Oracle Recovery Manager (RMAN) Configuration Guide Instructions

This document contains the following topics:

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December 2016 6-68446-04

Introduction

Oracle™ Recovery Manager (RMAN) allows Oracle servers to integrate with a DXi4700, DXi6900, and DXi6900-S disk backup systems. Once installed and configured, an Oracle server can manage backups through the DXi system and take advantage of the system's capabilities such as data deduplication and replication.

Installing and configuring the DXi and Oracle server for operation consists of the following major steps. See the following sections for detailed instructions for completing each step:

Installing the RMAN Plug-in

Before you can configure the DXi with Oracle Recovery Manager (RMAN), you must download and install the RMAN Plug-in on the Oracle server. The following versions of Oracle are currently supported:

- Oracle 11

To download the correct version of the RMAN Plug-in for your DXi configuration and media server operating system:

1. On the DXi remote management console, navigate to the **Configuration > System > Client Plug-Ins** page.
2. Click **Client Plug-in Download**

   The Quantum Client Plug-in download page displays.

   You can also access the Client Plug-in download page at:

   http://www.quantum.com/ServiceandSupport/SoftwareandDocumentationDownloads/OSTClientPlugin/Index.aspx
3. Click the links to download the latest *Quantum RMAN Plug-in* and *RMAN Plug-in Installation Instructions*.

   Make sure to download the correct RMAN Plug-in for the operating system installed on the Oracle server.

   The *RMAN Plug-in Installation Instructions* contain the installation procedure for the RMAN Plug-in. This procedure is different for each media server operating system platform. Follow the instructions to install the RMAN Plug-in on the Oracle server. When you are finished, continue to the next section.

Configuring the DXi

You must create Application Specific (RMAN) shares on the DXi remote management console before you configure the Oracle server. See the following sections to configure the DXi for RMAN.

Configuring the DXi consists of the following major steps. See the following subsections for detailed instructions for completing each step:

- Configuring RMAN Authentication below
- Configuring RMAN Shares on page 6

Note: You can also use the NAS Wizard to configure the DXi for Oracle RMAN shares. To learn more about using the **Configuration Wizards**, refer to the *User's Guide* for your DXi model.

Configuring RMAN Authentication

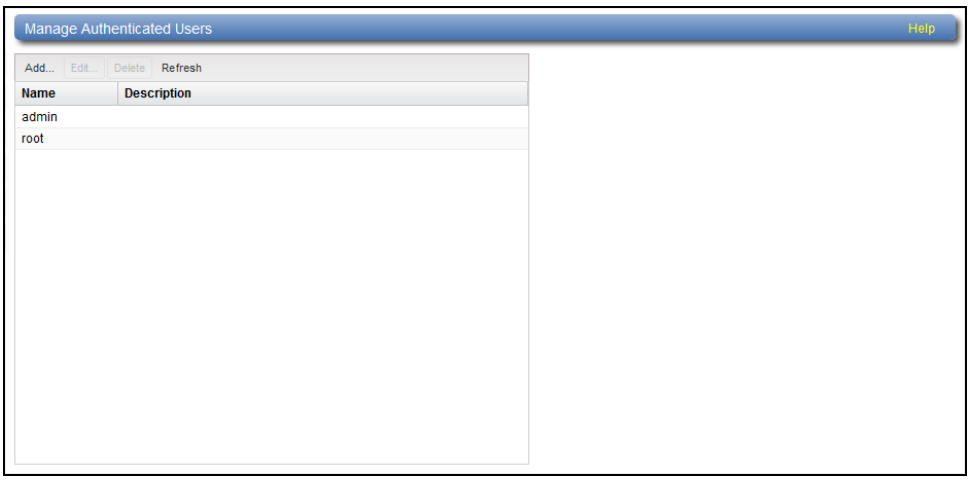
To authenticate the RMAN shares on an Oracle server, you must create RMAN user credentials.

The **Manage Users** page in the DXi remote management console allows you to create and manage local authenticated users for use with Oracle Recovery Manager (RMAN).

To create RMAN user credentials:

1. Log on to the DXi remote management console.
2. Navigate to the **Configuration > System > Manage Users** page (see Figure 1 below).

Figure 1: Manage Users Page



Tasks

Use the **Manage Users** page to perform the following tasks:

- View information about local authenticated RMAN users (see Manage Authenticated Users List below).
- Add a local authenticated RMAN user (see Adding an Authenticated User below).
- Edit a local authenticated RMAN user (see Editing an Authenticated User on the next page).
- Delete a local authenticated RMAN user (see Deleting an Authenticated User on page 6).

Manage Authenticated Users List

The **Manage Authenticated Users** list displays the following information for all local authenticated RMAN users:

Name	The name of the local authenticated user.
Description	A brief description of the local authenticated user (if available).

Note: To update the list with the latest information, click **Refresh**.

Adding an Authenticated User

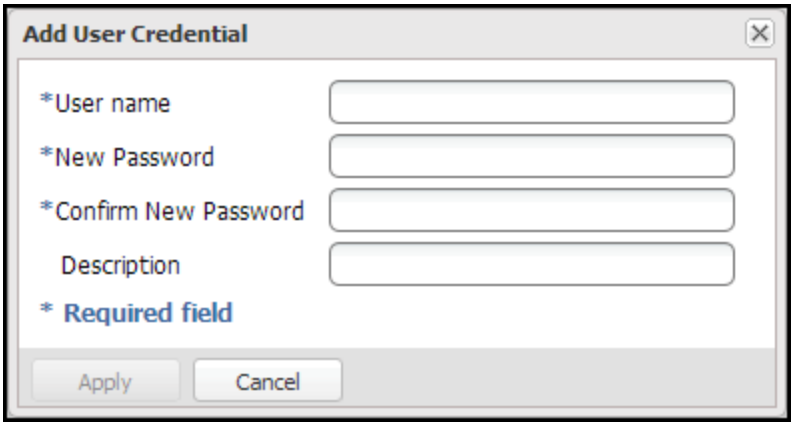
Add an authenticated user to create local RMAN user credentials. The user credentials are required to authenticate the Oracle server.

To add an authenticated user:

1. Click **Add**.

   The **Add User Credential** window displays (see Figure 2 below).

Figure 2: Add User Credential



2. Enter information about the authenticated user:

User name	Enter the name of the authenticated user.
New Password	Enter the password for the authenticated user.
Confirm New Password	Enter the password again to confirm it.
Description	(Optional) Enter a brief description of the authenticated user.

3. Click **Apply**.

Editing an Authenticated User

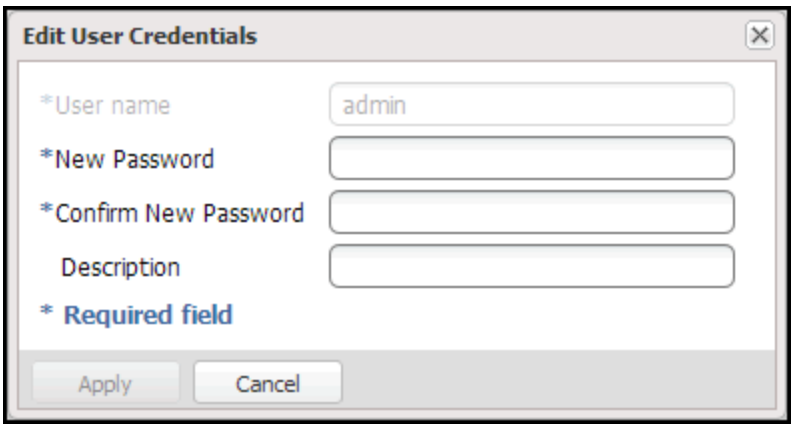
Edit an authenticated RMAN user to change the user's password or description.

To edit an authenticated RMAN user:

1. Select the user and click **Edit**.

   The **Edit User Credentials** window displays (see Figure 3 below).

   Figure 3: Edit User Credentials



2. Enter information about the authenticated user:

   Note: If you are editing an authenticated user, you cannot change the **User name**.

New Password	Enter the password for the authenticated user.
Confirm New Password	Enter the password again to confirm it.
Description	(Optional) Enter a brief description of the authenticated user.

3. Click **Apply**.

Deleting an Authenticated User

Delete an authenticated RMAN user if the user credentials are no longer needed to authenticate the Oracle server.

To delete an authenticated user, select the user and click **Delete**.

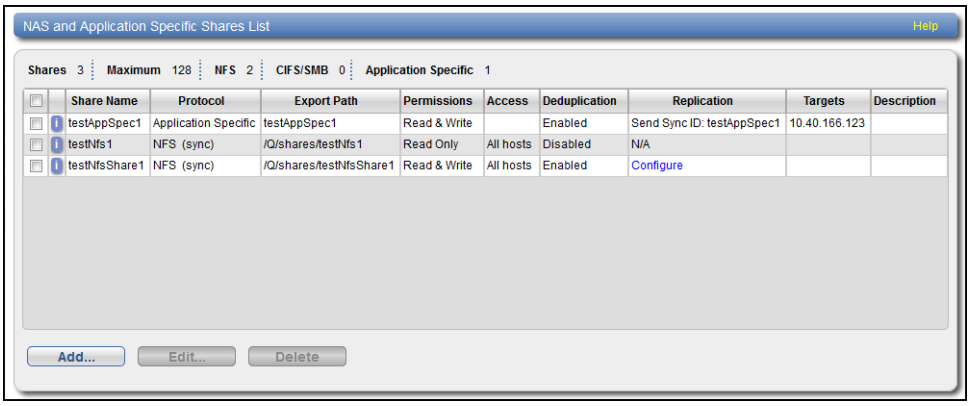
Note: You can select multiple users to delete at once.

Configuring RMAN Shares

To create and configure RMAN shares:

1. Log on to the DXi remote management console.
2. Navigate to the **Configuration > NAS > Summary** page (see Figure 4 below).

Figure 4: DXi6900 NAS Summary Page



The **NAS Summary** page allows you to manage RMAN shares on the DXi-Series. You can view information about existing shares, add or edit shares, and delete shares.

Tasks

Use the **NAS** page to perform the following tasks:

- View information about existing NAS shares (see NAS Shares List on the next page).
- Add a new RMAN share to the system (see Adding an RMAN Share on page 8).
- Edit properties for an existing RMAN share (see Editing an RMAN Share on page 9).
- Delete a RMAN share from the system (see Deleting an RMAN Share on page 10).

NAS Shares List

The **NAS Shares List** section displays the following information for all NAS shares on the DXi-Series. RMAN shares are listed as **Application Specific**.

Shares	The number of shares that have been added to the system.
Maximum	The maximum number of shares that can be added to the system.
NFS	The number of existing shares configured to use the NFS protocol (for Linux networks).
CIFS/SMB	The number of existing shares configured to use the CIFS/SMB protocol (for Windows networks).
Application Specific	The number of existing shares configured to use Oracle Recovery Manager (RMAN).
Share Name	The name of the share.
Protocol	The protocol (**CIFS/SMB**, **NFS**, or **Application Specific (RMAN)**) the share is configured to use. For NFS shares, the **Protocol** column displays the commit type of the share (**sync** for synchronous or **async** for asynchronous). For information about changing the commit type of NFS shares, see the *DXi-Series Command Line Interface (CLI) Guide*.
Export Path	The export path of the share (different for CIFS/SMB, NFS, and Application Specific (RMAN) shares).
Permissions	The permissions in use on the share (**Read & Write** or **Read Only**).
Access	The access type of the share (**all hosts** or specific users).
Deduplication	The data deduplication state of the share (**Enabled** or **Disabled**).
Replication	The current state of replication for the share: • **Enabled** - Replication is enabled. • **Send/Receive Sync ID** - Directory/File Based Replication is enabled. • **Configure** - Click to configure replication for the share (see Editing an RMAN Share on page 9) • **Scheduled** - Replication is scheduled for the share. Click to view or modify the schedule. RMAN shares use trigger-based replication and cannot be scheduled.
Targets	The targets the share is configured to replicate to.
Description	A brief description of the NAS share (if available).

Additional Information

- Click a column heading to sort the rows in the table by that column. Click the column heading again to reverse the sort order.
- Click the Information button **[i]** next to a share to display detailed information about the share and recent replication activity.

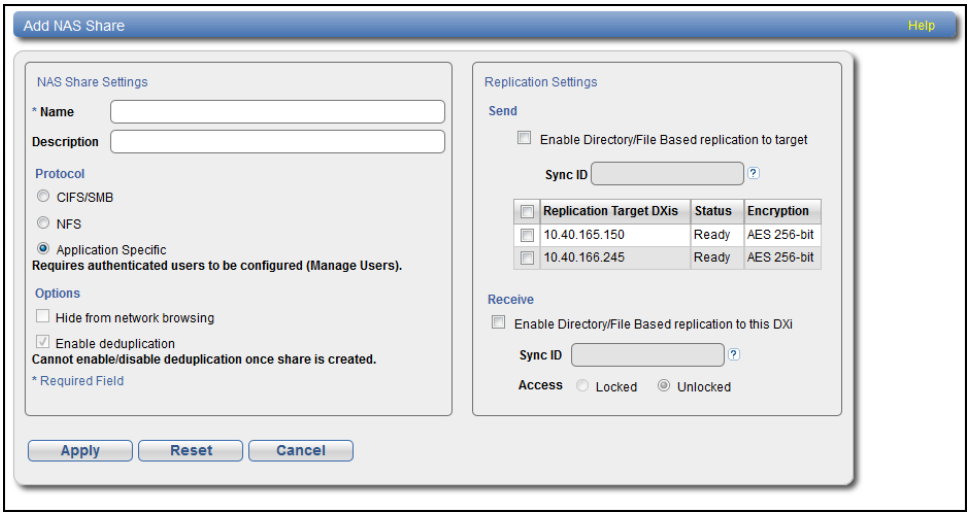
Adding an RMAN Share

To add an RMAN share:

1. Click **Add**.

   The **Add NAS Share** page displays (see Figure 5 below).

   Figure 5: Add NAS Share Page



2. Under **NAS Share Settings**, enter information about the Application Specific/RMAN share:

Name	Enter the name of the NAS share. **Note:** RMAN share names are not case-sensitive. For example, if you create a share named **rman1**, you cannot create another share named **RMAN1**.
Description	(Optional) Enter a brief description of the share.
Protocol	Select the **Application Specific** export protocol for the RMAN share:
Enable deduplication	Deduplication of RMAN shares is enabled by default and cannot be changed.

3. (Optional) Under **Replication Settings**, specify replication settings.

   For more information about configuring replication for a share, or to set up replication for the share at a later time, see the *DXi6900 User's Guide*.

4. Click **Apply**.

Editing an RMAN Share

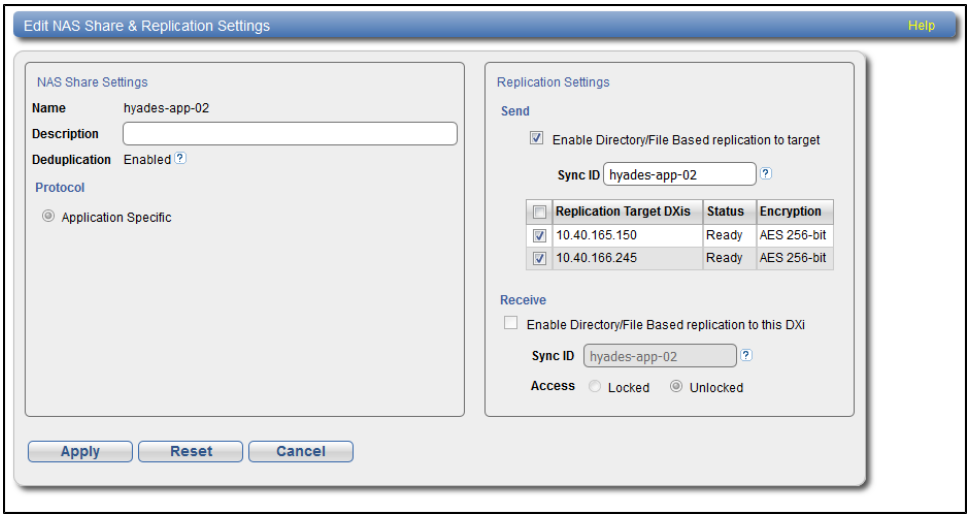
Edit an RMAN share to modify the settings for the share, for example, to change the description of the share or to select different options.

To edit an RMAN share:

1. Select the share and click **Edit**.

   The **Edit NAS Share & Replication Settings** page displays (see Figure 6 below).

   Figure 6: Edit NAS Share & Replication Settings Page



2. Under **NAS Share Settings**, enter information about the share:

   Note: If you are editing an RMAN share, only the **Description** option can be changed.

Description	(Optional) Enter a brief description of the share.

3. (Optional) Under **Replication Settings**, specify replication settings.

   For more information about configuring replication for a share, or to set up replication for the share at a later time, see the *DXi6900 User's Guide*.

4. Click **Apply**.

Deleting an RMAN Share

Delete an RMAN share if it is no longer needed. When you delete a share, all data stored on the share is lost, and any schedules associated with the share are deleted.

To delete a NAS share:

1. Select the share and click **Delete**. You can select multiple shares to delete at once.
2. Click **Yes** to confirm the deletion.

Configuring the Oracle Server

Storage Authentication

There are two methods the Oracle server can use to authenticate to DXi while using Oracle Recovery Manager (RMAN).

Within either the static `CONFIGURE` or dynamic `ALLOCATE CHANNEL`, use one of the following options to call within the PARMS section.

Authentication Parameters

The following parameters are used to establish connection to the DXi application specific (RMAN) share.

Parameter	Description
`BACKUP_CREDID`	User credentials saved by setting credentials (see Set Credentials on the next page).
`BACKUP_HOST`	IP address of the DXi.
`BACKUP_SHARE`	The application specific (RMAN) share you to wish to engage.
`BACKUP_PASSWORD`	Authenticated user password created in the DXi GUI.
`BACKUP_USER`	Authenticated user created in the DXi GUI.
`SBT_LIBRARY`	Identifies the MMS library for the Quantum RMAN plug-in.

Backup Username/Password

Use `BACKUP_USERNAME=<username>,BACKUP_PASSWORD=<password>`

See Figure 7 on the next page for an allocate channel example run on the Oracle server.

Figure 7: Allocate Channel Example

```
run
{
allocate channel dev2 type 'sbt_tape' parms 'SBT_LIBRARY=libQuantumobk.so,ENV=
(BACKUP_HOST=10.10.123.10,BACKUP_SHARE=rman1,BACKUP_USERNAME=sampleuser,BACKUP_
PASSWORD=123)';
backup as backupset database format '%U_%p';
release channel dev2;
}
```

CRED_ID Authentication

This approach removes the plain text user/pass from the allocate channel calls in the RMAN scripts and/or from the static `CONFIGURE` method.

`creds [-s|--set|-g|--get|-d|--delete] -c|--cred <cred_id> -H|--host <hostip> -u|--user <username> -p|--password <password>`

Note: The `creds` command must be run from the Oracle server via an Oracle RMAN run block.

Set Credentials

`-s` or `--set` credentials will create an entry recording host IP address (or host name), user, and password. See Figure 8 below for `--set` credentials example.

Note: Setting user credentials is only required once per user.

Figure 8: --set Credentials Example

```
{
ALLOCATE CHANNEL CH1 DEVICE TYPE 'sbt_tape' parms 'SBT_LIBRARY=libQuantumobk.so';
send 'creds --set --cred sampleuser --host 10.10.123.10 --user sampleuser --
password 123';
release channel CH1;
}
```

If this authentication method is employed, future allocate channel calls would then replace the `BACKUP_USERNAME` and `BACKUP_PASSWORD` variables (both) with a single `BACKUP_CREDID=<credid>`.

See Figure 9 on the next page for an example:

Figure 9: Backup Username and Password Replacement Example

```
connect target /

run

{

ALLOCATE CHANNEL CH1 DEVICE TYPE 'sbt_tape' parms 'SBT_
LIBRARY=libQuantumobk.so,ENV=(BACKUP_HOST=10.10.123.10,BACKUP_SHARE=rman1,BACKUP_
CREDID=sampleuser)';

backup as backupset database format '%U_%p';

release channel CH1;

}
```

Automatic Channel Configuration

An example of RMAN automatic channel configuration is below (see Figure 10 below).

Figure 10: Automatic Channel Configuration Example

```
RMAN> show all;

RMAN configuration parameters for database with db_unique_name ORCL are:
CONFIGURE RETENTION POLICY TO RECOVERY WINDOW OF 15 DAYS;
CONFIGURE BACKUP OPTIMIZATION OFF;
CONFIGURE DEFAULT DEVICE TYPE TO 'SBT_TAPE';
CONFIGURE CONTROLFILE AUTOBACKUP OFF;
CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE 'SBT_TAPE' TO
'/home/oracle/snap/%F';
CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK TO '%F'; # default
CONFIGURE DEVICE TYPE 'SBT_TAPE' PARALLELISM 4 BACKUP TYPE TO BACKUPSET;
CONFIGURE DEVICE TYPE DISK PARALLELISM 1 BACKUP TYPE TO BACKUPSET; # default
CONFIGURE DATAFILE BACKUP COPIES FOR DEVICE TYPE 'SBT_TAPE' TO 1;
CONFIGURE DATAFILE BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default
CONFIGURE ARCHIVELOG BACKUP COPIES FOR DEVICE TYPE 'SBT_TAPE' TO 1;
CONFIGURE ARCHIVELOG BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default
CONFIGURE CHANNEL 1 DEVICE TYPE 'SBT_TAPE' PARMS 'SBT_
LIBRARY=libobk.so,BLKSIZE=1048576,ENV=(BACKUP_HOST=10.10.123.10,BACKUP_
SHARE=rman1,BACKUP_CREDID=sampleuser)';
CONFIGURE CHANNEL 2 DEVICE TYPE 'SBT_TAPE' PARMS 'SBT_
LIBRARY=libobk.so,BLKSIZE=1048576,ENV=(BACKUP_HOST=10.10.123.10,BACKUP_
SHARE=rman1,BACKUP_CREDID=sampleuser)';
```

```
CONFIGURE CHANNEL 3 DEVICE TYPE 'SBT_TAPE' PARMS 'SBT_
LIBRARY=libobk.so,BLKSIZE=1048576,ENV=(BACKUP_HOST=10.10.123.10,BACKUP_
SHARE=rman1,BACKUP_CREDID=sampleuser)';
CONFIGURE CHANNEL 4 DEVICE TYPE 'SBT_TAPE' PARMS 'SBT_
LIBRARY=libobk.so,BLKSIZE=1048576,ENV=(BACKUP_HOST=10.10.123.10,BACKUP_
SHARE=rman1,BACKUP_CREDID=sampleuser)';
CONFIGURE CHANNEL DEVICE TYPE 'SBT_TAPE' FORMAT '/orcl_20160831_123621_%U_
XX.bck';
CONFIGURE MAXSETSIZE TO UNLIMITED;
CONFIGURE ENCRYPTION FOR DATABASE OFF;
CONFIGURE ENCRYPTION ALGORITHM 'AES128';
CONFIGURE COMPRESSION ALGORITHM 'BASIC' AS OF RELEASE 'DEFAULT' OPTIMIZE FOR LOAD
TRUE ; # default
CONFIGURE ARCHIVELOG DELETION POLICY TO NONE;
CONFIGURE SNAPSHOT CONTROLFILE NAME TO '/home/oracle/snap/%U_%P.snapf';
```

Get Credentials

`-g` or `--get` credentials will query to see if credentials exist. See Figure 11 below for an example of a successful credential query and Figure 12 on the next page for a failed credential query.

Figure 11: Successful Credential Query Example

```
Recovery Manager: Release 11.2.0.4.0 - Production on Thu Sep 29 17:27:08 2016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RMAN> connect target *

2> run

3> {

4> ALLOCATE CHANNEL CH1 DEVICE TYPE 'sbt_tape' parms 'SBT_
LIBRARY=libQuantumobk.so';

5> send 'creds --get --cred sampleuser --host 10.10.123.10';

6> release channel CH1;

7> }

8>

9>

connected to target database: ORCL (DBID=1442450746)
```

```
using target database control file instead of recovery catalog
allocated channel: CH1
channel CH1: SID=12 device type=SBT_TAPE
channel CH1: Quantum MMS for RMAN 1.0.0.3204

sent command to channel: CH1

released channel: CH1

Recovery Manager complete.
```

Figure 12: Credential Query Failure Example

```
Recovery Manager: Release 11.2.0.4.0 - Production on Thu Sep 29 17:28:23 2016

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RMAN> connect target *
2> run
3> {
4> ALLOCATE CHANNEL CH1 DEVICE TYPE 'sbt_tape' parms 'SBT_
LIBRARY=libQuantumobk.so';
5> send 'creds --get --cred sampleuser --host 10.10.123.10';
6> release channel CH1;
7> }
8>
9>
connected to target database: ORCL (DBID=1442450746)

using target database control file instead of recovery catalog
allocated channel: CH1
```

```
channel CH1: SID=152 device type=SBT_TAPE
channel CH1: Quantum MMS for RMAN 1.0.0.3204

released channel: CH1
RMAN-00571: ===========================================================
RMAN-00569: =============== ERROR MESSAGE STACK FOLLOWS ===============
RMAN-00571: ===========================================================
RMAN-03002: failure of send command at 09/29/2016 17:28:24
ORA-19559: error sending device command: creds --get --cred sampleuser --host
10.10.123.10
ORA-19557: device error, device type: SBT_TAPE, device name:
ORA-27194: skgfdvcmd: sbtcommand returned error
ORA-19511: Error received from media manager layer, error text:
Requested credentials are not found.

Recovery Manager complete.
```

Delete Credentials

`-d` or `--delete` credentials will delete an entry corresponding to the host IP address (or host name), user, and password. See Figure 13 below for a successful deletion and Figure 14 on the next page for a deletion that fails.

Figure 13: Delete Credentials Success Example

```
[oracle@oel72rman1 temp]$ rman cmdfile=credsdelete.cmd

Recovery Manager: Release 11.2.0.4.0 - Production on Thu Sep 29 17:30:52 2016

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RMAN> connect target *
2> run
3> {
```

```
4> ALLOCATE CHANNEL CH1 DEVICE TYPE 'sbt_tape' parms 'SBT_
LIBRARY=libQuantumobk.so';
5> send 'creds --delete --cred sampleuser --host 10.10.123.10';
6> release channel CH1;
7> }
8>
9>
connected to target database: ORCL (DBID=1442450746)

using target database control file instead of recovery catalog
allocated channel: CH1
channel CH1: SID=12 device type=SBT_TAPE
channel CH1: Quantum MMS for RMAN 1.0.0.3204

sent command to channel: CH1

released channel: CH1

Recovery Manager complete.
```

Figure 14: Delete Credentials Failure Example

```
Recovery Manager: Release 11.2.0.4.0 - Production on Thu Sep 29 17:31:29 2016

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RMAN> connect target *
2> run
3> {
4> ALLOCATE CHANNEL CH1 DEVICE TYPE 'sbt_tape' parms 'SBT_
LIBRARY=libQuantumobk.so';
5> send 'creds --delete --cred sampleuser --host 10.10.123.10';
```

```
6> release channel CH1;
7> }
8>
9>
connected to target database: ORCL (DBID=1442450746)

using target database control file instead of recovery catalog
allocated channel: CH1
channel CH1: SID=152 device type=SBT_TAPE
channel CH1: Quantum MMS for RMAN 1.0.0.3204

released channel: CH1
RMAN-00571: ===========================================================
RMAN-00569: =============== ERROR MESSAGE STACK FOLLOWS ===============
RMAN-00571: ===========================================================
RMAN-03002: failure of send command at 09/29/2016 17:31:31
ORA-19559: error sending device command: creds --delete --cred sampleuser --host
10.10.123.10
ORA-19557: device error, device type: SBT_TAPE, device name:
ORA-27194: skgfdvcmd: sbtcommand returned error
ORA-19511: Error received from media manager layer, error text:
Requested credentials are not found.

Recovery Manager complete.
```

Limitations

Oracle Limitations

Serial Backup Tape (SBT)	• When using SBT storage, Oracle prohibits backup as a copy and/or incremental updates (must be a disk target). • When employing an SBT storage target, catalog recovery requires special conditions be met in order to successfully rebuild the catalog. • Backup block size parameters should be the same for restore.
RMAN Client Side Encryption	• Oracle client side encryption is not available without using Oracle Secure Backup when using an SBT storage target.

DXi Limitations

Backup format outlay	• Absolute path must be avoided when specifying a format. The DXi will not create recursive directories from a plug-in invoked backup. • Filename must not exceed 255 characters (including the share name)
Oracle RAC Installations	• Not supported
Plug-ins	• An OST plug-in and RMAN plug-in residing on same client is currently prohibited.
Replication	• Only directory/file based replication is currently supported for application specific shares. • Target must support application specific shares (DXi 3.2.4.1 Software and above).
RMAN Client Side Compression	• Not prohibited, but a performance/deduplication penalty will occur.

Oracle Client Plug-in Installation Verification

After the plug is successfully installed, run **sbttest** to verify communication between the RMAN plug-in and DXi.

To run **sbttest**, do the following from an Oracle server terminal as the Oracle user:

1. Export the following environment variables:
   ```
   export BACKUP_HOST=<ip address of DXi>
   export BACKUP_SHARE=<application specific share on DXi>
   ```

```
export BACKUP_USERNAME=<user name>
export BACKUP_PASSWORD=<password>
```

2. Run the following command:
   `sbttest <arbitrary string used to identify test> -libname libQuantumobk.so`
3. Verify the test passes without any reported errors. See Figure 15 below for an example test.

Figure 15: sbttest Example

```
[oracle@rman1 ~]$ sbttest test -libname libQuantumobk.so
The sbt function pointers are loaded from libQuantumobk.so library.
-- sbtinit succeeded
-- sbtinit (2nd time) succeeded
sbtinit: vendor description string=Quantum MMS for RMAN 1.0.0.3204
sbtinit: Media manager is version 1.0.0.132
sbtinit: Media manager supports SBT API version 2.0
sbtinit: allocated sbt context area of 3888 bytes
-- sbtinit2 succeeded
-- regular_backup_restore starts ..............................
-- sbtbackup succeeded
write 100 blocks
-- sbtwrite2 succeeded
-- sbtclose2 succeeded
sbtinfo2: SBTBFINFO_NAME=test
sbtinfo2: SBTBFINFO_METHOD=stream
sbtinfo2: SBTBFINFO_SHARE=multiple users
sbtinfo2: SBTBFINFO_CRETIME=Wed Sep 21 13:42:47 2016
sbtinfo2: SBTBFINFO_LABEL=10.20.165.14_sdk
-- sbtinfo2 succeeded
-- sbtrestore succeeded
file was created by this program:
seed=457752398, blk_size=16384, blk_count=100
read 100 buffers
-- sbtread2 succeeded
```

```
-- sbtclose2 succeeded
-- sbtremove2 succeeded
-- regular_backup_restore ends ..............................
-- sbtcommand succeeded
proxy copy is not supported
-- sbtend succeeded
*** The SBT API test was successful ***
```

Once the **sbttest** utility confirms successful communication between DXi system and the Oracle server, you can begin using the DXi system to backup your Oracle Database.

Additional Information

See the *Oracle Database Backup and Recovery User's Guide* for information about Oracle Recovery Manager (RMAN) installation and basic configuration on an Oracle Server.

http://docs.oracle.com/cd/E11882_01/backup.112/e10642/

Troubleshooting

For troubleshooting information, refer to the following sections:

- sbttest below
- Oracle Trace Logging on the next page

sbttest

An Oracle supplied test utility called **sbttest** can be used to troubleshoot and debug the RMAN plug-in. This utility checks and diagnoses the media management API. To verify and authenticate the Quantum RMAN plug-in:

Note: Backup share, user, and password should already exist on the DXi specified in `BACKUP_HOST`. To add RMAN shares and manage users on the DXi system, see Configuring the DXi on page 3).

```
export BACKUP_HOST=<ip address of DXi>
```

```
export BACKUP_SHARE=<application specific share on DXi>
export BACKUP_USERNAME=<user name>
export BACKUP_PASSWORD=<password>
sbttest test -libname libQuantumobk.so
```

If **sbttest** fails to authenticate, it will report the reason why the authentication failed. In the example below, the authentication failed due to an incorrect exported password (see Figure 16 below).

In addition to failed authentication, there are other descriptive errors that could occur, such as a missing file, missing share, missing directory, etc.

Figure 16: sbttest Authentication Failure Example

```
[oracle@oel72rman1 temp]$ sbttest fail -libname libQuantumobk.so
The sbt function pointers are loaded from libQuantumobk.so library.
-- sbtinit succeeded
-- sbtinit (2nd time) succeeded
sbtinit: vendor description string=Quantum MMS for RMAN 1.0.0.3204
sbtinit: Media manager is version 1.0.0.132
sbtinit: Media manager supports SBT API version 2.0
sbtinit: allocated sbt context area of 3888 bytes
MMAPI error from sbtinit2: 7501, sbtinit2: authentication to server 10.20.165.14
username = chuck failed: MI_STS_EAUTH
-- sbtinit2 failed
```

For additional information on Recovery Manager (RMAN) trouble shooting, refer to the Recovery Manager Troubleshooting section of the *Oracle Database Backup and Recovery Advanced User's Guide*:

https://docs.oracle.com/cd/B19306_01/backup.102/b14191/rcmtroub.htm#BRADV012

Oracle Trace Logging

Quantum service can access RMAN logs contained in the `/usr/Quantum/log directory`. Log level control is similar to Veritas OST plug-in, with different settings modified in the `QuantumPlugin.conf` file.

The `rman.log` will also identify an Oracle trace file to review (see Figure 17 on the next page)

Figure 17: RMAN Log Example

```
INFO - 20160922 11:29:51.374 23644 rman_pgn_api.cpp:868 tracing to file
'/home/oracle/app/oracle/diag/rdbms/orcl/orcl/trace/sbtio.log' at level 0
```

Trace file logging can be accomplished by adding a trace <0-2> to the end of the allocate channel call when setting up the data transfer. This log (`sbtio.log`) will be needed when troubleshooting RMAN failures.

The trace file log usefulness depends on the trace level set by the user during the allocate channel call. If an operation repeatedly fails, the trace level should be increased to help identify the root cause of the issue.

By default, tracing occurs at level 0.

RMAN Plug-in Configurable Options

The RMAN plug-in supports the `DEBUG_LEVEL` Linux/Unix configurable debugging option. The following values can be set in `DEBUG_LEVEL` to help define the log message output level:

- `EMERGENCY`
- `ALERT`
- `CRITICAL`
- `ERROR`
- `WARNING`
- `NOTICE`
- `INFO`
- `DEBUG`

By default, `DEBUG_LEVEL` is set to `INFO`.

Enabling Verbose Logging

RMAN Plug-in Log

The RMAN Plug-in logs various messages to log files under `usr/Quantum/log` directory on a Linux or Unix database server. To enable verbose logging, set the `DEBUG_LEVEL` value to `DEBUG`.

Example

INFO - 20160916 11:38:13.104 29659 rman_pgn_api.cpp:2928 Quantum MMS for RMAN 1.0.0.3204

INFO - 20160916 11:38:13.104 29659 rman_pgn_api.cpp:2929 1.0.0.3204 Quantum RMAN plugin initialized.

INFO - 20160916 11:38:13.104 29659 rman_pgn_api.cpp:2930 (C) 2016 Quantum Corporation. All rights reserved.

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:425 IO_PATH=ACCENT

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:426 OPDUP_TIMEOUT=43200 secs

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:427 OPDUP_MBYTES=1024

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:428 RECONNECT_ALLOWED=60

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:429 USE_POLL=0

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:430 ADMIN_ALERT_TIME=300

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:431 ADMIN_ALERT_LIMIT=1

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:432 LOG_LIMIT=104857600

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:433 LOG_FILE_LIMIT=10

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:435 ACCENT_WRITE_CACHE_ SIZE=16777216

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:437 ACCENT_READ_CACHE_SIZE=16777216

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:439 ACCENT_SERVER_READ_ BUFFERED=4294967295

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:441 DATA_CONNECTION_BUSY_ TIMEOUT=300

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:442 ACCENT_ENCRYPTION=1

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:443 ENCRYPTION_REQUIRED=0

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:453 TCP_RCVBUF=4294967295

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:454 TCP_SNDBUF=4294967295

INFO - 20160916 11:38:13.104 29659 pgnconfig.cpp:455 TCP_NODELAY=current OS setting

INFO - 20160916 11:38:13.105 29659 pgnconfig.cpp:459 TCP_KEEPIDLE=current OS setting

INFO - 20160916 11:38:13.105 29659 pgnconfig.cpp:468 TCP_KEEPCNT=current OS setting

INFO - 20160916 11:38:13.105 29659 pgnconfig.cpp:477 TCP_KEEPINTVL=current OS setting

INFO - 20160916 11:38:13.105 29659 pgnconfig.cpp:484 DMC_READ_AHEAD_SIZE_MB=-1

```
INFO - 20160916 11:38:13.105 29659 pgnconfig.cpp:486 LEGACY_BACKUP_OPT=10
```

Other Options

Transmission Control Protocol (TCP)

The TCP Keep Alive settings can be configured from the Oracle server side to prevent an RMAN connection termination.

Parameter	Description	Default	Max
TCP_KEEPIDLE	Set the TCP option TCP_KEEPIDLE for socket connections. This is equivalent to tcp_keepalive_time.	System settings	276446
TCP_KEEPCNT	Set the TCP option TCP_KEEPCNT for socket connections.This is equivalent to tcp_keepalive_probes.	System settings	1215752191
TCP_ KEEPINTVL	Set the TCP option TCP_KEEPINTVL for socket connections. This is equivalent to tcp_keepalive_intvl.	System settings	276446