NetBackup & Backup Exec OST Configuration Guide Instructions

This document contains the following topics:

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Introduction

Caution: If you have previously used Active Directory (CIFS share) to perform authentication between an OST Plug-in and a DXi running 1.4.x or earlier, note that this has changed. The new method of OST Plug-in authentication between OST Plug-in 2.3 and later and DXi 2.x and later DOES NOT USE Active Directory authentication. Instead, you must add new OST user credentials on the DXi and the media server. For instructions, see Configuring OST Authentication on page 8.

Veritas OST (Open Storage) allows NetBackup and Backup Exec to seamlessly integrate with a DXi™-Series disk backup system (DXi V-Series, DXi4000, DXi6000, and DXi8500). Once installed and configured, NetBackup or Backup Exec can manage the backups through the DXi™ and take advantage of the system's capabilities such as data deduplication and replication.

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

- Installing the License Key and OST Plug-in on the next page
- Configuring the DXi on page 5
- Configuring Veritas NetBackup (Media Server) on page 19
- Configuring Veritas Backup Exec (Media Server) on page 34
- Initiating an OST Backup on page 42
- Performing OST Optimized Duplication on page 43
- Configuring OST Path to Tape on page 50
- Configuring the DXi on page 5

Additional Information

- This guide is for DXi 2.3 and DXi 3.x Software. For earlier versions of the DXi system software, refer to the OST Configuration Guide for software version 1.x (6-66755) or the OST Configuration Guide for software version 1.x (6-66910).
- OST Path to Tape (Direct To Tape) is available only for DXi4700 Multi-Protocol configurations, DXi6540, DXi6550, DXi6700, DXi6701, DXi6702, DXi6802, DXi690x, and DXi8500.
- The figures in this guide show the DXi6701 remote management console for illustrative purposes. The remote management console is similar for other DXi systems.

Installing the License Key and OST Plug-in

Before you can configure the DXi with OST, you must install the OST license key and the OST Plug-in. See the following subsections for detailed instructions for completing these tasks:

Installing the OST License Key

To install the OST license key, you must first obtain a License Certificate containing an authorization code.

- **DXi6500, DXi6700, DXi6800, and DXi8500** - The OST license is included with all DXi6500, DXi6700, DXi6800, and DXi8500 systems. A License Certificate containing an authorization code is included in the accessory kit that shipped with the system.
- **DXi4000 and DXi690x** - The OST license key is pre-installed on DXi4000 and DXi690x systems. You do not need to install the license key on the system. Instead, proceed to Installing the OST Plug-in.
- **DXi V-Series** - The OST license key is installed as part of the initial setup for the DXi V-Series virtual appliances. For information about installing the OST license key on the DXi V-Series virtual appliances, see the *DXi V-Series Quick Start Guide*

Locate the License Certificate, then perform the following steps:

1. Open a Web browser on a computer with Internet access.
2. Enter http://www.quantum.com/licensekeys in the browser address box.

   The **License Key Management** page displays (see Figure 1 on the next page).

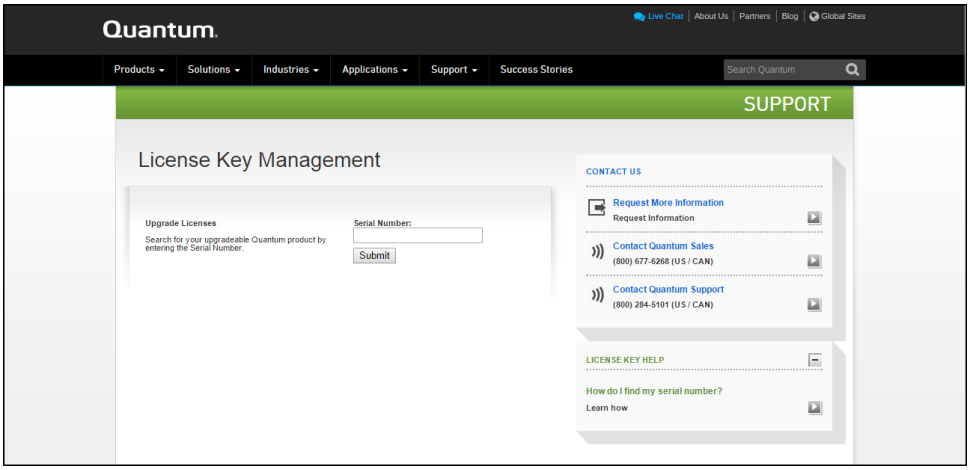


Figure 1: License Key Management Page

3. Enter the DXi system serial number in the Serial Number box and click **Submit**.

   The **Licensed Feature** page displays.

   Note: The serial number displays on the Home page in the remote management console.

4. Enter the authorization code (printed on the License Certificate) and click **Get License Key**.

   The **Licensed Feature** page returns a license key. Print out or write down the license key, or save it to a text file.

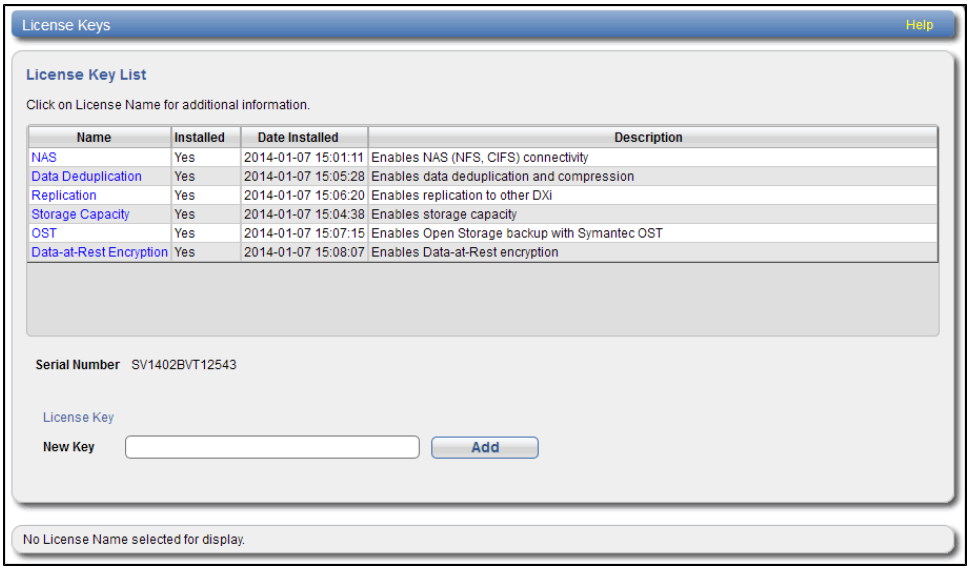
5. Access the DXi remote management console

   .For information about accessing the remote management console, see the *User's Guide* for your DXi system.

6. Click the **Utilities** menu, and then click the **License Keys** tab.

   The **License Keys** page displays (see Figure 2 below).

Figure 2: License Keys Page



7. Enter the license key in the **New Key** box.
8. Click **Add**.

   The license key is added to the system, and the OST feature is enabled.

Installing the OST Plug-in

Before you can configure the DXi with OST, you must download and install the OST Plug-in and install it on

the media server. See the *OST Plug-in Installation Guide* for instructions on how to download and install OST Plug-ins.

Configuring the DXi

You must configure storage servers and logical storage units on the DXi remote management console before you configure NetBackup or Backup Exec. See the following sections to configure the DXi for OST.

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

- Configuring OST Authentication below
- Configuring Storage Servers on the next page
- Configuring Logical Storage Units on page 12
- Target IP Mapping on page 16

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

Configuring OST Authentication

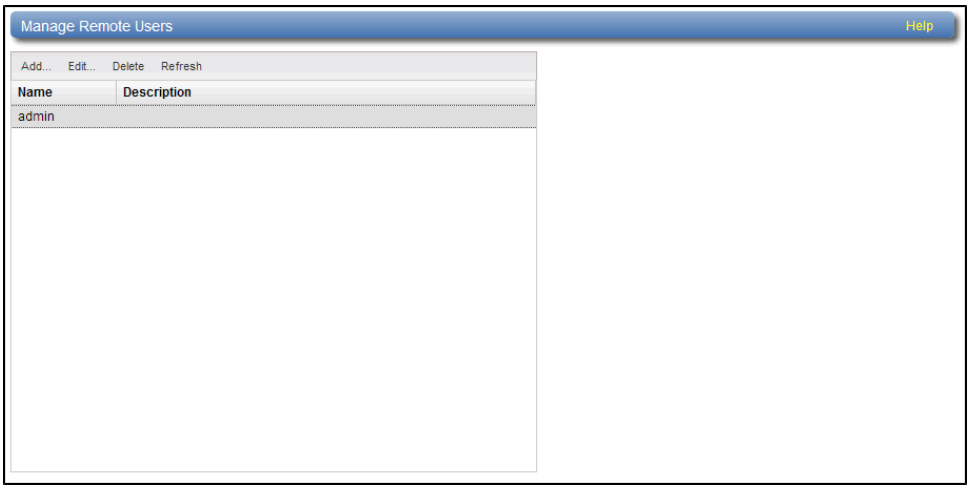
To authenticate the OST storage servers on a media server, you must create OST user credentials.

Caution: If you have upgraded to DXi 2.x Software from a version released prior to 2.0, you must add new OST credentials to the DXi to continue using OST. Shut down the NetBackup or Backup Exec services. Then perform the procedure below, making sure to use the same username and password that were used to register the existing OST devices. Finally, start the NetBackup or Backup Exec services.

To create OST user credentials:

1. Log on to the DXi remote management console.
2. Navigate to the **Configuration > System > Manage Users** page (see Figure 3 on the next page).

Figure 3: Manage Users Page



3. Click **Add**.
4. Specify the **Username** and **New Password** that will be used to authenticate the storage servers on the media server.

Note: For username, alphanumeric characters are allowed, as well as underscores (_) and hyphens (-). For password, alphanumeric characters are allowed, as well as the following special characters: ` ~ ! @ # $ % ^ & * ( ) - _ = + [{] } \ | ; : ' “ , < . > / ?

Caution: In DXi 2.x software, you no longer should include a domain name as part of the username. If you have upgraded from DXi 1.4.x Software, create a simple username and password using the rules noted above, and then provide the same credentials on the media server (see Registering the Storage Server with NetBackup and Discovering Logical Storage Units on page 19or Configuring Backup Exec and Logical Storage Units on page 35).

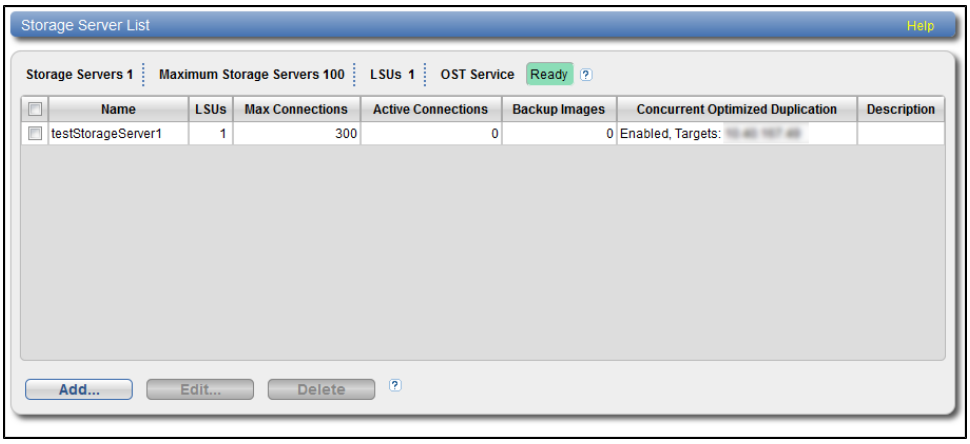
5. Click **Apply.**
6. In NetBackup or Backup Exec, add credentials for the storage server, making sure to use the same OST username and password you entered on the DXi. For more information, see Registering the Storage Server with NetBackup and Discovering Logical Storage Units on page 19 or Configuring Backup Exec and Logical Storage Units on page 35.

Configuring Storage Servers

To configure storage servers:

1. Log on to the DXi remote management console.
2. Navigate to the **Configuration > OST > Storage Server**s page (see Figure 4).

Figure 4: Storage Servers Page



Use the **Storage Server** page to perform the following tasks. See the following subsections for detailed instructions for completing each task:

- Adding a Storage Server below
- Editing a Storage Server on page 10
- Deleting a Storage Server on page 11

Note: Quantum recommends creating a different storage server for each NetBackup or Backup Exec domain (master server plus associated media servers). This segregates data so a NetBackup or Backup Exec administrator cannot accidentally modify or remove backup images belonging to another domain.

Adding a Storage Server

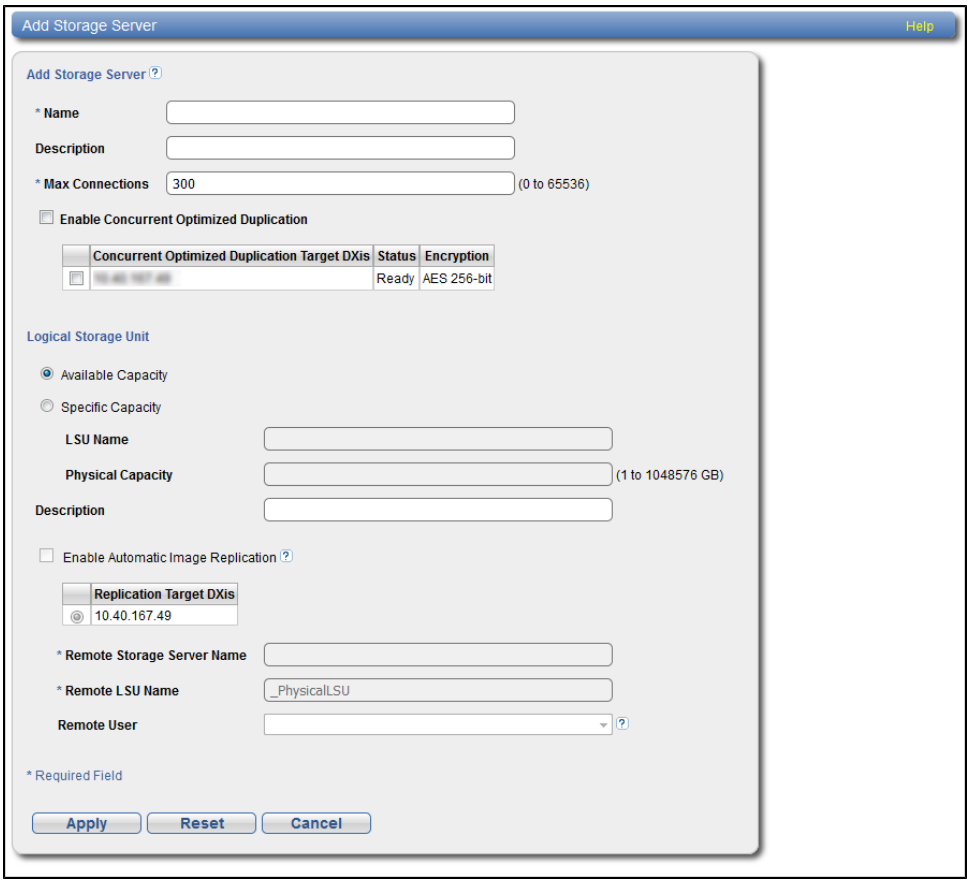
To add a storage server:

Note: You can create up to 100 storage servers.

1. On the **Storage Servers** page, click **Add**.

   The **Add Storage Server** page displays (see Figure 5 on the next page).

Figure 5: Add Storage Server Page



2. Under **Add Storage Server**, enter information about the storage server:

Name	Enter the name of the storage server. **Caution:** Do not use an underscore (_) in the name of the storage server. **Note:** Storage server names must be unique and not used again on other DXi systems. Also, storage server names are case sensitive on all platforms including Windows.
Description	(Optional) Enter a brief description of the storage server.

Max Connections	Enter the maximum number of connections allowed to the storage server (3 to 65536). The maximum connections indicate the number of NetBackup or Backup Exec jobs that can connect to the storage server. **Note:** Quantum recommends that this value is set to 300 so that media servers never run out of storage server connections.
Enable Concurrent Optimized Duplication	Select the check box to enable optimized duplication during OST ingest. Concurrent Optimized Duplication is disabled by default. If enabled, as data is written to the storage server, it is simultaneously replicated to the target DXi. When optimized duplication or Automatic Image Replication subsequently occurs, the operation is more efficient because a portion of the required data has already been replicated to the target storage server. **Note:** To use Concurrent Optimized Duplication, you must configure the source DXi and target DXi for replication (see Replication Channel for OST (NetBackup Only) on page 45). **Note:** When Concurrent Optimized Duplication is enabled, all data on the storage server is duplicated, not just the specified images.

3. Select the check box for each optimized duplication target you want to duplicate the storage server to. When the storage server is duplicated, its data will be sent to all selected targets.
4. Under **Logical Storage Unit**, enter information about the LSU to add to the new storage server:

Available Capacity	(Recommended for best performance) Select this option to add an LSU that uses the available capacity on the system. You cannot add an available capacity LSU to a storage server that already contains an LSU. Also, if you add an available capacity LSU to a storage server, you cannot add additional LSUs to that same storage server. **Note:** After you add an LSU that uses the **Available Capacity** option, you cannot change the LSU to use the **Specific Capacity** option. Instead, you must delete the LSU, then add a new LSU and choose the **Specific Capacity** option (see Deleting an LSU on page 15).
Specific Capacity	Select this option to specify the physical capacity of the LSU, and then enter the following information.
LSU Name	Enter the name of the LSU.
Physical Capacity	Enter the physical capacity of the LSU (1 to 1048576 GB). **Note:** Quantum recommends setting LSUs to maximum size (1048576 GB) because spanning them on a backup is not possible.

5. (Optional) In the Description box, enter a brief description of the LSU.

6. (Optional) Select the Enable Automatic Image Replication check box to automatically replicate (duplicate) data on the LSU to a remote LSU on another DXi.

   Automatic Image Replication (AIR) is disabled by default. If enabled, data on an LSU is automatically replicated to a remote LSU that resides on a DXi in a different NetBackup domain. The timing of the duplication, as well as the backup images that are duplicated, are determined by the storage lifecycle policies (SLPs) configured in NetBackup.

   OST AIR requires NetBackup 7.1 or later. For more information, see Setting Up Automatic Image Replication on page 47.

   Note: To use Automatic Image Replication, you must configure the source DXi and target DXi for replication (see Replication Channel for OST (NetBackup Only) on page 45).

   Note: You must configure at least one remote user before you can enable Automatic Image Replication (see Create a Remote User for OST AIR on page 49).

7. If Automatic Image Replication is enabled, select the replication target you want to replicate images to. (You can select only a single target.) When images are replicated, data will be sent to the selected target.
8. If Automatic Image Replication is enabled, specify the following information:

Remote Storage Server Name	The name of the remote storage server (on the target DXi) to replicate data to. The source DXi and target DXi must reside in different NetBackup domains. **Note:** To configure the target DXi, see Replication Channel for OST (NetBackup Only) on page 45.
Remote LSU Name	The name of the LSU in the remote storage server that will receive the replicated data.
Remote User	The OST user credentials to use for authentication on the remote (target) DXi. The selected remote user must match a local user on the **Configuration > OST > Manage Users** page on the target DXi (see Configuring OST Authentication on page 5).

9. Click **Apply**.

Editing a Storage Server

To edit a storage server:

1. On the **Storage Servers** page, select the storage server and click **Edit**.
2. Enter information about the storage server:

   Note: If you are editing a storage server, the Name option cannot be changed.

Description	(Optional) Enter a brief description of the storage server.
Max Connections	Enter the maximum number of connections allowed to the storage server (3 to 65536). The maximum connections indicate the number of NetBackup or Backup Exec jobs that can connect to the storage server. **Note:** Quantum recommends that this value is set to 300 so that media servers never run out of storage server connections.
Enable Concurrent Optimized Duplication	Select the check box to enable optimized duplication during OST ingest. Concurrent Optimized Duplication is disabled by default. If enabled, as data is written to the storage server, it is simultaneously replicated to the target DXi. When optimized duplication or Automatic Image Replication subsequently occurs, the operation is more efficient because a portion of the required data has already been replicated to the target storage server. **Note:** To use Concurrent Optimized Duplication, you must configure the source DXi and target DXi for replication (see Replication Channel for OST (NetBackup Only) on page 45). **Note:** When Concurrent Optimized Duplication is enabled, all data on the storage server is duplicated, not just the specified images.

3. Select the check box for each optimized duplication target you want to duplicate the storage server to. When the storage server is duplicated, its data will be sent to all selected targets.
4. Click **Apply**.

Deleting a Storage Server

To delete a storage server:

1. On the **Storage Servers** page, select the storage server and click **Delete**.

   You cannot delete a storage server if it has more than zero currently active connections. The number of active connections is displayed on the **OST** page. Also, you cannot delete a storage server if it contains LSUs. Before deleting the storage server, you must first delete any LSUs it contains (see Deleting an LSU on page 15).

   Note: You can select multiple storage servers to delete at once.

2. Click **Delete**.

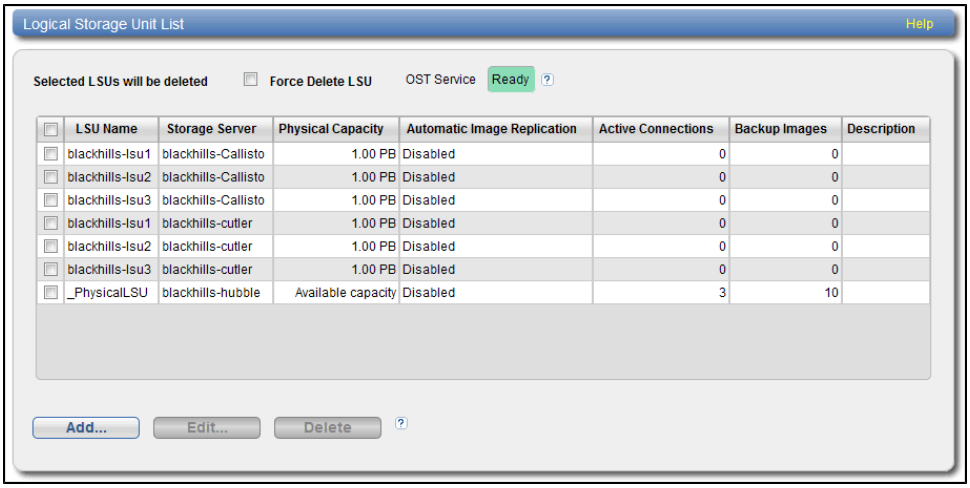
   Note: (NetBackup only) In order to remove the storage server from the DXi remote management console, you must remove the storage unit and disk pool from NetBackup. See the NetBackup Shared Storage Guide for details. After successfully deleting the storage units, disk pools and the corresponding storage server from the DXi remote management console, the connection between NetBackup and the storage server remains open for a grace period of about ten minutes. After the grace period, the active connection count drops to zero.

Configuring Logical Storage Units

To configure logical storage units:

1. Log on to the DXi remote management console.
2. Navigate to the **Configuration > OST > LSU** page (see Figure 6 below).

Figure 6: LSU Page



Use the LSU page to perform the following tasks. See the following subsections for detailed instructions for completing each task:

- Adding an LSU below
- Editing an LSU on page 14
- Deleting an LSU on page 15

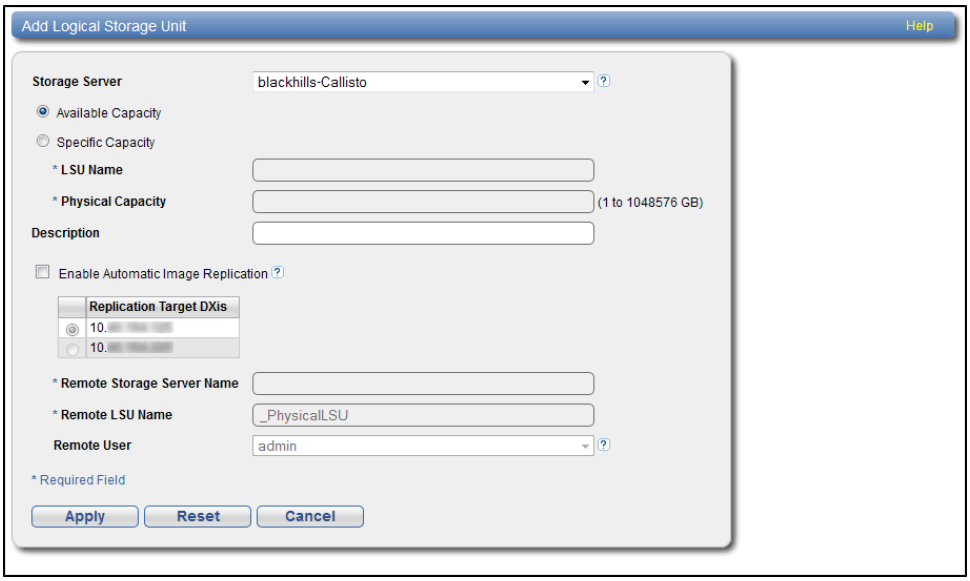
Adding an LSU

To add an LSU to a storage server:

1. On the **LSU** page, click **Add**.

   The **Add Logical Storage Unit** page displays (see Figure 7 on the next page).

Figure 7: Add Logical Storage Unit Page



2. Enter information about the LSU.

Storage Server	Select the storage server that will contain the new LSU.
Available Capacity	(Recommended for best performance) Select this option to add an LSU that uses the available capacity on the system. You cannot add an available capacity LSU to a storage server that already contains an LSU. Also, if you add an available capacity LSU to a storage server, you cannot add additional LSUs to that same storage server. **Note:** After you add an LSU that uses the **Available Capacity** option, you cannot change the LSU to use the **Specific Capacity** option. Instead, you must delete the LSU, then add a new LSU and choose the **Specific Capacity** option (see Deleting an LSU on page 15).
Specific Capacity	Select this option to specify the physical capacity of the LSU, and then enter the following information. • **LSU Name** - Enter the name of the LSU. • **Physical Capacity** - Enter the physical capacity of the LSU (1 to 1048576 GB). **Note:** Quantum recommends setting LSUs to maximum size (1048576 GB) because spanning them on a backup is not possible.

3. (Optional) In the **Description** box, enter a brief description of the LSU.
4. (Optional) Select the **Enable Automatic Image Replication** check box to automatically replicate

(duplicate) data on the LSU to a remote LSU on another DXi.

Automatic Image Replication (AIR) is disabled by default. If enabled, data on an LSU is automatically replicated to a remote LSU that resides on a DXi in a different NetBackup domain. The timing of the duplication, as well as the backup images that are duplicated, are determined by the storage lifecycle policies (SLPs) configured in NetBackup.

OST AIR requires NetBackup 7.1 or later. For more information, see Setting Up Automatic Image Replication on page 47.

Note: You must configure at least one remote user before you can enable Automatic Image Replication (see Create a Remote User for OST AIR on page 49).

5. If Automatic Image Replication is enabled, select the replication target you want to replicate images to. (You can select only a single target.) When images are replicated, data will be sent to the selected target.
6. If Automatic Image Replication is enabled, specify the following information:

Remote Storage Server Name	The name of the remote storage server (on the target DXi) to replicate data to. The source DXi and target DXi must reside in different NetBackup domains. **Note:** To configure the target DXi, see Replication Channel for OST (NetBackup Only) on page 45.
Remote LSU Name	The name of the LSU in the remote storage server that will receive the replicated data.
Remote User	The OST user credentials to use for authentication on the remote (target) DXi. The selected remote user must match a local user on the **Configuration > OST > Manage Users** page on the target DXi (see Configuring OST Authentication on page 5).

7. Click **Apply**.

Editing an LSU

To edit an LSU:

1. On the **LSU** page, select the LSU and click **Edit**.
2. Enter information about the LSU:

Note: If you are editing an LSU, the **Name** option cannot be changed.

Physical Capacity	(Specific capacity LSUs only) Enter the physical capacity of the LSU (1 to 1048576 GB). The physical capacity cannot be changed if the LSU has more than zero currently active connections. The number of active connections is displayed on the **LSU** page.
Description	Optional) Enter a brief description of the LSU.

3. (Optional) Select the Enable Automatic Image Replication check box to automatically replicate (duplicate) data on the LSU to a remote LSU on another DXi.

   Automatic Image Replication (AIR) is disabled by default. If enabled, data on an LSU is automatically replicated to a remote LSU that resides on a DXi in a different NetBackup domain. The timing of the duplication, as well as the backup images that are duplicated, are determined by the storage lifecycle policies (SLPs) configured in NetBackup.

   OST AIR requires NetBackup 7.1 or later. For more information, see Setting Up Automatic Image Replication on page 47.

   Note: You must configure at least one remote user before you can enable Automatic Image Replication (see Create a Remote User for OST AIR on page 49).

4. If Automatic Image Replication is enabled, select the replication target you want to replicate images to. (You can select only a single target.) When images are replicated, data will be sent to the selected target.
5. If Automatic Image Replication is enabled, specify the following information:

Remote Storage Server Name	The name of the remote storage server (on the target DXi) to replicate data to. The source DXi and target DXi must reside in different NetBackup domains. **Note:** To configure the target DXi, see Replication Channel for OST (NetBackup Only) on page 45.
Remote LSU Name	The name of the LSU in the remote storage server that will receive the replicated data.
Remote User	The OST user credentials to use for authentication on the remote (target) DXi. The selected remote user must match a local user on the **Configuration > OST > Manage Users** page on the target DXi (see Configuring OST Authentication on page 5).

6. Click **Apply**.

Deleting an LSU

Note: If you deleted the LSU from Veritas NetBackup or Veritas Backup Exec, you must wait several

minutes before deleting the LSU from the DXi.

To delete an LSU:

1. On the **LSU** page, select the LSU.

   You cannot delete an LSU if it has more than zero currently active connections. The number of active connections is displayed on the **LSU** page.

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

2. (Optional) Select the **Force Delete LSU** check box to delete LSUs that are not empty.

   Normally, you cannot delete an LSU if it contains existing backup images. If for some reason you cannot remove files from the LSU, selecting the **Force Delete LSU** check box allows you to delete the LSU even though it is not empty.

3. Click **Delete**.

Target IP Mapping

The **Target IP Mapping** page allows you to associate a data IP address with a replication IP address on a target DXi. This can be necessary if the target DXi is configured with different network interfaces (and therefore different IP addresses) for data and replication traffic.

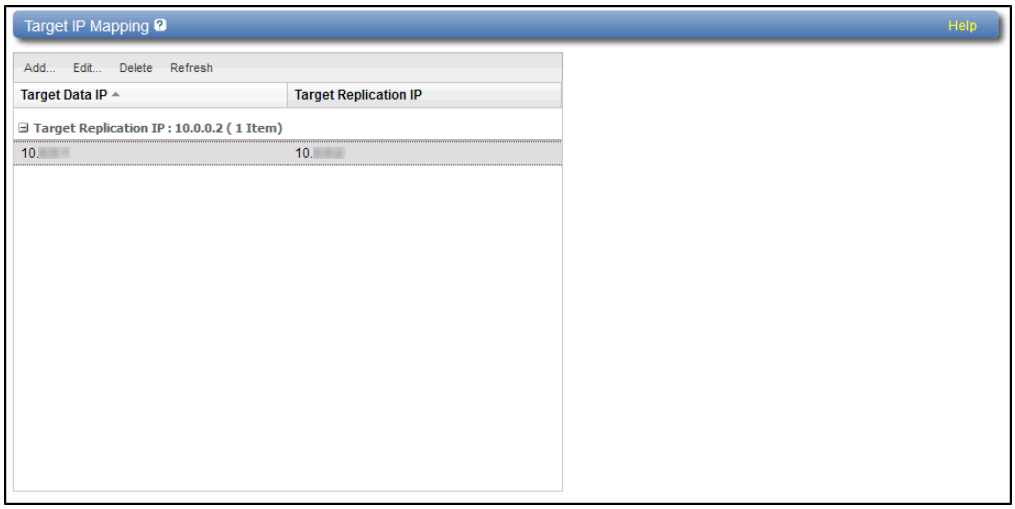
Generally, OST traffic is routed to the data network segment. However, the OST Automatic Image Replication (AIR) and Concurrent Optimized Duplication features use the replication network segment to transmit data to the target system. (Optimized duplication can optionally use the replication channel.) When a data IP address is mapped to a replication IP address, OST traffic that is sent to one of the IP addresses is routed to the other IP address as necessary.

Additional Information

- You must add target IP mapping information if you are performing optimized duplication on a segmented network and replication is not configured between the source DXi and target DXi.
- Quantum does not recommend mapping multiple data IP addresses to a single replication IP address. If you have mapped multiple data IP addresses and the routing is not working, try removing the additional data IP addresses, and map only a single data IP address.

To access the **Target IP Mapping** page, on the OST page, click the **Target IP Mapping** tab (see Figure 8 on the next page).

Figure 8: Target IP Mapping Page



Tasks

Use the **Target IP Mapping** page to perform the following tasks:

- View information about mapped data and replication IP addresses (see Target IP Mapping List below).
- Map a target data IP address to a replication IP address (see Mapping a Target IP Address below).
- Edit the mapping for a target data IP address (see Editing a Mapped IP Address on the next page).
- Delete the mapping for a target data IP address (see Deleting a Mapped IP Address on page 19).

Target IP Mapping List

The **Target IP Mapping** list displays the following information for all mapped IP addresses:

- **Target Data IP** - The mapped target data IP address.
- **Target Replication IP** - The replication IP address to which the data IP address is mapped.

Items in the list are grouped by target replication IP address.

Mapping a Target IP Address

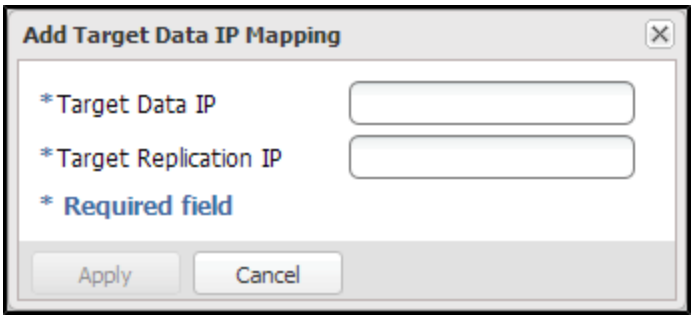
Add mapping for a target data IP address to route all network traffic sent to the address to the specified replication IP address instead.

To map a target IP address:

1. Click **Add**.

   The **Add Target Data IP** Mapping window displays (see Figure 9 on the next page).

Figure 9: Add Target Data IP Mapping



2. Enter information about the mapping:
   - **Target Data IP** - The target data IP address to map.
   - **Target Replication IP** - The replication IP address to map the data IP address to.
3. Click **Apply**.

Editing a Mapped IP Address

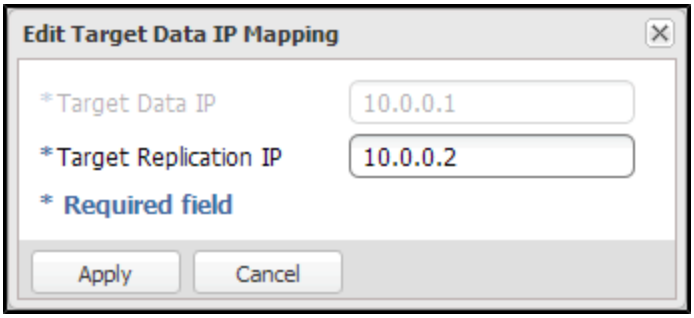
Edit a mapped IP address to route traffic sent to the target data IP address to a different replication IP address.

To edit a mapped IP address:

1. Select the mapped IP address and click **Edit**.

   The **Edit Target Data IP Mapping** window displays (see Figure 10 below).

Figure 10: Edit Target Data IP Mapping



2. In the **Target Replication IP** box, enter the replication IP address to map the data IP address to.

   Note: If you are editing a mapped IP address, you cannot change the target data IP address.

3. Click **Apply**.

Deleting a Mapped IP Address

Delete a mapped IP address if traffic sent to the target data IP address no longer needs to be routed to a replication IP address

To delete a mapped IP address, select the IP address and click Delete.

Note: You can select multiple mapped IP addresses to delete at once.

Configuring Veritas NetBackup (Media Server)

See the *NetBackup System Administrator's Guide* for information about NetBackup installation and basic configuration. Also, see the *NetBackup Shared Storage Guide* before proceeding further.

Caution: You MUST have all NetBackup 7.1.x updates (including the Java client and any for OST path-to-tape) applied before continuing with configuration.

To ensure that you have the correct licenses installed on your system, see the Quantum Compatibility Guide located at:

http://www.quantum.com/ServiceandSupport/CompatibilityGuides/Index.aspx

To configure Veritas NetBackup for OST, see the following sections:

- Registering the Storage Server with NetBackup and Discovering Logical Storage Units below
- Configuring Disk Pools and Storage Units in NetBackup on page 30

Registering the Storage Server with NetBackup and Discovering Logical Storage Units

After the Quantum OST Plug-in is installed and configured on the NetBackup media server, you must register the storage servers with NetBackup by defining them on the media server.

You must complete this process on every media server that will access the storage servers on the DXi. You can configure multiple media servers to use the same storage servers as long as the OST Plug-in is installed on each media server. To register a storage server, first define it using the **nbdevconfig** command, and then provide credentials using the **tpconfig** command.

Additional Information

- You can perform this process using the Storage Server Configuration Wizard instead of the CLI commands (see Using the Storage Server Configuration Wizard on page 24).

- The storage server argument passed to the **nbdevconfig** command should be in the form of **<name_IP>**, where the name is the name of storage server to be registered and IP is the IP address of the DXi. If the DXi is configured with multiple network interfaces (see the *User's Guide* for your DXi system), the IP will be the network interface used for data. This is also applicable when registering storage servers on a Windows platform.
- If the IP address of the DXi or media server changes at any time after registering the storage servers (for example, due to switch changes), you must delete the existing storage servers and disk pools on the media server, and then register the storage servers again using the procedures below. You must take these actions on all media servers that access the storage servers.

Perform the procedure for the operating system on the media server:

- Registering the Storage Server on Windows Platforms below
- Registering the Storage Server on Linux, Solaris, or AIX Platforms on page 22

Registering the Storage Server on Windows Platforms

To register the storage server on a Windows NetBackup media server platform, perform the following steps:

Additional Information

- The procedures in this section assume NetBackup is installed in the default location on the **C:** drive. If you installed Netbackup in a different drive or location, modify the commands with the correct path.
- For complete usage information about these commands, refer to *NetBackup Commands for Windows*.

1. Add the storage server to NetBackup:
   ```
   <install path>NetBackup\bin\admincmd\nbdevconfig -creatests -storage_server
   <storageserver_ip> -stype Quantum -media_server <media_servername> -st 9
   ```

   Example

   To a server with the Netbackup installation path **C:\Program Files\Veritas**, to add a storage server by name nbustorageserver at IP address **192.168.1.100** and a media server by name **nbumedia**.

   ```
   C:\Program Files\Veritas\NetBackup\bin\admincmd\nbdevconfig -creatests -
   storage_server nbustorageserver_192.168.1.100 -stype Quantum -media_server
   nbumedia -st 9
   ```

Additional Information

- When specifying the -storage_server variable, you must include both the name and IP address (or the name and hostname) of the storage server separated by an underscore. Storage server names are case sensitive on all platforms including Windows. For example: nbustorageserver_192.168.1.100 (or nbustorageserver_hostname).
- If the DXi is configured with multiple network interfaces (see the User's Guide for your DXi system), the IP address of the interface enabled for data should be used to register the storage server.
- A message from the prompt indicates that the storage server was added successfully. Otherwise, an error message is displayed.

2. Specify the credentials of the storage server:

```
C:\Program Files\Veritas\Volmgr\bin\tpconfig -add -storage_server
<storageserver_ip> -stype Quantum -sts_user_id <username> -password <password>
```

Example

Add credentials for storage server **nbustorageserver**.

```
C:\Program Files\Veritas\Volmgr\bin\tpconfig -add -storage_server
nbustorageserver_192.168.1.100 -stype Quantum -sts_user_id ostuser -
password quantum
```

Caution: The username and password must be the same as the OST user credentials created on the DXi remote management console (see Configuring OST Authentication on page 5).

Additional Information

- When specifying the **-storage_server** variable, you must include both the name and IP address (or the name and hostname) of the storage server separated by an underscore. Storage server names are case sensitive on all platforms including Windows. For example: **nbustorageserver_192.168.1.100** (or **nbustorageserver_hostname**).
- No message displays if the credentials are added successfully. However, an error message displays if the credentials are incorrect.

Verifying the LSU Discovery

After you have registered the storage server, verify the discovery of LSUs by performing the following step:

1. From the command line on the master server, type:
   `<install path>\netbackup\bin\admincmd\nbdevconfig –previewdv -stype Quantum –storage_servers <storageserver_ip>`

   Example

   Verify LSU discovery for storage server **nbustorageserver**.

   ```
   C:\Program Files\Veritas\NetBackup\bin\admincmd\nbdevconfig -previewdv -stype Quantum -storage_servers nbustorageserver_192.168.1.100
   ```

   Additional Information

   - When specifying the **-storage_server** variable, you must include both the name and IP address (or the name and hostname) of the storage server separated by an underscore. Storage server names are case sensitive on all platforms including Windows. For example: **nbustorageserver_192.168.1.100** (or **nbustorageserver_hostname**).

   This will show if the storage server has been discovered by NetBackup and if the password is correct.

Registering the Storage Server on Linux, Solaris, or AIX Platforms

To register the storage server on Linux, Solaris, or AIX NetBackup media server platforms:

Note: For complete usage information about these commands, refer to *NetBackup Commands for UNIX and Linux*.

1. Add the storage server to NetBackup by executing the following command on the NetBackup media server as root:
   `/usr/openv/netbackup/bin/admincmd/nbdevconfig -creatests -storage_server <storageserver_ip> -stype Quantum -media_server <media_servername> -st 9`

   Example

   Adding a storage server by name **nbustorageserver** and a media server by name **nbumedia**.

   ```
   /usr/openv/netbackup/bin/admincmd/nbdevconfig -creatests -storage_server nbustorageserver_192.168.1.100 -stype Quantum -media_server nbumedia -st 9
   ```

Additional Information

- When specifying the **-storage_server** variable, you must include both the name and IP address (or the name and hostname) of the storage server separated by an underscore. Storage server names are case sensitive on all platforms including Windows. For example: **nbustorageserver_192.168.1.100** (or **nbustorageserver_hostname**).
- If the DXi is configured with multiple network interfaces (see the *User's Guide* for your DXi system), the IP address of the interface enabled for data should be used to register the storage server.
- A message from the prompt indicates that the storage server was added successfully. Otherwise, an error message is displayed.

2. Specify the credentials of the storage server:
```
/usr/openv/volmgr/bin/tpconfig -add -storage_server <storageserver_ip> -stype
Quantum -sts_user_id <username> -password <password>
```

Example

Adding credentials for storage server **nbustorageserver**.

```
/usr/openv/volmgr/bin/tpconfig -add -storage_server nbustorageserver_
192.168.1.100 -stype Quantum -sts_user_id ostuser -password quantum
```

Caution: The username and password must be the same as the OST user credentials created on the DXi remote management console (see Configuring OST Authentication on page 8).

Additional Information

- When specifying the **-storage_server** variable, you must include both the name and IP address (or the name and hostname) of the storage server separated by an underscore. Storage server names are case sensitive on all platforms including Windows. For example: **nbustorageserver_192.168.1.100** (or **nbustorageserver_hostname**).
- No message displays if the credentials are added successfully. But an error message displays if the credentials are incorrect.

Verifying the LSU Discovery

After you have registered the storage server, verify the discovery of LSUs by performing the following step:

1. From the command line on the master server, type:
   `/usr/openv/netbackup/bin/admincmd/nbdevconfig –previewdv –stype Quantum –storage_servers <storageserver_ip>`

   Example

   Verify LSU discovery for storage server **nbustorageserver**.

   ```
   /usr/openv/netbackup/bin/admincmd/nbdevconfig –previewdv –stype Quantum –storage_servers nbustorageserver_192.168.1.100
   ```

   Note: When specifying the **-storage_server** variable, you must include both the name and IP address (or the name and hostname) of the storage server separated by an underscore. Storage server names are case sensitive on all platforms including Windows. For example: **nbustorageserver_192.168.1.100** (or **nbustorageserver_hostname**).

   This will show if the LSU has been discovered by NetBackup and if the password is correct.

Using the Storage Server Configuration Wizard

For NetBackup 7.1.x, you can use the Storage Server Configuration Wizard to register storage servers.

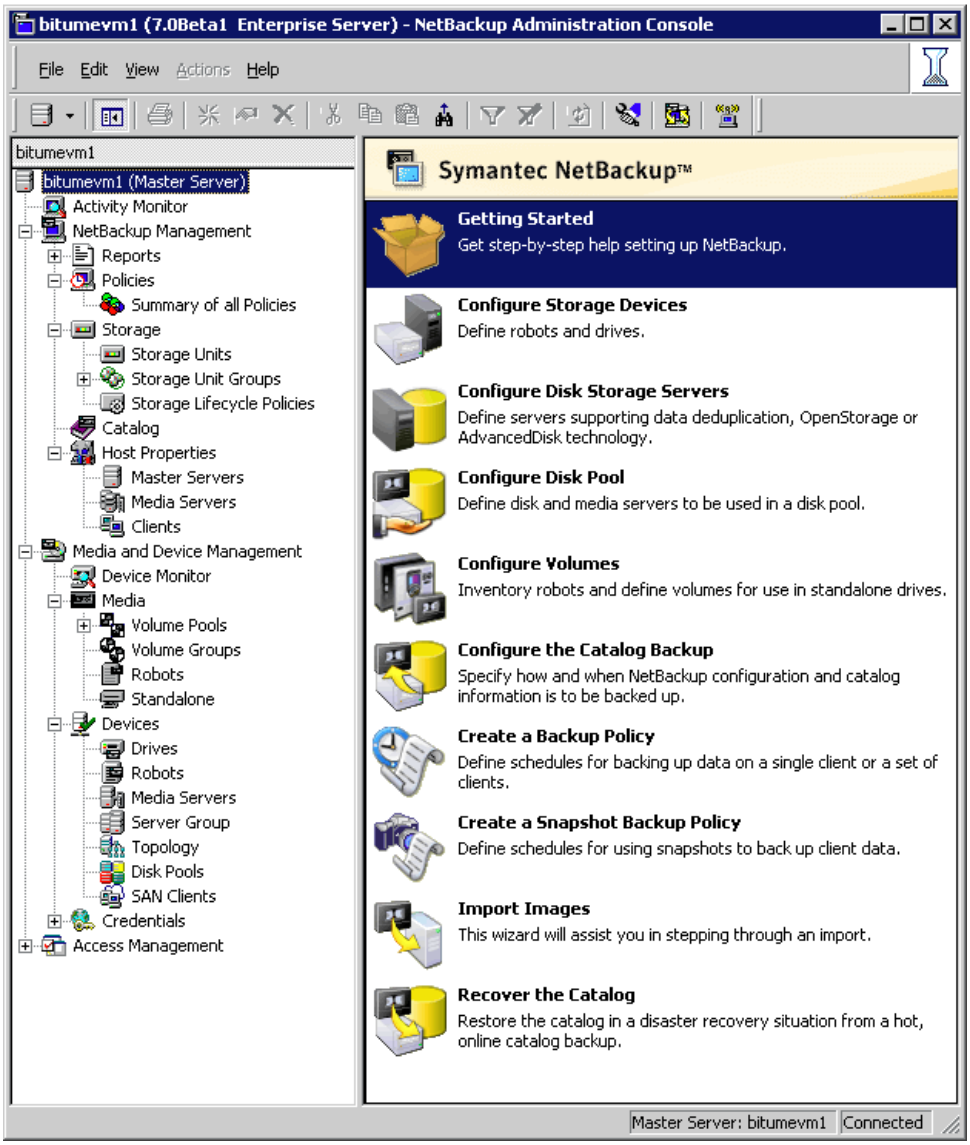
Note: The appearance of screens and screen names may vary depending on the version of NetBackup used (NetBackup 7.0 is shown.); relevant exceptions for newer versions are shown.

To register storage servers:

1. Start NetBackup:
   - In Windows, double-click the **NetBackup Administration Console** icon.
   - In Linux, Solaris, or AIX, run the following command:
     `/usr/openv/NetBackup/bin/jnbSA &`

   The **NetBackup Administration Console** displays (see Figure 11 on the next page).

Figure 11: NetBackup Administration Console



2. In the **Details** pane (on the right), click **Configure Disk Storage Servers**.

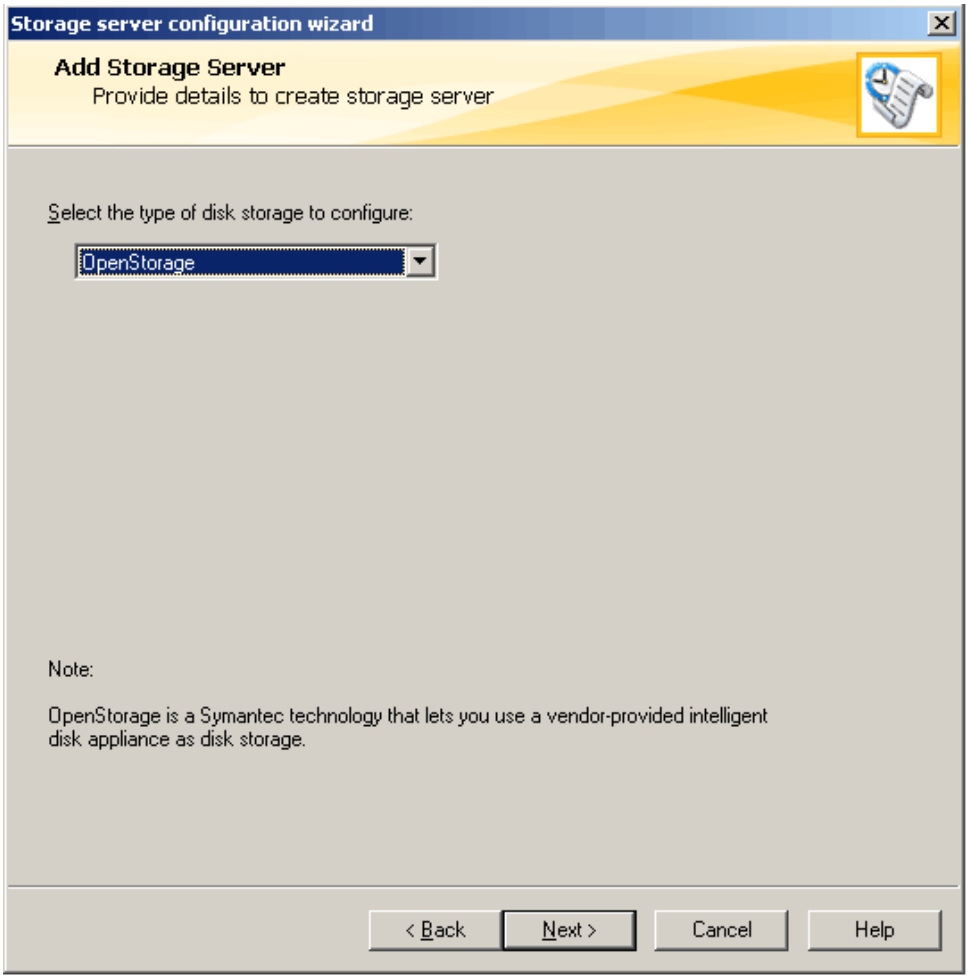
   The **Storage Server Configuration Wizard** displays (see Figure 12 on the next page).

Figure 12: Storage Server Configuration Wizard

3. Click **Next**.

   The **Add Storage Server Type** window displays (see Figure 13 on the next page).

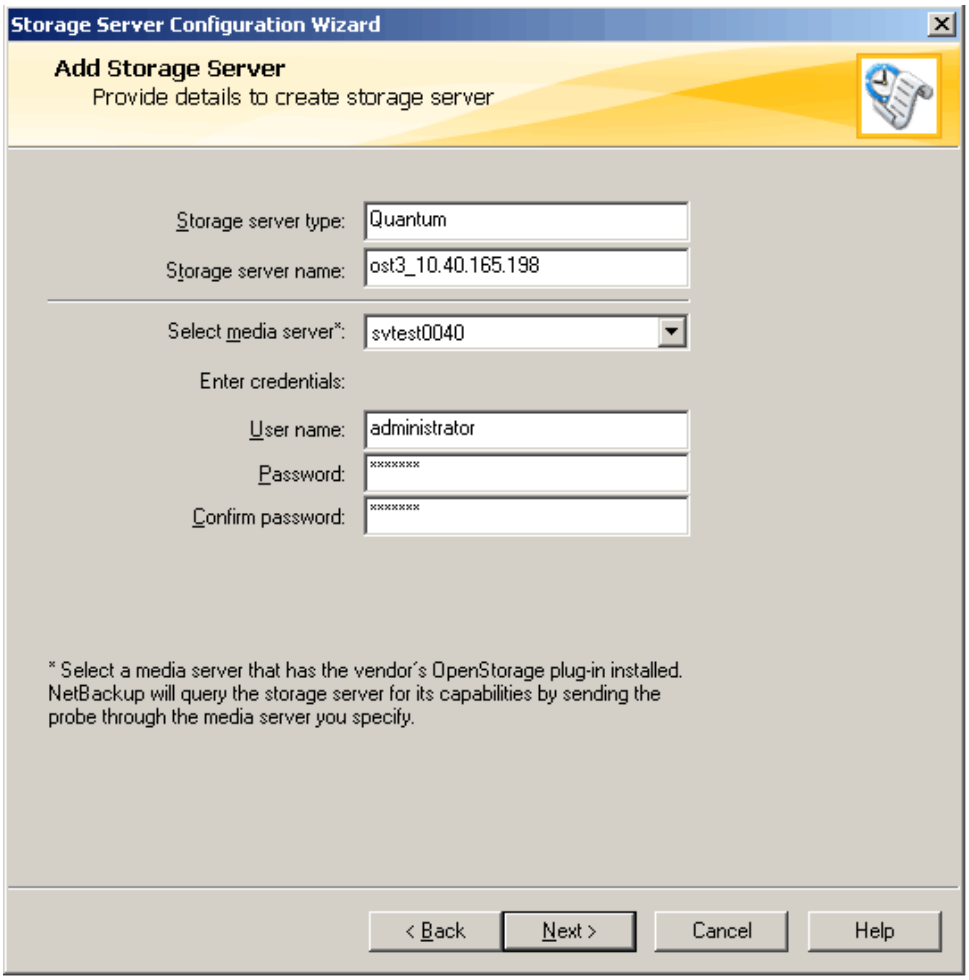
Figure 13: Storage Server Configuration Wizard: Add Storage Server Type



4. Select **OpenStorage** in the list, and then click **Next**.

   The **Add Storage Server Details** window displays (see Figure 14 on the next page).

Figure 14: Storage Server Configuration Wizard: Add Storage Server Details



5. Enter the following information about the storage server:

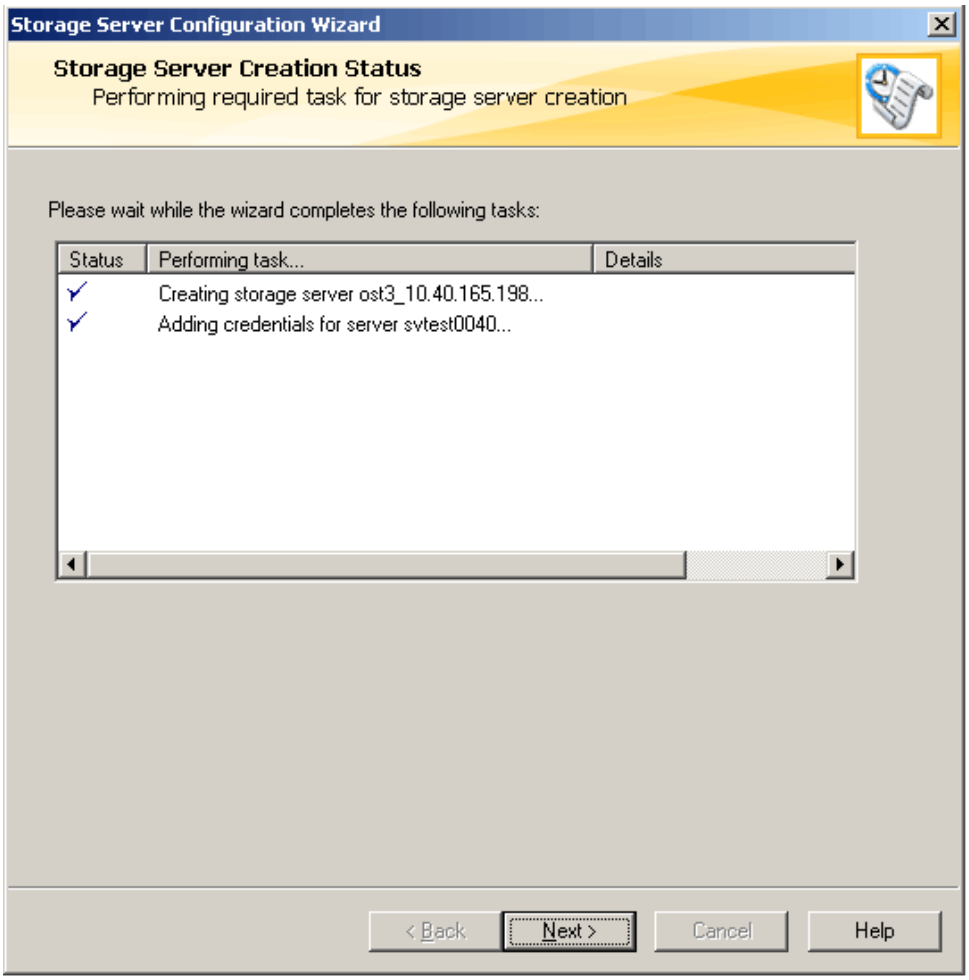
Storage server type	Enter **Quantum**.

Storage server name	The name of the storage server in the format <storageserver_ip>. **Note:** When specifying the **-storage_server** variable, you must include both the name and IP address (or the name and hostname) of the storage server separated by an underscore. Storage server names are case sensitive on all platforms including Windows. For example: **nbustorageserver_192.168.1.100** (or **nbustorageserver_hostname**). **Note:** If the DXi is configured with multiple network interfaces (see the *User's Guide* for your DXi system), the IP address of the interface enabled for data should be used to register the storage server.
Select media server	Select the media server that will access the storage server. The OST Plug-in must be installed on the media server.
Enter credentials	Enter the username and password for the storage server. **Caution:** The username and password must be the same as the OST user credentials created on the DXi remote management console (see Configuring OST Authentication on page 5). **Note:** If an error occurs when authenticating in Windows, try using the **tpconfig** command to validate the OST target (see Registering the Storage Server on Windows Platforms on page 20 or Registering the Storage Server on Linux, Solaris, or AIX Platforms on page 22).

6. Click **Next**.

   The **Storage Server Creation Status** window displays (see Figure 15 on the next page).

Figure 15: Storage Server Configuration Wizard: Storage Server Creation Status



7. Wait for the wizard to complete the tasks, and then click **Next**.
8. Click **Finish**.

   The storage server is created on the media server.

Configuring Disk Pools and Storage Units in NetBackup

Note: The appearance of screens and screen names may vary depending on the version of NetBackup used (NetBackup 7.0 is shown.); newer version will continue to **Configure Disk Pools** without the need to return to the **NetBackup Administration Console**.

To configure disk pools and storage units in NetBackup:

1. Start NetBackup:

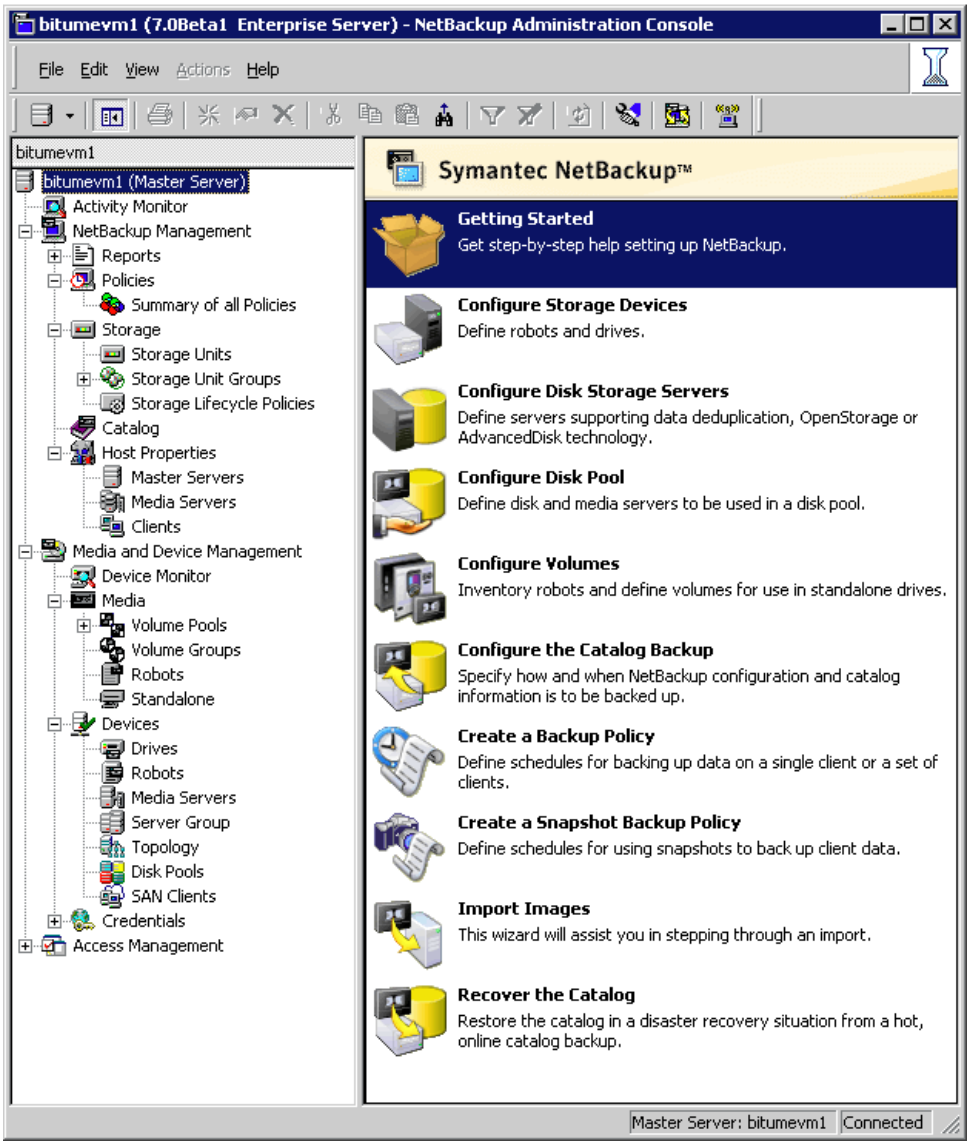
   In Windows, double-click the **NetBackup Administration Console** icon.

   In Linux, Solaris, or AIX, run the following command:

```
/usr/openv/NetBackup/bin/jnbSA &
```

The **NetBackup Administration Console** displays (see Figure 16 below).

Figure 16: NetBackup Administration Console



2. In the Details pane (on the right), click **Configure Disk Pool**.

   The **DIsk Pool Configuration Wizard** displays (see Figure 17 on the next page).

Figure 17: Disk Pool Configuration Wizard

3. Click **Next**.

   The **Disk Pool Type** window displays (see Figure 18 below).

Figure 18: Disk Pool Configuration Wizard: Disk Pool Type

4. Select **OpenStorage (Quantum)** for the disk pool type, and then click **Next**.

   The **Select Storage Server** window displays (see Figure 19 below).

Figure 19: Disk Pool Configuration Wizard: Select Storage Server

5. Select the storage server that you created on the media server, and then click **Next**.

   The **Select Volumes** window displays (see Figure 20 on the next page).

Figure 20: Disk Pool Configuration Wizard: Select Volumes

Note: Newer versions display the Select Disk Pool Properties and Volumes window (see Figure 21 below). If AIR is configured on the DXi for your LSU, the Replication choices will be populated when you select the Volume.

Figure 21: Disk Pool Properties and Volumes

6. Select an available LSU, and then click **Next**.

   The **Disk Pool Properties** (named **Additional Disk Poll Information** in newer versions) window displays (see Figure 22 below).

Figure 22: Disk Pool Configuration Wizard: Disk Pool Properties

7. Enter a **Disk Pool** name, and check the other information to make sure it is correct. Then click **Next**.

Note: Newer versions display the Summary window (see Figure 23 below). If you see this window, check the information to make sure it is correct, and then click **Next**.

Figure 23: Summary window

Note: Newer versions display the **Disk Pool Creation** window (see Figure 24 below). If you see this window, click Next.

Figure 24: Disk Pool Creation

The **Storage Unit Creation** window displays (see Figure 25 below).

Figure 25: Disk Pool Configuration Wizard: Storage Unit Creation

8. Select the **Create a Storage Unit that uses…** check box, and then click **Next**.

   The **Storage Unit Creation Details** window displays (see Figure 26 below).

Figure 26: Disk Pool Configuration Wizard: Storage Unit Creation Details

9. Accept the default settings, or modify the following information about the storage unit:

Storage unit name	Enter the name of the storage unit.
Media Server	Select an option to use any available media server to transport data, or select the specific media server(s) to use.

Maximum concurrent jobs	Enter the maximum number of backup jobs that can run concurrently to the storage unit. **Note:** Quantum recommends setting this value to no more than 16 jobs (DXi4000 and DXi6510) or 64 jobs (all other DXi6000 models, DXi8500). Keep in mind that restore jobs and optimized duplication jobs will cause additional system load.
Maximum fragment size	Enter the maximum size of backup archives that can be written to the storage unit.

10. Click **Next**.
11. Click **Finish**.

    The **Disk Pool** is now configured and ready for use. You can view or change current configuration settings in **Device Management** or **Storage Unit Management**.

Configuring Veritas Backup Exec (Media Server)

Please consult the *Veritas Backup Exec 2010 Administrator's Guide* for instructions on Backup Exec installation and basic configuration.

Caution: You *must* upgrade to Backup Exec 2010 R3 or later before configuring Backup Exec. R3 is a maintenance release that provides OST fixes that are required by DXi software version 2.x.

Additional Information

- Installation and licensing of the deduplication option in Backup Exec is required for OST support.
- To ensure that you have the correct licenses installed on your system, see the *Quantum Compatibility Guide* located at: http://www.quantum.com/ServiceandSupport/CompatibilityGuides/Index.aspx

To configure Veritas Backup Exec for OST, see the following sections:

- Backup Exec Configuration below
- Configuring Backup Exec and Logical Storage Units on the next page

Backup Exec Configuration

In addition to the basic configuration of Backup Exec media server, the following Backup Exec services have to be logged in with administrative credentials:

- Backup Exec Device & Media Service

To log in with administrative credentials:

1. Open the **Services** window.
2. Right-click on the service and click **Properties**.
3. In the **Properties** window of the service, click the **Log on** tab.
4. Select **This Account Option** and enter the administrative login name and password.
5. Click **OK** and restart the service to login with the new credentials.

Configuring Backup Exec and Logical Storage Units

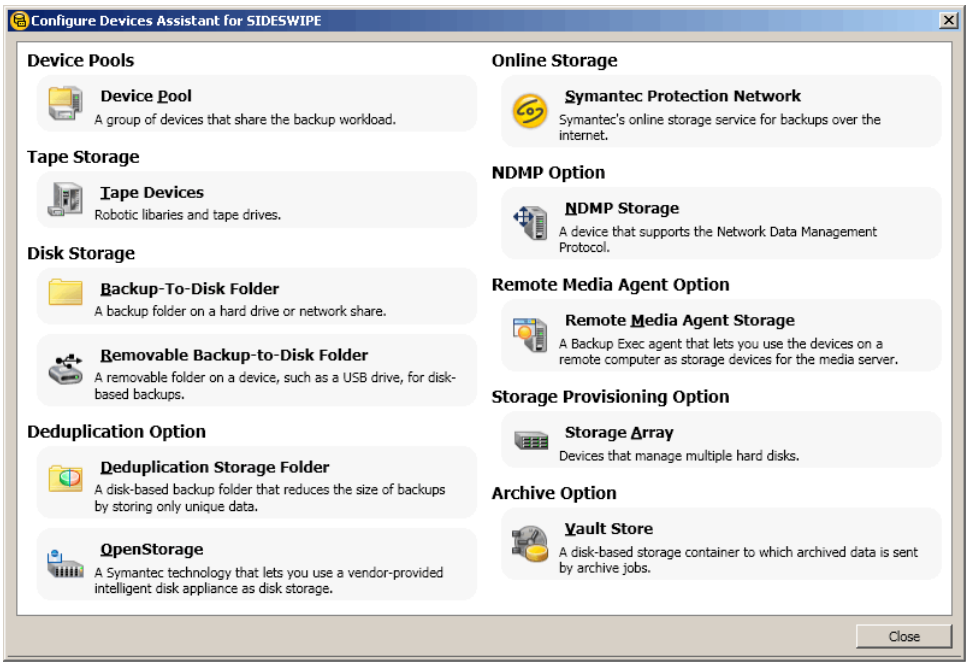
To configure Backup Exec and the logical storage units:

Note: Quantum recommends that you disable the Windows firewall on the Backup Exec server.

1. From the main Backup Exec menu, choose **Configure Devices**.

   The **Configure Devices** window displays (see Figure 27 below).

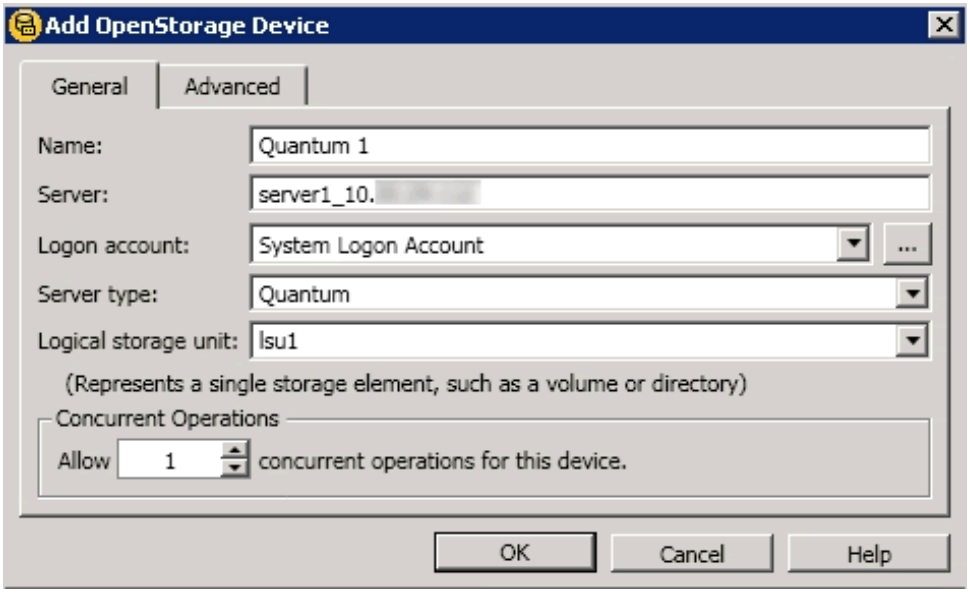
   Figure 27: Configure Devices Window



2. From the **Configure Devices** window, select **OpenStorage**.

   The **Add OpenStorage Device** window displays (see Figure 28 on the next page).

Figure 28: Add OpenStorage Window



3. Enter the following information in the **Add OpenStorage Device** window:
   a. Enter the **Server** name. The **Server** name must use the following format: `<OST storage server name>_<DXi data IP or hostname>`.

      The OST storage server name must match the OST storage server name configured earlier in the DXi remote management console (see Configuring Storage Servers on page 6). For example: **server1_10.30.24.112** or **server1_hostname**.

   b. Specify the **Logon** account. The **Logon** account username and password *must* be the same as the OST user credentials created on the DXi remote management console (see Configuring OST Authentication on page 5).

   c. The **Server** type Indicates the type of OpenStorage device. Select **Quantum** for the **Server** type.

      Note: Do not select **PureDisk** for the **Server** type.

   d. Enter the **Logical storage unit** (LSU) name. The name should match the LSU name configured earlier on the DXi remote management console (see Configuring Logical Storage Units on page 12).

   e. Select the number of allowed **Concurrent Operations**.

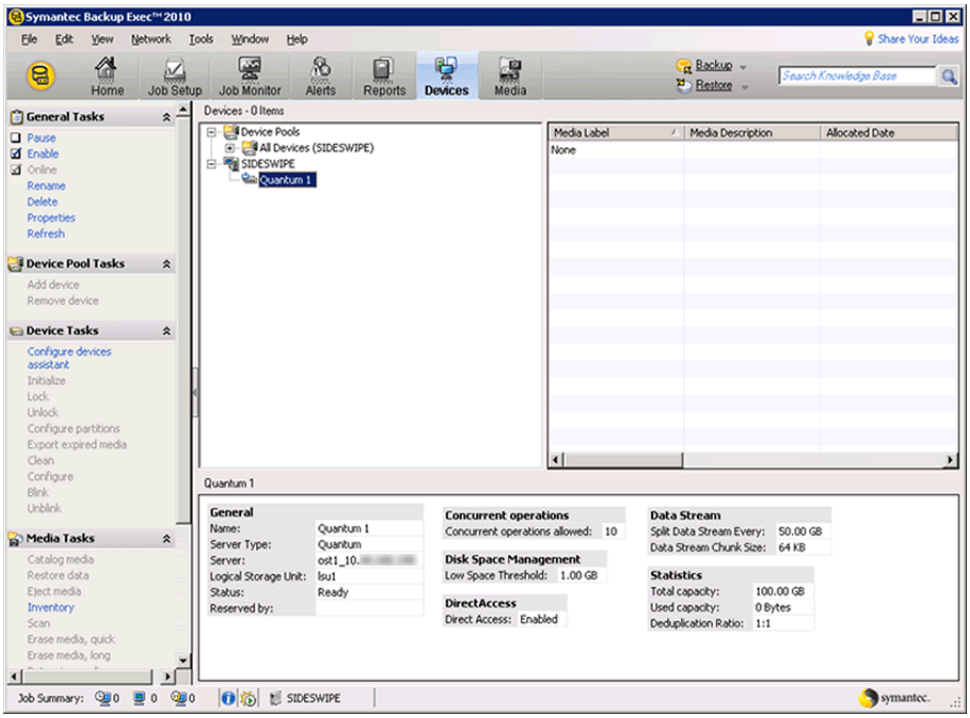
      Note: Quantum recommends setting this value to no more than 16 jobs (DXi4000 and DXi6510) or 64 jobs (all other DXi6000 models, DXi8500). Keep in mind that restore jobs and optimized duplication jobs will cause additional system load.

4. Sharing can be enabled when you add an OpenStorage device. Direct Access for Remote Agents is enabled by default.

5. Click **Restart Now** when prompted to restart services. Backup Exec will not discover the device until the Backup Exec services are restarted.

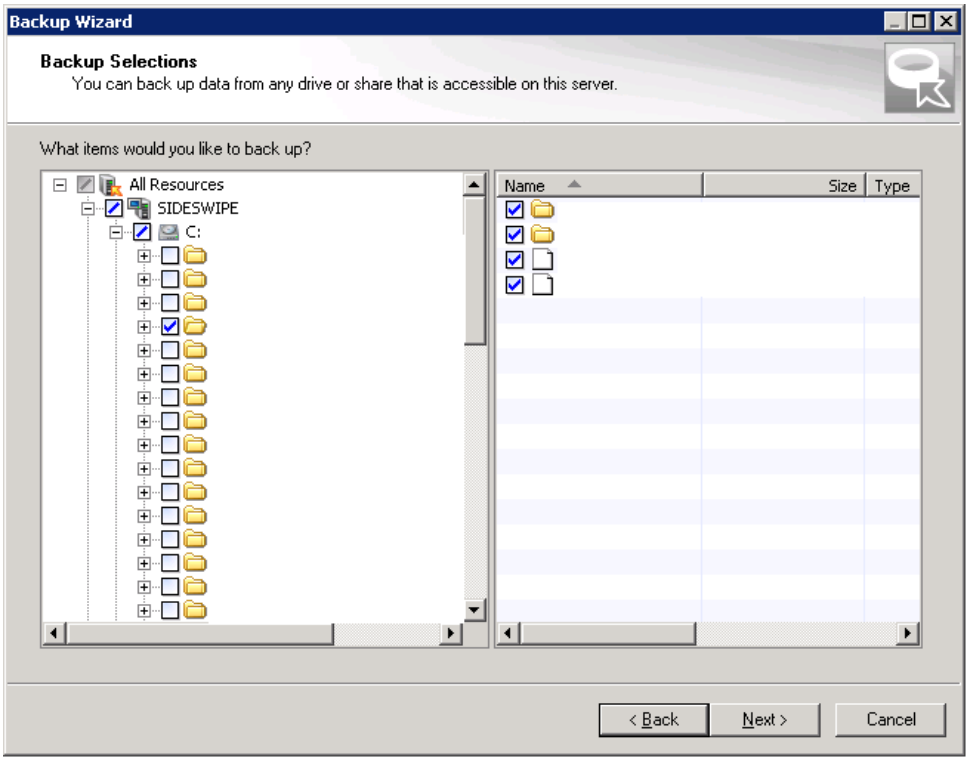
   The storage unit and LSU should show as ready after it is discovered by Backup Exec (see Figure 29 below).

   Figure 29: Backup Exec Window



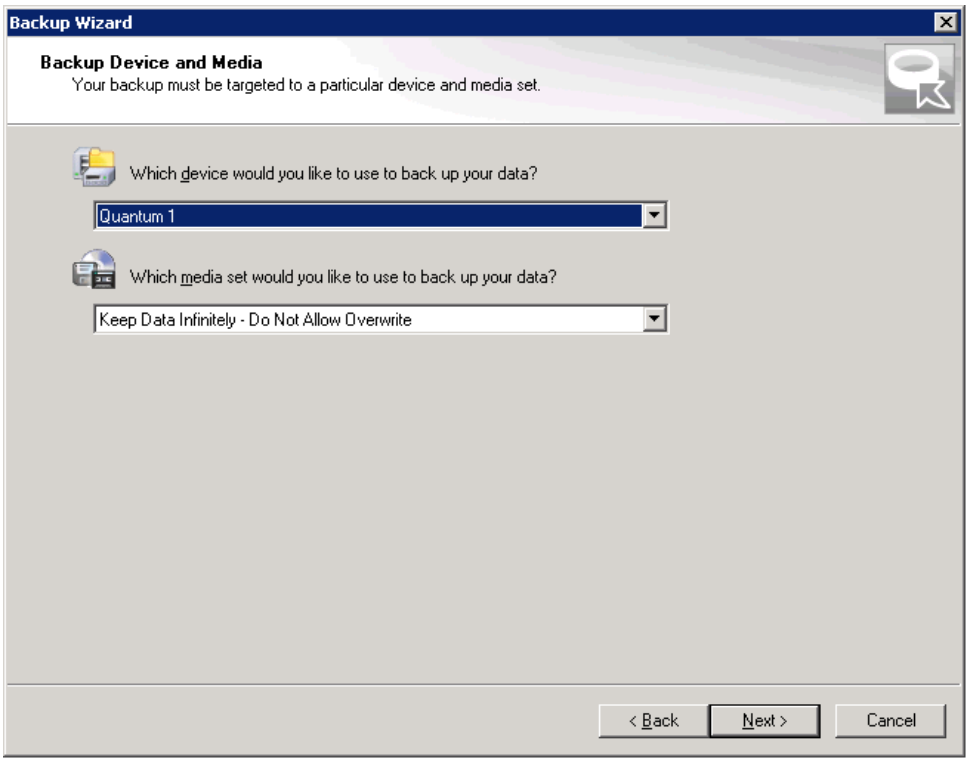
6. Create a small backup job using the **Backup Wizard** to verify connectivity (see Figure 30 on the next page).

Figure 30: Backup Wizard - Backup Selections



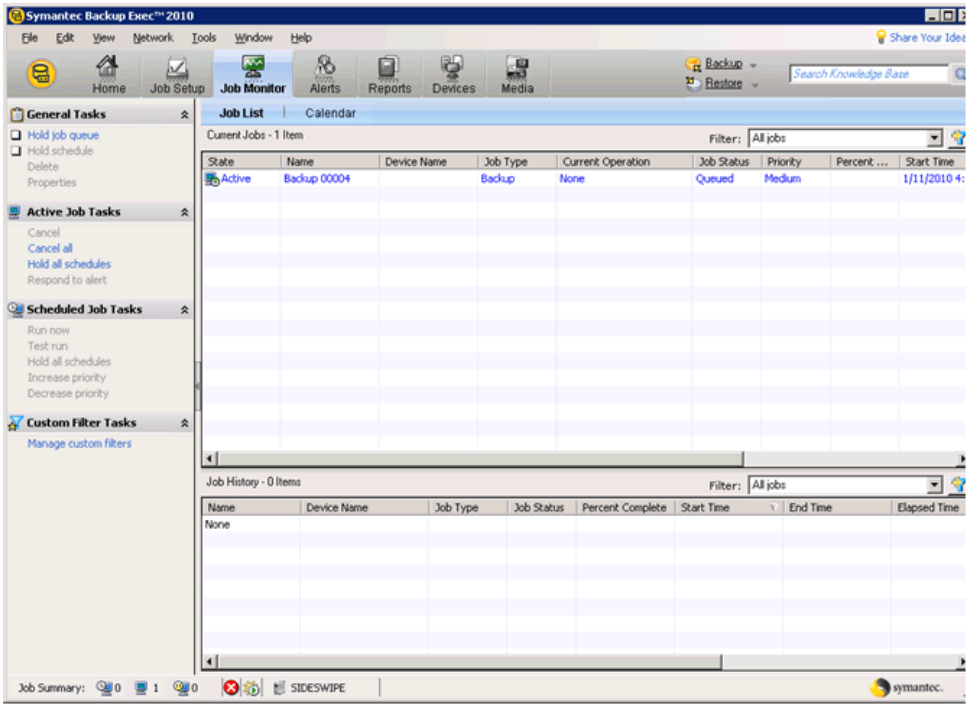
7. Select the new **OpenStorage** device as target (see Figure 31 on the next page).

Figure 31: Backup Wizard - Backup Device and Media



8. Choose the **Job Monitor** to view the progress (see Figure 32 on the next page).

Figure 32: Job Monitor



Sharing Deduplication Devices

To share a deduplication device between multiple media servers

1. On the navigation bar, click **Devices**.
2. In the **Devices** view, right-click the deduplication storage folder, the OpenStorage device, or the Remote Agent with Direct Access that you want media servers to access.
3. Select **Manage** sharing.
4. Select the deduplication device that you want to share.
5. Under **Media Servers**, select the media servers that you want to use with the deduplication device.
6. Click **OK**.
7. Restart the Backup Exec services on the media servers that you selected in step 5.

Creating a Backup Job with Direct Access

When you create a backup job with direct access, keep in mind the following items:

- The backup job can include resources from only one remote computer.
- The Remote Agent for Windows Systems must be installed and running on the remote computer.
- The remote computer must be configured as a Remote Agent with Direct Access.

- The remote computer must be pingable.
- The remote computer cannot be a Backup Exec media server.
- A OpenStorage device must be selected in the Device and Media view for the backup job.
- The option **Allow this job to have direct access to the device** must be selected in the **Device and Media** view for the backup job. This option is selected by default when you select a OpenStorage device as the destination for a backup job.

Configuring a Remote Agent with Direct Access

To configure a Remote Agent with Direct Access

1. On the navigation bar, click **Devices**.
2. In the task pane, under **Device Tasks**, click the **Configure devices** assistant.
3. Click **Remote Agent** with **Direct Access**.
4. If the **Remote Agent with Direct Access Configuration** dialog box appears, click **Add a remote agent with direct access**. This step does not apply if this is the first Remote Agent with Direct Access. The **Remote Agent with Direct Access Configuration** dialog box appears only if a Remote Agent with Direct Access already exists.
5. Complete the options to set up the remote agent.
6. On the **Sharing** tab, select each media server to which you want the remote agent to have direct access.
7. Click **OK**.
8. Restart the Backup Exec services on the media servers that you selected in step 6.

General Options for a Remote Agent with Direct Access

The following options are available for remote agents with direct access.

- *Description Item* - Indicates the name of the computer that you want to add as a Remote Agent with Direct Access.

  Note: The naming format that you use to enter the computer name must also be used to select the remote computer for backup. For example, if you use the IP address here, you must also use the IP address for the backup selection. Otherwise, source-side deduplication does not occur.

- *Server* - Indicates the port to use for communications between the media server and the remote computer.
- *Port* - Displays a description that you choose.
- *Enable ICMP ping operations for BackupExec to detect the server* - Lets the media server use ICMP ping to locate the remote computer.
- *Logon account* - Indicates the logon account that is required to access the remote computer.

Initiating an OST Backup

See the *NetBackup System Administrator's Guide* or the *Backup Exec User's Guide* for information on creating a backup policy to backup data to an OST disk pool.

Once the backup policies are configured, optimized duplication begins after the backup completes.

Performing Synthetic Full Backups (NetBackup Only)

A synthetic backup is a backup in which the images from a series of backups, starting with a full backup and followed by incremental backups, are combined into a new backup-typically a full backup.

For a synthetic backup to be successful, all the backups from the series must be intact and internally consistent. Intact means that each backup created still exists and no backup in the series has been expired. Internally consistent means that the individual backup catalogs are all consistent. The catalogs can become inconsistent for a variety of reasons, for example, by running two backups for a client and policy concurrently. (A scenario when this example can occur is if a manual incremental backup is performed while a scheduled incremental backup job is in progress.)

A synthetic backup produces its best results when it gets big offset ranges from the participating images that are combined to construct the synthetic image. However, as the offset ranges becomes smaller the performance drops and at some point the overhead to construct the synthetic images can become greater than the ingest of that data in raw form.

For DXi 2.2 and prior releases, synthetic backups are most effective under the following conditions:

- The average file size in the data set is greater than 5 MB.
- The modification of existing data since the previous full backup is not more than 15%. This includes deletion of existing files or append to those files, but does not include addition of new files.
- More frequent synthetic backups (like twice a week instead of once a week) can be done to keep the change rate under 15% if necessary, starting with the 2.2 release.

During a synthetic backup, the backup application first queries and analyzes the backups for the given policy and client and then attempts to use their catalog data to combine the content into a new logical backup. If a backup is missing, or if file metadata is inconsistent, the synthetic backup will fail with an error 671.

Primary causes of error 671 include the following:

- Expiration of a backup in the full/incremental series.
- Inconsistent incremental metadata due to concurrent backups in the series.
- Inconsistent incremental metadata due to utilization of Windows Archive Bit and cumulative incremental backups.
- Inconsistent incremental metadata due to, prior to NetBackup 7.1, use of dynamic selections and multistreaming.

Performing OST Optimized Duplication

The DXi has the capability to copy data on one system to another system (that is, the capability to perform replication). NetBackup or Backup Exec uses this capability to initiate an optimized duplication of backup images between these appliances. The duplication operation of NetBackup or Backup Exec triggers the duplication function in the OST disk appliance if both the source and destination volumes for the copy are OST LSUs.

OST optimized duplication reduces the workload on the NetBackup or Backup Exec media server because the replication is performed by the DXi. Duplication is done in the background, and it is faster because it uses Quantum's data deduplication capabilities to reduce the copy bandwidth. Duplication is still initiated, managed, and controlled by the NetBackup or Backup Exec media server while the actual data movement process is off-loaded to gain the maximum benefits from the Quantum appliance's replication capabilities.

The DXi can replicate (duplicate) OST data to another DXi using the following methods:

- **Optimized Duplication** - With optimized duplication, backup images on a storage server can be replicated to another storage server on a DXi that resides in the same NetBackup or Backup Exec domain. The duplication occurs when it is initiated in NetBackup (see Initiating an OST Optimized Duplication below).
- **Automatic Image Replication (AIR)** - If you are using Veritas NetBackup 7.1 or later, you can configure an LSU for Automatic Image Replication (see Setting Up Automatic Image Replication on page 47). If enabled, data on an LSU is automatically replicated to a remote LSU that resides on a DXi in a different NetBackup domain. The timing of the duplication, as well as the backup images that are duplicated, are determined by the storage lifecycle policies (SLPs) configured in NetBackup.
- **Concurrent Optimized Duplication** - For both optimized duplication and Automatic Image Replication, you can optionally enable Concurrent Optimized Duplication (see Configuring Storage Servers on page 6). If enabled, as data is written to the storage server, it is simultaneously replicated to the target DXi. When optimized duplication or Automatic Image Replication subsequently occurs, the operation is more efficient because a portion of the required data has already been replicated to the target storage server.

It is important to remember that, with Automatic Image Replication, the local and remote LSUs reside in *different* NetBackup domains. This differs from optimized duplication, which occurs between two LSUs residing within *the same* NetBackup domain.

Note: For information about configuring NetBackup for optimized duplication or Automatic Image Replication (also referred to as duplicating images to a remote master server domain), see the *Veritas NetBackup Administrator's Guide*.

Initiating an OST Optimized Duplication

To initiate an optimized duplication, refer to the following sections:

- Initiating Optimized Duplication in NetBackup on the next page
- Initiating Optimized Duplication in Backup Exec on the next page

Additional Information

- To increase the performance, Quantum recommends configuring the DXi to use the replication channel when performing optimized duplication (NetBackup only) (see Replication Channel for OST (NetBackup Only) on the next page)
- For Backup Exec, no more than two concurrent optimized duplication streams per source DXi to a target DXi are supported. Additional concurrent streams are not optimized.

Initiating Optimized Duplication in NetBackup

To initiate an optimized duplication with the **Administration Console**:

1. In the NetBackup Administration Console, expand the **NetBackup Management Catalog**.
2. Set up the search criteria for the image you want to duplicate.
3. Click **Search Now**.
4. Right-click the images you want to duplicate and select Duplicate from the shortcut menu.

Additional information

- You must designate an OST storage unit as the destination for the duplication. Use the **Storage Unit** field in the **Setup Duplication Variables** dialog box.
- If the optimized duplication fails, for NetBackup 7.1.x the administrator can control this failover using a configurable option. See the Veritas Technote at: http://seer.entsupport.symantec.com/docs/323669.htm for more information on this option.

For more information, see the section “Duplicating Backup Images” in the *NetBackup System Administrator's Guide*.

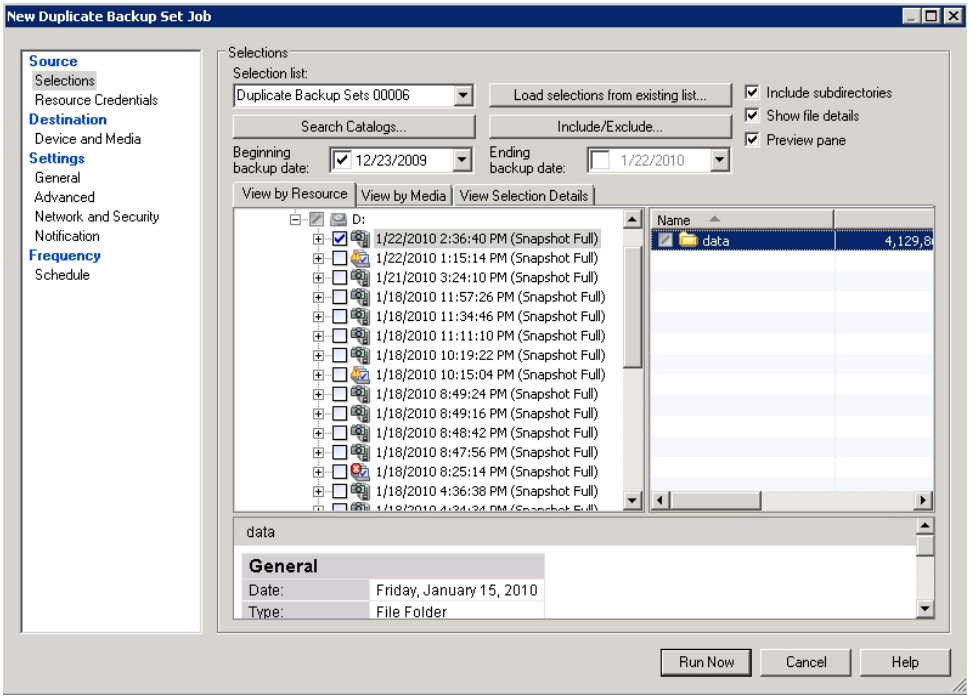
Initiating Optimized Duplication in Backup Exec

To initiate an optimized duplication with the **Administration Console**:

1. In the **Backup Exec** console, navigate to the **Job Setup** tab.
2. In the **Backup Tasks** section of the **Job Setup** tab, click **New job to duplicate backup sets**.

   The **New Duplicate Set Job** window displays (see Figure 33 on the next page).

Figure 33: New Duplicate Backup Set Job Window



3. There are two duplication options:
   - **Duplicate Existing Backup Sets**
   - **Duplicate Backup Sets Following a Job**

   Select the default option **Duplicate Existing Backup Sets**.
4. In the **Selections** section, select a previously successful backup job.
5. In the **Device and Media** section, select a destination OST device in the **Device** drop down menu. This device must reside on the optimized duplication target.
6. In the **General** section, select a source OST device in the **Preferred Source Device** drop down menu. This device must reside on the optimized duplication source.
7. In the **Schedule** section, select a **Date and Time** to schedule the job.
8. When all options are selected, click **Run Now** to start the job.

   For more information, see “Duplicating Backup Images” in the *Backup Exec Administrator's Guide*.

Replication Channel for OST (NetBackup Only)

Replication Channel for OST leverages the replication capabilities of the DXi (normally used to replicate NAS shares and VTL partitions) to perform optimized duplication using NetBackup. This significantly increase optimized duplication performance. In addition, more than two optimized duplication streams per source DXi are supported.

Replication Channel for OST is automatically used when the IP address of the target NetBackup storage server matches the IP address of the configured target DXi. You can configure up to two replication targets.

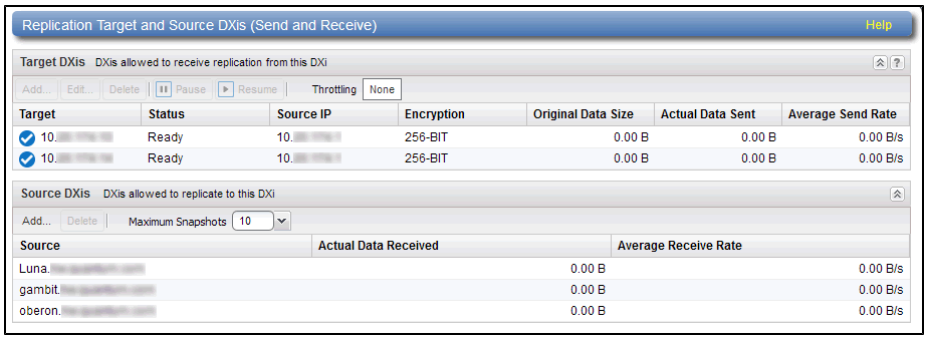
In segmented network configurations, when Replication Channel for OST is enabled, optimized duplication uses the replication interface instead of the data interface. Also, the IP address of the target NetBackup storage server (which acts as a data channel IP of the target) can be mapped to the replication IP (see Target IP Mapping on page 16).

Note: Replication Channel for OST is compatible with NetBackup only. Using the replication channel to perform optimized duplication with Backup Exec is not supported.

To use Replication Channel for OST when performing optimized duplication:

1. Log on to the DXi remote management console.
2. On the target DXi, perform the following steps:
   a. Navigate to the **Configuration > Replication** page (see Figure 34 below).

   Figure 34: Replication Receive Page



   b. Under **Source DXis**, click **Add**.
   c. In the **Source Hostname or IP** box, enter the hostname or IP address of the system that will send the replicated data to the DXi.
   d. Click **Apply**.
3. On the source DXi, perform the following steps:
   a. Navigate to the **Configuration > Replication** page (see Figure 34 above).
   b. Under **Target DXis**, click **Add**.
   c. In the **Target Hostname or IP** box, enter the hostname or IP address of the system that will receive the replicated data.
   d. In the **Encryption** drop-down box, select the type of encryption to use when sending replication data to the target system (**None, 128-bit, or 256-bit**).

Using 256-bit encryption (default) provides a stronger level of security but may have an impact on system performance in some situations. For best performance, if your data network is already secured, you should select **None** for encryption.

Caution: For encryption, select **None** or **128-bit** if you are sending data to a DXi running a system software version prior to DXi 2.1 Software.

e. In the **Source IP** box, enter the IP address that is used to uniquely identify the source DXi to the target. This may be different than the actual network IP address of the source DXi.

If the target system is at DXi 2.1 Software or later, the **Source IP** field is not required. If the target system is at DXi 2.0.1.x Software or below, then you must enter the IP address by which the target system recognizes the source system. The default value is **0.0.0.0**.

Note: The **Source IP** field does not accept fully qualified domain names. You must enter a valid IP address. Make sure this IP address is configured in the allowable sources list on the target DXi.

f. Click **Apply**.

4. Perform optimized duplication as normal.

Setting Up Automatic Image Replication

OST AIR requires NetBackup 7.1 or later. Setting up Automatic Image Replication (AIR) requires that you first configure the target (remote) DXi and then the source DXi (see Figure 35 on the next page). In addition, you must create storage lifecycle policies (SLPs) in NetBackup that define when the automatic replication occurs and which backup images are duplicated.

To automatically replicate (duplicate) all data on an LSU to a remote LSU that resides on a DXi in a different NetBackup domain:

1. On the target system, add the source system to the list of allowed replication sources (see Replication Channel for OST (NetBackup Only) on page 45).
2. On the target system, create a local OST user (see Configuring OST Authentication on page 5).

Caution: On the target system, make sure to create a local user on the **Configuration > OST > Manage Users** page.

3. On the target system, create a storage server and LSU to receive the replicated OST data (see Configuring Storage Servers on page 6).

Note: Quantum recommends selecting the Available Capacity option when creating an LSU for use with Automatic Image Replication.

4. On the source system, configure replication to the target system (see Replication Channel for OST (NetBackup Only) on page 45).
5. On the source system, create a remote OST user with the same user name and password that you

used in step 2 above (see Create a Remote User for OST AIR on the next page).

Caution: On the source system, make sure to create a remote user on the **Configuration > OST > Manage Remote Users** page.

Note: If the target DXi uses different IP addresses for data and replication traffic, you must configure target IP mapping on the source DXi (see Target IP Mapping on page 16).

6. On the source system, create a storage server and LSU, and enable the LSU for Automatic Image Replication (see Configuring Storage Servers on page 6).

   For **Remote Storage Server** and **Remote LSU**, make sure to specify the storage server and LSU created in step 3 above. Also, for **Remote User**, make sure to select the remote user created in step 5 above.

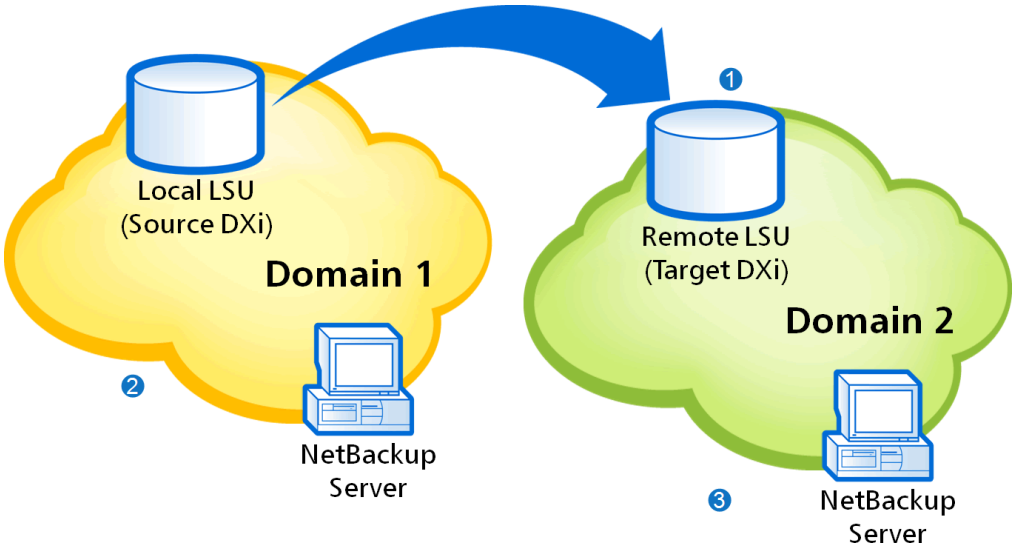
7. Register and configure the storage servers in NetBackup (see Registering the Storage Server with NetBackup and Discovering Logical Storage Units on page 19). Also, create disk pools in NetBackup and make sure the **Replication** property on the disk pool is updated (see Configuring Disk Pools and Storage Units in NetBackup on page 30).

   If the disk pool is the source, the **Replication** property of the disk pool should be **source**. If the disk pool is the target on the remote NetBackup media server, then the **Replication** property should be **target**.

   Note: A disk pool can be a target and also a source to another remote NetBackup media server. Make sure that the **Replication** property on the disk pool is updated before creating the storage lifecyle policies (SLPs).

8. Configure storage lifecycle policies in NetBackup to control when automatic replication of the LSU occurs (see the *Veritas NetBackup Administrator's Guide*).

Figure 35: Setting Up OST Automatic Image Replication



1	Configure target DXi: • Add allowed replication source. • Create local OST user. • Create storage server and LSU
2	Configure the source DXi: • Specify replication target. • Create remote OST user. • Create storage server and LSU with AIR enabled.
3	Create storage lifecycle policies (SLPs) on the NetBackup server in each domain to control when duplication occurs and images are imported.

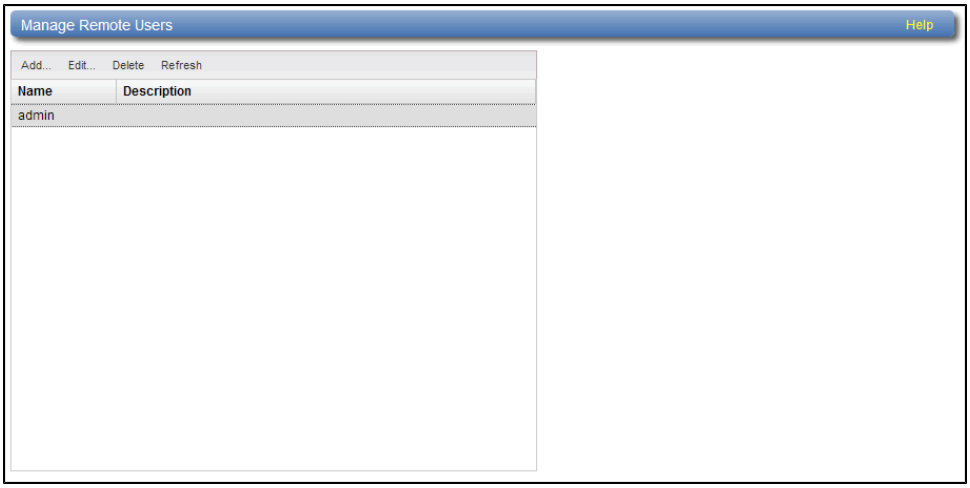
Create a Remote User for OST AIR

Add a remote user to create OST user credentials for use with OST AIR. When you enable Automatic Image Replication for an LSU, you specify a remote user. The remote user credentials on the source DXi must match the local user credentials on the target (remote) DXi.

To add a remote user:

1. Log on to the DXi remote management console.
2. Navigate to the **Configuration > OST > Manage Remote Users** page (see Figure 36 below).

Figure 36: Manage Users Page



3. Click **Add**.

4. Enter information about the remote user:

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

5. Click **Apply**.

Configuring OST Path to Tape

The OST path to tape (Direct to Tape) option allows you to copy OST LSUs to a physical tape library using NetBackup.

Note: This procedure assumes that you have physically connected the DXi and the target library using Fibre Channel either directly or through a Fibre Channel SAN. If you are connecting the devices using a SAN, you must perform the appropriate Fibre Channel switch zoning. You must also appropriately map the library device LUNs on the library side to correctly present them to the DXi.

Configuring OST path to tape consists of the following major steps. See the following subsections for detailed instructions for completing each step:

- Verifying Prerequisites below
- Configuring Physical Tape Libraries on page 52
- Configuring NetBackup OST for Path to Tape on page 53

Verifying Prerequisites

The following DXi systems support OST path to tape:

- DXi4700 - Multi-Protocol (MP) configuration
- DXi6540 or DXi6550
- DXi6700, DXi6701, or DXi6702
- DXi6802
- DXi690x
- DXi8500

The following steps must be completed before setting up NetBackup OST path to tape:

- The NetBackup version running on the media server must be 7.1.x, with all updates applied.
- The DXi must be installed and configured.
- Fibre Channel connectivity must be configured.
- The OST license and the Backup Application Specific license must be installed.
  - **DXi6540 and DXi6550** - A License Certificate for the OST license is included with DXi6540 and DXi6550 systems; to obtain and install the license key, see Installing the OST License Key on page 3. The Backup Application Specific **license is enabled when the OST license is installed; a separate license key is not required.**
  - **DXi4700-MP, DXi8500, DXi6802, DXi6700, DXi6701, DXi6702, and DXi690x** - A License Certificate for the OST license is included with DXi8500, DXi6802, DXi6700, DXi6701, and DXi6702 systems; to obtain and install the license key, see see Installing the OST License Key on page 3. The **OST** license is pre-installed on DXi4700-MP and DXi690x systems. The **Backup Application Specific** license key is pre-installed on DXi4700-MP, DXi8500, DXi6802, DXi6700, DXi6701, DXi6702, and DXi690x systems; you do not need to install the license key on these systems.
  - Only DXi4700 Multi-Protocol and DXi690x configurations contain both the OST and Backup Application Specific license keys.
- Aliases for the NDMP host (the DXi) must be created on the EMM server (see Creating Aliases for the NDMP Host below).

Creating Aliases for the NDMP Host

For optimal path to tape (direct copy) performance, you should create aliases for the NDMP host (the DXi) on the Enterprise Media Manager (EMM) server.

If you create aliases for the DXi, then data is sent directly from the DXi to tape during path to tape (direct copy) operations. If you do not create these aliases, data will be sent from the DXi to the media server, then back to the DXi before it is written to tape, which can cause slower performance.

To create aliases for the NDMP host:

1. On the EMM server, retrieve a list of all NDMP hosts (DXi systems).

   For Windows, run the following command:
   ```
   C:\Program Files\Veritas\NetBackup\bin\admincmd\nbemmcmd -listhosts -machinetype ndmp
   ```

   For Linux, Solaris, or AIX, run the following command as root:
   ```
   /usr/openv/netbackup/bin/admincmd/nbemmcmd -listhosts -machinetype ndmp
   ```

2. For each host (DXi) returned in Step 1 that will be performing direct copy to tape, retrieve a list of aliases

   For Windows, run the following command:
   ```
   C:\Program Files\Veritas\NetBackup\bin\admincmd\nbemmcmd -machinealias -getaliases -machinename <ndmphost> -machinetype ndmp
   ```

   For Linux, Solaris, or AIX, run the following command as root:

```
/usr/openv/netbackup/bin/admincmd/nbemmcmd -machinealias -getaliases -
machinename <ndmphost> -machinetype ndmp
```

3. A host (DXi) should have all available aliases: NetBIOS hostname, DNS hostname, and FQDN (fully qualified domain name). If the host (DXi) does not have one or more of these aliases, you should create them. To create an alias for a host (DXi), use the following commands.

   For Windows, run the following command:

   ```
   C:\Program Files\Veritas\NetBackup\bin\nbemmcmd -machinealias -machinename
   <ndmphost> -addalias -alias <alias_name> -machinetype ndmp
   ```

   For Linux, Solaris, or AIX, run the following command as root:

   ```
   /usr/openv/netbackup/bin/admincmd/nbemmcmd -machinealias -machinename <ndmphost>
   -addalias -alias <alias_name> -machinetype ndmp
   ```

Note: To correct any DNS issues (or simply to be proactive), you can add the entries to the hosts file.

Configuring Physical Tape Libraries

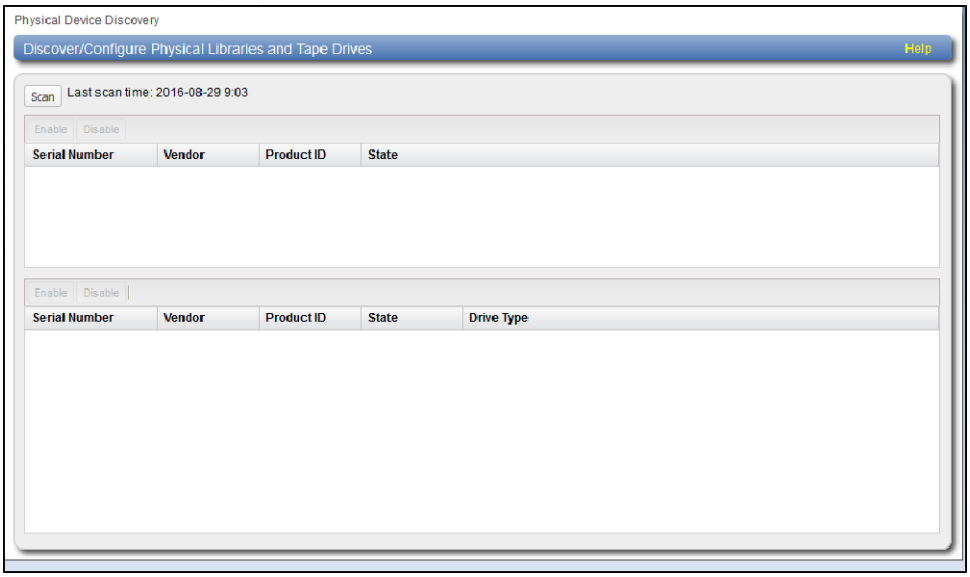
The **Physical Device Discovery** page allows you to discover and configure attached physical tape libraries and tape drives. After you discover and configure the libraries and drives, you can use them for path to tape data movement.

Note: The DXi4700 Multi-Protocol configuration license allows a maximum of 3 attached path to tape devices.

To discover and configure an attached physical tape library and tape drives:

1. Access the DXi remote management console.
2. Navigate to the **Configuration > PTT > Physical Device Discovery** page (see Figure 37 on the next page).

Figure 37: Physical Device Discovery Page



3. Click **Scan** to detect attached physical libraries.

   Attached physical libraries display in the list. Select a library in the list to view all of the drives in the library

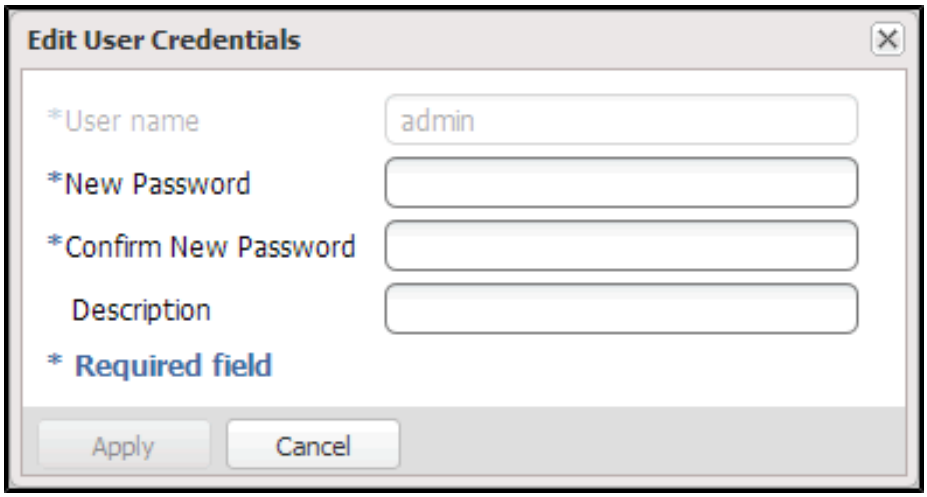
4. Make sure the changer and all of its drives are enabled. If necessary, select a changer or drive and click **Enable**.

Configuring NetBackup OST for Path to Tape

To configure direct path to tape from backups made to the DXi:

1. Access the DXi remote management console and perform the following steps:
   a. Navigate to the **Configuration > PTT > Backup Application Specific** page (see Figure 38 on the next page).

Figure 38: Backup Application Specific Page



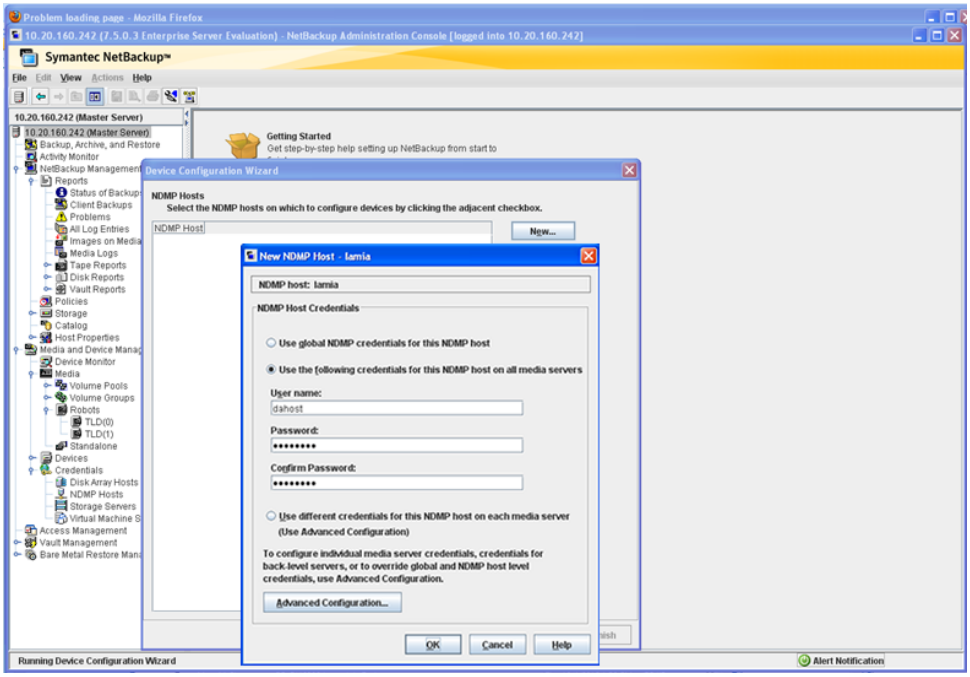
b. Click **Add**.

c. Specify the **Username** and **New Password** that are used by the NetBackup NDMP credentials in order to establish an NDMP connection.

d. Click **Apply**.

2. In NetBackup, under **NDMP Credentials**, you must create a new NDMP host using the DXi hostname as the name and using the username and password entered in the previous step. The hostname should be resolved by the DNS (see Figure 39 on the next page).

Figure 39: Adding a New NDMP Host



3. In NetBackup, when running the **Configure Storage Devices** wizard, the user must select the host and set the NDMP option.
4. Continue with the remaining configuration steps in the wizard.

   A storage unit is created pointing to the physical tape library.

Running a Duplication to Tape

NetBackup uses NDMP direct copy when you duplicate a backup image. Certain conditions apply to the duplication, explained in this section.

To run a duplication, you can use any of the following methods:

- The **Duplicate** option in the **Catalog** node of the NetBackup Administration Console.
- **NetBackup Vault** (see the *NetBackup Vault Administrator's Guide*).
- The **bpduplicate** command (see the *NetBackup Commands Guide*).
- A NetBackup Storage Life-cycle Policy.

Requirements

For NetBackup to use NDMP direct copy when you duplicate an image:

- As the destination for the duplication, you must designate an NDMP storage unit in a DXi.
- An NDMP tape drive must be available to mount the target image. The NDMP tape drive must be a physical tape drive in a tape library

If these two requirements are met, NDMP direct copy is enabled. NetBackup copies the image directly to the designated storage unit without using media server I/O or network bandwidth.

Initiate NDMP Direct to Tape with the Administration Console

To initiate a **NDMP Direct to Tape** with the Administration Console:

1. In the NetBackup Administration Console, expand **NetBackup Management > Catalog**.
2. Set up the search criteria for the image you want to duplicate. Click **Search Now**.
3. Right-click the images you want to duplicate and select **Duplicate** from the shortcut menu.

> **Note:** You must designate an NDMP storage unit (physical tape library) as the destination for the duplication. Use the **Storage Unit** box in the **Setup Duplication Variables** dialog box.

For more information, see the section “Duplicating Backup Images” in the *NetBackup System Administrator’s Guide*.

Configuring DXi Accent

Quantum’s DXi Accent software accelerates backups and reduces network bandwidth requirements by distributing deduplication between the backup server and the DXi.

DXi Accent Availability

DXi Accent is available for the following DXi-Series disk backup systems:

- DXi V-Series (V1000 , V2000, V4000 virtual appliances)
- DXi4601
- DXi4700
- DXi6700, DXi6701, and DXi6702
- DXi6802
- DXi8500
- DXi690x

DXi Accent Requirements

To use DXi Accent, all of the following requirements must be met:

- Firewall port 1062 is open for IP address that is used for data transfer.
- The media server is running meets the following requirements:

Operating System	One of the following operating systems: ◦ Red Hat Enterprise Linux 5 (x86, 32-bit or 64-bit) ◦ SUSE Linux 11 (x86, 64-bit) ◦ Windows Server 2003 R2 or 2008 R2 (32-bit or 64-bit) or 2012 (64-bit) ◦ Windows Small Business Server 2003 R2 or 2008 R2 (32-bit or 64-bit) or 2012 (64-bit) **Note:** NetBackup 7.6 or later is required for media servers running Windows 2012.
CPU	Greater than 2.2 GHz processor with at least 2 cores (4 cores recommended)
Memory	2 GB RAM or greater

- The OST Plug-in is installed on the media server (see Installing the OST Plug-in on page 4).
- Accent is enabled on the DXi (see Enabling or Disabling Accent on the DXi and Media Server below). By default, Accent is disabled on the DXi.
- Accent is enabled on the media server (see Configuring DXi Accent on the previous page). By default, Accent is enabled on the media server when you install the OST Plug-in.

When all of these requirements are met, Accent will be used for all OST transport between the media server and the DXi. Otherwise, normal OST transport will be used. For information about the maximum number of connections when Accent is enabled, see Maximum Number of DXi Accent Jobs on page 64.

Note: When DXi Accent is in use, you can monitor Accent performance information in the DXi remote management console, on the **Status > Accent** page. For more information, see the User's Guide for your DXi system.

Enabling or Disabling Accent on the DXi and Media Server

By default, DXi Accent is disabled on the DXi. To use Accent, you must enable it on the DXi.

Note: If Accent is enabled, all media servers that are using the same DXi must have the latest OST plug-in installed.

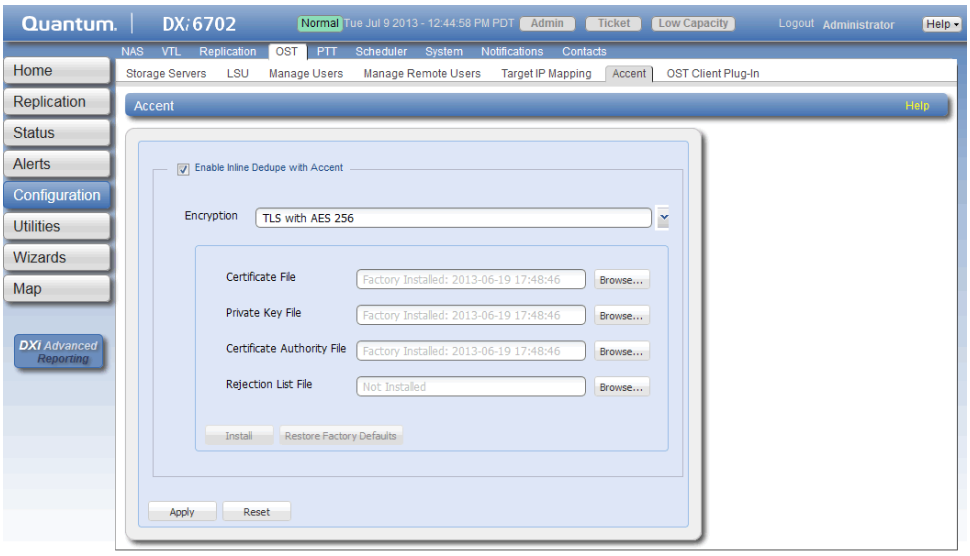
Select the version of DXi Software installed on the system.

DXi 3.0.x Software or Earlier

To enable or disable Accent on the DXi:

1. Access the DXi remote management console.
2. Navigate to the **Configuration > OST > Accent** page (see Figure 40 on the next page).

Figure 40: DXi Accent Page



3. To enable DXi Accent, click the **Enable Inline Dedupe with Accent** check box.

   Or to disable DXi Accent, clear the **Enable Inline Dedup with Accent** check box.

> **Note:** You cannot use DXi Accent if you are currently using NetBackup Accelerator or Optimized Synthetic Backups. If you are using Accelerator, please make sure that Accent is not enabled. For more information on using NetBackup Accelerator, see the *DXi-Series Configuration and Best Practices Guide for Veritas from Veritas* (6-67850).

4. To enable or disable encryption when sending OST data from the media server to the DXi, select an option in the **Encryption** drop-down box. Encryption applies to all OST data traffic.

None	OST data is not encrypted.
Default AES 128	OST data is encrypted using AES 128-bit encryption.
Default AES 256	OST data is encrypted using AES 256-bit encryption.
TLS with AES 256	OST data is encrypted using AES 256-bit encryption with Transport Layer Security (TLS).

Additional Information

- Using 256-bit encryption provides a stronger level of security but may have an impact on system performance in some situations.
- If encryption is enabled, all other OST data will use TLS with AES 256 encryption.

5. If you selected the **TLS with AES 256** encryption option, you must install the required certificate and key files on the DXi:
   - Certificate File
   - Private Key File
   - Certificate Authority File
   - Rejection List FIle

   To install a file, click the **Browse** button to browse the system and locate the file, and then click **Open**. Click **Install** to install the selected file on the DXi.

   Caution: Installing certificate files requires a system reboot immediately after the changes are applied. Wait for at least 15 minutes before logging back in.

   Additional Information
   - You can install new certificate and key files at any time, as long as there are no active network connections between the OST media server and the DXi.
   - To remove all certificate and key files, click **Restore Factory Defaults**.

6. Click **Apply**.

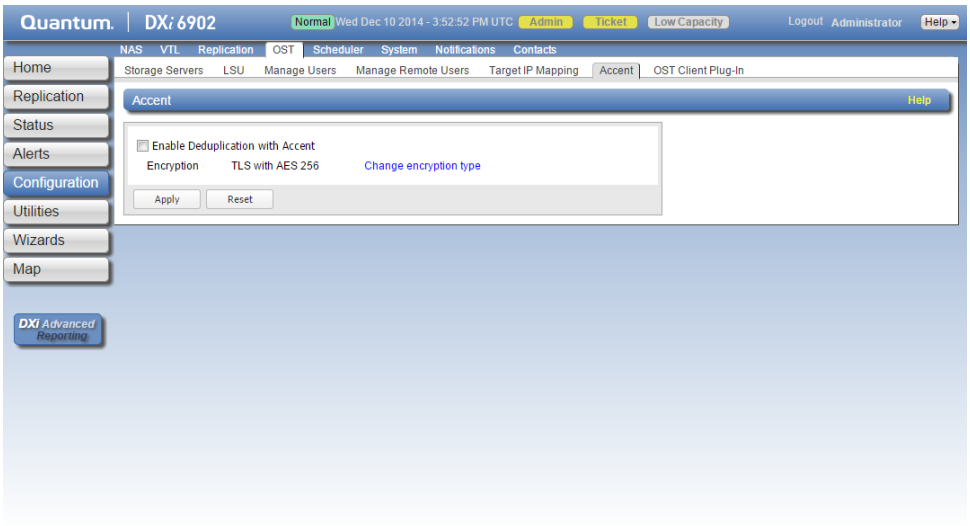
Note: The certificate files supplied with the OST Plug-in should be in the **/usr/Quantum/** directory along with the **QuantumPlugin.conf** file. For Windows, the certificate files are loaded automatically.

DXi 3.1.0 - 3.2.6 Software

To enable or disable Accent on the DXi:

1. Access the DXi remote management console.
2. Navigate to the **Configuration > OST > Accent page** (see Figure 41 on the next page).

Figure 41: DXi Accent Page



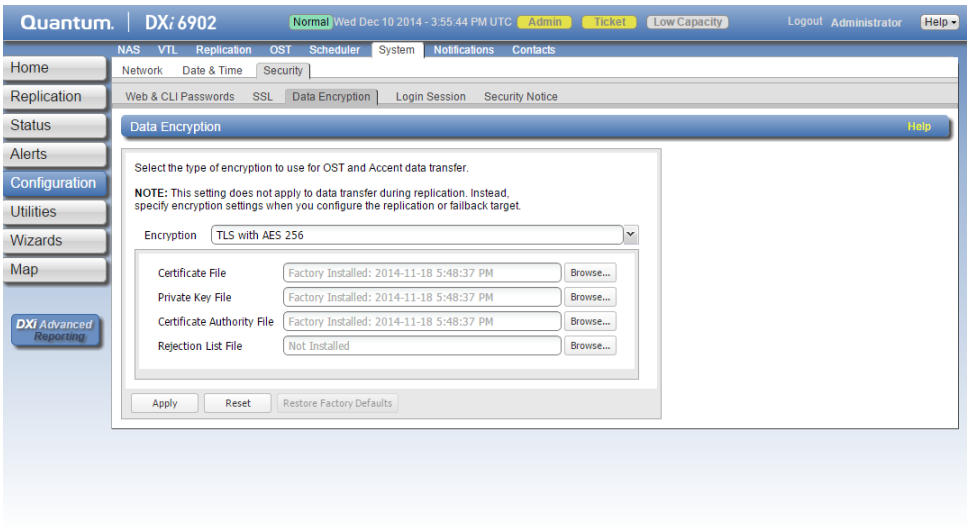
3. To enable DXi Accent, click the **Enable Deduplication with Accent** check box.

   Or to disable DXi Accent, clear the **Enable Deduplication with Accent** check box.

   Note: You cannot use DXi Accent if you are currently using NetBackup Accelerator or Optimized Synthetic Backups. If you are using Accelerator, please make sure that Accent is not enabled. For more information on using NetBackup Accelerator, see the *DXi-Series Configuration and Best Practices Guide for Veritas from Veritas* (6-67850).

4. Click **Apply**.
5. To enable or disable encryption when sending OST data from the media server to the DXi, select the **Change Encryption Type** link or go to the **Configuration > System > Security > Data Encryption** page (see Figure 42 on the next page).

Figure 42: DXi Data Encryption Page



6. Select an option in the Encryption drop-down box. Encryption applies to all OST data traffic.

None	OST data is not encrypted.
Default AES 128	OST data is encrypted using AES 128-bit encryption.
Default AES 256	OST data is encrypted using AES 256-bit encryption.
TLS with AES 256	OST data is encrypted using AES 256-bit encryption with Transport Layer Security (TSL).

Additional Information

- Using 256-bit encryption provides a stronger level of security but may have an impact on system performance in some situations.
- If encryption is enabled, all other OST data will use **TLS with AES 256** encryption.

7. If you selected the **TLS with AES 256** encryption option, you must install the required certificate and key files on the DXi:
   - Certificate File
   - Private Key File
   - Certificate Authority File
   - Rejection List FIle

To install a file, click the **Browse** button to browse the system and locate the file, and then click **Open**. Click **Install** to install the selected file on the DXi.

Caution: Installing certificate files requires a system reboot immediately after the changes are applied. Wait for at least 15 minutes before logging back in.

Additional Information

- You can install new certificate and key files at any time, as long as there are no active network connections between the OST media server and the DXi.
- To remove all certificate and key files, click **Restore Factory Defaults**.

8. Click **Apply**.

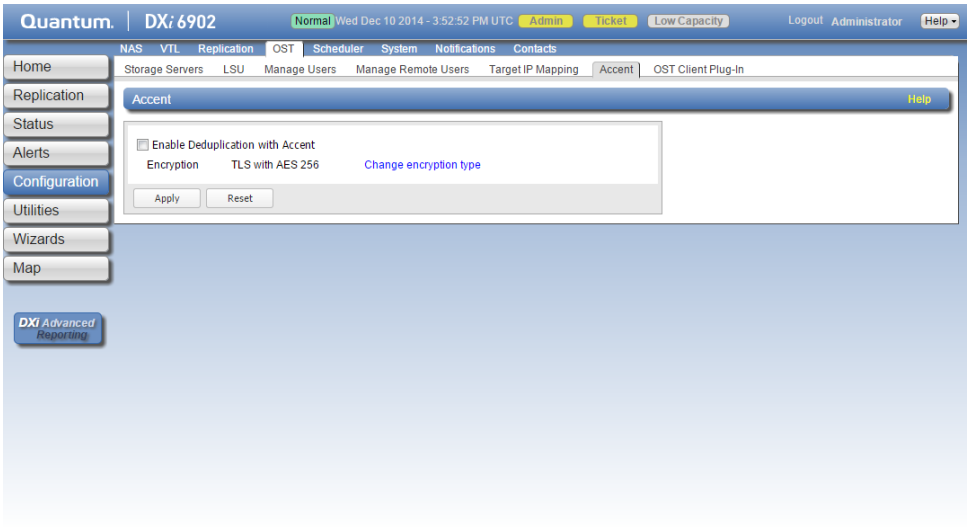
Note: The certificate files supplied with the OST Plug-in should be in the **/usr/Quantum/** directory along with the **QuantumPlugin.conf** file. For Windows, the certificate files are loaded automatically.

DXi 3.4.0 Software or Later

To enable or disable Accent on the DXi:

1. Access the DXi remote management console.
2. Navigate to the **Configuration > OST > Accent page** (see Figure 43 below).

Figure 43: DXi Accent Page

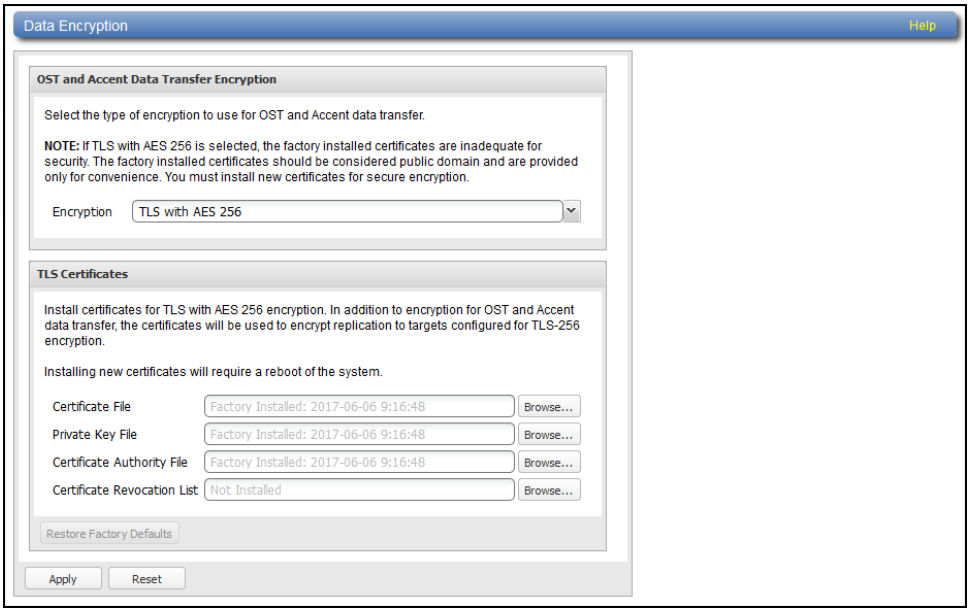


3. To enable DXi Accent, click the **Enable Deduplication with Accent** check box.

   Or to disable DXi Accent, clear the **Enable Deduplication with Accent** check box.
4. Click **Apply**.

5. To enable or disable encryption when sending OST data from the media server to the DXi, select the **Change Encryption Type** link or go to the **Configuration > System > Security > Data Encryption** page (see Figure 42 on page 61).

Figure 44: DXi Data Encryption Page



6. Select an option in the Encryption drop-down box. Encryption applies to all OST data traffic.

None	OST data is not encrypted.
Default AES 128	OST data is encrypted using AES 128-bit encryption.
Default AES 256	OST data is encrypted using AES 256-bit encryption.
TLS with AES 256	OST data is encrypted using AES 256-bit encryption with Transport Layer Security (TSL). **OST Media Server with TLS Encryption** The certificate and key files installed on the DXi or ETERNUS system must match the files on the OST media server. For more information on certificate and key files, see the *OST Plug-in Installation Instructions*.

Additional Information

- Using 256-bit encryption provides a stronger level of security but may have an impact on system performance in some situations.

- If TLS with AES 256 is selected, the factory installed certificates are inadequate for security. The factory installed certificates should be considered public domain and are provided only for convenience. You must install new certificates for secure encryption.
- If encryption is enabled, all other OST data will use **TLS with AES 256** encryption.

7. If you selected the **TLS with AES 256** encryption option, install the required certificate and key files on the DXi:
   - Certificate File
   - Private Key File
   - Certificate Authority File
   - Certificate Revocation List

   To install a file, click the **Browse** button to browse the system and locate the file, and then click **Open**. Click **Install** to install the selected file on the DXi.

   Caution: Installing certificate files requires a system reboot immediately after the changes are applied. Wait for at least 15 minutes before logging back in.

   Additional Information
   - You can install new certificate and key files at any time, as long as there are no active network connections between the OST media server and the DXi.
   - To remove all certificate and key files, click **Restore Factory Defaults**.

8. Click **Apply**.

Maximum Number of DXi Accent Jobs

When DXi Accent is enabled, a maximum of 100 concurrent Accent jobs can be run against the DXi. (For DXi4601, the maximum is 10 concurrent Accent jobs.)

If the connection limit is reached, one or more of the following messages (or similar) is logged in the DXi log in the `/var/log/messages directory`:

```
VServer "hybrid-dedupe-no-encrypt" limit reached (limit 100).

VServer "hybrid-dedupe-no-encrypt" connection limit failed due to VServer
"hybrid-group".

VServer "hybrid-group" connection limit failed due to VServer "hybrid-remote-
group".

VServer "hybrid-remote-group" limit reached (limit 100).
```

```
VServer "hybrid-dedupe-no-encrypt" connection limit failed due to VServer
"hybrid-group".

VServer "hybrid-group" limit reached (limit 100).
```

In addition, NetBackup or Backup Exec displays a message:

- **NetBackup** - The following progress message displays: `Critical bpdm (pid=12515) image open failed: error 2060020: storage server connection limit exceeded`
- **Backup Exec** - A generic error message will displays for several underlying errors.

When the connection limit is reached on the DXi, The OST plug-in retries the connection for 300 seconds by default. If the connection cannot be established after 300 seconds, the connection times out and an error is returned.

The default connection timeout is 300 seconds. To change the timeout value, edit the following setting in the `/usr/Quantum/QuantumPlugin.conf` file (Linux) or the `C:\libstspiQuantum.ini file` (Windows):

`DATA_CONNECTION_BUSY_TIMEOUT`

OST Plug-in Configurable Options

The following OST Plug-in configurable options are supported:

Linux/Unix

The following Linux and Unix configurable options are supported:

1. DEBUG_LEVEL:

   This defines the level of logging to enable. The value of this option defines the level of log messages to output. It is set to one of the following values:

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

   By default, DEBUG_LEVEL is set to ERROR.

2. OPDUP_TIMEOUT:

   The Optimized duplication option of NetBackup uses the replication feature of the OST server. The DXi replication feature cannot replicate unless the backup image file is deduplicated.

   On demand deduplication of the backup image file can take an unknown amount of time. OPDUP_TIMEOUT is the time in seconds to wait for deduplication of backup image file extent of 256MB or smaller before giving up on the replication attempt.

   If the file copy extent length is larger than 256MB, then the wait time will be a proportional multiple of OPDUP_TIMEOUT. For example, if the extent length is X*256MB, wait time will be X*OPDUP_TIMEOUT, where X need not be an integer. By default, OPDUP_TIMEOUT is set to 180 seconds.

   Note: This option is available only on Linux and Unix platforms. On Windows the timeout is fixed at 180 seconds.

   To change the default value of any of these options, edit the /usr/Quantum/QuantumPlugin.conf file and set the desired values.

Windows

The following Windows configurable options are supported:

1. `LOG_LEVEL`:

   This is similar to the `DEBUG_LEVEL` on Linux and Unix. It defines the level of logging to enable. The value of this option defines the level of log messages to output.

   - `NONE` - Disables logging for the logger.
   - `TRACE` - Enables tracing to error messages.
   - `DEBUG` - Enables debug to error messages.
   - `INFO` - Enables information to error messages.
   - `WARN` - Enables warning and error messages.
   - `ERROR` - Enables only error messages.

2. `LOG_LIMIT`:

   This defines the maximum file size (in byte) for the logger. Default size of the log file is 10MB. Increase this value if more logging has to be captured.

   `Edit %WINDIR%\libstspiQuantum*.ini` to change the default values.

Enabling Verbose Logging

OST Plug-in Log

The OST Plug-in logs various messages to %WINDIR%\libstspiQuantum*.log on a Windows media server.

The OST Plug-in logs various messages to log files under: /var/log/ostlog/client directory on a Linux or Unix media server.

Example

```
# tail -f /var/log/ostlog/client/ost_client.log
DEBUG - 20080725 16:12:43 15982 pgnapi.c:57 Plugin Prefix Quantum claimed.
DEBUG - 20080725 16:12:43 15982 pgnapi.c:58 stspi_claim exited
DEBUG - 20080725 16:12:43 15982 pgnapi.c:754 stspi_get_server_prop_byname_v9
entered
DEBUG - 20080725 16:12:43 15982 comm.c:939 ostSendRequest: message:0x20000005
DEBUG - 20080725 16:12:43 15982 pgnapi.c:798 stspi_get_server_prop_byname_v9
exited
DEBUG - 20080725 16:12:43 15982 pgnapi.c:44 stspi_claim_v9 entered
DEBUG - 20080725 16:12:43 15982 pgnapi.c:57 Plugin Prefix Quantum claimed.
DEBUG - 20080725 16:12:43 15982 pgnapi.c:58 stspi_claim exited
DEBUG - 20080725 16:12:43 15982 pgnapi.c:207 stspi_open_server_v9 entered
```

```
DEBUG - 20080725 16:12:43 15982 comm.c:939 ostSendRequest: message:0x20000002
```

Other Options

Transmission Control Protocol (TCP)

The TCP Keep Alive settings can be configured to prevent an OST connection termination by a firewall.

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