Quantum

User's Guide

Quantum DXi4000

6-67092-03 Rev A

Quantum DXi4000 User's Guide, 6-67092-03 Rev A, October 2011, Product of USA.

This document is for DXi 2.0.x Software.

Contents

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Preface

This manual introduces the Quantum DXi4000 enhanced data protection systems and discusses:

- System operations
- Configuration
- Web interface
- Basic troubleshooting

Audience

This manual is written for DXi4000 administrators and field service engineers.

Note: It is useful for the audience to have a basic understanding of UNIX® and backup/recovery systems.

Document Organization

Following is a brief description of chapter contents.

- Chapter 1, DXi4000 System Description provides an overview of the DXi4000.
- Chapter 2, Basic Operations provides basic operating instructions for the DXi4000.

- Chapter 3, DXi4000 Remote Management discusses using the DXi4000 remote management console to control the system remotely.
- Chapter 4, DXi4000 Configuration Wizards discusses the wizards that provide guidance for setting up the DXi4000.
- Chapter 5, DXi4000 Home Page discusses the information that appears on the **Home** page of the remote management console.
- Chapter 6, DXi4000 Replication discusses the remote replication capabilities of the DXi4000.
- Chapter 7, DXi4000 Status discusses DXi4000 status information.
- Chapter 8, DXi4000 Alerts discusses DXi4000 alert information and service tickets.
- Chapter 9, DXi4000 Configuration discusses configuration of the DXi4000.
- Chapter 10, DXi4000 Utilities discusses DXi4000 utilities such as diagnostic tools and rebooting the system.
- Appendix A, DXi4000 System Specifications provides system specifications for the DXi4000.
- Appendix B, Troubleshooting discusses problems you may encounter during the setup and operation of the DXi4000.
- Glossary provides definitions of terms used in this guide.

Notational Conventions

This manual uses the following conventions:

Note: Note emphasizes important information related to the main topic.

Caution: Caution indicates potential hazards to equipment or data.

WARNING: Warning indicates potential hazards to personal safety.

- Right side of the system - Refers to the right side as you face the component being described.

- Left side of the system - Refers to the left side as you face the component being described.
- Data sizes are reported in base 1000 rather than base 1024. For example:
  - 1 MB = 1,000,000 bytes
  - 1 GB = 1,000,000,000 bytes
  - 1 TB = 1,000,000,000,000 bytes

Product Safety Statements

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AVERTISSEMENT Avant d'utiliser ce produit, lisez la totalité des instructions et avertissements de ce document et du *Guide d'informations sur le système, la sécurité et la réglementation*.

HINWEIS	Lesen Sie vor der Verwendung dieses Produkts alle Anweisungen und Warnhinweise in diesem Dokument und im System, Safety, and Regulatory Information Guide (Info-Handbuch: System, Sicherheit und Richtlinien).

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경고	이 제품을 작동하기 전에 이 문서 및 시스템, 안전, 및 규제 정보 안내서에 수록된 모든 지침과 경고 표지를 숙지하십시오.

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ADVERTENCIA	Antes de utilizar este producto, lea todas las instrucciones y advertencias en este documento y en la Guia informativa sobre sistema, seguridad y normas.

VARNING	Läs alla anvisningar och varningar i detta dokument och i *System, säkerhet och krav från myndigheter - Informationshandbok* innan denna produkt tas i bruk.

Related Documents

The following Quantum documents are also available for the DXi4000:

Document No.	Document Title	Document Description
6-00618	*System Safety and Regulatory Information - Quantum Products*	Lists all safety and regulatory information for all Quantum products.
6-67093	*DXi4000 Site Planning Guide*	Provides site planning information for the DXi4000.
6-67079	*Symantec Veritas NetBackup OST Configuration Guide*	Provides information for setting up the DXi4000 for OST operation with NetBackup
6-67080	*Symantec Backup Exec OST Configuration Guide*	Provides information for setting up the DXi4000 for OST operation with Backup Exec
6-67081	*DXi-Series Command Line Interface (CLI) Guide*	Provides information on the DXi4000 command line interface.

For the most up to date information on the DXi4000, see:

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

Contacts

Quantum company contacts are listed below.

Quantum Corporate Headquarters

To order documentation on the DXi4000 or other products contact:

Quantum Corporation *(Corporate Headquarters)*
1650 Technology Drive, Suite 700
San Jose, CA 95110-1382

Technical Publications

To comment on existing documentation send e-mail to:

doc-comments@quantum.com

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http://www.quantum.com/ServiceandSupport/Services/GuardianInformation/Index.aspx

For further assistance, or if training is desired, contact the Quantum Customer Support Center:

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EMEA	00800-4-782-6886 (toll free) +49 6131 3241 1164
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For worldwide support: http://www.quantum.com/ServiceandSupport/Index.aspx	

Worldwide End-User Product Warranty

For more information on the Quantum Worldwide End-User Standard Limited Product Warranty:

http://www.quantum.com/pdf/QuantumWarranty.pdf

Chapter 1

DXi4000 System Description

This chapter describes the DXi4000 system and its components and includes the following sections:

Overview

The DXi4000 is Quantum's entry level disk backup solution that integrates data deduplication and replication technology to connect backup and DR (disaster recovery) protection across distributed corporate environments. The DXi4000 disk-based backup appliance uses Quantum's patented data deduplication technology to increase disk capacities by 10 to 50 times, and make WAN replication a practical, cost-effective part of disaster recovery planning. With up to 12 TB capacity (up to 11.61 TB usable for data storage), the DXi4000 is designed for departmental and medium business customers.

Advanced Data Deduplication Increasing Disk Retention for Backup Data

The DXi4000 leverages Quantum's patented data deduplication technology (U.S. Pat. No. 5,990,810) to dramatically increase the role that disk can play in the protection of critical data. With the DXi4000 solution, users can retain 10 to 50 times more backup data on fast recovery disk than with conventional arrays.

Remote Replication of Backup Data Providing Automated Disaster Recovery Protection

With the DXi4000, users can transmit backup data from a remote site to a central, secure location to reduce or eliminate media handling. DXi™-Series replication is asynchronous, automated, and operates as a background process.

Enterprise Features Provide Secure Repository

The DXi4000 features up to 12 TB capacity (up to 11.61 TB usable for data storage). The DXi4000 presents storage as NAS shares (CIFS and NFS) or OST storage servers.

Features and Benefits

The DXi4000 system provides the following features and benefits:

- New, inline data flow provides leading deduplication with an optimal combination of total system performance, manageability, and value.
- NAS or OST (OpenStorage) presentation layer.
- 10 source to one target LAN/WAN replication compatible with DXi2500-D, DXi4000, DXi6500, DXi6700, DXi7500, and DXi8500 models.
- OST Optimized Duplication support with Symantec Backup Exec and Symantec NetBackup.
- Supported by every major backup software vendor.
- Rack space requirements: 2U.
- Installs in a standard rack with a minimum depth of 24.09 in (61 cm).

Note: Quantum recommends installing the DXi4000 system in a controlled or restricted area to prevent access by untrained personnel. In addition, Quantum recommends that system installation be performed only by qualified IT personnel with strong networking experience.

What's New in DXi 2.0.x Software

DXi 2.0.x Software for DXi4000 is a major update and includes the following significant enhancements:

- **Inline Data Flow** - The new, inline data flow enabled by the DXi 2.0.x Software deduplicates data as it is ingested into the DXi appliance. Optimized for the new generation of purpose-built DXi hardware platforms, it provides enhanced performance and more efficient dynamic use of system resources (see Data Reduction on page 5).
- **OpenStorage (OST) Improvements** - Enhancements include increased total performance, including writes, reads, and replication; simplified deployment (see Manage Users on page 171); and dynamically sized LSUs with no hard size limit (see LSU on page 166).
- **Automatic Replication Trigger** - In the Directory/File Based Replication, a file is automatically replicated after it is closed (CIFS shares) or after several minutes of inactivity (NFS shares) (see Directory/File Based Replication on page 83). There is no need for scripting to execute this function. This action makes files at the target available for access without a local recovery operation.
- **Enhanced Usability** - The user interface of the remote management console has been updated and improved to make it easier to see important information at a glance and perform the most common tasks (see DXi4000 Remote Management on page 29).

  Note: For a list of all menus and pages in the remote management console, see DXi4000 Management Pages on page 36. Use this list to help find the new location of features in the remote manage console.

- **Custom Network Configuration** - You can now create a custom network configuration using the remote management console as well as through the CLI (command line interface). The custom network option allows you to configure the DXi4000 with individual IP subnet information for each physical interface (see Network on page 176).

- **Configuration Wizards** - New wizards provide guided assistance to help users configure key features of the DXi4000, such as storage presentation and data replication. Each wizard leads you step-by-step through the configuration process (see DXi4000 Configuration Wizards on page 43).

Data Reduction

Data reduction is the process of reducing the amount of storage capacity required to store your data. The DXi4000 systems provide two techniques to optimize the storage space required on your system:

- Data Deduplication
- Compression

Data Deduplication

The DXi-Series disk backup and replication systems use Quantum's patented data deduplication technology to dramatically increase the role that disk can play in data protection. With DXi-Series solutions, users can retain 10 to 50 times more backup data on fast recovery disk than with conventional arrays. This advantage allows IT departments to cost-effectively retain months of backup data on disk for faster, more reliable restores and more data recovery points. Quantum's innovative implementation of this core technology means that users do not have to compromise on performance to take advantage of extended retention capability. The new, inline data flow in the DXi 2.0.x Software provides streamlined deduplication that offers a maximum combination of total system performance, manageability, and value.

Quantum's deduplication technology uses a sub-file, variable-length approach to identify redundant blocks in a data stream—blocks that have appeared before in the same dataset or in datasets processed at an earlier time. When a block appears that has already been stored, the DXi system inserts a reference pointer to the earlier instance of the data segment instead of storing another copy. The result is a dramatic reduction in the storage capacity needed to store the data set, and a similar reduction in the bandwidth needed to replicate deduplicated data sets over a network. For more information on enabling data deduplication, see NAS Summary on page 138.

Compression

The DXi4000 systems use compression technology after duplicate blocks have been identified and replaced as part of the deduplication process. With compression, unique data that has been through the data deduplication process can be compressed at a typical ratio of approximately 2:1. This enables you to maximize the storage capacity of your system.

Space Reclamation

The space reclamation process performs multiple functions on the DXi4000.

When data is deduplicated it is stored in a block pool—a pool of all unique data blocks that were captured during the data deduplication cycle. When subsequent backup jobs occur, the data deduplication engine searches for new data entering the DXi and uses a variable length compression algorithm to compare new data to existing data in the block pool. Unique blocks are added to the block pool and known blocks are indexed.

The space reclamation function searches the blockpool for data blocks that are not referenced by any pointers (that is, the files associated with the block have been expired and removed). Once such a data block is identified, the block is removed to make the space reusable.

It may be beneficial to schedule space reclamation for a time when other operations are not normally being carried out. By default the process will commence every Sunday at 1:00pm. However, to maximize performance and capacity utilization, it is highly recommended that this process is performed on a daily basis. As best practice it is recommended that this process commences at least two hours after your backup job has completed on a daily basis. It is far more efficient to process a day's worth of new data than a week's worth.

Remote Replication

Today most backup occurs on isolated devices, making it difficult to deploy disk backup when disaster recovery protection is required. DXi-Series solutions use data deduplication and replication to decrease by up to 50 times the bandwidth required to move backup data over networks and between sites. This dramatic gain makes it practical and cost-effective for users to replicate backup data over WANs for secure, network-based disaster recovery protection, and it lets users combine rapid, local restores with sound disaster recovery protection.

With DXi-Series replication, users can transmit data from a single site or multiple sites to a central location using any DXi model. DXi-Series replication is an asynchronous, automated background process that includes encryption of data in transit. This model for protecting the distributed enterprise allows users to combine disk, replication, and tape for an optimal combination of performance, simplicity, and security.

For more information on implementing a replication plan, see Chapter 6, DXi4000 Replication.

DXi4000 System

The DXi4000 product family includes the following models:

- DXi4510
- DXi4520
- DXi4601

DXi4510

This configuration provides a base amount of data storage. It includes the following features:

- 1 system
- 1 RAID controller card

- 4 x 1GbE ports
- 2.2 TB usable for data storage

DXi4520

This system provides increased data storage. It includes the following features:

- 1 system
- 1 RAID controller card
- 4 x 1GbE ports
- 4.4 TB usable for data storage

DXi4601

This system provides increased data storage that can be quickly and easily upgraded at any time by purchasing and adding a license key. It includes the following features:

- 1 system
- 1 RAID controller card
- 4 x 1GbE ports
- Expandable storage capacity up to 12 TB:
  - **Base System Capacity** - 4 TB total (3.87 TB usable for data storage)
  - **With First Capacity Upgrade License** - 8 TB total (7.74 TB usable for data storage)
  - **With Second Capacity Upgrade License** - 12 TB total (11.61 TB usable for data storage)

Note: For DXi4601, storage capacity upgrades are enabled simply by adding a license key and rebooting the system (see Adding a License Key on page 241). To purchase a storage capacity upgrade license, contact your Quantum sales representative.

Figure 1 DXi4000 System

Hard Drive Storage

The DXi4000 system is based upon high speed disk drives instead of tape drives (see HDDs on page 9). The usable capacity is 2.2–11.61 TB. The drive storage area is presented as NAS shares or OST LSUs (Logical Storage Units) (see Network Attached Storage (NAS) on page 10 or OpenStorage (OST) on page 12).

By making use of high speed drives, the DXi4000 greatly reduces the time required for backup/restore functions and improves confidence in completing the backup in the time allowed.

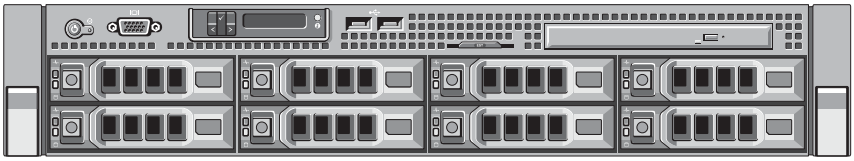
HDDs

To optimize performance, the DXi4000 uses hard disk drives (HDDs).

The DXi4000 supports eight hard disks (Figure 2 and Figure 3):

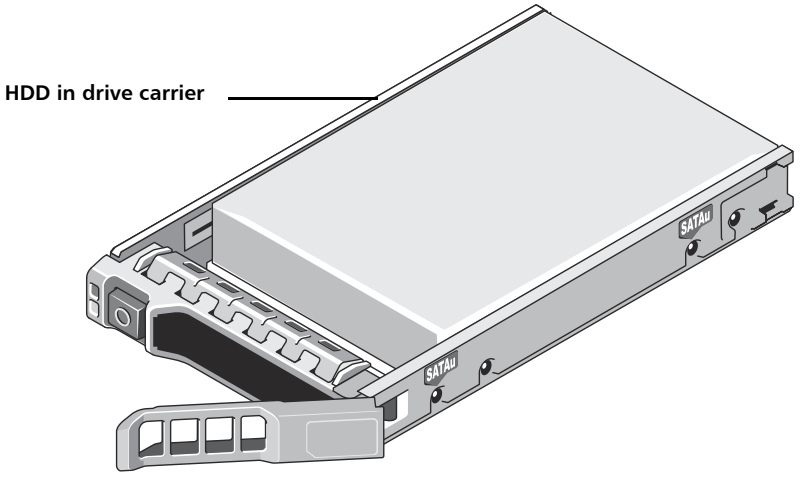
- **HDDs** - High capacity (500 GB, 1 TB, or 2 TB) hard disk drives are used for data storage, the operating system, and system software.

Figure 2 DXi4000 Drive Slot Numbering



HDD Slot 0	HDD Slot 2	HDD Slot 4	HDD Slot 6
HDD Slot 1	HDD Slot 3	HDD Slot 5	HDD Slot 7

Figure 3 DXi4000 Drive Carrier



Network Attached Storage (NAS)

The DXi4000 system has the ability to serve as a NAS backup system (see Figure 4) where the following protocols are supported:

- CIFS Protocol
- NFS Protocol

Note: In the DXi4000, NAS shares are optimized for backup rather than file sharing.

CIFS Protocol

The CIFS (Common Internet File System) protocol defines a standard for remote file access from many computers at a time in Windows environments. This protocol allows users with different platforms to share files without installing additional software.

Active Directory Support

The DXi4000 supports ADS (Active Directory Services) as well as ACLs (Access Control Lists). This provides the following benefits:

- **Compatibility with CIFS domains** - NAS shares are able to join CIFS domains and use domain authentication.
- **Precise control of file system permissions** - Administrators can specify which users and groups can perform what actions.
- **Robust administrative support** - Administrators have the same implicit permissions as they do in Windows operating systems.

Note: Windows 2003, Windows 2003 R2, Windows 2008, and Windows 2008 R2 are supported for Active Directory domain membership.

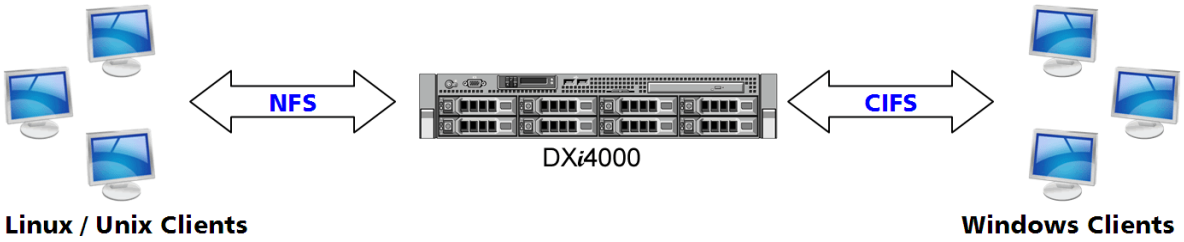
Note: When you create a CIFS share, the initial permissions are the same as the default permissions for a Windows 2003 share with the addition of an ACE (Access Control Entry) that permits full access to the share for all authenticated users. Administrators can choose to remove this full access ACE, set up custom permissions, or leave the ACL (Access Control List) as is if the server is set up in a fully trusted environment.

NFS Protocol

The NFS (Network File System) protocol was originally designed by Sun™ Microsystems and allows all network users to access shared files stored on computers of different types. NFS provides access to shared files through an interface called the Virtual File System (VFS) that runs on top of TCP/IP. Users can manipulate shared files as if they were stored locally on the user's own hard disk. With NFS, computers connected to a network operate as clients while accessing remote files, and as servers while providing remote users access to local shared files. This protocol is

used with UNIX and Linux networks. It can also be used with Windows networks.

Figure 4 NAS Backup using CIFS and NFS

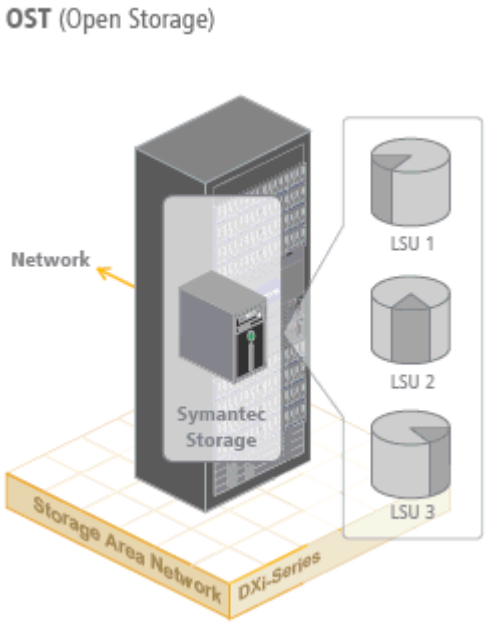


OpenStorage (OST)

With the OST presentation, the DXi system presents storage servers to a Symantec NetBackup or Backup Exec media server through a specific Symantec protocol. A storage server consists of logical storage units (LSUs), which are similar to directories in a NAS file system.

The OST presentation requires the Symantec NetBackup (6.5.3 or later) or Backup Exec 2010 or later host application and the OST Plug-in client installation on the media server. Plug-in clients are host-OS dependent and are supplied by Quantum. To use the DXi in OST mode, you must configure an OST storage server and LSUs on the DXi. You must also map the LSUs on the NetBackup server so that NetBackup can perform backups and restore from them. Additionally, policies for optimized duplication (OST replication) and OST direct to tape may need to be set on the NetBackup server.

Figure 5 OpenStorage (OST) Example



Supported RAID Configurations

RAID is short for Redundant Array of Independent (or Inexpensive) Disks, which is a category of storage that employs two or more drives in combination for fault tolerance and performance. There are a number of RAID levels in use today such as 0, 1, 3, 5, 6 and 10.

The DXi4000 uses the following RAID level:

- RAID 6 Configuration

RAID 6 Configuration

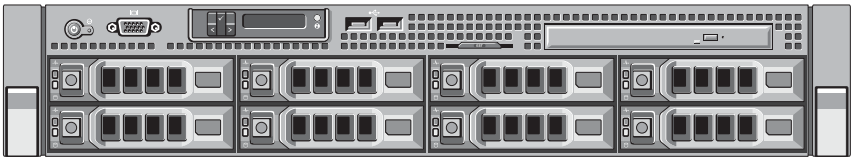
RAID 6 uses block-level striping with two parity blocks distributed across all member disks. Dual parity provided by a RAID 6 configuration ensures that your data retains full integrity even in the event of two hard drive failures. Since single parity RAID levels are vulnerable to data

loss until the failed drive is rebuilt: the larger the hard drive, the longer the rebuild will take and the longer the system is vulnerable to possible data loss.

The DXi4000 uses RAID 6 volumes for data storage.

- The system contains the following RAID 6 set (Figure 6):
  - **DATA** - HDD slots 1–8 (data storage)

Figure 6 DXi4000 RAID Sets



HDD Slot 0	**HDD Slot 2**	**HDD Slot 4**	**HDD Slot 6**
HDD Slot 1	**HDD Slot 3**	**HDD Slot 5**	**HDD Slot 7**

DXi Advanced Reporting

Quantum DXi Advanced Reporting works with all DXi-Series disk backup systems. DXi Advanced Reporting combines comprehensive performance data logging with powerful visual reporting and analysis tools to help you identify potential problems and optimize system operation. For more information, refer to the *DXi Advanced Reporting Software and Documentation CD* included with your system.

Network Segmentation

Network segmentation provides the ability to split your network into subnetworks or segments. There are two main purposes for segmenting your network:

- **Separate Physical Interfaces**: if your network is physically partitioned with no connectivity between the partitions, the DXi4000 needs the ability to communicate with each partition individually.
- **Combine or Separate Network Traffic**: Network traffic is either separated according to specific network needs or combined on a single IP address for simplicity. The DXi4000 has the capability of separating data traffic, replication traffic, and management traffic. Each traffic type can have its own IP address or they can be combined on a single IP address.

DXi4000 Segmentation Options

The DXi4000 allows the user to select one of the following network segmentation options:

Note: Work with your network administrator to determine the best network configuration for your needs and environment.

DXi4000 - (4 x 1GbE ports)

- **BOND ALL (Not segmented)** - All ports (ETH2, ETH3, ETH4, and ETH5) are bonded together and require a single set of network settings on the **Network** page.
- **BOND ALL (Replication/Management/Data)** - All ports (ETH2, ETH3, ETH4, and ETH5) are bonded together for all traffic types. Each segment (Data, Management, and Replication) requires a set of network settings on the **Network** page.
- **ETH2 (Replication), BOND ALL-1 (Management/Data)** - All Replication traffic takes place on port ETH2. Data and Management traffic take place on ports ETH3, ETH4 and ETH5. Each segment (Data, Management, and Replication) requires a set of network settings on the **Network** page.

- **ETH2 (Management), BOND ALL-1 (Replication/Data)** - All Management traffic takes place on port ETH2. Data and Replication traffic take place on ports ETH3, ETH4 and ETH5. Each segment (Data, Management, and Replication) requires a set of network settings on the **Network** page.
- **BOND ALL-1 (Data), ETH2 (Replication/Management)** - All Data traffic takes place on ports ETH3, ETH4 and ETH5. Management and Replication traffic take place on port ETH2. Each segment (Data, Management, and Replication) requires a set of network settings on the **Network** page.

Network Segmentation Scenarios

The following scenarios provide common examples of network segmentation.

- Un-Segmented Network
- Data and Replication Separate from Management
- Data and Management Separate from Replication

Un-Segmented Network

This is the most common network configuration (and also the default setting for DXi4000). In this example, the user has no need to separate network traffic types. All traffic will occur on a single IP address.

Segmentation and Bonding page selection:

- Select **BOND ALL (Not segmented)**

Data and Replication Separate from Management

In this example, the user has a dedicated low bandwidth wide area network (WAN) that is used to manage network resources. This network does not have the capacity for data and replication traffic. Replication is between two DXi systems that are in the same location with a dedicated network connection.

Segmentation and Bonding page selection:

- Select **ETH2 (Management), ETH3, ETH4, and ETH5 (Replication/Data)**

Data and Management Separate from Replication

In this example, the user has a dedicated local high bandwidth network used for data ingest and resource management. The user also has high bandwidth WAN used for offsite data movement. Data and management traffic can share the local network and replication traffic between DXi systems in two locations uses a dedicated WAN.

Segmentation and Bonding page selection:

- Select **ETH2 (Replication), ETH3, ETH4, and ETH5 (Management/ Data)**

Chapter 2

Basic Operations

Most DXi4000 system operations are performed using the remote management console (see Chapter 3, DXi4000 Remote Management). This chapter describes the features and basic operation of the DXi4000 hardware, including:

- DXi4000 System
- Hard Drive Carrier Indicators
- Ethernet Port Indicators
- Power Supply Indicators
- Turning On and Shutting Down the System

DXi4000 System

The DXi4000 system is a computer server that provides control for the DXi4000 software (host OS and software applications). The system also provides storage (backup data storage) for the DXi4000 system. The system contains 8 drive carriers. In addition, all network connections are made on the node.

System Front Panel Features and Indicators

Figure 7 shows the controls, indicators, and connectors located behind the optional rack bezel on the front panel of the system. Table 1 describes each item.

Figure 7 DXi4000 System Front View

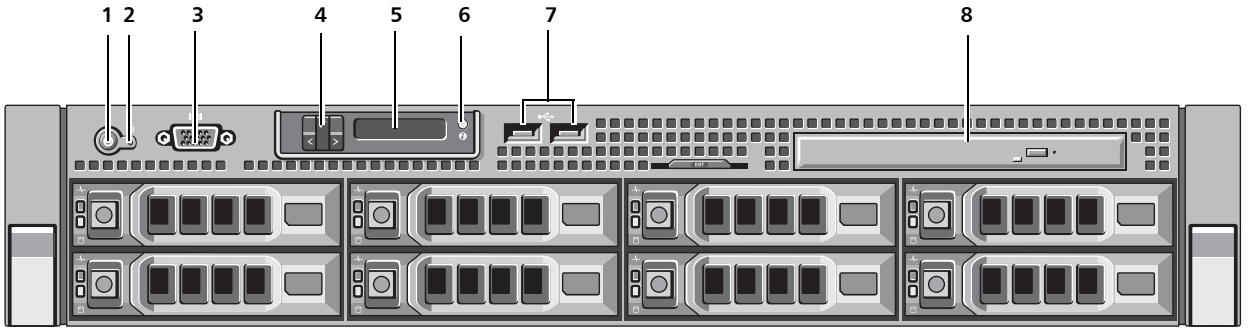


Table 1 DXi4000 System - Front Panel LED Indicators, Buttons, and Connectors

Item	Indicator, Button, or Connector	Icon	Description
1	Power button		Turns the system on or off. **Warning:** Turning off the power removes the main power but keeps standby power supplied to the system. Because of this, you must unplug the system before servicing. **Caution:** Turning off the power without properly shutting down the system may result in loss of data (see Turning On and Shutting Down the System on page 26). **Caution:** To shut down the system in the event of an emergency, press and hold the power button for 4 seconds. This may result in data loss and may cause a delay on next startup due to a block pool verify operation.
2	NMI button		Used to troubleshoot software and device driver errors. This button can be pressed using the end of a paper clip. Use this button only if directed to do so by qualified support personnel.
3	Video connector		Not used.
4	LCD menu buttons		Not used.
5	LCD panel		The LCD lights blue during normal system operation.

Item	Indicator, Button, or Connector	Icon	Description
6	System identification button		The identification buttons on the front and back panels can be used to locate a particular system within a rack. When one of these buttons is pushed, the LCD panel on the front and the blue system status indicator on the back blink until one of the buttons is pushed again.
7	USB connectors (2)		Connects USB 2.0 compliant devices to the system.
8	DVD-ROM		DVD-ROM drive.

System Back Panel Connectors

See the following subsections for information about the back panel connectors available in each possible configuration:

Note: Refer to the port numbering label on the back of the system to help you determine the correct port connections.

Figure 8 shows the connectors located on the rear panel of the system. Table 2 describes each item.

Figure 8 System Rear View

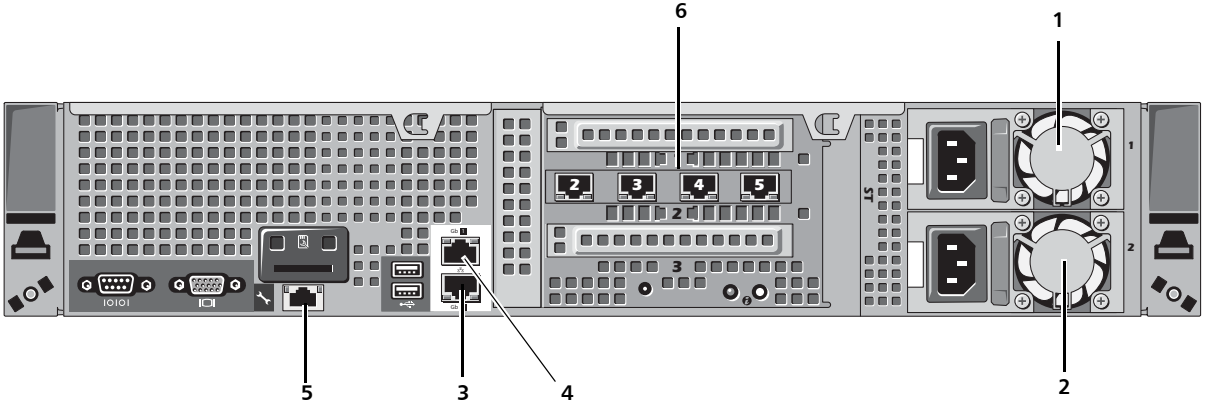


Table 2 Rear Panel Connectors

Item	Description
1	Power supply 1
2	Power supply 2
3	Service port (for Quantum use only)
4	IPMI port (not used)
5	IPMI port (not used)
6	Ethernet ports

Hard Drive Carrier Indicators

Each hard drive carrier has two LED indicators (see Figure 9):

- **Drive activity indicator (green)**
  - **Flashing** - Indicates hard disk drive activity.
- **Drive failure indicator (green and amber)**
  - **Off** - Drive ready for insertion or removal

    Note: The drive status indicator remains off until all hard drives are initialized after system power is applied. Drives are not ready for insertion or removal during this time.

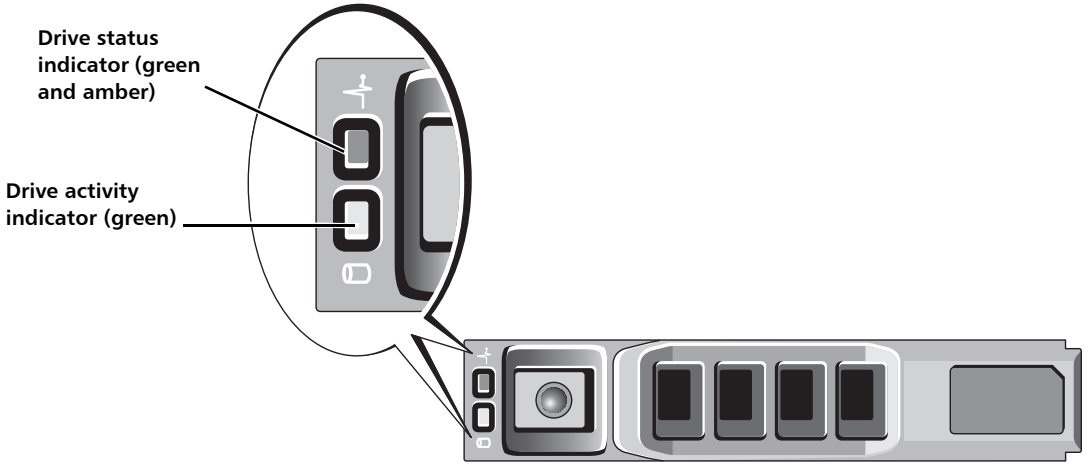
  - **Blinks green two times per second** - Identify drive/preparing for removal
  - **Blinks green, amber, and off** - Drive predicted failure
  - **Blinks amber four times per second** - Drive failed
  - **Blinks green slowly** - Drive rebuilding
  - **Steady green** - Drive online

- **Blinks green three seconds, off three seconds, amber three seconds, and off three seconds** - Rebuild aborted

Note: If a drive fails, you will be notified by an admin alert in the remote management console (see Admin Alerts on page 127).

Caution: All drives are hot swappable. When replacing drives, never remove more than one drive at a time from a RAID set. After removing a drive, first wait one minute. Then insert a working drive and wait for the RAID set to finish rebuilding (red indicator light is off) before removing another drive. For information about RAID sets, see Supported RAID Configurations on page 13.

Figure 9 Hard Drive Carrier LEDs

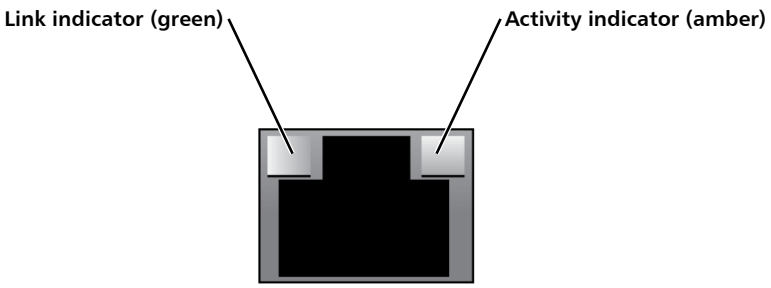


Ethernet Port Indicators

Each Ethernet port on the back panel has two LED indicators (see Figure 10):

- **Link Indicator (green)**
  - **Continuously lit** - Indicates the port is connected to the network.
  - **Off** - Indicates the port is not connected to the network.
- **Activity indicator (amber)**
  - **Blinking** - Indicates network data is being sent or received.

Figure 10 Ethernet Port LEDs



Power Supply Indicators

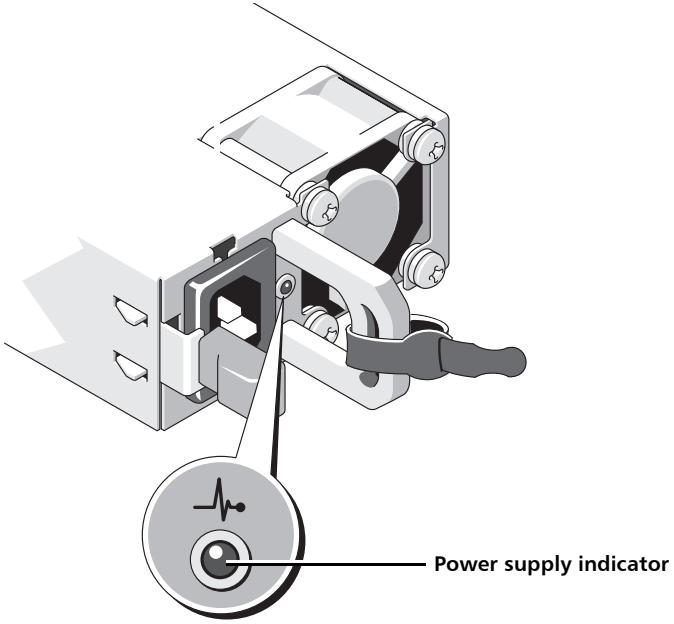
Each power supply has one LED indicator (see Figure 11):

- **Not lit -** the power supply is not plugged in
- **Green** - Indicates the power supply is turned on and operating correctly.
- **Amber** - Indicates power supply failure.
- **Alternating green and amber** - When hot-adding a power supply, this indicates that the power supply is mismatched with the other

power supply. Replace the power supply that has the flashing indicator with a power supply that matches the capacity of the other installed power supply.

Caution: All power supplies are hot swappable. When replacing power supplies, never remove more than one power supply at a time from the system. Also, before you remove one power supply, make sure the other power supply is operating correctly (indicator LED is green).

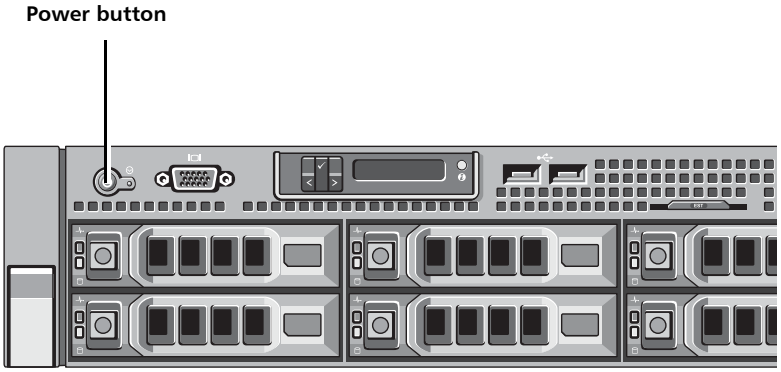
Figure 11 Power Supply LED



Turning On and Shutting Down the System

To turn on the system, press the power button located on the front panel of the system (see Figure 12).

Figure 12 Power Buttons



To shut down the DXi4000, you must use the remote management console (see Reboot & Shutdown on page 247). Shutting down the system can take up to 15 minutes.

Locating Serial Numbers

You will need the system serial number at various times:

- **System Serial Number** - You need this number to contact Quantum Support or to add a licensed feature.

You can locate the system serial number on the **Home** page of the remote management console.

You can also locate the system serial number by looking at the front and rear of the server node. The top of the EST tab on the front of the unit includes the serial number (labeled as Service Tag), and so does a sticker on the rear of the unit. An example system serial number is 1A2B3C4.

Chapter 3
DXi4000 Remote Management

The Quantum DXi4000 provides a powerful Web-based user interface that allows you to configure and manage the system from a remote workstation on the same network as the DXi4000.

Use the DXi4000 remote management console to perform the following tasks:

- Set up the DXi4000 using guided procedures (see DXi4000 Configuration Wizards on page 43).
- View important system information at a glance (see DXi4000 Home Page on page 71).
- Manage data replication activities (see DXi4000 Replication on page 81).
- Monitor hardware status and system performance (see DXi4000 Status on page 113).
- View administration alerts and resolve service tickets (see DXi4000 Alerts on page 127).
- Configure storage presentation, data replication, and system settings (see DXi4000 Configuration on page 137).
- Run diagnostic tools and maintain the system (see DXi4000 Utilities on page 223).

Accessing Remote Management

Access the remote management console using a Web browser on a workstation that is on the same network as the DXi4000.

See the following sections for more information about accessing DXi4000 remote management:

- Supported Browsers
- Logging On to the DXi4000
- Logging Off of the DXi4000

Supported Browsers

Web browser software is not included with the DXi4000. You must obtain and install it separately. The DXi4000 remote management console supports the following Web browsers:

- **Windows** - Microsoft Internet Explorer 7.x or higher, Mozilla Firefox 3.x or higher
- **Linux** - Mozilla Firefox 3.x or higher

Note: For correct operation of the remote management console, disable any pop-up blockers and enable JavaScript in your Web browser.

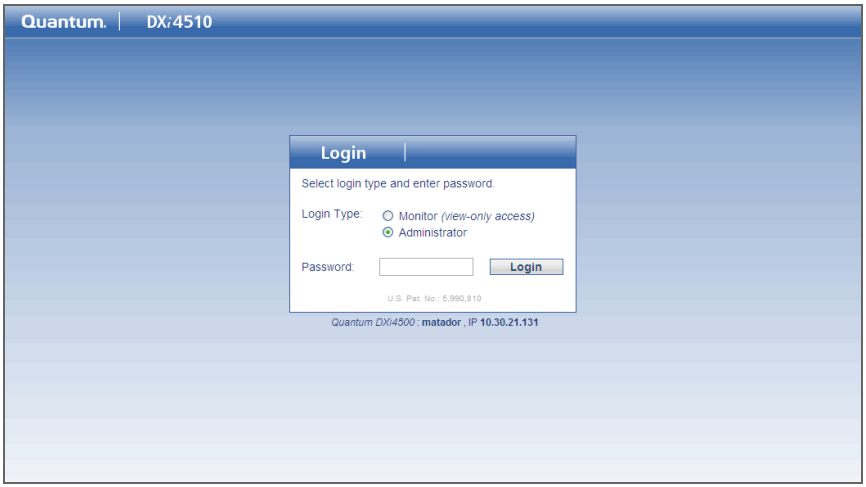
Logging On to the DXi4000

To log on to the DXi4000 remote management console:

1. Launch a supported Web browser on a workstation that has network access to the DXi4000.
2. In the browser address box, type the IP address of the DXi4000, and then press **<Enter>**.

   The **Login** window displays (see Figure 13).

Figure 13 Login Window



If the **Login** window does not display, verify that the IP address is correct and that the network path to the DXi4000 is valid. Also verify that you are using a supported Web browser. Then try again. If you are still unable to access the Login window, contact your DXi4000 administrator.

Note: The default IP address is **10.1.1.1**. The IP address can be changed during installation using the **Getting Started Wizard** or at a later time on the **Network** page (see Network on page 176).

3 Select the login type and enter the corresponding password.

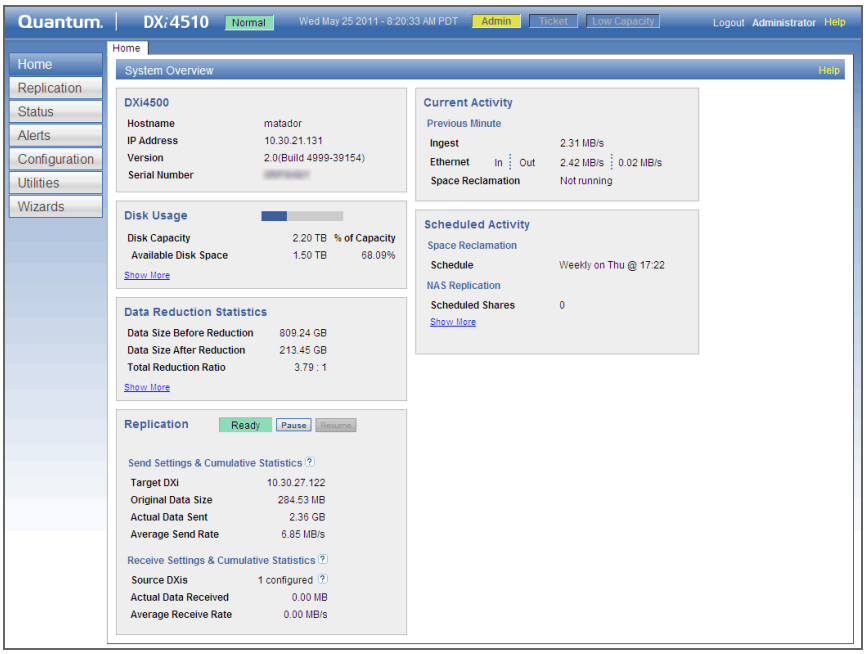
- **Monitor** - Allowed to view information on the DXi4000 remote management console but cannot make changes. (The default password is **password**.)
- **Administrator** - Allowed to view and change information on the DXi4000 remote management console. (The default password is **password**.)

Note: Passwords are limited to 15 characters. All alphanumeric characters are allowed, as well as underscores (_) and hyphens (-). Passwords can be changed on the **Web & CLI Passwords** page (see Web & CLI Passwords on page 192).

4 Click **Login**.

The **Home** page displays (see Figure 14).

Figure 14 Home Page



If you are unable to log on, verify that the password is correct, then try again. If you are still unable to log on, contact your DXi4000 administrator.

Logging Off of the DXi4000

When you are done working in the DXi4000 remote management console, click **Logout** on the upper right of the remote management console to end your session.

Note: If the DXi4000 remote management console is idle for more than 30 minutes (default setting), the system logs off the user. The inactivity timeout can be changed on the **Login Session** page (see Login Session on page 198).

The Remote Management Console

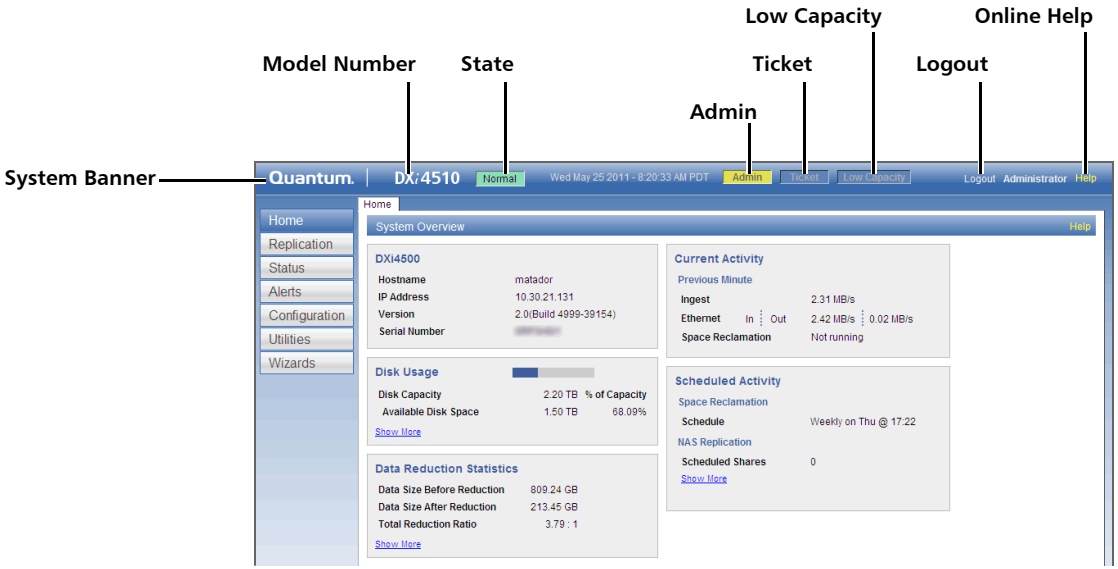
After you log on to the DXi4000, the remote management console displays. The remote management console includes the following features:

- System Banner
- Main Menu
- DXi4000 Management Pages

System Banner

The system banner displays at the top of the remote management console (see Figure 15). Use the system banner to see overall system status and alert information at a glance, and to quickly access additional information. The system banner also displays the time and date as well as the login type.

Figure 15 System Banner



The following items display on the system banner:

- **Model Number** - The model number of the DXi4000 (see Model Number on page 34).
- **State** - Displays the operating state of the DXi4000:
  - **Normal** - (Green) The system is operating correctly.
  - **Attention** - (Yellow) There is a problem with the system.
  - **I/O Write Low Threshold** - (Yellow) Ingest rate continues and space reclamation starts.
  - **Verify Failure** - (Red) The blockpool verify process has failed.
  - **Low Space** - (Red) Available disk space has fallen to a low level.
  - **No Space** - (Red) Available disk space has fallen to a critical level.

  Click the **Status** button to display detailed status information the system (see Hardware on page 113).
- **Admin** - The **Admin** button turns yellow when an administration alert occurs. Click the **Admin** button to manage administration alerts (see Admin Alerts on page 127).
- **Ticket** - The **Ticket** button turns yellow when open service tickets are present. Click the **Ticket** button to manage service tickets (see Service Tickets on page 129).
- **Low Capacity** - The **Low Capacity** button turns yellow when available disk space falls to a low level. Click the **Low Capacity** button to view the administration alerts related to low disk capacity (see Admin Alerts on page 127).

  Note: When disk capacity is low, target replication to the system is paused (see Replication Service on page 110). In addition, space reclamation is automatically started to free up disk space (see Space Reclamation on page 235).

- **Logout** - Click to end your remote management session.
- **Help** - Click to display the online help.

Model Number

The Model Number displays in the DXi4000 **System Overview** section on the **Home** page. The model number indicates the specific hardware configuration of the DXi4000.

Figure 3 describes the DXi4000 hardware configuration that is indicated by each model number.

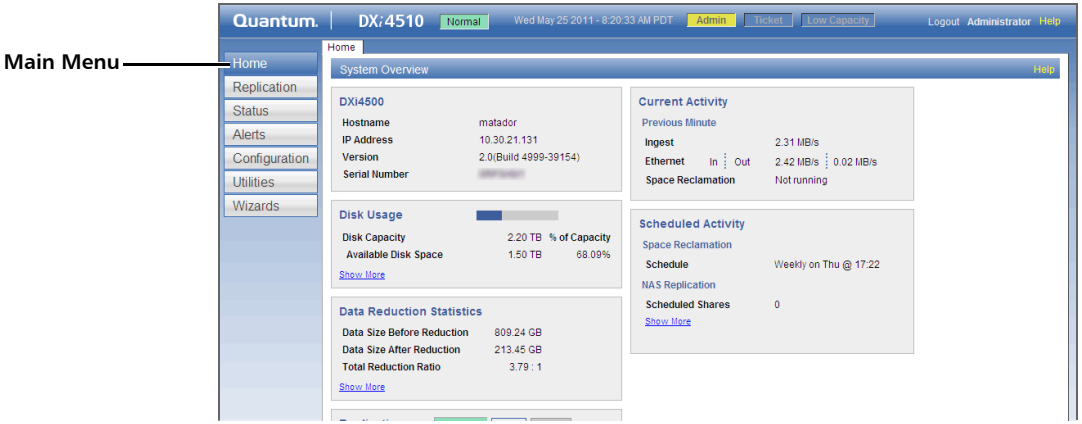
Table 3 DXi4000 Model Number

DXi4000 Model Number	DXi4000 Configuration
4510	2.2 TB usable for data storage 4 x 1GbE Ethernet ports
4520	4.4 TB usable for data storage 4 x 1GbE Ethernet ports
4601	4.0–12.0 TB total capacity (3.87–11.61 TB usable for data storage) 4 x 1GbE Ethernet ports

Main Menu

The main menu displays on the left side of the DXi4000 remote management console (see Figure 16). Click a menu item to display the corresponding management page.

Figure 16 Main Menu



DXi4000 Management Pages

Use the DXi4000 management pages to view information as well as configure and manage the system. To navigate to a page, first click a menu item, then click a tab to display the corresponding page. Some pages include sub-tabs that display pages with additional information and options.

If you need help as you work, click **Help** in the page's title bar to see online help for that page. In addition, Quick Tips are available on many pages. Click the **Quick Tip** icon **[?]** next to a section or field to learn more about that item.

Note: Clicking **Wizards** on the main menu replaces the main menu with the wizards menu. Click a menu item to begin a wizard, or click **Exit** to return to the main menu (see DXi4000 Configuration Wizards on page 43).

Caution: Do not use your Web browser's **Back**, **Forward**, or **Refresh** buttons when navigating in the remote management console. Doing so may have unintended effects. Instead, always use the main menu and tabs to navigate in the remote management console.

Table 4 lists the available menu items and management pages.

Table 4 Menu Items and Management Pages

Home Menu		
Home	System Overview	DXi4000
		Disk Usage
		Data Reduction Statistics
		Replication
		Current Activity
		Scheduled Activity
Replication Menu		

Send	NAS	
Receive	NAS	Received Snapshots
		Recovery Jobs
		Failback Jobs
		Directory/File Based
Actions	Replication Service	
	Replication State	
	Replication Performance	
Reports	Replication Report	
Status Menu		
Hardware	Summary	
	Details	System Board
		Network Ports
		Storage Arrays
	Firmware Version	
Performance	Ingest	
	Ethernet	
	RAID	
	CPU	
Disk Usage	Available	
	Used	
	Data Reduction	
Alerts Menu		
Admin Alerts		
Service Tickets		

Configuration Menu		
NAS	Summary	
	Windows Domain	
	Share Access	
	Advanced Setting	
Replication	Send	Target DXi
	Receive	Source DXis
		Maximum Received Snapshots
OST	Storage Servers	
	LSU	
	Manage Users	
	OST Client Plug-In	
System	Network	Basic
		Custom
		Segmented
	Date & Time (NTP Server or Manual)	
	Security	Web & CLI Passwords
		SSL
		Login Session

Notifications	Email	Recipients
		Server
		Test
		Email Home
	SNMP	Destinations
		Community
		Test
Contacts	Company	
	Primary	
	Secondary	
Utilities Menu		
Diagnostics	System Diag File	
	Storage Array Diag File	
	DSET	
	Healthchecks	General
		Status
		Schedule
Analyzer	Network	Performance
		Settings
	Disk	
Space Reclamation	General	
	Schedule	
License Keys		
Software Upgrade		
Reboot & Shutdown		

Wizards Menu	
Welcome	
NAS	About
	Protocol
	Windows
	Add Share
	Confirm
OST	About
	Add Storage Servers
	Add LSUs
	Add Users
	Confirm
	Download OST Client Plug-In
Replication	About
	System
	NAS Shares
	Confirm
Email Alerts	About
	Server
	Recipients
	Confirm

Support	About
	Licensed Features
	Registration
	Guardian
	System Log
Exit	

Chapter 4
DXi4000 Configuration Wizards

The **Configuration Wizards** provide guided assistance for setting up the DXi4000. Use the wizards to quickly configure the most important features of the system, including storage presentation and data replication. Each wizard leads you step-by-step through the configuration process.

The **Configuration Wizards** page displays the first time you log on to the remote management console after completing the **Getting Started** wizard. After that, to access the **Configuration Wizards**, click **Wizards** on the main menu. This replaces the main menu with the **Wizards** menu (see Figure 17).

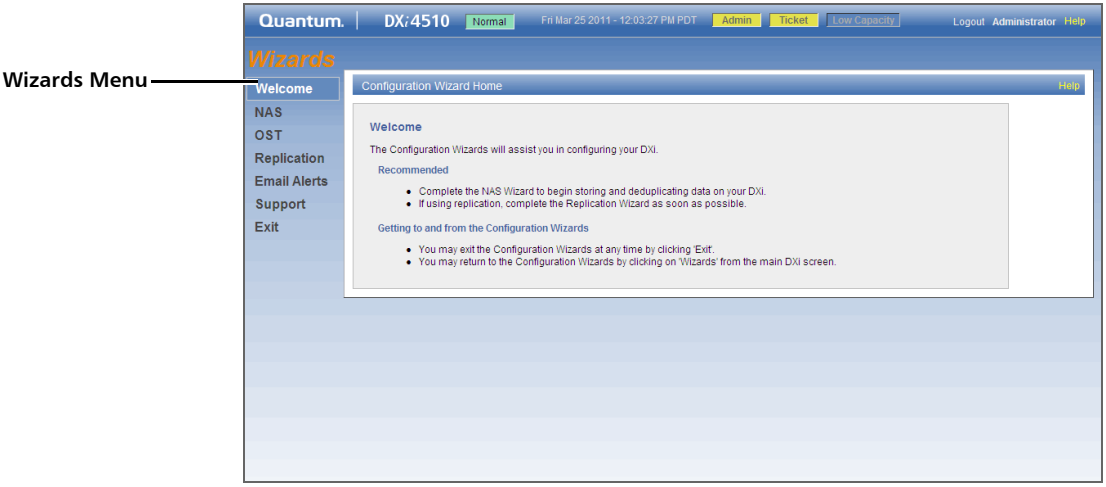
The **Wizards** menu includes the following wizards:

- **NAS** - Helps you configure the DXi4000 as a NAS (Network Attached Storage) appliance for use on a Windows or UNIX/Linux network (see NAS Wizard on page 44).
- **OST** - Helps you configure the DXi4000 to present its storage as one or more OST (OpenStorage) storage servers for use with a backup application (see OST Wizard on page 50).
- **Replication** - Helps you configure the DXi4000 to send replicated data to or receive replicated data from another DXi system (see Replication Wizard on page 56).
- **Email Alerts** - Helps you configure the DXi4000 to automatically send notifications and reports to selected recipients (see Email Alerts Wizard on page 61).

- **Support** - Helps you enable licensed features on the DXi4000, register your system with Quantum, and perform other tasks that will aid Quantum customer support in assisting you (see Email Alerts Wizard on page 61).

Click an item on the **Wizards** menu to begin a wizard. After you complete a wizard, a green check mark displays next to its name on the **Wizards** menu. To display the main menu again, click **Exit**.

Figure 17 Wizards Menu



NAS Wizard

The **NAS** wizard provides guided assistance for configuring the DXi4000 as a NAS (Network Attached Storage) appliance. The wizard helps you determine if the NAS shares will be used on a Windows or UNIX/Linux network, and if necessary helps you join the DXi4000 to a Windows domain. Then the wizard guides you through the process of adding one or more NAS shares to receive backup data.

Note: You cannot use the NAS wizard to edit existing shares. For more information about working with NAS shares, see NAS on page 137.

To begin the **NAS** wizard, on the **Wizards** menu, click **NAS**.

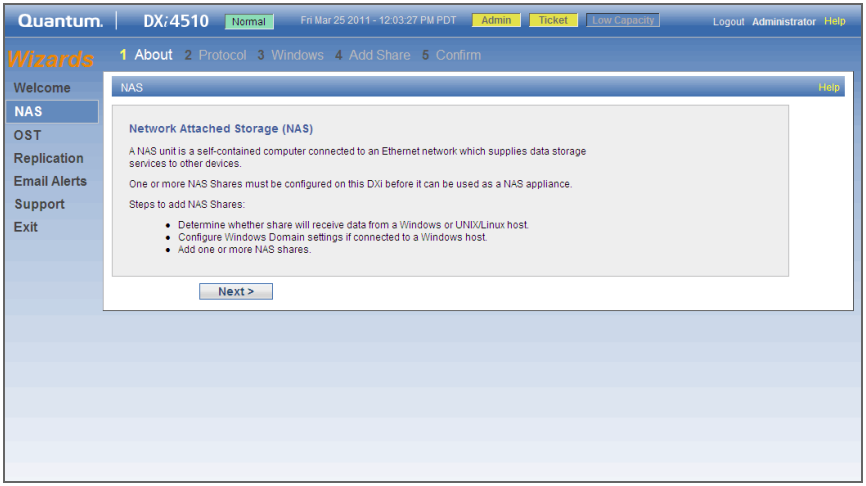
Step 1: About

1 Read the information about the wizard (see Figure 18).

2 Click **Next** to continue.

Note: At any time while using the wizard, you can click **Previous** to return to the previous step.

Figure 18 NAS Wizard: About



Step 2: Protocol

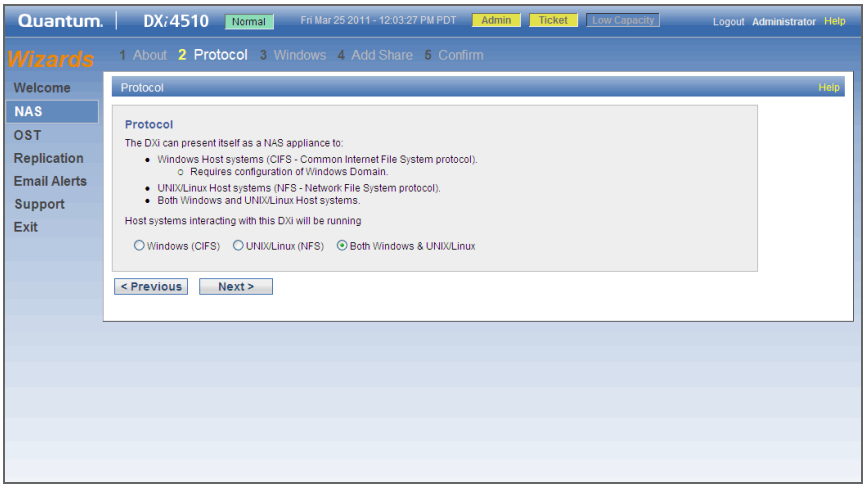
1 Select the type of host the DXi4000 will present NAS shares to (see Figure 19):

- **Windows (CIFS)** - All hosts that will interact with the DXi4000 run Windows.
- **UNIX/Linux (NFS)** - All hosts that will interact with the DXi4000 run UNIX or Linux.

- **Both Windows & UNIX/Linux** - Both types of hosts (Windows and UNIX/Linux) will interact with the DXi4000.

2 Click **Next** to continue.

Figure 19 NAS Wizard: Protocol



Step 3: Windows

Note: If you selected the **UNIX/Linux (NFS)** option in the previous step, the wizard automatically skips this step. Continue with Step 4: Add Share on page 48.

1 Select an option for joining the DXi4000 to the Windows network (see Figure 20):

- **Active Directory** - Add the DXi4000 to a Windows network using Active Directory
- **Workgroup** - Add the DXi4000 to a workgroup on a Windows network

Note: To disjoin a domain, see Windows Domain on page 144.

2 In the **Domain/Workgroup Name** box, enter the name of the domain or workgroup the DXi4000 is joining.

3 (Active Directory only) Enter information about the primary domain controller:

- **Primary Domain Controller** - Select an option for the Primary Domain Controller (PDC):
  - **Use DNS Discovery** - Discover the PDC automatically.
  - **Specify Address** - Enter the fully qualified name or the IP address of the PDC.
- **Organization Unit** - (Optional) Enter the name of the organizational unit in the domain.

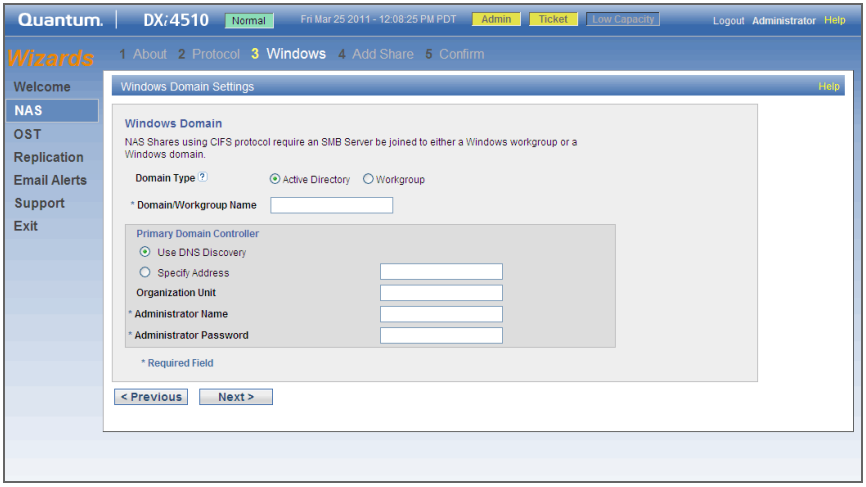
  The DXi4000 will become a member of this organization.
- **Administrator Name** - Enter **Administrator** or any user that has the right to join the domain.

  By default, any user belonging to the **Administrators** group or the **Domain Admins** group has the right to join the domain. In addition, any user can join the domain if they are specifically delegated this right by a member of the **Administrators** group.
- **Administrator Password** - Enter the password for the user entered above.

Note: To configure users, see Share Access on page 147.

4 Click **Next** to continue.

Figure 20 NAS Wizard: Windows



Step 4: Add Share

1 Under **Add Share**, enter information about the NAS share (see Figure 21):

- **Name** - Enter the name of the NAS share.
- **Description** - (Optional) Enter a brief description of the share.
- **Enable deduplication** - Select the check box to enable data deduplication. Quantum recommends that you enable data deduplication to optimize disk usage.

  Note: Data deduplication is enabled by default. You cannot enable or disable data deduplication after the share is added.

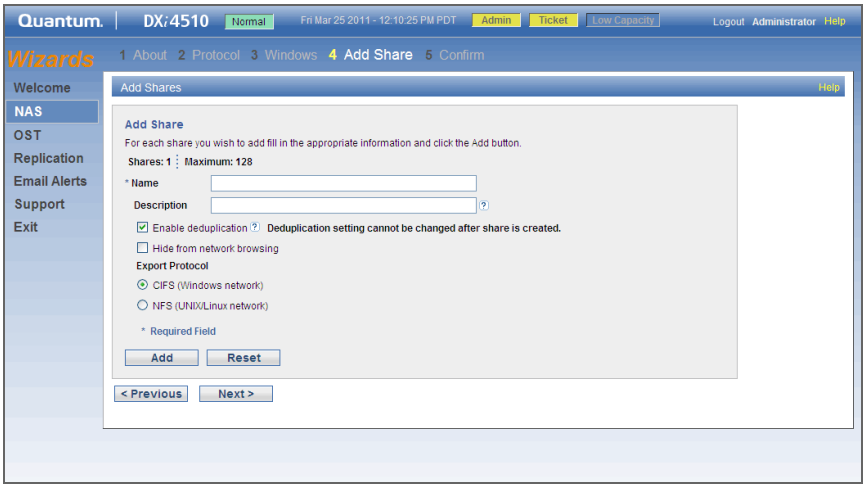
- **Hide from network browsing** - (Windows shares only) Select the check box to hide the share from network browsing. If selected, you cannot see the share when browsing the network.
- **Export Protocol** - (Available only if you selected the **Both** option in Step 2: Protocol on page 45) Select the export protocol for the share:
  - **CIFS** - Select the CIFS option to use the share on a Windows network.
  - **NFS** - Select the NFS option to use the share on a UNIX or Linux network.

2 Click **Add**.

3 (Optional) To add additional shares, repeat Steps 1–2.

4 Click **Next** to continue.

Figure 21 NAS Wizard: Add Share



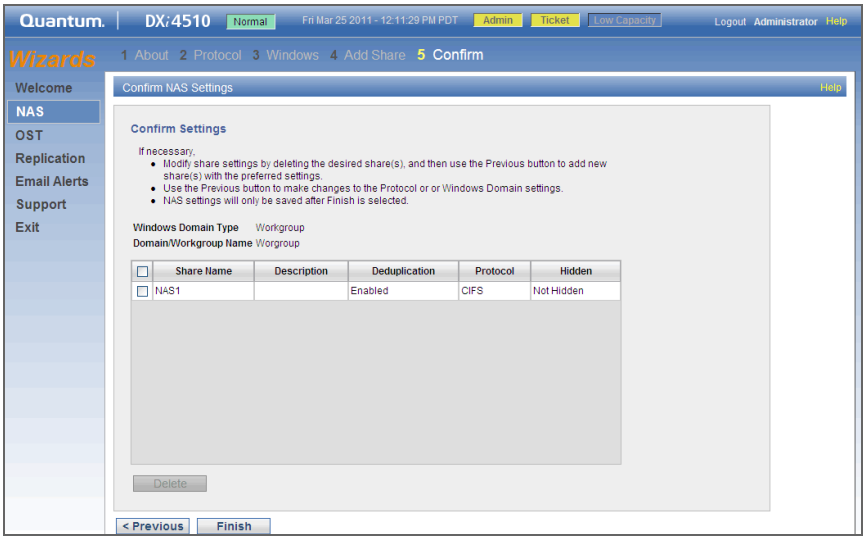
Step 5: Confirm

1 Review the settings you selected to make sure they are correct (see Figure 22). If necessary, click **Previous** to return to a previous step to make changes.

2 To make changes to a NAS share you added, first select the share and click **Delete** to delete the share. Then click **Previous** to return to the previous step and add a new share.

3 After you have confirmed all settings, click **Finish**. The wizard configures the DXi4000 with the settings you selected.

Figure 22 NAS Wizard: Confirm



OST Wizard

The **OST** wizard provides guided assistance for configuring the DXi4000 to present its storage as one or more OST (OpenStorage) storage servers for use with a backup application. The wizard guides you through the process of adding one or more OST storage servers, configuring LSUs (logical storage units), and adding OST users. The wizard also provides a link for downloading and installing the OST Plug-in on your backup host.

Note: You cannot use the OST wizard to edit existing storage servers or LSUs. For more information about working with OST, see OST on page 160.

To begin the **OST** wizard, on the **Wizards** menu, click **OST**.

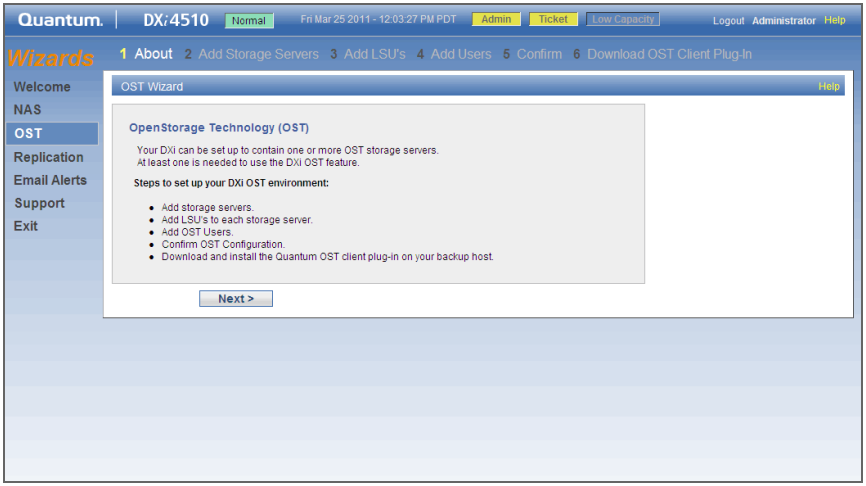
Step 1: About

1 Read the information about the wizard (see Figure 23).

2 Click **Next** to continue.

Note: At any time while using the wizard, you can click **Previous** to return to the previous step.

Figure 23 OST Wizard: About



Step 2: Add Storage Servers

1 Under **Add Storage Server**, enter information about the storage server (see Figure 24):

- **Name** - Enter the name of the storage server.
- **Max Connections** - Enter the maximum number of connections allowed to the storage server (3 to 65536).

Note: Quantum recommends setting **Max Connections** to 300.

2 Click **Add**.

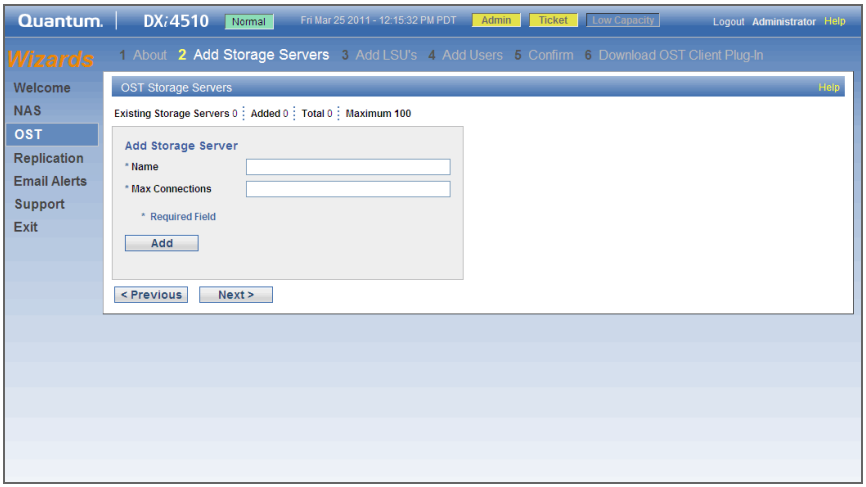
The storage server displays in the **Storage Servers Added** table.

3 (Optional) To add additional storage servers, repeat Steps 1–2.

To remove a storage server, select it in the **Storage Servers Added** table and click **Delete**.

4 Click **Next** to continue.

Figure 24 OST Wizard: Add Storage Servers



Step 3: Add LSUs

1 Enter information about the LSU (see Figure 25).

- **Storage Server** - Select the storage server that will contain the new LSU.
- **Use Available Capacity** - 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 170).

- **Specify 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).

2 Click **Add**.

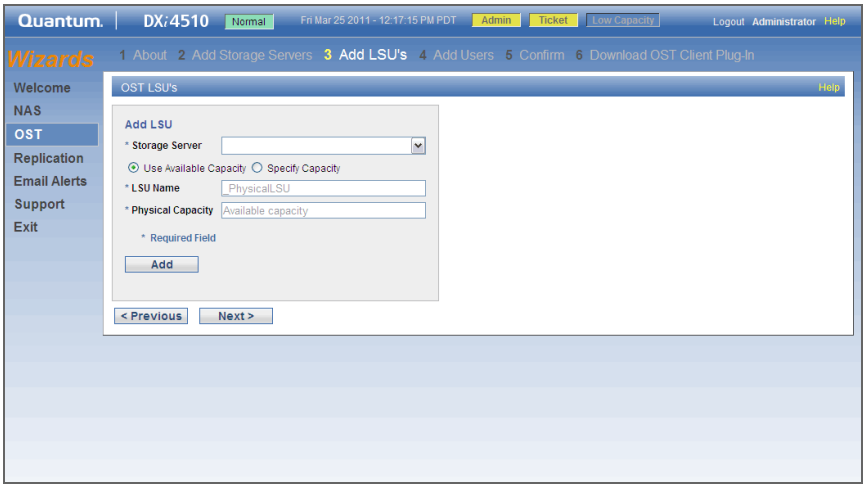
The LSU displays in the **LSUs Added** table.

3 (Optional) To add additional LSUs, repeat Steps 1–2.

To remove an LSU, select it in the **LSUs Added** table and click **Delete**.

4 Click **Next** to continue.

Figure 25 OST Wizard: Add LSUs



Step 4: Add Users

1 Enter information about the authenticated user (see Figure 26):

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

2 Click **Add**.

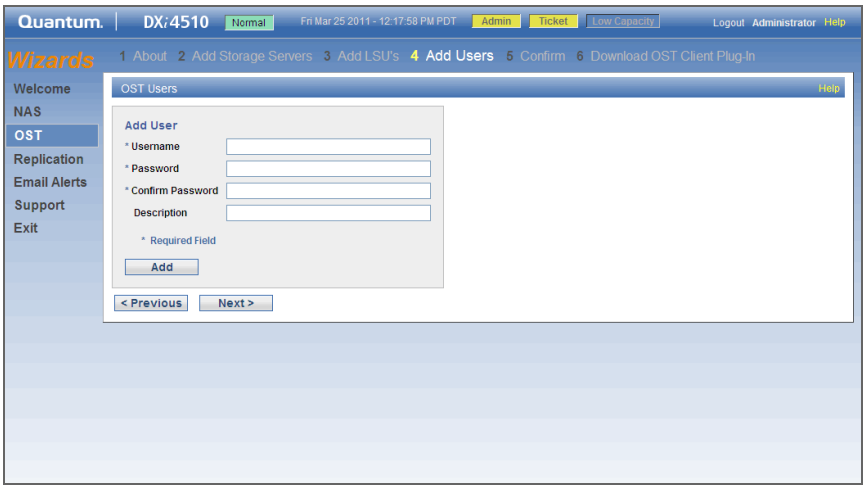
The user displays in the **Users Added** table.

3 (Optional) To add additional users, repeat Steps 1–2.

To remove a user, select it in the **Users Added** table and click **Delete**.

4 Click **Next** to continue.

Figure 26 OST Wizard: Add Users



Step 5: Confirm

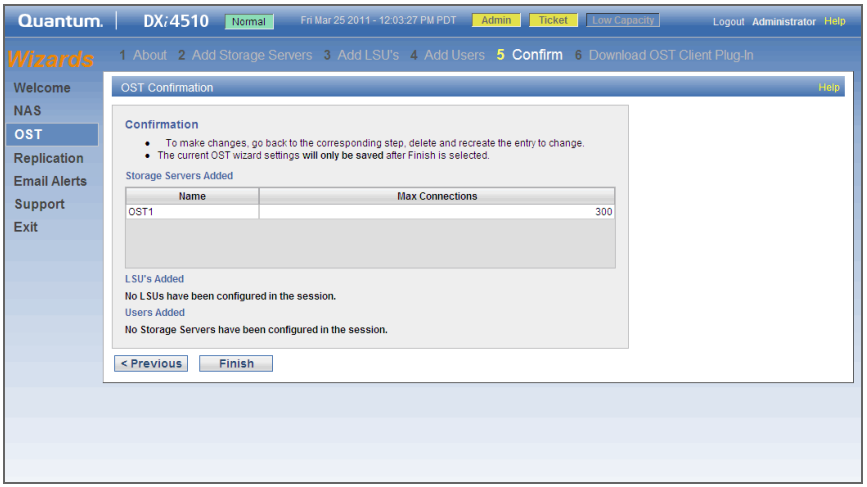
1 Review the settings you selected to make sure they are correct (see Figure 27). The items to be added display in the **Storage Servers Added**, **LSUs Added**, and **Users Added** tables. If necessary, click **Previous** to return to a previous step to make changes.

2 To make changes to storage servers, LSUs, or users you added, click **Previous** to return to the appropriate step. Select the incorrect item and click **Delete** to remove it, and then add a new item.

3 After you have confirmed all settings, click **Finish**. The wizard configures the DXi4000 with the settings you selected.

4 Click **Yes** to continue with downloading the OST Plug-in.

Figure 27 OST Wizard: Confirm

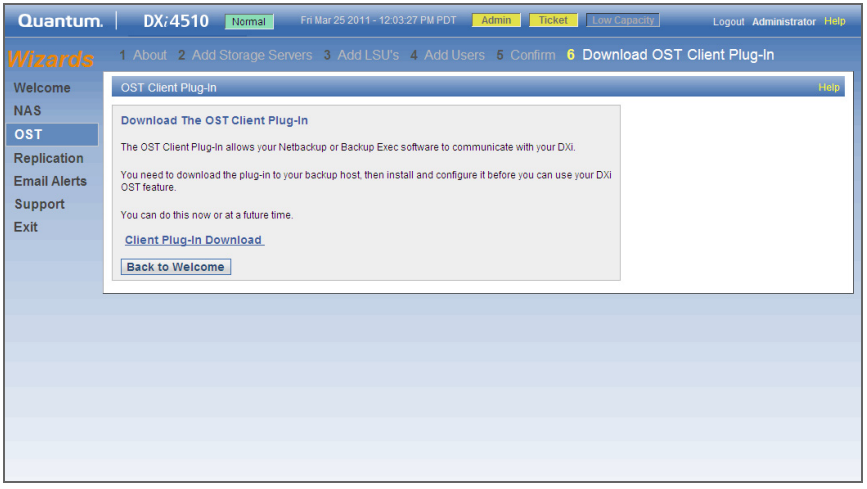


Step 6: Download OST Client Plug-In

To download the OST Plug-in, click **Client Plug-in Download** (see Figure 28). On the download page, download the correct OST Plug-in for your backup application and operating system.

Also on the download page, click **Installation Instructions**, to download the *OST Plug-in Installation Instructions*. Follow the instructions to install the OST Plug-in on your media server.

Figure 28 OST Wizard: Download OST Client Plug-in



Replication Wizard

The **Replication** wizard provides guided assistance for configuring the DXi4000 to send replicated data to another DXi system as part of disaster recovery plan. The wizard can also help you configure the DXi4000 to receive replicated data from another DXi system.

Sources *send* replicated data, and targets *receive* replicated data. A target system can receive data from up to 10 sources. However, a source system can send data to only a single target. Finally, one system can act as both a source and a target.

Note: For more information about working with data replication, see DXi4000 Replication on page 81.

Note: Use the **Replication** wizard (or the **Configuration > Replication** page) to configure other DXi systems that this DXi4000 is configured to send replicated data to or receive replicated data from. You should configure a target system before configuring source systems.

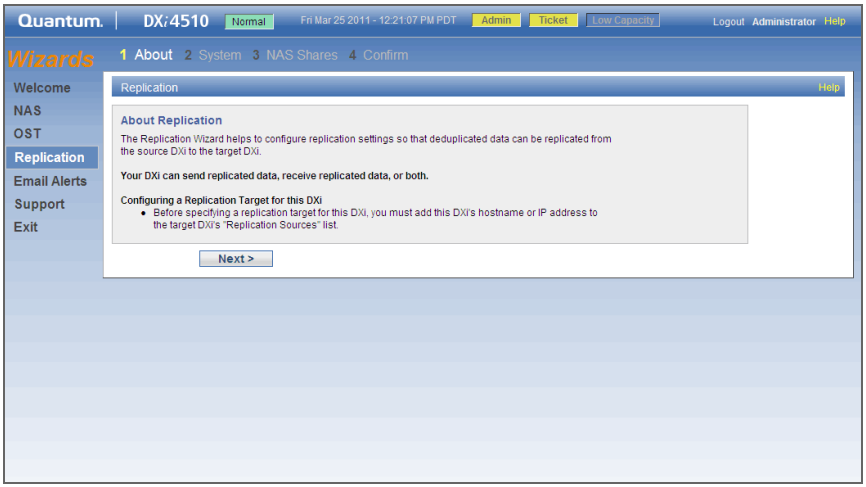
To begin the **Replication** wizard, on the **Wizards** menu, click **Replication**.

Step 1: About

1. Read the information about the wizard (see Figure 29).
2. Click **Next** to continue.

Note: At any time while using the wizard, you can click **Previous** to return to the previous step.

Figure 29 Replication Wizard: About



Step 2: System

1 If data on this DXi4000 will be replicated to another DXi system, enter the following information under **Target DXi** (see Figure 30):

a In the **Target Hostname or IP Address** box, enter the hostname or IP address of the system that will receive the replicated data.

Note: When entering IP addresses, never use an address that is in a reserved IP address range. To see a list of reserved IP address ranges, click the quick tip icon **[?]** located near the IP address field.

Note: To use hostname format, you must specify at least one DNS IP address on the **Network** page (see Network on page 176).

b (Optional) Clear the **Encrypt data before replication** check box to disable encryption when sending the snapshot to the destination.

Note: Encryption is enabled by default. However, for best performance, if your data network is already secured, you should clear the **Encrypt data before replication** check box.

2 If data on other DXi systems will be replicated to this DXi4000, enter the following information under **Source DXis**:

   a In the **Source Hostnames or IP Addresses** box, enter the hostname or IP address of the system that will send the replicated data to the DXi4000.

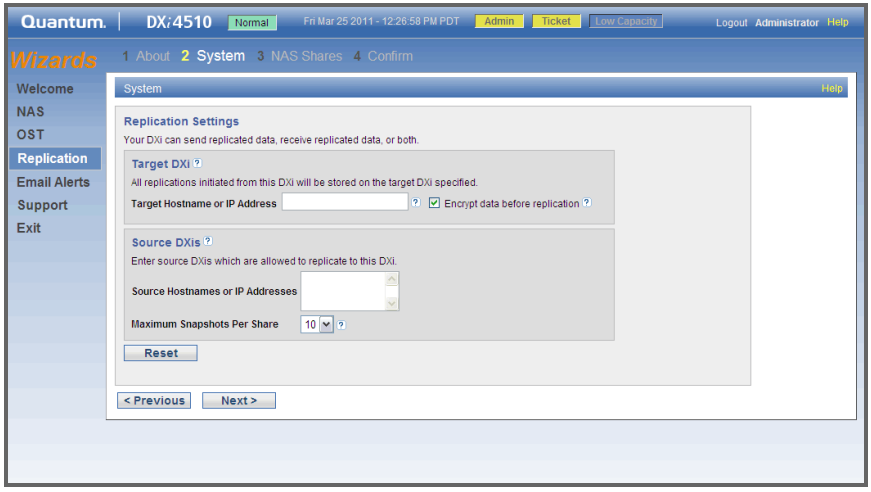
   To enter multiple sources, press **<Enter>** after each entry. You can specify up to 10 replication sources.

   b In the **Maximum Snapshots Per Share** drop-down box, select the number of snapshots to retain for each replicated share (up to 24).

   During scheduled or manual data replication, the DXi4000 receives a snapshot from the source system. A snapshot contains all of the data necessary to fully recover or failback a NAS share to the point in time when the snapshot was saved.

3 Click **Next** to continue.

Figure 30 Replication Wizard: System



Step 3: NAS Shares

1 Select a NAS share in the **Replication Settings for NAS Shares** section to manage its replication settings (see Figure 31).

Note: For help adding NAS shares to the system, use the **NAS** Configuration Wizard (see NAS Wizard on page 44).

2 To configure the share to replicate its data to another DXi system, enter the following information under **Send**:

   a Select the **Enable replication for selected share** check box to enable replication for the share.

   b (Recommended) Select the **Enable scheduled replication** check box to enable scheduled replication for the share.

   Caution: A saved snapshot is necessary to recover your data at a later time. For this reason, it is not enough to simply enable replication for a share. You must also configure a replication schedule (recommended) or perform manual replication on a regular basis to send snapshots of the share to the target system.

   c If you enabled scheduled replication, select a schedule option and specify the replication frequency:

   - **Daily at** - Specify the time to replicate the share every day.
   - **Every** - Specify the hourly interval at which to replicate the share and the starting time.

   d (Optional) Select the **Enable Directory/File based replication to target** check box to enable Directory/File Based Replication for the share, and then enter a **Sync ID** in the box.

   With Directory/File Based Replication, a file is automatically replicated when it is closed or a period of time after it is modified. After replication, the replicated files are immediately available on the target system.

   The Sync ID is used to identify the target share that will receive replicated data from the source share. The Sync ID *must* be identical to the Sync ID of the target share on the target system.

3 To configure the share to receive replicated data from another DXi system, enter the following information under **Receive**:

   a (Optional) Select the **Enable Directory/File based replication to this DXi** check box to enable Directory/File Based Replication for the share, and then enter a **Sync ID** in the box.

The Sync ID is used to identify the source share that will send replicated data to the target share. The Sync ID *must* be identical to the Sync ID of the source share on the source system.

b If you enabled Directory/File Based Replication, select an **Access** option:

- **Locked** - The share is not allowed to receive new Directory/File Based Replication data.
- **Unlocked** - The share is allowed to receive new Directory/File Based Replication data.

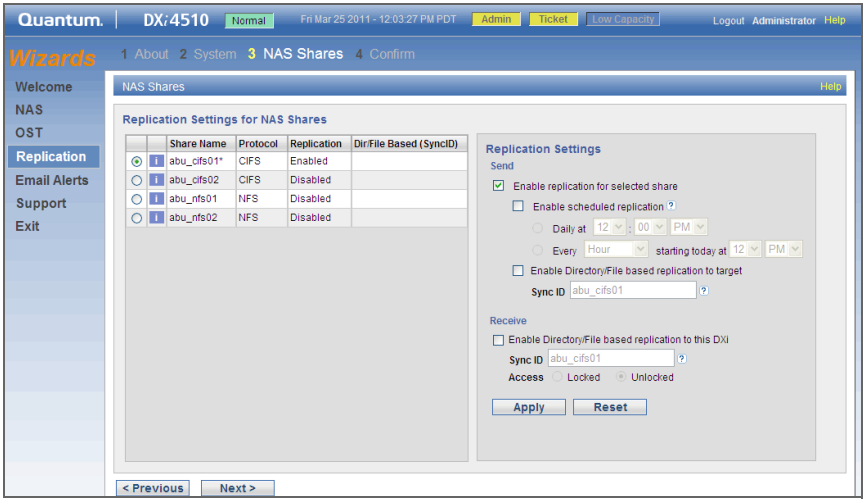
Note: You cannot configure a share to both send and receive Directory/File Based Replication data.

4 Click **Apply**.

5 (Optional) To configure additional shares for replication, repeat Steps 1–4.

6 Click **Next** to continue.

Figure 31 Replication Wizard: NAS Shares



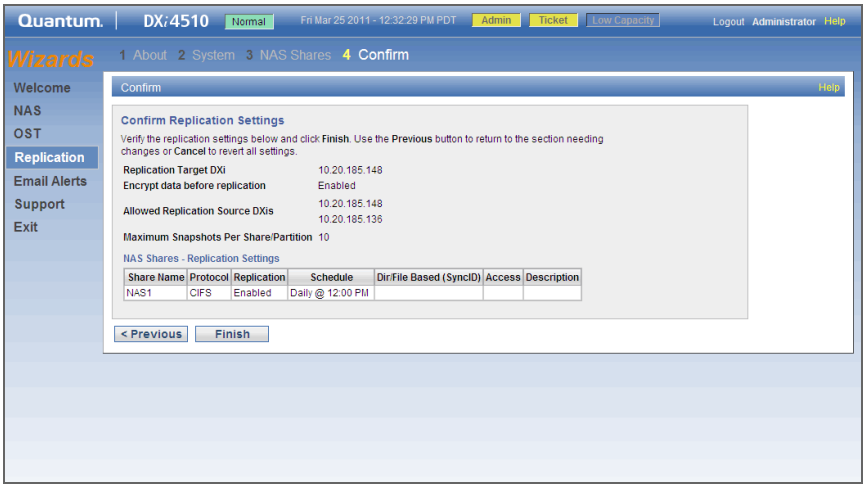
Step 4: Confirm

1 Review the settings you selected to make sure they are correct. If necessary, click **Previous** to return to a previous step to make

changes (see Figure 32).

2 After you have confirmed all settings, click **Finish**. The wizard configures the DXi4000 with the settings you selected.

Figure 32 Replication Wizard: Confirm



Email Alerts Wizard

The **Email Alerts** wizard provides guided assistance for configuring the DXi4000 to automatically send notifications and reports to selected recipients. The wizard helps you configure an outgoing e-mail server. Then the wizard guides you through the process of specifying e-mail recipients and selecting the notifications and reports to send to the recipients.

Note: For more information about sending e-mail alerts, see Email on page 200.

To begin the **Email Alerts** wizard, on the **Wizards** menu, click **Email Alerts**.

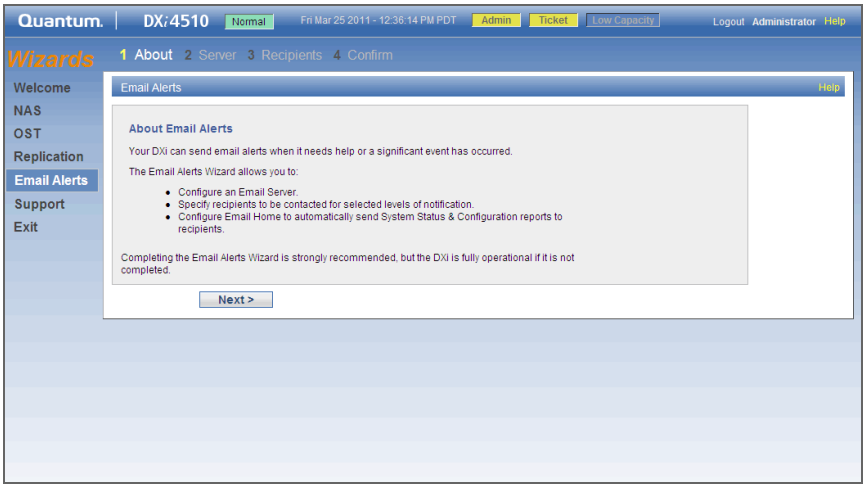
Step 1: About

1 Read the information about the wizard (see Figure 33).

2 Click **Next** to continue.

Note: At any time while using the wizard, you can click **Previous** to return to the previous step.

Figure 33 Email Alerts Wizard: About



Step 2: Server

1 In the **Hostname or IP Address** box, enter the hostname or IP address of the outgoing e-mail server (see Figure 34).

Note: When entering IP addresses, never use an address that is in a reserved IP address range. To see a list of reserved IP address ranges, click the quick tip icon **[?]** located near the IP address field.

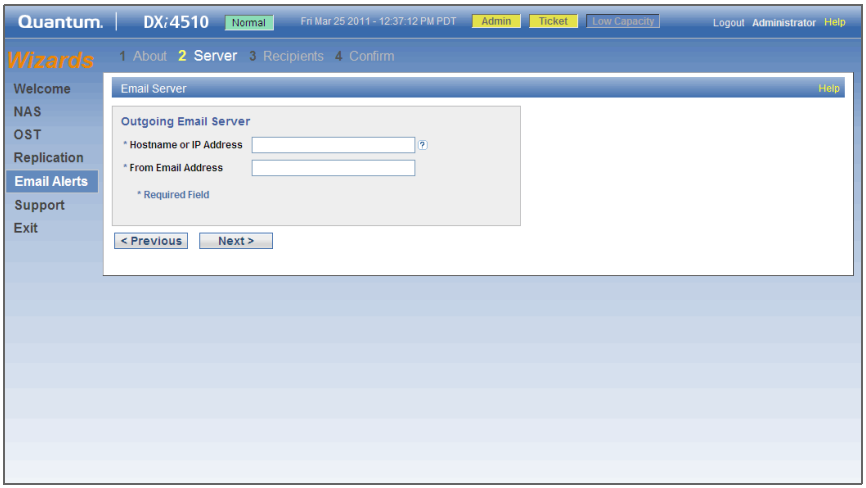
Note: To use hostname format, you must specify at least one DNS IP address on the **Network** page (see Network on page 176).

2 In the **From Email Address** box, enter the return e-mail address displayed in e-mails sent by the DXi4000.

Specify a return address that lets you easily identify the system that generated the e-mail (for example, `systemname@any-domain.com`). The return address must contain an @ symbol and a valid domain name, including a period.

3 Click **Next** to continue.

Figure 34 Email Alerts Wizard: Server



Step 3: Recipients

1 Under **Add Email Recipient**, enter information about the recipient (see Figure 35):

- **Name** - The name of the recipient.
- **Email Address** - The e-mail address of the recipient.
- **Notification Type** - Select the types of notifications to send to the recipient:
  - **High** - Send e-mail notifications for High service tickets.

    High service tickets indicate that a critical problem has occurred and needs to be resolved immediately. The operation and performance of the DXi4000 are degraded, and there is a risk of system failure or data loss.
  - **High and Medium** - Send e-mail notifications for High and Medium service tickets.

Medium service tickets indicate that a serious problem occurred and needs to be resolved, but it does not necessarily need to be fixed immediately. The operation and performance of the DXi4000 may be degraded.

- **All** - Send e-mail notifications for High, Middle, and Low service tickets, as well as any administration alerts.

  Low service tickets indicate that a minor problem occurred and needs to be resolved, but the operation and performance of the DXi4000 are not significantly affected.

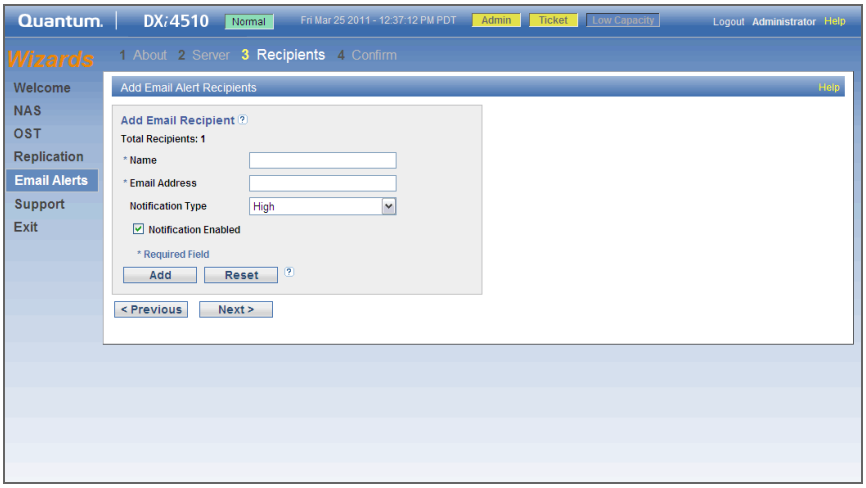
2 Select the **Notification Enabled** check box to enable sending of notifications to the recipient.

3 Click **Add**.

4 (Optional) To add additional recipients, repeat Steps 1–3

5 Click **Next** to continue.

Figure 35 Email Alerts Wizard: Recipients



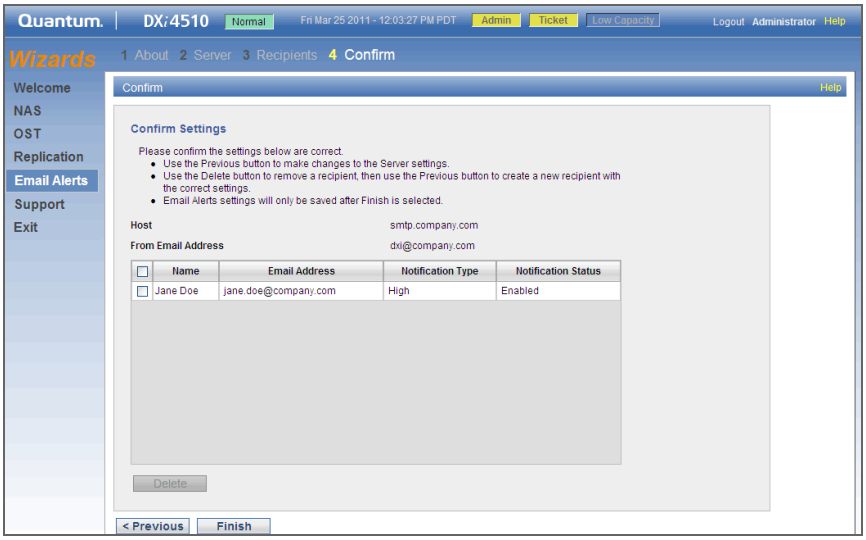
Step 4: Confirm

1 Review the settings you selected to make sure they are correct. If necessary, click **Previous** to return to a previous step to make changes (see Figure 36).

2 To make changes to an e-mail recipient you added, first select the recipient and click **Delete** to delete the recipient. Then click **Previous** to return to the previous step and add a new recipient.

3 After you have confirmed all settings, click **Finish**. The wizard configures the DXi4000 with the settings you selected.

Figure 36 Email Alerts Wizard: Confirm



Support Wizard

The **Support** wizard provides guided assistance to help you enable licensed features on the DXi4000 and register your system with Quantum. The wizard also guides you through other tasks that will aid Quantum customer support in assisting you, such as downloading StorageCare Guardian and creating a system log.

To begin the **Support** wizard, on the **Wizards** menu, click **Support**.

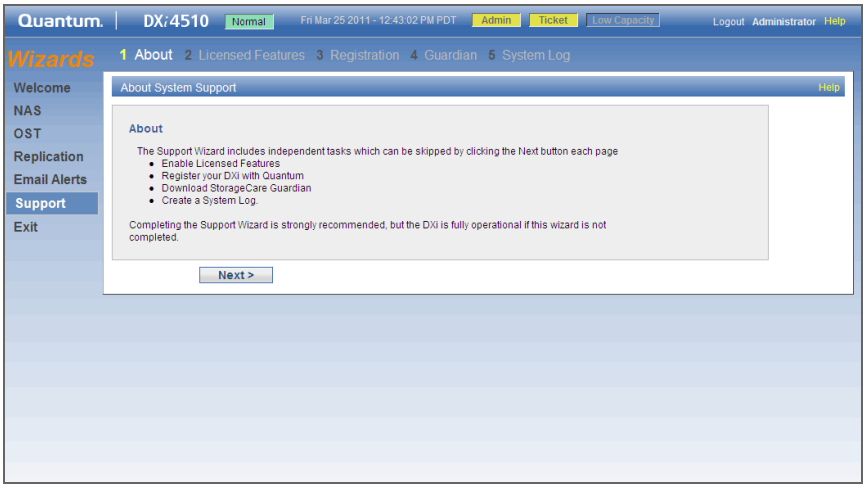
Step 1: About

1 Read the information about the wizard (see Figure 37).

2 Click **Next** to continue.

Note: At any time while using the wizard, you can click **Previous** to return to the previous step.

Figure 37 Support Wizard: About



Step 2: Licensed Features

Add a license key to enable new functionality on the DXi4000. To install a license key, you must first obtain a License Certificate containing an authorization code.

Contact your Quantum sales representative to purchase a license. After you purchase the license, you will receive a License Certificate containing an authorization code.

Note: Some licenses are pre-installed on the DXi4000. For more information about licensed features, see License Keys on page 239.

1 Select the DXi system serial number (displayed under **Enable Licensed Features**) and press **<Ctrl+C>** to copy it (see Figure 38).

2 Click the link for Quantum's License Key Management site.

The **License Key Management** page displays.

3 Click to place the cursor in the **Serial Number** box and press **<Ctrl+V>** to paste the DXi system serial number.

4 Click **Submit**.

The **Licensed Feature** page displays.

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

The **Licensed Feature** page returns a license key. Select the license key and press **<Ctrl+C>** to copy it. You should also print out or write down the license key, or save it to a text file, for future use.

6 Switch back to the **Support** wizard.

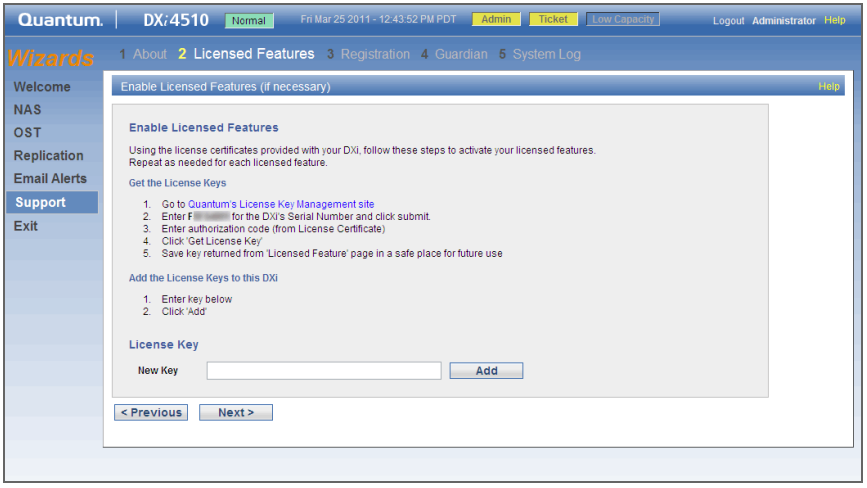
7 Click to place the cursor in the first available **New Key** box and press **<Ctrl+V>** to paste the license key.

8 Click **Add**.

9 (Optional) To add additional license keys, repeat Steps 1–8.

10 Click **Next** to continue.

Figure 38 Support Wizard: Licensed Features



Step 3: Registration

You must register your DXi4000 to receive service and support from Quantum.

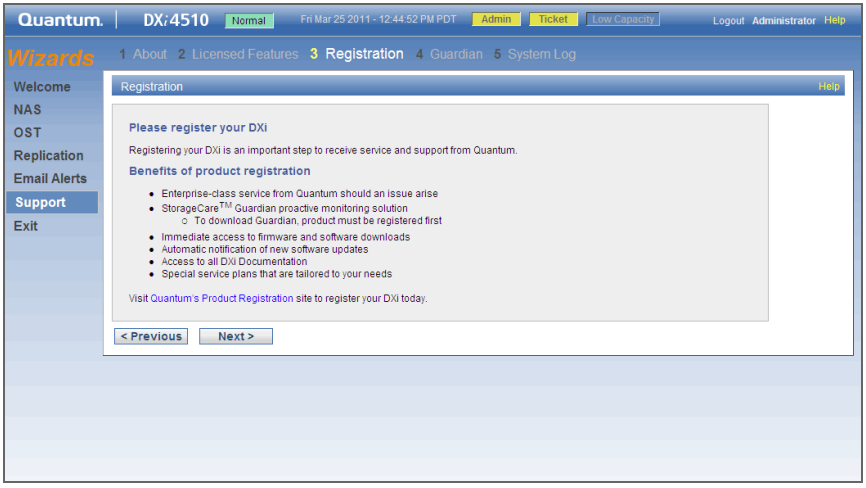
1 Click the link for Quantum's Product Registration site (see Figure 39).

2 Follow the onscreen instructions to register your system.

3 When you are finished, switch back to the **Support** wizard.

4 Click **Next** to continue.

Figure 39 Support Wizard: Registration



Step 4: Guardian

StorageCare Guardian is a remote monitoring and diagnostic solution that enables Quantum to monitor the health of Quantum systems over the Internet and use the intelligent diagnostics data to remotely service the equipment if issues arise.

StorageCare Guardian delivers more reliable backups and faster resolution time for customers at no additional cost for supported products under warranty or service contract.

1 Click the link to learn more about the features and benefits of StorageCare Guardian (see Figure 40).

2 Click the link to download StorageCare Guardian, and then install it on a workstation with outgoing Internet access.

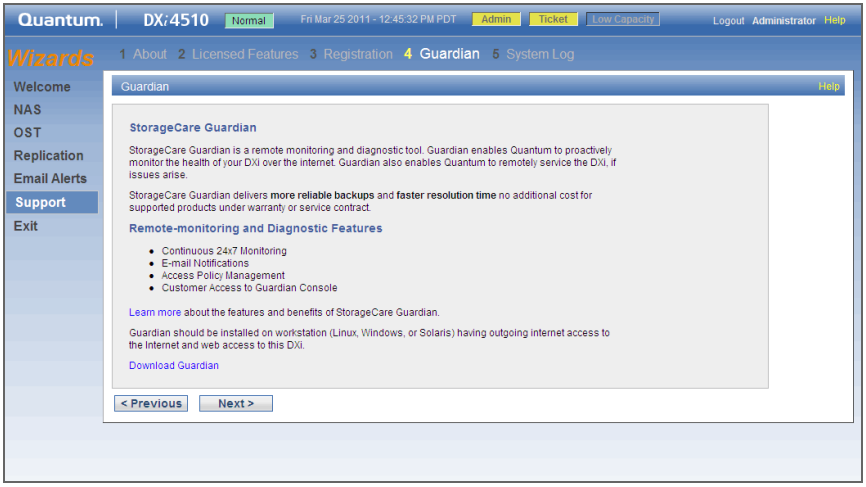
For more information, see the *StorageCare Guardian Installation Guide*. You can download a copy of the *Installation Guide* by

clicking the link under **Documentation** on the StorageCare Guardian download page.

3 When you are finished, switch back to the **Support** wizard.

4 Click **Next** to continue.

Figure 40 Support Wizard: Guardian



Step 5: System Log

This system diagnostics file contains the diagnostic logs for all of the system components. The diagnostic files are helpful when troubleshooting problems on the DXi4000. You should generate a system diagnostic file after setting up your DXi4000 and save it for future reference.

1 Click **Generate New** to generate a new system diagnostics file (see Figure 41).

The system generates a new diagnostics file. This can take several minutes.

2 After the file finishes generating, refresh the Web browser to enable the **Download Current** button.

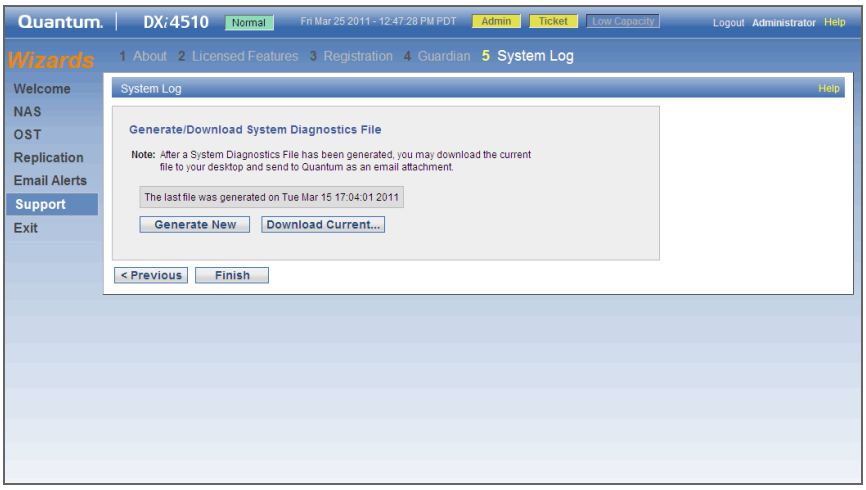
3 To download the generated diagnostics file, click **Download Current**.

A dialog box displays asking if you want to open or save the file.

4 Click **Save** or **OK** to download the file.

5 Click **Finish** to complete the **Support** wizard.

Figure 41 Support Wizard: System Log



Chapter 5
DXi4000 Home Page

The first page that displays after you log on to the DXi4000 remote management console is the **Home** page (see Figure 42). Use the **Home** page to see important performance information at a glance, including disk usage, data reduction statistics, and replication activity.

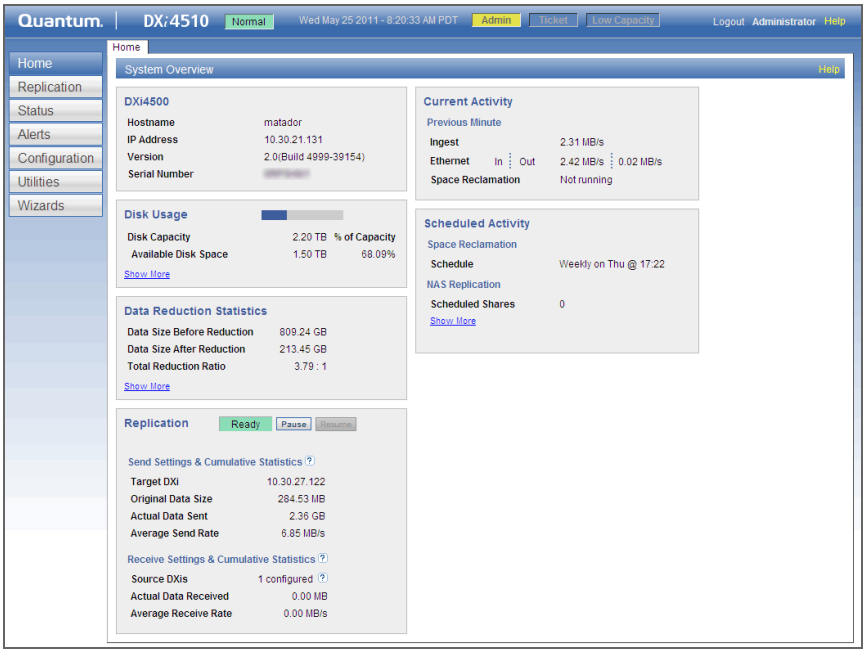
To return to the **Home** page at any time, click **Home** on the main menu.

The **Home** page contains the following overviews:

- DXi4000 System Overview
- Disk Usage Overview
- Data Reduction Statistics Overview
- Replication Overview
- Current Activity Overview
- Scheduled Activity Overview

Note: Disk usage statistics, data reduction statistics, replication statistics, and current and scheduled activity are updated every 30 seconds.

Figure 42 Home Page

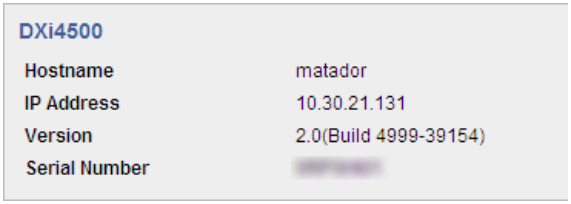


DXi4000 System Overview

The **DXi4000 System Overview** on the **Home** page (see Figure 43) displays the following information about the system:

- **Hostname** - The hostname of the DXi4000. Click to change the hostname (see Network on page 176).
- **IP Address** - The IP address of the DXi4000. Click to change the IP address (see Network on page 176).
- **Version** - The software version installed on the DXi4000. (To update the software, see Software Upgrade on page 243.)
- **Serial Number** - The serial number of the DXi4000. (You need to know the serial number to add a licensed feature. For more information, see License Keys on page 239.)

Figure 43 DXi4000 System Overview



Disk Usage Overview

The **Disk Usage** overview on the **Home** page (see Figure 44) displays the following information about disk usage on the system:

Note: Values are displayed as an amount and as a percentage of the total capacity in the system.

Note: Click an item to view detailed statistics for disk usage (see Disk Usage on page 125).

- **Disk Capacity** - The total usable disk capacity of the DXi4000.

  Note: (DXi4601 only) Click the **Quick Tip** icon [?] to see information about on demand storage capacity upgrades. For more information about upgrading storage capacity of the DXi4601, see License Keys on page 239.

- **Available Disk Space** - The disk space available for data storage (free space).

  On the disk space meter, blue (left side of meter) indicates used disk space and gray (right side of meter) indicates available disk space. The left side of the meter changes color based on the amount of remaining free disk space and the state of the DXi4000:

  - 550GB free space - (Yellow) I/O Write Low Threshold state
  - 250GB free space - (Red) Stop Write state
  - 10GB free space - (Red) Stop I/O state

Note: When disk space is low, click the **Quick Warning** icon **[!]** next to the space meter to see more information.

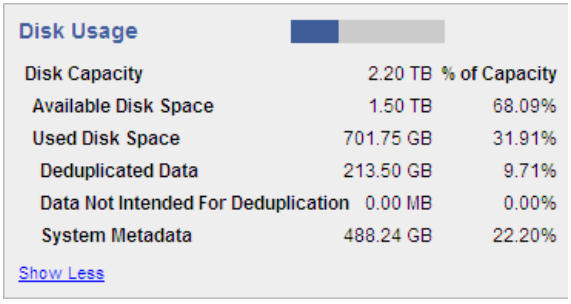
Note: When disk capacity is low, target replication to the system is paused (see Replication Service on page 110). In addition, space reclamation is automatically started to free up disk space (see Space Reclamation on page 235).

Click **Show More** to display additional information:

- **Used Disk Space** - The disk space that already holds data, including deduplicated data, system metadata, and data not intended for deduplication.
- **Deduplicated Data** - The amount of data that has been deduplicated.
- **Data Not Intended for Deduplication** - The amount of data on shares that do not have deduplication enabled.
- **System Metadata** - The amount of disk space used for internal operations of the DXi, including system configuration files as well as temporary files created during replication, space reclamation, and healthchecks.

Note: Used disk space includes data that is eligible for space reclamation. Because of this, it may appear that your system is using more disk space than you expected. Space is only reclaimed as needed to allow for optimal performance in the event you need to restore your data.

Figure 44 Disk Usage Overview



Data Reduction Statistics Overview

The **Data Reduction Statistics** overview on the **Home** page (see Figure 45) displays the following information about the results of data reduction:

Note: Click an item to view detailed statistics for disk usage (see Disk Usage on page 125).

- **Data Size Before Reduction** - The original, native size of all data that has been processed by the data deduplication and compression engines.
- **Data Size After Reduction** - The final, reduced size of all data that has been processed by the data deduplication and compression engines.
- **Total Reduction Ratio** - The total reduction ratio of all data that has been processed by the data deduplication and compression engines (**Data Size Before Reduction** divided by **Data Size After Reduction**).

Click **Show More** to display additional information:

- **Deduplication Ratio** - The deduplication ratio of all data that has been processed by the data deduplication engine.
- **Compression Ratio** - The compression ratio of all data that has been processed by the compression engine.

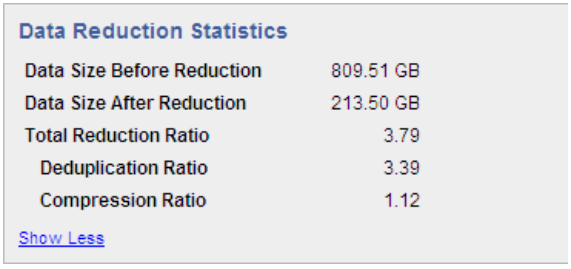


Figure 45 Data Reduction Statistics Overview

Replication Overview

The **Replication** overview on the **Home** page (see Figure 46) displays the following information about target and source replication activity:

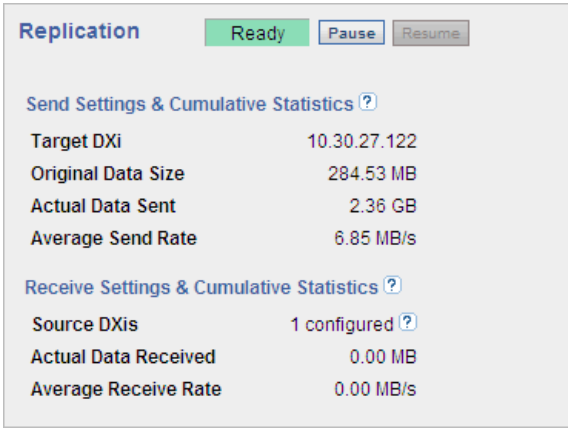
- **Status** - The replication status of the DXi4000.
  - **Ready** - (Green) The system is ready to perform replication.
  - **In Progress** - (Blue) A replication job is currently in progress.
  - **Queued** - (Blue) A replication job is queued and will continue when the system is ready.
  - **Waiting** - (Blue) A replication job is waiting for another replication job to complete before beginning.
  - **Partial** - (Yellow) A replication job was partially completed. Generate a replication report to see the files that were not replicated (see Reports on page 112).
  - **Manually Paused** - (Yellow) Replication was manually paused. To resume replication, click **Resume**.
  - **System Paused** - (Yellow) The system has automatically paused replication due to a problem, for example, low disk space or a problem on the target system.

    To see more information about the problem that occurred, click **Admin** at the top of the remote management console to view administration alerts (see Admin Alerts on page 127). You may also need to view alerts on the target DXi.
  - **Failed** - (Red) A replication job was not completed.
  - **Internal Error** - (Red) An error occurred during replication.
- **Pause** - Click to pause replication activity.
- **Resume** - Click to resume replication activity.
- **Send Settings & Cumulative Statistics** - Statistics for all data sent from the system since system installation or since **Send** cumulative replication statistics were last cleared by clicking **Clear Send** on the **Replication Actions** page (see Replication Performance on page 111).

- **Target DXi** - The hostname or IP address of the target system that the DXi4000 is configured to replicate data to. Click to specify a replication target (see Replication Send on page 155).
- **Original Data Size** - The original, native size of data sent during replication or failback. This value does not represent the amount of data actually sent over the network during replication or failback because data is deduplicated and compressed before being sent.
- **Actual Data Sent** - The amount of data actually sent over the network during replication or failback. This value is usually much less than the **Original Data Size** due to the benefits of data deduplication and compression.
- **Average Send Rate** - The average send rate (in MB/s) of data sent over the network during replication or failback (**Actual Data Sent** divided by the amount of time required to complete replication or failback).

- **Receive Settings & Cumulative Statistics** - Statistics for all data received by the system from all sources since system installation or since **Receive** cumulative replication statistics were last cleared by clicking **Clear Receive** on the **Replication Actions** page (see Replication Performance on page 111).
  - **Source DXis** - The number of source systems configured to replicate data to the DXi4000. Click to specify replication sources (see Replication Receive on page 157).
  - **Actual Data Received** - The amount of data actually received over the network during replication or failback. Click to view detailed statistics for replication (see Replication Receive on page 157).
  - **Average Receive Rate** - The average receive rate (in MB/s) of data received over the network during replication or failback (**Actual Data Received** divided by the amount of time required to complete replication or failback). Click to view detailed statistics for replication (see Replication Receive on page 157).

Figure 46 Replication Overview



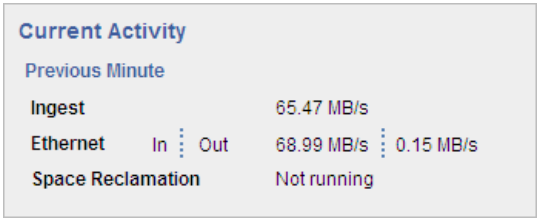
Current Activity Overview

The **Current Activity** overview on the **Home** page (see Figure 47) displays the following information about system activity that occurred in the previous minute:

- **Inline** - The inline data flow throughput (in MB/s). Inline data flow includes deduplicated and non-deduplicated backup data as well as received replication data. Click to view detailed statistics for inline performance (see Inline on page 120).
- **Ethernet** - The amount of data received (**In**) and sent (**Out**) by all Ethernet ports (in MB/s). Click to view details statistics for Ethernet performance (see Ethernet on page 121).
- **Space Reclamation** - The status of space reclamation (**Not running** or **Percent complete**). Click to start or stop space reclamation (see Space Reclamation on page 235).

Note: For more detailed information about all system activity, see DXi4000 Status on page 113.

Figure 47 Current Activity Overview



Scheduled Activity Overview

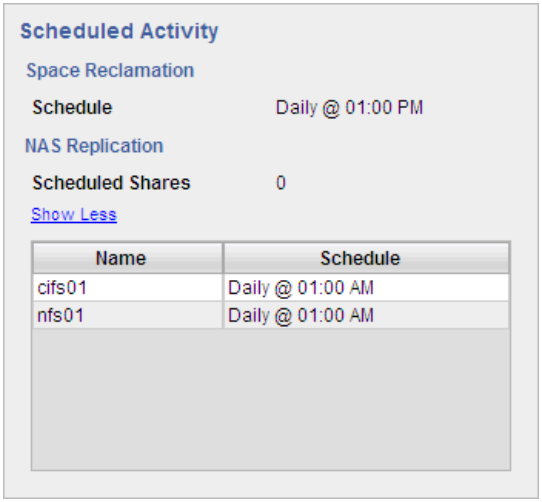
The **Scheduled Activity** overview on the **Home** page (see Figure 48) displays the following information about scheduled system activity:

- **Space Reclamation Schedule** - The schedule for space reclamation activity. Click to configure a space reclamation schedule (see Schedule on page 237).
- **NAS Replication** - NAS shares scheduled for replication.
  - **Scheduled Shares** - The number of shares scheduled for replication. Click to configure a share for scheduled replication (see Configuring a Replication Schedule For a Share on page 93).

  Click **Show More** to display additional information:

  - **Name** - The name of the NAS share scheduled for replication.
  - **Schedule** - The schedule for replication of the NAS share.

Figure 48 Scheduled Activity Overview



Chapter 6

DXi4000 Replication

The DXi4000 provides data replication capabilities that you can use as an integral part of a disaster recovery plan. Replication allows you to configure the DXi4000 to create a copy of your data on another DXi system at scheduled intervals (or manually as needed).

In the event of a disaster in which the original data is lost, you can quickly recover the replicated data on the remote system, allowing your business to resume normal operations. Once the original system is available again, you can restore all data back to its original location.

Note: Quantum recommends that you configure and start replication before storing large amounts of data on the DXi4000.

See the following sections for more information about the data replication capabilities of the DXi4000:

- Understanding Data Replication
- Performing Data Replication

Understanding Data Replication

During data replication, data is sent from one system (the source) to another system, usually in another location (the target). For example, you might replicate data from a branch office (the source) to a central office (the target).

Sources *send* replicated data, and targets *receive* replicated data. A target system can receive data from up to 10 sources. However, a source system can send data to only a single target. Finally, one system can act as both a source and a target.

Replication works only with deduplicated data, and data is compressed before it is replicated. Because of this, the amount of data transmitted between systems during replication is greatly reduced compared to the original amount of data stored. In addition, a data block is transmitted only if the target does not already have a copy of the block. Finally, data can optionally be encrypted before it is transmitted.

The DXi4000 can perform the following types of replication:

- Replication
- Directory/File Based Replication
- OST Optimized Duplication

Replication

Replication occurs when replication is enabled for a deduplicated NAS share and a replication schedule is configured (or manual replication is performed on a regular basis). For replication to occur, the source system must be configured to point to the target system. Similarly, the target system must be configured to accept data from the source system.

To optimize the replication process, deduplicated data is continuously sent in the background from the source system to the target system. However, a snapshot that preserves the file structure of your data is sent to the target system only when a scheduled or manual replication job occurs. A snapshot contains all of the information that is necessary to recreate a share just as it was at the point in time when the snapshot was created.

Caution: A saved snapshot is necessary to recover your data at a later time. For this reason, it is not enough to simply enable replication for a share. You must also configure a replication schedule (recommended) or perform manual replication on a regular basis to send snapshots of the share to the target system.

If the source system ever becomes unavailable, you can recover the share on the target system using a saved snapshot. After you recover a share, it is recreated on the target system and is available for use. Once the source system becomes available again, you can perform a failback operation to restore the share to its original location.

Directory/File Based Replication

Like replication, Directory/File Based Replication sends data from a NAS share to another system where it can be accessed. However, Directory/File Based Replication differs in a number of important ways:

- Both replication and Directory/File Based Replication must be enabled for the share.
- A unique Sync ID is used to associate the replicated share on the source system with the share that will receive the replicated data on the target system.
- You do not need to schedule or manually perform Directory/File Based Replication through the remote management console. Instead, replication is triggered when a file is closed or a period of time after it is modified (NAS shares).

  Note: For CIFS shares, a file is replicated immediately after it is closed. For NFS shares, a file is replicated after it has been idle (not accessed) for several minutes.

- After directories and files are replicated using Directory/File Based Replication, they are automatically recovered on the target system and are immediately available for use. There is no need to first recover the share to access its data.
- You must manually initiate a synchronization from the source system on a regular basis. Synchronizing ensures that the contents of the source share are exactly the same as the target share by propagating deletions from the source system to the target system.

OST Optimized Duplication

The DXi4000 can duplicate the data on an LSU (logical storage unit) to another location using the OST optimized duplication (OST replication) feature supported by Symantec NetBackup and Backup Exec.

For information about configuring and using OST optimized duplication, see the *Symantec NetBackup OST Configuration Guide* and the *Symantec Backup Exec OST Configuration Guide*.

Performing Data Replication

The **Replication** page allows you to set up replication for NAS shares and to replicate and recover data.

To access the **Replication** page, click the **Replication** menu.

The **Replication** page contains the following tabs:

- Send NAS
- Receive NAS
- Actions
- Reports

Use the DXi4000 data replication features to perform the following tasks:

- Replicate all data on a share to another system where it can be recovered at a later time (see Task Overview: Setting Up and Performing Replication on page 85).
- Automatically replicate directories and files to another system where they are immediately available (see Task Overview: Setting Up and Performing Directory/File Based Replication on page 86).
- Recover data from a lost or damaged share (see Task Overview: Recovering a Replicated Share on page 87).
- Restore a lost or damaged share back to its original location (see Task Overview: Performing a Share Failback on page 87).

Note: The **Replication** wizard provides guided assistance for configuring data replication (see DXi4000 Configuration Wizards on page 43).

Task Overview: Setting Up and Performing Replication

To replicate all data on a NAS share from a source system to a target system:

1. On the target system, add the source system to the list of allowed replication sources (see Replication Receive on page 157).
2. On the source system, specify the target system that will receive replicated data (see Replication Send on page 155).
3. On the source system, create a new share with deduplication enabled (see Adding a NAS Share on page 140).
4. Enable replication for the new share (see Enabling Replication For a Share on page 91).
5. Before writing any data to the new share, replicate the new share (see Replicating a Share on page 94).

   Quantum recommends that you always replicate a new share immediately after creating it. This establishes the initial data structure on the target system and greatly increases the speed of the first replication.
6. Choose one of the following methods to regularly replicate the new share:
   - (Recommended) Set up a schedule for performing replication automatically after backups complete (see Configuring a Replication Schedule For a Share on page 93).
   - Manually perform replication at frequent intervals (see Replicating a Share on page 94).

After replication, a snapshot is sent to the target system. You can use the snapshot to recover the replicated share on the target system (see Task Overview: Recovering a Replicated Share on page 87) or restore the share to its original location on the source system (see Task Overview: Performing a Share Failback on page 87).

Caution: If you do not configure a replication schedule or manually replicate the share on a regular basis, your data is *not* protected. While the DXi4000 continually sends data to the target system in the background to optimize the replication process, a snapshot that preserves the complete structure of your data is sent to the target system *only* when a scheduled or manual replication job occurs. If you do not regularly and frequently replicate your data as described in Step 6 above, it cannot be restored at a later time.

Task Overview: Setting Up and Performing Directory/File Based Replication

To automatically replicate directories and files from a source system and immediately recover them for use on a target system:

1. Perform the following steps on the target system:
   a. Add the source system to the list of allowed replication sources (see Replication Receive on page 157).
   b. Create a new share with deduplication enabled (see Adding a NAS Share on page 140).
   c. Enable Directory/File Based Replication for the new share and specify the Sync ID (see Configuring a Target Share for Directory/File Based Replication on page 107).
2. Perform the following steps on the source system:
   a. Specify the target system that will receive replicated data (see Replication Send on page 155).
   b. Create a new share with deduplication enabled (see Adding a NAS Share on page 140).
   c. Enable Directory/File Based Replication for the new share and specify the Sync ID (see Configuring a Source Share for Directory/File Based Replication on page 93).

A file is automatically replicated when it is closed or a period of time after it is modified. After replication, the replicated directories and files are immediately available on the target system. There is no need to recover the share to make the directories and files available.

Task Overview: Recovering a Replicated Share

If a NAS share is lost or damaged on the source system, you can recover it on the target system using a received snapshot. When you recover a share, it is recreated on the target system just as it was at the point in time when the snapshot was saved.

To recover a replicated share:

1. On the target system, select a received snapshot and perform a recover operation (see Recovering a Share on page 99).

   The share is now available on the target system.

2. (Optional) Map your backup application to the recovered share on the target system to continue making backups.

3. When the source system is operating correctly again, choose one of the following actions:

   - Failback the share to restore it on the original source system (see Task Overview: Performing a Share Failback on page 87). Then, if necessary, map your backup application to the restored share on the original source system.
   - Continue to make backups to the recovered share on the original target system. In addition, set up replication to replicate the share back to the original source system (see Task Overview: Setting Up and Performing Replication on page 85). In this scenario, the original source system is now the target, and the original target system is now the source.

Task Overview: Performing a Share Failback

If a NAS share is lost or damaged on the source system, you can failback the share to the source system using a received snapshot on the target system. When you failback a share, it is restored on the source system just as it was at the point in time when the snapshot was saved.

To perform a share failback:

1. On the original source system, add the original target system to the list of allowed replication sources (see Replication Receive on page 157).

   Note: For the purposes of failback, the original source system is now acting as a target because it will receive the snapshot from the original target system.

2 On the original target system, select a received snapshot and perform a failback operation pointing to the original source system, and then recover the share on the original source system (see Performing a Failback For a Share on page 100).

   The share is now available on the original source system.

3 (Optional) If necessary, map your backup application to the restored share on the original source system.

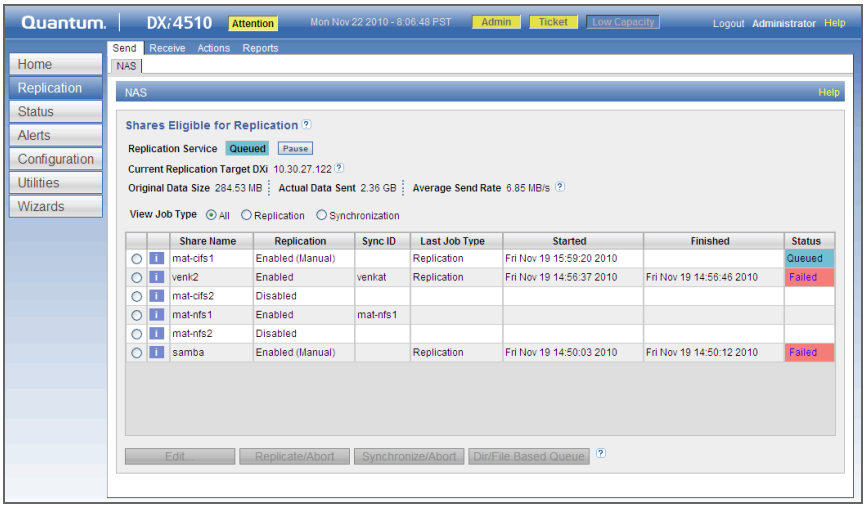
Send NAS

The **Send NAS** page allows you to manage outgoing replication activity for NAS shares. You can replicate shares on the DXi4000 (the source) to another DXi system that supports NAS (the target).

Note: Before you can replicate shares, you must specify the replication target (see Replication Send on page 155).

To access the **Send NAS** page, click the **Replication** menu, and then click the **Send > NAS** tab (see Figure 49).

Figure 49 Send NAS Page



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

- View replication information for shares (see Shares Eligible for Replication on page 89).
- Enable or disable replication for a share (see Enabling Replication For a Share on page 91).
- Schedule replication for a share (see Configuring a Replication Schedule For a Share on page 93).
- Configure Directory/File Based Replication for a share (see Configuring a Source Share for Directory/File Based Replication on page 93).
- Initiate replication for a share (see Replicating a Share on page 94).
- Synchronize a share configured for Directory/File Based Replication (see Synchronizing a Share on page 95).
- View replication statistics for a share configured for Directory/File Based Replication (see Directory/File Based Queue on page 95).

Shares Eligible for Replication

The **Shares Eligible for Replication** section displays replication statistics for all NAS shares on the DXi4000 that are eligible for replication. To be eligible for replication, a share must have data deduplication enabled at the time it is created.

Note: For information about creating NAS shares, see Adding a NAS Share on page 140.

The **Shares Eligible for Replication** section displays the following information:

- **Replication Service** - The replication status of the DXi4000. Click **Pause** to pause replication activity. Click **Resume** to resume replication activity.

  Note: For a detailed description of all possible replication statuses, see Replication Overview on page 76.

- **Current Replication Target DXi** - The hostname or IP address of the target system that the DXi4000 is configured to replicate data to. (To change the target system, see Replication Send on page 155.)

- **Cumulative Statistics** - Statistics for all data sent from the system since system installation or since cumulative replication statistics were last cleared. (To clear cumulative replication statistics, see Replication Performance on page 111.)
  - **Original Data Size** - The original, native size of data sent during replication or failback. This value does not represent the amount of data actually sent over the network during replication or failback because data is deduplicated and compressed before being sent.
  - **Actual Data Sent** - The amount of data actually sent over the network during replication or failback. This value is usually much less than the **Original Data Size** due to the benefits of data deduplication and compression.
  - **Average Send Rate** - The average send rate (in MB/s) of data sent over the network during replication or failback (**Actual Data Sent** divided by the amount of time required to complete replication or failback).
- **View Job Type** - Select an option to filter the list of NAS shares:
  - **All** - Displays all shares.
  - **Replication** - Displays shares with replication jobs.
  - **Synchronization** - Displays shares with synchronization jobs.
- **Share Name** - The name of the share.
- **Replication** - The replication state (**Enabled**, **Disabled**, or scheduled).
- **Sync ID** - The Sync ID of the share if Directory/File Based Replication is enabled.
- **Last Job Type** - The type of the most recent replication job (**Replication** or **Synchronization**).
- **Started** - The time the most recent replication job was started.
- **Finished** - The time the most recent replication job finished.
- **Status** - The status of the most recent replication job (see Replication and Synchronization Status on page 91). Click the status to display detailed information about the most recent replication job.

Note: Click a column heading to sort the rows in the table by that column. Click the column heading again to reverse the sort order.

Note: Click the **Information** button **[i]** next to a share to display detailed information about the share and recent replication activity.

Replication and Synchronization Status

A replication job can have one of the following statuses:

- **In Progress** - The replication job is in progress.
- **Partial** - The replication job was partially completed. Generate a replication report to see the files that were not replicated (see Reports on page 112).
- **Queued** - The replication job is queued and will continue when the system is ready.
- **Waiting** - The replication job is waiting for another job to complete before beginning.
- **Success** - The replication job was completed successfully.
- **Failed** - The replication job was not completed.

A synchronization job can have one of the following statuses:

- **Queued** - The synchronization job is queued and will continue when the system is ready.
- **Success** - The synchronization job was completed successfully.
- **Recovering** - The recover operation is in process.
- **Replicating** - The replication operation is in process.
- **Failed** - The synchronization job was not completed.

Enabling Replication For a Share

Enable replication for a NAS share to allow the share's data to be replicated to another DXi system (the target). Disable replication if you do not want to replicate the share's data to another DXi system.

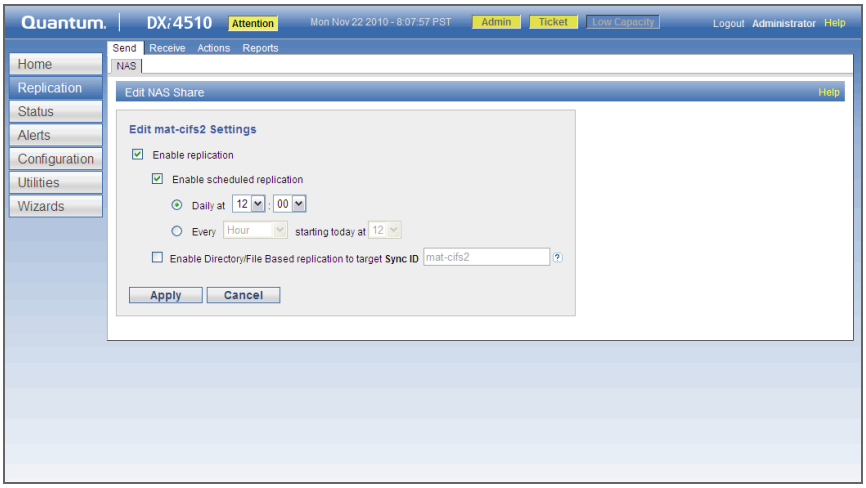
Note: To be eligible for replication, a share must have data deduplication enabled at the time it is created.

To enable or disable replication for a share:

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

The **Edit NAS Share** page displays (see Figure 50).

Figure 50 Edit NAS Share Page



2 Select the **Enable replication** check box to enable replication for the share.

Or clear the **Enable replication** check box to disable replication for the share.

3 Click **Apply**.

Note: Quantum recommends scheduling replication to run after backups are complete (see Configuring a Replication Schedule For a Share on page 93). If you do not enable scheduled replication, replication will only occur if you manually replicate a share (see Replicating a Share on page 94) or if you configure Directory/File Based Replication (see Configuring a Source Share for Directory/File Based Replication on page 93).

Configuring a Replication Schedule For a Share

Configure a replication schedule for a NAS share to automatically replicate the share's data to the target system at regular intervals. Disable scheduled replication if you do not want to automatically replicate the share's data to the target.

To configure a replication schedule for a share:

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

   The **Edit NAS Share** page displays (see Figure 50).

2. If it is not already selected, select the **Enable replication** check box to enable replication for the share.

3. Select the **Enable scheduled replication** check box to enable scheduled replication for the share.

   Or clear the **Enable scheduled replication** check box to disable scheduled replication for the share.

4. Select a schedule option and specify the replication frequency:

   - **Daily at** - Specify the time to replicate the share every day.
   - **Every** - Specify the hourly interval at which to replicate the share and the starting time.

5. Click **Apply**.

Configuring a Source Share for Directory/File Based Replication

Configure a NAS share for Directory/File Based Replication to automatically replicate files to a target system. A file is automatically replicated when it is closed or a period of time after it is modified. After replication, the replicated files are immediately available on the target system. There is no need to recover the share to make the files available. Disable Directory/File Based Replication if you do not want to automatically replicate files.

When you configure a share for Directory/File Based Replication, you specify a Sync ID for the share. The Sync ID associates the share on the source system with the share on the target system that will received the replicated data. As long as you specify a matching Sync ID for both the source and target shares, the shares do not have to have the identical names. However, if you do not specify a Sync ID, the source and target shares must have identical names. Quantum recommends that you assign a matching Sync ID to the source and target shares.

Note: For information about specifying the Sync ID on the target share, see Configuring a Target Share for Directory/File Based Replication on page 107.

To configure a share for Directory/File Based Replication:

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

   The **Edit NAS Share** page displays (see Figure 50).

2. If it is not already selected, select the **Enable replication** check box to enable replication for the share.

3. Select the **Enable Directory/File Based replication to target Sync ID** check box to enable Directory/File Based Replication for the share.

   Or clear the **Enable Directory/File Based replication to target Sync ID** check box to disable Directory/File Based Replication for the share.

4. Enter a **Sync ID** in the box.

   The Sync ID is used to identify the target share that will receive replicated data from the source share. The Sync ID *must* be identical to the Sync ID of the target share on the target system.

5. Click **Apply**.

Note: After you configure a share for Directory/File Based Replication, you should periodically synchronize it to keep it in sync with the target share (see Synchronizing a Share on page 95).

Replicating a Share

Replicate a NAS share to send a snapshot of the share to the target system. A snapshot is required to recover the data on the share at a later time. If you have not configured a replication schedule for a share, replication only occurs when you manually initiate it (see Configuring a Replication Schedule For a Share on page 93).

Note: During replication, files that are in use on a share are skipped.

To replicate a share, select the share and click **Replicate Now**. The status of the replication job displays in the **Status** column.

To cancel the replication job, select the share and click **Abort Replication**.

Synchronizing a Share

Synchronize a NAS share to synchronize the contents of the share with the corresponding share on the target system. To synchronize a share, it must be configured for Directory/File Based Replication (see Configuring a Source Share for Directory/File Based Replication on page 93).

Synchronizing a share ensures that the contents of the source share are the same as the target share. The synchronization verifies that the same files exist in both locations, and that no additional files exist in either location. This is important because, during replication, files that are deleted on the source share are not automatically deleted on the target share. These files are only deleted during synchronization.

Quantum recommends that you periodically perform a synchronization, and also that you also perform a synchronization before scheduled space reclamation.

Note: If replication is paused, always perform a synchronization after replication is resumed again. Any file deletions that occurred while replication was paused will be propagated from the source shares to the targets.

To synchronize a share, select the share and click **Synchronize Now**. The status of the synchronization job displays in the **Status** column.

To cancel the synchronization job, select the share and click **Abort Sync**.

Directory/File Based Queue

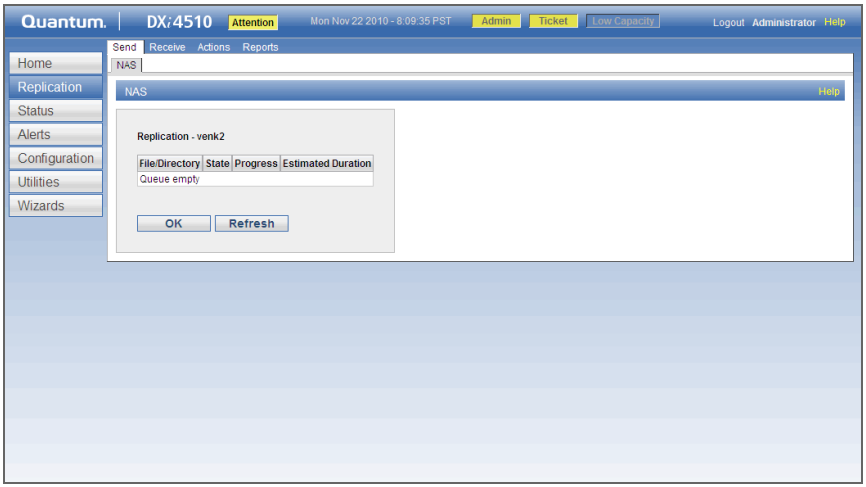
The Directory/File Based Queue displays replication statistics for shares that are configured for Directory/File Based Replication (see Configuring a Source Share for Directory/File Based Replication on page 93).

To view the Directory/File Based Queue:

1. Select a share that is configured for Directory/File Based Replication.
2. Click **Dir/File Based Queue**.

   The Directory/File Based Queue displays (see Figure 51).

Figure 51 Directory/File Based Queue



The Directory/File Based Queue displays the following information for the share:

- **File/Directory** - The file or directory to be replicated.
- **State** - The replication state for the file or directory.
- **Progress** - The percentage complete for replication of the file or directory.
- **Estimated Duration** - The estimated time it will take to complete replication for the file or directory.

Note: The estimated duration may display as **unknown** if replication has been very recently initiated. After the system has enough information to calculate a value, the estimated duration will display.

To update the statistics with the latest information, click **Refresh**.

Note: The contents of the Directory/File Based Queue are dynamic. Because of this, statistics are subject to change if items are added to the queue.

3 To return to the **Send NAS** page, click **OK**.

Receive NAS

The **Receive NAS** page allows you to manage incoming replication activity for NAS shares. You can recover a replicated share on the target system if the source system is unavailable. Once the source system becomes available, you can failback the share to make it available on the source system again.

Note: Before you can receive replicated shares, you must specify one or more replication sources (see Replication Receive on page 157).

To access the **Receive NAS** page, click the **Replication** menu, and then click the **Receive > NAS** tab.

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

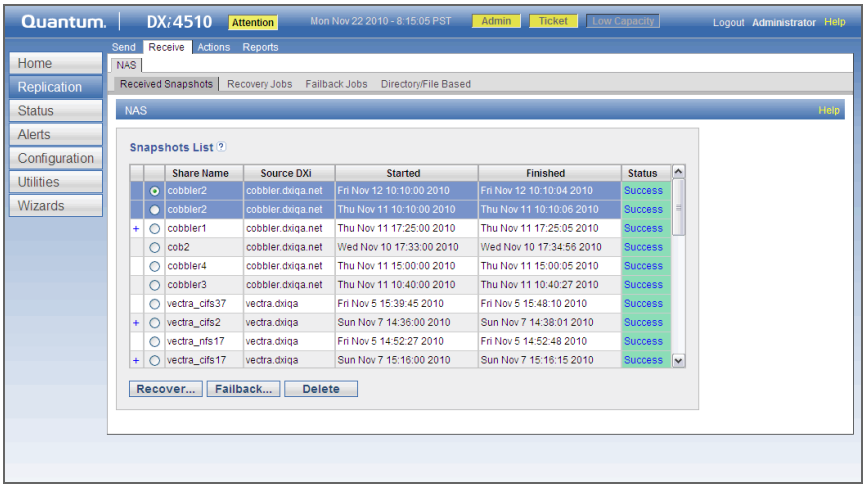
- View received snapshots and recover, failback, or delete snapshots (see Received Snapshots on page 97).
- Manage recovery jobs (see Recovery Jobs on page 103).
- Manage failback jobs (see Failback Jobs on page 104).
- Manage shares configured for Directory/File Based Replication (see Directory/File Based on page 105).

Received Snapshots

The **Received Snapshots** page allows you to view and work with received snapshots. When a replicated NAS share is received from a source system, it is saved as a snapshot. The snapshot contains all of the data necessary to fully recover or failback the share to the point in time when the snapshot was saved.

To access the **Received Snapshots** page, on the **Receive NAS** page, click the **Received Snapshots** tab (see Figure 52).

Figure 52 Received Snapshots Page



Use the **Received Snapshots** page to perform the following tasks:

- View information about received snapshots (see Snapshots List on page 98).
- Recover a share on the target system (see Recovering a Share on page 99).
- Failback a share to the source system (see Performing a Failback For a Share on page 100).
- Delete a received snapshot (see Deleting a Snapshot on page 102).

Note: The target system will retain up to 10 replication snapshots (default setting) for each replicated share. Once 10 snapshots have been saved, the oldest snapshot is deleted to make room for each new snapshot that is received. (To change the maximum number of snapshots retained for each share, see Replication Receive on page 157).

Snapshots List

The **Snapshots List** displays all available snapshots that have been received from configured replication sources. Snapshots are grouped by NAS share. To see all available snapshots for a share, click the plus icon [+] next to the share name.

The **Snapshots List** displays the following information about each snapshot:

- **Share Name** - The name of the share.
- **Source DXi** - The hostname of the system that the snapshot was sent from.
- **Started** - The time the most recent replication job was started.
- **Finished** - The time the most recent replication job finished.
- **Status** - The status of the most recent replication job (see Replication and Synchronization Status on page 91). Click the status to display detailed information about the most recent replication job.

Note: Click a column heading to sort the rows in the table by that column. Click the column heading again to reverse the sort order.

Note: Click the Information button **[i]** next to a share to display detailed information about the share and recent replication activity.

Recovering a Share

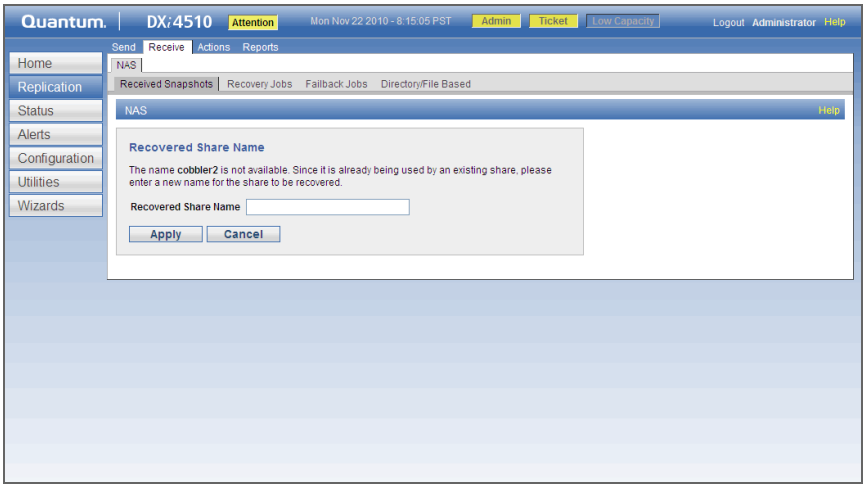
Recover a NAS share if the source system is unavailable and you need to access the share (for example, to continue performing backups). When you recover a share, you select a received snapshot. The DXi4000 uses the snapshot to recreate the share on the target system just as it was at the point in time when the snapshot was saved.

To recover a share:

1. On the target system, select a snapshot in the **Snapshots List** and click **Recover**.

   The **Recovered Share Name** page displays (see Figure 53).

Figure 53 Recovered Share Name Page



2 (Optional) In the **Recovered Share Name** box, type a new name for the recovered share. (The default name is the original share name.)

3 Click **Apply**.

The share is recovered on the target system. All data stored on the share at the time the snapshot was saved is available. The original export protocol of the share (NFS or CIFS) is retained in the recovery process.

Note: After you recover a share, if you want to continue backing up data to the share, you must remap your backup application to point to the target system instead of the source system.

Performing a Failback For a Share

Perform a failback of a NAS share if a source system that was previously unavailable becomes available again. When you failback a share, you select a received snapshot. The DXi4000 copies the snapshot from the target system back to the source system. You can then perform a recover operation to recreate the share on the source system just as it was at the point in time when the snapshot was saved.

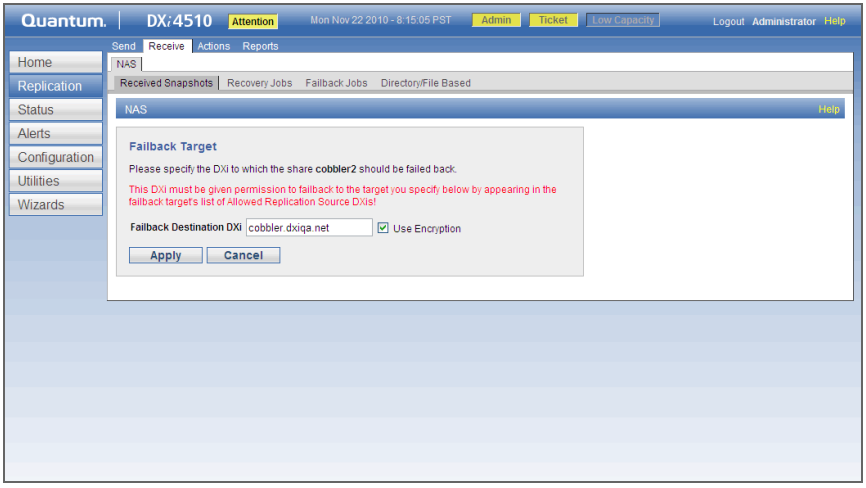
Note: Before you can failback a share, on the original source system, you must add the original target system to the list of allowed replication sources (see Replication Receive on page 157). This is because, during failback, the original target is acting as a source when it sends a snapshot to the original source.

To perform a share failback:

1 On the target system, select a snapshot in the **Snapshots List** and click **Failback**.

The **Failback Target** page displays (see Figure 54).

Figure 54 Failback Target Page



2 (Optional) In the **Failback Destination DXi** box, type the hostname or IP address of a new destination system to failback the share to. (The default destination is the original source system.)

Note: To use hostname format, you must specify at least one DNS IP address on the **Network** page (see Network on page 176).

3 (Optional) Clear the **Use Encryption** check box to disable encryption when sending the snapshot to the destination.

Note: Encryption is enabled by default. However, for best performance, if your data network is already secured, you should clear the **Use Encryption** check box.

4 Click **Apply**.

The snapshot is sent to the source system.

5 On the source system, in the **Snapshots List**, select the snapshot that was sent during the failback operation and click **Recover**.

The **Recovered Share Name** page displays (see Figure 53).

6 (Optional) In the **Recovered Share Name** box, type a new name for the recovered share. (The default name is the original share name.)

7 Click **Apply**.

The share is recovered on the source system. All data stored on the share at the time the snapshot was saved is available. The original export protocol of the share (NFS or CIFS) is retained in the recovery process.

Note: If you previously remapped your backup application to a recovered share on the target system, after you failback the share, you must remap your backup application again to point to the source system.

Deleting a Snapshot

Delete a snapshot if it is no longer needed. After you delete a snapshot, it can no longer be used to recover or failback a NAS share.

Note: You cannot delete a snapshot if a failback operation is in progress for the snapshot. Wait for the failback operation to complete, or abort the operation (see Failback Jobs on page 104).

To delete a snapshot:

1 Do one of the following actions:

- On the source system, disable replication for the share associated with the snapshot (see Enabling Replication For a Share on page 91).

- On the target system, delete the source system associated with the snapshot from the list of allowed replication sources (see Replication Receive on page 157).

2 On the target system, select a snapshot in the **Snapshots List** and click **Delete**.

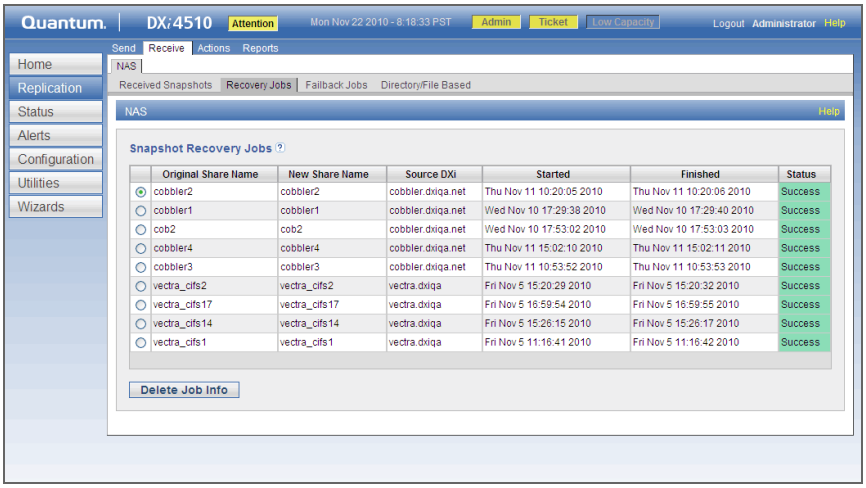
3 Click **Yes** to confirm the action.

Recovery Jobs

The **Recovery Jobs** page allows you to view information about snapshot recover operations that were previously completed.

To access the **Recovery Jobs** page, on the **Receive NAS** page, click the **Recovery Jobs** tab (see Figure 55).

Figure 55 Recovery Jobs Page



The **Snapshot Recovery Jobs** section displays the following information about recovery jobs:

- **Original Share Name** - The name of the share the snapshot was created from.
- **New Share Name** - The name of the share the snapshot was recovered to.
- **Source DXi** - The hostname of the system that the snapshot was received from.
- **Started** - The time the recovery job was started.

- **Finished** - The time the recovery job finished.
- **Status** - The status of the recovery job (**Success**, **In Progress**, or **Failed**).

Note: Click the Information button **[i]** next to a share to display detailed information about the share and recent replication activity.

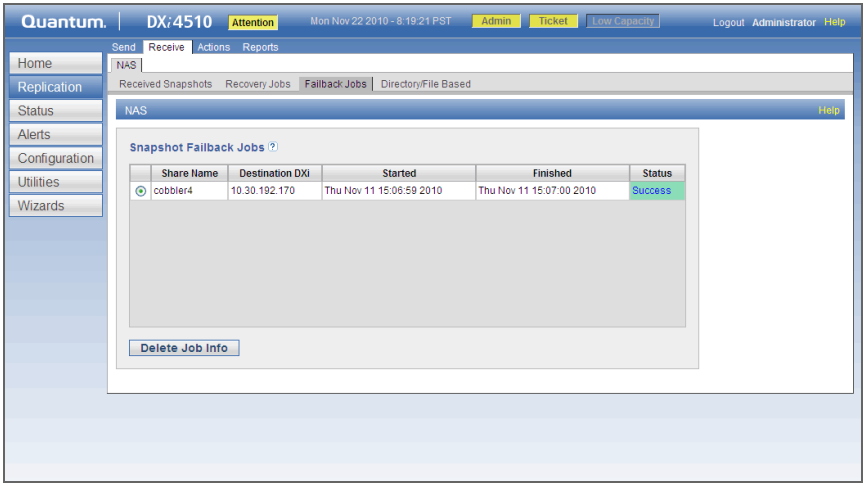
To delete information for a recovery job, select it in the **Snapshot Recovery Jobs** list and click **Delete Job Info**.

Failback Jobs

The **Failback Jobs** page allows you to view information about snapshot failback operations that were previously completed. You can also abort a failback that is currently in progress.

To access the **Failback Jobs** page, on the **Receive NAS** page, click the **Failback Jobs** tab (see Figure 56).

Figure 56 Failback Jobs Page



The **Snapshot Failback Jobs** section displays the following information about failback jobs:

- **Share Name** - The name of the share the snapshot was created from.

- **Destination DXi** - The hostname of the system that the snapshot was sent to.
- **Started** - The time the failback job was started.
- **Finished** - The time the failback job finished.
- **Status** - The status of the failback job (**Success**, **In Progress**, or **Failed**).

Use the **Failback Jobs** page to perform the following tasks:

- To delete information for a failback job, select it in the **Snapshot Failback Jobs** section and click **Delete Job Info**.
- To abort a failback job that is in progress, select it in the **Snapshot Failback Jobs** section and click **Abort**.

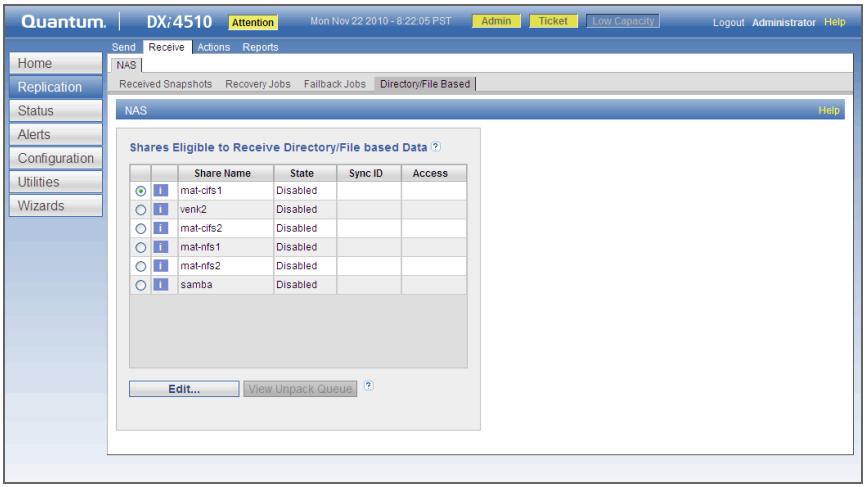
Directory/File Based

The **Directory/File Based** page allows you to manage Directory/File Based Replication on the target system. You can configure a NAS share to receive Directory/File Based Replication data sent from a source system and view replication statistics for the share.

Note: For information about creating NAS shares, see Adding a NAS Share on page 140.

To access the **Directory/File Based** page, on the **Receive NAS** page, click the **Directory/File Based** tab (see Figure 57).

Figure 57 Directory/File Based Page



Use the **Directory/File Based** page to perform the following tasks:

- View shares eligible to receive Directory/File Based data (see Shares Eligible to Receive Directory/File Based Data on page 106)
- Configure a share to receive Directory/File Based Replication data (see Configuring a Target Share for Directory/File Based Replication on page 107)
- View statistics for shares configured for Directory/File Based Replication (see Unpack Queue on page 108)

Shares Eligible to Receive Directory/File Based Data

The **Shares Eligible to Receive Directory/File Based Data** section displays information for all NAS shares on the DXi4000 that are eligible to receive Directory/File Based Replication data from a source share. To be eligible to receive Directory/File Based Replication data, a share must have data deduplication enabled at the time it is created.

The **Shares Eligible for Replication** section displays the following information:

- **Share Name** - The name of the share.
- **State** - The state of Directory/File Based Replication for the share (**Enabled** or **Disabled**).
- **Sync ID** - The Sync ID used to identify the source share that will send replicated data to the share.

- **Access** - The selected access option for the share (**Locked** or **Unlocked**).

Note: Click the Information button **[i]** next to a share to display detailed information about the share and recent replication activity.

Configuring a Target Share for Directory/File Based Replication

Configuring a NAS share for Directory/File Based Replication enables the automatic replication of files and directories on the source share to the target share. Before you configure a share on the source system for Directory/File Based Replication, you must configure a share on the target system to receive the replicated data from the source share.

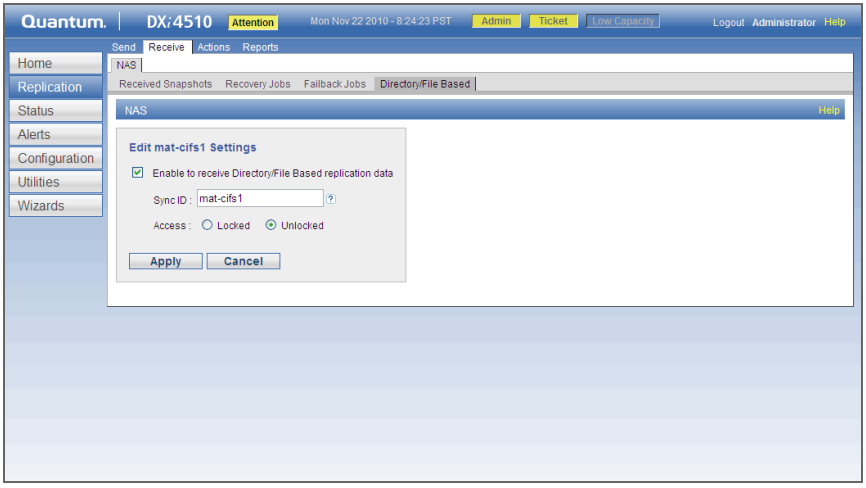
Note: For information about configuring Directory/File Based Replication on the source system, see Configuring a Source Share for Directory/File Based Replication on page 93.

To configure a target share for Directory/File Based Replication:

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

The **Edit Share Settings** page displays (see Figure 58).

Figure 58 Edit Share Settings Page



2 Select the **Enable to receive Directory/File Based replication data** check box to enable Directory/File Based Replication for the share.

   Or clear the **Enable to receive Directory/File Based replication data** check box to disable Directory/File Based Replication for the share.

3 Enter a **Sync ID** in the box.

   The Sync ID is used to identify the source share that will send replicated data to the target share. The Sync ID *must* be identical to the Sync ID of the source share on the source system.

4 Select an **Access** option:

   - **Locked** - The share is not allowed to receive new Directory/File Based Replication data.
   - **Unlocked** - The share is allowed to receive new Directory/File Based Replication data.

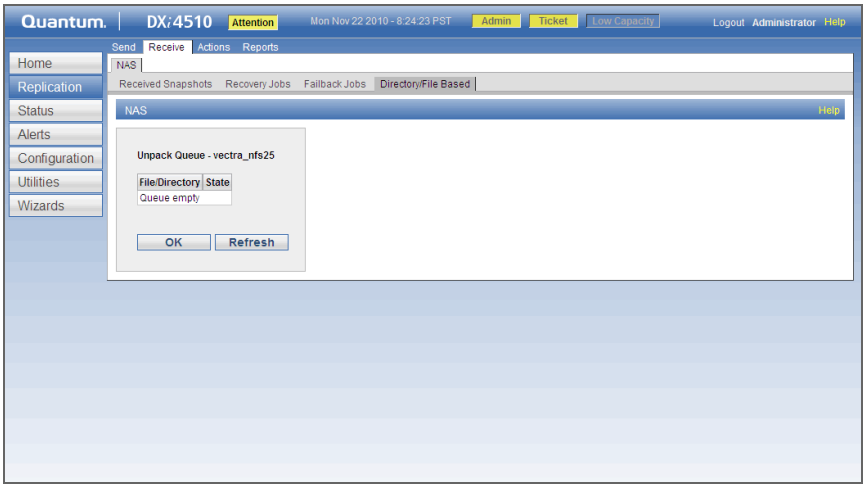
5 Click **Apply**.

Unpack Queue

Use the **Unpack Queue** to view Directory/File Based Replication statistics for data received from the source system.

To view the **Unpack Queue**, select a share and click **View Unpack Queue** (see Figure 59).

Figure 59 Unpack Queue



The **Unpack Queue** displays the following information:

- **File/Directory** - The file or directory to be replicated.
- **State** - The replication state of the file or directory.

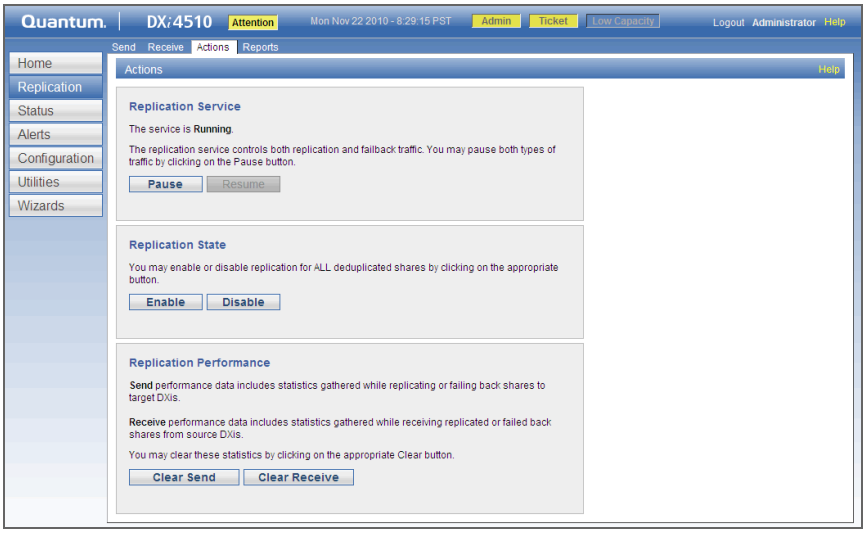
Click **Refresh** to update the statistics in the Unpack Queue. Click **OK** to return to the **Directory/File Based** page.

Actions

The **Actions** page allows you to manage replication activity on the DXi4000. You can pause the replication service, enable the replication state, and clear performance statistics.

To access the **Actions** page, click the **Replication** menu, and then click the **Actions** tab (see Figure 60).

Figure 60 Actions Page



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

- Pause or resume the replication service (see Replication Service on page 110).
- Enable or disable the replication state (see Replication State on page 111).
- Clear cumulative replication statistics (see Replication Performance on page 111).

Replication Service

The replication service controls replication and failback traffic on the DXi4000.

- Click **Pause** to pause all replication and failback traffic.

  If a replication job is currently in progress, the system continues to replicate the current block of data. The process of replicating the current block can take up to 15 minutes to complete. After the block has completed replication, the system pauses replication.

  Note: If you pause a replication job that is in process, a Failure event is logged in the replication report (see Reports on page 112).

- Click **Resume** to resume all incoming and outgoing replication and failback traffic.

  If a replication job was in progress when replication was paused, the replication job continues.

Replication State

The replication state applies to all NAS shares on the DXi4000 that are eligible for replication (that is, all deduplicated shares).

- Click **Enable** to enable replication for all shares.
- Click **Disable** to disable replication for all shares.

  If a replication job is currently in progress, the system continues until the entire replication job is complete. After the replication job has completed, the system disables replication. The system will not be able to replicate data for any shares until you click **Enable**.

Note: To disable replication for a single share, select it on the **Replication > Send** page and click **Edit**. Clear the **Enable replication** and the **Enable scheduled replication** check boxes, and then click **Apply**. For more information, see Send NAS on page 88.

Replication Performance

The DXi4000 maintains cumulative performance statistics for send and receive replication activity. The statistics appear on the **Home** page and elsewhere. To reset these statistics so the system will calculate them with new data going forward, click **Clear**.

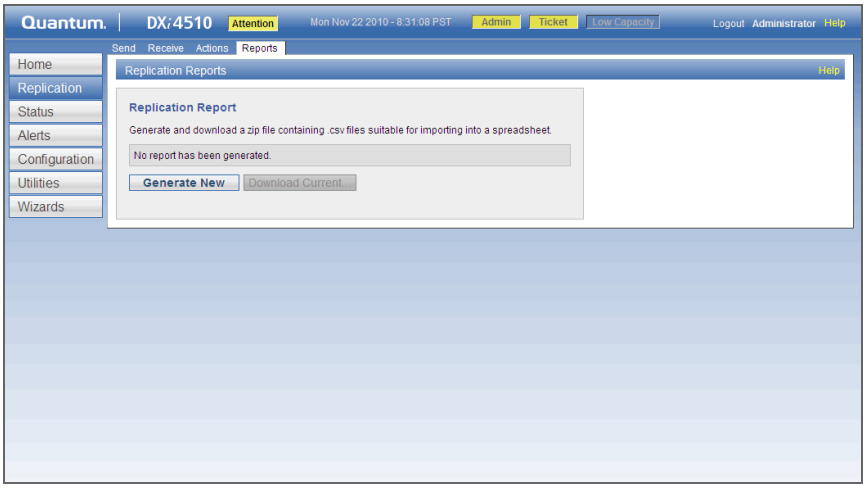
- Click **Clear Send** to reset cumulative performance statistics gathered while replicating shares to target systems, or when sending a snapshot during a failback operation.
- Click **Clear Receive** to reset cumulative performance statistics gathered while receiving replicated shares from source systems, or when receiving a snapshot during a failback operation.

Reports

The **Reports** page allows you to generate and download a replication report. The report includes detailed information about all replication activity, including Directory/File Based Replication.

To access the **Reports** page, click the **Replication** menu, and then click the **Reports** tab (see Figure 61).

Figure 61 Reports Page



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

- To generate a new replication report, click **Generate New.**
- To download the most recently generated replication report, click **Download Current**.

  Save the replication report to your local workstation, and then unzip the downloaded file. The report consists of a ZIP file that contains multiple CSV (comma separated value) files. To view the CSV files, open them in a compatible spreadsheet application.

Chapter 7

DXi4000 Status

The **Status** page allows you to view status information for the DXi4000 hardware as well as performance and disk usage information.

Note: Status information is gathered by the system every two minutes.

To access the **Status** pages, click the **Status** menu.

The **Status** pages contains the following tabs:

- Hardware
- Performance
- Disk Usage
-

Hardware

The **Hardware** page allows you to view information about the hardware components of the DXi4000. You can view the overall status of the node as well as detailed status information for components such as the system board, network ports, and storage arrays.

To access the **Hardware** page, click the **Status** menu, and then click the **Hardware** tab.

The **Hardware** page contains the following tabs:

- Summary
- Details
- Firmware Version

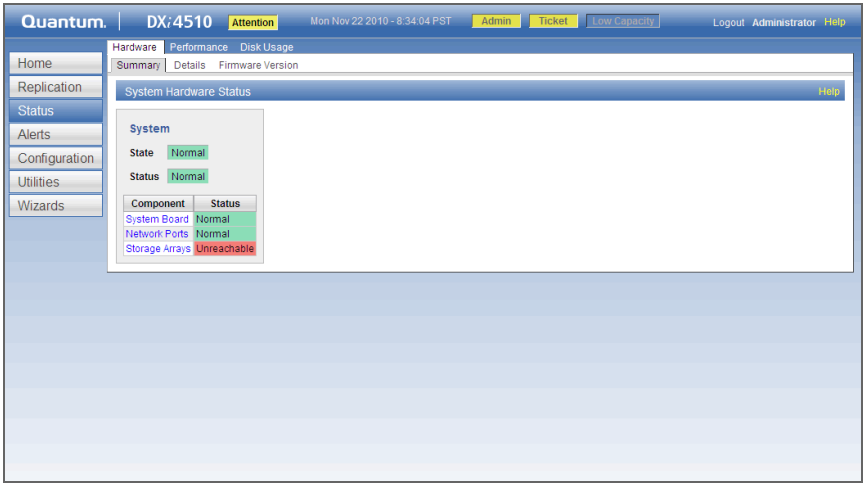
Summary

The **Hardware Summary** page allows you to view the overall status of the node and its main components. The system and each component can have one of the following statuses:

- **Normal** - (Green) The hardware is operating correctly.
- **Attention** - (Yellow) There is a problem with the hardware.
- **Failed** - (Red) The hardware has failed.

To access the **Hardware Summary** page, on the **Hardware** page, click the **Summary** tab (see Figure 62).

Figure 62 Hardware Summary Page



The **Hardware Summary** page displays the following information:

- **State** - The status of the node.
- **Status** - The overall status of all components in the node.

- **Component Name** - The name of the main component.

  Click the component name to see detailed information (see Details on page 115).

- **Component Status** - The overall status of the main component.

Details

The **Details** page allows you to view detailed information about the hardware components of the DXi4000.

To access the **Details** page, on the **Hardware** page, click the **Details** tab.

Use the **Details** page to view information for the following components:

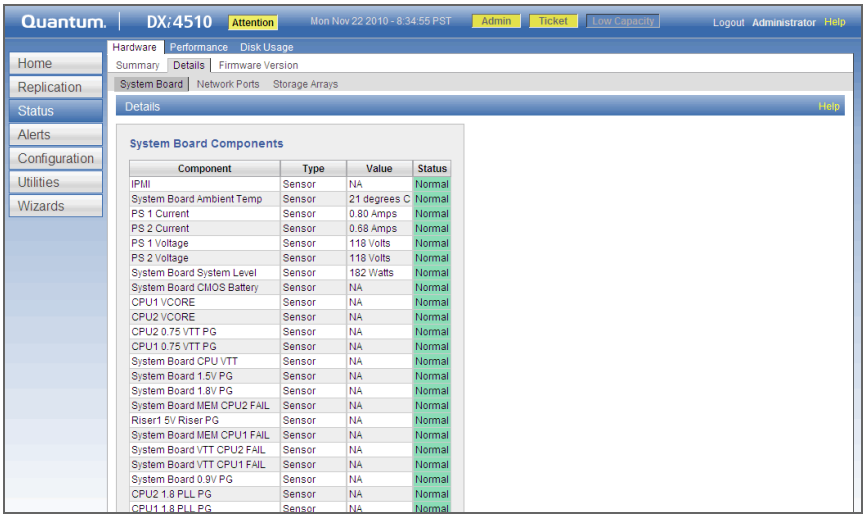
- System Board
- Network Ports
- Storage Arrays

System Board

The **System Board** page allows you to view information reported by the main system board in the node, such as temperature, voltage, fan, and power supply information.

To access the **System Board** page, on the **Details** page, click the **System Board** tab (see Figure 63).

Figure 63 System Board Page



The **System Board** page displays the following information:

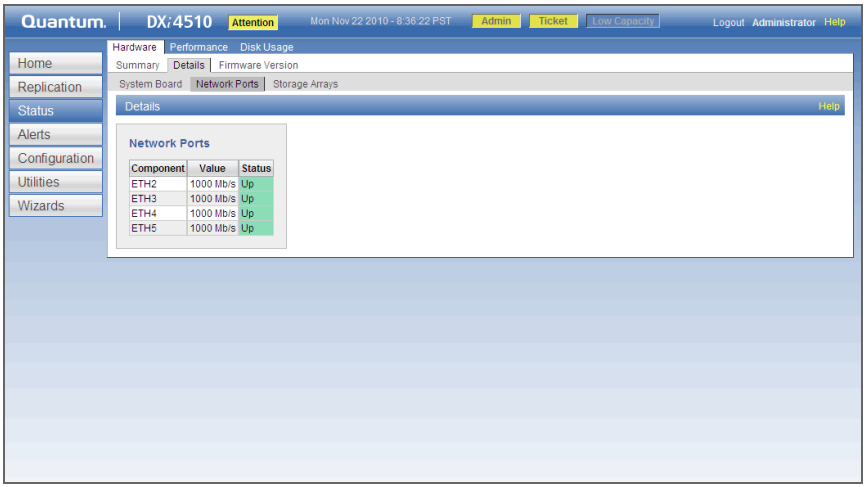
- **Component** - The name of the component on the system board.
- **Type** - The component type (Sensor, Fan, or Power Supply).
- **Value** - The value reported by the sensor or component.
- **Status** - The status of the component.
  - **Normal** - (Green) The component is operating correctly.
  - **Attention** - (Yellow) There is a problem with the component .
  - **Failed** - (Red) The component has failed.

Network Ports

The **Network Ports** page allows you to view information about Ethernet ports in the system. The DXi4000 includes four Ethernet ports.

To access the **Network Ports** page, on the **Details** page, click the **Network Ports** tab (see Figure 64).

Figure 64 Network Ports Page



The **Network Ports** page displays the following information:

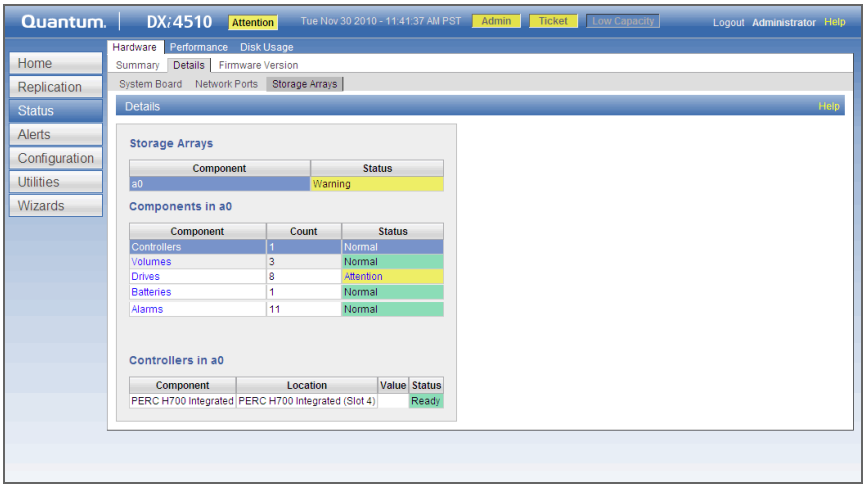
- **Component** - The number of Ethernet port.
- **Value** - The speed of the port in Mb/s.
- **Status** - The status of the Ethernet port.
  - **Up** - (Green) The port is connected.
  - **Down** - (Green) The port is not connected.

Storage Arrays

The **Storage Arrays** page allows you to view information about storage arrays and controllers in the DXi4000.

To access the **Storage Arrays** page, on the **Details** page, click the **Storage Arrays** tab (see Figure 65).

Figure 65 Storage Arrays Page



The **Storage Arrays** section displays the following information about each storage array:

- **Component** - The name of the storage array.

  Click the name of the storage array to view detailed information for the array in the **Component** section.

- **Status** - The status of the storage array.
  - **Normal** - (Green) The component is operating correctly.
  - **Attention** - (Yellow) There is a problem with the component .
  - **Failed** - (Red) The component has failed.

The **Components** section displays the following information about the components in the selected storage array:

- **Component** - The name of the component.

  Click the name of the component to view detailed information for the component in the subcomponent section.

- **Count** - The number of that component type in the system.
- **Status** - The status of the component.
  - **Normal** - (Green) The component is operating correctly.
  - **Attention** - (Yellow) There is a problem with the component .
  - **Failed** - (Red) The component has failed.

The subcomponent section displays the following information about the subcomponents in the selected component:

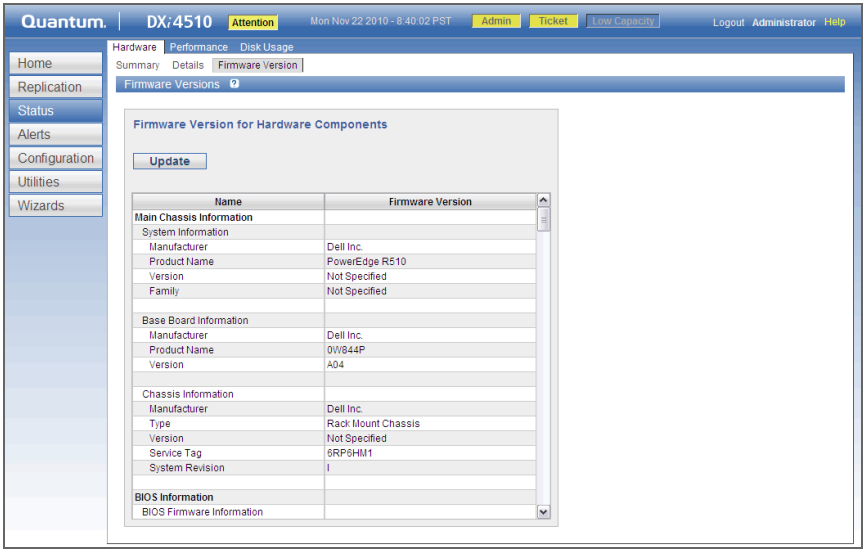
- **Component** - The name of the subcomponent.
- **Location** - The location of the subcomponent within the system.
- **Value** - The value reported by the subcomponent.
- **Status** - The status of the subcomponent.
  - **Normal** - (Green) The component is operating correctly.
  - **Attention** - (Yellow) There is a problem with the component .
  - **Failed** - (Red) The component has failed.

Firmware Version

The **Firmware Version** page allows you to view information about hardware components installed in the DXi4000, such as the firmware version, hardware revision, and manufacturer.

To access the **Firmware Version** page, on the **Hardware** page, click the **Firmware Version** tab (see Figure 66).

Figure 66 Firmware Version Page



The **Firmware Version** page displays the following information:

- **Name** - Displays a hardware component or a property of the component (for example, **Manufacturer**, **Version**, or **Release Date**).

  Note: The properties that are listed vary depending on the hardware component.

- **Firmware Version** - The value of the corresponding item in the **Name** column (for example, the specific manufacturer, version number, or release date for the item).

Click **Update** to refresh the table with the latest information.

Performance

The **Performance** page allows you to view information about system performance, including inline throughput, network throughput, read/write throughput, and CPU usage.

To access the **Performance** page, click the **Status** menu, and then click the **Performance** tab.

The **Performance** page contains the following tabs:

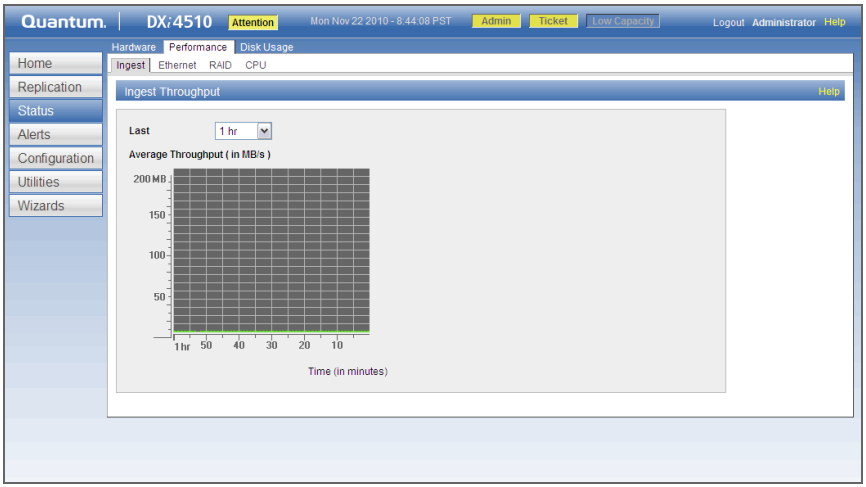
- Inline
- Ethernet
- RAID
- CPU

Inline

The **Inline** page allows you to view throughput performance for inline data flow. Inline data flow includes deduplicated and non-deduplicated backup data as well as received replication data.

To access the **Inline** page, on the **Performance** page, click the **Inline** tab (see Figure 67).

Figure 67 Inline Page



Use the **Inline** page to display recent inline data flow activity in a dynamic graph:

- Select the amount of time to display in the **Last** list (1–24 hours).
- The horizontal axis displays time (in minutes).
- The vertical access displays inline throughput (0–2,000 MB/s).

Note: The range represented by the Y-axis changes based on the maximum value, increasing in 200 MB increments as needed.

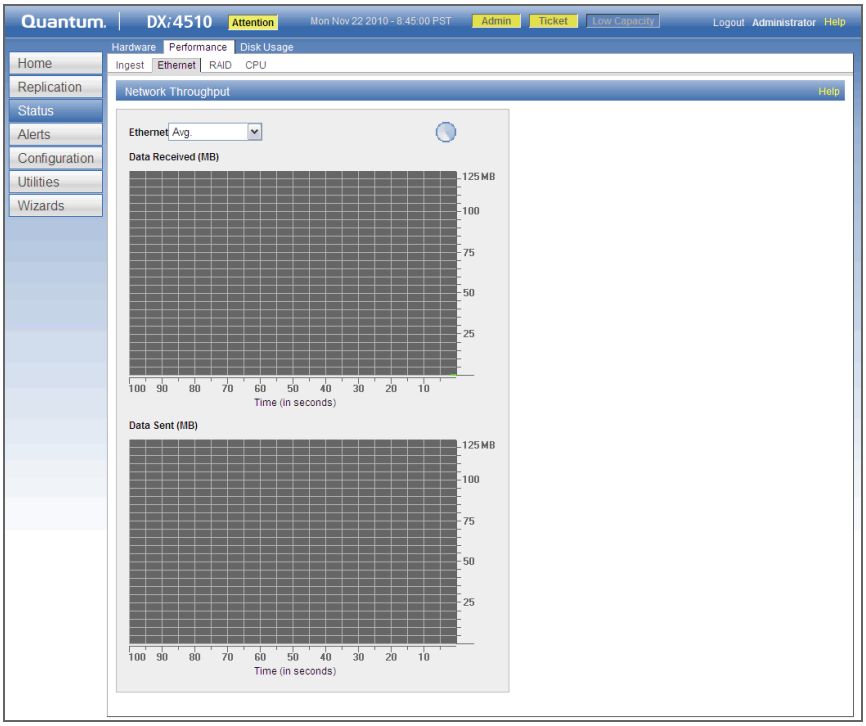
- Each bar on the graph represents approximately 1 minute of time.
- Hold the cursor over a bar to display the value of the bar.

Ethernet

The **Ethernet** page allows you to view throughput performance for network send and receive activity.

To access the **Ethernet** page, on the **Performance** page, click the **Ethernet** tab (see Figure 68).

Figure 68 Ethernet Page



Use the **Ethernet** page to display recent network activity in dynamic graphs:

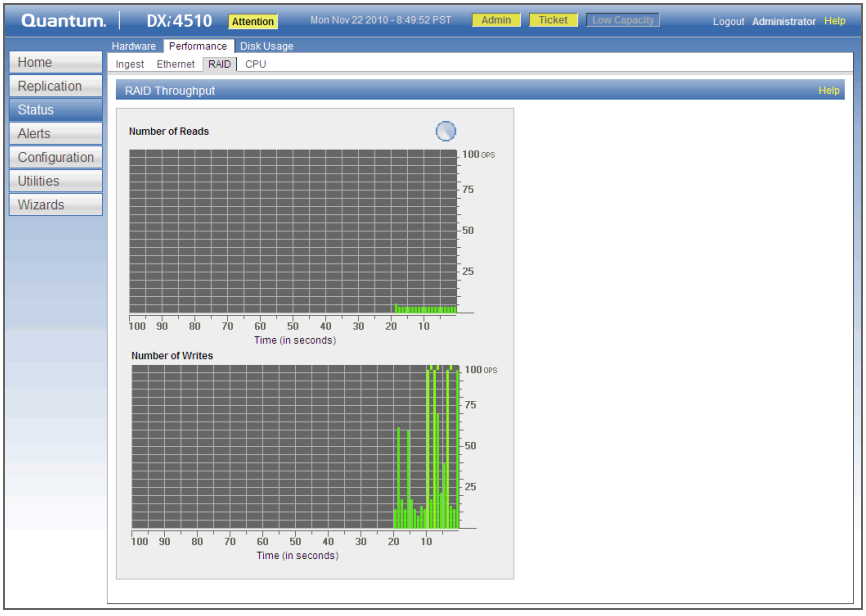
- The top graph reports data received and the bottom graph reports data sent.
- Select the port to monitor in the **Ethernet** drop-down box, or select **Avg** to display an average of all ports.
- The horizontal axis displays time (0–100 seconds).
- The vertical axis displays data throughput (0–125 MB/s).
- Values that exceed the maximum value of the vertical axis are shown in lighter green.
- Each bar on the graph represents approximately 1 second of time.
- Hold the cursor over a bar to display the value of the bar.

RAID

The **RAID** page allows you to view throughput performance for RAID read and write activity.

To access the **RAID** page, on the **Performance** page, click the **RAID** tab (see Figure 69).

Figure 69 RAID Page



Use the **RAID** page to display recent RAID activity in dynamic graphs:

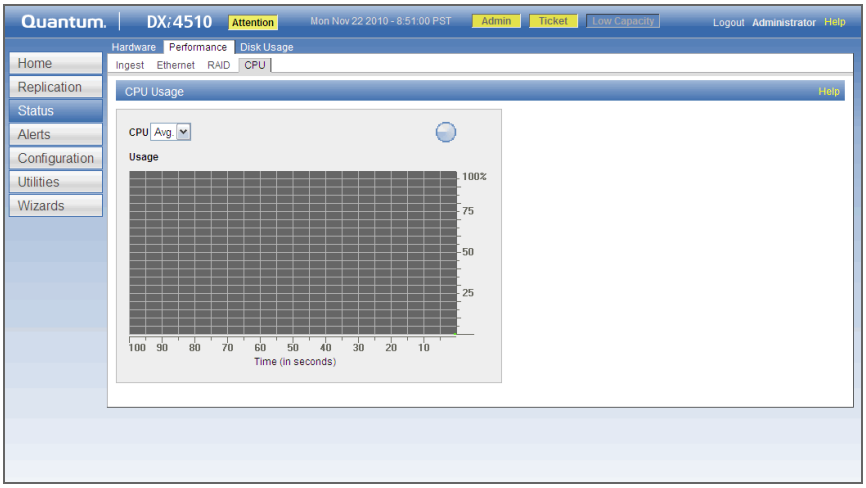
- The top graph reports data reads and the bottom graph reports data writes.
- The horizontal axis displays time (0–100 seconds).
- The vertical axis displays the amount of data read or written (100 OPS/s).
- Values that exceed the maximum value of the vertical axis are shown in lighter green.
- Each bar on the graph represents approximately 1 second of time.
- Hold the cursor over a bar to display the value of the bar.

CPU

The **CPU** page allows you to view CPU usage.

To access the CPU page, on the **Performance** page, click the **CPU** tab (see Figure 70).

Figure 70 CPU Page



Use the **CPU** page to display recent CPU usage in a dynamic graph:

- Select the CPU core to monitor in the **CPU** drop-down box, or select **Avg** to display an average of all CPUs.

  Note: The **CPU** drop-down box lists all CPU threads. Each hyper-threaded CPU core counts as two threads.

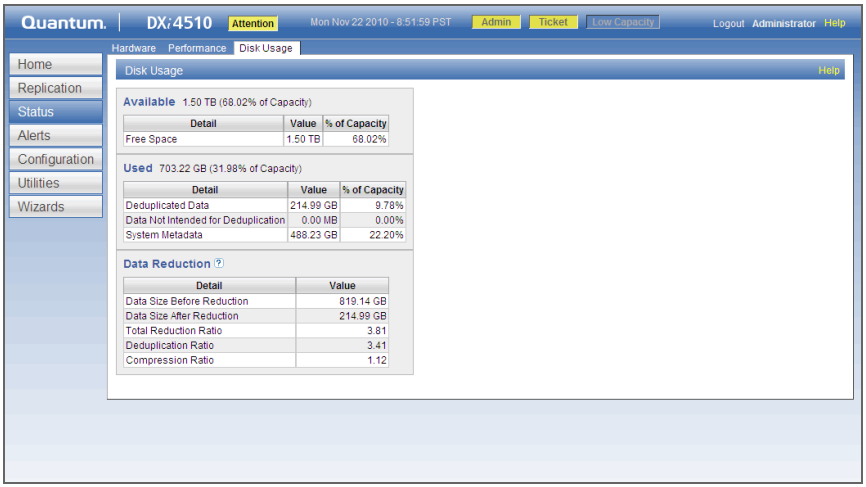
- The horizontal axis displays time (0–100 seconds).
- The vertical axis displays CPU usage (0–100%).
- Each bar on the graph represents approximately 1 second of time.
- Hold the cursor over a bar to display the value of the bar.

Disk Usage

The **Disk Usage** page allows you to view information about free and used disk space on the system. You can also view data reduction statistics.

To access the **Disk Usage** page, click the **Status** menu, and then click the **Disk Usage** tab (see Figure 71).

Figure 71 Disk Usage Page



Use the **Disk Usage** page to view the following information:

- Available
- Used
- Data Reduction

Available

Available space is the area that is available for data storage. The **Available** value (also called **Free Space**) is displayed as an amount and as a percentage of the total capacity in the system.

Used

Used space is the area that already holds data. The **Used** value is displayed as an amount and as a percentage of the total capacity in the system.

Used space is divided into the following categories:

Note: The value for each category is displayed as an amount and as a percentage of the total capacity in the system.

- **Deduplicated Data** - The amount of data that has been deduplicated.
- **Data Not Intended For Deduplication** - The amount of data that will not be deduplicated (data on shares that do not have deduplication enabled).
- **System Metadata** - The amount of disk space used for internal operations of the DXi, including system configuration files as well as temporary files created during replication, space reclamation, and healthchecks.

Data Reduction

The data reduction area displays the data reduction performance for the system. Data reduction is divided into the following categories:

- **Data Size Before Reduction** - The original, native size of all data that has been processed by the data deduplication and compression engines.
- **Data Size After Reduction** - The final, reduced size of all data that has been processed by the data deduplication and compression engines.
- **Total Reduction Ratio** - The total reduction ratio of all data that has been processed by the data deduplication and compression engines (**Data Size Before Reduction** divided by **Data Size After Reduction**).
- **Deduplication Ratio** - The deduplication ratio of all data that has been processed by the data deduplication engine.
- **Compression Ratio** - The compression ratio of all data that has been processed by the compression engine.

Chapter 8

DXi4000 Alerts

The **Alerts** page allows you to view and work with administration alerts and service tickets. The DXi4000 generates administration alerts and service tickets when a hardware or software event occurs.

To access the **Alerts** page, click the **Alerts** menu.

The **Alerts** page contains the following tabs:

- Admin Alerts
- Service Tickets

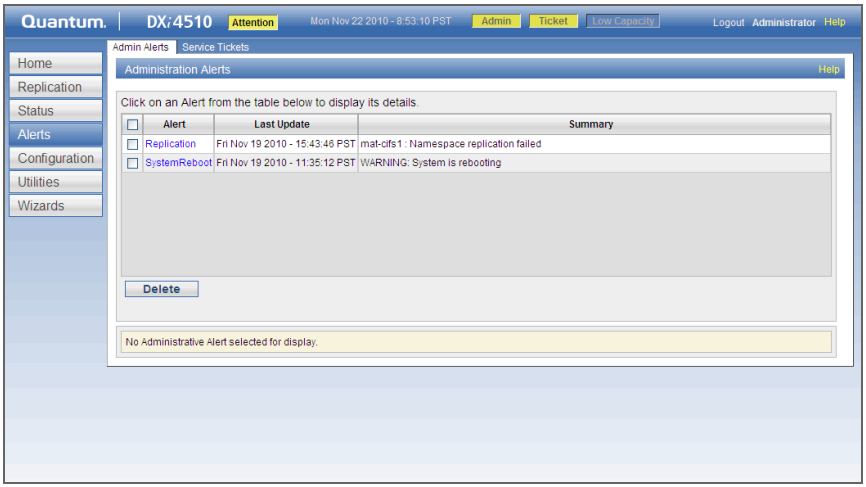
Admin Alerts

The **Admin Alerts** page allows you to view and work with administration alerts. The DXi4000 generates an administration alert when the condition of the system has changed, such as going from the offline state to the online state.

Note: In addition to viewing administration alerts on the **Admin Alerts** page, you can configure the system to send alerts to an e-mail address (see Recipients on page 200).

To access the **Admin Alerts** page, click the **Alerts** menu, and then click the **Admin Alerts** tab (see Figure 72).

Figure 72 Admin Alerts Page



The **Admin Alerts** page displays the following information about administration alerts:

- **Alert** - The name of the administration alert.
- **Last Update** - The date when the administration alert was last updated by the system.
- **Summary** - A brief description of the administration alert.

Note: Click a column heading to sort the rows in the table by that column. Click the column heading again to reverse the sort order.

Use the **Admin Alerts** page to perform the following tasks:

- To view details about an administration alert, click the alert name. Detailed information about the alert appears in the **Activity Status History** section.
- To delete an administration alert, select it and click **Delete**.

Service Tickets

The DXi4000 has the capability to automatically detect and resolve problems encountered by the system during operation. If a problem cannot be resolved automatically and requires user intervention or servicing, the system generates a service ticket.

A service ticket contains detailed information about the problem and, if appropriate, steps you can take to resolve it. If the DXi4000 detects that the problem is resolved, the system automatically closes the service ticket. You can also manually close a service ticket after the problem is corrected.

Note: Tickets that are not resolved are generated again after 24 hours.

See the following sections for more information about service tickets:

- Service Ticket Priority
- Recommended Actions
- Working With Service Tickets

Service Ticket Priority

The system assigns each service ticket a priority based on the criticality of the problem that caused the system to generate the ticket. There are three priority levels:

- **Low** - (Green) A minor problem occurred and needs to be resolved, but the operation and performance of the DXi4000 are not significantly affected.
- **Middle** - (Yellow) A serious problem occurred and needs to be resolved, but it does not necessarily need to be fixed immediately. The operation and performance of the DXi4000 may be degraded.
- **High** - (Red) A critical problem has occurred and needs to be resolved immediately. The operation and performance of the DXi4000 are degraded, and there is a risk of system failure or data loss.

Recommended Actions

If appropriate, a service ticket includes recommended actions. The recommended actions provide instructions for resolving the problem that caused the system to generate the ticket.

Perform the recommended actions to try to resolve the problem before contacting Quantum customer support. If you are able to resolve the problem, you can close the service ticket.

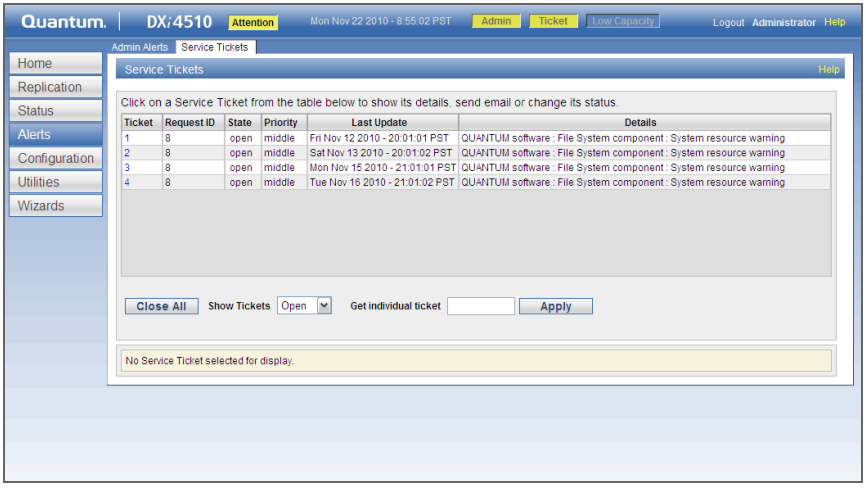
Note: The recommended actions should be performed by a user who is familiar with operating the DXi4000.

Working With Service Tickets

The **Service Tickets** page allows you to view and work with service tickets.

To access the **Service Tickets** page, click the **Alerts** menu, and then click the **Service Tickets** tab (see Figure 73).

Figure 73 Service Tickets Page



The **Service Tickets** page displays the following information about open service tickets:

- **Ticket** - The service ticket number.
- **Request ID** - The Request ID of the ticket.
- **State** - The current status of the service ticket (**Open** or **Closed**).

- **Priority** - The priority level of the service ticket (**Low**, **Middle**, or **High**).
- **Last Update** - The date when the service ticket was last updated by the system.
- **Details** - A brief description of the service ticket.
- **Close All** - Click to close all open service tickets.
- **Show Tickets** - Select an option to display **Open** tickets, **Closed** tickets, or **All** tickets.
- **Get individual ticket** - To display a specific ticket in the list, enter a ticket number and click **Apply**.

Note: Click a column heading to sort the rows in the table by that column. Click the column heading again to reverse the sort order.

Use the **Service Tickets** page to perform the following tasks:

- View details for a service ticket, including recommended actions (see Viewing a Service Ticket on page 131).
- Add information to a service ticket (see Modifying a Service Ticket on page 133).
- Send a service ticket to an e-mail address (see Sending a Service Ticket on page 134).
- Close a service ticket that has been resolved (see Closing a Service Ticket on page 135).

Viewing a Service Ticket

View a service ticket to see detailed information about the problem that caused the system to generate the ticket and to view recommended actions.

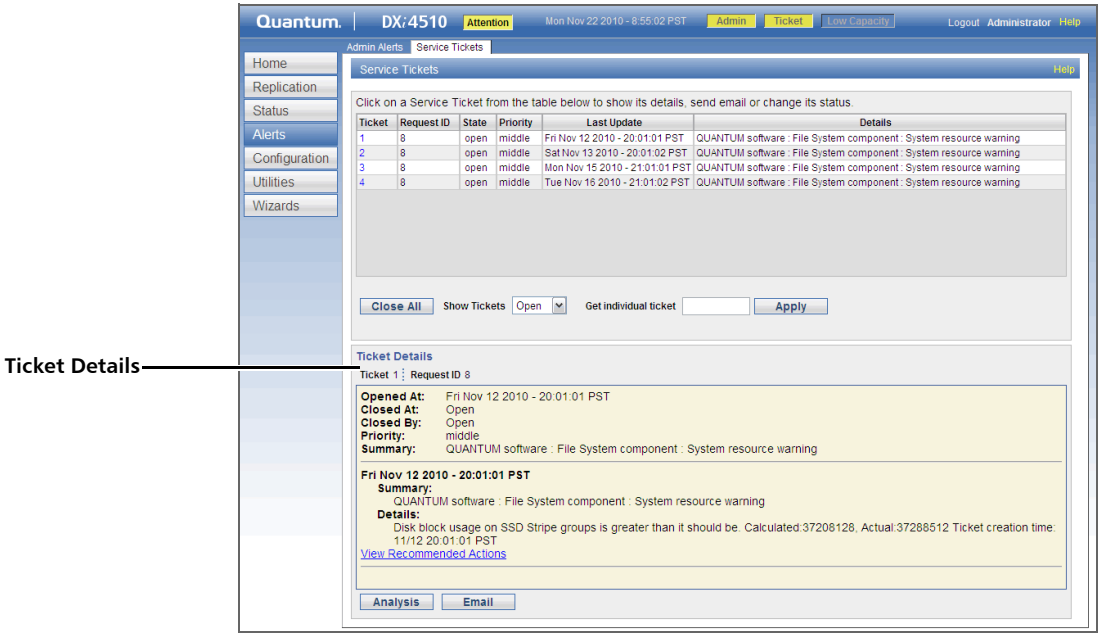
To view a service ticket:

1. In the list of service tickets, click the ticket number.

   The **Ticket Details** section at the bottom of the page displays information about the service ticket, including the time the ticket was opened and closed, the ticket status, and detailed information about the problem (see Figure 74).

Note: The time indicated in the service ticket may not match the DXi4000 system time.

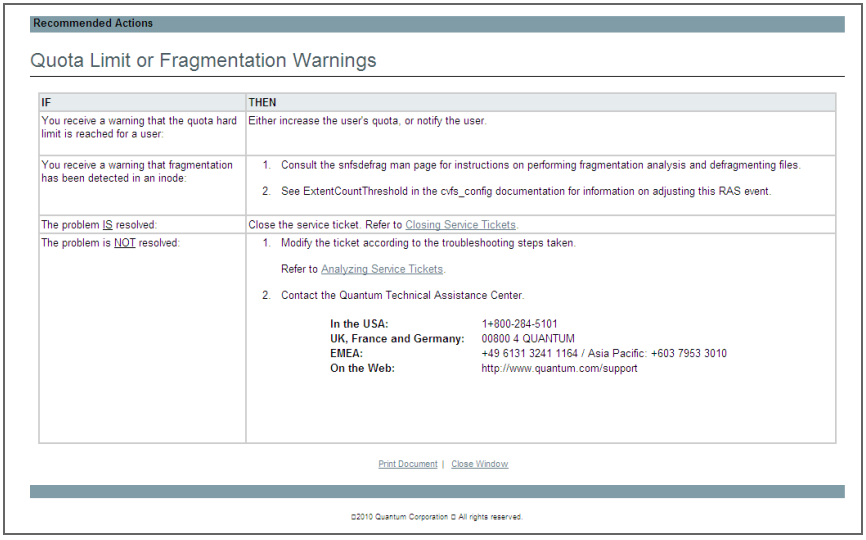
Figure 74 Ticket Details



2 (Optional) Click **View Recommended Actions** to view instructions for resolving the problem.

The recommended actions display in a new Web browser window (see Figure 75). Follow the instructions to resolve the problem. When you are finished, click the close button **[x]** on the upper right corner of the window.

Figure 75 Recommended Actions



Recommended Actions

Quota Limit or Fragmentation Warnings

IF	THEN
You receive a warning that the quota hard limit is reached for a user:	Either increase the user's quota, or notify the user.
You receive a warning that fragmentation has been detected in an inode:	1. Consult the snfsdefrag man page for instructions on performing fragmentation analysis and defragmenting files. 2. See ExtentCountThreshold in the cvfs_config documentation for information on adjusting this RAS event.
The problem IS resolved:	Close the service ticket. Refer to Closing Service Tickets.
The problem is NOT resolved:	1. Modify the ticket according to the troubleshooting steps taken. Refer to Analyzing Service Tickets. 2. Contact the Quantum Technical Assistance Center. In the USA: 1+800-284-5101 UK, France and Germany: 00800 4 QUANTUM EMEA: +49 6131 3241 1164 / Asia Pacific: +603 7953 3010 On the Web: http://www.quantum.com/support

Print Document | Close Window

Modifying a Service Ticket

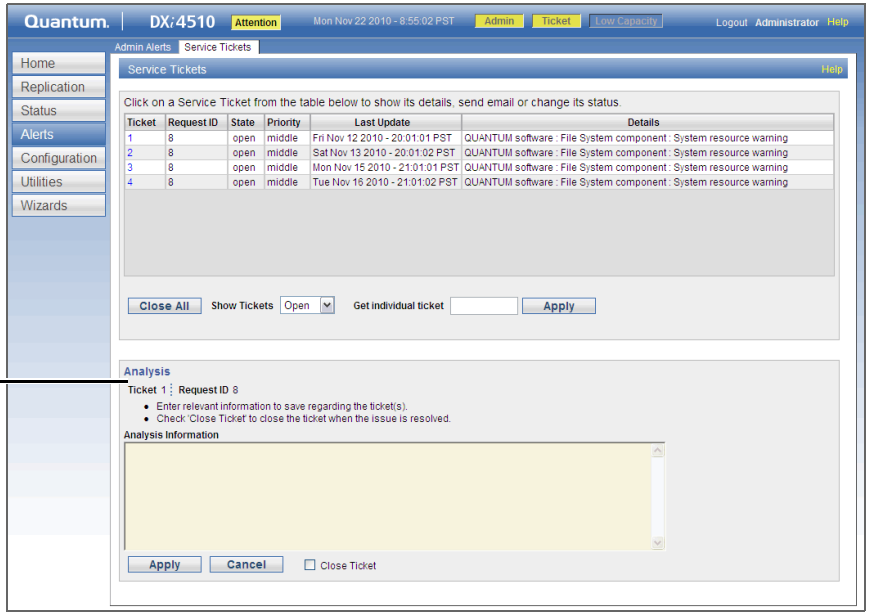
Modify a service ticket to add additional information to the ticket, for example, troubleshooting steps you have taken or a record of calls made to Quantum customer support. The additional information is saved with the service ticket and remains associated with the ticket even after it is closed.

To modify a service ticket:

1. In the list of service tickets, click the ticket number.
2. Click **Analysis** at the bottom of the page.

   The **Ticket Analysis** section displays at the bottom of the page (see Figure 76).

Figure 76 Ticket Analysis



3 In the **Analysis Information** box, enter all relevant information about actions taken to resolve the issue.

4 Click **Apply**.

Sending a Service Ticket

Send a service ticket to send the ticket details to an e-mail address. You can also add optional comments to the e-mail.

Note: To enable the DXi4000 to send e-mail, you must specify an outgoing e-mail server (see Server on page 205).

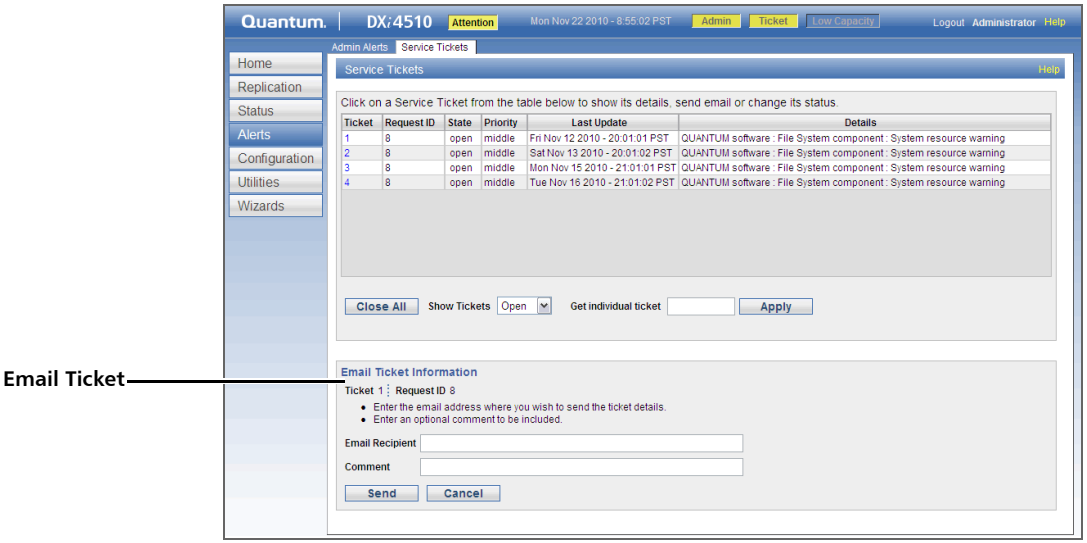
To send a service ticket:

1 In the list of service tickets, click the ticket number.

2 Click **Email** at the bottom of the page.

The **Email Ticket Information** section displays at the bottom of the page (see Figure 77).

Figure 77 Email Ticket Information



3 In the **Email Recipient** box, enter the e-mail address where you want to send the ticket details.

4 (Optional) In the **Comment** box, enter additional information to send with the ticket.

5 Click **Send**.

Closing a Service Ticket

Close a service ticket if the problem the caused the system to generate the ticket is resolved. You can also close all service tickets that are currently open.

Note: You can still view and modify a ticket after it has been closed.

To close all service tickets that are currently open, below the list of service tickets, click **Close All**.

To close a single service ticket:

1 In the list of service tickets, click the ticket number.

2 Click **Analysis** at the bottom of the page.

The **Ticket Analysis** section displays at the bottom of the page (see Figure 76).

3 Select the **Close Ticket** check box.

4 Click **Apply**.

Chapter 9

DXi4000 Configuration

The **Configuration** page allows you to configure the features of the DXi4000, including storage presentation, data replication, system settings, and notifications.

To access the **Configuration** page, click the **Configuration** menu.

The **Configuration** page contains the following tabs:

- NAS
- Replication
- OST
- System
- Notifications
- Contacts

NAS

The **NAS** page allows you to configure the DXi4000 to present its storage capacity as NAS (network attached storage) shares that are compatible with standard backup applications. You can create NAS

shares for use with Windows or Linux networks. You can also join the DXi4000 to a Windows domain or workgroup and manage users.

Note: The **NAS** wizard provides guided assistance for configuring NAS shares (see DXi4000 Configuration Wizards on page 43).

Caution: Caution: Filenames on NAS shares are limited to a length of 256 bytes. If a filename uses Japanese characters, the filename can be no longer than 85 characters. This is because each Japanese character is represented by 3 bytes.

To access the **NAS** page, click the **Configuration** menu, and then click the **NAS** tab.

The **NAS** page contains the following tabs:

- NAS Summary
- Windows Domain
- Share Access
- Advanced Setting

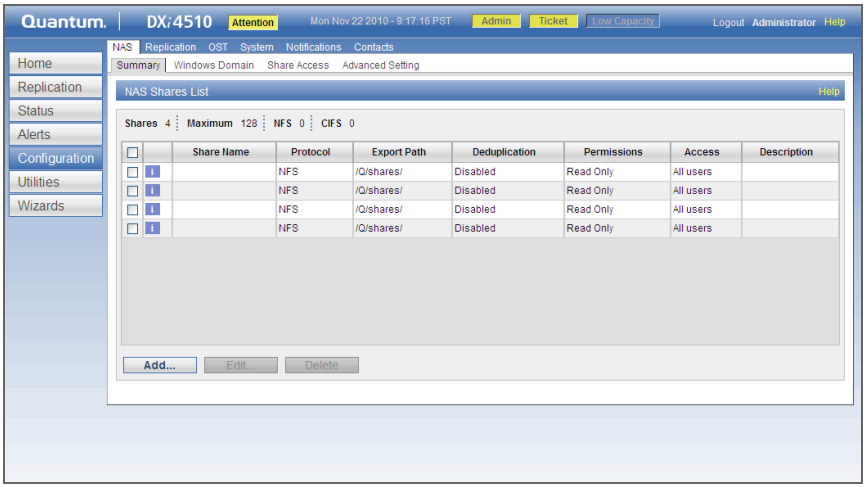
NAS Summary

The **NAS Summary** page allows you to manage NAS shares on the DXi4000. You can view information about existing shares, add or edit shares, and delete shares.

Note: When using NAS shares with network segmentation, I/O must be performed on the CIFS or NFS IP address, *not* the management or replication IP address (see Network on page 176).

To access the **NAS Summary** page, on the **NAS** page, click the **Summary** tab (see Figure 78).

Figure 78 NAS Summary Page



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

- View information about existing NAS shares (see NAS Shares List on page 139).
- Add a new NAS share to the system (see Adding a NAS Share on page 140).
- Edit properties for an existing NAS share (see Editing a NAS Share on page 142).
- Delete a NAS share from the system (see Deleting a NAS Share on page 144).

NAS Shares List

The **NAS Shares List** section displays the following information for all NAS shares on the DXi4000:

- **Shares** - The number of shares that have been added to the system.
- **Maximum** - The maximum number of shares that can be added to the system.
- **NFS** - The number of existing shares configured to use the NFS protocol (for Linux networks).
- **CIFS** - The number of existing shares configured to use the CIFS protocol (for Windows networks).
- **Share Name** - The name of the share.

- **Protocol** - The protocol (**CIFS** or **NFS**) the share is configured to use.
- **Export Path** - The export path of the share (different for CIFS and NFS shares).
- **Deduplication** - The data deduplication state of the share (**Enabled** or **Disabled**).
- **Permissions** - The permissions in use on the share (**Read & Write** or **Read Only**).
- **Access** - The access type of the share (**all hosts** or specific users).
- **Description** - A brief description of the NAS share (if available).

Note: Click a column heading to sort the rows in the table by that column. Click the column heading again to reverse the sort order.

Note: Click the Information button **[i]** next to a share to display detailed information about the share and recent replication activity.

Adding a NAS Share

Add a NAS share to present the storage capacity of the DXi4000 as a NAS share that is compatible with standard backup applications. You can add up to 128 shares. When you add a share, you must specify whether it uses the NFS protocol (for Linux networks) or the CIFS protocol (for Windows networks).

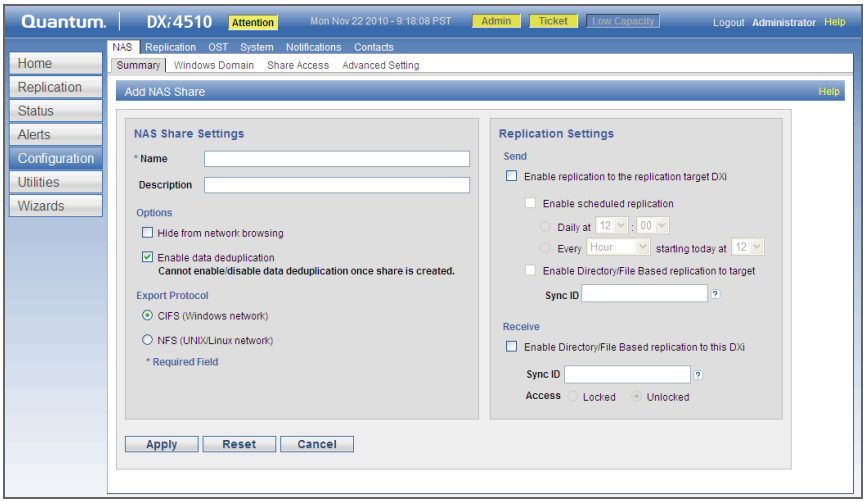
Note: If you are adding a CIFS share for use with a Windows network, you must configure the Windows domain before adding the new share (see Windows Domain on page 144).

To add a NAS share:

1 Click **Add**.

The **Add NAS Share** page displays (see Figure 79).

Figure 79 Add NAS Share Page



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

- **Name** - Enter the name of the NAS share.
- **Description** - (Optional) Enter a brief description of the share.
- **Hide from network browsing** - (CIFS shares only) Select the check box to hide the share from network browsing. If selected, you cannot see the share when browsing the network.
- **Enable data deduplication** - Select the check box to enable data deduplication. Quantum recommends that you enable data deduplication to optimize disk usage.

  Note: Data deduplication is enabled by default. You cannot enable or disable data deduplication after the share is added.

- **Export Protocol** - Select the export protocol for the share:
  - **CIFS** - Select the CIFS option to use the share on a Windows network.
  - **NFS** - Select the NFS option to use the share on a UNIX or Linux network.

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

For more information about configuring replication for a share, or to set up replication for the share at a later time, see DXi4000

Replication on page 81.

4 Click **Apply**.

Note: When you create a CIFS share, the initial permissions are the same as the default permissions for a Windows 2003 share with the addition of an ACE (Access Control Entry) that permits full access to the share for all authenticated users. Administrators can choose to remove this full access ACE, set up custom permissions, or leave the ACL (Access Control List) as it is if the server is set up in a fully trusted environment.

Editing a NAS Share

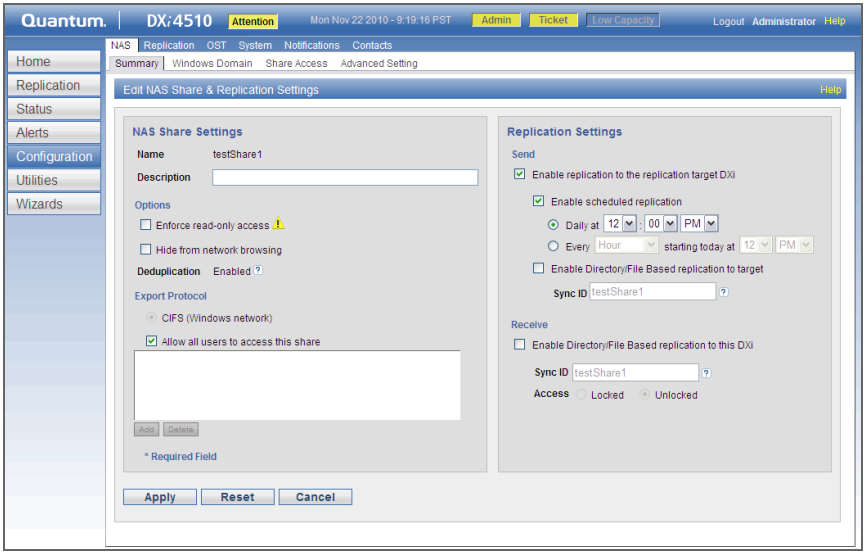
Edit a NAS share to modify the settings for the share, for example, to change the description of the share or to select different options.

To edit a NAS share:

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

The **Edit NAS Share & Replication Settings** page displays (see Figure 80).

Figure 80 Edit NAS Share & Replication Settings Page



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

Note: If you are editing a share, only the **Description**, **Enforce read-only access**, **Hide from network browsing**, and **Allow all users to access this share** options can be changed.

- **Description** - (Optional) Enter a brief description of the share.
- **Enforce read-only access** - Select the check box to make the share read only. If selected, you cannot write to the share.
- **Hide from network browsing** - (CIFS shares only) Select the check box to hide the share from network browsing. If selected, you cannot see the share when browsing the network.
- **Allow all users/hosts to access this share** - Select this check box to allow all users (CIFS shares) or hosts (NFS shares) to access the share.

  Or clear the check box to allow only specified users or hosts to access the share. To add a user or host to the access list, click **Add**. Specify the **Workgroup User** (CIFS shares) or the **Hostname or IP Address** (NFS shares) and the associated permissions (**Read Only** or **Read & Write**), and then click **Apply**.

  Note: To modify the users that are available in the **Workgroup User** list, see Share Access on page 147.

  Note: After you add a user or host to the access list, you cannot change their permissions. Instead, select the user or host in the access list and click **Delete** to remove them from the list. Then add the user or host again with the correct permissions.

3 Click **Apply**.

Note: If you modify a NAS share that uses the CIFS protocol, you must restart the CIFS service for the changes to take effect. To restart the CIFS service, first disjoin the Windows workgroup, then join it again (see Windows Domain on page 144). Restarting the CIFS service will close all active connections to the share. Most Windows workstations will automatically reconnect, but some applications may be affected.

Deleting a NAS Share

Delete a NAS share if it is no longer needed. When you delete a share, all data stored on the share is lost.

To delete a NAS share:

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

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

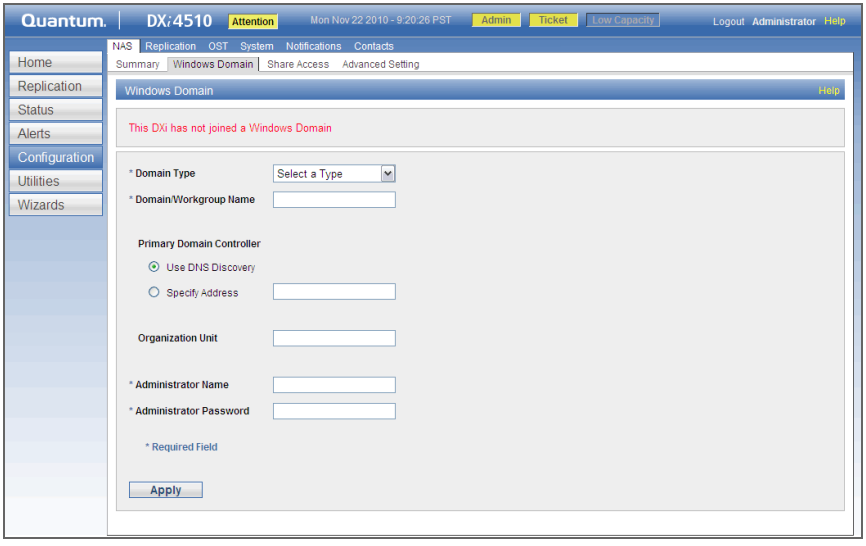
2 Click **Yes** to confirm the deletion.

Windows Domain

The **Windows Domain** page allows you to join the DXi4000 to a Windows workgroup or a Windows domain using **SMB**. To use a NAS share configured for the CIFS protocol on a Windows network, you must first join the DXi4000 to a workgroup or a domain. After you join the DXi4000 to a workgroup or a domain, CIFS shares are available for use on the Windows network.

To access the **Windows Domain** page, on the **NAS** page, click the **Windows Domain** tab (see Figure 81).

Figure 81 Windows Domain Page



Use the **Windows Domain** page to perform the following tasks:

- Join the DXi4000 to a Windows workgroup (see Joining a Windows Workgroup on page 145).
- Join the DXi4000 to a Windows domain (see Joining a Windows Domain on page 145).
- Remove the DXi4000 from a Windows workgroup or domain (see Disjoining a Workgroup or Domain on page 147).

Joining a Windows Workgroup

Join a Windows workgroup to add the DXi4000 to a workgroup on a Windows network. After you join a workgroup, CIFS shares are available for use on the Windows network.

To join a Windows workgroup:

1. Enter the following information about the Windows domain:
   - **Domain Type** - Select Workgroup.
   - **Domain/Workgroup Name** - Enter the workgroup name.

     The workgroup name can be the name of an existing workgroup or a new workgroup (for example, **Workgroup** or **Sales**).
2. Click **Apply**.

Note: When an SMB server is joined to a workgroup, share security is managed directly from the remote management console. For a CIFS share, security is provided through the read only or read/write access to the share. By default, when a CIFS share is created, the default security setting allows access for all users. Any access restrictions on individual users can be managed by editing a share on the NAS Summary page (see Editing a NAS Share on page 142).

Joining a Windows Domain

Join a Windows domain to add the DXi4000 to a Windows network using Active Directory. After you join a domain, CIFS shares are available for use on the Windows network.

Before joining a Windows domain, make sure the date and time on the DXi4000 is correct and is synchronized with the Active Directory Services

(ADS) server (see Date & Time on page 190). The time difference between the DXi4000 and the ADS server (domain controller) must be less than 300 seconds. Quantum recommends using the same NTP server for the DXi4000 and the ADS server to keep them synchronized.

To join a Windows domain:

1 Enter the following information about the Windows domain:

- **Domain Type** - Select **Active Directory**.
- **Domain/Workgroup Name** - Enter the domain name.
- **Primary Domain Controller** - Select an option for the Primary Domain Controller (PDC):
  - **Use DNS Discovery** - Discover the PDC automatically.
  - **Specify Address** - Enter the fully qualified name or the IP address of the PDC.
- **Organization Unit** - (Optional) Enter the name of the organizational unit in the domain.

  The DXi4000 will become a member of this organization.
- **Administrator Name** - Enter **Administrator** or any user that has the right to join the domain.

  By default, any user belonging to the **Administrators** group or the **Domain Admins** group has the right to join the domain. In addition, any user can join the domain if they are specifically delegated this right by a member of the **Administrators** group.
- **Administrator Password** - Enter the password for the user entered above.

2 Click **Apply**.

Note: When the system is joined to the Active Directory domain, share security is managed by the MMC (Microsoft Management Console) that is running on the domain controller. By default, when a CIFS share is created, the default security setting allows access for all users. Any access restrictions on individual users must be managed from the MMC.

Note: When using Active Directory with network segmentation, ADS management must be performed on the CIFS IP address, *not* the management or replication IP address (see Network on page 176).

Disjoining a Workgroup or Domain

Disjoin a workgroup or a domain to remove the DXi4000 from a Windows workgroup or domain. After you disjoin the workgroup or domain, CIFS shares are no longer available for use on the Windows network

To disjoin a workgroup or domain, click **Disjoin**.

Share Access

The **Share Access** page allows you to manage workgroup users when the DXi4000 is joined to a Windows workgroup, or manage share administrators when the DXi4000 is joined to a Windows domain using Active Directory. You can add users or administrators, change user privileges, and delete users or administrators. Available users or administrators can be granted access to NAS shares configured for the CIFS protocol.

Note: You must join a Windows workgroup or domain before you can add workgroup users or share administrators (see Windows Domain on page 144). The **Share Access** page is different depending on whether the DXi is joined to a workgroup or domain.

To access the **Share Access** page, on the **NAS** page, click the **Share Access** tab (see Figure 82 and Figure 83).

Figure 82 Share Access Page (Windows Workgroup)

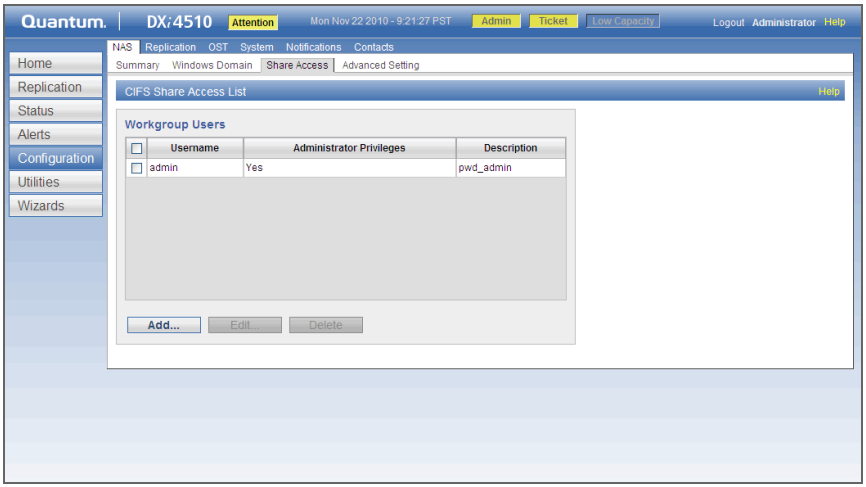
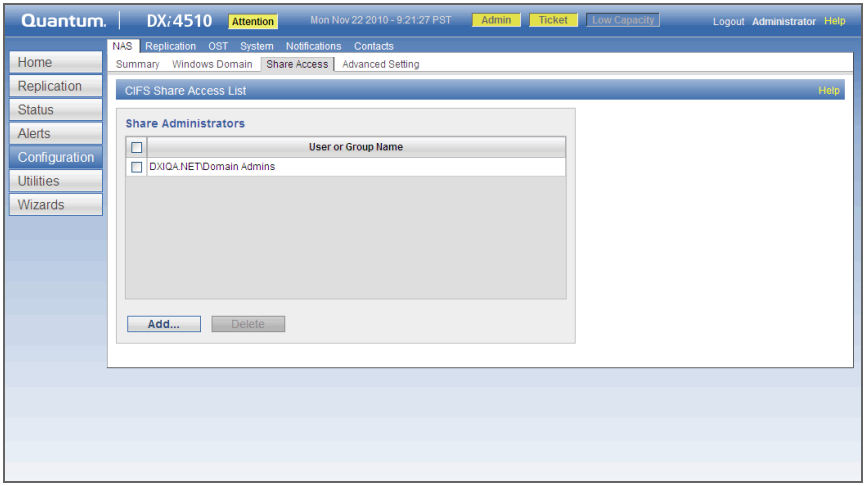


Figure 83 Share Access Page (Active Directory)



Use the **Share Access** page to perform the following tasks:

- View information about workgroup users or share administrators (see Workgroup Users or Share Administrators on page 149).
- Add a workgroup user or a share administrator (see Adding a Workgroup User or Share Administrator on page 149).
- Edit a workgroup user (see Editing a Workgroup User on page 151).

- Delete a workgroup user or a share administrator (see Deleting a Workgroup User or Share Administrator on page 152).

Workgroup Users or Share Administrators

If the DXi4000 is joined to a Windows workgroup, the **Workgroup Users** section displays the following information about workgroup users:

- **Username** - The name of the workgroup user.
- **Administrator Privileges** - The privileges of the workgroup user (**Yes** if the user has administrator privileges, **No** if they do not.)
- **Description** - A brief description of the workgroup user (if available).

If the DXi4000 is joined to a Windows domain using Active Directory, the **Share Administrators** section displays the following information about share administrators:

- **User or Group Name** - The fully qualified name of the user or group.

Adding a Workgroup User or Share Administrator

Add a workgroup user or share administrator to be able to grant that user or administrator access to CIFS shares.

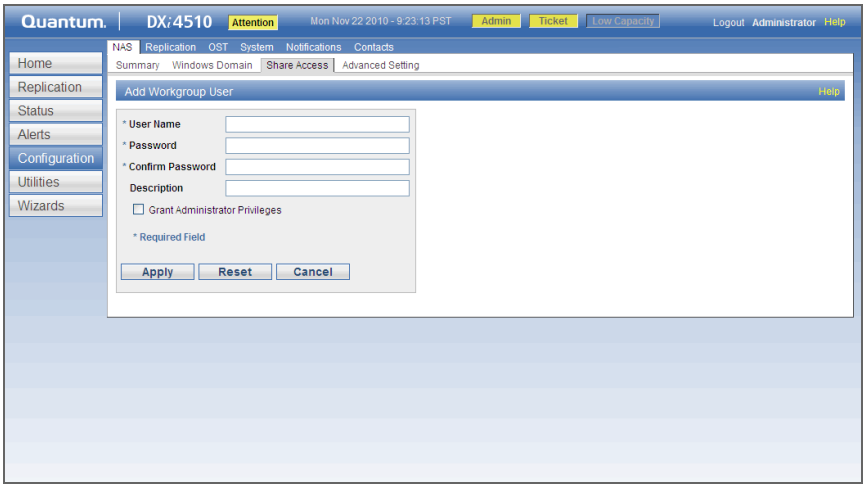
Windows Workgroup

To add a workgroup user for a Windows workgroup:

1. Click **Add**.

   The **Add Workgroup User** page displays (see Figure 84).

Figure 84 Add Workgroup User Page



2 Enter information about the workgroup user:

- **User Name** - Enter the name of the workgroup user.
- **Password** - Enter the password for the workgroup user.
- **Confirm Password** - Enter the password again to confirm it.
- **Description** - (Optional) Enter a brief description of the workgroup user.
- **Grant Administrator Privileges** - Select the check box to add the workgroup user to the Windows Administrators group.

  This allows the workgroup user to override certain permissions settings and prevents the workgroup user from being locked out of shares or directories.

3 Click **Apply**.

After you create a workgroup user, you can grant the user access to a NAS share (see Editing a NAS Share on page 142).

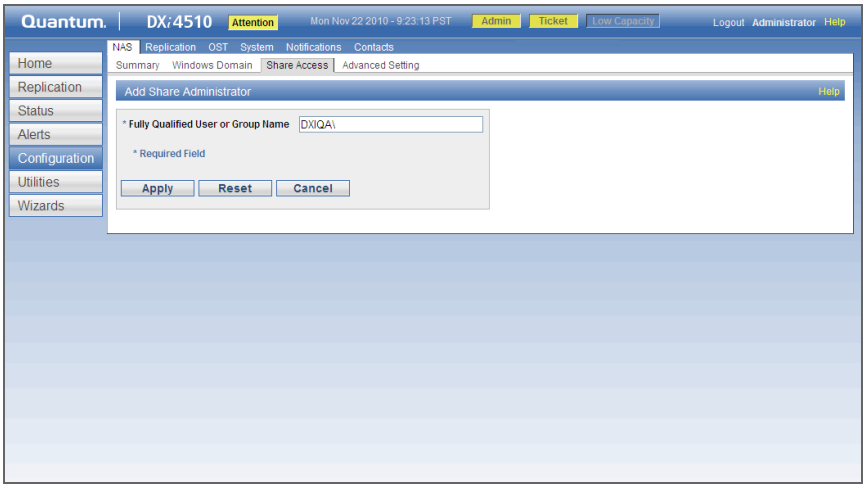
Windows Domain

To add a share administrator for a Windows domain:

1 Click **Add**.

The **Add Share Administrator** page displays (see Figure 85).

Figure 85 Add Share Administrator Page



2 Enter the **Fully Qualified User or Group Name** of the share administrator.

3 Click **Apply**.

Use the MMC (Microsoft Management Console) to manage users (see ADS Share Permissions on page 153).

Editing a Workgroup User

Edit a workgroup user to change the user's password or description, or to change the user's administrator privileges.

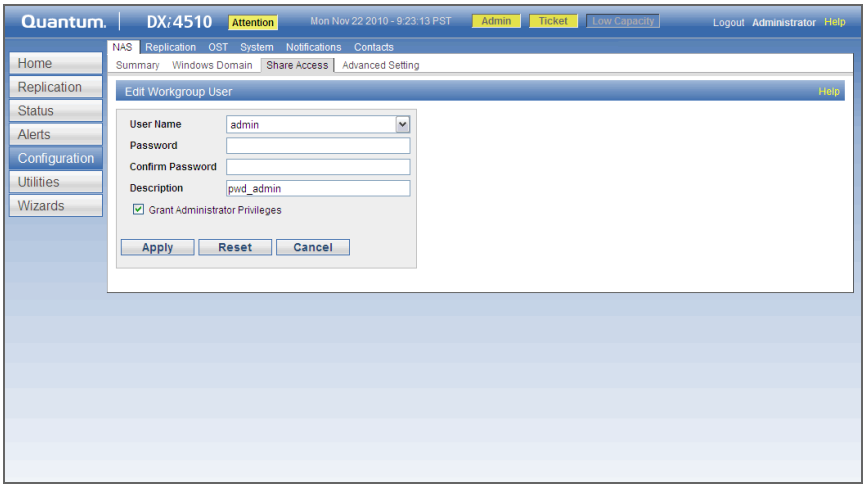
Note: You cannot edit a share administrator. Instead, delete the share administrator, then add a new share administrator.

To edit a workgroup user:

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

The **Edit Workgroup User** page displays (see Figure 86).

Figure 86 Edit Workgroup User Page



2 Enter information about the workgroup user:

Note: If you are editing a workgroup user, you cannot change the **User Name**.

- **User Name** - (Optional) Select a different workgroup user to edit.
- **Password** - Enter the password for the workgroup user.
- **Confirm Password** - Enter the password again to confirm it.
- **Description** - (Optional) Enter a brief description of the workgroup user.
- **Grant Administrator Privileges** - Select the check box to add the workgroup user to the Windows Administrators group.

  This allows the workgroup user to override certain permissions settings and prevents the workgroup user from being locked out of shares or directories.

3 Click **Apply**.

Deleting a Workgroup User or Share Administrator

Delete a workgroup user or share administrator if the user or administrator no longer needs to access CIFS shares.

To delete a workgroup user or share administrator, select the user or administrator and click **Delete**.

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

ADS Share Permissions

To manage user access to CIFS shares when the DXi4000 is joined to a Windows domain, use the MMC (Microsoft Management Console). Log onto the MMC on the domain controller and access a share's properties to set share permissions for users.

Note: In some cases, when you view file permissions on a Windows system, you will not see the user and group information. Instead you will see the SID (security ID) which appears as a series of numbers. This occurs when you move files (for example, using a backup utility or DOS **xcopy**) from one system to another system, and the user and group from the source system do not exist on the target system.

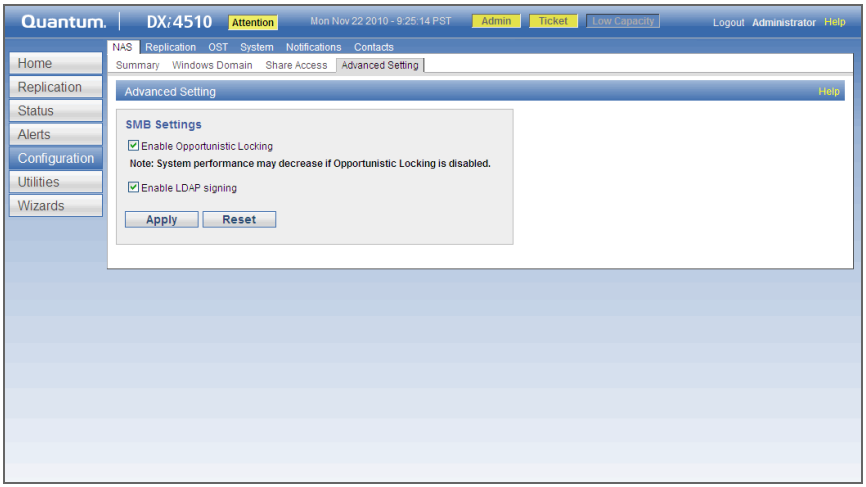
Often users and groups are unique to a particular scope, such as a Windows system or an ADS domain. As a result, some assigned permissions might not be available on the target system because the associated user and group do not exist there. However, common groups (for example, **Administrators**, **Users**, and **Everyone**) are recognized on most Windows systems and domains.

Advanced Setting

The **Advanced Setting** page allows you to enable or disable advanced SMB settings.

To access the **Advanced Setting** page, on the **NAS** page, click the **Advanced Setting** tab (see Figure 87).

Figure 87 Advanced Setting Page



To enable or disable advanced SMB settings:

1 Select the check box to enable, or clear the check box to disable, the following settings:

- **Enable Opportunistic Locking** - (Enabled by default) Opportunistic locking lets clients lock files and locally cache information without the risk of another user changing the file. This increases performance for many file operations, but it may decrease performance in other operations because the server that grants the opportunistic lock must manage the breaking of that lock when another user requests access to the file.

  Note: System performance may decrease if **Opportunistic Locking** is disabled.

- **Enable LDAP signing** - (Disabled by default) An Active Directory Services (ADS) server can be configured to require signing to authenticate users. If the DXi4000 is joined to a Windows domain that is configured to require signing, you should enable LDAP signing.

  Note: Before enabling LDAP signing, coordinate with your ADS administrator.

2 Click **Apply**.

Replication

The **Replication Configuration** page allows you to configure the DXi4000 to act as a replication source or target. A source *sends* replicated data to a target, and a target *receives* replicated data from up to 10 sources. A DXi4000 can act as both a source and a target.

Note: For more information about data replication, or to perform data replication, see DXi4000 Replication on page 81.

To access the **Replication Configuration** page, click the **Configuration** menu, and then click the **Replication** tab.

The **Replication Configuration** page contains the following tabs:

- Replication Send
- Replication Receive

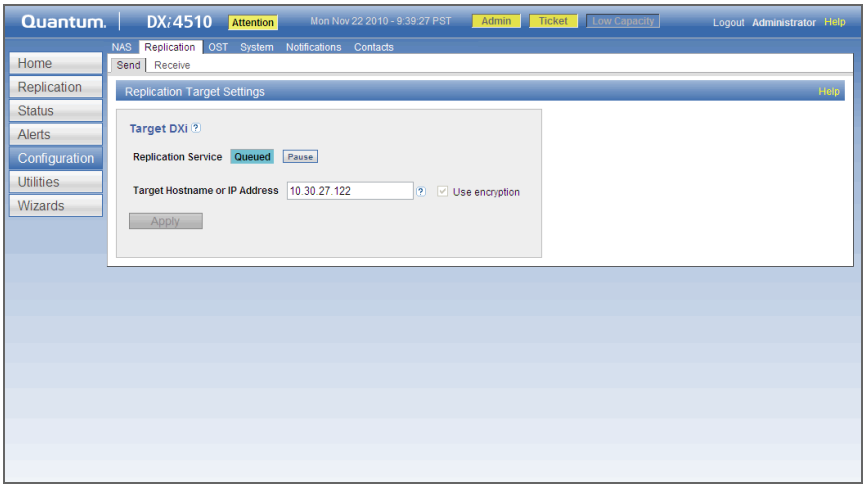
Replication Send

The **Replication Send** page allows you to specify the target system the DXi4000 will send replicated data to. You must specify the replication target before you enable replication for a NAS share. When replication is enabled for a share, replicated data is sent to the target system during scheduled or manual replication.

Note: For more information about enabling and scheduling replication for a share, see Send NAS on page 88.

To access the **Replication Send** page, on the **Replication Configuration** page, click the **Send** tab (see Figure 88).

Figure 88 Replication Send Page



To specify the replication target:

1 If you have previously specified a replication target, you must pause the replication service before changing the target.

Replication Service displays the replication status of the DXi4000. Click **Pause** to pause replication activity. Click **Resume** to resume replication activity.

Note: For a detailed description of all possible replication statuses, see Replication Overview on page 76.

2 In the **Target Hostname or IP Address** box, enter the hostname or IP address of the system that will receive the replicated data.

Note: When entering IP addresses, never use an address that is in a reserved IP address range. To see a list of reserved IP address ranges, click the quick tip icon **[?]** located near the IP address field.

Note: To use hostname format, you must specify at least one DNS IP address on the **Network** page (see Network on page 176).

3 (Optional) Clear the **Use Encryption** check box to disable encryption when sending the snapshot to the destination.

Note: Encryption is enabled by default. However, for best performance, if your data network is already secured, you should clear the **Use Encryption** check box.

4 Click **Apply**.

5 If necessary, click **Resume** to resume the replication service.

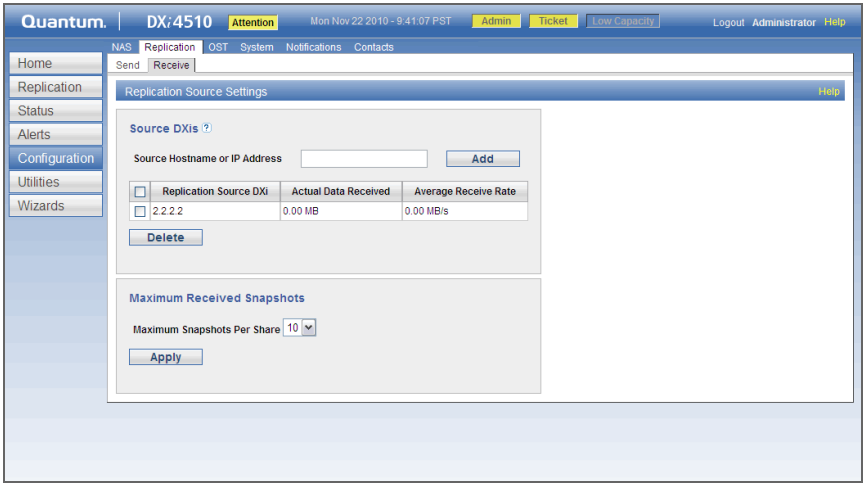
Replication Receive

The **Replication Receive** page allows you to specify the source systems the DXi4000 will receive replicated data from. You must add a source system to the list of allowed replication sources before you configure the source to send replicated data to the DXi4000. The DXi4000 can receive replicated data from up to 10 sources. You can also specify the number of received snapshots that are retained for each source.

Note: For more information about working with received snapshots, see Receive NAS on page 97.

To access the **Replication Receive** page, on the **Replication Configuration** page, click the **Receive** tab (see Figure 89).

Figure 89 Replication Receive Page



Use the **Replication Receive** page to perform the following tasks:

- View information about allowed replication source systems (see Source DXis on page 158).
- Add a system to the list of allowed replication sources (see Adding a Replication Source on page 158).
- Delete a system from the list of allowed replication sources (see Deleting a Replication Source on page 159).
- Specify the maximum number of received snapshots to retain for each source (see Maximum Received Snapshots on page 159).

Source DXis

The **Replication Receive** page displays the following information for each source DXi:

- **Replication Source DXi** - The IP address of the source system that is allowed to send data to the DXi4000.
- **Actual Data Received** - The amount of data actually received over the network during replication or failback.
- **Average Receive Rate** - The average receive rate (in MB/s) of data received over the network during replication or failback (**Actual Data Received** divided by the amount of time required to complete replication or failback).

Note: The statistics on the **Replication Receive** page are for each source DXi rather than a cumulative total for all sources as is displayed on the **Home** page.

Adding a Replication Source

Add a system to the list of replication sources to allow it to send replicated data to the DXi4000. You can specify up to 10 replication sources.

To add a replication source:

1. In the **Source Hostname or IP Address** box, enter the hostname or IP address of the system that will send the replicated data to the DXi4000.

Note: To use hostname format, you must specify at least one DNS IP address on the **Network** page (see Network on page 176).

2 Click **Add**.

Deleting a Replication Source

Delete a system from the list of replication sources if it will no longer send replicated data to the DXi4000. After the source system is deleted, the DXi4000 will no longer accept replicated data from that system.

To delete a replication source:

1 Select the system in the **Source DXis** list.

2 Click **Delete**.

Note: If a source DXi is deleted from the list, its contribution to the cumulative totals on the **Home** page are not removed until you clear **Receive** statistics (see Replication Performance on page 111).

Maximum Received Snapshots

During scheduled or manual data replication, the DXi4000 receives a snapshot from the source system. A snapshot contains all of the data necessary to fully recover or failback a NAS share to the point in time when the snapshot was saved.

The DXi4000 can retain up to 24 snapshots for each replicated share. Once the maximum number of snapshots have been saved, the oldest snapshot is deleted to make room for each new snapshot that is received.

To configure the maximum number of received snapshots:

1 In the **Maximum Snapshots Per Share** drop-down box, select the number of snapshots to retain for each replicated share.

The default value is 10. The maximum value is 24.

2 Click **Apply**.

OST

The **OST** page allows you to configure the DXi4000 to present its storage capacity as storage servers using OpenStorage (OST) technology. You can also add one or more Logical Storage Units (LSUs) to a storage server. Storage servers and LSUs are compatible with backup applications that support OST, such as Symantec NetBackup and Symantec Backup Exec.

The **OST** page also allows you to manage authenticated users. To authenticate OST devices on a media server, you must create OST user credentials. After you create the OST user credentials, enter them in the backup application to authenticate OST devices on the media server.

To access the **OST** page, click the **Configuration** menu, and then click the **OST** tab.

The **OST** page contains the following tabs:

- Storage Servers
- LSU
- Manage Users
- OST Client Plug-In

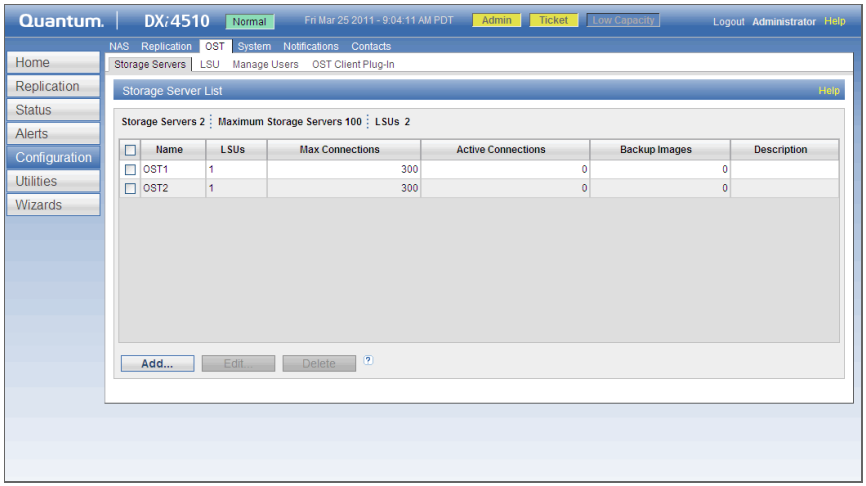
Storage Servers

The **Storage Servers** page allows you to manage OST storage servers on the DXi4000. You can view information about existing storage servers, add or edit storage servers, and delete storage servers.

Note: When using OST with network segmentation, I/O must be performed on the data IP address, *not* the management or replication IP address (see Network on page 176).

To access the **Storage Servers** page, on the **OST** page, click the **Storage Servers** tab (see Figure 90).

Figure 90 Storage Servers Page



Use the **Storage Servers** page to perform the following tasks:

- View information about existing storage servers (see Storage Server List on page 161).
- Add a new storage server to the system (see Adding a Storage Server on page 162).
- Edit properties for an existing storage server (see Editing a Storage Server on page 164).
- Delete a storage server from the system (see Deleting a Storage Server on page 165).

Storage Server List

The **Storage Server List** displays the following information for all storage servers on the DXi4000:

- **Storage Servers** - The number of storage servers that have been added to the system.
- **Maximum Storage Servers** - The maximum number of storage servers that can be added to the system.
- **LSUs** - The number of logical storage units (LSUs) that have been added to the system (see LSU on page 166).
- **Name** - The name of the storage server.

- **LSUs** - The number of LSUs that have been added to the storage server.
- **Max Connections** - The maximum number of connections allowed to the storage server.
- **Active Connections** - The number of currently active connections to the storage server.
- **Backup Images** - The number of backup images on the storage server.
- **Description** - A brief description of the storage server (if available).

Note: Click a column heading to sort the rows in the table by that column. Click the column heading again to reverse the sort order.

Note: The connections of a storage server that are used equals the data streams plus one for each LSU polling. A backup job may generate more than one data stream if the data can be read in parallel. For example, a policy that is backing up A, B, C, and D, drives of a Windows system can generate four data streams in parallel.

Adding a Storage Server

Add a storage server to present the storage capacity of the DXi4000 as LSUs that are compatible with backup applications that support OST. You can add up to 100 storage servers. When adding a storage server, you must also add an LSU to the storage server. (For more information about LSUs, see LSU on page 166.)

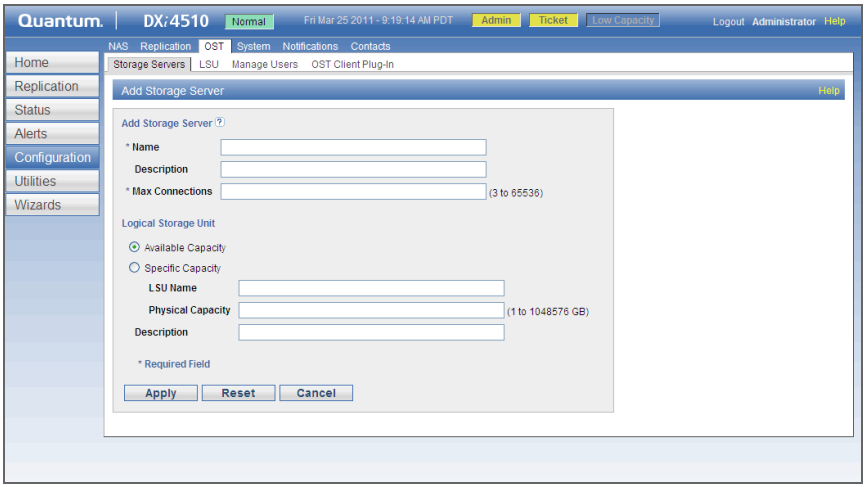
Note: Data on storage servers is always deduplicated.

To add a storage server:

1 Click **Add**.

The **Add Storage Server** page displays (see Figure 91).

Figure 91 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.

- **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).

  Note: Quantum recommends setting **Max Connections** to 300.

3 Under **Logical Storage Unit**, select the type of 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 170).

- **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.

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

Editing a Storage Server

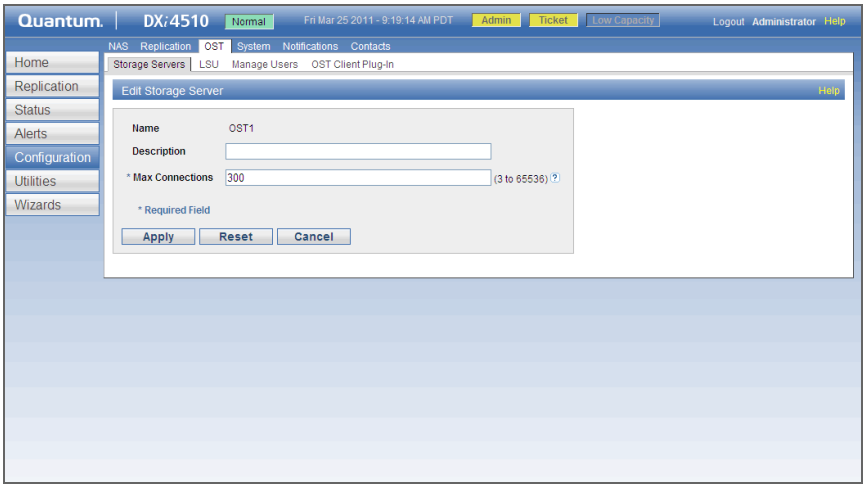
Edit a storage server to change the description of the storage server or the maximum number of allowed connections.

To edit a storage server:

1. Select the storage server and click **Edit**.

   The **Edit Storage Server** page displays (see Figure 92).

Figure 92 Edit Storage Server Page



2 Enter information about the storage server:

Note: If you are editing a storage server, only the **Description** and **Max Connections** options can 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 number of connections cannot be changed if the storage server has more than zero currently active connections. The number of active connections is displayed on the **OST** page (see Storage Server List on page 161).

  Note: Quantum recommends setting **Max Connections** to 300.

3 Click **Apply**.

Deleting a Storage Server

Delete a storage server if it is no longer needed. When you delete a storage server, all data stored on the storage server is lost.

Note: If you deleted the storage server from Symantec NetBackup or Symantec Backup Exec, you must wait several minutes before deleting the storage server from the DXi4000.

To delete a storage server:

1 Select the storage server in the **Storage Server List**.

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 (see Storage Server List on page 161). 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 170).

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

2 Click **Delete**.

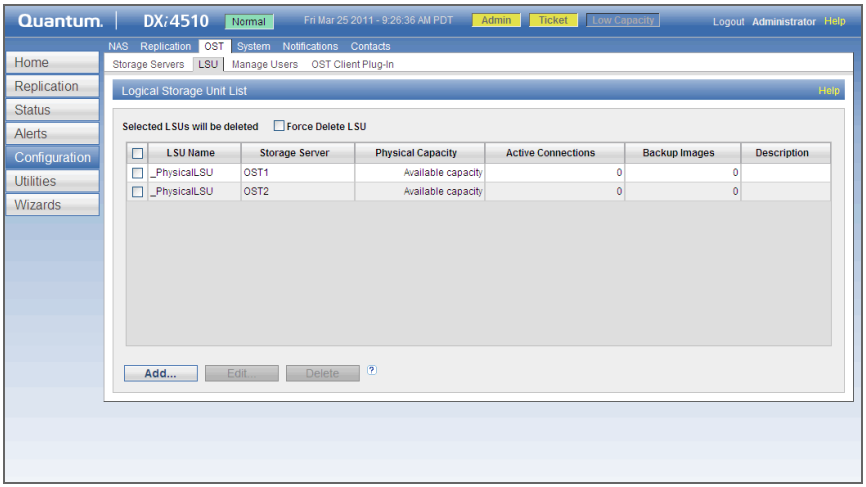
LSU

The **LSU** page allows you to manage the logical storage units (LSUs) contained on OST storage servers on the DXi4000. You can view information about existing LSUs, add or edit LSUs, and delete LSUs.

Note: When using OST with network segmentation, I/O must be performed on the OST IP address, *not* the management or replication IP address (see Network on page 176).

To access the **LSU** page, on the **OST** page, click the **LSU** tab (see Figure 93).

Figure 93 LSU Page



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

- View information about existing LSUs (see Logical Storage Unit List on page 167).
- Add a new LSU to the system (see Adding an LSU on page 168).
- Edit properties for an existing LSU (see Editing an LSU on page 169).
- Delete an LSU from the system (see Deleting an LSU on page 170).

Logical Storage Unit List

The **Logical Storage Unit List** displays the following information for all LSUs on the DXi4000:

- **LSU Name** - The name of the LSU.
- **Storage Server** - The storage server that contains the LSU.
- **Physical Capacity** - The physical storage capacity of the LSU.
- **Active Connections** - The number of currently active connections to the LSU.
- **Backup Images** - The number of backup images on the LSU.
- **Description** - A brief description of the LSU (if available).

Note: Click a column heading to sort the rows in the table by that column. Click the column heading again to reverse the sort order.

Adding an LSU

Add an LSU to a storage server to present the storage capacity of the DXi4000 as an LSU that is compatible with backup applications that support OST. You can add an LSU with a specific capacity, or you can add an LSU that uses the available capacity of the DXi4000.

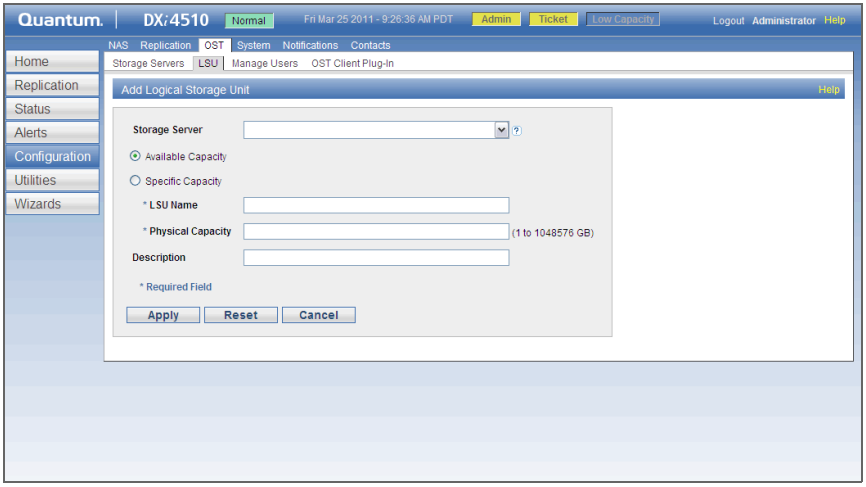
Note: You must create a storage server before you can add an LSU (see Adding a Storage Server on page 162).

To add an LSU to a storage server:

1 Click **Add**.

The **Add Logical Storage Unit** page displays (see Figure 94).

Figure 94 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 170).

- **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. Click **Apply**.

Editing an LSU

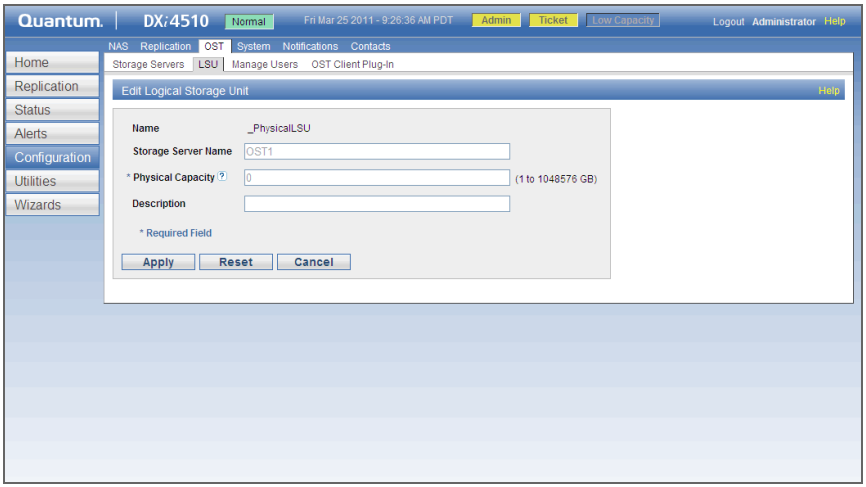
Edit an LSU to change the description of the storage server or the maximum number of allowed connections.

To edit an LSU:

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

   The **Edit Logical Storage Unit** page displays (see Figure 95).

Figure 95 Edit Logical Storage Unit Page



2 Enter information about the LSU:

Note: If you are editing an available capacity LSU, only the **Description** option can be changed. If you are editing a specific capacity LSU, only the **Physical Capacity** and **Description** options can 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 (see Logical Storage Unit List on page 167).

- **Description** - (Optional) Enter a brief description of the LSU.

3 Click **Apply**.

Deleting an LSU

Delete an LSU if it is no longer needed. When you delete an LSU, all data stored on the LSU is lost.

Note: If you deleted the LSU from Symantec NetBackup or Symantec Backup Exec, you must wait several minutes before deleting the LSU from the DXi4000.

To delete an LSU:

1 Select the LSU in the **Logical Storage Unit List**.

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 (see Logical Storage Unit List on page 167).

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.

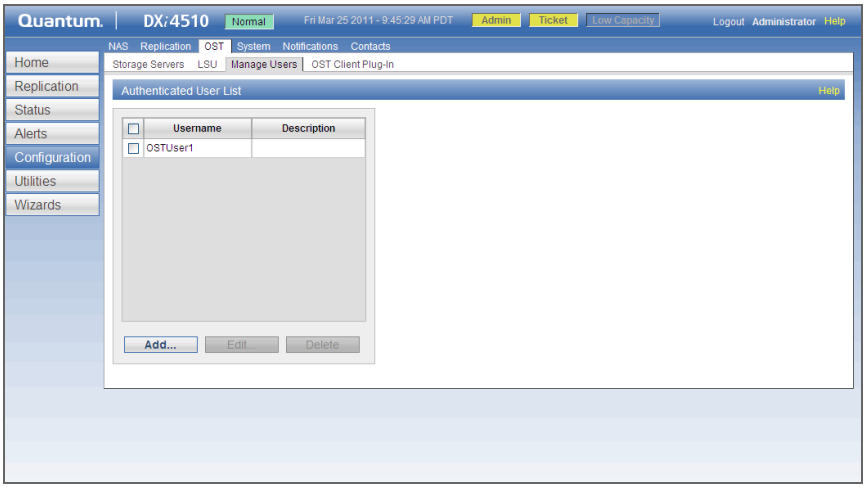
3 Click **Delete**.

Manage Users

The **Manage Users** page allows you to create and manage authenticated users for use with OST. After you create the OST user credentials, enter them in the backup application to authenticate OST devices on the media server.

To access the **Manage Users** page, on the **OST** page, click the **Manage Users** tab (see Figure 96).

Figure 96 Manage Users Page



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

- View information about authenticated users (see Authenticated User List on page 172).
- Add an authenticated user (see Adding an Authenticated User on page 172).
- Edit an authenticated user (see Editing an Authenticated User on page 173).
- Delete an authenticated user (see Deleting an Authenticated User on page 174).

Authenticated User List

The **Authenticated User List** section displays the following information for all authenticated users:

- **Username** - The name of the authenticated user.
- **Description** - A brief description of the authenticated user (if available).

Adding an Authenticated User

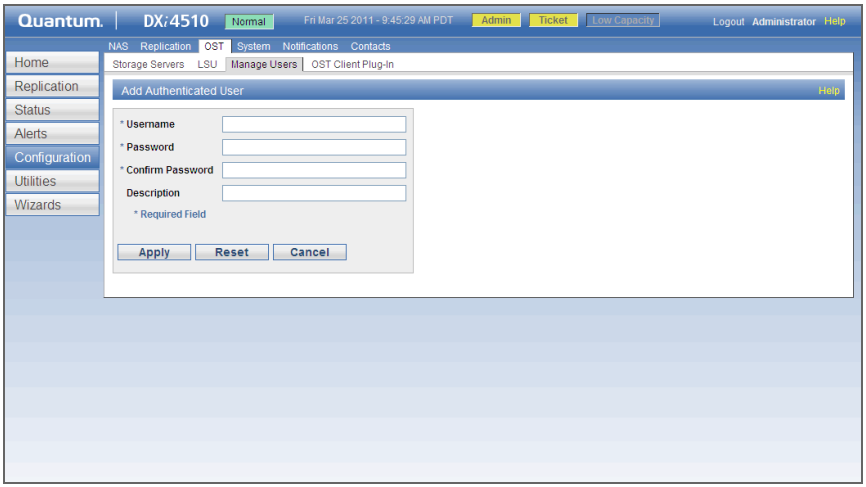
Add an authenticated user to create OST user credentials. The OST user credentials are required to authenticate OST devices on a media server.

To add an authenticated user:

1 Click **Add**.

The **Add Authenticated User** page displays (see Figure 97).

Figure 97 Add Authenticated User Page



2 Enter information about the authenticated user:

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

3 Click **Apply**.

Editing an Authenticated User

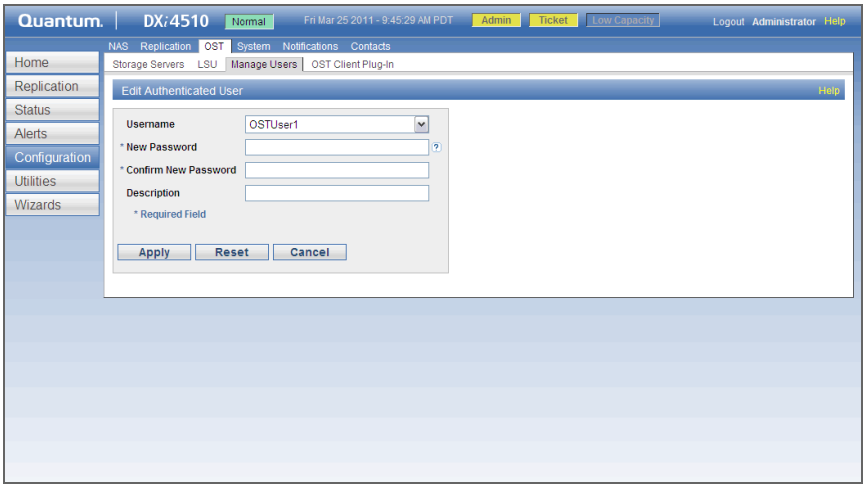
Edit an authenticated user to change the user's password or description.

To edit an authenticated user:

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

The **Edit Authenticated User** page displays (see Figure 98).

Figure 98 Edit Authenticated User Page



2 Enter information about the authenticated user:

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

- **Username** - (Optional) Select a different authenticated user to edit.
- **New Password** - Enter the password for the authenticated user.
- **Confirm New Password** - Enter the password again to confirm it.
- **Description** - (Optional) Enter a brief description of the authenticated user.

3 Click **Apply**.

Deleting an Authenticated User

Delete an authenticated user if the OST user credentials are no longer needed to authenticate OST devices on a media server.

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

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

OST Client Plug-In

Use the **OST Client Plug-In** page to download the Quantum OST Plug-in.

OST (OpenStorage) technology allows Symantec NetBackup and Backup Exec to seamlessly integrate with the DXi4000. Using OST, NetBackup and Backup Exec can manage backups through the DXi4000 and can take advantage of the system's capabilities, such as data deduplication and replication. To use OST, you must first download the OST Plug-in and install it on the NetBackup or Backup Exec media server.

To download the OST Plug-in, click **Client Plug-in Download**. On the download page, download the correct OST Plug-in for your backup application and operating system. Also on the download page, click **Installation Instructions**, to download the *OST Plug-in Installation Instructions*. Follow the included instructions to install the OST Plug-in on your media server.

Note: For information about configuring and using OST with the DXi4000, see the *Symantec NetBackup OST Configuration Guide* and the *Symantec Backup Exec OST Configuration Guide*.

System

The **System** page allows you to configure system settings for the DXi4000, including network settings, system date and time, and security settings.

To access the **System** page, click the **Configuration** menu, and then click the **System** tab.

The **System** page contains the following tabs:

- Network
- Date & Time
- Security

Network

The **Network** page allows you to view and change network configuration information for the DXi4000. The DXi4000 uses this information to connect to the network.

Network configuration information is entered during initial setup DXi4000. You should consult your network administrator before making any changes to the network settings.

Caution: Changing the network configuration requires a system reboot for all system services to function correctly. The system automatically reboots immediately after you apply changes.

Note: Rebooting the system can take several minutes. After the new network configuration is saved, close your Web browser and wait 15 minutes before logging in again. If you change the IP address that you use to log in to the system, you will temporarily lose your connection to the remote management console. Because of this, you might not see a confirmation page informing you that the new settings have been saved.

To access the **Network** page, on the **System** page, click the **Network** tab.

Use the **Network** page to perform the following types of network configuration:

- **Basic** - The **Basic** network option allows you to configure the DXi4000 with a single bonded interface. All physical Ethernet ports are bonded together to act as a single interface (logical port). This interface is used for all types of network traffic (replication, management, and data) and uses one set of network settings.

  The **Basic** network option is simpler to set up and meets typical network and performance needs. Use the **Basic** option unless you are sure you need to use a custom or segmented configuration. To choose this option, see Basic Network Configuration on page 177.

- **Custom** - The **Custom** network option allows you to configure the DXi4000 with individual IP subnet information for each physical interface. In addition, you can also create bonded interfaces (logical ports) consisting of two or more physical ports.

The **Custom** network option provides a great amount of flexibility to meet specific network needs but is more complex to set up and may require switch configuration changes. Use the **Custom** network option only if it is required by your network. To choose this option, see Custom Network Configuration on page 180.

- **Segmented** - The **Segmented** network option allows you to configure the DXi4000 with network segmentation. You can select from different bonding scenarios that route different types of network traffic (replication, management, and data) over different network interfaces. Each type of traffic uses its own set of network settings.

  The **Segmented** network option can provide performance and security advantages for some networks but is more complex to set up and may require switch configuration changes. Use the **Segmented** network option only if it is required by your network. To choose this option, see Segmented Network Configuration on page 185.

Basic Network Configuration

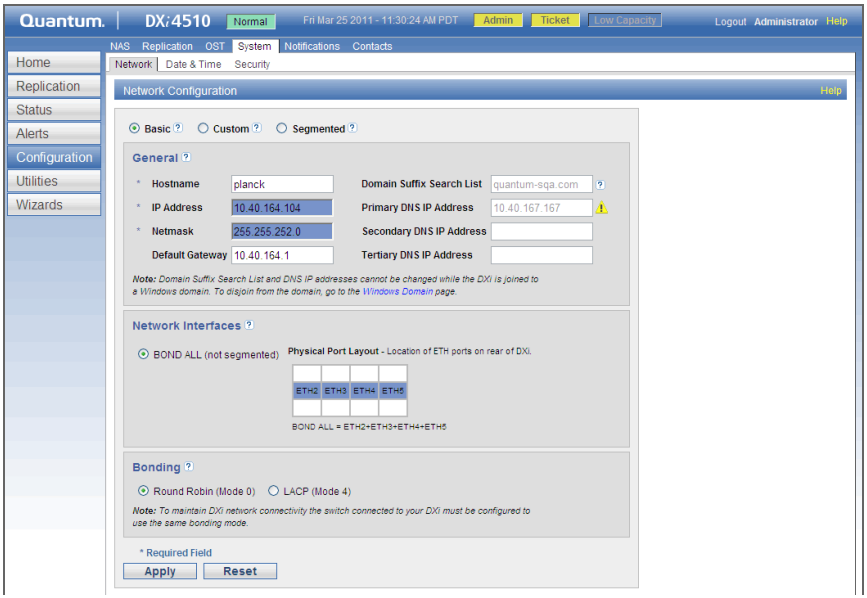
With basic network configuration, all physical Ethernet ports are bonded together in a single network interface (logical port). All types of network traffic (replication, management, and data) are routed over this interface. Because there is only one network interface, only a single group of network settings are required.

Note: To revert to the previous settings without making changes, click **Reset**. For network changes to take effect, you must apply the changes, finalize the confirmation, and reboot the system.

To perform basic network configuration:

1 On the **Network** page, select the **Basic** option (see Figure 99).

Figure 99 Basic Network Configuration



2 Under **General**, enter the following network information as provided by your network administrator:

Note: When entering IP addresses, never use an address that is in a reserved IP address range. To see a list of reserved IP address ranges, click the quick tip icon [?] located near the IP address field.

- **Hostname** - The hostname of the DXi4000.
- **IP Address** - The IP address of the DXi4000.
- **Netmask** - The network mask of the DXi4000.
- **Default Gateway** - The default gateway IP address.

  Specifying a default gateway is optional if all access is local to a particular subnet. For example, if the DXi4000 and all of its clients are on the same subnet, you do not need to specify a default gateway.

Caution: Specifying a default gateway is required to enable connectivity with all subnets other than those that the DXi4000 is directly connected to. For example, if the DXi4000 and its clients are on different subnets, you must specify a default gateway.

- **Domain Suffix Search List** - (Optional) The local domain to search first when resolving domain names.

  The domain suffix is a single domain name. The domain name may contain only letters (A–Z), numbers (0–9), dots (.), and hyphens (-).

- **Primary, Secondary, and Tertiary DNS IP Address** - (Optional) The IP address of up to three DNS servers used to resolve domain names and translate them into IP addresses.

Note: You must specify a DNS IP address if you plan to use hostname format when configuring an NTP time server, outgoing e-mail server, replication sources and targets, and other information.

Note: The **Domain Suffix Search List** and **DNS IP Addresses** cannot be modified if the DXi4000 is currently joined to a Windows domain. To disjoin a Windows domain, see Windows Domain on page 144.

3 Under **Network Interfaces**, select the type of Ethernet ports to use for the bonded interface:

- **BOND ALL 1GB** - Use the 1GbE Ethernet ports for all traffic types.

Note: The grid displays a graphical representation of the Ethernet as they appear on the rear of the system. Ports that are bonded together in an interface are shaded the same color.

4 Under **Bonding**, select the bonding mode:

Note: To maintain network connectivity, the switch connected to the DXi4000 must be configured to use the same bonding mode. The best time to change the bonding mode on the switch is during the next reboot of your system, after saving the new network settings. Changing the bonding mode on the switch before saving these settings and rebooting may result in the loss of network connectivity to the system.

- **Round Robin (Mode 0)** - This option sends Ethernet frames using the bonded Ethernet ports with a valid MII link. Frames are sent in a round-robin fashion, starting with the first slave device and then the rest of the devices. This only applies to the traffic sent from the DXi4000. The Ethernet switch needs to aggregate the ports, so the connected ports are treated as a logical port. The frame reception is completely dependent on the transmission algorithm of the Ethernet switch. The bonding mechanism does not balance the frame reception.
- **LACP (Mode 4)** - This option (Link Aggregation Control Protocol) is based on the 802.3ad IEEE standard for aggregating Ethernet ports. If the bonding algorithm is set to LACP, the Ethernet switch ports must be configured in a 802.3ad based Link Aggregation group (LAG) in LACP mode. The frame reception and transmission is controlled by the LACP between the bonded ports and the Ethernet switch ports.

5 Click **Apply**.

Custom Network Configuration

With **Custom** network configuration, each individual interface on the DXi can be configured as a subnet with its own network settings. Each physical Ethernet port can be configured as an interface. In addition, you can also create bonded interfaces (logical ports) consisting of two or more physical ports.

When using a **Custom** network configuration, the DXi does not use segmentation to route different types of traffic over different interfaces. Instead, any traffic can pass through any of the configured Ethernet ports. This means that the routing of different traffic types must be controlled using the network infrastructure (routers and switches) that the DXi is connected to.

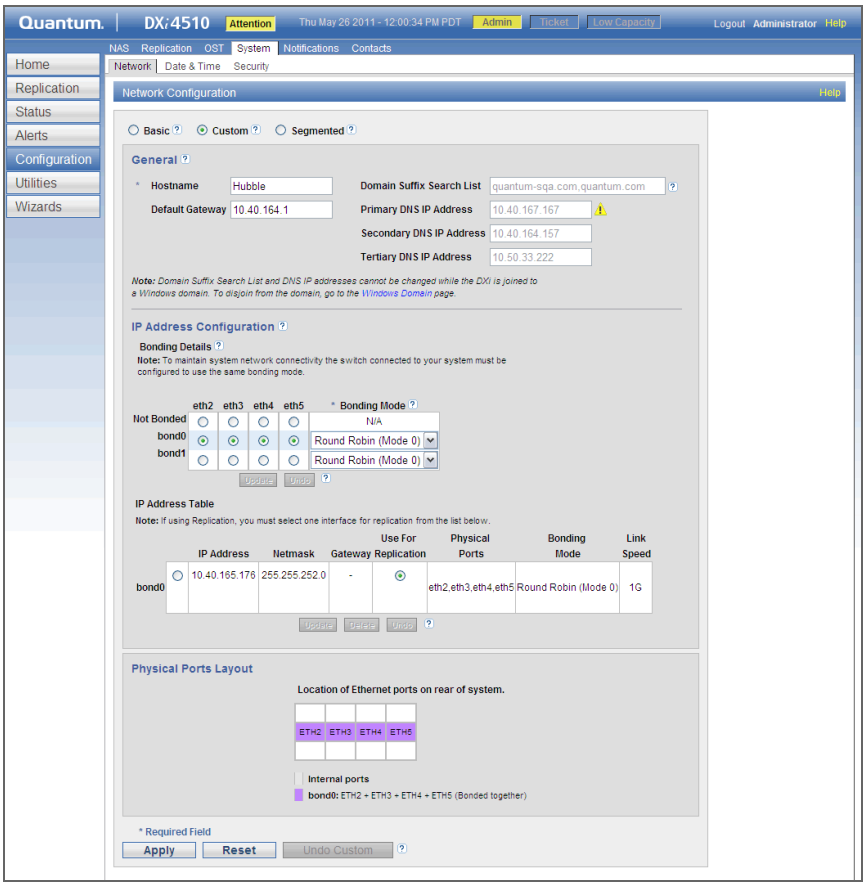
Note: The **Custom** network configuration option is not appropriate for sites that rely on host-based security because it does not provide firewall capability.

Note: To revert to the previous settings without making changes, click **Reset**. For network changes to take effect, you must apply the changes, finalize the confirmation, and reboot the system.

To perform custom network configuration:

1 On the **Network** page, select the **Custom** option (see Figure 100).

Figure 100 Custom Network Configuration



2 Under **General**, enter the following network information as provided by your network administrator:

Note: When entering IP addresses, never use an address that is in a reserved IP address range. To see a list of reserved IP address ranges, click the quick tip icon [**?**] located near the IP address field.

- **Hostname** - The hostname of the DXi4000.
- **Default Gateway** - The default gateway IP address.

  Specifying a default gateway is optional if all access is local to a particular subnet. For example, if the DXi4000 and all of its clients are on the same subnet, you do not need to specify a default gateway.

  Caution: Specifying a default gateway is required to enable connectivity with all subnets other than those that the DXi4000 is directly connected to. For example, if the DXi4000 and its clients are on different subnets, you must specify a default gateway.

- **Domain Suffix Search List** - (Optional) The local domain to search first when resolving domain names.

  The domain suffix is a single domain name. The domain name may contain only letters (A–Z), numbers (0–9), dots (.), and hyphens (-).

- **Primary, Secondary, and Tertiary DNS IP Address** - (Optional) The IP addresses of up to three DNS servers used to resolve domain names and translate them into IP addresses.

  Note: You must specify a DNS IP address if you plan to use hostname format when configuring an NTP time server, outgoing e-mail server, replication sources and targets, and other information.

  Note: If you are using network segmentation, you must specify a DNS server for the Data IP address to enable NAS access.

Note: The **Domain Suffix Search List** and **DNS IP Addresses** cannot be modified if the DXi4000 is currently joined to a Windows domain. To disjoin a Windows domain, see Windows Domain on page 144.

3 (Optional) Under **IP Address Configuration > Bonding Details**, configure bonded interfaces:

a For each available port, select the interface to assign the port to (for example, **bond0** or **bond1**), or select **Not Bonded**.

All ports assigned to the same interface are bonded together into a single logical port. For example, if you select **bond0** for port **eth0** and port **eth1**, both ports are bonded together in the **bond0** interface. A bonded interface can contain two or more ports.

b For each bonded interface, specify the bonding mode:

Note: To maintain network connectivity, the switch connected to the DXi4000 must be configured to use the same bonding mode. The best time to change the bonding mode on the switch is during the next reboot of your system, after saving the new network settings. Changing the bonding mode on the switch before saving these settings and rebooting may result in the loss of network connectivity to the system.

- **Round Robin (Mode 0)** - This option sends Ethernet frames using the bonded Ethernet ports with a valid MII link. Frames are sent in a round-robin fashion, starting with the first slave device and then the rest of the devices. This only applies to the traffic sent from the DXi4000. The Ethernet switch needs to aggregate the ports, so the connected ports are treated as a logical port. The frame reception is completely dependent on the transmission algorithm of the Ethernet switch. The bonding mechanism does not balance the frame reception.
- **LACP (Mode 4)** - This option (Link Aggregation Control Protocol) is based on the 802.3ad IEEE standard for aggregating Ethernet ports. If the bonding algorithm is set to LACP, the Ethernet switch ports must be configured in a 802.3ad based Link Aggregation group (LAG) in LACP

mode. The frame reception and transmission is controlled by the LACP between the bonded ports and the Ethernet switch ports.

c Click **Update** to update the **Network** page with the specified bonding details. (Clicking **Update** does not yet apply the changes to the DXi4000.)

Click **Undo** to revert to the previous bonding configuration.

4 Under **IP Address Configuration > IP Address Table**, enter network information for each interface (physical Ethernet port or bonded interface):

a Click **Add New** to add network settings for an interface.

Or select an interface to edit network settings.

b Enter the following network information as provided by your network administrator (all fields are required):

- **IP Address** - The IP address of the interface.
- **Netmask** - The network mask of the interface.
- **Gateway** - The gateway IP address. (The gateway for a directly connected interface is the IP address.)
- **Use For Replication** - Select to use this network interface for replication traffic. You can select only one interface for replication. If you do not select a replication interface, the first available interface will be used for replication.

c Click **Update** to update the **Network** page with the specified network settings. (Clicking **Update** does not yet apply the changes to the DXi4000.)

Click **Delete** to remove network settings for the selected interface. Or click **Undo** to revert to the previous network settings.

5 Click **Apply**.

The grid in the **Physical Ports Layout** section displays the current bonding scenario (see Physical Ports Layout on page 185).

Note: After you apply a **Custom** network configuration, the **Basic** and **Segmented** options are no longer available. To change to a **Basic** or **Segmented** configuration, you must first undo the **Custom** configuration by clicking **Undo Custom**. This action deletes all custom network settings and reverts to the **Basic** network configuration. After the DXi reboots, you can proceed with configuring the **Basic** or **Segmented** network option.

Physical Ports Layout

The **Physical Ports Layout** section at the bottom of the **Network** page displays a graphical representation of the Ethernet ports as they appear on the rear of the system.

The grid indicates how the Ethernet ports are bonded using the settings currently selected in the **IP Address Configuration > Bonding Details** section. Ports that are bonded together in an interface are shaded the same color.

Note: Changes to the network settings are not applied to the system until you click **Apply**.

Segmented Network Configuration

With **Segmented** network configuration, you can select one of several bonding scenarios. When multiple physical Ethernet are bonded together, they act as a single network interface (logical port). Each scenario uses segmentation to route different types of network traffic (replication, management, and data) over different network interfaces. In addition, each type of traffic uses its own set of network settings.

Segmentation can provide performance and security advantages for some networks. Performance is improved because there are fewer hosts on the segmented network, which minimizes local traffic. Security is improved because the data traffic is contained on this segment and is not visible to the outside network.

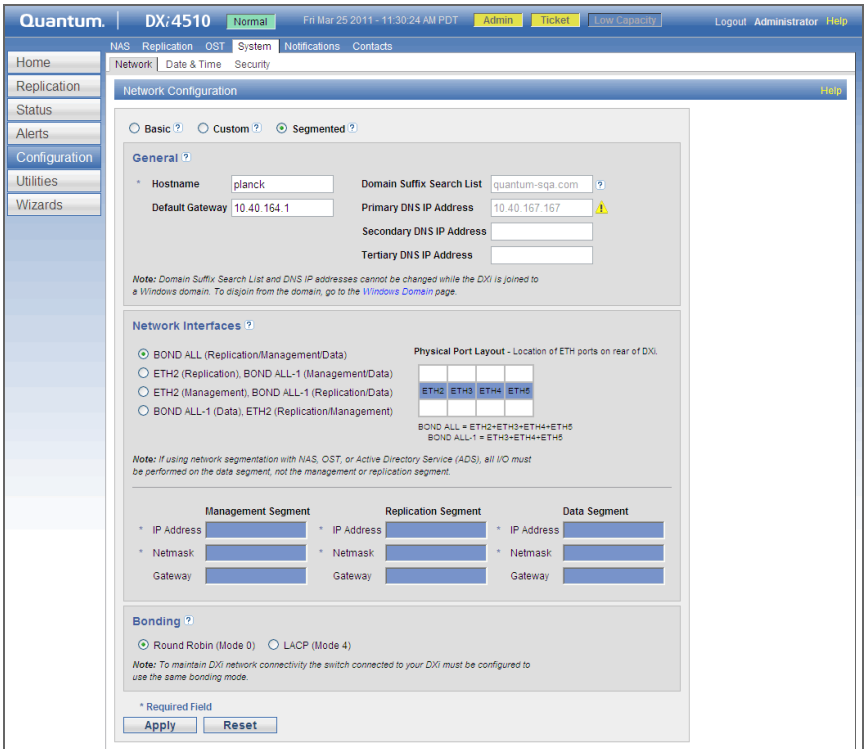
Note: To revert to the previous settings without making changes, click **Reset**. For network changes to take effect, you must apply the changes, finalize the confirmation, and reboot the system.

Note: If your system is configured using network segmentation, you must use the data segment IP address, *not* the management segment IP address or hostname, to map CIFS shares or manage the system. If the system is joined to an Active Directory domain, you can use the Microsoft Management Console (MMC) tool to manage shares and user or group access. To do this, right-click the server name in MMC and click **Manage**. The **Computer Management** console displays and your system is connected for management. If your system uses network segmentation, the connection will fail because the system name is not resolved into the data segment IP address. In this case you must specify the system using its data segment IP address, not the hostname, by selecting the following option in the **Computer Management** console: **Action > Connect to another computer > Another computer**.

To perform segmented network configuration:

1 On the **Network** page, select the **Segmented** option (see Figure 101).

Figure 101 Segmented Network Configuration



2 Under **General**, enter the following network information as provided by your network administrator:

Note: When entering IP addresses, never use an address that is in a reserved IP address range. To see a list of reserved IP address ranges, click the quick tip icon [?] located near the IP address field.

- **Hostname** - The hostname of the DXi4000.
- **Default Gateway** - The default gateway IP address.

  Specifying a default gateway is optional if all access is local to a particular subnet. For example, if the DXi4000 and all of its clients are on the same subnet, you do not need to specify a default gateway.

Caution: Specifying a default gateway is required to enable connectivity with all subnets other than those that the DXi4000 is directly connected to. For example, if the DXi4000 and its clients are on different subnets, you must specify a default gateway.

- **Domain Suffix Search List** - (Optional) The local domain to search first when resolving domain names.

  The domain suffix is a single domain name. The domain name may contain only letters (A–Z), numbers (0–9), dots (.), and hyphens (-).

- **Primary, Secondary, and Tertiary DNS IP Address** - (Optional) The IP addresses of up to three DNS servers used to resolve domain names and translate them into IP addresses.

Note: You must specify a DNS IP address if you plan to use hostname format when configuring an NTP time server, outgoing e-mail server, replication sources and targets, and other information.

Note: If you are using network segmentation, you must specify a DNS server for the Data IP address to enable NAS access.

Note: The **Domain Suffix Search List** and **DNS IP Addresses** cannot be modified if the DXi4000 is currently joined to a Windows domain. To disjoin a Windows domain, see Windows Domain on page 144.

3 Under **Network Interfaces**, select a bonding option:

DXi4000 - 4510/4520/4601 (4 x 1GbE ports)

- **BOND ALL (Replication/Management/Data)** - All ports (ETH2, ETH3, ETH4, and ETH5) are bonded together for all traffic types. Each traffic type (Data, Management, and Replication) requires a set of network settings below.
- **ETH2 (Replication), BOND ALL-1 (Management/Data)** - All Replication traffic takes place on port ETH2. Data and Management traffic take place on ports ETH3, ETH4, and ETH5.

Each traffic type (Data, Management, and Replication) requires a set of network settings below.

- **ETH2 (Management), BOND ALL-1 (Replication/Data)** - All Management traffic takes place on port ETH2. Data and Replication traffic take place on ports ETH3, ETH4, and ETH5. Each traffic type (Data, Management, and Replication) requires a set of network settings below.
- **BOND ALL-1 (Data), ETH2 (Replication/Management)** - All Data traffic takes place on ports ETH3, ETH4, and ETH5. Management and Replication traffic take place on port ETH2. Each traffic type (Data, Management, and Replication) requires a set of network settings below.

Note: The grid displays a graphical representation of the Ethernet as they appear on the rear of the system. Ports that are bonded together in an interface are shaded the same color.

---

4 For each network segment (**Management**, **Replication**, and **Data**), enter the following network information as provided by your network administrator:

- **IP Address** - The IP address of the DXi4000.
- **Netmask** - The network mask of the DXi4000.
- **Gateway** - (Optional) The gateway IP address.

5 Under **Bonding**, select the bonding mode:

Note: To maintain network connectivity, the switch connected to the DXi4000 must be configured to use the same bonding mode. The best time to change the bonding mode on the switch is during the next reboot of your system, after saving the new network settings. Changing the bonding mode on the switch before saving these settings and rebooting may result in the loss of network connectivity to the system.

- **Round Robin (Mode 0)** - This option sends Ethernet frames using the bonded Ethernet ports with a valid MII link. Frames are sent in a round-robin fashion, starting with the first slave device and then the rest of the devices. This only applies to the traffic sent from the DXi4000. The Ethernet switch needs to aggregate the ports, so the connected ports are treated as a

logical port. The frame reception is completely dependent on the transmission algorithm of the Ethernet switch. The bonding mechanism does not balance the frame reception.

- **LACP (Mode 4)** - This option (Link Aggregation Control Protocol) is based on the 802.3ad IEEE standard for aggregating Ethernet ports. If the bonding algorithm is set to LACP, the Ethernet switch ports must be configured in a 802.3ad based Link Aggregation group (LAG) in LACP mode. The frame reception and transmission is controlled by the LACP between the bonded ports and the Ethernet switch ports.

6 Click **Apply**.

Note: After you apply a **Segmented** network configuration, the **Custom** option is no longer available. To change to a **Custom** configuration, you must select the **Basic** configuration and apply it. After the DXi reboots, you can proceed with configuring the **Custom** network option.

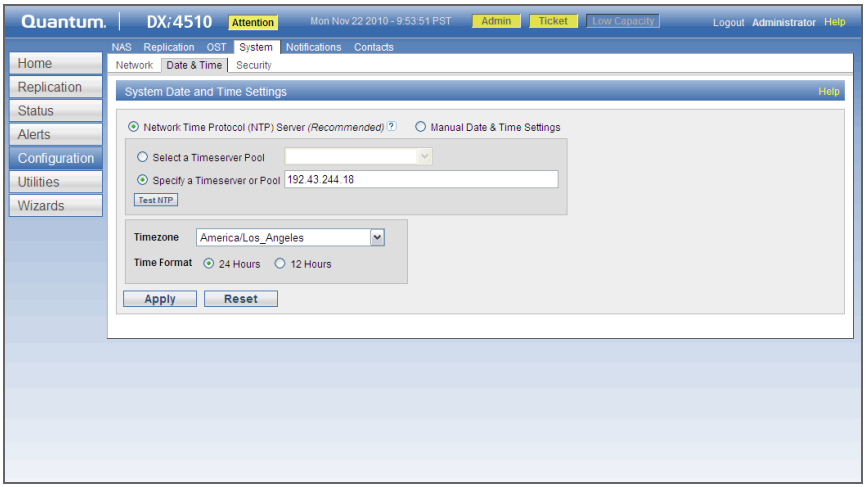
Date & Time

The **Date & Time** page allows you to set the system date and time of the DXi4000. You can specify a Network Time Protocol (NTP) server to synchronize the system time with, or you can manually enter the date and time.

Note: If you intend to join the DXi4000 to a Windows network using Active Directory for NAS storage, Quantum recommends using an NTP Server to set the system date and time (see Windows Domain on page 144).

To access the **Date & Time** page, on the **System** page, click the **Date & Time** tab (see Figure 102).

Figure 102 Date & Time Page



To set the system date and time:

1 Select one of the following options:

- **Network Time Protocol (NTP) Server** - (Recommended) Select this option to synchronize the DXi4000 with an NTP timeserver or pool. Then select or specify a timeserver or pool.
  - **Select a Timeserver Pool** - (Recommended) Select one of the well-known, geographically-based NTP timeserver pools in the drop-down box.

    Note: To select a timeserver pool, you must first specify at least one DNS IP address on the **Network** page (see Network on page 176). Otherwise, you must specify the IP address of the timeserver pool.

  - **Specify a Timeserver or Pool** - Type the name or IP address of the NTP server or pool. (See http://support.ntp.org for information about publicly available NTP servers)

  To verify that the DXi4000 can communicate with the NTP server or pool, click **Test NTP**.

- **Manual Date & Time Settings** - Select this option to manually set the system date and time.

  Specify the **New System Date** by clicking the calendar icon. Specify the **New System Time** using the drop-down boxes.

2 In the **Timezone** drop-down box, select the time zone where the DXi4000 is located.

3 Next to **Time Format**, select the format to use when displaying times (**24 hours** or **12 hours**).

4 Click **Apply**.

Security

The **Security** page allows you to configure security settings for the DXi4000, including access passwords, SSL settings, and the inactivity timeout.

To access the **Security** page, click the **Configuration** menu, and then click the **Security** tab.

The **Security** page contains the following tabs:

- Web & CLI Passwords
- SSL
- Login Session

Web & CLI Passwords

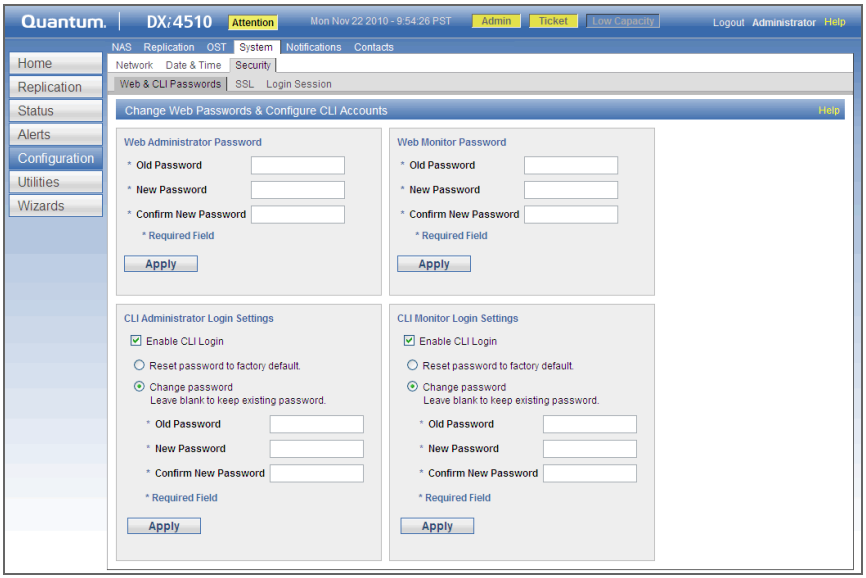
The **Web & CLI Passwords** page allows you to change the account passwords for the remote management console (Web) and the command line interface (CLI). You can also enable or disable the CLI account.

The DXi4000 has two access levels for logging onto the remote management console or the CLI:

- **Monitor** - Allowed to view information on the DXi4000 remote management console or the CLI but cannot make changes.
- **Administrator** - Allowed to view and change information on the DXi4000 remote management console or the CLI.

To access the **Web & CLI Passwords** page, on the **Security** page, click the **Web & CLI Passwords** tab (see Figure 103).

Figure 103 Web & CLI Passwords Page



Use the **Web & CLI Passwords** page to perform the following tasks:

- Change the administrator or monitor password for Web access (see Changing Web Passwords on page 193).
- Enable or disable CLI access for the administrator or monitor account (see Enabling CLI Accounts on page 194).
- Change the administrator or monitor password for CLI access (see Changing CLI Passwords on page 194).
- Reset the CLI administrator or monitor password to the factory default (see Resetting CLI Passwords on page 195).

Changing Web Passwords

Use the Web passwords when logging onto the remote management console as an administrator or monitor (see Accessing Remote Management on page 30).

To change the Web passwords:

1. Under **Web Administrator Password** or under **Web Monitor Password**, enter the following information:
   - **Old Password** - Enter the old password.
   - **New Password** - Enter the new password.

- **Confirm New Password** - Enter the new password again to confirm it.

Note: The default password is **password**.

Note: Passwords are limited to 15 characters. All alphanumeric characters are allowed, as well as underscores (_) and hyphens (-).

2 Click **Apply**.

Enabling CLI Accounts

The CLI accounts provide access to the DXi4000 command line interface as an administrator or monitor.

Note: For more information about using the CLI, see the *DXi4000 Command Line Interface (CLI) Guide*.

To enable or disable the CLI accounts:

1 Under **CLI Administrator Login Settings** or under **CLI Monitor Login Settings**, do one of the following steps:

- Select the **Enable CLI Login** check box to enable the CLI account.
- Clear the **Enable CLI Login** check box to disable the CLI account.

2 Click **Apply**.

Changing CLI Passwords

Use the CLI passwords when logging onto the command line interface as an administrator or monitor.

To change the CLI passwords:

1 Under **CLI Administrator Login Settings** or under **CLI Monitor Login Settings**, select the **Change password** option.

2 Enter the following information:

- **Old Password** - Enter the old password.
- **New Password** - Enter the new password.

- **Confirm New Password** - Enter the new password again to confirm it.

Note: The default password for the CLI Administrator account is **cliadmin**. The default password for the CLI Monitor account is **cliviewer**.

Note: Passwords are limited to 15 characters. All alphanumeric characters are allowed, as well as underscores (_) and hyphens (-).

3 Click **Apply**.

Resetting CLI Passwords

The default password for the CLI Administrator account is **cliadmin**. The default password for the CLI Monitor account is **cliviewer**.

To reset the CLI account passwords to their default values:

1 Under **CLI Administrator Login Settings** or under **CLI Monitor Login Settings**, select the **Reset password to factory default** option.

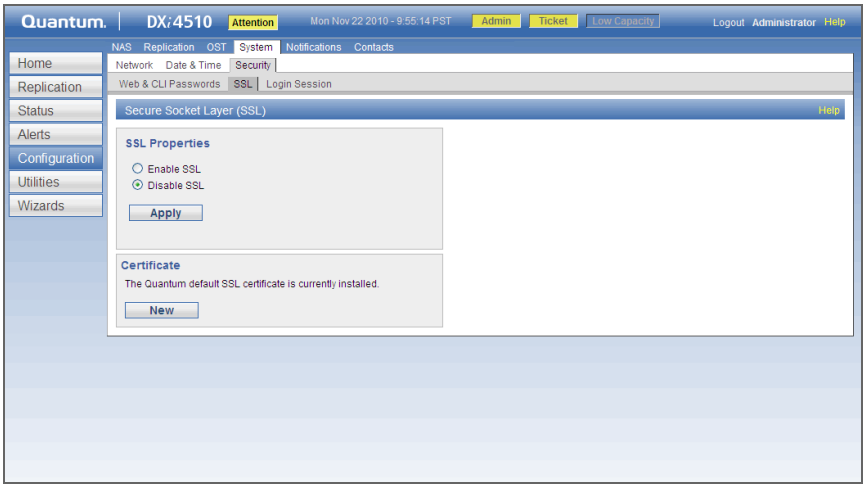
2 Click **Apply**.

SSL

The **SSL** page allows you to enable or disable SSL on the DXi4000. You can also install a new SSL certificate to replace the Quantum default SSL certificate.

To access the **SSL** page, on the **Security** page, click the **SSL** tab (see Figure 104).

Figure 104 SSL Page



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

- Enable or disable SSL on the DXi4000 (see Enabling SSL on page 196).

  Note: If you enable SSL, see Server Authentication Warnings on page 197 for important information about Web browser settings.

- Install a new SSL certificate (see Installing an SSL Certificate on page 197).

Enabling SSL

SSL (Secure Sockets Layer) is a protocol that provides security and privacy over the Internet by negotiating encryption keys before transmitting data between a client and a server.

To establish a secure connection, the DXi4000 must have an encryption key assigned to it by a Certification Authority in the form of a certificate file, private key file, and pass phrase. After you install these components, you can establish a secure connection using the SSL protocol. The DXi4000 comes with a Quantum default SSL certificate.

To enable or disable SSL:

1 Under **SSL Properties**, select the **Enable SSL** option to enable SSL.

  Or select the **Disable SSL** option to disable SSL.

Note: The default setting is disabled.

2 Click **Apply**.

Server Authentication Warnings

Enabling SSL with the default Quantum certificate allows you to securely communicate with the DXi4000 Web-based interface using SSL encryption. However, you may receive a warning from your Web browser stating that the server you are attempting to connect to does not match the server embedded within the certificate.

This is expected behavior because the default certificate can only be used for encryption and not server authentication. You can install your own custom certificate in order to take advantage of server authentication in addition to encrypted communication.

To suppress server authentication warnings for the default certificate:

- **Internet Explorer** - If a dialog box displays warning you of a possible certificate error, add the IP address for the DXi4000 to the **Trusted Sites** list (**Tools > Internet Options > Security > Trusted Sites**). If subsequent warning pages display along with an option to close your Web browser or continue to the Web site, click **Continue**. This suppresses the warnings until you restart your Web browser.
- **Firefox** - If the **Secure Connection Failed** dialog box displays, click the link at the bottom of the dialog box and follow the instructions to add an exception for your DXi4000.

Installing an SSL Certificate

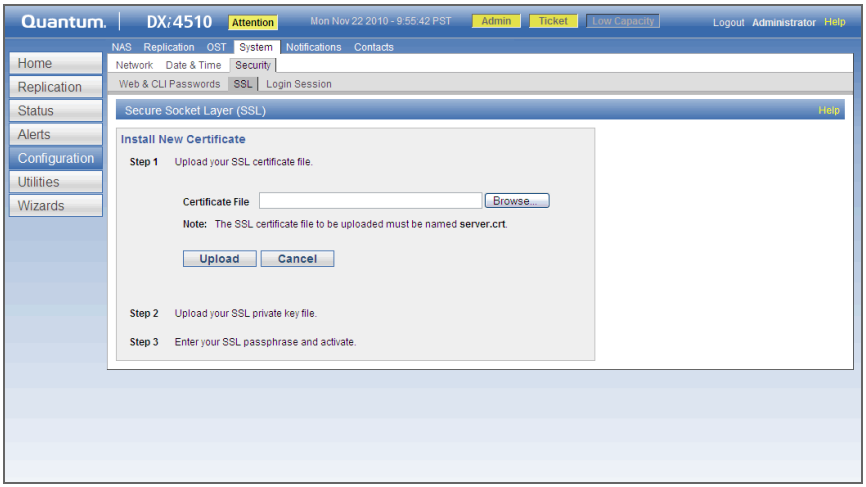
You can purchase and install your own custom SSL certificate in order to take advantage of server authentication in addition to encrypted communication on the DXi4000.

To install an SSL certificate:

1 Under **Certificate**, click **New**.

The **Install New Certificate** page displays (see Figure 105).

Figure 105 Install New Certificate Page



2 In the **Certificate File** box, type the location and filename of the new SSL certificate file.

   Or click **Browse** to browse the system and locate the SSL certificate file. The SSL certificate file must be named **server.crt**.

3 Click **Upload**.

4 Type your SSL private key and press **<Enter>**.

5 Type your SSL pass phrase and press **<Enter>**.

   A **Successful Upload** page displays stating that the SSL certificate file has been installed on the system.

6 Click **OK**.

   The certificate displays in the **Certificate** section.

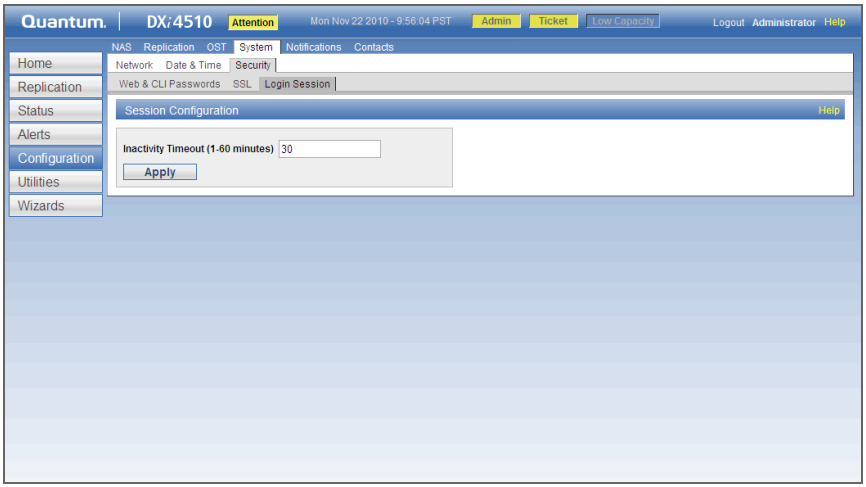
Login Session

The **Login Session** page allows you to specify the inactivity timeout for the DXi4000 remote management console. The default timeout is 30 minutes.

When the remote management console is inactive for the specified period of time, the user is automatically logged off and must log back on to continue (see Accessing Remote Management on page 30).

To access the **Login Session** page, on the **Security** page, click **Login Session** (see Figure 106).

Figure 106 Login Session Page



To specify the inactivity timeout:

1. In the **Inactivity Timeout** box, enter the number of minutes of inactivity before a user is automatically logged off (1–60 minutes).
2. Click **Apply**.

Notifications

The **Notifications** page allows you to manage the methods the DXi4000 uses to send notifications. The DXi4000 can send notifications by e-mail or using SNMP (Simple Network Management Protocol).

To access the **Notifications** page, click the **Configuration** menu, and then click the **Notifications** tab.

The **Notifications** page contains the following tabs:

- Email
- SNMP

Email

The **Email** page allows you to specify the recipients to notify by e-mail when administration alerts or service tickets occur. You can specify e-mail recipients, notification levels, and information about your e-mail configuration. You can also configure the DXi4000 to generate and send configuration and status reports.

Note: For more information about administration alerts and service tickets, see DXi4000 Alerts on page 127.

To access the **Email** page, on the **Notifications** page, click the **Email** tab.

The **Email** page contains the following tabs:

- Recipients
- Server
- Test
- Email Home

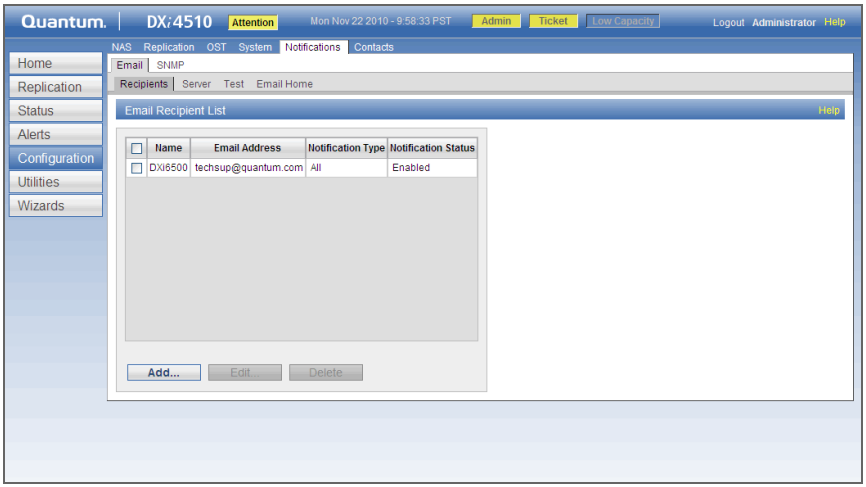
Recipients

The **Recipients** page allows you to manage the e-mail recipients the DXi4000 sends notifications to. You can add, edit, and delete e-mail recipients, and you can specify the types of notifications to send.

Note: To enable the DXi4000 to send e-mail, you must specify an outgoing e-mail server (see Server on page 205).

To access the **Recipients** page, on the **Email** page, click the **Recipients** tab (see Figure 107).

Figure 107 Recipients Page



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

- View information about e-mail recipients (see Email Recipient List on page 201).
- Add an e-mail recipient (see Adding an E-mail Recipient on page 202).
- Edit an e-mail recipient (see Editing an E-mail Recipient on page 203).
- Delete an e-mail recipient (see Deleting an E-mail Recipient on page 204).

Email Recipient List

The **Email Recipient List** displays the following information about e-mail recipients:

- **Name** - The name of the recipient.
- **Email Address** - The e-mail address of the recipient.
- **Notification Type** - The types of notifications sent to the recipient (**High**, **High and Medium**, or **All**).
- **Notification Status** - The status of e-mail notifications for the recipient (**Enabled** or **Disabled**).

Adding an E-mail Recipient

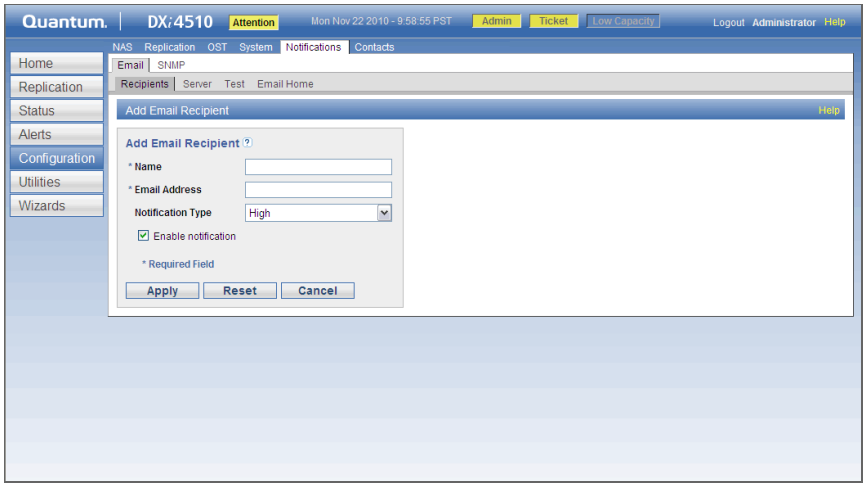
Add an e-mail recipient to send notifications about administration alerts or service tickets to the recipient by e-mail.

To add an e-mail recipient:

1 Click **Add**.

The **Add Email Recipient** page displays (see Figure 108).

Figure 108 Add Email Recipient Page



2 Enter information about the recipient:

- **Name** - The name of the recipient.
- **Email Address** - The e-mail address of the recipient.
- **Notification Type** - Select the types of notifications to send to the recipient:
  - **High** - Send e-mail notifications for High service tickets.

    High service tickets indicate that a critical problem has occurred and needs to be resolved immediately. The operation and performance of the DXi4000 are degraded, and there is a risk of system failure or data loss.
  - **High and Medium** - Send e-mail notifications for High and Medium service tickets.

    Medium service tickets indicate that a serious problem occurred and needs to be resolved, but it does not

necessarily need to be fixed immediately. The operation and performance of the DXi4000 may be degraded.

- **All** - Send e-mail notifications for High, Middle, and Low service tickets, as well as any administration alerts.

  Low service tickets indicate that a minor problem occurred and needs to be resolved, but the operation and performance of the DXi4000 are not significantly affected.

3 Select the **Enable notification** check box to enable sending of notifications to the recipient.

  Or clear the **Enable notification** check box to disable sending of notifications to the recipient.

4 Click **Apply**.

Editing an E-mail Recipient

Edit an e-mail recipient to change the recipient's e-mail address or the types of notifications sent to the recipient. You can also enable or disable sending of notifications to the recipient.

To edit an e-mail recipient:

1 Click **Edit**.

  The **Edit Email Recipient** page displays (see Figure 109).

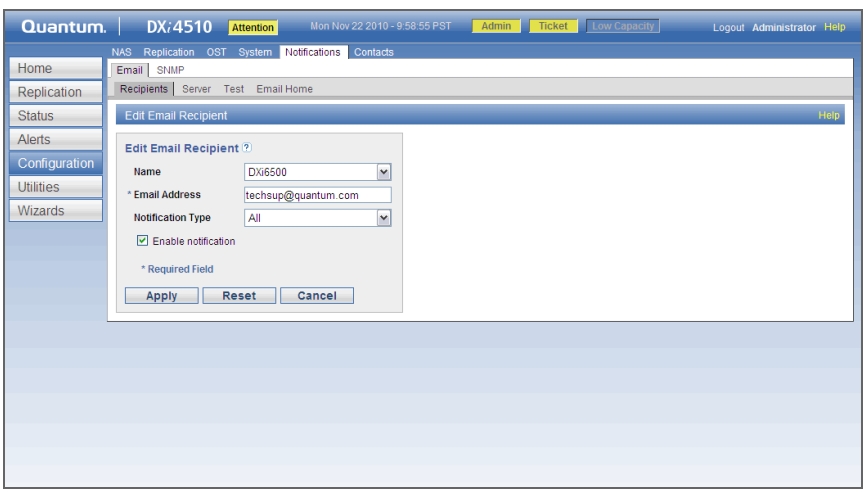


Figure 109 Edit Email Recipient Page

2 Enter information about the recipient:

Note: If you are editing an e-mail recipient, you cannot change the **Name**.

- **Name** - (Optional) Select a different e-mail recipient to edit.
- **Email Address** - The e-mail address of the recipient.
- **Notification Type** - Select the types of notifications to send to the recipient:
  - **High** - Send e-mail notifications for High service tickets.

    High service tickets indicate that a critical problem has occurred and needs to be resolved immediately. The operation and performance of the DXi4000 are degraded, and there is a risk of system failure or data loss.
  - **High and Medium** - Send e-mail notifications for High and Medium service tickets.

    Medium service tickets indicate that a serious problem occurred and needs to be resolved, but it does not necessarily need to be fixed immediately. The operation and performance of the DXi4000 may be degraded.
  - **All** - Send e-mail notifications for High, Middle, and Low service tickets, as well as any administration alerts.

    Low service tickets indicate that a minor problem occurred and needs to be resolved, but the operation and performance of the DXi4000 are not significantly affected.

3 Select the **Enable notification** check box to enable sending of notifications to the recipient.

  Or clear the **Enable notification** check box to disable sending of notifications to the recipient.

4 Click **Apply**.

Deleting an E-mail Recipient

Delete an e-mail recipient if you no longer want the DXi4000 to send e-mail notifications to the recipient.

To delete an e-mail recipient, select the recipient and click **Delete**.

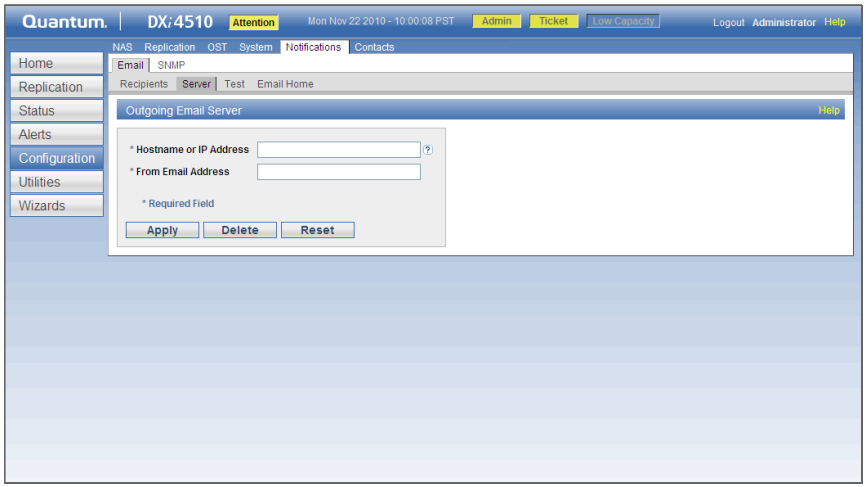
Note: You can select multiple recipients to delete at once.

Server

The **Server** page allows you to specify the server for outgoing e-mail. The DXi4000 cannot send e-mail notifications until you specify the outgoing e-mail server.

To access the **Server** page, on the **Email** page, click the **Server** tab (see Figure 110).

Figure 110 Server Page



To specify the outgoing e-mail server:

1 In the **Hostname or IP Address** box, enter the hostname or IP address of the outgoing e-mail server.

Note: When entering IP addresses, never use an address that is in a reserved IP address range. To see a list of reserved IP address ranges, click the quick tip icon **[?]** located near the IP address field.

Note: To use hostname format, you must specify at least one DNS IP address on the **Network** page (see Network on page 176).

2 In the **From Email Address** box, enter the return e-mail address displayed in e-mails sent by the DXi4000.

Specify a return address that lets you easily identify the system that generated the e-mail (for example, `systemname@any-domain.com`). The return address must contain an @ symbol and a valid domain name, including a period.

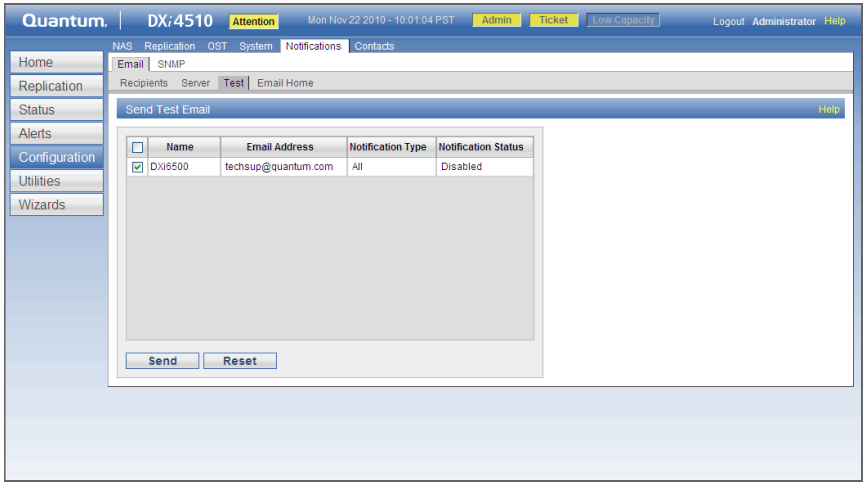
3 Click **Apply**.

Test

The **Email Test** page allows you to send a test e-mail to verify that e-mail notifications are correctly configured on the DXi4000.

To access the **Email Test** page, on the **Email** page, click the **Test** tab (see Figure 111).

Figure 111 Email Test Page



To send a test e-mail, select a recipient in the list and click **Send**. If the recipient does not receive the e-mail, make sure that the recipient's e-mail address is correct (see Editing an E-mail Recipient on page 203). Also make sure that the outgoing e-mail server is correct (see Server on page 205).

Email Home

The **Email Home** page allows you to configure the DXi4000 to send reports to e-mail recipients. The system can generate a report with system status data or with configuration data. Each report also includes

the system serial number, date and time, and a message that informs the recipient that the e-mail is automated and they should not respond to it.

Note: To enable the DXi4000 to send e-mail, you must specify an outgoing e-mail server (see Server on page 205).

To access the **Email Home** page, on the **Email** page, click the **Email Home** tab.

The **Email Home** page contains the following tabs:

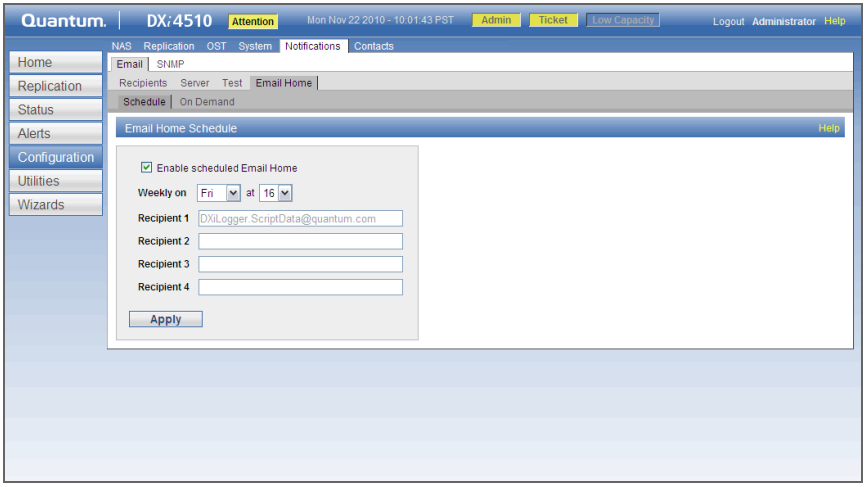
- Schedule
- On Demand

Schedule

The **Schedule** page allows you to configure the DXi4000 to automatically send status data and configuration data reports to e-mail recipients. The reports are sent once a week to the specified recipients.

To access the **Schedule** page, on the **Email Home** page, click the **Schedule** tab (see Figure 112).

Figure 112 Schedule Page



To configure the DXi4000 to automatically send status data and configuration data reports:

1 Select the **Enable scheduled Email Home** check box to enable the Email Home schedule.

   Or clear the **Enable scheduled Email Home** check box to disable the Email Home schedule.

   Note: The default setting is enabled.

2 Use the drop-down boxes to specify the day and hour when reports are sent each week.

3 Enter the e-mail addresses of up to three recipients.

   Note: You cannot edit the first recipient.

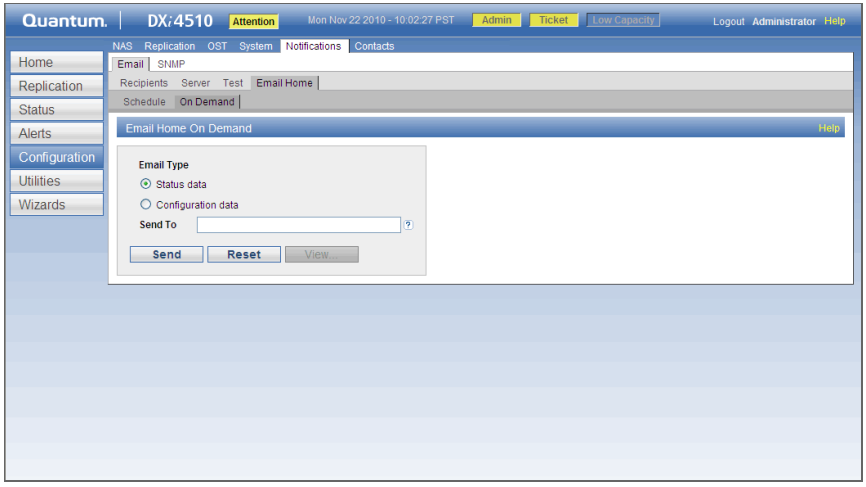
4 Click **Apply**.

On Demand

The **On Demand** page allows you to manually generate a status data or configuration data report. The report is immediately sent to the specified e-mail recipient. You can also view configuration data.

To access the **On Demand** page, on the **Email Home** page, click the **On Demand** tab (see Figure 113).

Figure 113 On Demand Page



Use the **On Demand** page to perform the following tasks:

- Manually send a status data or configuration data report (see Sending a Report on page 209).
- View a configuration data report (see Viewing Configuration Data on page 209).

Sending a Report

To manually send a status data or configuration data report:

1. Under **Email Type**, select the type of report to send (**Status data** or **Configuration data**).
2. In the **Send To** box, enter the e-mail address of the recipient.
3. Click **Send**.

Viewing Configuration Data

To view a configuration data report:

1. Under **Email Type**, select **Configuration data**.
2. Click **View**.

   The **System Configuration Report** window displays.
3. (Optional) Click **Save** to save a local copy of the report in TXT format.

SNMP

The **SNMP** page allows you to configure the DXi4000 to send status messages using SNMP (Simple Network Management Protocol). The DXi4000 supports SNMP v1 and v2c.

SNMP works by sending messages, called protocol data units (PDUs), to different parts of a network, or communities. SNMP compliant devices, called agents, store data about themselves in Management Information Bases (MIBs) and return this data to the SNMP requesters.

You can configure the DXi4000 to act as an agent and send traps to a specified destination. You can also add SNMP community information.

To access the **SNMP** page, on the **Notifications** page, click the **SNMP** tab.

The **SNMP** page contains the following tabs:

- Destinations

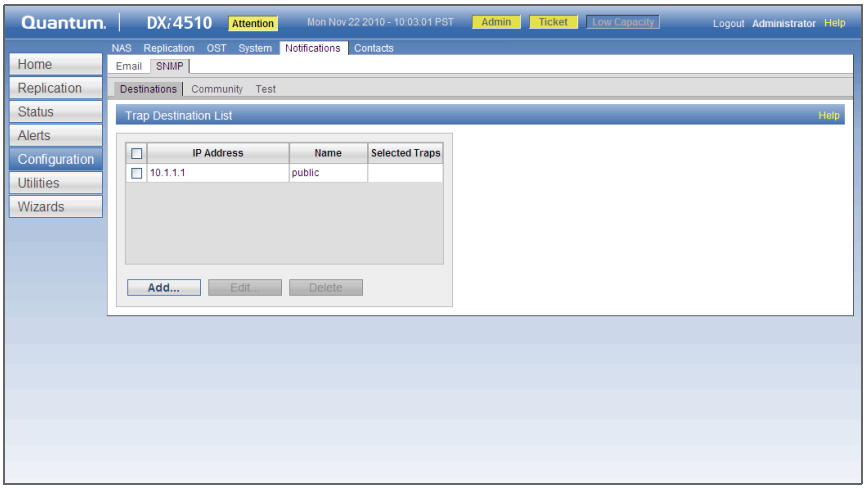
- Community
- Test

Destinations

The **Destinations** page allows you to manage the destinations the DXi4000 sends SNMP traps to. You can add, edit, and delete SNMP destinations, and you can specify the types of traps to send.

To access the **Destinations** page, on the **SNMP** page, click the **Destinations** tab (see Figure 114 on page 210).

Figure 114 Destinations Page



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

- View information about SNMP destinations (see Trap Destination List on page 210).
- Add an SNMP destination (see Adding a Destination on page 211).
- Edit an SNMP destination (see Editing a Destination on page 212).
- Delete an SNMP destination (see Deleting a Destination on page 213).

Trap Destination List

The **Trap Destination List** displays the following information about SNMP destinations:

- **IP Address** - The IP address of the destination.
- **Name** - The name of the destination.
- **Selected Traps** - The traps the DXi4000 sends to the destination (**Failure**, **Warning**, **Informational**, **Available**, or **Unavailable**).

Adding a Destination

Add an SNMP destination to send traps from the DXi4000 to the destination.

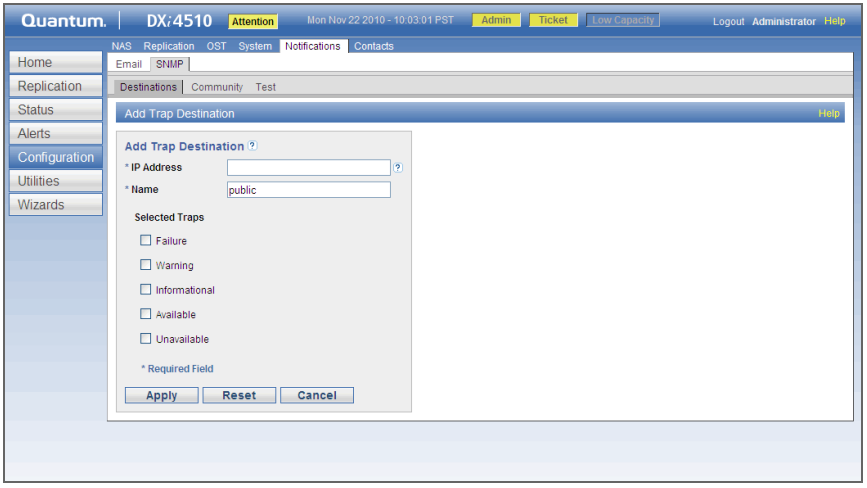
Note: You can add up to 5 destinations.

To add a destination:

1 Click **Add**.

The **Add Trap Destination** page displays (see Figure 115).

Figure 115 Add Trap Destination Page



2 Enter information about the destination:

- **IP Address** - Enter the IP address of the system that will receive the traps generated by the DXi4000.

Note: When entering IP addresses, never use an address that is in a reserved IP address range. To see a list of reserved IP address ranges, click the quick tip icon **[?]** located near the IP address field.

Note: To use hostname format, you must specify at least one DNS IP address on the **Network** page (see Network on page 176).

- **Name** - Enter the name of the destination.

3 Select one or more traps to send to the destination:

- **Failure** - Sends failure traps.
- **Warning** - Sends warning traps.
- **Informational** - Sends informational traps.
- **Available** - Sends a trap when the system transitions from an unavailable to an available state.
- **Unavailable** - Sends a trap when the system transitions from an available to an unavailable state.

4 Click **Apply**.

Editing a Destination

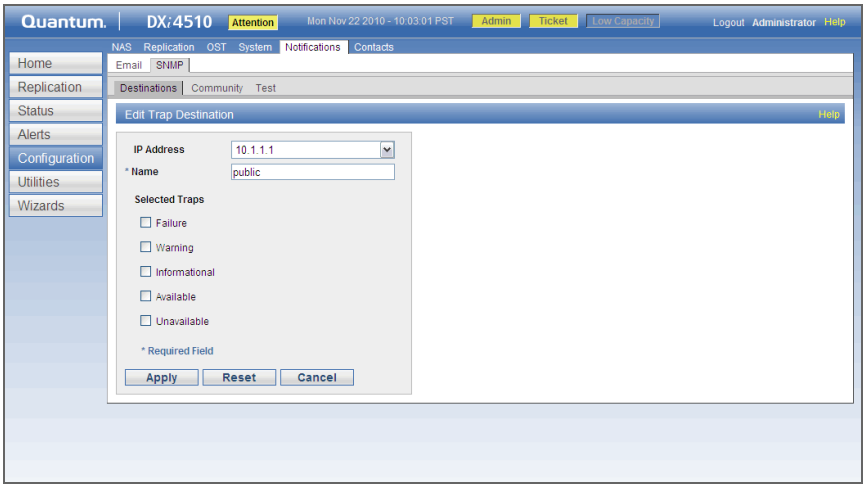
Edit an SNMP destination to change the name of the destination or the types of traps the DXi4000 sends to the destination.

To edit a destination:

1 Click **Edit**.

The **Edit Trap Destination** page displays (see Figure 116).

Figure 116 Edit Trap Destination Page



2 Enter information about the destination:

Note: If you are editing a destination, you cannot change the **IP Address**.

- **IP Address** - (Optional) Select a different destination to edit.
- **Name** - Enter the name of the destination.

3 Select one or more traps to send to the destination:

- **Failure** - Sends failure traps.
- **Warning** - Sends warning traps.
- **Informational** - Sends informational traps.
- **Available** - Sends a trap when the system transitions from an unavailable to an available state.
- **Unavailable** - Sends a trap when the system transitions from an available to an unavailable state.

4 Click **Apply**.

Deleting a Destination

Delete an SNMP destination if you no longer want the DXi4000 to send traps to the destination.

To delete a destination, select the destination and click **Delete**.

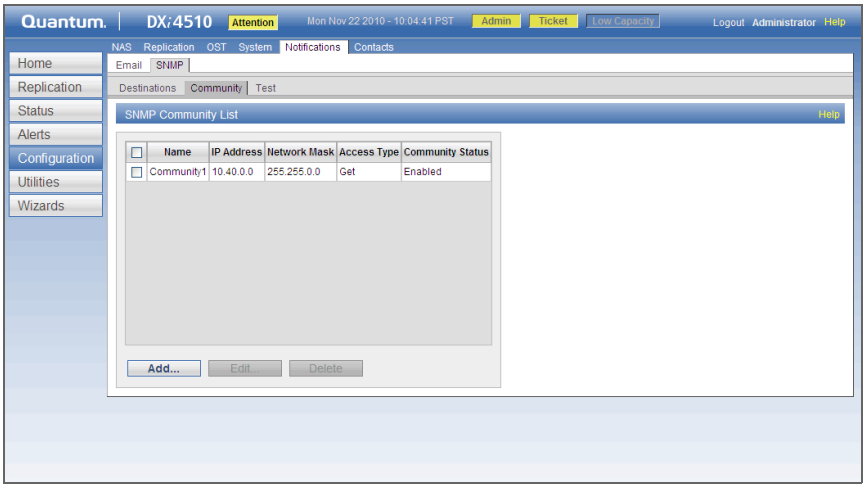
Note: You can select multiple destinations to delete at once.

Community

The **Community** page allows you to manage SNMP community information for the DXi4000. You can add, edit, and delete communities, and you can specify the community access type.

To access the **Community** page, on the **SNMP** page, click the **Community** tab (see Figure 117).

Figure 117 Community Page



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

- View information about SNMP communities (see SNMP Community List on page 214).
- Add an SNMP community (see Adding a Community on page 215).
- Edit an SNMP community (see Editing a Community on page 217).
- Delete an SNMP community (see Deleting a Community on page 219).

SNMP Community List

The **SNMP Community List** displays the following information about SNMP communities:

- **Name** - The name of the community.
- **IP Address** - The IP address of the community.
- **Network Mask** - The network mask of the community.
- **Access Type** - The access type of the community (**Get** or **Get/Set**).
- **Community Status** - The status of the community (**Enabled** or **Disabled**).

Adding a Community

Add an SNMP community to include the DXi4000 in a group of devices that are monitored by a common management station.

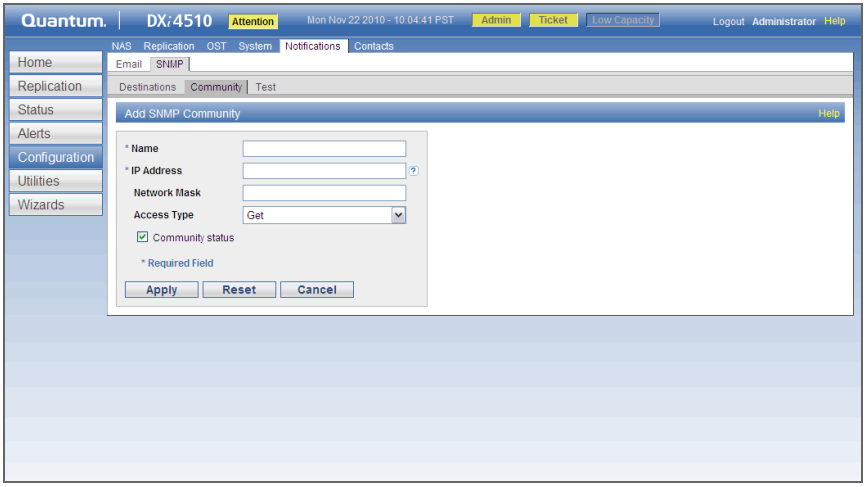
Note: If no communities are defined, the SNMP agent is not accessible.

To add a community:

1 Click **Add**.

The **Add SNMP Community** page displays (see Figure 118).

Figure 118 Add SNMP Community Page



2 In the **Name** box, enter a unique **Name** for the community (up to 20 characters).

Valid characters are letters, numbers, hyphens, and underscores.

3 Enter a valid **IP Address** and **Network Mask** pair.

A pair is valid if performing a logical bitwise **AND** operation on the IP address and the network mask results in the IP address. See the table below for examples:

IP Address / Network Mask	Result
10.40.166.87 255.255.255.255	Allows access only from 10.40.166.87
10.40.166.87 10.40.166.87	Allows access only from 10.40.166.87
10.40.166.87 10.40.166.0	Invalid because the logical bitwise operation (address **AND** mask) is not equal to the address
10.40.166.87 255.255.0.0	Invalid because the logical bitwise operation (address **AND** mask) is not equal to the address
10.40.0.0 255.255.0.0	Allows access from any client with address 10.40.xx.xx

Note: If you define a single community and set both the IP address and network mask to 0.0.0.0 (or leave both blank), then IP address-based access control is disabled. In this case, the SNMP agent is accessible from any IP address.

Note: When entering IP addresses, never use an address that is in a reserved IP address range. To see a list of reserved IP address ranges, click the quick tip icon **[?]** located near the IP address field.

4 In the **Access Type** drop-down box, select the access type for the community:

- **Get** - Allows SNMP get operations.
- **Get/Set** - Allows both SNMP **get** and **put** operations.

5 Select the **Community status** check box to enable the community.

Or clear the **Community status** check box to disable the community.

6 Click **Apply**.

Editing a Community

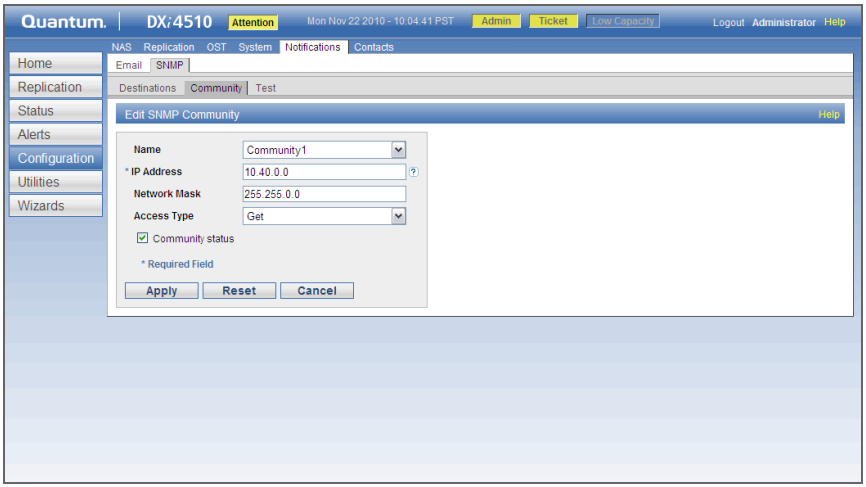
Edit an SNMP community to change the IP address or access type for the community. You can also enable or disable the community.

To edit a community:

1 Click **Edit**.

The **Edit SNMP Community** page displays (see Figure 118).

Figure 119 Edit SNMP Community Page



2 (Optional) In the **Name** box, select a different community to edit.

3 Enter a valid **IP Address and Network Mask** pair.

A pair is valid if performing a logical bitwise **AND** operation on the IP address and the network mask results in the IP address. See the table below for examples:

IP Address / Network Mask	Result
10.40.166.87 255.255.255.255	Allows access only from 10.40.166.87
10.40.166.87 10.40.166.87	Allows access only from 10.40.166.87
10.40.166.87 10.40.166.0	Invalid because the logical bitwise operation (address **AND** mask) is not equal to the address
10.40.166.87 255.255.0.0	Invalid because the logical bitwise operation (address **AND** mask) is not equal to the address
10.40.0.0 255.255.0.0	Allows access from any client with address 10.40.xx.xx

Note: If you define a single community and set both the IP address and network mask to 0.0.0.0 (or leave both blank), then IP address-based access control is disabled. In this case, the SNMP agent is accessible from any IP address.

Note: When entering IP addresses, never use an address that is in a reserved IP address range. To see a list of reserved IP address ranges, click the quick tip icon **[?]** located near the IP address field.

4 In the **Access Type** drop-down box, select the access type for the community:

- **Get** - Allows SNMP get operations.
- **Get/Set** - Allows both SNMP **get** and **put** operations.

5 Select the **Community status** check box to enable the community.

Or clear the **Community status** check box to disable the community.

6 Click **Apply**.

Deleting a Community

Delete an SNMP community if you no longer want the DXi4000 to belong to a group of devices that are monitored by a common management station.

To delete a community, select the community and click **Delete**.

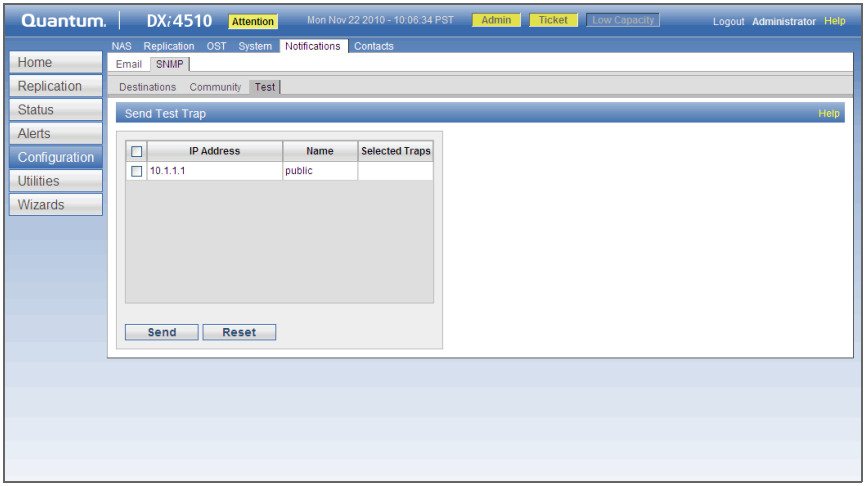
Note: You can select multiple communities to delete at once.

Test

The **SNMP Test** page allows you to send a test SNMP trap to verify that SNMP is correctly configured on the DXi4000.

To access the **SNMP Test** page, on the **SNMP** page, click the **Test** tab (see Figure 120).

Figure 120 SNMP Test Page



To send a test SNMP trap, select a destination in the list and click **Send**. If the destination does not receive the SNMP trap, make sure that the destination IP address is correct (see Editing a Destination on page 212). Also make sure that the community information is correct (see Community on page 214).

Contacts

The **Contacts** page allows you to enter company information. You can also enter individual contact information for primary and secondary contacts.

To access the **Contacts** page, click the **Configuration** menu, and then click the **Contacts** tab.

The **Contacts** page contains the following tabs:

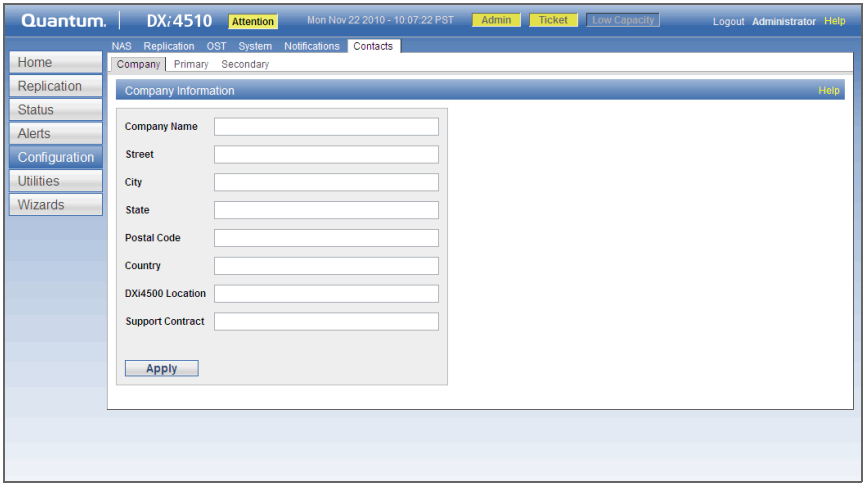
- Company
- Primary and Secondary

Company

The **Company** page allows you to enter information about the company and location of the DXi4000.

To access the **Company** page, on the **Contacts** page, click the **Company** tab (see Figure 121).

Figure 121 Company Page



To enter company information:

1 Enter the following information:

- **Company Name** - Enter the company name.
- **Street** - Enter the company street address.
- **City** - Enter the company city.
- **State** - Enter the company state.
- **Postal Code** - Enter the company postal code.
- **Country** - Enter the company country.
- **DXi4000 Location** - Enter the physical location of the DXi4000 (for example, data center).
- **Support Contract** - Enter the support contract number for the DXi4000 .

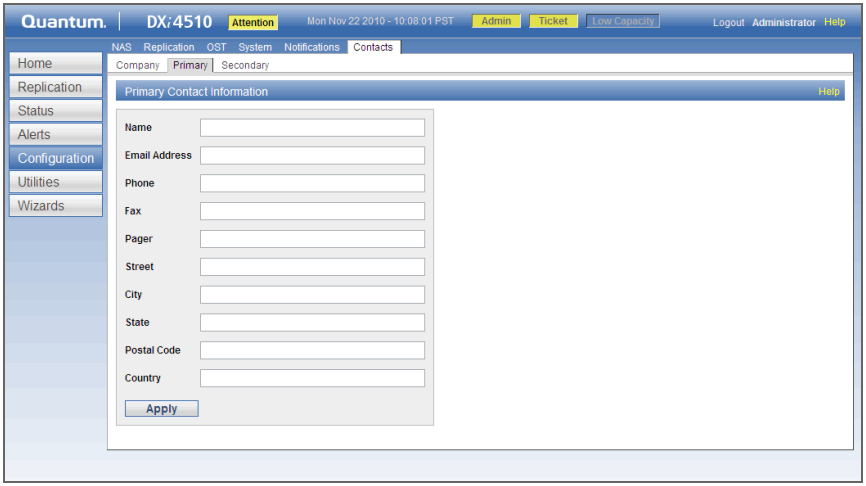
2 Click **Apply**.

Primary and Secondary

The **Primary** and **Secondary** pages allow you to enter information about the primary and secondary contacts for the DXi4000.

To access the **Primary** or **Secondary** page, on the **Contacts** page, click the **Primary** or **Secondary** tab (see Figure 122).

Figure 122 Primary and Secondary Pages



To enter primary or secondary contact information:

1 Enter the following information:

- **Name** - Enter the contact name.
- **Email Address** - (Required) Enter the contact e-mail address.
- **Phone** - Enter the contact phone number.
- **Fax** - Enter the contact fax number.
- **Pager** - Enter the contact pager number.
- **Street** - Enter the contact street address.
- **City** - Enter the contact city.
- **State** - Enter the contact state.
- **Postal Code** - Enter the contact postal code.
- **Country** - Enter the contact country.

2 Click **Apply**.

Chapter 10
DXi4000 Utilities

The **Utilities** pages to perform maintenance tasks on the DXi4000, such as generating and downloading diagnostic files, analyzing disk and network performance, and managing space reclamation. You can also install license keys, upgrade the system software, and reboot or shut down the DXi4000.

To access the **Utilities** pages, click the **Utilities** menu.

The **Utilities** pages contain the following tabs:

- Diagnostics
- Analyzer
- Space Reclamation
- License Keys
- Software Upgrade
- Reboot & Shutdown

Diagnostics

The **Diagnostics** page allows you to generate and download diagnostic files. You can also perform healthchecks to verify the health and integrity of the data deduplication blockpool.

The diagnostic files are helpful when troubleshooting problems on the DXi4000. Generate and download the diagnostic files before contacting Quantum customer support.

To access the **Diagnostics** page, click the **Utilities** menu, and then click the **Diagnostics** tab.

The **Diagnostics** page contains the following tabs:

- System Diag File
- Storage Array Diag File
- DSET
- Healthchecks

System Diag File

The **System Diag File** page allows you to generate and download a system diagnostics file. This file contains the diagnostic logs for all of the system components.

To access the **System Diag File** page, on the **Diagnostics** page, click the **System Diag File** tab (see Figure 123).

Figure 123 System Diag File Page

To generate and download a system diagnostics file:

1. Click **Generate New** to generate a new system diagnostics file.

   The system generates a new diagnostics file. This can take several minutes.

2. After the file finishes generating, refresh the Web browser to enable the **Download Current** button.

3. To download the generated diagnostics file, click **Download Current**.

   A dialog box displays asking if you want to open or save the file.

4. Click **Save** or **OK** to download the file.

Storage Array Diag File

The **Storage Array Diag File** page allows you to generate and download a storage array diagnostics file. This file contains the diagnostic logs for the storage arrays.

To access the **Storage Array Diag File** page, on the **Diagnostics** page, click the **Storage Array Diag File** tab (see Figure 124).

Figure 124 Storage Array Diag File Page

To generate and download a system diagnostics file:

1 Click **Generate New** to generate a new storage array diagnostics file.

   The system generates a new diagnostics file. This can take several minutes.

2 After the file finishes generating, refresh the Web browser to enable the **Download Current** button.

3 To download the generated diagnostics file, click **Download Current**.

   A dialog box displays asking if you want to open or save the file.

4 Click **Save** or **OK** to download the file.

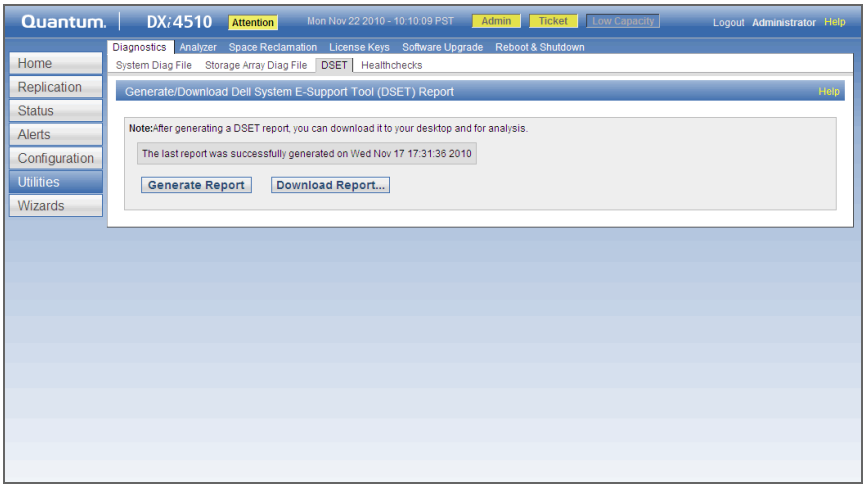
DSET

The **DSET** page allows you to generate a DSET report. DSET is a hardware diagnostic utility included with the DXi4000. A DSET report contains an array of status information about the DXi4000 hardware. A Quantum customer support representative can use this information to help identify and diagnose problems.

Note: Generate a DSET report only if directed to do so by a Quantum customer support representative.

To access the **DSET** page, on the **Diagnostics** page, click the **DSET** tab (see Figure 125).

Figure 125 DSET Page



To generate a DSET report:

1. Click **Generate Report**.

   Click **OK** to continue. The system generates a new DSET report. This can take several minutes.

2. To download the newly generated DSET report, click **Download Report**.

   A dialog box displays asking if you want to open or save the file.

3. Click **Save** or **OK** to download the file.

   The DSET report is saved as a compressed zip file to the specified location.

4. Locate the DSET report you downloaded and send it to the e-mail address provided by Quantum Customer Support.

Healthchecks

The **Healthchecks** page allows you to perform tests that verify the health and integrity of the data deduplication blockpool. You can also configure the DXi4000 to automatically run the healthchecks at specified intervals.

To access the **Healthchecks** page, on the **Diagnostics** page, click the **Healthchecks** tab.

The **Healthchecks** page contains the following tabs:

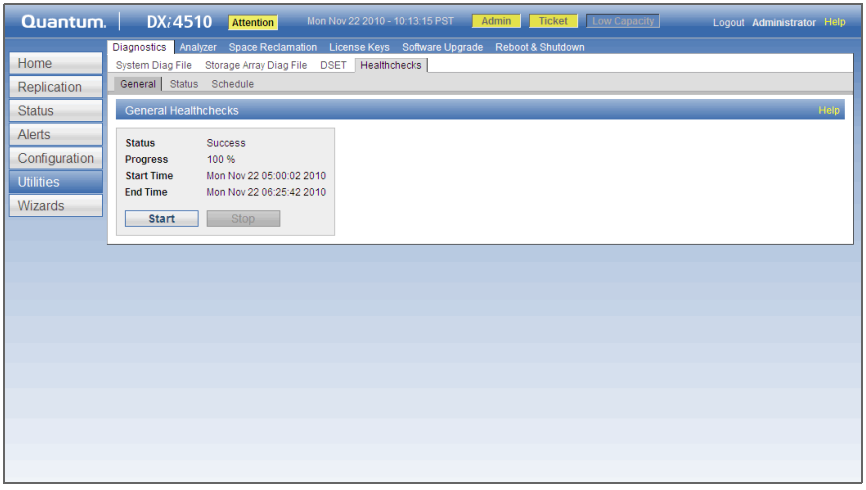
- General
- Status
- Schedule

General

The **General** page allows you to start running the healthchecks or stop them if they are already running. When you start the healthchecks, only the healthchecks that are currently enabled are run (see Status on page 229).

To access the **General** page, on the **Healthchecks** page, click the **General** tab (see Figure 126).

Figure 126 General Page



The **General** page displays the following information about the most recently run healthchecks:

- **Status** - The status of the healthchecks (**In Progress**, **Success**, **Failed**, or **Interrupted**).
- **Progress** - The percentage complete of the healthchecks.
- **Start Time** - The time the healthchecks started.

- **End Time** - The time the healthchecks ended.

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

- To start all enabled healthchecks, click **Start**.
- To stop all healthchecks in progress, click **Stop**.

Status

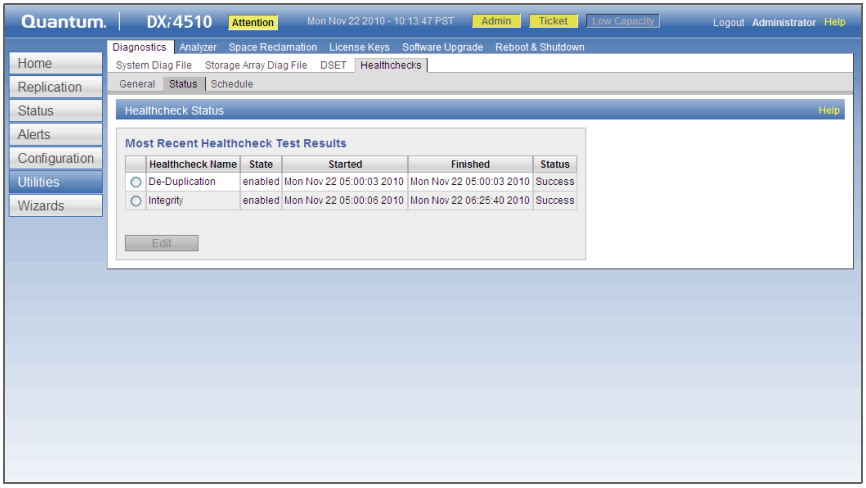
The **Status** page allows you to view information about the most recent test results for each healthcheck. You can also enable or disable a healthcheck.

The following healthchecks are available:

- **De-Duplication** - Checks the overall health of the blockpool. This healthcheck verifies that the metadata in the namespace file and the data tags in the blockpool are correctly in sync.
- **Integrity** - Checks the integrity of data in the blockpool. This healthcheck examines a sample of data tags in the blockpool and verifies that the data has been properly stored without errors or corruption.

To access the **Status** page, on the **Healthchecks** page, click the **Status** tab (see Figure 127).

Figure 127 Status Page



The **Status** page displays the following information about the most recently run test for each healthcheck:

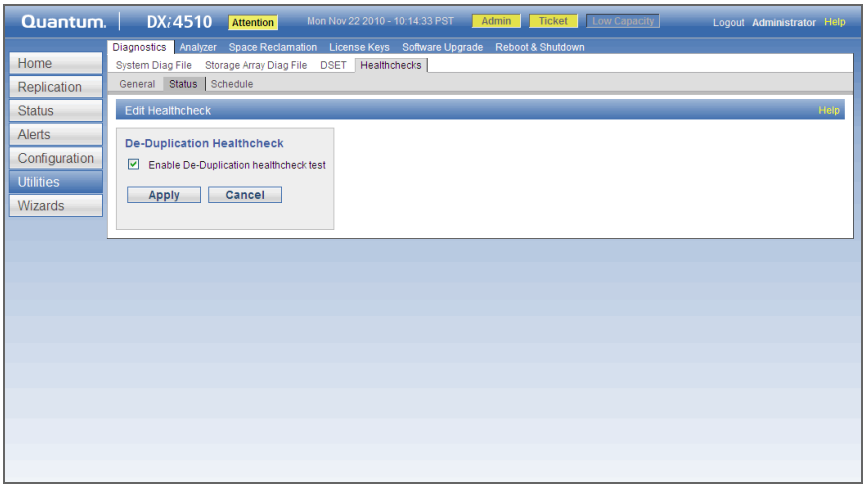
- **Healthcheck Name** - The name of the healthcheck.
- **State** - The state of the healthcheck (**enabled** or **disabled**).
- **Started** - The time the healthcheck started.
- **Finished** - The time the healthcheck ended.
- **Status** - The status of the healthcheck (**Success** or **Failed**).

To enable or disable a healthcheck:

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

The **Edit Healthcheck** page displays (see Figure 128).

Figure 128 Edit Healthcheck Page



2 Select the check box to enable the healthcheck.

Or clear the check box to disable the healthcheck.

3 Click **Apply**.

Note: When healthchecks are run (manually or scheduled), only enabled healthchecks are run.

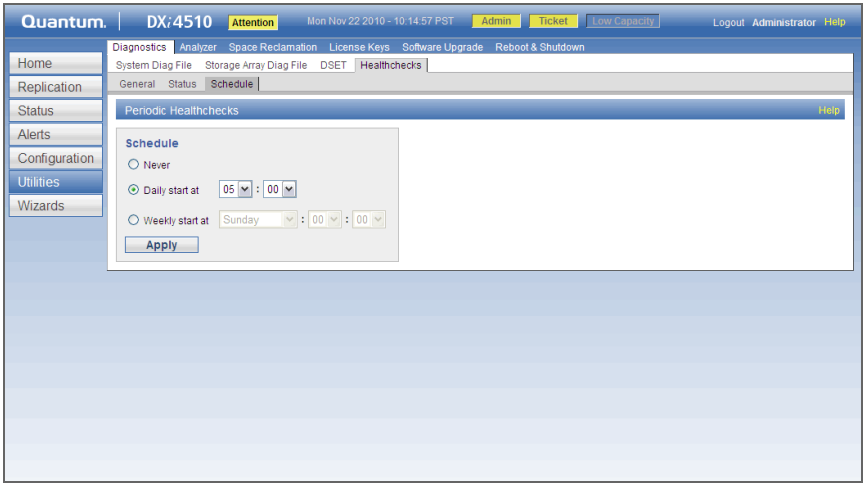
Caution: If a healthcheck fails when it is run, there may be a problem in the blockpool that could cause replication or restore operations to fail. Contact Quantum customer support if a healthcheck fails.

Schedule

The **Schedule** page allows you to configure the DXi4000 to automatically run healthchecks. You can schedule healthchecks to run daily, weekly, or not at all. When you schedule healthchecks, only the healthchecks that are currently enabled are run (see Status on page 229).

To access the **Schedule** page, on the **Healthchecks** page, click the **Schedule** tab (see Figure 129).

Figure 129 Schedule Page



To configure a healthchecks schedule:

1 Select a schedule option:

- **Never** - The DXi4000 does not automatically run healthchecks.
- **Daily start at** - The DXi4000 runs healthchecks once each day. In the drop-down boxes, specify the time to run the healthchecks each day.

- **Weekly start at** - The DXi4000 runs healthchecks once each week. In the drop-down boxes, specify the day and time to run the healthchecks each week.

2 Click **Apply**.

Analyzer

The **Analyzer** page allows you to analyze the network and disk performance of the DXi4000.

To access the **Analyzer** page, click the **Utilities** menu, and then click the **Analyzer** tab.

The **Analyzer** page contains the following tabs:

- Network
- Disk

Network

The **Network Analyzer** page allows you to analyze network performance by measuring network throughput between the DXi4000 and another system (such as another DXi system).

To access the **Network Analyzer** page, on the **Analyzer** page, click the **Network** tab.

The **Network Analyzer** page contains the following tabs:

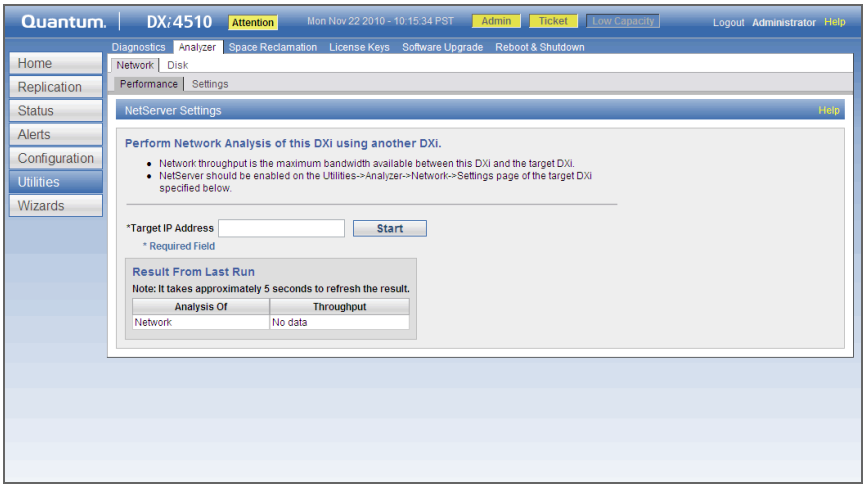
- Performance
- Settings

Performance

The **Performance** page allows you to perform network analysis with another system (the target). You can also view results from the most recently run test

To access the **Performance** page, on the **Network Analyzer** page, click the **Performance** tab (see Figure 130).

Figure 130 Performance Page



To perform network analysis:

1 In the **Target IP Address** box, enter the IP address of the system to perform network analysis with.

  The target system must have NetServer enabled (see Settings on page 233).

2 Click **Start**.

  The throughput result is displayed under **Result From Last Run** in MB/s.

Note: It takes approximately 5 seconds to refresh the results.

Settings

The **Settings** page allows you to enable or disable NetServer on the DXi4000. NetServer must be enabled on the target DXi system to perform network analysis with the system (see Performance on page 232).

To access the **Settings** page, on the **Network Analyzer** page, click the **Settings** tab (see Figure 131).

Figure 131 Settings Page

To enable or disable NetServer on the target DXi4000:

1 Select **Enable NetServer** to enable NetServer.

Or select **Disable NetServer** to disable NetServer.

2 Click **Apply**.

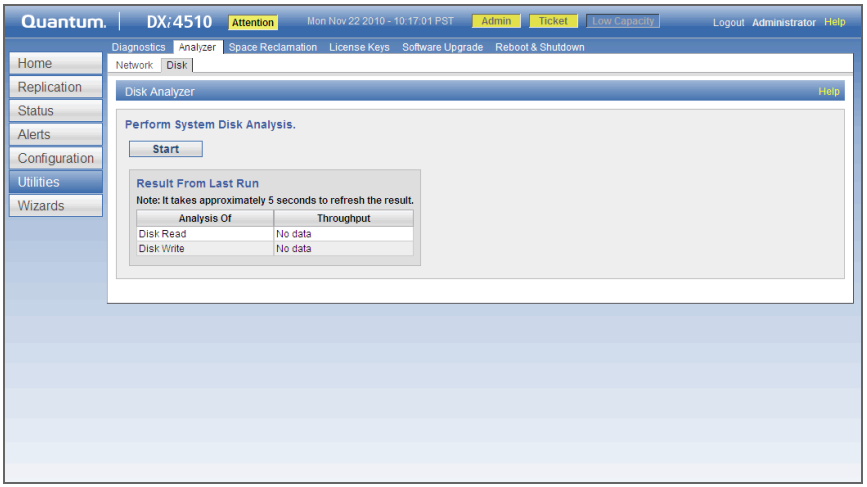
Note: You should disable NetServer on the target system when you are done analyzing network performance.

Disk

The **Disk Analyzer** page allows you to analyze disk performance by measuring disk read and write throughput.

To access the **Disk Analyzer** page, on the **Analyzer** page, click the **Disk** tab (see Figure 132).

Figure 132 Disk Analyzer Page



To perform disk analysis, click **Start**. The throughput result is displayed under **Result From Last Run** in KB/s.

Note: It takes approximately 5 seconds to refresh the results.

Space Reclamation

The **Space Reclamation** page allows you to manage space reclamation activity on the DXi4000. You can start space reclamation and monitor its progress. You can also schedule space reclamation to occur on a regular basis.

During space reclamation, the DXi4000 searches the blockpool for tags that are no longer referenced and then deletes the unneeded tags to free up space.

Note: When disk capacity is low, target replication to the system is paused (see Replication Service on page 110). In addition, space reclamation is automatically started to free up disk space.

To access the **Space Reclamation** page, click the **Utilities** menu, and then click the **Space Reclamation** tab.

The **Space Reclamation** page contains the following tabs:

- General
- Schedule

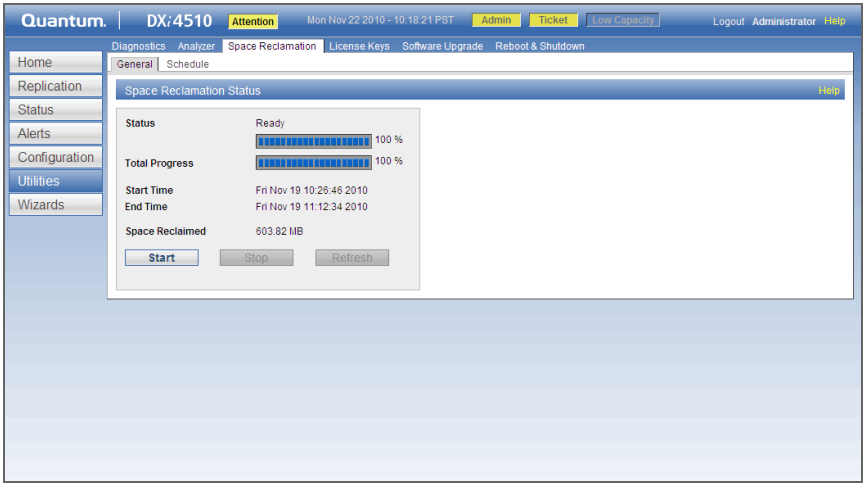
General

The **General** page allows you to start or stop space reclamation. You can also monitor the progress of space reclamation activity.

Caution: Space reclamation may affect system performance. Avoid running space reclamation during known backup periods.

To access the **General** page, on the **Space Reclamation** page, click the **General** tab (see Figure 133).

Figure 133 General Page



The **General** page displays the following information about the current or most recent space reclamation activity:

- **Status** - The status of space reclamation (see Space Reclamation Status on page 237).
- **Total Progress** - The percentage complete of all space reclamation activity.

- **Start Time** - The time space reclamation started.
- **End Time** - The time space reclamation ended.
- **Space Reclaimed** - The amount of disk space reclaimed.

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

- To start space reclamation, click **Start**.
- To stop space reclamation, click **Stop**.

Space Reclamation Status

Space reclamation can have one of the following statuses:

- **Reclamation Completed** - Space reclamation completed without errors.
- **Reclamation Started by User** - Space reclamation was started manually by a user.
- **Reclamation Interrupted** - Space reclamation was interrupted and must be restarted.
- **Reclamation Interrupted by User** - Space reclamation was interrupted by a user and must be restarted.
- **Reclamation Interrupted** - Error Encountered - Space reclamation was interrupted because an error was encountered and must be restarted.
- **Reclamation Completed** - No Candidates To Delete - Space reclamation completed, but there were no candidates for reclamation.
- **Reclaim Existing Blockpool Freed Space** - The existing blockpool space has been reclaimed for use.
- **Stage 1 of 4** - Reclaim Disk Space (Initial).
- **Stage 2 of 4** - Calculating Deletion Candidates.
- **Stage 3 of 4** - Delete New Candidates.
- **Stage 4 of 4** - Reclaim Disk Space.

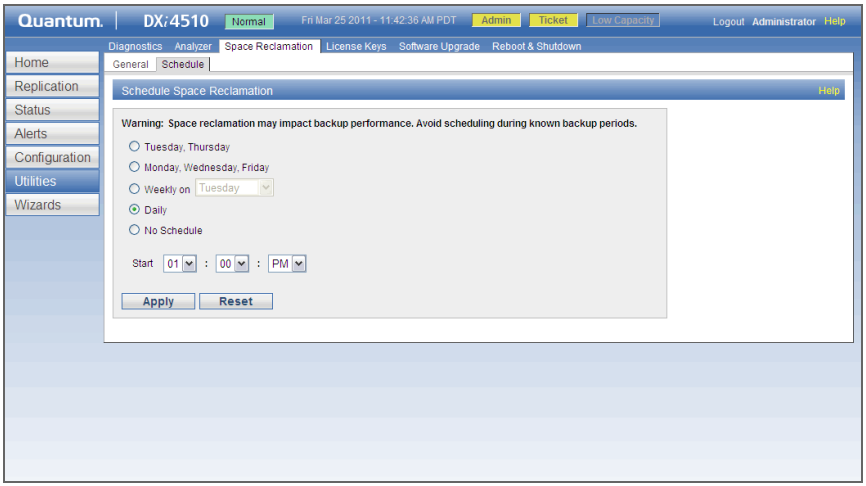
Schedule

The **Schedule** page allows you to configure the DXi4000 to automatically perform space reclamation on a regular basis.

Caution: Space reclamation may affect system performance. Avoid running space reclamation during known backup periods.

To access the **Schedule** page, on the **Space Reclamation** page, click the **Schedule** tab (see Figure 134).

Figure 134 Schedule Page



To schedule space reclamation:

1 Select a schedule option:

Note: By default, space reclamation is run daily at 1:00p.m.

- **Tuesday, Thursday** - Space reclamation occurs on Tuesdays and Thursdays.
- **Monday, Wednesday, Friday** - Space reclamation occurs on Mondays, Wednesdays, and Fridays.
- **Weekly on** - Space reclamation occurs on the day specified in the drop-down box.
- **Daily** - Space reclamation occurs every day.
- **No Schedule** - Scheduled space reclamation does not occur.

2 Use the drop-down boxes to specify the time when space reclamation starts on the specified days.

3 Click **Apply**.

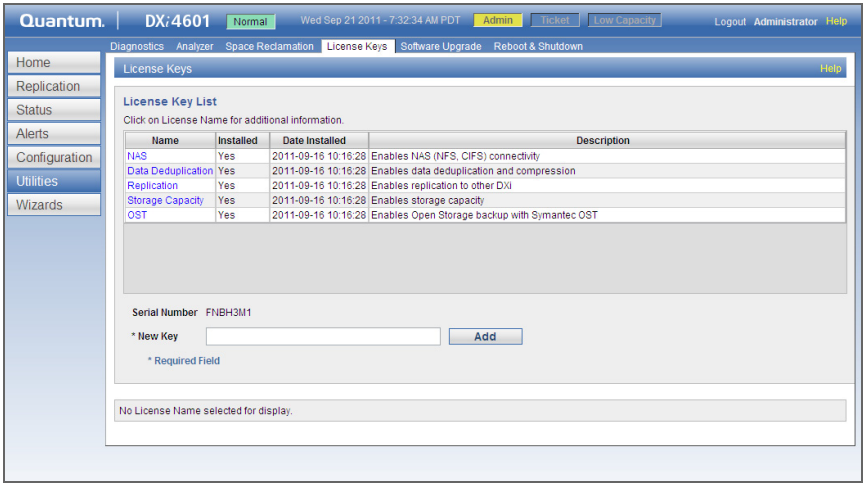
License Keys

The **License Keys** page allows you to add a license key to the DXi4000 to enable new functionality. You can also view a list of available licenses and see the licenses are installed on the system.

For DXi4601 systems, you can add license keys to increase the available storage capacity of the system up to a total of 12 TB (11.61 TB usable for data storage). For more information, see Adding a License Key on page 241.

To access the **License Keys** page, click the **Utilities** menu, and then click the **License Keys** tab (see Figure 135).

Figure 135 License Keys Page



Use the **License Keys** page to perform the following tasks:

- View information about available and installed licenses (see License Key List on page 240).
- Add a license key (see Adding a License Key on page 241).

License Key List

The **License Key List** displays the following information about licenses that are available for the DXi4000:

- **Name** - The name of the license.

  To display details for a license, click the license name. For a description of the licenses that are available on the DXi4000, see Available Licenses on page 240.

- **Installed** - The state of the license (**Yes** if the license is installed, **No** if the license is not installed).
- **Date Installed** - If installed, the date the license was installed.
- **Description** - A brief description of the license.

Available Licenses

The following licenses are available from Quantum.

- **NAS** - Enables NAS (NFS, CIFS) connectivity. (License key is pre-installed on all DXi4000 models.)
- **Data Deduplication** - Enables data deduplication and compression. (License key is pre-installed on all DXi4000 models.)
- **Replication** - Enables replication to other DXi systems. (License key is pre-installed on all DXi4000 models.)
- **Storage Capacity** - (DXi4601 only) Enables the purchased storage capacity for the system. (License key is pre-installed on all DXi4601 models.)

  A storage capacity license key is pre-installed for all initially purchased capacity. You can increase the available storage capacity of the system up to a total of 12 TB (11.61 TB usable for data storage) by adding additional license keys.

  Note: If you purchase a storage capacity upgrade, you will receive a License Certificate you can use to enable the additional capacity (see Adding a License Key on page 241).

- **OST** - Enables OpenStorage backup with Symantec OST. (License key is pre-installed on all DXi4000 models.)

Adding a License Key

Add a license key to enable additional storage capacity on a DXi4601 system. To install a license key, you must first obtain a License Certificate containing an authorization code.

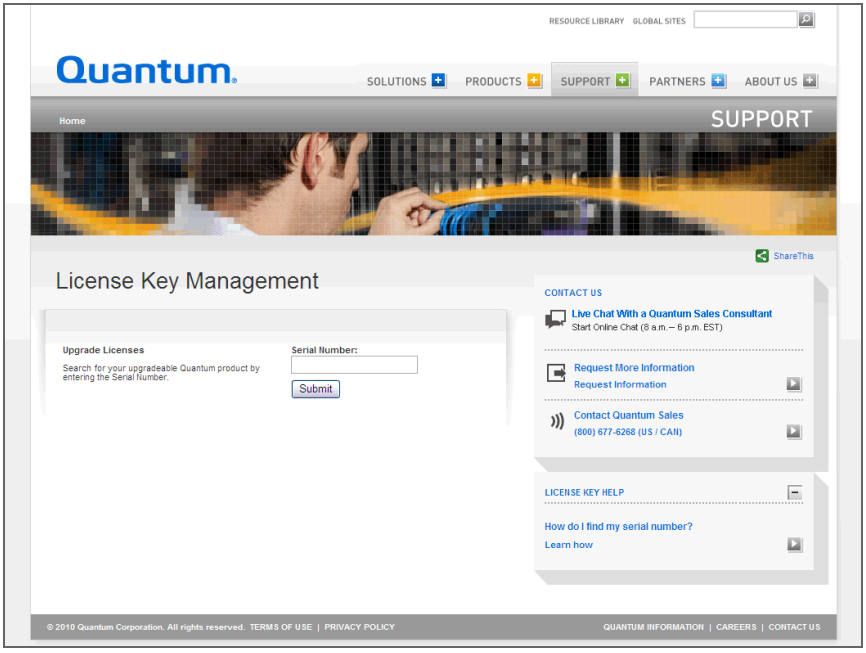
Contact your Quantum sales representative to purchase a storage capacity upgrade license. After you purchase the license, you will receive a License Certificate containing an authorization code.

To upgrade the storage capacity of a DXi4601, locate the License Certificate, and 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 136).

Figure 136 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 (see DXi4000 System Overview on page 72).

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 (see Accessing Remote Management on page 30).

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

The **License Keys** page displays (see Figure 135).

7 Enter the license key in the **New Key** box.

8 Click **Add**.

The license key is added to the system.

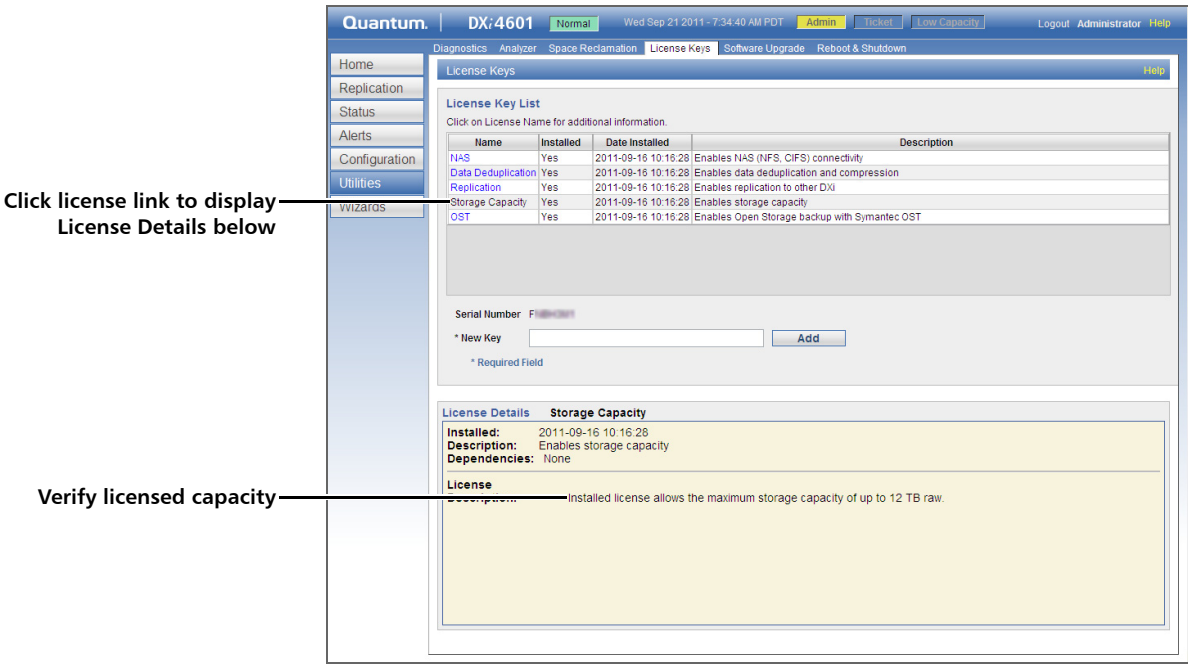
9 Reboot the DXi to complete the storage capacity upgrade (see Reboot & Shutdown on page 247).

Caution: Stop all backup, restore, and replication jobs before rebooting. The new storage capacity will not be available until you reboot the DXi.

10 After the DXi finishes rebooting, verify the licensed capacity.

Click the **Storage Capacity** license link on the **License Keys** page. The maximum allowed storage capacity appears under **License Details** (see Figure 137). Verify that the licensed capacity equals the total purchased capacity, including the new capacity upgrade.

Figure 137 License Details



Software Upgrade

The **Software Upgrade** page allows you to upload a new software image to update the system software on the DXi4000. To upgrade to DXi 2.0.x Software, contact Quantum Customer Support (see Getting More Information or Help on page xxii).

Caution: To upgrade to DXi 2.0.x Software, the DXi must be running 1.4 or later. Upgrading from 1.3.x or earlier to 2.0.x is not supported. Instead, you should upgrade to 1.4.2, and then upgrade to 2.0.x. The current software version is displayed on the **Home** page (see DXi4000 System Overview on page 72).

Note: The system should be scheduled for downtime during a software upgrade.

To access the **Software Upgrade** page, click the **Utilities** menu, and then click the **Software Upgrade** tab (see Figure 138).

Note: Figure 138 and Figure 139 show the **Software Upgrade** page for DXi 2.0.x Software. The appearance of the page is slightly different in software version 1.4.x, but the upgrade procedure is the same.

Figure 138 Software Upgrade Page

To upload a new system software image:

1. See the *DXi-Series Software Upgrade Guide* (6-67321) for information about all steps that must be completed prior to beginning the upgrade process.
2. Make sure the following conditions are met before you continue:
   - All replication and backup jobs are completed (see DXi4000 Replication on page 81).
   - All space reclamation tasks are completed without errors (see Space Reclamation on page 235).
   - All hardware statuses on the system are **Normal** (see Hardware on page 113).

- All outstanding administration alerts are deleted (see Admin Alerts on page 127).
- Healthchecks complete successfully without errors (see Healthchecks on page 227).

3 In the **Software Image File** box, type the location and filename of the new software image file.

Or click the **Browse** button to browse the system and locate the new software image. The software image file must end with the **.fw** extension.

4 Click **Upload**.

A **Warning** message displays.

5 Click **Start** to begin the upload process.

Do not close the window until the upload process is complete. An **Information** message displays stating the software image was uploaded successfully.

6 Click **OK**.

The **Activate/Remove Software Image** message displays (see Figure 139).

Figure 139 Activate/Remove Software Image

7 If you are upgrading from software version 1.4.x, insert the DXi 2.0.x Software DVD into the DVD drive on the node.

Caution: If you are upgrading from software version 1.4.x, the DXi 2.0.x Software DVD *must* be inserted into the DVD drive on the node before you activate the new software image or the upgrade will not complete successfully.

Do *not* use the software DVD if you are upgrading from 2.0 or 2.0.0.x to 2.0.x.

8 Click **Activate** to activate the new software image.

Note: To remove the software image from the system instead of activating it, click **Remove**.

A **Confirmation** message displays.

9 Click **Yes**.

A **Warning** message displays stating that activating the software will cause backup jobs to fail.

10 Click **Yes**.

An Information message displays stating that the system will restart.

The system automatically reboots two or more times during the software update process. After the system ejects the DVD, wait at least 15 minutes before attempting to log on to the system again.

Note: Clear your Web browser cache before logging on to the remote management console for the first time following the software upgrade. This will ensure the remote management console displays correctly.

11 If the software DVD was used during the upgrade, remove the software DVD from the DVD drive on the node.

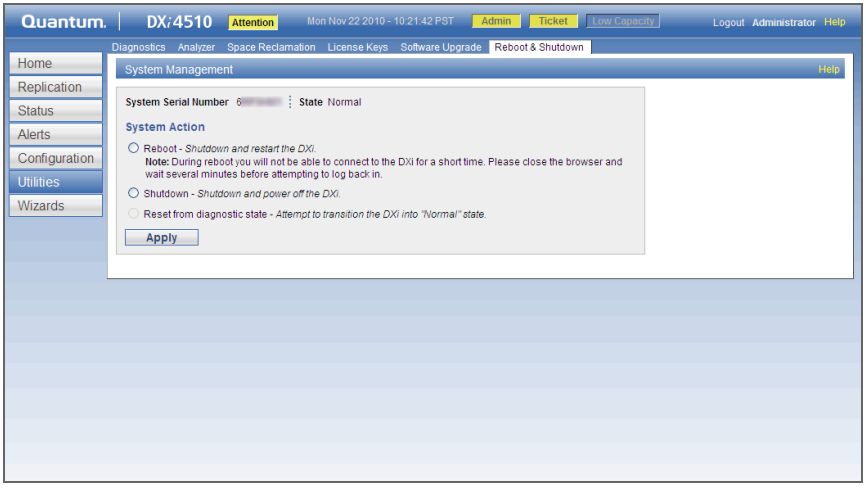
Caution: It is important that you do not leave the DXi 2.0.x Software DVD in the DVD drive. If the DXi4000 is rebooted with the DXi 2.0.x Software DVD in the DVD drive, but a firmware file has not been activated, the system will attempt to perform an upgrade. However, the upgrade process may not complete successfully.

Reboot & Shutdown

The **Reboot & Shutdown** page allows you to reboot or shut down the DXi4000.

To access the **Reboot & Shutdown** page, click the **Utilities** menu, and then click the **Reboot & Shutdown** tab (see Figure 140).

Figure 140 Reboot & Shutdown Page



To reboot or shutdown the DXi4000:

1 Under **System Action**, select an option:

- **Reboot** - Reboots the DXi4000.

  Rebooting the system closes the Web browser connection. You must log on again after the system has rebooted.

- **Shutdown** - Shuts down the DXi4000.

- **Reset from diagnostic state** - (Only available when the node is in degraded mode) Restarts the services on the node without rebooting the system.

2 Click **Apply**.

Note: Shutting down the system can take up to 15 minutes. Only the node will completely shut down.

Appendix A
DXi4000 System Specifications

This appendix lists characteristics and specifications of the DXi4000. These characteristics and specifications are categorized as follows:

- Physical Characteristics
- Environmental Specifications

Note: For hard drive specifications see the appropriate hard drive product manual.

Physical Characteristics

The following tables provide dimensions and other physical characteristics of the DXi4000 system components:

- Table 5 - Physical Characteristics
- Table 6 - Storage Capacity
- Table 7 - Cable Drops
- Table 8 - Interfaces
- Table 9 - Power Requirements

Table 5 Physical Characteristics

	System
Height	3.40 in (8 6 cm)
Width (side to side)	17.19 in (43.6 cm)
Depth (front to back)	24.09 in (61 cm)
Weight (stand alone)	49.5 lbs (22.5 Kg)
Rack Space Required	2U
Air clearance	Open 4 in (10.2 cm) behind unit for proper air flow

Table 6 Storage Capacity

DXi4000 Storage Capacity	

Usable capacity	• **DXi4510** - 2.2 TB usable for data storage
	• **DXi4520** - 4.4 TB usable for data storage
	• **DXi4601** - Expandable storage capacity up to 12 TB:
	  • **Base System Capacity** - 4 TB total (3.87 TB usable for data storage)
	  • **With First Capacity Upgrade License** - 8 TB total (7.74 TB usable for data storage)
	  • **With Second Capacity Upgrade License** - 12 TB total (11.61 TB usable for data storage)
	Note: For DXi4601, storage capacity upgrades are enabled simply by adding a license key and rebooting the system (see Adding a License Key on page 241). To purchase a storage capacity upgrade license, contact your Quantum sales representative.

Table 7 Cable Drops

DXi4000 Cable Drops	
Ethernet Cable Drops	**Model 4510/4520/4601 (4 x 1GbE ports) -** 1 to 4 1GbE Ethernet connections for NAS or OST connectivity, replication, and remote management
Power Outlets	**System** - 2 USA type 3-prong power outlets (**Nema 5-15**) or 2 C13 type 3-prong power outlets (**IEC320 C13**).

Table 8 Interfaces

DXi4000 Interfaces	
Interfaces	**NAS backup target:** 128 shares maximum (NFS or CIFS) **OST backup target:** 100 storage servers maximum **Note:** Samba version: 3.5.2
Hardware	**Model 4510/4520/4601** 4 ports 10/100/1000 BaseT Ethernet (RJ45 connector)

Table 9 Power Requirements

DXi4000 Power Requirements	
Power Supplies and Cords	Two (2) hot swappable redundant power supplies Two (2) USA type 3-prong power cords with **IEC320 C13** to **Nema 5-15** connectors Two (2) C13 to C14 type 3-prong power cords with **IEC320 C13** to **IEC320 C14** connectors
Voltage	100–240 VAC
Frequency	50–60Hz

DXi4510	**Inrush**	2.2A @ 100V 0.92A @ 240V 220W
	Typical	2.0A @100V 0.83A @240V 200W 683 BTU/Hr
	Maximum	7.5A @100V 4.0A @ 240V 750W
DXi4520 and DXi4601	**Inrush**	3.0A @ 100V 1.3A @ 240V 300W
	Typical	2.0A @100V 0.83A @240V 200W 683 BTU/Hr
	Maximum	7.5A @100V 4.0A @ 240V 750W

Caution: To safeguard backups in the event of a power outage, Quantum recommends that you connect the DXi4000 to a UPS (uninterruptable power supply).

Environmental Specifications

Table 10 provides various DXi4000 environmental specifications.

Table 10 Environmental Specifications

Climatic Environment		
Temperature and Altitude	Operating	10 to 35 °C (50 to 95 °F) 35 °C Max, Altitude = 900 m or 2952.75 ft (28 °C Max, Altitude = 3048 m or 10,000 ft)
	Shipping and storage	-40 to 65 °C (-40 to 149 °F) up 12,000m (39,370 ft)
Relative humidity	Operating	20% to 80% (non-condensing)
	Shipping and storage	5% to 95% (non-condensing)
Vibration and Shock		
Operational Shock	Peak Acceleration	31G
	Duration	2.6 milliseconds
	Wave Shape	½ Sine
Operational Vibration	Mode	Random Vibration
	Frequency Range	5Hz–350Hz
	Amplitude	0.26Grms
	Application	Operational Orientations
Shipping and Storage	Mode	Random Vibration
	Frequency Range	10Hz–250Hz
	Amplitude	1.54 Grms
	Rate/Duration	(PSD can be provided) 15 minutes all operational orientations
Acoustic		
Acoustic output	Operating	< 67 dBA at 1 meter, room temperature (20C)
Agency Approvals		
Safety	IEC 60950-1 (ed. 1), CSA 60950-1-03/UL 60950-1 1st Edition	

Emissions	EN55022 Class A, FCC Part 15 Class A, ICES-003 Class A, VCCI Class A, CISPR 22 Class A, CNS13438 Class A, KN22 Class A
Immunity	EN55024/KN24: EN 61000-3-2 - Harmonic current emissions test EN 61000-3-3 - Voltage fluctuations and flicker in low-voltage supply systems test EN 55024:1998 - Information technology equipment - Immunity characteristics - Limits and methods of measurements EN 61000-4-2 - Electrostatic discharge immunity test EN 61000-4-3 - Radiated, radio-frequency, electromagnetic field immunity test EN 61000-4-4 - Electrical fast transient/burst immunity test EN 61000-4-5 - Surge immunity test EN 61000-4-6 - Immunity to conducted disturbances, induced by radio-frequency fields EN 61000-4-8 - Power frequency magnetic field immunity test EN 61000-4-11 - Voltage dips, short interruptions and voltage variations immunity test

Caution: The DXi4000 system is designed to be installed in a rack enclosure. Ensure that the operating temperature inside the rack enclosure does not exceed the maximum rated ambient temperature. Do not restrict air flow to the DXi4000 components.

Appendix B

Troubleshooting

This appendix describes the status and problem reporting features of the DXi4000 as well as problems you might encounter during setup and operation of the system. Corrective information is provided to help you resolve these problems.

For for information about troubleshooting the DXi4000, see the following sections:

DXi4000 Status and Problem Reporting

To maintain system health and help you identify and correct problems that occur, the DXi4000 constantly performs the following actions:

- Monitors the system software and hardware components.
- Detects system problems.
- Attempts to isolate each problem to a specific field replaceable component.

- Attempts to recover from the problem.
- Logs the problem.
- If the problem requires service, the system reports the problem in a service ticket associated with the field replaceable component.

General Troubleshooting Actions

For information about general troubleshoot actions you can take, see the following sections:

- Viewing Service Tickets
- Checking Hardware Status
- Downloading a System Diagnostics File

Viewing Service Tickets

Service tickets include time and date information, status (open or closed), information about each error, and links to recommended troubleshooting procedures. The DXi4000 generates service tickets according to the following scenarios:

- If the component associated with the problem does not have an open service ticket, the DXi4000 opens a service ticket for the component and reports the problem in a service ticket.
- If the problem reoccurs, the DXi4000 logs the number of times that it detects the problem in the existing report.
- If a different problem occurs with the same component, the DXi4000 adds a new report to the same service ticket.
- If a problem occurs with a different component, the DXi4000 uses the above scenario to open a new service ticket for the component or report the problem in an existing service ticket associated with the component.

To access the **Service Tickets** page, click the **Alerts** menu, and then click the **Service Tickets** tab.

For more information about working with service tickets, see Service Tickets on page 129.

Checking Hardware Status

The **Hardware** page allows you to view information about the hardware components of the DXi4000. You can view the overall status of the node as well as detailed status information for components such as the system board, Fibre Channel adapters, network ports and storage arrays.

To access the **Hardware** page, click the **Status** menu, and then click the **Hardware** tab.

For information about using the **Status** page, see Hardware on page 113.

Downloading a System Diagnostics File

The **System Diag File** page allows you to generate and download a system diagnostics file. This file contains the diagnostic logs for all of the system components.

To access the **System Diag File** page, on the **Diagnostics** page, click the **System Diag File** tab.

For information about downloading the system diagnostics file, see System Diag File on page 224.

Common Problems and Solutions

The troubleshooting information in this section covers the following topics:

- Start-up Problems
- Hardware Problems
- Ethernet Network Problems
- Replication Problems
- Temperature Problems

Start-up Problems

Table 11 describes problems that can occur during system start-up.

Table 11 Start-up Problems

Problem	Corrective Action
FATAL ERROR Unable to start SNFS! Message displays.	Contact your Quantum Customer Support representative (see Getting More Information or Help on page xxii).
FATAL ERROR Unable to start blockpool! Message displays.	Contact your Quantum Customer Support representative (see Getting More Information or Help on page xxii).

Hardware Problems

Table 12 describes corrective actions for problems occurring with the system hardware.

Table 12 Hardware Problems

Problem	Corrective Action
The system does not power on.	Make sure the power cords are connected to a grounded electrical outlet and the power switches located on the back of the power supplies are on. If the problem persists, contact your Quantum Customer Support representative to arrange for service (see Getting More Information or Help on page xxii).
One power supply is not functioning.	Determine which power supply has failed by observing the red fault LED on the power supply. Contact your Quantum Customer Support representative to arrange for service (see Getting More Information or Help on page xxii).
Both power supplies are not functioning.	Determine which power supply has failed by observing the red fault LED on the power supply. Contact your Quantum Customer Support representative to arrange for service (see Getting More Information or Help on page xxii).

Problem	Corrective Action
One fan is not operating.	Determine which fan has failed by reading the service ticket generated by the system. Contact your Quantum Customer Support representative to arrange for service (see Getting More Information or Help on page xxii).
Multiple fans are not operating.	**Caution:** Turn the system off immediately! The system will overheat with multiple fans not operating. Contact your Quantum Customer Support representative to arrange for service (see Getting More Information or Help on page xxii).
A hard drive is not responding	Determine which drive has failed by observing the red fault LED on the drive carrier. Contact your Quantum Customer Support representative for a drive carrier replacement (see Getting More Information or Help on page xxii).
A SAS cable is removed during normal operation.	The system will shut down as soon as it recognizes the problem. There is a potential for data loss. Power off the system, re-insert the SAS cable and restart the system. Depending on the state of the system when the SAS cable was removed, a long-running, mandatory data verification may occur.

Ethernet Network Problems

Table 13 describes corrective actions for problems occurring with the Ethernet network.

Table 13 Ethernet Network Problems

Problem	Corrective Action
The Ethernet link light on the DXi4000 is not lit when a cable is connected to a hub or switch.	Check to make sure the Ethernet cable is not a cross-over cable. Use only "straight" CAT-6 Ethernet cables. Port on the hub or switch is not active or damaged. Port on the DXi4000 is damaged. Contact the Quantum Customer Support department (see Getting More Information or Help on page xxii).
The Ethernet link light on the switch or hub is not lit when a cable is connected to DXi4000 system.	Check to make sure the Ethernet cable is not a cross-over cable. Use only "straight" CAT-6 Ethernet cables. Port on the hub or switch is not active or damaged. Port on the DXi4000 is damaged. Contact the Quantum Customer Support department (see Getting More Information or Help on page xxii).
DXi4000 system is not visible on the Ethernet network.	Try to ping the DXi4000 system IP address from a host on the same network. If the ping reports round trip times, the DXi4000 system is active. If not, check the cables, switches, or hubs for damaged components. If everything checks out, contact the Quantum Customer Support department (see Getting More Information or Help on page xxii).

Problem	Corrective Action
DXi4000 remote management pages are not visible.	IF you cannot connect to the DXi4000 remote management pages, verify that the following network settings for the DXi4000 are correct: • Hostname • IP addresses • Default gateway • Subnet mask • Domain name (optional)
An Ethernet cable is removed during normal operation.	The system will discontinue use of the associated Ethernet port. A Service ticket will be issued. The possibility of errors exist; data corruption will not occur. Reconnect the cable as soon as possible. It is not necessary to power the system off. Depending on the state of the system when the Ethernet cable was removed, replication, system management, or ingest may need to be restarted.

Replication Problems

Table 14 describes corrective actions for problems occurring with the replication.

Table 14 Replication Problems

Problem	Explanation/Corrective Action
The replication was paused, but the replication is still in process.	When you click **Pause**, the system will continue to replicate the current tag or block of information in process. The process of completing the current tag replication can take up to 15 minutes to complete. Once that tag has completed replication the system will pause and wait to resume.

Problem	Explanation/Corrective Action
The replication was paused and a **Failure** event was generated in the **Replication Events** page.	This is normal. When a replication is paused, a failure event is generated on the **Replication Events** page. They system will continue the replication when you click **Resume**.
Replication was disabled while a replication was in process and the replication completed.	If you click **Disable** during a replication in process, the system will complete the entire replication and then disable replication on the system. The system will be unable to replicate until you click **Enable**.
Enabled replication on a NAS share and received the following Event: `No destination host is specified for replication.`	You must configure the target system prior to configuring the source. If the target system is not configured first, you will not be able to designate the replication target.
Able to enable and schedule replication for NAS even though no target IP configured.	It is possible to enable and schedule a replication when a target system has not been configured. The replication will not start until a target system is configured.

Temperature Problems

Temperature problems are generally caused by incorrect room temperature, poor air circulation inside the DXi4000 rack or components, or a malfunctioning cooling fan (see Environmental Specifications on page 285).

Use the following procedure if a temperature problem is reported:

1. Check the ambient temperature of the room containing the DXi4000 system to verify that the temperature falls within the specified range.
2. Inspect for adequate air circulation inside the rack. Some racks may provide additional fans to improve air circulations. Check the fan for proper operation. Clean or replace any air filter as necessary.

3 If a component reports a temperature problem, verify that the associated fan is operating correctly. If necessary, contact Quantum customer support to replace the fan (see Getting More Information or Help on page xxii).

Glossary

B

Blockpool A pool of all unique data blocks that were captured during the data deduplication cycle. When backup jobs occur, the data deduplication engine searches for new data entering the DXi4000 and uses a variable length compression type algorithm to compare this to existing data in the blockpool. Unique blocks are added to the blockpool and all known blocks are indexed.

Byte The basic unit of computer memory which is large enough to hold one character.

C

Compress A process of removing fine-grained redundancy from data prior to storing or transmitting it. The granularity may vary, but generally compression deals with redundancy in grains of a few bytes.

D

Data Deduplication A process of removing coarse-grained redundancy from data prior to storing or transmitting it. The granularity may vary, but generally data deduplication deals with redundancy in grains of several kilobytes. When you select **Enable Data Deduplication** for a NAS share, data deduplication is running all of the time. Backup data is sent to the DXi4000 and data deduplication is performed on data as it

is ingested.

Disk A fixed set of sectors with sequential numbers starting from zero, directly and independently accessible and mutable by those numbers without affecting any other sector.

F

Filesystem An abstraction layered over storage devices (typically disks) obscuring the physical details of the storage devices it supports in favor of a presentation oriented at storing and organizing files.

H

Host The device or devices to which the system is connected.

I

Ingest The throughput performance of data writes to the system.

L

LSU Logical Storage Unit. A logical storage entity defined under the Symantec OpenStorage API.

N

NAS Network Attached Storage is file-level computer data storage connected to a computer network providing data access to network clients.

NDMP Network Data Management Protocol is a protocol meant to transport data between NAS devices, also known as filers, and backup devices. This removes the need for transporting the data through the backup server itself, thus enhancing speed and removing load from the backup server.

O

OST OpenStorage API. An interface specific to Symantec NetBackup and Backup Exec for writing data to disk backup appliances, replicating it, and, in the case of NetBackup, writing data directly to disk, under control of the backup application.

R

RAID Redundant Array of Independent Disks is a technology through which several physical storage disks are grouped into an array that appears to an operating system as one or more physical devices.

S

SNFS StorNext® File System

SNMP Short for *Simple Network Management Protocol*, a set of protocols for managing complex networks.

Sync ID When you configure a share for Directory/File Based Replication, you specify a Sync ID for the share. The Sync ID associates the share on the source system with the share on the target system that will received the replicated data. The Sync ID of the source share and the target share *must* be identical.

T

Terabyte A unit of measure for digital data equal to 1,000 gigabytes.