs_seg_size	scaled integer	
objs_skip	string	(regex; files not to store)
objs_pri	decimal integer	(objs_pri in [0..999])
trunc	boolean	
trunc_age	interval	
trunc_min_size	scaled integer	
trunc_low_water	decimal integer	(trunc_low_water in [0,100])
trunc_high_water	decimal integer	(trunc_high_water in [0,100])
trunc_stub_size	scaled integer	
trunc_skip	string	(regex; files not to truncate)
trunc_pri	decimal integer	(trunc_pri in [0..999])
rep_input	enumerated type	{true|false|disabled}
rep_output	boolean	
rep_subtree	boolean	
rep_dedup	boolean	
rep_compress	boolean	

rep_encrypt	boolean	
rep_report	boolean	
rep_target	string	(replication target (see below))
rep_inline_size	scaled integer	
rep_copies	decimal integer	
rep_realize	string	(format string for target pathname)
rep_callout	string	((script) pathname, see */usr/cvfs/bin/rep_callout*)
rep_name	string	(name on replication target)
rep_relation	string	(configure replication to this TSM relation point)
rep_skip	string	(regex; files not to replicate)
rep_off	string	(crontab−format schedule string)
rep_pri	decimal integer	(rep_pri in [0..999])

rep_target

The *rep_target* attribute has unique qualities. Within any one policy, the rep_target attribute may be assigned multiple values. Successive values do not replace previous values −− all values are kept as an array of strings. Inheritance is normal: if rep_target is set in a policy, values from other policies are not inherited.

Each assigned value has a format:

[cron−spec]targetlist...

The optional cron−spec determines times during which replication is scheduled. The standard spec recognizes, successively, minutes, hours, days−of−month, months, and days−of−week. An asterisk ("*") is a wild−card, matching all legal values for that field. Ranges may be specified by separating values with a minus−sign ("−"), or as a list separated by commas. A range may be augmented with a slash ("/") and a step.

Thus, the following specifies hourly every week day, omitting Saturdays and Sundays:

[0 * * * 1−5]

This specifies every 3rd day of every month (1, 4, 7, ... 31):

[0 0 1−31/3 * *]

The cron−spec parser also recognizes "@reboot", "@yearly", "@annually", "@monthly", "@weekly", "@daily", "@midnight", and "@hourly". The following is equivalent to "[0 * * * *]".

[@hourly]

If the brackets and cron−spec are omitted, replication to the targetlist is permitted at any time. The target list is a list of hostnames and paths to which replication may be done in the format:

target://*pathname@host_name*:*port*

For instance:

rep_target="[* 9−16 * * *]target://stornext/vids1_dup@backup2:"

schedules replication during the hours from 9AM − 4:59 PM to host **backup2**'s mount point **/stornext/vids1_dup** every day (Monday − Sunday), and uses the default port. At present, the port specification is ignored. Multiple schedules might be enabled:

rep_target="target://stornext/vids0_dup@backup0:"
rep_target="[* 9−16 * * *]target://stornext/vids1_dup@backup1:"
rep_target="[* 17−23 * * 1−5]target://stornext/vids1_dupnight@backup1: target://stornext/vidsalt1_dupnight@backup2:"

which enables replication to host backup0 anytime, and schedules the replication of two copies on weeknights between 5PM and midnight in addition to a single daily copy scheduled between 9:00 AM and 4:59 PM. (Note that a blank is required before the second and subsequent 'target:' literals within one rep_target value.)

The *pathname* must be prefixed with a StorNext mount point that exists on the target host. Directories and pathnames beyond that point will be treated similarly to those present in the *rep_realize* attribute including, potentially, *%N*, *%H*, *%D*, and similar specifiers.

It may also be suffixed with a directive ?**inherit**=*policyname*, which will cause the specified target directory to inherit the named policy. Once specified and initially replicated, however, the inheritance may not be changed.

rep_callout

The *rep_callout* attribute, if set, should be set to the pathname of a script or executable program. The program will be called at various points before, during, and after replication. It may be set on either or both of the source and target hosts involved in replication. Various arguments are provided to it to allow coordination and control of other activities with replication. See */usr/cvfs/bin/rep_callout* for a template callout script and further documentation of its arguments.

Regex Attributes

The attributes marked 'regex' are interpreted as POSIX.2 *fnmatch(3)* style regular expressions. The rep_skip, trunc_skip, and dedup_skip attributes are matched against filenames: files that match are **not** replicated, truncated, or deduplicated, respectively.

Scheduling Attributes

The *rep_off* and *dedup_off* attributes determine times during which replication and deduplication are disabled. **crontab(5)** describes the format. E.g., to disable processing during 9AM − 5PM Monday−Friday, the format:

[* 9−16 * * 1−5]

could be used for these strings.

Realize Formats

A directory in a file system can be replicated - but not the entire file system. Replication creates copies of an existing directory's namespace. The created copies must be assigned names; the assigned names are derived from the rep_realize string attributes on the source and target host directories. String substitutions are made on the *rep_realize* string to obtain the new pathnames. The '%' character introduces a substitution; the character immediately following a '%' character determines the kind of substitution.

%D

The ISO 8601 date format (YYYY−mm−dd).

%F

A hexadecimal representation of the source file system ID.

%H

The source hostname as supplied by the source. Note that in an HA configuration, this will change when failover occurs.

%K

A decimal representation of the source key value.

%N

The policy's rep name.

%P

The source path.

%T

The time (hh_mm_ss).

BUILT−IN POLICIES

Several policies are "built in" to StorNext File Systems. They are named:

default (compiled in cannot be changed)
global (inherits from default)
config (inherits from global)
target (inherits from global)

Administrators may update or modify these policies, and assign them to directories. Administrators may also create and modify new policies, and similarly assign them to directories. Policies may be inherited by files and directories from the directory they reside in.

If inheritance is not specified, any newly created policy inherits from **global**. Inheritance is dynamic −− changes made to attributes of the **global** policy affect the values of unspecified attributes in policies that inherit from **global**, specifically including policies created before the changes were made.

The **target** policy is unique. The value of its **rep_input** attribute determines whether the file system will allow its use as a target of replication. The **rep_input** attribute may take on the values **true** (allow replication to use this file system), **false** (do not allow replication to this file system), and **disabled** (temporarily disallow replication to this file system).

Object Storage (OBJS)

snpolicyd allows file data to be stored to and retrieved from **Object Storage (OBJS)**. Like deduplication and replication, a named policy that enables the **OBJS** feature must be defined and associated with directories in an snpolicy-managed filesystem. Before a named policy is created, an **OBJS** configuration must be defined. The OBJS configuration file (*/usr/cvfs/config/objs.conf*) designates how **snpolicyd** accesses the **OBJS** storage. Please refer to **objs.conf**(5) for more details.

There are several policy parameters related to **Object Storage**:

objs must be turned on to enable **OBJS** store.

objs_id is the OBJS config ID defined in **objs.conf**. This parameter must be defined for OBJS-enabled policy.

objs_namespace specifies the namespace in **OBJS** storage in which the file data is stored. This namespace must exist in the OBJS config file for the designated **objs_id**. This parameter must be defined for OBJS-enabled policy.

objs_age defines how long a file must be unchanged before it is eligible to be stored in **OBJS**.

objs_min_size specifies the minimum size for a file to be stored to **OBJS**. If a file's size is less than the designated minimum, the file won't be stored.

objs_seg_size is the segment size for large files. If this parameter is defined (non-zero), it is rounded up to the next power of 2. For example, if it is set to 10GB, the segment size is rounded up to 16GB. A file larger than the defined segment size is broken into multiple segments to be stored to **OBJS**. If this parameter is not defined, but parameter **max_seg_size** in the OBJS config file (*objs.conf*) is defined, the value of parameter **max_seg_size** is used as the segment size for large files. If neither parameter is defined, then large files are not broken up for storage.

objs_skip defines a regular expression. If defined, the policy is not applied to filenames that match the regular expression.

Suppose we have defined OBJS config **objscfg1** and namespace **ns1** in **OBJS** config file *objs.conf*. To create an OBJS-enabled, named policy **objs1** that uses OBJS config **objscfg1** and namespace **ns1**:

```
# snpolicy −createpolicy=/stornext/snfs1 \
      −name=objs1 \
      −policy=objs=on,objs_id=objscfg1,objs_namespace=ns1
```

Next, associate this policy to a directory /stornext/snfs1/objs_test:

```
# snpolicy −assignpolicy=/stornext/snfs1/objs_test \
      −inherit=objs1
```

Once this is done, files under directory /stornext/snfs1/objs_test will be stored to namespace ns1 in Object Storage designated by **OBJS** config objscfg1.

EXAMPLES

To obtain a list of a host's filesystems and whether or not they may be used for replication or deduplication, the **listfilesystems** directive may be used with a hostname.

```
$ snpolicy −listfilesystems rh−pair−a
(I) [1208 10:48:50] SNAdmin initialized (SNAdmin_Init).
fsname:    b−pair [replication dedup] up 17:34:54
mount:     /stornext/b−pair
blockpool: Running up 17:35:10
fsname:    a−pair [replication dedup] up 17:35:12
mount:     /stornext/a−pair
blockpool: Running up 17:35:10
```

This shows that host **rh−pair−a** has two mounted filesystems that support replication and deduplication.

To list the existing policies on a StorNext File System, use the **listpolicies** directive:

```
# snpolicy −listpolicies /stornext/a-pair
(I) [1209 17:17:53] SNAdmin initialized (SNAdmin_Init).
(I) [1209 17:17:53] NS Connect Handle: 0, Ref count: 1
 NAME: default
  NAME: global                    inherits from: default
    NAME: rep_realize_test              inherits from: global
      DIR: /stornext/a-pair/rep_realize_test (key: 21)
        active: rep               inherits from: rep_realize_test
```

Replication is set up and managed through the use of policies. Here is an example that replicates a directory in a filesystem, */stornext/fssource*, on a host, *src*, to a target directory in filesystem, */stornext/fstarget*, on host *tgt*. First, the built−in policy **target** is updated on the target host to permit replication to the target file system.

```
tgt# snpolicy −createpolicy /stornext/fstarget \
                        −name target \
                        −policy rep_input=true
```

On the source host, create a policy describing the replication, and permit replication export from it:

```
src# /usr/cvfs/bin/snpolicy −createpolicy=/stornext/fssource \
```

**−name=rep_realize_test **
−policy='rep_output=true,rep_target=target://stornext/fstarget@tgt:'

Next, create the source directory for export, assign the export policy to it, and put a file into it to test replication:

src# **mkdir /stornext/fssource/rep_realize_test**
src# **cp /var/log/messages /stornext/fssource/rep_realize_test/messages**
src# **/usr/cvfs/bin/snpolicy **
**−assignpolicy=/stornext/fssource/rep_realize_test **
−inherit=rep_realize_test

(I) [1118 16:56:32] Assigned policy key 444.

Ensure that no files exist on the target host that would interfere with replication:

tgt# **rm −rf /stornext/fstarget/rep_realize_test**

Test replication.

src# **/usr/cvfs/bin/snpolicy **
**−replicateforce=/stornext/fssource/rep_realize_test **
−wait

Verify replication occurred on the target:

tgt# **ls −l /stornext/fstarget/rep_realize_test**
total 1776
−rw−−−−−−− 1 root root 1815148 Dec 2 11:26 messages

$ **snpolicy −dumppolicy=/stornext/snfs1**
(E) [0813 12:04:03] /stornext/snfs1 is not a managed directory.

$ **snpolicy −dumppolicy=/stornext/snfs1 −name=global**
global
name=global
inherit=default
dedup=off
dedup_filter=off
max_seg_size=1G
max_seg_age=5m
dedup_age=1m
dedup_min_size=4K
dedup_seg_size=1G
dedup_min_round=8M
dedup_max_round=256M
dedup_bfst="localhost"
fencepost_gap=16M
trunc=off
trunc_age=365d
trunc_low_water=0
trunc_high_water=0
rep_output=false
rep_report=true

$ **snpolicy −dumppolicy /stornext/a−pair −name rep_realize_test**
(I) [1209 17:35:45] SNAdmin initialized (SNAdmin_Init).
name=rep_realize_test
inherit=global
dedup=off
dedup_filter=off
max_seg_size=1G
max_seg_age=5m
dedup_age=1m
dedup_min_size=4K
dedup_seg_size=1G
dedup_min_round=8M
dedup_max_round=256M
dedup_bfst="localhost"
fencepost_gap=16M
trunc=off
trunc_age=365d
trunc_low_water=0
trunc_high_water=0
rep_output=true
rep_report=true
rep_target="target://stornext/b−pair@rh−pair−b:"
rep_realize="test_rep_new"

$ **snpolicy −backlog=/stornext/a−pair/rep_realize_test**
blocklet 0K data in 0 event
blocklet_truncate 0K data in 0 event
blocklet_delete 0K data in 0 event
replicate_src 143940K data in 1 event
replicate 0K data in 0 event

$ **snpolicy −backlog=/stornext/a−pair/rep_realize_test −event=dedup**
blocklet 0K data in 0 event

$ **snpolicy −backlog=/stornext/a−pair/rep_realize_test −event=delete**
blocklet_delete 0K data in 0 event

$ **snpolicy −dump=/stornext/a−pair/rep_realize_test −event=delete**
blocklet_delete 0K data in 0 event

$ **snpolicy −policystate=/stornext/a−pair/rep_realize_test**
/stornext/a−pair/rep_realize_test:
Deduplicated: 0 files 0 Kbytes
Backlogs:
Ingest: 0 files 0 Kbytes
Truncation: 0 files 0 Kbytes
Replication: 29 files 4174260 Kbytes
Processed:
Ingested: 1 files 143940 Kbytes
Retrieved: 0 files 0 Kbytes
Truncated: 0 files 0 Kbytes
Replicated: 0 files 0 Kbytes
Network data: 0/0 Kbytes sent/received

```
$ snpolicy −policystates=/stornext/a-pair/rep_realize_test
/stornext/a−pair/rep_realize_test:
 Deduplicated:       0 files         0 Kbytes
 Backlogs:
  Ingest:            0 files         0 Kbytes
  Truncation:        0 files         0 Kbytes
  Replication:      32 files    4606080 Kbytes
 Processed:
  Ingested:          1 files     143940 Kbytes
  Retrieved:         0 files         0 Kbytes
  Truncated:         0 files         0 Kbytes
  Replicated:        0 files         0 Kbytes
 Network data: 0/0 Kbytes sent/received

$ snpolicy −report /stornext/c−pair
/stornext/c−pair/src_realize_test: [ 1835190 1835195] ROOT
/stornext/c−pair/src_realize_test/snpolicyd.c
   policy: 1835190    inode: 1835203
    flags: TARGET NO_TAG
    mtime: 2009−11−18 17:09:50.903904553 CST
   ingest: 2009−11−18 17:09:50.903904553 CST
     size:       16778 disk blocks: 64
    seqno:      8 blk seqno:      0
/stornext/c−pair/src_realize_test/sn_rep_export.c
   policy: 1835190    inode: 1835204
    flags: TARGET NO_TAG
    mtime: 2009−11−18 17:09:50.927901358 CST
   ingest: 2009−11−18 17:09:50.927901358 CST
     size:       50055 disk blocks: 128
    seqno:      8 blk seqno:      0
/stornext/c−pair/src_realize_test/sn_lowspace.c
   policy: 1835190    inode: 1835205
    flags: TARGET NO_TAG
    mtime: 2009−11−18 17:09:50.871908812 CST
   ingest: 2009−11−18 17:09:50.871908812 CST
     size:       10616 disk blocks: 32
    seqno:      8 blk seqno:      0
/stornext/c−pair/src_realize_test/dm_blocklet_event.c
   policy: 1835190    inode: 1835206
    flags: TARGET NO_TAG
    mtime: 2009−11−18 17:09:50.496958726 CST
   ingest: 2009−11−18 17:09:50.496958726 CST
     size:       62104 disk blocks: 128
    seqno:      8 blk seqno:      0


$ snpolicy −repstatus /stornext/b−pair
Replication state for: /stornext/b−pair/rep_realize_test
  0 files 0 dirs 0 Kbytes of data
  last scanned at:  1969−12−31 18:00:00.000000000 CST
 target: target://stornext/c−pair@rh−pair−a: (STALE)
  stored at: /stornext/c−pair/rep_realize_test
  replicated ok at: 1969−12−31 18:00:00.000000000 CST
  moved a total of 1 files, 1772 Kbytes
```

```
  network usage 0/0 Kbytes sent/received
  last report at /usr/cvfs/data/b−pair/rep_reports/1969−12−31/report_444_125858419007
Replication state for: /stornext/b−pair/src_realize_test
  21 files 1 dirs 638 Kbytes of data
  last scanned at:  2009−11−18 17:10:32.859360000 CST
 target: target://stornext/c−pair@rh−pair−a: (STALE)
  stored at: /stornext/c−pair/src_realize_test
  replicated ok at: 2009−11−18 17:10:32.859360000 CST
  moved a total of 0 files, 0 Kbytes
  network usage 0/0 Kbytes sent/received
  last report at /usr/cvfs/data/b−pair/rep_reports/2009−11−18/report_453_125858419016
```

$ **snpolicy −truncate=/stornext/snfs1/rh.test −verbose**
progress: directories 1 files 1 done

$ **snpolicy −regen /stornext/snfs1/rh.test/**
Totals
  deduplicated : 0 (0K)
  ingest candidates : 0 (0K)
  truncate candidates : 0 (0K)
  replication candidates: 1 (143940K)

FILES

FsName*/.rep_private*
/usr/cvfs/bin/rep_callout

SEE ALSO

fnmatch(3), **crontab**(5), **objs.conf**(5)
/usr/cvfs/bin/rep_callout

NAME

snpolicyd.conf − StorNext File System Replication and Deduplication Daemon Configuration

SYNOPSIS

/usr/cvfs/config/snpolicyd.conf

DESCRIPTION

The StorNext File System (SNFS) *snpolicyd.conf* file provides a way to configure the **snpolicyd** process. This process handles most aspects of StorNext replication and deduplication.

SYNTAX

The **snpolicyd.conf** file exists in the SNFS 'config' directory. It contains parameters controlling various aspects of the **snpolicyd** process including some communication ports, the number of threads used for different purposes, the set of interval time values, the maximum size of the snpolicyd log file, and various other parameters. A parameter takes the **default** value if the parameter is not configured in the config file. It takes a **preset** value if it is preconfigured in the config file but remain unchanged. For example, when StorNext is installed, the following line is in the **snpolicyd.conf** file:

```
log_size=8M
```

Thus log_size has a **preset** value of 8M. If that line is removed from snpolicyd.conf, then the log_size will have the **default** value of 1M.

Blank lines and lines starting with a pound-sign (#) are skipped.

If any error occurs during parsing, all values previously changed from the config file are correctly altered. The parsing stops and the remaining fields in the config file are skipped. All other values will be defaulted. A RAS message is sent when a parsing error occurs.

Values representing sizes can be postfixed by k, m or g to represent multipliers of 1024, 1024*1024 and 1024*1024*1024.

Values representing a time interval can be represented as a number of seconds, or as a set of numbers followed by w, d, h, m or s, e.g. 3h is 3 hours, 3h 30m is 3 hours and 30 minutes, 1d is one day. Also, a time interval can be specified in HH:MM:SS format.

Some scheduled operations can also be controlled using a cron style specification to trigger the execution at specific times of day or of the week. See the crontab man page for details of the allowed syntax. The cron schedule must be surrounded by '[' ']'. For example, running a something at 1:30 am every day would be specified as: [30 1 * * *]

The following parameters can be specified:

```
rep_port=<value>
```

where <**value**> is a number. This parameter is the port snpolicyd should use for replication when communicating with snpolicyd on a remote machine. All machines communicating for replication must have the same **rep_port** in their configuration file. The default value is 14500.

```
bfst_port=<value>
```

where <**value**> is a number. This parameter is the port to use when communicating with the blockpool. All machines communicating for replication must have the same **bfst_port**. Furthermore, all blockpools must have their **blockpool_config.txt** file configured with this value for the blockpool parameter **Port**. The default value is 1062.

```
log_size=<value>
```

where <**value**> is a number. This parameter specifies the maximum size of the file */usr/cvfs/debug/snpolicy.out*. When the file hits this size, it is rotated. See **log_count.** The default value is 1M. The preset value is 8M.

`log_count=<value>`

where <**value**> is a number. This parameter specifies the number of */usr/cvfs/debug/snpolicy.out* files to keep before deleting the oldest. Each version has a # added to the file name. The default value is 4.

`replicate_threads=<value>`

where <**value**> is a number. This parameter specifies the number of threads to use for replication. The value must be in the range 2 to 16, inclusive. The default value is 4. The preset value is 8.

`ingest_threads=<value>`

where <**value**> is a number. This parameter specifies the number of concurrent threads to use for the deduplication of user data. The value must be in the range 2 to 256, inclusive. The default value is 4. The preset value is 16. This may need to be increased for accessing Object Storage (OBJS).

`event_threads=<value>`

where <**value**> is a number. This parameter specifies the number of threads to use to handle various internal events. The value must be in the range 2 to 256, inclusive. The default value is 4, The preset value is 16.

`delete_threads=<value>`

where <**value**> is a number. This parameter specifies the number of threads used to process blockpool deletes, The value must be in the range 1 to 16, inclusive. The default value is 4. The preset value is 4.

`objs_delete_threads=<value>`

where <**value**> is a number. This parameter specifies the number of threads used to process object storage deletes, The value must be in the range 1 to 64, inclusive. The default value is 4. The preset value is 4.

`cmd_threads=<value>`

where <**value**> is a number. This parameter specifies the number of threads to use when handling snpolicy commands. The value must be in the range 2 to 16, inclusive. The default value is 4. The preset value is 8.

`idle_conn=<value>`

where <**value**> is a time interval. This parameter specifies amount of time to hold an idle connection to the blockpool. The default value is 600.

`replicate_interval=<interval>`

where <**interval**> is the interval between runs. This parameter specifies the time interval between processing runs which handle replication events. The default value is 60. The preset value is 45.

`ingest_interval=<interval>`

where <**interval**> is a time interval. This parameter specifies the time interval between processing runs which handle ingest events which handle deduplication of data. The default value is 60. The preset value is 30.

`delete_interval=<cron spec>|<interval> [ <max-interval> ]`

where <**interval**> is a time interval. This parameter specifies the interval between processing runs which handle blockpool delete events. The default value is 180. The preset value is 600. Using a cron specifier <**cron spec**> allows triggering delete processing at a specific time of day. The optional parameter <**max-interval**> is a time interval. This specifies the maximum time for the delete processing to run with cron based schedules. If an interval based schedule it used, <**max-interval**> is ignored (see **delete_cycle** for information on limiting delete processing for interval based schedules).

`delete_cycle=<value>`

where **<value>** is a number. This parameter specifies the default maximum percentage of the time deletes will run for when controlled on an interval basis. Range 1 to 100, default 50%. Delete processing will run for upto this percentage of the delete_interval before stopping, if the backlog grows too large the percentage of the time it runs will increase. This option is not used if deletes are on a cron based schedule.

`objs_delete_interval=<cron spec>|<interval> [ <max-interval> ]`

where **<interval>** is a time interval. This parameter specifies the interval between processing runs which handle OBJS delete events. The default value is 180. The preset value is 600. Using a cron specifier **<cron spec>** allows triggering delete processing at a specific time of day. The optional parameter **<max-interval>** is a time interval. This specifies the maximum time for the OBJS delete processing to run with cron based schedules. If an interval based schedule it used, **<max-interval>** is ignored (see **objs_delete_cycle** for information on limiting OBJS delete
processing for interval based schedules).

`objs_delete_cycle=<value>`

where **<value>** is a number. This parameter specifies the default maximum percentage of the time OBJS deletes will run for when controlled on an interval basis. Range 1 to 100, default 50%. Delete processing will run for upto this percentage of the objs_delete_interval before stopping, if the backlog grows too large the percentage of the time it runs will increase. This option is not used if OBJS deletes are on a cron based schedule.

`trunc_interval=<interval>`

where **<interval>** is a time interval. This parameter specifies the time interval between processing runs which handle truncate events. The default value is 300. The preset value is 120.

`fsspace_interval=<interval>`

where **<interval>** is a time interval. This parameter specifies the interval between processing runs which check for low space conditions. The default value is 180.

`compact_interval=<cron spec>|<interval>`

where **<interval>** is a time interval. This parameter specifies the interval between processing runs which handle blockpool compact processing. The default value is 8hours. The preset value is 8hours. Using a cron specifier **<cron spec>** allows triggering compact processing at a specific time of day. Since compact is reclaiming space freed by delete processing, then if delete is on a cron based schedule, it makes sense to run compact some period after delete runs.

`minimum_compact=<value>`

Minimum amount of reclaimable space the blockpool must report before compact will run. Default 256 Mbytes.

`sched_interval=<interval>`

where **<interval>** is a time interval. This parameter specifies the interval between processing runs which check if a scheduled replication policies need to be run. The default value is 60. The minimum value is 60

Changing this value will affect the granularity of control over replication jobs and is not recommended.

`rescan_interval=<cron spec>|<interval>`

where **<interval>** is a time interval. This parameter specifies the time between rescanning the file system for files missed by ingest processing. The default value is off. Using a cron specifier **<cron spec>** allows triggering the rescan at a specific time.

`rep_retry_interval=<interval>`

where **<interval>** is a time interval. This parameter specifies the time to wait before retrying a failed replication run. The default value is 180. The minimum value is also 180.

`data_buffer_size=<value>`

where **<value>** is a number. This parameter specifies the maximum buffer size to use during replication file transfers. The default value is 4194304 (4m). The minimum value is also 512k and the maximum is 32m. The number can be appended with k or m.

`keepalive_idle=<value>`

where **<value>** is a number. This parameter specifies the time in seconds to wait for a TCP connection to go idle before sending probe packets. The default value is 120 seconds. Setting the value to zero will leave the value at the default of your host operating system.

`keepalive_count=<value>`

where **<value>** is a number. This parameter specifies the number of TCP keepalive probes to send before declaring a connection down. The default value is 5 probes. Setting the value to zero will leave the value at the default of your host operating system.

`keepalive_interval=<value>`

where **<value>** is a number. This parameter specifies the time in seconds between sending of TCP keepalive probes. The default value is 60 seconds. Setting the value to zero will leave the value at the default of your host operating system.

`bfst_lowspace_throttle=<value>`

where **<value>** is a number. This parameter specifies amount of free space in the blockpool file system in MB that will cause the ingest into the blockpool to be throttled to more carefully manage blockpool resources. Note that when ingest processing considers this parameter, it will also include the current data available for deduplication as "used space" on the blockpool file system. This is done as an attempt to ensure that there is enough space in the blockpool for all the data to be deduplicated. The default value is 32GB. Setting the value to zero will disable throttling (not recommended).

`bfst_lowspace_stop=<value>`

where **<value>** is a number. This parameter specifies amount of free space in the blockpool file system in MB that will cause the ingest into the blockpool to be stopped until more space is available. Note that, unlike the bfst_lowspace_stop parameter above, this does not include the amount of data available for deduplication, but only considers the actual free space currently available on the blockpool file system. The default value is 10GB. Setting the value to zero will allow ingest to run until the blockpool file system runs out of space (not recommended).

`debug=<value>`

where **<value>** is a number. This parameter specifies a debug tracing mask to use when logging in */usr/cvfs/debug/snpolicy.out*. The default value is 0, which turns off all debug options. The supported debug options and their mask values are:

general	0x1
bfst	0x2
events	0x4
thread	0x8
policy	0x10

replicate	0x20
truncate	0x40
dmapi	0x80
stream	0x100
deepstream	0x200
inode	0x400
sched	0x800
ingest	0x1000
api	0x2000
stats	0x4000
perfs	0x8000
objs	0x10000
objscurl	0x20000

To turn on multiple options, add the options' corresponding values. For example, to turn on options bfst, replicate, truncate and inode, set the value to 0x2 + 0x20 + 0x40 + 0x400, i.e. 0x462.

```
bnp_version=BNP3|BNP4
```

where **<value>** is either **BNP3** or **BNP4**. This parameter specifies which protocol version the blockpool should try to use when replicating. The default value is BNP3.
NOTE: **Not intended for general use**. Do not change unless recommended by Quantum Support.

EXAMPLE

To change the replication port

rep_port=22007

Note that all other MDC nodes communicating with this node must have the same change.

This **snpolicyd.conf** file is only needed on SNFS servers and is internally generated.

FILES

/usr/cvfs/config/snpolicyd.port
/usr/cvfs/debug/snpolicy.out

SEE ALSO

snpolicy(8), **cvfs**(8), **snfs_config**(5), **fsm**(8), **fsmpm**(8),

NAME

snpolicy_gather − Gather snpolicy and file system information for StorNext File System

SYNOPSIS

snpolicy_gather [**-pb**]

DESCRIPTION

The **snpolicy_gather** script collects snpolicy information (replication and deduplication) beyond file system information provided by the **cvgather** command. The script provides information needed for rebuilding the policies for a file system in case the file system is recreated. The script also provides Quantum technical support staff with enough information to deal with most problems encountered by SNFS replication and deduplication users. The information collected by this script includes:

Snpolicy-enabled file systems list
Policy list for snpolicy-enabled file systems
Policy dump
Repstatus dump
Active replications
Policy backlogs
Target copies dump
Replication history summary
tsm policy and relation points
vip config
network config
blockpool config

snpolicy_gather displays its output to standard output. To save the result, redirect the output to a file. For example, the following command saves the result to a file snpolicy.dump

$ **snpolicy_gather &>snpolicy.dump**

In addition, **snpolicy_gather** is also called by **cvgather** program and **pse_snapshot** on Linux platform. The output is stored in a file with extension "snpolicy_gather" by **cvgather** and "snpolicy_gather.out" by **pse_snapshot**.

USAGE

When the operator encounters an error using SNFS replication and deduplication wishes to send debugging information to Quantum technical support, the **snpolicy_gather** utility may be run. In addition, this utility may be run with option "-p" to save the gathered policy information for backup purpose especially when there are changes to policies.

-p Only collect policy list for snpolicy-enabled file systems and the policy dump for each policy.

-b Also make a backup copy of each named policy for existing mounted StorNext file systems. The backup policy files are contined in directory */usr/cvfs/data/fs_name/policy_history/* where fs_name is the file system name.

NOTES

IMPORTANT: **snpolicy_gather** requires root privilege to run. It is only supported on Linux platform.

snpolicy_gather only collects information on the local machine. To collect snpolicy information for both source and target, it should be run on both source and target machines.

FILES

/usr/cvfs/config/blockpool_config.txt
/usr/cvfs/config/ha_vip.txt

SEE ALSO

cvgather(8), **pse_snapshot, snpolicy**(8), **vip_control**(8), **fsclassinfo**

NAME

snprobe − Collect StorNext cluster state information

SYNOPSIS

Linux only.

snprobe [**-acCdlLqsv**] [**-D** *label*] [**-h** *host*] [**-m** *pattern*] [**-n** *nameserver*] [**-o** *output*] [**-p** *altpmap*]

DESCRIPTION

Snprobe will use the StorNext administrative API to locate filesystems, hosts and storage associated with a StorNext cluster and output this as a json formatted description of the discovered resources. The output is designed for use by other programs, and not for an administrator to read directly.

OPTIONS

The command line options are used to control the level of detail provided.

-a Include all details.

-c Requests that filesystem client hosts are queried. The output will include which clients are connected to which filesystems and some details about the software revision running on the client.

-C Option indicates that the json output should use a compact form which minimizes its size. This is for machine readable copy and is not recommended for human use.

-d Requests that the StorNext disks visible to each host are reported and information about their capacity and SCSI query information.

-D *label*

This option tests the label search and match capability of the snprobe api. If the specified label is found on any host in the cluster, information about the disk is printed to the output file. This information is plain text, not json, and the normal json output is supressed. Specifying this option automatically sets the client and disk options. The **-D** option may be specified multiple times to search for multiple labels in one call.

-h *host* Defines which host is queried for information first. This host must be running StorNext services. It will be queried for the list of filesystems it sees from the name service and where these filesystems are located. Each filesystem is then queried in turn for information about its size, usage, layout, and if requested, quota and client information. Finally each host identified is queried for information about the software level it is running, the platform it is running on and the licenses installed. If requested, the list of disks visible from the host is also reported. The **-h** option may be specified multiple times.

-l Requests that license information be reported for each visible host.

-L Do links. This option is not yet implemented.

-m *pattern*

Use this regular expression to identify disks that are to be assembled into the same class. This option may repeated. The disk inquiry string is used to match disks that fall into the same class. For many disk arrays, a filter is not needed. However, in some cases, such as when iscsi disks are used, the disk inquiry string is set by the administrator and may contain different characters for each disk. Without using a regular expression, each disk would be its own class.

-n *nameserver*

Indicates that the host is a nameserver for the cluster. Code is present in StorNext and snprobe to return the list of nameservers in the cluster and set this value automatically. To support hosts in clusters which have not yet been upgraded with this functionality, nameservers can be identified on the command line. The **-n** option may be specified multiple times for the case that multiple nameservers are present.

-o *output*

Will cause output to be sent to the specified file, stdout is the default.

-p *altpmap*
Tells snprobe to use this port number to contact the alternate portmapper. See the fsports man page for more information on changing the default alternate portmapper port for a cluster.

-q Requests that disk quota usage is included for filesystems which have quotas enabled.

-s List the services running on the host as part of the filesystem. Storage Manager information is not reported as it is not externally visible. For each service the last time it was started is reported, its current status, how many times it has run, and if it has core dumped, how many times this has happened. If no host is specified, the localhost is queried.

-v Print snprobe version information and exit. No json output.

EXIT STATUS

Snprobe will return 0 on success and 1 on failure to connect to any services.

SEE ALSO

StorNext File System Release Notes

NAME

snquota − StorNext Quota Configuration Utility

SYNOPSIS

snquota {**-F** *file_system_name*|**-P** *path*} *action* [*options*]

DESCRIPTION

The **snquota** command manipulates the quota system in the *StorNext file system*.

The quota system provides a means for limiting the amount of disk storage consumed on a per user or per group basis across an entire file system or within a designated directory hierarchy. Quota limits apply to the space consumed by disk-block allocations for a user or group, which is not equal to the sum of their file sizes. Disk-block allocations can be less than the file size if the file is sparse, or more if the file system has allocated extra sequential blocks for the efficiency of anticipated future writes.

There are three types of quotas: user quotas, group quotas, and directory quotas. User and group quotas limit the number of file system blocks that can be allocated by the user or group on which the limit is placed. When quotas are on, the total allocated file system space of all users and groups that own files in the file system are automatically kept.

Directory quotas are a little different. The system does not automatically keep track of the usage for each directory. The **snquota** command allows directories to be turned into the root of a **Directory Quota Name Space (DQNS)**. Then, the number and size of all files in the directory and all its subdirectories are tracked and (optionally) limited.

For all quota types, limits and usage values only apply to regular files, not directories, symlinks, or special device files

Each quota entity has two limits associated with it. These are the hard limit and the soft limit.

The hard limit is the absolute limit which file system space usage should not exceed. Any time the total allocated space is at or over the hard limit, all further allocations or write requests by the offending user or group will be denied.

The soft limit is a lesser limit. When the user exceeds this limit (but not the hard limit), allocations are still permitted for a while. On UNIX platforms, a warning message will be written to the TTY of the user. When the soft limit has been overrun for longer than the grace period, the soft limit becomes a hard limit and any further allocations or write requests are denied. When the usage again falls below the soft limit, allocation requests will again be serviced.

When the hard limit, soft limit, and grace period are all zero, no limits are enforced for that quota. If any of the three are zero, all three must be zero.

For performance reasons related to the distributed nature of StorNext, quota overruns are not only possible but likely. The overrun size depends upon a number of factors including the size of the allocation request(s) at the time of the quota overrun.

When working with Directory Quotas, the specified file system must be mounted on the node running **snquota**.

Limits are not enforced against super user accounts.

DIRECTORY QUOTA NAME SPACES

DQNSs are created by either of two actions, **-C** or **-M**. They have different performance trade-offs and which one to use depends on the situation at hand.

The **-C** action creates a DQNS whose usage values (the amount of disk space and the number of files) are already initialized to the correct value. In order to initialize them, **snquota** must walk the directory tree under the root of the DQNS and tally up how much disk space is used. For big directory trees, this process can take a long time. Any modifications to the files and directories in the DQNS will be stalled until this walk is complete.

The **-M** action quickly creates a DQNS whose usage values are zero. As files are created in the DQNS, the usage value will increase, but will never count the files that were present in the directory when it was creat-

ed. In order to initialize the DQNS so the values are correct, the quota database must be rebuild using the **-R** action. A rebuild runs much faster than a file-tree walk on a per-inode basis, but it must look at **all** of the inodes in the file system. When the rebuild is running, modifications to the file system will be stalled until the rebuild is complete.

So, when creating a DQNS that is believed to contain only a small percentage of the inodes in the file system, use **-C**. When creating a DQNS (or many DQNSs) that use a large percentage of the files, use **-M**.

A typical situation where **-M** would be useful is converting an existing file system to use directory quotas. First every directory which needs to be a DQNS root is marked with a call to "snquota **-M**". Then, all of the DQNSs are initialized with one call to "snquota **-R**".

When in doubt, use **-C**.

Nesting of DQNSs is not allowed. This means that a DQNS may not be a subdirectory of another DQNS.

Directories can not be renamed across DQNS boundaries. Also, all hard links to an inode must be within the same DQNS. Attempts to rename directories/files or create hard links that would violate this rule will result in a EXDEV being returned.

If a directory tree contains inodes with hard links outside of the tree, an attempt to convert the tree into a DQNS via the **-C** action on the tree will result in an error. An attempt to convert the tree into a DQNS via the **-M** and **-R** actions will result in an error during the **-R** action.

QUOTAS IN MIXED OS ENVIRONMENTS

The user and groups names specified in **-u** and **-g** represent underlying identifiers that are determined by the OS type of the MDC.

On a Linux MDC, those identifiers are the classic UNIX User IDentifier (UID) and Group IDentifier (GID). When a UNIX client (Linux, MacOS, Solaris, etc) creates a file, it passes the user's UID and GID to the MDC. Those IDs are attached to the file and are used by the quota subsystem. When a Windows client creates a file, it passes a UID and GID it gets from one of three places:

1. If the Active Directory entry for the user has UNIX IDs associated with it, those are used. The behavior at this point is just like UNIX client. The administrator can set the IDs for a user via the AD configuration tool under the "UNIX Attributes" tab. This tab is part of the "Identity Management for UNIX" subsystem.
2. If the user doesn't have UNIX attributes, then the user and group "nobody" IDs from the file system configuration file are used.
3. If the process's SID is a special "Root SID", the UID/GID passed will be 0/0 (i.e. root). The "root SID" is S-1-5-18.

The Windows client can associate a NTSD with a file, but it's ignored by the quota subsystem. (It's only used for access control by the client at that point.)

On a Windows MDC, the favored identifiers are user and group SIDs derived from the NTSD which owns the file. If there is no NTSD associated with the file, the UID/GID values associated with the inode are used. So, when a Windows client creates a file, it passes in a NTSD. That NTSD broken into SIDs and used as file's owner identifiers as far as the quota subsystem is concerned. When a UNIX client creates a file, it passes the usual UID/GID pair, not a NTSD. This is used by the quota system. If that file is accessed from a on Windows client, it gets assigned an NTSD. At that point the quota will be wrong. Subsequent allocations of that file will be charged to the SD and not the UID/GID.

So, the preferred method of running quotas with a mixture of UNIX and Windows clients is to run with a Linux MDC with UNIX user/group mappings for Active Directory users. That way, a user who logs into clients of either OS will have a single quota (which will be based on the UID).

Another option is to just use Directory Quotas. They are much more straight-forward to share between OS types.

UNITS

Usage and Limits are printed in a human-readable form, suffixed with "K", "M", "G", "T", or "P" for kilobytes, megabytes, gigabytes, terabytes, or petabytes (respectively). These are base-2 values (i.e. 1K = 1024). A value without a suffix is in bytes.

File count values are also printed with these suffixes, but they are base-10 values (i.e. 1K = 1000).

Time values are printed with the suffixes "m", "h", "d", "w", "M" and "y" for minutes, hours, days, weeks, months and years (respectively).

If the **-e** option is used, the suffixes are disabled and exact values are printed. Time units are in minutes.

These suffixes can also be used when specifying limits with the **-h**, **-s**, and **-t** options. Decimal values may be used (e.g -h 1.5g). The case of the suffix doesn't matter.

FILE SYSTEM SPECIFICATION

-F *FileSystemName*
: Specify FileSystemName as the file system to manipulate.

-P *Path* Specify the file system containing *Path* as the file system to manipulate.

ACTIONS

-C This action creates an initialized DQNS on the directory specified by the **-d** argument. After this command is run, disk space usage and file counts will be tracked in the directory and all its subdirectories. Later, limits may be set on the DQNS using the **-S** action. Note that since this operation creates *and initializes* the DQNS, the directory tree contained by the new DQNS will be walked to total up the current usage values. This may take some time. Modifications to the files and directories in the DQNS will be stalled until this walk is complete.

-D This action destroys the DQNS specified by the **-d** argument. Disk space and file count usage values will no longer be tracked. Limits will no longer be enforced. Note that this does not modify or destroy the files and directories in the DQNS in any way.

-G This action returns the quota limits and values for the user, group, or directory specified by the **-u**, **-g**, or **-d** option (respectively).

-L This action lists the current quota limits and values for all user, group, and directory quotas.

-M This action creates (marks) an uninitialized DQNS on the directory specified by the **-d** argument. After this command is run, disk space usage and file counts will be tracked in the directory and all its subdirectories. Later, limits may be set on the DQNS using the **-S** option. Note that since this operation creates *(but does not initialize)* the DQNS, the usage values for the DQNS will start out at zero. The user should later use the **-R** action to initialize the usage values. See the **DIRECTORY QUOTA NAME SPACES** section above for a discussion on when to use **-M** and when to use **-C**. When in doubt, don't use this action. Use **-C** instead.

-R This action rebuilds the quota database. It is most useful when used after **snquota** has been used a number of times with the **-M** action. See the **DIRECTORY QUOTA NAME SPACES** section above. Note that this action can take a long time. The file system will be unresponsive during this time. The action cannot be canceled after it is started. A prompt will be displayed confirming the intent to run the action unless the **-Y** option is specified. A rebuild preserves limits and DQNSs.

-S This action sets the quota limits for the user, group, or directory specified by the **-u**, **-g**, or **-d** option (respectively). The limits must be specified by the **-h**, **-s**, and **-t**, options. All three must be present.

-X This action generates quota reports for all users and groups. There are three files placed in */usr/cvfs/data/*<file_system_name>:

1. quota_report.txt - a "pretty" text file report.
2. quota_report.csv - a comma delimited report suitable for Excel spreadsheets.
3. quota_regen.in - a list of snquota commands that can be used to set up an identical quota database on another

StorNext file system. Redirecting this file to the shell executes this as a script.

-Z This action resets and then rebuilds the quota database as in the **-R** option above. Unlike the **-R** action, **-Z** clears the limits and DQNSs but they can be restored from a quota.regen.in file.

OPTIONS

-a When this option is used, directory quota paths printed by the **-L** and **-G** options will be absolute paths. Paths supplied to the **-d** option are also absolute paths (or relative to the CWD). When this option is absent, all paths are relative to the root of the specified file system.

-d *Directory*
This option specifies a DQNS on a *StorNext file system* to be used with the **-C**, **-D**, **-G**, **-M**, or **-S** options. The directory supplied is the root directory of the DQNS. The directory path is relative to the root of the specified file system, unless the **-a** option is used.

-e When used with the **-G** or **-L** actions, numbers will be printed as *exact* values. Usage and Limits which represent disk space are printed in bytes. Times are printed in minutes. For example, with this option, a one megabyte hard limit will be printed as "1048576", not "1M". A one day grace period will be printed as "1440", not "1d".

-f The **-f** option is only useful with the **-G** and **-S** actions and the **-d** option. When the **-f** option is present, limits and values represent the number of regular files contained in the DQNS. If the **-f** option is not present, limits and values represent the disk space contained in the DQNS.

-g *GroupName*
This option specifies the name of a group to get or set with the **-G** or **-S** action. The group name may also be of the form "G:id", where "id" is a number that represents a group's GID.

-H *HostName*
Use a hostname in a StorNext cluster that is different from the cluster the command is being run on. This option in rarely needed.

-h *HardLimit*
This option specifies a hard limit to set when used with the **-S** action. See the **UNITS** section above.

-h This option causes **snquota** to print a friendly help message and exit. It only works when used by itself. If there are other options present, it is assumed that a hard limit is being specified.

-o {**text**|**xml**|**json**}
Print output in **text**, **xml**, or **json**. The default is **text**.

-s *SoftLimit*
This option specifies a soft limit to set when used with the **-S** action. See the **UNITS** section above.

-t *GracePeriod*
This option specifies a grace period to set when used with the **-S** action. See the **UNITS** section above.

-u *UserName*
This option specifies the name of a user to get or set with the **-G** or **-S** action. The user name may also be of the form "U:id", where "id" is a number that represents a user's UID.

-Y When used with the **-R** action, this option prevents **snquota** from asking for confirmation.

-z This option is the same as specifying "-h 0 -s 0 -t 0". It's only useful with the **-S** action.

EXIT VALUES

snquota will return 0 on success and non-zero on failure.

EXAMPLES

List all the quota limits and values on a file system named "data".

```
snquota -F data -L
```

Specify a hard limit of ten gigabytes, a soft limit of nine gigabytes, and a grace period of one week on user "lisa" in a file system named "data".

```
snquota -F data -S -u lisa -h 10g -s 9g -t 1w.
```

Turn off quota limits for user "lisa" in a file system named "data".

```
snquota -F data -S -u lisa -z.
```

Get the quota values for a group named "simpsons" on a file system mounted on "/stornext/data".

```
snquota -P /stornext/data -G -g simpsons
```

Create a **DQNS** on the directory "/lisa/saxophone_music" in a file system mounted on "/stornext/data".

```
snquota -P /stornext/data -C -d /lisa/saxophone_music
```

Specify a hard limit of one gigabyte, a soft limit of nine hundred megabytes, and a grace period of one day on pre-existing DQNS "/lisa/saxophone_music" in a file system named "data".

```
snquota -F data -S -d /lisa/saxophone_music -h 1g -s 900m -t 1d.
```

Create a number of DQNSs using **-M** and **-R**. This is faster than using **-C** if these directories take up most of the space in the file system.

```
snquota -F data -M -d /bart/comics
snquota -F data -M -d /bart/pranks
snquota -F data -M -d /bart/itchy_and_scratchy
snquota -F data -R
```

Create the same DQNSs using **-C**. This is faster than using **-M** and **-R** if the directories are small.

```
snquota -F data -C -d /bart/comics
snquota -F data -C -d /bart/pranks
snquota -F data -C -d /bart/itchy_and_scratchy
```

Specify a hard limit of one thousand files, a soft limit of nine hundred files, and a grace period of one week on pre-existing DQNS "/bart/pranks" in a file system named "data".

```
snquota -F data -S -d /bart/pranks -f -h 1k -s 900 -t 1w.
```

SEE ALSO

cvadmin(8), **snfs_config**(5)

NAME

snstatd − StorNext Statistics Daemon

SYNOPSIS

StorNext File System process

DESCRIPTION

snstatd is a daemon that is launched by the *StorNext File System* (*SNFS*) **fsmpm**(8) process. It is used to gather statistics about file system activity and related activity such as I/O and storage manager activity. This daemon also services requests from the qustat command and archives statistics to .csv files. The archive files reside in /usr/cvfs/qustats.

snstatd is configured using the **qustat.conf**(5) configuration file, which specifies the intervals for gathering and archiving statistics. Debugging levels can also be specified in this file.

snstatd may be started, stopped or restarted in **cvadmin**(8) using the **startd**, **stopd**, **restartd** commands respectively. This may be done to propagate changes made to the existing **qustat.conf**(5) file.

snstatd logs to */usr/cvfs/debug/snstatd.log* for debugging purposes.

ENVIRONMENT

snstatd is available on all StorNext installs.

FILES

/usr/cvfs/debug/snstatd.log
/usr/cvfs/config/qustat.conf

SEE ALSO

qustat.conf(5), **qustat**(8),

NAME

sn_dmap − Disk map utility

SYNOPSIS

sn_dmap [*options*] *devname*

DESCRIPTION

sn_dmap is a utility that can be used to manage disk volumes that are thin-provisioned. Typically these volumes remap logical block addresses (LBAs) and allocate space as needed. Space is allocated when a block is first written and can only be freed by issuing a SCSI unmap command.

sn_dmap operates on one device at a time specified by the **devname** parameter. The **devname** parameter can either be a full path to the device like /dev/mapper/mpathai or the StorNext volume label. By default **sn_dmap** will print summary mapping information about the volume. More detailed information may be displayed using the -v option.

OPTIONS

-? Display usage and exit.

-c Clear. Unmap all the blocks on the volume except the StorNext label. This option should be used only to clean up a volume before a cvmkfs operation. This will effectively clear all the blocks on the volume except the StorNext label and cannot be undone.

-C Clear. Unmap all the blocks on the volume including the StorNext label. This option should be used only to clean up a volume before a cvlabel and a cvmkfs operation. This will effectively clear all the blocks on the volume including the StorNext label and cannot be undone.

-d[**dddd**]
Run in debug mode. The more "d's" specified, the more debug information is printed.

-f Force the clear or unmap operation without an warning message.

-h Help. Display usage and exit.

-l *LBA* The starting logical block address. Optional when the **-v** option is sepcified and required for an unmap operation. See **-u**.

-n *nblks*
Specify the number of blocks. This option is required for an unmap operation. See **-u**.

-o *nsegments*
Specify the number of segments to display. This option is valid with the **-v** option and limits the number of segments displayed to the specified value.

-u Unmap the range specified by the -l and -n options.

-v Verbose. Display information about all the segments. The **-l** option can be specified to display segments starting with the specified **LBA**. The **-o** may be specified to limit the output to the specified number of segments.

-x Disply segment information in hexadecimal. This option is available only with the **-v** option.

EXAMPLES

Display general mapping information about the given volume:

```
per1-# sn_dmap  /dev/mapper/mpathal
/dev/mapper/mpathal {

                  segments         blocks
      mapped             4        2277376    1.09 GiBytes
    unmapped             6    15818022912    7.37 TiBytes
       total            10    15820300288    7.37 TiBytes
```

```
} snfs_meta_qx3_L23
```

Display verbose information about each segment of the given volume. Note that we used the StorNext volume name as the device name in this example:

```
per1-# sn_dmap -v snfs_meta_qx3_L23
/dev/mapper/mpathal {

   Segment                      LBA       NBlocks      Status
         0                        0          8192      mapped    4.00 MiBytes
         1                     8192       7806976    unmapped    3.72 GiBytes
         2                  7815168       2088960      mapped   1020.00 MiBytes
         3                  9904128       5718016    unmapped    2.73 GiBytes
         4                 15622144        172032      mapped   84.00 MiBytes
         5                 15794176    4294959104    unmapped    2.00 TiBytes
         6               4310753280    4294959104    unmapped    2.00 TiBytes
         7               8605712384    4294959104    unmapped    2.00 TiBytes
         8              12900671488    2919620608    unmapped    1.36 TiBytes
         9              15820292096          8192      mapped    4.00 MiBytes

} snfs_meta_qx3_L23
```

Unmap a segment with the force option (no warning):

```
per1-# sn_dmap -f -u -l 7815168 -n 2088960 snfs_meta_qx3_L23
```

Verify that the segment is now unmapped:

```
per1-# sn_dmap -v snfs_meta_qx3_L23
/dev/mapper/mpathal {

   Segment                      LBA       NBlocks      Status
         0                        0          8192      mapped    4.00 MiBytes
         1                     8192      15613952    unmapped    7.45 GiBytes
         2                 15622144        172032      mapped   84.00 MiBytes
         3                 15794176    4294959104    unmapped    2.00 TiBytes
         4               4310753280    4294959104    unmapped    2.00 TiBytes
         5               8605712384    4294959104    unmapped    2.00 TiBytes
         6              12900671488    2919620608    unmapped    1.36 TiBytes
         7              15820292096          8192      mapped    4.00 MiBytes

} snfs_meta_qx3_L23
```

Clear all mapped segments except those containing the StorNext label:

```
per1-# sn_dmap -c snfs_meta_qx3_L23

sn_dmap: *WARNING WARNING WARNING*

          You are about to unmap all the blocks on the device /dev/mapper/mpathal
          This will destroy all data on the StorNext volume snfs_meta_qx3_L23
          except the StorNext label. This operation can not be undone.

          Do you want to procede? (y / n) -> y
```

Verify all is unmapped except the StorNext label (first and last segments):

```
per1-# sn_dmap -v snfs_meta_qx3_L23
/dev/mapper/mpathal {

   Segment                      LBA       NBlocks      Status
         0                        0          8192      mapped    4.00 MiBytes
         1                     8192    4294959104    unmapped    2.00 TiBytes
         2               4294967296    4294959104    unmapped    2.00 TiBytes
         3               8589926400    4294959104    unmapped    2.00 TiBytes
         4              12884885504    2935406592    unmapped    1.37 TiBytes
         5              15820292096          8192      mapped    4.00 MiBytes

} snfs_meta_qx3_L23
```

NOTES

The unmap option (-u) is most likely useful only for development purposes.

sn_dmap execs the cvlabel command (/usr/cvfs/bin/cvlabel) to match the StorNext volume name to the device.

sn_dmap is currently supported only on Linux.

FILES

/usr/cvfs/bin/sn_dmap

SEE ALSO

cvlabel(8)

NAME

takeover_ip − broadcast virtual IP information for StorNext

SYNOPSIS

/usr/cvfs/lib/takeover_ip -d *device_name* **-m** *mac_address* **-i** *ipv4_ip*

DESCRIPTION

takeover_ip provides a mechanism for sending a gratuitous arp reply when the secondary node in an HA pair takes over as primary and activates the configured virtual IPs (VIPs).

This is typically used by the startup/shutdown scripts, not by an administrator. Only use when recommended by Quantum Support.

FLAGS

-h Display help

-d *device_name*
The device name of the network interface the VIP is on

-m *mac_address*
Mac address of network device the VIP is on

-i *ipv4_ip*
IPv4 address for VIP

FILES

/usr/cvfs/config/ha_vip.txt

SEE ALSO

cvfs(8), **vip_control**(8), **cnvt2ha.sh**(8)
SNFS Installation Instructions

NAME

vidio − Video frame producer consumer performance test

SYNOPSIS

vidio [*options*] *dir_path* [*dir_path*...]

DESCRIPTION

vidio can emulate a producer or a consumer of video frames. When run as a producer (write mode), **vidio** generates video frames and writes them to files that are created in the specified directory. When **vidio** is run as a consumer (read mode), it reads frames from the files in the specified directory that were previously created and written. By default, **vidio** runs in producer mode and creates one file for each frame.

vidio will run in one of two modes, constrained or unconstrained. The default mode is unconstrained and **vidio** will produce or consume frames at an unconstrained rate; as fast as the I/O will allow. If the **-F** option is specified, **vidio** will produce or consume frames based upon the specified frame rate. Dropped frames are noted in the output.

Optionally, more than one directory can be named. In this case, **vidio** will start an identical I/O stream in each specified directory.

vidio will then write performance information to the standard output. The verbosity of the performance data can be controlled using the -v option. A realtime updating curses based display is optionally available via the **-c** option.

OPTIONS

-? Display usage.

-c Display important statistics via a curses based continuously updating display.

-d[**dd**] Run in debug mode. The more "d's" specified, the more debug information is printed.

-D Use direct I/O.

-f *framesize*

Specify the *framesize* or the frame type. Various type of video frame types may be specified. The default frame type is "hdtv". Currently this results in a frame size of 8,294,400 bytes. Use the -? option to get a list of currently supported frame types. The *framesize* can also be specified in bytes. Optionally, the suffixes k, m, g, K, M or G can be added to the numeric frame size value to represent kilobytes, megabytes, gigabytes, kilobinary, megabinary or gigabinary values, respectively. The lowercase letters represent base 10 units (e.g. 1k = 1000) and the uppercase letters represent base 2 units (e.g. 1K = 1024.)

-F *framerate*

Emulate a frame producing or consuming device by limiting the number of frames produced or consumed per second to the specified frame rate. If the file file system cannot keep up to the specified frame rate, the "Dropped frames" stat is incremented.

-n *nframes*

The number of frames to read or write. The default is currently 60 frames.

-p *prefix*

Frame file names use the given *prefix* instead of the default of "vidio". Vidio then appends '_NNNNNNN' as the frame number to the *prefix*.

-q *qdepth*

Do asynchronous I/O by queuing requests *qdepth* deep. If a frame rate is specified, the *qdepth* will effectively equate to the number of frames that are buffered.

-r Consumer mode. Read frames of previously created using the -w option.

-v[**vv**] Print performance output in a more verbose fashion. The more "v's" specified, the more performance information is printed.

-V Show the vidio version and exit.

-w Producer mode. Create files and write frames. Create and write is the default test mode.

FILES

/usr/cvfs/bin/vidio

SEE ALSO

cvfs(8)

NAME

vidiomap − Video frame allocation inspector and resequencer

SYNOPSIS

vidiomap [*options*] *target_dir* [*target_dir*...]

DESCRIPTION

The **vidiomap** utility can be used to determine how the **StorNext** file system has allocated the files within a given directory. Optionally, **vidiomap** can be used to "defragment" and "resequence" those files. Optionally, multiple target directories may be specified.

The **vidiomap** utility is intended to be used primarily on video frame files within a directory. It is not indented for use as a general purpose file system allocation analysis or "defragmentation" utility. See **snfsdefrag**(1).

Without options, **vidiomap** will print a summary analysis of the allocation of files in the target directory, including the number of regular files, the total number of extents, and space consumed. Also printed is information relating to the total number and average size of the gaps between the extents.

The **-v** option may be used to provide detailed information about file allocation on a per extent basis. The actual file system block numbers consumed are printed along with the gaps between extents. Notice that gaps can be negative, indicating the sebsequent allocation was to a lesser file system block number than the current allocation.

To analyze the allocation of files within a directory, the desired file order first must be determined. By default, **vidiomap** will sort all the files in the target directory alpha-numerically by file name. Optionally, file names may be filtered by file prefix and file suffix. See the **-p** and **-s** options. Optionally, a list of file names may be provided. See the **-f** option.

The "resequencing" and "defragmentation" of files is a multi-step process that makes heavy use of the **StorNext** file System Application Programming Interface, **SNAPI**. The steps are a follows:

1. Determine the file order.
2. For each file, a "shadow file" is created and blocks are preallocated.
3. The data is coppied from the original file, to the shadow file.
4. The newly allocated extents are swapped into the original file inode.
5. The "shadow files" are removed.

Shadow files are named *filename*_**shadow** and are created in the target directory.

As stated previously, **vidiomap** is not a general purpose file system "defragmentor". An older file system or a file system nearing capacity may have a fragmented free space pool. Using **vidiomap** to resequence files may not help in this case and could make fragmentation worse. Consider using **snfsdefrag** before resequencing files with **vidiomap**.

The resequencing option is intended to work with the StorNext **Allocation Session Reservation** feature. This feature is managed using the GUI or by modifying the **AllocSessionReservationSize** parameter, see **snfs_config**(5).

Because resequencing copies the data to the newly allocated space, consider the performance impact of resequencing files on a production system. Resequencing a large number of files can take some time, depending on the size of the files, the performance of the underlying storage, and other file system activity.

OPTIONS

-? Display usage.

-d[**dd**] Run in debug mode. The more "d's" specified, the more debug information is printed.

-f *file_list*
Get the list of target files from the specified file instead of the the target directory. The files will be processed in the order listed. The format for this file is one file name per line.

-p *prefix*
Target only files with the specified *prefix*. If the prefix option is specified along with the suffix option, both must be true to target a given file.

-r Resequence and "defragment" the target files.

-s *suffix* Target only files with the specified *suffix*. If the prefix option is specified along with the suffix option, both must be true to target a given file.

-v Be verbose. Print each extent of each target file showing the file system blocks consumed and gaps between the extents.

FILES

/usr/cvfs/bin/vidiomap

SEE ALSO

cvfs(8), **snfsdefrag**(1), **snfs_config**(5), **vidio**(1)

NAME

vip_control − manipulate virtual IP information for StorNext

SYNOPSIS

/usr/cvfs/bin/vip_control *option*

DESCRIPTION

vip_control provides a mechanism for editing, listing, activating and deactivating virtual IPs (VIPs) for the StorNext system. Virtual IPs are required when running in an HA configuration with deduplication or replication enabled. Changes made to VIPs are not automatically copied over to an MDC's HA peer. As such, any changes that are made to the VIP configuration need to be done on both HA MDCs. **vip_control** does not update firewall rules. Changes to VIP configurations may require additional changes to the firewall rules of the system.

OPTIONS

-h Display help

-a Activate all configured VIPs

-d Deactivate all configured VIPs

-i Show VIP status along with physical NIC status

-l Show configured VIPs in a compact format

-u *vip_str*

Update the VIP configuration with the *vip_str* string. This replaces the contents of the VIP configuration file. The format of *vip_str* is as follows:

```
MAC address, IPV4 VIP, netmask, IPV6 VIP, prefix length
```

Each field in a VIP entry is separated by a comma, and each VIP entry can be separated by either a newline or a semicolon. Typically, the semicolon is used.

The following is an example of setting up two VIPs:

```
# vip_control -u "0030482D38F6,10.0.0.2,255.255.255.0,,;0030482d38f7,10.1.0.2,255
```

FILES

/usr/cvfs/config/ha_vip.txt /opt/DXi/scripts/netcfg.sh

SEE ALSO

cvfs(8), **snfs_config**(5), **cnvt2ha.sh**(8), **iptables**(8)
SNFS Installation Instructions

NAME

altstoreadd − Enables the Alternate Store Location Remote Copy feature on files and adds them to the alternate store candidate list. It can also be used to verify that a remote copy has been made for a file or list of files. Note: The Alternate Store Location Remote Copy feature is a licensed feature.

SYNOPSIS

altstoreadd [**-c** [**-e**] [**-m**] [**-i**]] [**-h**] *[file [file ...]]*

DESCRIPTION

This command should only be executed under the direction of Quantum technical support or professional services.

The **altstoreadd**(1) command takes as input a list of files either as command line arguments or from reading standard input and enables the Alternate Store feature by setting the REMOTE_COPY_ENABLED flag in the extended attributes of the files and adds them to the alternate store candidate list. The specified files must be full path names, regular files, reside in a StorNext file system that has an Alternate Store Node configured, and be members of a policy class that has the Alternate Store feature enabled.

If the -c option is specified, each file in the specified list is only checked for whether a remote copy has been successfully made. No candidates will be added in this case. This can be useful to determine how many files in the list are still waiting for a remote copy to be made.

OPTIONS

-c Checks each file in the specified list to determine if a remote copy has been made and returns a total count of the number of files that have had a remote copy made, a total count of the files in the list that have remote copy enabled, and a total count of the files in the list that were either invalid or do not have remote copy enabled.

-e The **-e** option is only valid when **-c** is also specified. This option will cause the path to be written to stdout for every file in the list that has a remote copy.

-m The **-m** option is only valid when **-c** is also specified. This option will cause the path to be written to stdout for every file in the list that has remote copy enabled but is missing a remote copy.

-i The **-i** option is only valid when **-c** is also specified. This option will cause the path to be written to stdout for every file in the list that either does not have remote copy enabled or is invalid.

-h Show the usage and exit.

EXAMPLES

```
$ altstoreadd /stornext/snfs1/sdisk_policy/sdiskfile1 /stornext/snfs1/sdisk_polic
/stornext/snfs1/sdisk_policy/sdiskfile1: new alternate store candidate added
/stornext/snfs1/sdisk_policy/sdiskfile2: new alternate store candidate added

$ find /stornext/snfs1/lto_policy -type f | altstoreadd
/stornext/snfs1/lto_policy/ltofile2: new alternate store candidate added
/stornext/snfs1/lto_policy/ltofile6: new alternate store candidate added
/stornext/snfs1/lto_policy/ltofile9: new alternate store candidate added
/stornext/snfs1/lto_policy/ltofile1: new alternate store candidate added

$ find /stornext/snfs1/lto_policy -maxdepth 1 -type f | altstoreadd -c
21 of 121 remote copies exist (0 invalid or not enabled)
```

SEE ALSO

altstoremod(1), **fsaltnode**(1) **fsmodclass**(1)

NAME

altstoremod − Display and/or manipulate the Alternate Store Location Remote Copy feature alternate store candidate list. Note: The Alternate Store Location Remote Copy feature is a licensed feature.

SYNOPSIS

altstoremod [**-e**[-i]**]** [**-m**[-i]**]** [**-n** *num_entries*] [**-l**] [**-p**] [**-v**] *[mnt_pt...*]

altstoremod -d [**-s p**|**q**|**i**|**r**|**c**|**e**] [**-c a**|**b**|**o**] [**-l**] [**-p**] [**-v**] *[mnt_pt...*]

altstoremod -u p|**q**|**i**|**r**|**c**|**e -s p**|**q**|**i**|**r**|**c**|**e** [**-c a**|**b**|**o**] [**-l**] [**-p**] [**-v**] *[mnt_pt...*]

altstoremod -r

DESCRIPTION

This command should only be executed under the direction of Quantum technical support or professional services.

The **altstoremod**(1) command can be used to perform a variety of tasks for displaying and manipulating the alternate store candidate list as follows:

Show files with remote copies and/or missing remote copies.
Delete candidates from the alternate store candidate list.
Update the status for candidates.
Reset all candidates with active status to pending status.

If no arguments are specified, the **altstoremod**(1) command will display statistics for all candidates scheduled for remote copies.

OPTIONS

-c a|**b**|**o** Show candidates scheduled for remote copies.
Using **-c a** displays all candidates.
Using **-c b** displays batch candidates.
Using **-c o** displays on-demand candidates.
The default behavior is to display all candidates when the **-c** option is not specified.

-d Delete candidates. Not valid with the **-u** option.

-e Show files with existing remote copies.

-i Show inactive files rather than active files. This option is only valid with the -e or -m option. The default behavior is to display information on active files.

-l List additional candidate information.

-m Show files with missing remote copies.

-n *num_entries*
Limit output to the specified number of candidate entries.

-p List full file path in the output.

-r Reset all candidates with active status to pending status.

-s p|**q**|**i**|**r**|**c**|**e**
Select candidates based on current status.
Valid with the **-d** or **-u** options.
Using **-s p** selects candidates with a status of pending.
Using **-s q** selects candidates with a status of queued.
Using **-s i** selects candidates with a status of in progress.
Using **-s r** selects candidates with a status of retrieve wait.
Using **-s c** selects candidates with a status of completed.
Using **-s e** selects candidates with a status of error.

-u p|**q**|**i**|**r**|**c**|**e**

Update the selected candidates to the specified status.
Not valid with the **-d** option.
Using **-u p** updates candidates to a status of pending.
Using **-u q** updates candidates to a status of queued.
Using **-u i** updates candidates to a status of in progress.
Using **-u r** updates candidates to a status of retrieve wait.
Using **-u c** updates candidates to a status of completed.
Using **-u e** updates candidates to a status of error.

-v Verify that candidates exist in the StorNext file system. Note that this command issues the stat(2) system call and can have a performance impact on the file system.

mnt_pt...

The StorNext managed file system mount point(s) used for displaying and manipulating the alternate store candidate lists. The default is all StorNext managed file system mount points.

SEE ALSO

altstoreadd(1), **fsaltnode**(1)

NAME

archive_cmp − Compare Archive, Media Manager, and Tertiary Manager configuration information

SYNOPSIS

archive_cmp [**-a** *archive_name*] [**-u**] [**-d**]

archive_cmp -i [**-u**]

archive_cmp -r

archive_cmp -h

The following options are for internal usage only, not for general use.

archive_cmp -dryrun [**-a** *archive_name*] [**-u**] [**-d**]

archive_cmp -g

archive_cmp -f *file_name*

DESCRIPTION

The function of **archive_cmp**(l) utility is to verify that Media Manager tape drive configuration matches the Tertiary Manager view and also verify those tape drives still exist within the actual archive. The primary purpose of the utility is to provide an ability to update Storage Manager's configuration with an archive after the archive has had tape drive maintenance performed such as a tape drive replacement.

The utility first compares Media Manager's tape drive configuration of an archive to the tape drive's that are actually contained within the archive. If there are differences found, the utility will resync Media Manager's configuration with the archive if the **-u** option is specified; otherwise, it will just indicate the discrepancies it has found.

Secondly the utility compares the Tertiary Manager's tape drive configuration with Media Manager's configuration. If a discrepancy is discovered, it will log that Tertiary Manager has a tape drive configured that no longer exists within Media Manager and if the **-u** option is specified the utility will update any tape drive device paths that are found to be incorrect. If a tape drive that Tertiary Manager knows about no longer exists in the archive, it is considered an orphan drive and is no longer available for use by Storage Manager. One can remove the orphan tape drive by deleting it or use this utility to specify a replacement tape drive from a list of free tape drive know to Media Manager by use of the **-r** option. The benefit of doing a replacement versus a delete/add of a old/free drive is that the new replaced tape drive will keep the same Storage Manager drive ID, which affects drive pools, and if the original tape drive was configured in DDM, it makes the necessary updates so the new tape drive replaces the original tape drive within DDM.

If no options are specified, the utility will only report current state information of Media Manager tape drives, Tertiary Manager tape drives, the tape drives within the archive itself.

Any tape drives configured within a vault are ignored by the utility. These drives are manually loaded drives and their configuration cannot be validated.

The output of the utility is captured in the */usr/adic/MSM/logs/scripts/archive_cmp.log* file. The output of each run is concatenated to the log file and the log files are rolled when necessary. This log file is captured by a pse_snapshot.

OPTIONS

-a *archive_name*
: Only run the comparisons and updates against the specified archive.

-u
: Make any configuration updates that can be performed to resync the tape drive configurations between Tertiary Manager, Media Manager, and the archive(s) that do not require a user's decision.

-d
: Use this option if the utility is not being executed from the command line (daemon mode). With this option, an admin alert is issued if any issues are detected and need to be addressed. Output is only captured within the log file. This option is used when the utility is added as a scheduled feature through **fsschedule**(1).

-i The utility will run in a user interactive mode. If a decision needs to be made as to what archive to check or if an update needs to be done, the utility will prompt the user to make a selection.

-r Makes any configuration updates to resync tape drive configurations between the archives, Media Manager, and Tertiary Manager (*-u* updates) and indicates if any orphaned tape drives exist. If an orphan tape drive exits, it prompts the user to select to either skip, delete, or replace the orphan drive with an available free drive.

-debug Enable additional debug output, primarly used for debugging the utility.

-h Display help.

-dryrun
Used internally when this utility is added as a scheduled feature through **fsschedule**(1). It makes a dryrun of the options to be used by the utility through the scheduler to make sure they are valid.

-g Used internally by the GUI to obtain a list of orphaned Tertiary Manager drives and a list of free drives that could be used to replace the orphaned drive.

-f *file_name*
Used internally by the GUI to specify the file to use by the utility for orphan drive deletion/replacement.

EXAMPLES

Example 1.

Run utility in display mode. This example shows a drive in an archive not known to Media Manager and suggestions on how to resolve the mismatch.

```
[root@xxx ~]#archive_cmp.pl

Checking MSM’s configuration against Archive:
  Archive #     Archive Name     Archive Type     Serial #
  1             sl500            ACSLS            559000100372

  Archive sl500 is connected to ACSLS server acsls-srvr and is configured to ACS

  Comparing MSM’s configuration against acsls archive

    Drive HU10552H0T: MSM configuration matches Archive (Slot: 0,0,1,1)

WARN: Archive drive 1210022999 with slot location of 0,0,1,2 not found in MSM
xdicomp

    Update not enabled, run vsarchiveconfig to sync MSM and archive
    or run archive_cmp.pl -u

Checking TSM’s configuration against MSM’s:
    Drive HU10552H0T: TSM configuration matches MSM (DRVID: 1)
```

Example 2.

Run the utility in update mode. This example shows a mismatch between Media Manager and a archive where a a new drive was found in the archive that does not exist in Media Manager and what was run to resync them.

```
[root@xxx ~]#archive_cmp.pl -u

Checking MSM’s configuration against Archive:
```

```
  Archive #     Archive Name     Archive Type     Serial #
  1             sl500            ACSLS            559000100372

  Archive sl500 is connected to ACSLS server acsls-srvr and is configured to ACS

  Comparing MSM’s configuration against acsls archive

    Drive HU10552H0T: MSM configuration matches Archive (Slot: 0,0,1,1)

WARN: Archive drive 1210022999 with slot location of 0,0,1,2 not found in MSM
xdicomp

  Running "/usr/adic/MSM/cli/bin/vsarchiveconfig -u acsls -n sl500" to get MSM
  in-sync with archive

Checking TSM’s configuration against MSM’s:
    Drive HU10552H0T: TSM configuration matches MSM (DRVID: 1)
```

Example 3.

Run the utility in replacement mode. This example shows an orphan Tertiary Manager drive and the replacement of it with a free drive from the same archive.

```
[root@xxx ~]#archive_cmp -r

Checking MSM’s configuration against Archive:
  Archive #     Archive Name     Archive Type     Serial #
  1             i500a            SCSI             ADICA0C0238B02_LLA

  Comparing MSM’s configuration against scsi archive

    Drive 1210025795: MSM configuration matches Archive (Slot: d257l0)
    Drive HU18464262: MSM configuration matches Archive (Slot: d256l0)
    Drive 1310023452: MSM configuration matches Archive (Slot: d258l0)

Checking TSM’s configuration against MSM’s:
WARN:  Drive 1210022999: Orphaned within TSM, not found in MSM
       Drive ID: 3
    Drive HU18464262: TSM configuration matches MSM (DRVID: 1)
    Drive 1310023452: TSM configuration matches MSM (DRVID: 2)

Processing the orphan TSM drives
  Processing Drive 1210022999 (DRVID: 3):
    Enter "s" To skip processing this drive
    Enter "d" To delete this drive from the TSM configuration
    Enter one of the following serial numbers to replace the orphaned drive
        1210025795   Archive name: i500a, Archive type: scsi

1210025795

    Replacing drive 1210022999 with drive 1210025795

  The processing of orphan drives succeeded
```

EXIT STATUS

0	Success completion.
1	There was an error processing the arguments.
255	An internal fatal error prematurely terminated **archive_cmp**(l).

SEE ALSO

fsschedule(1), **fsschedlock**(1)

NAME

bucket_report − Lattus Per-Bucket Report

SYNOPSIS

bucket_report *User Password IP_Address*

DESCRIPTION

The **bucket_report** command issues a REST API command to a Lattus main controller node for collecting per-bucket information. The results of the REST API are in JSON format, which is piped into a JSON parser to glean the desired information. Output is a Comma Separated Values (CSV) list suitable for use as input to a spreadsheet program. The columns of the CSV output are:

```
Bucket Name
Sum of sizes of files in the bucket (bytes written)
Number of files in the bucket
```

The reported information is generated once per day by a job running on the Lattus. Because of this, the information can be 24 hours old, depending on the timing of the Lattus job versus the running of the **bucket_report** command. The information can be updated by running the following qshell command per bucket:

```
# login to Lattus control node
# or run this as a remote command with ssh
/opt/qbase3/qshell -c "q.dss.manage.monitorNameSpace('<bucket name>', realtime=Tr
```

The *User* and *Password* parameters are the credentials of a user on the Lattus Control Node that has *LIST* permission on */manage*. Refer to section 8.4 of the Lattus REST API Users Guide for information about users. The *admin* user that is described in that section can be used as the credentials for the **bucket_report** command.

The following qshell commands can be used on the Lattus Control Node to create a new user with only *LIST* permission if that is preferred.

```
# login to Lattus control node
# run qshell
q.dss.manage.addUser('bucketrpt','xyzzy')
q.dss.manage.setPermissions('/manage','bucketrpt', ['LIST'])
quit()
```

Lattus permissions can be checked by logging into the main controller node of the Lattus system, and running the following command:

```
/opt/qbase3/bin/dss --permission-settings-get /manage
```

The *IP_Address* parameter is the address of the Lattus main controller node.

This user-editable script assumes that the port is the default value 8080. The script can be modified if a different port number has been selected in the Lattus configuration.

The **bucket_report** and **bucket_csv** executable programs are placed in the */usr/adic/TSM/util* folder for use by StorNext administrators.

FILES

bucket_report -- a user modifiable shell script.
bucket_csv -- a filter that takes JSON input and produces CSV output

NAME

build_file − Create a test data file.

SYNOPSIS

build_file

build_file *FILETYPE SIZE* [*filename*]

build_file help

DESCRIPTION

The **build_file**(1) utility is used to create a test data file of a specified type and size. Each file has an alphabetic header which is 80 bytes long and contains the *FILETYPE* and is of size *SIZE*. The minimum file size is 80 bytes and the maximum is 2 terabyte (2,199,023,255,552 bytes.)

OPTIONS

help Will show long instructions.

FILETYPE

Specify the type of file to generate. This can be one of the following:

binary - Create a data file with binary data. The data is written as an incrementing 32-bit integer.

alpha - Create a data file with alpha data. The data consists of the printable characters, (ASCII 32 through ASCII 126) repeated until the file size specified is reached.

sparse - Create a sparse data file. The data is sparsely written by creating gaps or holes which occupies no physical space. 1024 bytes of binary data are written at the end of each 5 megabytes of file size, however this is only done up to 100 times. The file size chosen will be rounded up to the next multiple of 5,000,000 bytes.

trans - Create a data file with bytes selected to stress transitioning of the bits.

SIZE Specify the size of the file. It can be specified using a floating point number followed by a ‘G’, ‘M’, ‘K’, ‘B’ or nothing as a scaling factor. The scaling factors multiply the floating point number given by 1000000000, 1000000, 1000, or 1 respectively.

filename

Specify the name of the file. If not specified, the *SIZE* parameter will be used as the file name.

EXIT STATUS

0 No issues were found.

1 The command failed.

EXAMPLES

To create a binary file which is 12.5 gigabytes long and is named "big_file":

```
% build_file binary 12.5G big_file
```

To create an alpha file which is 80 bytes long and is named "small_file":

```
% build_file alpha 80 small_file
```

To create a sparse file which is 80 megabytes long and is named "med_file":

```
% build_file sparse 80m med_file
```

SEE ALSO

build_verify(1)

NAME

build_verify − Used to verify the data integrity of a file previously built (created) by the build_file (1) utility

SYNOPSIS

build_verify

build_verify [**-f**] *filename*

build_verify help

DESCRIPTION

The **build_verify**(1) utility used to verify the data integrity (correctness) of a file previously built by the **build_file**(1) utility. It does this by reading the header block in the file. This block is 80 bytes long and contains the filetype (**binary**, **alpha**, **sparse**, or **trans**) and size of the file. Given this information, **build_verify**(1) reads the file and determines if the data in the file is exactly what it should be. The **build_verify**(1) utility uses the same logic as that used in the **build_file**(1) utility. If an error in the file data is encountered, an error message will be displayed giving the address of the offending byte and the program will terminate.

OPTIONS

help Will show long instructions.

-f Selects fast verification. This options only affects sparse files. Fast verification option skips over the holes in a sparse file and only verifies the live data written between them. Fast verification will not detect any error where the holes are supposed to be.

filename

The name of the file to verify.

EXIT STATUS

0 No issues were found.

1 The command failed.

SEE ALSO

build_file(1)

NAME

checkArchiveAvailabilityTsm − Verify that all configured archives are online.

SYNOPSIS

checkArchiveAvailabilityTsm [**-ras**]

checkArchiveAvailabilityTsm -report

DESCRIPTION

The **checkArchiveAvailabilityTsm**(1) command will verify that all configured archives are online.

OPTIONS

-ras Used to indicate that a RAS Alert should be generated on any failure.

-report Used to describe the purpose of this command.

EXIT STATUS

0 No issues were found.

1 An issue was found. If the **-ras** option is specified, a RAS Alert will also be generated.

NAME

checkDiskSpaceTsm − Verify that enough disk space exists for the StorNext database tables, logging, and other functions.

SYNOPSIS

checkDiskSpaceTsm [**-ras**] [**-failpct** *failValue*] [**-warnpct** *warnValue*]

checkDiskSpaceTsm -report

DESCRIPTION

The **checkDiskSpaceTsm**(1) command will find all file systems that are in use by StorNext that are running out of space. This does not include user SNFS file systems. It does include all file systems that are accessible from /usr/adic, including those reached by symbolic link.

OPTIONS

-ras Used to indicate that a RAS Alert should be generated on any failure.

-report Used to describe the purpose of this command.

-failpct *failValue*
Used to indicate the file system percentage utilization at which a failure will be generated. The *failValue* must be an integer between 0 and 100. The default value is 95.

-warnpct *warnValue*
Used to indicate the file system percentage utilization at which a warning will be generated. The *warnValue* must be an integer between 0 and 100. The default value is 99.

EXIT STATUS

0 No issues were found.

1 One or more filesystem has exceeded the **-failpct** percentage full. If the **-ras** option is specified, a RAS Alert will also be generated.

2 One or more filesystem has exceeded the **-warnpct** percentage full.

EXAMPLES

This example shows a successful run:

```
% checkDiskSpaceTsm
- Scanning files and directories in /usr/adic...
- OK: Filesystem /dev/sda3 is at 37%  (/usr/adic/DSM)
- OK: Filesystem /dev/sdc is at 42%  (/usr/adic/mysql)
- OK: Filesystem /dev/sdb is at 75%  (/usr/adic/DSM/bin/fs_fmover)
- Exiting with status 0 (Success)
```

This example shows a run with warnings:

```
% checkDiskSpaceTsm -failpct 95 -warnpct 75
- Scanning files and directories in /usr/adic...
- OK: Filesystem /dev/sda3 is at 37%  (/usr/adic/DSM)
- OK: Filesystem /dev/sdc is at 42%  (/usr/adic/mysql)
- WARNING: A StorNext file system has exceeded the warning threshold for percent
- WARN: Filesystem /dev/sdb is at 75%  (/usr/adic/DSM/bin/fs_fmover)
- Exiting with status 2 (Warn)
```

This example shows a run with failure:

```
% checkDiskSpaceTsm -failpct 75
- Scanning files and directories in /usr/adic...
- OK: Filesystem /dev/sda3 is at 37%  (/usr/adic/DSM)
- OK: Filesystem /dev/sdc is at 42%  (/usr/adic/mysql)
- ERROR: A StorNext file system has exceeded the maximum allowable threshold for
```

```
- FAIL: Filesystem /dev/sdb is at 75%  (/usr/adic/DSM/bin/fs_fmover)
- Exiting with status 1 (Fail)
```

NAME

checkDriveAvailabilityTsm − Verify that all configured drives are online.

SYNOPSIS

checkDriveAvailabilityTsm [**-ras**]

checkDriveAvailabilityTsm -report

DESCRIPTION

The **checkDriveAvailabilityTsm**(1) command will verify that all configured drives are online.

OPTIONS

-ras Used to indicate that a RAS Alert should be generated on any failure.

-report Used to describe the purpose of this command.

EXIT STATUS

0 No issues were found.

1 An issue was found. If the **-ras** option is specified, a RAS Alert will also be generated.

NAME

checkDriveSlotToDrivePathTsm − Verify that device path and device slot mappings are correct for tape drives.

SYNOPSIS

checkDriveSlotToDrivePathTsm [**-ras**] [**-timeout** *secs*] [**-retries** *num*] [**-help**]

checkDriveSlotToDrivePathTsm -report

DESCRIPTION

The **checkDriveSlotToDrivePathTsm**(1) utility will verify that device path and device slot mappings are correct for tape drives. The utility does this by mounting and dismounting tapes in the each of the tape drives.

OPTIONS

-ras Used to indicate that a RAS Alert should be generated on any failure.

-report Used to describe the purpose of this command.

-timeout *secs*
Used to indicate the timeout in seconds that the **checkDriveSlotToDrivePathTsm**(1) will wait for a mount or dismount to occur. The default value is 60 seconds.

-retries *num*
Used to indicate the number of retries passed to the **vsmount**(1) and **vsdismount**(1) commands. The default value is 2 retries.

-help Used to show the usage for this command.

EXIT STATUS

0 No issues were found.

1 The command failed. If the **-ras** option is specified, a RAS Alert will also be generated.

WARNING

The **checkDriveSlotToDrivePathTsm**(1) utility will stop and restart Tertiary Manager during the verification process.

SEE ALSO

vsmount(1), **vsdismount**(1)

NAME

checkEventsTsm − Verify that Tertiary Manager is keeping up with the file system events.

SYNOPSIS

checkEventsTsm [**-ras**] [**-maxentries** *num*]

checkEventsTsm -report

DESCRIPTION

The **checkEventsTsm**(1) will verify that Tertiary Manager is keeping up with the file system events by validating that there are less than **-maxentries** candidates in the Tertiary Manager event file(s).

OPTIONS

-ras Used to indicate that a RAS Alert should be generated on any failure.

-report Used to describe the purpose of this command.

-maxentries *num*

Used to indicate the maximum number of entries at which **checkEventsTsm**(1) will fail. The default value is 1000.

EXIT STATUS

0 No issues were found.

1 The command failed. If the **-ras** option is specified, a RAS Alert will also be generated.

2 There are greater than **-maxentries** candidates in the Tertiary Manager event file(s).

NAME

fsCheckMediaAvailabilityTsm − Verify that there are enough media available for all policies to store all file copies.

SYNOPSIS

checkMediaAvailabilityTsm [**-ras**]

checkMediaAvailabilityTsm -report

DESCRIPTION

The **checkMediaAvailabilityTsm**(1) command will verify that there are enough media available for all policies to store all file copies.

OPTIONS

-ras Used to indicate that a RAS Alert should be generated on any failure.

-report Used to describe the purpose of this command.

EXIT STATUS

0 No issues were found.

1 An issue was found. If the **-ras** option is specified, a RAS Alert will also be generated.

NAME

checkPolicyClassStore − Verify that each policy class can either be stored automatically or by the scheduler.

SYNOPSIS

checkPolicyClassStore [**-ras**]

checkPolicyClassStore -report

DESCRIPTION

The **checkPolicyClassStore**(1) command will verify that each policy class has the Auto Store option turned on or is scheduled to be stored. If a policy class fails the tests, the command will generate a report detailing the issues preventing the stores.

OPTIONS

-ras Used to indicate that a RAS Alert should be generated on any failure.

-report Used to describe the purpose of this command.

EXIT STATUS

0 No issues were found.

1 An issue was found. If the **-ras** option is specified, a RAS Alert will also be generated.

NAME

checkStoreCandidates − Verify that Tertiary Manager is keeping up with store candidate processing.

SYNOPSIS

checkStoreCandidates [**-ras**] [**-maxentries** *numentries*] [**-maxerrors** *numerrors*] [**-help**]

checkStoreCandidates -report

DESCRIPTION

The **checkStoreCandidates**(1) will verify that Tertiary Manager is keeping up with store candidate processing by checking the number of candidates in each store candidate table.

OPTIONS

-help Used to show the usage for this command.

-maxentries *numentries*
Used to indicate the maximum number of store candidates for a filesystem at which **checkStoreCandidates**(1) will fail. The default value is 10000.

-maxerrors *numerrors*
Used to indicate the maximum number of files in each table that have an error count before **checkStoreCandidates**(1) will fail. The default value is 0.

-ras Used to indicate that a RAS Alert should be generated on any failure.

-report Used to describe the purpose of this command.

EXIT STATUS

0 No issues were found.

1 The command failed. If the **-ras** option is specified, a RAS Alert will also be generated.

2 There are greater than *numentries* store candidates in a filesystem or greater than *numerrors* files with errors.

NAME

checkTsmToMsmMediaSync − Verify the SNSM media are configured correctly.

SYNOPSIS

checkTsmToMsmMediaSync [**-ras**]

checkTsmToMsmMediaSync -report

DESCRIPTION

The **checkTsmToMsmMediaSync**(1) command will verify the SNSM media are configured correctly by verifying that every media in the mediadir table exists in the archivemedia table. The command will output the number of media checked and the number that failed.

OPTIONS

-ras Used to indicate that a RAS Alert should be generated on any failure.

-report Used to describe the purpose of this command.

EXAMPLE

```
% checkTsmToMsmMediaSync
- Number of Media Checked: 20
- Number of Media Failed : 0
- Exiting with status code = 0 (Success)
```

EXIT STATUS

0 No issues was found.

1 An issue was found. If the **-ras** option is specified, a RAS Alert will also be generated.

NAME

dbdropfs − This utility will perform cleanup for file systems that have been removed

SYNOPSIS

dbdropfs [**-F**] *mount_point*

DESCRIPTION

This command will remove all information for a specific file system from the database. This command can only be run on file systems which have been remade via the **cvmkfs**(8) command or for those which no longer exist. The TSM software must be restarted to pick up the changes. If immediate cleanup is desired, a **fsclean -B** may be executed.

OPTIONS

-F This will bypass the prompt for verification.

mount_point

The file system to operate on.

SEE ALSO

fsclean(1)

NAME

dbdrvslot − Queries for drive slot information about an archive.

SYNOPSIS

dbdrvslot *archiveName*

DESCRIPTION

The **dbdrvslot**(l) command is issued from the command line in order to obtain drive slot information about an archive from the database. This information consists of the following colon separated values:

- drive identifier
- hardware location information
- slot
- drive serial number

The slot value is required by the **vsdrivecfg**(l) command when configuring a new drive. There is no drive slot information for vaults so this command will return nothing if a vault is specified.

OPTIONS

archiveName

Identifies the archive to obtain drive slot information about.

EXIT STATUS

0 The command completed successfully.

1 An error is detected by the Media Manager software.

EXAMPLES

Request port information for a scsi archive before any drives have been configured

dbdrvslot lib3

Output returned:

```
-:d256l0:0,0,12,256:1210024470
-:d257l0:0,0,12,257:1210027302
```

Request port information for an acsls archive before any drives have been configured

dbdrvslot acslslib

Output returned:

```
-:0,0,1,1:0,0,12,0:
-:0,0,1,2:0,0,12,1:
```

SEE ALSO

vsdrivecfg(l)

NAME

dm_altstoretest − Test path names for REMOTE_COPY_ENABLED

SYNOPSIS

dm_altstoretest [**-s**|**-h**]

DESCRIPTION

Use this filter when searching for pre-existing files to add to the remote file copies made by the Alternate Store Location feature. It reads file path names from input, tests if they are enabled for Alternate Store Location copy to remote, ignores path names that are enabled or prints path names to stdout for those that are not enabled. Any irregularities, such as path names for non-existing files, are printed to stderr.

OPTIONS

-s do not print path names for non-existing files

-h print help information to stderr

EXAMPLE

Following is an example use for the filter.

```
# One-time script for finding pre-existing files for potential
# background copying by the Alternate Store Location (ASL) feature.
# Change the parameters of the 'find' command to be: 1) the full
# path of the ASL-enabled relation point, and 2) a date & time
# later than the activation of ASL on that relation point.

find /stornext/snfs1/rel_pt -type f ! -newermt "time string" ! -empty |
    dm_altstoretest > backgrd_candidates 2>altstoretest_log_file
if [ -s altstoretest_log_file ]
then
    echo Problems:
    cat altstoretest_log_file
    exit 1
fi
split -l 10000 backgrd_candidates backgrd_candidates_part_

#############################################################################

# Restartable script for spoon-feeding the background-copy
# candidates in quantities that limit the performance impact
# on database transactions.
function countrows () {
  rowcount=`altstoremod |
  sed -n -e '/=/ s/.*=\([0-9]*\).*=\([0-9]*\)/\1 \2/p' |
    awk '{a=a+$1+$2} END {print a}' `
  eval [ $rowcount -ge 10000 ]
  return
}

for background_slice in backgrd_candidates_part_*
do
    while countrows
    do
        sleep 30
    done
    dm_altstoretest < $background_slice 2>>altstoretest_log_file2 |
        altstoreadd >> added_files
```

done

SEE ALSO

altstoreadd(1)**, dm_util**(1)**, fsfileinfo**(1)

NAME

dm_foreign − Set extended attribute information for foreign files and directories

DESCRIPTION

This utility is used by the **fsimportnamespace**(1) script to create an inode with foreign flags and events set. Users should not run this command, unless directed to do so by Quantum technical assistance.

NAME

dm_info − Display extended attribute and inode information

SYNOPSIS

dm_info -F *file...*

dm_info -N *file...*

dm_info [**-A**|**-h**|**-d**|**-i**|**-e**|**-s**|**-o**|**-a** *attr_arg*] *file...*

DESCRIPTION

This will display extended attribute and inode information which is used by by the Tertiary Manager software.

The user must be root or the utility must be owned by root with the ’s’ bit set.

OPTIONS

-F show file system hdl and event set of the file system

-N show extended attributes names

-A show affinity association

-h show file handle

-d show device number and fsid

-i show inode and generation number

-e show event mask

-s show association

-o show object ids

-a *attr_arg*

show attributes where *attr_arg* can be:

key	**class**	**flags**	**vsn**
oneup	**stublen**	**cpymap**	**totvers**
ldbn	**slen**	**fsn**	**totseg**
mask	**medlist**	**reserved**	**all**

file The names of the file(s) on disk to report on. The file path(s) must also be in a managed file system. The entire path name need not be entered. If preceded by a slash (/) in the command definition, the full path name, starting from the root directory, is required as input to the command. Otherwise, the Tertiary Manager command expands the directory name using the current working directory as the parent. If multiple files are entered, the files must be separated by spaces.

EXAMPLE

An example of the output is:

```
Filename:     myfile

handle (hex): 0003dc583e00125a000e00000000000000000000000000007
  fsid: 0x0003dc583e00125a  dev: 67895298  rdev: 67895298  aff: n/a
  size: 3000009    block size: 4096    number of blocks: 5888
  ino: 7   gen: 0   type: S_IFREG   mode: 0100664   lnks: 1
  extended attributes:   attrname: SNEA   attr_ver: 5.82   key: 6
    class,sub: 3,0  oneup: 6  vsn: 000  totvers: 2  totseg: 0
    cpymap: 0x1   flags: 0x0   events: 0x180000   stublen: 0
    flags:  NONE
  objids:                    Objid           Offset           Length
       04c0dff7aa2004fe0a3f3001001               0             1000
  eventlist: ATTRIBUTE  DESTROY
```

```
region events:
atime = 1086697327 -> Tue Jun  8 07:22:07 2004
ctime = 1088686531 -> Thu Jul  1 07:55:31 2004
mtime = 1088686531 -> Thu Jul  1 07:55:31 2004
```

SEE ALSO

dm_util(1)

NAME

dm_master − Utility to bypass Tertiary Manager event processing

SYNOPSIS

dm_master *wait number_of_msgs* [**mount**] [**-a**] *mountpoint...*

DESCRIPTION

The **dm_master**(1) process receives the event callouts from the file system. This can be used in place of the Tertiary Manager software when some work needs to be done. This should only be used under the guidance of Quantum technical assistance. It can potentially cause files to be in an inconsistent state with the Tertiary Manager database if used incorrectly.

When used, the **dm_master**(1) process should be brought up and remain running as the required processing is performed on the files.

The user must be root or the utility must be owned by root with the 's' bit set.

OPTIONS

wait If set to 0, the server will sleep between dm_get_events() calls. If set to 1, the server will block (interruptibly) in dm_get_events().

number_of_msgs
If set to 0, the server will wait forever, otherwise the server will wait for the indicated number of event messages before exiting.

mount Registers to receive mount events only. Note: When using the **mount** option **dm_master**(1) will acknowledge a mount of the *mountpoint*; however you must restart **dm_master**(1) to get it to acknowledge subsequent events within the *mountpoint* file system.

-a Indicates that the daemon should also register for the asynchronous events handled by the file system. By default those are ignored.

mountpoint...
file system(s) from which to receive events.

NAME

dm_session − Utility to manage DMAPI sessions.

SYNOPSIS

dm_session [**-d** *sid*]

dm_session [**-n** *sid* [*sess_info*]]

DESCRIPTION

This utility will either report on the current sessions and tokens or be used to clean up old sessions. Typically, the Tertiary Manager software will clean up sessions when it is terminated gracefully, and upon startup. However, in the event that some do not get cleaned up, this utility provides a means of doing so.

The user must be root or the utility must be owned by root with the 's' bit set.

OPTIONS

-d *sid* Destroy a session. This also responds to any outstanding events.

-n *sid* Create a new session, assuming the disposition and outstanding events of the old session.

sid Valid DMAPI session ID

sess_info
Name for the new session. If not specified it defaults to the old session name.

NAME

dm_trunc − Truncates a file.

SYNOPSIS

dm_trunc *startoffset count file...*

DESCRIPTION

This will truncate a file. It is highly recommended that the **fsrmcopy**(1) be used instead of this utility. There should be no need to use this utility unless directed to do so by Quantum technical assistance.

This utility must be run as root or be owned by root with the 's' bit set.

OPTIONS

startoffset

This is the offset within the file where the truncation should start to occur. This should be on a disk block boundary.

count The number of bytes to truncate. If set to 0, then all bytes from the specified offset will be truncated and the startoffset is automatically adjusted to be on a block boundary. Currently, only 0 is supported until managed regions is supported.

file The names of the file(s) on disk to truncate. The file path(s) must also be in a managed file system. The entire path name need not be entered. If preceded by a slash (/) in the command definition, the full path name, starting from the root directory, is required as input to the command. Otherwise, the Tertiary Manager command expands the directory name using the current working directory as the parent. If multiple files are entered, the files must be separated by spaces.

SEE ALSO

fsrmcopy(1), **fsrmdiskcopy**(1)

NAME

dm_util − Set extended attribute information for a file

SYNOPSIS

dm_util -D *mnt_pt*...

dm_util -r [**-N** *attr_name*] *file*...

dm_util -T *tmp_type mnt_pt*

dm_util -A *affinity_file*...

dm_util -a|**-d** *eventset*| *flags file*...

dm_util -u *attr_arg attr_val*... *file*...

dm_util [**-v**] **-o** *objid_info_str file*

dm_util [**-F**] **-E** *eventlist_bits file*

WARNINGS

This utility should be used VERY carefully and only under the guidance of Quantum technical assistance.

DESCRIPTION

This utility can be used to modify flags and event settings for files managed by the Tertiary Manager software. It can also be used to disassociate (remove all) events from a file system or create special temporary directories in the file system.

The user must be root or the utility must be owned by root with the 's' bit set.

OPTIONS

-D *mnt_pt*
Disassociate (remove all) events from the indicated mount points.

-r Remove all events, flags, or keys for a file or directory.

-N *attr_name*
Attribute name for attribute clean up which is reported as *attrname* by *dm_info*.

-T *tmp_type*
Create StorNext temp directory of type *tmp_type* on specified mount point. Valid values for *tmp_type*:

jnl : used for journaling
rel : used for file relocation feature
for : used for foreign migration feature
alt : used for alternate node retrieval feature

-A *affinity*
Set the specified *affinity* on files and directories. The affinity must be one that is currently configured in the file system. Specify *none* to clear the affinity setting on files and directories.

-a *eventset*|*flags*
Add the specified *eventset* or *flags* to a file.

-d *eventset*|*flags*
Delete the specified *eventset* or *flags* from a file.

eventset
Valid values are:

admin data attr inherit inherited migr post read write tape_copy blocklet

The **admin** event set is valid for directories only. All other event sets are for files.

flags Valid values:

all_copies no_reloc remote_copy_exists tier_override
foreign_filesystem no_store remote_copy_enabled trunc_exclude
in_process no_trunc stranger_media trunc_immed
invalid_path

-u class <*class_ndx*>|RECYCLE|TEMP|NONE
Updates the class to the specified class index. For special cases use keywords of **RECYCLE** for Recycle bin, **TEMP** for StorNext temp dir and **NONE** for no class,

-u media *segment media_index generation*
When setting media values, provide the segment number, the media index and media generation number. Example:

```
% dm_util -u media 2 347 1 filea
```

Where **2** is the segment number, **347** is the media index and **1** is the media generation number for that segment.

-u *attr_arg attr_val...*
Update the indicated attribute for a file or directory. Unless so indicated, attribute updates take one attr value.

attr_arg
Valid values are:

key class vsn oneup
stublen cpymap totvers ldbn
slen fsn totseg mask
media objid reserved

When updating **cpymap** or **mask** the *attr_val* must be provided in hex. The size of **mask** is 24 bytes.

When updating the **objid** the *attr_val* provided will be a string that indicates: **objid**,offset,length

(That is the **objid** value and the offset and length for the data where the object id applies.)

Some samples of the *objid* attr value:

- Set objid for entire file
  . abcdefghijklmonp,0,0
- Set objid for offset/length: 0/100000
  . abcdefghijklmonp,0,100000
- Set objid for offset/length: 100000/100000
  . 1234567890123456,100000,100000
- Remove existing objid at offset 0
  . 0,0
- Remove existing objid at offset 100000
  . 0,100000

[**-v**] **-o** *objid_info_str*
Generate the object id for the indicated file using the object id information provided. Formatting information for the input string:

- Input format:
  fsid,ino,gen,ctime,mtime,pid,tid,cpy,vsn,seg,offset
- Field specifics:
  fsid - format of dm_info output (ex. 0004cb296df4ba27)
  ctime/mtime - date string format: YYYY:MM:DD:hh:mm:ss
  (ex. 2012:10:04:07:35:25) or Unix time
  (ex. 1349354125)
  If the last 3 items are not provided they default as follows:

vsn: 1, seg: 1, offset: 0
- If '-v' provided then report the input values for the object id

[**-F**] **-E** *eventlist_bits*
Set/Update events on the specified file or directory using the *eventlist_bits* specified. Valid options for the eventlist_bits:

0xnnnnn - set eventset to 0xnnnnn.

+0xnnnnn - add bits 0xnnnnn to eventset.

-0xnnnnn - clear bits 0xnnnnn from eventset.

+0xnnnnn:-0xmmmmm - add bits 0xnnnnn to eventset and clear bits 0xmmmmm from eventset.

- If '**-F**' provided then apply the changes to the filesystem.

mnt_pt file system mount point.

file The name(s) of the managed file(s) to update.

SEE ALSO

dm_info(1)

NAME

exclusions − file exclusions

SYNOPSIS

/usr/adic/TSM/config/excludes.store

/usr/adic/TSM/config/excludes.truncate

/usr/adic/TSM/config/excludes.postrestore

DESCRIPTION

These files allow criteria to be specified which will exclude files from store, truncation or post restore operations. The syntax of all the files is identical. Any updates to these files will not require TSM to be cycled for them to go into effect.

NOTE: with exclusion specifications being openly defined it is possible to potentially exclude files that may be critical for disaster recovery.

The format of this file is strict and each line must begin with one of the following specifiers: **#** , **EXACT:** , **CONTAINS:** , **BEGINS:** , **ENDS:** , **MATCH:** , and **MATCH_PATH:**

Each entry in the exclusion file must start in column one.

Store Exclusions

To facilitate identifying files to be excluded from store operations an exclusion file (*/usr/adic/TSM/config/excludes.store*) can be used. Filenames (node name, not full path names) are tested against the exclusions specified during preparation for stores and if the filename matches an exclusion the file is not included in the store operation. One caveat to this behavior occurs when files have been renamed after they have been stored. It will not matter if the new file meets or does not meet the exclusion criteria as the exclusions are applied against the original stored pathname. If it is unclear that this condition exists, then running the **fsfileinfo**(1) report on the file will display the stored path if it is indeed different the the current file path.

Truncation Exclusions

To facilitate identifying files to be excluded from truncation operations an exclusion file (*/usr/adic/TSM/config/excludes.truncate*) can be used. Full path names are tested against the specified exclusions as files are being stored. If the pathname matches an exclusion then the file will be marked so that it will not be truncated. This has the same effect as running **fschfiat -t** *e* on each file.

Disaster Recovery Exclusions

fspostrestore(1) is used when recovering a file system after a disaster. In addition to its primary restore responsibilities it can also create a file which contains a list of all the files in the file system that are excluded from truncations. This list includes files that either met the truncation exclusion criteria when it was stored or that have been explicitly marked with **fschfiat -t** *e*. The files are referred to as "no truncate" files. This list can be used in conjunction with the **fsretrieve -B** option to re-stage these files back to disk.

If some of these files are considered to be more critical than others, then there may be a need to separate them such that some are retrieved before others. In order to accomplish this, the */usr/adic/TSM/config/excludes.postrestore* exclusion file can be used to specify criteria which is used to filter the "no truncate" files.

Full path names are tested against the specified exclusions as files are being examined by **fspostrestore**(1). If the pathname matches the criteria then the file path will be written to a second list which results in two lists of files being generated instead of one. Then **fsretrieve -B** can be invoked for each one of the lists.

Exclusion File Tags:

This is the comment identifier. The remainder of the line is ignored.

EXACT:

A file name/path is matched if it is identical to this string.

CONTAINS:

A file name/path is matched if any part of this string appears in it.

BEGINS:
A file name/path is matched if it begins with this string.

ENDS: A file name/path is matched if it ends with this string.

MATCH:
A file name/path is matched if it matches the specified shell expression. This tag is different from the others as it will expand shell wildcards when evaluating a file. For example an asterisk (*) will match anything when used with this tag but only match an asterisk when used with the other tags.

Wildcards:
A string is a wildcard pattern if it contains one of the characters ?, * or [. These wildcard characters are expanded according to the following definitions:

A ? (not between brackets) matches any single character.

A * (not between brackets) matches any string, including the empty string.

Character classes:
An expression [...] where the first character after the leading [is not an ! matches a single character, namely any of the characters enclosed by the brackets. The string enclosed by the brackets cannot be empty; therefore] can be allowed between the brackets, provided that it is the first character. (Thus, [][!] matches the three characters [,] and !.)

Ranges:
There is one special convention: two characters separated by - denote a range. (Thus, [A-Fa-f0-9] is equivalent to [ABCDEFabcdef0123456789].) One may include - in its literal meaning by making it the first or last character between the brackets. (Thus, []-] matches just the two characters] and -, and [--0] matches the three characters -, ., 0, since / cannot be matched.)

Complementation:
An expression [!...] matches a single character, namely any character that is not matched by the expression obtained by removing the first ! from it. (Thus, [!]a-] matches any single character except], a and -.)

One can remove the special meaning of ?, * and [by preceding them by a backslash. Between brackets these characters stand for themselves. Thus, [[?*] matches the four characters [, ?, * and .

MATCH_PATH:
This is identical to MATCH except that it will only match a slash in a filename/path with a slash in then pattern and not by an asterisk (*) or a question mark (?) metacharacter, nor by a bracket expression ([]) containing a slash. So every slash in the file path must match a slash in the specified exclusion string.

EXAMPLES: store exclusions

A comment line

```
# Exclude definitions for temporary files
```

Will exclude "temp_work.tmp" and "backup.out", but no other files

```
EXACT:temp_work.tmp
EXACT:backup.out
```

Will exclude "exclusions.man", "testrun.temp", "temp.logs", and "temporary", but not "manifest" or "sherman"

```
CONTAINS:.man
CONTAINS:temp
```

Will exclude "tmp.file", "tmpstuff", and "temporary", but not "file.tmp", "file.tmp.1", or ".temporary"

```
BEGINS:tmp
BEGINS:temp
```

Will exclude "work.tmp" and "work.temp", but not "temp.work" and "tmp.work"

```
ENDS:.tmp
ENDS:.temp
```

Will exclude "tmp.file", "tmpstuff", and "temporary", but not "file.tmp", "file.tmp.1", or ".temporary"

```
MATCH:tmp*
MATCH:temp*
```

Will exclude any file starting with "a", "c", "e"

```
MATCH:[ace]*
```

Will exclude "temp.1", "tempXY", and "file.temp.1", but not "temporary", "tempABC" or "file.temp"

```
MATCH:*temp??
```

Will exclude "tmp.file", "tmpstuff", and "temporary", but not "file.tmp", "file.tmp.1", or ".temporary" Since store exclusions are based on file names and not paths, MATCH_PATH will yield the same results as MATCH

```
MATCH_PATH:tmp*
MATCH_PATH:temp*
```

EXAMPLES: truncate/postrestore exclusions

A comment line

```
# Exclude definitions for temporary files
```

Will exclude "/sn/fs1/temp_work.tmp" and "/sn/fs1/backup.out", but not "/sn/fs9/temp_work.tmp"

```
EXACT:/sn/fs1/temp_work.tmp
EXACT:/sn/fs1/backup.out
```

Will exclude "exclusions.man", "testrun.temp", "temp.logs", "temporary", anything in the "/sn/fs1/temp/" directory, but not "manifest", "sherman" or "/sn/fs1/xman/file"

```
CONTAINS:.man
CONTAINS:temp
```

Will exclude "/sn/fs1/dir1/tmp.file", and "/sn/fs1/dir1/tmpstuff", but not "/sn/fs1/dir1/file.tmp", or "/sn/fs1/dir2/tmp.file"

```
BEGINS:/sn/fs1/dir1/tmp
```

Will exclude "work.tmp" and "work.temp", but not "temp.work" and "tmp.work"

```
ENDS:.tmp
ENDS:.temp
```

Will exclude "/sn/fs1/dir1/tmpfile", "/sn/fs2/dir1/tmpfile", but not "/sn/fs1/dir2/tmpfile"

```
ENDS:/dir1/tmpfile
```

Will exclude "tmp.file", "tmpstuff", and anything under the "/sn/fs1/tmp/" directory, but not "file.tmp", or "file.tmp.1"

```
MATCH:*/tmp*
```

Will exclude any file in the "/sn/fs1/dir1/" directory and any subordinate directory such as /sn Will exclude "/sn/fs1/dir1/file1", "/sn/fs1/dir1/dir2/file2"

```
MATCH_PATH:/sn/fs1/dir1/*
```

Will exclude "tmp.file", "tmpstuff", and "/sn/fs1/dir/tmp.file", but not "file.tmp", or "/sn/fs1/dir2/tmp.file"

MATCH:*/dir1/tmp*

Will exclude "/sn/fs1/.profile", and "/sn/fsZ/.profile", but not "/sn/fs10/.profile" or "/SN/fs1/.profile"

MATCH:/sn/fs?/.profile

Will only exclude "/fs1/file", "/fs2/file", "/fs3/file" or "/fsZ/file"

MATCH:/fs[1-3Z]/file

Will exclude any file in the "/sn/fs1/dir1/" directory but not any files in subordinate directories such as "/sn/fs1/dir1/dir2/file"

MATCH_PATH:/sn/fs1/dir1/*

FILES

/usr/adic/TSM/config/excludes.store
/usr/adic/TSM/config/excludes.truncate
/usr/adic/TSM/config/excludes.postrestore

SEE ALSO

fschfiat(1), **fspostrestore**(1), **fsretrieve**(1)

NAME

fhpath − Generate file path from handle

SYNOPSIS

fhpath *phandle fhandle*

DESCRIPTION

The fhpath utility will convert the specified file handle and parent file handle into the associated path.

OPTIONS

phandle Parent handle in hex. (Use 0 if the parent handle is unknown.)

fhandle File handle of file or directory in hex.

SEE ALSO

dm_info(1)

NAME

filesystems

SYNOPSIS

/usr/adic/TSM/config/filesystems

DESCRIPTION

The file system configuration file contains the file systems that are being managed by the TSM software. Each file system is listed along with some configuration parameters for the file system. File system entries are automatically added to the file when the **fsaddrelation**(1) command is used to add the first relation to a file system. Also, entries are automatically removed from this file when the **fsrmrelation**(1) command is used to remove the last relation from a file system.

NOTE - A line in the file with a first character of '#' will be treated as a comment line. A line with a first character of '/' will be treated as a file system entry. Tabs or spaces may be used between parameters in a file system entry.

NOTE - When an entry is added by the **fsaddrelation**(1) command, the entry is added with the default parameters (shown below). If those parms are to be changed, edit the file and make the desired updates.

WARNING - Do not add or remove entries from the file by hand. Allow that to be done automatically by the **fsaddrelation**(1) and **fsrmrelation**(1) commands. You may, however, update file system parameters by modifying the file.

In order to manage file data and maintain adequate disk space for a file system, the TSM software will relocate data blocks of existing files from one affinity to another or truncate data blocks of existing files from disk. These operations are performed automatically but can be applied manually by using the **fsrelocate**(1), **fsrmcopy**(1) or **fspolicy**(1) commands. Certain criteria apply for file data to be eligible for relocation or truncation (see man pages for the above commands).

The automatic relocation and truncation of managed files is accomplished via **fspolicy**(1) commands. A set of daemons issue these commands as they are needed. The parameters in the filesystems configuration file specify the target fill level to be used by **fspolicy**(1) for each file system. Additionally, they indicate which policy scheme is in effect for each file system: Space Based or Min Time. The differences between these two schemes is discussed in a latter part of this man page.

Each entry in the configuration file is a line of fields separated by spaces/tabs of the form:

Mount_Point Low_Use High_Use Enable_Min_Time Min_Use Enable_Truncation

A detailed description of each parameter is given in a latter part of this man page.

Daemon Policy Schemes:

For the automatic relocating or truncating of managed data, there are two schemes used for kicking off policies: Space Based and Min Time. Operationally, these schemes have similarities and differences.

Scheme Similarities:

With either policy scheme, relocation or truncation policies are started when the file system fill level goes above the *High Use* percentage. When this occurs, all possible candidates for the file system are NOT put in the candidate list for relocation or truncation, but just a manageable number of candidates that have reached their minreloctime or mintrunctime, as specified by their policy class. The files in the list are then relocated or truncated in an attempt to reach the *Low Use* file system fill percentage.

With either policy scheme, emergency relocation and truncation policies are started when the file system fill level reaches 100 percent. When this occurs, all possible candidates for the file system are NOT put in the candidate list for relocation or truncation, but just a "quick" list of the largest files available is built. The files in the list are then relocated or truncated in an attempt to reach the *Low Use* file system fill percentage.

With either policy scheme, a daemon will run daily mintime relocation and truncation policies whose primary purpose is to manage the files that never make it into space based candidate lists. The mintime policies do put all possible candidates into the candidate lists, which are sorted by time from oldest to youngest. These policies are run to more accurately apply the relocation and truncation parameters defined in the con-

figured policy classes and to pro-actively keep the fill level below the *High Use* percentage.

Scheme Differences: - Space Based - The daily mintime policies will truncate candidate files in the file system until the *Low Use* file system fill percentage is reached.

You would use this scheme on a file system if you want to automatically manage the file system fill level no lower than the *Low Use* level. In other words, you want the automatic relocation or truncation of files to occur only as space needs indicate. - *Min Time* - The daily mintime policies will truncate candidate files in the file system until the *Min Use* file system fill percentage is reached.

You would use this scheme if you want more flexibility in having old files truncated from disk. You can set *Min Use* lower than *Low Use* so that old files will be truncated even if the file system is already below *Low Use*. Setting *Min Use* to 0 would cause all valid candidates to be truncated regardless of the file system fill level.

File System Configuration Parameters:

Low Use

The target fill level for a non-mintime truncation policy (a policy that does NOT use the -m option). It is given as a percentage of used blocks.

Example: Assume the Low Use value is 75%, and the file system is currently 90% full. Also assume there are valid candidates that can be used to manage the file system down to 65%. The policy operation will stop at 75% even though there are more valid candidates to manage.
(Default Low Use: 75)

High Use

The fill level at which the space-monitoring daemon automatically runs a non-mintime policy in an attempt to reach the *Low Use* fill level. This is done regardless of the current policy scheme. It is given as a percentage of used blocks.
(Default High Use: 85)

Enable Min Time

This flag indicates which policy scheme is in effect. If set to *true*, it indicates the Min Time policy scheme is being used, and *Min Use* will be the target file system fill level for mintime policies. If set to *false*, it indicates the Space Based scheme is being used, and *Low Use* will be the target file system fill level for mintime policies.
(Default Enable Min Time: true)

Min Use

The target fill level for a mintime truncation policy (a policy that uses the -m option). It is given as a percentage of used blocks in the file system.

Example: Assume the *Min Use* value is 35%, and the file system is currently 50% full. Also assume there are valid candidates that can be used to manage the file system down to 20%. The mintime policy will stop at 35% even though there are more valid candidates. If the *Min Use* value is 0, then all files that are valid candidates will be affected.

Note - If *Enable Min Time* is false, this parameter has no effect, and the *Low Use* value will be the target for any mintime truncation policies run on the file system.
(Default Min Use: 75)

Enable Truncation

This flag indicates whether file truncation is enabled (*true*) or disabled (*false*) for the given filesystem.

By default file truncation is enabled, so files are automatically truncated in order to free up space, also a user call causing no-space condition will be blocked until free space is available. When set

to disable no truncation takes place, a user call caused no-space condition will fail with ENOSPC error.

Note - when truncation is disabled it is still possible to truncate files using **fsrmdiskcopy**(1) utility.

SEE ALSO

fspolicy(1), **fsrelocate**(1), **fsrmcopy**(1), **fsclassinfo**(1), **fsaddclass**(1), **fsmodclass**(1)

NAME

fsactivevault − Run an active vault policy

SYNOPSIS

fsactivevault [**-archive** *a1,...*] [**-vault** *dest*] [**-copy** *c1,...*] [**-used** *size*] [**-remaining** *size*] [**-age** *age*] [**-sort** *column*] [**-migrate**|**-nomigrate**] [**-pending**|**-nopending**] [**-highmark** *pct*] [**-lowmark** *pct*] [**-fullpct** *pct*] [**-report**] [**-include-policy** *p1,...*] [**-exclude-policy** *p1,...*] [**-capacity**] [**-dryrun**] [**-limit** *num*] [**-notify** *level*] [**-noheader**] [**-debug**] [**-help**] [**-policy** *name*]

DESCRIPTION

The **fsactivevault**(1) command calls **vsmove**(l) to automatically vault qualifying media. Media are vaulted when the percentage of the used capacity of the Storage Manager license meets or exceeds the **ACTIVEVAULT_HIGH_USE** sysparm value. Media will continue to be vaulted by **fsactivevault**(1) until the used capacity is below the **ACTIVEVAULT_LOW_USE** sysparm threshold. By default, only media that meet or exceed the **ACTIVEVAULT_FULL_PERCENT** sysparm value will be vaulted. Active Vault policies may be scheduled with the **fsschedule**(1) command.

The administrator must manually complete the **vsmove**(l) operation through the Library Operator Interface (LOI) in the StorNext GUI. When used in conjunction with the Quantum Scalar library Active Vault feature and SNAPI, the media will automatically move to the Active Vault after completing the **vsmove**(l) operation through the LOI. Otherwise, the media will be in the library mailbox and need to be manually removed.

OPTIONS

-archive *a1,...*

Media to be vaulted are selected from this list of archives. Multiple archives may be specified by either listing them as a comma separated list or by specifying multiple **-archive** options. At least one archive name is required unless **-report** is also specified.

-vault *dest*

The destination archive where to vault media. The **-vault** option is required unless **-report** is also specified.

-copy *c1,...*

A list of copy numbers to query on. If no **-copy** option is specified, then media belonging to any copy may be moved to the vault. Multiple copies may be specified by either listing them as a comma separated list or by specifying multiple **-copy** options.

-used *size*

Select only media that have used *size* capacity. *size* is in bytes by default, but a suffix of **B**(ytes), **K**(ibibytes), **M**(ebibytes), **G**(ibibytes) or **T**(ebibytes) may be used to specify capacity.

-remaining *size*

Select only media that have *size* capacity remaining. *size* is in bytes by default, but a suffix of **B**(ytes), **K**(ibibytes), **M**(ebibytes), **G**(ibibytes) or **T**(ebibytes) may be used to specify capacity.

-highmark *pct*

Override the **ACTIVEVAULT_HIGH_USE** sysparm value to start vaulting if the used capacity of the Storage Manager license is at or above the *pct* percent.

-lowmark *pct*

Override the **ACTIVEVAULT_LOW_USE** sysparm value to stop vaulting if the used capacity of the Storage Manager license is below the *pct* percent.

-fullpct *pct*

Override the **ACTIVEVAULT_FULL_PERCENT** sysparm value to consider vaulting media that is at or above the *pct* percent.

-age *age*

Vault media according to age. *age* by default is in seconds, but a time unit may also be provided to specify **seconds**, **days**, **weeks**, **months** or **years**. A specific date may also be specified with the **YYYY:MM:DD:hh:mm:ss** format.

-sort *column*
Sort results based according to *column* where *column* can be **age**, **id**, **full**, **remaining** or **used**.

age will sort by last access time of the media.

id will sort by media ID.

full will sort by the percentage full of the media. This is the default behavior if no **-sort** option is specified.

remaining will sort by space remaining on the media.

used will sort by the amount of space used on the media.

-migrate
Select from media in the MIGRATE media class.

-nomigrate
Ignore media in the MIGRATE media class.

-include-policy *p1***,...**
Select media belonging to the list of policy classes. If this option is used, only media belonging to the list will be selected. Multiple policies may be specified either by using a comma separated list or by including multiple **-include-policy** options.

-exclude-policy *p1***,...**
Excludes media belonging to the listed policy classes. The **_adic_backup** policy is excluded unless explicitly included by **-include-policy**. Multiple policies may be specified either by using a comma separated list or by including multiple **-exclude-policy** options.

-limit *num*
Limit the number of vaulted media to *num*.

-dryrun
Show what media would be vaulted according to the selection criteria without actually calling the **vsmove**(l) command to vault the media.

-notify *level*
Set the email notification level for active vault policy admin alerts where *level* is either **none**, **error**, **warn**, or **info**.

none will suppress all email notifications.

error will only send notifications when an error occurs, such as database errors or licensing errors.

warn will send notifications for warnings, such as being unable to vault enough media to satisfy the low water mark.

info will cause email notifications to be sent indicating that the active vault policy completed successfully. The default notification level is **warn**.

-debug Enable extra debug output.

-help Display help.

-policy *policyname*
The name of the Active Vault policy to use for email notifications.

REPORTING OPTIONS

-report Generate a media report based upon the selection criteria. This does not call the **vsmove**(l) command.

-pending
Select media where a vaulting operation is pending.

-nopending
Select media where no vaulting operation is pending.

-capacity
Report the current licensed capacity and total available licensed capacity.

-noheader
Do not display header or result count in the media report.

ENVIRONMENT

The following parameters are configurable in the *fs_sysparm* file.

ACTIVEVAULT_HIGH_USE
Percentage of used licensed capacity at which to begin the Active Vault policy.

ACTIVEVAULT_LOW_USE
Percentage of used licensed capacity at which to stop the Active Vault policy.

ACTIVEVAULT_FULL_PERCENT
Percentage value used to check against to determine if a medium is full enough for vaulting consideration by Active Vault.

EXAMPLES

Example 1.
Vault all copy #2 media in the i6k archive to the vault01 archive that are in the MIGRATE class.

```
fsactivevault -a i6k -v vault01 -c 2 -migrate
```

Example 2.
Create a scheduled policy that runs everyday at 2 am that will vault media that are at least 500 MiB in size and are older than 2 months. Limit the number of vaulted media to 10. Media are to be vaulted in order of access time from least recently accessed to most recently accessed. The default high and low thresholds and full percent apply.

```
fsschedule -a -n mypolicy -f activevault -p daily -t 0200 -- \
   -a i6k -v vault01 -age 1month -used 500M -sort age -limit 10
```

Example 3.
The capacity for the Storage Manager is at or near the licensed capacity. To reclaim licensed capacity an administrator might decide to vault media belonging to a policy class named "old_data" that has not been accessed in the last 10 days that is also over 1 GiB in use. The selection criteria is sorted by the size to reduce the amount of vaulting that may be needed. The fullpct value is reduced to 1% to override the default ACTIVEVAULT_FULL_PERCENT sysparm to help make sure that there are qualified media.

```
fsactivevault -a i6k -v vault01 -include-policy old_date -used 1G \
    -age 10days -sort size -fullpct 1
```

Example 4.
Query media to determine which media will be vaulted next, excluding all media belonging to policy class "important".

```
fsactivevault -report -exclude-policy important
```

Example 5.
Compression is enabled on drives and the data compresses at a high data compression ratio. To avoid vaulting media with a large amount of space remaining, the administrator sets the remaining size constraint and sets the fullpct to 0.

```
fsactivevault -a i6k -v vault01 -remaining 500M -fullpct 0
```

Example 6.

Vault media that have not been accessed since a specific date of "Jan 15 12:30:00 2012".

```
fsactivevault -a i6k -v vault01 -age 2012:01:15:12:30:00
```

EXIT STATUS

0	Success completion.
1	There was an error processing the arguments.
2	The vaulting license is invalid.
11	There were not any media detected that matched the policy criteria.
12	The Active Vault policy was unable to vault enough media to get below the high water mark.
13	The Active Vault policy was unable to vault enough media to get below the low water mark.
255	An internal fatal error prematurely terminated **fsactivevault**(1).

FILES

/usr/adic/TSM/config/fs_sysparm.README

SEE ALSO

vsmove(l), **fsschedule**(1), **fsschedlock**(1)

NAME

fsaddclass − Create and define a new policy class.

SYNOPSIS

fsaddclass *class* [**-F** *type*] [**-s** *softlimit*] [**-h** *hardlimit*] [**-S** *stubsize*] [**-t** *mediatype*] [**-l** *securitycode*] [**-o** *acctnum*] [**-x** *maxcopies*] [**-d** *defaultcopies*] [**-m** *minstoretime*] [**-c** *mintrunctime*] [**-a** *affinity...*] [**-i** *minreloctime*] [**-R** *affinity*] [**-v** *drivepool*] [**-k** *maxversions*] [**-f i**|**p**] [**-r c**|**s**] [**-p yes**|**no**] [**-z** *minsetsize* **-g** *maxsetage*] [**-T ANTF**|**LTFS**] [**-L** *drivelimit*] [**-G y**|**n**] [**-V y**|**n**] [**-D y**|**n**] [**-e** *encryptiontype*] [**-A y**|**n**] [**-M** *mkeyname*] [**-q** *compressiontype*]

DESCRIPTION

The **fsaddclass**(1) command creates a new policy class definition. For each of the optional arguments that are not entered, the Tertiary Manager software will substitute default values. Most default values can be modified in a system parameter file.

This command accepts upper case or lower case input, but class names will always be converted to lower case.

OPTIONS

class Policy class. If the policy class already exists, the command is rejected. A policy class is a maximum of 16 alphanumeric characters. The special "-", ".", and "_" characters are also permitted.

-a *affinity...*

A space-separated list of disk affinities that the files in this policy class will traverse throughout their life cycle. Valid entries include any of the affinities already configured in the managed file systems or the word **none**. The first affinity in this list will be considered the default disk affinity for this policy class, the affinity in which files initially will be created. When they become eligible candidates for relocation, the files will be moved to the next disk affinity in the list. The word **none** may be specified in place of the affinity list to indicate no automatic relocation is to occur for this policy class. NOTE: Presently a maximum of two affinities are supported, including the default disk affinity. If the **-a** option is not used, no automatic relocation will occur for this policy class.

-R *affinity*

The affinity to retrieve a truncated file to. This will override the default affinity.

-d *defaultcopies*

The total number of copies that will be stored (including the primary copy) for each file in this policy class. The *defaultcopies* option can be set equal to, but not exceeding, the *maxcopies* setting. It cannot be set to less than one. If the **-d** option is not used, the default number of copies will be specified by the system parameter CLASS_DEFAULT_COPIES.

-f i|**p** The file retention policy for the policy class. The files can be truncated immediately (**i**) or at policy application time (**p**) once all file copies are stored on a medium. If the **-f** option is not used, the file retention policy will be specified by the system parameter CLASS_FILE_CLEANUP.

-h *hardlimit*

The maximum number of media that are allowed in this policy class. When the hard limit is reached, a warning message is sent to the *syslog* and to the user specified as the e-mail contact for this policy class. Files can still be stored in the policy class, as long as there is room on the media that have already been used to store files in that policy class. If the **-h** option is not used, the *hardlimit* will be specified by the system parameter CLASS_HARDLIMIT.

-l *securitycode*

Up to four characters can be used for the security code. The special "_" character is also permitted. If the **-l** option is not used, the default will be specified by the system parameter CLASS_SCODE.

-c *mintrunctime*

The minimum time that a stored file must reside unaccessed on disk before being considered a candidate for truncation (the clearing of disk blocks). A file will not have its disk blocks truncated (by a truncation policy) until it has remained unaccessed on disk for this amount of time. After that

time, a truncation policy will consider the file a valid candidate for truncation, but it may or may not actually be truncated. That will depend on the current file system fill level and the file system configuration parameters. NOTE: An "emergency" truncation policy ignores this time. If the **-c** option is not used, the default *mintrunctime* will be specified by the system parameter CLASS_TRUNCTIME. The minimum value allowed for this time is 5 minutes. See SETTING CLASS TIMES below for more info on time format and usage.

-i *minreloctime*

The minimum time that a file must reside unaccessed on disk before being considered a candidate for relocation (the moving of data blocks from one disk affinity to another). A file will not have its data blocks relocated (by a relocation policy) until it has remained unaccessed on disk for this amount of time. After that time, a relocation policy will consider the file a valid candidate for relocation. The file may or may not actually be relocated at that time, depending on the current file system fill level and the file system configuration parameters. NOTE: An "emergency" relocation policy ignores this time. The **-a** option is required to use this option. If the **-i** option is not used, the default *minreloctime* will be specified by the system parameter CLASS_TIERTIME. The minimum value allowed for this time is 5 minutes. See SETTING CLASS TIMES below for more info on time format and usage.

-m *minstoretime*

The minimum time that a file must reside unmodified on disk before being considered a candidate for storage on media. A file will not be stored (by a store policy) until it has remained unmodified on disk for this amount of time. After that time, the next policy run will attempt to store the file. If the **-m** option is not used, the default *minstoretime* will be specified by the system parameter CLASS_MINTIME. The minimum value allowed for this time is 1 minute. See SETTING CLASS TIMES below for more info on time format and usage.

-S *stubsize*

The truncation stub size (in kilobytes). This value is used to determine the number of bytes to leave on disk when files are truncated. This value will be the minimum number of bytes left on disk (the value will be rounded up to a multiple of the file system block size). This value is not used when a stub size has been explicitly set for a file with **fschfiat**(1). If the **-S** option is not used, the default will be specified by the system parameter CLASS_TRUNCSIZE.

-o *acctnum*

Up to five characters can be used for the account number. The special "_" character is also permitted. If the **-o** is not used, the default will be specified by the system parameter CLASS_ACCTNUM.

-r c|s Media classification after cleanup policy has been performed. When all files are deleted from a medium, the medium can revert back to the owning policy class blank pool (**c**) or to the system blank pool (**s**). If the **-r** option is not used, the default media classification will be specified by the system parameter CLASS_MEDIA_CLEANUP.

-s *softlimit*

The warning limit for the number of media that can be allocated in this policy class. When the soft limit is reached, a warning message sent to the *syslog* and to the user specified as the e-mail contact for this policy class. The value of *softlimit* must be less than or equal to the value of *hardlimit*. If the **-s** option is not used, the default *softlimit* will be specified by the system parameter CLASS_SOFTLIMIT.

-t *mediatype*

Defines the type of media to be used for the policy class. Depending on the type of platform used, the following media types are supported by Tertiary Manager software:

AIT
AITW
AWS
AZURE

LATTUS
S3
QVAULT
S3COMPAT
LTO
LTOW
SDISK
3590
3592
9840
9940
T10K
DLT4
DLT2 (SDLT600 media)

The **fsstore**(1) command can override this parameter with the **-t** option. If the **-t** option is not used, the default media will be specified by the system parameter CLASS_DEF_MEDIA_TYPE.

-v *drivepool*

The Media Manager drive pool group used to store or retrieve data for this policy class. This drive pool name must be defined within the Media Manager software before any media operations can occur for this policy class. The special "_" character is permitted to identify the drive pool group. If the **-v** option is not used, the default drive pool group will be specified by the system parameter CLASS_DRIVEPOOL.

-x *maxcopies*

The maximum number of copies (including the primary copy) that are allowed for each file in this policy class. The *maxcopies* value cannot be less than one. NOTE: If the copy setting for a particular file is adjusted using the **fschfiat**(1) command, it cannot exceed the value defined by the *maxcopies* setting. If the **-x** option is not used, the maximum number of copies will be specified by the system parameter CLASS_MAX_COPIES.

-k *maxversions*

This is the maximum number of inactive versions to keep for a file (the current version is active, all others are inactive). When a stored file is modified, the version number is immediately incremented for the file. Old versions are kept around until the **fsclean**(1) command is used to clean those versions from Tertiary Manager media. At the time a new version is stored, the oldest version will be deleted if maxversions has been reached. The **fsclean**(1) command will not be required to clean that version. If maxversions is defined as 0, only the active version will be retained and if removed from the file system, it will still be recoverable unless the **-D** option is set on the file. If the **-k** option is not used, the default max versions to keep will be specified by the system parameter CLASS_MAX_VERSIONS.

-p yes|no

This option decides if we allow the policy engine to automatically store files for this policy class. If the **-p** option is not used, the default will be specified by the system parameter CLASS_AUTOSTORE.

-z *minsetsize*

The minimum set size of the policy class. It will be specified in the form of [0-999][MB|GB]. When this option is specified with a non-zero value, the store candidates in the policy class have to add up to *minsetsize* before any of them can be stored by the policy engine. This option works in conjunction with **-g** option. Specifying zero value for this option will disable the check, which requires **-g** be set to zero as well. If the **-z** option is not used, the default will be specified by the system parameter CLASS_MINSETSIZE, which is always in MB and does not require the unit suffix.

-g *maxsetage*

Candidate expiration time (in hours) of the policy class. This option works in conjunction with **-z** option so that files will not sit forever on the candidate list because the *minsetsize* has not been

reached. As soon as any file on the store candidate list in the policy class is *maxsetage* old, all of the files should be stored. Specifying zero will disable the check, which requires **-z** be set to zero as well. The maximum value for this option is 720 hours, which equals to 30 days. If the **-g** option is not used, the default will be specified by the system parameter CLASS_MAXSETAGE.

-T ANTF|LTFS

Specifies the media format type that will be used when formatting or selecting media. **ANTF** is the Quantum internal tape format. **LTFS** is the Linear Tape File System specification tape format. A value of **ANTF** will format media with a single partition containing ANTF volume labels. This data partition will store StorNext file data. A value of **LTFS** will format media with two partitions containing LTFS volume labels. The index partition will store LTFS metadata and the data partition will store StorNext file data. The **LTFS** media format type is only applicable to LTO media generation 5 and beyond (e.g. LTO-5, LTO-6, etc). Any attempt to assign **LTFS** to non-LTO media types will result in an error. The backup policy class _adic_backup does not support a media format type of **LTFS**. Any attempt to assign **LTFS** to _adic_backup will result in an error.

If the **-T** option is not specified, the default will be determined as follows:

A media type of Lattus will default to **NONE**.
A media type that does not support **LTFS** will default to **ANTF**.
A media type that supports **LTFS** will default to the system parameter CLASS_MEDIA_FORMAT.

-L *drivelimit*

The maximum number of drives to use when the policy is run. Specifying **none** will disable the drive limit. If the **-L** option is not specified, all available drives will be used.

-G y|n Generate and maintain a checksum for each stored file. If this option is enabled, a checksum will be generated as each file is written (stored) to the associated protection tier. The checksum will be retained for use in the checksum-validation phase of subsequent retrieve operations. This option can be overridden by the FS_GENERATE_CHECKSUM parameter in *fs_sysparm*. See *fs_sysparm.README* file for details. The **fsfileinfo**(1) command can be used to determine if a file has a corresponding retained checksum value.

-V y|n Verify the checksum of each retrieved file. If this option is enabled, a checksum will be generated as each file is read (retrieved) from the associated protection tier. The generated checksum will be compared to the corresponding (created when the file was stored) retained value. The retrieve will fail and a RAS ticket will be opened if the checksum does not match. No compare will occur if no retained value exists (checksum generation was not enabled when file was stored). This option can be overridden by the FS_VALIDATE_CHECKSUM parameter in *fs_sysparm*. See *fs_sysparm.README* file for details.

-D y|n Remove database information when a file is removed. If this option is enabled, then when a file is removed from the file system, the corresponding database information indicating where the file was stored will also be removed, and the file will NOT be recoverable through **fsrecover**(1). If this option is disabled, then the database entries will be retained and the file is recoverable through **fsrecover**(1).

-A y|n Enable Alternate Store Location support. If this option is enabled, files created under this policy class will be eligible for an additional remote copy to be made to the configured Alternate Store Location. Note: This is a licensed feature.

-e *encryptiontype*

The encryption algorithm to be applied to the content of files stored into an Object Storage system. This option is ignored for all other media types. Currently, the following encryption types are supported:

0 None (No encryption)

1 SERVER_AES256 (Server-side AES256 encryption)
This encryption type is valid only if supported by the Object Storage system.

2 CLIENT_AES256 (Client-side AES256 encryption)
This encryption type is supported only on Object Storage systems from providers QCV1 and QVV1.

If this option is not specified, the encryption type will be set to None.

A summary usage report for object storage that includes encrypted object count information, sorted by media ID and policy class ID, can be obtained via the **fsobjinfo**(1) command.

-M *mkeyname*
The Master Key name that is required by and used for the client-side encryption service. Refer to **fskey**(1) man page for how to create a Master Key name.

-q *compressiontype*
The compression algorithm to be applied to the content of the file stored into Object Storage systems. This option is ignored for all other media types. Furthermore, this option is only supported on Object Storage system from providers QCV1 and QVV1. Currently, the following compression type values are supported:

0 None (No compression)

1 CLIENT_LZ4 (Client-side LZ4 compression)

If this option is not specified, the compression type will be set to None.

A summary usage report for object storage that includes the total pre and post-compressed file size information, sorted by policy class ID and media ID, can be obtained via the **fsobjinfo**(1) command.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default) or **JSON**.

TEXT is the "legacy" textual format.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application. See http://json.org for more information.

SETTING CLASS TIMES

The policy time values associated with a class: *minstoretime*, *mintrunctime* and *minreloctime* can all be set in units of minutes, hours or days. To specify minutes put an '**m**' suffix on the value, to specify hours put an '**h**' suffix on the value and for days use a '**d**' suffix. Note that if the unit suffix is not specified the *minstoretime* value defaults to units of minutes while the others default to units of days. Some valid examples for policy times:

15m - 15 minutes
3h - 3 hours
7d - 7 days
10 - 10 minutes for *minstoretime* and 10 days for the other times

Store policy commands are kicked off automatically every minute or so as long as files are being created. Therefore setting a value for *minstoretime* to just a few minutes will usually result in a store policy command starting the store operation for the files in a class within the time requested. Note however if files are being created slowly the software may wait up to 5 minutes before kicking off a store policy in an attempt to get a larger number of files to store at one time. Also be aware that other factors like system load, media availability etc can affect the time the stores will actually occur.

Truncation and relocation policies are only run automatically once a day at midnight. (There are also policies that run as file system fill levels warrant but the time when these occur is not scheduled. See the **filesystems**(4) man page for more info on the space based policies.) If there is a real need to have file data trun-

cated at a specific time after last access then two steps are necessary, the setting of the class time and the scheduling of the policy commands. As an example let us assume you want to truncate class data for class1 after being unaccessed after one hour. The first step would be to set the *mintrunctime* to **1h** (or **60m**). Next you must schedule via cron a truncation policy to run every half hour. (Note here that even with policies running every half hour; a file may wait up until the time between policies beyond the trunctime before truncation occurs. For example if policies run on the half hour, a file is created at 01:00:01am, it will not be truncated until 2:30am since at 2:00am it is 1 second short of being an hour old.)

When setting up the policy cron job it is probably easiest to set up a simple shell script to wrap the policy so that the processing environment is set up correctly. For example set up a script under TSM: */usr/adic/TSM/util/truncPolicy* The contents of the script may look like:

```
#!/bin/sh
#
. /usr/adic/.profile
/usr/adic/TSM/exec/fspolicy -t -c class1 -o 0
```

Note the last argument to the policy command '**-o 0**'. This tells the policy to keep truncating files until it runs out of candidates or the file system reaches 0 percent full. If you look at the **filesystems**(4) man page it indicates the automatic nightly policy only truncates to the Min Use percentage and then quits even if more valid candidates are present. If the desire is to truncate all candidates then the '**-o 0**' is needed. Truncating all files for a class should be done carefully as there will be an expense to retrieving those files back if needed.

Only one truncation policy is allowed to run at a time. This is due to potential conflicts in candidate management between policies and also for performance reasons. If it is desired to run multiple policies 'at the same time' then just put multiple policies in the truncate script and have them run sequentially. Be sure and not place an ampersand after the commands or some will fail because they are locked out by the currently running policy. Also be sure when setting up the cron jobs not to have the scheduled scripts run too close together. The User's Guide contains more info on the scheduling of truncation policies. An example of a script with multiple scheduled policies would be:

```
#!/bin/sh
#
. /usr/adic/.profile
/usr/adic/TSM/exec/fspolicy -t -c class1 -o 0
/usr/adic/TSM/exec/fspolicy -t -c class2 -o 0
/usr/adic/TSM/exec/fspolicy -t -c class3 -o 0
```

The next step is to create the actual cron entry. Run **crontab -e** and set the entry to look something like this:

```
00,30 * * * * /usr/adic/TSM/util/truncPolicy
```

One last thing to note on scheduling 'extra' truncation or relocation policies: there is an expense to running these commands as they get and check their candidate lists, even if no files are actually truncated or relocated. This is especially true for sites where millions of files are resident on disk at one time. See the User's Guide for more recommendation info on the scheduling of these policies.

SEE ALSO

filesystems(4), **fsmodclass**(1), **fsrmclass**(1), **fsclassinfo**(1), **fschfiat**(1), **fsstore**(1), **fsrelocate**(1), **fsversion**(1), **fsclean**(1), **fsfileinfo**(1), **fspolicy**(1), **fskey**(1), **fsobjinfo**(1)

NAME

fsaddrelation − Add a directory-to-policy class association.

SYNOPSIS

fsaddrelation [**-F** *type*] **[-m** *mediaid]* **-c** *class directory*

DESCRIPTION

The **fsaddrelation**(1) command associates a directory with a policy class. Classes of data are delineated by assigning the directories on disk to policy classes. The directory specified in *directory* must not be superior or subordinate to any directory that already has a directory-to-policy class relationship. The policy class relation point cannot be a directory in the root file system, and it is recommended that the command be executed before adding any files to the directory. If the directory contains files when the **fsaddrelation**(1) command is executed, the file system must be inactive (no users in the file system), because it must be unmounted, mapped, and remounted at the time of the **fsaddrelation**(1). The **fsaddrelation**(1) command will fail if the specified directory is not empty and the associated file system is busy. It is recommended that the **fsaddrelation**(1) be performed to a populated directory during a slack time, because users will not be able to access any files in the files system.

Adding a directory relationship to a policy class causes the directory to become a migration directory under Tertiary Manager software control. A migration directory is one in which the files stored by client users are Tertiary Manager controlled media. The relationship can be removed by using the **fsrmrelation**(1) command after all files subordinate to the policy class relation point are removed.

fsaddrelation(1) will fail if *directory* has an affinity. If *directory* has an affinity associated with it, first use the **cvaffinity**(1) command to remove its affinity. Upon successful completion of **fsaddrelation**(1), if the *class* has any affinities, the directory will have its affinity set to the first affinity in the class affinity list.

Be aware that if *directory* has subordinate directories already in existence when this command is run, the subordinate directories will retain their current affinity association. In that case, the creation of any new files in those directories may result in allocations to unexpected stripe groups. Therefore, it is again strongly recommended that **fsaddrelation**(1) be executed before adding any files or subdirectories to *directory*.

When the first relation is added to a directory in a file system, that file system becomes a managed file system. An entry for the file system is added to the file system configuration file: $TM_DIR/config/filesystems. The entry is added with system defaults for values. If it is desired to change the defaults, edit the file and make the desired updates. The file itself has a description of the configuration values. When the last relation is removed from a file system, the entry is removed from the configuration file.

The identifier specified in *class* determines how media will be selected for use in migrating files in the specified directory. Only media containing files associated with the same policy class, or system blanks, will be selected.

The first file written to a medium taken from the system blank pool will determine which policy class the medium is associated with.

This command accepts upper case or lower case input.

SNPOLICY CONVERSION

This command is used as part of the process for converting a directory that has been previously managed by snpolicyd to now be managed by Storage Manager. Note that this is only useful if snpolicyd was used for storing files to LATTUS media since that is the only media type that snpolicyd and Tertiary Manager have in common.

This command can be used to add a relationship to any non-empty directory. When the command is to be used for adding a relationship to an snpolicy directory, where LATTUS was the target, then the **-m** option will be required. Beyond the normal processing for a non-empty directory when the **-m** is specified the files that were stored to LATTUS media by snpolicyd will have their info updated to reflect those file copies are already stored.

Note the command will fail if an attempt is made to add a relationship to a directory that has previously been managed by snpolicyd and the **-m** option is not provided with a valid LATTUS media.

OPTIONS

directory

Path name of the directory to be associated with the policy class. The directory must already exist and the name must be less than 256 characters long. The entire path name need not be entered. If preceded by a slash (/) in the command definition, the full path name (starting from the root directory) is required as input to the command. Otherwise, the Tertiary Manager command expands the directory name using the current working directory as the parent.

-c *class* Policy class to be associated with the directory. A policy class name can be a maximum of 16 alphanumeric characters. The special "-", ".", and "_" characters are also permitted.

-m *mediaid*

The LATTUS mediaid that contains the files under the directory to be processed. The media specified must have already been configured using fsobjcfg. (See SNPOLICY CONVERSION above.)

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default) or **JSON**.

TEXT is the "legacy" textual format.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application. See http://json.org for more information.

SEE ALSO

fsrmrelation(1), **fsclassinfo**(1), **fsdirclass**(1), **fsaudit**(1), **filesystems**(4)

NAME

fsaffdf − Report affinity disk space usage for a particular mount point.

SYNOPSIS

fsaffdf *mount_point*

DESCRIPTION

The **fsaffdf**(1) command displays the amount of disk space available on each affinity within the specified mount point. If there are no affinities defined, the command will report the same information for the entire mount point.

OPTIONS

mount_point...

The StorNext filesystem for which to obtain affinity disk space information.

EXIT STATUS

0 A valid mount point was specified and information determined.

255 Some type of failure occurred.

REPORT STATUS

affname

The name of the affinity.

blksize The block size for the affinity.

totalblks

The number of blocks in use in the affinity.

freeblks

The number of available blocks in the affinity.

usedspc

The percentage of space used in the affinity.

NAME

fsaffinity − Add or modify affinities in the Tertiary Manager database.

SYNOPSIS

fsaffinity -a *affinity* [**-f**]

fsaffinity -r *affinity***new_name** [**-f**]

fsaffinity -d [**-f**]

fsaffinity -l

DESCRIPTION

The **fsaffinity**(1) command populates the Tertiary Manager database with affinities that have been previously configured in managed file systems. This command may also be used to rename, delete, or list existing affinity entries in the database.

OPTIONS

-a *affinity*
Adds *affinity* to the Tertiary Manager database.

-r *affinity new_name*
Renames *affinity* to *new_name* in the Tertiary Manager database.

-d Deletes all affinity entries from the Tertiary Manager database.

-l Lists all affinities currently in the Tertiary Manager database.

-f Forces the addition, renaming, or deletion of affinities, bypassing file system affinity verification.

USAGE

Use this command after adding or modifying affinities in your managed file system configurations. This command will make the Tertiary Manager aware of the affinities in use by the managed file systems.

EXIT STATUS

0 Successful completion.

1 An error occurred.

SEE ALSO

fsaddclass(1), **fsmodclass**(1), **fsclassinfo**(1), **fsfileinfo**(1)

NAME

fsaltnode − Add, modify or delete alternate retrieval location information in the Tertiary Manager database.

SYNOPSIS

fsaltnode -a|**-m**|**-d -n** *remote_node_name*

fsaltnode -a|**-m -p** *local_filesys* **-r** *remote_filesys* [**-n** *remote_node_name*]

fsaltnode -d -p *local_filesys*

fsaltnode -l

DESCRIPTION

The **fsaltnode**(1) command is used to add, modify, or delete alternate retrieval location information in the Tertiary Manager database. The alternate retrieval location is used when a truncated file on a managed filesystem cannot be retrieved from the standard file copies. For example, unavailable tape drives may prevent a retrieval with the standard file copies. If an alternate (remote) node and an alternate (remote) filesystem are specified for the local managed filesystem, the file will be retrieved from that remote filesystem on the remote node.

A single alternate retrieval node name may be added, modified, or deleted by specifying the -n option. This remote node name applies to all filesystems that also have an alternate retrieval filesystem name specified. The existence of the alternate node is not verified when this command is executed. Note also that the contents and version of the file on the alternate node are not verified by the alternate retrieval mechanism. The application software is required to keep the standard filesystem and the alternate retrieval location in sync.

OPTIONS

-a -n *remote_node_name*
: Adds *remote_node_name* to the Tertiary Manager database as the alternate node to be used for all alternate location retrievals.

-m -n *remote_node_name*
: Modifies the Tertiary Manager database to specify *remote_node_name* as the alternate node to be used for all alternate location retrievals.

-d -n *remote_node_name*
: Deletes *remote_node_name* as the Tertiary Manager database as the alternate node to be used for all alternate location retrievals.

-a -p *local_filesys* **-r** *remote_filesys*
: Adds *remote_filesys* to the Tertiary Manager database as the remote filesystem to be used for alternate node retrievals for local filesystem *local_filesys*.

-m -p *local_filesys* **-r** *remote_filesys*
: Modifies the Tertiary Manager database making *remote_filesys* the remote filesystem to be used for alternate node retrievals for local filesystem *local_filesys*.

-d -p *local_filesys*
: Deletes *remote_filesys* as the the remote filesystem to be used for alternate node retrievals for local filesystem *local_filesys*.

-l Lists all filesystems having alternate retrieval location specified.

EXIT STATUS

0 Successful completion.

1 An error occurred.

EXAMPLES

Define an alternate retrieval location node name rabbit as the alternate node for all filesystems:

```
fsaltnode -a -n rabbit
```

Modify the existing alternate retrieval location node name to be squirrel for all filesystems:

```
fsaltnode -m -n squirrel
```

Define the alternate retrieval path for filesystem /stornext/snfs1 to be /backups/dir01. This can only be done if no alternate retrieval path is currently specified for /stornext/snfs1:

```
fsaltnode -a -p /stornext/snfs1 -r /backups/dir01
```

Modify the alternate retrieval path for filesystem /stornext/snfs1 to be /backups/apples:

```
fsaltnode -m -p /stornext/snfs1 -r /backups/apples
```

NAME

fsautoconfig − Automatically configure devices in the Quantum storage subsystem.

SYNOPSIS

fsautoconfig -a

fsautoconfig [**-a**] [**-n** *alias*] **-d** *scsiPath*

fsautoconfig -h

DESCRIPTION

The **fsautoconfig**(1) command gives the ability to automatically configure a single device or all devices not already configured in StorNext. Devices that can be automatically configured include tape drives and media changers / archives, limiting the scope of this automatic configuration to SNSM. At this time only SCSI Archives are supported by this command.

When a non-configured archive is the specified device to auto-configure, the archive along with all media associated with the archive are added. If **-a** is specified then all associated tape drives are added too. When multiple paths are detected for the associated tape drives, the tape drives will be configured across the host buses to ensure that a single host bus doesn't become a limiting factor. By default the name scheme used for the archive is archive<num> unless **-n** is specified. If the archive is already configured or the associated tape drives cannot be determined, the **fsautoconfig**(1) command will fail.

When a non-configured tape drive is specified as the SCSI path, the slot will be detected from the parent archive, and the tape drive will be configured appropriately. The name scheme used is <archive>_dr<num>. If the device is already configured or the slot cannot be determined from the archive, the **fsautoconfig**(1) command will fail.

When **-a** is used without **-d**, all non-configured archives and tape drives will be configured into StorNext. If multiple paths are found to the non-configured devices, load balancing will be used to spread the devices across the host buses from which those devices are being seen for optimal configuration.

A round-robin load balancing scheme is used to spread the devices across the detected host buses. E.g. If there are 2 HBAs that can see the same 4 tape drives, 2 tape drives will be configured through each HBA. The paths can always be changed once configured using the **fsconfig**(1) command.

fsautoconfig(1) requires that the Tertiary Manager, Media Manager, and database software be active.

OPTIONS

-a Configure all non-configured, detected SCSI devices (archives and tape drives) into SNSM.

-d *scsiPath*
The device to configure. If the device is a media changer and **-a** is specified then all drives associated with the changer are also configured.

-n alias This will be used as the device alias instead of the software generated name.

-h Generates the usage report.

SEE ALSO

fsdevice(1), **fsconfig**(1), **fsmedin**(1), **vsarchiveconfig**(l), **vsdrivecfg**(l), **vsaudit**(l), **vsarchiveqry**(l), **vsarcmedclasscreate**(l)

NAME

fsbulkcreate − Create several test files in a managed file system

SYNOPSIS

fsbulkcreate -d *dir_path* [**-s** *file_size*] [**-n** *num_files*] [**-S**] [**-c** *copies*] [**-v** *versions*] [**-p** *policy_class*]

fsbulkcreate -d *dir_path* **-f** *file_name* [**-n** *num_files*] [**-S**] [**-c** *copies*] [**-v** *versions*]

WARNINGS

This utility should be used with EXTREME CAUTION and only under the guidance of Quantum technical assistance. It is intended to be used by professional services personnel or system testers ONLY for the purpose of demonstrating or testing SNSM on very large file systems.

This utility will stop all storage management software components. Therefore, ensure all users are off all managed file systems before running this utility.

It is strongly recommended that you run a SNSM backup before running this utility. This will enable you to restore your file system to its original state after running this utility.

This utility will drop and re-create critical Tertiary Manager database tables. In case of system failure, database tables could be left in an unusable state. If this occurs, you may restore your system from the previous SNSM backup.

This utility will need exclusive use of the storage management software components and the Tertiary Manager database tables. Therefore, do not attempt to launch more than one instance of this utility at once.

Before running this utility, ensure you have enough disk space in the file system where /usr/adic/mysql/db resides. To create 100 million files with 1 copy and 1 version, you will need approximately 50 GB of disk space. You will also need free disk space on the file system containing *dir_path* sufficient to allocate 100 million inodes.

DESCRIPTION

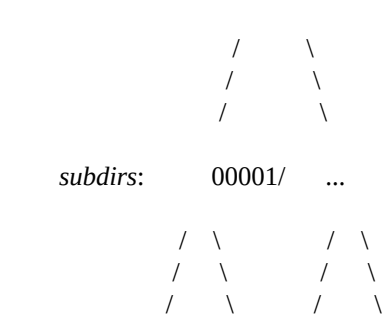
This utility creates a large number of test files on an existing managed file system. Upon successful completion, all new files will appear truncated with the appropriate number of copies and versions stored to tape.

To prevent spending a large amount of time storing every file to tape, all new files will reference the same file data on one tape. This applies to all copies and versions of the new files.

The file that is actually stored to tape is referred to as the "base file". File attributes for the new files are derived from this file. If not provided by the user, this utility will create the base file.

For a balance of performance and namespace readability, new files will be created in a predetermined directory structure. Directly under the directory specified by the user, the utility will create a maximum of 10,000 subdirectories. In each of those subdirectories, a maximum of 10,000 files will be created, for a total maximum of 100,000,000 files.

For example, the full directory structure for 100 million files may appear as follows:



The utility will create the minimum number of subdirectories needed to accommodate the number of files requested by the user. For example, to accommodate 200,000 files, the utility will create only 20 subdirectories.

The subdirectories will be named numerically, starting with "00001" and incrementing up to the last subdirectory created. The files also will be named numerically, starting with "000000001" and incrementing up to the last file created.

If the directory specified by -d *dir_path* does not exist, the utility will create it. If the directory is not managed, the utility will make it into a relation point using the class specified by -p *policy_class*. If the directory is already managed, -p *policy_class* will be ignored.

If the relation point needs to be made, and the class specified under -p *policy_class* does not exist, the utility will create the class. If no class is specified by the user, the default class "bulkcreate" will be used.

The user may specify his own base file with -f *file_name* instead of specifying a class and file size with -p *policy_class* and -s *file_size*. The file name must be a fully qualified path that points to an existing managed file.

OPTIONS

-d *dir_path*
Specifies *dir_path* as the directory to populate. Must be an absolute directory path.

-s *file_size*
Specifies *file_size* as the size in bytes for each new file. (default 1024)

-n *num_files*
Specifies *num_files* as the number of files to create. (default 10000, max 100000000)

-c *copies*
Specifies *copies* as the number of copies to create. (default 1)

-v *versions*
Specifies *versions* as the number of versions to create. (default 1)

-p *policy_class*
Specifies *policy_class* as the data class to create. (default "bulkcreate")

-f *file_name*
Specifies *file_name* as the base file for the new files.

-S Run the command single threaded. By default the command creates a thread for the database operations and performs the file system creates in the main thread. (This option will make the command run more slowly but can aid in debugging issues.)

USAGE

This utility is intended to be used by professional services personnel or system testers ONLY for the purpose of demonstrating or testing SNSM on very large file systems.

This utility will assume the user has already completed the StorNext Configuration Wizard. It will also assume that there are tape media available, that the tape archive is online, and that all SNSM software components are up and responsive. It is assumed that at least one relation point already exists in the file system where bulk create files will be created.

It is strongly recommended that you run a SNSM backup before running this utility. This will enable you to restore your file system to its original state after running this utility.

To clean up the file system, the user always has the option of removing the new files with the *rm* command, but that process can be very time consuming for a large number of files.

Before running this utility, ensure you have enough disk space in the file system where /usr/adic/mysql/db resides. To create 100 million files with 1 copy and 1 version, you will need approximately 50 GB of disk space. Also, the file system that **fsbulkcreate**(1) creates the files in will require enough free space to allocate 100 million inodes.

This utility will reload and index three database tables with pre-existing and newly created records. Because of this, be advised that this utility will take a longer time to run for large pre-existing database tables, specifically the FILEINFO and FILECOMP tables.

BENCHMARKS

Below are the performance results from running this utility on different platforms. The processing times represent the time it took to create 100,000,000 files with 1 copy and 1 version for each file.

machine: Dell Poweredge 1750
operating system: Linux AS
processor(s): 2 x Xeon @ 2.4 GHz
memory: 512 MB RAM
disks: internal SCSI (for managed file system)
processing time: 41:11:40 (HH:MM:SS)

machine: Sun-Fire-V50
operating system: Solaris 9
processor(s): 2 x UltraSPARC IIIi @ 1.28 GHz
memory: 2 GB RAM
disks: internal SCSI (for managed file system)
processing time: 47:48:10 (HH:MM:SS)

EXIT STATUS

0 Successful completion.

1 An error occurred.

FILES

${MYSQL_HOME}
Checked for sufficient space for work area and database.

${MYSQL_HOME}/bulk_create/
Used for work space.

NOTES

For increased performance, this utility will create files in bulk sets. This means that the user may get a few extra files than he actually needs. The same goes for directories. The user may get a few more directories than he actually needs.

The **fsmedinfo -l** command may show duplicate file entries. This is because all file copies will appear to be stored to the same tape. In normal operating conditions, each file copy is stored to a separate tape.

Because file verification remains circumvented for the life of the files, all new files and the base file itself

should all be considered test data only.

This command will not work properly with storage disk or Object Storage media types. It will succeed creating the files, but would fail later on when trying to retrieve the files back from the storage disk or Object Storage media.

SEE ALSO

fsaddclass(1), **fsaddrelation**(1), **fsstore**(1), **fsrmcopy**(1), **fsclassinfo**(1), **fsfileinfo**(1), **fsmedinfo**(1), **dm_info**(1)

NAME

fsbulkload − Utility used by foreign file system migration to load foreign file system information into the database.

DESCRIPTION

The **fsbulkload**(1) is used by foreign file system migration to load foreign file system information into the database.

WARNINGS

Users should not run this command, unless directed to do so by Quantum technical assistance.

NAME

fscancel − Cancels requests.

SYNOPSIS

fscancel [**-F** *type*] *requestID*

DESCRIPTION

The **fscancel**(1) command allows cancellation of media, file, and resource queued requests. The **fsqueue**(1) command displays the pending queues awaiting resources. The request identifier associated with a specific queue is used to cancel that process. Requests waiting for restore from QVault to complete can be removed from the queue but not cancelled from QVault. A restore request to QVault is asynchronous and cannot be cancelled.

OPTIONS

requestID

The request identifier of the request to be canceled.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

SEE ALSO

fsqueue(1), **fsxsd**(1)

NAME

fschdiat − Modify the class attributes of a directory.

SYNOPSIS

fschdiat [**-s e**|**p**] [**-r e**|**p**] [**-t e**|**p**] [**-D y**|**n**] [**-c** *class*] [**-S** *stubsize*] [**-F** *type*] *directory_name...*

fschdiat [**-s e**|**p**] [**-r e**|**p**] [**-t e**|**p**] [**-D y**|**n**] [**-c** *class*] [**-S** *stubsize*] [**-F** *type*] **-R** *directory*

fschdiat [**-s e**|**p**] [**-r e**|**p**] [**-t e**|**p**] [**-D y**|**n**] [**-c** *class*] [**-S** *stubsize*] [**-F** *type*] **-B** *batchfilename*

DESCRIPTION

The **fschdiat**(1) command allows modification of the directory attributes pertaining to cleanup and storage policies. It also provides the capability of modifying the directory's class. Policy attributes set for the directory will propagate to any newly created entities created underneath that directory, whether it be another directory or a file. In other words, attributes and class for newly created files and directories are inherited from the parent directory.

Directories which are at the relation point cannot have their class modified by this command. You must use the **fsrmrelation**(1) and **fsaddrelation**(1) to modify the class for a directory which is at the relation point.

OPTIONS

directory_name...

Directory or directories to modify.

-R *directory*

The directory from which to start the recursive operation. All entries from the specified directory and any subdirectories will be processed. Success for individual items (files, directories, etc) will not be reported. Instead an overall progress status message will be reported periodically with this general format: "Processed <N> out of <TOTAL> entries..." It may take some time before the value of <TOTAL> is known. Until that time, <TOTAL> will be reported as <TBD>. By default, <N> is reported at intervals of 1000. This can be overridden by the system parameter RECURSION_BATCH_REPORT_INTERVAL. The parameter is an integer value. For a further description of the system parameter see the *fs_sysparm.README* file.

-B *batchfilename*

The batch file contains the list of entries to be processed. Each entry must be listed one per line. Do not enclose the entry in quotes, use escape characters or any character not in the actual name. Success for individual items (files, directories, etc) will not be reported. Instead an overall progress status message will be reported periodically with this general format: "Processed <N> out of <TOTAL> entries..." It may take some time before the value of <TOTAL> is known. Until that time, <TOTAL> will be reported as <TBD>. By default, <N> is reported at intervals of 1000. This can be overridden by the system parameter RECURSION_BATCH_REPORT_INTERVAL. The parameter is an integer value. For a further description of the system parameter see the *fs_sysparm.README* file.

-s This option indicates how storage policies operate. The *e* argument excludes files from storage when a store policy occurs. The *p* argument stores files by storage policy.

-r This option indicates how relocation policies operate. The *e* argument excludes files from relocation when a relocation policy occurs or if a **fsrelocate**(1) command is issued. The *p* argument relocates files by relocation policy.

-t This option indicates how truncation policies operate. The *e* argument excludes files from truncation when a store and/or cleanup policy application occurs. The *p* argument truncates the file by cleanup policy.

-D This options indicates if the database entries are to be cleaned when the file is removed from the file system. The *y* argument indicates that the database entries will be cleaned and the file will NOT be recoverable by the **fsrecover**(1) command. The *n* argument indicates that the database entries will NOT be cleaned and the file will be recoverable by the **fsrecover**(1) command.

-c This specifies the class that will be associated with the directory.

-S *stubsize*

This indicates the stub size (in kilobytes) and is used to determine the number of bytes to leave on disk when files are truncated. It will be the minimum number of bytes left on disk (the value is rounded up to a multiple of the file system block size). If *class* is specified as the value, then the policy class definitions will be used to determine the stub size.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

SEE ALSO

fsaddclass(1), **fsmodclass**(1), **fsstore**(1), **fschfiat**(1), **fsrmrelation**(1), **fsaddrelation**(1), **fsxsd**(1)

NAME

fsCheckAffinities − Verify affinities are configured correctly in StorNext for managed file systems.

SYNOPSIS

fsCheckAffinities [**-ras**]

fsCheckAffinities -report

DESCRIPTION

The **fsCheckAffinities**(1) command will verify that all affinities are configured correctly in StorNext for managed file systems.

OPTIONS

-ras Used to indicate that a RAS Alert should be generated on any failure.

-report Used to describe the purpose of this command.

EXIT STATUS

0 If no issues are found.

1 If any issues are found. If the **-ras** option is specified, a RAS Alert will also be generated.

NAME

fsCheckSlotMapping − Verify tape drive slot to device path mapping is configured correctly in SNSM.

SYNOPSIS

fsCheckSlotMapping [**-ras**]

fsCheckSlotMapping -report

DESCRIPTION

The **fsCheckSlotMapping**(1) command will verify that all tape drive slot to device path mappings are configured correctly in SNSM.

OPTIONS

-ras Used to indicate that a RAS Alert should be generated on any failure.

-report Used to describe the purpose of this command.

EXIT STATUS

0 If no issues are found.

1 If any issues are found. If the **-ras** option is specified, a RAS Alert will also be generated.

NAME

fsCheckTsmFilesystemsConfig − Verify the Tertiary Manager and Replication/Deduplication file systems are identified correctly.

SYNOPSIS

fsCheckTsmFilesystemsConfig [**-ras**]

fsCheckTsmFilesystemsConfig -report

DESCRIPTION

The **fsCheckTsmFilesystemsConfig**(1) command will verify that all Tertiary Manager and Replication/Deduplication file systems are identified correctly.

OPTIONS

-ras Used to indicate that a RAS Alert should be generated on any failure.

-report Used to describe the purpose of this command.

EXIT STATUS

0 No issues was found.

1 An issue was found. If the **-ras** option is specified, a RAS Alert will also be generated.

NAME

fschfiat − Modify the class attributes of a file.

SYNOPSIS

fschfiat [**-s e**|**p**] [**-r e**|**p**] [**-t e**|**p**|**i**|**c**] [**-D y**|**n**] [**-A y**|**n**] [**-c** *copies*] [**-a** *class*] [**-S** *stubsize*] [**-F** *type*] *filename...*

fschfiat [**-s e**|**p**] [**-r e**|**p**] [**-t e**|**p**|**i**|**c**] [**-D y**|**n**] [**-A y**|**n**] [**-c** *copies*] [**-a** *class*] [**-S** *stubsize*] [**-F** *type*] **-R** *directory*

fschfiat [**-s e**|**p**] [**-r e**|**p**] [**-t e**|**p**|**i**|**c**] [**-D y**|**n**] [**-A y**|**n**] [**-c** *copies*] [**-a** *class*] [**-S** *stubsize*] [**-F** *type*]
-B *batchfilename*

DESCRIPTION

The **fschfiat**(1) command allows modification of the file attributes pertaining to cleanup and storage policies. The file cleanup policy attribute affects how a file is truncated when cleanup policy is applied. A file can be truncated immediately (**-t** *i*), by policy (**-t** *p*), or excluded (**-t** *e*) from file truncation following a store. The file storage policy attribute is used to exclude (**-s** *e*) a file from being stored or consider the file for storage (**-s** *p*). The file relocation policy attribute is used to exclude (**-r** *e*) a file from being relocated or to consider the file for relocation (**-r** *p*). The number of file copies produced on a medium during storage policies can also be modified.

If a file has been excluded from truncation by the **fschfiat**(1) command, the retention (**-f**) option of the **fsstore**(1) command cannot apply to a file. If the file attribute allows truncation and the file is a candidate for truncation following a store, the retention option can be applied. The **-t** *p* option of the **fschfiat**(1) command allows the file attribute to be reset to the default state of having the file data removed from disk when the cleanup policy is applied.

The number of copies specified for the **fschfiat**(1) command cannot exceed the maximum number of copies allowed (*maxcopies*) for the policy class that is associated with the file's parent directory.

The policy attributes can also be modified by changing the policy class of the file. Then the rules for the new class will be applied to the file during storage and cleanup policies.

OPTIONS

filename...
One or more file(s) having the attributes changed.

-R *directory*
The directory from which to start the recursive operation. All entries from the specified directory and any subdirectories will be processed. Success for individual items (files, directories, etc) will not be reported. Instead an overall progress status message will be reported periodically with this general format: "Processed <N> out of <TOTAL> entries..." It may take some time before the value of <TOTAL> is known. Until that time, <TOTAL> will be reported as <TBD>. By default, <N> is reported at intervals of 1000. This can be overridden by the system parameter RECURSION_BATCH_REPORT_INTERVAL. The parameter is an integer value. For a further description of the system parameter see the *fs_sysparm.README* file.

-B *batchfilename*
The batch file contains the list of entries to be processed. Each entry must be listed one per line. Do not enclose the entry in quotes, use escape characters or any character not in the actual name. Success for individual items (files, directories, etc) will not be reported. Instead an overall progress status message will be reported periodically with this general format: "Processed <N> out of <TOTAL> entries..." It may take some time before the value of <TOTAL> is known. Until that time, <TOTAL> will be reported as <TBD>. By default, <N> is reported at intervals of 1000. This can be overridden by the system parameter RECURSION_BATCH_REPORT_INTERVAL. The parameter is an integer value. For a further description of the system parameter see the *fs_sysparm.README* file.

-c *copies*
Number of copies of the file(s) to be stored. The value is the total number of copies, including the primary copy of the file. This number cannot exceed the number of copies defined in the policy class *maxcopies* parameter. If the number of copies stored is less than the number specified by the

policy class definition or by the **fschfiat**(1) command, the remainder of the copies are stored when the storage policy is applied. Once a file is located on tape only, its file copy attribute cannot be increased unless that many copies already exist on media. To increase the file copy attribute, you must first retrieve the file.

-s This option indicates how storage policies operate on the file. The *e* argument excludes the file from storage when a store policy occurs. The *p* argument stores the file by storage policy.

-r This option indicates how relocation policies operate on the file. The *e* argument excludes the file from relocation when a relocation policy occurs or if a **fsrelocate**(1) command is issued. The *p* argument relocates the file by relocation policy.

-t This option indicates how truncation policies operate on the file. The *e* argument excludes the file from truncation when a store and/or cleanup policy application occurs. The *i* argument truncates the file immediately when stored to a medium. The *p* argument truncates the file by cleanup policy. The *c* argument temporarily clears the indication that this file met truncate exclusion criteria defined in the excludes.truncate file. If the file is modified and then stored again then the file will marked as excluded provided it still meets the criteria. This indicator is independent of the settings made be the other arguments of this option.

-D This options indicates if the database entries are to be cleaned when the file is removed from the file system. The *y* argument indicates that the database entries will be cleaned and the file will NOT be recoverable by the **fsrecover**(1) command. The *n* argument indicates that the database entries will NOT be cleaned and the file will be recoverable by the **fsrecover**(1) command.

-A y|n Enable Alternate Store Location support. If this option is enabled, the specified files will be eligible for an additional remote copy to be made to the configured Alternate Store Location. Alternate Store Location can only be enabled on files having an associated policy class with Alternate Store Location enabled.

-a This specifies the class that will be associated with the file. The rules for the new class will be applied to the file by the storage and truncation policies.

-S *stubsize*

The truncation stub size (in kilobytes). This value is used to determine the number of bytes to leave on disk when files are truncated. It will be the minimum number of bytes left on disk (the value is rounded up to a multiple of the file system block size). If *class* is specified as the value, then the policy class definitions will be used to determine the stub size.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

SEE ALSO

fsaddclass(1), **fsmodclass**(1), **fsstore**(1), **fschdiat**(1), **exclusions**(4)

NAME

fschmedstate − Change the class or state of a medium.

SYNOPSIS

fschmedstate [**-F** *type*] **-s** *state mediaID...*

fschmedstate [**-F** *type*] **-c** *class mediaID...*

fschmedstate [**-F** *type*] **-b** *mediaID...*

DESCRIPTION

The **fschmedstate**(1) command can be used to change the state of a medium or the policy class in which a medium belongs. The states are not mutually exclusive. The valid states include: - Unsuspect - Protected - Unprotected - Available - Unavailable - Unmark

The **fschmedstate**(1) command can change the state of a medium to unsuspect after the Tertiary Manager software marks it suspect. A medium is marked suspect when there is a read/write or position error with that medium in a drive. A suspect medium is used, thereafter, as read only. A medium can have its suspect count incremented if another read or position error occurs when it is mounted in a drive. The system administrator can use the logs to determine that an error was caused by the drive or by the medium.

Changing a medium to protected or unprotected status affects whether or not the medium is chosen by the Tertiary Manager software for file storage. Files can be read from protected media, but additional data can not be written to the protected media.

A medium can be changed from available to unavailable to prevent the medium from further accesses. This includes storage, retrieval, and media movement requests.

The unmark state cancels the action performed on the medium. This state can only be applied to certain Mark Status states. These states include: - Error - Checkout (only if medium is still located within the Tertiary Manager system)

A medium with an *Error* status can be unmarked to allow the medium to be accessed again or the process in which the error occurred to be attempted again so the log file(s) can be monitored to determine the problem. A medium with a *Check-out* status can be unmarked if the medium is not *Out of FS*. If the medium is Out of FS, the unmark request will fail.

The **-c** and **-b** options only apply to blank media. The **-c** option allows blank media to be associated with a policy class or blank media associated with a policy class to be changed to a different policy class. The **-b** option reverts blank media associated with the policy class to the system blank pool.

OPTIONS

mediaID...
: One or more 16-character media identifiers. Multiple media identifiers must be separated by spaces. The number of media identifiers that can be entered is limited to 99.

-c *class* Change the policy class name of blank media.

-s *state* Media state. Valid values for states are as follows:

unsusp Reset error count associated with media to 0.

protect Mark media as write-protected. Files can be read, but no data can be written to the media.

unprotect
: Mark the media as unprotected for data storage on media.

avail Media are available for storage and retrieval.

unavail Media are unavailable to Tertiary Manager software.

unmark Unmark media that are marked *Error*, or *Check out*.

-b Change policy class for a blank medium to system blank pool.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

SEE ALSO

fsmedinfo(1), **fsmedout**(1)

NAME

fschmod − Changes permission and ownership information on files and directories within the Tertiary Manager install location.

SYNOPSIS

fschmod

DESCRIPTION

The **fschmod**(1) utility is used to change the permissions on all Tertiary Manager installed directories to the default installation permissions. In addition, the **fschmod**(1) utility will change the owner and group settings on all files within the Tertiary Manager installed directories to the default installation owner and group settings. The utility does not take any arguments.

EXIT STATUS

0 The command was successful.

1 The command had a problem.

ENVIRONMENT

FS_HOME

The environment variable FS_HOME specifies the location to the Tertiary Manager environment and must be set.

FILES

Owner and group information are determined from values in the $FS_HOME/config/fs_sysparm file.

NOTES

This command must be run as root.

NAME

fschstate − Change the state of a storage component in the Quantum storage subsystem.

SYNOPSIS

fschstate [**-F** *type*] **-s** *state componentalias*

DESCRIPTION

The **fschstate**(1) command changes the state of a specific storage component configured in the Quantum storage subsystem.

The **fschstate**(1) command can be executed when Tertiary Manager software is active or nonactive. Only storage subsystems states can be changed if Tertiary Manager or Media Manager software is down. Drive component changes require both software components to be active.

If a component is taken to the off-line state, Tertiary Manager software does not attempt any processing using that component. Changes in drive components and storage subsystems are reflected through the Media Manager software as well. If the Media Manager operator changes a drive's state to off-line, the Tertiary Manager software will reflect this change of state. This also works the same if the Tertiary Manager system administrator change the state of a drive or storage subsystem.

OPTIONS

componentalias

The alias for storage subsystem and drive components. The system administrator configures the possible values for component aliases during system configuration or by using the **fsconfig**(1) command. If the *componentalias* contains spaces, use single quotes around the words.

-s *state* The desired state of the drive components or subsystems. The valid values for drive components is *MAINT*, *ON*, or *OFF*. Valid values for subsystems is *ON* or *OFF*.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

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SEE ALSO

fsconfig(1), **fsstate**(1)

NAME

fsclassinfo − Report policy class processing parameters, associated directory paths, and affinity lists.

SYNOPSIS

fsclassinfo [**-l**] [**-F** *type*] [*class*...]

DESCRIPTION

For one or more policy classes, the **fsclassinfo**(1) command by default displays a short report that includes the processing parameters for each policy class. The **-l** option specifies a detailed listing for each policy class, consisting of the top level directory paths, the affinity list, and the copy configuration information.

If no policy classes are specified, a short report is displayed for all policy classes. If the **-l** option is specified without a policy class, a long report is displayed for all policy classes.

This command accepts upper case or lower case input. However, the input policy class is converted to lower case.

REPORT STATUS

The processing parameters listed by the **fsclassinfo**(1) command are as follows:

Soft Limit — The soft limit on the number of media allocated for the policy class

Hard Limit — The hard limit on the number of media allocated for the policy class

Drive Pool — The drive pool associated with the policy class

Target Stub Size (KB) — The target stub size (in kilobytes) is used to determine the number of bytes to leave on disk when files are truncated. This value will be the minimum number of bytes left on disk as the truncation processing will round the value up to a multiple of the file system block size.

Security Code — The four-character policy class security level. NOTE: This only appears on the long report.

Acct Number — The five-character policy class account number. NOTE: This only appears on the long report.

Def Copies — The defined number of copies allowed for each file associated with the policy class

Max Copies — The maximum number of copies allowed for each file associated with the policy class

Max Inactive Versions — The maximum number of inactive versions to keep for each file associated with the policy class (the current version is active, all others are inactive)

Media Type — Default media type for the policy class

File Cleanup — The default file cleanup action for the policy class

Media Cleanup — The default media cleanup action for the policy class indicates if the media should remain associated with the policy class or if it should be returned to the general scratch pool when all data has been logically removed from the media.

Store Min Time (mins, hrs or days) — The minimum time that a file must reside unmodified on disk before being considered a candidate for storage on media. A file will not be stored (by a store policy) until it has remained unmodified on disk for this amount of time. After that time, the next policy run will attempt to store the file. The 'm', 'h' or 'd' suffix on the reported value indicates minutes, hours or days.

Store Max Set Age (hrs) — Candidate expiration time (in hours) of the policy class. As soon as any file on the store candidate list in the policy class has remained unmodified for this amount of time, all of the files on the store candidate list should be stored.

Store Min Set Size (MB) The minimum set size (in MB) of the policy class. The store candidates in the policy class have to add up to this size before any of them can be stored by the policy engine.

Store Automatically Enable/disable automatic store. It decides if we allow the policy engine to automatically store files for this policy class.

Reloc Min Time (days, hrs or mins)
The minimum time that a file must reside unaccessed on disk before being considered a candidate for relocation. A file will not have its disk blocks relocated (by a relocation policy) until it has remained unaccessed on disk for this amount of time. After that time, a relocation policy will consider the file a valid candidate for relocation, but it may or may not actually be relocated. That will depend on the current file system fill level and the file system configuration parameters. The 'd', 'h' or 'm' suffix on the reported value indicates days, hours or minutes. NOTE: An "emergency" relocation policy ignores this time.

Trunc Min Time (days, hrs or mins)
The minimum time that a stored file must reside unaccessed on disk before being considered a candidate for truncation. A file will not have its disk blocks truncated (by a truncation policy) until it has remained unaccessed on disk for this amount of time. After that time, a truncation policy will consider the file a valid candidate for truncation, but it may or may not actually be truncated. That will depend on the current file system fill level and the file system configuration parameters. The 'd', 'h' or 'm' suffix on the reported value indicates days, hours or minutes. NOTE: An "emergency" truncation policy ignores this time.

Generate Checksum The state of Checksum Generation for the policy class. If **ENABLED**, checksums will be generated when files are stored by this policy class. The checksums will be retained for use in subsequent checksum validation during retrieve operations. If **DISABLED**, no checksums will be generated during stores. Note: policy-based Checksum Generation can be overridden by the **FS_GENERATE_CHECKSUMS** environment variable in *fs_sysparm*. See *fs_sysparm.README* file for details.

Validate Checksum The state of Checksum Validation for the policy class. If **ENABLED**, checksums will be generated when files stored by this policy class are retrieved. The generated checksums will be compared to the values generated when the files were stored. If a miscompare is detected a RAS ticket will be opened and, if there are additional copies of the file, the retrieve will be retried with another copy. If **DISABLED**, no checksums will be generated during retrieves and no validation will occur. Note: policy-based Checksum Validation can be overridden by the **FS_VALIDATE_CHECKSUMS** environment variable in *fs_sysparm*. See *fs_sysparm.README* file for details.

Alternate Store Location +**Disabled**|**Enabled** to show whether the Alternate Store Location option has been configured for the class.

Encryption The encryption algorithm to be applied to the content of the file stored into an Object Storage system. This parameter is ignored for all other media types and is valid only if supported by the Object Storage system.

Master Key Name The Master Key name that is used for the client side encryption service.

Compression The compression algorithm to be applied to the content of the file stored into Object Storage systems. This parameter is ignored for all other media types. Furthermore, this parameter is only supported on Object Storage system from providers QCV1 and QVV1.

OPTIONS

class... One or more specified policy classes to be listed. Multiple policy classes must be separated by a space. A policy class name is a maximum of 16 alphanumeric characters. The special "-", ".", and "_" characters are permitted. If one or more policy class names in a list are invalid, an error message is generated, stating which policy class names were not found, and the report is generated for the remaining policy class names in the list. If *class* is not specified, a report is generated for all policy classes.

-l Long report. For the specified policy classes, this option provides all of the processing parameters, all associated directory paths, the disk affinity list, and the copy configuration information. The parameters listed are the *Soft Limit, Hard Limit, Media Type, Drive Pool, Notify ID (deprecated), Security Code, Account Number, Default Copies, Max Copies, File Cleanup, Media Cleanup, Store Min Time, Store Max Set Age, Store Min Set Size, Store Automatically, MinRelocTime, MinTruncTime, Encryption, Master Key Name, Compression, Affinity List*, and the top-level directories associated with each policy class.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

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SEE ALSO

filesystems(4), **fsaddclass**(1), **fsmodclass**(1)

NAME

fsclassrnm − Rename an existing policy class

SYNOPSIS

fsclassrnm *oldclass newclass*

DESCRIPTION

The **fsclassrnm**(1) command changes a policy class. This command causes all files and media that were in the *oldclass* to be assigned to the *newclass*. If the policy class specified as the *newclass* already exists, the command will fail.

OPTIONS

oldclass

Policy class to be changed - The identifier specified in *oldclass* cannot be the same as that specified in *newclass*.

newclass

New policy class for the old policy class association. A policy class name can be a maximum of 16 alphanumeric characters. The special "-", ".", and "_" characters are also permitted.

SEE ALSO

fsclassinfo(1)

NAME

fsclean − Remove file version information from Tertiary Manager knowledge.

SYNOPSIS

fsclean [**-F** *type*] **-m** *mediaID*... [**-t** [*endtime*]] [**-d**] [**-P**] [**-I** | **-B**]

fsclean [**-F** *type*] **-s** *filesystemmountpoint*... [**-t** [*endtime*]] [**-d**] [**-P**] [**-B**]

fsclean [**-F** *type*] **-c** *class*... [**-t** [*endtime*]] [**-d**] [**-P**] [**-B**]

fsclean [**-F** *type*] **-t** [*endtime*] [**-d**] [**-P**] [**-B**]

fsclean [**-F** *type*] **-r** [**-l**] [**-I** | **-B**]

fsclean [**-F** *type*] **-r** [**-p** *filename*] [**-P**] [**-I** | **-B**]

fsclean [**-F** *type*] **-C** [*requestId*] [**-W**]

fsclean [**-F** *type*] **-D** *directory* [**-a**] [**-R**] [**-I**]

DESCRIPTION

The primary function of the **fsclean**(1) command is to remove inactive versions of files. This functionality does not affect current file versions on media or on disk unless the *-a* option is used. When files with copies stored on a medium are modified or deleted from disk, version information about these files is still retained by the Tertiary Manager software, and the former version of the modified or deleted file is made inactive. These inactive file versions are available from the Tertiary Manager system until they are removed (cleaned) using this command. Any file that was deleted and still has inactive versions can be restored to disk using the **fsrecover** command. Also, the current version of a file can be replaced by an older version using the **fsversion** command. Inactive versions that have been cleaned from media are no longer reusable.

Media can be cleaned by *mediaID*, by *class*, by *filesystemmountpoint*, or by *endtime*. To limit what is cleaned, the *-t* [endtime] option may be used with the *-m*, *-c*, and *-s* options. To clean all inactive file versions, use the **fsclean**(1) command with the **-t** option and no endtime specified. To clean only inactive versions that are associated with files that have been deleted, use the **fsclean**(1) command with one of the above described options and the **-d** option.

The **fsclean**(1) command is run automatically by the Tertiary Manager software to remove inactive file versions and to keep the saved information from growing to an unmanageable size. It also releases media into the blank media pool when all of the stored file versions on a medium have been cleaned.

OPTIONS

-m *mediaID...*

One or more media identifiers for which to clean. No other media identifiers are affected when this option is used. Multiple media identifiers must be separated by spaces.

-s *filesystemmountpoint...*

One or more file systems for which to clean associated media. No other file systems are affected when this option is used. Multiple file systems must be separated by spaces.

-c *class...*

Policy class associated with data to clean. A policy class name can have a maximum of 16 characters from the set of alphanumeric, '-', '.' and '_' characters. This option has no effect on storage disk media since that is not associated with just a single policy class.

-t *endtime*

Endtime option. The endtime value should be current time or older. When the time specified is in the future, the current time is used. The default is the current time, which causes inactive versions for all time values to be removed.

The format for the time parameter is YYYY:MM:DD:hh:mm:ss where:
YYYY = Numeric, year

The following are optional; defaults are shown:,
MM = Numeric, two-digit month

(default:01 (January)),
DD = Numeric, two-digit day
(range: 01-31, default:01),
hh = Numeric hour
(range: 00-23, default:00),
mm = Numeric minute
(range: 00-59, default:00),
ss = Numeric second
(range: 00-59, default:00)

-d This option limits the *-m*, *-s*, *-c*, and *-t* options to process inactive versions associated with deleted files. Inactive versions associated with active files are not impacted by this option.

-r *mediaID*

Clean all Tertiary Manager knowledge of files on the media where rminfo processing has been done. When the *-l* option is specified, a listing of these media is provided.

Without the *-l* option, the *-r* option results in all saved info on file versions, active and inactive, being cleaned from the Tertiary Manager software's knowledge after the rminfo command has been run on the file media. When no copies of an affected file remain, and the file is truncated, the file is deleted from disk.

When a *mediaID* is specified with the *-r* option, **fsclean**(1) operates only on the specified media. The command without the *-r* option has no impact on Write Once Read Multiple (WORM) media.

The **fsclean**(1) command with the *-r* option is periodically run automatically by the Tertiary Manager software and does not normally have to be run by hand.

-l This option is only valid with the *-r* option, and gives a listing of all media where rminfo processing has been run.

-p *filename*

This option is only valid with the *-r* option. When these two are provided extra processing of the removed versions is performed. Any files that are truncated and no longer have all of their copies present (because the media was removed), are printed out to the file specified with the *-p* option. The generated file will contain a list of files that need to be retrieved so that their missing copies can be regenerated. (See the Report File Format section below for details on the file.)

-P This option is used to indicate that a purge of the database name space will be performed. This is a time-consuming process that can be avoided when a quick response from the command is desired.

The following two operations take place when cleaning: 1) cleanup of the file component and media information, 2) (optional) purge of old name space information from the database. The purging of the database name space is the most process-intensive portion of the cleanup, and can be skipped when quick turnaround is desired, for example, for making a media go blank. Note that the regularly scheduled cleanup feature, 'clnver', does the purging of the name space. When the processing has been skipped for one or more calls to **fsclean**(1), the purging is performed in the next scheduled run.

NOTE: When the purge is skipped, **fsrecover**(1) will report files as recoverable that are actually not available because their component information is gone. The next scheduled, or manual, cleanup with a purge will resolve this discrepancy.

-I This option can be used when cleaning an object media to ignore the cleanup of the Object Storage. When it is provided the cleanup of the Tertiary Manager database will still take place but there will be no attempt to delete the objects from the Object Storage.

WARNING: This option should ONLY be used if the media is not to be used again and there is no concern whether or not space on the Object Storage will actually be cleaned. If it is used there is no way to come back later and perform the cleanup of the Object Storage. After the command has run all information necessary for the Object Storage cleanup has been removed from Tertiary Manager.

The option is meaningless and has no effect when the media being cleaned is not of Object Storage type.

-B This option can be used when cleaning an object media to make the command run more quickly by performing some of the functionality in the background after command exit. There are two main Tertiary Manager tasks associated with the cleaning of an object media: the cleaning of the database records and the sending of the delete requests to the Object Storage. By default, when cleaning an object media, the command will not exit until both main tasks have been completed. With the *-B* option the **fsclean**(1) command will exit after the Tertiary Manager database has been cleaned.

While the command is running both tasks are occurring but the cleaning of the database runs more quickly. The sending of the deletes can run for some time after the database operations. Also, there is Tertiary Manager functionality that can proceed after the database has been cleaned even though there are still deletes to send.

As with the *-I* option, this option is meaningless and has no effect when the media being cleaned is not of Object Storage type.

-C This option can be used when an object media was cleaned using the **-B** option. The command will check and report on the background task of sending of the object deletes. When the *-B* option has been used on a request, this *-C* option can be used to check on the status of the background tasks. It will report on the percent complete for outstanding deletion requests still to be sent to the Object Storage. When a request id is provided the report will only cover deletion requests for that id. Without the "requestId" all outstanding requests are included.

NOTE: There is a few seconds lag time on the startup of an object store cleanup where a command may not show up in this report. (This is true whether reporting with or without the *-W* option.) If a recently started request does not appear wait a few seconds and rerun the report.

-W This option can be used in combination with the *-C* option to wait on a **fsclean**(1) command that was run previously with the *-B* option. Instead of just checking and reporting on the deletes that are yet to be delivered this will cause the command to wait until all the deletes have been sent, periodically updating the report as it continues.

-D *directory*

This option will clean all inactive versions of files in the specified directory. The directory does not have to exist so this can be run on directories which have already been removed. The **-P** and **-B** options are always executed with the*-D* option even though they do not have to be specified. To preview what inactive files will be cleaned the following command can be executed:
fsrecover -d -r *directory*

NOTE: There is a race condition where active files which have been removed just prior to running **fsclean**(1) may not got cleaned due to time it takes for the asynchronous file delete processing to complete. If this situation occurs, then waiting a few mintues and then reissuing the clean command will resolve the issue. The chance of this occuring is much smaller if **-a** is used to delete the active files.

-a This is only valid when cleaning a directory. It will clean active files as well as inactive files from the directory but will have no impact on any sub-directories unless **-R** is specified. Use caution with this option as it will remove active files from the directory and all related inactive versions, which means that the active files will not be recoverable after using this option. The specified directory will also be removed if it is empty unless it is a relation point. **fsrmrelation**(1) must be run on the relation point directory before it can be removed.

-R Indicates recursive processing is requested. All inactive file versions in the specified directory and any subdirectories will be cleaned. If used with **-a**, then the entire directory tree will be removed and cleaned.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

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Report File Format

A report file is generated when using the **-r -p** option. The report file contains information indicating the media where the files are located and their relative position on those media. This allows an administrator (with the aid of support), to group the files for optimal retrieve performance. When using the **-p** option, the following information is generated for each file having missing copies:

Number of segments
: This indicates when multiple media are required for retrieving a file.

Media Index
: This is an internal ID (not the barcode media ID), used by StorNext to identify where the file resides. It can be used to tell what files are on the same media.

Cumulative Data Block Number
: This indicates where the file is located on the media. When retrieves of files are batched together by their order on media, retrieval performance is better.

Filename
: Name of the file

SEE ALSO

fsmedinfo(1), **fsversion**(1), **fsrecover**(1), **fsrminfo**(1) **fsrmrelation**(1)

NAME

fsconfig − Configure or report on tape drive and subsystem components in the Quantum storage subsystem.

SYNOPSIS

fsconfig [**-p** *driveID*] [**-v** *devicepath*] [**-r** *drivetype*] [**-e** *delaytime*] [**-c y|n**] [**-F** *type*] **-a -h** *componentID* **-i** *componentalias* **-t** *componenttype*

fsconfig [**-p** *driveID*] [**-v** *devicepath* [**-f**]] [**-r** *drivetype*] [**-e** *delaytime*] [**-c y|n**] [**-F** *type*] [**-i** *componentalias*] **-m -h** *componentID*

fsconfig [**-F** *type*] **-d -h** *componentID*|**-i** *componentalias*

fsconfig [**-h** *componentID*] [**-F** *type*] **-s**

fsconfig [**-h** *componentID*] [**-F** *type*] **-L**

fsconfig [**-h** *componentID*|**-i** *componentalias*] [**-F** *type*]

DESCRIPTION

The **fsconfig**(1) command adds, modifies, deletes, or reports on tape drive and subsystem component configuration settings for the Quantum storage system. By specifying the **-a**, **-m**, or **-d** options, hardware components can be added, modified, or deleted to reflect the actual physical configuration of the Quantum storage system. The **-s** option will scan the configured drives and update the device path if it is found to be wrong. The **fsconfig**(1) command should not be used to change the state of a hardware component. For that purpose, the **fschstate**(1) command should be used.

The **fsconfig -a** command adds a new component to the Quantum storage system. The *componentID*, *componentalias*, and *componenttype* are required values. (Note: The *componentID* cannot be modified after being added.) When adding a new tape drive, the corresponding subsystem (e.g. V0) must be configured beforehand. A new tape drive will also require the *driveID* and *devicepath* values. To add a tape drive, the Tertiary Manager software must be active. For a subsystem, it can be active or inactive.

The **fsconfig -m** command modifies an existing component in the system. A *componentID* value is required. To modify a tape drive, the Tertiary Manager software must be active. For a subsystem, it can be active or inactive.

The **fsconfig -d** command deletes components from the system. A *componentID* or *componentalias* value is required. To delete a tape drive, the Tertiary Manager software must be active, and no medium can be mounted in the drive. To delete a subsystem, the software can be active or inactive, but the drives associated with the subsystem must be deleted beforehand.

The **fsconfig -s** command updates tape drive device paths for the system and will not add new entries. If enabled in the *fs_sysparm* system parameters file, SCSI-3 persistent reservations will be established for all configured tape drives. This option is typically used when the Tertiary Manager software is started. If Tertiary Manager is running, it will need to be restarted in order for the changes to be applied.

The **fsconfig -L** command releases SCSI-3 persistent reservations and unregisters the reservation key from all configured tape drives. This option is typically used when the Tertiary Manager software is stopped.

The **fsconfig** command with no options generates a report showing all tape drive and subsystem components configured in the Quantum storage system. When specified with a *componentID* or a *componentalias* value, the report is limited to that component. Note that component alias names are case sensitive. To generate a report, the Tertiary Manager software can be active or inactive.

REPORT STATUS

The processing parameters listed by the **fsconfig**(1) command are as follows:

Component ID	The unique component identifier.
Device pathname	The device path of the tape drive.
Compression	Whether tape drive compression is enabled.
User Alias	The component alias name.

Component Type	The type of component: DRIVE, SUBSYSTEM.
Device serial #	The serial number of the tape drive.
Drive Type	The type of tape drive: LTO, T10K, DLT4, etc.
Drive ID	The numeric identifier of the tape drive.
Delay Time	The dismount delay time for the tape drive.
Vendor ID	The vendor identifier of the tape drive.
Product ID	The product identifier of the tape drive.
Product Revision	The firmware revision of the tape drive.

OPTIONS

-a Add a new component. The component identifier, component type, and component alias are required values when a new component is added. For a tape drive, the drive identifier and device path fields are also required.

-m Modify a component. The component identifier and at least one modifier is required.

-d Delete a component. The component identifier or component alias is required.

-s Scan for devices and update device paths as needed. Updates only take effect if the Tertiary Manager software is restarted after its execution.

-L Release SCSI-3 persistent reservations and unregister the reservation key from all configured tape drives.

-p *driveID*
Numeric identifier of a tape drive. This maps a drive in the Tertiary Manager database to a Media Manager drive identifier. Drive identifier values must be greater than 0. Duplicates are not allowed.

-v *devicepath*
Device path of the tape drive. The device path is required for configuring new drives and consists of a variable string of up to 255 characters. Duplicates are not allowed, but can be overridden by the **-f** option.

-r *drivetype*
Type of tape drive. A drive type is required for configuring new tape drives only. The valid values are listed below. The default is **LTO**.

3590
3592
AIT
LTO
9840
9940
T10K
DLT4
SDLT600

-e *delaytime*
Dismount delay time (in seconds) for a tape drive. This value must be greater than or equal to 0. The default is **0**.

-c y|n Enable or disable drive compression. The default is **n** (no compression).

-h *componentID*
Component identifier. Examples: **V0** refers to a subsystem, and **V0,1** refers to a specific drive within that subsystem. Duplicates are not allowed. When specifying a drive component identifier, there is no space between the comma and number.

-i *componentalias*

Component alias. A component alias is a variable string of up to 255 characters. If the component alias contains spaces, use single quotes around the string. Duplicates are not allowed. The component alias string is case sensitive.

-t *componenttype*

Type of component. A component type is a multi-character identifier: **drive** or **subsystem**. For a drive, the subsystem must first be configured. This value can be specified in upper or lower case.

-f Force an update of a duplicate device path while Tertiary Manager software is running. Duplicate device paths are not normally allowed while Tertiary Manager software, this option will override that restriction. This option should not used be used unless directed by Quantum personal. This option is only allowed with the **-m** and **-v** options.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

RESTRICTIONS

All drives in a drive pool must be configured in the Tertiary Manager system before the drives can be accessed.

EXAMPLES

To update the device path to /dev/sg14 for tape drive component V0,1 while Storage Manger is up running,

```
fsconfig -m -h V0,1 -v /dev/sg14
```

To update all device paths while the system is not running

```
fsconfig -s
```

SEE ALSO

fschstate(1)

NAME

fsddmconfig − Configure or report all hosts and devices to be used in distributed data copy operations for the Quantum storage subsystem.

SYNOPSIS

fsddmconfig -q

fsddmconfig *hostname*

fsddmconfig -a|**-u** [**-s e**|**d**] [**-m** *max_movers*] [**-M** *max_movers]* [**-n** *threshold*] *hostname*

fsddmconfig -d *hostname*

fsddmconfig -a [**-s e**|**d**] **-i** *device_id* **-t** *device_type* [**-p** *path*] *hostname*

fsddmconfig -u [**-s e**|**d**] **-i** *device_id* [**-p** *path*] *hostname*

fsddmconfig -d -i *device_id hostname*

DESCRIPTION

The **fsddmconfig**(1) command reports, adds, modifies and deletes data mover configuration items. Note the this command, and the corresponding configuration info, is not normally needed. The default mode of operation for the Tertiary Manager software is to run all data copy operations locally on the metadata controller (MDC) server. This command is only needed if data copy operations are to be done on any clients in addition to, or instead of, the MDC.

To be able to perform copy operations on a another host at least one tape drive, storage disk, or Object Storage device that is configured on the MDC must also be visible on that host. Additionally at least one managed file system must be visible on the host as well.

To configure a client to be used for distributed copy operations the following steps must be completed:

- Configure all tape drives, storage disks, Object Storage devices, and managed file systems as usual for use by the Tertiary Manager software. Use the **fsconfig**(1), **fsdiskcfg**(1), **fsobjcfg**(1) or **fsaddrelation**(1) commands respectively.
- Set the DISTRIBUTED_MOVING sysparm to **all** or **threshold**. By default the sysparm has a value of **none**. See NOTES section below.
- Use this **fsddmconfig**(1) command to configure hosts being used for data copy operations.
- Use this **fsddmconfig**(1) command to configure devices on hosts in preparation for data copy operations.

Note that if a host is disabled via **fsddmconfig**(1) it will not be used for moving data even though all devices on the host may be enabled. This makes it easier to disable a host for a time if needed.

If you are planning on using an sdisk via NFS there is a permissions issue. That file system must be exported with the "no_root_squash" option set so that the client will have permission to make required updates.

A device on a host can be automatically disabled by the Tertiary Manager software. This is only done if there is an unrecoverable error on the device that can only be fixed by operator intervention. For example no configured device on the host matches the device identifier requested. The **fsddmconfig**(1) command can be used to re-enable the device when the situation has been resolved.

A host may also automatically disabled by the Tertiary Manager software. This is done if the version of software on the client does not match the MDC. When the software on the client, or MDC, is updated then the **fsddmconfig**(1) command can be used to re-enable the host.

REPORT STATUS

There are three reporting options for the command. The reports and their corresponding output are shown here. For a more detailed description of the configuration items reported see the OPTIONS section.

At the bottom of each of these three reports is a line that indicates the state of the DISTRIBUTING_MOVING sysparm. An example of this line is:

Distributed Data Mover State: Enabled

If the sysparm is set to "all" then the displayed state is **Enabled**. If the sysparm is set to "threshold" then

the displayed state is **Threshold**. If the sysparm is set to "none" then the displayed state is **Disabled**.

NOTE: As indicated in the DESCRIPTION section above, the default mode for copy operations is to run all of them on the MDC. Because the MDC is the default host, it does not show up in any of the reports below. This will be true unless the MDC host is specifically configured via the fsddmconfig command. This restriction applies even to the âHost Reportâ mentioned below. If the report is issued for the MDC, and the MDC was not specifically configured via fsddmconfig, then the requested report will be empty.

Quick Report

Mover Host The name of the host where distributed moving is configured.

Current State Is the host currently enabled for use?
Enabled - the host is enabled for use
Disabled - the host is not enabled for use

Server Threshold The number of simultaneous **fs_fmover** processes to run locally on the MDC before running any of the processes on a client.

Maximum Movers Server The maximum number of **fs_fmover** processes to run simultaneously on the host when the host is the MDC server.

Maximum Movers Client The maximum number of **fs_fmover** processes to run simultaneously on the host when the host is a client machine.

Host Report

State Is the host currently enabled for use?
Enabled - the host is enabled for use
Disabled - the host is not enabled for use

Server Threshold The number of simultaneous **fs_fmover** processes to run locally on the MDC before running any of the processes on a client. This field is only shown for the MDC host.

Max Movers Allowed The maximum number of **fs_fmover** processes to run simultaneously on the host.

For each device configured on the host the following is also shown:

Device Identifier The character string identifying a device.

Type The type of device.
TAPE - a tape drive
SDISK - a storage disk
OBJECT_STORAGE - an Object Storage device
FS - a managed file system

State Is the device currently enabled for use?
Enabled - the device is enabled for use
Disabled - the device is not enabled for use
DISABLED - the device has been automatically disabled

Path The pathname for the device as it is seen on the host to be used.

Default Report

Device Identifier The character string identifying a device.

Type The type of device.
TAPE - a tape drive
SDISK - a storage disk
OBJECT_STORAGE - an Object Storage device
FS - a managed file system

State Is the device currently enabled for use?
Enabled - the device is enabled for use
Disabled - the device is not enabled for use

DISABLED - the device has been automatically disabled

Host The name of the host where distributed moving is configured.

Path The pathname for the device as it is seen on the host to be used.

OPTIONS

Note that with no options or args the **Default Report** is displayed.

hostname

The *hostname* argument can be either IP address or hostname. The hostname can be either a local (single word) hostname or a fully qualified domain name (FQDN). Any *hostname* other than previously stated is considered ambiguous. The Tertiary Manager software will attempt to match a specified FQDN hostname to the host that it belongs to. The match attempt could fail due to improper DNS setup. In such case, users can either ensure that their DNS environments are setup correctly or specify a *hostname* that matches exactly with the output of the **hostname**(1) command when run on the respective host.

If this host is configured with device type **object_storage** and **https**, please refer to the **fsobjcfg**(1) man page for https configuration requirement for DDM hosts.

Note that with no options and just a hostname argument provided the command will display the **Host Report** for that host.

-q Generate the **Quick Report** of hosts configured for distributed moving operations.

-a Add the specified host or device to the configuration.

-u Update the configuration for the specified host or device.

-d Delete the specified host or device from the configuration.

-s e|**d** Set the state of the specified host or device to enabled (**e**) or disabled (**d**).

-m *max_movers*

Set the maximum number of simultaneous **fs_fmover** processes allowed on the host when it is a client. A value of **all** indicates no limit.

-M *max_movers*

Set the maximum number of simultaneous **fs_fmover** processes allowed on the host when it is running as the MDC server. A value of **all** indicates no limit.

Note that this value can be ignored if the current configuration is such that not all resources are covered. If there is no where else to run an **fs_fmover** process it will run locally on the MDC server. For example assume a simple configuration with a server and a single client with eight shared tape drives. There can be eight copy operations occurring at the same time. If the maximum client movers is set to two and the maximum server movers is set to four, when the seventh and eighth simultaneous **fs_fmover** processes are run they will default to running on the MDC server.

-n *threshold*

Set the number of simultaneous **fs_fmover** processes to run on the server before giving work to the clients. This value is only used when DISTRIBUTED_MOVING is set to **threshold**. When a new host is configured this value defaults to zero. When the value is zero, and DISTRIBUTED_MOVING is set to **threshold**, the system acts like the DISTRIBUTED_MOVING value is **all**. See NOTES section below.

-i *device_id*

The character string identifying a device. For tape drives the identifier is the serial number of the drive as reported by **fsconfig**(1). For storage disks it is the alias of the sdisk as reported by **fsdiskcfg**(1). For Object Storage devices it is the alias of the controller I/O path as reported by **fsobjcfg**(1). For managed file systems it is the name of the file system as it appears in the **/usr/cvfs/config/fsmlist** file or in the file system configuration table. (Ex. */etc/fstab*) Note that there is also a pseudo device identifier "disk2disk" that is used for relocation operations.

-t *device_type*

The type of device to add. Valid values are **tape** for tape drives, **sdisk** for storage disks, **object_storage** for Object Storage devices, and **fs** for managed file systems.

-p *path* The pathname for the device as it is seen on the host to be used. For tape drives the path is as reported by **fsconfig**(1). For storage disks the path is as reported by **fsdiskcfg**(1). For managed file systems the path is the mount point of the file system. For Object Storage devices the path is not valid. Note that the device path values and mount points on the server and client may differ.

NOTES

The DISTRIBUTED_MOVING sysparm is used as the overriding mechanism for enabling or disabling data movement operations on distributed clients. It can be disabled by setting the value to **none**, the default, or be enabled by setting the value to **all** or **threshold**. Note that like many other sysparms, when a change is made the Tertiary Manager software must be cycled.

A **none** value means all copy operations will be done locally on the MDC.

An **all** value means all configured hosts will be treated equally when deciding where to run an **fs_fmover** process. A host is selected based on the fewest number of current active processes. For ties the host that has the oldest allocation time will be used.

A **threshold** value means the MDC is weighted more heavily than distributed clients when deciding where to run an **fs_fmover** process. The processes are assigned to the local host until the threshold number is reached and then the **all** strategy is applied. The threshold number defaults to zero but can be configured via **fsddmconfig**(1). To truly operate in **threshold** mode the value for the MDC host must be non-zero. With a zero value the system immediately applies the **all** strategy.

If the value of the sysparm is **none** no distributed operations will be done but running the **fsddmconfig**(1) command will still show what hosts/devices are configured. This allows for disabling all distributed operations for a time without having to disable or delete all individual configuration items. If all items are configured and enabled and no distributed operations are occurring check the DISTRIBUTED_MOVING sysparm.

In the event that the Tertiary Manager software won't start, there may be a communication issue with one of the configured hosts. Use **fsddmconfig**(1) with the **-s d** option to disable the host. This will prevent the software from trying to establish any communications with that host when starting. For this reason it is recommended that all MDC hosts are configured for distributed data moving if the system is running in a failover mode.

SEE ALSO

fsconfig(1), **fsdiskcfg**(1), **fsobjcfg**(1), **fsaddrelation**(1)

NAME

fsdefrag − Report or defragment all currently fragmented media.

SYNOPSIS

fsdefrag -d [*mediaID...*] [**-p** *destinationdrivepool*] [**-S** *sourcedrivepool*]

fsdefrag -d [**-v**] [**-n** *numMedia*] [**-p** *destinationdrivepool*] [**-S** *sourcedrivepool*]

fsdefrag -s

fsdefrag [**-v**] [**-n** *numMedia*]

DESCRIPTION

The **fsdefrag**(1) command provides the capability to report or defragment all fragmented media in the system. This command will only report or defragment media that are fragmented based on parameters in *fs_sysparm*.

The **fsdefrag**(1) command and the **fsmedcopy**(1) command are similar in functionality but differ in the following ways:

Reporting
: The **fsdefrag**(1) command will only report media that are fragmented based on the parameters in *fs_sysparm*. This is true even if a mediaid is provided to the command. No report will be given if the media is not fragmented. The **fsmedcopy**(1) command will report on any and all media in the system that contain any data.

Defragmentation
: Again, the **fsdefrag**(1) command will only defrag media that are fragmented based on the parameters in *fs_sysparm*. The **fsmedcopy**(1) command, in replace mode, can be used to replace any media.

NOTE The **fsdefrag**(1) command in defragment mode actually invokes the **fsmedcopy**(1) command to perform the replacement of a media.

Fragmented Media

As indicated above the **fsdefrag**(1) command works on media that are fragmented based on parameters in *fs_sysparm*. The parameters used are:

DFG_FULL_PERCENT
: The percent at which a media is considered full. A media whose fill percentage is greater than or equal to this value is considered full.

DFG_FRAG_PERCENT
: The percent at which a media is considered fragmented. A media whose fragmentation percentage is greater than or equal to this value is considered fragmented. (This is the wasted space in the used portion of the media.)

A media will only be reported or defragmented by the **fsdefrag**(1) command if the media is full AND fragmented. A media which is only full or only fragmented will not be processed by **fsdefrag**(1).

In report mode this command will show the media that are fragmented and that will be defragmented by future defragmentation runs. Fragmented media that are not available for defragmentation are not included in the report by default. A verbose mode exists so even those media are included in the report if desired.

When reporting on fragmented media one column of the report 'Available' is included to show the current availability of the fragmented media. This column is included even in the default report where all media reported are available. Also in that column along with the availability indicator is a '(Vault)' for media that currently reside in a vault archive. Being located in a vault affects availability and how a media will be treated during defragmentation. See DFG_IGNORE_VAULTED_MEDIA below.

No storage disk media or Object Storage media will be defragmented by this process. Tape media become fragmented when **fsclean**(1) is run because db contents are deleted but space on the tape is still used. When **fsclean**(1) is run on an sdisk the data is removed from the media as the db contents are cleaned. This command does however report fragmentation levels on sdisk media in verbose and summary modes for infor-

mational purposes. This can be helpful in indicating that other data is present on the file system besides just the sdisk contents. This command does not report fragmentation levels on Object Storage media since the data is removed from the media when the database is cleaned.

Note that the media determined to be fragmented are sorted by this command. This is true when reporting fragmented media and also when using the **-d** option for initiating the defragmentation of media. The media are sorted from the highest fragmentation percentage to the lowest. Additionally tape media appear in the list before sdisk media when verbose mode is used regardless of fragmentation percentage.

Other Fragmentation Parameters

Some other system parameters also affect defragmentation and the processing done by the **fsdefrag**(1) command. The parameters are:

FS_MAX_ACTIVE_TAPECOPIES

This is the max number of **fsmedcopy** operations that can be run simultaneously. Let's assume that this value is 3 and that there are 10 fragmented media on a system when **fsdefrag**(1) is run; only 3 **fsmedcopy** operations will be run at a time and the other media will be queued by **fsdefrag**(1). Note that 2 drives are required for a **fsmedcopy** operation.

DFG_MAX_MEDCOPY_ATTEMPTS

This is the max number of times that the **fsdefrag**(1) command will invoke the **fsmedcopy**(1) command for a media in an attempt to replace that media. After the max has been reached no further attempts will be made to replace the media until the next **fsdefrag**(1) command is run. Each command will make the max attempts unless a media has become unavailable for mounting.

DFG_IGNORE_VAULTED_MEDIA

The action to take when a fragmented media that is currently in a vault archive is encountered. If the value is true then a media in a vault will be ignored and no defragmentation will be attempted. If the value is false then the media will be processed with all other fragmented media. Note this parameter will also affect what is reported by the command. Vaulted media will only be reported in verbose mode unless this parameter is false.

CLEAN_VERSIONS_EXPIRATION

This parameter is not used directly by the **fsdefrag**(1) command but does affect automated defragmentation operations. It is the age used by the **clnver** schedule item for determining which inactive file segments are old enough for removal from the database. It is this cleaning of the old file segments from the database that causes a media to become fragmented.

Scheduled Tape Defragmentation

Via the **fsschedule**(1) command; Scheduled tape defragmentation can be configured using the **defrag** feature type. The scheduler daemon will execute the **fsdefrag** command per the configured schedule to identify and defragment fragmented tape media. Below are some 'Best Practices' to keep in mind:

The **defrag** schedule item should be scheduled a few hours after the **clnver** item for best results. The two features work together in managing out of date media contents.

The value for DFG_FULL_PERCENT is recommended not to be configured below 50%. If the parameter is set below this value it will likely result in 'thrashing' with media constantly being defragmented.

The value for DFG_FRAG_PERCENT is recommended not to be configured below 50%. The optimal value will be determined by the type of files being stored to tape. For example if a large percentage of files being stored to tape are temporary files then a higher DFG_FRAG_PERCENT value of 95% will prevent defragmentation from occurring too often. If a large percentage of files are stored but rarely deleted, then a lower DFG_FRAG_PERCENT value like 65% may be configured.

The values for DFG_FULL_PERCENT and DFG_FRAG_PERCENT may require tuning on your system. The defaults for the parameters are set to be conservative so that defragmentation does not occur too often. Once the **defrag** feature has been scheduled you should monitor the number of tape media being defragmented and adjust accordingly. Note that when the feature is turned on for the first time there may be a large number of tapes being processed.

Defragmentation duration time can be adjusted by using the DFG_MAX_MEDIA_TO_DEFRAG parameter to limit the number of tape media processed during each scheduled defragmentation. The DFG_MAX_MEDIA_TO_DEFRAG parameter will determine the **-n** value provided to this command by the scheduler. A value of 0 implies all media and the **-n** is not used.

Note: Tape Defragmentation default parameters are listed in the *fs_sysparm.README* file.

OPTIONS

mediaID...

The media to defragment or to report on. Multiple media identifiers must be separated by spaces. The number of media identifiers that can be entered is limited by the local machine's command-line length.

-d Perform defragmentation on the media. The default is to just report the fragmented media.

-n *numMedia*

Limit the operation, either reporting or defragmentation, to numMedia media. Since the media are sorted by fragmentation level this will result in the most fragmented tape media being reported or defragmented. If zero is provided for numMedia the default command behavior is performed which is to report/defragment all indicated fragmented media.

-p *destinationdrivepool*

Media Manager drive pool group used for the destination media when copying the fragmented media. The drive pool must be defined in Media Manager software. If the **-p** option is not used, the default drive pool group will be specified by the policy class definition. The special "_" character is permitted to identify the drive pool group.

-S *sourcedrivepool*

Media Manager drive pool group used for the fragmented media when copying the media. The drive pool must be defined in Media Manager software. If the **-S** option is not used, the default drive pool group will be specified by the policy class definition. The special "_" character is permitted to identify the drive pool group.

-v This option when used in defragment mode, indicates that media to be left unprocessed due to availability etc. should be reported along with those being defragmented. Note that in defragment mode when this option is used in combination with **-n** the unprocessed media do not count against numMedia. Only media that are to be processed are included in the count.

-v This option when used in report mode indicates verbose output. In verbose mode unavailable fragmented media are included in the report. By default unavailable media (and media that are in a vault if those are being ignored) are not included in the report of fragmented media, regardless of the fragmentation levels. Also included with this option is a list of storage disk media at the end of the report.

-s This option indicates summary report mode. In summary mode only a count of fragmented media is given along with a breakdown of the total count. The total fragmented media are broken into: available, unavailable, storage disks and media in a vault. All media in a vault are included in the vault count and not in the available/unavailable tallies regardless of their availability.

SEE ALSO

fsmedcopy(1), **fsclean**(1), **fsschedule**(1)

NAME

fsdevice − Reports StorNext related SCSI devices

SYNOPSIS

fsdevice -s [**-f**] [**-c** *criteria*]

fsdevice -b [**-l**] [**-c** *criteria*]

fsdevice -f [**-l**] [**-c** *criteria*]

fsdevice -h

DESCRIPTION

The **fsdevice**(1) command reports SCSI devices as detected by the common device infrastructure of the Quantum storage system. By default **fsdevice**(1) will probe all scsi devices seen by the server to obtain the listing of devices. Further inquiries to specific device paths or StorNext configuration databases and files will be used to fill in all information reported. The default command will generate a tabular, parsable report that lists all detected devices that can be or are already used by StorNext. Adding the -l option presents the devices in a human readable format along with displaying archive and tape drive relationships.

The -c option gives the additional ability to filter the detected devices for one or more devices that match the specified criteria. Devices will be printed that match or partially match the serial number, SCSI device path, system device path, vendor, product, device type string (e.g. sequential access, direct access, media changer), configured name or alias of the device, or the unique identifier as shown in the long listing (-l).

fsdevice(1) can be run with Tertiary Manager software active or inactive, but requires the database to operate.

REPORT STATUS

The columns reported by the default **fsdevice**(1) command are as follows:

System Device Path
SCSI Device Path
Vendor
Product
Revision
Serial Number
Host Bus
Channel
SCSI ID
Logical Unit Number (LUN)
Device Type (0 - direct; 1 - sequential; 8 - changer)
Is Configured in StorNext (0 or 1)

OPTIONS

-s Prints the slot to device path mapping for supported scsi archives

-l List devices in a human readable format

-b When multiple paths to the devices are present, this option will report each device only once by first using a round-robin load balancing scheme across the detected host buses. The result will be a unique set of devices reported instead of the duplicated list normally printed in the default report of **fsdevice**(1) or by **fs_scsi**(1).

-f Unlike the default detection that starts with probing all SCSI devices seen from the server, this will look to StorNext's configuration databases and files to detect the devices. SCSI Information Inquiry information will then be used to fill in the information for the devices. The resulting list will be only the items configured into StorNext.

-c *criteria*

The text to filter the devices on. The criteria will be compared against the vendor, product, serial number, device type string (e.g. sequential, direct, changer), system device, SCSI path, configured name, and the unique id. Any partial match will be reported.

EXAMPLES

To look for all Quantum products in a human readable format issue:

```
fsdevice -c Quantum -l
```

To look for all disk devices:

```
fsdevice -c 'direct access'
```

or, more simply:

```
fsdevice -c direct
```

To look for all configured disk devices:

```
fsdevice -fc direct
```

SEE ALSO

fs_scsi(1), **fsconfig**(1), **cvlabel**(8), **vsarchiveqry**(l), **vsdriveqry**(l), **dbdrvslot**(1M)

NAME

fsdirclass − Report the policy class associated with a directory.

SYNOPSIS

fsdirclass [**-F** *type*] *directory*

DESCRIPTION

The **fsdirclass**(1) command displays the directory-to-policy class association of the specified directory. If the directory specified is not associated with a policy class, an error message is issued.

REPORT STATUS

The report produces the following information:

Directory Name
: The directory path

Class
: The policy class name associated with the directory

OPTIONS

directory
: The directory path name for which the associated policy class is returned. The name must be less than 256 characters long. The entire path name need not be entered. The directory path will be resolved using the current working directory. If preceded by a slash (/) in the command definition, the full path name, starting from the root directory, is required as input to the command. Otherwise, the Tertiary Manager software expands the directory name using the current working directory as the parent.

-F *type*
: Sets the output format to the specified *type*. Valid values are **TEXT** (default) or **JSON**.

  TEXT is the "legacy" textual format.

  JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application. See http://json.org for more information.

SEE ALSO

fsclassinfo(1)

NAME

fsdiskcfg − Configure or report all storage disks in the Quantum storage system.

SYNOPSIS

fsdiskcfg -a -p *pathname* [**-c** *copy*] [**-s** *streams*] *alias*

fsdiskcfg -m [**-p** *pathname*] [**-c** *copy*] [**-s** *streams*] *alias*

fsdiskcfg -d *alias*

fsdiskcfg -l

fsdiskcfg -r *alias*

fsdiskcfg [*alias*]

DESCRIPTION

The **fsdiskcfg**(1) command adds, modifies, deletes, and reports configuration settings for storage disks in the Quantum storage system. Storage disks are used by the Tertiary Manager software as secondary storage similar to tape media.

For any **fsdiskcfg**(1) command option, the Tertiary Manager software can be active or inactive.

Submitting the **fsdiskcfg**(1) command with no options generates a report showing all Quantum storage disks that are currently configured. A report for one storage disk can be generated by specifying the corresponding *alias*. Alias names are case sensitive and must match exactly or the request will fail. Additionally, the **-l** option can be used to generate a list of file system mount points which could possibly be used as a storage disk.

The **fschstate**(1) command can be used to change the state of a storage disk once it has been configured.

OPTIONS

-a Add a new storage disk. The alias and path are required values. If the command is invoked and any of these parameters are omitted, an error message is returned. The error message identifies the field that was not entered.

-m Modify a storage disk. The alias and at least one modifier is required. The alias cannot be modified.

-d Delete a storage disk. The alias is required. A storage disk can not be deleted if it contains copies of any user data. The **fsrminfo**(1) command can be used to purge any data prior to removing a storage disk from the configuration.

-l List candidates. This will provide a list of file system mount points that could be used for a storage disk. It is possible that some entries in the list are not usable due to permissions. This is validated when a specific path is specified when adding a storage disk. This list will not include file systems which are already being used for a storage disk.

alias Alias. An alias is a variable string of up to 16 characters. If the alias contains spaces, use single quotes around the string. Duplicates are not allowed. This command is case sensitive. The *alias* is used to uniquely identify a storage disk.

-p *pathname*
Storage disk directory pathname. The pathname is required for configuring new storage disks and consists of a variable string of up to 255 characters. Duplicate pathnames are not allowed nor are two pathnames residing under the same mount point. A pathname which resides under a relation point, in a temporary file system, or in the root file system will not be allowed either.

-c *copy* File copy number. Media are associated with a specific file copy number. This is done so all copies are stored to different media. Due to the limited number of storage disks, it may be desirable to pre-configure the copy number that is associated with a storage disk for systems using multiple copies. This ensures that there is a storage disk available for each copy.

-r Refresh the available and used space of the storage disk. This is required when the storage disk space has been reconfigured - extended or reduced.

-s *streams*

Maximum number of I/O streams. This allows the number of concurrent I/O operations for a storage disk to be adjusted. The specified value must be greater than 0.

RESTRICTIONS

The system will only allow a maximum of 16 storage disks to be configured.

The file system associated with the *pathname* for the storage disk must be mounted when performing add, modify or delete operations.

SEE ALSO

fschstate(1), **fsrminfo**(1)

NAME

fsdismount − Unmounts specified drive or media.

SYNOPSIS

fsdismount [**-w**] *drivealias*

fsdismount -m *mediaID*

DESCRIPTION

The **fsdismount**(1) command unmounts a medium from a drive. The drive state can be on-line or off-line for the **fsdismount**(1) command to be issued. It is recommended that the drive be placed in the off-line state using the **fschstate**(1) command before performing the dismount if multiple requests are allocated against that medium. If the drive was placed in the off-line state, any additional queued request against that medium will be suspended until the drive is transitioned back to the on-line state.

If the drive with the medium to be dismounted is in use (retrieve or store) when the **fsdismount**(1) command is executed, an error message will be returned. The error message notifies the user that the **fsdismount**(1) command has failed because medium is being accessed or delayed in dismount. Executing the **fsstate**(1) report for the drive shows the status state of the drive.

The **-w** option forces the **fsdismount**(1) command to wait for the medium to enter the appropriate state instead of failing. Once the drive enters the *DELAYED* or *FAILED* status state, the medium will be dismounted from the drive.

If **-m** option is used to dismount a specific media ID, then it is unnecessary to run the **fschstate**(1) command if the **fsmount**(1) command was used to get the media mounted. The **fsstate**(1) report will show the status state for drive with this media mounted as *USER MOUNT*. If the media was mounted with **fsmount**(1) then the **-m** option must be used to dismount the media. If the media was mounted by other Tertiary Manager processing then all rules and restrictions when dismounting by drive alias apply.

OPTIONS

drivealias

Drive alias. A drive alias is a variable string of up to 255 characters. If the drive alias contains spaces, use single quotes around the string.

-w Suspends dismount request until drive completes all queued requests and enters appropriate state for dismount to occur.

-m *mediaId*

Dismount by media id. The media identifier must not be longer than 16-characters and will be known by the Media Manager software but may or may not be known to the Tertiary Manager software.

NOTES

The Media Manager software should not be used to dismount a medium from a drive when the Tertiary Manager was used to mount it.

This command is not valid for storage disks.

SEE ALSO

fschstate(1), **fsconfig**(1), **fsmount**(1)

NAME

fsdrvclean − Cleans the specified drive.

SYNOPSIS

fsdrvclean *drivealias*

DESCRIPTION

The **fsdrvclean**(1) command mounts a cleaning medium into the specified drive. If the drive state is not on-line or cleaning is in progress for the drive, then the request will fail.

OPTIONS

drivealias

Drive alias. A drive alias is a variable string of up to 255 characters. If the drive alias contains spaces, use single quotes around the string.

NAME

fsdumpfind − Utility used by foreign file system migration to dump the namespace information needed by SNSM.

DESCRIPTION

The **fsdumpfind**(1) utility is used by foreign file system migration to dump the namespace information needed by SNSM.

WARNINGS

Users should not run this command, unless directed to do so by Quantum technical assistance.

NAME

fsdumpnamespace − get namespace data from a foreign server

SYNOPSIS

fsdumpnamespace *foreignHost foreignDumpDir foreignWorkingDir outputDir*

DESCRIPTION

This script will put dump namespace scripts on the foreign host. Then it will execute the scripts on the foreign host, dumping the foreign namespace. The results are then retrieved and put into *outputDir*/**dump.txt** and *outputDir*/**dumpErrors.txt**. The **dump.txt** file can then be used as input for the **fsimportnamespace**(1) command.

The *foreignDumpDir* is the root directory for the namespace dump. It must be an absolute directory name (e.g. /usr/local instead of local").

The *foreignWorkingDir* will be used as storage for the dump scripts and for the the dump data. Please ensure that the *foreignWorkingDir* has sufficient free space. The files in the *foreignWorkingDir* are not cleaned up after the command completes.

The *outputDir* will be used as the output destination for the dump.txt and dumpError.txt files. Please ensure that the *outputDir* has sufficient free space. After the command completes, it is strongly recommended that the **dump.txt** and **dumpError.txt** files are archived.

The amount of space can vary based on lengths of filepaths, but estimate .5GB per million files and directories to be dumped (on both the *foreignWorkingDir* and the *outputDir*).

Note that the dump process can take a long time, depending on the system size and speed.

The caller's **netrc**(4) file must be set up for the FTP to the foreign host. The caller should also have a **rhosts**(4) file set up so that **rsh**(1) can be used to execute commands on the foreign host.

NAME

fsechostderr − Utility used by foreign file system migration to echo what is passed to it to standard error.

SYNOPSIS

fsechostderr *text*

DESCRIPTION

The **fsechostderr**(1) utility is used by foreign file system migration to echo what is passed to it to standard error.

WARNINGS

Although running **fsechostderr**(1) utility stand alone will not harm anything, it is used by foreign file system migration and is not intended to be run stand alone.

NAME

fsexclusioncheck − checks files against exclusion criteria

SYNOPSIS

fsexclusioncheck -h

fsexclusioncheck [**-ds**] [**-t** *type*] [**-c** *criteria_file*] *file...*

DESCRIPTION

The **fsexclusioncheck**(1) command will allow you to verify that the criteria in the exclusion files will work as expected. Criteria specifications can be checked against file names/paths without impacting the system if the alternate criteria file is specified. The command outputs the complete file path(s) and text indicating if they meet or do not meet the exclusion criteria.

OPTIONS

-h Displays usage

-d Turns on debug logging, which appears in /tmp/logs.

-s Silently executes the check without generating any output

-t *type* The valid types are *store*, *truncate*, and *postrestore*. The default is *truncate*. The selected type will determine which exclusion criteria file is to be used unless the **-c** option is used. It will also affect how the specified files are processed. For store exclusions only the file name is used, while the other exclusion types use the full path name.

-c *criteria file*

This specifies an alternate criteria file to use instead of the one corresponding to the type of exclusion check being requested. This is useful for validating criteria before putting them into production. The default exclusion files used for each type are:

store	*/usr/adic/TSM/config/excludes.store*
truncate	*/usr/adic/TSM/config/excludes.truncate*
postrestore	*/usr/adic/TSM/config/excludes.postrestore*

file... The file name/path to validate.

RETURN VALUE

0 When none of the specified files meet the exclusion criteria.

1 When all of the files meet the criteria.

2 When some of the files meet the criteria, or any error.

EXAMPLES

Example 1: Checking a file that meets store exclusion criteria against the default store exclusion file. The following shows the command and its output:

```
example% fsexclusioncheck -t store /sn/fs1/policyclass/myfile
/sn/fs1/policyclass/myfile is excluded
```

Example 2: Checking a file that meets truncation exclusion criteria against the default truncation exclusion file. The following shows the command and its output:

```
example% fsexclusioncheck /sn/fs1/policyclass/myfile
/sn/fs1/policyclass/myfile is excluded
```

Example 3: Checking files that do not meet truncation exclusion criteria based on criteria in the testCriteria exclusion file. The following shows the command and its output:

```
fsexclusioncheck -t truncate -c testCriteria fileA fileB
/sn/fs1/policyclass/fileA is not excluded
/sn/fs1/policyclass/fileB is not excluded
```

SEE ALSO

exclusions(4)

NAME

fsextlog − Extract the contents of a system log file.

SYNOPSIS

fsextlog *logfilename* [**-t** *starttime* [*endtime*]]

DESCRIPTION

The **fsextlog**(1) command extracts information from any of the Tertiary Manager system logs. The information is returned to *stdout*. If no options are specified, all of the information in the specified log is extracted by default.

The time range option (**-t** *starttime*) extracts only information stored in the log over the time frame specified. If specified, the *starttime* and *endtime* must be before the current time, and the *starttime* must be before the *endtime*. If no *endtime* is specified, *endtime* defaults to current time.

OPTIONS

logfilename

File name of a Tertiary Manager log file - The full file path name does not have to be entered. If preceded by a slash (/) in the command definition, the full path name, starting from the root directory, is required as input to the command. Otherwise, the Tertiary Manager command expands the directory name using the current working directory as the parent.

-t *starttime* [*endtime*]

Time range on which to report. The format for the time parameter is MM:DD:hh:mm:ss, where:
MM = Numeric, two-digit month
(default:01 (January)),

The following are optional; defaults are shown:,
DD = Numeric, two-digit day
(range: 01-31, default:01),
hh = Numeric hour
(range: 00-23, default:00),
mm = Numeric minute
(range: 00-59, default:00),
ss = Numeric second
(range: 00-59, default:00)

NAME

fsfilecopy − Copies files for replacement.

SYNOPSIS

fsfilecopy *filename...* **-r -d** *destinationmediaID* [**-c** *copynum*] [**-s** *sourcedrivepool*] [**-v** *destinationdrivepool*] [**-T ANTF**|**LTFS**] [**-G y**|**n**] [**-e** *encryptiontype*] [**-M** *mkeyname*] [**-q** *compressiontype*]

fsfilecopy *filename...* **-r** [**-b**] [**-t** *mediatype*] [**-c** *copynum*] [**-s** *sourcedrivepool*] [**-v** *destinationdrivepool*] [**-T ANTF**|**LTFS**] [**-G y**|**n**] [**-e** *encryptiontype*] [**-M** *mkeyname*] [**-q** *compressiontype*]

DESCRIPTION

The **fsfilecopy**(1) command replaces the primary or specific copy of files from a medium by duplicating them on another medium. Files located on the original medium are copied onto a blank or nonblank medium.

Non-active (deleted) files are not copied. These files remain on the original medium and cannot be accessed or copied to another medium unless the file(s) is recovered using the **fsrecover**(1) command.

The **-r** option is used to replace a file or files on a medium by moving data to a different medium. By default the primary copy of the file(s) is used unless the **-c** option is specified. If the requested copy is not available the **fsfilecopy**(1) command will fail. Files located on the source medium are copied onto blank (**-b**) or nonblank medium. After **fsclean**(1) is invoked, any inactive file versions will be removed, and the original medium will be marked as blank if all the files on the original medium have been replaced. The original medium can stay within the policy class or can be moved to the system blank pool, depending on the policy class attributes. If **fsclean**(1) is not performed, or some files still exist on the original medium, the medium will remain within the policy class and new files will be written to the medium. If a nonblank medium (**-d**) is chosen, files from the source medium will be appended to the destination medium. If sufficient room is not available on the destination medium, a message will be returned showing the number of file(s) not copied.

Execution of the **fsfilecopy -r** command may be time consuming if a large number of files exist on the medium. The extensive database activity caused by **fsfilecopy -r** impacts the performance of most other Tertiary Manager commands. It is recommended that **fsfilecopy -r** be run during a time of little or no use of Tertiary Manager software if a large number of files need to be replaced.

The **-s** option will copy files using only drives for the source media that are associated with the specified drive pool.

The **-v** option will copy files using only drives for the destination media that are associated with the specified drive pool.

OPTIONS

-r Copies specified file(s) to a medium and deletes all specified file(s) on the original medium. Copying files from Q-Cloud Vault media or AWS Glacier media is not supported.

-c *copynum*
Specify file copy number to replace. This option affects all specified files. Without this option the primary copy of the file(s) is used.

-b Specify blank media for destination copy. This option is not supported for Object Storage media.

-d *destinationmediaID*
Destination media identifier. Allows user to specify where file(s) will be copied.

filename...
The path name of at least one file is required. The full file path name does not have to be entered. The file name will be resolved from the current working directory. If preceded by a slash (/) in the command definition, the full path name starting from the root directory is required as input to the command. Otherwise, the Tertiary Manager command expands the directory name using the current working directory as the parent. Multiple filenames must be separated by spaces

-s *sourcedrivepool*

Media Manager drive pool group from which the source drive will be selected when copying the specified files. The drive pool must be defined in Media Manager software. If the **-s** option is not used, the default drive pool group will be specified by the policy class definition. The special "_" character is permitted to identify the drive pool group.

-t *mediatype*

Defines the type of medium to be used for replacement. Depending on the platforms used, the following media types are supported by Tertiary Manager software:

AIT
AITW
AWS
AZURE
LATTUS
S3
QVAULT
S3COMPAT
LTO
LTOW
SDISK
3590
3592
9840
9940
T10K
DLT4
DLT2 (SDLT600 media)

If **-t** is not specified, the policy class definition will be used.

-v *destinationdrivepool*

Media Manager drive pool group from which the destination drive will be selected when copying the specified files. The drive pool must be defined in Media Manager software. If the **-v** option is not used, the default drive pool group will be specified by the policy class definition. The special "_" character is permitted to identify the drive pool group.

-T ANTF|LTFS

Specifies the media format type that will be used when formatting or selecting media. **ANTF** is the Quantum internal tape format. **LTFS** is the Linear Tape File System specification tape format. A value of **ANTF** will format media with a single partition containing ANTF volume labels. This data partition will store StorNext file data. A value of **LTFS** will format media with two partitions containing LTFS volume labels. The index partition will store LTFS metadata and the data partition will store StorNext file data. The **LTFS** media format type is only applicable to LTO media generation 5 and beyond (e.g. LTO-5, LTO-6, etc). Any attempt to assign **LTFS** to non-LTO media types will result in an error.

If the **-T** option is not specified, the default will be determined as follows:

A media type of Lattus will default to **NONE**.
A media type that does not support **LTFS** will default to **ANTF**.
A media type that supports **LTFS** will default to the policy class copy definition.

-G y|n Generate and maintain a checksum for each copied file. When this option is enabled, a checksum will be generated as each file is written (stored) to the new media. Policy class settings are not used when this option is not specified, so it defaults to 'n'. Any file being copied that already had a checksum generated will ignore this option and continue to use the existing value.

-e *encryptiontype*

The encryption algorithm to be applied to the content of files stored into an Object Storage system. This option is ignored for all other media types. Currently, the following encryption types are supported:

0 None (No encryption)

1 SERVER_AES256 (Server-side AES256 encryption)
This encryption type is valid only if supported by the Object Storage system.

2 CLIENT_AES256 (Client-side AES256 encryption)
This encryption type is supported only on Object Storage systems from providers QCV1 and QVV1.

If this option is not specified, the encryption type will be set to None. Please note that copying of a file that had client-side encrytion enabled from the source media to the destination media with client-side encryption enabled is not supported. All other copying combinations involving client-side encryption are supported.

-M *mkeyname*

The Master Key name that is required by and used for the client-side encryption service. Refer to **fskey**(1) man page for how to create a Master Key name.

-q *compressiontype*

The compression algorithm to be applied to the content of the file stored into Object Storage systems. This option is ignored for all other media types. Furthermore, this option is only supported on Object Storage system from providers QCV1 and QVV1. Currently, the following compression type values are supported:

0 None (No compression)

1 CLIENT_LZ4 (Client-side LZ4 compression)

If this option is not specified, the compression type will be set to None. Please note that copying of a file that had client-side compression enabled from the source media to the destination media with client-side compression enabled is not supported. All other copying combinations involving client-side compression are supported.

SEE ALSO

fsmedout(1), **fsmedinfo**(1), **fsrecover**(1), **fschmedstate**(1), **fskey**(1)

NAME

fsfileinfo − Generate a report about files known to the Tertiary Manager.

SYNOPSIS

fsfileinfo [**-c**] [**-e**] [**-q**] [**-o**] [**-u**] [**-F** *type*] *filename...*

fsfileinfo [**-c**] [**-e**] [**-q**] [**-o**] [**-u**] [**-F** *type*] **-R** *directory*

fsfileinfo [**-c**] [**-e**] [**-q**] [**-o**] [**-u**] [**-F** *type*] **-B** *batchfilename*

DESCRIPTION

The **fsfileinfo**(1) command reports the current location(s) of files, whether on disk, on a particular medium, or not in the SNSM system. It also shows file attribute information.

REPORT STATUS

The processing parameters listed by the **fsfileinfo**(1) command are as follows:

Filename	The full path name where the file is located
Stored Name	The full path name of the file when it was stored. It will be different than *Filename* when the file has been renamed.
Last Modification	The date and time the file was last modified
Owner	The owner of the file
Group	The group to which the file belongs
Access	The file permission for the file
Class	The policy class governing the file
Store	How storage policies operate on the file. Values are: **MINTIME**, **NEVER**, **EXCLUDE**
Trunc	How truncation policies operate on the file. Values are: **MINTIME**, **IMMEDIATE**, **NEVER**, **EXCLUDE**
Reloc	How relocation policies operate on the file. Values are: **MINTIME**, **NEVER**
Clean Database	Indicates if database entries are cleaned when file is removed
Affinity	The disk affinity on which the file resides
Media	The media identifier and media copy number; (1) is the primary copy, (2) is the secondary, etc.
File size	The size of the file in bytes
Location	The location where the file data currently resides. Values are: **DISK**, **DISK AND ARCHIVE**, **ARCHIVE** (where **ARCHIVE** indicates TAPE, SDISK, or Object Storage media).
Existing Copies	The number of media copies that currently exist for the file
Target Copies	The number of media copies that should exist for the file
Existing Stub (KB)	The existing stub size (in kilobytes). This is the actual stub size if the file is only located on storage media, otherwise it is 'n/a'.
Target Stub (KB)	The truncation stub size (in kilobytes). This value is used to determine the number of bytes to leave on disk when the file is truncated. It will be the minimum number of bytes left on disk (the value is rounded up to a multiple of the file system block size).
Alternate Class	The policy class which is used instead of the primary class when policies are run
Checksum	**Y**|**N** to show whether a checksum value has been generated for the file
Encryption	**Y**|**N** to show whether encryption was applied to the Object Storage copy of the file

Alt Store Copy **Disabled**|**Enabled** to show whether the file is eligible for an Alternate Store Location copy. If **Enabled**, additional information will be displayed to indicate whether a copy of the file is **Needed** or **Exists**.

Compression **Y**|**N** to show whether compression was applied to the Object Storage copy of the file

Object Ids **Y**|**N** to show whether the file has any objects stored to the Object Storage

OPTIONS

filename...

The path name of at least one file is required. The full file path name does not have to be entered. The file name will be resolved from the current working directory. If preceded by a slash (/) in the command definition, the full path name starting from the root directory is required as input to the command. Otherwise, the Tertiary Manager command expands the directory name using the current working directory as the parent. Multiple filenames must be separated by spaces.

-R *directory*

The directory from which to start the recursive operation. All entries from the specified directory and any subdirectories will be processed.

-B *batchfilename*

The batch file contains the list of entries to be processed. Each entry must be listed one per line. Do not enclose the entry in quotes, use escape characters or any character not in the actual name.

-c If checksum was turned on for the file when stored and this option is specified, the checksum value generated for the file will be displayed.

-e If encryption was turned on for the file when stored and this option is specified, the encryption type for the file will be displayed.

-q If compression was turned on for the file when stored and this option is specified, the compression type, size, and ratio for the file will be displayed.

-o If the file has a copy or more stored to Object Storage, then the object ids will be displayed. Offset information will also be displayed for each object id.

-u If the file has a copy or more stored to Object Storage, then the object URLs will be displayed. Object Storage configuration information is also displayed.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

SEE ALSO

fsmedinfo(1), **fsclassinfo**(1), **fsxsd**(1)

NAME

fsfiletapeloc − Generate a report about a file's tape copy location.

SYNOPSIS

fsfiletapeloc [**-c** *copy*] [**-F** *type*] *filename*

DESCRIPTION

The **fsfiletapeloc**(1) command reports the location information of the file's on-tape copies. The report will list all the segments belonging to the specified file copy.

REPORT STATUS

The following information is reported for each copy segment:

segnum	The segment number
media ID	The media ID where the segment resides
library ID	The library ID that the media belongs to
format	The format type of the tape (XML/JSON output only). Valid values: **ANTF**, **LTFS**, **UNKNOWN**
start blk	The block number where the segment starts
offset	The offset from the starting block where the segment starts. Note, the offset will always be zero for LTFS formatted tapes.
segsize	The length of the segment
blk size	The I/O block size for the media. Note, the block size will be -1 for AMASS media.

OPTIONS

filename

The path name of the file is required. The full file path name does not have to be entered. The file name will be resolved from the current working directory. If preceded by a slash (/) in the command definition, the full path name starting from the root directory is required as input to the command. Otherwise, the Tertiary Manager command expands the directory name using the current working directory as the parent.

-c *copy* The copy id to generate report for. If not specified, the information for the primary copy will be reported.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

NOTES

This command is only valid for file copies on tape media. It will not report anything for file copies on storage disks or Lattus.

SEE ALSO

fsfileinfo(1)

NAME

fsforeignstatus − Get status on the foreign background migration

SYNOPSIS

fsforeignstatus [**-errored**] [**-waiting**] [**-trashed**]

DESCRIPTION

This will provide a report on the foreign files background migration, on a per file system basis. By default, just the file counts for each category are shown.

Each one of the optional command line parameters will provide a full remote file listing for that category. The optional command line parameters can be abbreviated.

Errored files should be addressed. It is possible that they might never be migrated so they should be cleaned up. For example, if the file is removed from or changed on the foreign file system it will not be migrated. That file should be manually moved over or destroyed so that the background migration does not try to continually retrieve that file.

NAME

fsformat − Formats blank media for use.

SYNOPSIS

fsformat [**-f**] [**-T ANTF**|**LTFS**] *mediaID...*

fsformat -c *class* [**-q** *quantity*] [**-f**] [**-T ANTF**|**LTFS**]

fsformat -q *quantity* [**-f**] [**-T ANTF**|**LTFS**]

DESCRIPTION

The **fsformat**(1) command provides the capability to format one or more media based on the media identifier, policy class, or quantity.

Media are considered formatted after the volume label is written and can be formatted by class or by specifying a specific media identifier.

The **-q** option specifies quantity of media to be formatted in a class or in the general pool of blank media. If the **-q** option is not specified for **fsformat**(1) class, all blanks associated with the policy class specified will be formatted.

If format processing, either manual or automatic, failed for a particular medium, that medium is marked for ejection from the Quantum storage subsystem and is no longer considered as available for file storage. The user would have to change the state of the medium before the next format of the medium can be attempted.

OPTIONS

mediaID...

One or more media identifier(s) to be formatted. Multiple media identifiers must be separated by spaces.

-c *class* Specifies the policy class the medium is to be associated with when formatted.

-q *quantity*

Specified quantity of media to be formatted.

-f Forces the formatting of blank media that was previously used or formatted. Typically this option should not be needed, but may be required when introducing media that were used in another SNSM system. Format failure of a pre-formatted medium without the force option prevents accidentally formatting a medium containing data.

-T ANTF|**LTFS**

Specifies the media format type that will be used when formatting or selecting media. **ANTF** is the Quantum internal tape format. **LTFS** is the Linear Tape File System specification tape format. A value of **ANTF** will format media with a single partition containing ANTF volume labels. This data partition will store StorNext file data. A value of **LTFS** will format media with two partitions containing LTFS volume labels. The index partition will store LTFS metadata and the data partition will store StorNext file data. The **LTFS** media format type is only applicable to LTO media generation 5 and beyond (e.g. LTO-5, LTO-6, etc). Any attempt to assign **LTFS** to non-LTO media types will result in an error.

If the **-T** option is not specified, the default will be specified by the system parameter CLASS_MEDIA_FORMAT.

NOTES

This command is not valid for storage disks.

SEE ALSO

fsmedin(1)

NAME

fsgetclasses − Report all policy classes with association points in a file system.

SYNOPSIS

fsgetclasses [**-F** *type*] *filesystem*

DESCRIPTION

The **fsgetclasses**(1) command lists all policy classes that have association points within a specified file system. Policy class association points are added using **fsaddrelation**(1).

REPORT STATUS

The report produces the following information for each policy class that has at least one association in the file system:

File System Name
: The name of the mount point

Class
: The policy class name

OPTIONS

filesystem
: Name of the file system for which to generate policy class association report

-F *type*
: Sets the output format to the specified *type*. Valid values are **TEXT** (default) or **JSON**.

  TEXT is the "legacy" textual format.

  JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application. See http://json.org for more information.

SEE ALSO

fsdirclass(1), **fsaddrelation**(1), **fsclassinfo**(1)

NAME

fsgetforeign − Utility used by foreign file system migration to obtain a file from a foreign filesystem.

DESCRIPTION

The **fsgetforeign**(1) utility is used by foreign file system migration to retrieve a file from a foreign filesystem.

WARNINGS

Users should not run this command, unless directed to do so by Quantum technical assistance.

NAME

fshistrpt − Report history of hardware component state changes or media status changes.

SYNOPSIS

fshistrpt -h [*componentID...*] [**-t** *starttime* [*endtime*]] [**-f** *logfilename*]

fshistrpt -m *mediaID...* [**-t** *starttime* [*endtime*]] [**-f** *logfilename*]

DESCRIPTION

The **fshistrpt**(1) command lists the state changes of specified media or hardware components. The **-h** or **-m** option is required to indicate the report type.

The information gathered by **fshistrpt**(1) is maintained in the Tertiary Manager log files. The historical data for the media status is maintained in the *$FS_HOME/logs/history/hist_03* file. The historical data for components is logged to the *$FS_HOME/logs/history/hist_04* file. These are the default log files used, however a different log file can be specified using the **-f** option.

State changes that may occur for components are *on* and *off*. These changes occur by system administrator execution of the **fschstate**(1) command or internally by Tertiary Manager software. Valid state changes for media are *unavailable*, *available*, *protect*, *unprotect*, *unsuspect*, and *unmark*. Media state changes can occur using the **fschmedstate**(1) command or can be initiated by Tertiary Manager software.

The time range option (**-t** *starttime*) extracts only information over the time frame specified. If specified, the *starttime* and *endtime* must be before the current time, and the *starttime* must be before the *endtime*. If no *endtime* is specified, *endtime* defaults to current time.

OPTIONS

-h Historical report of component state changes.

componentID...

One or more component identifiers from which to give a historical report of the state changes. Because the component alias is configurable, the component identifier is given to obtain complete historical information.

-m *mediaID...*

One or more media identifiers from which to obtain a historical report of media status changes. Multiple media identifiers must be separated by spaces.

-t *starttime* [*endtime*]

The time range in which to print entries. If no end time is specified, the current time is used. The format for the time parameter is MM:DD:hh:mm:ss, where:

MM = Numeric, two-digit month
(default:01 (January)),

The following are optional; defaults are shown:,
DD = Numeric, two-digit day
(range: 01-31, default:01),
hh = Numeric hour
(range: 00-23, default:00),
mm = Numeric minute
(range: 00-59, default:00),
ss = Numeric second
(range: 00-59, default:00)

-f *logfilename*

File name of a Tertiary Manager log file - The full file path name does not have to be entered. If preceded by a slash (/) in the command definition, the full path name, starting from the root directory, is required as input to the command. Otherwise, the Tertiary Manager command expands the directory name using the current working directory as the parent.

SEE ALSO

fschstate(1), **fschmedstate**(1)

NAME

fsimportnamespace − take a dumped foreign server namespace and import the namespace into SNMS

SYNOPSIS

fsimportnamespace -relationPoint *dir* **-policy** *policy* **-namespaceFile** *file* **-hostname** *host* [**-continue**] [**-bypassdb**]

DESCRIPTION

This program takes a namespace dump file of a foreign server from the output of **fsdumpnamespace**(1). The entire namespace will be recreated in a StorNext filesystem. After the program completes the new namespace can be used like a normal StorNext filesystem. As files are used they will be migrated over from the foreign system as necessary. Also, there will be a background process that will migrate the unused files from the foreign server.

Please be aware that the import can take a long time to run. On a fast machine, using the **-bypass** option, it can take about one hour per 1.25 million files and directories. However, times vary depending on the hardware being used.

As this program runs it will build up temporary database files that will be loaded into the database after the namespace is created on disk. These temporary database files will be stored one directory above the relation point. It is recommended that they be archived after the import completes successfully.

Also, please note that the database must have enough disk space available for the import. The size required can vary greatly, but estimate .75 gigabytes per million files and directories imported. The space must be available on the filesystem that contains the StorNext installation.

OPTIONS

Options can be abbreviated to any length.

−relationPoint *dir*
: The relation point for the imported namespace. The relation point directory must be empty, unless the continue option is present.

−policy *policy*
: The policy class for the imported namespace.

−namespaceFile *file*
: The dumped namespace information *file* (*dump.txt*, usually) from the output of **fsdumpnamespace**(1).

−hostname *host*
: The foreign server's hostname.

−continue
: This option should only be used if a previous import ran for some time and then was interrupted for some reason. This option will cause the program to pick up the import at the point where the previous import stopped. It should only be used if the previous import ran for a significant amount of time. Continue mode can only be used if the file system has not been modified in any way since the previous import.

−bypassdb
: This option can be used to delay the loading of the database files after import. Using this option and then running the program indicated at the completion of **fsimportnamespace**(1) will be faster that running without this option. It is recommended to not use this option unless working directly with Quantum technical assistance personnel. To use this option the following conditions must be met:
- The Storage Manager software must be shut down.
- Backups must be performed before running **fsimportnamespace**(1)
- Backups must be performed after completing the database loading via another script (the location of which is shown after **fsimportnamespace**(1) completes).

RESTRICTIONS

This script must be run as root.

Hard links will be imported as individual files, not links.

Files with special characters will be imported with question marks replacing the special characters, but they will get errors when they are migrated. They will show up as errors in the **fsforeignstatus**(1) output and should be cleaned up accordingly.

SEE ALSO

fsdumpnamespace(1), **fsforeignstatus**(1)

NAME

fskey − Create, manage and report encryption keys in Quantum Cloud Storage system.

SYNOPSIS

fskey -a -n *mkname* **-p** *passphrase*

fskey -c *mkstoreid*

fskey [-l] [**-n** *mkname*] [**-F** *type*]

fskey -m -n *mkname* **-o** *passphrase* **-p** *passphrase*

fskey -r *mkstoreid* **-n** *mkname* **-p** *passphrase*

fskey -R -I *QCAI* **-P** *QCPK*

fskey -u -n *mkname*

DESCRIPTION

The **fskey**(1) command adds, modifies and reports master keys used in client-side encryption feature in the Quantum storage system. It can also be used to generate a new data protection key associated with a specific master key. A data protection key (DPK) is used to encrypt data content before it is uploaded to an Object Storage when the client-side encryption is enabled, while master keys are used to wrap (encrypt) data protection keys.

A master key's content is derived from a user-supplied passphrase. Each master key has a unique name. This unique key name can be assigned to a particular policy if the client-side encryption is enabled for this policy. The key content of a master key can be changed by providing a new passphrase. In this case, a new master key instance is created. The old instance is then removed after all data protection keys wrapped by the old instance are rewrapped by the new instance.

Each master key can be associated with multiple data protection keys. The latest data protection key associated with a master key is the active data protection key, which is used in the encryption of subsequent store operations with client-side encryption enabled policies.

Each data protection key has a unique id. This id is stored in the database when a file is successfully encrypted and uploaded to Object Storage. When a file stored with client-side encryption enabled is retrieved, the related data protection key id is retrieved first. It is then used to locate the corresponding data protection key data, which includes the associated master key instance. Then the master key instance is used to unwrap the data protection key. Thus the unencrypted data protection key is obtained and used to decrypt data received from Object Storage.

Master keys are stored in a local master key store file. Data protection keys are wrapped and stored in the Name Value Store (NVS) in Quantum Cloud Storage. In order to access NVS, Quantum Cloud Storage must have been configured. At the beginning, master key store is empty. Before adding a master key, a master key store must be created first. A key store id must be provided for the master key store.

In order to run this command, a valid encryption license must exist and Tertiary Manager software should be active.

REPORT STATUS

The encryption key report has two formats. If no master key name is specified, a summary of all existing master keys is reported:

Master Key Name
: The name of the master key

Creation Time
: The date and time of the initial creation of the key

Modification Time
: The date and time of the most recent modification to the key

Instances
The total number of instances of the key

If a master key name is specified (via the **-n** option), specific information for its instances is reported:

Creation Time
The date and time of the initial creation of the instance

Active An indication of whether the instance is active. Values are: **true**, **false**

Instance ID
The uuid of the instance

OPTIONS

-a Add a new master key. A unique master key name must be specified. After a new master key is created successfully, a data protection key associated with this master key is also created.

-c *mkstoreid*
Create a master key store with the master key store id. If master key store already exists, the command is rejected. A master key store id is a maximum of 15 alphanumeric characters. The special characters "-", "_" and "." are also permitted. This key store id must be unique within a user's administrative domain, e.g. if a corporate user has multiple StorNext clusters, each key store id must be unique for the master key stores created for the stornext clusters. This master key store id must be remembered since it is needed in the case of disaster recovery.

-l Report master key information. If no master key name is specified, the master key store id and a summary of all existing master keys is reported. If a master key name is specified, specific information for its instances is reported.

-m Change the key content of a master key with a new passphrase. In order to perform the change, the old passphrase must also be provided. This creates a new master key instance and a new data protection key associated with this key instance. The old instance is then removed from master key store after all data protection keys wrapped by the old instance are rewrapped with the new master key content.

-r Recover a master key in a master key store by a master key store id. A master key name and the corresponding passphrase used last time must be provided. This is used in disaster recovery where the local master key store file is lost. In such case, use this option to recover each master key in the master key store.

-u Create a new data protection key associated with the specified master key. The new data protection key becomes the active one and is used for subsequent store operations if the associated policy has client-side encryption enabled on and the specified master key name configured.

-n *mkname*
The master key name. This key name length is limited to 31 characters. Only alphanumeric characters and special characters '-', '_', and '.' are allowed.

-o *passphrase*
The old passphrase that was last used to generate master key content. This is used in changing master key content.

-p *passphrase*
The passphrase that is used to derive master key content. The length is limited to 127 characters. This passphrase must be remembered or be kept in safe place. It is needed for changing passphrase and the reconstruction of the master key store, in the case of disaster recovery.

-R To initialize the Name Value Store (NVS) in Quantum Cloud Storage during Disaster recovery. This is required, before Master Keys can be recovered during Disaster Recovery.

-I *QCAI*
Valid Q-Cloud Access Identifier. This identifier is given to the user when a Q-Cloud device is purchased.

-P *QCPK*

Valid Q-Cloud Product Identifier. This identifier is given to the user when a Q-Cloud device is purchased.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

EXAMPLES

To create a master key store "mks1":

```
fskey -c mks1
```

To create a master key "mk1" with passphrase "mypass":

```
fskey -a -n mk1 -p mypass
```

To change the passphrase from "mypass" to "mypassnew" for master key "mk1":

```
fskey -m -n mk1 -o mypass -p mypassnew
```

To change current data protection key for master key "mk1":

```
fskey -u -n mk1
```

To initialize the Name Value Store (NVS) in Quantum Cloud Storage during Disaster recovery.

```
fskey -R -I QCAI -P QCPK
```

To list all master keys:

```
fskey
```

SEE ALSO

fsaddclass(1), **fsmodclass**(1), **fsclassinfo**(1), **fsfileinfo**(1), **fsxsd**(1)

NAME

fslocate − Locates files/directories based on file keys.

SYNOPSIS

fslocate [**-d**] [**-f** *mount_point...*] [**-k** *key*[,*pkey...*]] [**-i**] [**-h**]

DESCRIPTION

The **fslocate**(1) command provides an interface to find the paths of files or directories based on file keys. The user can query for directories or files. They can also specify an optional list of file system mount points. If mount points are not specified, the utility will get a list of file system mount points from the database.

The utility also provides an interactive interface. The key list option cannot be used in conjunction with the interactive mode.

OPTIONS

-d This option denotes directory lookups.

-f *mount_point...*
This option contains a list of file system mount points which will be examined.

-k *key*[,*pkey*]...
This option contains a list of file keys with optional parent keys.

-i This option specifies that the interactive interface be used to query for keys.

-h This option specifies usage.

NAME

fsloglevel − Dynamically enables or disables TAC logs and perf logs for specified priorities.

SYNOPSIS

fsloglevel -s *state* **-l** *level*... **-p** *process*...

fsloglevel -s *state* **-l** *level*... **-a**

DESCRIPTION

The **fsloglevel**(1) command is used to control the logging output of Tertiary Manager resident processes. This command is usually used with assistance from Quantum technical assistance personnel to aid in obtaining additional information while investigating a potential problem.

TAC level messages or those messages with a priority of 8 through 16, inclusive, are written to the $FS_HOME/logs/tac/tac_00 file. These messages provide additional internal details about Tertiary Manager processing. If all these messages were enabled, large quantities of logging information could be generated consuming a large portion of disk space. Keeping these logs disabled during normal operations saves both disk space and time by not having to continually clean up the Tertiary Manager logs.

Performance trace messages are those messages which indicate performance of the Tertiary Manager system. These messages are written to the $FS_HOME/logs/perf directory. These logs are not needed during normal operations.

The **-l** option allows selection of the priority of messages to be enabled or disabled based upon the required **-s** option. Individual priorities or combination of priorities in the range from 8 through 16 can be specified, or *tac* can be specified to indicate all priority 8-16 messages are to be affected. Specifying *perf* affects performance-tracing messages.

The **-a** option specifies all resident processes are to be affected by the command.The **-p** option allows a list of resident Tertiary Manager processes to be specified.

OPTIONS

-s *state* Used to enable or disable log levels of a Tertiary Manager resident process. Valid inputs are *on* or *off*.

-l *level* The priority levels to be altered. Valid entries are *perf*, *tac*, and levels *8* through *16*. *tac* indicates all level 8-16 messages are to be affected. *perf* controls performance trace messages.

-a Indicates all Tertiary Manager resident processes will be affected by this command.

-p *process*
The resident process name for which log messages will be changed.

NAME

fsmedcopy − Move media content, defragment media, or generate a media fragmentation report.

SYNOPSIS

fsmedcopy [[**-d** *mediaID*] | [-b][-t *mediatype*]] [**-a**] [**-c** *class*] [**-s** *drivepool*] [**-v** *drivepool*] [**-u** *runtime*] [**-T ANTF**|**LTFS**] [**-G y**|**n**] [**-e** *encryptiontype*] [**-M** *mkeyname*] [**-q** *compressiontype*] [**-F** *type*] **-r** *mediaID...*

fsmedcopy [**-f** *fill*] [**-w** *fragmentation*] [**-F** *type*] [*mediaID...* | -i]

DESCRIPTION

The **fsmedcopy**(1) command can be used to move the contents from one storage medium to another or to generate a fragmentation report.

The files on a particular medium can be moved to other available media using the **-r** option. By default, an available destination medium within the same policy class is chosen. A blank medium is picked if there are no available media within the policy class. A specific destination medium can be specified with the **-d** option, a blank destination medium can be specified with the **-b** option, or a medium of a different type not in the policy class can be specified with the **-t** option.

If a destination medium is not specified, **fsmedcopy** will use up to three destination media to complete the copy process. Typically, only one media is required, but there are cases where more than one destination media might be required. When the destination is specified, the copy process will be stopped after the originally selected destination media runs out of available space. If three media have been used, and the copy has not completed, the copy process will stop, and the command will exit with a return value of 1, indicating failure. (A return value of 0 indicates success.) The command output will also indicate that some files could not be copied. Note that all files copied up to that point will be fine. The command will just need to be restarted if there are still files on the source medium to be copied.

If multiple media IDs are specified, it is recommended that the state of each medium be changed to *protect* using the **fschmedstate -s** command before executing the **fsmedcopy**(1) command. This is only necessary to ensure no more files are stored to the specified source media prior to the copy operation.

After a file is successfully copied to the new medium, the original file's information in the system is updated with information about the new medium. This logically moves the file from the original medium to the new medium.

If the process is taking too long, it can be canceled using Control-C, or if the request ID is known, the **fscancel**(1) command can be used.

Media Maintenance

If errors occur frequently when attempting to write or read from a particular medium (possibly due to a medium that is reaching the end of its life), a user may want to use the **fsmedcopy -r** command to move all the data to a new or more reliable medium.

A medium may contain inactive file versions. Inactive file versions are file copies for which the original file has been changed or deleted since the copy was made. These inactive versions are NOT copied by default during the **fsmedcopy** operation. To change this behavior, use the -a option to copy inactive file versions along with the active version.

Media Defragmentation

Inactive file versions cause a medium to be filled with unusable space that the user may want to reclaim. These inactive versions are NOT copied by default during the **fsmedcopy -r** operation. This process in effect achieves a defragmenting of the media by keeping data for only active file versions.

Note: After all active file versions are copied, the source medium will revert to a blank status only if it does not contain any inactive file versions. If it does contain inactive file versions, the user must clean up the inactive file versions on the source medium with the **fsclean**(1) command in order for the source medium to become blank. This operation can be performed before or after the **fsmedcopy** operation.

Media Defragmentation Report

When no options are specified, the **fsmedcopy** command generates a report of all media in the system that fit the evaluation criteria for wasted space. The user can specify fill level (**-f**) and fragmentation level (**-w**) to use as the criteria, and whether to ignore media in a vault (**-i**). A report on all media in the system may be lengthy, therefore the user may choose to limit the report by specifying only certain media IDs.

The fill level is the percentage of total space used. The fragmentation level is the percentage of inactive data, based on the amount of space used, not the total available space. Based on this criteria, a list of media that are candidates for defragmentation is generated. The user may use this report to determine which media need to be defragmented.

It should be noted that the fill and fragmentation levels are calculated values based on current media characteristics. Internally to the command the values for these calculated percentages are kept to the calculated precision. This can cause some confusion when generating reports while using the (**-f**) or (**-w**) options; that is since the values are rounded when reporting to the nearest hundredths. For example the actual fill percentage for a media may be 50.4999999 percent but is reported as 50.50. If a second report is requested using a fill level of 50.5 the media in question will not be reported in this case since it is actually less than 50.5. Another example of a way in this can be observed is when a media has nothing but wasted space. The calculation for getting wasted space can internally produce a value 99.9999999 percent wasted space; the report however of wasted space will indicate 100 percent. Running a report requesting only media that have 100 percent wasted will not include this media. Note that the rounding done when printing works both ways so the actual values my be slightly larger or smaller than what is shown in the report.

REPORT STATUS

The defragmentation report produces the following information for each medium:

Media ID	The media ID
Fill Level	The fill level of the medium as a percentage
Wasted Space	The amount of wasted space as a percentage
Segment Count	Total number of segments on the medium
Available	The availability of the medium. Values are: **Y**, **N** Additional values for TEXT output only are: **Y (Vault)**, **N (Vault)**
Vaulted	Whether the medium is vaulted (XML/JSON output only). Values are: **Y**, **N**

OPTIONS

mediaID...

The media IDs for which to generate a fragmentation report.

-i Denotes to ignore media in a vault when reporting the media fragmentation.

-f *fill* Fill level threshold between 0 and 100 percent. The percentage of the medium that has been written, including active and inactive file versions. A default of 0 percent is used if not specified. See the Media Defragmentation section above for more information on the fill percentage.

-w *fragmentation*

The percent (0-100) of wasted space out of the filled space on a medium. The percentage is based on the amount of filled media space, not the total capacity of the medium. A default of 0 percent is used if not specified. See the Media Defragmentation section above for more information on the wasted space percentage.

-r *mediaID...*

Initiates file data movement from the specified source media ID(s). Note that copies from Q-Cloud Vault media or AWS Glacier media are not supported.

-a Indicates all files (active and inactive versions) are to be copied from the source medium. After all versions are copied, the source medium will revert to blank status.

-c *class* Copy only data file(s) belonging to the specified class. Note, this is useful only for non-tape media which are not associated with a single policy class.

-d *mediaID*

Use the given media ID as the destination medium.

-b Use blank media for destination media. This option is not supported for Object Storage media.

-t *mediatype*

The type of destination medium to be used. Depending on the platform used, the following media types are supported by Tertiary Manager software:

AIT
AITW
AWS
AZURE
LATTUS
S3
QVAULT
S3COMPAT
LTO
LTOW
SDISK
3590
3592
9840
9940
T10K
DLT4
DLT2 (SDLT600 media)

If **-t** is not specified, the policy class definition will be used.

-s *drivepool*

The drive pool from which the source drive will be selected when copying files from the specified medium. If the **-s** option is not used, the default drive pool will be dictated by the policy class definition. The special "_" character is permitted to identify the drive pool.

-v *drivepool*

The drive pool from which the destination drive will be selected when copying files from the specified media. If the **-v** option is not used, the default drive pool will be dictated by the policy class definition. The special "_" character is permitted to identify the drive pool.

-u *runtime*

Maximum allowable time in hours for the command to finish.

-T ANTF|LTFS

Specifies the media format type that will be used when formatting or selecting media. **ANTF** is the Quantum internal tape format. **LTFS** is the Linear Tape File System specification tape format. A value of **ANTF** will format media with a single partition containing ANTF volume labels. This data partition will store StorNext file data. A value of **LTFS** will format media with two partitions containing LTFS volume labels. The index partition will store LTFS metadata and the data partition will store StorNext file data. The **LTFS** media format type is only applicable to LTO media generation 5 and beyond (e.g. LTO-5, LTO-6, etc). Any attempt to assign **LTFS** to non-LTO media types will result in an error.

If the **-T** option is not specified, the default will be determined as follows:

A media type that does not support **LTFS** will default to **ANTF**.
A media type that supports **LTFS** will default to the policy class copy definition.

-G y|n Generate and maintain a checksum for each copied file. If this option is enabled, a checksum will be generated as each file is written (stored) to the new media. Policy class settings are not used when this option is not specified so it defaults to 'n'. Any file being copied that already had a

checksum generated will ignore this option and continue to use the existing value.

-e *encryptiontype*

The encryption algorithm to be applied to the content of files stored into an Object Storage system. This option is ignored for all other media types. Currently, the following encryption types are supported:

0 None (No encryption)

1 SERVER_AES256 (Server-side AES256 encryption)
This encryption type is valid only if supported by the Object Storage system.

2 CLIENT_AES256 (Client-side AES256 encryption)
This encryption type is supported only on Object Storage systems from providers QCV1 and QVV1.

If this option is not specified, the encryption type will be set to None. Please note that copying of a file that had client-side encrytion enabled from the source media to the destination media with client-side encryption enabled is not supported. All other copying combinations involving client-side encryption are supported.

-M *mkeyname*

The Master Key name that is required by and used for the client-side encryption service. Refer to **fskey**(1) man page for how to create a Master Key name.

-q *compressiontype*

The compression algorithm to be applied to the content of the file stored into Object Storage systems. This option is ignored for all other media types. Furthermore, this option is only supported on Object Storage system from providers QCV1 and QVV1. Currently, the following compression type values are supported:

0 None (No compression)

1 CLIENT_LZ4 (Client-side LZ4 compression)

If this option is not specified, the compression type will be set to None. Please note that copying of a file that had client-side compression enabled from the source media to the destination media with client-side compression enabled is not supported. All other copying combinations involving client-side compression are supported.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

NOTE

fsmedcopy only supports the following source to destination media combinations:

Tape to Tape
Tape to Object Storage

Object Storage (except QVAULT and Glacier) to Object Storage
Storage Disk to Object Storage

SEE ALSO

fsmedout(1), **fsrecover**(1), **fsmedinfo**(1), **fscancel**(1), **fsqueue**(1), **fsversion**(1), **fsdefrag**(1), **fskey**(1)

NAME

fsmedin − Logically enters media into the Tertiary Manager system from the Media Manager system.

SYNOPSIS

fsmedin -r [**-F** *type*] [**-q** *quantity*] [**-t** *mediatype*]

fsmedin -b [**-F** *type*] [**-q** *quantity*] [**-t** *mediatype*] [**-w**] [**-c** *class*]

fsmedin -b [**-F** *type*] [**-w**] [**-c** *class*] *mediaID...*

fsmedin -b [**-F** *type*] [**-q** *quantity*] [**-t** *mediatype*] [**-c** *class*] [**-T ANTF**|**LTFS**]

fsmedin -b [**-F** *type*] [**-c** *class*] [**-T ANTF**|**LTFS**] *mediaID...*

fsmedin -A [**-F** *type*] *mediaID...*

fsmedin -s [**-F** *type*] *mediaID...*

fsmedin -k [**-F** *type*] *mediaID...*

DESCRIPTION

Logical media entry operations into the Tertiary Manager software is performed with the **fsmedin**(1) command. Media are introduced into the Quantum storage subsystem by an operator using the Library Operator Interface console. The media is physically entered into the desired library and into the correct Media Manager MediaClass group known to Tertiary Manager software, i.e., F0_AIT_ADDBLANK. The **fsmedin**(1) command reclassifies the media to a different Media Manager MediaClass name and makes the media available to the Tertiary Manager software.

The **-q** option limits the *quantity* of media specified and indicates the number of media to be used. If this information is not specified, the system parameter default, VS_DEF_QUANTITY, value is used.

Media can be entered into the Tertiary Manager software in one of two ways: - Checking in nonblank media (**-r**) - Adding blank media (**-b**)

Additionally system backup or cleaning media can be entered using the **-s** and **-k** options, respectively.

Checking in Nonblank Media

The **fsmedin -r** command allows re-entry of checked out media. Checking in media does not require adjustments to the SNFS nor does it cause the medium to be mounted, because the file and media information is still within the Tertiary Manager database, only the status of the medium is updated.

Checked in media can be entered into any storage subsystem controlled by Tertiary Manager software as long as that subsystem is valid for the entered media type. After a medium is checked in, that medium can have files stored and retrieved from it.

Adding Blank Media

The **fsmedin -b** command is used to add blank media to a storage subsystem. Blank media can be added to the general blank pool or to a specified policy class pool (**-c**). Blank media in the general blank pool are available for use in any policy class. Blank media in a policy class pool are only available for use in that particular policy class.

The **fsmedin**(1) command allows the following two types of format options. - Immediate format (**fsmedin -b**) - Withhold from format (**-w**)

Immediate format is performed whenever the **-w** option is not specified. The withhold from format is performed when the **-w** option is specified. Withhold from format media will be formatted when the media is chosen for data storage or when the system administrator manually issues the **fsformat**(1) command. It is recommended that the withhold formatting option be used in order to limit the number of mount operations.

If the media identifiers are entered then those specific media will be added to Tertiary Manager system.

OPTIONS

-b Add blank media.

-r Re-enter media that were previously removed (checked out) from the archive.

-s Add system backup media.

-k Add cleaning media.

-w Withhold formatting media immediately.

-c *class* Policy class. A policy class name can have maximum of 16 alphanumeric characters. The special "-", "." and "_" characters are also permitted. It is important to note that when using this option, if a quantity is not specified, whatever quantity is specified in VS_DEF_QUANTITY will be used. Unless modified, this quantity has a default of 99. Using this option and the **-q** option will enable you to add a quantity greater than that specified in the hardlimit for the class. Reference the **-h** option in **fsaddclass**(1).

-q *quantity*
Number of media to be added to the storage subsystem. The maximum number of media that can be added is limited to 99 except when adding blank media. The maximum value is 10000 when the **-b** option is used. If **-q** option is not used, the default will be specified by the system parameter VS_DEF_QUANTITY. The default number is usually 99.

-t *mediatype*
Defines the type of media being imported. The following media types are supported by Tertiary Manager software:

-T ANTF|LTFS
Specifies the media format type that will be used when formatting or selecting media. **ANTF** is the Quantum internal tape format. **LTFS** is the Linear Tape File System specification tape format. A value of **ANTF** will format media with a single partition containing ANTF volume labels. This data partition will store StorNext file data. A value of **LTFS** will format media with two partitions containing LTFS volume labels. The index partition will store LTFS metadata and the data partition will store StorNext file data. The **LTFS** media format type is only applicable to LTO media generation 5 and beyond (e.g. LTO-5, LTO-6, etc). Any attempt to assign **LTFS** to non-LTO media types will result in an error.

If the **-T** option is not specified, the default will be specified by the system parameter CLASS_MEDIA_FORMAT.

-A Intended to be used during the SAM-QFS conversion process to import SAM-QFS media into the Tertiary Manager system. This results with the media being logically write protected and formatted without any formatting actually occurring.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default) or **JSON**.

TEXT is the "legacy" textual format.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application. See http://json.org for more information.

NOTES

This command is not valid for storage disks.

SEE ALSO

fsmedout(1), **fsfilesout**(1), **fsfilesin**(1), **fsformat**(1), **fsfilecopy**(1), **fschmedstate**(1)

NAME

fsmedinfo − Generate a report on media based on their current status.

SYNOPSIS

fsmedinfo [**-l [**-g**] [**-s *starttime***] [**-e *endtime***]]** [**-F** *type*] *mediaID*...

fsmedinfo [**-l [**-g**] [**-s *starttime***] [**-e *endtime***]]** [**-F** *type*] **-B** *batchfilename*

DESCRIPTION

The **fsmedinfo**(1) command produces either a short report or a long report on the specified media, based on the options entered. One or more media identifiers must be entered.

REPORT STATUS

The default short report produces the following information for each medium:

Media ID — Media identifier and copy number of the specified medium. The number in parenthesis indicates the copy ID of the files on the medium: (1) -primary copy, (2) -secondary copy, etc.

Media Type — The medium's physical media type. Values are:

AIT
AITW
AWS
AZURE
LATTUS
S3
QVAULT
S3COMPAT
LTO
LTOW
SDISK
3590
3592
9840
9940
T10K
DLT4
DLT2 (SDLT600 media)

Class ID — The medium's associated policy class.

Media Class — The medium's media class (tape only). Example: **F0_LTO_DATA**, etc.

Media Status — The medium's current status for file storage and retrieval. Values are: **AVAIL**, **UNAVAIL**, **PENDING REMOVAL**.

Current State — The state of the archive in which the medium is currently located (tape only). Values are: **On-line**, **Off-line**, **Diagnostic**, **Unavailable**.

Assignment — Whether the medium is available for mounting (tape only). Values are: **Allocated**, **Free**.

Action State — Whether and why the medium is being moved (tape only). Values are: **None**, **Export**, **Migration**, **Import**, **Mount/Move**, **Operator**, **Checkout**, **Checkin**, **Move**, **Entering**.

Mark Status — The medium's current mark status. Values are: **UNMARKED**, **CHECK-OUT**, **PENDING**, **ERROR**.

Suspect Count — The number of times read/write positioning failures were detected for the medium. If the medium is changed to unsuspect using the **fschmedstate**(1) command, the suspect count returns to zero.

Write Protect Whether or not the medium is write protected. Values are: **Y**, **N**.

Storage Area Area where medium is located. Examples: **VolSub**, **Storage Disk**, **Lattus appliance**, etc.

Location State The medium's location relative to its archive (tape only). Values are: **Archive**, **Checkout**, **Intransit**.

Current Archive The archive in which the medium is currently located (tape only).

Pending Archive The archive into which the medium is being moved (tape only).

Medium Location The medium's location within its storage area. Values for tape media are: **SLOT/BIN**, **DRIVE**. For Storage Disk media, it will be the device mount point. For Lattus media, it will be the namespace.

External Location The medium's location if not currently in an archive (tape only).

Import Date The date and time the medium was added to the archive (tape only).

Last Accessed The date and time the medium was last accessed.

Move Count The number of times the medium has been moved (tape only).

Mount Count The number of times the medium was mounted by the Tertiary Manager.

Formatted Whether or not the medium is formatted. Values are: **Y**, **N**.

Format Type The media format type. Note that this will display the previous media format type when the medium transitions from formatted to unformatted (i.e. formatted tape is cleaned and returned to the system blank pool). The following lists types of media and their supported format types.

Never formatted: UNKNOWN
Tape: ANTF or LTFS
SDISK: ANTF
Lattus: NONE

Number of Segments Total number of segments on the medium that have not been logically removed via **fsclean**(1).

Bytes Used Space used (in bytes).

Space Remaining Space remaining (in bytes).

Percentage Used Space used (percentage).

The long report (**-l** option) will add the following information for each file segment:

Segment Offset
The byte offset in the file where the segment begins. (Shown for Lattus media only.)

Segment Length
The length of the segment in bytes.

Version The version number of the file. If the version number is enclosed by double parentheses this means the segment is for an old version or a deleted file.

Modify/Delete Date
If a file is still current on the disk then the modtime is displayed, for removed files or old versions the delete date is shown. (This column is displayed if neither the **-s** or **-e** options have been used.)

Store/Recover Date
If a file has never been removed or if the file has been removed but has not been recovered, then the store time is displayed. If a removed file has been recovered back to disk then the recover time is shown. (This column is displayed if the **-s** and/or **-e** options are used since the report is sorted by this time.)

Object ID

The object id for the file if stored on Lattus media. If the ID is not set, then NULL is reported.

Seg:TotSeg

The segment number of the file and the total number of segments that comprise the file.

Key:Pathname (name at store time)

The internal file key for the file and the name of the file at store time. If the file has been renamed since store time, the new name will not be reflected in this report. This column is also preceded by a **'-'** if the file has been deleted.

If there is a failure in generating the path name that a file was stored with one of these strings will be reported for the path:

"PATH UNKNOWN, (name rec not found)"

"<mount_point>/PathUnknown"

The report will still include the key for these files even if the path is not known. If there are files in a report in this state, the system will still continue to operate normally. However, Quantum technical assistance should be notified to verify this is not a symptom of another problem.

OPTIONS

mediaID...

One or more media identifiers on which to report. If multiple media identifiers are entered, the media identifiers must be separated by spaces. The number of media identifiers that can be entered is limited by the local machine's command-line length.

-B *batchfilename*

The batch file contains the list of entries to be processed. Each entry must be listed one per line. Do not enclose the entry in quotes, use escape characters or any character not in the actual name.

-l Produce the long form of the report that contains the same information as the short form, plus a list of the file segments on the medium. (See the description of the fields in the output above.)

-g Used with the long option to report the segment number and the total number of segments for each file on the media to be reported.

-s *starttime*

Used with the long option to indicate a start time of the files on the media to be reported. If this time and/or the end time are used with the (**-l**) option then only the files on the media that were stored or recovered during the specified time window will be displayed. When this option or the **-e** is used, the output will be sorted per file system by the store/recovery time. The format for the time parameter is YYYY:MM:DD:hh:mm:ss where:

YYYY = Numeric, year

The following are optional; defaults are shown:,

MM = Numeric, two-digit month
(default:01 (January)),

DD = Numeric, two-digit day
(range: 01-31, default:01),

hh = Numeric hour
(range: 00-23, default:00),

mm = Numeric minute
(range: 00-59, default:00),

ss = Numeric second
(range: 00-59, default:00)

-e *endtime*

Used with the long option to indicate an end time of the files on the media to be reported. (See the **-s** option description for more time related info.)

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

SEE ALSO

fsmedlist(1), **fschmedstate**(1), **fsclean**(1), **fsxsd**(1)

NAME

fsmedlist − List media in a data and/or storage area.

SYNOPSIS

fsmedlist [**-c** *class...*] [**-g**] [**-l** [**km**]] [**-F** *type*]

fsmedlist [**-c** *class...*] [**-g**] [**-l** [**bfpqanus**]] [**-F** *type*]

fsmedlist [**-c** *class...*] [**-g**] [**-l** [**dhtzo**]] [**-F** *type*]

DESCRIPTION

The **fsmedlist**(1) command produces a list of media. The organization of the media list is defined by the use of options. If no options are used, the **fsmedlist**(1) command generates a short report that lists the total quantity of media in each policy class (including the general scratch pool), and breaks down the number of media for each of the following categories: - Avail - Available for use - Blank - Blank media - Drive - Residing in a recorder - Exit - Exiting the storage area - Mark - Marked for removal - Out - Located out of the storage area - Prot - In the write-protected state - Slot - Residing in a slot/bin - Susp - Marked as suspect - Trans - In-transit in the Quantum system - Total - Total number of media associated with the policy class

The general scratch pool is broken out by tape and nontape media such as sdisk and Object Storage. Only meaningful categories are displayed for nontape media. These include: - Blank - Blank media - Prot - In write-protected state - Avail - Available for use

A subset of the policy classes and categories can be obtained by providing the appropriate option from the list of options. For example, to list only media in the general blank media pool, use the **-g** option.

The **-l** option generates a long report. The long report lists the media identifiers of the media in all or specific categories.

The list is sent to *stdout* and can be redirected to a file or piped to a printer.

OPTIONS

-c *class...*

One or more policy classes for which the report is to be generated. Multiple policy classes must be separated by spaces. If this parameter is entered, the report only lists media in the specified policy class(es). If this parameter is not entered, the report lists information for all media in all policy classes and media in the general scratch pool. To display all nontape media such as sdisk and Lattus, enter "NA" as the class name.

-g Used to report on the blank media in the general scratch pool.

-l List media in the long report format. If this option is not specified, a short report is generated that lists total counts of media by attribute. All attributes are listed if this option is used by itself. Multiple options from any category can be specified after the **-l** option. The options are listed without spaces after the **-l** option (for example, **fsmedlist -lkbd**). The options to limit the report to specific attributes are shown in the following list.

Media removal categories:

k List all media marked for check out.

m List all media that are marked for removal.

Media state categories:

b List unformatted blank media.

f List formatted blank media.

p List all write protected media.

q List media with mark error.

a List all available media.

n List all media unavailable to Tertiary Manager software.

u List all media marked as unavailable, but still located within the Tertiary Manager system.

s List all suspect media.

Media movement and location categories:

d List all media located in a drive.

h List all media located in their home slot/bin.

t List all media transitioning between locations.

z List all media exiting a storage area.

o List all media that are checked out of the storage areas.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

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SEE ALSO

fsmedinfo(1), **fsxsd**(1)

NAME

fsmedloc − Change or report the external location of media.

SYNOPSIS

fsmedloc *mediaID...* **-l** *location*

fsmedloc [*mediaID...*]

DESCRIPTION

The **fsmedloc**(1) command changes or reports the external location of one or more specified media. This command is valid only for media that are checked out or marked for check out. Media removed by use of the **fsmedout**(1) are valid candidates for **fsmedloc**(1). Without the **-l** option, the **fsmedloc**(1) command reports the location for the given *mediaID*. The **fsfsmedloc**(1) report indicates that a medium is checked out of the Quantum storage subsystem by placing a '+' sign next to the media location description. If the '+' does not appear, the medium is marked for removal.

OPTIONS

mediaID...

One or more media identifiers to have their external location description(s) changed or reported. Entry of at least one media identifier is required to make a change. Multiple media identifiers must be separated by spaces. The number of media identifiers that can be entered is limited by the local machine's command-line length. If no media identifiers are specified and the **-l** option is not used, a report is generated that provides the location of all media.

-l *location*

Text describing the new external location. The *location* parameter must be less than 255 characters. If the location is composed of more than one word, it must be surrounded by single quotes (') or double quotes (").

SEE ALSO

fsfileinfo(1), **fsmedinfo**(1), **fsmedout**(1)

NAME

fsmedout − Logically removes media from the Tertiary Manager system.

SYNOPSIS

fsmedout -b [**-F** *type*] [**-q** *quantity*] [**-c** *class*]

fsmedout [**-F** *type*] [**-kf**] *mediaID...*

fsmedout -r [**-F** *type*] [**-l** *location*] [**-f**] *mediaID...*

fsmedout -m [**-F** *type*] [**-l** *location*] [**-f**] *mediaID...*

DESCRIPTION

Logical media removal from the Tertiary Manager system is performed with the **fsmedout**(1) command. Media is logically removed from the Tertiary Manager system, then physically removed from the Quantum storage subsystem using Media Manager commands.

Media can be removed from the Tertiary Manager system in three ways:

- Checking out media (**fsmedout -r**)
- Removing blank media (**fsmedout -b**)
- Removing error media

Checking out Non-Blank Media

The **fsmedout -r** command provides the capability to temporarily remove blank and non-blank media while retaining information about the media and the file copies it holds. This is referred to as "check out".

Checking out media causes the files and/or file segments on the media to be temporarily inaccessible. There is no check for incomplete files that are checked out. This allows part of a file (spanned file segment) residing on a specific medium to be removed and then reentered. The accessible file segments in the system can still be accessed using the Tertiary Manager partial retrieve operation even though the entire file is not available.

Removing Blank Media

The **fsmedout -b** command is used to remove blank media. Blank media can be removed from the general blank pool or from a specified policy-class pool.

Removing Error Media

The **fsmedout**(1) command also provides the capability to remove error media (media that failed format), from the system. Since error media has no file information tracked in the database, the media are logically removed from the Tertiary Manager system.

Marking Media

Media in the Tertiary Manager software can either be marked implicitly by Tertiary Manager software or explicitly by the user for future removal. Media can be marked in one of two instances:

- A user requests that a specific set of non-blank media be marked for check out with the **fsmedout -m** command.
- An error renders a medium unusable (format failure). That medium is marked automatically by Tertiary Manager software for removal.

OPTIONS

mediaID...
: One or more media identifier(s) separated by spaces. The maximum number of media that can be removed is 99.

-m Marks the medium for check out.

-r Checks out media from the Tertiary Manager system.

-b Removes blank media.

-c *class* Limits media candidates to those allocated to the specified policy class. All media marked for removal belonging to that policy class are removed.

-f Forces the logical removal of a medium from the Tertiary Manager system if the medium is shown to be *UNAVAIL* using the **fsmedinfo**(1) command, that is, physically removed from Media Manager without using the **fsmedout**(1) command. The removed medium should be reentered into the Media Manager system to correct this situation.

-l *location*
Sets the location information to track the external physical location of the medium. The *location* parameter is limited to 255 characters. When the location of the medium changes after removal, the *location* parameter text can be changed using the **fsmedloc**(1) command.

-q *quantity*
Removes the specified *quantity* of media. The maximum number of media that can be removed is 99, except when removing blank media. When the **-b** option is used, the maximum value is 10000. When **-q** option is not used, the default is specified by the system parameter VS_DEF_QUANTITY.

-k Keeps the selected media in the library instead of directing Media Manager to remove it.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

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NOTES

This command is not valid for storage disks.

SEE ALSO

fsmedin(1), **fsrminfo**(1), **fsmedloc**(1)

NAME

fsmedread − Reads file from a media.

SYNOPSIS

fsmedread [**-c** *cdbn*] **-f** *fsn* **-l** *ldbn* **-d** *device dest*

fsmedread -u *URL* [**-n** *namespace* **-o** *objectname*] [**-v** *provider*] [**-t** *mediatype*]
[[**-U** *username* **-P** *password*] | [**-I** *QCAI* **-K** *QCPK*] | [**-A** *CAP_agency* **-m** *CAP_mission*]]
[**-a** *serverAuth*] [**-e** *encryptiontype*] [**-q** *compressiontype*] [**-S** *signingtype*] [**-Y** *authenticationtype*]
[**-r** *role*] [**-O** *storageclass*] [**-Z** *authentication_endpoint*] [**-H** *CAP_hostport*]
[**-C** *certfile* | **-R** *certpath*] [**-L** *clientcertfile*] [**-k** *clientkeyfile*] [**-p** *clientkeypass*] *dest*

fsmedread *source dest*

DESCRIPTION

This command will retrieve data from the specified location into the specified file for SNSM ANTF formatted tapes, storage disk media, or Object Storage media (AXR, AWS, Azure, QVAULT, S3, S3COMPAT). This does not support LTFS formatted tapes. For tape and storage disk media, it is recommended to use **fsmedscan**(1) first to determine the file's location on the media.

Before this command is run, tape media must be mounted in the tape drive which can be done using **fsmount**(1). There is no such a requirement for other media.

OPTIONS

-f *fsn* File Sequence Number (FSN/tape mark) where file is located.

-c *cdbn* Cumulative Data Block Number (CDBN) where file is located.

-l *ldbn* Logical Data Block Number (LDBN) where file is located. This is the byte offset from the previous FSN.

-d *device*
SCSI device path of tape drive where media is mounted.

-u *URL* Full URL to the object located on the Object Storage media.

-n *namespace*
Namespace name. Required if the Object Storage media is using S3, QVAULT or S3COMPAT REST API.

-o *objectname*
Object name. Required if the Object Storage media is using S3, QVAULT or S3COMPAT REST API.

-v *provider*
Identifies the provider of the appliance where the file is located. The appliance provider determines the format of provider-specific REST headers. The following provider types are supported by Tertiary Manager software:

AWS
AZURE
IBM:CLEVERSAFE
LATTUS
NETAPP:WEBSCALE
QCV1
QVV1
SCALITY:RING

-t *mediatype*
The object storage media type. The following object storage media types are supported by Tertiary Manager software:

AWS
AXR

AZURE
QVAULT
S3
S3COMPAT

The default is **AXR**.

-U *username* **-P** *password*

Username and password to access the URL if necessary. These are required if the Object Storage media is using S3 or Azure Blob REST API from the following providers:

AWS (standard and STS)
AZURE
IBM:CLEVERSAFE
LATTUS
NETAPP:WEBSCALE
SCALITY:RING

-I *QCAI* **-K** *QCPK*

QCAI and **QCPK** are for devices from providers QCV1 and QVV1. **QCAI** (Q-Cloud Access Identifier) and **QCPK** (Q-Cloud Product Key) were provided to the user or system administrator when the Q-Cloud product was purchased. These are required for Q-Cloud Object Storage media.

-A *CAP_agency* **-m** *CAP_mission*

The agency and mission associated with the target C2S account. These options are valid only for the CAP authentication type.

-e *encryptiontype*

The encryption algorithm to be applied to the content of the file stored into an Object Storage system. This option is ignored for all other media types. Currently, the following encryption types are supported:

0 None (No decryption of file's content on Client Host)

1 SERVER_AES256 (File can be Server-side AES256 encrypted or not encrypted)
This encryption type is valid only if supported by the Object Storage system.

2 CLIENT_AES256 (File must be Client-side AES256 encrypted)
This encryption type is supported only on Object Storage systems from providers QCV1 and QVV1.

If this option is not specified, the encryption type will be set to None.

-q *compressiontype*

The compression algorithm to be applied to the content of the file stored into Object Storage systems. This option is ignored for all other media types. Furthermore, this option is only supported on Object Storage system from providers QCV1 and QVV1. Currently, the following compression type values are supported:

0 None (No compression)

1 CLIENT_LZ4 (Client-side LZ4 compression)

If this option is not specified, the compression type will be set to None.

-a *serverAuth*

The server authorization setting. Default is 2. The valid options are:

0 none

1 verify peer only

2 verify peer and host

-S *signing_type*

Used to specify the signing type for the requests sent to the Object Storage and/or authentication server. The following signing types are supported:

V2
V4
AZURE

The default is **V4** for AWS, Q-Cloud, Cleversafe and Webscale media, **V2** for other S3 compatible media and **AZURE** for Azure media. This option is not valid for AXR media. To be able to configure V4, both AWS full payload and chunked uploading for V4 signing should be supported by the Object Storage server.

-Y *authentication_type*

An authentication type is required for all Object Storage media except for AXR. The following authentication types are supported:

STANDARD
STS_PUBLIC
STS_GOVCLOUD
CAP

If this option is not specified, the authentication type will be set to **STANDARD**.

The **STANDARD** type applies to all media and authenticates with a user name and password for Object Storage access. For S3 compatible media the user name and password are the Access Key Id and Secret Access Key. For Azure media, the user name and password are the Storage Account Name and Storage Access Key.

The **STS_PUBLIC** type uses the AWS Security Token Service (STS) to obtain temporary credentials for access to Object Storage in the AWS public cloud. This authentication type applies only to AWS media and requires a role, username and password be specified.

The **STS_GOVCLOUD** type uses the AWS Security Token Service (STS) to obtain temporary credentials for access to Object Storage in the AWS GovCloud. This authentication type applies only to AWS media and requires a role, username and password be specified.

The **CAP** type uses the AWS Commercial Cloud Services (C2S) Access Portal (CAP) to obtain temporary credentials for access to Object Storage in the AWS Private Cloud for the Federal Government. This authentication type applies only to AWS media and requires a role, CAP mission, and CAP agency be specified. The connection endpoint for the CAP server, the location of the client certificate, and either the file or directory path to the CA certificate files must also be specified.

-r *role* For **STS_PUBLIC** and **STS_GOVCLOUD** authentication, use the Amazon Resource Name (ARN) of the role to assume. For **CAP** authentication, use the Identity and Access Management (IAM) role associated with the target C2S account. A role is required by AWS STS and the CAP servers to obtain temporary credentials. This option is valid only with the **STS_PUBLIC**, **STS_GOVCLOUD**, and **CAP** authentication types.

-O *storageclass*

Defines the storage class for AWS and Azure media only. The following storage classes are supported:

standard
standard_ia
glacier
azure_append_blob

standard specifies the AWS Standard storage class, **standard_ia** the AWS Standard - Infrequent Access storage class, **glacier** the AWS Glacier storage class and **azure_append_blob** the Azure Append Blob storage class.

By default, this is set to **standard** for all AWS and Q-Cloud Archive media, **glacier** for Q-Cloud Vault media, and **azure_append_blob** for Azure media.

-Z *authentication_endpoint*
Specifies an authentication endpoint which overrides the default endpoint for the public or GovCloud STS server. This option is valid only with the **STS_PUBLIC** and **STS_GOVCLOUD** authentication types.

-C *certfile*
File name to Certificate Authority (CA) certificate(s).

-R *certpath*
Directory path that contains the individual CA certificate files.

-k *clientkeyfile*
Specifies the location of the client private key. This option is required for CAP authentication if the client private key is kept in a separate file rather than included as part of the X.509 client certificate file.

-p *clientkeypass*
Client private key passphrase. This is required if the private key is protected by a passphrase.

-H *CAP_hostport*
Specifies the connection endpoint for the CAP server.

-L *clientcertfile*
The location of the X.509 client certificate installed on the system for the CAP server to authenticate. Note that the certificate should be in PEM format and is required for CAP authentication.

source The full pathname to a file copy on a storage disk whose data will be retrieved.

dest The name of the file where the data is to be written. The file must not exist, otherwise the command will fail.

EXIT STATUS

Exit codes for the **fsmedread**(1) command are:

0 Command completed successfully.

1 Command failed.

2 Command syntax error.

NOTE

The resulting file will end up with the ownership and group of the caller to the program and empty permissions. This is done because no permission, ownership, or group information for files is kept on the source media.

EXAMPLES

Read from Object Storage using the AWS Security Token Service to obtain access to the AWS media:

```
fsmedread -u https://namespace.s3.amazonaws.com/myFile -n namespace \
     -o myFile -t AWS -U username -P password -r role -Y STS_PUBLIC \
     -v AWS -S V4 localFile
```

Read from Object Storage using the AWS Commercial Cloud Services Access Portal to obtain access to the AWS media:

```
fsmedread -u https://namespace.s3.amazonaws.com/myFile -n namespace \
     -o myFile -t AWS -A agency -m mission -r role -Y CAP -v AWS \
     -R /opt/ssl -H capserver -S V4 -L /opt/ssl/client.pem localFile
```

Read from Object Storage using QCAI and QCPK to obtain access to the QVAULT media:

```
fsmedread -u https://s3-us-west-1.amazonaws.com/namespace/myfile \
```

```
-o myfile -v QVV1 -t QVAULT -I QCAI -K QCPK -n namespace \
localfile
```

SEE ALSO

fsmedscan(1), **fsmount**(1)

NAME

fsmedscan − Scan SNSM media and report found files.

SYNOPSIS

fsmedscan -h

fsmedscan [**-b**] [**-n** *num*] [**-f** *sn* [**-c** *cdbn*]] *devpath*

fsmedscan [**-b**] [**-n** *num*] [**-f** *sn* [**-c** *recs*]] *devpath*

fsmedscan [**-R** *recoverRoot*] [**-n** *num*] [**-f** *sn devpath*

fsmedscan [**-d** *dir*] *sdpath*

fsmedscan [**-k** *key* [**-v** *ver*] [**-s** *seg*]] *sdpath*

DESCRIPTION

This utility can be used to scan a Tertiary Manager ANTF formatted tape media or storage disk media. However, this utility is not applicable for Object Storage media and it does not support LTFS formatted tapes. For tape media, it will scan an entire media for session directories and then print the contents of the directory. Each session directory contains a listing of information about all files which were written to the media during the session. For storage disk media, it will scan all the files on the media and print the header label for each file.

This can also be used to perform a detailed scan by using the **-b** option. This form of the scan will search byte by byte looking for file labels that the Tertiary Manager writes to tape before each file. When a label is encountered, the file's position on tape is reported along with some other label information. All data between two tape marks is examined. The **-f** option can be used to indicate where the scan should begin.

This can also be used to read files found on tape by using the **-R** option. This form of the scan will read the tape, temporarily placing file contents in files under the recoverRoot named according to the key. If a matching directory entry is found, the temporary file is renamed to the original path appended to the recoverRoot. If **-n** is specified, it limits the recovery to *num* session directories. If **-f** is specified, it causes an initial forward skip *fsn* file marks. For files with multiple segments, the data for each segment is written to the appropriate offset in the recovered file.

For tape media, it must already be mounted in the drive before this command is run.

TAPE LAYOUT

A formatted media contains at minimum a volume label and a tape mark. It can then contain any number of sessions. The elements of a formatted media are:

Volume Label
Tape Mark
Sessions (0 or more)

A session is the amount of data written to a media by a single I/O process (i.e fs_fmover). Each session consists of a number of file records and ends with a directory. The directory is basically a table of contents which provides information about all the files written during the session. A session contains the following elements:

File Records (1 or more)
Tape Mark
Session Directory
Tape Mark

Each file written during the session is preceded with a label which allows the Tertiary Manager software to verify the file when it is retrieved from the media. A file record contains the following elements:

File Label
File Data

OPTIONS

-h Help. Shows usage.

-b Byte scan. This will search byte by byte for file header labels up to the next tape mark. If **-n** is used the scan will stop after finding the specified number of file header labels. This can be used to verify file position information.

-R *recoverRoot*
Recover scan. This will Recreate files found on tape to the directory tree beginning with the recoverRoot. Files are first created with the name of the file key, then renamed to the original path beneath the *recoverRoot* if a matching session directory is found. If **-n** is specified, it limits the recovery to *num* session directories.

-n *num* The number of session directories or file header labels to find. Default is all. When scanning for directories, the entire tape is examined and tape marks have no impact. When scanning for file header labels (**-b** option), only data between two tape marks is examined, so the scan is terminated when either a tape mark is encountered or *num* file headers have been detected.

-f *fsn* Specifies File Sequence Number (FSN) to start at. The default is 0 which is the beginning of tape (BOT).

-c *cdbn* Specifies Cumulative Data Block Number (CDBN) to start at. The default is 0 which is the beginning of tape (BOT). This is only valid with the **-f** option.

-r *recs* The number of records to skip from specified FSN. The default is 0. This allows the scanning to start anywhere between tape marks and is only valid with the **-f** option.

-d *dir* Specifies the starting directory to scan a storage disk. *dir* can be set to any directory below the storage disk's root directory.

-k *key* Scan file copies that belong to a file whose file key equals to *key*.

-v *ver* Scan file copies that belong to the specific file version *ver*. This is only valid with the **-k** option.

-s *seg* Scan file copies whose segment number equals to *seg*. This is only valid with the **-k** option.

devpath
SCSI tape device path.

sdpath Storage Disk directory that is specified when adding a storage disk.

EXIT STATUS

Always 0

SEE ALSO

fsmedread(1), **fsdiskcfg**(1)

NAME

fsmedwrite − Reads a file from disk and writes it to a namespace in the Object Storage system.

SYNOPSIS

fsmedwrite -n *namespace* [**-o** *outfilename*] [**-V**] [**-e** *encryptiontype*] [**-M** *mkeyname*] [**-q** *compressiontype*] *sourcefile*

fsmedwrite -u *URL* **-n** *namespace* [**-o** *outfilename*] [**-v** *provider*] [**-t** *mediatype*] [[**-U** *username* **-P** *password*] | [**-A** *CAP_agency* **-m** *CAP_mission*]] [**-a** *serverAuth*] [**-e** *encryptiontype*] [**-M** *mkeyname*] [**-q** *compressiontype*] [**-S** *signingtype*] [**-Y** *authenticationtype*] [**-r** *role*] [**-Z** *authentication_endpoint*] [**-H** *CAP_hostport*] [**-C** *certfile* | **-R** *certpath*] [**-L** *clientcertfile*] [**-k** *clientkeyfile*] [**-p** *clientkeypass*] [**-V**] *sourcefile*

DESCRIPTION

This is a utility used internally by the StorNext backup system to write a file to the Object Storage system without tracking it in StorNext. This utility will take advantage of the Object Storage System configured using **fsobjcfg**(1). When the URL is not specified, the location of the namespace and all security options are located in the TSM database and used for writing the file to the Object Storage System. When the URL is specified, the location of the namespace and the security options are determined from the command options and used for writing the file to the Object Storage System. The namespace option is required.

OPTIONS

-V Used to print more verbose output.

-n *namespace*

The namespace on the Object Storage system to write to. This is a required option if Object Storage is accessed via TSM or the Object Storage media is using S3 or QVAULT REST API.

-o *outputfilename*

If a specific name is wanted on the Object Storage system, this can be specified. Otherwise the name will be that of the source file. This is required if the URL is specified and the Object Storage media is using S3 or QVAULT REST API.

-u *URL* The URL to the Object Storage System. A complete connection endpoint address including the protocol. Example https://192.168.21.111:444

-v *provider*

Identifes the provider of the appliance to which the file is to be written. The appliance provider determines the format of provider-specific REST headers. The following provider types are supported by Tertiary Manager software:

AWS
AZURE
IBM:CLEVERSAFE
LATTUS
NETAPP:WEBSCALE
QCV1
QVV1
SCALITY:RING

-t *mediatype*

The object storage media type. The following object storage media types are supported by Tertiary Manager software:

AWS
AXR
AZURE
QVAULT

S3
S3COMPAT

The default is **AXR**.

-a *serverAuth*

The server authorization setting. Default is 2. The valid options are:

0 none

1 verify peer only

2 verify peer and host.

-S *signing_type*

Used to specify the signing type for the requests sent to the Object Storage and/or authentication server. The following signing types are supported:

V2
V4
AZURE

The default is **V4** for AWS, Q-Cloud, Cleversafe and Webscale media, **V2** for other S3 compatible media and **AZURE** for Azure media. This option is not valid for AXR media. To be able to configure V4, both AWS full payload and chunked uploading for V4 signing should be supported by the Object Storage server.

-Y *authentication_type*

An authentication type is required for all Object Storage media except for AXR. The following authentication types are supported:

STANDARD
STS_PUBLIC
STS_GOVCLOUD
CAP

If this option is not specified, the authentication type will be set to **STANDARD**.

The **STANDARD** type applies to all media and authenticates with a user name and password for Object Storage access. For S3 compatible media the user name and password are the Access Key Id and Secret Access Key. For Azure media, the user name and password are the Storage Account Name and Storage Access Key.

The **STS_PUBLIC** type uses the AWS Security Token Service (STS) to obtain temporary credentials for access to Object Storage in the AWS public cloud. This authentication type applies only to AWS media and requires a role, username and password be specified.

The **STS_GOVCLOUD** type uses the AWS Security Token Service (STS) to obtain temporary credentials for access to Object Storage in the AWS GovCloud. This authentication type applies only to AWS media and requires a role, username and password be specified.

The **CAP** type uses the AWS Commercial Cloud Services (C2S) Access Portal (CAP) to obtain temporary credentials for access to Object Storage in the AWS Private Cloud for the Federal Government. This authentication type applies only to AWS media and requires a role, CAP mission, and CAP agency be specified. The connection endpoint for the CAP server, the location of the client certificate, and either the file or directory path to the CA certificate files must also be specified.

-r *role* For **STS_PUBLIC** and **STS_GOVCLOUD** authentication, use the Amazon Resource Name (ARN) of the role to assume. For **CAP** authentication, use the Identity and Access Management (IAM) role associated with the target C2S account. A role is required by AWS STS and the CAP servers to obtain temporary credentials. This option is valid only with the **STS_PUBLIC**, **STS_GOVCLOUD**, and **CAP** authentication types.

-Z *authentication_endpoint*
Specifies an authentication endpoint which overrides the default endpoint for the public or GovCloud STS server. This option is valid only with the **STS_PUBLIC** and **STS_GOVCLOUD** authentication types.

-C *certfile*
File name to Certificate Authority (CA) certificate(s).

-R *certpath*
Directory path that contains the individual CA certificate files.

-U *username* **-P** *password*
Username and password to access the URL if necessary. These are required if the Object Storage media is using S3 REST API.

-A *CAP_agency* **-m** *CAP_mission*
The agency and mission associated with the target C2S account. These options are valid only for the CAP authentication type.

-k *clientkeyfile*
Specifies the location of the client private key. This option is required for CAP authentication if the client private key is kept in a separate file rather than included as part of the X.509 client certificate file.

-p *clientkeypass*
Client private key passphrase. This is required if the private key is protected by a passphrase.

-H *CAP_hostport*
Specifies the connection endpoint for the CAP server.

-L *clientcertfile*
The location of the X.509 client certificate installed on the system for the CAP server to authenticate. Note that the certificate should be in PEM format and is required for CAP authentication.

-e *encryptiontype*
The encryption algorithm to be applied to the content of files stored into an Object Storage system. This option is ignored for all other media types. Currently, the following encryption types are supported:

0 None (No encryption)

1 SERVER_AES256 (Server-side AES256 encryption)
This encryption type is valid only if supported by the Object Storage system.

2 CLIENT_AES256 (Client-side AES256 encryption)
This encryption type is supported only on Object Storage systems from providers QCV1 and QVV1.

If this option is not specified, the encryption type will be set to None.

-M *mkeyname*
The Master Key name that is required by and used for the client-side encryption service. Refer to **fskey**(1) man page for how to create a Master Key name.

-q *compressiontype*
The compression algorithm to be applied to the content of the file stored into Object Storage systems. This option is ignored for all other media types. Furthermore, this option is only supported on Object Storage system from providers QCV1 and QVV1. Currently, the following compression type values are supported:

0 None (No compression)

1 CLIENT_LZ4 (Client-side LZ4 compression)

If this option is not specified, the compression type will be set to None.

sourcefile
The file to write to the Object Storage system.

EXIT STATUS

Exit codes for the **fsmedwrite**(1) command are:

0 Command completed successfully.

2 Command failed.

3 Command syntax error.

EXAMPLES

Here are examples of typical usage:

Basic write using information from TSM database

```
fsmedwrite -n ns2 localFile
```

Basic write using information from TSM database. Specifying a different name to use in the Object Storage system

```
fsmedwrite -n ns2 -o myFile2 /tmp/localFile
```

Write using command line URL

```
fsmedwrite -u http://192.168.21.111:8080 -n ns2 -o myFile2 /tmp/localFile
```

Write using command line URL, https security, and specific Certificate Authority Cert file

```
fsmedwrite -u https://192.168.21.111:444 -n ns2 -o myFile2 \
     -a 2 -C /opt/ssl/certfile /tmp/localFile
```

Write using command line URL, https security, and Certificate Authority Cert directory:

```
fsmedwrite -u https://192.168.21.111:444 -n ns2 -o myFile2 \
     -a 1 -R /opt/ssl /tmp/localFile
```

Write using command line URL, https security, Certificate Authority Cert directory, and username/password:

```
fsmedwrite -u https://192.168.21.111:444 -n ns2 -o myFile2 \
     -a 1 -R /opt/ssl -U user -P password /tmp/localFile
```

Write to Object Storage via S3 REST API using command line URL:

```
fsmedwrite -u http://192.168.21.111:7070 -n bucket1 -o myFile2 \
     -t S3 -U user -P password /tmp/localFile
```

Write to Object Storage using the AWS Security Token Service to obtain access to the AWS media:

```
fsmedwrite -u https://namespace.s3.amazonaws.com -n namespace \
     -o myFile2 -t AWS -U username -P password -r role       \
     -Y STS_PUBLIC -v AWS -S V4 /tmp/localFile
```

Write to Object Storage using the AWS Commercial Cloud Services Access Portal to obtain access to the AWS media:

```
fsmedwrite -u https://namespace.s3.amazonaws.com -n namespace     \
     -o myFile2 -t AWS -A agency -M mission -r role -Y CAP -v AWS \
     -R /opt/ssl -H capserver -S V4 -L /opt/ssl/client.pem       \
     /tmp/localFile
```

Write to Object Storage using the username and password to obtain access to the QVAULT media:

```
fsmedwrite -u https://namespace.s3-us-west-1.amazonaws.com \
     -U username -P password -t QVAULT -o myfile -n namespace -v QVV1 \
     -V /tmp/localFile
```

Write using command line URL to Azure media:

```
fsmedwrite -u https://blob.core.windows.net -n namespace \
     -o myFile2 -t AZURE -v AZURE -U user -P password /tmp/localFile
```

SEE ALSO

fsobjcfg(1), **fskey**(1)

NAME

fsmodclass − Modify the processing parameters of a policy class.

SYNOPSIS

fsmodclass [**-t** *mediatype*|**-C** *copy*] [**-T ANTF**|**LTFS**|**NONE**] [**-L** *drivelimit*] [**-s** *softlimit*] [**-h** *hardlimit*] [**-S** *stubsize*] [**-l** *securitycode*] [**-o** *acctnum*] [**-x** *maxcopies*] [**-d** *defaultcopies*] [**-m** *minstoretime*] [**-c** *mintrunctime*] [**-a** *affinity...*] [**-i** *minreloctime*] [**-R** *affinity*] [**-v** *drivepool*] [**-k** *maxversions*] [**-f i**|**p**] [**-r c**|**s**] [**-p yes**|**no**] [**-z** *minsetsize* **-g** *maxsetage*] [**-G y**|**n**] [**-V y**|**n**] [**-D y**|**n**] [**-F** *type*] [**-e** *encryptiontype*] [**-A y**|**n**] [**-M** *mkeyname*] [**-q** *compressiontype*] *class*

DESCRIPTION

The **fsmodclass**(1) command allows the system administrator to modify the processing parameters of a particular policy class in the Tertiary Manager software. For each of the optional arguments that are not entered, those policy class processing parameters will be left unmodified.

This command accepts upper case or lower case input. However, most input is converted to lower case, except for the security level, and account number.

The administrator can view the current parameter settings by using the **fsclassinfo**(1) command.

NOTE: At least one option must be specified for the **fsmodclass**(1) command. The **-C** option requires the **-T** option and/or the **-L** option.

OPTIONS

class policy class. A policy class name can have a maximum of 16 alphanumeric characters. The special "-", ".", and "_" characters are also permitted.

-a *affinity...*

A space-separated list of disk affinities that the files in this policy class will traverse throughout their life cycle. Valid entries include any of the affinities already configured in the managed file systems or the word *none*. The first affinity in this list will be considered the default disk affinity for this policy class, the affinity in which files initially will be created. When they become eligible candidates for relocation, the files will be moved to the next disk affinity in the list. The word *none* may be specified in place of the affinity list to indicate no automatic relocation is to occur for this policy class. NOTE: Presently a maximum of two affinities is supported, including the default disk affinity. WARNING: When removing an affinity from the list, bear in mind that files in this policy class may reside on that disk affinity. To avoid unwanted behavior, these files may be manually relocated to another disk affinity using **fsrelocate**(1) command.

-R *affinity*

The affinity to retrieve a truncated file to. This will override the default affinity. If *affinity* is set to *none* then a truncated file will be retrieved to the default affinity.

Note that Storage Manager must be stopped and restarted after using the **-R** option before the new affinity selection will take effect.

-d *defaultcopies*

The total number of copies that will be stored (including the primary copy) for each file in this policy class. The *defaultcopies* option can be set equal to, but not exceeding, the *maxcopies* setting. It cannot be set to less than one.

-f i|**p** The file retention policy for the policy class. The files can be truncated immediately (**i**) or at policy application time (**p**) once all file copies are stored on a medium.

-h *hardlimit*

The maximum number of media that are allowed in this policy class. When hard limit is reached, a warning message is sent to the *syslog* and to the user specified as the e-mail contact for this policy class. Files can still be stored in that policy class, as long as there is room on the media that are already been to store files in that policy class.

-l *securitycode*

Up to four characters can be used for security code. The special "_" character is also permitted.

-c *mintrunctime*

The minimum time that a stored file must reside unaccessed on disk before being considered a candidate for truncation (the clearing of disk blocks). A file will not have its disk blocks truncated (by a truncation policy) until it has remained unaccessed on disk for this amount of time. After that time, a truncation policy will consider the file a valid candidate for truncation, but it may or may not actually be truncated. That will depend on the current file system fill level and the file system configuration parameters. NOTE: An "emergency" truncation policy ignores this time. The minimum value allowed for this time is 5 minutes. See SETTING CLASS TIMES below for more info on time format and usage.

-i *minreloctime*

The minimum time that a file must reside unaccessed on disk before being considered a candidate for relocation (the moving of data blocks from one disk affinity to another). A file will not have its data blocks relocated (by a relocation policy) until it has remained unaccessed on disk for this amount of time. After that time, a relocation policy will consider the file a valid candidate for relocation. The file may or may not actually be relocated at that time, depending on the current file system fill level and the file system configuration parameters. NOTE: An "emergency" relocation policy ignores this time. The minimum value allowed for this time is 5 minutes. See SETTING CLASS TIMES below for more info on time format and usage.

-m *minstoretime*

The minimum time that a file must reside unmodified on disk before being considered a candidate for storage on media. A file will not be stored (by a store policy) until it has remained unmodified on disk for this amount of time. After that time, the next policy run will attempt to store the file. The minimum value allowed for this time is 1 minute. See SETTING CLASS TIMES below for more info on time format and usage.

-S *stubsize*

The truncation stub size (in kilobytes). This value is used to determine the number of bytes to leave on disk when files are truncated. This value will be the minimum number of bytes left on disk (the value will be rounded up to a multiple of the file system block size). This value is not used when a stub size has been explicitly set for a file with **fschfiat**(1). If the **-S** option is not used, the default will be specified by the system parameter CLASS_TRUNCSIZE.

-o *acctnum*

Up to five characters can be used for the account number. The special "_" character is also permitted.

-r c|s Media classification cleanup action. When all files are deleted from a medium, the medium can revert back to the policy class blank pool (**c**) or to the system blank pool (**s**).

-s *softlimit*

The warning limit for the number of media that can be allocated to this policy class. When the soft limit is reached, a warning message is sent to the *syslog* and to the user specified as the e-mail contact for this policy class. The value of *softlimit* must be less than or equal to the value of *hardlimit*.

-t *mediatype*

Defines the type of medium to be used. Depending on the type of platform used, the following media types are supported by Tertiary Manager software:

AIT
AITW
AWS
AZURE
LATTUS
S3

QVAULT
S3COMPAT
LTO
LTOW
SDISK
3590
3592
9840
9940
T10K
DLT4
DLT2 (SDLT600 media)

Changing the media type will change the media format type to a supported value, if necessary, for each copy not overridden in the *filesize.config* file, according to the rules for determining a default value listed under the **-T** option. The **-t** option is not allowed with the **-C** option.

The **fsstore**(1) command can override this parameter with the **-t** option.

-v *drivepool*

The Media Manager drive pool group used to store or retrieve data for this policy class. This drive pool name must be defined within the Media Manager software before any media operations can occur for this policy class. The special "_" character is permitted to identify the drive pool group.

-x *maxcopies*

The maximum number of copies (including the primary copy) that are allowed for each file in this policy class. The *maxcopies* value cannot be less than one. NOTE: If the copy setting for a particular file is adjusted using the **fschfiat**(1) command, it cannot exceed the value defined by the *maxcopies* setting.

-k *maxversions*

This is the maximum number of inactive versions to keep for a file (the current version is active, all others are inactive). When a stored file is modified, the version number is immediately incremented for the file. Old versions are kept around until the **fsclean**(1) command is used to clean those versions from Tertiary Manager media. At the time a new version is stored, the oldest version will be deleted if maxversions has been reached. The **fsclean**(1) command will not be required to clean that version. If maxversions is defined as 0, only the active version will be retained and if removed from the file system, it will still be recoverable unless the **-D** option is set on the file.

When *maxversions* is changed for a class, it will not take effect for up to 60 minutes due to caching. This cache timeout can be adjusted using the CPYRESP_MAXVER_QRY_SECS sysparm.

-p yes|no

This option decides if we allow the policy engine to automatically store files for this policy class.

-z *minsetsize*

The minimum set size of the policy class. It will be specified in the form of [0-999][MB|GB]. When this option is specified with a non-zero value, the store candidates in the policy class have to add up to *minsetsize* before any of them can be stored by the policy engine. This option works in conjunction with **-g** option. Specifying zero value for this option will disable the check, which requires **-g** be set to zero as well. **-g** option.

-g *maxsetage*

Candidate expiration time (in hours) of the policy class. This option works in conjunction with **-z** option so that files will not sit forever on the candidate list because the *minsetsize* has not been reached. As soon as any file on the store candidate list in the policy class is *maxsetage* old, all of the files should be stored. Specifying zero will disable the check, which requires **-z** be set to zero

as well. The maximum value for this option is 720 hours, which equals to 30 days.

-C *copy*

Used to apply the copy options to a specific copy. If the **-C** option is not specified, the copy options will apply to all copies. Copy options are media format type and drive limit. The **-C** option requires the **-T** option and/or the **-L** option. The **-C** option is not allowed with the **-t** option.

-T ANTF|LTFS|NONE

Specifies the media format type that will be used when formatting or selecting media. **ANTF** is the Quantum internal tape format. **LTFS** is the Linear Tape File System specification tape format. **NONE** is used for Lattus media since no special formatting is done. A value of **ANTF** will format media with a single partition containing ANTF volume labels. This data partition will store StorNext file data. A value of **LTFS** will format media with two partitions containing LTFS volume labels. The index partition will store LTFS metadata and the data partition will store StorNext file data. The **LTFS** media format type is only applicable to LTO media generation 5 and beyond (e.g. LTO-5, LTO-6, etc). Any attempt to assign **LTFS** to non-LTO media types will result in an error. The backup policy class _adic_backup does not support a media format type of **LTFS**. Any attempt to assign **LTFS** to _adic_backup will result in an error.

If neither of the **-T** or **-t** options have been specified, no changes will be made to the existing media format type settings.

If the **-T** option is not specified and the **-t** option is specified, the default value will be determined as follows:

A media type of Lattus will default to **NONE**.
A media type that does not support **LTFS** will default to **ANTF**.
A media type that supports **LTFS** will default to the system parameter CLASS_MEDIA_FORMAT.

Whenever the **-T**, **-t**, or **-x** options are specified, the *filesize.config* file will be validated for copies to ensure that at least one of the file size range media types supports the configured media format type for that specific copy. Any media types that do not support the configured media format type will be overridden to a supported media format type during file store processing.

-L *drivelimit*

The maximum number of drives to use when the policy is run. Specifying **none** will disable the drive limit. If the **-L** option is not specified, no changes will be made to the existing drive limit settings.

-G y|n Generate and maintain a checksum for each stored file. If this option is enabled, a checksum will be generated as each file is written (stored) to the associated protection tier. The checksum will be retained for use in the checksum-validation phase of subsequent retrieve operations. This option can be overridden by the FS_GENERATE_CHECKSUM parameter in *fs_sysparm*. See *fs_sysparm.README* file for details. The **fsfileinfo**(1) command can be used to determine if a file has a corresponding retained value.

-V y|n Verify the checksum of each retrieved file. If this option is enabled, a checksum will be generated as each file is read (retrieved) from the associated protection tier. The generated checksum will be compared to the corresponding (added when the file was stored) retained value. The retrieve will fail and a RAS ticket will be opened if the checksum does not match. No compare will occur if no retained value exists (checksum generation was not enabled when file was stored). This option can be overridden by the FS_VALIDATE_CHECKSUM parameter in *fs_sysparm*. See *fs_sysparm.README* file for details.

-D y|n Remove database information when a file is removed. If this option is enabled, then when a file is removed from the file system, the corresponding database information indicating where the file was stored will also be removed, and the file will NOT be recoverable through **fsrecover**(1). If this option is disabled, then the database entries will be retained and the file is recoverable through **fsrecover**(1).

-A y|n Enable Alternate Store Location support. If this option is enabled, files created under this policy class will be eligible for an additional remote copy to be made to the configured Alternate Store Location. Note: This is a licensed feature.

-e *encryptiontype*

The encryption algorithm to be applied to the content of files stored into an Object Storage system. This option is ignored for all other media types. Currently, the following encryption types are supported:

0 None (No encryption)

1 SERVER_AES256 (Server-side AES256 encryption)
This encryption type is valid only if supported by the Object Storage system.

2 CLIENT_AES256 (Client-side AES256 encryption)
This encryption type is supported only on Object Storage systems from providers QCV1 and QVV1.

If this option is not specified, the encryption type will be set to None.

A summary usage report for object storage that includes encrypted object count information, sorted by media ID and policy class ID, can be obtained via the **fsobjinfo**(1) command.

-M *mkeyname*

The Master Key name that is required by and used for the client-side encryption service. Refer to **fskey**(1) man page for how to create a Master Key name.

-q *compressiontype*

The compression algorithm to be applied to the content of the file stored into Object Storage systems. This option is ignored for all other media types. Furthermore, this option is only supported on Object Storage system from providers QCV1 and QVV1. Currently, the following compression type values are supported:

0 None (No compression)

1 CLIENT_LZ4 (Client-side LZ4 compression)

If this option is not specified, the compression type will be set to None.

A summary usage report for object storage that includes the total pre and post-compressed file size information, sorted by policy class ID and media ID, can be obtained via the **fsobjinfo**(1) command.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

SEE ALSO

filesystems(4), **fsaddclass**(1), **fsrmclass**(1), **fsclassinfo**(1), **fsclassrnm**(1), **fsstore**(1), **fsversion**(1), **fsclean**(1), **fsfileinfo**(1), **fschfiat**(1), **fspolicy**(1), **fskey**(1), **fsobjinfo**(1)

NAME

fsmount − Mounts specified media

SYNOPSIS

fsmount *mediaID*

DESCRIPTION

The **fsmount**(1) will allow any media known to the Media Manager to be mounted. A media mounted using this command is under the control of the user or application which mounted it and will not be dismounted until the **fsdismount**(1) command is issued or the Tertiary Manager software is restarted.

OPTIONS

mediaID The media identifier that is to be mounted.

NOTES

This command is not valid for storage disks.

SEE ALSO

fsdismount(1)

NAME

fsmoverpt − Generate a report on media that were removed from or introduced into Quantum storage subsystems.

SYNOPSIS

fsmoverpt [**-aboi**] [*mediaID...*] [**-f** *logfilename*] [**-t** *starttime* [*endtime*]]

DESCRIPTION

The **fsmoverpt**(1) command generates a report of media that were moved into or out of the Quantum system using the **fsmedin**(1) and **fsmedout**(1) commands. The historical data for the media status is maintained in the $FS_HOME/logs/history/hist_03 file. This is the default log file used, however a different log file can be specified using the **-f** option.

Any number of category options can be entered. If no options are entered, all media movement types are listed. The softcopy report is sent to *stdout* and can be redirected to a file or piped to a printer.

The time range option (**-t** *starttime*) extracts only information stored in the log over the time frame specified. If specified, the *starttime* and *endtime* must be before the current time, and the *starttime* must be before the *endtime*. If no *endtime* is specified, *endtime* defaults to current time.

OPTIONS

-a Generate an historical report listing blank media that were added.

-b Generate an historical report listing blank media that were removed.

-o Generate an historical report listing media that were checked out (removed with the information retained).

-i Generate an historical report listing media that were checked in.

mediaID...

One or more media identifiers. Multiple media identifiers must be separated by spaces. The number of media identifiers that can be entered is limited by the local machine's command-line length.

-t *starttime* [*endtime*]

Time range on which to report. If no end time is entered, the end time defaults to the current time. The format for the time parameter is MM:DD:hh:mm:ss, where:

MM = Numeric, two-digit month
(default:01 (January)),

The following are optional; defaults are shown:,
DD = Numeric, two-digit day
(range: 01-31, default:01),
hh = Numeric hour
(range: 00-23, default:00),
mm = Numeric minute
(range: 00-59, default:00),
ss = Numeric second
(range: 00-59, default:00)

-f *logfilename*

File name of a Tertiary Manager log file - The full file path name does not have to be entered. If preceded by a slash (/) in the command definition, the full path name, starting from the root directory, is required as input to the command. Otherwise, the Tertiary Manager command expands the directory name using the current working directory as the parent.

SEE ALSO

fsmedout(1), **fsmedin**(1)

NAME

fsobjcfg − Configure or report all Object Storage components in Quantum storage system.

SYNOPSIS

fsobjcfg -a -i *host_address* **-p** *port_number* [**-e http**|**https**] [**-U** *username* **-P** *password*] [**-v** *provider*] [**-B**] *appliance_alias*

fsobjcfg -m [**-i** *host_address*] [**-p** *port_number*] [**-e http**|**https**] [**-U** *username* [**-P** *password*]] [**-B**] *appliance_alias*

fsobjcfg -d *appliance_alias*

fsobjcfg -a -n *controller_alias* [**-s** *streams*] [**-B**] *appliance_alias*

fsobjcfg -m -s *streams* [**-B**] **-n** *controller_alias*

fsobjcfg -d -n *controller_alias*

fsobjcfg -a -o *iopath_alias* **-i** *connection_endpoint* [**-e http**|**https**] [**-t** *mediatype*] [**-u PATH**|**VHOST**] [**-B**] **-n** *controller_alias*

fsobjcfg -m -o *iopath_alias* [**-i** *connection_endpoint*] [**-e http**|**https**] [**-t** *mediatype*] [**-u PATH**|**VHOST**] [**-B**] **-n** *controller_alias*

fsobjcfg -d -o *iopath_alias* **-n** *controller_alias*

fsobjcfg -a -b *namespace* [**-c** *copy*] [**-C** *class*] [**-f** *mediaid*] [**-t** *mediatype*] [**-U** *username* **-P** *password*] [**-S** *signing_type*] [**-O** *storageclass*] [**-Y** *authentication_type*] [**-B**] *appliance_alias*

fsobjcfg -a -b *namespace* **-t AWS -Y STS_PUBLIC|STS_GOVCLOUD -R** *role* **-U** *username* **-P** *password* [**-c** *copy*] [**-C** *class*] [**-f** *mediaid*] [**-D** *role_duration*] [**-O** *storageclass*] [**-S** *signing_type*] [**-Z** *authentication_endpoint*] [**-B**] *appliance_alias*

fsobjcfg -a -b *namespace* **-t AWS -Y CAP -R** *role* **-A** *CAP_agency* **-M** *CAP_mission* [**-c** *copy*] [**-C** *class*] [**-f** *mediaid*] [**-D** *role_duration*] [**-O** *storageclass*] [**-S** *signing_type*] [**-B**] *appliance_alias*

fsobjcfg -m [**-b** *namespace*] [**-c** *copy*] [**-C** *class*] [**-t** *mediatype*] [**-U** *username*] [**-P** *password*] [**-O** *storageclass*] [**-S** *signing_type*] [**-Y** *authentication_type*] [**-B**] [**-X**] **-f** *mediaid*

fsobjcfg -m [-t AWS] [-Y STS_PUBLIC|STS_GOVCLOUD] [**-b** *namespace*] [**-c** *copy*] [**-C** *class*] [**-U** *username*] [**-P** *password*] [**-R** *role*] [**-D** *role_duration*] [**-O** *storageclass*] [**-S** *signing_type*] [**-Z** *authentication_endpoint*] [**-B**] **-f** *mediaid*

fsobjcfg -m [-t AWS] [-Y CAP] [**-b** *namespace*] [**-c** *copy*] [**-C** *class*] [**-A** *CAP_agency*] [**-M** *CAP_mission*] [**-R** *role*] [**-D** *role_duration*] [**-O** *storageclass*] [**-S** *signing_type*] [**-B**] **-f** *mediaid*

fsobjcfg -d -f *mediaid*

fsobjcfg -r -f *mediaid*

fsobjcfg [**-l**] [**-F** *type*]

DESCRIPTION

The **fsobjcfg**(1) command adds, modifies, deletes, and reports configuration settings for Object Storage components in the Quantum storage system. Object Storage components are: Appliances, Controllers, IO Paths, and Namespaces. These components and their attributes provide the addressing information required to form the URL to store and retrieve objects from the Object Storage.

The URL to the Objects in the Object Storage consists of an Internet Address and optional TCP/IP Port Number, and the Namespace. The IO Path is a complete TCP/IP connection endpoint. The Namespace component provides the location within Object Storage where the data is stored. A URL looks like :

AXR http://10.64.68.22:8090/namespace/bucketname/objectid

S3 http://10.64.68.22:7070/bucketname/objectid

Object Storage Namespaces are used by the Tertiary Manager software as secondary storage similar to tape

or Storage Disk media.

For any **fsobjcfg**(1) command option, the Tertiary Manager software can be active or inactive.

Submitting the **fsobjcfg**(1) command with no options or **-l** option generates a report showing all Quantum Object Storage components that are currently configured.

The **fschstate**(1) command can be used to change the state of an Object Storage component once it has been configured.

OPTIONS

-a Add a new Object Storage component. If the command is invoked and any of the required parameters are omitted, an error message is returned. The error message identifies the field that was not entered.

-m Modify an Object Storage component. The component alias cannot be modified.

-d Delete an Object Storage component. A component cannot be deleted if it has children components still configured. A namespace component can not be deleted if it contains any stored copies. The **fsrminfo**(1) command can be used to purge any data prior to removing a namespace component from the configuration.

-r Refresh the space available capacity for the specified media. It is typically used to reenable storage of data after an out-of-space condition has been encountered with a Lattus media and actions have already been taken to address the out-of-space issue on the Lattus appliance.

appliance_alias

Appliance Alias. This is a variable string of up to 256 characters and is case sensitive. Duplicates are not allowed. This command is normally the name you have given to your Object Storage device. The *appliance_alias* is used to uniquely identify a single system.

-i *connection_endpoint*

Connection_endpoint of either the management GUI or IO Data Path of the Object Storage device. The *connection_endpoint* given in the appliance configuration is used to access the appliance management GUI. For the appliance, the port number is given as a separate option. The *connection_endpoint* given in the IO Path configuration is used to access the appliance namespace and its objects. For the iopath, the port number is a part of the connection endpoint if it is needed. *connection_endpoint* can either be DNS hostname e.g. host.abc.com or an Internet Protocol address e.g. 10.65.166.123, or an Internet Protocol address and port number e.g. 10.65.166.123:8080. If the port number is not given in the connection endpoint, port 80 is the default. Duplicate connection endpoints are not allowed.

-u PATH | **VHOST**

There are 2 ways to format a URL, PATH style and VHOST style. A PATH style URL looks like:

http://*ip-address***:***port*/*namespace-name*/*object-id*

A VHOST style URL looks like:

http://*namespace-name***.***ip-address***:***port*/*object-id*

Using a VHOST style URL requires additional address resolution setup on the calling host and target Object Storage system. For more information on VHOST URLs, please refer to the following link:
http://docs.aws.amazon.com/AmazonS3/latest/dev/VirtualHosting.html.

Please refer to the S3 setup instructions provided by the specific vendor.

The default is **PATH** style URL. **VHOST** style URLs are supported for S3 compatible media only and is not supported for AXR and Azure media.

-p *port_numbers*

This is the TCP/IP port number that you have configured for the management GUI. Specify the singular VIP(Virtual IP) for the management GUI.

-e http | **https**

Network protocol to use when accessing the management GUI or Client Daemons on Object Storage systems. Management GUI port can either be http or https. Each iopath references a Client Daemon. Each iopath can either be http or https. Verify with your Administrator the configured http/https port numbers.

Https is a layering of http on top of SSL/TLS. SNSM, via libcurl, uses an OpenSSL implementation of the SSL and TLS protocols.

Libcurl is configured at build time to set the correct default location for Certificate Authority (CA) Root certificates for OpenSSL use. This default varies depending on the OS distribution. You can override the default directory that holds the individual certificates with FS_OBJSTORAGE_CAPATH. You can also override the default certificate file bundle with FS_OBJSTORAGE_CACERT. Note that /opt/quantum/openssl/bin/c_rehash must be run on the overriding directory that holds the individual certificates to create the necessary symlinks to the individual certificate files for OpenSSL use. This action is not needed when overriding the certificate bundle file.

The FS_OBJSTORAGE_SSL_VERIFY_PEERHOST indicates the type of verification to be used: either peer or both peer and host verification. The default is peer and host verification. Note that wildcards in the hostname used in the Common Name (CN) in the certificate are incompatible with host verification. You must change the host verification to peer if wildcards are used.

If you overrode the default CA Root certificate(s) location set by libcurl, make sure that each DDM host is also re-configured accordingly.

-n *controller_alias*

This is normally the name you have given to your Object Storage controllers. Duplicates are not allowed. *controller_alias* is a variable string of up to 256 characters and is case sensitive.

-s *streams*

Maximum number of I/O streams per controller. This allows the number of concurrent I/O operations per controller to be adjusted. The specified value must be greater than 0. If not specified, the current default is used. Use the display option to see the default configured.

-o *iopath_alias*

The I/O path alias. Duplicates are not allowed. *iopath_alias* is a string of up to 256 characters and is case sensitive.

-b *namespace*

This corresponds to the namespace that you have created on Object Storage system. Duplicates within the same appliance are not allowed. Namespace is a string of up to 256 characters and is case sensitive. A namespace can only be associated with either the AXR or the S3 Object Storage API. This is persistent and can not be modified.

-v *provider*

This identifies the provider of the appliance. The appliance provider determines the format of provider-specific REST headers. The following provider types are supported by Tertiary Manager software:

AWS
AZURE
IBM:CLEVERSAFE
LATTUS
NETAPP:WEBSCALE
QCV1
QVV1
SCALITY:RING

-t *mediatype*

The object storage media type. This is assigned to a namespace and an iopath. Namespaces and iopaths are associated with a specific Object Storage API. The following object storage media types are supported by Tertiary Manager software:

AWS
AXR
AZURE
QVAULT
S3
S3COMPAT

If **-t** is not specified, the media type will default to **AXR**. Connectivity tests are only performed for **AXR** iopaths.

-S *signing_type*

Used to specify the signing type for the requests sent to the Object Storage and/or authentication server. The following signing types are supported:

V2
V4
AZURE

The default is **V4** for AWS, Q-Cloud, Cleversafe and Webscale media, **V2** for other S3 compatible media and **AZURE** for Azure media. This option is not valid for AXR media. To be able to configure V4, both AWS full payload and chunked uploading for V4 signing should be supported by the Object Storage server.

-U *username*

If permissions have been configured on the appliance system which require username/password authentication, the same credentials must be specified here. If no permissions have been configured on the appliance, they should not be configured here either. To remove the username/password combination during modification specify **none** for the username. For media types **AWS** (not using **CAP** authentication), **S3COMPAT** and **AZURE**, the username is required and must be defined in the bucket (namespace) configuration. The *username* can be a maximum of 256 characters and consist of any ASCII character. The username is also known as the Access Key Id for S3 compatible media, or the Storage Account Name for Azure media.

-P *password*

If permissions have been configured on the appliance system which require username/password authentication, the same credentials must be specified here. If no permissions have been configured on the appliance, they should not be configured here either. For media types **AWS** (not using **CAP** authentication), **S3COMPAT** and **AZURE**, the password is required and must be defined in the bucket (namespace) configuration. The *password* can be a maximum of 256 characters and consist of any ASCII character. The password is also known as the Secret Access Key for S3 compatible media, or the Storage Access Key for Azure media.

-f *mediaid*

Media identifier is a name that uniquely identifies a specific namespace amongst multiple Object Storage systems. Media identifier is a variable string of 16 characters.

-Y *authentication_type*

An authentication type is required for all Object Storage media except for AXR. The following authentication types are supported:

STANDARD
STS_PUBLIC
STS_GOVCLOUD
CAP

If this option is not specified, the authentication type will be set to **STANDARD**.

The **STANDARD** type applies to all media and authenticates with a user name and password for Object Storage access. For S3 compatible media the user name and password are the Access Key Id and Secret Access Key. For Azure media, the user name and password are the Storage Account Name and Storage Access Key.

The **STS_PUBLIC** type uses the AWS Security Token Service (STS) to obtain temporary credentials for access to Object Storage in the AWS public cloud. This authentication type applies only to AWS media and requires a role, username and password be specified.

The **STS_GOVCLOUD** type uses the AWS Security Token Service (STS) to obtain temporary credentials for access to Object Storage in the AWS GovCloud. This authentication type applies only to AWS media and requires a role, username and password be specified.

The **CAP** type uses the AWS Commercial Cloud Services (C2S) Access Portal (CAP) to obtain temporary credentials for access to Object Storage in the AWS Private Cloud for the Federal Government. This authentication type applies only to AWS media and requires a role, CAP mission, and CAP agency be specified. Furthermore, it requires the specification of the following sysparms in */usr/adic/TSM/config/fs_sysparm_override*:

FS_OBJSTORAGE_CAPATH which sets the directory where the issuer's certificate authority (CA) can be found, if it is not already included in the operating system's default trusted root certificate file. Note, the certificate should be in PEM format. For example, the certificate can be copied to */usr/cvfs/config/ssl* and configured as follows:

FS_OBJSTORAGE_CAPATH=/usr/cvfs/config/ssl;

Note, if your customized CA PEM file contains more than one certificate, we recommend that you append the content of your customized CA PEM file to your operating system's default CA bundle and to **NOT** use sysparm FS_OBJSTORAGE_CAPATH to set the location of your customized CA PEM file. Otherwise, you could split your CA PEM file into multiple CA PEM files, each of which contains a single CA certificate, and use sysparm FS_OBJSTORAGE_CAPATH to set the location of your newly split single certificate CA PEM files.

FS_OBJSTORAGE_CLIENTCERT which sets the location of the X.509 client certificate installed on the system for the CAP server to authenticate. Note that the certificate should be in PEM format. For example, the client certificate can be copied to */usr/cvfs/config/ssl/client-cert-filepath*, and configured as follows:

FS_OBJSTORAGE_CLIENTCERT=/usr/cvfs/config/ssl/client-cert-filepath;

FS_OBJSTORAGE_C2S_CAP_HOSTPORT which sets the connection endpoint for the CAP server and can be configured as follows:

FS_OBJSTORAGE_C2S_CAP_HOSTPORT=cap-portal:port;

FS_OBJSTORAGE_CLIENTKEY which sets the location of the client private key if the client private key is kept separately from (i.e. not included in) the client certificate file. This parameter can be configured as follows:

FS_OBJSTORAGE_CLIENTKEY=/usr/cvfs/config/ssl/client-key-filename;

FS_OBJSTORAGE_CLIENTKEY_PASS which specifies the passphrase used to protect the client private key and can be configured as follows:

FS_OBJSTORAGE_CLIENTKEY_PASS=passphrase;

Make sure to run the following command to generate the hash for your certificates: */opt/quantum/openssl/bin/c_rehash /usr/cvfs/config/ssl*. Restart TSM to allow the system parameter changes to take effect.

***-Z** authentication_endpoint*

Specifies an authentication endpoint which overrides the default endpoint for the public or GovCloud STS server. This option is valid only with the **STS_PUBLIC** and **STS_GOVCLOUD** au-

thentication types.

-O *storageclass*
Defines the storage class for AWS and Azure media only. The following storage classes are supported:

standard
standard_ia
glacier
azure_append_blob

standard specifies the AWS Standard storage class, **standard_ia** the AWS Standard - Infrequent Access storage class, **glacier** the AWS Glacier storage class and **azure_append_blob** the Azure Append Blob storage class.

By default, this is set to **standard** for all AWS and Q-Cloud Archive media, **glacier** for Q-Cloud Vault media, and **azure_append_blob** for Azure media.

-R *role* For **STS_PUBLIC** and **STS_GOVCLOUD** authentication, use the Amazon Resource Name (ARN) of the role to assume. For **CAP** authentication, use the Identity and Access Management (IAM) role associated with the target C2S account. A role is required by AWS STS and the CAP servers to obtain temporary credentials. This option is valid only with the **STS_PUBLIC**, **STS_GOVCLOUD**, and **CAP** authentication types.

-D *role_duration*
The duration, in seconds, of the role session or temporary credentials before expiration. The value must be in the range 900 to 3600. A default value of 3600 seconds is used if a role duration is not specified. This option is valid only for the **STS_PUBLIC**, **STS_GOVCLOUD**, and **CAP** authentication types.

-A *CAP_agency*
The agency associated with the target C2S account. This option is valid only for the CAP authentication type.

-M *CAP_mission*
The mission associated with the target C2S account. This option is valid only for the CAP authentication type.

-c *copy* Used to specify the copy number for the namespace or media being configured. If not specified when adding a namespace, the copy number will be set to 1.

-C *class*
Used to specify the policy class for the namespace or media being configured. If not specified when adding a namespace, no policy class association will be set for the media, and the media can be used by any and multiple policy classes. When modifying a namespace, the associated policy class can be changed as long as the media is blank. To remove the policy class association for a media so that it can be used by multiple policy classes, use the **fschmedstate**(1) command with the **-b** option.

-l As part of the report, show the configured username for all configured appliances and namespaces.

-B During addition and modification, the path to the component is verified for connectivity. If connectivity cannot be made, a warning message will be given and the command will fail. By specifying the **-B** option, the connectivity verification will still occur, but the command will not fail if the connectivity cannot be verified.

-X For conversion from AXR to S3, if the media has active objects, this option is required to force the change of the media name and/or type.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

RESTRICTIONS

The host address, port numbers, and namespace must be accessible when performing add, modify, or delete operations. The command automatically performs connectivity tests. If using https, the host address must match one of the names in the connecting server's SSL Certificate during SSL/TLS authentication.

EXAMPLES

Configure a Webscale Object Storage destination, followed by a namespace corresponding to bucket web-bucket, specifying media type **S3COMPAT**, V4 signing, and standard authentication :

```
fsobjcfg -a -i webscale-server-hostname -v NETAPP:WEBSCALE -p 443 \
     -e https webscale
fsobjcfg -a -n websctl -s 48 webscale
fsobjcfg -a -o webspath -i webscale-server-hostname:8082 -e https \
     -u PATH -t S3COMPAT -n websctl
fsobjcfg -a -b web-bucket -t S3COMPAT -c 1 -f WS0001 -U username \
     -P password -S V4 -Y STANDARD webscale
```

Configure an Azure Object Storage destination, followed by a namespace corresponding to Azure container az-container, specifying media type **AZURE**, azure signing, standard authentication, and the Azure Append Blob storage class :

```
fsobjcfg -a -i blob.core.windows.net -v AZURE -p 443 -e https azure
fsobjcfg -a -n azurectl -s 48 azure
fsobjcfg -a -o azurepath -i blob.core.windows.net -e https -u PATH \
     -t AZURE -n azurectl
fsobjcfg -a -b az-container -t AZURE -c 1 -f AZ0001 -U username \
     -P password -O azure_append_blob -S AZURE -Y STANDARD azure
```

Configure an AWS Object Storage destination, followed by a namespace corresponding to AWS bucket, bucket-1, requesting V4 signing, standard authentication, and the standard storage class :

```
fsobjcfg -a -i s3.amazonaws.com -v AWS -p 443 -e https aws
fsobjcfg -a -n awsctl -s 48 aws
fsobjcfg -a -o awspath -i s3-us-west-2.amazonaws.com -e https \
      -u VHOST -t AWS -n awsctl
fsobjcfg -a -b bucket-1 -t AWS -c 1 -f AWS0001 -U username \
      -P password -O standard -S V4 -Y STANDARD aws
```

Configure an AWS GovCloud Object Storage destination, followed by a namespace corresponding to AWS bucket govbucket-1, requesting V4 signing, AWS STS GovCloud authentication, and the

standard storage class :

```
fsobjcfg -a -i s3-us-gov-west-1.amazonaws.com -v AWS -p 443 \
     -e https awsgov
fsobjcfg -a -n awsctl -s 48 awsgov
fsobjcfg -a -o awspath -i s3-us-gov-west-1.amazonaws.com -e https \
     -u VHOST -t AWS -n awsctl
fsobjcfg -a -b govbucket-1 -t AWS -c 1 -f AWS0000 -U username \
     -P password -O standard -S V4 -Y STS_GOVCLOUD -D 3600 \
     -R arn:aws-us-gov:iam::123456789012:role/gov-role awsgov
```

Configure a Commercial Cloud Services Object Storage destination, followed by a namespace corresponding to AWS bucket c2sbucket-1, requesting V4 signing, CAP authentication and the AWS Glacier storage class :

```
showsysparm FS_OBJSTORAGE_C2S_CAP_HOSTPORT
FS_OBJSTORAGE_C2S_CAP_HOSTPORT=ec2-12-34-567-89.us-west-2.compute.amazonaws.com:4

showsysparm FS_OBJSTORAGE_CLIENTCERT
FS_OBJSTORAGE_CLIENTCERT=/root/ec2-client.pem

fsobjcfg -a -i s3.amazonaws.com -v AWS -p 443 -e https awsc2s
fsobjcfg -a -n awsctl -s 48 awsc2s
fsobjcfg -a -o awspath -i c2sbucket-1_region_endpoint -e https \
       -u VHOST -t AWS -n awsctl
fsobjcfg -a -b c2sbucket-1 -t AWS -c 1 -f C2S0001 -O glacier -S V4 \
       -Y CAP -R myrole -D 3600 -M mission -A agency awsc2s
```

FILES

/usr/adic/TSM/config/fs_sysparm.README
usr/adic/TSM/config/fs_sysparm

SEE ALSO

fschstate(1), **fschmedstate**(1), **fsrminfo**(1)

NAME

fsobjinfo − Generate a usage report for object store media.

SYNOPSIS

fsobjinfo [**-s**] [**-F** *type*]

fsobjinfo -c *id* [*id ...*] [**-s**] [**-F** *type*]

fsobjinfo -m *id* [*id ...*] [**-s**] [**-F** *type*]

DESCRIPTION

The **fsobjinfo**(1) command produces a summary usage report for object store media. Object store usage is summarized based on object store media ID and policy class ID. Reported usage can be limited to the optionally specified set of policy class IDs or object store media IDs.

USAGE REPORT

The default usage report produces the following information for each object store medium and policy class:

Media ID	Media identifier of the medium.
Class ID	The medium's associated policy class.
Total Object Count	The total number of objects written to the medium.
Encrypted Object Count	The total number of encrypted objects written to the medium.
PreCompress Size(MB)	The total number of bytes in MB before compression written to the medium.
PostCompress Size(MB)	The total number of bytes in MB after compression written to the medium. If compression is not enabled for the policy class, the PostCompress Size will be equal to the PreCompress Size.

OPTIONS

-c *classID ...*

One or more policy class identifiers on which to report. If multiple policy class identifiers are entered, the policy class identifiers must be separated by spaces. The number of policy class identifiers that can be entered is limited by the local machine's command-line length.

-m *mediaID ...*

One or more media identifiers on which to report. If multiple media identifiers are entered, the media identifiers must be separated by spaces. The number of media identifiers that can be entered is limited by the local machine's command-line length.

-s Reports the total sum across all object store media and/or policy classes.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default) or **JSON**.

TEXT is the "legacy" textual format.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application. See http://json.org for more information.

SEE ALSO

fsobjcfg(1)

NAME

fspolicy − Command used for managing disk data and disk space on a policy class or file system basis.

SYNOPSIS

fspolicy -s -c *class* [**-v** *drivepool*] [**-m** *minstoretime*]

fspolicy -r -y *filesystemmountpoint* [**-e**] [**-o** *goal*] [**-m** *minreloctime*] [**-z** *minsize*] **-a** *affinity*

fspolicy -t -y *filesystemmountpoint* [**-e**] [**-o** *goal*] [**-m** *mintrunctime*] [**-z** *minsize*] [**-a** *affinity*]

fspolicy -s -e -y *filesystemmountpoint* [**-v** *drivepool*] [**-m** *minstoretime*]

fspolicy -r -c *class* [**-m** *inreloctime*] [**-z** *minsize*]

fspolicy -t -c *class* [**-o** *goal*] [**-m** *mintrunctime*] [**-z** *minsize*]

fspolicy -b -y *filesystemmountpoint*

DESCRIPTION

The **fspolicy**(1) command is used for managing files on file systems controlled by the Tertiary Manager software. It manages these files by applying a combination of 1) the storage, relocation, and truncation parameters as defined by the policy class and 2) the file system configuration parameters.

A set of candidates for storing, relocating, and truncating are kept up to date by a group of daemons that track file system activity. When the **fspolicy**(1) command is executed manually or by a Tertiary Manager daemon, a group of those files meeting the criteria will be stored, relocated, or truncated as needed.

The **-s** option is valid for the policy class identified. It is also valid for an archival file system if it is an emergency (**-e** option is present). It causes files that have remained on disk longer than *minstoretime* to be stored to media. Any additional copies of files that were not stored since the last policy application are also stored at this time. The storage policy uses the default drive pool associated with the policy class media type. The drive pool and media must be available, or no files will be stored.

The **-r** option is valid for the policy class identified or an archival file system. It conditionally causes files on disk to be relocated from one disk affinity to another. The files which have not been accessed in *minreloctime* days and are not excluded (via **fschfiat**(1)) are considered candidates for relocation. Relocation candidates found may or may not actually be relocated. This will depend on the current file system fill level, other options provided, and the file system configuration parameters. The relocation of files will proceed until the target file system fill level has been reached. That target, again, is dependent on the options provided and the file system configuration parameters.

The **-t** option is valid for the policy class identified or an archival file system. It conditionally causes stored files on disk to be truncated. The files which have all required copies on tape, have not been accessed in *mintrunctime* days, and are not excluded (via **fschfiat**(1)) are considered candidates for truncation. Truncation candidates found may or may not actually be truncated. This will depend on the current file system fill level, other options provided, and the file system configuration parameters. The truncation of files will proceed until the target file system fill level has been reached. That target, again, is dependent on the options provided and the file system configuration parameters.

The **-b** option causes the rebuild command to be run by the automatic scheduler to verify candidate-list integrity. It rebuilds candidate lists (store, alternate-store-location, relocate, and truncate), per file system by searching the file system map for files needing these actions.

NOTE: This command will generate a new file system map whenever it is run. The map generation will be analogous to the running of the **fs_mapper**(1) command with the **-m** option specified (the map will be generated from the metadump for the file system since that operation is much faster than mapping directly from the disk). Because of this behavior, if it is felt that the metadump is out of date, you will want to run a backup to bring the metadump up to date before running the rebuild policy. (The default schedule used by **fs_scheduler**(1) runs a rebuild policy only after a backup.) See the man page for **fs_mapper**(1) for more mapping info.

The **-o** option can be specified for a truncation or relocation policy to override the target file system fill percentage specified in the file system configuration parameters. The eligibility of individual files for trunca-

tion or relocation is based on the mintrunctime or minreloctime values, respectively, as specified in the policy class (unless overridden by the **-e** or **-m** options shown below.)

The **-e** option changes the priority of the command. For stores, this means that instead of the store command being placed at the end of the queue waiting for resources, the command is given a priority value of 1 so it will be placed at the head of the queue. For truncates, this means the mintrunctime for a file will be ignored, and a file that can be truncated (all copies stored) will be a valid candidate, regardless of how recently it has been accessed. For relocates, this means the minreloctime for a file will be ignored, and a file will be a valid candidate, regardless of how recently it has been accessed.

The **-z** option allows file size to be considered when determining which files are to be truncated or relocated. Files larger than or equal to the specified *minsize* will be candidates for truncation or relocation. Files less than the minsize will not be truncated or relocated during the command execution. As in any truncation or relocation operation, the candidate files will be processed until the target file system fill level has been reached. That target is dependent on the other options provided and the file system configuration parameters.

The **-m** option is used to supersede the defaults specified by the policy class definition for *minstoretime*, *minreloctime*, and *mintrunctime*.

When used in storing (minstoretime), this option specifies the amount of time the file must reside on disk before becoming a candidate for storage on media. If a file is retrieved and modified, all existing copies on media will become invalid, and the file will again become a candidate for storage after minstoretime.

When used in relocating (minreloctime), this option specifies the amount of time that a file must reside unaccessed on disk before being considered a candidate for relocation. A file will not have its disk blocks relocated before it has remained unaccessed on disk for this specified time. As in any relocation operation, the processing of candidate files will proceed until the target file system fill level has been reached. That target is dependent on the other options provided and the file system configuration parameters. Note that the use of the **-m** option can affect the target file system fill percentage. See the file system configuration file, **filesystems**(4).

When used in truncating (mintrunctime), this option specifies the amount of time that a stored file must reside unaccessed on disk before being considered a candidate for truncation. A file will not have its disk blocks truncated before it has remained unaccessed on disk for this specified time. As in any truncation operation, the processing of candidate files will proceed until the target file system fill level has been reached. That target is dependent on the other options provided and the file system configuration parameters. Note that the use of the **-m** option can affect the target file system fill percentage. See the file system configuration file, **filesystems**(4).

The **-v** option will store files only using drives associated with the specified *drivepool*. This allows the number of drives used for store policies to be throttled by only allocating a subset of the drives to the specified drivepool.

OPTIONS

-c *class* The policy class associated with the data to be stored, relocated or truncated.

-e Emergency. Invokes a high priority for immediate action on the storage of the files in a file system. Also overrides mintrunctime for truncation and minreloctime for relocation. For storage, policy class settings for maximum set age, minimum set age and auto store are bypassed.

-s Invoke the storage policy. Storage is based on policy class parameters.

-r Invoke the relocation policy. Relocation is based on policy class parameters and on settings in the file system configuration file. See the file system configuration file.

-t Invoke the truncation policy. Truncation is based on policy class parameters and on settings in the file system configuration file. See the file system configuration file.

-y *filesystemmountpoint*
File system to which policy will be applied. The file system name must be the mount directory for the file system.

-m *minstoretime,minreloctime,mintrunctime*
Minimum time that a file must reside on disk before being considered a candidate for storage (minstoretime), or the minimum time a file must reside unaccessed on disk before being considered a candidate for relocation (minreloctime), or the minimum time a file must reside unaccessed on disk before being considered a candidate for truncation (mintrunctime). If the **-m** option is not used, the default *minstoretime*, *minreloctime*, or *mintrunctime* will be those specified by the policy class definition.
See the MINIMUM TIME FORMAT section below for more info on the format and usage of the minimum time value specified on the **-m** option.

-o *goal* The percentage of used disk space at which a relocation or truncation policy ceases to be applied. It will override the target specified by the file system configuration parameters.

-v *drivepool*
The *drivepool* from which drives are allocated when storing files.

-b Scans the file system map for candidates (files needing store, alternate-store-location, relocate, and truncate), and rebuilds the candidate lists.

-z *minsize*
Minimum file size in bytes to be relocated or truncated. Only files larger than or equal to the specified *minsize* will be processed.

USAGE

A set of Tertiary Manager daemons will kick off the **fspolicy**(1) command as needed. It is generally not necessary for a user/administrator to run the command.

EXIT STATUS

Exit codes for the **fspolicy**(1) command are:

0 Policy command completed successfully.

1 A policy of this type is already running.

2 Generic policy error.

3 Command syntax error.

4 Specified file system not mounted.

5 Truncation goal not met.

6 Scanning of file system failed.

7 License failure for **manager** feature.

8 License failure for **sdisk** feature.

9 License failure for **checksum** feature.

10 License failure for **object_storage** feature.

11 Currently no files to store/relocate/truncate.

MINIMUM TIME FORMAT

The **-m** option for minstoretime, mintrunctime and minreloctime can all be specified in units of minutes, hours or days. To specify minutes put an '**m' suffix on the value, to specify hours put an 'h' suffix on the value and for days use a 'd' suffix. Note that if the unit suffix is not specified the minstoretime value defaults to units of minutes while the others default to units of days. Please be very careful when using the -m option as you may get unintended results. Some valid examples for times are shown below:**

15m - 15 minutes
3h - 3 hours
7d - 7 days
10 - 10 minutes for *minstoretime* and 10 days for the other times

Below is an example of an emergency truncation policy specifying a mintrunctime value of 6000 minutes.

```
fspolicy -t -y /stornext/snfs -e -m 6000m
```

SEE ALSO

filesystems(4), **fsstore**(1), **fsclassinfo**(1), **fsaddclass**(1), **fsmodclass**(1), **fschfiat**(1), **fsrelocate**(1), **fs_mapper**(1), **sntsm**(1)

NAME

fspostrestore − Resync the disk and database after a restore operation.

SYNOPSIS

fspostrestore -s *sTimeString* [**-e** *eTimeString*] [**-d** *directory*] [**-t y**|**n**] [**-p**] [**-b**] [**-o** *outFile*] *mountPoint*

DESCRIPTION

The **fspostrestore**(1) command is used to resync the disk and database after a restore operation. If a managed file system or any part of the database was lost, then this should be executed as the last step of the restore process. (If multiple file systems were lost, or the database was lost, this will need to be executed against each managed file system.)

The start time stamp of the backup used in the restore should be the start time provided to this command. If the restore did not require the use of a backup (for example, a file system was recovered from its metadump file which was still on disk) then choosing a start time of one week prior to the disaster is a good default.

OPTIONS

mountPoint

The mount point of the file system to resync with the database.

-s *sTimeString*

Indicates the start time of the time range to check during operation. The format for the time parameter is YYYY:MM:DD:hh:mm:ss where:
YYYY = Numeric, year

The following are optional; defaults are shown:,
MM = Numeric, two-digit month
(default:01 (January)),
DD = Numeric, two-digit day
(range: 01-31, default:01),
hh = Numeric hour
(range: 00-23, default:00),
mm = Numeric minute
(range: 00-59, default:00),
ss = Numeric second
(range: 00-59, default:00)

-e *eTimeString*

Indicates the end time of the time range to check during operation. This defaults to the current time and should not normally be set without consulting Quantum technical assistance. The format for the time parameter is YYYY:MM:DD:hh:mm:ss where:
YYYY = Numeric, year

The following are optional; defaults are shown:,
MM = Numeric, two-digit month
(default:01 (January)),
DD = Numeric, two-digit day
(range: 01-31, default:01),
hh = Numeric hour
(range: 00-23, default:00),
mm = Numeric minute
(range: 00-59, default:00),
ss = Numeric second
(range: 00-59, default:00)

-o *outFile*

The output file for the report of the command. The default is */usr/adic/TSM/logs/reports/fspostrestore.out*

-t y|n Indicates if a list of files that are excluded from truncation should be generated. The file created is named *fspostrestore.<file system name>.no_trunc*. If postrestore exclusions are specified (see exclusions man page) then two lists will be generated. The second file name is identical to the first with an additional _filtered suffix. The default is **y** which generates the list.

-d *directory*
This specifies the directory where the list of files excluded from truncation will be generated. The default is /usr/adic/TSM/logs/reports/

-p Preserve snpolicyd information. NOTE: Only use this option when directed by Quantum technical assistance.

-b Preserve snpolicyd managed files that are deduplicated and stored in blockpool. NOTE: Only use this option when directed by Quantum technical assistance.

NOTES

One of the tasks of this command is to find files that are on disk but not in the Tertiary Manager database. (This can happen for example if an older version of the database backup had to be used for some reason.) Files that are found in this state are removed from disk since no data is left on disk after a file system is restored. One side effect of this behavior is that if a user has any 100% sparse files on disk, those would be removed as part of this processing. (The Tertiary Manager software adds nothing to the database for these files.) A listing of the files removed by the processing can be found in the saved output of the command.

This command runs in two passes. The first pass is where the bulk of the work is done. (Files only on disk are located and removed, version discrepancies are fixed etc.) In the second pass files that are in the database, but not on disk in the location they were when the file was stored are processed. This step of the command basically scans the dump to determine if the files do still exist on disk in some new location. If the files are not anywhere on disk they are made recoverable in the database. At that point they can be brought back to disk by the **fsrecover**(1) command if desired. If there are lots of files in this state (because for example the database restored was more up to date than the disk) and the dump contains many files, then this step can take a long time.

During the first pass of the command no activity should be attempted on the file system being processed. During the second pass activity on the file system can be resumed if it is decided that you do not want to wait for the pass to complete. It is recommended however that both passes are allowed to complete before the file system is put back in use.

WARNINGS

This utility should be used carefully and only under the guidance of Quantum technical assistance.

SEE ALSO

snbkpreport(1), **exclusions**(4)

NAME

fsqueue − View subsystem resource requests.

SYNOPSIS

fsqueue [**-r** *requestID*] [**-F** *type*]

fsqueue -m [**-r** *requestID*] [**-F** *type*]

fsqueue -f [[**-r** *requestID*] | [*filename*...]] [**-F** *type*]

fsqueue -a [**-v**] [**-F** *type*]

DESCRIPTION

The **fsqueue**(1) command displays a report on requests awaiting drive and media resources. Alternatively, it displays data mover host and data mover request reports.

Resource Allocation Report: By default, the **fsqueue**(1) command generates a full report on all drive and media allocation requests currently in the system. If a request ID is specified, it generates a report on drive and media allocation requests associated with that request ID.

Media Operations Report: The **-m** option generates a report on all media operations occurring in the system. If a request ID is specified, it generates a report on the media operations associated with that request ID.

File Processing Report: The **-f** option generates a report on the current state of each file being processed in the system. This report obtains the active request ID associated with a store or retrieve if a filename is known. However, because of potential dependencies, the original request ID for a **fsstore**(1) or **fsretrieve**(1) command issued by a particular user may not be discernible. If a request ID or a list of filenames is specified, it restricts the report to the files associated with that request ID or to the files in the file list.

Mover Host Report and **Mover Request Report:** The **-a** option generates a report on the hosts being used by distributed data movers. When the -v option is added, the report displays detailed information on the state of each data mover.

RESOURCE REPORT STATUS

Common Report Elements

Pos The position of the request in the queue. Note, this is only an approximation of the order in which requests will be processed. It is not a guarantee of actual processing order.

Request ID
The request ID.

Request Type
Type of request. Values are:

CPY	Copy files or duplicate media
ENT	Enter Media
EJE	Eject Media
FMT	Format
N/A	Not Available
RTV	Retrieve
STR	Store
UNK	Unknown/unavailable

State The state of the request. Values are:

ALLOCATE	Resource allocated
CANCEL	Being cancel
COMPLETE	Request done
COPY	Start copying
FORMAT	Formatting
MOUNT	Mounting

PROCESS	Being processed
QUEUE	Request in queue
READY	Ready to process
VERIFY	Verify label
QVWISSUE	Waiting to issue restore
QVWRESTR	Waiting for restore complete

Resource Allocation Report

Media Manager ID — The Media Manager request ID associated with the request

Priority C:M:A — The request's current priority level (*C*), maximum priority level (*M*), and age timer (*A*) in minutes for the request. When the age timer expires and the request has not been processed, the priority level of the request will be decremented to the next value. The age timer will be reset and the process will continue until it is processed or the maximum priority field is reached. If the request reaches the maximum priority value, the request will stay at this level until it is processed. Top priority requests specified with **fsretrieve -p** will display the letter 'P' for the current priority level instead of a numeric value.

Drive ID — Component alias drive ID

Media ID — Media ID associated with the request

Submitted Time — Time request was submitted

File Processing Report

File Size — The size of the file in bytes associated with the request

File Name — The pathname and file name associated with the file

Media Operations Report

Media ID — Media ID associated with the request

MOVER REPORT STATUS

Mover Host Report

Host — The name of the host configured for distributed data movers.

State — The state of the host for running data movers. Values are: **Enabled**, **Disabled**.

Active Data Movers — The number of data movers that are currently running on host.

Mover Request Report

Host — The name of the host configured for distributed data movers.

Request ID — The request ID.

Device Alias — The component alias as defined by **fsconfig**(1) for tape devices, the alias as defined by **fsdiskcfg**(1) for storage disks, or *disk2disk* for relocation operations. For media or file copy operations, the alias for the second device is also displayed.

Run Time — The length of time the data mover has been running. The format for the time is hh:mm:ss, where:
hh = Number of hours (range: 00-99)
mm = Number of minutes (range: 00-59)
ss = Number of seconds (range: 00-59)

Total Files — The number of files to be copied.

Files Copied — The number of files successfully copied.

Files Failed — The number of files that failed to be copied.

OPTIONS

-f Displays all files in the queue or specific files if a request ID or file list is specified.

-m Displays all media operations (**ENT**,**EJE**,**FMT**,**CPY**) in the queue or media operations for a specific request ID.

filename

The *filename* for which the associated resource requests will be reported. A fully qualified pathname should be used unless the file is located in current working directory.

-r *requestID*

The request ID for which the associated resource requests will be reported.

-a Displays summary information on distributed data mover hosts.

-v Displays detailed status on active distributed data movers.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

SEE ALSO

fscancel(1), **fsddmconfig**(1), **fsxsd**(1)

NAME

fsqvault − Restores and reports the state of an object in Qvault.

SYNOPSIS

fsqvault -h

fsqvault -u *URL* **-n** *namespace* **-o** *objectname* [**-U** *username* **-P** *password*]|[**-I** *QCAI* **-K** *QCPK*] [**-a** *serverAuth*] [**-C** *certfile* | **-R** *certpath*] [**-r**] [**-s**] [**-w**]

DESCRIPTION

This command will report the state of an object, restores an object asynchronously or restores an object synchronously from Qvault.

OPTIONS

-u *URL* URL that includes the bucket name of the Q-Cloud Vault media.

-n *namespace*
Bucket name.

-o *objectname*
Object name.

-U *username* **-P** *password*
Username and password to access the URL. Needed if QCAI and QCPK were not given.

-I *QCAI* **-K** *QCPK*
Q-Cloud Vault Access Identifier and Product Key. Needed if Username and password were not given.

-a *serverAuth*
The server authorization setting. Default is 2. The valid options are:

0 none

1 verify peer only

2 verify peer and host

-C *certfile*
File name to Certificate Authority (CA) certificate(s).

-R *certpath*
Directory path that contains the individual CA certificate files.

-r Restore the object from qvault. Do not wait for completion.

-s Report the state of the qvault object.

-w Restore the object from qvault. Wait for completion.

EXIT STATUS

Exit codes for the **fsqvault**(1) command are:

0 Command completed successfully.

1 Command failed.

2 Command syntax error.

NOTE

This command applies to Qvault objects only. Objects are restored to temporary cache space and not into Stornext primary disk space.

EXAMPLES

Check the state of a Qvault object - Object NOT yet in Glacier

```
fsqvault -u https://my-bucket.s3-us-west-1.amazonaws.com/ \
      -o my-object-id -n my-bucket -U my-access-id \
```

```
      -P my-secret-key -s
fsqvault: URL: https://my-bucket.s3-us-west-1.amazonaws.com/
fsqvault: Bucket: my-bucket
fsqvault: 1 Object
          Object Id: my-object-id
          Object Class: QVault - INITIAL CACHED
```

Check The state of a Qvault object - Object in Glacier

```
fsqvault -u https://my-bucket.s3-us-west-1.amazonaws.com/ \
      -o my-object-id -n my-bucket -U my-access-id \
      -P my-secret-key -s
fsqvault: URL: https://my-bucket.s3-us-west-1.amazonaws.com/
fsqvault: Bucket: my-bucket
fsqvault: 1 Object
          Object Id: my-object-id
          Object Class: QVault - NOT CACHED
```

Synchronous restore of Qvault object

```
fsqvault -u https://my-bucket.s3-us-west-1.amazonaws.com/ \
      -o my-object-id -n my-bucket -U my-access-id \
      -P my-secret-key -w
fsqvault: issued restore request.
```

Asynchrounous restore of Qvault object

```
fsqvault -u https://my-bucket.s3-us-west-1.amazonaws.com/ \
      -o my-object-id -n my-bucket -U my-access-id \
      -P my-secret-key -r
fsqvault: issued restore request.
fsqvault: URL: https://my-bucket.s3-us-west-1.amazonaws.com/
fsqvault: Bucket: my-bucket
fsqvault: 1 Object
          Object Id: my-object-id
          Object Class: QVault - RESTORING
```

SEE ALSO

fsmedread(1)

NAME

fsrecover − Report or recover Recoverable files on media.

SYNOPSIS

fsrecover *filename...* [**-t** *starttime* [*endtime*]]

fsrecover *dirname...* **-d** [**-r**] [**-a** [**-t** *dirtime*]]

fsrecover [*RM_time::*] *filepathname...* **-u** [**-v**]

fsrecover *dirpathname...* **-u -d** [**-r**] [**-v**] [**-a** [**-t** *dirtime* [**-n** *destination_dir*]]]

DESCRIPTION

The **fsrecover**(1) command can be used to report on Recoverable files. It can also be used to recover those files back to disk. A Recoverable file is a file for which there is still knowledge of its location on managed media, but the file no longer resides on disk (it has been removed.)

A Recoverable file can be recovered up until the time the managed media has been cleaned via the **fsclean**(1) command. At that point the files cleaned are completely gone. When a file is recovered, the version of the file that was active at remove time is made the active version.

The following conditions must exist for a file to be recovered: - The Recoverable file must be stored on media. - The user must have read access to the file and write access to the directory from which the file was stored.

The following list shows the ways to use **fsrecover**(1): - To report Recoverable files and directories that contain them. - To recover these Recoverable files back to disk.

Reporting

The report generated by **fsrecover**(1) lists all Recoverable files and the directories that contain them. Names and wildcards can be used to limit what list is reported.

Note that the report wildcard is '%' so that it will not conflict with the shell wildcard.

The time range option (**-t** *starttime*) extracts only information over the time period specified. The *starttime* and *endtime* must be before the current time, and the *starttime* must be before the *endtime*. If no *endtime* is specified, *endtime* defaults to current time.

If the directory time option (**-t** *dirtime*) is used when reporting on a directory that indicates that only files that were active in the directory at that time will be reported. Note that those files may have been removed since then, or updated and now have a new version. Likewise files that were active before that time, then were removed, will not be included in the report.

Restoring Deleted Files and Directories

Although a report can be generated with a file name or a path name, execution of **fsrecover -u** to recover a file or a directory requires that a full path be indicated. The user cannot change the placement of the recovered file or directory. All files are recovered with the same name and directory in which the files had at the time when removed. After recovering a file or directory, it can then be renamed as usual. (Note that recovering a directory instance with the **-a**, **-t** and **-n** options is an exception to this behavior and will be covered more below.)

When reporting Recoverable files the complete path names are reported along with the time of the remove in the form of (RM_time::PATH_NAME) The expected format for the remove time string "RM_time" is shown in this example:

```
2005:05:31:06:36:44::/stornext/snfs1/dir1/dir2/file.a
```

If there are multiple files with the same path that can be recovered then by default the one with the most recent remove time is recovered. If it is desired to recover an older instance of the file with that name, then the remove time string must be provided with the file.

Files that are recovered are considered stored on media and truncated from disk. The file is not copied to disk, but appears in a listing of the directory contents (UNIX **ls** command). An attempt to read or edit the file results in a copy of the file from a medium to disk, as in all other stored and truncated Tertiary Man-

ager-controlled files. Additionally, if the file is configured to have a stub file, then the stub will not be present until the file is retrieved again.

If a list of files or directories are specified, **fsrecover**(1) processes each file and directory individually, failing invalid entries but continuing to recover what it can.

The **fsrecover -d -u** command, when used with the directory path and without the **-a**, **-t** and **-n** options, recovers the directory and its child files. The **fsrecover -d -u** command will recover the latest instance of all files in those directories. If the recurse option is specified, the Tertiary Manager software attempts to recover all child files and recursively recover subdirectories and subdirectory child files.

Recovering an Instance of a Directory

The **fsrecover -d** command, when used with the **-a**, **-t** and **-n** options, can be used to recover an instance of a directory. This flavor of the command accepts the recursive **-r** option and works like any directory recover with the following exceptions: - Files that are recovered from the directory are recovered to a new location (not where they were located when removed, if indeed they were removed). - Because the files are recovered to a new location they end up as new files with only a limited relation to the existing files. If the original files are still active then any actions such as removal or modification of those files will not affect the newly recovered directory. (The one relation the files do have is they share the same media copies. So if the media that contained the original is lost or the info is removed via **fsrminfo**(1) then both sets of files are gone.)

When recovering a directory instance it can be thought of as recovering the files that were active in a directory at the specified time. Hence the use of the **-a** and **-t** options. Here is sample usage for recovering an instance of directory /stornext/snfs1/relp1/subdir1 from Apr 10, 2010 at 4:30pm: - fsrecover /stornext/snfs1/relp1/subdir1 -duat 2010:04:10:16:30 -n /stornext/snfs1/relp1/newdir

Note that the destination directory does not have to exist but at least its parent directory must exist. Also the destination directory must be on the same file system and be of the same policy class as the original directory.

Note that file versions which have been removed and then recovered, via a normal **fsrecover**(1), will be counted as active from the time the version was first created until the final endtime. This is true regardless of how many times it was updated/removed and re-recovered during that time. Any recovery of the directory instance between those times will result in that file being recovered to the new destination directory.

Lastly note that recovering an instance of a directory should always be done to a new directory. (If a recover operation is stopped for whatever reason it can be restarted to the same destination directory.) The reason for this recommendation is that if an instance is recovered to an existing directory, for any name collisions those files will not be recovered. This is true even if the collisions are with removed files in the destination directory. To ensure getting every file from an instance in time always use a new destination directory.

> For example: if you have recovered an instance of a directory, then accidentally remove file(s) from that directory; you can use the command options not related to recovering an instance of a directory for reporting or recovering those file(s). Don't attempt to re-run the instance recovery again.
>
> Another example: if you have recovered an instance, and you realize that for some of the files you want them from a different instance in time; you will have to recover that instance to a new directory. (You can then move any of those newly recovered files to the desired location.)

OPTIONS

filename...

> The file name(s) of the file(s) to report. The name can be a file name, partial path name, or full path name. The full path name of each file matching the name is reported.

dirname...

> The dir name(s) to report. The name can be a dir name, partial path name, or full path name.

[RM_time::]filepathname...

> Full path name of each file to recover. If the command is being run in the directory desired a full path can be indicated by specifying: ./filename A timestamp of the form returned in the report can

be provided with the file path.

dirpathname...
Full path name of each dir to recover. If the command is being run in the directory desired a full path can be indicated by specifying: ./dirname

-u Indicates recovery processing requested. (Undo the remove.) Required option to recover files or directories. If the option is not specified, a report is produced. Wildcards cannot be used with this option.

-d Indicates that directory processing is requested.

-p DEPRECATED: Previously this option was required to report files that the user had permissions to access verses just files that the user owned. Now the report mode will show all files the user has permission to recover, which is the same behavior as recovery mode.

-r Indicates recursive processing is requested. Recursive processing is available for either a directory report or for recovering a directory.

-t *starttime* [*endtime*]
Indicates a time range to restrict the report length displayed to the user. If an entry to be displayed is a file to which the user has access and is within the time range specified by the user, it is displayed. If specifying a time range, the user must enter a *starttime*, but the *starttime* can not be greater than the current time. If the *endtime* is not specified, the current time is used. If the user specifies an *endtime*, it must be greater than the *starttime*. The format for the time parameter is YYYY:MM:DD:hh:mm:ss where:
YYYY = Numeric, year

The following are optional; defaults are shown:,
MM = Numeric, two-digit month
(default:01 (January)),
DD = Numeric, two-digit day
(range: 01-31, default:01),
hh = Numeric hour
(range: 00-23, default:00),
mm = Numeric minute
(range: 00-59, default:00),
ss = Numeric second
(range: 00-59, default:00)

-t *dirtime*
This indicates the point in time a directory instance should be reported/recovered.

-n *destination_dir*
This indicates the destination directory when recovering a directory instance.

-a When reporting or recovering a directory use active files instead of Recoverable files. Wildcards cannot be used with this option.

-v Verbose mode during a recover. Will report on files recovered.

SEE ALSO

fsclean(1)

NAME

fsrelocate − Relocate a managed file from one disk affinity to another or change the affinity association of a truncated file.

SYNOPSIS

fsrelocate *filename...* **-a** *affinity* [**-F** *type*]

DESCRIPTION

The **fsrelocate**(1) command allows a user with write-to-file permission to relocate the specified file(s) from one disk affinity to another, regardless of whether the file has been copied (stored) to secondary media. This command only works on files residing in managed directories.

NOTE: Before using the **fsrelocate**(1) command, the file system must be configured with two affinities, and a policy class must be created using those two affinities (see **fsaddclass**(1) or **fsmodclass**(1)). Refer to the system administrator guide for more details on configuring a system for disk-to-disk relocation.

The nominal method of relocating files is through the execution of periodic relocation policies. However, the **fsrelocate**(1) command allows the user to relocate files at will.

If the specified file has not been truncated from disk, its data blocks will be moved to the disks associated to the specified *affinity*.

If the specified file has been truncated from disk, no data blocks will be moved, but the file's affinity association will be changed to the specified *affinity*. This has the effect of designating the affinity to which the file will eventually be retrieved. This overrides the default behavior, which is to retrieve a file to the first affinity specified by the file's policy class.

OPTIONS

filename...

One or more files to be relocated. The files must reside in a managed directory. If multiple files are entered, the files must be separated by spaces.

-a *affinity*

The destination affinity. This affinity must be defined for the file system in which the file resides. The file will be relocated to this affinity if it has not been truncated. If the file has been truncated, only the file's affinity association will change.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

SEE ALSO

fsaddclass(1), **fsmodclass**(1), **fsaddrelation**(1), **fspolicy**(1), **fsfileinfo**(1), **fsstore**(1), **fsrmcopy**(1)

NAME

fsretrieve − Retrieve files from media and place on disk.

SYNOPSIS

fsretrieve [**-c** *copy*] [**-x y**|**n**] [**-a**] [**-p**] [**-F** *type*] *filename...*

fsretrieve *filename* **-n** *newfilename* [**-b** *startbyte endbyte*] [**-a**] [**-p**] [**-F** *type*]

fsretrieve *filename* **-n** *newfilename* [**-c** *copy*] [**-a**] [**-p**] [**-F** *type*]

fsretrieve -R *directory*|**-B** *batchfilename* [**-a**] [**-p**] [**-F** *type*]

DESCRIPTION

The **fsretrieve**(1) command retrieves files from media and places the files on disk. If the **-n** *newfilename* parameter is omitted, the files are retrieved and stored on disk using the original path and file name. The user can then transfer the files across the network to the client disk. If the **-n** *newfilename* option is specified, the files are retrieved into new file names on disk in a previously created directory.

The **fsretrieve**(1) command normally retrieves the primary copy of the file requested unless the **-c** option is used. If the primary copy is inaccessible or corrupted, an attempt is made to retrieve another copy of the file. A message will be displayed indicating that another copy was retrieved (File copy #2 used for retrieval). The system parameter MAX_RETRIEVE_RETRY_COUNT controls how many retry attempts are made for additional copies of a file in the event one or more copies are corrupted. This value can be changed to meet the needs of each site.

If a file cannot be retrieved using the copies mentioned above, and if the Alternate Retrieval Location feature is enabled, the file will be retrieved from a specified directory on an alternate machine (node). The **-x** option can be used to change the **fsretrieve**(1) behavior when the Alternate Retrieval Location feature is enabled.

If a recursive retrieve is requested using the **-R** option, all files that reside on media in the directory specified and all files that reside on media in all subdirectories will be retrieved and placed on disk.

If a batch retrieve is requested using the **-B** option, all files specified in the *batchfilename* that reside on Tertiary Manager media will be retrieved and placed on disk.

The **-b** option causes a partial file retrieval. Given a *newfilename*, and a *startbyte* and *endbyte*, the part of the file specified in the byte range is copied onto disk in *newfilename* in the current working directory. NOTE: For Quantum Cloud Storage, partial file retrieval is not supported for copies with client-side encryption or compression. It is only supported for copies with server-side encryption or without encryption and compression.

The **-c** option retrieves a specific copy of a file and places it in *newfilename*.

The **-a** option will update the access time of the file upon retrieval of the file. If a requested file already resides on disk, the access time will also be updated.

The **-p** option specifies top priority and will cause all files for the retrieve request to be placed at the top of the retrieve queue. Excessive use of this option could undermine the built-in retrieve starvation prevention mechanisms, which could lead to lengthy retrieve times for certain requests.

OPTIONS

filename...

The required path and file name(s) of the file(s) to retrieve. Each file path must specify a file in a migration directory.

-c *copy* Used to retrieve a specific copy of *filename* if one exists.

-n *newfilename*

The new path and file name into which to retrieve the file. The location specified for the new file must be a local file system. Retrieval to an NFSmounted file system is not permitted. NOTE: For systems configured with distributed data movers, using this option will result in the operation being performed on the primary MDC host only.

-R *directory*

The directory from which to do start the recursive retrieve. All files from the specified directory and any subdirectories will be retrieved. Depending upon the number of files in the directory and subdirectories, running this option may use extensive Tertiary Manager resources.

-B *batchfilename*

The batch file contains a list of files to be retrieved. File names should be listed one per line. Each line in the file is read as a string of characters, without interpretation, up to the line terminator. You should not enclose the file name in quotes, use escape characters or any character not in the actual file name.

Depending upon the number of files in the batch file, running this option may use extensive Tertiary Manager resources. This option can be used with the batch file generated by **fspostrestore**(1), which contains files that have been configured to be excluded from truncation. This provides a capability to re-stage those files back on disk.

-b *startbyte endbyte*

The *startbyte* must be less than *endbyte*, and both must be within the byte range of the file. The byte range is inclusive. To retrieve a single byte, the *startbyte* is equal to the *endbyte*. If the *startbyte* and *endbyte* are specified, the **-n** *newfilename* must be specified. Otherwise, the command is rejected. The byte range is zero relative; therefore a specified byte range must be zero to the end byte minus 1.

-a Updates the access time of the requested files.

-p Specifies top priority and will cause all files for the retrieve request to be placed at the top of the retrieve queue.

-x y|n Force change in alternate retrieval location behavior. Using **-x y** forces the alternate location to be used immediately, bypassing the standard copies. Using **-x n** forces the alternate location to be ignored. The command will fail if a file cannot be retrieved from a standard copy.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

SEE ALSO

fsstore(1), **fsaltnode**(1), **fspostrestore**(1), **fsxsd**(1)

NAME

fsretrievestats − Generate a report on successful and failed file retrieves and on checksum errors.

SYNOPSIS

fsretrievestats [-startdate *date*] [-enddate *date*] [-manageddir *dir...*] [-taclogdir *dir*] [-genonly]

DESCRIPTION

The **fsretrievestats**(1) tool parses the Tertiary Manager tac logs and generates a report on successful retrieves, failed retrieves, and checksum validation errors for a specific date range.

In addition to sending the report to stdout, the tool also sends a copy of the report via an SN admin alert email. Anyone signed up to receive admin alerts will receive an email with the report attached.

This tool generates an intermediate raw data file that must be kept up to date with the current Tertiary Manager tac log files. Additionally, the system administrator may want the report tool to run automatically on a periodic basic. To facilitate both of those objectives, edit the crontab for the tdlm user (crontab -e -u tdlm) and add lines similar to the following:

```
# The following entry is the daily fsretrievestats raw data gathering schedule.
0 0 * * * /usr/adic/gui/bin/cmdwrap -NO_END_OF_FILE /usr/adic/TSM/util/fsretrieve

# The following entry is the monthly fsretrievestats report generation schedule.
0 1 1 * * /usr/adic/gui/bin/cmdwrap -NO_END_OF_FILE /usr/adic/TSM/util/fsretrieve
```

The above entries define two cron jobs, each preceded by a comment line. The first job keeps the raw data file up to date. The second job generates the report on the first day of every month at 01:00. If a different report schedule is desired, modify the second job with the desired schedule.

REPORT STATUS

Header

The header displays the title and the date range that the report encompasses.

Summary

The summary displays the total number of Retrieve Successes, Retrieve Failures, and Checksum Errors for each directory.

File Retrieve Failures

This section displays details for each retrieve failure.

Failure Date
: The date the retrieve failure occurred.

Directory
: The directory that contains the file that failed to retrieve. The files are grouped by this directory column, so the directory name is listed only once at the beginning of each group.

File
: The name of the file that failed to retrieve. This will on occasion include the subdirectory path if the file resides within a subdirectory of the listed directory.

Checksum Validation Errors

This section displays details for each checksum validation error. Note: Not every checksum validation error results in a file retrieve failure.

Error Date
: The date the checksum error occurred.

Copy
: The copy number of the file that experienced the checksum error.

Ver
: The version number of the file that experienced the checksum error.

Copy Replacement Date
: The date when the copy was replaced. If the copy has yet to be replaced, "NA" will appear in this field.

Directory
The directory that contains the file that experienced the checksum error. The files are grouped by this directory column, so the directory name is listed only once at the beginning of each group.

File
The name of the file that experienced the checksum error. This will on occasion include the subdirectory path if the file resides within a subdirectory of the listed directory.

OPTIONS

-startdate **date**
The start date (default: first day of previous month at time 00:00:00). This date cannot be over a year away or after the end date. The format for the date parameter is YYYY:MM:DD:hh:mm:ss, where:
YYYY = numeric year
MM = numeric month (range: 01-12)
DD = numeric day (range: 01-31)
hh = numeric hour (range: 00-23)
mm = numeric minute (range: 00-59)
ss = numeric second (range: 00-59)

-enddate **date**
The end date (default: last day of previous month at time 23:59:59). The format for the date parameter is YYYY:MM:DD:hh:mm:ss, where:
YYYY = numeric year
MM = numeric month (range: 01-12)
DD = numeric day (range: 01-31)
hh = numeric hour (range: 00-23)
mm = numeric minute (range: 00-59)
ss = numeric second (range: 00-59)

-manageddir **dir...**
The list of managed directories to report on (default: all relation points, except the StorNext backup directory)

-taclogdir **dir**
The directory containing the Tertiary Manager tac logs (default: /usr/adic/TSM/logs/tac)

-genonly
Generate raw data file only. Do not print the report. This option is meant to be used by a cron job to keep the raw data file updated. The raw data file is an intermediate file used to generate the actual report.

RETURN VALUE

0 Success

>0 An error occurred. Check output for details.

NAME

fsrmclass − Remove a policy class

SYNOPSIS

fsrmclass *class*

DESCRIPTION

The **fsrmclass**(1) command removes a policy class and its relationships from the Tertiary Manager software. The policy class will not be removed when there are media associated with it. The **fsmedlist -c** report can be run to determine if any media are still associated with the policy class.

If non-empty directories are related to the policy class, the policy class will not be removed. The related directories can be displayed using the **fsclassinfo -l** report. A status message is displayed to show which directory relationships were successfully removed and not removed.

This command accepts upper case or lower case policy class names, although the parameter is converted to lower case.

OPTIONS

class Policy class to be removed from the Tertiary Manager software. A policy class name can have a maximum of 16 alphanumeric characters. The special "-", ".", and "_" characters are also permitted.

SEE ALSO

fsaddclass(1), **fsmodclass**(1), **fsclassinfo**(1)

NAME

fsrmcopy − Remove copy/copies of a file from disk or media

SYNOPSIS

fsrmcopy [**-c** *copynum*|**-a**] [**-F** *type*] [**-r]** *filename...*

fsrmcopy [**-c** *copynum*|**-a**] [**-F** *type*] [**-r] -R** *directory*

fsrmcopy [**-c** *copynum*|**-a**] [**-F** *type*] [**-r] -B** *batchfilename*

DESCRIPTION

The **fsrmcopy**(1) command allows a user with the UNIX write-to-file permission to remove the copy/copies of the specified file(s) from disk after the file is copied to media, or from media if the file resides on disk.

When only *filename* is specified, then the disk copy of the file is deleted if a valid tape copy exists. If the **-c** option is specified, then the copy of the file indicated by *copynum* will be deleted from the medium where it is stored. The **-a** option may be used to remove all copies of a file from the media where it is stored. A valid copy of the file must reside on disk for these operations to be performed. Additionally, the **-c** and **-a** options are not allowed for Write Once Read Multiple (WORM) media types.

Suggested uses for the **fsrmcopy**(1) command include the following: - After viewing a migrated file. Viewing the file caused it to be retrieved to disk. If the file is not modified, the disk copy can be removed. - After storing the file to medium with the **fsstore**(1) command without using the option to immediately truncate the file from disk. - Between the application of the storage and truncation policies by the system administrator.

OPTIONS

filename...

One or more files to remove from disk or media. The file paths must be in a migration directory. The entire path name need not be entered. If preceded by a slash (/) in the command definition, the full path name, starting from the root directory, is required as input to the command. Otherwise, the Tertiary Manager command expands the directory name using the current working directory as the parent. If multiple files are entered, the files must be separated by spaces.

-R *directory*

The directory from which to start the recursive operation. All entries from the specified directory and any subdirectories will be processed. Success for individual items (files, directories, etc) will not be reported. Instead an overall progress status message will be reported periodically with this general format: "Processed <N> out of <TOTAL> entries..." It may take some time before the value of <TOTAL> is known. Until that time, <TOTAL> will be reported as <TBD>. By default, <N> is reported at intervals of 1000. This can be overridden by the system parameter RECURSION_BATCH_REPORT_INTERVAL. The parameter is an integer value. For a further description of the system parameter see the *fs_sysparm.README* file.

-B *batchfilename*

The batch file contains the list of entries to be processed. Each entry must be listed one per line. Do not enclose the entry in quotes, use escape characters or any character not in the actual name. Success for individual items (files, directories, etc) will not be reported. Instead an overall progress status message will be reported periodically with this general format: "Processed <N> out of <TOTAL> entries..." It may take some time before the value of <TOTAL> is known. Until that time, <TOTAL> will be reported as <TBD>. By default, <N> is reported at intervals of 1000. This can be overridden by the system parameter RECURSION_BATCH_REPORT_INTERVAL. The parameter is an integer value. For a further description of the system parameter see the *fs_sysparm.README* file.

-c *copynum*

The *copynum* of *filename* to delete from a medium. A copy of the file must exist on disk before the specified copy is deleted.

-a All copies of *filename* are deleted from media if a copy of the file exists on disk.

-r The remote copy of *filename* will be invalidated if it exists.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

SEE ALSO

fsstore(1), **fspolicy**(1), **fsrmcopy**(1), **fsxsd**(1)

NAME

fsrmdiskcopy − Remove the copy of a file from disk after the file was stored to a medium.

SYNOPSIS

fsrmdiskcopy [**-F** *type*] *filename...*

fsrmdiskcopy [**-F** *type*] **-R** *directory*

fsrmdiskcopy [**-F** *type*] **-B** *batchfilename*

DESCRIPTION

The **fsrmdiskcopy**(1) command allows a user with the UNIX write-to-file permission to remove the copy/copies of the specified file(s) from disk after the file is copied to media. The cleanup policy is the system administration method of routinely freeing disk space by removing files after being stored on media. The **fsrmdiskcopy**(1) command is used by users to maintain a desired level of disk space by truncating individual files. Files specified for removal from disk with the **fsrmdiskcopy**(1) command must have an exact copy on media.

Suggested uses for the **fsrmdiskcopy**(1) command include the following: - After viewing a migrated file. Viewing the file caused it to be retrieved to disk. If the file is not modified, the disk copy can be removed. - After storing the file to medium with the **fsstore**(1) command without using the option to immediately truncate the file from disk. - Between the application of the storage and truncation policies by the system administrator.

OPTIONS

filename...

One or more files to remove from disk. The file paths must be in a migration directory. The entire path name need not be entered. If preceded by a slash (/) in the command definition, the full path name, starting from the root directory, is required as input to the command. Otherwise, the Tertiary Manager command expands the directory name using the current working directory as the parent. If multiple files are entered, the files must be separated by spaces.

-R *directory*

The directory from which to start the recursive operation. All entries from the specified directory and any subdirectories will be processed. Success for individual items (files, directories, etc) will not be reported. Instead an overall progress status message will be reported periodically with this general format: "Processed <N> out of <TOTAL> entries..." It may take some time before the value of <TOTAL> is known. Until that time, <TOTAL> will be reported as <TBD>. By default, <N> is reported at intervals of 1000. This can be overridden by the system parameter RECURSION_BATCH_REPORT_INTERVAL. The parameter is an integer value. For a further description of the system parameter see the *fs_sysparm.README* file.

-B *batchfilename*

The batch file contains the list of entries to be processed. Each entry must be listed one per line. Do not enclose the entry in quotes, use escape characters or any character not in the actual name. Success for individual items (files, directories, etc) will not be reported. Instead an overall progress status message will be reported periodically with this general format: "Processed <N> out of <TOTAL> entries..." It may take some time before the value of <TOTAL> is known. Until that time, <TOTAL> will be reported as <TBD>. By default, <N> is reported at intervals of 1000. This can be overridden by the system parameter RECURSION_BATCH_REPORT_INTERVAL. The parameter is an integer value. For a further description of the system parameter see the *fs_sysparm.README* file.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

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XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

SEE ALSO

fsstore(1), **fspolicy**(1), **fsrmcopy**(1), **fsxsd**(1)

NAME

fsrminfo − Marks the media as logically blank and invalidates all copies of files that were stored on the media in the Tertiary Manager database.

SYNOPSIS

fsrminfo *mediaID...* [**-y**]

DESCRIPTION

After the **fsrminfo**(1) command is run on a media, the media is logically blank and the files on the media are no longer accessible. (A user cannot even use the **fsrecover**(1) command to bring a file back.) Truncated files, who have no other copies on another media, will be removed from disk by the follow-on scheduled background processing (see below).

The **-y** option is used to cancel prompting. Since this command cannot be undone, by default a prompt is given for each media to perform processing. This option indicates a positive response to all prompts.

The command itself completes very quickly, but the scheduled background processing (**fsclean -r**) is performed by the system sometime after the command completes. This processing does the removal of truncated files from disk for the provided media (unless other media copies are available), and removes the information for all files on the media from the Tertiary Manager database. The user can manually run the **fsclean -r**; however, care should be used since this processing can be quite time consuming depending on the number of files on the media, and the overall number of files in the system.

During the time after the command is run, and before the scheduled background processing completes, there will be files on disk that no longer have their media data available. If an attempt is made to retrieve one of these files, an error will be reported indicating the media information for the file was removed.

Note that after the command has completed, the media is available for re-use immediately. Regardless of whether or not the background processing has completed.

OPTIONS

-y The command normally prompts before performing the rminfo processing on a media. This command will cause the prompt to be left off and a yes response will be assumed.

SEE ALSO

fsclean(1)

NAME

fsrmrelation − Remove a directory-to-policy class relationship.

SYNOPSIS

fsrmrelation *directory*

DESCRIPTION

The **fsrmrelation**(1) command removes a directory-to-policy class relationship from the Tertiary Manager system. The directory specified in *directory* must be an upper-level boundary of the policy class. It cannot be subordinate to any directory that retains a directory-to-policy class relationship. Before issuing the **fsrmrelation**(1) command, all files and subdirectories in the highest level directory of that particular directory hierarchy associated with the policy class must be deleted so that the *directory* is empty. The *directory* specified in the command remains in the file system unassociated with any policy class.

Removing a policy class relationship from a directory causes it to be considered a "nonmigration" directory by the Tertiary Manager software. Therefore, files that are stored by users in this *directory* after it is disassociated from the policy class are not migrated to media. The relationship can be restored by using the **fsaddrelation**(1) command. The *directory* will again become a migration directory.

OPTIONS

directory

The directory path to be disassociated from the policy class. The *directory* must be less than 256 characters long. The entire path name need not be entered. If preceded by a slash (/) in the command definition, the full path name starting from the root directory is required as input to the command. Otherwise, the Tertiary Manager command expands the directory name using the current working directory as the parent.

SEE ALSO

fsaddrelation(1), **fsclassinfo**(1)

NAME

fsschedlock − Command used for locking/unlocking some automated features.

SYNOPSIS

fsschedlock [**-r**]

fsschedlock <**-a**|**-d**> <**-t** *type*> <**-f**|<**-s** *time* <**-e** *time*|**-p** *hrs*>>> <*day*> [...]

DESCRIPTION

The **fsschedlock**(1) command is used for managing the locking of some automated StorNext features. The command can be used to lock out a feature for some defined time period, to unlock a previously locked feature, or to report features that are currently locked. Note that locking a feature does NOT prohibit the feature from being run by hand. It only stops the feature from being started AUTOMATICALLY.

When run with no options or args, or with the -r option, the command will only report current lock information. With no args, the current locking schedule is reported. If no features are currently locked, the output from the command will be empty. With the -r option, the current lock status of all features is reported.

The **-a** option is used when a lock is to be added for a feature. The **-d** option is used when a lock is to be deleted for a feature. The remaining options are used to indicate specifics of the feature(s) to be added or deleted.

The **-t** option specifies the feature type to lock. The valid values (and their corresponding feature) are:

store	Store Policies (non-scheduled automatic store policies that are run as the system recognizes there are files available for storing)
altstore	Alternate Store Location Remote Copy Transfers
reloc	Relocate Policies
foreign	Foreign Migration
rebuild	Rebuild Policies (Scheduled Feature)
lospace	Low Space Truncation Policies
mintime	Class Mintime Truncation Policies
clninfo	Cleanup of marked fsrminfo records (Scheduled Feature)
clnver	Cleanup of old inactive file versions (Scheduled Feature)
defrag	Defragment media (Scheduled Feature)
p_backup	Partial backup (Scheduled Feature)
f_backup	Full backup (Scheduled Feature)
healthck	Health Check Framework (Scheduled Feature)
spolicy	Store policy (Scheduled Feature, a class store policy that runs at the scheduled time regardless of when the last policy was run and whether or not there are currently any files to store for the class)
activevault	Activevault policy (Scheduled Feature)
archive_cmp	Archive compare utility (Scheduled Feature)
all	All of the above

OPTIONS

-a	Add a lock to the feature(s) indicated by the other arguments.
-d	Delete a lock from the feature(s) indicated by the other arguments.
-r	Report the current lock status for all features.
-t *type*	The type of feature(s) to have their lock added/deleted.

-f Lock out the feature for a full day.

-s *time* The time of day to start the lock out. The format for the time parameter is hh:mm on a 24-hour clock, where:
hh = Numeric hour
(range: 00-24, midnight is 00 or 24),
mm = Numeric minute
(range: 00-59),
For example: 1:15 AM is 115, 11:30 PM is 2330. For a midnight start time, use 0000.

-e *time* The time of day to end the lock out. The format for the time parameter is hh:mm on a 24-hour clock, where:
hh = Numeric hour
(range: 00-24, midnight is 00 or 24),
mm = Numeric minute
(range: 00-59),
For example: 1:15 AM is 115, 11:30 PM is 2330. For a midnight end time, use 2400.

-p *hrs* The size of the lock out period in hours. (Use this for time frames spanning days. Time frames specified with **-s** and **-e** cannot cross day boundaries. The **-p** cannot be used with multiple day args. The day given is the start day. The hours specified cannot be greater than a week.)

day [...] The day(s) of the week to lock the feature. Valid values for the arg are: sun, mon, tue, wed, thu, fri, sat or all.

WARNING

There is a functional dependency that the **defrag** feature has on the **clnver** feature. These two features work together in managing out of date media contents. The **clnver** feature will clean up the database information for old inactive file segments; and the **defrag** feature is used to replace media which become fragmented due to these segments being cleaned. (See the **fsdefrag** man page for more info.) If the **clnver** feature is locked out, but the **defrag** feature is left active; this will result in a waste of resources since no media will become fragmented if the **clnver** feature is not running.

NOTES

If a lock of a feature already exists, another lock cannot be added in the same time frame. For example: if store policies are locked on Mondays from noon to 3PM, another lock cannot be added from 2PM to 4PM. (One can however be added from 3PM to 4PM.)

An exception is made to the above rule for full day locks. A full day lock can be added even if there is already an existing lock. So for the case above, a full day lock can be added for store policies on Monday. (A full day lock cannot be added on top of another full day lock.)

Lock items that are added are treated as single entities. So for example if a lock is added from noon to 4PM, a delete specifying a start time of noon and an end time of 2PM (or a period of 2 hrs) will fail. If that is the desired behavior, the current item will have to be deleted, and a new one from 2PM to 4PM will have to be added.

In the report a start/end time of "++++" indicates the feature has been locked out for the full day.

A "*" before the start/end time in the schedule report, indicates the feature lock has been overridden by full day lockout.

EXAMPLES

Add full day lock of all features every day:

```
fsschedlock -a -t all -f all
```

Add a lock of store processing from 1100AM to 400PM on Tuesdays:

```
fsschedlock -a -t store -s 1100 -e 1600 tue
```

Add a lock of reloc processing from 900AM Saturdays to 900PM on Sundays:

```
fsschedlock -a -t reloc -s 0900 -p 36 sat
```

SEE ALSO

fsschedule(1), **fspolicy**(1), **fsrminfo**(1), **fsdefrag**(1)

NAME

fsschedule − Insert, modify, delete, reset, or report all maintenance features in the Quantum storage subsystem.

SYNOPSIS

fsschedule [**-F** *type*] [**-f** *feature*|**-n** *name*] [**-l**]

fsschedule -a [**-F** *type*] **-n** *name* **-f** *feature* **-p** *period* [**-e** *weekday*|**-y** *monthday*] **-t** *runtime* [**-w** *window*] [**-o** *option*] [**--** *activevault_option ...*] [**--** *archive_cmp_option ...*]

fsschedule -m [**-F** *type*] **-n** *name* [**-p** *period* [**-e** *weekday*|**-y** *monthday*]] [**-t** *runtime*] [**-w** *window*] [**-o** *option*] [**--** *activevault_option ...*]

fsschedule -d [**-F** *type*] **-n** *name*

fsschedule -r [**-F** *type*] **-f** *feature*

DESCRIPTION

The **fsschedule**(1) command reports, inserts, modifies, deletes, or resets scheduled features for the Quantum storage system. By default, **fsschedule**(1) will generate a report that indicates when the automated features are scheduled along with the status of the last run for each feature. To see further information about the scheduled features, the **-l** option is available for reporting the next run time and last good run time.

Option **-a** and its associated arguments are used to add a schedule for the specified feature. The name specified with the **-n** option must be unique across all scheduled entries.

Option **-d** is used to delete a schedule. A schedule name is required for this option.

Option **-r** is used to reset schedules of a feature. A feature is required for this option. When a reset is performed, all of the existing schedules are deleted. A default schedule for that feature will be added.

Option **-m** and its associated arguments are used to modify an existing schedule. This option requires a schedule name. The modify option allows the user to change the run time, the window, the period, the weekday (or the monthday), and the policy options of a schedule. If the period is changed, the weekday (or the monthday) must be provided. If the weekday (or the monthday) is changed, the period must be provided.

The **fsschedule**(1) command can be run with TSM software active or inactive, but requires the database to operate.

REPORT STATUS

The columns reported by the **fsschedule**(1) command are as follows:

Name	Name of the scheduled feature
Feature	Type of feature. Values are: **clnver**, **defrag**, **clninfo**, **rebuild**, **f_backup**, **p_backup**, **healthck**, **spolicy**, **activevault**, **archive_cmp**
Period	Period of the schedule. Values are: **daily**, **weekly**, **monthly**
Day	Day(s) of the week or month. If the period is **daily**, this field is displayed in "XXXXXXX" format, where each X represents a weekday starting from Sunday. The value of X will either be 'Y' (enabled) or 'N' (disabled). For example, 'YNNNNNN' means that the feature runs on Sunday only.
Start Window	The run-time window in "HH:MM - HH:MM" format. The first number is the desired run time. The second number indicates the time span in which this schedule can be started.
Last Attempt	The date and time at which the schedule last expired. This timestamp will be updated regardless if the feature was or was not run.
Status	The status of the last attempted run. Values are: **Successful**, **Running**, **Locked**, **Terminated**, **Failed**, **None** The **Terminated** status indicates that the software was shut down in the middle of its run. The **Failed** status will also list a description of the failure.

FEATURE TYPES

The -f option specifies one of the following feature types:

clnver Cleans up old versions and instances of files from the database that have exceeded the system expiration time. The default expiration time can be overridden by the system parameter, CLEAN_VERSIONS_EXPIRATION. The parameter is an integer value followed by an optional period indicator. For example: 90d (90 days), 5w (5 weeks), 7m (7 months) or 3y (3 years). The current default time period is 7 years. For a further description of the system parameter see the *fs_sysparm.README* file. Note that this feature emulates the running of **fsclean -t -P**. When this feature is turned off or locked out, there is no automated purging of database namespace, and you should use the **-P** option of **fsclean** to replace the *clnver* feature. See the **fsclean**(1) man page for more info.

defrag Defragments media that have reached the appropriate fill and fragmentation levels. The **fsdefrag -d -n** <*num*> command is run when scheduled to take care of the defragmentation process. Note that this schedule item should normally be scheduled a few hours after the *clnver* feature. The two work together in managing out of date media contents. The *clnver* feature cleans up database information for old inactive file segments. The *defrag* feature replaces media that have become fragmented by cleaning. Note that the DFG_MAX_MEDIA_TO_DEFRAG system parameter is used by the schedule daemon to determine the value for the **-n** <*num*> option when running the **fsdefrag**(1) command. This option limits the number of media an individual *defrag* schedule item will process. A value of 0 for this parameter indicates no maximum, so all fragmented media will be processed. (The **-nP option to fsdefrag**(1) is left off in this case.) See the **fsdefrag**(1) man page for more info.

clninfo Clean up files marked for removal by the fsrminfo command. It is equivalent to running **fsclean -r**.

rebuild (Rebuild Policy) Maps the file systems and rebuilds the candidate lists. The mapping files created are prerequisite for several other TSM commands including fsrminfo (clninfo feature), so it must be run regularly. The rebuild feature spawns rebuild policies for each file system. The default number of concurrently running policies is 2. The sysparm attribute, MAX_CONCURRENT_REBUILDS may be specified to override the default behavior.

f_backup (Full Backup) Runs a full backup of the Quantum storage system by executing **snbackup**(1) utility. By default, the full backup is scheduled to run once per week on Sunday night.

p_backup (Partial Backup) Runs a partial backup of the Quantum storage system by executing **fsbackup -p**. By default, the partial backup is scheduled to run at midnight every weekday, excluding Sunday.

healthck (Health Check) Invokes the health check framework to run on all checks listed in the system at the *Light* level. RAS Alerts are sent for each individual health-check failure.

spolicy (Store Policy) Invokes a store policy for a specified policy class. The specified policy class must exist. When adding this feature, **-o** must be specified with a policy class on which to run the store policy. The policy is run at the scheduled time regardless of when the last policy was run and regardless if there are currently any files to store for the class.

activevault Creates a vaulting policy that helps manage the SNSM licensed capacity by periodically vaulting qualified media to a library vault. The **fsactivevault**(1) command is run when scheduled to manage the vaulting process. At each run, the system's SNSM used capacity is computed and checked against licensed capacity. When used capacity exceeds a high-water-mark percentage of licensed capacity, **fsactivevault**(1) initiates vaulting actions until used capacity is below a low-water-mark percentage of licensed capacity. The selection criteria for media to be vaulted is fully configurable by the user. When adding the *activevault* feature, the **--** option must be used to specify the vaulting parameters and

criteria for the activevault policy. See the **fsactivevault**(1) man page for more info.

archive_cmp (archive compare) Invokes the **/usr/adic/MSM/util/archive_cmp.pl** utility, which validates that the Media Manager archive configurations match the Tertiary Manager's configurations. When run within the scheduler, the utility is always run in daemon mode (-d). See the **archive_cmp**(l) man page for more info.

OPTIONS

-a *add* Add a new schedule. This option requires **-n**, **-f**, and **-p**.

-m *modify* Modify an existing schedule. This option requires **-n**. If **-p** is specified, **-e** (or **-y**) must be specified. If the schedule was for an activevault policy, the **--** option could also be specified to modify the existing activevault policy at the same time. Note that the **--** option will have to be respecified entirely.

-d *delete* Delete a schedule. This option requires a schedule name.

-r *reset* Reset all schedules of a feature. This option requires a feature.

-n *name* The schedule name.

-f *feature* The feature to change. Values are: **clnver**, **defrag**, **clninfo**, **rebuild**, **f_backup**, **p_backup**, **healthck**, **spolicy**, **activevault**, **archive_cmp**

-l List schedules in the long report format.

-p *period* The period of the schedule. Values are:

daily A daily schedule is run on the specified weekday(s) at the specified runtime.

weekly A weekly schedule is run on the same day every week at the specified runtime.

monthly A monthly schedule is on the specified day of the month (-y)* or on the first weekday (-e).

* When the day specified by (-m) is 31, the feature is run on the last day of every month (Jan 31, Feb 28 or 29, Mar 31, Apr 30, ...). When the period type is bimonthly and day 31 is chosen, the runtime is the 15th of the month. When the period type is bimonthly and day 15 is chosen, the runtime is the 30th (except for February, which is run on the last day of the month).

-e *weekday* The day of the week. Values are: **Sun**, **Mon**, **Tue**, **Wed**, **Thu**, **Fri**, **Sat**

-y *monthday* The day of the month. Values are: **1**-**31**

-t *runtime* The start time of the feature specified in HHMM format.

-w *window* The runtime window specified in HHMM format. By default, this is set to 0100 (1 hour). The runtime window is used if the system is not active when a scheduled time expires. When the system restarts, the schedules that are still within the runtime window are started.

-o *option* The option used by the feature. Currently, only the spolicy feature requires an option, which is an existing policy class.

-- The options specified for the activevault or archive_cmp features. Anything after **--** is unique to the activevault or archive_cmp features. See the **fsactivevault**(1) or **archive_cmp**(l) man page for a complete list of valid options for this section.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

EXAMPLES

To report on a specific schedule named Midnight_CleanVer, issue the following command:

```
fsschedule -n Midnight_CleanVer
```

To report on just the rebuild feature, issue the following command:

```
fsschedule -f rebuild
```

To add a schedule named Morning_CleanVer for clnver feature to run daily, every morning at 2:00 AM, issue the following command:

```
fsschedule -a -n Morning_CleanVer -f clnver -p daily -t 0200
```

To add a schedule named Weekly_CleanInfo for the clninfo feature to run weekly, every Wednesday evening at 11:15 PM, issue the following command:

```
fsschedule -a -n Weekly_CleanInfo -f clninfo -p weekly \
    -e wed -t 2315
```

To schedule a full backup on Saturday at midnight, plus run a partial backup at midnight every day except Saturday, with a 3 hour window for each type, issue the following command:

```
fsschedule -a -n weeklyFullBackup -f f_backup -p weekly \
    -e sat -t 0 -w 300
fsschedule -a -n dailyPartialBackup -f p_backup -p daily \
    -e "mon,tue,wed,thu,fri,sun" -t 0 -w 300
```

To give the rebuild feature a 6 hour run window every first of the month at 10:00pm, issue the following command:

```
fsschedule -a -n MonthlyVersions -f rebuild -p monthly \
    -y 1 -t 2200 -w 600
```

To add a store policy named spolicy_class_1 for a store policy feature to run every day at 4:00AM, against policy class pc_1, issue the following command:

```
fsschedule -a -n spolicy_class_1 -f spolicy -p daily \
    -t 0400 -o pc_1
```

To schedule the archive_cmp feature to run every Saturday evening at 11:00 PM, issue the following command:

```
fsschedule -a -n ac_check_1 -f archive_cmp -p weekly \
```

```
    -e sat -t 2300
```

To schedule an activevault policy, named av_policy_1, to run daily at 1:00AM, to vault from an archive named i6k to a vault named vault01, at most 10 qualified media which have been used for copy number 1 and have not been accessed for at least 1 month, issue the following command:

```
fsschedule -a -n av_policy_1 -f activevault -p daily \
    -t 0100 -- -a i6k -v vault01 -limit 10 -copy 1 -age 1month
```

To modify the above av_policy_1 to run daily at 2:00AM, issue the following command:

```
fsschedule -m -n av_policy_1 -p daily -t 0200
```

To further modify the above av_policy_1 to run daily at 4:00AM, to vault from archives i6k_a and i6k_b to vault01, at most 20 qualified media that have not been accessed for at least 1 month, regardless of the copy number, issue the following command:

```
fsschedule -m -n av_policy_1 -p daily -t 0400 -- \
    -a i6k_a,i6k_b -v vault01 -limit 20 -age 1month
```

To modify MonthlyVersions to run at 11:00 PM, issue the following command:

```
fsschedule -m -n MonthlyVersions -t 2300
```

To modify MonthlyVersions to run weekly on Sunday, issue the following command:

```
fsschedule -m -n MonthlyVersions -p weekly -e sun
```

To modify MonthlyVersions to have a window of 3 hours, issue the following command:

```
fsschedule -m -n MonthlyVersions -w 300
```

To delete a schedule named weeklyCleanVersions, issue the following command:

```
fsschedule -d -n weeklyCleanVersions
```

To reset all schedules of the clnver feature, issue the following command:

```
fsschedule -r -f clnver
```

SEE ALSO

fsschedlock(1), **fspolicy**(1), **fsclean**(1), **fsrminfo**(1), **snbackup**(1), **fsclassinfo**(1), **fsdefrag**(1), **fsactivevault**(1) **archive_cmp**(l)

NAME

fsstate − Report the state of all Quantum storage subsystem drive components and storage subsystems and/or Tertiary Manager software.

SYNOPSIS

fsstate [*componentalias*|**-f**] [**-F** *type*]

DESCRIPTION

The **fsstate**(1) command is a user command that can be executed when Tertiary Manager software is active or nonactive. The **fsstate**(1) command reports the state of the Tertiary Manager software and/or all storage subsystems and drive components configured in the Quantum storage subsystem.

Submitting the **fsstate**(1) command with the *componentalias* option generates a report for a single Quantum components, i.e. drive(s), drive identifier(s), and Media Manager system(s).

The **-f** option reports the state of the Tertiary Manager software. Valid states are *active*, *not active*, *starting*, *stopping*, and *unknown*.

Submitting the **fsstate**(1) command without any options generates a report showing all storage subsystems and drive components currently configured in the Quantum storage subsystem and the state of Tertiary Manager software. The report uses information from both Tertiary Manager software and Media Manager software. The *MEDIA ID* field information is derived from the Media Manager software while the remaining fields are derived from the Tertiary Manager software. The *MEDIA ID* field denotes whether media is mounted or not mounted in a drive by displaying the media identifier. Sometimes, the **fsstate**(1) report may show a drive *IN USE*, but no media identifier is specified. This is a result of request delay timing. The special character '*' next to drive names denote configuration information. The '*' character denotes drives not configured in the Media Manager system.

REPORT STATUS

The parameters listed by the **fsstate**(1) command are as follows:

Component Alias
: The component alias names used to identify storage subsystems and drive components

Drive ID
: Component alias drive identifier

State
: The state of the drive or subsystem:

  UNAVAIL — Not Available

  MAINT — Diagnostics Mode

  ON — Component is On-Line

  OFF — Component is Off-Line

  UNKNOWN — Tertiary Manager software is unable to access drive state information from Media Manager software.

Status
: The status of a drive:

  FREE — No medium mounted

  IN USE — Medium mounted and in use

  DELAYED — Medium mounted but not in use. Dismount of the medium will occur after the delay timer expires unless the medium is needed for another request.

  DISMOUNT — Dismount has been requested for medium.

  CLEANING — Cleaning medium mounted

  USER MOUNT — Medium mounted via **fsmount**(1)

  OTHER — Medium mounted by something other than Tertiary Manager.

FAILED Drive failed

Media ID The medium identifier for any medium mounted in a drive or storage disk. Since Object Storage iopath devices can be used with multiple namespaces concurrently a specific media identifier can not be displayed so "****" are shown instead.

Tertiary Manager Software State

The state of the Tertiary Manager software will be shown at the end of the report and will consist of one of the following:

active Tertiary Manager software is operational

not active Tertiary Manager software is not operational

starting Tertiary Manager software is initializing.

stopping Tertiary Manager software is terminating.

unknown Tertiary Manager software is in an unknown state.

OPTIONS

componentalias

The alias for storage subsystem and drives. The system administrator configures the possible values for component aliases during system configuration or by using the **fsconfig**(1) command. If the *componentalias* contains spaces, use single quotes around the words.

-f Generates a report showing status of the Tertiary Manager software. Valid states are *active*, *not active*, *starting*, *stopping*, and *unknown*.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

SEE ALSO

fschstate(1), **fsxsd**(1)

NAME

fsstats − Used to generate Tertiary Manager system usage reports.

SYNOPSIS

fsstats [**-sparse**] [**-perf**] [**-dir** *directory*] [**-beg** *date*] [**-end** *date*] [**-out** *directory*] [**-overwrite**] [**-<ioType>**]

DESCRIPTION

The **fsstats**(1) is a script to process the information in the log file(s) and generate hourly and daily Tertiary Manager system usage reports.

The **fsstats**(1), with no options, will generate the hourly and daily system usage information for the previous day. The reports focus on stores, retrieves, relocation (disk-to-disk), and media copy (tape-to-tape) requests. The information is appended to the existing report files in the /usr/adic/TSM/logs/reports directory.

In order for the reports to stay current, it is recommended that the **fsstats**(1) script be run via a cron job every day.

The **-beg** and **-end** options are intended to be used to specify a range of dates for which the hourly and daily reports will be generated.

By default the reports will report stats for stores, retrieves, disk-to-disk, and tape-to-tape I/O types. These reports can be limited by specifying specific I/O types using the **-Store**, **-Retrieve**, **-Disk**, or **-Tape** options.

OPTIONS

-sparse Only display non zero statistics. This option is recommended as it makes the reports easier to view

-perf Use the perf_00 log file(s) instead of the trace_01 log file(s). This option is primarily used to support legacy systems where the perf logs were the primary means for obtaining the necessary information for the reports. There should be no need to use the option as the trace_01 log is now the preferred means for gathering the report information.

-dir *directory*

Specifies the directory where the logs are located. The default is /usr/adic/TSM/logs/trace.

-beg *date*

Specifies the start date for which the reports will be generated. If specified, the script will generate the usage reports beginning at 00:00:00 on the specified start date. The format of the date is YYYY:MM:DD where:

YYYY = Numeric, four-digit year
MM = Numeric, two-digit month
DD = Numeric, two digit day

The default value is yesterday 00:00:00.

-end *date*

Specifies the end date for which the reports will be generated. If specified, the script will generate the usage reports ending at 23:59:59 on the specified end date. (See the **-beg** option description for more date related info.) The default value is yesterday 23:59:00.

-out *directory*

Specifies the directory where the reports are generated. The default is /usr/adic/TSM/logs/reports. NOTE: Reports may not be rolled/collected if placed in a non-default directory.

-overwrite

Overwrite reports instead of appending to the reports.

-<ioType> ...

Specifies the types of i/o to display in the report. If not specified, all i/o types will be displayed. The possible values are:

Store Displays statistics for Store requests.

Retrieve Displays statistics for Retrieve requests.

Disk Displays statistics for Disk-to-Disk requests.

Tape Displays statistics for Tape-to-Tape requests.

REPORT STATUS

The following reports will be generated:

daily_file_size_dist	Will report the file size distribution by i/o type for the day.
daily_system_report	Will report the file count, amount of data, effective rate, minimum file size, maximum file size, and average file size by i/o type for the day.
daily_policy_report	For each policy class defined, this will report the number stores, truncates, and relocates, the number of success and failed stores, and the amount of data truncated and relocated for the day.
daily_request_dist	Will report the request distribution by i/o type for the day.
hourly_system_report	Will report the file count, amount of data, effective rate, minimum file size, maximum file size, and average file size by i/o type for each hour in the day.
hourly_policy_report	For each policy class defined, this will report the number stores, truncates, and relocates, the number of success and failed stores, and the amount of data truncated and relocated for each hour in the day.
hourly_request_dist	Will report the request distribution by i/o type for each hour in the day.
hourly_file_size_dist	Will report the file size distribution by i/o type for each hour in the day.

NAME

fsstore − Expedite the storage of a file that currently resides on disk to media.

SYNOPSIS

fsstore *filename...* [**-t** *mediatype*] [**-c** *copies*] [**-f i**|**p**] [**-v** *drivepool*] [**-z** *minsize*] [**-u** *runtime*] [**-F** *type*] [**-T ANTF**|**LTFS**]

fsstore -R *directory* [**-t** *mediatype*] [**-c** *copies*] [**-f i**|**p**] [**-v** *drivepool*] [**-z** *minsize*] [**-u** *runtime*] [**-F** *type*] [**-T ANTF**|**LTFS**]

fsstore -B *batchfilename* [**-t** *mediatype*] [**-c** *copies*] [**-f i**|**p**] [**-v** *drivepool*] [**-z** *minsize*] [**-u** *runtime*] [**-F** *type*] [**-T ANTF**|**LTFS**]

DESCRIPTION

The **fsstore**(1) command expedites the storage of data to media, instead of allowing it to be migrated automatically by Tertiary Manager software. Tertiary Manager software initiates storage of a file to Tertiary Manager media based on the migration parameters of the policy class to which the file is associated. The **fsstore**(1) command activates Tertiary Manager software to initiate the migration of the file to a media. Status is returned to the user upon completion of this command. The user cannot specify the specific medium on which the file is placed, but the user can specify a media type.

The user can specify a number of copies of the file to be stored to media when the command executes. This number can be up to, but not exceed, the number of copies specified as the policy class *maxcopies* parameter for the file. To store more copies of the file than are specified in the default copies parameter in the policy class, the file's copy attribute must be modified. Use **fschfiat** *filename* **-c** to change this attribute. Then the **-c** option can be used with the **fsstore**(1) command to store an additional copy of the file. The **fsstore**(1) command will never store more than one copy unless the **-c** parameter is set. If fewer than the maximum number of copies is specified with the **-c** option, that number is stored to disk. The rest of the copies are stored when policy is applied to the policy class. If the **-c** option is not specified, only one copy is stored when the command is executed, and any other copies are stored when the storage policy is applied. After the store command completes, the **fsfileinfo**(1) command can be used to see on which media the file is stored.

The policy-class default file-cleanup action can be temporarily overridden using the **-f** option, provided the file is not marked for exclusion from cleanup. File data can be truncated immediately (**i**) or held for evaluation when the cleanup policy is applied (**p**).

The **-v** option associates a drive pool with the policy class. If a drive pool is specified, the drive pool name *must* be defined within the Media Manager software before any data operation can occur for the policy class associated with the new drive pool name.

The **-z** option allows file size to be considered when determining which files are to be stored. Files larger than or equal to the specified *minsize* will be stored while files less than the *minsize* will not be stored during the command execution.

OPTIONS

filename...

The names of the file(s) on disk to store to media. The file path(s) must also be in a migration directory. The entire path name need not be entered. If preceded by a slash (/) in the command definition, the full path name, starting from the root directory, is required as input to the command. Otherwise, the Tertiary Manager command expands the directory name using the current working directory as the parent. If multiple files are entered, the files must be separated by spaces.

-R *directory*

The directory from which to start the recursive operation. All entries from the specified directory and any subdirectories will be processed. Success for individual items (files, directories, etc) will not be reported. Instead an overall progress status message will be reported periodically with this general format: "Processed <N> out of <TOTAL> entries..." It may take some time before the value of <TOTAL> is known. Until that time, <TOTAL> will be reported as <TBD>. By default, <N> is reported at intervals of 1000. This can be overridden by the system parameter

RECURSION_BATCH_REPORT_INTERVAL. The parameter is an integer value. For a further description of the system parameter see the *fs_sysparm.README* file.

-B *batchfilename*

The batch file contains the list of entries to be processed. Each entry must be listed one per line. Do not enclose the entry in quotes, use escape characters or any character not in the actual name. Success for individual items (files, directories, etc) will not be reported. Instead an overall progress status message will be reported periodically with this general format: "Processed <N> out of <TOTAL> entries..." It may take some time before the value of <TOTAL> is known. Until that time, <TOTAL> will be reported as <TBD>. By default, <N> is reported at intervals of 1000. This can be overridden by the system parameter RECURSION_BATCH_REPORT_INTERVAL. The parameter is an integer value. For a further description of the system parameter see the *fs_sysparm.README* file.

-c *copies*

Number of copies of the file(s) to be stored. The value is the total number of copies, including the primary copy of the file. This number cannot exceed the number of copies defined in the policy class *maxcopies* parameter. To store more copies of the file than are specified in the default copies parameter in the policy class, the file's copy attribute must be modified. Use **fschfiat** *filename* **-c** to change this attribute. Then, the **-c** option can be used with the **fsstore**(1) command to store additional copies of the file. If the number of copies stored is less than the number specified by the policy class definition or by the **fschfiat**(1) command, the remainder of the copies are stored when the storage policy is applied.

-f i|**p** The file retention policy for the filename specified. The files can be truncated immediately (**i**) or at policy application time (**p**) once all file copies are stored on a medium. If the **-f** option is not used, the file retention policy will be specified by the policy class definition.

-t *mediatype*

Defines the type of medium to be used for storage. Depending on the type of platform used, the following media types are supported by Tertiary Manager software:

AIT
AITW
AWS
AZURE
LATTUS
S3
QVAULT
S3COMPAT
LTO
LTOW
SDISK
3590
3592
9840
9940
T10K
DLT4
DLT2 (SDLT600 media)

If **-t** is not specified, the policy class definition will be used.

-T ANTF|**LTFS**

Specifies the media format type that will be used when formatting or selecting media. **ANTF** is the Quantum internal tape format. **LTFS** is the Linear Tape File System specification tape format. A value of **ANTF** will format media with a single partition containing ANTF volume labels. This data partition will store StorNext file data. A value of **LTFS** will format media with two partitions containing LTFS volume labels. The index partition will store LTFS metadata and the data

partition will store StorNext file data. The **LTFS** media format type is only applicable to LTO media generation 5 and beyond (e.g. LTO-5, LTO-6, etc). Any attempt to assign **LTFS** to non-LTO media types will result in an error.

If the **-T** option is not specified, the default will be determined as follows:

A media type of Lattus will default to **NONE**.
A media type that does not support **LTFS** will default to **ANTF**.
A media type that supports **LTFS** will default to the policy class copy definition if it is valid, otherwise it will default to the system parameter CLASS_MEDIA_FORMAT.

-v *drivepool*

Media Manager drive pool group used to store the file specified. The drive pool must be defined in Media Manager software. If the **-v** option is not used, the default drive pool group will be specified by the policy class definition. The special "_" character is permitted to identify the drive pool group.

-z *minsize*

Minimum File Size in bytes to be stored. Files larger than or equal to the specified *minsize* will be stored. Files with a size less than specified *minsize* will not be stored.

-u *runtime*

Maximum allowable time in hours for the command to finish. This command normally runs until it completes. This option can be used to limit how long it should remain active. If the store has not completed in the specified amount of time, then any outstanding activity will be canceled.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

SEE ALSO

fsretrieve(1), **fsfileinfo**(1), **fschfiat**(1), **fsclassinfo**(1), **fspolicy**(1), **fsxsd**(1)

NAME

fstypes − Displays valid drive and media types.

SYNOPSIS

fstypes -h

fstypes -d

fstypes -m [**-f** *format*] [*mediatype*]

DESCRIPTION

The **fstypes**(1) command will display the valid drive or media types to be used in the StorNext system.

OPTIONS

-h Help. Shows usage.

-m Lists the valid media type(s).

-d Lists the valid drive types.

-f *format*

The format of the media type to display. Valid options:

tsm Tertiary Manager

msm Media Manager

display Graphical User Interface

mediatype

Used to specify a media type to convert to the specified format.

EXIT STATUS

0 Command completed successfully.

1 Command failed.

NAME

fsusedspace − Report showing total amount of stored primary copy data in the Quantum storage subsystem.

SYNOPSIS

fsusedspace

DESCRIPTION

The **fsusedspace**(1) command shows the volume of primary copy data stored on media in the Quantum storage subsystem. The value is shown in Gigabytes (GB).

Primary copy data includes: - Space occupied by deleted files or older versions of existing files. - Fragmented space from files that were logically removed from media using **fsclean**(1) or replaced by **fsfilecopy -r**, but the source medium contains other files. - Used space on checked-out media.

Used storage can be reduced by defragmenting media using **fsmedcopy**(1), or executing **fsrminfo**(1) for checked-out media no longer necessary.

SEE ALSO

fsmedcopy(1), **fsrminfo**(1), **fsclean**(1), **fsfilecopy**(1)

NAME

fsversion − Report or change versions of a file

SYNOPSIS

fsversion -h

fsversion [**-av**] *name*

fsversion -c *ver* [**-f**] *name*

DESCRIPTION

The **fsversion**(1) command will generate a report of valid versions for a file. By default the report only displays the current version If *-a* is specified, then all the inactive versions are displayed too.

The current version can also be changed using this command with the **-c** option. When changing versions the current version will be truncated from disk, if is not already migrated. Then the current version becomes an inactive version, and the specified new version becomes the current version. The new version will appear as migrated, so it will have to be retrieved before the data can be used. Additionally, if the file is configured to have a stub file, then the stub will not be present until the new file version is retrieved and truncated again.

If the current version only exists on disk and does not have a valid tape copy the command will fail unless the **-f** option is used. The use of the **-f** option will prevent any further access to the data that was in the file unless a copy of that data resides somewhere else.

If the current version has a valid Alternate Store Location remote copy, the command will fail unless the **-f** option is used. The use of the **-f** option will invalidate the remote copy and exclude the new version of the file from being considered as an Alternate Store Location candidate. The fschfiat(1) command can be used to enable the Alternate Store Location remote copy for the updated version of the file and add it to the Alternate Store Location candidate list.

OPTIONS

name... The file name(s) of the file(s) to operate on. The *filename* can be a file name, partial path name, or full path name.

-h Displays usage.

-a Lists all available versions for the file which includes current and inactive versions.

-v Verbose listing. This will also display the following information for each version: file modification time associated with the version, the time the version became inactive, and the time each version was stored or recovered. If a file has never been removed or if the file has been removed but has not been recovered, then the store time is displayed. If a removed file has been recovered back to disk then the recover time is displayed.

-c *ver* This will change the current version to the specified version.

-f This forces the version change if the current version has not yet been stored on tape. This is dangerous and will prevent any recovery of the data that is currently on disk. If this is not the desired result, then the current version can be stored using **fsstore**(1) or a copy made using any standard operating system commands such as cp.

SEE ALSO

fsrecover(1),**fschfiat(1),**altstoreadd(1)

NAME

fsvsdiff − Report discrepancies between media entries in the Tertiary Manager mediadir database table and media in the Media Manager database tables.

SYNOPSIS

fsvsdiff [*mediaID* ...]

DESCRIPTION

The **fsvsdiff**(1) utility reports discrepancies between media entries in the Tertiary Manager mediadir database table and media in the FX_XXX_DATA, FX_XXX_REMOVE, and FX_XXX_MIGRATE media classes in Media Manager database tables.

This utility does NOT check media user criteria fields. It only checks for correct media class associations.

REPORT STATUS

The report output will look similar to the following:

```
NOTICE: the Tertiary Manager software is active.
This will impact system performance. Do you wish to continue (y/n): y
000004 Unknown by Media Manager software
000334 found in MC: F0_LTO_DATA should be in MC: F0_LTO_MIGRATE
001235 found in MC: F0_LTO_MIGRATE should be in MC: F0_LTO_DATA
002341 Unknown by Tertiary Manager software
012591 Unknown by Tertiary Manager software
```

OPTIONS

mediaID ...

List of media IDs to test. If not specified, all media IDs in the Tertiary Manager mediadir database table will be tested.

RESTRICTIONS

Media Manager must be up to run this utility.

Tertiary Manager can be up or down to run this utility.

Because this utility can degrade performance, it is recommended that **fsvsdiff**(1) be run when Tertiary Manager is down or when there are no queued mount requests.

NAME

fsvssync − Correct discrepancies between media entries in the Tertiary Manager mediadir database table and media entries in the Media Manager mediacriteria database table.

SYNOPSIS

fsvssync [*mediaID* ...]

WARNINGS

This utility should be used VERY carefully and only under the guidance of Quantum technical assistance.

DESCRIPTION

The **fsvssync**(1) utility will go through the specified media or all media (depending upon what is passed to the utility) and update the entries in the Media Manager mediacriteria database table so that the values match the values in the Tertiary Manager mediadir database table.

OPTIONS

mediaID ...

List of media IDs to synchronize. If not specified, all media IDs in the Tertiary Manager mediadir database table will be synchronized.

EXIT STATUS

0 Media was successfully updated.

1 No media could be successfully updated.

RESTRICTIONS

Media Manager must be up to run this utility.

Tertiary Manager cannot be active to run this utility.

NAME

fsxsd − Generate XSD files for commands in the Quantum storage system. An XSD is an XML Schema Definition and is often used to validate XML.

SYNOPSIS

fsxsd -h

fsxsd -l

fsxsd *command*

DESCRIPTION

The **fsxsd**(1) generates an XSD file for a given command.

OPTIONS

-h	Print the **fsxsd**(1) usage (help)
-l	Print the commands that have XSD output.
command	Command to generate the XSD specification for.

EXAMPLE

You can use the **fsxsd**(1) command, the *command*, and the Linux command *xmllint* to validate XML output against the XML schema.

For example, these commands create XML and XSD output and then validate the XML against the XSD using the Linux *xmllint* command.

```
fsfileinfo -F xml /stornext/path/and/file > fsfileinfo.xml
fsxsd fsfileinfo > fsfileinfo.xsd
xmllint --schema fsfileinfo.xsd fsfileinfo.xml
```

SEE ALSO

fscancel(1), **fsfileinfo**(1), **fsmedinfo**(1), **fsmedlist**(1), **fsqueue**(1), **fsrelocate**(1), **fsretrieve**(1), **fsrmcopy**(1), **fsrmdiskcopy**(1), **fsstate**(1), **fsstore**(1), **fsobjcfg**(1)

NAME

fs_fmoverc − Clean up after an fs_fmover process failure or abnormal termination.

SYNOPSIS

fs_fmoverc -f *fsName* [**-d** *deviceId*] [**-it**]

fs_fmoverc -a [**-d** *deviceId*] [**-it**]

fs_fmoverc -c

WARNINGS

This utility should be used VERY carefully and only under the guidance of Quantum technical assistance.

DESCRIPTION

This utility is used to clean up after a failed **fs_fmover** process. It is normally called automatically by the resident processes but can be used manually if needed. In addition to optionally terminating running **fs_fmover** processes it will clean up the parameter file(s) used by those processes. The utility can also be used to initialize the parameter files for new file systems or storage devices and any stale cleaninProgress directories.

The user must be root to use the utility.

OPTIONS

-f *fsName*

The snfs file system being used by the **fs_fmover** process. The name will match the value for the file system identifier as reported by the **fsddmconfig**(1) command. This option is used if a specific **fs_fmover** process is to be cleaned up or if the set of parameter files for the file system are to be initialized.

-a This option is used if all **fs_fmover** process are to be cleaned up.

-c This option is used to clean up SDISK in the event that some processing involving those media was abnormally terminated. This is always run when the Tertiary Manager software is started.
For SDISK media this option is used to clean up stale cleaninProgress directories. At Tertiary Manager startup, the current cleaninProgress directory for each SDISK is moved to cleaninProgress.[Timestamp] and a process is created to clean these directories. This cleanup process, only cleanup cleaninProgress directories with names that have '.' and timestamp appended to 'cleaninProgress'. It is recommended that you restart Tertiary Manager to clean these directories instead of manually running this command.

-d *deviceId*

The device identifier for the device that was being used by the **fs_fmover** process. The value for the identifier should be as it appears in the output of the **fsddmconfig**(1) command. For storage disks the identifier has an additional "." and a stream number appended to the end. There is also a pseudo device identifier "disk2disk" that is used for relocation operations.

-i Initialize/repair the parameter file(s) indicated.

-t Terminate the indicated **fs_fmover** process(es) if they are still running.

EXAMPLES

Here are examples of typical usage:

Terminate a specific rogue **fs_fmover** process what was using file system snfs1 and device 1210024470. Also reset the parameter file being used:

```
fs_fmoverc -f snfs1 -d 1210024470 -i -t
```

Terminate all running **fs_fmover** processes and reset their parameter files:

```
fs_fmoverc -a -i -t
```

Initialize the parameter files for all devices on file system snfs1:

```
fs_fmoverc -f snfs1 -i
```

Initialize the parameter files for device 1210024470 on all file systems:

```
fs_fmoverc -d 1210024470 -i
```

Clean all stale cleaninProgress and recovery directories:

```
fs_fmoverc -c
```

SEE ALSO

fsddmconfig(1)

NAME

fs_mapper − Generate a new map for the indicated Tertiary Manager file system or relation point directory.

SYNOPSIS

fs_mapper [**-h**] [**-v**] [**-m**] [**-d** *relpt_dir*] *mountpt*

DESCRIPTION

The **fs_mapper**(1) command will generate the map files for the indicated Tertiary Manager file system or relation point directory.

There are Tertiary Manager commands, for example **fsclean -r**, that require a map of a file system to run. A file system map is a snap shot of the file system name space and metadata. The data for the map is kept in a set of mapping files. This map can be searched and processed much more quickly than by scanning the file system itself.

This command is typically only run manually if mapping files have been lost or if there is reason to believe the map has become corrupt. The maps are kept up to date automatically by the **fs_scheduler** daemon, which kicks off a rebuild policy on a regular basis after a backup is run. The mapping process used by the rebuild policy is analogous to running this command with the **-m** option.

A file system map can be generated from the metadump of a file system or by scanning the file system directly. The map can be generated much more quickly from the metadump than by scanning the file system. If however the metadump is out of date, generating the map from the file system is more accurate. This command by default generates the map directly from the file system.

NOTE: While the processing of an existing map is efficient and quick compared to scanning a file system, the process of generating the map is slow. It also uses many cpu and I/O resources. Be aware of this when running the command by hand. Because the mapping process is time consuming any command that creates a map, including this one, will output a msg at the beginning of the mapping process to let the user know mapping is taking place. The user will observe a message similar to one of the two messages below when mapping begins. The first indicates the map is being created from the metadump file for the file system and the second indicates the map is being created directly from disk.

```
Creating map for /stornext/snfs1 ....
```

or

```
Creating map for /stornext/snfs1 (from fs) ....
```

OPTIONS

-v Run the command in verbose mode.

-m Create the new map from the metadump for the file system.

-d *relpt_dir*
Recreate only the portion of the map under the specified relation point.

mountpt
The mount point of the Tertiary Manager file system to be mapped.

The **-v** option indicates that the verbose mode of the command should be used. In this mode many of the errors that may be encountered when mapping are reported as output instead of only being logged to the TAC logs.

The **-m** option indicates that the map should be created from the file system metadump instead of scanning the file system directly. As indicated this is the more efficient of the two methods. Obviously it requires a metadump be present, and the map will only be as up to date as the metadump.

The **-d** option indicates that only the indicated relation point should be mapped. When a map is created a set of mapping files is used to hold the map data. Each relation point in the file system is represented by a set of these files. If for some reason you believe that just one portion of a map is unreliable, this option can be used so just that portion of the map will be regenerated. (Note this can only be run against a relation point already in the map, not for a new relation point recently added to the file system but not yet in the

map.)

NAME

health_check − Perform a series of tests to ensure StorNext application health

SYNOPSIS

health_check [**-level** *aLevel*] [**-type** *Type Name*]... [**-component** *aComp*]... [**-ras**] [**-verbose**] [**-stopOnError**] [**-output xml**|**std**]

health_check -report -verbose [**-level** *aLevel*] [**-type** *"Type Name"*]... [**-component** *aComp*]... [**-stopOnError**] [**-output xml**|**std**]

health_check -describe levels|**types**|**components** [**-output xml**|**std**]

health_check -help

DESCRIPTION

This utility runs a set of health check operations to determine the health of the StorNext application. The arguments to *health_check.pl* control which operations get run and also control the way in which they run.

Arguments that have embedded spaces, such as in **-type** *"Type Name"*, must be surrounded by quotes. If the argument contains no spaces, the quotes are optional.

Health check operations that can run are defined in control files named *filelist* whose location is described by: <basepath>/<StorNextComponent>*/config/filelist* (i.e., */usr/adic/TSM/filelist*). These files contain health check entries, one per line, that represent health check operations to be run.

OPTIONS

Option specifiers need to be complete enough for uniqueness. Therefore **-level** is equivalent to **-lev** and **-l**.

The following options are supported:

-level *aLevel*

Runs all health check operations at or below the specified level. Three values are allowed: **0**, **1** or **2**. If no **-level** option is specified, the default action is to run health check operations at level 0. Multiple **-level** specifiers are not allowed.

The values **light**, **heavy**, and **excl** (or **exclusive**) can be used in place of **0**, **1**, and **2** respectively.

When a particular level is chosen, all health check operations at OR BELOW that level are run. Therefore, choosing **-level 1** would run all health check operations at either level 1 or level 0.

Each level is defined to mean the following:

0 - Light : Operations at level 0 should have no or minimal impact on StorNext application business operations. Users would not be expected to notice that the health check is running at this level.

1 - Heavy : Operations at level 1 are expected to have noticeable impact on the performance or behavior of the system. However, the impact is not expected to be severe. While these operations may delay user business operations somewhat, the user operations are guaranteed to still succeed.

2 - Exclusive : For operations at this level, it is expected that there is no other activity on the system except for the health check. It is recommended that the system be made unavailable to clients. Any client operations that are concurrently running cannot be ensured to complete successfully or reliably.

-type *"Type Name*"

Run the health check operations of a particular type. If no **-type** option is specified, the default action is to include ALL types.

Multiple **-type** specifiers are allowed.

-type specifiers are case insensitive. **-type** specifiers that contain spaces must be surrounded by quotes. If there are no spaces, the quotes are optional. All of the following values for **-type** "*Type Name*" are equivalent:

-type "Disk Space"
-type "disk space"
-type "DiskSpace"
-type DiskSpace

Use **health_check.pl -describe types** to get the complete list of types. The quotes will not appear in this listing of type names when -output std is specified (default).

-component *aComp*
Specifies a particular component for which health checks are to be run. If no **-component** option is specified, the default action is to include all components.

Multiple **-component** specifiers are allowed.

Use **health_check.pl -describe components** to get the complete list of components.

-verbose
If **-verbose** is specified, additional detailed output is written to the output stream.

-report -verbose
If **-report -verbose** is specified, instead of each test executing, information describing each test is printed, one description per line. If **-report** is specified and **-verbose** is not specified, the current behavior of health_check.pl is to print no output.

-ras If **-ras** is specified, **health_check.pl** will cause each specific health check operation failure to send a RAS Alert appropriate to the type of failure.

-stopOnError
If **-stopOnError** is specified, **health_check.pl** will halt after the first health check operation fails. Otherwise, it will run through all tests regardless of failures of any individual health check operation.

-output xml|std
If **-output** is specified, its specifier must be one of xml or std. If xml is specified, all output will be printed in xml format. If std is specified, all output will be printed in normal paragraph form. The default is std.

-help Print a usage giving a short description of the health check operations. Invalid combinations of option specifiers will also print the usage.

-describe levels|types|components
Describe (show information) for the indicated aspect of the health check framework. Only one of the given aspects can be described at a time.

levels: information about all levels will be listed, one level per line:

0 : Light (minimal impact on system)

1 : Heavy (major impact on system)

2 : Exclusive (all users must be off the system)

components: scan across all components, and for each that contains a *filelist* file in its config directory, the component will be output. The list will contain one component per line, in alphabetical order.

types : scan all *filelist* files across all components, and gather all **type** elements that are found in health check entries. List them in alphabetical order one per line. Types that differ only in case or in spaces vs underscores are considered equivalent and will only be output once. The format of the listed element will be defined by:

A. Convert all underscores to spaces (create words)

B. The first letter of each word is uppercase.

C. The other letters of each word are lowercase.

Therefore, "disk space" would be output as "Disk Space".

EXIT STATUS

Exit codes for the **health_check.pl** command are:

0 All tests were run; No errors or warnings occurred.

1 At least one health check operation failed.

2 There were no failures, but there was at least one warning during the health check run.

Other An error occurred in the execution of the health check framework itself, or a health check operation returned an unexpected exit code (not 0,1,2).

EXAMPLES

health_check.pl -c DSM -c TSM -l 1 -t Network -t "Disk Info" -t "Disk Space"

Run all level 1 and level 0 operations of type "Network", "Disk Info", and "Disk Space" from the DSM and TSM components. NOTE: These examples use the minimum acceptable characters for option specifiers. **-c** is the same as **-component**. **-t** is the same as **-type**.

health_check.pl -t "Disk Info" -c DSM -t Network -c TSM -l heavy -t "Disk Space"

The options are ordered unusually, but the result is exactly the same as the above example. Note the use of the alias "heavy" for level 1.

health_check.pl -c DSM -c TSM -l 1 -t Network -t "Disk Info" -t "Disk Space" -r -v

The same as the first example, but with the "-report" option included. None of the tests will actually be run, but a short description of their purposes will be listed instead.

health_check.pl -c DSM -c TSM -c DSM -l 0 -t "Disk Info" -t "Disk Space"

Invalid. -component values cannot be duplicates.

health_check.pl -c DSM -c TSM -l 0 -t Network -t "Disk Info" -l 1

Invalid. Multiple -level specifiers not allowed.

health_check.pl -c DSM -c TSM -l light -t Network -t "Disk Info" -t "disk info"

Invalid. -type values cannot be duplicates. Note the comparison is case insensitive.

health_check.pl -l light

Run the health check operations of level 0 for all types, across all components.

health_check.pl -l light -ras

Run the health check operations of level 0 for all types, across all components. For each health check operation that fails, send a RAS Alert appropriate for the type of failure.

health_check.pl -l

Invalid. "-l" requires a value.

health_check.pl -d types

Describe (list) all the type values that are found in all component filelist files.

health_check.pl -d types -c TSM

Invalid. A -d specifier cannot be used with any other specifier.

health_check.pl -d type -d level -d comp

Invalid. Only one -d value is allowed at a time.

THE FILELIST FILE And Health Check Section And Entries:

In *filelist* files, the **health_check** section lists the operations (executable binaries or scripts) that will be run by the **health_check.pl** utility. Each entry represents one or more individual health check operations.

Each entry below must conform to the following syntax or it will be ignored:

health_check : <level> : <type> : <execution string> : <timeout> where

level : must be one of 0, 1, or 2.

type : Each operation type should be a short but readable phrase and can allow spaces. All of the following examples are equivalent:

Disk Space

disk space

DISK SPACE

DiskSpace

execution expression : A pathname for an executable to be run. The rules for expressing a pathname are as follows, IN ORDER:

- If the pathname has no "/" or "*" characters, it is an atomic executable name that will be found via the PATH.

- If the path starts with a "/", it is considered a fully specified path. Otherwise, it is considered relative to the component containing that filelist file.

- If the path specifies a directory (and does not contain wildcards) then all executable files in the entire subtree of that directory are selected.

- Wildcarding (the use of the "*" character) is allowed. It represents the selection of one or more executable files. However, wildcarding does not apply to directories.

- Arguments to the executable follow the file name.

- Note wildcarding does not select on directories, only on executables, so directory recursion is not possible with wildcarding.

timeout : The number of seconds the operation is allowed to run, after which it is considered to have failed. A value of zero indicates no timeout (run to completion).

Each individual health check operation that is represented by a filelist entry in the health_check section must conform to a set of rules:

- It must return a status code of 0 for success, 1 for failure, or 2 for warning. Any other returned status code will be considered a failure (1).

- It must "clean up" prior to exiting, leaving the system in the same state that it was in upon starting.

EXAMPLES OF FILELIST health_check SECTION ENTRIES:

These examples show a few of the ways that **health_check** section entries can be written to correspond to the ways that health check operations (scripts and executables) can be organized in directory trees.

health_check : 0 : Disk Space : util/hchk/diskspace/light_* : 30

All binaries and scripts in the util/hchk/diskspace/ directory whose names begin with "light_" are organized as being of intrusion level 0 and of type "Disk Space". If they run, each is expected to complete in less than 30 seconds.

health_check : 1 : Disk Space : util/hchk/diskspace/heavy_* : 180

This entry is the same as the above except the operation names begin with "heavy_", are at intrusion level 1, and each is expected to complete within 180 seconds.

health_check : 0 : media : exec/fsmedchk -a -gen 2 -perdrive : 60

This entry identifies one specific health check operation, "exec/fsmedchk". It also specifies arguments to that operation.

health_check : 1 : policy : systest/policy -c tempClass : 300

This example illustrates "directory" recursion - under the assumption that *systest/policy* is a directory. All operations anywhere within the entire directory subtree of the *systest/policy* directory are chosen (at intrusion level 1 for type "policy"). Every such operation will be passed "-c" "tempClass" as its arguments.

NAME

keydb_init − Will initialize the Tertiary Manager keydb table.

SYNOPSIS

keydb_init

DESCRIPTION

The **keydb_init**(1) utility is used to initialize the Tertiary Manager keydb table after the database is reinitialized.

WARNINGS

If the database has not been reinitialized, there is no reason to run this utility.

Users should not run this command, unless directed to do so by Quantum technical assistance.

NAME

maptst − Examine Tertiary Manager mapping files

SYNOPSIS

maptst [**-g**|**-m**[**-b**]] [**-d**|**-i**|**-r** *map_dir*] *mount_point*

maptst [**-a**] **list**|**mlist**

DESCRIPTION

This command can be used to browse the contents of the current set of mapping files for a file system. After the mapping files are generated or if no options are specified, a menu is displayed allowing the user to traverse through the mapping files examining their contents.

This command can also be used to generate a new set of mapping files before allowing browsing of those files. The mapping files can be generated from the current metadump, or from the file system directly. See the man page for **fs_mapper**(1) for more info on map generation.

Finally the command can be used to list current file systems. It can list mounted and unmounted file systems. Also StorNext file systems and regular file systems can be listed. Some basic file system attributes are provided in the list.

OPTIONS

-g This will cause new mapping files to be generated directly from the file system instead of just reading the existing mapping files.

-m This will cause new mapping files to be generated from the current metadump instead of just reading the existing mapping files.

-b This will cause the mapping processing to scan for candidates (analogous to the rebuild policy) while the map files are being generated. This can be used with the **-g** or the **-m** options.

-d *map_dir*
This will only map the specified directory and the directory must be a relation point. (The mapping files for the provided relation point will be regenerated.)

-i *map_dir*
This will map the specified directory using inodes instead of file keys and will always generate new mapping files. (It will not affect the default mapping files for a file system but will generate a new set for use in the browsing operation.)

-r *map_dir*
This will map the specified directory for retrieve processing, analogous to what is done by an **fsretrieve -R**, and will always generate new mapping files. (It will not affect the default mapping files for a file system but will generate a new set for use in the browsing operation.)

mount_point
The file system to operate on.

-a Report all file systems when **list** or **mlist** is requested and not just StorNext file systems.

list Report on all file systems, not just mounted file systems.

mlist Report only mounted file systems.

SEE ALSO

fs_mapper(1), **fspolicy**(1)

NAME

mmportinfo − Queries for import/export port information about an archive

SYNOPSIS

mmportinfo [**-h**] *archiveName*

DESCRIPTION

The **mmportinfo**(l) command is issued from the command line to in order to obtain import/export port information about an archive. This information consists of the following colon separated values:

- hardware name
- list of media types
- portID

The *portID* value is required by the **vsarchiveenter**(l) and **vsarchiveeject**(l) commands when moving media in and out of an archive. There is no import/export port information for vaults so this command will return nothing if a vault is specified.

OPTIONS

archiveName

Identifies the archive to obtain port information about.

Valid archive names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-h Requests help for the entered command.

The Help option returns the usage for the entered command.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

EXIT STATUS

0 The **mmportinfo**(l) command completed successfully

1 An error is detected by the Media Manager software.

EXAMPLES

Request port information for a scsi archive

mmportinfo archive1

Output returned:

```
16:LTOW,LTO:0,0,15,16
```

In this example the hardware name is 16, the media type list is LTOW,LTO and the portID is 0,0,15,16

Request port information for an acsls archive

mmportinfo archive2

Output returned:

```
0,0,0:LTOW,LTO:0,0,15,1
```

In this example the hardware name is 0,0,0, the media type list is LTOW,LTO and the portID is 0,0,15,1

NOTES

None.

SEE ALSO

vsarchiveeject(l), **vsarchiveenter**(l)

NAME

pr_util − Display contents of a distributed data mover parameter results file

SYNOPSIS

pr_util -h

pr_util [**-i** *string*] [**-s**|**-r**|**-f** *filenum*] *file*

DESCRIPTION

Parameter result files contain request information used by distributed movers. Distributed movers also place resulting status information in these files. This utility can be used to view this information.

OPTIONS

-h Help. Shows usage.

-i *string* Elements of sub structures are indented for better readability. By default the indentation string used is "| " but can be set to anything with this option.

-s This will only display the status information.

-r This will only display the request information.

-f *filenum* This will display request and status information for a single file specified by *filenum*. *filenum* must be 1-300.

file The parameter results file to operate on.

EXIT STATUS

This will exit with 0 upon successful execution. Anything else indicates failure.

NAME

showc − Show candidate information

SYNOPSIS

showc [**-l**] [**-nrstTCD**] [<*mnt_pt*>...]"

showc -p [**-nsTCD**] [<*mnt_pt*>...]"

showc [**-l**|**-p**] [**-sx**] [**-f** < *file_name*>...]

showc -T [<*mnt_pt*>...]

DESCRIPTION

This will report the count of store candidates for each specified file system or all file systems if none are specified. It can also report the number of truncation (**-t**) or relocation (**-r**) candidates. Instead of reporting counts, file handles (**-l**) or complete path (**-p**) names can be displayed.

By default the reported information is based on the contents of the database. This is where candidate entries eventually end up. Prior to being put in the database, each candidate is placed in a temporary file. The **-C** and **-D** options can be used to generate reports based on the contents of these files. Additionally, the **-f** option to report information based on a specific event or candidate file.

OPTIONS

-l List file handle information for candidate entries.

-p List complete path for candidate entries. This can be time consuming and is not valid in conjunction with the **-t** or **-r** options.

-s This will perform a stat system call on each candidate to verify that it still exists on disk.

-n Report based on new candidate files

-t Generates a report of truncation candidates.

-r Generates a report of relocation candidates.

-C Report based on unprocessed (directory) create event files.

-x Treats event files specified with **-f** as destroy event files.

-D Report based on unprocessed destroy event files.

-f *file_name*...
Report based on the specified candidate/event file(s).

-T Report oldest and newest store candidate times. This is based on the create event files and the database.

PATH ERRORS

When reporting candidate counts, or optionally the handles of candidates when using the "**-l**" option, this command just reports on the contents of the indicated candidate table or file. When the "**-p**" option is used the path names must be generated from the candidate information. If the parent and file handles are both available they will be used to generate the path. If the parent handle is not available, or there was an error using the parent, then only the file handle will be used for the generation.

The path generation process can fail with different processing errors. If the path generation succeeds for a candidate the class index and path are reported as follows:

```
class - 3 path - /stornext/snfs1/class1/sub1/file.01
```

If the path generation fails the class index is still displayed along with an unknown path indicator and handle information for the candidate:

```
class - 3 path - (unknown): pino - 82 pgen - 0 ino - 71 gen - 2 name - file.01 (g
```

If the parent handle is not available only the handle info is provided:

```
class - 3 path - (unknown): ino - 71 gen - 2 name - file.01 (gone)
```

Note that the text in the parentheses at the end of the failure message is the reason for the generation failure. The current generation failures are:

```
(gone) - the file has been removed
(path too long) - the path is longer than the expected system maximum
(path generation error) - unexpected generation failure
```

One final note is that the candidate name is not always known. In the case of a generation failure where the name is not available "NA" will be reported for the name.

WARNINGS

This command is expensive to run on large candidate sets. This is true whether the command is just showing a count of candidates or whether an option is specified to show more specific candidate information.

Because of the expense, and potential affect on other running processes, it is recommended that this utility ONLY be used if some sort of problem is suspected with existing candidates or candidate processing. It should NOT be used as some sort of continuous monitoring tool.

Note that this command has an especially adverse affect on the snbackup process. Do not run while backups are running.

EXIT STATUS

O for success. Anything else is a failure.

NAME

showsysparm − Report the value for the specified Tertiary Manager system parameters.

SYNOPSIS

showsysparm [**-F** *type*] *sysparm...*

DESCRIPTION

The **showsysparm**(1) command takes a Tertiary Manager system parameter and will report the associated value for that item.

OPTIONS

sysparm

The Tertiary Manager system parameter to report the value of.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

REPORT STATUS

The resulting output will be of format <sysparm>=<value>

EXAMPLE

```
% showsysparm DEFAULT_MEDIA_TYPE CLASS_DRIVEPOOL BACKUPFS BOGUS_SYSPARM
DEFAULT_MEDIA_TYPE=LTO
CLASS_DRIVEPOOL=fs_F0drivepool
BACKUPFS=/stornext/snfs1
```

EXIT STATUS

0 Command found and reported the values of the sysparms specified.

n Command could not find n number of sysparms specified.

NAME

snbackup − Execute backup of configuration, database, and file system metadata.

SYNOPSIS

snbackup [**-F** *type*] [**-c**] [**-h**] [**-p**] [**-s**]

DESCRIPTION

The **snbackup**(1) command generates a backup of StorNext software using SNSM or snpolicyd which can later be used to restore the database, configuration files, and file system metadata. Each backup component (database, configuration, and file system metadata) is created in a compressed tar file. Each archive file is stored to media that was selected for use by the defined backup class. snpolicyd supports only Lattus devices.

A specific class is used for all backup activity. For SNSM, this class is named _adic_backup. For snpolicyd with Lattus Object Storage, this class is named _snpolicy_backup. Users can modify backup parameters for SNSM with the **fsmodclass**(1) command. Refer to **fsmodclass** man page for more information. Backup parameters for Lattus Object Storage with snpolicyd should only be changed using the **snpolicy**(8) command under the direction of Quantum technical support. Any modifications to the _adic_backup class or _snpolicy_backup class will take effect during the next invocation of the **snbackup**(1).

The **snbackup**(1) command can make a full backup or a partial backup. A full backup is a complete checkpoint of the database, a full snapshot of each file system's metadata, and a full snapshot of the system configuration files. A partial backup contains an incremental checkpoint of the database since the last backup, a full snapshot of each file system's metadata, and a full snapshot of the configuration. A request to create a partial backup is upgraded to a full backup if there is no recorded full backup.

snbackup(1) will generate manifest files that are used by **snrestore**(1). The manifest files are created in */usr/adic/TSM/internal/status_dir* with a redundant copy made to */usr/adic/mysql*. Each backup will produce a *snbackup_manifest* file that catalogs the backup files and associated media. A *device_manifest* file is created for storage disk or Object Storage media to facilitate access to these media types during **snrestore**(1). If Object Storage media is used for backups, then a third manifest file is generated called *snobjs_manifest* that will map files to Object Storage object IDs.

By default, the SNSM software is configured to run full backups once a week on Sunday, with a partial backup every day from Monday through Saturday. Systems configured for snpolicyd using Lattus Object Storage will need to configure **cron**(8) to schedule backups. The **snbackup_cron_util**(1) utility can be used to help with scheduling.

Backup notifications will be done by email and RAS events. Emails will be sent to users configured to receive backup notifications and will contain status information as well as copies of the manifest files. These mail notifications should be retained in the event that the system needs to be recovered using **snrestore**(1). RAS events will be generated for failed backups.

REPORT STATUS

For the TEXT output format, the status report produces a full listing of the most recent backup or the currently running backup. For the JSON format, a more limited status report is generated:

State The current state of snbackup (JSON output only). Valid values: **idle, running, unknown**

Result The final results of the most recent run. Valid values: **completed, failed**

Result Details
: Additional information on the results of the most recent run. Valid values: **Backup Successful** or information specifying the type of failure that occurred

Start Time
: The date and time when the most recent run started

End Time
: The date and time when the most recent run ended

OPTIONS

-p Create partial backup

-s Get status for currently running backup or results of previous backup.

-h Print usage information.

-n DEPRECATED: This option is now ignored. It previously skipped creating gzip'd metadata-dump-file copies.

-c For use when **snbackup**(1) is run via cron for snpolicyd using Lattus Object Storage.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default) or **JSON**.

TEXT is the "legacy" textual format.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application. See http://json.org for more information.

ENVIRONMENT

The **BACKUPFS** setting in the *fs_sysparm* file will determine which file system **snbackup**(1) will try to use when run. If this setting is not defined, **snbackup**(1) will attempt to automatically chose a file system that has either been configured for SNSM or snpolicyd using Lattus Object Storage and will then update the *fs_sysparm* file accordingly.

The **POST_UPGRADE_BACKUP** environment variable indicates the location of the **POST_UPGRADE_BACKUP** file, which determines if the next backup should be a full backup. The **POST_UPGRADE_BACKUP** file is created the first time the Tertiary Manager software is started following a StorNext upgrade. If the **POST_UPGRADE_BACKUP** file is present, then the backup will be forced to be a full backup. Upon completion of the backup, the **POST_UPGRADE_BACKUP** file will be deleted if it exists. The default location of **POST_UPGRADE_BACKUP** can be found at */usr/adic/TSM/internal/status_dir/post_upgrade_backup*.

FILES

/usr/adic/TSM/config/fs_sysparm.README
/usr/adic/TSM/internal/status_dir/snbackup_manifest
/usr/adic/TSM/internal/status_dir/device_manifest
/usr/adic/TSM/internal/status_dir/snobjs_manifest
/usr/adic/TSM/internal/status_dir/post_upgrade_backup
/usr/adic/mysql/snbackup_manifest
/usr/adic/mysql/device_manifest
/usr/adic/mysql/snobjs_manifest

SEE ALSO

snrestore(1), **snbkpreport**(1), **fsmodclass**(1), **snpolicy**(8), **snbackup_cron_util**(1)

NAME

snbackup_cron_util − utility for manipulating crontab entries for snbackup

SYNOPSIS

snbackup_cron_util [**-install**] [**-list**] [**-remove**] [**-help**]

DESCRIPTION

snbackup_cron_util is a helper utility for manipulating the snbackup crontab entry of the tdlm user for snpolicyd configurations that use Lattus. The **-list** option lists the currently installed snbackup crontab entries for the tdlm user. This is also the default option if no other options are specified. The **-install** option will install the default snbackup entries in the tdlm user's crontab. The **-remove** option will remove the default snbackup entries.

FILES

/usr/adic/TSM/util/install/snbackup_cron_util

SEE ALSO

snbackup(1)

NAME

snbkpreport − Display available SNSM backups

SYNOPSIS

snbkpreport [**-h**]

DESCRIPTION

The **snbkpreport**(1) command provides a listing of available SNSM software backups which can be used for a restore operation. Information will be listed in a tabular form. Full backups and all subsequent partial backups will be grouped together. Each copy will also be grouped together. Media required for each set of backups will be shown in the media column.

OPTIONS

-h Help option shows usage.

SEE ALSO

snbackup(1), **snrestore**(1)

NAME

sncompare − Validate the consistency between the Tertiary Manager database and the filesystems.

SYNOPSIS

sncompare -m *mountpoint* [**-d** *dirname*] [**-c db**|**fs**] [**-f**] [**-r**] [**-t**] [**-D** *level*] [**-P** *count*]

sncompare -m *mountpoint* [**−c ob**|**qf**] [**-d** *dirname*] [**-f**] [**-D** *level*] [**-P** *count*]

sncompare -m *mountpoint* [**−c qt**] [**-d** *dirname*] [**-D** *level*] [**-P** *count*]

DESCRIPTION

This command is used only for Quantum support and should only be executed at the direction of Quantum technical support.

The **sncompare**(1) command is used to validate the consistency of the database versus the filesystems.

There are two main modes of operation. The recommendation is to run the quick tests first to determine the extent of the problem and which filesystems, if any, may need to be repaired. Afterwards, the DB and FS tests can be run on the filesystems identified to have problems. - The quick tests provide a snapshot of the consistency of the Tertiary Manager database and whether all files are listed in the database. All filesystems are validated. - The other two tests are more thorough in that they will generate SQL and shell commands to repair the database and files. These two tests operate on a single mountpoint at a time.

No changes are made to the database or any filesystem during the execution of this command. All commands are written to files that can be run at a later time to repair any problems found. See section REPAIR OUTPUT FILES for more details about these files.

Several logfiles are generated during the execution of this command. They are stored in the directory specified by the **-d** option. If not specified then */tmp/sncompare_output* is used.

OPTIONS

-m *mountpoint*

Specifies the mountpoint of the filesystem to validate. It must be specified for all tests.

-c db|**fs**|**ob**|**qt**|**qf**

Specifies which test(s) to run. The default is to run the **db** and **fs** tests. The **db** and **fs** tests cannot be run at the same time as either the **ob** or the **qt** or the **qf** tests. The tests are:

db Validate database vs. filesystem

fs Validate filesystem vs. database

ob Validate the file object IDs

qt Run quick database checking tests

qf Run the filesystem quick test

-d *dirname*

Specifies the name of the directory where all the various repair and log files are stored. If this directory does not exist it will be created. If this directory exists then sncompare will display an error message and terminate. The default directory is */tmp/sncompare_output*.

The specified directory name can be a full pathname, i.e. it starts with a '/' character, or it can be relative to the current directory, e.g. "./sncompare_output".

-f Forces the verification of all directories and files in the mountpoint. The default is to verify only the relation points defined within TSM. This option applies to the **-c fs**, **-c qf** and **-c ob** tests.

-h Prints the usage for the command.

-r Specifies the maximum recursion level allowed for the **-c fs** test. The allowable range is 0 to 200 with the default being 200. Specifying a value of 0 means ignore this check and continue running until it completes or the pathame limit of 1024-characters is reached.

Exceeding the maximum level during the testing of a directory will stop processing that directory, log an event in the "sncompare_log.txt" logfile, and then continue to process the remaining directories.

-t Enables the gathering and reporting of the total disk space used by all files and the total number of blocks truncated. The total number of blocks truncated does not include the stub size, if any.

-D *level*

Enables debugging output. When enabled, the logfile will grow about 700MB per 1 million files processed. The debug levels are **0-4** and **9** where a higher debug level includes all lower levels. The debug levels include the following:

0 entry/exit, test calls/status, file/directory info and status

1 procedure calling

2 procedure return status

3 database debug

4 miscellaneous debug

9 this is a very verbose debugging mode used only by the "-c fs" test

-P *count*

Enables progress prints. The *count* field specifies how often to print file information. For example, **-P 500000** will print a progress line in the logfile every 500,000th file or entry.

USAGE

This should only be run at the direction of Quantum support.

```
sncompare -m <mountpoint> -d /tmp/sncompare_db1 -c db
sncompare -m <mountpoint> -d /tmp/sncompare_fs1 -c fs
sncompare -m <mountpoint> -c qt -d /tmp/sncompare_qt1
sncompare -m <mountpoint> -c qf -d /tmp/sncompare_qf1
sncompare -m <mountpoint> -c qt -c qf -d /tmp/sncompare_qf2
```

TEST OPTIONS

Below is a list of conditions reported when using the **-c db** option.

Deleted File
File found in the Filesystem
Moved File
No Parent Directory Found
Replaced File

Below is a list of conditions reported when using the **-c fs** option.

0-Length File
File found in the Database
Managed Directory
Unmanaged Directory
Moved File
No DM_INFO returned for a File
No FILE_KEY in Database
No Parent Found for File
Non-Stored File
File with a matching file_key entry in FILEINFO table but a different name (could be an ORPHAN or a hardlink)
Orphaned FILEINFO entry, i.e. no corresponding FILECOMP entries
Other entries such as ".", "..", links, etc.

When the **-c ob** option is specified, a test is run to verify the Object Storage ObjectIds of all files found. The

object ids from the FSM and the FILECOMP table are compared. All mountpoints are verified.

Below is a list of database tables checked when using the **-c qt** option.

DIRPATH
FILECOMP
FILEINFO
MEDIADIR
OLDMEDIA

When the **-c qf** option is specified, a quick test is run to validate that all files in all filesystems are listed in the Tertiary Manager database.

EXIT STATUS

Exit codes for the **sncompare**(1) command are:

0	Command completed successfully.
1	Command syntax error.
2	Stornext environment initialization error.
3	DMAPI initialization error.
4	DMAPI read error.
5	Call to read file/directory stats failed.
6	Memory allocation error.
7	Memory reallocation error.
8	Linked list error.
9	File open error.
10	File read error.
11	Specified directory path is null.
12	Directory not found.
13	Directory create error.
14	Directory open error.
14	Directory read error.
16	Database open/connection error.
17	Database data error.
18	Database query error.
19	File key is zero error.
20	Parent not found.
21	User canceled command.
22	No relationpoints found in CLASSDIR table.
23	File objids in extattrs and database do not match.
24	File data not found.
25	File not found.
26	Unexpected child failure.
27	No Object Storage Media found.

REPAIR OUTPUT FILES

These executable files contain SQL and/or shell commands that will fix or remove information from the filesystem and/or database to resolve problems and inconsistencies that were found during the validation.

All repair scripts are created in the *repair* subdirectory in the directory specified by the **-d** *dirname* option. For example if the **-d** option was specified as */tmp/sncompare_run1* then the subdirectory would be */tmp/sncompare_run1/repair*.

Below is a list of each repair script created and a description of its contents.

sncompare_dirpath.sql

Contains SQL commands to add or update the parent directories in the DIRPATH table for the following types of errors:

Parent is not found in the table. This can also occur if the file FILEINFO entry has the pfile_key field set to 0 and there is no entry in the table for its parent directory.

Table entry exists but the path is null.

sncompare_dirpath_moved.sql

Contains SQL commands to add or update the parent directories in the DIRPATH table for a file that has been moved since it was stored.

sncompare_filecomp.sql

Contains SQL commands to fix entries in the FILECOMP table for the following types of errors:

Delete entries from the FILECOMP table that have no corresponding entry in the FILEINFO table and the media are waiting to be cleaned, i.e. they are in the OLDMEDIA table.

Delete entries from the FILECOMP table where the media are not found in the MEDIA table.

Set ENDTIME in the FILECOMP table entries of moved (or replaced) files so that **fsclean**(1) will clean them up.

sncompare_fileinfo.sql

Contains SQL queries to fix entries in the FILEINFO table for the the following types of errors:

Update the parent_key if the current parent_key in the table is 0.

Add an entry to the FILEINFO table since it is missing for some unknown reason.

sncompare_fileinfo_moved.sql

Contains SQL queries to fix entries in the FILEINFO table for the the following types of errors:

Update the parent_key to the new directory for a file that has been moved since it was stored.

sncompare_oldmedia.sql

Contains SQL queries to remove unneeded OLDMEDIA table entries, i.e. media not in MEDIADIR table.

sncompare_dmutil.sh

Contains dm_util commands to clear the ALL_COPIES_MADE flag in the extended attributes of a file so it can be retrieved.

sncompare_rtv.sh

Contains **fsretrieve**(1) commands for each file that has only 1 copy stored to tape but should have 2 or more. This in conjunction with clearing the ALL_COPIES_MADE flag should result in new store candidates the next time the rebuild policy is run.

sncompare_rm.sh

Contains "**rm -f** <*file*>" commands to remove files from the filesystem that are truncated and do not exist in the database anymore.

To perform the database cleanup, it is recommended the above four *.*sql* repair scripts be executed in this order:

sncompare_dirpath.sql
sncompare_filecomp.sql
sncompare_fileinfo.sql
sncompare_oldmedia.sql

When each of the above repair scripts is executed, please redirect the output to a new file. Examine this output to determine if the repair script successfully executed. Do not proceed to the next repair script until all problems with the current repair script are resolved.

These two scripts can optionally be executed to update the database so the parent directory of moved files references their current location and not their stored location. Whether these are executed or not does not affect StorNext functionality, it is in fact an expected condition that the names in the database will be stale when files are moved. If executed then follow the same guidelines as described above.

sncompare_dirpath_moved.sql
sncompare_fileinfo_moved.sql

The other *.*sh* files are used to clean up the filesystem and they are optional to run and can be run at any time.

To correct the number of copies stored to tape run these two scripts in this order:

sncompare_dmutil.sh
sncompare_rtv.sh

The last file, *sncompare_rm.sh*, can be optionally run to remove old files from the filesystem.

LOGGING OUTPUT FILES

These files contain information about what types of entries were found and whether they were repairable or not.

Below is a list of each of these logfiles created and their contents. These are in the directory specified by the **-d** option.

sncompare_debug.txt
Contains debugging information that is enabled by specifying the **-D** option on the command line.

sncompare_log.txt
Contains various error and warning messages.

It also contains entries for unknown files whose state cannot be ascertained. No action is taken on these files. An example of this type of file is one with a non-zero key and copies but 0 size and 0 blocks.

Also included entries for 0-length files and pure sparse files found in the filesystem. These entries are okay, but not they are not stored on tape and cannot be recovered from the database via the **fsrecover**(1) command.

sncompare_summary.txt
Contains a summary of the number of errors/warnings from each test that was run. It also includes the arguments passed to **sncompare**(1) and start and end dates/times of each test.

QUICK TEST DESCRIPTIONS

These tests are run on all filesystems, i.e. all device_keys.

check_filecomp
Find all FILECOMP table entries without a corresponding FILEINFO table entry. There is no checking of the media state.

check_filecomp1
Runs a similar check as the check_filecomp but this will also check if the media associated with the file has had **fsrminfo**(1) run on them. If this is the case then the only way to fix is to remove the FILECOMP table entries.

check_filecomp2
Find FILECOMP entries without a corresponding MEDIADIR entry.

check_fileinfo
Find FILEINFO entries with a name like "KEY.*". This usually indicates the file was moved and modified while it was being stored. The name in the FILEINFO entry is not updated unless the user does a manual **fsstore**(1) on the file.

check_oldmedia
Find all entries in the OLDMEDIA table that do not have a corresponding entry in the MEDIADIR table. Removing these entries will allow **fsclean**(1) to run as not removing them will cause **fsclean**(1) to die reporting that it could not find the media in the mediadir table.

check_relpts
Check that all relation point directories found in the CLASSDIR table exist in the filesystems.

check_removed_files
Obtain a list of files that have been removed.

check_not_all_copies_made
Check all FILEINFO entries to ensure that all expected copies are stored. It will report either:

Not all copies are stored.
Too many copies are stored.

check_parent_keys
Find all FILEINFO table entries where the parent file_key is either 0 or is missing from DIRPATH table.

check_dmapi
Parses the TSM/internal/mapping_dirs files and prints the number of directories and files found.

check_media
Check all media found in the MEDIADIR table for the following conditions:

Media exists in MEDIACRITERIA table (MSM)
Media exists in MEDIA table (MSM)
Media exists in ARCHIVEMEDIA table (MSM)
MEDIA.locationstate = 1 (archive/vault)
MEDIA.currentarchiveid = ARCHIVEMEDIA.archiveid
MEDIA.status = MEDIACRITERIA.field2

filesystem_qt
Verifies whether all files found in the filesystem are in the database. The goal of this test is to be thorough, i.e. check all filesystem entries, but also run very quickly. The following algorithm is used:

Search for file_key of the parent directory in the DIRPATH table

Search for leaf name and parent file_key in the FILEINFO table

If either SQL query fails then an appropriate message is logged indicating an error was detected.

SNCOMPARE_SUMMARY.TXT FILE DESCRIPTION

Common Header Description

The beginning of the file contains the following information:

1. Starting date/time of the **sncompare**(1) run

2. StorNext release version
3. List of arguments

Below is an example:

```
Start time = Sat Jun 23 20:13:30 2012

sncompare, Version = 4.3.0(25782)
Arguments: -m /stornext/snfs1 -d /tmp/sncompare_4

**********************************************************************
**********************************************************************
```

DB and FS Test Summary Description

If either the **db** and/or the **fs** test is run, the format of this file is as follows:

```
**********************************************************************
*********         Checking database vs. filesystem         *********
**********************************************************************

  Total number of FILEINFO entries processed  = 698574
  Total number of files with dirpath errors   = 200
  Total number of files found in FS           = 698268
  Total number of files not found in FS       = 0
  Total number of removed files (ignored/ok)  = 2
  Total number of renamed files (ignored/ok)  = 1
  Total number of replaced files (ignored/ok) = 103

Intermediate time = Sat Jun 23 17:41:54 2012

**********************************************************************
*********         Checking filesystem vs. database         *********
**********************************************************************
  Total number of FS entries processed             = 700913
  Total number of files found in DB                = 698268
  Total number of files not found in DB            = 1
  Total number of files: parent missing            = 200
  Total number of files: filecomp records missing  = 1
  Total number of unknown files                    = 0
  Total number of non-stored files (ok)            = 0
  Total number of renamed files (ok)               = 103
  Total number of replaced files (ok)              = 0
  Total number of orphaned files (ok)              = 2
  Total number of zero length files (ok)           = 3
  Total number of subdirectories in FS (ignored)   = 773
  Total number of other entries in FS (ignored)    = 1562
  Total number of unmanaged directories in FS (ok) = 0

Intermediate time = Sat Jun 23 18:01:12 2012


End time = Sat Jun 23 18:01:12 2012
```

Object Storage Object IDs Test Summary Description

If the Object Storage Object IDs test is run, the format of this file contains:

```
*****************************************************************
********* Running Object Storage Objids Test for device_key:    1  *********
*****************************************************************
Start time = Tue Feb  5 19:18:35 2013

 Results for Object Storage Objids test:
=================================================================
Found 0 of 1409470 filesystem entries with errors


End time = Tue Feb  5 20:33:58 2013
```

Quick Tests Summary Description

If the quick tests are run, the format of this file is described below. The tests for each device_key (or mountpoint) starts with:

```
*****************************************************************
********* Running the Quick Tests for device_key:    1     *********
*****************************************************************
```

After this is a summary of the results of each quick test separated by a line of '*'. It also includes the start date/time of each quick test. Below is a portion of this output as an example.

```
Start time = Thu Feb  7 13:52:47 2013

 Results for check_dirpath() test:
=================================================================
Found 0 DIRPATH1 duplicate entries

*****************************************************************
 Start time = Thu Feb  7 13:52:47 2013

  Results for check_filecomp() test:
=================================================================
Found 0 FILECOMP1 entries with no FILEINFO1 entry

*****************************************************************
```

The last entries include the total number of errors, the total number of warnings detected by the quick tests, and finally the end date/time of the **sncompare**(1) run. For example:

```
*****************************************************************
*****************************************************************

Total Errors   = 7
Total Warnings = 0


End time = Sat Jun 23 14:14:41 2012
```

Quick Filesystem Test Summary Description

If the filesystem quick test, option **qf**, is run, the format of this file is shown below.

```
*****************************************************************
********* Running FS Quick Test for device_key:    1       *********
*****************************************************************
Start time = Thu Feb  7 13:52:56 2013
```

```
 Results for filesystem quick test:
=====================================================================
Found 2 managed directories
Found 0 unmanaged directories
Found 1 of 26 filesystem entries with errors


End time = Thu Feb  7 13:52:59 2013
```

SNCOMPARE_LOG.TXT FILE ERROR EXAMPLES

This logfile contains the following information for each test run:

Processes started and their status. When running in multi-processing mode, up to 8 child processes are run.

Log file for each process.

Errors and warnings detected by each test.

Each error entry is prefixed by one of the following strings:

[FX] Indicates the problem is fixable by running the repair scripts.

[NR] Indicates the problem is not fixable.

[OK] Indicates there is no problem to be repaired.

[RE] Indicates the problem is recoverable.

[UK] This indicates the cause of the problem is unknown. It is also unknown how to repair the problem.

Below are some example entries that could be logged in this logfile.

FILE_KEY NOT IN DB (1100): /stornext/snfs1/test/large1/popdir_1/popdir_1_1/popdir_1_1.1.090

Indicates the specified file does not have a FILEFINFO entry. Both the file_key, the number in the parentheses, and the full pathname of the file are included.

[RE] FILECOMP Records Not Found: '/stornext/snfs1/sncompare_testdir/managed/popdir_4/popdir_4_1/popdir_4_1.100.099'

Indicates the specified file does not have a FILECOMP entry.

[NR] Media Entry Not Found For File_Key 695339: ndx=999999, gen=0, classndx=7

Indicates the media entry for the specified file_key does not exist in the MEDIADIR table. The mediandx, medgen, and classndx of the missing media are included.

MediaId 000010 status mismatch (A / N)

This indicates that the MSM and TSM status, whether the media is available for use or not, is different. The first letter is the TSM status: A - available, U - unavailable. The second letter is the MSM status: Y - available , N - not available.

Exceeded maximum recursion level: process_fs(51, /stornext/snfs3/dirA_0/dirB_0/dirA_1/dirB_1/dirA_2/dirB_2/dirA_3/dirB_3/dirA_4/dirB_4/dirA_5/dirB_5/dirA_6/dirB_6/dirA_7/dirB_7/dirA_8/dirB_8/dirA_9/dirB_9/dirA_10/dirB_10/dirA_11/dirB_11/dirA_12/dirB_12/dirA_13/dirB_13/dirA_14/dirB_14/dirA_15/dirB_15/dirA_16/dirB_16/dirA_17/dirB_17/dirA_18/dirB_18/dirA_19/dirB_19/dirA_20/dirB_20/dirA_21/dirB_21/dirA_22/dirB_22/dirA_23/dirB_23/dirA_24/dirB_24/dirA_25/dirB_25)

This indicates that the maximum recursion level was exceeded. The first value is the current recursion level and the second value is the directory pathname that exceeded the recursion threshold.

Maximum pathname length of 1024 characters exceeded in 'fs' test: /stornext/snfs3/dirA_0/dirB_0/dirA_1/dirB_1/dirA_2/dirB_2/dirA_3/dirB_3/dirA_4/dirB_4/dirA_5/dirB_5/dirA_6/dirB_6/dirA_7/dirB_7/dirA_8/dirB_8/dirA_9/dirB_9/dirA_10/dirB_10/dirA_11/dirB_11/dirA_12/dirB_12/di-

rA_13/dirB_13/dirA_14/dirB_14/dirA_15/dirB_15/dirA_16/dirB_16/dirA_17/dirB_17/dirA_18/dirB_18/dirA_19/dirB_19/dirA_20/dirB_20/dirA_21/dirB_21/dirA_22/dirB_22/dirA_23/dirB_23/dirA_24/dirB_24/dirA_25/dirB_25/dirA_26/dirB_26/dirA_27/dirB_27/dirA_28/dirB_28/dirA_29/dirB_29/dirA_30/dirB_30/dirA_31/dirB_31/dirA_32/dirB_32/dirA_33/dirB_33/dirA_34/dirB_34/dirA_35/dirB_35/dirA_36/dirB_36/dirA_37/dirB_37/dirA_38/dirB_38/dirA_39/dirB_39/dirA_40/dirB_40/dirA_41/dirB_41/dirA_42/dirB_42/dirA_43/dirB_43/dirA_44/dirB_44/dirA_45/dirB_45/dirA_46/dirB_46/dirA_47/dirB_47/dirA_48/dirB_48/dirA_49/dirB_49/dirA_50/dirB_50/dirA_51/dirB_51/dirA_52/dirB_52/dirA_53/dirB_53/dirA_54/dirB_54/dirA_55/dirB_55/dirA_56/dirB_56/dirA_57/dirB_57/dirA_58/dirB_58/dirA_59/dirB_59/dirA_60/dirB_60/dirA_61/dirB_61/dirA_62/dirB_62/dirA_63/dirB_63/dirA_64 [recursion=127]

This indicates that the maximum pathname length of 1024 characters has been exceeded. The pathname that exceeded the limit is included.

[OK] ORPHAN/HLINK File Found: '/stornext/snfs1/tape/testfile_10'
Database File(good): /stornext/snfs1/tape/testfile_11

Indicates a hard link was found. The link pathname is listed on the first line. The pathname to which it is linked is listed on the second line.

[RE] PARENT NOT FOUND: file_key/pfile_key=691361/690877, name=popdir_1_1_3.100.041

[FX] PARENT NOT IN DB: '/stornext/snfs1/sncompare_testdir/managed/popdir_2/popdir_2_2/popdir_2_2.100.002'

This indicates the parent was not found in the DIRPATH table.

Relpt not found in dirpath1 table: 915117

An entry like the following indicates a relationship that contains no files. The number is the file_key of the non-existent directory and can be used to retrieve the entry from the CLASSDIR database table.

[RE] RENAMED File Found: '/stornext/snfs1/sncompare_testdir/managed/popdir_2/popdir_2_3/temp/popdir_2_3_1/popdir_2_3_1.100.003'

[RE] REPLACED File Found: '/stornext/snfs1/sncompare_testdir/managed/popdir_3/popdir_3_1/popdir_3_1_2/popdir_3_1_1.100.007.moved'

Report FS Disk/Truncation Space:

Reports the total disk space used by all files verified in the **db** test. It also reports the total disk space that has been truncated. This report is present only if the **-t** option is specified.

Below is an example of the disk/truncation space report in the *sncompare_summary.txt file.*

```
Report FS Disk/Truncation Space:

  Total file disk space on FS = 1.40e+02MB
  Total file space truncated  = 1.14e+00MB
```

[OK] Pure Sparse File: '/stornext/snfs1/sncompare_testdir/managed/sparse/sparse_file'

Indicates the file is a pure sparse file. A sparse file is one that marks empty blocks, i.e. containing nothing, in the file's metadata rather than allocating disk blocks. A "pure" sparse file is on that is totally empty, and has no allocated disk blocks.

[OK] 0-Length File: '/stornext/snfs1/large3/lg3_1/stornextgui.log'

Indicates the file is a 0-length file, i.e. a file using 0 bytes of disk space. Examples of this file type include a soft link or a file created by the **touch** command. No action is required.

WARNINGS

This utility should be used carefully and only under the guidance of Quantum technical support.

SEE ALSO

fsclean(1), **fsrecover**(1), **fsretrieve**(1), **fsrminfo**(1), **fsstore**(1)

NAME

snmsm − Activates or terminates the Media Manager software and activates the system log display.

SYNOPSIS

snmsm [**-s**|**-q**|**-t**]

DESCRIPTION

The **snmsm**(l) command is issued from the command line to start or terminate the Media Manager software.

OPTIONS

-s Starts the Media Manager software in the single user mode. Only commands issued via **vsadm**(l) are executed. Client interface commands are refused.

-d Redisplays the Media Manager syslog consoles after the workstations are logged out and then logged back on.

-q Quits the Media Manager operations. The Media Manager software terminates immediately.

-t Terminates the Media Manager operations. The Media Manager software terminates gracefully. Outstanding commands are cancelled and any commands awaiting status are allowed to complete (within a certain time period).

EXIT STATUS

0 Command completed successfully - The Media Manager software started or completed normally.

1 Command did not complete successfully - The Media Manager software did not start or complete as expected.

EXAMPLES

Successful Media Manager system start-up.

snmsm

Requests the Media Manager software to start.

Output returned:

```
Media Manager Version 4.2.0 for Linux (Kernel:2618 OS:RHEL5) -- Copyright (C)   1

Initiating Media Manager software start up

Setup environment variables ok

Starting up process server .... Done

Process server started ok

Starting up Media Manager server processes ..... Done

Server processes started ok

Starting up Media Manager system processes .....Done

System processes started ok

Media Manager software start up completed
```

SEE ALSO

vsadm(l)

NAME

snnas_usage − Produce a report of tertiary storage usage per-share per-user

SYNOPSIS

snnas_usage

DESCRIPTION

The **snnas_usage** program calls the **snnas_usage_engine** program for each StorNext managed file-system device to create a report file of tertiary storage usage per-share per-user for each file system. It automatically generates the input files per file system.

The SNNAS feature must be configured to run on both MDCs in HA mode. Other configurations, including SNNAS Gateways, are not supported by this program because it cannot access those SNNAS servers to collect the necessary share path information.

Share paths must be unique across share names and must not be nested. When duplicate or nested paths occur, a warning is printed and these paths are discarded in a consistent manner for the purposes of reporting usage.

Each file-system device has an output file in comma-separated-values format (CSV) with the following path name:

```
/var/shareUsageReports/<timestamp>/<mount name>/<mount name>_<timestamp>
```

For example:

```
/var/shareUsageReports/20151217111117/stornext_snfs1/stornext_snfs1_2015121711111
```

The output files from previous runs may be on either MDC since the path is not on a shared file system.

The CSV output file is suitable for importing into a spreadsheet where a pivot-table function can be used to sum the total space per user ID or per share. The columns of the CSV output file are as follows:

```
Path Name, Share Name, Numeric User ID, Size in Bytes
```

The digits of the timestamp are: year(4), month(2), day(2), hour(2), minute(2), second(2).

Note: Location information for a copy is recorded when the copy is made. When a file's location is changed to a different share, the **snnas_usage** report will continue to report the file's usage in the original share until the file is changed and a new copy is made. This discrepancy can be viewed with the **fsfileinfo** command in its *Stored Name* field.

FILES

/usr/local/quantum/etc/brand.txt
File contains the *controller.port* value for configuring the TCP/IP port of the SNNAS controller.

SEE ALSO

snnas_usage_engine(1) **fsfileinfo**(1)

NAME

snnas_usage_engine − Process data for a tertiary-storage usage report

SYNOPSIS

snnas_usage_engine [**-dh**] **-f** *join_table_file* **-m** *mount_path* **-o** *output_file* **-p** *dirpath_file*
-s *JSON_shares_file*

DESCRIPTION

The **snnas_usage_engine** program generates a comma-separated-values (CSV) report of tertiary-storage usage per-share per-user for one file system. It is intended to be called by the **snnas_usage** script, which generates the input files per file system.

Share paths must be unique across share names and must not be nested. When duplicate or nested paths occur, a warning is printed and these paths are discarded in a consistent manner for the purposes of reporting usage.

OPTIONS

-d Debug mode. This generates information per share and per file, so the information can be very large on production systems.

−f *join_table_file*
CSV file with the results of joining the fileinfo and filecomp tables for one device. The columns are: parent file key, file key, numerical UID, size in bytes for one segment. There is no header row.

-h Displays the usage of the command.

−m *mount_path*
Path of the mount point for one device. The mount path must not end with a slash (/).

−o *output_file*
CSV report of tertiary storage usage per-share per-user for one file system. The columns are: share pathname, share name, numerical user ID, size in bytes. There is no header row. The size is bytes of non-compressed data, so the value may need to be prorated for storage destinations that use compression. Alternatively, the charge-back rate could simply be scaled to reflect the cost of compressed storage. The non-share storage used for the device is accumulated into a pseudo share with path name *non-share files*, and name *non-share files*.

−p *dirpath_file*
CSV rows of the dirpath table for one device. The columns are: parent file key, path below the mount point. There is no header row.

−s *JSON_shares_file*
JSON formatted report of the configured shares from the SNNAS server.

EXIT VALUES

Returns zero on success and non-zero on failure.

SEE ALSO

snnas_usage(1)

NAME

snrestore − Restore elements of SNSM system.

SYNOPSIS

snrestore [**-h**] [**-e**] [**-r** *extract_dir*] [**-p** *temp_path*] [**-m** [*file_system_name*]] [**-d**] [**-c**] [**-a** *serverauth*]
[[**-U** *username* **-P** *password*] | [**-I** *QCAI* **-K** *QCPK*] | [**-A** *CAP_agency* **-M** *CAP_mission*]]
[**-S** *signingtype*] [**-Y** *authenticationtype*] [**-N** *role*] [**-O** *storageclass*] [**-Z** *authentication_endpoint*]
[**-H** *CAP_hostport*] [**-C** *certfile* | **-R** *certpath*] [**-L** *clientcertfile*] [**-k** *clientkeyfile*] [**-w** *clientkeypass*]

DESCRIPTION

This command is used to restore elements of SNSM or snpolicy on backup media. Configuration information, database information, and file system metadata can be restored through this utility. Each one of the three elements of a restore package can be restored individually or all together. If a backup manifest file is present on the system, information about known backups are displayed by the utility. The user specifies the backup identifier and supplies the media required for the restore. These two pieces of information are supplied by the backup manifest or the backup email notification. All required media must be present to be able to restore the system. snpolicy supports Lattus devices only.

The first part of the restore process involves retrieving the archived backup files from media. The retrieved backup files are stored in a directory specified by the **-p** option or in the default directory. The default is /usr/adic/TSM/tmp. Only selected files are retrieved from media. The **-r** option specifies a directory which contains backup files. If this option is specified, file retrieval is skipped and the restore process uses the files present in the directory specified. The **-e** option allows the user to only extract backup files from media without following through with the rest of the restore processing. The files are stored in the temporary directory or the directory specified by the **-p** option.

The user can select specific components they are interested in. The **-c** option selects configuration information. The **-d** option specifies the database component. The **-m** option selects the file system metadata. A specific file system can be specified by providing the optional file system name.

The user will be queried for different pieces of information during the restore. The user will first be queried for the backup identifier. This backup identifier will be used to select files from the tape device, storage disk or Object Storage media. The user will also be queried for the copy number. In addition, the user will be queried for a scsi device path, storage disk path or Object Storage URL.

Once files have been retrieved, they can be processed. The system software is shut down and the specified components are restored. In HA environments, the HaShared file system needs to be mounted prior to restoring components. Configuration information is restored for each of the specified software components. The database is restored from the most recent backup associated with the backup identifier. File system metadata is restored to disk and the previous metadata file is archived. Once restore processing is complete, the software remains shut down. Manual intervention is needed to complete the restore process and to bring the system software online.

OPTIONS

-p *temporary_path*
: Specifies a temporary storage directory for retrieved files. The default is /usr/adic/TSM/tmp. If used in conjunction with the **-r** option, *temporary_path* is used as a temporary directory in which to expand and rebuild/merge the files required for the restore step.

-e
: Extract backup files to a temporary directory. No further processing is done. The files are retrieved from the media and stored in the temporary storage area.

-r *restore_directory_path*
: Uses files contained with this directory for the restore process. No files are retrieved from media.

-c
: Restore all software configuration information. In HA environments, the HaShared file system must be mounted.

-d
: Restore database to /usr/adic/mysql/db. In HA environments, /usr/adic/mysql/db is a symbolic link to /usr/adic/HAM/shared/mysql/db, and requires that the HaShared file system is mounted.

-m [*file_system_name*]

Restores file system metadata information for all file systems or the selected optional file system. The metadata files are restored to the /usr/adic/database/metadumps directory. In HA environments, /usr/adic/database/metadumps is a symbolic link to /usr/adic/HAM/shared/database/metadumps, and requires that the HaShared file system is mounted.

-mj [*file_system_name*]

DEPRECATED: Previously this option would restore file system metadata journals for all file systems or the optional selected file system name.

-a *serverauth*

The SSL certificate authentication mode to use when retrieving from Object Storage media. **0** indicates that no SSL certificate validation is to be done. **1** indicates to check only the peer. **2** is the default operation and indicates that both the host and peer are to be validated.

-C *cacert*

SSL certificate to use with HTTPS restore from Object Storage media.

-R *capath*

Directory of SSL certificates as prepared by **c_rehash** to use with HTTPS restore from Object Storage media.

-L *clientcertfile*

The location of the X.509 client certificate installed on the system for the CAP server to authenticate. Note that the certificate should be in PEM format and is required for CAP authentication.

-k *clientkeyfile*

Specifies the location of the client private key. This option is required for CAP authentication if the client private key is kept in a separate file rather than included as part of the X.509 client certificate file.

-w *clientkeypass*

Client private key passphrase. This is required if the private key is protected by a passphrase.

-U *username* **-P** *password*

Username and password to access the URL if necessary. These are required if the Object Storage media is using S3 or Azure Blob REST API from the following providers:

AWS (standard and STS)
AZURE
IBM:CLEVERSAFE
LATTUS
NETAPP:WEBSCALE
SCALITY:RING

-I *QCAI* **-K** *QCPK*

QCAI and **QCPK** are for devices from providers QCV1 and QVV1. **QCAI** (Q-Cloud Access Identifier) and **QCPK** (Q-Cloud Product Key) were provided to the user or system administrator when the Q-Cloud product was purchased. These are required for Q-Cloud Object Storage media.

-A *CAP_agency* **-M** *CAP_mission*

The agency and mission associated with the target C2S account. These options are valid only for the CAP authentication type.

-Y *authentication_type*

An authentication type is required for all Object Storage media except for AXR. The following authentication types are supported:

STANDARD
STS_PUBLIC
STS_GOVCLOUD
CAP

If this option is not specified, the authentication type will be set to **STANDARD**.

The **STANDARD** type applies to all media and authenticates with a user name and password for Object Storage access. For S3 compatible media the user name and password are the Access Key Id and Secret Access Key. For Azure media, the user name and password are the Storage Account Name and Storage Access Key.

The **STS_PUBLIC** type uses the AWS Security Token Service (STS) to obtain temporary credentials for access to Object Storage in the AWS public cloud. This authentication type applies only to AWS media and requires a role, username and password be specified.

The **STS_GOVCLOUD** type uses the AWS Security Token Service (STS) to obtain temporary credentials for access to Object Storage in the AWS GovCloud. This authentication type applies only to AWS media and requires a role, username and password be specified.

The **CAP** type uses the AWS Commercial Cloud Services (C2S) Access Portal (CAP) to obtain temporary credentials for access to Object Storage in the AWS Private Cloud for the Federal Government. This authentication type applies only to AWS media and requires a role, CAP mission, and CAP agency be specified.

-N *role* For **STS_PUBLIC** and **STS_GOVCLOUD** authentication, use the Amazon Resource Name (ARN) of the role to assume. For **CAP** authentication, use the Identity and Access Management (IAM) role associated with the target C2S account. A role is required by AWS STS and the CAP servers to obtain temporary credentials. This option is valid only with the **STS_PUBLIC**, **STS_GOVCLOUD**, and **CAP** authentication types.

-S *signing_type*

Used to specify the signing type for the requests sent to the Object Storage and/or authentication server. The following signing types are supported:

V2
V4
AZURE

The default is **V4** for AWS, Q-Cloud, Cleversafe and Webscale media, **V2** for other S3 compatible media and **AZURE** for Azure media. This option is not valid for AXR media. To be able to configure V4, both AWS full payload and chunked uploading for V4 signing should be supported by the Object Storage server.

-O *storageclass*

Defines the storage class for AWS and Azure media only. The following storage classes are supported:

standard
standard_ia
glacier
azure_append_blob

standard specifies the AWS Standard storage class, **standard_ia** the AWS Standard - Infrequent Access storage class, **glacier** the AWS Glacier storage class and **azure_append_blob** the Azure Append Blob storage class.

By default, this is set to **standard** for all AWS and Q-Cloud Archive media, **glacier** for Q-Cloud Vault media, and **azure_append_blob** for Azure media.

-H *CAP_hostport*

Specifies the connection endpoint for the CAP server.

-Z *authentication_endpoint*

Specifies an authentication endpoint which overrides the default endpoint for the public or GovCloud STS server. This option is valid only with the **STS_PUBLIC** and **STS_GOVCLOUD** authentication types.

-h help option shows usage

EXIT STATUS

0 when successful and 1 after any failure.

EXAMPLES

Restore all components from backup located on tape media

```
snrestore
```

Restore database from backup located on tape media and use /tmp as the temporary directory

```
snrestore -d -p /tmp
```

Restore from backup files located in the /backup directory

```
snrestore -r /backup
```

Restore configuration components

```
snrestore -c
```

Restore file system data for snfs1 file system

```
snrestore -m snfs1
```

Extract backups to a working directory, and restore from the working directory using a separate temporary directory for backup file expansion and merge.

```
mkdir /home/ejr/dump.test
snrestore -e -p /home/ejr/dump.test
mkdir /tmp/dump.work
snrestore -r /home/ejr/dump.test -p /tmp/dump.work
```

FILES

/usr/adic/TSM/internal/status_dir/snbackup_manifest
/usr/adic/TSM/internal/status_dir/device_manifest
/usr/adic/TSM/internal/status_dir/snobjs_manifest
/usr/adic/mysql/snbackup_manifest
/usr/adic/mysql/device_manifest
/usr/adic/mysql/snobjs_manifest

SEE ALSO

snbackup(1), **snbkpreport**(1)

NAME

sntsm − Activate or terminate Tertiary Manager software.

SYNOPSIS

sntsm

sntsm -c [**-y**]

sntsm -t [**force**] [**-y**]

sntsm -s

sntsm -l [**-v**] [**-F** *type*] *feature*

DESCRIPTION

The **sntsm** command activates or terminates the Tertiary Manager software. This command can also be used to provide license information for features related to the Tertiary Manager software.

OPTIONS

-c Initiates a contingency start of the Tertiary Manager software. This is recommended after an abnormal shutdown of the software. A contingency start reinitializes a subset of the Tertiary Manager system parameters and removes recovery processing files. A contingency start allows the Tertiary Manager software to return to a quiescent processing state when a normal start fails to do so.

-t force Initiates a graceful termination of the Tertiary Manager software. The Tertiary Manager software completes all requests that are currently being processed and rejects any requests received after the system termination request. If "force" arguement is given, a force termination is initiated.

-y Answers yes to all command prompts.

-s This option indicates if startup of the Tertiary Manager software is allowed based on the current state of licenses.

-l Display the status of a feature license. Valid feature types: **manager**, **snsm_capacity**, **vaulting**, **sdisk**, **ddm**, **maintenance**, **archive_conv**, **object_storage**, and **altstore.**

-v Display additional information about a feature license.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default) or **JSON**.

TEXT is the "legacy" textual format.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application. See http://json.org for more information.

LICENSE EXPIRATION

When one license expires, access to all licensed features is suspended with the exception of the "snsm_capacity", "maintenance" and "proxy" licenses. The **-l** option together with the **-v** option can be used to determine the expiration date of the feature and the expiration date of all the licenses as a group. The "License expiration" is when the feature will become unusable due to one or more licenses expiring and is derived from the contents of the entire license file. The "Actual expiration" is when the feature will become unusable if there are no other expired licenses and is decoded from the license string for that feature.

Note: It is invalid to mix expiring licenses with non-expiring licenses with the exception of the "snsm_capacity", "maintenance" and "proxy" licenses.

EXIT STATUS

Exit codes for the **sntsm**(1) command with the **-l** option are:

0 Feature is licensed and usable

1 Feature not licensed but not in use

2 Current feature capacity undetermined but feature not in use

3 Feature has no license string in the license file

4 Feature has a license but the expiration date has been reached

5 Feature has a license but the capacity has been reached

6 Feature has a license but the current capacity could not be determined

7 Feature license status could not be determined

8 Invalid mixture of temporary and permanent licenses detected

EXAMPLES

When the command is used with the **-l** option license info for the indicated Tertiary Manager feature is reported. The **-v** option can be added to increase the info reported. Note that if license status cannot be determined for a feature it is treated as NOT licensed. Also note some features have an associated capacity and some do not.
Some examples:

Feature **manager** is properly licensed for 12 terabytes and has no expiration:

```
% sntsm -l manager
- The manager license status is: Good

% sntsm -l -v manager
- Found existing license: manager
- License expiration:     None
- Actual expiration:      None
- Licensed capacity:      10T
- Current used capacity:  3T
  - Current Tape used capacity:  2T
  - Current storage disk used capacity:  1T
- The manager license status is: Good
```

Feature **snsm_manager** is properly licensed for 10 terabytes and has expiration:

```
% sntsm -l snsm_capacity
- The manager license status is: Good

% sntsm -l -v sntsm_capacity
- Found existing license: snsm_capacity
- License expiration:     Wed Oct 12 23:59:59 2016
- Actual expiration:      Wed Oct 12 23:59:59 2016
- Licensed capacity:      10T
- Current used capacity:  3T
  - Current tape used capacity:  2T
  - Current storage disk used capacity:  1T
  - Current object storage used capacity:  0
- The snsm_capacity license status is: Good
- The manager license status is: Good
```

Feature **sdisk** is properly licensed and has no expiration:

```
% sntsm -l sdisk
- The sdisk license status is: Good

% sntsm -l -v sdisk
```

```
- Found existing license: sdisk
- License expiration:     None
- Actual expiration:      None
- The sdisk license status is: Good
```

Feature **sdisk** is not properly licensed, no license string in the license file:

```
% sntsm -l sdisk
- The sdisk license status is: License Missing

% sntsm -l -v sdisk
- The sdisk license status is: License Missing
```

Feature **manager** has a valid license but the capacity has been reached:

```
% sntsm -l manager
- The manager license status is: Over Capacity

% sntsm -l -v manager
- Found existing license: manager
- License expiration:     None
- Actual expiration:      None
- Licensed capacity:      12T
- Current used capacity:  13T
  - Current Tape used capacity:  10T
  - Current storage disk used capacity:  3T
- The manager license status is: Over Capacity
```

Feature **ddm** has a valid license but the capacity could not be determined:

```
% sntsm -l ddm
- The ddm license status is: Capacity Undetermined

% sntsm -l -v ddm
- Found existing license: ddm
- License expiration:     None
- Actual expiration:      None
- Licensed capacity:      3 clients
- Current used capacity:  UNKNOWN
- The ddm license status is: Capacity Undetermined
```

Feature **vaulting** has a license but it has expired:

```
% sntsm -l vaulting
- The vaulting license status is: Expired

% sntsm -l -v vaulting
- Found existing license: vaulting
- License expiration:     Thu Jan  1 23:59:59 2009
- Actual expiration:      Thu Jan  1 23:59:59 2009
- The vaulting license status is: Expired
```

Feature **archive_conv** has a valid license but the usage could not be determined:

```
% sntsm -l archive_conv
- The archive_conv license status is: Unused
```

Feature **object_storage** has a valid license that has not expired yet:

```
% sntsm -l object_storage
- The object_storage license status is: Good

% sntsm -l -v object_storage
- Found existing license: object_storage
- License expiration:     Fri Nov  9 23:59:59 2012
- Actual expiration:      Fri Nov  9 23:59:59 2012
- Licensed capacity:      12T
- Current used capacity:  2T
- The object_storage license status is: Good
```

Feature **manager** has a valid license that does not expire but there is a license for feature **ddm** that expires. This is an invalid combination of expiring and non-expiring licenses:

```
% sntsm -l manager
- Having both permanent and temporary licenses is not allowed
  (except for 'maintenance' and DLAN 'proxy' licenses).

% sntsm -l -v manager
- Found existing license: manager
- License expiration:     Jan  1 23:59:59 2009
- Actual expiration:      None
- Licensed capacity:      10T
- Current used capacity:  5T
  - Current Tape used capacity:  3T
  - Current storage disk used capacity:  2T
- Having both permanent and temporary licenses is not allowed
  (except for 'maintenance' and DLAN 'proxy' licenses).

% sntsm -l sdisk
- Having both permanent and temporary licenses is not allowed
  (except for 'maintenance' and DLAN 'proxy' licenses).

% sntsm -l -v sdisk
- Found existing license: sdisk
- License expiration:     Jan  1 23:59:59 2009
- Actual expiration:      Jan  1 23:59:59 2009
- Having both permanent and temporary licenses is not allowed
  (except for 'maintenance' and DLAN 'proxy' licenses).
```

Display **snsm_capacity** licenses in JSON.

```
% sntsm -l -v -FJSON snsm_capacity
{
    "header": {
      "commandName": "sntsm",
      "commandLine": "sntsm -l -v -FJSON snsm_capacity",
      "commandDescription": "Storage Manager license information",
      "localDateISO": "2016-09-12T20:21:31",
      "localDate": "2016-09-12",
      "localTime": "20:21:31",
      "localDayOfWeek": 1,
      "gmtDateISO": "2016-09-13T01:21:31Z",
      "gmtDate": "2016-09-13",
      "gmtTime": "01:21:31",
      "gmtDayOfWeek": 1
```

```
            },
            "license": [
              {
                  "name": "snsm_capacity",
                  "expiration": "Wed Oct 19 23:59:59 2016",
                  "actual-expiration": "Wed Oct 19 23:59:59 2016",
                  "capacity": 10995116277760,
                  "cur-used-capacity": 0,
                  "cur-tape-capacity": 0,
                  "cur-sdisk-capacity": 0,
                  "cur-objstorage-capacity": 0,
                  "status": 0
              }
            ],
            "footer": {
              "returnCode": 0,
              "localDateISOEnd": "2016-09-12T20:21:31",
              "localDateEnd": "2016-09-12",
              "localTimeEnd": "20:21:31",
              "localDayOfWeekEnd": 1,
              "gmtDateISOEnd": "2016-09-13T01:21:31Z",
              "gmtDateEnd": "2016-09-13",
              "gmtTimeEnd": "01:21:31",
              "gmtDayOfWeekEnd": 1,
              "elapsedTimeInSeconds": "0.0000"
            }
        }
```


SEE ALSO

fsconfig(1), **snlicense**(8)

NAME

vsarchiveconfig − Configures an archive for the Media Manager system.

SYNOPSIS

vsarchiveconfig -a stage -n *arch_name* **-o** *arch_mode*
-m *medtype˜#bin...*
-k *medtype˜actionmode...* [**-w** *medtype˜low^high...*]

vsarchiveconfig -a das|dadas -n *arch_name* **-o** *arch_mode* **-T** *Das_Server* [**-N** *Das_Client*]
[**-m** *medtype˜#bin...*] [**-e** *medtype˜eifId...*]
[**-k** *medtype˜actionmode...*] [**-w** *medtype˜low^high...*]
[**-i** *medtype˜mediaclass...*] [**-c** *medtype...*]

vsarchiveconfig -a scsi -n *arch_name* **-o** *arch_mode* **-T** *scsi_device*
[**-m** *medtype˜#bin...*] [**-e** *medtype˜eifId...*]
[**-k** *medtype˜actionmode...*] [**-w** *medtype˜low^high...*]
[**-i** *medtype˜mediaclass...*] [**-c** *medtype...*]

vsarchiveconfig -a acsls -s *acs_num* **-n** *arch_name* **-o** *arch_mode* **-T** *acsls_Server*
[**-k** *medtype˜actionmode...*] [**-w** *medtype˜low^high...*]
[**-i** *medtype˜mediaclass...*] [**-c** *medtype...*]

vsarchiveconfig -u stage -n *arch_name* [**-p** *new_arch_name*] [**-o** *arch_mode*]
[**-m** *medtype˜#bin...*]
[**-k** *medtype˜actionmode...*] [**-w** *medtype˜low^high...*] [**-x** *medtype...*]

vsarchiveconfig -u das|dadas -n *arch_name* [**-p** *new_arch_name*] [**-o** *arch_mode*] [**-T** *Das_Server*]
[**-N** *Das_Client*]
[**-m** *medtype˜#bin...*] [**-e** *medtype˜eifId...*]
[**-k** *medtype˜actionmode...*] [**-w** *medtype˜low^high...*]
[**-i** *medtype˜mediaclass...*] [**-c** *medtype...*]

vsarchiveconfig -u scsi -n *arch_name* [**-p** *new_arch_name*] [**-o** *arch_mode*] [**-T** *scsi_device*]
[**-m** *medtype˜#bin...*] [**-e** *medtype˜eifId...*]
[**-k** *medtype˜actionmode...*] [**-w** *medtype˜low^high...*]
[**-i** *medtype˜mediaclass...*] [**-c** *medtype...*]

vsarchiveconfig -u acsls -n *arch_name* [**-p** *new_arch_name*] [**-o** *arch_mode*] [**-T** *acsls_Server*]
[**-k** *medtype˜actionmode...*] [**-w** *medtype˜low^high...*]
[**-i** *medtype˜mediaclass...*] [**-c** *medtype...*]

vsarchiveconfig -d *arch_type* **-n** *arch_name* [**-F** *media_actionstate*]

DESCRIPTION

vsarchiveconfig(l) is issued from the command line to request execution of the Media Manager Archive Configure command. The Media Manager software must be active in order to run this command.

In order to use an archive many actions must be performed. First the archive must configured with this command, then media classes created and associated with the archive, then drives configured and associated with the archive, and finally media added to the archive.

OPTIONS

arch_type

valid archive types are:
- stage (vault archive)
- das
- dadas (Dual Aisle DAS)
- scsi
- acsls

-a *arch_type*
This will add an archive of the specified type.

-u *arch_type*
The update option allows an archive of the specified type to be reconfigured. When updating the archive configuration the archive will become unavailable until the update is complete. This option will result in the software processes that are unique to the specified archive to be restarted.

-d *arch_type*
This will delete an archive of the specified type. By default, an archive can only be deleted when there are no media associated with it. However, it can also be removed if media are contained in it. The ability to delete an archive with media in it depends on the value of the DELETE_ARCHIVE_WITH_MEDIA environment variable. When set to **N**, any archive containing media can not be deleted. When set to **Y**, the value of the DELETE_ARCHIVE_MEDIA_ACTIONSTATE environment variable determines how media are to be handled when a populated archive is deleted. These variables can be adjusted in the */usr/adic/MSM/config/envvar.config* file. The **-F** option can also be used as an alternative to the environment variables.

-n *arch_name*
This is the unique user defined name for the archive. Valid archive names may contain up to 16 characters, including spaces. Leading and trailing spaces are not permitted.

-p *new_arch_name*
This is the new unique user defined name to use for the archive. Valid names may contain up to 16 characters, including spaces. Leading and trailing spaces are not permitted.

-o *arch_mode*
The archive mode parameter indicates whether a human is available to perform media enter and eject operations for the archive. There are two archive mode settings:
a - attended
n - unattended
This option impacts the behavior of those commands that require human intervention. These are the Check-out Media, Export Media, Move Media, and (sometimes) Mount Media commands.

-s *acs_num*
For **acsls** type archives only. The ACSLS server's acs number of the library being configured. This number cannot be modified once set.

-T *scsi_device* | *acsls_Server* | *Das_Server*
For **scsi** archive types this is the scsi device name for the archive. Note that it is just the device name and not the complete path. For example: *sg123*
For **acsls** archive types this is the IP address of the ACSLS server.
For **das** and **dadas** archive types this is the host name of the DAS server.

-N *Das_Client*
This is the client name for the corresponding DAS server host. For **das** and **dadas** type archives only.

-m *medtype˜#bin*[,*medtype˜#bin*]...
This indicates the number of bins available for the specified media types. This is required for **stage** archive types. For other archive types it can be computed automatically. Multiple media type/bin values can be specified when separated with a comma and no embedded spaces are used.

-e *medtype˜eifId*[,*medtype˜eifId*]...
This specifies the eject/insert facility identifier for each media type. This option usually does not need to be specified. Multiple media type/eifId values can be specified when separated with a comma and no embedded spaces are used.

-k *medtype˜actionmode*[,*medtype˜actionmode*]...
The action mode parameter specifies what action, if any, that is initiated when the number of media of the specified media type reaches the calculated high mark threshold or drops to the calculat-

ed low mark threshold. The possible action mode values are:

o - none. This mode indicates no action is be initiated and is the typical setting.

n - notify. The mode will generate a notification to the system syslog.

Multiple media type/action mode values can be specified when separated with a comma and no embedded spaces are used.

-w *medtype~low^high*[,*medtype~low^high*]...

This specifies the low and high watermark parameters for the specified media types. The action performed when watermark thresholds have been hit is defined by the **-k** option. Multiple media type/watermark values can be specified when separated with a comma and no embedded spaces are used. The watermark values are a number between 0 and 100. The low watermark must be less than the high watermark. These values default to 0 when not specified.

-i *medtype~mediaclass*[,*medtype~mediaclass*]...

This enables the automatic import capability for the specified media types. When the Audit command detects the physical presence of media that are unknown to Media Manager, then the media are automatically assigned to the specified mediaclass. Multiple media type/media class values can be specified when separated with a comma and no embedded spaces are used.

-c *medtype*[,*medtype*]...

This enables the automatic check-in capability for the specified media types. This applies to media that have been checked out with Check Out command. There are two operations that can detect the physical presence of checked-out media: the Audit and Enter commands. When the Audit or Enter commands detect the physical presence of media that are checked-out, then the media are automatically checked-in and remain assigned to the mediaclass which they were associated when they were checked-out. Multiple media type values can be specified when separated with a comma and no embedded spaces are used.

-x *medtype*[,*medtype*]...

This specifies the media types to remove from the archive. It is only valid for **stage** archive types. The specified media type can only be removed if there are no archive media classes for the media type associated with the archive. The media class associations can be viewed by using the **-c** option with the Archive Query command. Multiple media type values can be specified when separated with a comma and no embedded spaces are used.

-F *media_actionstate*

This will allow an archive to be deleted when it contains media. It has the same effect as if the DELETE_ARCHIVE_WITH_MEDIA environment variable is set to **Y**. The media action state value determines how the media are treated and behaves just like the DELETE_ARCHIVE_MEDIA_ACTIONSTATE environment variable. The possible **media_actionstate** values are:

i - intransit. This puts media into the intransit state.

e - export. This will cause media to be exported.

EXIT STATUS

0 The command is successfully processed.

255 An error is detected by either the CLI software or the API software.

>0 and <255

The returned exit status corresponds to the error detected by the Media Manager software.

EXAMPLES

Create an attended SCSI archive called lib1 that has a device path of /dev/sg5, supports LTO and LTO Worm media, and will import media into the LTO_ADDBLANK and LTOW_ADDBLANK media classes.

vsarchiveconfig -a scsi **-n** lib1 **-o** a **-T** /dev/sg5 **-k** LTO~o,LTOW~o **-i** LTO~F0_LTO_ADDBLANK,LTOW~F0_LTOW_ADDBLANK

Create an attended ACSLS archive called liba that uses an ACSLS server located at 10.20.230.123, supports LTO and LTO Worm media, and will import media into the LTO_ADDBLANK and LTOW_ADDBLANK media classes.

vsarchiveconfig -a acsls **-n** liba **-o** a **-T** 10.20.230.123 **-k** LTO˜o,LTOW˜o **-i** LTO˜F0_LTO_ADDBLANK,LTOW˜F0_LTOW_ADDBLANK

NOTES

The valid media type values that this command uses can be listed with the Media Type Query command.

SEE ALSO

vsarchiveqry(l), **vsmedtypeqry**(l), **vsenter**(l), **vscheckout**(l), **vsexport**(l), **vsmove**(l), **vsmount**(l), **vsaudit**(l)

NAME

vsarchiveeject − Ejects media out of an archive to be entered into another archive.

SYNOPSIS

vsarchiveeject [**-Ivh**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*] [**-s** *portID*] [**-F** *type*] *mediaID...*

DESCRIPTION

vsarchiveeject(l) is issued from the command line to request execution of the Media Manager Archive Eject command.

A client uses the Archive Eject command to physically remove media from an archive. Media that are ejected are still known by the software, but are unavailable for client allocation. Media ejection does not require operator intervention.

Upon receipt of an Archive Eject request, the software verifies the specified media exists in an archive. The current archive of each specified medium is commanded to physically eject the medium from the archive system. The medium becomes an Intransit medium that can be entered into another archive with the Media Manager Archive Enter command. Archives can be either attended or unattended.

OPTIONS

mediaID...

Specifies a list of one or more media to be moved.

A valid medium identifier may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

The number of media that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 64.

The media ID must be known to the software and exist in an archive. Multiple media IDs can span archives, as long as the portID is not required for the archives, or if it is required matches is the same for all of the archives that it is required for.

Media not in the archive (in transit, checked out) cannot be ejected. Mounted media cannot be ejected, it must be dismounted first (see vsdismount). Media cannot be ejected from an offline archive. Media cannot be ejected if it is being checked in or imported. Media that has been exported (see vsexport) prior to calling this command will be physically ejected and removed from the system, and the corresponding Library Operator Interface request will be cleared.

-v Indicates that verbose output is desired.

If **-v** is specified, status is returned on all media specified in the Archive Eject request.

If **-v** is not specified, status is returned on only those media that were not successfully processed.

-s *portID*

Specifies the import/export port the media is ejected to (if applicable).

If the portID is not specified for archives of type scsi, acsls, das, and dadas, then a default of 0,0,0,0 will be tried. **vsarchiveqry -s** can be used to obtain the portID for an archive.

If the portID is specified for stage archives, it is ignored.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

EXIT STATUS

0 The **vsarchiveeject** command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful Archive Eject request, verbose option specified.

vsarchiveeject MED016 MED023 MED044 MED048 **-v**

Requests the Media Manager software to eject media MED016, MED023, MED044, and MED048 out of an archive; and to return status on every specified medium.

Output returned:

```
Archive Eject 4 of 4 media was successful

   Media [MED016]      no error

   Media [MED028]      no error

   Media [MED043]      no error

   Media [MED048]      no error
```

Successful Archive Eject request, verbose option not specified.

vsarchiveeject MED013 MED016 MED028 MED031

Requests the Media Manager software to eject media MED013, MED016, MED028, and MED028 from their current archives.

Output returned:

```
Archive eject 4 of 4 media was successful.
```

Error(s) with verbose option specified (nonexistent media)

vsarchiveeject MED013 MED016 MED022 MED034 **-v**

Requests the Media Manager software to eject media MED013, MED016, MED022, and MED034 and to return status on every specified medium.

Output returned:

```
Archive eject 1 of 4 media was successful

Error VOL024: error in the list

   Media [MED013]   no error

   Media [MED016]   item not found

   Media [MED022]   item not found

   Media [MED034]   item not found
```

Error(s) with verbose option not specified

vsarchiveeject MED003 MED004 MED013 MED028 MED033 MED043

Requests the Media Manager software to eject media MED003, MED004, MED013, MED028, MED033, and MED043.

Output returned:

```
Archive eject 3 of 6 media was successful

Error VOL024: error in the list

   Media [MED003]   item not found
```

```
Media [MED004]   item not found

Media [MED033]   item not found
```

Unsuccessful Archive Eject request

NOTES

Media that is allocated to an Archive Eject request is not available for other allocation until an enter completes.

A pending Archive Eject request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control-\). The request also is aborted by sending the SIGINT signal (control-c).

ERRORS

VOL206 archive type not supported - Only scsi, das, dadas, acsls, and vault archive types are supported for this command.

SEE ALSO

vsarchiveenter(l), **vsexport**(l), **vsmove**(l), **vsarchiveqry**(l)

NAME

vsarchiveenter − Enters media that has been ejected out of an archive into another archive.

SYNOPSIS

vsarchiveenter [**-Ihv**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*] [**-s** *portID*] [**-F** *type*] **-a** *archivename mediaID...*

DESCRIPTION

vsarchiveenter(l) is issued from the command line to request execution of the Media Manager Archive Enter command.

A client uses the Archive Enter command to physically enter ejected media into an archive. Media that was ejected are still known by the software, but are unavailable for client allocation. Media entering does not require operator intervention.

Upon receipt of an Archive Enter request, the software verifies the specified media exists and the archive can accept it. The specified archive commanded to physically enter the medium into the archive system. Archives can be either attended or unattended.

OPTIONS

mediaID...

Specifies a list of one or more media to be moved.

A valid medium identifier may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

The number of media that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 64.

The media ID must be known to the software and not be in an archive. Media cannot be entered if it is being exported, checked out, or checked in. Media that has been imported (see vsimport) prior to calling this command will be physically entered into the archive and system, and the corresponding Library Operator Interface (LOI) request will be cleared.

The media cannot be entered into an an archive that has reached its media type or media class capacity.

-a *archivename*

Specifies the name of the archive to which the specified media are to be moved.

Valid archive names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

The archive must be online and support the media type and media class. If the vsarchiveenter command was issued after a vsmove or vsimport command for the same media and the archivenames do not match, then this command will fail.

-v Indicates that verbose output is desired.

If **-v** is specified, status is returned on all media specified in the Archive Enter request.

If **-v** is not specified, status is returned on only those media that were not successfully processed.

-s *portID*

Specifies the import/export port the media is entered from (if applicable).

If the portID is not specified for archives of type scsi, acsls, das, and dadas, then a default of 0,0,0,0 will be tried. **vsarchiveqry -s** can be used to obtain the portID for an archive.

If the portID is specified for stage archives, it is ignored.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained

in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

EXIT STATUS

0 The **vsarchiveenter** command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful Archive Enter request, verbose option specified.

vsarchiveenter -a vault1 MED016 MED023 MED044 MED048 **-v**

Requests the Media Manager software to enter media MED016, MED023, MED044, and MED048 into a stage archive; and to return status on every specified medium.

Output returned:

```
Archive Enter 4 of 4 media was successful

   Media [MED016]      no error

   Media [MED028]      no error

   Media [MED043]      no error

   Media [MED048]      no error
```

Successful Archive Enter request, verbose option not specified.

vsarchiveenter -a vault1 MED013 MED016 MED028 MED031

Requests the Media Manager software to enter media MED013, MED016, MED028, and MED028 into the specified stage archive.

Output returned:

```
  Archive enter 4 of 4 media was successful.
```

Error(s) with verbose option specified (nonexistent media)

vsarchiveenter -s 0,0,15,16 -a lib1 MED013 MED016 MED022 MED034 **-v**

Requests the Media Manager software to enter media MED013, MED016, MED022, and MED034 and to return status on every specified medium.

Output returned:

```
Archive enter 1 of 4 media was successful

Error VOL024: error in the list

   Media [MED013]   no error

   Media [MED016]   media class is full

   Media [MED022]   media class is full

   Media [MED034]   media class is full
```

Error(s) with verbose option not specified

vsarchiveeenter -s 0,0,15,16 -a lib1 MED003 MED004 MED013 MED028 MED033 MED043

Requests the Media Manager software to enter media MED003, MED004, MED013, MED028, MED033, and MED043.

Output returned:

```
Archive enter 3 of 6 media was successful

Error VOL024: error in the list

   Media [MED003]   media class is full

   Media [MED004]   media class is full

   Media [MED033]   media class is full
```

Unsuccessful Archive Enter request

NOTES

Media that is allocated to an Archive Enter request is not available for other allocation until the enter completes.

A pending Archive Enter request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control-\). The request also is aborted by sending the SIGINT signal (control-c).

ERRORS

VOL206	archive type not supported - Only scsi, das, dadas, acsls, and vault archive types are supported for this command
VOL107	an archive was specified that does not exist
VOL081	the specified archive was not online
VOL107	the specified archive does not exist

SEE ALSO

vsarchiveeject(l), **vsimport**(l), **vsmove**(l), **vsarchiveqry**(l)

NAME

vsarchiveqry − Report the status of media archives.

SYNOPSIS

vsarchiveqry [**-Ihcdmstv**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*] [**-F** *type*] **-a**|*archivename*

DESCRIPTION

The **vsarchiveqry**(l) command generates a status report for all media archives. The user may limit the report to one particular archive.

REPORT STATUS

In its most verbose form (specified by the **-v** option), the report lists all of the following information for each media archive:

Archive Name
The name of the media archive

Archive Type
The type of archive. Values are: **Stage**, **DAS**, **SCSI**, **ACSLS**, **Dual Aisle**

Current State
The current state of the archive. Values are: **ERROR**, **On-line**, **Off-line**, **Diagnostic**, **Unavailable**, **Nonexistent**

Archive Mode
The current mode of the archive. Values are: **Unattended**, **Attended**

Fill Mode (deprecated)
The configured fill mode of the archive. Values are: **None**

Configure State
The current configuration state of the archive. Values are: **Not Being Configured**, **Being Configured**, **Being Reconfigured**, **Being Deleted**, **Terminating**, **Starting**, **Cycling**

Drive ID(s)
The drive IDs for all drives associated with the archive

Media ID(s)
The media IDs for all media associated with the archive

I/E Port(s)
The port IDs (in **X,X,X,X** format) for all import/export ports in the archive

For each media class associated with the archive, the follow information is listed:

MediaClass
The name of the media class

Media Type
The type of media associated with this media class. Values are: **CTIV**, **D3**, **3590**, **3490E**, **3490**, **4mm**, **8mm**, **RF5.25**, **MO5.25**, **CTIII**, **ST-120**, **3480**, **D2L**, **D2M**, **D2S**, **DTF**, **DTF-2**, **9840**, **LTO**, **NCTP**, **AIT**, **9940**, **SDLTT1**, **DVC**, **AITW**, **3592**, **T10K**, **LTOW**, **DLT4**, **DLT2**

Class Capacity %
The percentage of media in this media class that can be allocated to the archive

Class Capacity
The maximum number of media allowed in this media class

Current Fill Level
The current number of media in this media class

Action The action to take on media in this media class once watermark thresholds have been hit: **None, Notify**

For each media type associated with the archive, the follow information is listed:

Media Type
The type of media. Values are: **CTIV**, **D3**, **3590**, **3490E**, **3490**, **4mm**, **8mm**, **RF5.25**, **MO5.25**, **CTIII**, **ST-120**, **3480**, **D2L**, **D2M**, **D2S**, **DTF**, **DTF-2**, **9840**, **LTO**, **NCTP**, **AIT**, **9940**, **SDLTT1**, **DVC**, **AITW**, **3592**, **T10K**, **LTOW**, **DLT4**, **DLT2**

Archive Capacity
The maximum number of media of this type allowed in the archive

Current Fill Level
The current number of media of this type in the archive

Assigned Locations
The current number of bins in the archive occupied by media of this type

Auto Checkin
An indication of whether auto-checkin into the archive is enabled for media of this type. Values are: **On**, **Off**

Auto Import
An indication of whether auto-import into the archive is enabled for media of this type. Values are: **On**, **Off**

Action The action to take on media of this type once watermark thresholds have been hit. Values are: **None**, **Notify**

Import Media Class
The media class associated to media of this type upon import into the archive

Import Manufacturer
The name of the media manufacturer specified when the media was entered

Import Batch
The manufacturerâs batch identifier specified when the media was entered

OPTIONS

archivename
Identifies the archive to be listed in the report.

Valid archive names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-a Specifies that all archives are to be listed in the report.

-c Indicates that detailed information on all media classes associated with the specified archive(s) are to be reported.

-d Indicates that all drives associated with the specified archive(s) are to be reported.

-m Indicates that all media IDs associated with the specified archive(s) are to be reported.

-s Indicates that all import/export ports associated with the specified archive(s) are to be reported.

-t Indicates that detailed information on all media types associated with the specified archive(s) are to be reported.

-v Indicates that all media classes, all drives, all media IDs, all media types, and all import/export ports associated with the specified archive(s) are to be reported.

Specifying the **-v** option is equivalent to specifying the **-c**, **-d**, **-m**, **-s**, and **-t** options.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*
The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*
The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*
The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*
The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*
The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

EXIT STATUS

0 The **vsarchiveqry** command is successfully processed.
-1 An error is detected by either the CLI software or the API software.
>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful Archive Query

vsarchiveqry vault01 **-ct**

Requests the Media Manager software to return the media classes and the media types associated with the vault01 archive.

Output returned:

```
------------------------------------------------
Archive Query Report   May 24 12:43:18 1993           1
------------------------------------------------

Archive:  vault01
------------------------------------------------
               Archive Type:  Stage
              Current State:  On-Line
               Archive Mode:  Attended
                  Fill Mode:  None
             Configure State:  Not Being Configured

MediaClass:  F0_LTO_ADDBLANK
             MediaType:  LTO
      Class Capacity %:  100%
        Class Capacity:  500000
    Current Fill Level:  2
                Action:  None

Media Type:  LTO
     Archive Capacity:  500000
   Current Fill Level:  2
   Assigned Locations:  2
         Auto Checkin:  Off
          Auto Import:  Off
               Action:  None
```

Successful Archive Query

vsarchiveqry archive1 **-v**

Requests the Media Manager software to return the drives, the media, the media classes, the media types, and the import/export ports associated with the archive1 archive.

Output returned:

```
------------------------------------------------
Archive Query Report   May 24 12:59:38 1993           1
------------------------------------------------

Archive:  archive1

------------------------------------------------
               Archive Type:  SCSI
              Current State:  On-Line
               Archive Mode:  Attended
                  Fill Mode:  None
             Configure State:  Not Being Configured

   Drive ID(s):     1       2

   Media ID(s):     med001        med002        med003
```

```
                    med004
MediaClass:  F0_LTO_ADDBLANK
             MediaType:  LTO
      Class Capacity %:  50%
        Class Capacity:  40
    Current Fill Level:  2

                Action:  None

Media Type: LTO
     Archive Capacity:  40
   Current Fill Level:  2
   Assigned Locations:  2
         Auto Checkin:  Off
          Auto Import:  On
               Action:  None
   Import Media Class:  FO_LTO_ADDBLANK
  Import Manufacturer:
         Import Batch:

   I/E Port(s):  0,0,15,16
```

Unsuccessful Archive Query

vsarchiveqry BadArchiveName **-d**

Requests the Media Manager software to return the drives associated with the BadArchiveName archive.

Output returned:

```
Archive query was unsuccessful

Error VOL008: item not found
```

NOTES

The Archive Query command does not trigger unsolicited status messages from the Media Manager software.

A pending or executing Archive Query request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control-\). The request is also aborted by sending the SIGINT signal (control-c).

SEE ALSO

vsarchivevary(l)

NAME

vsarchivevary − Varies the state of an archive.

SYNOPSIS

vsarchivevary [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*] [**-F** *type*] **-s** *state* *archivename*

DESCRIPTION

vsarchivevary(1) is issued from the command line to request execution of the Media Manager Archive Vary command.

The Archive Vary command is used to change the state of a configured archive. The name of the archive and the target state (on-line, off-line, or diagnostic) must be specified.

Upon receipt of an Archive Vary command, the software attempts to change the state of the specified archive. The return code presented to the client indicates the success or failure of the command.

OPTIONS

archivename

Identifies the archive to be varied.

Valid archive names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-s *state* Identifies the state into which the archive is placed.

Valid archive states are: on-line, off-line, and diagnostic. The archive states, online,offline, and diagnostic are abbreviated as on, of, and d respectively.

-I Indicates command line options are read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming language. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

EXIT STATUS

0 The **vsarchivevary** command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful archive vary

vsarchivevary shelf1 **-s** diagnostic

Requests the Media Manager software to vary the shelf1 archive to the diagnostic state.

Output returned:

```
Vary of archive [shelf1] to state [diagnostic] was   successful
```

Unsuccessful archive vary

vsarchivevary BadArchiveName **-s** on-line

Requests the Media Manager software to vary the BadArchiveName archive to the online state.

Output returned:

```
Vary of archive [BadArchiveName] to state [on  line] was   unsuccessful

Error VOL013: invalid archive
```

NOTES

The Media Manager software rejects all incoming requests that could physically command an off-line or diagnostic archive (for example: Mount, Dismount, and Move).

The Media Manager software processes commands that interact strictly with the database (for example: Query Mount, Create Drive Pool, and Create Archive Media Class), regardless of the state of the associated archive.

All components associated with an offline or diagnostic archive, such as media, drives, and physical hardware, are unavailable.

The Archive Vary command does not trigger unsolicited status messages from the Media Manager software.

A pending Archive Vary request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control\). The request also is aborted by sending the SIGINT signal (control-c).

SEE ALSO

vsarchiveqry(l), **vsdrivevary**(l)

NAME

vsarcmedclasscreate − Associates an existing media class to an archive.

SYNOPSIS

vsarcmedclasscreate [**-Ih**] [**-H** *host*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *prognum*] [**-c** *capacityPercent*] **-a** *archive mediaclass*

DESCRIPTION

The **vsarcmedclasscreate**(l) command associates an existing media class to an archive. This association is referred to as an archive media class.

The media class must be created beforehand with the **vsmedclasscreate**(l) command. Afterward, the media class may be associated with one or more archives.

OPTIONS

-I Indicates command line options are to be read from stdin.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *host* The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *prognum*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

-c *capacityPercent*

This parameter specifies the percentage of media contained in the media class which can be allocated to the specified archive. This defaults to 0 when not specified but should typically be set to 100.

-a *archive*

Identifies the archive name that the media class is to be associated with. The archive name parameter is a user-specified name by which the archive is known to the user.

Valid archive names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

mediaclass

The name of the media class. The media class name parameter is a user-specified name by which the media class is known to the user.

Valid media class names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

EXIT STATUS

0 The command is successfully processed.

255 An error is detected by either the CLI software or the API software.

>0 and <255

The returned exit status corresponds to the error detected by the Media Manager software.

EXAMPLES

Associate a media class called *abc* with archive *lib1*

vsarcmedclasscreate -c 100 **-a** lib1 abc

NOTES

To cancel the request generated by this command, use the **vscancelreq** command, or send a SIGQUIT signal (control-\).

The command can be aborted by sending a SIGINT signal (control-c), however this will not cancel the request.

SEE ALSO

vsarcmediaclassdelete(l), **vscancelreq**(l)

NAME

vsarcmedclassdelete − Deletes an archive media class for the Media Manager system.

SYNOPSIS

vsarcmedclassdelete [**-Ih**] [**-H** *host*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *prognum*] **-a** *archive mediaclass*

DESCRIPTION

vsarcmedclassdelete(l) is issued from the command line to request execution of the Media Manager Archive Media Class Delete command. The Media Manager software must be active in order to run this command.

This will remove the association of a media class from an archive.

OPTIONS

-I Indicates command line options are to be read from stdin.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *host* The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *prognum*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

-a *archive*

Identifies the archive name that the media class is associated with. The archive name parameter is a user-specified name by which the archive is known to the user.

Valid archive names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

mediaclass

The media class name parameter is a user-specified name by which the media class is known to the user.

Valid media class names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

EXIT STATUS

0 The command is successfully processed.

255 An error is detected by either the CLI software or the API software.

>0 and <255
The returned exit status corresponds to the error detected by the Media Manager software.

EXAMPLES

Delete association of a media class called *abc* from archive *lib1*

vsarcmedclassdelete -a lib1 abc

NOTES

To cancel the request generated by this command, use the **vscancelreq** command, or send a SIGQUIT signal (control-\).

The command can be aborted by sending a SIGINT signal (control-c), however this will not cancel the request.

SEE ALSO

vsarcmediaclasscreate(l), **vscancelreq**(l)

NAME

vsaudit − Performs archive inventory verification.

SYNOPSIS

vsaudit *archivename* [**-Ihp**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vsaudit(l) is issued from the command line to request execution of the Media Manager Audit command.

Upon receipt of an Audit command request, the Media Manager software performs an inventory verification of the specified archive.

If the specified archive is robotically controlled, the robot scans each physical bin location and verifies that the database is consistent with the actual location of media. Any noted inconsistencies are returned to the client, logged in a system log file, and the software initiates corrective action, based on the circumstances of the discrepancy.

If the specified archive is a manual archive, the archive operator is directed to generate the audit report. The operator then directs the report to be printed or to verify the information online. Either way, the operator performs the inventory and corrects any reported discrepancies. Discrepancies are resolved by issuing appropriate media management commands (for example, Eject) to relocate media to the appropriate locations. Audits of manual archives do not return a discrepancy list.

Audit requests are for full archive audits only; no subset audits are permitted from the command line. Subset audits are conducted from the system operator GUI. Full archive audits are lengthy and should be requested with discretion.

OPTIONS

archivename

Specifies the name of the archive to audit.

Valid archive names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-I Indicates command line options are read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-p Causes a physical inventory of a library.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vsaudit** command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful audit request

vsaudit shelf1

Requests the Media Manager to audit the shelf1 archive.

Output returned:

```
------------------------------------------------

Audit Report           May 24 12:43:18 1993           1

------------------------------------------------

Archive:  shelf1

------------------------------------------------

no discrepancies found
```

Unsuccessful audit request

vsaudit BadArchiveName

Requests the Media Manager software to audit the BadArchiveName archive.

Output returned:

```
Audit of archive [BadArchiveName] was unsuccessful

Error VOL013: invalid archive
```

NOTES

With the exceptions of the manual archives, a pending or executing Audit request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control-\). The request also is aborted by sending the SIGINT signal (controlc).

A pending or executing Audit request is reprioritized using the Media Manager Reprioritize command. The Media Manager Reprioritize command is not available from the command line. The Reprioritize command is available to the client through either the API or the RPC interface.

A pending or executing STK ACS product family archive audit requires a Cassette Autoloader Port (CAP). If the CAP is busy, the Audit command can be queued. This results in intermediate status that indicates the Audit command is waiting for a busy CAP to be freed.

In the DataTower or STK ACS product family database, the Media Manager software does not actually track media location to the bin level, only down to the Manipulator Unit (MU) level. However, the logic and the Media Manager software responses are similar to the bin tracking performed in the DataLibrary software with no internal database.

The Audit command does not trigger unsolicited status messages from the Media Manager software.

The total length of time the CLI software waits for a command status, in synchronous mode, from the Media Manager software is (VSID_RETRY_LIMIT plus 1) multiplied by VSID_TIMEOUT_VALUE. Because of the time required for robotic audits, the time-out value or retries may need to be increased from the CLI default values.

SEE ALSO

None

NAME

vscancelreq − cancels an outstanding request for the Media Manager system.

SYNOPSIS

vscancelreq [**-Ih**] [**-H** *host*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *prognum*] **-c** *command requestid*

DESCRIPTION

vscancelreq(l) is issued from the command line to request execution of the Media Manager Cancel Request command. The Media Manager software must be active in order to run this command.

Any command in the command queue, except the dismount command, can be cancelled. The arguments needed for this command can be obtained by issuing the Get Request Identifiers command.

OPTIONS

-I Indicates command line options are to be read from stdin.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *host* The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *prognum*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

-c *command*

This is command identifier for the request being cancelled.

requestid

The request identifier of the request to cancel.

EXIT STATUS

0 The command is successfully processed.

255 An error is detected by either the CLI software or the API software.

>0 and <255
The returned exit status corresponds to the error detected by the Media Manager software.

EXAMPLES

First list the active requests and then cancel an outstanding mount request.

vsgetreqids

Output returned:

```
1122518995˜Mount˜14
```

Then cancel the request using the results

vscancelreq -c 14 1122518995

SEE ALSO

vsgetreqids(l)

NAME

vscheckin − Logically checks media into the Media Manager system that were previously checked out of the Media Manager system.

SYNOPSIS

vscheckin *mediaID...* [**-a** *archivename*] [**-v**] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vscheckin(l) is issued from the command line to request execution of the Media Manager CheckIn command.

A client requests execution of the Media Manager CheckIn command to logically check media into the Media Manager system. Only media that have been previously checked out can be checked in.

Checkin is a logical operation. After a medium is logically checked in to the Media Manager system, the medium is physically entered into an archive before becoming available for client use (mounting,...). A medium is physically entered into the Media Manager system via the Enter functionality that is available from the appropriate archive's console display. The Enter functionality is not available from the command line.

OPTIONS

mediaID...

Specifies a list of one or more media to be checked in.

A valid medium identifier may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

The number of media that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 64.

-a *archivename*

Specifies the name of the destination archive for the media to be entered into after they are checked in.

Valid archive names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-v Indicates that verbose output is desired.

If the **-v** option is specified, status is returned on every medium specified in the **vscheckin**(l) command.

If **-v** is not specified, status is returned on only those media that were not successfully checked in.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vscheckin** command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful Checkin request with verbose option specified

vscheckin MED012 MED014 MED023 **-v**

Requests the Media Manager software to check MED012, MED014, and MED023 into the archive from which they were checked out and to return status on each medium.

Output returned:

```
Check in 3 of 3 media was successful

   Media [MED012]      no error

   Media [MED014]      no error

   Media [MED023]      no error
```

Successful Checkin request with verbose option not specified

vscheckin MED013 **-a** shelf2

Requests the Media Manager software to check MED013 into the shelf2 archive and to return status on a medium only if processing for that medium failed.

Output returned:

```
Check in 1 of 1 media was successful
```

Error(s) with verbose option specified

vscheckin MED011 MED014 MED021 **-v**

Requests the Media Manager software to check MED011, MED014, and MED021 into the archive from which they were checked out and to return status on every specified medium.

Output returned:

```
Check in 1 of 3 media was successful

Error VOL024: error in the list

   Media [MED011]   invalid action or location state for

                  operation

   Media [MED014]   no error

   Media [MED021]   item not found
```

Error(s) with verbose option not specified.

vscheckin MED001 MED002 MED093 **-a** stage1

Requests the Media Manager software to check MED001, MED002, and MED093 into the stage1 archive and to return status on a medium only if processing for that medium failed.

Output returned:

```
Check in 1 of 3 media was successful

Error VOL024: error in the list

   Media [MED001]   archive not associated with media class

   Media [MED093]   item not found
```

NOTES

Media must be checked out of the Media Manager system before the Checkin command request is valid.

Media checked out of one archive can be checked in to another archive, as long as the receiving archive is configured to support the media's MediaClass group and the receiving archive is not at capacity for the media's media type.

Media checked out from more than one archive can be checked in as a single group into a single new archive (assuming necessary archive media class associations exist).

Media that are checked out from more than one archive and are checked in as a single group without a target archive specified on the Checkin command are returned to their respective check-out archives.

Failure of the Checkin request for one or more media in a list does not fail the request for all media in the list.

The Checkin command triggers unsolicited status messages from the Media Manager software to the client software.

A pending or executing Checkin request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control-\). The request also is aborted by sending the SIGINT signal (control-c).

SEE ALSO

vscheckout(l)

NAME

vscheckout − Checks media out of the Media Manager system.

SYNOPSIS

vscheckout *mediaID...* [**-t***comment*] [**-v**] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vscheckout(l) is issued from the command line to request execution of the Media Manager Checkout command.

A client uses the Checkout command to logically remove media from the Media Manager system. Media that are checked out are still known by the software, but are unavailable for client allocation.

Upon receipt of a Checkout request, the Media Manager software marks the specified media for checkout. If the specified media are contained in archives, the Media Manager software adds the media to the Eject list of the containing archive. An operator selects the Eject functionality from the appropriate archive's console display to physically remove the checked-out media from the containing archive.

OPTIONS

mediaID...

Specifies a list of one or more media to be checked out of the Media Manager system.

A valid medium identifier may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

The number of media that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 64.

-t *comment*

Provide a comment to be associated with each checked-out media. This comment is provided on the Eject list (a GUI display) from the archive console associated with the archive containing the media.

-v Indicates that verbose output is needed.

If the **-v** option is specified, status is returned on every medium specified in the **vscheckout**(l) command.

If **-v** is not specified, status is returned on only those media that were not successfully checked out.

-I Indicates command line options are read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vscheckout**(l) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful Checkout request with verbose option specified

vscheckout MED003 MED004 MED005 **-t** "Transfer to Library" **-v**

Requests the Media Manager software to check MED003,MED004,and MED005 out of the Media Manager system and to return status on every specified medium.

Output returned:

```
Check out 3 of 3 media was successful

   Media [MED003]      no error

   Media [MED004]      no error

   Media [MED005]      no error
```

Successful Checkout request with verbose option not specified.

vscheckout MED003 MED004 MED005 MED006 MED007 MED008

Requests the Media Manager software to check MED003, MED004, MED005, MED006, MED007, and MED008 out of the Media Manager system and to return status on a medium only if processing for that medium failed.

Output returned:

```
Check out 6 of 6 media was successful
```

Error(s) with verbose option specified

vscheckout MED010 MED011 MED012 MEDa13 **-v**

Requests the Media Manager software to check MED010, MED011, MED012, and MED13 out of the Media Manager system and to return status on every specified medium.

Output returned:

```
Check out 2 of 4 media was successful

Error VOL024: error in the list

   Media [MED010]      invalid action or location state for operation

   Media [MED011]      no error

   Media [MED012]      no error

   Media [MED013]      item not found
```

Error(s) with verbose option not specified

vscheckout MED010 MED011 MED012 MEDa13

Requests the Media Manager software to check MED010, MED011, MED012, and MEDa13 out of the Media Manager system and to return status on a medium only if processing for that medium failed.

Output returned:

```
Check out 2 of 4 media was successful

Error VOL024: error in the list

   Media [MED010]      invalid action or location state for operation

   Media [MED013]      item not found
```

NOTES

Failure of the Checkout request for one or more media in a list does not fail the request for all media in the list.

A currently allocated medium is checked out of the Media Manager system. Attempts to physically eject an allocated medium fail until the medium is no longer in use.

A medium marked for checkout is unmarked (removed from the Eject list) by the Clear Eject command. An operator removes a medium from the Eject list by performing an Eject Fail operation from the appropriate archive's console display. The Eject Fail functionality is not available from the command line.

The Clear Eject command is available to clients, whereas, Fail Eject is an operator-only command.

The Checkout command triggers unsolicited status messages from the Media Manager software.

A pending or executing Checkout request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control-\). The request is aborted by sending the SIGINT signal (control-c).

SEE ALSO

vscheckin(l), **vscleareject**(l)

NAME

vsclearejct − Removes the specified media from the archive's Eject list

SYNOPSIS

vsclearejct *mediaID...* [**-v**] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number***]**

DESCRIPTION

vsclearejct(l) is issued from the command line to request execution of the Media Manager Clear Eject command.

A client uses the Clear Eject command to reverse the scheduled eject of one or more media from an archive.

Ejects can be generated during processing of the Media Manager Checkout Export, Mount, and Move commands. Ejects can also be generated during automigration.

The Clear Eject command essentially undoes the completion of these commands. Media are removed from the Eject list and returned to the available state.

For example, if a client issues an **export** command for a specific medium, the specified medium is scheduled for removal by adding the medium to the Eject list for the archive associated with the medium. If the client decides the medium should not be removed from its associated archive, the client issues the Clear Eject command, and the Media Manager software removes the medium from the Eject list, thus voiding the Export request.

OPTIONS

mediaID...

Specifies the media to remove from the Eject list.

A valid medium identifier may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

The number of media that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 64.

-v Indicates that verbose output is desired.

If **-v** is specified, return status on every media specified in the command.

If **-v** is not specified, return status on only the media that were not successfully processed.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vsclearej**ect(l) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful with verbose option specified

vscleareject MED017 MED021 MED023 **-v**

Requests the Media Manager software to remove MED017, MED021, and MED023 from the Eject list and to return status on each specified medium.

Output returned:

```
Clear Eject 3 of 3 media was successful

   Media [MED017]      no error

   Media [MED021]      no error

   Media [MED023]      no error
```

Successful with verbose option not specified

vscleareject MED016 MED018 MED020 MED021

Requests the Media Manager software to remove MED016, MED018, MED020, and MED021 from the Eject list and to return status on a medium only if processing for that medium failed.

Output returned:

```
Clear Eject 4 of 4 media was successful
```

Error(s) with verbose option specified

vscleareject MED012 MED013 MEd014 MED051 **-v**

Requests the Media Manager software to remove MED012, MED013, MED014, and MED051 from the Eject list and to return status on every specified medium.

Output returned:

```
Clear Eject 2 of 4 media was successful

Error VOL024: error in the list

   Media [MED012]      no error

   Media [MED013]      item not marked for ejection

   Media [MED014]      no error

   Media [MED051]      item not found
```

Error(s) with verbose option not specified

vsclearejectMED012 MED013 MED014 MED051

Requests the Media Manager software to remove MED012, MED013, MED014, and MED051 from the Eject list and to return status on a medium only if processing for that medium failed.

Output returned:

```
Clear Eject 2 of 4 media was successful

Error VOL024: error in the list

   Media [MED013]      medium not marked for ejection

   Media [MED051]      item not found
```

NOTES

The Clear Eject request fails for a medium if the medium is already selected for eject by the operator.

Failure of the **vsclearejectrequest** for one or more media in a list does not fail the request for all media in the list.

An operator also removes a medium from the Eject list by performing an Eject Fail from the appropriate archive's console display. The Eject Fail functionality is not available from the command line.

The Clear Eject command triggers unsolicited status messages from the Media Manager software.

A pending Clear Eject request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control\). The request also is aborted by sending the SIGINT signal (controlc).

SEE ALSO

vscheckout(l), **vsexport**(l), **vsmount**(l), **vsmove**(l)

NAME

vsconnectqry − Queries for enterprise connection information.

SYNOPSIS

vsconnectqry *enterpriseID* [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vsconnectqry(l) is issued from the command line to request execution of the Media Manager Connect Query command.

The Connect Query command provides a list of all client internet addresses that are currently associated with the given enterprise identifier.

OPTIONS

enterpriseID

Specifies the identifier of the enterprise connection being queried.

An enterprise identifier must be numeric.

-I Indicates command line options are read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vsconnectqry**(l) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful enterprise query

vsconnectqry 3

Requests the Media Manager software to return a list of the client internet addresses associated with enterprise identifier 3.

Output returned:

```
------------------------------------------------

Connect Query Report   May 24 12:43:18 1993         1

------------------------------------------------

Enterprise ID:  3

------------------------------------------------

Client #: 1

   Socket Family:              10
   Socket Port:                1
   Internet Address:           300
   Program Number:             300016
   Version Number:             2
   Procedure Number:           1
```

Unsuccessful enterprise query

vsconnectqry 13

Requests the Media Manager software to return a list of the client Internet addresses associated with enterprise identifier 13.

Output returned:

```
Connect query was unsuccessful

Error VOL008: item not found
```

NOTES

The Connect Query command is issued through either the client interface or the GUI. However, only from the GUI can "query all" be specified to list all enterprises. From the client interface, only one enterprise can be specified within a single command. This restriction prevents any single client from listing the clients of other enterprises being serviced by the Media Manager software.

The Connect Query command does not trigger unsolicited status messages from the Media Manager software.

A pending Connect Query request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control-\). The request also is aborted by sending the SIGINT signal (control-c).

SEE ALSO

None

NAME

vsdismount − Dismounts a medium from a drive.

SYNOPSIS

vsdismount *mediaID* **-d** *driveID* [**-l** *lockID*] [**-u** *usagetime*] [**-e** *errorcount*] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vsdismount(l) is issued from the command line to request execution of the Media Manager Dismount command.

A client uses the Dismount command to inform the software that the client is no longer using a drive and the medium mounted in the drive.

Upon receipt of a Dismount request for an automated archive, the software checks to see that the medium is ejected from the drive by the storage subsystem. If the medium is not ejected from the drive, the Dismount request fails and the Media Manager software returns a failure status to the client.

For automated archives, if the medium is ejected from the drive, the software commands the archive robotics to move the medium from the drive pickup point to a bin within the archive system. A successful return code is returned to the client after the medium movement is completed.

For manual archives, a dismount notice is sent to the appropriate archive's console display for action. An operator dismounts the specified medium and then notifies the Media Manager software that the medium dismount is complete. The Media Manager software returns a successful return code to the client only after the operator confirms the dismount is complete.

OPTIONS

mediaID

Identifies the medium to be dismounted.

A valid medium identifier may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-d *driveID*

Identifies the drive on which the medium is mounted.

-l *lockID*

Specifies the lock identifier associated with the drive if the drive is mounted with a lock identifier.

-u *usagetime*

The amount of time (in seconds) the drive is in use.

-e *errorcount*

The number of errors encountered while interacting with the drive.

-I Indicates command line options are read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vsdismount**(l) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful dismount

vsdismount MED012 **-d** 2

Requests the Media Manager software to dismount MED032 from drive 2.

Output returned:

```
Dismount of Media [MED032] from Drive [2] was successful
```

Unsuccessful dismount request

vsdismount MED016 **-d** 13

Requests the Media Manager software to dismount MED016 from drive 13.

Output returned:

```
Dismount of Media [MED016] from Drive [13] was unsuccessful

Error VOL081: drive not mounted
```

Unsuccessful dismount request

vsdismount MED016 **-d** 9

Requests the Media Manager software to dismount MED016 from drive 9.

Output returned:

```
Dismount of Media [MED016] from Drive [9] was unsuccessful
```

```
Error VOL044: medium not mounted
```

NOTES

The Dismount command triggers unsolicited status messages from the Media Manager software.

A pending Dismount request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control\). The request also is aborted by sending the SIGINT signal (controlc).

SEE ALSO

vsmount(l)

NAME

vsdrivecfg − Configures a specified drive for the Media Manager system.

SYNOPSIS

vsdrivecfg -c *driveID* **-t** *mediaType...*
[**-Ih**] [**-H** *host*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *prognum*]

vsdrivecfg -b *driveID* **-a** *archiveName* [**-s** *slotName*]
[**-Ih**] [**-H** *host*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *prognum*]

vsdrivecfg -u *driveID* **-a** *archiveName*
[**-Ih**] [**-H** *host*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *prognum*]

vsdrivecfg -r *driveID*
[**-Ih**] [**-H** *host*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *prognum*]

DESCRIPTION

vsdrivecfg(l) is issued from the command line to request execution of the Media Manager Drive Configure command. The Media Manager software must be active in order to run this command.

This command is use to create or remove a drive, and associate or disassociate a drive with an archive. A drive can be created and associated with an archive at any time providing the Media Manager software is running. All created drives must be associated with an archive before it can be used to mount media. Drives can be defined before the creation of media classes.

OPTIONS

-c *driveID*

This will create a drive with the specified identifier which is used by other commands to reference the drive. The drive identifier must be a unique numeric integer and is restricted to a range from 1 to 2147383647 inclusive.

-b *driveID*

This will associate the specified drive with an archive.

-u *driveID*

This will disassociate the specified drive from an archive. An in-use drive cannot be disassociated from an archive.

-r *driveID*

This will remove the specified drive. A drive can only be removed if is not associated with any archives.

-a *archiveName*

The name of the archive which the drive is to be associated or disassociated. The archive name parameter is a user-specified name by which the archive is known to the user.

Valid archive names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-t *mediaType...*

This list specifies the valid media types that can be used with the drive. Media types can be listed with the Media Type query command.

-s *slotName*

This specifies the location where the drive is physically located in the archive. These can be obtained for an archive by running the **dbdrvslot** utility.

-I Indicates command line options are to be read from stdin.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *host* The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *prognum*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The command is successfully processed.

255 An error is detected by either the CLI software or the API software.

>0 and <255

The returned exit status corresponds to the error detected by the Media Manager software.

EXAMPLES

Create a drive with an identifier of 1 that supports LTO and LTO Worm media types.

```
vsdrivecfg -c  1 -t LTO LTOW
```

Associate drive 1 with SCSI archive *lib1* that has a slotName of 0,0,12,256.

```
vsdrivecfg -b  1 -a lib1 -s  0,0,12,256
```

Remove drive 1. Note that the drive must first be disassociated.

```
vsdrivecfg -u  1 -a lib1
vsdrivecfg -r  1
```

NOTES

To cancel the request generated by this command, use the **vscancelreq** command, or send a SIGQUIT signal (control-\).

The command can be aborted by sending a SIGINT signal (control-c), however this will not cancel the request.

SEE ALSO

vsmedtypeqry(l), **vsdriveqry**(l), **dbdrvslot**(l), **vscancelreq**(l)

NAME

vsdriveqry − Queries for information on the specified drive(s).

SYNOPSIS

vsdriveqry *driveID...* [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

vsdriveqry -a [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vsdriveqry(l) is issued from the command line to request execution of the Media Manager Drive Query command.

The Drive Query command is used to obtain information about one or more drives in a Media Manager system.

OPTIONS

driveID...

If the **-a** option is not specified, specify a list of one or more drives to be queried.

The number of drives that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 64.

-a Specifies the **-a** option to indicate all drives known to the Media Manager system are to be queried.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vsdriveqry**(l) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful drive query

vsdriveqry -a

Requests the Media Manager software to return information on every drive known to the Media Manager system.

Output returned:

```
------------------------------------------------

Drive Query Report     Mar 10 11:00:32 1994         1

------------------------------------------------

Drive ID:  1

------------------------------------------------

   Drive Type:                  Magnetic

   Associated Archive:          stage1

   Current State:               On-line

   Assignment:                  Free

   Usage Count:                 0

   Current Usage Time:          0

   Total Usage Time:            0

   Error Count:                 0

   Mount State:                 Unmounted

   Mounted Media ID:

   Media Type(s) Supported:     D2M

Drive ID:  3

------------------------------------------------

   Drive Type:                  Magnetic

   Associated Archive:          shelf1
```

```
   Current State:              On-line
   Assignment:                 Free
   Usage Count:                1
   Current Usage Time:         0
   Total Usage Time:           0
   Error Count:                0
   Mount State:                Unmounted
   Mounted Media ID:
   Media Type(s) Supported:    D2M
-----------------------------------------------
Drive ID:  4
-----------------------------------------------
   Drive Type:                 Magnetic
   Associated Archive:         shelf1
   Current State:              On-line
   Assignment:                 Free
   Usage Count:                0
   Current Usage Time:         0
   Total Usage Time:           0
   Error Count:                0
   Mount State:                Unmounted
   Mounted Media ID:
   Media Type(s) Supported:    D2M
```

Unsuccessful drive query

vsdriveqry 35

Requests the Media Manager software to return information on drive 35. (Drive 35 does not exist.)

Output returned:

```
Drive query was unsuccessful.
```

```
Error VOL008: item not found.
```

NOTES

The Drive Query command does not trigger unsolicited status messages from the Media Manager software.

A pending Drive Query request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control\). The request also is aborted by sending the SIGINT signal (controlc).

SEE ALSO

vsdrivevary(l)

NAME

vsdrivevary − Changes the state of a drive.

SYNOPSIS

vsdrivevary *driveID...* **-s** *state* [**-v**] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number***]**

vsdrivevary -p *drivepool* **-s** *state* [**-v**] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number***]**

DESCRIPTION

vsdrivevary(l) is issued from the command line to request execution of the Media Manager Drive Vary command.

The Drive Vary command is used to change the operational availability state of a drive.

A drive in the offline, unavailable, or diagnostic state is excluded from the software's drive selection algorithm.

A Mount or Lock request for an off-line, unavailable, or diagnostic drive fails.

Conversely, varying a drive to the online state makes it available for selection for Mount or Lock requests.

OPTIONS

driveID...

Specifies one or more individual drive(s) whose state is to be varied.

The number of drives that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 64.

-p *drivepool*

Specifies the name of a drive pool to vary the state of all drives associated with the drive pool.

Valid drive pool names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-s *state* Specifies the target state of the specified drive(s). Valid drive states are on-line, off-line, and diagnostic. The drive states, online, offline, and diagnostic can be abbreviated as on, of, and d respectively.

-v Indicates that verbose output is needed.

If **-v** is specified, list status information on all drives varied in the Media Manager system.

If **-v** is not specified, reports only those drives unsuccessfully varied.

-I Indicates command line options are read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vsdrivevary**(l) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful drive vary with verbose option specified

vsdrivevary -p drvpoolusr **-s** offline **-V**

Requests the Media Manager software to vary all drives in the drvpoolusr drive pool to the offline state and to return status on every drive in drvpoolusr.

Output returned:

```
Vary 8 of 8 drives to state [off  line] was successful.

   Drive [1]     no error

   Drive [4]     no error

   Drive [5]     no error

   Drive [7]     no error

   Drive [8]     no error

   Drive [11]    no error

   Drive [12]    no error

   Drive [14]    no error
```

Successful drive vary with verbose option not specified

vsdrivevary 2 **-s** diagnostic

Requests the Media Manager software to vary drive 2 to the diagnostic state and to return status on a drive only if processing for that drive failed.

Output returned:

```
Vary 1 of 1 drives to state [diagnostic] was successful.
```

Error(s) with verbose option specified

vsdrivevary 5 15 8 18 11 **-s** on-line **-v**

Requests the Media Manager software to vary drives 5, 15, 8, 18, and 11 to the online state and to return status on every specified drive.

Output returned:

```
Vary 3 of 5 drives to state [on-line] was successful

   Drive [5]        no error

   Drive [15]       invalid drive specified

   Drive [8]        no error

   Drive [18]       invalid drive specified

   Drive [11]       no error
```

Error(s) with verbose option not specified

vsdrivevary 5 15 8 18 11 **-s** off-line

Requests the Media Manager software to vary drives 5, 15, 8, 18, and 11 to the offline state and to return status on a drive only if processing for that drive failed.

Output returned:

```
Vary 3 of 5 drives to state [off-line] was successful

Error VOL024: error in the list

   Drive [15]       invalid drive specified

   Drive [18]       invalid drive specified
```

Unsuccessful Drive Vary request

vsdrivevary -p BadPoolName **-s** diagnostic

Requests the Media Manager software to vary every drive associated with the BadPoolName drive pool to the diagnostic state.

Output returned:

```
Error VOL030: invalid drive pool specified
```

NOTES

Mounted drives that have their state changed remain inuse. Varying a drive has no impact on client data transfer operations in progress and the client receives no automatic notification of a drive state change.

Drives can be varied, regardless of whether or not they are associated with an archive.

Drives can be varied, regardless of whether or not they are allocated; however, allocated drives that are not on-line cannot be dismounted.

The unavailable state is assignable only by the Media Manager software when a higher level component in the archive system is no longer online. For example, varying a CLM offline causes the associated drive to be viewed as unavailable.

The Drive Vary command does not trigger unsolicited status messages from the Media Manager software.

A pending Drive Vary request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control-\). The request also is aborted by sending the SIGINT signal (controlc).

SEE ALSO

vsdriveqry(l)

NAME

vsenter − Enters media into an archive.

SYNOPSIS

vsenter [**-Ih**] [**-H** *host*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *prognum*]
-s *portID* [**-e**] [**-c** *mediaclass*] [**-b** *batch* **-f** *manufacturer*] *archivename*

DESCRIPTION

vsenter(l) is issued from the command line to request execution of the Media Manager Enter command. The archive must be online to run this command.

The Enter command is used to enter all media that are in the import/export ports into an archive. It is primarily for entry of unknown media, however, it can also be used to re-enter checked out media. This command does not support **stage** type archives (vaults). To enter media into a **stage** archive refer to the Archive Enter command.

All media can be classified as known or unknown. Unknown media have never been introduced into a Media Manager system or were removed using the Export Media command. Known media are contained in an archive, are checked out using the Check out Media command, or are intransit to an archive as a result of a Move Media command, or Mount Media command.

Three ways exist to enter unknown media into an archive. One way is the Import Media command to specify a list of media. Another is to load a large number of media at one time using the bulk load method and then run the Audit command. Finally, the Enter Media command to enter all media in the archive import/export ports.

Multiple ways exist to enter known media into an archive. One way is the Archive Enter command to specify a list of media. Another way is to run the Audit command. Checked out media can be re-entered with the Checkin command or this command. When this command is used to re-enter checked out media, then any checked-out media detected in the import/export ports will be entered if the archive is configured for automatic checkin or if the **-e** option is specified.

OPTIONS

-I Indicates command line options are to be read from stdin.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *host* The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus

1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *prognum*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

-s *portID*

Specifies the import/export port the media is entered from (if applicable). **vsarchiveqry -s** can be used to obtain the portID for an archive.

-e Provides the capability to enable automatic checkin. When the target archive is not configured with the auto checkin option, than all media that are checked out are left in the load port and a failure message is logged.

-c *mediaclass*

Identifies the mediaclass name with which any entered unknown media are to be associated.

-b *batch*

Specifies the manufacturer's batch that contains the media to be entered.

If this option is specified, then the **-f** *manufacturer* option must also be specified. Valid batch names may contain up to 32 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-f *manufacturer*

Specifies the name of the media manufacturer.

If this option is specified, then the **-b** *batch* option must also be specified. Valid manufacturer names may contain up to 32 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

archivename

Specifies the name of the archive to which the specified media are to be added.

EXIT STATUS

0 The command is successfully processed.

255 An error is detected by either the CLI software or the API software.

>0 and <255

The returned exit status corresponds to the error detected by the Media Manager software.

EXAMPLES

Enter media where import/export ports contain 2 unknown media and 1 duplicate media

vsenter -s 0,0,15,16 libc

Output returned:

```
------------------------------------------------------------------------
Enter Report               16-Sep-2013 10:29:05                 1
------------------------------------------------------------------------

Archive Name: libc
------------------------------------------------------------------------

Media ID      : 000018
Error         : medium already exists in an archive

Media ID      : 000049
Error         : no error
```

```
Media ID      : 000048
Error         : no error
```

Enter media where there are no media in the import/export ports

vsenter -s 0,0,15,16 liba

Output returned:

```
Enter of media into archive [liba] was unsuccessful
Error VOL080: port is empty
```

Attempt to re-enter a checked out media into an archive which is not configured for auto checkin.

vsenter -s 0,0,15,16 liba

Output returned:

```
--------------------------------------------------------------------------------
Enter Report               16-Sep-2013 08:42:27                  1
--------------------------------------------------------------------------------

Archive Name: liba
--------------------------------------------------------------------------------

Media ID      : 000216
Error         : medium must be checked in
```

Use the auto check-in option to re-enter a checked out media into an archive which is not configured for auto checkin.

vsenter -s 0,0,15,16 **-e** liba

Output returned:

```
--------------------------------------------------------------------------------
Enter Report               16-Sep-2013 09:12:05                  1
--------------------------------------------------------------------------------

Archive Name: liba
--------------------------------------------------------------------------------

Media ID      : 000216
Error         : no error
```

NOTES

To cancel the request generated by this command, use the **vscancelreq** command, or send a SIGQUIT signal (control-\).

The command can be aborted by sending a SIGINT signal (control-c), however this will not cancel the request.

SEE ALSO

vsimport(l), **vsarchiveqry**(l), **vsarchiveenter**(l), **vscancel**(l)

NAME

vsexport − Marks media and related media information for removal from the Media Manager system.

SYNOPSIS

vsexport *mediaID...* [**-t** comment] [**-v**] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vsexport(l) is issued from the command line to request execution of the Media Manager Export command.

A client uses the Export command to mark media and related information for removal from the Media Manager system. If the specified media are not associated with an archive, they are logically removed from the Media Manager system. If the specified media are associated with an archive, they are placed on the Eject list of the appropriate archive.

A client can also use the Export command to remove information about media that have been checked out of the archive and are physically out of the archive.

Upon receipt of an Export request, the software marks the specified media for eject and returns a successful return code to the client. The **Eject** button is highlighted on the operator's console to indicate that media need to be ejected from the archive.

To physically remove the media marked for export from the archive system, an operator must select the Eject functionality from the appropriate archive's console display. The Eject functionality is not available from the command line.

After media, specified on a **vsexport**(l) command, is physically removed from the archive system, the media is no longer under the control of the software, and all information related to exported media is deleted from the system.

OPTIONS

mediaID...

Specifies a list of one or more media to export.

A valid medium identifier may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

The number of media that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 64.

-t *comment*

Provide a text message to be displayed on the archive console for each medium being exported. This comment is provided on the Eject list (a GUI display) from the archive console associated with the archive containing the media.

The length of the comment is restricted by the CLI software. Currently, the maximum allowed length is 80.

-v Indicates that verbose output is desired.

If **-v** is specified, list status information on all media specified on the command.

If **-v** is not specified, report on only those media for which processing failed.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vsexport** command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful export request with verbose and comment options specified

vsexport MED012 MED014 MED016 **-t** Media to be shipped offsite **-v**

Requests to Media Manager software to place media MED012, MED014, and MED016 on the Eject list with the comment, *Media to be shipped off-site,* and to return status on every specified medium.

Output returned:

```
Export 3 of 3 media was successful

   Media [MED012]      no error

   Media [MED014]      no error

   Media [MED016]      no error
```

Successful export request with comment option specified and verbose option not specified

vsexport MED001 MED002 MED003 MED012 MED014 MED016 **-t** *Media to be shipped offsite*

Requests to Media Manager software to place media MED001, MED002, MED003, MED012, MED014, and MED016 on the Eject list with the comment, *Media to be shipped off-site*, and to return status on a medium only if processing for that medium failed.

Output returned:

```
Export 6 of 6 media was successful
```

Error(s) with verbose and comment options specified

vsexport MED007 MED014 MED021 MED028 MED053 MED042 **-t** *Media to be shipped offsite* **-v**

Requests to Media Manager software to place media MED007, MED014, MED021, MED028, MED053, and MED042 on the Eject list with the comment, *Media to be shipped off-site*, and to return status on every specified medium.

Output returned:

```
Export 4 of 6 media was successful

Error VOL024: error in the list

   Media [MED007]      no error

   Media [MED014]      invalid action or location state

                        for operation

   Media [MED021]      no error

   Media [MED028]      no error

   Media [MED053]      item not found

   Media [MED042]      no error
```

Error(s) with verbose option not specified and comment option specified

vsexport MED007 MED014 MED021 MED028 MED053 MED042 **-t** *Media to be shipped offsite*

Requests to Media Manager software to place media MED007, MED014, MED021, MED028, MED053, and MED042 on the Eject list with the comment, *Media to be shipped off-site*, and to return status on a medium only if processing on that medium failed.

Output returned:

```
Export 4 of 6 media was successful

Error VOL024: error in the list

   Media [MED014]      invalid action or location state

                        for operation

   Media [MED053]      item not found
```

NOTES

The Export command cannot be cancelled. Media can be unmarked for export via the Clear Eject request or if the operator fails the eject.

A medium that is marked for ejection from the archive system cannot be reallocated to satisfy a client re-

quest, except to satisfy a query of the medium. Any other request (except Clear Eject) received for that medium fails.

An allocated medium can be marked for export. Attempts to physically eject an allocated medium fail until the medium is no longer inuse.

The Export command triggers unsolicited status messages from the Media Manager software to the client software.

SEE ALSO

vscleareject(l), **vsimport**(l)

NAME

vsgetreqids − Lists the outstanding requests for the Media Manager system.

SYNOPSIS

vsgetreqids

DESCRIPTION

vsgetreqids(l) is issued from the command line to request execution of the Media Manager Get Request Identifiers command. The Media Manager software does not need to be active to run this command, however there would be output to display when the software is not running.

This will return a list of requests that are active in the Media Manager system.

OUTPUT

Each line of output contains a request identifier, a command type and a command identifier with each field separated by a "˜". The syntax for a line of output would be:

Request Identifier˜Command Type˜Command Identifier

Request Identifier
: The request id associated with the command. It can be used with the Request Query command to obtain more details about the request or the Cancel Request command to cancel the request.

Command Type
: Text identifying the type of the command.

Command Identifier
: The numeric identifier for the command. This value is needed by the Cancel Request command.

EXIT STATUS

0 The command is successfully processed.

255 An error is detected by either the CLI software or the API software.

>0 and <255
: The returned exit status corresponds to the error detected by the Media Manager software.

EXAMPLES

List active requests. In this example there are outstandings requests for an audit, mounts, dismount, eject and enter operations.

vsgetreqids

Output returned:

```
1122519038˜Audit˜7
1122518995˜Mount˜14
1122518996˜Mount˜14
1122518999˜Dismount˜16
1122519025˜Archive Eject˜47
1122519034˜Archive Enter˜48
```

SEE ALSO

vsrequestqry(l), **vscancelreq**(l)

NAME

vsimport − Logically adds media to the Media Manager system.

SYNOPSIS

vsimport *mediaID...* **-a** *archivename* **-Bc** *mediaclass* [**-f** *manufacturer* **-b** *batch*] [**-v**] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vsimport(l) is issued from the command line to request execution of the Media Manager Import command.

A client uses the Import command to logically add media to the Media Manager system. Upon receipt of an Import request, the specified media are added to the Media Manager system. If a non-unique media identifier is specified, the Import for that medium fails.

The Import is a logical operation. Media must be physically entered into an archive before they are available for client use (mounting,...). Entry is performed when an operator selects the Enter functionality from the appropriate archive's console display. The Enter functionality is not available from the command line.

OPTIONS

mediaID...

Specifies a list of one or more media to import.

A valid medium identifier may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

The number of media that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 64.

-a *archivename*

Identifies the archive into which the media are to be entered.

The Media Manager software sends Enter commands for the media to be entered to the console for the specified archive.

Valid archive names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-c *mediaclass*

Identifies the MediaClass name with which the imported media are to be associated.

Valid MediaClass names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-f *manufacturer*

Specifies the name of the media manufacturer.

If the **-f** *manufacturer* option is specified, the **-b** *batch* option must also be specified.

If the **-f** *manufacturer* option is not specified, the **-b** *batch* option cannot be specified.

-b *batch*

Specifies the manufacturer's batch that contains the media to be entered.

If the **-b** *batch* option is specified, the **-f** *manufacturer* option must also be specified.

If the **-b** *batch* option is not specified, the **-f** *manufacturer* option cannot be specified.

-v Indicates verbose output is desired.

If **-v** is specified, list status information on all media specified on the command.

If **-v** is not specified, report on only those media for which processing failed.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained

in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vsimport**(l) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful Import request with verbose option specified

vsimport MED003 MED018 MED021 MED030 MED036 **-a** shelf1 **-c** medclasssh1med **-v**

Requests the Media Manager software to import media MED003, MED018, MED021, MED030, and MED036 into the medclasssh1med MediaClass group in the shelf1 archive and to return status on every specified medium.

Output returned:

```
Import 5 of 5 media was successful

   Media [MED003]      no error

   Media [MED018]      no error

   Media [MED021]      no error
```

```
   Media [MED030]      no error

   Media [MED036]      no error
```

Successful Import request with verbose option not specified

vsimport MED003 MED018 MED021 MED030 MED03 **-a** shelf1 **-c** medclasssh1med

Requests the Media Manager software to import media MED003, MED018, MED021, MED030, and MED036 into the medclasssh1med MediaClass group in the shelf1 archive and to return status on a medium only if processing for that medium failed.

Output returned:

```
  Import 5 of 5 media was successful
```

Error(s) with verbose option specified

vsimport MED003 MED018 MED021 MED030 MED036 **-a** shelf1 **-c** medclasssh1med **-v** **-f** "MediaMaker ABC" **-b** 1001

Requests the Media Manager software to import media MED003, MED018, MED021, MED030, and MED036 into the medclasssh1med MediaClass group in the shelf1 archive and to return status on every specified medium. "MediaMaker ABC" is the manufacturer of these media and these media were part of batch "1001."

Output returned:

```
Import 3 of 5 media was successful

Error VOL024: error in the list

   Media [MED003]      no error

   Media [MED018]      item already exists

   Media [MED021]      item already exists

   Media [MED030]      no error

   Media [MED036]      no error
```

Error(s) with verbose option not specified

vsimport MED003 MED018 MED021 MED030 MED036 **-a** shelf1 **-c** medclasssh1med **-f** "MediaMaker ABC" **-b** 1001

Requests the Media Manager software to import media MED003, MED018, MED021, MED030, and MED036 into the medclasssh1med MediaClass group in the shelf1 archive and to return status on a medium only if processing for that medium failed. "MediaMaker ABC" is the manufacturer of these media and these media were part of batch "1001."

Output returned:

```
Import 3 of 5 media was successful

Error VOL024: error in the list

   Media [MED018]      item already exists
```

```
Media [MED021]      item already exists
```

Unsuccessful Import request

vsimport MED003 MED018 MED021 MED030 MED036 **-a** BadArchiveName **-c** medclassmed

Requests the Media Manager software to import media MED003, MED018, MED021, MED030, and MED036 into the medclassmed MediaClass group in the BadArchiveName archive and to return status on a medium only if processing for that medium failed.

Output returned:

```
Import of media was unsuccessful

Error VOL013: invalid archive
```

NOTES

Import is a logical operation. Media must be physically entered into an archive by an operator before they are available for general use. A successful Import request results in the media identifier being placed on the receiving archive's Enter list.

Media identifier values must be unique throughout a Media Manager system. Non-unique media identifiers are rejected.

If the Enter fails for the medium to be imported, the medium is placed Intransit.

Media identifiers of media being imported into manual archives may contain alphanumeric and special characters including spaces. However, spaces cannot be used as leading or trailing characters. If media in a manual archive can later be moved into an automated archive, the media identifiers must also conform to any naming restrictions imposed by the automated archive. For example, special characters may not be allowed in media identifiers in the automated archive.

The media type for the media is determined by the media type of the specified MediaClass group.

After the MediaClass capacity is reached, no more media can be imported into the MediaClass group.

The Import command triggers unsolicited status messages from the Media Manager software to the client software.

A pending Import request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control-\). The request also is aborted by sending the SIGINT signal (controlc).

SEE ALSO

vsexport(l)

NAME

vslock − Obtains exclusive use of one or more drives.

SYNOPSIS

vslock *driveID...* [**-q** *quantity*] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

vslock -p *drivepool* [**-x** *driveID...*] [**-q** *quantity*] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vslock(l) is issued from the command line to request execution of the Media Manager Lock command.

The Lock command is used to obtain exclusive use of a drive or a set of drives.

The lock identifier assigned to the locked drive(s) is returned to the client. This lock identifier must be used by clients on subsequent requests (such as Mount) for those drive(s).

A request to lock a drive that is busy (mounted or previously locked) is queued until the drive becomes available. In addition, intermediate status is returned to indicate the reason a request is being queued.

A Lock command that specifies a drive pool or a list of drives should also indicate the number of drives from the pool/list to be locked. The software selects the drives to lock from within the pool/list according to drive availability.

A Lock command cannot specify a drive pool or a list of drives that spans archives, they must be associated with a single archive.

A Lock command reserves one drive for exclusive use if a quantity is not specified on the command.

The Media Manager software considers only on-line drives as candidates to be locked. If a sufficient number of on-line drives in the same archive are unavailable to satisfy a Lock command, the Lock command fails.

If there is a sufficient number of online drives in the same archive to satisfy a Lock request, but the number of available online drives is not sufficient, the request waits until sufficient drives become available. Partial locks are not set.

OPTIONS

driveID...

Specifies a list of one or more candidate drives to reserve (lock) for exclusive use.

The number of drives that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 64.

-p *drivepool*

Specifies the drive pool name from which candidate drive(s) are reserved for exclusive use.

Valid drive pool names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-x *driveid...*

Specifies a list of one or more drive(s) contained in the specified drive pool that are NOT reserved for exclusive use.

The number of drives that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 64.

-q *quantity*

Specifies the number of drives to be locked. If the **-q** *quantity* option is not specified, the number of drives to be locked defaults to 1.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained

in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vslock**(l) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful Lock request that specifies a list of one or more drives

vslock 4 8 12

Requests the Media Manager software to lock (reserve for exclusive use) one of the drives 4, 8, and 12.

Output returned:

```
Lock [1] drives locked with lock id[1719790788]

      1          Drive[4]
```

Successful Lock request that specifies a drive pool and a quantity

vslock -p drvpoolmed **-q** 2

Requests the Media Manager software to lock (reserve for exclusive use) 2 drives from drive pool drvpoolmed.

Output returned:

```
Lock [2] drives locked with lock id[1719790788]

      1          Drive[40]

      2          Drive[41]
```

Unsuccessful Lock request, too many drives requested to be reserved

vslock -p drvpooltwr **-q** 5

Requests the Media Manager software to lock (reserve for exclusive use) 5 drives from drive pool drvpooltwr (drvpooltwr contains only 2 drives.)

Output returned:

```
Lock was unsuccessful

Error VOL122: not enough available drives in pool
```

Unsuccessful Lock request

vslock -p BadDrivePool **-q** 1

Requests the Media Manager software to lock (reserve for exclusive use) 1 drive from drive pool BadDrivePool.

Output returned:

```
Lock was unsuccessful

Error VOL030: invalid drive pool specified
```

NOTES

It is important to keep

Any Mount or Dismount request that contains the proper lock identifier has access to a locked drive.

If a Mount request does not specify a lock identifier for a locked drive, whether the drive is available for use or not, the Mount request waits until the drive is both unlocked and available.

If a Mount request specifies a drive pool, but does not specify a lock identifier, only available unlocked drives in the specified drive pool are considered to satisfy the Mount request. If there are no available unlocked drives in the specified drive pool, the Mount request waits until a drive from the specified drive pool becomes available and unlocked.

A Lock command that is queued and awaiting resources is cancelled via the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control-\). The request also is aborted by sending the SIGINT signal (controlc).

An **unlock** command is issued when the client no longer needs drives for exclusive use.

The Lock command does not trigger unsolicited status messages from the Media Manager software.

Intermediate status may be returned if the Lock command is queued.

SEE ALSO

vsdismount(l), **vsmount**(l), **vsunlock**(l)

NAME

vsmanualeject − Logically eject the specified media from the Media Manager system.

SYNOPSIS

vsmanualeject [**-v**] [**-Ih**] [**-H** *host*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *prognum*] *mediaID*...

DESCRIPTION

vsmanualeject(l) is issued from the command line to request execution of the Media Manager Manual Eject command. The Manual Eject command is generally used when media in an archive cannot be accessed by the robot. Although the command can be used for any reason that a medium cannot be accessed such as:

A medium label cannot be read by a robot barcode reader.

A medium has fallen on the archive floor.

A medium becomes jammed in a tape drive.

A medium is unavailable for any reason, such as a nonoperational robot or archive equipment.

After executing the Manual Eject command, the specified media are placed in the intransit state. This state indicates that media are known by Media Manager software but are not physically in an archive.

Unlike the Export Media command, media information is retained in the Media Manager database after the Manual Eject command is executed so these media remain known to the Media Manager software.

The Move media command is recommended for re-entering media that were manually ejected but the Enter command or the bulk load method using the Audit command can also be used.

The Media Manager software must be active in order to run this command however the archive where the media are located must be logically offline within the Media Manager software. Prior to running this command, an operator should have already physically removed the media from the archive.

OPTIONS

-v Indicates verbose output is desired. When this option is used, it will show status information on all media specified on the command otherwise, only those media for which processing failed will be reported.

-I Indicates command line options are to be read from stdin.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *host* The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *prognum*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

mediaID...

Specifies one or more media to manually eject.

A valid medium identifier may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

EXIT STATUS

0 The command is successfully processed.

255 An error is detected by either the CLI software or the API software.

>0 and <255

The returned exit status corresponds to the error detected by the Media Manager software.

EXAMPLES

Attempt to manually eject 3 media when the archive is online.

vsmanualeject -v 000047 000048 000049

Output returned

```
Manual eject 0 of 3 media was successful
Error VOL024: error in the list
        Medium [000047]             Archive not offline
        Medium [000048]             Archive not offline
        Medium [000049]             Archive not offline
```

Manually eject 3 media when the archive is offline.

vsmanualeject -v 000047 000048 000049

Output returned

```
Manual eject 3 of 3 media was successful
        Medium [000047]             no error
        Medium [000048]             no error
        Medium [000049]             no error
```

NOTES

To cancel the request generated by this command, use the **vscancelreq** command, or send a SIGQUIT signal (control-\).

The command can be aborted by sending a SIGINT signal (control-c), however this will not cancel the request.

SEE ALSO

vsexport(l), **vsenter**(l), **vsmove**(l), **vscancelreq**(l)

NAME

vsmedclasscreate − Creates a media class for the Media Manager system.

SYNOPSIS

vsmedclasscreate [**-Ih**] [**-H** *host*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *prognum*] [**-C**] [**-x** *highMarkPercent*] [**-n** *notificationComment*] **-c** *capacity* **-t** *mediaType mediaclass*

DESCRIPTION

vsmedclasscreate(l) is issued from the command line to request execution of the Media Manager Media Class Create command. The Media Manager software must be active in order to run this command.

After an archive is successfully configured and registered with Media Manager, at least one media class must be created. Media classes provide logical organization of media into smaller groups.

Media classes have several important characteristics:

When a medium is entered into an archive, it is also entered into a media class. The medium can be in one, and only one, media class.

Once a medium in entered into a media class, it can only be moved into another media class with the Reclassify Media command or a Mount Media command with the reclassify option selected.

Only one media type can exist within a media class.

Media classes can be associated with more than one archive.

OPTIONS

-I Indicates command line options are to be read from stdin.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *host* The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *prognum*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

-C This option indicates that the Mount Media command can perform mounts by specifying this media class.

-x *highMarkPercent*

The high mark percent indicates a capacity break point that is calculated as a percentage of class capacity. After the high mark capacity is reached, a notification is logged and displayed in the system syslog. An optional notification comment is logged with the syslog message when the **-n** option is specified. The syslog message occurs for every media added to the media class after the high mark has been exceeded. No more media may be entered into the media class when class capacity is reached, regardless of which archive it is associated with. Syslog notification messages stop whenever the amount of media drops below the high mark. This can be achieved by ejecting media, or using the Reclassify Media command to move media into another media class.

-n *notificationComment*

The notification comment parameter specifies a message that is included in the system logs when the media class fill level exceeds the high mark threshold.

-c *capacity*

The capacity parameter indicates the maximum number of media that can be associated with this media class. Media classes are designed to be associated with multiple archives. However, a media class can be wholly associated with one archive. Therefore, plan media class capacities to cover the expected size of the archives. No software restriction is placed on the media class capacity. Class capacity can exceed the total combined capacity of all archives, or can be as small as one.

-t *mediaType*

The media type parameter identifies the type of media used in the media class. As noted before, only one media type can be specified for a media class. The valid media types can be obtained with the **vsmedtypeqry -a** command.

mediaclass

The media class name parameter is a user-specified name by which the media class is known to the user.

Valid media class names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

EXIT STATUS

0 The command is successfully processed.

255 An error is detected by either the CLI software or the API software.

>0 and <255

The returned exit status corresponds to the error detected by the Media Manager software.

EXAMPLES

Create a media class called *abc* with a capacity of 100 LTO media

vsmedclasscreate -c *100* **-t** *LTO abc*

Create a media class called *abc* with a capacity of 100 LTO media, which issues a notification with an additional comment of "*time to add media*" when the media class is 75 percent full

vsmedclasscreate -c 100 **-t** LTO **-x** 75 **-n** "TIme to add media" abc

NOTES

To cancel the request generated by this command, use the **vscancelreq** command, or send a SIGQUIT signal (control-\).

The command can be aborted by sending a SIGINT signal (control-c), however this will not cancel the request.

SEE ALSO

vsmount(l), **vsmediaclassdelete**(l), **vsreclassify**(l), **vsmedtypeqry**(l), **vscancelreq**(l)

NAME

vsmedclassdelete − Delete a media class for the Media Manager system.

SYNOPSIS

vsmedclassdelete [**-Ih**] [**-H** *host*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *prognum*] *mediaclass*

DESCRIPTION

vsmedclassdelete(l) is issued from the command line to request execution of the Media Manager Media Class Delete command. The Media Manager software must be active in order to run this command.

When a media class is no longer needed it can be deleted using the Delete Media Class command. However, the deletion of the media class is only allowed if it not associated with any archives. The archive association can be removed using the **vsarcmedclassdelete** command.

OPTIONS

-I Indicates command line options are to be read from stdin.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *host* The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *prognum*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

mediaclass

Specifies the name of the media class to be deleted. The media class name parameter is a user-specified name by which the media class is known to the user.

Valid media class names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

EXIT STATUS

0 The command is successfully processed.

255 An error is detected by either the CLI software or the API software.

>0 and <255

The returned exit status corresponds to the error detected by the Media Manager software.

EXAMPLES

Delete media class called abc

vsmedclassdelete abc

NOTES

To cancel the request generated by this command, use the **vscancelreq** command, or send a SIGQUIT signal (control-\).

The command can be aborted by sending a SIGINT signal (control-c), however this will not cancel the request.

SEE ALSO

vsarcmedclassdelete(l), **vscancelreq**(l)

NAME

vsmedclassqry − Queries for the attributes of a specified MediaClass group or all MediaClass groups.

SYNOPSIS

vsmedclassqry *mediaclass* [**-m**|**-v**] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

vsmedclassqry -a [**-m**|**-v**] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vsmedclassqry(l) is issued from the command line to request execution of the Media Manager MediaClass Query command.

The MediaClass Query command is used to obtain information about one or all MediaClass groups in the Media Manager system. The members of the MediaClass group and any additionally requested information on each medium is returned to the client.

OPTIONS

mediaclass

Specifies a single MediaClass name on which to request information.

Valid MediaClass names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-a Requests information on all MediaClass groups known to the Media Manager system.

-m Requests a list of media identifiers for all media associated with each reported MediaClass group.

-v (verbose) Requests detailed information for all media associated with each reported MediaClass group.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vsmedclassqry**(l) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful MediaClass Query with neither -m nor -v specified

vsmedclassqry -a

Requests the Media Manager software to return information on every MediaClass group known to the Media Manager system. No mediaspecific information is requested.

Output returned:

```
    ------------------------------------------------

    Media Class Query Report   May 14 10:09:11 1993      1

    ------------------------------------------------

    Media Class: medclassstgusr

    ------------------------------------------------

       Media Type:                  USRTYPE
       Capacity:                    20
       Current Fill Level:          2
       High Mark %:                 80%
       Mountable by Class:          Yes
       Notify Comment:              Media exceed high mark
       RPC Option:                  No Callback

    Media Class: medclasssh2med

    ------------------------------------------------

       Media Type:                  D2M
       Capacity:                    20
       Current Fill Level:          3
       High Mark %:                 80%
       Mountable by Class:          Yes
       Notify Comment:              Media exceed high mark
       RPC Option:                  Enterprise Callback
       Enterprise ID:               3

    Media Class: medclasssh2sml

    ------------------------------------------------
```

```
   Media Type:                 D2S
   Capacity:                   20
   Current Fill Level:         2
   High Mark %:                80%
   Mountable by Class:         Yes
   Notify Comment:             Media exceed high mark
   RPC Option:                 Standard Callback
   HostName:                   copper
   Program Number:             1
   Version Number:             1
   Procedure Number:           1
   Protocol:                   TCP
```

Successful Media Class Query request with -m option specified

vsmedclassqry medclasssh1usr -m

Requests the Media Manager software to return detailed media information for every medium in the medclasssh1usr MediaClass group.

Output returned:

```
    ------------------------------------------------

    Media Class Query Report   May 14 09:45:57 1993      1

    ------------------------------------------------

    Media Class: medclasssh1usr

    ------------------------------------------------

       Media Type:  USRTYPE

       Capacity:                   20
       Current Fill Level:         3
       High Mark %:                80%
       Mountable by Class:         Yes
       Notify Comment:             Media exceed high mark
       RPC Option:                 No Callback
```

Media ID(s): MED007 MED025 MED040

Successful Media Class Query request with -v option specified

vsmedclassqry medclasssml -v

Requests the Media Manager software to return detailed media information for every medium in the medclasssml MediaClass group.

Output returned:

```
    ------------------------------------------------

    Media Class Query Report   May 14 09:45:57 1993      1

    ------------------------------------------------
```

```
Media Class: medclasssml

-----------------------------------------------

   Media Type:                 D2S
   Capacity:                   20
   Current Fill Level:         8
   High Mark %:                80%
   Mountable by Class:         Yes
   Notify Comment:             Media exceed high mark
   RPC Option:                 No Callback

MediaID: MED005

   Media Type:                 D2S
   Media Class:                medclasssml
   Assignment:                 Free
   Location State:             Archive
   Current Archive:            stage1
   Pending Archive:
   Action State:               None
   Import Date:                May 14 09:30:09 1993
   Last Access:                May 14 09:45:43 1993
   Mount Count:                2
   Move Count:
   Manufacturer:               MediaMaker
   Batch:                      1001

MediaID: MED017

   Media Type:                 D2S
   Media Class:                medclasssml
   Assignment:                 Allocated
   Location State:             Archive
   Current Archive:            shelf2
   Pending Archive:
   Action State:               None
   Import Date:                May 14 09:28:41 1993
   Last Access:                May 14 09:40:21 1993
   Mount Count:                1
   Move Count:                 1
   Manufacturer:
   Batch:

MediaID: MED038

   Media Type:                 D2S
   Media Class:                medclasssml
   Assignment:                 Free
   Location State:             Archive
   Current Archive:            shelf2
   Pending Archive:            shelf1
   Action State:               Move
   Import Date:                May 14 09:30:09 1993
```

```
   Last Access:
   Mount Count:                1
   Move Count:                 2
   Manufacturer:
   Batch:

MediaID: MED051

   Media Type:                 D2S
   Media Class:                medclasssml
   Assignment:                 Free
   Location State:             Intransit
   Current Archive:
   Pending Archive:            shelf1
   Action State:               Import
   Import Date:                May 14 09:30:09 1993
   Last Access:
   Mount Count:                0
   Move Count:                 0
   Manufacturer:
   Batch:
```

Unsuccessful Media Class Query

vsmedclassqry UnknownClass

Requests the Media Manager software to return information on the UnknownClass MediaClass group.

Output returned:

```
Query of Media Class [UnknownClass] was unsuccessful

Error VOL008: item not found
```

NOTES

The Media Class Query command does not trigger unsolicited status messages from the Media Manager software.

A pending Media Class Query request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control-\). The request also is aborted by sending the SIGINT signal (controlc).

SEE ALSO

vsmedqry(l)

NAME

vsmedqry − Queries for the attributes of one or more specified media.

SYNOPSIS

vsmedqry *mediaID...* [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

vsmedqry -a [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vsmedqry(l) is issued from the command line to request execution of the Media Manager Media Query command.

The Media Query command is used to obtain information about one, many, or all media in the Media Manager system. The values of the attributes of the media are returned to the client.

OPTIONS

mediaID...

Specifies a list of one or more media to be queried.

The number of media that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 64.

-a Specifies the **-a** option to indicate information is to be reported on all media known to the Media Manager system.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

OUTPUT

Media Type	The type of media.
Media Class	The media class designated for the tape.
Assignment	Indicates whether the tape is available for mounting. Values are Allocated or Free.
Location State	The location of the tape. Values are Archive, Checkout, or Intransit.
Current Archive	The current library in which the media is located.
Pending Archive	Indicates whether the media is associated with another library.
Action State	Indicates when and how the media is moving.
Import Date	The date and time the media was added to the archive.
Last Access	The date and time when the media was last used.
Mount Count	The number of times the tape has been mounted.
Move Count	The number of times the tape has been moved.
Manufacturer	The name of the media manufacturer, if one was specified during an enter.
Batch	Indicates the manufacturer's batch that contained the media, if one was specified during an enter.
Current State	If the media is in an archive, the state of the archive where the media is located. Values are On-line, Off-line, Diagnostic, or Unavailable.

EXIT STATUS

0	The **vsmedqry**(l) command is successfully processed.
-1	An error is detected by either the CLI software or the API software.
>0	An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful Media Query request

vsmedqry -a

Requests the Media Manager software to return information on every medium known to the Media Manager system.

Output returned:

```
------------------------------------------------

Media Query Report  May 14 10:34:30 1993           1

------------------------------------------------

Media ID:  MED001

------------------------------------------------

   Media Type:                 USRTYPE
   Media Class:                medclassstgusr
   Assignment:                 Free
   Location State:             Archive
```

```
   Current Archive:            stage1
   Pending Archive:
   Action State:               None
   Import Date:                May 13 12:06:15 1993
   Last Access:                May 13 13:12:09   1993
   Mount Count:                1
   Move Count:                 2
   Manufacturer:
   Batch:
   Current State:              On-line

Media ID:  MED015

-----------------------------------------------

   Media Type:                 D2M
   Media Class:                medclassmed
   Assignment:                 Free
   Location State:             Intransit
   Current Archive:
   Pending Archive:            shelf1
   Action State:               Move
   Import Date:                May 13 16:25:39 1993
   Last Access:                May 13 16:40:53   1993
   Mount Count:                0
   Move Count:                 0
   Manufacturer:               MediaMaker ABC
   Batch:                      1001
   Current State:

Media ID:  MED027

-----------------------------------------------

   Media Type:                 D2M
   Media Class:                medclassmed
   Assignment:                 Free
   Location State:             Archive
   Current Archive:            shelf2
   Pending Archive:            shelf1
   Action State:               Move
   Import Date:                May 12 14:36:10 1993
   Last Access:                May 13 16:13:53 1993
   Mount Count:                0
   Move Count:                 0
   Manufacturer:
   Batch:
   Current State:              On-line

Media ID:  MED039

-----------------------------------------------

   Media Type:                 D2M
```

```
   Media Class:                medclassmed
   Assignment:                 Allocated
   Location State:             Archive
   Current Archive:            shelf1
   Pending Archive:            shelf2
   Action State:               Move
   Import Date:                May 12 14:36:10 1993
   Last Access:                May 13 14:36:10 1993
   Mount Count:                1
   Move Count:                 1
   Manufacturer:
   Batch:
   Current State:              On-line
```

Media Query request with errors

vsmedqry MED027 BadMedium MED039

Requests the Media Manager software to return information on media MED027, BadMedium, and MED039.

Output returned:

```
-----------------------------------------------

Media Query Report  May 25 16:06:09 1993           1

-----------------------------------------------

Media ID:  MED027

-----------------------------------------------

   Media Type:                 D2M
   Media Class:                medclassmed
   Assignment:                 Free
   Location State:             Archive
   Current Archive:            shelf2
   Pending Archive:            shelf1
   Action State:               Move
   Import Date:                May 13 16:36:39 1993
   Last Access:                May 24 12:23:25 1993
   Mount Count:                0
   Move Count:                 0
   Manufacturer:
   Batch:
   Current State:              On-line

Media ID:  BadMedium

-----------------------------------------------

   Error:  item not found


Media ID:  MED039
```

```
-----------------------------------------------

   Media Type:                  D2M
   Media Class:                 medclassmed
   Assignment:                  Allocated
   Location State:              Archive
   Current Archive:             shelf1
   Pending Archive:             shelf2
   Action State:                Move
   Import Date:                 May 13 16:36:39 1993
   Last Access:                 May 24 12:23:25 1993
   Mount Count:                 1
   Move Count:                  1
   Manufacturer:
   Batch:
   Current State:               On-line
```

NOTES

A Media Query request can query any media in the Media Manager system. The media specified in a single Media Query request are not required to be located in the same archive.

A pending Media Query request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control\). The request also is aborted by sending the SIGINT signal (controlc).

The Media Query command does not trigger unsolicited status messages from the Media Manager software.

SEE ALSO

vsmedclassqry(l)

NAME

vsmedstateqry − Query for media that are in the Intransit or Unknown states.

SYNOPSIS

vsmedstateqry -i [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *prognum*]

vsmedstateqry -u [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *prognum*]

DESCRIPTION

vsmedstateqry(l) is issued from the command line to request execution of the Media Manager Media State Query command.

A client uses the Media State Query command to obtain information about media in the Intransit or Unknown states. The query returns a list of media identifiers.

A medium is considered to be in the Intransit state if it is waiting to be entered into an archive as a result of **Import**, **Mount**, **Move**, **Check-out**, or migration activity processing.

A medium is considered to be the Unknown state if its location is not known as the result of a Manual Eject or a Failed Enter activity.

The **vsmedstateqry**(l) command supports no command-specific options.

OPTIONS

-i Return information about media in the Intransit state.

-u Return information about media in the Unknown state.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The help option takes precedence over any other option entered on a command. When the help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *prognum*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vsmedstateqry**(l) command was successfully processed.

-1 An error was detected by either the CLI software or the API software.

>0 An error was detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful media state query

vsmedstateqry -i

Requests the Media Manager software to return a list of all media in the Intransit state.

Output returned:

```
------------------------------------------------

Media State Query Report   08-May-2012 10:54:02

------------------------------------------------

Media ID(s):  MED007  MED025  MED040
```

Unsuccessful media state query

vsmedstateqry -i

Requests the Media Manager software to return a list of all media in the Intransit state.

Output returned:

```
Media State query was unsuccessful

Error VOL008: item(s) not found
```

NOTES

Only media in the Intransit state or Unknown state are queried and reported to the client.

The Media State Query command does not trigger unsolicited status messages from the Media Manager software.

A pending Media State Query request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control-\). The request also is aborted by sending the SIGINT signal (control-c).

SEE ALSO

vsmedqry(l)

NAME

vsmedtypeqry − Queries for the attributes of one or more media types.

SYNOPSIS

vsmedtypeqry *mediatype*... [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

vsmedtypeqry -a [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vsmedtypeqry(l) is issued from the command line to request execution of the Media Manager Media Type Query command.

The Media Type Query command is used to obtain information about one, several, or all media type(s) in the Media Manager system. The values of the attributes of the media types are returned to the client.

OPTIONS

mediatype...

Specifies a list of one or more media type(s) to be queried.

Either systemspecified media type(s) and/or userdefined media type(s) can be specified.

Valid media type names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

The number of media types that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 32.

-a Indicates that information is to be returned on all media types known to the Media Manager system.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vsmedtypeqry**(l) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful Media Type Query request

vsmedtypeqry -a

Requests the Media Manager software to return information on every media type known to the Media Manager system.

Output returned:

```
------------------------------------------------

Media Type Query Report  May 24 12:43:18 1993         1

------------------------------------------------

MediaType:  D2S

------------------------------------------------

   Capacity:           25000.00 megabytes
   Number of Sides:    1

MediaType:  3480

------------------------------------------------

   Capacity:           200.00 megabytes
   Number of Sides:    1
```

Media Type Query request with errors.

vsmedtypeqry D2S USRTYPE

Requests the Media Manager software to return information on media types D2S and USRTYPE.

Output returned:

```
------------------------------------------------

Media Type Query Report  May 24 12:43:18 1993         1

------------------------------------------------

MediaType:  D2S
```

```
-----------------------------------------------

   Capacity:           25000.00 megabytes
   Number of Sides:    1

MediaType:  USRTYPE

-----------------------------------------------

   Error: item not found
```

NOTES

The Media Type Query command does not trigger unsolicited status messages from the Media Manager software.

A pending Media Type Query request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control-\). The request also is aborted by sending the SIGINT signal (controlc).

SEE ALSO

vsmedclassqry(l), **vsmedqry**(l)

NAME

vsmount − Mounts a medium onto a drive.

SYNOPSIS

vsmount *mediaID...* **-d** *driveID* [**-i**|**-u**] [**-l** *lockID*] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

vsmount -c *mediaclass* **-d** *driveID* **[**-n *newmediaclass***]** [**-i**|**-u**] [**-l** *lockID*] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

vsmount *mediaID...* **-p** *drivepool* [**-x** *driveID...*] [-i|-u**]** [**-l** *lockID*] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

vsmount -c *mediaclass* **-p** *drivepool* [**-x** *driveID...*] [**-n** *newmediaclass*] [**-i**|**-u**] [**-l** *lockID*] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vsmount(l) is issued from the command line to request execution of the Media Manager Mount command.

A client uses the Mount command to mount a medium onto a drive.

When issuing a Mount command, the client can specify one of the following.

A single medium
A list of media
A MediaClass group

and either

A specific drive
A drive pool
A drive pool with the exclusion of drive(s)

The **vsmount**(l) command supports a lock identifier parameter. This parameter is required if the drive to be used in satisfying the Mount request has been previously locked with a Lock request. If a Mount request is issued for a locked drive and does not specify a lock identifier, the Mount request waits until the requested drive is unlocked.

The client can also specify how to handle a Mount request that requires an interarchive movement of the medium. This option indicates whether an inter-archive medium movement should or should not be attempted and whether to consider if the source and destination archives are operator-attended or not.

If more than one media and/or a drive pool is specified on the **vsmount**(l) command, the Media Manager software applies a selection algorithm to select a medium/drive pair from the list of media and available drives.

For manual archives, a Mount notice is sent to the operator console for action. The operator is then responsible for confirmation to the Media Manager software when the mount is complete. The Media Manager software returns a return code to the client after the operator action is complete.

A Mount request is queued for later processing if:

The specified/selected drive is busy.
The specified/selected medium is busy.
The selected/specified drive is locked and a lock identifier was not specified on the Mount request.

When a Mount request is queued for later processing, the Media Manager software returns intermediate status to the client that specifies the reason the Mount request was queued.

OPTIONS

mediaID...

Specifies a list of one or more media from which the medium to be mounted is to be selected.

A valid medium identifier may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

The number of media that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 64.

-d *driveID*
Specifies a drive that can be used to satisfy the Mount request.

-c *mediaclass*
Specifies a MediaClass name from which the medium to be mounted is to be selected.

-p *drivepool*
Specifies a drive pool from which the drive to satisfy the Mount request can be selected.

Valid drive pool names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-x *driveid...*
Specifies a list of one or more drive(s) contained in the specified drive pool that are to be excluded from consideration when allocating drive(s) to satisfy the Mount request.

The number of drives that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 64.

-n *newmediaclass*
Specifies the destination MediaClass group for the reclassification of the medium selected to satisfy the Mount request.

Specifies the **-n** *newmediaclass* option only if the selected medium is to be reclassified to a different MediaClass group.

-i Indicates that a mount requiring an interarchive move fails if either the source and destination archive is marked as unattended.

-u Indicates that a mount requiring an interarchive move is to be performed, regardless of whether either the losing or gaining archive is attended or unattended.

Neither **-i** nor **-u**
Indicates that any mount requiring an interarchive move is to be failed.

-l *lockID*
Specifies the associated lock identifier if a locked drive(s) is/are specified to satisfy the Mount request.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*
The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*
The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vsmount**(1) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful Mount request that specifies a list of one or more media and a specific drive

vsmount MED026 **-d** 9

Requests the Media Manager software to mount medium MED026 on drive 9.

Output returned:

```
Mount of Media [MED026] onto Drive [9] was successful
```

Successful Mount request that specifies a MediaClass group and a specific drive

vsmount -c medclassmed **-d** 10 **-n** medclasssh1med

Requests the Media Manager software to mount a medium from MediaClass medclassmed onto drive 10 and to reclassify the selected medium to MediaClass group medclasssh1med.

Output returned:

```
Mount of Media [MED027] onto Drive [10] was successful
```

Successful Mount request that specifies a specific medium and a drive pool with an exclusion drive list

vsmount MED022 **-p** drvpoolusr **-x** 4 14

Requests the Media Manager software to mount medium MED022 onto any drive from drive pool drvpoolusr, excluding drives 4 and 14.

Output returned:

```
Mount of Media [MED022] onto Drive [12] was successful
```

Successful Mount request that specifies a MediaClass name and a drive pool

vsmount -c medclasssml **-p** drvpooltwr

Requests the Media Manager Software to mount a medium from the medclasssml MediaClass group onto a drive from the drvpooltwr drive pool.

Output returned:

```
Mount of Media [MED041] onto Drive [7] was successful
```

Successful Mount request when all specified drives are in use

vsmount MED034 **-d** 12

Requests the Media Manager software to mount medium MED034 onto drive 12. (MED022 is currently mounted on drive 12.)

Output returned:

```
Mount waiting due to busy drive

Mount of Media [MED034] onto Drive [12] was successful
```

Successful Mount request when specified medium is in use

vsmount MED034 **-p** drvpoolmed **-x** 12

Requests the Media Manager software to mount medium MED034 on any drive in drive pool drvpoolmed except drive 12.

Output returned:

```
Mount waiting due to busy medium

Mount of Media [MED034] on Drive [14] was successful
```

Successful Mount request reclassifying the selected medium

vsmount -c medclassstgmed **-p** drvpoolmed **-n** medclassmed

Requests the Media Manager software to mount any medium from MediaClass group medclassstgmed onto any drive in drive pool drvpoolmed, and to change the MediaClass association of the selected medium from medclassstgmed to medclassmed.

Output returned:

```
Mount of Media [MED048] onto Drive [3] was successful
```

Before execution of the **vsmount**(l) request, MED048 was associated with medclassstgmed. After execution of the **vsmount**(l) request, MED048 is associated with medclassmed. The **vsmedqry**(l) command can be used to verify the MediaClass association of a specific medium.

Unsuccessful Mount request requiring an interarchive move

vsmount MED023 **-d** 11

Requests the Media Manager software to mount medium MED023 located in the stage1 archive onto drive 11 associated with the tower1 archive.

Output returned:

```
Media could not be mounted onto drive

Error VOL110: mount crosses archives
```

Unsuccessful Mount request with unknown media specified

vsmount BadMedium **-d** 5

Requests the Media Manager software to mount medium BadMedium onto drive 5.

Output returned:

```
Media could not be mounted onto drive

Error VOL029: invalid media specified
```

NOTES

The time required to satisfy a specific mount request is dependent on the number of available drives and pending Mount requests.

A drive that is specified in a Mount request may not be the ideal drive on which to mount the specified medium. It may take considerably longer to mount the medium onto a specified drive than if a drive pool is specified.

The **-i** and **-u** options have no effect on a Mount request that does not require an inter-archive medium movement.

If a specified drive was previously locked, the lock identifier assigned to that drive must be supplied before that drive is considered in the selection process.

If a specified or selected drive was previously locked and the Mount request does not specify a lock identifier, Media Manager software returns a message to the client that the selected drive is locked and the Media Manager software is waiting for the drive to become unlocked to continue execution of the command.

If the Mount request specifies a MediaClass group and the **-n** *newmediaclass* option is specified, the reclassify to a different MediaClass group occurs only after the Media Manager software selects the medium to satisfy the Mount request. Only the selected medium is reclassified. The remaining media in the MediaClass group are not reclassified.

If the **-n** *newmediaclass* option is specified, the receiving MediaClass group is checked for compatible media type, as well as for adequate room for another medium (i.e., fill level less than capacity). If either of these conditions is not satisfied, the Mount request fails.

A pending Mount request (waiting for a drive or a medium) is cancelled with the Media Manager Cancel request. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control-\). The request also is aborted by sending the SIGINT signal (control-c).

The Mount request fails if no specified drive is online.

If a medium and/or drive is specified and either the medium or drive (or both) are presently in use, the Mount request waits for resources and a message is returned to the client that indicates the reason for the delay.

When specifying a drive pool that contains drives that support different types of media, only those drives that support the media type of the media specified in the Mount request are considered for selection.

If a list of media specified in a Mount request contains media of more than one type, the request fails.

When a medium/drive pairing requires the medium be moved within a single archive system (such as cross-aisle) the mount may take a while to complete. The **-i** and **-u** options do NOT apply to intra-archive system movement.

When a Mount request with groups of media and/or drives is submitted, the Media Manager software attempts to select a drive/medium pair where the drive and medium are associated with the same archive. If multiple drive/medium pai are candidates, the Media Manager software selects a drive/medium pair from the archive with an available drive.

If no drive/medium pair associated with the same archive exists, the Media Manager software then selects a

drive/medium pair where the drive and medium are associated with a different archive. If multiple drive/medium pair are candidates, the Media Manager software selects a drive/medium pair from the archive with the largest number of drives. If all archives contain the same number of drives, the Media Manager software then selects a drive/medium pair from the archive with the largest number of media.

When specifying a mount by MediaClass group, and the specified MediaClass group is associated with more than one archive, no inter-archive medium/drive pairing is permitted. The medium selected from the MediaClass group must be in the same archive as the selected drive; otherwise the Mount request fails.

When a medium is ejected (as a result of Export, or Checkout, no check is made to determine if a queued Mount request exists for the ejected medium. As a result, the Mount request remains queued until a drive is freed. At that time, the Mount request fails because the medium is not available. In other words, the request queue is not checked for impact on pending requests each time a resource changes its availability and after a medium/drive pair is identified. The Media Manager software does not attempt re-pairing based on changed availability of resources.

The Mount command triggers unsolicited status messages from the Media Manager software to the client software.

Mount requests may require interarchive medium movement or a Mount request can be queued waiting for an inuse medium or drive. The client may want to increase the *timeout* value or the *retries* value so the CLI **vsmount** request does not timeout while waiting for the Mount request to complete.

If the Mount request allows movement, Media Manager checks the destination archive for available space. If no space is available, the mount fails.

SEE ALSO

vsdismount(l), **vsreclassify**(l)

NAME

vsmove − Moves media from one archive to another.

SYNOPSIS

vsmove [**-Ihiwv**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*] [**-F** *type*]
-a *archivename mediaID...*

DESCRIPTION

vsmove(l) is issued from the command line to request execution of the Media Manager Move command.

A client uses the Move command to direct the movement of media from one archive to another. Interarchive media movement requires operator intervention. The operator must eject the media from their current archives and enter them into the target archive. The Eject and Enter functionalities are available from the appropriate archive's console display. The Eject and Enter functionalities are not available from the command line.

Upon receipt of a Move request, the software verifies the specified media exist, the target archive supports the media type of the specified media, and there exists an appropriate archive MediaClass association with the target archive. The current archive of each specified medium is commanded to eject the medium. An Eject request, specifying the target archive, is displayed on the archive console of each losing archive. The operator must select and manually eject/remove the media on the list. After a medium is selected for ejection, the target archive displays a corresponding **Enter** request for that medium. The operator must then manually enter the media specified on the list into the target archive.

The client has the option of specifying the **-w** option in the Move request.

When the **-w** option is specified, the Media Manager software waits until processing of the Move command completes before returning status to the client. The client must monitor the media movement (e.g., unsolicited status messages) to know when the media are entered into the target archive system.

When the **-w** option is not specified, the Media Manager software returns a status code to the client after the specified medium (media) are placed on the Eject list of the source archive.

When the media are ejected from the original archive and entered into the target archive, the Media Manager system generates unsolicited status messages if any of the moved media are associated with MediaClass groups that are configured to generate unsolicited communication from the Media Manager software.

The Move command is issued for "homeless" media. A homeless medium is an Intransit medium that has no pending movement activity.

OPTIONS

-a *archivename*

Specifies the name of the archive to which the specified media are to be moved.

Valid archive names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

mediaID...

Specifies a list of one or more media to be moved.
A valid medium identifier may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.
The number of media that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 64.

-i Indicates this command is to be processed only if both the source and destination archives are operator-attended.

-w Indicates the Media Manager software waits until the command processing completes before returning status to the client.

If the move requires an interarchive move, Media Manager software waits until the move completes, whether the source and destination archives are attended or unattended. When the

-w option is not specified, final status is returned as soon as move processing begins.

-v Indicates that verbose output is desired.

If **-v** is specified, status is returned on all media specified in the Move request.

if **-v** is not specified, status is returned on only those media that were not successfully processed.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

-F *type* Sets the output format to the specified *type*. Valid values are **TEXT** (default), **XML**, or **JSON**.

TEXT is the "legacy" textual format.

XML (Extensible Markup Language) is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. You may validate the XML output using the XSD (see **fsxsd**(1) for details). See http://en.wikipedia.org/wiki/XML for more information.

JSON (JavaScript Object Notation) is a lightweight text-based open standard designed for human-readable data interchange. It is derived from the JavaScript programming language for representing simple data structures and associative arrays, called objects. Despite its relationship to JavaScript, it is language-independent, with parsers available for virtually every programming lan-

guage. The JSON format is often used for serializing and transmitting structured data over a network connection. It is primarily used to transmit data between a server and web application, serving as an alternative to XML. See http://json.org for more information.

EXIT STATUS

0 The **vsmove**(l) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful Move request, wait until move completes before returning status to client, verbose option specified.

vsmove MED016 MED023 MED044 MED048 **-a** stage1 **-wv**

Requests the Media Manager software to move media MED016, MED023, MED044, and MED048 to archive stage1; to wait until the move completes before returning status to the client; and to return status on every specified medium.

Output returned:

```
Move 4 of 4 media was successful

   Media [MED016]      no error

   Media [MED028]      no error

   Media [MED043]      no error

   Media [MED048]      no error
```

Successful Move request, verbose option not specified

vsmove MED013 MED016 MED028 MED031 **-a** shelf1

Requests the Media Manager software to move media MED013, MED016, MED028, and MED028 to archive shelf1. Since the **-i** option is NOT specified, the move is to complete whether the losing and gaining archives are attended or unattended.

Output returned:

```
Move 4 of 4 media was successful.
```

Error(s) with verbose option specified (target archive is unattended)

vsmove MED013 MED016 MED022 MED034 **-a** shelf1 **-iv**

Requests the Media Manager software to move media MED013, MED016, MED022, and MED034 to the shelf1 archive only if both the source archive(s) and the destination archive are attended and to return status on every specified medium.

Output returned:

```
Move 0 of 4 media was successful

Error VOL024: error in the list

   Media [MED013]   target archive mode is unattended
```

```
   Media [MED016]   target archive mode is unattended

   Media [MED022]   target archive mode is unattended

   Media [MED034]   target archive mode is unattended
```

Error(s) with verbose option not specified

vsmove MED003 MED004 MED013 MED028 MED033 MED043 **-a** shelf2

Requests the Media Manager software to move media MED003, MED004, MED013, MED028, MED033, and MED043 to the shelf2 archive.

Output returned:

```
Move 3 of 6 media was successful

Error VOL024: error in the list

   Media [MED003]   item not found

   Media [MED004]   medium already exists in an archive

   Media [MED033]   archive not associated with media
                    class
```

Unsuccessful Move request

vsmove MEDabc MEDxyz **-a** BadArchive

Requests the Media Manager software to move media MEDabc and MEDxyz to the BadArchive archive.

Output returned:

```
Move of media was unsuccessful

Error VOL107: invalid target archive
```

NOTES

Movement of media is between archives, not within archives. Media that is allocated to a Move request is not available for other allocation until the move completes.

If the **-w** option is not specified, status from the Move request indicates only the initial validity of the move. Actual completion of the move can only be traced via callback processing, media querying, or operator monitoring.

The Move command does trigger unsolicited status messages from the Media Manager software.

If the **-w** option is specified on a Move request, the client can increase the *timeout* value or the *retries* value so the CLI **vsmove**(l) command does not time-out while awaiting completion of the Move request.

A pending Mount request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control-\). The request also is aborted by sending the SIGINT signal (control-c).

SEE ALSO

vscleareject(l)

NAME

vsping − Pings the Media Manager system.

SYNOPSIS

vsping [**-Ih**] [**-H** *hostname*] [**-V** *number*]

DESCRIPTION

vsping(l) is issued from the command line to request execution of the Media Manager Ping command.

The **vsping**(l) command allows a user to check the availability of the software (in other words, a means for the client systems to "ping" the Media Manager system.) If the software responds to the **vsping**(l), it is assumed by the client that the software client interface is available and functioning.

The client is not required to use the **vsping**(l) command before sending other commands, but **vsping**(l) is available for clients to verify that software is running.

If no options are specified, **vsping**(l) tries to ping the Media Manager system on the host machine at Media Manager's default program number.

The **vsping**(l) command supports no commandspecific options.

OPTIONS

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vsping**(l) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful request, Media Manager software is available

vsping

Requests the Media Manager software to acknowledge receipt of the Ping request.

Output returned:

```
Media Manager is available.
```

```
Successful request, Media Manager software is not available
```

Successful request, Media Manager software is not available

vsping

Requests the Media Manager software to acknowledge receipt of the Ping request

Output returned:

```
Media Manager is not available

Error CMD022: could not send command to volume server.
```

NOTES

The client is not required to use **vsping**(l) before issuing other commands.

The **vsping**(l) command is a relatively fast operation.

No Media Manager software status messages are returned in response to the **vsping**(l) command.

The **vsping**(l) command does not trigger unsolicited status messages from the Media Manager software.

SEE ALSO

None

NAME

vspoolcfg − Configures a specified drive pool for the Media Manager system.

SYNOPSIS

vspoolcfg -p *drivepool* **-c** *driveID...* [**-Ih**] [**-H** *host*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *prognum*]

vspoolcfg -p *drivepool* **-i** *driveID...* [**-Ih**] [**-H** *host*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *prognum*]

vspoolcfg -p *drivepool* **-r** *driveID...* [**-Ih**] [**-H** *host*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *prognum*]

vspoolcfg -p *drivepool* **-d** [**-Ih**] [**-H** *host*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *prognum*]

DESCRIPTION

vspoolcfg(l) is issued from the command line to request execution of the Media Manager Drive Pool Configure command. The Media Manager software must be active in order to run this command.

When an client uses the **vsmount** command and the specified drive is busy, the command is placed in a command queue or failed. To increase the likelihood of an available drive, the **vsmount** command may specify a collection of drives on which to perform the mount. This collection can be a list of specific drives or a named collection of drives. Such a named collection is defined as a drive pool and is created using this command. Features of a drive pool are:

All defined drives are available for inclusion in a drive pool

A drive does not need to be associated with an archive to be a drive pool member

A drive can be a member of multiple drive pools

Any mix of drive types can be included in a drive pool as long as the subject media types are supported by the Media Manager system

A drive pool may contain zero or more drives.

Besides increasing the likelihood of a successful mount, drive pools can also be used to segregate specific drives to particular user groups. This can reduce the possibility of drive contention between such groups.

OPTIONS

-p *drivepool*

Specifies a single drive pool to be configured.

Valid drive pool names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-c *driveID*

This will create the drive pool specified by the **-p** option and add the *driveID* to that pool.

-r *driveID*

This will remove a drive from the drive pool specified by the **-p** option.

-i *driveID*

This will insert a drive into the drive pool specified by the **-p** option.

-d This will delete the drive pool specified by the **-p** option. All drives must removed from the pool before it can be deleted.

-I Indicates command line options are to be read from stdin.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *host* The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *prognum*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The command is successfully processed.

255 An error is detected by either the CLI software or the API software.

>0 and <255

The returned exit status corresponds to the error detected by the Media Manager software.

EXAMPLES

Create poolabc drive pool with drive 1

vspoolcfg -p poolabc **-c** 1

Add drive 2 and 3 to the drive pool

vspoolcfg -p poolabc **-i** 2 3

Remove drive 2 from the drive pool

vspoolcfg -p poolabc **-r** 2

Delete the drive pool. Note all the drives must be removed from the pool first.

vspoolcfg -p poolabc **-r** 1 3 **vspoolcfg -p** poolabc **-d**

NOTES

To cancel the request generated by this command, use the **vscancelreq** command, or send a SIGQUIT signal (control-\).

The command can be aborted by sending a SIGINT signal (control-c), however this will not cancel the request.

SEE ALSO

vspoolqry(l), **vscancelreq**(l)

NAME

vspoolqry − Queries for information on a specified drive pool or on all drive pools known to the Media Manager system.

SYNOPSIS

vspoolqry *drivepool* [**-v**] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

vspoolqry -a [**-v**] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vspoolqry(l) is issued from the command line to request execution of the Media Manager Drive Pool Query command.

The Drive Pool Query command is used to report information about one or all drive pools in the Media Manager system. The Drive Pool Query command returns the list of drives contained in each drive pool. Detailed information on each individual drive is obtained by specifying the -v (verbose) option.

OPTIONS

drivepool

Specifies a single drive pool to be queried.

Valid drive pool names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-v Indicates that verbose output is desired.

If **-v** is specified, detailed information about each drive associated with the specified drive pool(s) is returned.

If **-v** is not specified, only the identifiers of the drives associated with the specified drive pool(s) is returned.

-a Specifies the **-a** option to request information on all drive pools known to the Media Manager system.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vspoolqry**(l) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful Drive Pool Query request with verbose option specified

vspoolqry drvpoolsml **-v**

Requests the Media Manager to return detailed drive information for the every drive in the drvpoolsml drive pool.

Output returned:

```
------------------------------------------------

Drive Pool Query Report   May 25 15:03:52 1993      1

------------------------------------------------

Drive Pool: drvpoolsml

------------------------------------------------

Drive ID: 4

   Drive Type:                 Magnetic
   Associated Archive:         shelf2
   Current State:              Off-line
   Assignment:                 Free
   Usage Count:                1
   Mount State:                Unmounted
   Mounted Media ID:

Drive ID: 7

   Drive Type:                 Magnetic
   Associated Archive:         tower1
   Current State:              On-line
   Assignment:                 Allocated
   Usage Count:                1
   Mount State:                Mounted
   Mounted Media ID:           MED041
```

```
Drive ID: 13

   Drive Type:                  Magnetic
   Associated Archive:          shelf1
   Current State:               Diagnostic
   Assignment:                  Free
   Usage Count:                 0
   Mount State:                 Unmounted
   Mounted Media ID:
```

Successful Drive Pool Query request with verbose option not specified

vspoolqry -a

Requests the Media Manager to return a list of Drive IDs for every drive pool known to the Media Manager system.

Output returned:

```
-----------------------------------------------

Drive Pool Query Report   May 26 15:45:52 1993      1

-----------------------------------------------



Drive Pool: drvpoolsml

-----------------------------------------------

   Drive ID(s):     2    4    6    7
                    9    11   13   14

Drive Pool: drvpooltwr

-----------------------------------------------

   Drive ID(s):     7    11

Drive Pool: drvpoolstg

-----------------------------------------------

   Drive ID(s):     1    3    9
```

Unsuccessful Drive Pool Query

vspoolqry NoPool **-v**

Requests the Media Manager to return a list of drive identifiers for the NoPool drive pool.

Output returned:

```
Query of drive pool [NoPool] was unsuccessful

Error VOL008: item not found
```

NOTES

The Drive Pool Query command does not trigger unsolicited status messages from the Media Manager software.

A pending Drive Pool Query request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control-\). The request also is aborted by sending the SIGINT signal (control-c).

SEE ALSO

None

NAME

vsqrymount − Queries for drives that could be used in a subsequent mount of a specified medium.

SYNOPSIS

vsqrymount *mediaID* [-Ih] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vsqrymount(l) is issued from the command line to request execution of the Media Manager Query Mount command.

A client uses the Query Mount command to determine which drives are available for use in a subsequent Mount command for the specified medium. The Query Mount output lists the drives in the order of preference, based (in order of relative importance) upon their availability, proximity to the medium, and usage time.

Upon receipt of the Query Mount request, the software determines which archive contains the specified medium.

If the specified medium is not in an archive, a null list of drives is returned to the client.

If the medium is in an archive, the software determines which drives in that archive (and only that archive) are suitable (based on the medium's type) for mounting the medium.

OPTIONS

mediaID

Specifies the medium for which a list of drives supporting the medium's type is being requested.

A valid medium identifier may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vsqrymount**(l) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful Query Mount request

vsqrymount MED024

Requests the Media Manager software to return a list of drives that are candidates to be mounted with MED024.

Output returned:

```
Medium [MED024] can be mounted on the following drives:

      1       Drive [14]

      2       Drive [12]
```

Unsuccessful Query Mount request, specified medium already mounted

vsqrymount MED041

Requests the Media Manager software to return a list of drives that are candidates to be mounted with MED041.

Output returned:

```
Query Mount for medium [MED041] was unsuccessful.

Error VOL043: medium mounted

      1       Drive [11]

      2       Drive [7]
```

Unsuccessful Query Mount request

vsqrymount MED003

Requests the Media Manager software to return a list of drives that are candidates to be mounted with MED003.

Output returned:

```
Query Mount for medium [MED003] was unsuccessful.

Error VOL008: item not found
```

NOTES

The returned list of drives are known to be suitable for mounting the specified medium, but those drives are not available if they are currently in use.

Drives that are not online are not considered suitable for mounting and are, therefore, not returned in response to the query.

If a Query Mount is issued against a medium that is found to be currently mounted, the output to the client includes a message that the medium is mounted, in addition to a list of suitable drives.

If a Query Mount is issued against a medium that is currently allocated for mounting (but has not completed the mount move), the output includes a message that the medium is assigned.

The ordering of the returned drive list is based on the medium's current physical location. Drives that are not mounted are listed before drives that have a medium mounted on them. Consequently, for a mounted medium, the drive on which the medium is currently mounted may not be the first drive on the returned list.

The Query Mount command does not trigger unsolicited status messages from the Media Manager software.

A pending Query Mount request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control\). The request also is aborted by sending the SIGINT signal (control-c).

SEE ALSO

vsmount(l)

NAME

vsreclassify − Changes the MediaClass name of media.

SYNOPSIS

vsreclassify *mediaID..* **-c** *currentmediaclass* **-n** *newmediaclass* [**-v**] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vsreclassify(l) is issued from the command line to request execution of the Media Manager **reclassify** command.

A client uses the **reclassify** command to change the MediaClass name of one or more media.

Upon receipt of the **reclassify** request, the software verifies that each specified media identifier references a media of the type supported by the target MediaClass group.

If all media are of the appropriate media type, the software verifies that the target MediaClass group is not filled to capacity.

If the target MediaClass group is filled to capacity, the **reclassify** fails and a failure return code is returned to the client.

If the target MediaClass group is not filled to capacity, only as many media as it takes to reach the capacity are reclassified. Any remaining media specified in the **reclassify** command request are not reclassified and have a failure indicator returned to the client.

OPTIONS

mediaID...

Specifies a list of one or more media to be reclassified.

The number of media that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 64.

-c *currentmediaclass*

Specifies the MediaClass group with which the specified media are currently associated.

Valid MediaClass names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-n *newmediaclass*

Specifies the new MediaClass group with which the specified media are to be associated.

Valid MediaClass names may contain up to 16 alphanumeric characters, including spaces. Leading and trailing spaces are not permitted.

-v Specifies that the verbose output is desired.

If **-v** is specified, status will be returned on all media specified in the command.

If **-v** is not specified, status is returned on only the media that were not successfully reclassified.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vsreclassify**(l) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful Reclassify request with verbose option specified

vsreclassify MED002 MED023 MED044 **-c** medclassstgsml **-n** medclasssml **-v**

Requests the Media Manager software to reclassify media MED002, MED023, and MED044 from MediaClass group medclassstgsml to medclasssml and to return status on every specified medium.

Output returned:

```
Reclassify of 3 of 3 media into class [medclasssml] was successful

   Media [MED003]      no error

   Media [MED023]      no error

   Media [MED044]      no error
```

Successful Reclassify request with verbose option not specified

vsreclassify MED002 MED023 MED044 **-c** medclasssml **-n** medclassstgsml

Requests the Media Manager software to reclassify media MED002, MED023, and MED044 from MediaClass group medclasssml to medclassstgsml and to return status on a medium only if processing for that medium was unsuccessful.

Output returned:

```
Reclassify of 3 of 3 media into class [medclassstgsml] was successful
```

Error(s) with verbose option specified

vsreclassify MED013 MED017 MED020 MED032 MED041 BadMedium **-c** medclasssml **-n** medclasssh2sml **-v**

Requests the Media Manager software to reclassify media MED013, MED017, MED020, MED032, MED041, and BadMedium from MediaClass group medclasssml to medclasssh2sml and to return status on every specified medium.

Output returned:

```
Reclassify of 2 of 6 media into class [medclasssh2sml] was successful

Error VOL024:  error in the list

   Media [MED013]   class does not support media type

   Media [MED017]   no error

   Media [MED020]   invalid current class

   Media [MED032]   no error

   Media [MED041]   archive not associated with media
                  class

   Media [BadMedium]  item not found
```

Error(s) with verbose option not specified

vsreclassify MED013 MED017 MED020 MED032 MED041 BadMedium **-c** medclasssml **-n** medclasssh2sml

Requests the Media Manager software to reclassify media MED013, MED017, MED020, MED032, MED041, and BadMedium from MediaClass group medclasssml to medclasssh2sml and to return status on a medium only if processing on that medium was unsuccessful.

Output returned:

```
Reclassify of 2 of 6 media into class [medclasssh2sml] was   successful

Error VOL024:  error in the list

   Media [MED013]   class does not support media type

   Media [MED020]   invalid current class

   Media [MED041]   archive not associated with media
                  class

   Media [BadMedium]  item not found
```

Unsuccessful Reclassify request

vsreclassify MED042 **-c** medclassmed **-n** BadClass

Requests the Media Manager software to reclassify the medium MED042 from MediaClass group medclassmed to BadClass and to return status on a medium only if processing on that medium was

unsuccessful.

Output returned:

```
Reclassify of media into class [BadClass] was unsuccessful

Error VOL147: invalid target class
```

NOTES

The **reclassify** command cannot be cancelled.

Pending Mount requests are not affected by the reclassification of media.

If the capacity of the target MediaClass group is exceeded by the reclassification, only as many media as necessary to reach capacity are reclassified; the reclassification of any remaining media fails.

The capacity of an archive media class is a soft limit. If the capacity of an archive media class is exceeded, the entire **reclassify** request is processed unless the capacity of the associated MediaClass group is reached. When the capacity of the archive media class is reached, applicable High Mark processing is initiated.

An attempt to reclassify a medium into its current MediaClass group fails.

If reclassifying a medium places it in a MediaClass group that does not have the medium's present location as a preferred location, the medium is NOT moved just to place it into a preferred area. Later, if the medium is mounted then dismounted, or ejected then entered, an attempt is made to place the media in a preferred location as defined by the target archive media class.

If a medium to be reclassified is in an archive, the target MediaClass group must be associated with that archive.

A medium that does not reside in an archive can be reclassified.

The **reclassify** command triggers unsolicited status messages from the Media Manager software.

SEE ALSO

vsmount(l), **vsmedclassqry**(l)

NAME

vsrequestqry - Queries for information about a specified request.

SYNOPSIS

vsrequestqry *requestID* [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vsrequestqry(l) is issued from the command line to request execution of the Media Manager Request Query command.

A client uses the **vsrequestqry**(l) command to obtain information about an outstanding software request. The client must specify the Media Manager software assigned request identifier of the request being queried.

Upon receipt of a Request Query request, the software searches its request queue for the specified request identifier. If the specified request is not found, status is returned to the client that indicates a non-existent request. If the request is found, the attribute values of the request are returned to the client.

OPTIONS

requestID

Specifies the Media Manager identifier of the request to be queried.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vsrequestqry**(l) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful Request Query

vsrequestqry 1014402136

Requests the Media Manager software to return status on request 1014402136

Output returned:

```
------------------------------------------------

Request Query Report   May 24 12:43:18 1993         1

------------------------------------------------

Request ID:  1014402136

------------------------------------------------

   Request Type:                Move
   Priority:                    15
   Time:                        May 24 12:41:54 1993
   Current State:               Executing
```

Unsuccessful Request Query

vsrequestqry 1014402137

Requests the Media Manager software to return status on request 1014402137

Output returned:

```
------------------------------------------------

Request Query Report   May 24 12:54:43 1993         1

------------------------------------------------

   Error:  item not found
```

NOTES

The client must know the request identifier to be queried.

After execution of a request completes, a relatively short period of time exists where the request shows a state of complete. Afterwards, all knowledge of the request is removed from the Media Manager system and any subsequent queries for the command fail.

The Request Query command returns information for only one request per execution.

The Request Query command does not trigger unsolicited status messages from the Media Manager software.

A pending Request Query request is cancelled with the Media Manager Cancel command. The Media Man-

ager Cancel command is issued from the command line by sending a SIGQUIT signal (control-\). The request also is aborted by sending the SIGINT signal (control-c).

SEE ALSO

None

NAME

vsunlock - Releases exclusive use of one or more drives.

SYNOPSIS

vsunlock *driveID...* **-l** *lockID* [-v] [**-Ih**] [**-H** *hostname*] [**-P** *priority*] [**-R** *retries*] [**-T** *timeout*] [**-V** *number*]

DESCRIPTION

vsunlock(l) is issued from the command line to request execution of the Media Manager unlock command.

The **unlock** command is used to release exclusive use of a drive or a set of drives. The list of drive(s) to be unlocked and the assigned lock identifier for those drives must be specified.

A client needing to release a subset of locked drives, locked via a single lock command, can issue multiple **unlock** requests. Each unlock request can specify a subset of the drives held by the client. The software releases only those drives specified in the unlock request.

OPTIONS

driveID...

Specifies a list of one or more drives to be released (unlocked) from exclusive use.

The number of drives that can be specified is restricted by the CLI software. Currently, the maximum allowed number is 64.

-l *lockID*

Indicates the lock identifier assigned to the specified, locked drive(s).

-v Indicates that verbose output is desired.

If the **-v** option is specified, status is returned on every drive specified in the **vsunlock**(l) command.

If **-v** is not specified, status is returned on only those drives that were not successfully unlocked.

-I Indicates command line options are to be read from stdin.

The **-I** option provides the capability for the client to enter command options on the command line, in a text file, or a combination of both. When the **-I** option is specified, command options are first read from the command line. The Media Manager software then reads any options contained in the specified text file.

-h Requests help for the entered command.

The Help option returns the usage for the entered command, a copyright notice, and the version number of the CLI software.

The Help option takes precedence over any other option entered on a command. When the Help option is specified, no command line processing is performed.

An exit code of 0 is returned to the client when the Help option is specified.

-H *hostname*

The host name of the Media Manager server.

The default host name is the host name of the computer where the CLI command is issued.

-P *priority*

The execution priority of the entered command.

Assignable priority values are restricted to a range from 1 (highest) to 32 (lowest) inclusive.

The default priority value is 15.

-R *retries*

The number of retries the CLI software attempts if a timeout is returned by the API software.

The default retries value is 3.

-T *timeout*

The amount of time (in seconds) the API software waits for status from the Media Manager software before returning a timeout to the CLI software. Total wait time for a command is (retries plus 1) multiplied by time-out value.

The default time-out value is 120 seconds.

-V *number*

The RPC program number for the Media Manager software.

The default value for the Media Manager software program number is 300016.

EXIT STATUS

0 The **vsunlock**(l) command is successfully processed.

-1 An error is detected by either the CLI software or the API software.

>0 An error is detected by the Media Manager software. The returned exit code corresponds to the error code given by the Media Manager software.

EXAMPLES

Successful Unlock request with verbose option specified

vsunlock -v 4 8 12 -l 1719790788

Requests the Media Manager software to unlock drives 4, 8, and 12, all of which have an assigned lock identifier of 1719790788, and to return status on every specified drive.

Output returned:

```
Unlock [3] drives unlocked with lock id [1719790788]

      Drive [4]          no error
      Drive [8]          no error
      Drive [12]         no error
```

Successful Unlock request without verbose option specified

vsunlock 4 8 -l 1719790788

Requests the Media Manager software to unlock drive 4 and 3, with an assigned lock identifier of 1719790788, and to return status on a drive only if the Unlock request for that drive was unsuccessful.

Output returned:

```
Unlock [2] drives unlocked with lock id [1719790788]
```

Unsuccessful Unlock identifier with verbose option

vsunlock -v 40 41 42 43 -l 1719790788

Requests the Media Manager software to unlock drives 40, 41, 42, and 43, three of which have an assigned lock identifier of 1719790788, and to return status on every specified drive.

Output returned:

```
Unlock [3] drives unlocked with lock id [1719790788]

Error VOL024: error in the list

      Drive [40]         invalid lock id
      Drive [41]         no error
      Drive [42]         no error
```

```
Drive [43]          no error
```

Unsuccessful Unlock identifier without verbose option

vsunlock 40 41 42 43 -l 1719790788

Requests the Media Manager software to unlock drives 40, 41, 42, and 43, three of which have an assigned lock identifier of 1719790788 and to return status on a drive only if the Unlock request for that drive was unsuccessful.

Output returned:

```
Unlock [3] drives unlocked with lock id [1719790788]

Error VOL024: error in the list

        Drive [40]          invalid lock id
```

NOTES

The client can release a subset of drives locked by a single Lock request.

The Media Manager software fails an Unlock request for a drive if the lock identifier specified in the Unlock request does not match the lock identifier assigned to the drive.

The Unlock command does not trigger unsolicited status messages from the Media Manager software.

A pending Unlock request is cancelled with the Media Manager Cancel command. The Media Manager Cancel command is issued from the command line by sending a SIGQUIT signal (control\). The request also is aborted by sending the SIGINT signal (control-c).

SEE ALSO

vslock(l)

NAME

vsxsd - generate XSD files for commands which output XML.

SYNOPSIS

vsxsd [**-Bhl**] *command*

DESCRIPTION

vsxsd(l) is issued from the command line to request execution of the Media Manager xsd command. A client uses the vsxsd command to generate an XSD. An XSD (XML Schema Definition) and is often used to validate XML.

OPTIONS

-h Print the **vsxsd**(l) usage (help)

-l Print the commands that have XSD output.

command

Command to generate the XSD specification for.

EXAMPLE

You can use the **vsxsd**(l) command and the Linux command **xmllint**(1) to validate XML output against the XSD schema.

For example, these commands create XML and XSD output and then validates the XML against the XSD using the Linux **xmllint**(1) command.

```
> vsmove -F xml -a tape T00001 > vsmove.xml
> vsxsd vsmove > vsmove.xsd
> xmllint --schema vsmove.xsd vsmove.xml
```

SEE ALSO

xmllint(1)

NAME

xdi_Test - Utility to test API commands with library.

SYNOPSIS

xdi_Test

DESCRIPTION

xdi_Test(l) is issued from the command line to request execution of the xdi test program. It can be used to query an archive for drive, media, slot, mailbox, and state information. It can also move media between slots, drives and mailbox ports.

When the utility is invoked the user will be prompted for some configuration options in order for the utility to determine how to operate. After the options are selected a list of operations to perform is displayed. Logging is always enabled and appears in */tmp/logs/trace/trace_09*.

OPTIONS

There are no command line options, however there are options which must be selected as a result of some prompts.

Client Access Control

This is the first option that must be specified. It determines what configuration file to use. The prompt will look like:

Please select Client Access Control (CAC) Mode:
0 - Enabled (Default)
1 - Disabled
2 - EXIT
Enter option:

0-Enabled

Selecting this option will generate another prompt asking for a configuration file name. The response should be the path name of a configuration file that the Media Manager (MSM) created for the archive which would be:

*/usr/adic/MSM/internal/config/config_file_*<lib name>

1-Disabled

Selecting this option will cause a temporary configuration file to be generated and used. This is the easiest option to use since it requires less coordination of answers between all prompts.

2-EXIT

Selecting this option will cause the utility to exit.

Archive Type

This is the second option that must be selected. The prompt will look like:

Please select archive type:
1-IBM
2-STK
3-AML
4-SCSI
Enter option:

1-IBM Selecting this option generates another prompt asking for archive name. This name must match an entry in the */etc/ibmatl.conf* file.

2-STK Selecting this option generates another prompt asking for archive name.

3-AML Selecting this option will generate 3 more prompts asking for the archive name, AML server host, and AML client. The AML client string can be anything. Stornext typically uses *snmsm* for this value.

4-SCSI Selecting this option will generate 2 more prompts asking for the archive name and device name. The device name is a SCSI device path to the archive such as */dev/sg14*.

The archive name for any of the selected archive types can be anything, but if the enabled option for Client Access Control was selected then the archive name in the specified configuration file should be used.

Operation Menu

After the options have been selected a menu of operation appears. Typically when working with an archive the API must be initialized and then the archive must be opened before performing any of the other archive operations. This menu contains the following operation choices:

1. Initialize API
2. Open Archive
3. XDI Version
4. Query Archive Configuration
5. Query Volumes
6. Query Drives
7. Import
8. Export
9. Mount
10. Dismount
11. Audit library
12. Query Requests
13. Drive Access
14. Check Archive State
15. Query Mailbox
16. Close Archive
17. Terminate

99. Quit

Enter number:

Most operations will prompt for a priority to attach to the command. The priority ranges from 1 (highest) to 30 (lowest). This will only have an impact if the archive is servicing other commands when the selected operation is executed.

1. Initialize API

This will prompt for the XDI Client name. It doesn't matter what is specified here but it can not exceed 63 characters.

2. Open Archive

This will prompt for the archive name. It is recommended to use the same name that was specified for the archive name prompt as part of the archive type selection. The name doesn't always have to be the same for this operation to succeed but it is better to always use the same name. *3. XDI Version* This will show the version of the XDI software that this utility was built with. Example output from this operation:

```
Xdi_TestVersion: COMPLETED WITH NO ERRORS.

Server version: XDI Version 3.0.0

API version: XDI Version 3.0.0
```

4. Query Archive Configuration

This will query the archive for slot, media type, vendor and drive information. It will allow you to select if the archive should rescan all slots before returning the information. Example output from this operation:

```
Xdi_TestQueryArch: COMPLETED WITH NO ERRORS.

Storage Slot Count = 30 for mediaType: LTO-L1

Storage Slot Count = 30 for mediaType: LTO-L2

Storage Slot Count = 30 for mediaType: LTO3-WORM

Storage Slot Count = 30 for mediaType: LTO-L3

EIF INFORMATION
---------------
Insert Port   Export Port     Media Type
16            16              LTO-L3,LTO3-WORM,LTO-L2,LTO-L1

VENDOR INFORMATION
------------------
Vendor Id = ADIC
Product Id = Scalar i500
Product Rev Level = 571G
Serial Number = ADICA0C0345826_LLA

DRIVE INFORMATION
-----------------
Drive  Addr      Media  MedState  Type       State
257    d257t2l0                  IBM_LTO_3  online
256    d256t1l0                  IBM_LTO_3  online
```

5. Query Volumes

This will query the archive for information about all media or some specified media. Example output from this operation:

```
Xdi_TestQueryVol: COMPLETED WITH NO ERRORS.


The volume reply list follows:
Media State      Media Type     Media Id
Mounted               LTO-L3      000039
Home Bin              LTO-L3      000022
Home Bin              LTO-L3      000024
Home Bin              LTO-L3      000025
```

6. Query Drives

This will query the archive for drive information. It will return the drive id, the drive address in the archive, the id of a mounted media, the drive type and state. The media state and drive serial number columns in the report output are almost always blank. Example output from this operation (the empty Serial Number column has been excluded):

```
Xdi_TestQueryDrive: COMPLETED WITH NO ERRORS.

DRIVE INFORMATION
-----------------
Drive  Addr      Media  MedState  Type       State
257    d257t2l0  000039           IBM_LTO_3  online
```

```
256    d256t1l0                    IBM_LTO_3  online
```

7. Import

This will move a list of specified media from the mailbox or all media in the mailbox to slots. The port id for the mailbox can also be specified if the default value is not acceptable. Example output from this operation:

```
Xdi_TestImport: COMPLETED WITH NO ERRORS.


The import reply list follows:
 MediaId        MediaType
--------------------------------------
000060         LTO_3
```

8. Export

This will move a list of specified media from slots to the mailbox. The port id for the mailbox can also be specified if the default value is not acceptable. Example output from this operation:

```
Xdi_TestExport: COMPLETED WITH NO ERRORS.


All requested volumes ejected successfully.
```

9. Mount

This will mount a specified media into a specified drive. A prompt to flip the media is also issued but is only valid for optical media so the response should always be to not flip the media. Example output from this operation:

```
Xdi_TestMount COMPLETED WITH NO ERRORS.
Successful mount of 000090 in drive 257
```

10. Dismount

This will dismount a specified media from a specified drive. Example output from this operation:

```
Xdi_TestDismount: COMPLETED WITH NO ERRORS.
Successful dismount of 000090 from drive 257
```

11. Audit library

This will audit all slots or a specified range of slots in the archive. A prompt to flip the media is also issued but is only valid for optical media so the response should always be to not flip the media. Example output from this operation:

```
Xdi_TestAudit: COMPLETED WITH NO ERRORS.
```

12. Query Requests

This will query the archive for any pending requests.

13. Drive Access

This will allow you to enable or disable access to list of specified drives for AML archive types. For other archive types this will just return success.

14. Check Archive State

This issues a test unit ready in order to determine if the archive is in a usable state.

15. Query Mailbox

This will query the archive for information about each entry in the mailbox. Example output from this operation:

```
Xdi_TestQueryMailbox: COMPLETED WITH NO ERRORS.
Mailbox contents:
State     Media Id     Media Type(s)
EMPTY                  LTO-L3,LTO3-WORM,LTO-L2,LTO-L1
EMPTY                  LTO-L3,LTO3-WORM,LTO-L2,LTO-L1
EMPTY                  LTO-L3,LTO3-WORM,LTO-L2,LTO-L1
EMPTY                  LTO-L3,LTO3-WORM,LTO-L2,LTO-L1
EMPTY                  LTO-L3,LTO3-WORM,LTO-L2,LTO-L1
EMPTY                  LTO-L3,LTO3-WORM,LTO-L2,LTO-L1
```

16. Close Archive

This will close the connection to the archive and prevent most of the other operations from working.

17. Terminate

This will terminate your session. Only the quit operation will complete successfully after terminating the session.

99. Quit

This will exit the utility.

EXIT STATUS

0 This is the only exit status.

SEE ALSO