

Quantum[®]

User's Guide

Quantum DXi4000

with DXi 2.3 Software



Quantum DXi4000 User's Guide, 6-67092-07 Rev A, November 2013, Product of USA.

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Preface

This manual introduces the Quantum DXi4000 disk backup solution and discusses:

- System operations
- Configuration
- Web interface
- Basic troubleshooting

Audience

This manual is written for DXi4000 operators and administrators.

Note: It is useful for the audience to have a basic understanding of Windows, Linux, and UNIX® as well as 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

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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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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	<i>System Safety and Regulatory Information - Quantum Products</i>	Lists all safety and regulatory information for all Quantum products.
6-67093	<i>DXi4000 Site Planning Guide</i>	Provides site planning information for the DXi4000.
6-67079	<i>DXi-Series NetBackup and Backup Exec OST Configuration Guide</i>	Provides information for setting up the DXi4000 for OST operation with NetBackup and Backup Exec.
6-67081	<i>DXi-Series Command Line Interface (CLI) Guide</i>	Provides information on the DXi4000 command line interface.
6-67353	<i>DXi Advanced Reporting User's Guide</i>	Provides information about using DXi Advanced Reporting features.

For the most up-to-date documentation for the DXi4000, go to:

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

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Chapter 1

DXi4000 System Description

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

- [Overview](#)
- [Features and Benefits](#)
- [What's New in DXi 2.3 Software](#)
- [Data Reduction](#)
- [Space Reclamation](#)
- [Remote Replication](#)
- [DXi4000 System](#)
- [Hard Drive Storage](#)
- [Supported RAID Configurations](#)
- [DXi Advanced Reporting](#)
- [Network Configuration](#)

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.

DXi Accent distributes deduplication between the DXi4000 and the backup server to accelerate backups over bandwidth-constrained networks. Compatibility with Quantum's vmPRO software provides consolidated support for backup of physical and virtual 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 family, DXi6000 family, 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 2.3 Software

DXi 2.3 Software include the following significant enhancements:

- **Web Browser Compatibility** - Access the DXi Remote Management Console using Google Chrome in addition to Microsoft Internet Explorer and Mozilla Firefox (see [Supported Browsers](#) on page 30).
- **Help Menu** - Quickly access documentation and learning resources on Quantum.com, as well as the built-in online help, using the **Help** drop-down menu (see [System Banner](#) on page 33).

- **Multiple Replication Targets** - Replicate data from a source DXi system to up to two target DXi systems. Each share can be configured individually to replicate to one or both targets, and replication can be paused per target (see [DXi4000 Replication](#) on page 85).
- **Replication Send Page** - The redesigned **Replication > Send** page lets you easily manage data replication for all shares. In addition, you can quickly enable or disable replication for one or more shares (see [Replication Send](#) on page 93).
- **OST Status Page** - The enhanced **Status > OST** page provides statistics for recent OST optimized duplication as well as DXi Accent activity (see [OST Status](#) on page 135).
- **Replication Configuration Page** - The redesigned **Configuration > Replication** page allows you to manage both replication targets and sources using a single, unified interface (see [Replication Configuration](#) on page 169).
- **Increased Replication Snapshots** - You can retain up to 32 snapshots for each share configured for replication (see [Changing the Maximum Number of Snapshots](#) on page 180).
- **Scheduler Page** - The redesigned **Configuration > Scheduler** page provides tools for quickly adding a new scheduled event, as well as for managing schedules for multiple shares (see [Scheduler](#) on page 212).
- **Network Address Translation (NAT)** - You can specify a NAT IP address for the DXi to enable replication across a public network, when the source and target are located behind NAT-enabled routers (see [Network](#) on page 223).
- **Software Upgrade Utility** - The **Software Upgrade Utility** can automatically check for software upgrades for your DXi system. If an upgrade is found, you can choose to download and install it to update your DXi to the latest software version (see [Software Upgrades](#) on page 297).
- **Chargeback Reporting** - DXi Advanced Reporting (included with DXi 2.3 Software) enables per share reporting, also called chargeback reporting. Using the chargeback reports, you can see ingest, incoming replication, and outgoing replication statistics for individual CIFS/NFS shares or OST LSUs (for more information, see the *Quantum DXi Advanced Reporting User's Guide* (6-67353)).

Enhancements in Previous Releases

The following enhancements were introduced in DXi 2.2.x Software:

- **Site Map** - The **User Interface Site Map** displays a visual map of all management pages in the DXi remote management console. Use the map to quickly locate and jump to any page (see [DXi4000 Management Pages](#) on page 39).
- **User Activity Log** - Use the **Activity Log** to view a record of all activities performed by administrative and service users in the past 90 days. You can view the user who performed the activity, the time the activity was performed, and other information. You can also download the activity log to an XML file (see [Activity Log](#) on page 137).
- **OST Automatic Image Replication** - If you are using Symantec NetBackup 7.1 or higher, you can configure an LSU for Automatic Image Replication. If enabled, data on an LSU is automatically replicated to a remote LSU that resides on a DXi in a different NetBackup domain (see [Replicating OST Data](#) on page 181).
- **Concurrent Optimized Duplication** - With Concurrent Optimized Duplication, as data is written to the storage server, it is simultaneously replicated to the target DXi. When optimized duplication or Automatic Image Replication subsequently occurs, the operation is more efficient because a portion of the required data has already been replicated to the target storage server (see [Replicating OST Data](#) on page 181).
- **DXi Accent Improvements** - DXi Accent supports Windows based media servers running Symantec Backup Exec or NetBackup. In addition, data sent from the media server to the DXi can be encrypted using AES (Advanced Encryption Standard) encryption methods (see [DXi Accent](#) on page 209).
- **Consolidated Job Scheduler** - All scheduled functions of the DXi are now managed on the **Scheduler** page, including the scheduling of replication, replication throttling, e-mail reports, healthchecks, and space reclamation (see [Scheduler](#) on page 212).
- **VLAN Tagging** - You can enable VLAN tagging and Jumbo Frames for any configured network interface on the DXi (see [Network](#) on page 223).
- **Space Reclamation Improvements** - Scheduled and on demand space reclamation has been tuned for increased performance, while automatic space reclamation during low space conditions provides maximum free space recovery. Also, the blockpool automatically

reuses free bytes when ingesting data (see [Space Reclamation](#) on page 287).

- **Secure Shred** - With Secure Shred, you can securely and permanently erase sensitive data stored on the DXi. To securely erase data, first delete files on NAS shares or storage servers, then start secure shred. During secure shred, all residual data associated with the deleted files is securely erased from the disk drives and is overwritten with random patterns (see [Secure Shred](#) on page 294).

The following enhancements were introduced in DXi 2.1.x Software:

- **Additional OpenStorage (OST) Improvements** - Enhancements include support for optimized synthetic full backups, and support for HP-UX 11i v3 IA-64 platforms (NetBackup only).
- **Replication Throttling and Scheduler** - With replication throttling, you can configure the DXi to limit its outgoing data replication bandwidth to a specified maximum in order to avoid network contention. Use the new **Scheduler** page to set up a recurring schedule for replication throttle, and to manage schedules for space reclamation and healthchecks.
- **AES 256-bit Encryption** - When sending replicated data to a target system, the DXi can take advantage of 256-bit encryption for stronger security.
- **New CLI Functionality** - The command line interface (CLI) supports new and updated functionality for enabling symlinks and hard links on NAS shares, enabling SMB server signing for NAS shares, mapping OST IP addresses, scheduling replication throttling, and performing advanced configuration of network interfaces.
- **Improved Space Reclamation Process** - The space reclamation process now better adjusts its use of system resources, consuming fewer resources during data ingest and performing space reclamation more quickly when more system resources are available.

The following enhancements were introduced in DXi 2.0.x software:

- **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 8).

- **OpenStorage (OST) Improvements** - Enhancements include increased total performance, including writes, reads, and replication; simplified deployment (see [Manage Users](#) on page 199); and dynamically sized LSUs with no hard size limit (see [LSU](#) on page 193).
- **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 87). 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 39. 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 223).
- **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 41).

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.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 152.

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.

For correct system operation, space reclamation *must* be run at regular intervals (at least once a week). Quantum recommends creating a schedule to automatically run space reclamation (see [Scheduling Space Reclamation](#) on page 221).

It may be beneficial to schedule space reclamation for a time when other operations are not normally being carried out. Therefore it is important to know when to schedule the space reclamation process. 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 291). 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 13). 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 14 or [OpenStorage \(OST\)](#) on page 16).

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.

DXi Usage Scenarios

DXi storage presentations are optimized for backup usage rather than file sharing. Backup application usage is typically characterized by:

- Aggregated name spaces and file contents.
- Limited direct, active file access.
- Limited browsing, scanning, or stating.
- Limited metadata manipulation (including rename).

Usage diverging from these characteristics must be qualified to ensure acceptable behavior with respect to functionality, performance, replication, and recovery.

Note: Using Backup Exec with GRT (Granular Recovery Technology) over CIFS is not recommended usage. GRT requires frequently overwriting portions of and appending data to existing files, which is inconsistent with the DXi usage scenarios. Instead, Quantum recommends using OST.

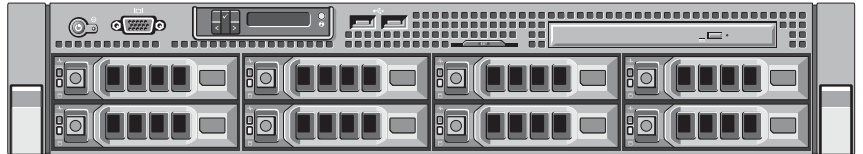
HDDs

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

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

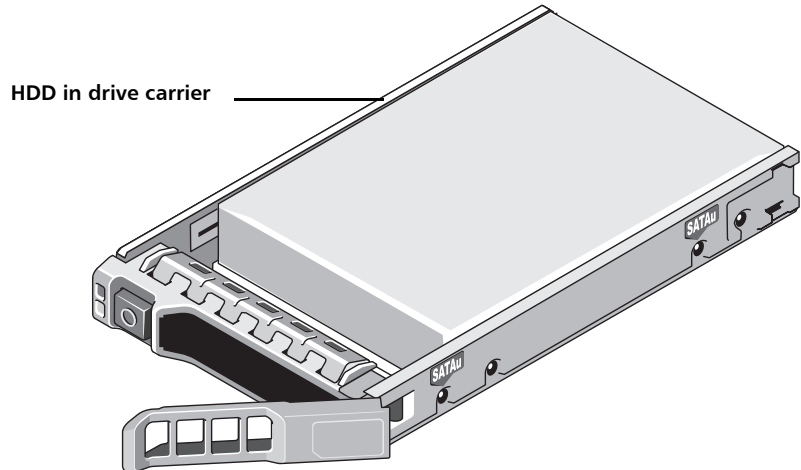
- **HDDs** - High capacity (500 GB, 1 TB, or 2 TB) hard disk drives are used for data storage, the operating system, and system software.

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](#)

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.

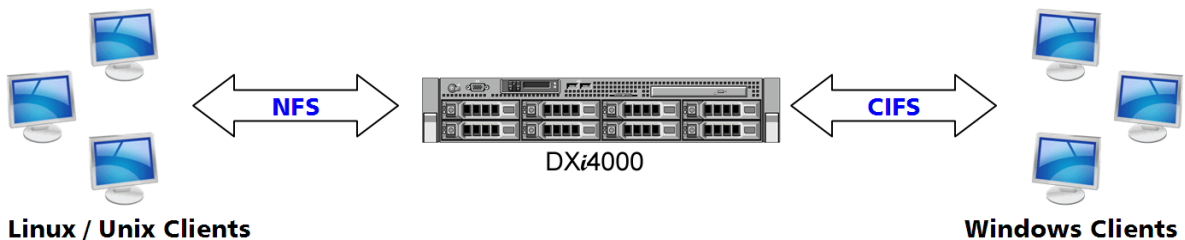
Note: Windows 2003, Windows 2003 R2, Windows 2008, and Windows 2008 R2 are supported for Active Directory domain membership.

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

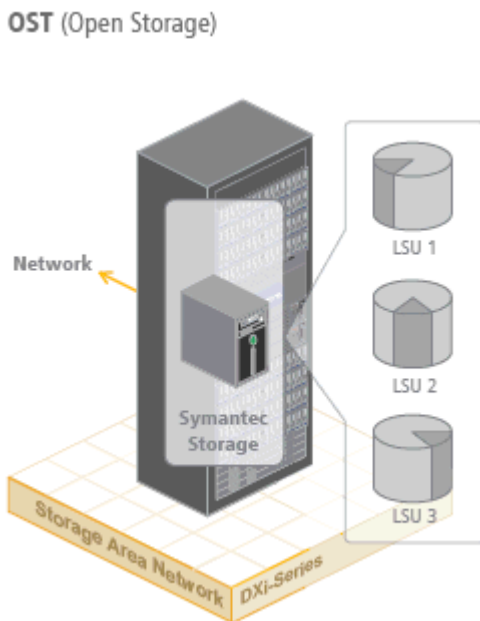


OpenStorage (OST)

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](#)

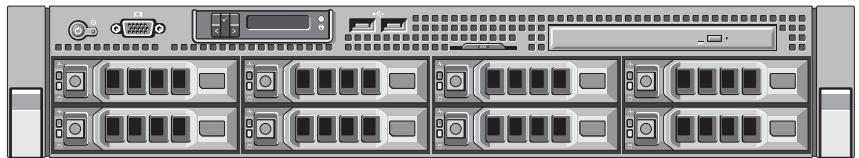
RAID 6 Configuration

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 User's Guide* (6-67353).

Network Configuration

During network configuration, each individual interface on the DXi4000 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.

Keep in mind that any traffic can pass through any of the configured Ethernet ports. This means that the routing of different traffic types, as well as firewall capability, must be controlled using the network infrastructure (routers and switches) that the DXi4000 is connected to.

For more information about configuration network settings, see [Network](#) on page 223.

Note: Each configured network interface requires its own set of network settings (IP address, network mask, and gateway).

Caution: For effective bonded network use, a properly configured network switch is required. (A network switch is not supplied with the DXi4000.) The DXi4000 bonding settings must match the switch settings. If the switch settings and the DXi4000 settings do not match, your system may become inaccessible through the switch.



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

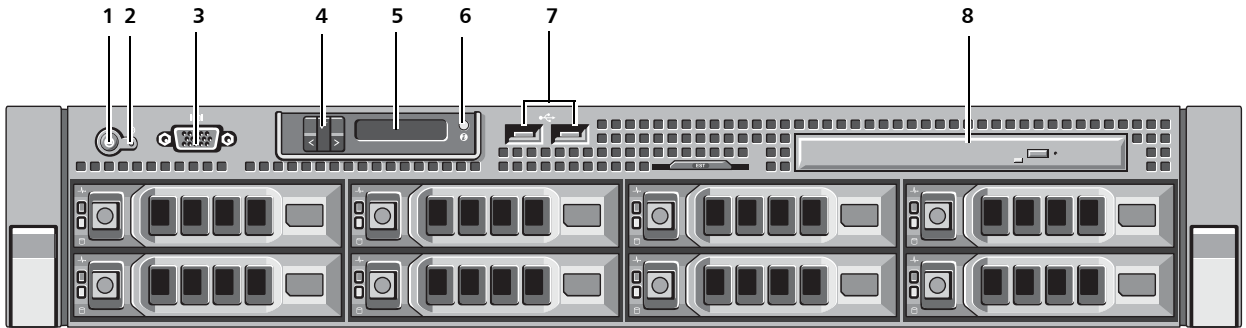






Table 1 DXi4000 System -
Front Panel LED Indicators,
Buttons, and Connectors

Item	Indicator, Button, or Connector	Icon	Description
1	Power button		<p>Turns the system on or off.</p> <p>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.</p> <p>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 27).</p> <p>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.</p>
2	NMI button		<p>Used to troubleshoot software and device driver errors. This button can be pressed using the end of a paper clip.</p> <p>Use this button only if directed to do so by qualified support personnel.</p>
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 2.0 connectors (2)		Caution: Use of connected peripheral devices, such as a USB or PS/2 keyboard and mouse or a VGA display, is <i>not</i> supported and may cause incorrect system operation.
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

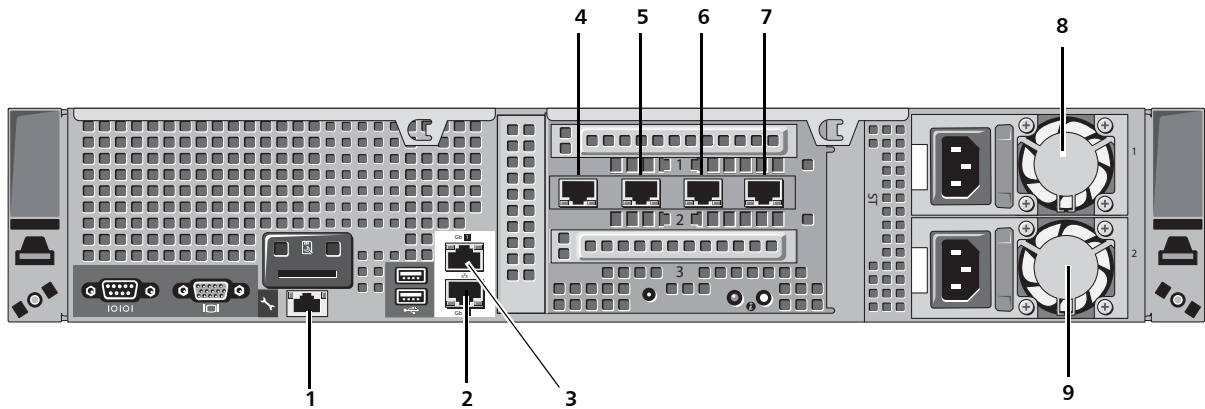


Table 2 Rear Panel Connectors

Item	Description
1	iDRAC port (not for customer use)
2	Not used
3	Service port (not for customer use)
4	Ethernet port (ETH2)
5	Ethernet port (ETH3)
6	Ethernet port (ETH4)
7	Ethernet port (ETH5)
8	Power supply 1
9	Power supply 2

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

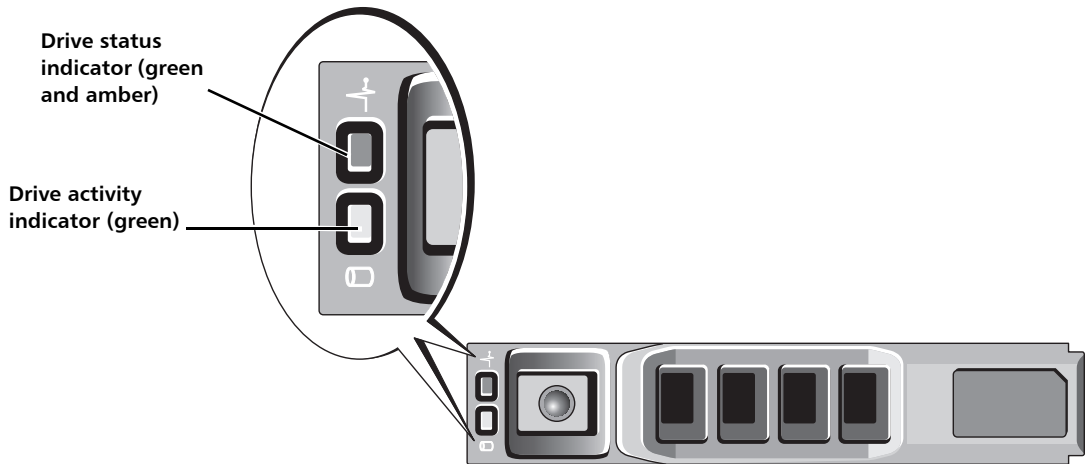
Note: The drive status indicator remains off until all hard drives are initialized after system power is applied. Drives are not ready for insertion or removal during this time.

- **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 141).

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 17.

Figure 9 Hard Drive Carrier LEDs

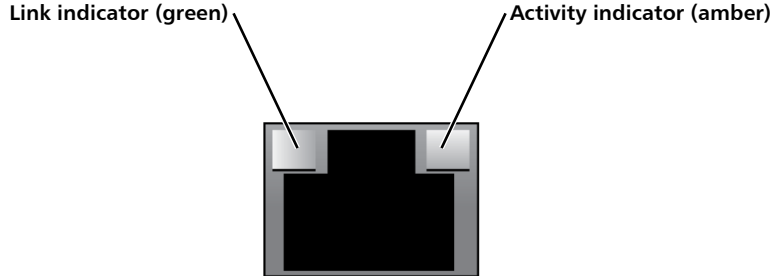


Ethernet Port Indicators

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



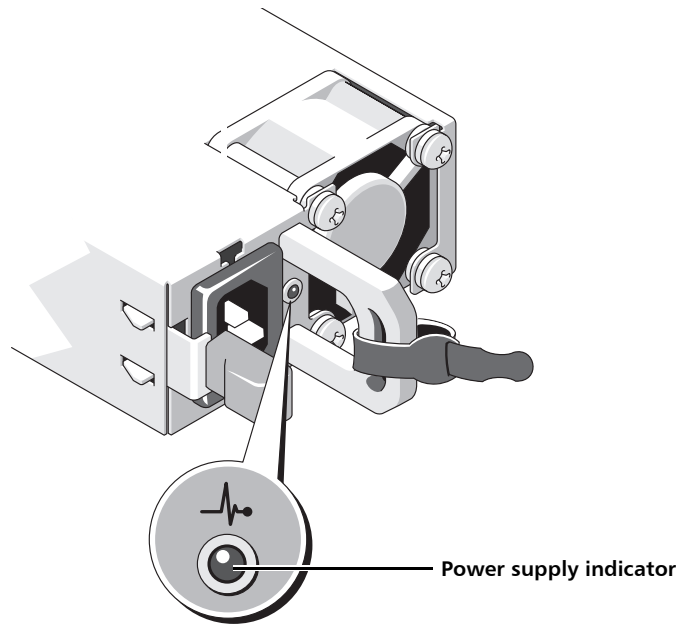
Power Supply Indicators

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).

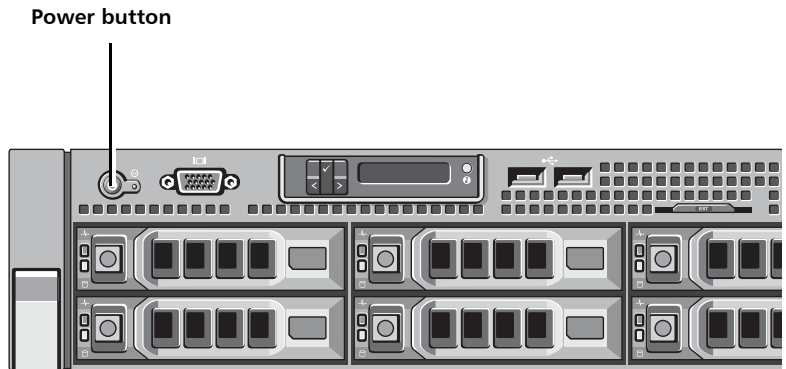
Figure 11 Power Supply LED



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 305). Shutting down the system can take up to 15 minutes.

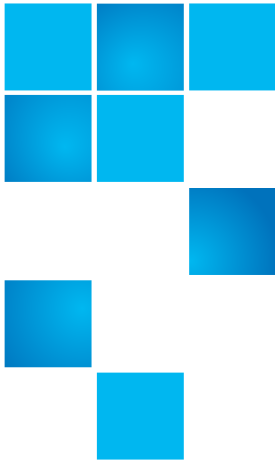
Locating Serial Numbers

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 41).
- View important system information at a glance (see [DXi4000 Home Page](#) on page 73).
- Manage data replication activities (see [DXi4000 Replication](#) on page 85).
- Monitor hardware status and system performance (see [DXi4000 Status](#) on page 121).
- View administration alerts and resolve service tickets (see [DXi4000 Alerts](#) on page 141).
- Configure storage presentation, data replication, and system settings (see [DXi4000 Configuration](#) on page 151).
- Run diagnostic tools and maintain the system (see [DXi4000 Utilities](#) on page 275).

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:

- Mozilla Firefox 10 or later
- Google Chrome 21 or later
- Microsoft Internet Explorer 8, 9, or 10

Note: For Microsoft Internet Explorer 10, you must enable Compatibility View.

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

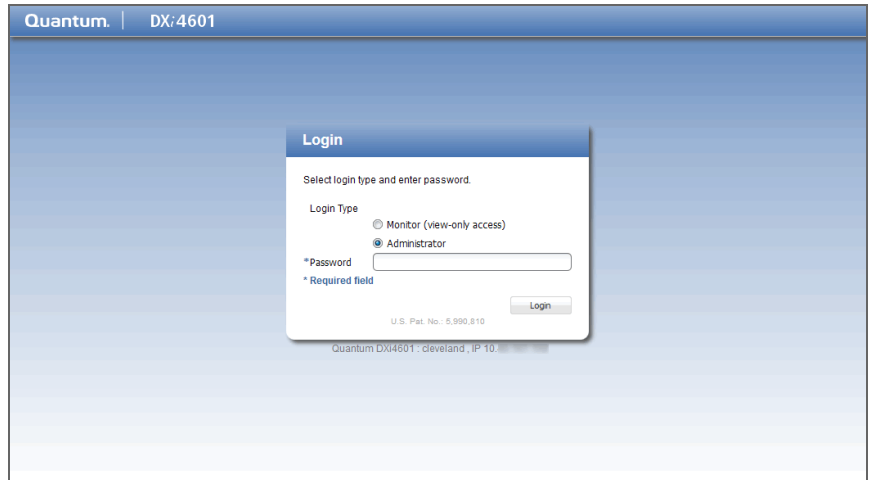
Logging On to the DXi4000

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 223).

- 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. Alphanumeric characters and special characters are allowed. Passwords can be changed on the **Web & CLI Passwords** page (see [Web & CLI Passwords](#) on page 241).

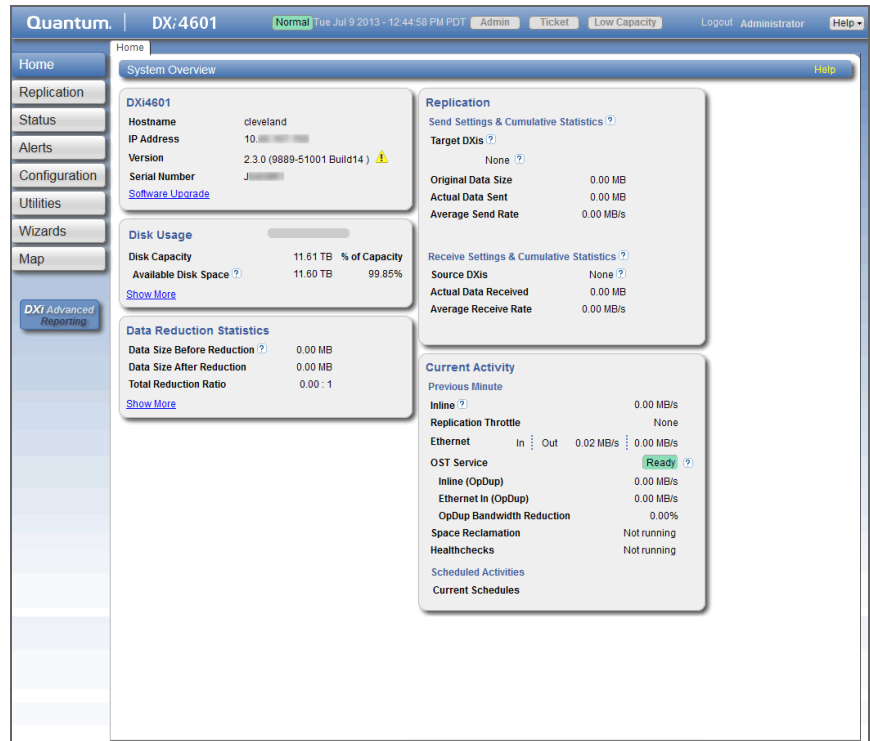
- 4 Click **Login**.

- 5 If a security banner message has been specified for the DXi4000, click **Accept**.

Note: For information about specifying a security banner message, see [Security Notice](#) on page 248.

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.

Caution: More than one Administrator can log on to the DXi at a time. If two Administrators attempt to make configuration changes on the same page at the same time, it is possible that one Administrator's changes will overwrite the other's. Always coordinate configuration changes with other Administrator users.

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 247).

The Remote Management Console

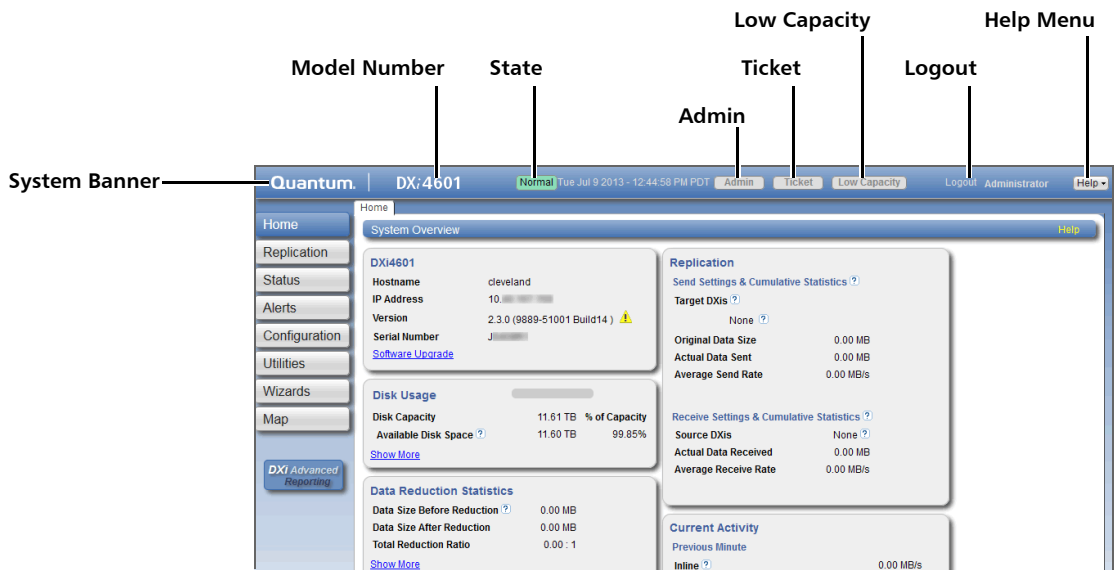
After you log on to the DXi4000, the remote management console displays. The remote management console includes the following features:

- [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 (administrator or monitor).

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 35).
- **State** - Displays the operating state of the DXi4000:
 - **Normal** - (Green) The system is operating correctly.
 - **Attention** - (Yellow) There is a problem with the system.

Note: The state displays **Attention** during a blockpool verify operation (see [Blockpool Verify Behavior](#) on page 37).

- **Verify Failure** - (Red) The blockpool verify process has failed.
- **Low Space** - (Yellow) Available disk space is low. Ingest and replication continue, and space reclamation starts.
- **Critical Reserve Space** - (Red) Available disk space is critically low. Ingest and replication are stopped, and space reclamation continues.
- **No Space** - (Red) Available disk space is critically low. Ingest and replication are stopped, and space reclamation continues.

Click the **State** button to display detailed status information about the system (see [Hardware](#) on page 121).

- **Admin** - The **Admin** button turns yellow when an administration alert occurs. Click the **Admin** button to manage administration alerts (see [Admin Alerts](#) on page 141).
- **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 143).
- **Low Capacity** - The **Low Capacity** button turns yellow when available disk space falls to a low level and the DXi enters **Low Space** state (see [Low Space Management](#) on page 36). Click the **Low Capacity** button to view the administration alerts related to low disk space (see [Admin Alerts](#) on page 141).

Note: When disk space is low, target replication to the system is paused (see [Replication Service](#) on page 117). In addition, space reclamation is automatically started to free up disk space (see [Space Reclamation](#) on page 287).

- **Logout** - Click to end your remote management session.
- **Help Menu** - Select from the following help options:
 - **Help Contents** - Open the DXi4000 online help.
 - **Online Documentation** - Access documentation resources on the Quantum Web site.
 - **About** - Display DXi software version information.

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.

[Table 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

Low Space Management

As disk capacity is used and free disk space approaches low levels, the DXi4000 automatically responds as detailed in [Table 4](#).

When the DXi4000 enters the **Low Space** state, space reclamation is automatically started to free up disk space. A space reclamation task is initiated every 10 minutes until space reclamation begins. Space reclamation ends when the DXi4000 exits the **Low Space** state. (Any space reclamation tasks running at that time are allowed to complete.)

When the DXi4000 enters the **Critical Reserve Space** state, backup ingest is stopped, and target replication to the system is paused. Backup ingest and target replication resume when the DXi4000 exits the **Critical Reserve Space** state.

Note: The system generates a service ticket and an admin alert when it enters the **Low Space**, **Critical Reserve Space**, and **No Space** states. In addition, a service ticket and an admin alert are generated when Used Disk Space reaches 85% and 95% of total disk capacity.

Table 4 Low Space States

DXi State	Disk Space Level	System Actions
Normal (Green)	Normal disk space	Low Capacity button is dark. Backup ingest and replication occur as normal. Space reclamation occurs at normally scheduled times.
Low Space (Yellow)	(DXi4510) Free Space is less than: 550 GB + 100 GB x (total usable capacity in TB / 10 TB) (DXi4520, DXi4601) Free Space is less than: 850 GB + 100 GB x (total usable capacity in TB / 10 TB)	Low Capacity button is lit. Backup ingest and replication occur as normal. Space reclamation is automatically started.
Critical Reserve Space (Red)	Free Space is less than: 250 GB	Low Capacity button is lit. Backup ingest and replication are stopped. Space reclamation is automatically started. Note:
No Space (Red)	Free Space is less than: 10 GB Note: No Space also occurs if the Used Metadata percentage is 85% or greater.	Low Capacity button is lit. Backup ingest and replication are stopped. Space reclamation is automatically started. Note:

Blockpool Verify Behavior

A blockpool verify operation occurs if data on the system requires repair, for example, after an unexpected shutdown due to a power loss. During a blockpool verify operation, the banner displays the **Attention** state. Clicking **Attention** displays the message: *A previous unclean shutdown of the DXi has required a data verification to commence. While in this*

condition the DXi is operational, but performance may be severely degraded.

While a blockpool verify operation is in progress, some system operations are affected.

- Retrieving data created prior to the blockpool verify may fail.
- Ingesting new data using NAS/OST should succeed.
- Sending data that existed prior to the blockpool verify to a replication target may fail.
- Sending new data to a replication target, or receiving replicated data, should succeed.
- Space reclamation and healthchecks will fail.

When the blockpool verify is complete, the banner displays Normal, and the system resumes normal operation

Main Menu

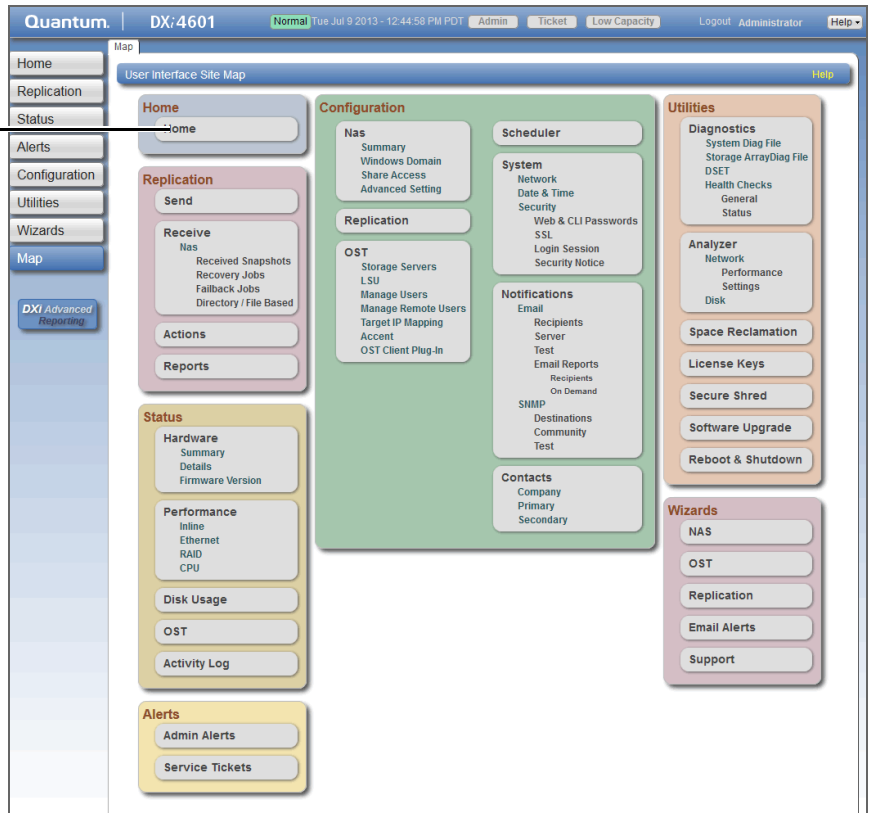
The main menu displays on the left side of the DXi4000 remote management console (see [Figure 16](#)). Click a menu item to display the corresponding management page.

To access **DXi Advanced Reporting**, click the link below the main menu. Quantum DXi Advanced Reporting provides performance data logging and visual reporting and graphing features for Quantum DXi-Series systems. For more information, see the *Quantum DXi Advanced Reporting User's Guide* (6-67353).

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 41).

Figure 17 Remote Management Pages Map

Click a page name to navigate to that page





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 18](#)).

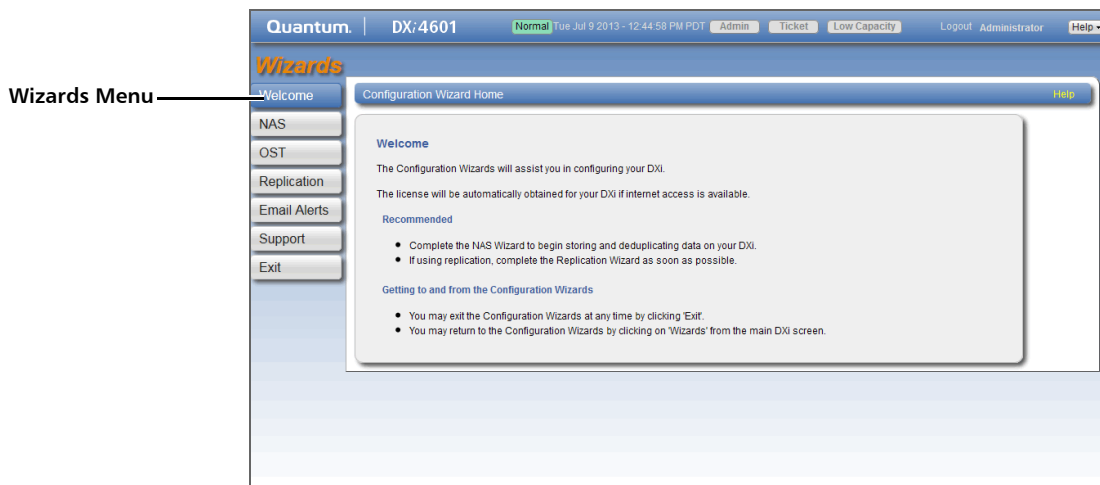
The **Wizards** menu includes the following wizards:

- **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 42).
- **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 49).
- **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 62).

- **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 [Support Wizard](#) on page 66).

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 18 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 151.

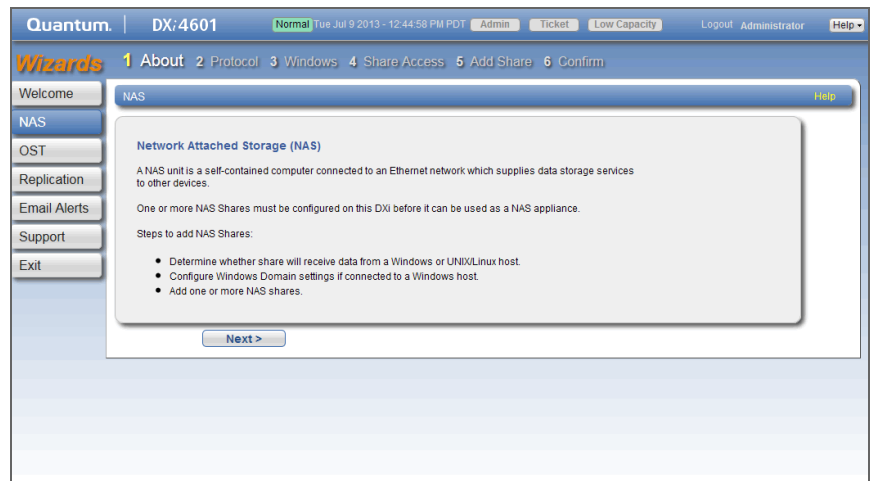
To begin the **NAS** wizard, on the **Wizards** menu, click **NAS**.

Step 1: About

- 1 Read the information about the wizard (see [Figure 19](#)).
- 2 Click **Next** to continue.

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

Figure 19 NAS Wizard: About



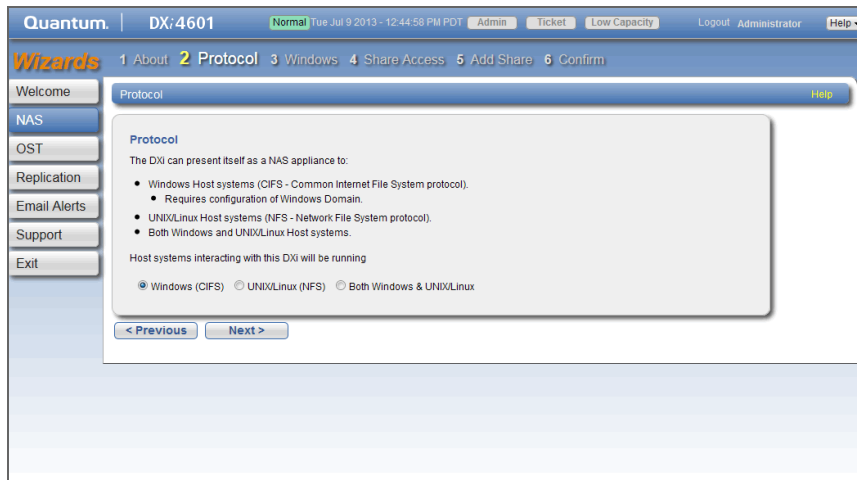
Step 2: Protocol

- 1 Select the type of host the DXi4000 will present NAS shares to (see [Figure 20](#)):
 - **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 20 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 and the next step. Continue with [Step 5: Add Share](#) on page 47.

- 1 Select an option for joining the DXi4000 to the Windows network (see [Figure 21](#)):
 - **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 159.

- 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 162.

4 Click **Next** to continue.

Figure 21 NAS Wizard:
Windows

The screenshot displays the 'Windows Domain Settings' configuration window within the Quantum DXi4000 NAS Wizard. The interface includes a top navigation bar with 'Wizards' and steps 1-6. A left sidebar contains menu items like 'Welcome', 'NAS', 'VTL', 'OST', 'Replication', 'Email Alerts', 'Support', and 'Exit'. The main content area is titled 'Windows Domain Settings' and contains the following fields and options:

- Domain Type**: Radio buttons for 'Active Directory' (selected) and 'Workgroup'.
- * Domain/Workgroup Name**: A text input field.
- Primary Domain Controller**: Radio buttons for 'Use DNS Discovery' (selected) and 'Specify Address'.
- Organization Unit**: A text input field.
- * Administrator Name**: A text input field.
- * Administrator Password**: A text input field.

A note states: 'NAS Shares using CIFS protocol require an SMB Server be joined to either a Windows workgroup or a Windows domain.' At the bottom, there are '< Previous' and 'Next >' buttons. A legend indicates '* Required Field'.

Step 4: Share Access

- 1 Do one of the following depending on whether the DXi4000 is joining a Windows Workgroup or an Active Directory Domain:
 - **Windows Workgroup** - 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.
 - **Active Directory Domain** - Enter information about the share administrator:
 - **Fully Qualified User or Group Name** - Enter the administrator's user or group name.
- 2 Click **Add**.
- 3 (Optional) To add additional workgroup users or share administrators, repeat Steps 1–2.
- 4 Click **Next** to continue.

Figure 22 NAS Wizard: Share Access



Step 5: Add Share

1 Under **Add Share**, enter information about the NAS share (see [Figure 23](#)):

- **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.

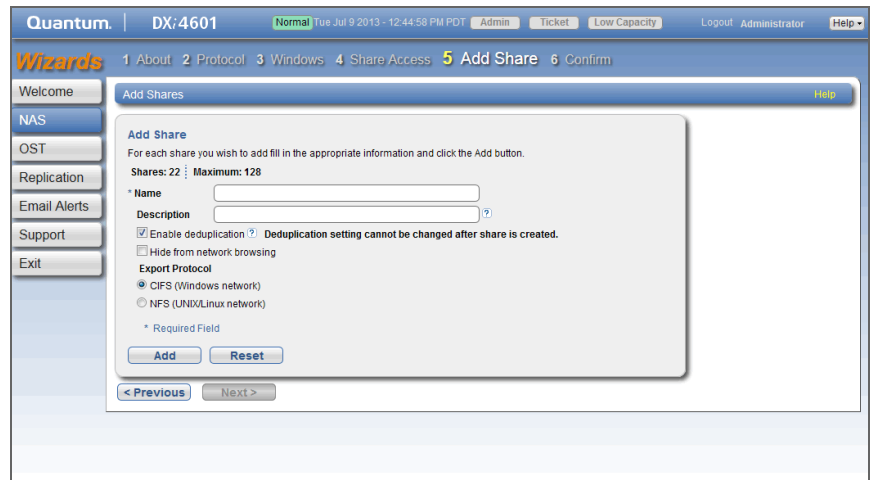
Note: Data deduplication is enabled by default. You cannot enable or disable data deduplication after the share is added.

- **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 43) 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.

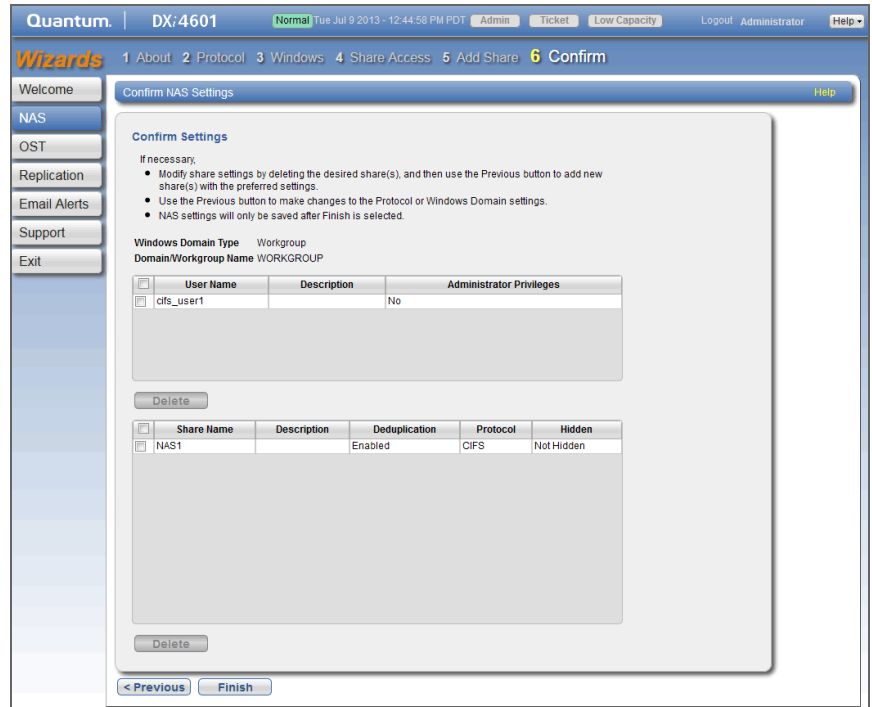
Figure 23 NAS Wizard: Add Share



Step 6: Confirm

- 1 Review the settings you selected to make sure they are correct (see [Figure 24](#)). 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 24 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: If you plan to use **Concurrent Optimized Duplication**, you should complete the Replication wizard before beginning the OST wizard (see [Replication Wizard](#) on page 56).

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 180.

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

Step 1: About

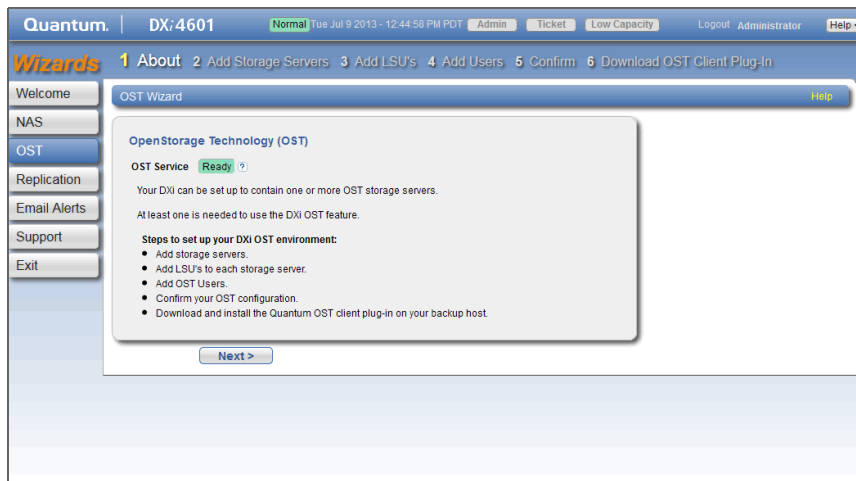
1 Read the information about the wizard (see [Figure 25](#)).

The **About** page displays the status of the OST service. OST settings can be configured in **Ready**, **Stopped**, or **Verifying** state. The OST server is available for backup only in **Ready** state.

2 Click **Next** to continue.

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

Figure 25 OST Wizard: About



Step 2: Add Storage Servers

1 Under **Add Storage Server**, enter information about the storage server (see [Figure 26](#)):

- **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.

- **Enable Concurrent Optimized Duplication** - Select the check box to enable optimized duplication during OST ingest.

Concurrent Optimized Duplication is disabled by default. If enabled, as data is written to the storage server, it is simultaneously replicated to the target DXi. When optimized duplication or Automatic Image Replication subsequently occurs, the operation is more efficient because a portion of the required data has already been replicated to the target storage server.

Note: To configure the target DXi, see [Replication Wizard](#) on page 56.

Note: When Concurrent Optimized Duplication is enabled, all data on the storage server is duplicated, not just the specified images.

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

- 3 Click **Add**.

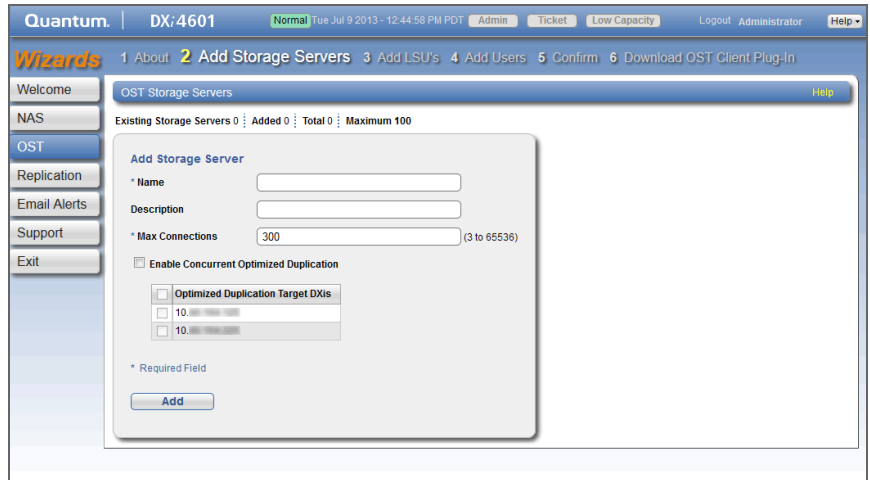
The storage server displays in the **Storage Servers Added** table.

- 4 (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**.

- 5 Click **Next** to continue.

Figure 26 OST Wizard: Add Storage Servers



Step 3: Add LSUs

1 Enter information about the LSU (see [Figure 27](#)).

- **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 199).

- **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.

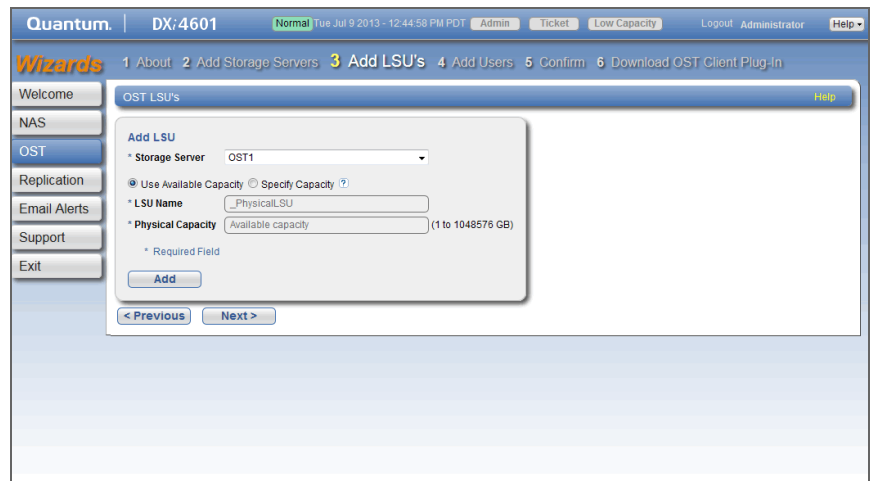
3 (Optional) To add additional LSUs, repeat Steps 1–2.

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

4 Click **Next** to continue.

Note: To configure the LSU for Automatic Image Replication, use the **Configuration > OST > LSU** page (see [LSU](#) on page 193).

Figure 27 OST Wizard: Add LSUs



Step 4: Add Users

1 Enter information about the authenticated user (see [Figure 28](#)):

- **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 **Apply**.

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

- 3 (Optional) To add additional users, click **Add** and then repeat Steps 1–2.

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

- 4 Click **Next** to continue.

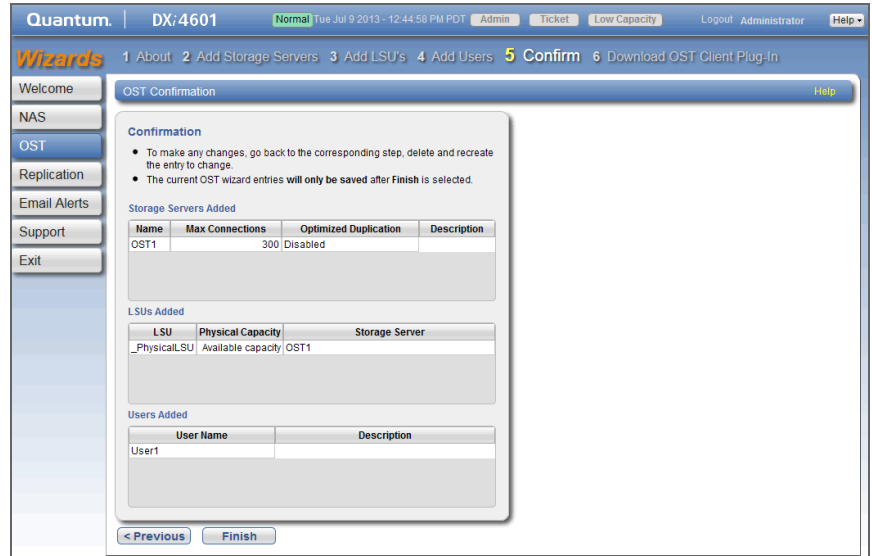
Figure 28 OST Wizard: Add Users

The screenshot displays the 'Add Users' step of the OST Wizard. At the top, the Quantum logo and system information (DXi4601, Normal, Tue Jul 9 2013 - 12:44:58 PM PDT) are visible. The navigation bar shows steps: 1 About, 2 Add Storage Servers, 3 Add LSU's, 4 Add Users (current), 5 Confirm, and 6 Download OST Client Plug-In. The left sidebar contains buttons for Welcome, NAS, OST (selected), Replication, Email Alerts, Support, and Exit. The main content area is titled 'OST Users' and features a 'Help' button. The 'Add User' form has the following fields: Username (required), Password (required), Confirm Password (required), and Description. An 'Apply' button is located below the form. At the bottom of the form, there are '< Previous' and 'Next >' buttons. A note indicates that fields with an asterisk are required.

Step 5: Confirm

- 1 Review the settings you selected to make sure they are correct (see [Figure 29](#)). 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.

Figure 29 OST Wizard:
Confirm

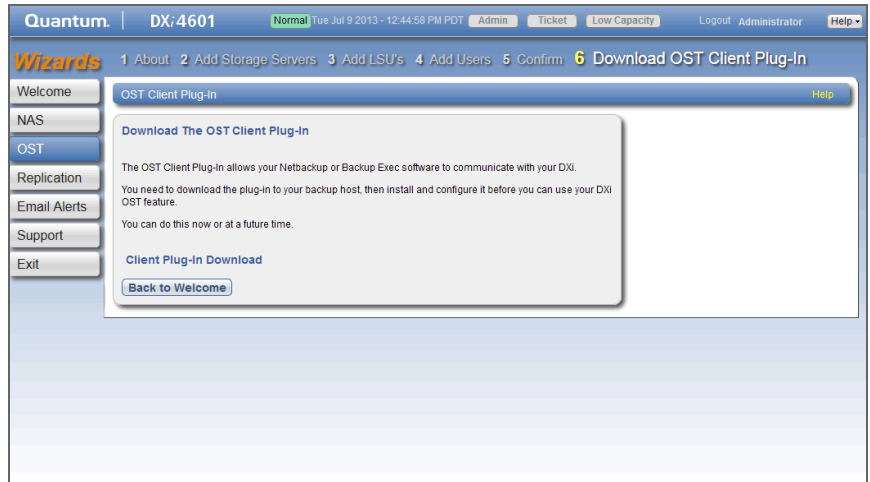


Step 6: Download OST Client Plug-In

To download the OST Plug-in, click **Client Plug-in Download** (see [Figure 30](#)). 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 30 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 85.

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.

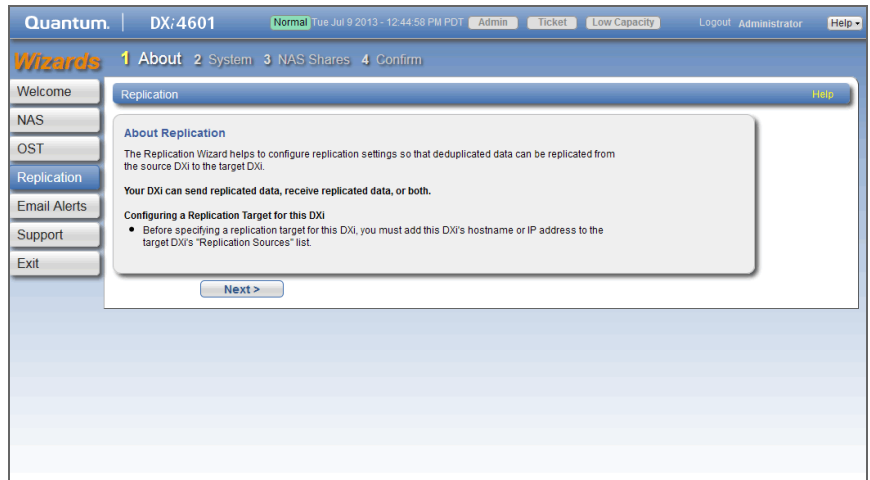
To begin the **Replication** wizard, on the **Wizards** menu, click **Replication**.

Step 1: About

- 1 Read the information about the wizard (see [Figure 31](#)).
- 2 Click **Next** to continue.

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

Figure 31 Replication Wizard:
About



Step 2: System

- 1 If data on this DXi4000 will be replicated to another DXi system, enter target information under **Target DXIs** (see [Figure 32](#)). You can specify up to two targets:

Note: If two targets are already specified, you must delete a target before adding another. First click **Pause** to pause replication to the target, and then click **Delete** to remove the target.

- 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 223).

- b** (Optional) Select the **Encrypt data before replication** check box to enable encryption when sending replication data to the target system. Or clear the **Encrypt data before replication** check box to disable encryption when sending replication data to the target system.

If encryption is enabled, select an encryption strength (**128-bit** or **256-bit**). Using 256-bit encryption (default) provides a stronger level of security but may have an impact on system performance in some situations.

Caution: Select 128-bit encryption if you are sending data to a DXi running a system software version prior to DXi 2.1 Software.

Note: For best performance, if your data network is already secured, you should clear the **Encrypt data before replication** check box.

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

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

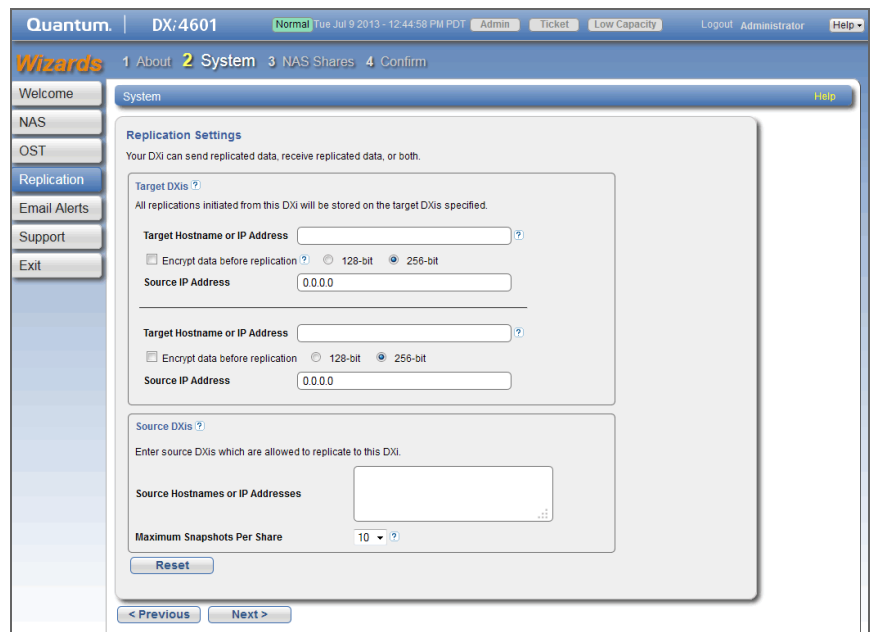
- 2** If data on other DXi systems will be replicated to this DXi4000, enter the following information under **Source DXIs**:

- 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 32).

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 32 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 33](#)).

Note: For help adding NAS shares to the system, use the **NAS Configuration Wizard** (see [NAS Wizard](#) on page 42).

- 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 (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.

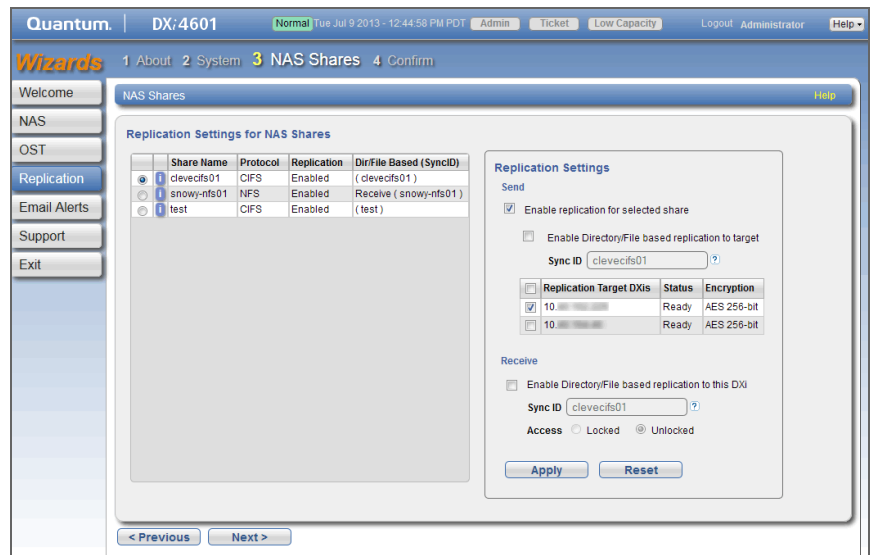
The Sync ID is used to identify the target share that will receive replicated data from the source share. The Sync ID *must* be identical to the Sync ID of the target share on the target system.
 - c Select the check box for each replication target you want to replicate the share to. When the share is replicated, its data will be sent to all selected targets.
- 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.

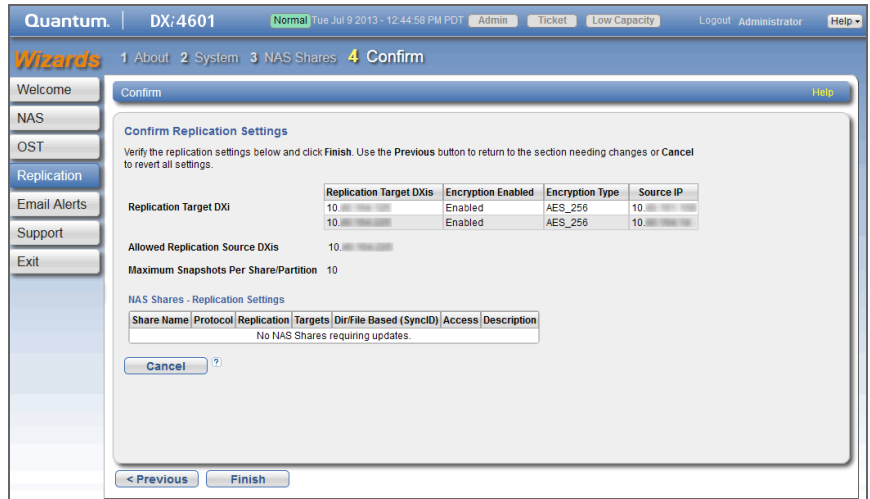
Figure 33 Replication Wizard:
NAS Shares



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 34](#)).
- 2 After you have confirmed all settings, click **Finish**. The wizard configures the DXi4000 with the settings you selected.

Figure 34 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 249.

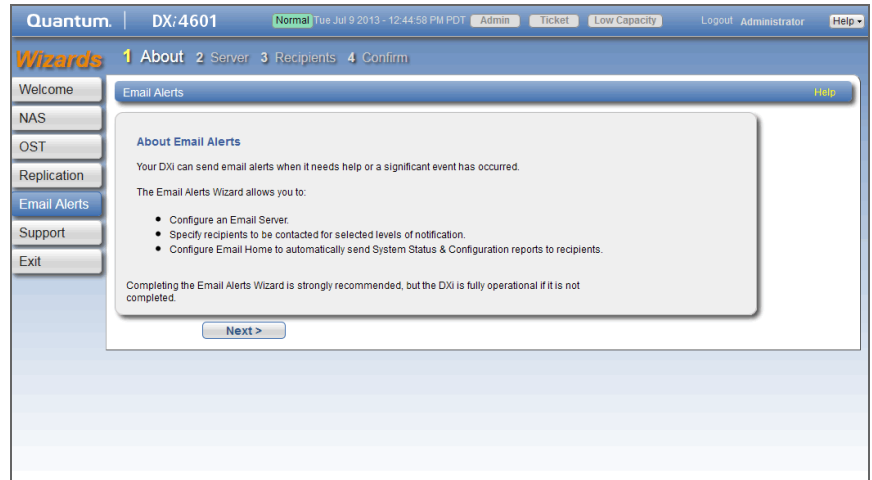
To begin the **Email Alerts** wizard, on the **Wizards** menu, click **Email Alerts**.

Step 1: About

- 1 Read the information about the wizard (see [Figure 35](#)).
- 2 Click **Next** to continue.

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

Figure 35 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 36](#)).

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.

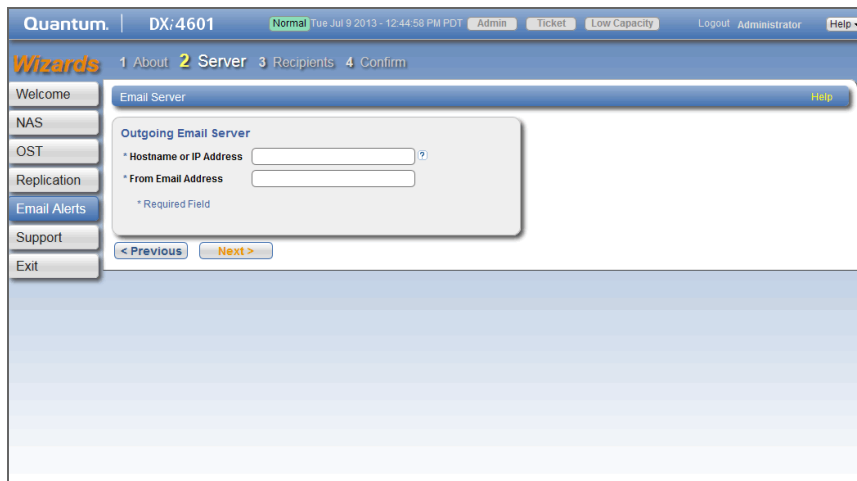
Note: To use hostname format, you must specify at least one DNS IP address on the **Network** page (see [Network](#) on page 223).

- 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 36 Email Alerts Wizard:
Server



Step 3: Recipients

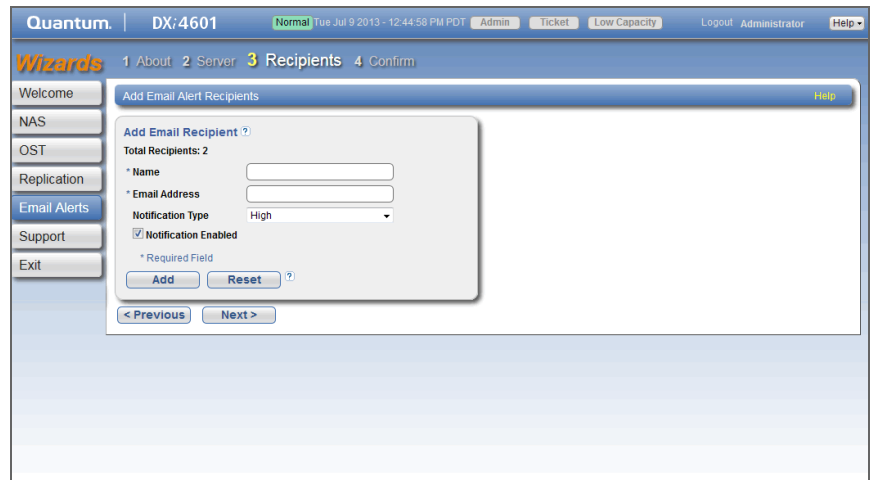
1 Under **Add Email Recipient**, enter information about the recipient (see [Figure 37](#)):

- **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.

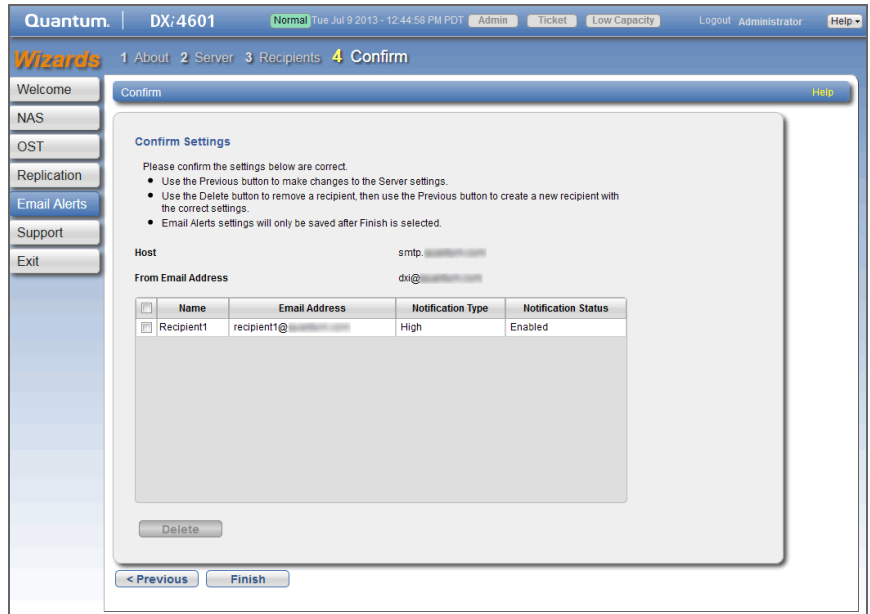
Figure 37 Email Alerts Wizard: Recipients



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 38](#)).
- 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 38 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 39](#)).
- 2 Click **Next** to continue.

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

Figure 39 Support Wizard:
About

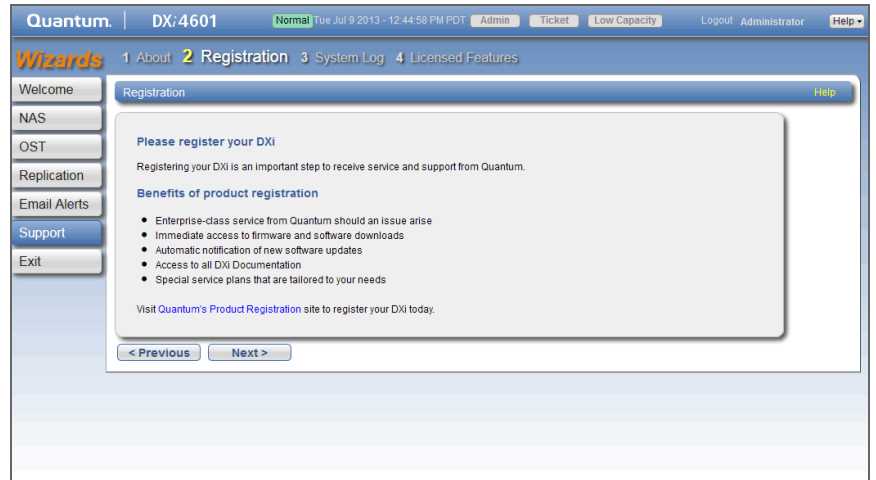


Step 2: Registration

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

- 1 Click the link for [Quantum's Product Registration](#) site (see [Figure 40](#)).
- 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 40 Support Wizard:
Registration



Step 3: 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.

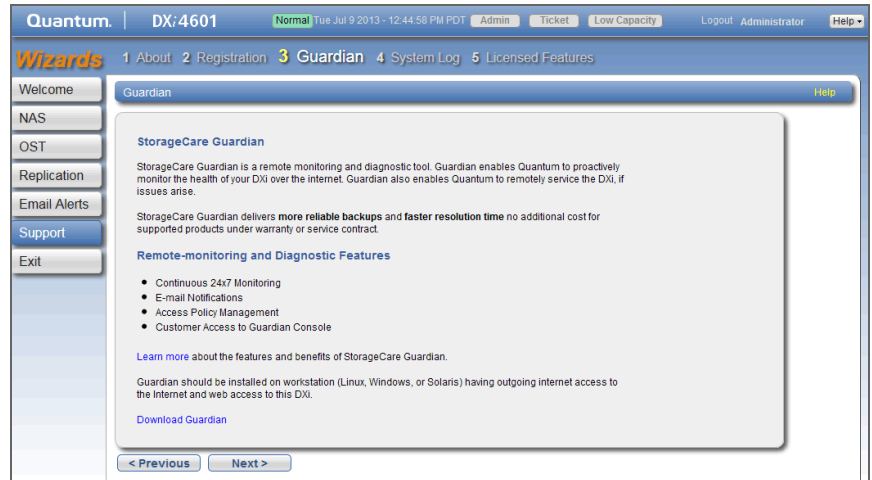
StorageCare Guardian delivers more reliable backups and faster resolution time for customers at no additional cost for supported products under warranty or service contract.

- 1 Click the link to [learn more](#) about the features and benefits of StorageCare Guardian (see [Figure 41](#)).
- 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 41 Support Wizard:
Guardian



Step 4: 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 42](#)).

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

- 2 After the file finishes generating, click the link 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 **Next** to continue.

Figure 42 Support Wizard:
System Log



Step 5: 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 290.

- 1 Select the DXi system serial number (displayed under **Enable Licensed Features**) and press **<Ctrl+C>** to copy it (see [Figure 43](#)).
- 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**.

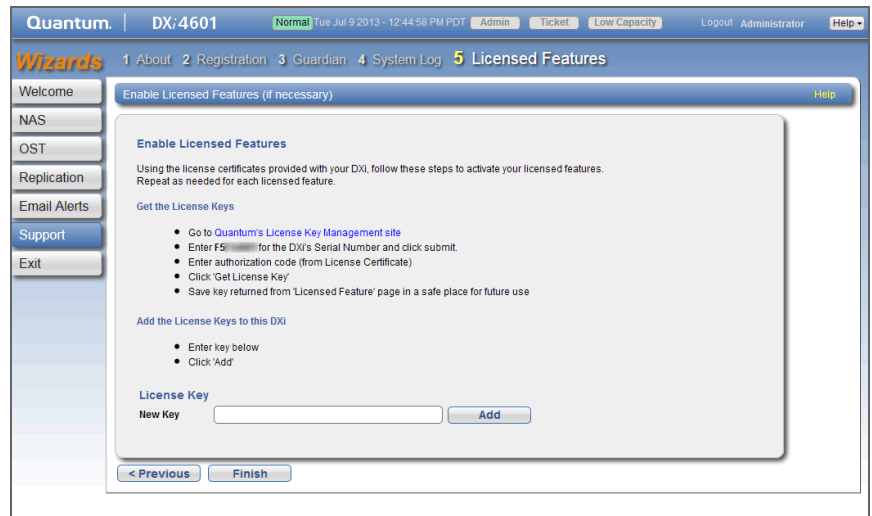
The **Licensed Feature** page returns a license key. Select the license key and press **<Ctrl+C>** to copy it. You should also print out or write down the license key, or save it to a text file, for future use.

- 6 Switch back to the **Support** wizard.
- 7 Enter the license key in the **New Key** box, and then click **Add**.

The license key is added to the system.

- 8 (Optional) To add additional license keys, repeat Steps 1–7.
- 9 Click **Finish** to complete the **Support** wizard.

Figure 43 Support Wizard:
Licensed Features





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 44](#)). Use the **Home** page to see important performance information at a glance, including disk usage, data reduction statistics, and replication activity.

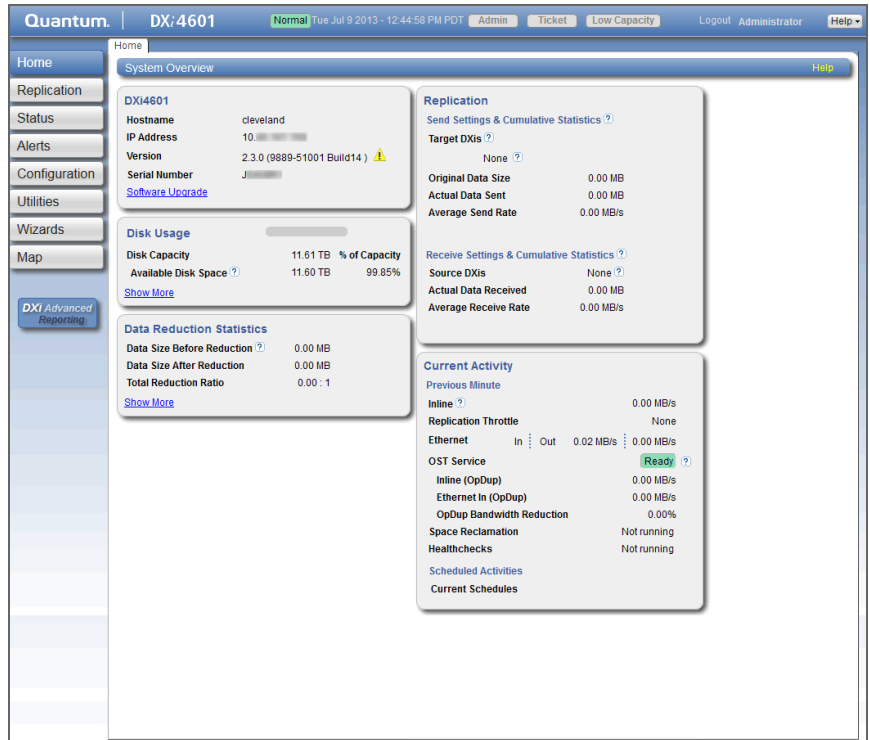
To return to the **Home** page at any time, click **Home** on the main menu.

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

- [DXi4000 System Overview](#)
- [Disk Usage Overview](#)
- [Data Reduction Statistics Overview](#)
- [Replication Overview](#)
- [Current Activity Overview](#)

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

Figure 44 Home Page



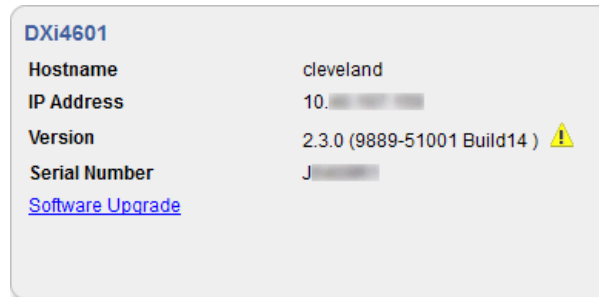
DXi4000 System Overview

The **DXi4000 System Overview** on the **Home** page (see [Figure 45](#)) displays the following information about the system:

- **Hostname** - The hostname of the DXi4000. Click to change the hostname (see [Network](#) on page 223).
- **IP Address** - The IP address of the DXi4000. Click to change the IP address (see [Network](#) on page 223).
- **Version** - The software version installed on the DXi4000. A Quick Tip icon indicates if a software upgrade is available for the DXi4000. Click to upgrade the software (see [Software Upgrades](#) on page 297).

- **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 290.)
- **Software Upgrade** - Click to displays the **Software Upgrade Utility** (see [Software Upgrades](#) on page 297).

Figure 45 DXi4000 System Overview



Disk Usage Overview

The **Disk Usage** overview on the **Home** page (see [Figure 46](#)) displays the following information about disk usage as an amount and as a percentage of the total capacity in the system:

- **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 290.

- **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. For more information, see [Low Space Management](#) on page 36.

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

Note: When disk space is low, target replication to the system is paused (see [Replication Service](#) on page 117). In addition, space reclamation is automatically started to free up disk space (see [Space Reclamation](#) on page 287).

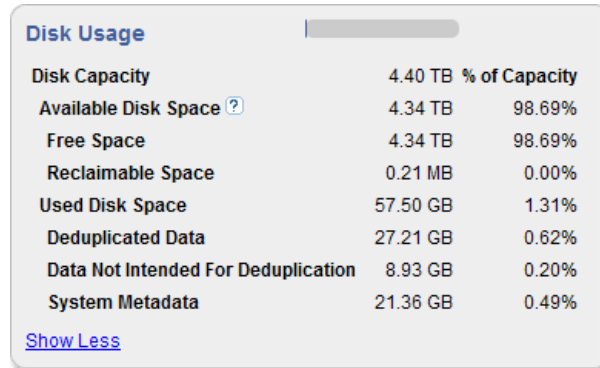
Note: For optimal system performance, Quantum recommends keeping the amount of **Available Disk Space** (free space) at 20% or more.

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

- **Free Space** - The disk space that can be used for new deduplicated or non-deduplicated data.
- **Reclaimable Space** - The disk space that is occupied by outdated deduplicated data and which will be automatically reused if additional space for new deduplicated data is needed.
- **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.

Click an item to view detailed statistics for disk usage (see [Disk Usage](#) on page 133).

Figure 46 Disk Usage Overview



Data Reduction Statistics Overview

The **Data Reduction Statistics** overview on the **Home** page (see [Figure 47](#)) displays the following information about the results of data reduction:

- **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**).

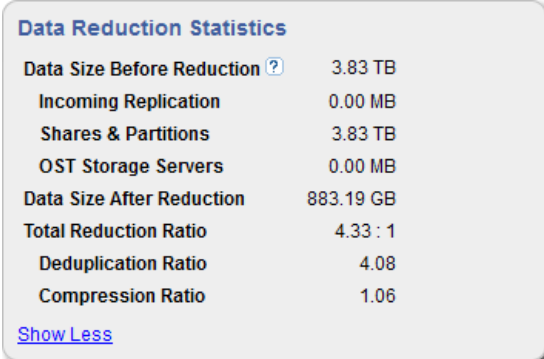
Click **Show More** to display additional information:

- **Incoming Replication** - The amount of data stored on the DXi via replication from another DXi. This does *not* include incoming data from Directory/File Based Replication, or incoming data from Failback replication.

- **Shares** - The amount of data stored on the DXi via local I/O. This includes incoming data from Directory/File Based Replication, and incoming data from Failback replication.
- **OST Storage Servers** - The amount of data stored in deduplicated OpenStorage (OST) storage servers. This includes incoming data for OST and DXi Accent.
- **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.

Click an item to view detailed statistics for disk usage (see [Disk Usage](#) on page 133).

Figure 47 Data Reduction
Statistics Overview



Data Reduction Statistics	
Data Size Before Reduction ?	3.83 TB
Incoming Replication	0.00 MB
Shares & Partitions	3.83 TB
OST Storage Servers	0.00 MB
Data Size After Reduction	883.19 GB
Total Reduction Ratio	4.33 : 1
Deduplication Ratio	4.08
Compression Ratio	1.06

[Show Less](#)

Replication Overview

The **Replication** overview on the **Home** page (see [Figure 48](#)) displays the following information about target and source replication activity:

- [Send Settings & Cumulative Statistics](#)
- [Receive Settings & Cumulative Statistics](#)

Send Settings & Cumulative Statistics

The **Send Settings & Cumulative Statistics** section displays 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 119).

- **Target DXis** - The IP address and replication status for each configured replication target (up to two). Click to specify a replication target (see [Replication Configuration](#) on page 169).
 - **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.
 - **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 141). You may also need to view alerts on the target DXi. In addition, make sure that the DXi is an allowed replication source on the target DXi (see [Replication Configuration](#) on page 169).
 - **Failed** - (Red) A replication job was not completed.
 - **Internal Error** - (Red) An error occurred during replication.
- **Pause/Resume** - The source DXi controls the replication pause behavior. To manually pause replication between the source and target, click **Pause** on the source DXi. To manually restart replication, click **Resume** on the source DXi.

Note: When the target DXi enters low disk space condition, replication on the source DXi is automatically paused. Replication will resume when the target leaves low disk space condition.

- **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.

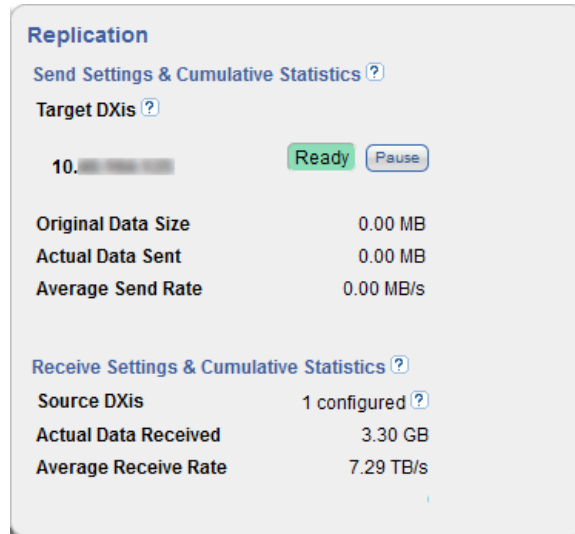
- **Actual Data Sent** - The amount of data actually sent over the network during replication or failback. This value is usually much less than the **Original Data Size** due to the benefits of data deduplication and compression.
- **Average Send Rate** - The average send rate (in MB/s) of data sent 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

The **Receive Settings & Cumulative Statistics** section displays 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 119).

- **Source DXIs** - The number of source systems configured to replicate data to the DXi4000. Click to specify replication sources (see [Replication Configuration](#) on page 169).
- **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).

Figure 48 Replication
Overview



Current Activity Overview

The **Current Activity** overview on the **Home** page (see [Figure 49](#)) 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 OST data. Click to view detailed statistics for inline performance (see [Inline](#) on page 129).
- **Replication Throttle** - The system replication throttle currently in effect (in KB/s or MB/s). When a constant throttle is enabled, the DXi limits the amount of data it sends during source replication so that it does not exceed the specified bandwidth. Click to enable or disable system throttling (see [Replication Configuration](#) on page 169).
- **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 129).

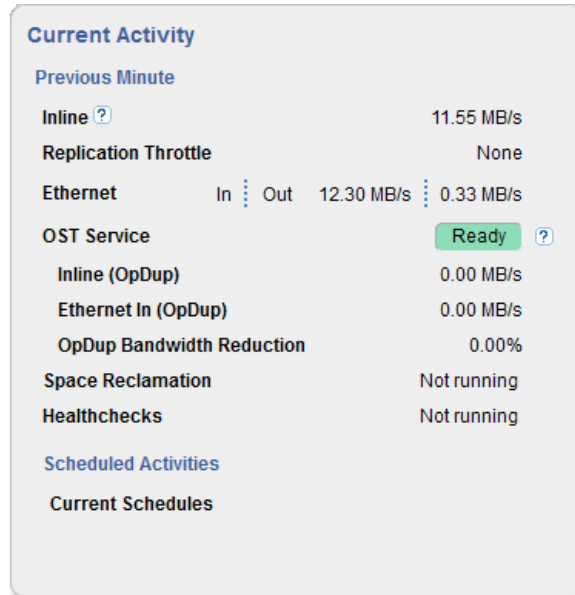
- **OST Service** - The status of the OST service. OST settings can be configured in **Ready**, **Stopped**, or **Verifying** state. The OST server is available for backup only in **Ready** state.
 - **Inline (OpDup)** - The inline data flow throughput (in MB/s). Inline data flow represents the original, native size of the data protected by the DXi.
 - **Ethernet In (OpDup)** - The amount of data received by all Ethernet ports (in MB/s). This amount represents the reduced size of the data protected by the DXi (after deduplication and compression on the media servers).
 - **OpDup Bandwidth Reduction** - The percentage by which network bandwidth utilization was reduced by using Optimized Duplication.
 - **Inline (Accent)** - The inline data flow throughput (in MB/s). Inline data flow represents the original, native size of the data protected by the DXi.
 - **Ethernet In (Accent)** - The amount of data received by all Ethernet ports (in MB/s). This amount represents the reduced size of the data protected by the DXi (after deduplication and compression on the media servers).
 - **Accent Bandwidth Reduction** - The percentage by which network bandwidth utilization was reduced by enabling Accent.
- **Space Reclamation** - The status of space reclamation (**Not running** or **Percent complete**). Click to start or stop space reclamation (see [Space Reclamation](#) on page 287).
- **Healthchecks** - The status of healthchecks (**Not running** or **Percent complete**). Click to start or stop space healthchecks (see [Healthchecks](#) on page 280).

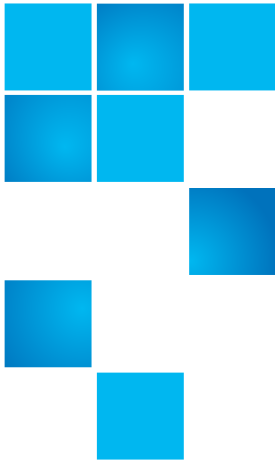
To view or modify scheduled system activity, click **Current Schedules** (see [Scheduler](#) on page 212).

Note: For more detailed information about all system activity, see [DXi4000 Status](#) on page 121.

Note: DXi Accent activity displays only if DXi Accent is currently enabled or was previously enabled (see [DXi Accent](#) on page 209).

Figure 49 Current 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](#)

Note: To schedule replication for a share, use the **Configuration > Scheduler** page (see [Scheduling a Share for Replication](#) on page 217). To limit the amount of network bandwidth used for replication, enable a constant throttle (see [Enabling System Throttling](#) on page 176), or schedule replication throttling (see [Scheduling Replication Throttling](#) on page 218).

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 ten sources. A source system can send data to up to two targets. 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](#)
- [Multiple Target Replication](#)

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.

Note: To optimize the replication process, deduplicated data is continuously sent in the background from the source system to the target system. Any remaining data is sent (along with metadata) at the time a file is closed.

- After 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.

- Deletions are automatically propagated from the source system to the target system in order to free up space on the target. In addition, you can manually initiate a synchronization from the source system at any time. Synchronizing ensures that the contents of the source share are exactly the same as the target share.

Note: If you delete a share configured for Directory/File Based Replication on the source DXi, the share is *not* automatically deleted on the target DXi. If you do not want to retain the share on the target DXi, you can manually delete it.

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. If you are using Symantec NetBackup 7.1 or higher, you can configure an LSU for Automatic Image Replication.

For information about configuring and using OST optimized duplication and Automatic Image Replication, see [Replicating OST Data](#) on page 181.

Multiple Target Replication

The DXi4000 can send replicated data to multiple target systems. First, configure up to two replication targets (see [Adding a Replication Target](#) on page 172). Then, for each share, select which targets to replicate data to—one, both, or neither (see [Enabling Replication For a Share](#) on page 96).

Below are two possible scenarios in which multiple replication targets are configured.

All Shares Replicate to Multiple Targets

For enhanced disaster recovery, all shares on the DXi4000 are configured to replicate to multiple targets. In this scenario, even if one target system is lost, the other target system still retains a full copy of all data on the source DXi4000.

Some Shares Replicate to Multiple Targets

For increased flexibility, each share on the DXi4000 is configured to replicate only to the targets where needed. In this scenario, shares fall into three categories:

- Some shares replicate to Target 1. (They may also replicate to Target 2.)
- Some shares replicate to Target 2. (They may also replicate to Target 1.)
- Some shares are not replicated.

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:

- [Replication Send](#)
- [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 90).
- Automatically replicate files to another system where they are immediately available (see [Task Overview: Setting Up and Performing Directory/File Based Replication](#) on page 91).
- Recover data from a lost or damaged share (see [Task Overview: Recovering a Replicated Share](#) on page 92).

- Restore a lost or damaged share back to its original location (see [Task Overview: Performing a Share Failback](#) on page 93).

Note: The **Replication** wizard provides guided assistance for configuring data replication (see [DXi4000 Configuration Wizards](#) on page 41).

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 [Adding a Replication Source](#) on page 178).
- 2 On the source system, specify the target system that will receive replicated data (see [Adding a Replication Target](#) on page 172).
- 3 On the source system, create a new share with deduplication enabled (see [Adding a NAS Share](#) on page 155).
- 4 Enable replication for the new share (see [Enabling Replication For a Share](#) on page 96).
- 5 Before writing any data to the new share, replicate the new share (see [Replicating a Share](#) on page 100).

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) Use the **Scheduler** page to set up a schedule for performing replication automatically after backups complete (see [Scheduling a Share for Replication](#) on page 217).
 - Manually perform replication at frequent intervals (see [Replicating a Share](#) on page 100).

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 92) or restore the share to its original location on the source system (see [Task Overview: Performing a Share Failback](#) on page 93).

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.

Note: To limit the amount of network bandwidth used for replication, enable a constant throttle (see [Enabling System Throttling](#) on page 176), or schedule replication throttling (see [Scheduling Replication Throttling](#) on page 218).

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

To automatically replicate 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 [Adding a Replication Source](#) on page 178).
 - b Create a new share with deduplication enabled (see [Adding a NAS Share](#) on page 155).
 - 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 114).
- 2 Perform the following steps on the source system:
 - a Specify the target system that will receive replicated data (see [Adding a Replication Target](#) on page 172).
 - b Create a new share with deduplication enabled (see [Adding a NAS Share](#) on page 155).
 - c Enable Directory/File Based Replication for the new share and specify the Sync ID (see [Configuring Directory/File Based Replication](#) on page 98).

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.

Note: To limit the amount of network bandwidth used for replication, enable a constant throttle (see [Enabling System Throttling](#) on page 176), or schedule replication throttling (see [Scheduling Replication Throttling](#) on page 218).

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 106).
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 93). 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 90). 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 [Adding a Replication Source](#) on page 178).

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 107).

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.

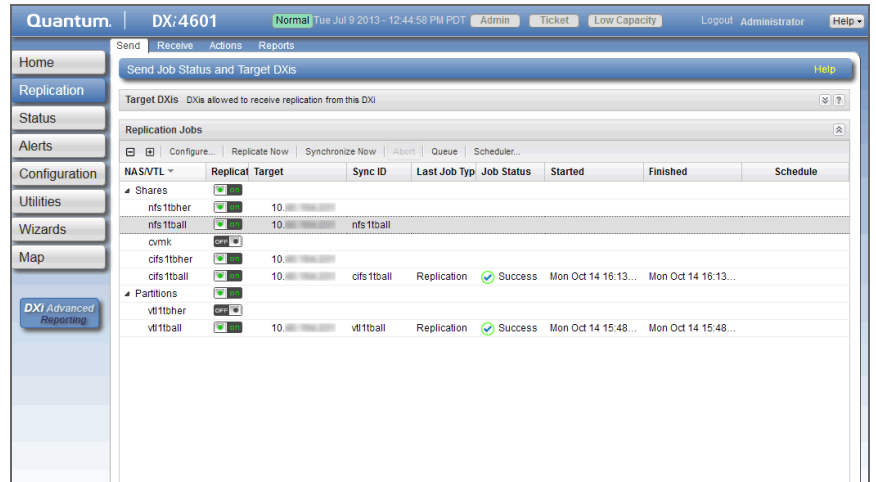
Replication Send

The **Replication Send** page allows you to manage outgoing replication activity for NAS shares. You can replicate shares on the DXi4000 (the source) to other DXi systems (the targets). You can also schedule replication, and view the status of current and recent replication jobs.

Note: Before you can replicate shares, you must specify a replication target (see [Adding a Replication Target](#) on page 172).

To access the **Replication Send** page, click the **Replication** menu, and then click the **Send** tab (see [Figure 50](#)).

Figure 50 Replication Send Page



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

- View replication information for shares (see [Replication Jobs List](#) on page 94).
- Enable or disable replication for a share (see [Enabling Replication For a Share](#) on page 96).
- Configure Directory/File Based Replication for a share (see [Configuring Directory/File Based Replication](#) on page 98).
- Initiate replication for a share (see [Replicating a Share](#) on page 100).
- Synchronize a share configured for Directory/File Based Replication (see [Synchronizing a Share](#) on page 100).
- View replication statistics for a share configured for Directory/File Based Replication (see [Directory/File Based Replication Queue](#) on page 101).
- Schedule a share for replication (see [Scheduling a Share For Replication](#) on page 103).
- Manage replication targets (see [Target DXis List](#) on page 103)

Replication Jobs List

The **Replication Jobs** list 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 155.

The **Replication Jobs** list displays the following information:

Note: Click the arrow next to **Shares** to display all shares in the list. Alternately, click the plus [+] or minus [-] icons to show or hide all shares.

- **NAS** - The name of the share. Hold the cursor over the name to display detailed information about the share.

Note: If multiple targets are configured for a share, click the arrow next to the share to view all targets.

- **Replication** - The replication state (**On** or **Off**). Click the toggle switch to turn replication on or off for the share.

Note: Clicking the toggle next to **Shares** will turn replication on or off for all shares.

- **Target** - The hostname or IP address of the configured replication target. If the share is configured to replicate to multiple targets, click the arrow next to the share name to display all targets.
- **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**).
- **Job Status** - The status of the most recent replication job (see [Replication and Synchronization Status](#) on page 96). Hold the cursor over the job status to display detailed job statistics.
- **Started** - The time the most recent replication job was started.
- **Finished** - The time the most recent replication job was completed.
- **Schedule** - A watch icon displays if replication is scheduled for the share, as well as the next scheduled event (see [Scheduling a Share For Replication](#) on page 103).

You can customize the appearance of the **Replication Jobs** list in the following ways:

- Click the top banner row of the list to collapse or expand the list.
- Click the arrow to the right of a column heading and select **Sort Ascending** or **Sort Descending** to sort the rows in the table by that column.
- To show or hide a column, click the arrow to the right of a column heading, and then click **Columns**. Select the check box to show a column, or clear the check box to hide a column.
- To filter content in a column, click the arrow to the right of a column heading, and then click **Filters**. Type or select the desired filter. (If one row for a share matches the filter, all rows for the share are displayed.)

Replication and Synchronization Status

A replication job can have one of the following statuses:

- **In Progress** - The replication job is in progress.
- **Queued** - The replication job is queued and will continue when the system is ready.
- **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 data on the share to be replicated to other DXi systems (the targets). Disable replication if you do not want to replicate the share to other DXi systems.

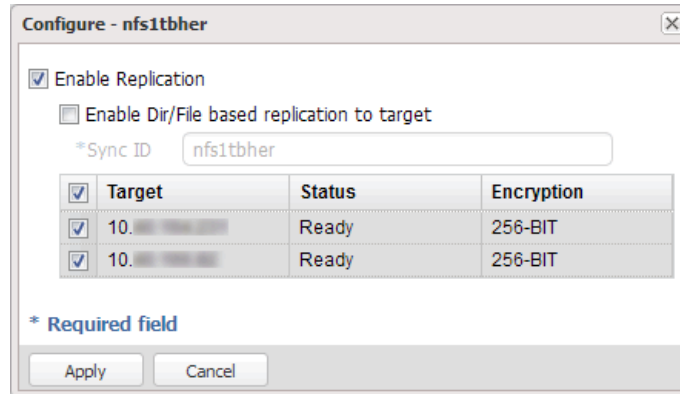
Note: To be eligible for replication, a share must have data deduplication enabled at the time it is created.

To enable or disable replication for a share:

- 1 Select the share and click **Configure**.

The **Share Configure** window displays (see [Figure 51](#)).

Figure 51 Share Configure Window



- 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. Any jobs from that share that are in progress or queued will transition to failure. Also, all replication job history for that combination of target and share will be removed.

- 3 Select the check box for each replication target you want to replicate the share to. (You must select at least one target.) When the share is replicated, its data will be sent to all selected targets.

- 4 Click **Apply**.

Note: Quantum recommends scheduling replication to run after backups are complete (see [Scheduling a Share For Replication](#) on page 103). If you do not enable scheduled replication, replication will only occur if you manually replicate a share (see [Replicating a Share](#) on page 100) or if you configure Directory/File Based Replication (see [Configuring Directory/File Based Replication](#) on page 98).

Note: Disabling replication for a share does not delete any scheduled replication events for that share. If you no longer want to schedule the share for replication, manually delete the schedule (see [Deleting a Scheduled Event](#) on page 222).

Configuring Directory/ File Based Replication

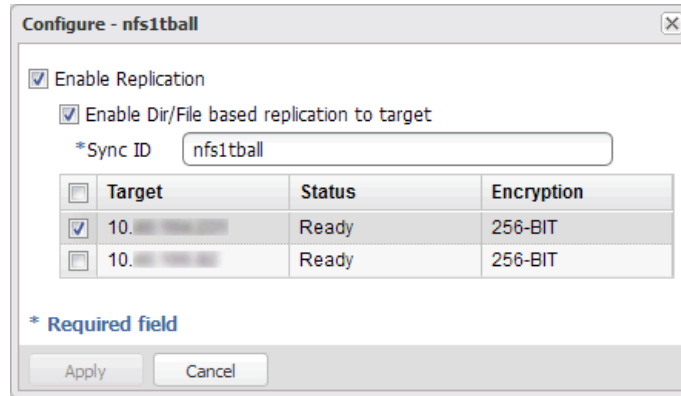
Configure a NAS share for Directory/File Based Replication to automatically replicate files to other DXi systems (the targets). A file is automatically replicated when it is closed or a period of time after it is modified. After replication, the replicated files are immediately available on the target systems. 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 must specify a Sync ID. The Sync ID associates the share on the source system with the share on the target systems that will receive the replicated data. The **Sync ID** for the source share must match the **Sync ID** for the target share.

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

- 1 If you have not already done so, configure the target share on the target DXi (see [Configuring a Target Share for Directory/File Based Replication](#) on page 114.)
- 2 On the source DXi, select the source share and click **Configure**.
The **Share Configure** window displays (see [Figure 52](#)).

Figure 52 Share Configure Window



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

4 Select the **Enable Directory/File Based Replication to target** check box to enable Directory/File Based Replication for the share.

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

5 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.

The **Sync ID** must contain no more than 32 characters (NAS share) and can contain only alphanumeric characters, underscores, and hyphens. (An underscore or hyphen must not be the first character.)

Note: If you are performing Directory/File Based Replication with a system running a DXi software version prior to 2.3, you may need to change the **Sync ID** on the system running pre-2.3 software to match the above **Sync ID** name restrictions.

6 Select the check box for each replication target you want to replicate the share to. (You must select at least one target.) When the share is replicated, its data will be sent to all selected targets.

Note: Directory/File Based Replication will be configured for all selected targets. You cannot configure one share for multiple replication types.

7 Click **Apply**.

Note: After you configure a share for Directory/File Based Replication, you should synchronize it to ensure it is in sync with the target share (see [Synchronizing a Share](#) on page 100).

Replicating a Share

Replicate a NAS share to send a snapshot of the share to the target systems. A snapshot is required to recover the data on the targets at a later time. If you have not configured a replication schedule for a share, replication only occurs when you manually initiate it (see [Scheduling a Share For Replication](#) on page 103).

To replicate a share:

- 1 Select the share to replicate.

If multiple targets are configured, click the arrow next to the share to display all targets, and then select the desired target.

- 2 Click **Replicate Now**.

The status of the replication job displays in the **Job Status** column.

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

Synchronizing a Share

Synchronize a NAS share to synchronize its contents with the corresponding share on the target systems. To synchronize a share, it must be configured for Directory/File Based Replication (see [Configuring Directory/File Based Replication](#) on page 98).

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.

You should perform a synchronization in any of the following situations:

- When Directory/File Based Replication is first enabled for a share.

- If a Directory/File Based Replication job fails.
- If Directory/File Based Replication is disabled for a time and then is re-enabled.

Caution: Before synchronizing a share, make sure all media are unmounted and there are no active backup jobs to the share. (After the synchronization reaches the **Replicating** state, backup jobs are allowed.)

Note: Even when replication is paused, the system continues to queue Directory/File Based Replication operations. Each time an operation is queued, the system logs an administration alert that reports the total number of queued Directory/File Based Replication requests.

Note: If a synchronization fails, make sure the target share is unlocked (see [Configuring a Target Share for Directory/File Based Replication](#) on page 114).

To synchronize a share:

- 1 Select the share to synchronize.

If multiple targets are configured, click the arrow next to the share to display all targets, and then select the desired target.

- 2 Click **Synchronize Now**.

The status of the synchronization job displays in the **Job Status** column.

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

Directory/File Based Replication Queue

The Directory/File Based Replication Queue displays replication statistics for shares that are configured for Directory/File Based Replication (see [Configuring Directory/File Based Replication](#) on page 98).

To view the Directory/File Based Replication Queue:

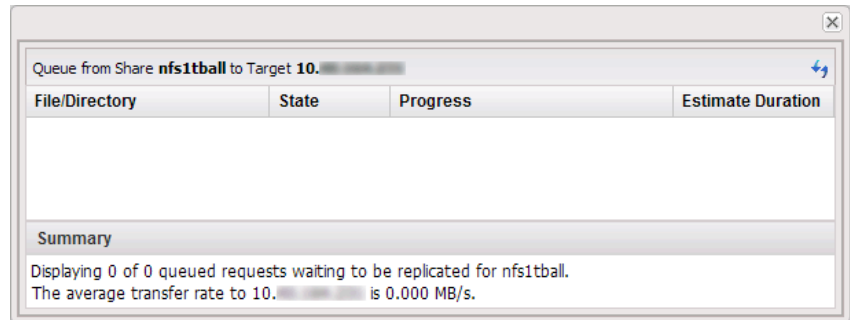
- 1 Select a share that is configured for Directory/File Based Replication.

If multiple targets are configured, click the arrow next to the share to display all targets, and then select the desired target.

2 Click Queue.

The Directory/File Based Replication Queue displays (see [Figure 53](#)).

Figure 53 Directory/File Based
Replication Queue



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

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

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

Note: The queue may show a large number of deletion entries after a single directory is deleted. This is expected behavior, and occurs because several recursive file or subdirectory deletions may be required.

- 3 To close the **Directory/File Based Replication Queue**, click the **Close** icon.

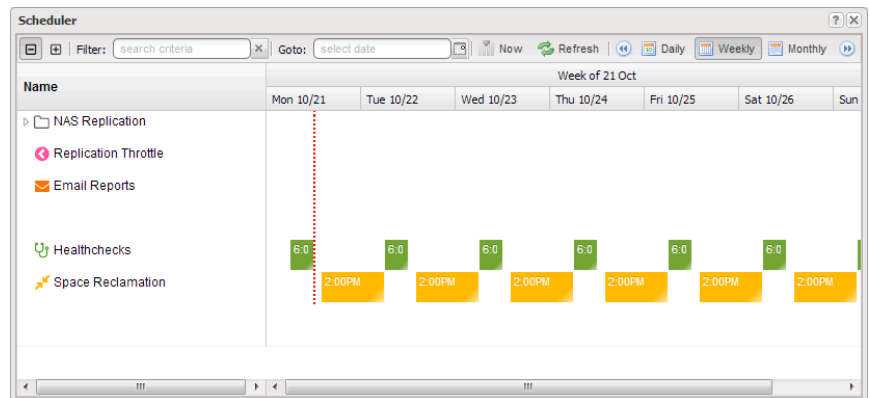
Scheduling a Share For Replication

When a share is enabled for replication, it is important to regularly replicate the share to the target systems. Quantum recommends scheduling replication to run after backups are complete.

To schedule a share for replication, click **Scheduler**. The **Scheduler Calendar** windows displays (see [Figure 54](#)).

For details about using the **Scheduler Calendar** to add or edit a replication schedule, see [Scheduling a Share for Replication](#) on page 217.

Figure 54 Scheduler Calendar Window



Target DXis List

The **Target DXis** list allows you to configure and manage replication targets on the DXi4000. Click the arrows at the upper right, or click the top banner row, to expand or collapse the **Target DXis** list. For details about working with targets, see [Target DXis List](#) on page 171.

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 [Adding a Replication Source](#) on page 178).

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:

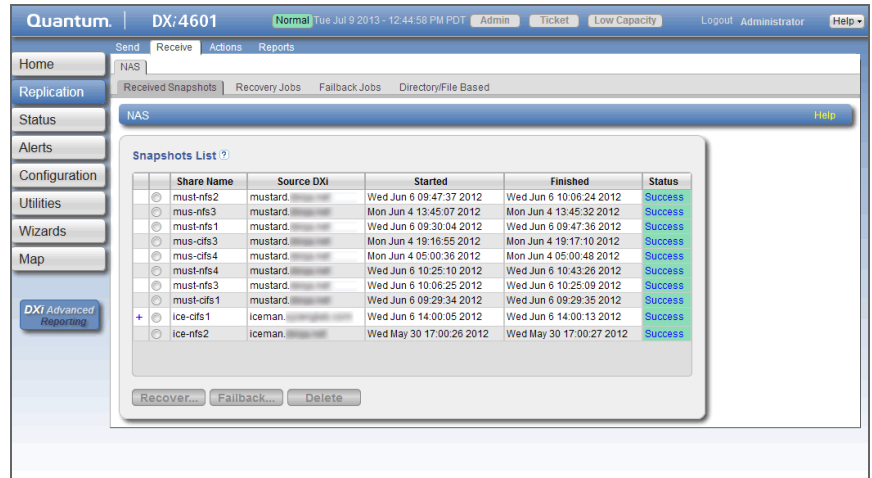
- View received snapshots and recover, failback, or delete snapshots (see [Received Snapshots](#) on page 104).
- Manage recovery jobs (see [Recovery Jobs](#) on page 110).
- Manage failback jobs (see [Failback Jobs](#) on page 111).
- Manage shares configured for Directory/File Based Replication (see [Directory/File Based](#) on page 112).

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 55](#)).

Figure 55 Received Snapshots Page



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

- View information about received snapshots (see [Snapshots List](#) on page 105).
- Recover a share on the target system (see [Recovering a Share](#) on page 106).
- Failback a share to the source system (see [Performing a Failback For a Share](#) on page 107).
- Delete a received snapshot (see [Deleting a Snapshot](#) on page 109).

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 [Changing the Maximum Number of Snapshots](#) on page 180).

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 96). 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.

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.

Note: Before recovering a share, you must enable CIFS on the DXi (see [Windows Domain](#) on page 159). Also, if the DXi is not using Active Directory, you must configure at least one workgroup user to own recovered CIFS shares (see [Share Access](#) on page 162).

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 56](#)).

Figure 56 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**.
- 4 If the DXi is joined to a Windows workgroup, select the workgroup user that will own the recovered share, and then 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.

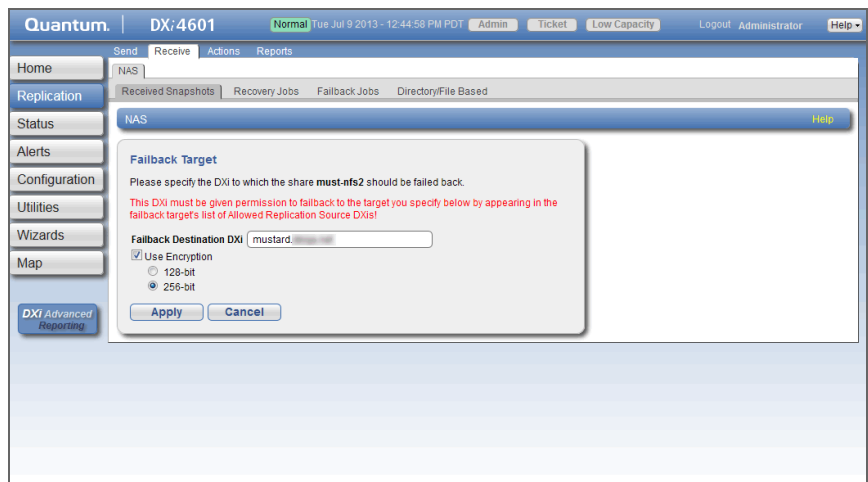
Note: Before you can failback a share, on the original source system, you must add the original target system to the list of allowed replication sources (see [Adding a Replication Source](#) on page 178). This is because, during failback, the original target is acting as a source when it sends a snapshot 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 57](#)).

Figure 57 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 223).

- 3 (Optional) Leave the **Use Encryption** check box selected to enable encryption when sending the snapshot to the destination. Or clear the **Use Encryption** check box to disable encryption when sending the snapshot to the destination.

If encryption is enabled, select an encryption strength (**128-bit** or **256-bit**). Using 256-bit encryption (default) provides a stronger level of security but may have an impact on system performance in some situations.

Caution: Select 128-bit encryption if you are sending data to a DXi running a system software version prior to DXi 2.1 Software.

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 56](#)).

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 111).

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 96).
 - On the target system, delete the source system associated with the snapshot from the list of allowed replication sources (see [Deleting a Replication Source](#) on page 179).
- 2 On the target system, select a snapshot in the **Snapshots List** and click **Delete**.

Note: If you delete the last snapshot for a share while replication for the share (to this target) is still enabled, any replicated data not yet protected by a replicated share is *not* deleted. To delete this data, on the source system, disable replication for the share before deleting the last snapshot.

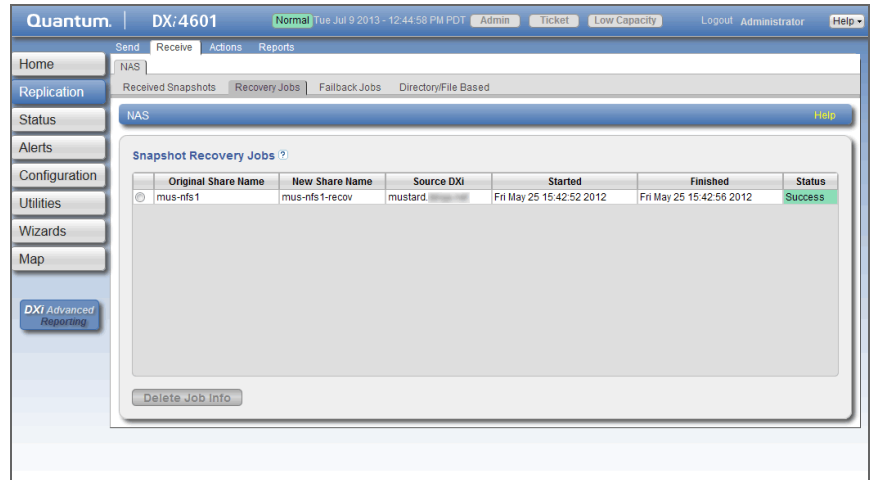
- 3 Click **Yes** to confirm the action.

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 58](#)).

Figure 58 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**).

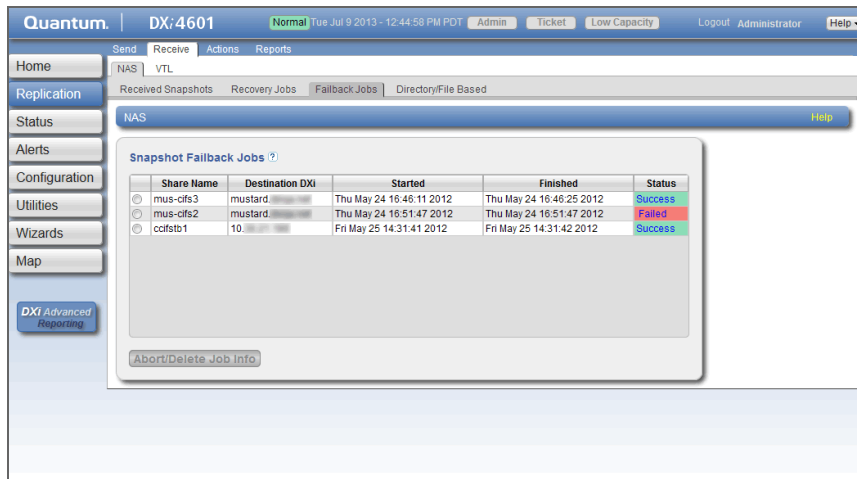
To delete information for a recovery job, select it in the **Snapshot Recovery Jobs** list and click **Delete Job Info**.

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 59](#)).

Figure 59 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**.

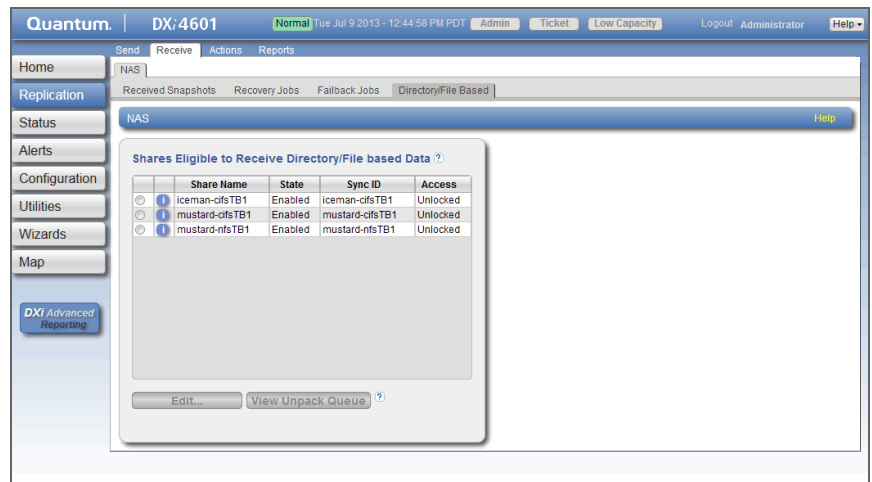
Directory/File Based

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 155.

To access the **Directory/File Based** page, on the **Receive NAS** page, click the **Directory/File Based** tab (see [Figure 60](#)).

Figure 60 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 113)
- Configure a share to receive Directory/File Based Replication data (see [Configuring a Target Share for Directory/File Based Replication](#) on page 114)
- View statistics for shares configured for Directory/File Based Replication (see [Unpack Queue](#) on page 116)

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.

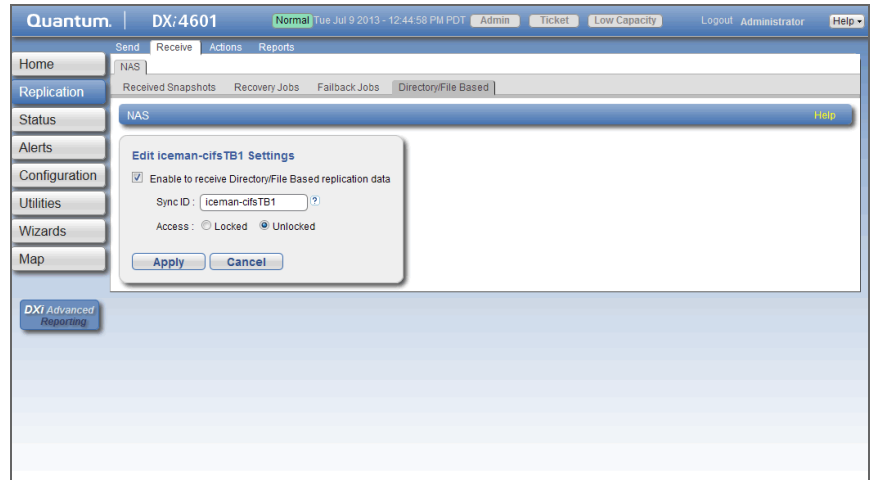
Note: For information about configuring Directory/File Based Replication on the source system, see [Configuring Directory/File Based Replication](#) on page 98.

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 61](#)).

Figure 61 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.

Note: If a share configured for Directory/File Based Replication is locked on the target system, synchronization jobs may fail on the source system.

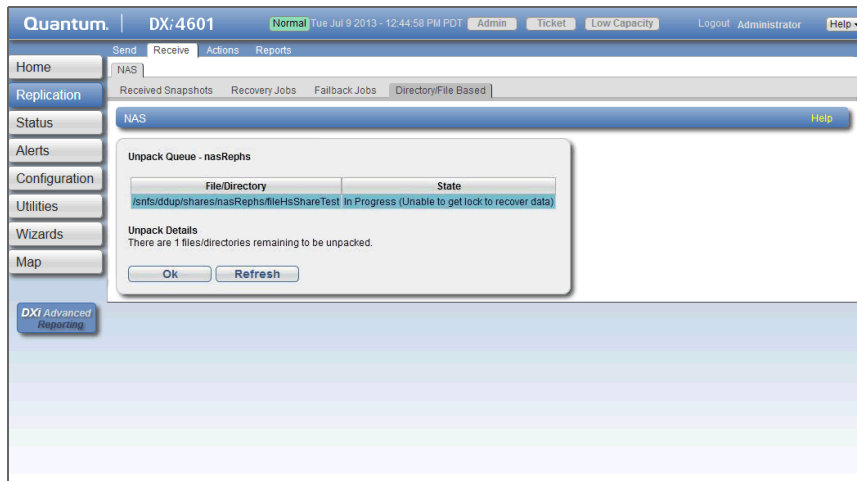
- 5 Click **Apply**.

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 62](#)).

Figure 62 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 63](#)).

Figure 63 Actions Page

The screenshot shows the Quantum DXi4000 Actions page. The page is titled "Quantum | DXi:4601" and includes a navigation menu on the left with options like Home, Replication, Status, Alerts, Configuration, Utilities, Wizards, and Map. The main content area is titled "Actions" and contains three sections:

- Replication Service:** This section contains two replication targets, each with a "Ready" status indicator and a "Pause" button.
- Replication State:** This section contains an "Enable" button and a "Disable" button.
- Replication Performance:** This section contains a "Clear Send" button and a "Clear Receive" button. It also includes a table of replication targets with columns for "Replication Target DXis", "Status", and "Encryption".

Replication Target DXis	Status	Encryption
10	Ready	AES 256-bit
10	Ready	AES 256-bit

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

- Pause or resume the replication service (see [Replication Service](#) on page 117).
- Enable or disable the replication state (see [Replication State](#) on page 118).
- Clear cumulative replication statistics (see [Replication Performance](#) on page 119).

Replication Service

The replication service controls replication and failback traffic on the DXi4000. You can pause each replication target independently.

- Click **Pause** next to a target to pause all replication and failback traffic to that target.

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 119).

- Click **Resume** next to a target to resume all incoming and outgoing replication and failback traffic to that target.

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).

Note: The **Replication Actions** page may appear busy for a few moments when enabling or disabling the replication state. Wait for the process to complete before performing other actions.

- 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 [Replication Send](#) on page 93

Replication Performance

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

- To clear send statistics, first select one or more targets to clear statistics for, and then click **Clear Send**. This resets cumulative performance statistics gathered while replicating shares to the selected target systems, or when sending a snapshot during a failback operation.
- To clear receive statistics, click **Clear Receive**. This resets 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 64](#)).

Figure 64 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](#)
- [OST Status](#)
- [Activity Log](#)

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](#)

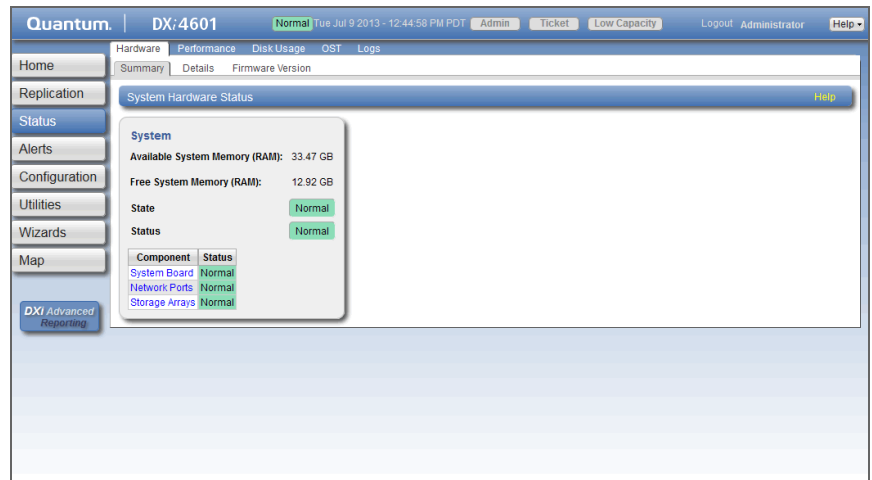
Summary

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 65](#)).

Figure 65 Hardware Summary Page



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

- **Available System Memory (RAM)** - The total amount of memory (RAM) installed in the system.
- **Free System Memory (RAM)** - The amount of system memory (RAM) that is currently free.
- **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 123).

- **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:

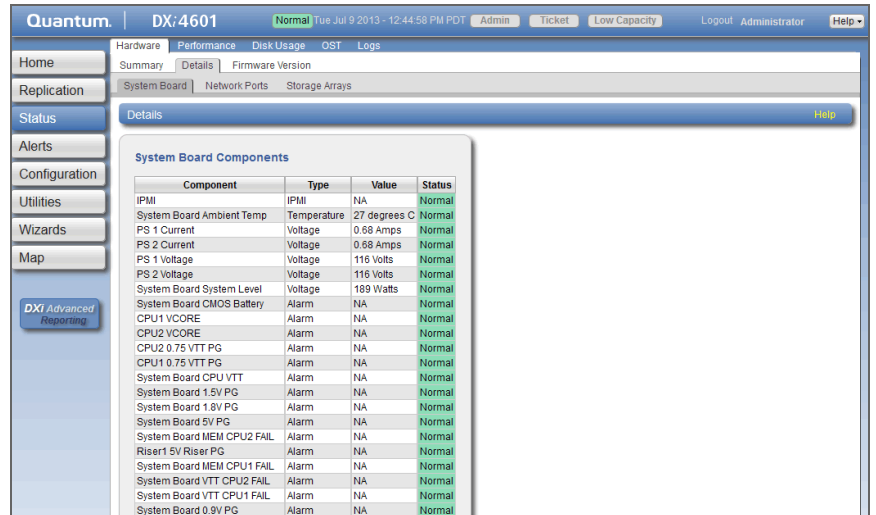
- [System Board](#)
- [Network Ports](#)
- [Storage Arrays](#)

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 66](#)).

Figure 66 System Board Page



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

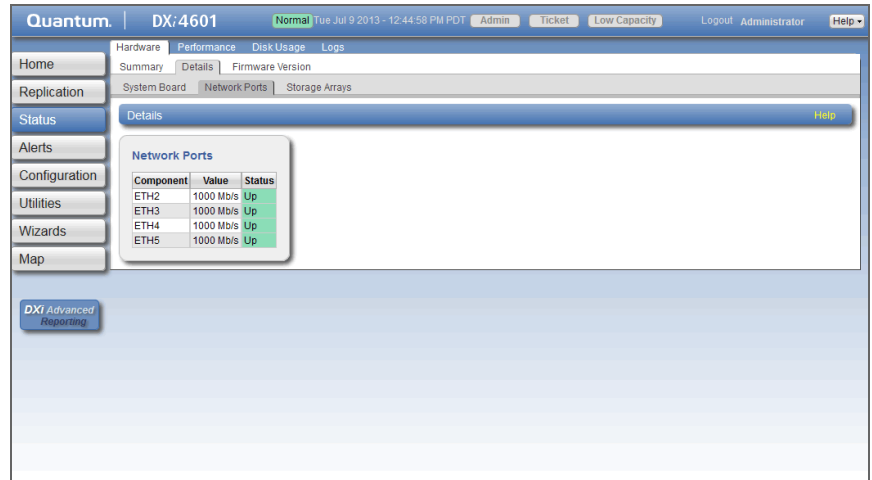
- **Component** - The name of the component on the system board.
- **Type** - The component type (Sensor, Fan, or Power Supply).
- **Value** - The value reported by the sensor or component.
- **Status** - The status of the component.
 - **Normal** - (Green) The component is operating correctly.
 - **Attention** - (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 67](#)).

Figure 67 Network Ports Page



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

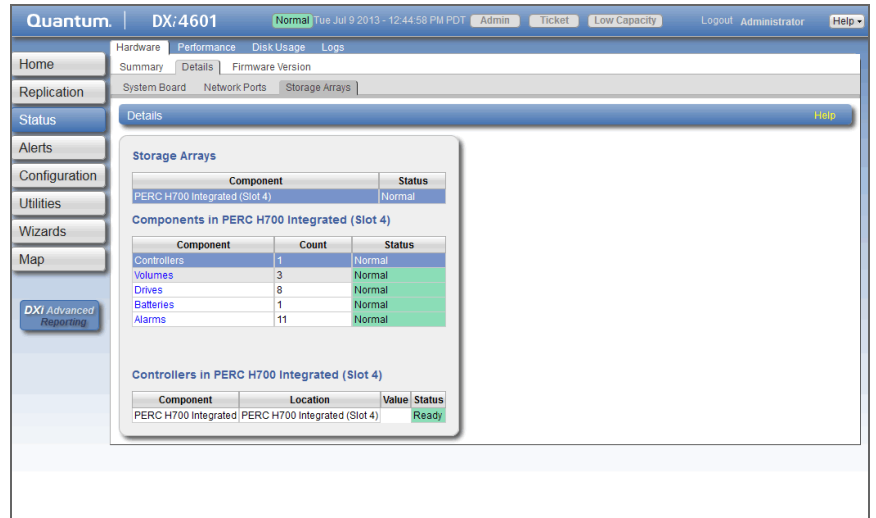
- **Component** - The number of Ethernet port.
- **Value** - The speed of the port in Mb/s.
- **Status** - The status of the Ethernet port.
 - **Up** - (Green) The port is connected.
 - **Down** - (Green) The port is not connected.

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 68](#)).

Figure 68 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:

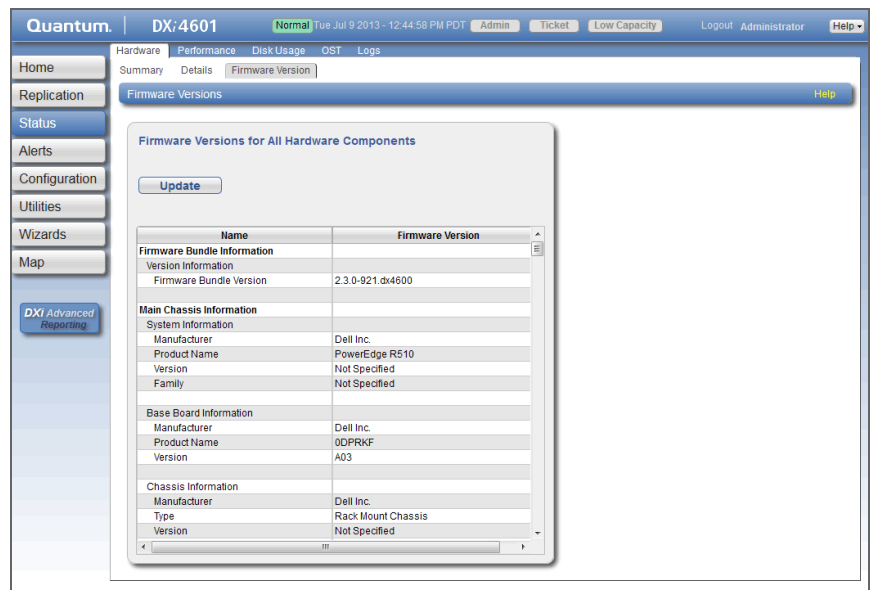
- **Component** - The name of the subcomponent.
- **Location** - The location of the subcomponent within the system.
- **Value** - The value reported by the subcomponent.
- **Status** - The status of the subcomponent.
 - **Normal** - (Green) The component is operating correctly.
 - **Attention** - (Yellow) 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 69](#)).

Figure 69 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.

Note: In some cases, when updating firmware versions, the remote management console may time out and then return to the **Home** page. If this occurs, simply navigate back to the **Status > Hardware > Firmware Version** page to see the updated 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:

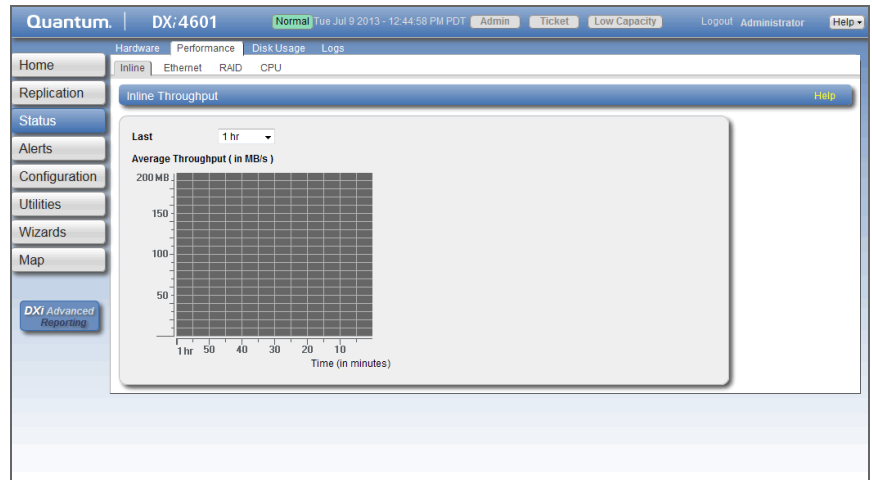
- [Inline](#)
- [Ethernet](#)
- [RAID](#)
- [CPU](#)

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 70](#)).

Figure 70 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 axis 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.

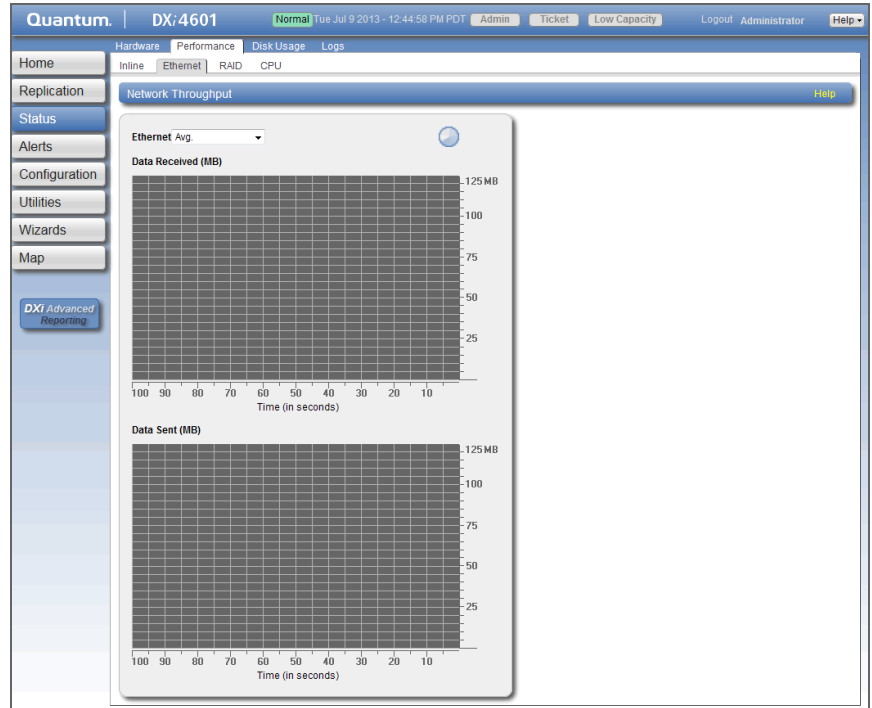
- Each bar on the graph represents approximately 1 minute of time.
- Hold the cursor over a bar to display the value of the bar.

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 71](#)).

Figure 71 Ethernet Page



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

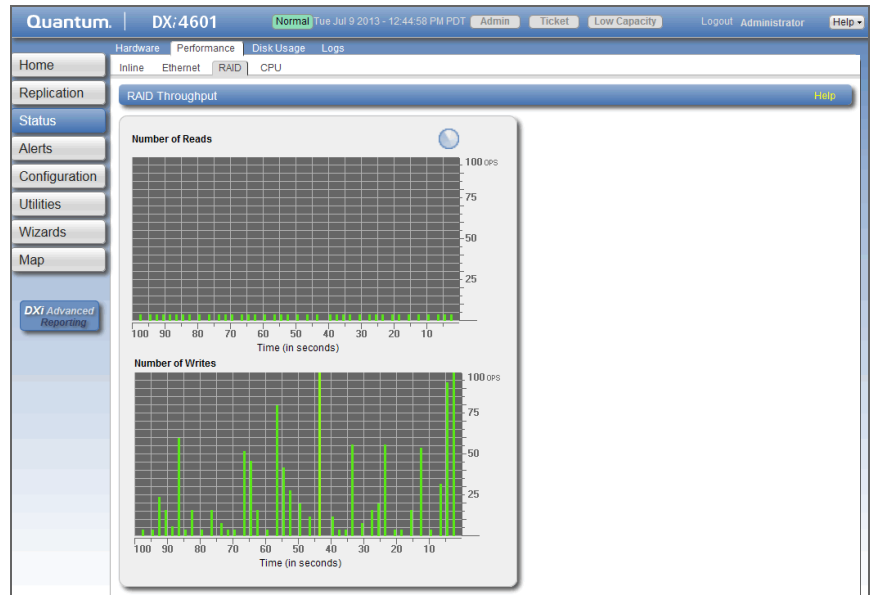
- The top graph reports data received and the bottom graph reports data sent.
- Select the port to monitor in the **Ethernet** drop-down box, or select **Avg** to display an average of all ports.
- The horizontal axis displays time (0–100 seconds).
- The vertical axis displays data throughput (0–125 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 72](#)).

Figure 72 RAID Page



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

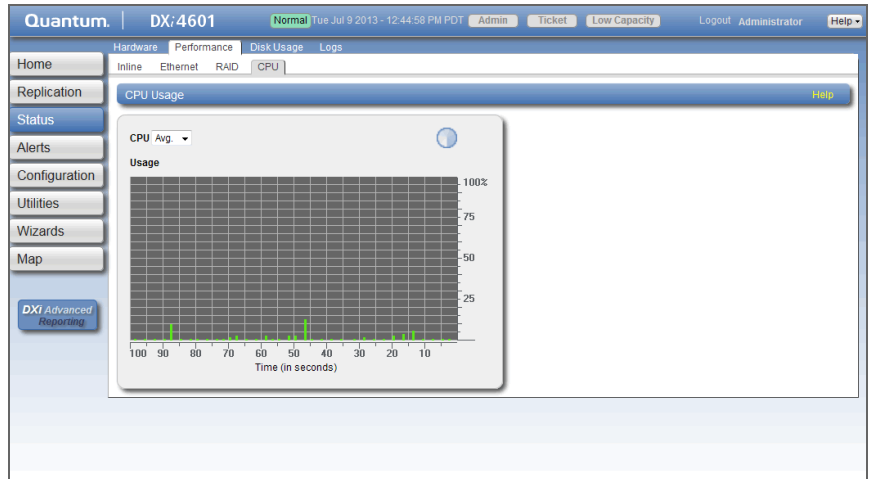
- The top graph reports data reads and the bottom graph reports data writes.
- The horizontal axis displays time (0–100 seconds).
- The vertical axis displays the amount of data read or written (100 OPS/s).
- Values that exceed the maximum value of the vertical axis are shown in lighter green.
- Each 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 73](#)).

Figure 73 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.

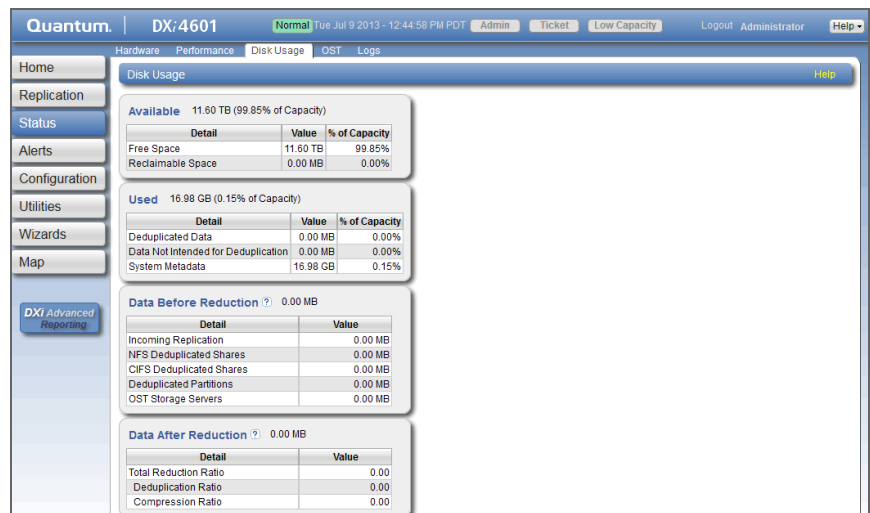
- The horizontal axis displays time (0–100 seconds).
- The vertical axis displays CPU usage (0–100%).
- Each bar on the graph represents approximately 1 second of time.
- Hold the cursor over a bar to display the value of the bar.

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 74](#)).

Figure 74 Disk Usage Page



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

- [Available](#)
- [Used](#)
- [Data Before Reduction](#)
- [Data After Reduction](#)

Available

Available nspace is the area that is available for data storage. The **Available** value is displayed as an amount and as a percentage of the total capacity in the system.

Available space is divided into the following categories:

- **Free Space** - The disk space that can be used for new deduplicated or non-deduplicated data.
- **Reclaimable Space** - The disk space that is occupied by outdated deduplicated data and which will be automatically reused if additional space for new deduplicated data is needed.

Note: For optimal system performance, Quantum recommends keeping the amount of **Available** disk space at 20% or more.

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:

- **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 Before Reduction

The **Data Before Reduction** value represents the original, native size of all data that has been processed by the data deduplication and compression engines.

Data before reduction is divided into the following categories:

- **Incoming Replication** - The amount of data stored on the DXi via replication from another DXi. This does *not* include incoming data from Directory/File Based Replication, or incoming data from Failback replication.
- **NFS Deduplicated Shares** - The amount of data stored in deduplicated shares configured in Network File System (NFS) format for Linux systems. This includes incoming data from Directory/File Based Replication, and incoming data from Failback replication.

- **CIFS Deduplicated Shares** - The amount of data stored in deduplicated shares configured in Common Internet File System (CIFS), also known as Server Message Block (SMB), format for Windows systems. This includes incoming data from Directory/File Based Replication, and incoming data from Failback replication.
- **OST Storage Servers** - The amount of data stored in deduplicated OpenStorage (OST) storage servers. This includes incoming data for OST and DXi Accent.

Data After Reduction

The **Data After Reduction** value represents the final, reduced size of all data that has been processed by the data deduplication and compression engines.

Data after reduction is divided into the following categories:

- **Total Reduction Ratio** - The total reduction ratio of all data that has been processed by the data deduplication and compression engines (**Data Before Reduction** divided by **Data 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.

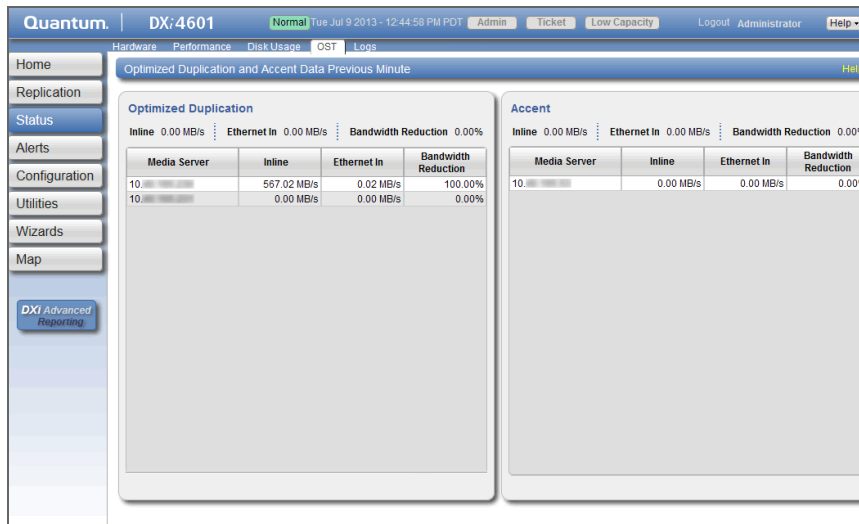
OST Status

Use the **OST Status** page to view statistics for OST optimized duplication and DXi Accent activity that occurred in the previous minute.

Note: DXi Accent statistics display only if DXi Accent is currently enabled or was previously enabled (see [DXi Accent](#) on page 209).

To access the **OST Status** page, click the **Status** menu, and then click the **OST** tab (see [Figure 75](#)).

Figure 75 OST Status Page



Combined statistics for all media servers display at the top of each section (**Optimized Duplication** and **Accent**):

- **Inline** - The inline data flow throughput (in MB/s). Inline data flow represents the original, native size of the data protected by the DXi.
- **Ethernet In** - The amount of data received by all Ethernet ports (in MB/s). This amount represents the reduced size of the data protected by the DXi (after deduplication and compression on the media servers).
- **Bandwidth Reduction** - The percentage by which network bandwidth utilization was reduced by using optimized duplication or enabling Accent.

Statistics for individual media servers display in the tables in each section (**Optimized Duplication** and **Accent**):

- **Media Server** - The IP address of the media server.
- **Inline** - The inline data flow throughput (in MB/s). Inline data flow represents the original, native size of the data protected by the DXi.
- **Ethernet In** - The amount of data received by all Ethernet ports (in MB/s). This amount represents the reduced size of the data protected by the DXi (after deduplication and compression on the media server).

- **Bandwidth Reduction** - The percentage by which network bandwidth utilization was reduced by using optimized duplication or enabling Accent.

Activity Log

The **Activity Log** page allows you to view a record of all activities performed by administrative and service users in the past 90 days. You can view the user who performed the activity, the time the activity was performed, and other information. You can also download the activity log to an XML file.

To access the **Activity Log** page, click the **Status** menu, and then click the **Logs** tab (see [Figure 76](#)).

Figure 76 Activity Log Page

Activity log toolbar —

Navigation controls —

User	Date/Time	Origin	Action	Category	Role	Summary
Administrator	2013-09-10 4:04 PM	GUI	UPDATE	UTILITY	ADMIN	ACTION=Generate ACTIONSTATUS=Success CLIENTID=1378846133@10. Generating=CollectLogs
Administrator	2013-09-10 3:44 PM	GUI	DELETE	ALERT	ADMIN	ACTION=AdminDeleteItem ACTIONSTATUS=Success CLIENTID=1378846133@10. SelectAll=on mediaCredBox=Replications/Pause
Administrator	2013-09-10 3:11 PM	GUI	UPDATE	ALERT	ADMIN	ACTION=CloseAllTickets ACTIONSTATUS=Success CLIENTID=1378846133@10. showTickets=All
Administrator	2013-09-10 2:48 PM	GUI	CREATE	UTILITY	ADMIN	ACTIONSTATUS=Success CLIENTID=10. -authenticate -name=admin -encrypted.password= -client=10. @GUI -apiclientname=QSys_Authenticate
root	2013-09-10 2:00 PM	CLI	CREATE	UTILITY	ADMIN	ACTIONSTATUS=Success CLIENTID=localhost -start=reclamation
Administrator	2013-09-10 12:16 PM	GUI	UPDATE	OST	ADMIN	ACTION=OSTEditLsu ACTIONSTATUS=Success CLIENTID=1378771872@10. LsuName=bighorn1. OSTLsu.PhysicalCapacity=1048576 OSTStorageServerName=bighornrc2 OSTLsu.totalsEnabled=on OSTLsu.RemoteLsuName=bighorn1 OSTLsu.RemoteServerName=bighornosttgt OSTLsu.RemoteUser=admin OSTRemoteHostId=10.
Administrator	2013-09-10 12:16 PM	GUI	UPDATE	OST	ADMIN	ACTION=OSTEditLsu ACTIONSTATUS=Success CLIENTID=1378771872@10. LsuName=bighorn1.

Use the **Activity Log** page to perform the following tasks:

- View information about activities that have been recorded in the log (see [Viewing Logged Activities](#) on page 138).

- Enable or disable the recording of activities in the log (see [Enabling or Disabling Activity Logging](#) on page 139).
- Delete one or more activities from the log (see [Deleting Logged Activities](#) on page 140).
- Download the activity log in XML format (see [Downloading the Activity Log](#) on page 140).

Viewing Logged Activities

The **Administrative Activity Log** list displays the following information for each entry:

- **User** - The user that performed the activity (**Administrator, Monitor, Service, Engineering, cliadmin, or root**).
- **Date/Time** - The date and time the activity was performed.
- **Origin** - The interface where the activity originated. Possible origins are the **GUI** (remote management console) or the **CLI** (command line interface).
- **Action** - The type of activity performed (**Create, Update, or Delete**).
- **Category** - The category of the activity (**Alert, Analyzer, Cluster, Date Time, Email, Event, Hard Drive Security, Healthcheck, NAS, Network, OST, Replication, Security, SNMP, or Utility**).
- **Role** - The role of the user that performed the activity (**Admin**).
- **Summary** - Details about the activity that was performed, including CLI commands and field values.

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.

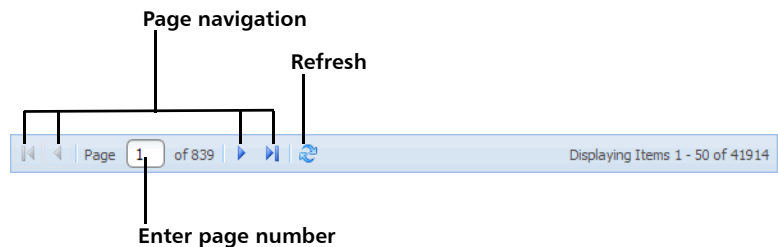
Note: To rearrange the order of the columns, click and drag a column heading left or right. To show or hide columns, click the arrow to the right of a column heading. In the pop-up menu, point to **Columns**, then select the name of a column to show or hide it.

Navigating in the Activity Log

Use the controls at the bottom of the **Administrative Activity Log** list to adjust the activity log view (see [Figure 77](#)):

- To navigate between pages in the list, use the left and right arrows.
- To view a specific page, type the page number in the box.
- To update the activity log with latest data, click the **Refresh** icon.

Figure 77 Activity Log View Controls

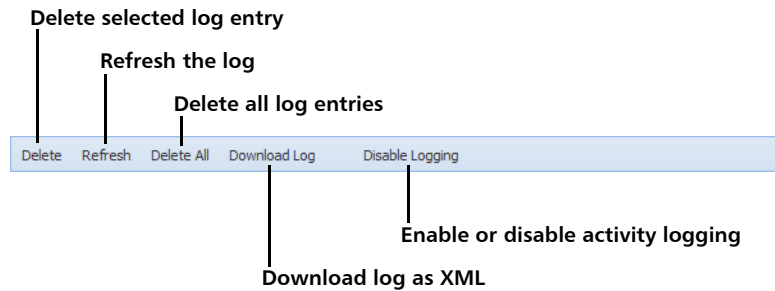


Enabling or Disabling Activity Logging

By default, activity logging is enabled on the DXi4000. Use the toolbar above the **Administrative Activity Log** list to enable or disable activity logging (see [Figure 78](#)).

- To enable the logging of administrative and service actions, click **Enable Logging** on the toolbar.
- To disable the logging of administrative and service actions, click **Disable Logging** on the toolbar.
- To update the activity log with latest data, click **Refresh** on the toolbar.

Figure 78 Activity Log View
Controls



Deleting Logged Activities

Use the toolbar above the **Administrative Activity Log** list to delete one or more entries in the activity log (see [Figure 78](#)).

- To delete a log entry, select the entry and click **Delete**.
- To delete all entries in the activity log, click **Delete All**.

Downloading the Activity Log

Use the toolbar above the **Administrative Activity Log** list to save the activity log in XML format (see [Figure 78](#)). You can then open the log file in another program that is compatible with XML.

To download the activity log, click **Download Log**. Specify a location to save the file, and then click **OK** or **Save**.



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](#)

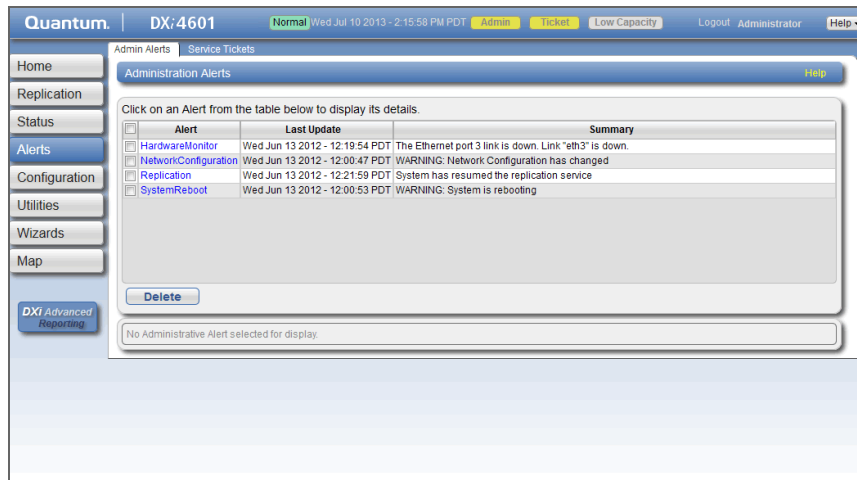
Admin Alerts

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 250).

To access the **Admin Alerts** page, click the **Alerts** menu, and then click the **Admin Alerts** tab (see [Figure 79](#)).

Figure 79 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** - A minor problem occurred and needs to be resolved, but the operation and performance of the DXi4000 are not significantly affected.
- **Middle** - 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** - 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.

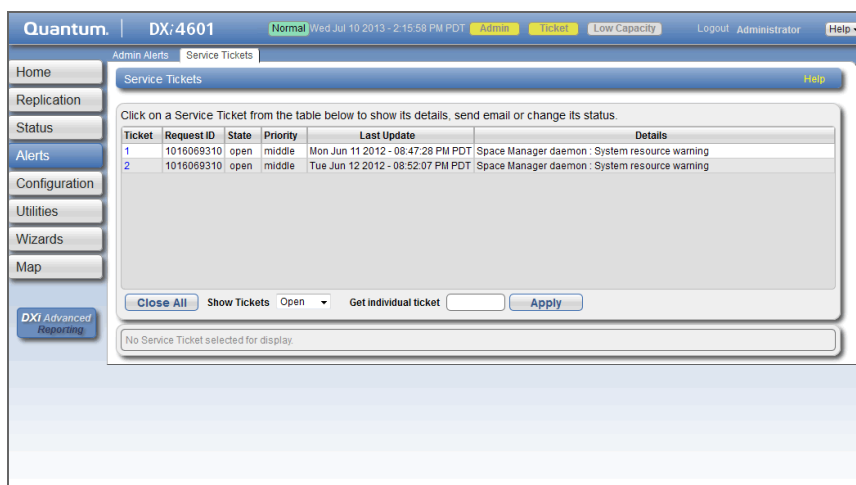
Note: The recommended actions should be performed by a user who is familiar with operating the DXi4000.

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 80](#)).

Figure 80 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 145).
- Add information to a service ticket (see [Modifying a Service Ticket](#) on page 147).
- Send a service ticket to an e-mail address (see [Sending a Service Ticket](#) on page 148).
- Close a service ticket that has been resolved (see [Closing a Service Ticket](#) on page 149).

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.

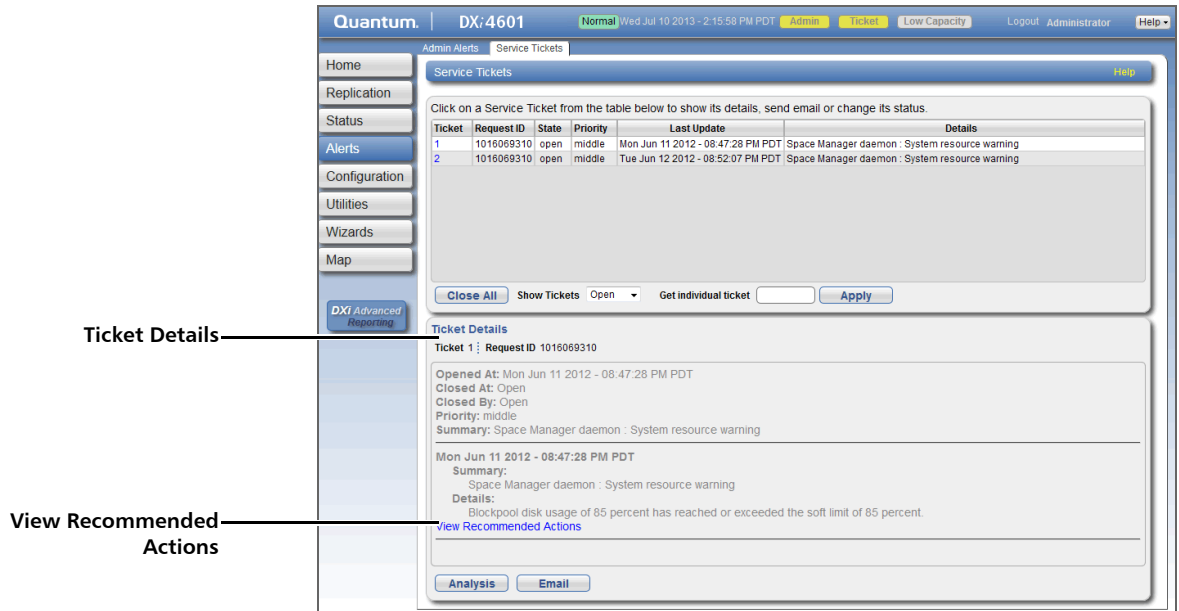
To view a service ticket:

- 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 81](#)).

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

Figure 81 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 82](#)). 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 82 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:	<ol style="list-style-type: none"> 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:	<ol style="list-style-type: none"> 1. Modify the ticket according to the troubleshooting steps taken. Refer to Analyzing Service Tickets. 2. Contact the Quantum Technical Assistance Center. <ul style="list-style-type: none"> 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	
<small>©2010 Quantum Corporation © All rights reserved.</small>	

Modifying a Service Ticket

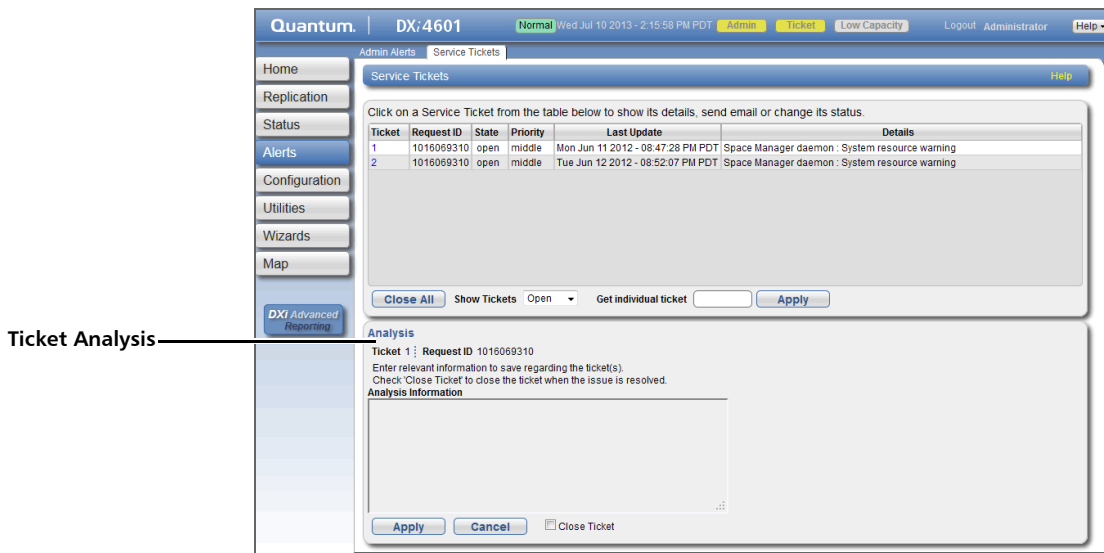
Modify a service ticket to add additional information to the ticket, for example, troubleshooting steps you have taken or a record of calls made to Quantum customer support. The additional information is saved with the service ticket and remains associated with the ticket even after it is closed.

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 83](#)).

Figure 83 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.

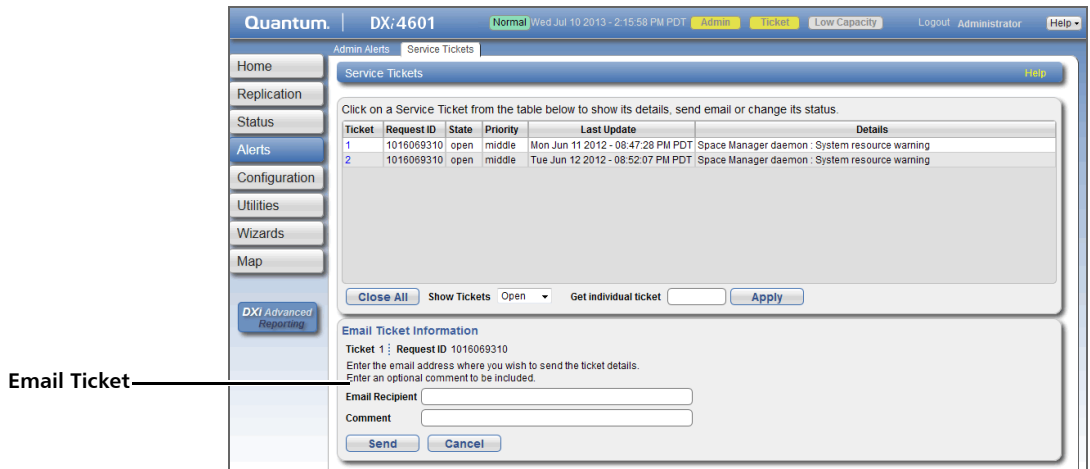
Note: To enable the DXi4000 to send e-mail, you must specify an outgoing e-mail server (see [Server](#) on page 255).

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 84](#)).

Figure 84 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 83](#)).

- 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 Configuration](#)
- [OST](#) (including DXi Accent with OST)
- [Scheduler](#)
- [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 41).

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:

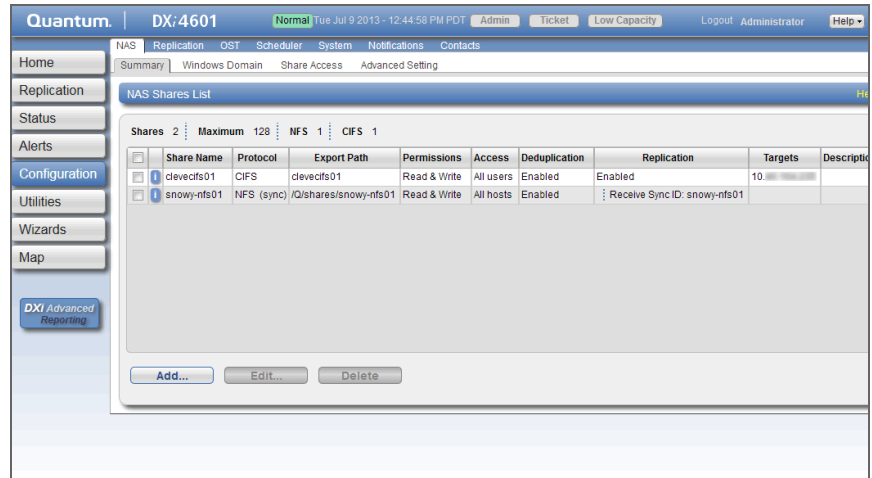
- [NAS Summary](#)
- [Windows Domain](#)
- [Share Access](#)
- [Advanced Setting](#)

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.

To access the **NAS Summary** page, on the **NAS** page, click the **Summary** tab (see [Figure 85](#)).

Figure 85 NAS Summary Page



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

- View information about existing NAS shares (see [NAS Shares List](#) on page 153).
- Add a new NAS share to the system (see [Adding a NAS Share](#) on page 155).
- Edit properties for an existing NAS share (see [Editing a NAS Share](#) on page 156).
- Delete a NAS share from the system (see [Deleting a NAS Share](#) on page 158).

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.
For NFS shares, the **Protocol** column displays the commit type of the share (**sync** for synchronous or **async** for asynchronous). For information about changing the commit type of NFS shares, see the *DXi-Series Command Line Interface (CLI) Guide* (6-67081).
- **Export Path** - The export path of the share (different for CIFS and NFS shares).
- **Permissions** - The permissions in use on the share (**Read & Write** or **Read Only**).
- **Access** - The access type of the share (**all hosts** or specific users).
- **Deduplication** - The data deduplication state of the share (**Enabled** or **Disabled**).
- **Replication** - The current state of replication for the share:
 - **Enabled** - Replication is enabled.
 - **Send/Receive Sync ID** - Directory/File Based Replication is enabled.
 - **Configure** - Click to configure replication for the share (see [Editing a NAS Share](#) on page 156)
 - **Scheduled** - Replication is scheduled for the share. Click to view or modify the schedule (see [Scheduling a Share for Replication](#) on page 217).
- **Targets** - The targets the share is configured to replicate to.
- **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 159).

To add a NAS share:

- 1 Click **Add**.

The **Add NAS Share** page displays (see [Figure 86](#)).

Figure 86 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. If data duplication is disabled, then data compression is also disabled.

- **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 85.

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

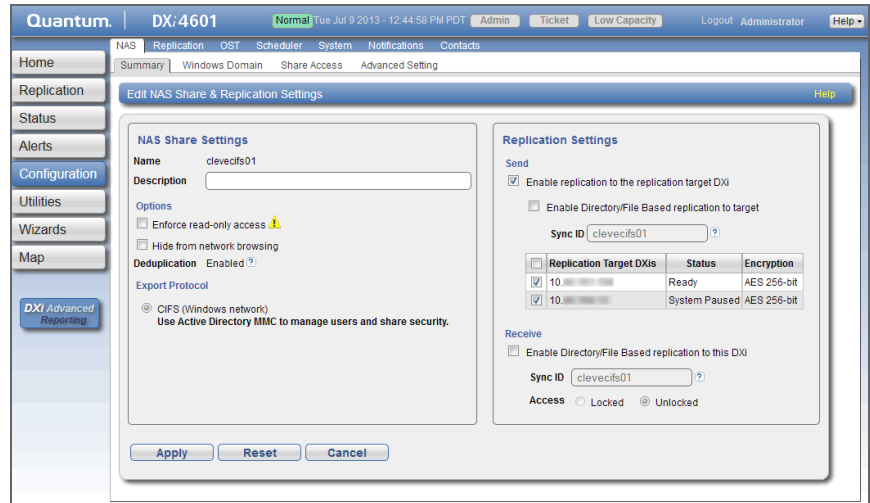
Edit a NAS share to modify the settings for the share, for example, to change the description of the share or to select different options.

To edit a NAS share:

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

The **Edit NAS Share & Replication Settings** page displays (see [Figure 87](#)).

Figure 87 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 162.

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 (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 85.

4 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 159). 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, and any schedules associated with the share are deleted.

Note: If you delete a share configured for Directory/File Based Replication on the source DXi, the share is *not* automatically deleted on the target DXi. If you do not want to retain the share on the target DXi, you can manually delete it.

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 88](#)).

Figure 88 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 160).
- Join the DXi4000 to a Windows domain (see [Joining a Windows Domain](#) on page 160).
- Remove the DXi4000 from a Windows workgroup or domain (see [Disjoining a Workgroup or Domain](#) on page 161).

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 156).

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 239). 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.

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 159). 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 89](#) and [Figure 90](#)).

Figure 89 Share Access Page
(Windows Workgroup)

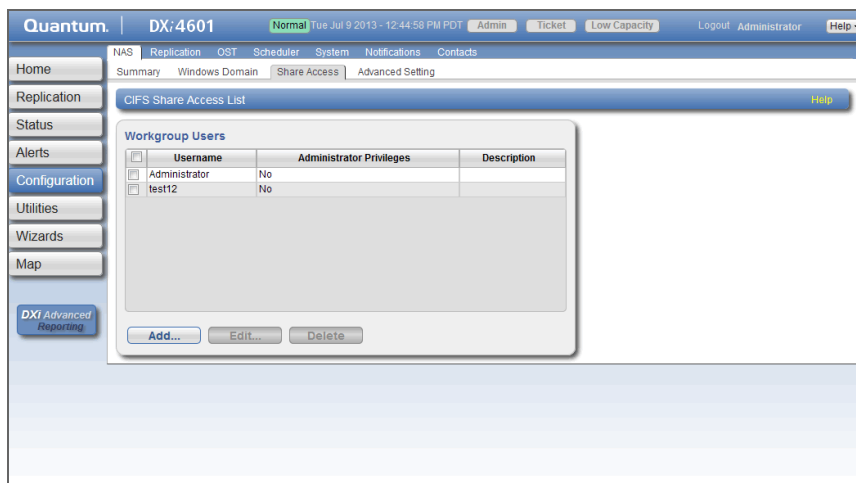
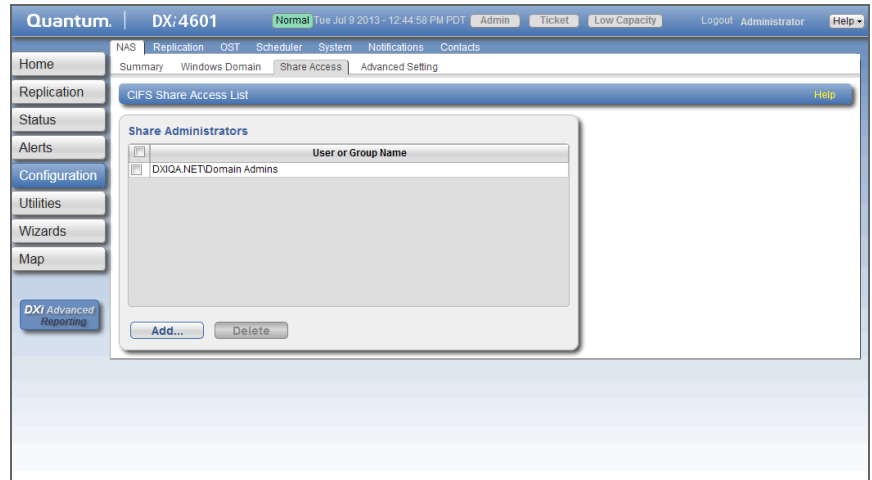


Figure 90 Share Access Page
(Active Directory)



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 163).
- Add a workgroup user or a share administrator (see [Adding a Workgroup User or Share Administrator](#) on page 164).
- Edit a workgroup user (see [Editing a Workgroup User](#) on page 165).
- Delete a workgroup user or a share administrator (see [Deleting a Workgroup User or Share Administrator](#) on page 167).

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.

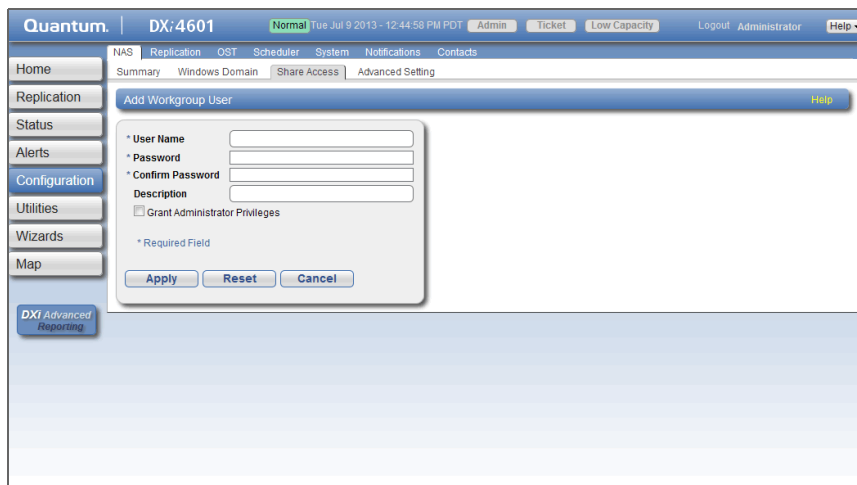
Windows Workgroup

To add a workgroup user for a Windows workgroup:

- 1 Click **Add**.

The **Add Workgroup User** page displays (see [Figure 91](#)).

Figure 91 Add Workgroup User Page

The screenshot shows the Quantum DXi4000 web management interface. At the top, there's a navigation bar with the Quantum logo, the device ID 'DXi:4601', and various status indicators like 'Normal', 'Admin', 'Ticket', 'Low Capacity', 'Logout', and 'Administrator'. Below this is a menu with options like 'NAS', 'Replication', 'OST', 'Scheduler', 'System', 'Notifications', and 'Contacts'. The main content area is titled 'Add Workgroup User' and contains a form with the following fields: 'User Name', 'Password', 'Confirm Password', and 'Description'. There is also a checkbox for 'Grant Administrator Privileges'. The form has 'Apply', 'Reset', and 'Cancel' buttons at the bottom. A 'Help' link is visible in the top right corner of the form area. On the left side of the interface, there is a vertical navigation menu with buttons for 'Home', 'Replication', 'Status', 'Alerts', 'Configuration', 'Utilities', 'Wizards', and 'Map'. At the bottom left, there is a 'DXi Advanced Reporting' button.

- 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 156).

Windows Domain

To add a share administrator for a Windows domain:

1 Click Add.

The **Add Share Administrator** page displays (see [Figure 92](#)).

Figure 92 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 167).

Editing a Workgroup User

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

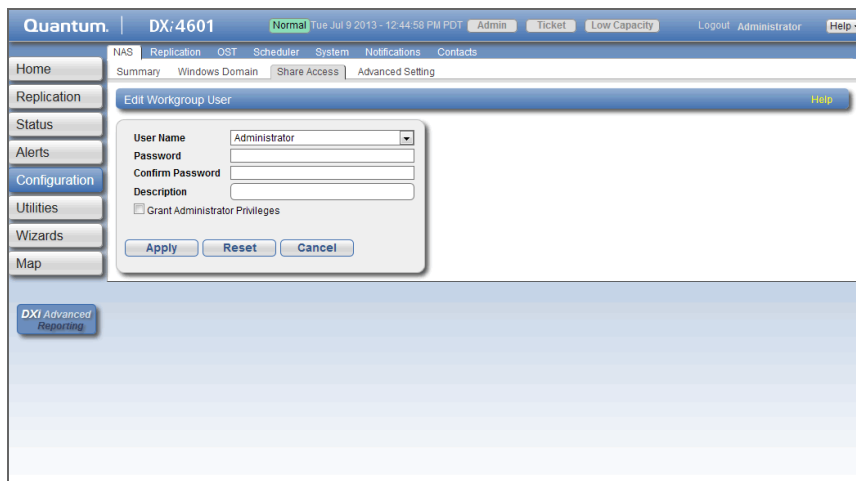
Note: You cannot edit a share administrator. Instead, delete the share administrator, then add a new share administrator.

To edit a workgroup user:

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

The **Edit Workgroup User** page displays (see [Figure 93](#)).

Figure 93 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.

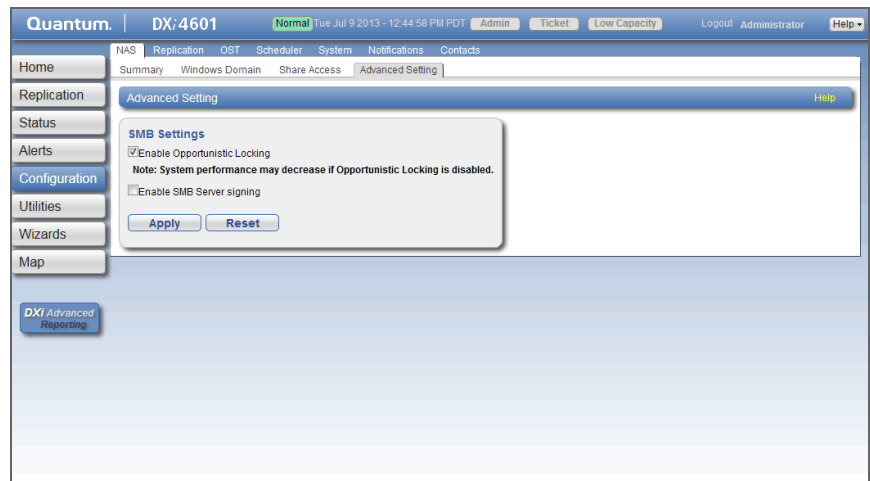
Often users and groups are unique to a particular scope, such as a Windows system or an ADS domain. As a result, some assigned permissions might not be available on the target system because the associated user and group do not exist there. However, common groups (for example, **Administrators**, **Users**, 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 94](#)).

Figure 94 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 SMB Server signing** - (Disabled by default) SMB server signing improves security on Windows networks by requiring clients to provide a security signature to connect to a server. If the DXi4000 is joined to a Windows domain that is configured to require signing, you should enable SMB server signing.

2 Click **Apply**.

Replication Configuration

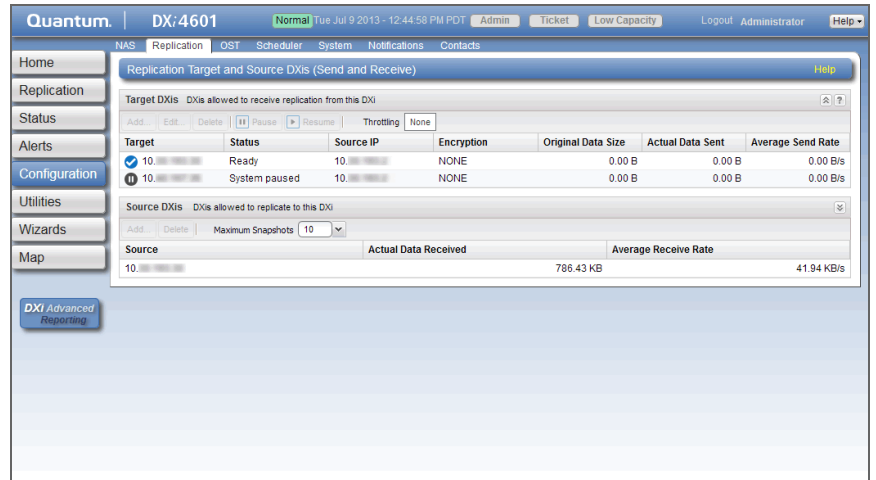
The **Replication Configuration** page allows you to configure and manage replication targets and allowed replication sources on the DXi4000. A source *sends* replicated data to 1 or 2 targets, and a target *receives* replicated data from up to 10 sources. A DXi4000 can act as both a source and a target.

Note: For more information about data replication, or to perform data replication, see [DXi4000 Replication](#) on page 85.

Note: If the DXi is configured as a replication target *and* replication is performed across a public network, with the source and target located behind NAT-enabled routers, you *must* specify a NAT IP address for the DXi on the **Network** page (see [Configuring Interface IP Addresses](#) on page 229).

To access the **Replication Configuration** page, click the **Configuration** menu, and then click the **Replication** tab (see [Figure 95](#)).

Figure 95 Replication
Configuration Page



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

- View information about configured replication target systems (see [Target DXis List](#) on page 171).
- Add, edit, or delete a replication target (see [Adding a Replication Target](#) on page 172, [Editing a Replication Target](#) on page 174, or [Deleting a Replication Target](#) on page 176).
- Pause or resume replication to a target (see [Pausing or Resuming Replication to a Target](#) on page 176).
- Configure a constant replication throttle (see [Enabling System Throttling](#) on page 176).
- View information about allowed replication source systems (see [Source DXis List](#) on page 178).
- Add or delete an allowed replication source (see [Adding a Replication Source](#) on page 178 or [Deleting a Replication Source](#) on page 179).
- Specify the maximum number of received snapshots to retain for each source (see [Changing the Maximum Number of Snapshots](#) on page 180).

Target DXis List

The **Target DXis** list displays the following information for each target DXi:

- **Target** - The IP address of the target system that the DXi4000 is configured to send data to.
- **Status** - The replication status of the DXi4000. For a detailed description of all possible replication statuses, see [Replication Overview](#) on page 78.
- **Source IP** - The IP address that is used to uniquely identify the source DXi to the target.
- **Encryption** - The type of encryption used when sending replicated data to the target system (**None**, **128-bit**, or **256-bit**).
- **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 B/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).

You can customize the appearance of the **Target DXis** list in the following ways:

- Click the top banner row of the list to collapse or expand the list.
- Click the arrow to the right of a column heading and select **Sort Ascending** or **Sort Descending** to sort the rows in the table by that column.
- To show or hide a column, click the arrow to the right of a column heading, and then click **Columns**. Select the check box to show a column, or clear the check box to hide a column.

Note: The statistics in the **Target DXis** list are for each target DXi rather than a cumulative total for all targets as is displayed on the **Home** page.

Adding a Replication Target

Add a replication target to configure the DXi4000 to send replicated data to that target. You can add up to two targets. After you add a target, you can enable replication to that target 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: Before you can add a replication target, you must add the DXi to the list of allowed replication sources on the target DXi (see [Adding a Replication Source](#) on page 178).

Note: To add a new target when two targets are already configured, first delete one target (see [Deleting a Replication Target](#) on page 176). Then add the new target.

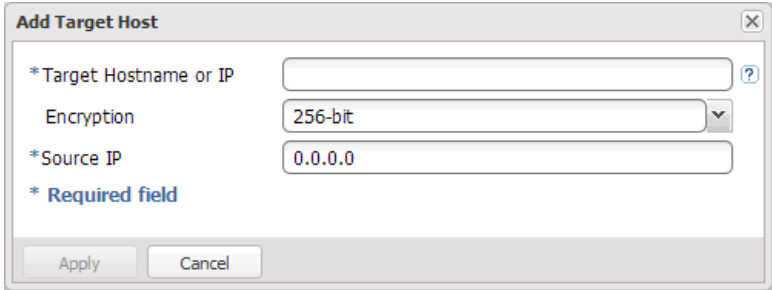
Note: For more information about enabling and scheduling replication for a share, see [Replication Send](#) on page 93.

To add a replication target:

- 1 Under **Target DXis**, click **Add**.

The **Add Target Host** window displays (see [Figure 96](#)).

Figure 96 Add Target Host



The screenshot shows a dialog box titled "Add Target Host". It contains the following fields and controls:

- *Target Hostname or IP: A text input field with a help icon (?) to its right.
- Encryption: A dropdown menu currently showing "256-bit".
- *Source IP: A text input field containing "0.0.0.0".
- * Required field: A label indicating that the Source IP field is required.
- Buttons: "Apply" and "Cancel" buttons at the bottom.

- 2 In the **Target Hostname or IP** 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 223).

- 3 In the **Encryption** drop-down box, select the type of encryption to use when sending replication data to the target system (**None**, **128-bit**, or **256-bit**).

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

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

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

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

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

Note: When configuring segmented network interfaces, if the source DXi replication, data, and management interfaces are on the same subnet, you must add a host route on the source DXi to make sure the replication interface is correctly selected when replicating data to the target DXi (see [Understanding Interface Routing](#) on page 234).

5 Click **Apply**.

Note: The new target is not automatically added to existing replication schedules. You must add or edit scheduled events to schedule replication to the new target (see [Scheduler](#) on page 212).

Editing a Replication Target

Edit a replication target to change encryption options or the source IP address.

To edit a replication target:

- 1 Under **Target DXis**, select the target and click **Pause** to pause replication.
- 2 Select the target again and click **Edit**.

The **Edit Target Host** window displays (see [Figure 97](#)).

Note: If you are editing a target, you cannot change the **Target Hostname or IP**.

Figure 97 Edit Target Host

The screenshot shows a dialog box titled "Edit Target Host". It contains three input fields: "*Target Hostname or IP" with the value "10.40.165.181", "Encryption" with a dropdown menu showing "256-bit", and "*Source IP" with the value "0.0.0.0". Below the fields is a blue asterisk and the text "* Required field". At the bottom are "Apply" and "Cancel" buttons.

- 3 In the **Encryption** drop-down box, select the type of encryption to use when sending replication data to the target system (**None**, **128-bit**, or **256-bit**).

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

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

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

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

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

Note: When configuring segmented network interfaces, if the source DXi replication, data, and management interfaces are on the same subnet, you must add a host route on the source DXi to make sure the replication interface is correctly selected when replicating data to the target DXi (see [Understanding Interface Routing](#) on page 234).

- 5 Click **Apply**.
- 6 Under **Target DXis**, select the target and click **Resume** to pause replication.

Deleting a Replication Target

Delete a replication target if the DXi4000 no longer needs to send replicated data to that target. After the target system is deleted, the DXi4000 will no longer send replicated data to that system.

When a target is deleted:

- All replication jobs to that target that are in progress or queued will transition to failed.
- All replication job history for that combination of target and share is removed.
- All shares will be reconfigured to no longer replicate to that target.

To delete a replication target:

- 1 Under **Target DXis**, select one or more targets to delete.
- 2 Click **Pause** to pause replication to the target.
- 3 Click **Delete**.

Note: The deleted target is not automatically removed from existing replication schedules. You must edit scheduled events to remove the deleted target (see [Scheduler](#) on page 212).

Pausing or Resuming Replication to a Target

The source DXi controls the replication pause behavior.

- To pause replication, select a target under **Target DXis** and click **Pause**. The DXi temporarily stops sending replicated data to the selected target.
- To resume replication, select a target under **Target DXis** and click **Resume**. The DXi resumes sending replicated data to the selected target.

Enabling System Throttling

Enable system throttling to limit the network bandwidth used for replication to all targets. When a constant throttle is enabled, the DXi limits the amount of data it sends during source replication so that it does not exceed the specified bandwidth.

Note: If multiple targets are configured, replication to all targets counts against the same bandwidth limit.

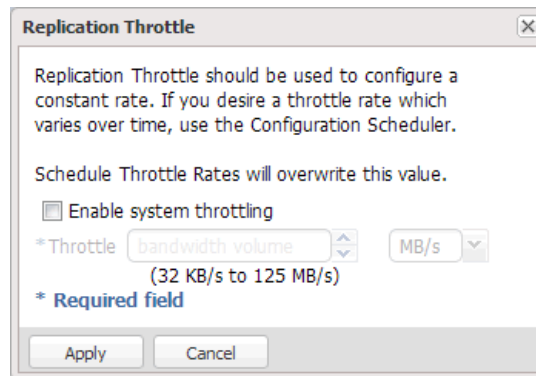
Note: To vary the replication throttle rate over time, use the **Configuration > Scheduler** page (see [Scheduler](#) on page 212). Do *not* enable a constant throttle if a throttle schedule is configured. The scheduled replication throttling bandwidth settings take precedence over the constant throttle value. (The currently active replication throttle rate appears on the **Home** page under **Current Activity**.)

To enable system replication throttling:

- 1 Under **Target DXis**, click the box next to **Throttling**.

The **Replication Throttle** window displays (see [Figure 96](#)).

Figure 98 Replication Throttle



- 2 Select the **Enable system throttling** check box.
Or clear the check box to disable system throttling.
- 3 In the **Throttle** box, enter the maximum allowed bandwidth, and select the units you want to use to specify the constant throttle (**KB/s** or **MB/s**). The lowest value you can set is 32 KB/s. The highest value you can set is 125 MB/s.
- 4 Click **Apply**.

Caution: Do not set the maximum allowed bandwidth to a value that is lower than necessary. If the maximum allowed bandwidth is set to the lowest value, large replication jobs may fail.

Source DXis List

The **Source DXis** list displays the following information for each source DXi:

- **Source** - 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).

You can customize the appearance of the **Source DXis** list in the following ways:

- Click the top banner row of the list to collapse or expand the list.
- Click the arrow to the right of a column heading and select **Sort Ascending** or **Sort Descending** to sort the rows in the table by that column.
- To show or hide a column, click the arrow to the right of a column heading, and then click **Columns**. Select the check box to show a column, or clear the check box to hide a column.

Note: The statistics in the **Source DXis** list 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 must add a source system to the list of allowed replication sources on the target DXi before you configure the source DXi to send replicated data to the target. The DXi can receive replicated data from up to 10 sources.

Note: For more information about working with received snapshots, see [Receive NAS](#) on page 104.

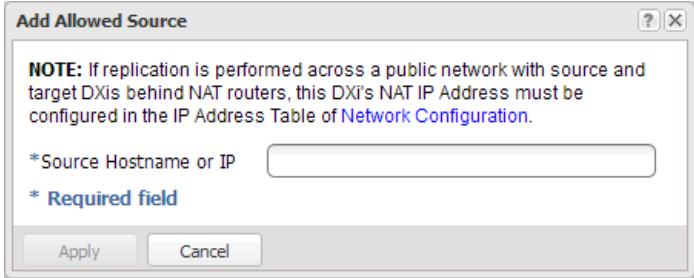
Note: It is typical for the target DXi to require additional disk space for replication data compared to the source DXi. This is because complete replication data is sent to the target before old data is deleted. For optimal performance, if the DXi is a replication target, Quantum recommends keeping the amount of free space at 20% or more (see [Disk Usage](#) on page 133).

To add a replication source:

- 1 Under **Source DXis**, click **Add**.

The **Add Allowed Source** window displays (see [Figure 96](#)).

Figure 99 Add Allowed Source



- 2 In the **Source Hostname or IP** 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 223).

- 3 Click **Apply**.

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 Under **Source DXis**, select one or more sources to delete.
- 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 119).

Changing the Maximum Number of 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 32 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 change the maximum number of received snapshots:

- Under **Source DXis**, in the **Maximum Snapshots** drop-down box, select the number of snapshots to retain for each replicated share.
- The default value is 10. The maximum value is 32.

OST

The **OST** page allows you to configure the DXi4000 to present its storage capacity as storage servers using OpenStorage (OST) technology. You can 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. In addition, OST data can be duplicated (replicated) between DXi systems using NetBackup (see [Replicating OST Data](#) on page 181).

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](#)
- [Manage Remote Users](#)
- [Target IP Mapping](#)
- [DXi Accent](#)
- [OST Client Plug-In](#)

Replicating OST Data

The DXi4000 can replicate (duplicate) OST data to another DXi using the following methods:

- **Optimized Duplication** - With optimized duplication, backup images on a storage server can be replicated to another storage server on a DXi that resides in the same NetBackup domain. The duplication occurs when it is initiated in NetBackup. With optimized duplication can specify up to two replication targets.
- **Automatic Image Replication (AIR)** - If you are using Symantec NetBackup 7.1 or higher, you can configure an LSU for Automatic Image Replication (see [Task Overview: Setting Up Automatic Image Replication](#) on page 182). If enabled, data on an LSU is automatically replicated to a remote LSU that resides on a DXi in a different NetBackup domain. The timing of the duplication, as well as the backup images that are duplicated, are determined by the storage lifecycle policies (SLPs) configured in NetBackup. With AIR, you can specify a single replication target.
- **Concurrent Optimized Duplication** - For both optimized duplication and Automatic Image Replication, you can optionally enable Concurrent Optimized Duplication. If enabled, as data is written to the storage server, it is simultaneously replicated to the target DXi. When optimized duplication or Automatic Image

Replication subsequently occurs, the operation is more efficient because a portion of the required data has already been replicated to the target storage server.

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

Note: For more information about configuring the DXi4000 for optimized duplication or Automatic Image Replication, see the *DXi-Series NetBackup and Backup Exec OST Configuration Guide* (6-67079).

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

Task Overview: Setting Up Automatic Image Replication

Setting up Automatic Image Replication (AIR) requires that you first configure the target (remote) DXi and then the source DXi (see [Figure 100](#)). In addition, you must create storage lifecycle policies (SLPs) in NetBackup that define when the automatic replication occurs and which backup images are duplicated.

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

- 1 On the target system, add the source system to the list of allowed replication sources (see [Adding a Replication Source](#) on page 178).
- 2 On the target system, create a local OST user (see [Manage Users](#) on page 199).

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

- 3 On the target system, create a storage server and LSU to receive the replicated OST data (see [Adding a Storage Server](#) on page 186).

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

- 4 On the source system, specify the target system that will receive the replicated data (see [Adding a Replication Target](#) on page 172).
- 5 On the source system, create a remote OST user with the same user name and password that you used in step 2 above (see [Manage Remote Users](#) on page 203).

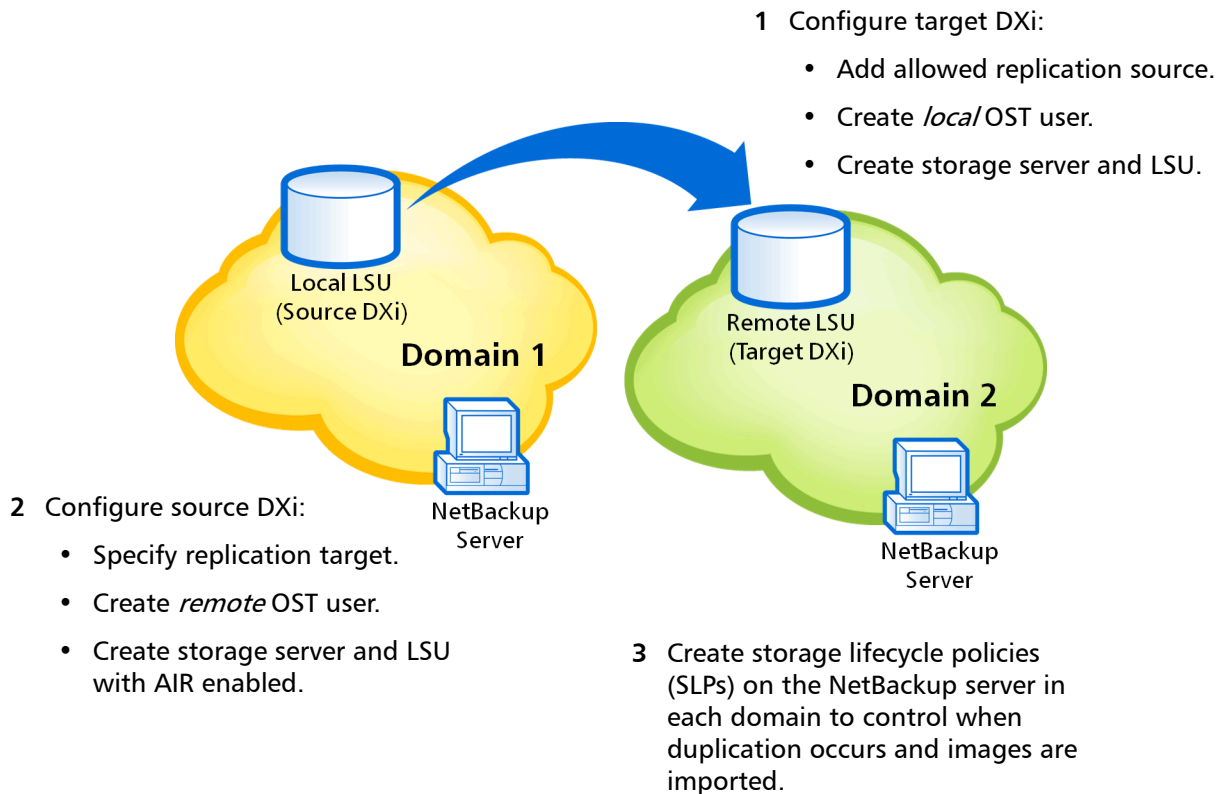
Caution: On the source system, make sure to create a *remote* user on the **Configuration > OST > Manage Remote Users** page.

- 6 On the source system, create a storage server and LSU, and enable the LSU for Automatic Image Replication (see [Adding a Storage Server](#) on page 186).

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

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

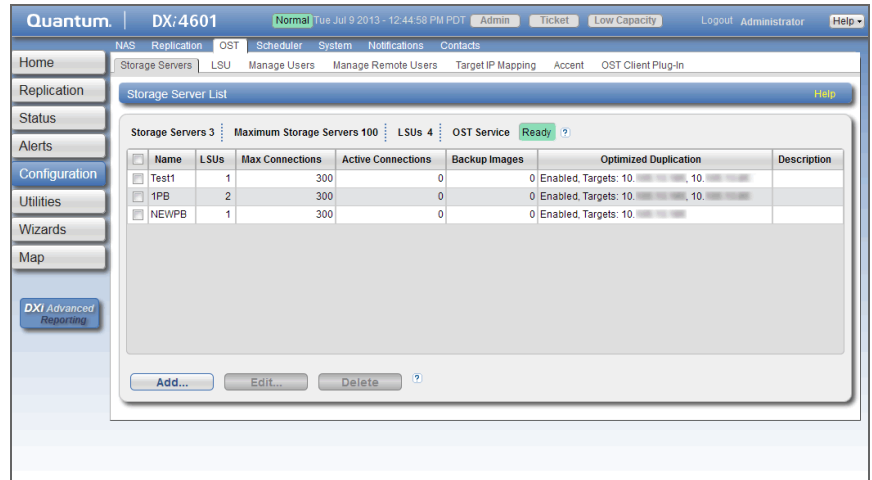
Figure 100 Setting Up OST
Automatic Image Replication



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.

To access the **Storage Servers** page, on the **OST** page, click the **Storage Servers** tab (see [Figure 101](#)).

Figure 101 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 185).
- Add a new storage server to the system (see [Adding a Storage Server](#) on page 186).
- Edit properties for an existing storage server (see [Editing a Storage Server](#) on page 190).
- Delete a storage server from the system (see [Deleting a Storage Server](#) on page 192).

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 193).

- **OST Service** - The status of the OST service. OST settings can be configured in **Ready**, **Stopped**, or **Verifying** state. The OST server is available for backup only in **Ready** state.
- **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.
- **Optimized Duplication** - The status of Concurrent Optimized Duplication for the storage server (**Enabled** or **Disabled**), as well as the configured targets (if any).
- **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 193.)

Note: Data on storage servers is always deduplicated.

To add a storage server:

- 1 Click **Add**.

The **Add Storage Server** page displays (see [Figure 102](#)).

Figure 102 Add Storage Server Page

The screenshot shows the 'Add Storage Server' configuration page in the Quantum DXi4000 interface. The page is titled 'Add Storage Server' and contains several sections for configuring a new storage server. The 'Add Storage Server' section includes fields for Name, Description, and Max Connections (set to 300). Below this is a section for 'Enable Concurrent Optimized Duplication' with a table of targets. The 'Logical Storage Unit' section has radio buttons for 'Available Capacity' (selected) and 'Specific Capacity', and fields for LSU Name, Physical Capacity, and Description. The 'Enable Automatic Image Replication' section has a table of targets. The 'Remote Storage Server Name', 'Remote LSU Name', and 'Remote User' fields are also present. At the bottom are 'Apply', 'Reset', and 'Cancel' buttons.

- 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.

- **Enable Concurrent Optimized Duplication** - Select the check box to enable optimized duplication during OST ingest.

Concurrent Optimized Duplication is disabled by default. If enabled, as data is written to the storage server, it is simultaneously replicated to the target DXi. When optimized duplication or Automatic Image Replication subsequently occurs, the operation is more efficient because a portion of the required data has already been replicated to the target storage server.

Note: To configure the target DXi, see [Adding a Replication Target](#) on page 172.

Note: When Concurrent Optimized Duplication is enabled, all data on the storage server is duplicated, not just the specified images.

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

- 4 Under **Logical Storage Unit**, 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 199).

- **Specific Capacity** - Select this option to specify the physical capacity of the LSU, and then enter the following information.
 - **LSU Name** - Enter the name of the LSU.
 - **Physical Capacity** - Enter the physical capacity of the LSU (1 to 1048576 GB).

Note: Quantum recommends setting LSUs to maximum size (1048576 GB) because spanning them on a backup is not possible.

- 5 (Optional) In the **Description** box, enter a brief description of the LSU.
- 6 (Optional) Select the **Enable Automatic Image Replication** check box to automatically replicate (duplicate) data on the LSU to a remote LSU on another DXi.

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

OST AIR requires NetBackup 7.1 or higher. For information about configuring NetBackup for Automatic Image Replication, see the *DXi-Series NetBackup and Backup Exec OST Configuration Guide* (6-67079).

Note: You must configure at least one remote user before you can enable Automatic Image Replication (see [Manage Remote Users](#) on page 203).

- 7 If Automatic Image Replication is enabled, select the replication target you want to replicate images to. (You can select only a single

target.) When images are replicated, data will be sent to the selected target.

8 If Automatic Image Replication is enabled, specify the following information:

- **Remote Storage Server Name** - The name of the remote storage server (on the target DXi) to replicate data to. The source DXi and target DXi must reside in different NetBackup domains.

Note: To configure the target DXi, see [Adding a Replication Target](#) on page 172.

- **Remote LSU Name** - The name of the LSU in the remote storage server that will receive the replicated data.
- **Remote User** - The OST user credentials to use for authentication on the remote (target) DXi. The selected remote user *must* match a local user on the **Configuration > OST > Manage Users** page on the target DXi (see [Manage Users](#) on page 199).

9 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 103](#)).

Figure 103 Edit Storage Server Page

Quantum | DXi4001 | Normal | Tue Jul 9 2013 - 12:44:58 PM PDT | Admin | Ticket | Low Capacity | Logout | Administrator | Help

NAS | Replication | OST | Scheduler | System | Notifications | Contacts

Storage Servers | LSU | Manage Users | Manage Remote Users | Target IP Mapping | Accent | OST Client Plug-In

Storage Server List

Name: bighornostlgt

Description: [Text Field]

* Max Connections: 300 (3 to 65536) ?

Enable Concurrent Optimized Duplication

Optimized Duplication Target DXIs	Status	Encryption
<input type="checkbox"/> 10	Ready	AES 256-bit
<input type="checkbox"/> 10	System Paused	AES 256-bit

* Required Field

Apply | Reset | Cancel

2 Enter information about the storage server:

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

- **Description** - (Optional) Enter a brief description of the storage server.
- **Max Connections** - Enter the maximum number of connections allowed to the storage server (3 to 65536).

The maximum 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 185).

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

- **Enable Concurrent Optimized Duplication** - Select the check box to enable optimized duplication during OST ingest.
- Concurrent Optimized Duplication is disabled by default. If enabled, as data is written to the storage server, it is simultaneously replicated to the target DXi. When optimized duplication or Automatic Image Replication subsequently occurs, the operation is more efficient because a portion of the

required data has already been replicated to the target storage server.

Note: To configure the target DXi, see [Adding a Replication Target](#) on page 172.

Note: When Concurrent Optimized Duplication is enabled, all data on the storage server is duplicated, not just the specified images.

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

Deleting a Storage Server

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 185). 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 199).

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

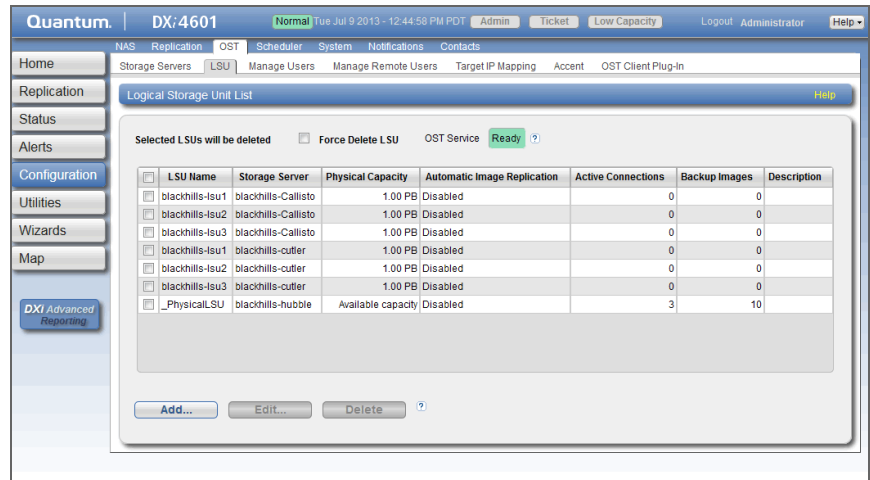
- 2 Click **Delete**.

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.

To access the **LSU** page, on the **OST** page, click the **LSU** tab (see [Figure 104](#)).

Figure 104 LSU Page



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

- View information about existing LSUs (see [Logical Storage Unit List](#) on page 193).
- Add a new LSU to the system (see [Adding an LSU](#) on page 194).
- Edit properties for an existing LSU (see [Editing an LSU](#) on page 197).
- Delete an LSU from the system (see [Deleting an LSU](#) on page 199).

Logical Storage Unit List

The **Logical Storage Unit List** displays the following information for all LSUs on the DXi4000:

- **OST Service** - The status of the OST service. OST settings can be configured in **Ready**, **Stopped**, or **Verifying** state. The OST server is available for backup only in **Ready** state.
- **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.
- **Automatic Image Replication** - The status of Automatic Image Replication (AIR) for the LSU (**Enabled** or **Disabled**), as well as the configured targets (if any).

Note: To view details about the remote LSU if AIR is enabled, use the **Edit Logical Storage Unit** page (see [Editing an LSU](#) on page 197).

- **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 186).

To add an LSU to a storage server:

- 1 Click **Add**.

The **Add Logical Storage Unit** page displays (see [Figure 105](#)).

Figure 105 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 199).

- **Specific Capacity** - Select this option to specify the physical capacity of the LSU, and then enter the following information.
 - **LSU Name** - Enter the name of the LSU.
 - **Physical Capacity** - Enter the physical capacity of the LSU (1 to 1048576 GB).

Note: Quantum recommends setting LSUs to maximum size (1048576 GB) because spanning them on a backup is not possible.

- 3 (Optional) In the **Description** box, enter a brief description of the LSU.
- 4 (Optional) Select the **Enable Automatic Image Replication** check box to automatically replicate (duplicate) data on the LSU to a remote LSU on another DXi.

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

OST AIR requires NetBackup 7.1 or higher. For information about configuring NetBackup for Automatic Image Replication, see the *DXi-Series NetBackup and Backup Exec OST Configuration Guide* (6-67079).

Note: You must configure at least one remote user before you can enable Automatic Image Replication (see [Manage Remote Users](#) on page 203).

- 5 If Automatic Image Replication is enabled, select the replication target you want to replicate images to. (You can select only a single target.) When images are replicated, data will be sent to the selected target.
- 6 If Automatic Image Replication is enabled, specify the following information:
 - **Remote Storage Server Name** - The name of the remote storage server (on the target DXi) to replicate data to. The source DXi and target DXi must reside in different NetBackup domains.

Note: To configure the target DXi, see [Adding a Replication Target](#) on page 172.

- **Remote LSU Name** - The name of the LSU in the remote storage server that will receive the replicated data.
- **Remote User** - The OST user credentials to use for authentication on the remote (target) DXi. The selected remote user *must* match a local user on the **Configuration > OST > Manage Users** page on the target DXi (see [Manage Users](#) on page 199).

7 Click **Apply**.

Editing an LSU

Edit an LSU to change its capacity, description, or automatic image replication settings.

To edit an LSU:

- 1 Select the LSU and click **Edit**.

The **Edit Logical Storage Unit** page displays (see [Figure 106](#)).

Figure 106 Edit Logical Storage Unit Page

The screenshot shows the 'Edit Logical Storage Unit' page in the Quantum DXi4000 web interface. The page title is 'Quantum DXi4000' and the user is logged in as 'Administrator'. The page contains a form with the following fields and values:

- Name:** blackhills-lsu1
- Storage Server Name:** blackhills-Callisto
- Physical Capacity:** 1048576 (1 to 1048576 GB)
- Description:** (empty)
- Enable Automatic Image Replication:**
- Replication Target DXIs:** Two radio buttons, the first is selected.
- Remote Storage Server Name:** (empty)
- Remote LSU Name:** Physical.LSU
- Remote User:** admin

At the bottom of the form are three buttons: **Apply**, **Reset**, and **Cancel**.

- 2 Enter information about the LSU:

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

- **Physical Capacity** - (Specific capacity LSUs only) Enter the physical capacity of the LSU (1 to 1048576 GB).

The physical capacity cannot be changed if the LSU has more than zero currently active connections. The number of active connections is displayed on the **LSU** page (see [Logical Storage Unit List](#) on page 193).

- **Description** - (Optional) Enter a brief description of the LSU.

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

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

OST AIR requires NetBackup 7.1 or higher. For information about configuring NetBackup for Automatic Image Replication, see the *DXi-Series NetBackup and Backup Exec OST Configuration Guide* (6-67079).

Note: You must configure at least one remote user before you can enable Automatic Image Replication (see [Manage Remote Users](#) on page 203).

- 4 If Automatic Image Replication is enabled, select the replication target you want to replicate images to. (You can select only a single target.) When images are replicated, data will be sent to the selected target.
- 5 If Automatic Image Replication is enabled, specify the following information:
 - **Remote Storage Server Name** - The name of the remote storage server (on the target DXi) to replicate data to. The source DXi and target DXi must reside in different NetBackup domains.

Note: To configure the target DXi, see [Adding a Replication Target](#) on page 172.

- **Remote LSU Name** - The name of the LSU in the remote storage server that will receive the replicated data.
- **Remote User** - The OST user credentials to use for authentication on the remote (target) DXi. The selected remote user *must* match a local user on the **Configuration > OST > Manage Users** page on the target DXi (see [Manage Users](#) on page 199).

6 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 193).

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**.

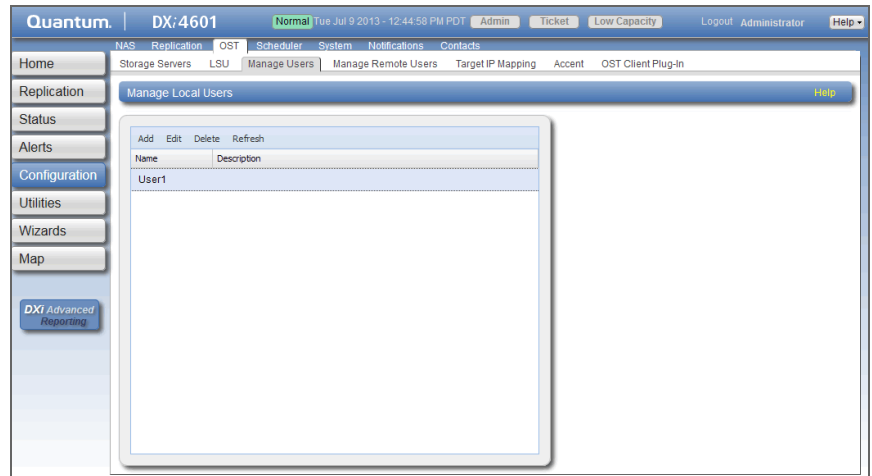
Manage Users

The **Manage Users** page allows you to create and manage local 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. When using OST Automatic Image

Replication (AIR), the remote user credentials specified on the source DXi must match the local user credentials on the target (remote) DXi.

To access the **Manage Users** page, on the **OST** page, click the **Manage Users** tab (see [Figure 107](#)).

Figure 107 Manage Users Page



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

- View information about local authenticated users (see [Manage Local Users List](#) on page 200).
- Add a local authenticated user (see [Adding an Authenticated User](#) on page 201).
- Edit a local authenticated user (see [Editing an Authenticated User](#) on page 201).
- Delete a local authenticated user (see [Deleting an Authenticated User](#) on page 202).

Manage Local Users List

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

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

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

Adding an Authenticated User

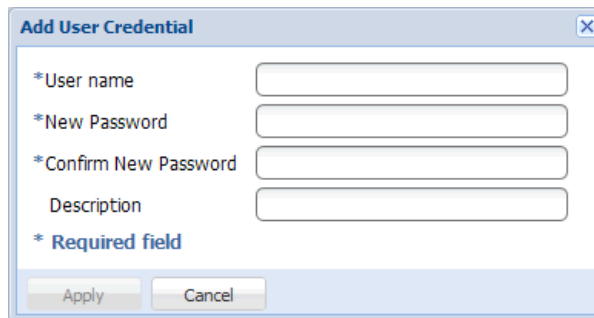
Add an authenticated user to create local OST user credentials. The OST user credentials are required to authenticate OST devices on a media server, or to enable the DXi to receive duplicated data using OST AIR.

To add an authenticated user:

- 1 Click **Add**.

The **Add User Credential** window displays (see [Figure 108](#)).

Figure 108 Add User Credential



The screenshot shows a dialog box titled "Add User Credential" with a close button in the top right corner. It contains four text input fields: "*User name", "*New Password", "*Confirm New Password", and "Description". Below the fields is a legend for "* Required field". At the bottom are "Apply" and "Cancel" buttons.

- 2 Enter information about the authenticated user:

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

- 3 Click **Apply**.

Editing an Authenticated User

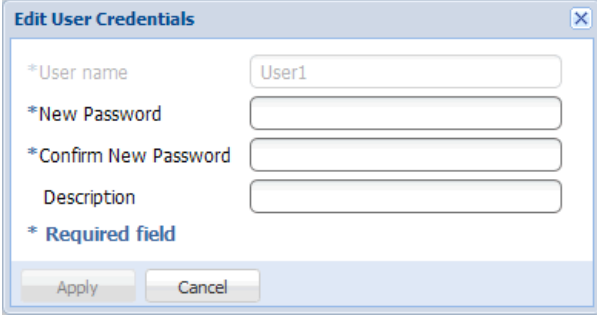
Edit an authenticated user to change the user's password or description.

To edit an authenticated user:

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

The **Edit User Credentials** window displays (see [Figure 109](#)).

Figure 109 Edit User
Credentials



The screenshot shows a dialog box titled "Edit User Credentials" with a close button in the top right corner. It contains four text input fields: "*User name" (with "User1" entered), "*New Password", "*Confirm New Password", and "Description". Below the fields is a legend for "* Required field". At the bottom are "Apply" and "Cancel" buttons.

- 2 Enter information about the authenticated user:

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

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

- 3 Click **Apply**.

Deleting an Authenticated User

Delete an authenticated 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**.

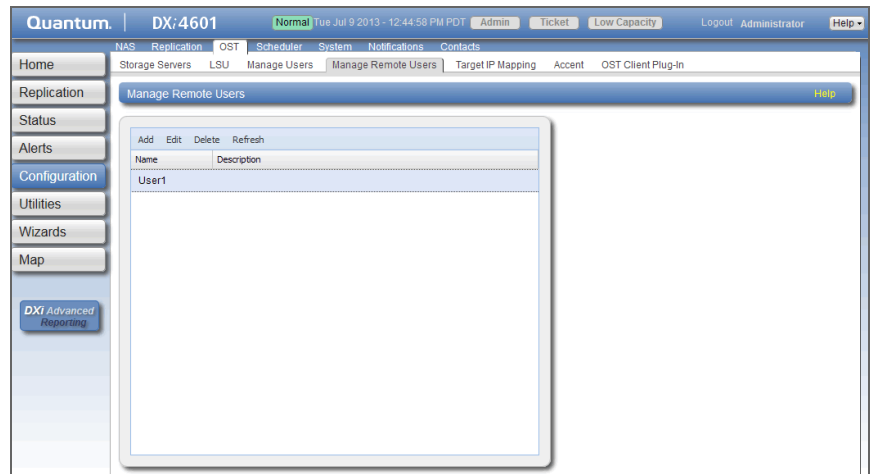
Note: You can select multiple users to delete at once.

Manage Remote Users

The **Manage Remote Users** page allows you to create and manage remote users for use with OST Automatic Image Replication (AIR). You must configure at least one remote user before you can enable Automatic Image Replication for an LSU (see [Adding an LSU](#) on page 194). When using OST Automatic Image Replication (AIR), the remote user credentials specified on the source DXi must match the local user credentials on the target (remote) DXi.

To access the **Manage Remote Users** page, on the **OST** page, click the **Manage Remote Users** tab (see [Figure 110](#)).

Figure 110 Manage Remote Users Page



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

- View information about remote users (see [Manage Remote Users List](#) on page 203).
- Add a remote user (see [Adding a Remote User](#) on page 204).
- Edit a remote user (see [Editing a Remote User](#) on page 205).
- Delete a remote user (see [Deleting a Remote User](#) on page 205).

Manage Remote Users List

The **Manage Remote Users** list displays the following information for all remote users:

- **Name** - The name of the remote user.

- **Description** - A brief description of the remote user (if available).

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

Adding a Remote User

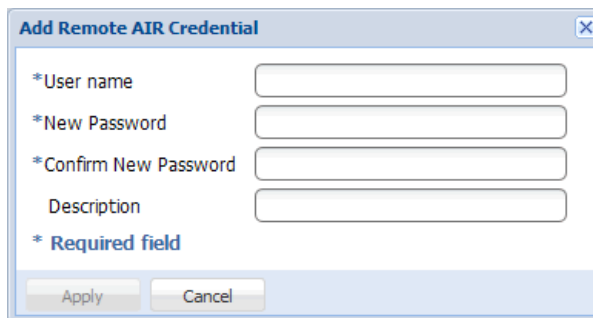
Add a remote user to create OST user credentials for use with OST AIR. When you enable Automatic Image Replication for an LSU, you specify a remote user. The remote user credentials on the source DXi must match the local user credentials on the target (remote) DXi.

To add a remote user:

- 1 Click **Add**.

The **Add Remote AIR Credential** window displays (see [Figure 111](#)).

Figure 111 Add Remote AIR Credential



The screenshot shows a dialog box titled "Add Remote AIR Credential" with a close button (X) in the top right corner. The dialog contains four text input fields: "*User name", "*New Password", "*Confirm New Password", and "Description". Below the fields is a legend for "* Required field". At the bottom of the dialog are "Apply" and "Cancel" buttons.

- 2 Enter information about the remote user:
 - **User name** - Enter the name of the remote user.
 - **New Password** - Enter the password for the remote user.
 - **Confirm New Password** - Enter the password again to confirm it.
 - **Description** - (Optional) Enter a brief description of the remote user.
- 3 Click **Apply**.

Editing a Remote User

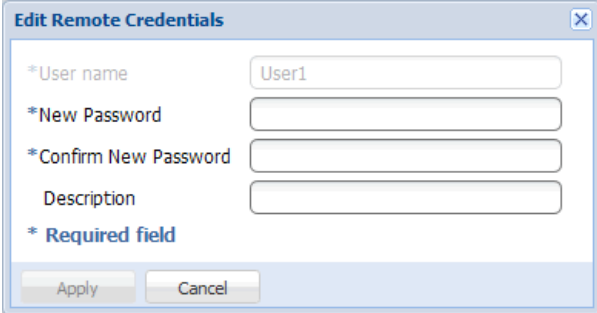
Edit a remote user to change the user's password or description.

To edit a remote user:

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

The **Edit Remote Credentials** window displays (see [Figure 112](#)).

Figure 112 Edit Remote Credentials



The screenshot shows a dialog box titled "Edit Remote Credentials" with a close button in the top right corner. The dialog contains the following fields and controls:

- *User name: A text box containing "User1".
- *New Password: An empty password text box.
- *Confirm New Password: An empty password text box.
- Description: An empty text box.
- * Required field: A legend indicating that fields with an asterisk are required.
- Buttons: "Apply" and "Cancel" buttons at the bottom.

- 2 Enter information about the remote user:

Note: If you are editing a remote user, you cannot change the **User name**.

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

- 3 Click **Apply**.

Deleting a Remote User

Delete a remote user if the OST user credentials are no longer needed to authenticate an LSU for Automatic Image Replication.

To delete a remote user, select the user and click **Delete**.

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

Target IP Mapping

The **Target IP Mapping** page allows you to map a target data IP address to route all network traffic sent to the data IP address to the specified replication IP address instead. This can be necessary if the target DXi is configured with different network interfaces (and therefore different IP addresses) for data and replication traffic (see [Network](#) on page 223).

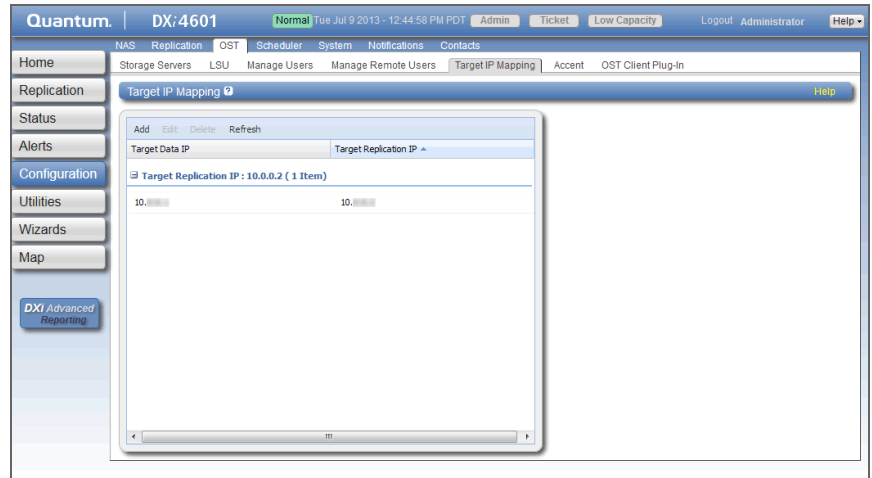
Generally, OST traffic is routed to the data network segment. However, the OST Automatic Image Replication (AIR) and Concurrent Optimized Duplication features use the replication network segment to transmit data to the target system. (Optimized duplication can optionally use the replication channel.)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

Note: You must add target IP mapping information if you are performing optimized duplication on a segmented network and replication is not configured between the source DXi and target DXi.

Note: Quantum does not recommend mapping multiple data IP addresses to a single replication IP address. If you have mapped multiple data IP addresses and the routing is not working, try removing the additional data IP addresses, and map only a single data IP address.

To access the **Target IP Mapping** page, on the **OST** page, click the **Target IP Mapping** tab (see [Figure 113](#)).

Figure 113 Target IP Mapping Page



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

- View information about mapped data and replication IP addresses (see [Target IP Mapping List](#) on page 207).
- Map a target data IP address to a replication IP address (see [Mapping a Target IP Address](#) on page 208).
- Edit the mapping for a target data IP address (see [Editing a Mapped IP Address](#) on page 208).
- Delete the mapping for a target data IP address (see [Deleting a Mapped IP Address](#) on page 209).

Target IP Mapping List

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

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

By default, items in the list are grouped by target replication IP address. To turn off grouping, click the arrow to the right of a column heading and clear the **Show in groups** check box.

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

Mapping a Target IP Address

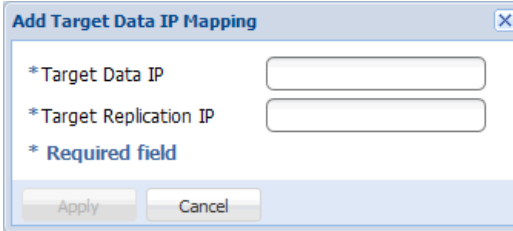
Add mapping for a target data IP address to route all network traffic sent to the address to the specified replication IP address instead.

To map a target IP address:

- 1 Click **Add**.

The **Add Target Data IP Mapping** window displays (see [Figure 114](#)).

Figure 114 Add Target Data IP Mapping



The screenshot shows a dialog box titled "Add Target Data IP Mapping". It features two text input fields: one for "* Target Data IP" and another for "* Target Replication IP". Below these fields, the text "* Required field" is displayed. At the bottom of the dialog, there are two buttons: "Apply" and "Cancel".

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

Editing a Mapped IP Address

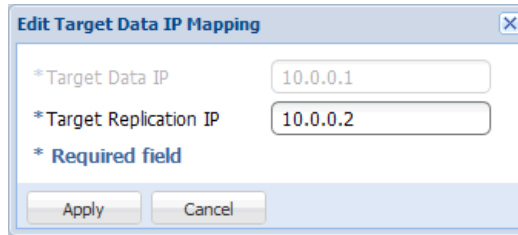
Edit a mapped IP address to route traffic sent to the target data IP address to a different replication IP address.

To edit a mapped IP address:

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

The **Edit Target Data IP Mapping** window displays (see [Figure 115](#)).

Figure 115 Edit Target Data IP Mapping



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

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

- 3 Click **Apply**.

Deleting a Mapped IP Address

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

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

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

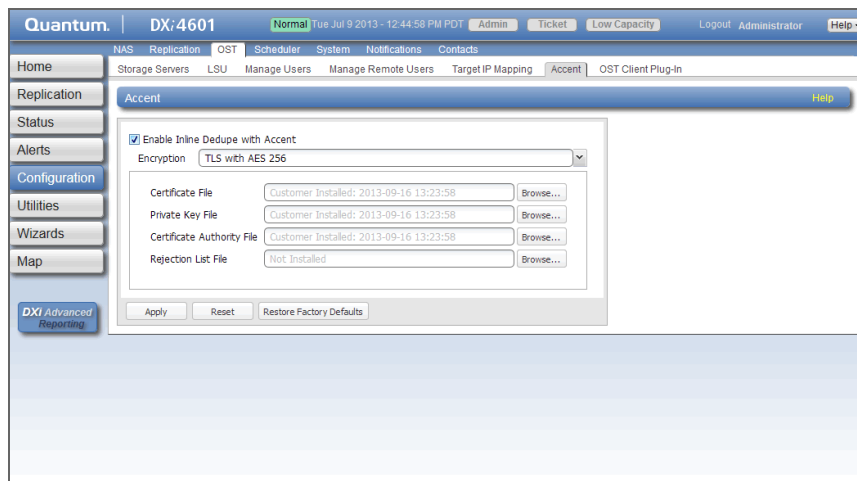
DXi Accent

Use the **Accent** page to enable or disable DXi Accent. Quantum's DXi Accent software accelerates backups and reduces network bandwidth requirements by distributing deduplication between the backup server and the DXi. OST data sent from the media server to the DXi can be encrypted using AES (Advanced Encryption Standard) encryption methods.

Note: DXi Accent is supported only on DXi4601.

To access the **Accent** page, on the **OST** page, click the **Accent** tab (see [Figure 107](#)).

Figure 116 Accent Page



To configure DXi Accent:

- 1 To enable DXi Accent, select the **Enable Inline Dedupe with Accent** check box.

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

- 2 To enable or disable encryption when sending OST data from the media server to the DXi, select an option in the **Encryption** drop-down box:
 - **None** - OST data is not encrypted.
 - **Default AES 128** - OST data is encrypted using AES 128-bit encryption.
 - **Default AES 256** - OST data is encrypted using AES 256-bit encryption.
 - **TLS with AES 256** - OST data is encrypted using AES 256-bit encryption with Transport Layer Security (TLS).

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

- 3 If you selected the **TLS with AES 256** encryption option, you must install the required certificate and key files on the DXi:

- Certificate File
- Private Key File
- Certificate Authority File
- Rejection List File

To install a file, click the **Browse** button to browse the system and locate the file, and then click **Open**.

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

Note: You can install new certificate and key files at any time, as long as there are no active network connections between the OST media server and the DXi.

4 Click **Apply**.

Note: To clear all changes without saving them, click **Reset**. To remove user installed certificate and key files, click **Restore Factory Defaults**.

Note: To use DXi Accent, you must install the Quantum OST Client Plug-in on the media server. For information about installing the OST Plug-in and using DXi Accent, see the *DXi-Series NetBackup and Backup Exec OST Configuration Guide* (6-67079).

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 *DXi-Series NetBackup and Backup Exec OST Configuration Guide (6-67079)*.

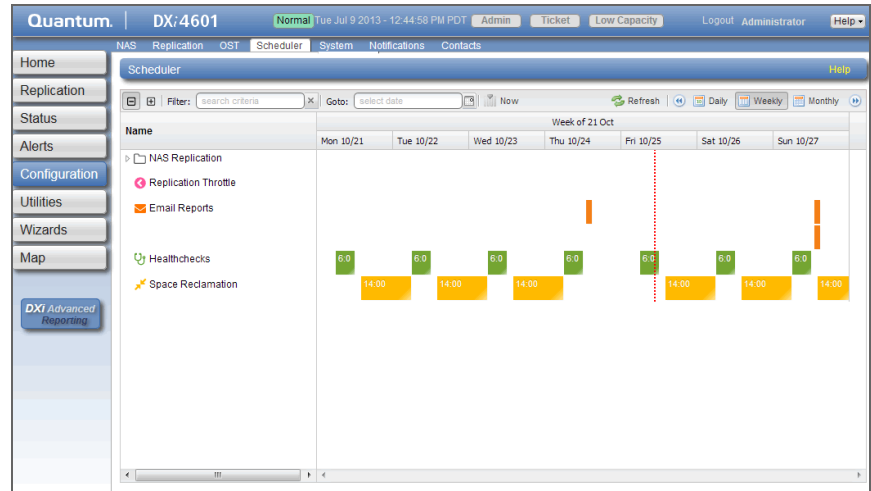
Note: *NetBackup and Backup Exec*To update the list with the latest information, click **Refresh**.

Scheduler

The **Scheduler** page allows you to manage scheduled events on the DXi4000, including replication and replication throttling, e-mail reports, healthchecks, and space reclamation. With schedules, you specify when certain events should occur, and the system automatically performs those events at the specified time. Events can be one-time only, or they can reoccur at defined intervals.

To access the **Scheduler** page, click the **Configuration** menu, and then click the **Scheduler** tab (see [Figure 117](#)).

Figure 117 Scheduler Page



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

- View currently scheduled events (see [Viewing Scheduled Events](#) on page 214).
- Add a new scheduled event or edit an existing event (see).
- Configure NAS shares for scheduled replication (see [Scheduling a Share for Replication](#) on page 217).
- Configure replication throttle events (see [Scheduling Replication Throttling](#) on page 218).
- Configure the DXi4000 to send status and configuration reports (see [Scheduling E-mail Reports](#) on page 220).
- Configure the DXi4000 to run healthchecks (see [Scheduling Healthchecks](#) on page 220).
- Configure the DXi4000 to run space reclamation (see [Scheduling Space Reclamation](#) on page 221).
- Specify when and how often an event reoccurs (see [Setting Recurrence for a Scheduled Event](#) on page 221).
- Remove an event occurrence or event series from the schedule (see [Deleting a Scheduled Event](#) on page 222).

Viewing Scheduled Events

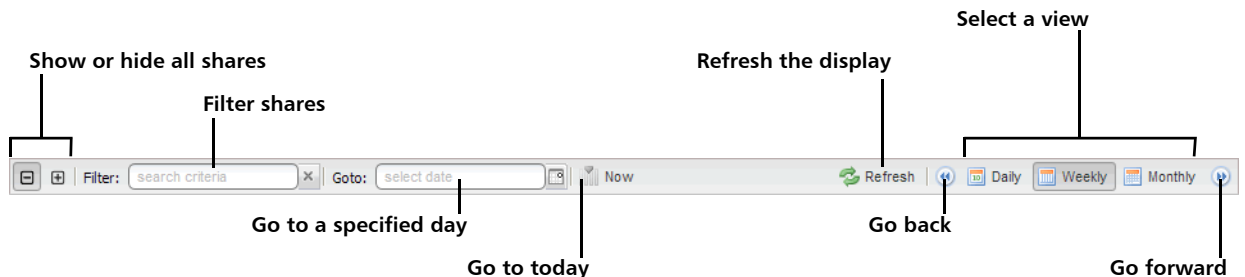
The **Scheduler** page displays all replication, replication throttle, e-mail report, healthchecks, and space reclamation events scheduled to occur in a selected time period. To view scheduled replication events for NAS shares, click the arrow next to the folder to display all shares.

Use the following toolbar controls to adjust the schedule view (see [Figure 117](#)):

- To show or hide all shares, click the plus [+] or minus [-] icons.
- To filter shares based on name, begin typing in the **Filter** box. Click the x to clear the filter.
- To view the schedule for a specific day, select it in the **Goto** pop-up calendar.
- To view the schedule for today, click **Now**.
- To update the schedule view with the latest data, click the **Refresh** icon.
- To move the view backward or forward in time, click the arrows.
- To change the number of days displayed at a time, click **Daily**, **Weekly**, or **Monthly**.

Note: The thickness of the bars on the schedule view varies based on the type of event and the selected time frame. Healthcheck events have an estimated span of 6 hours. Space Reclamation events have an estimated span of 16 hours. All other open-ended events have a default span of 2 hours.

Figure 118 Scheduler Toolbar



Adding or Editing a Scheduled Event

To add or edit a scheduled event:

- 1 On the **Scheduler** page, adjust the schedule view to display the time period when the event will occur (see [Viewing Scheduled Events](#) on page 214). Then do one of the following actions (see [Figure 119](#)):

- To add a new event, click and drag on the schedule in the row for the type of event to add. A new event is added where you dragged the cursor.

To schedule replication for NAS shares, click the arrow next to the folder to display all shares. Then click and drag in the row for the share to schedule.

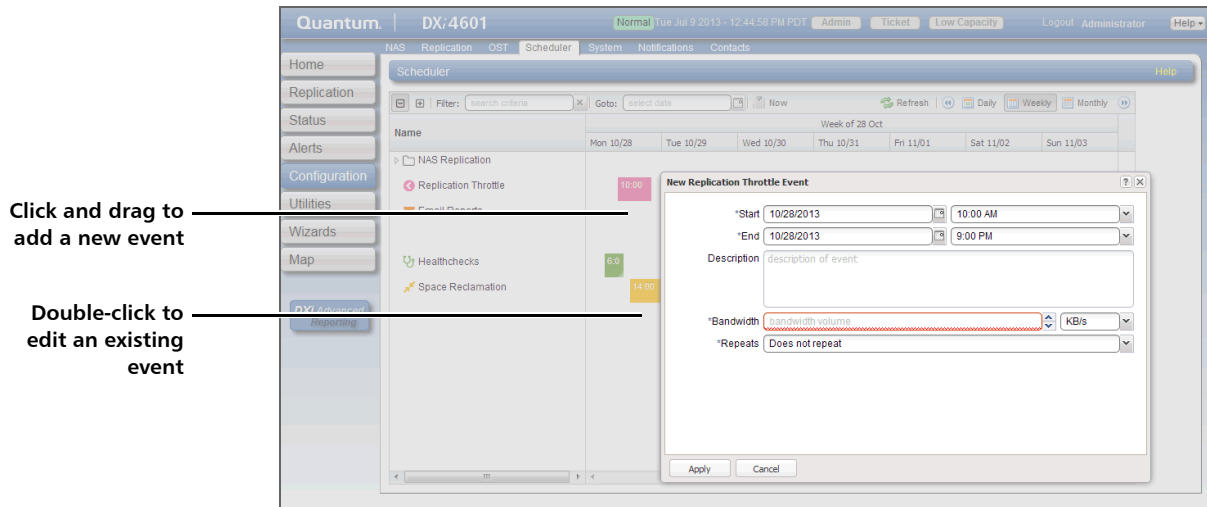
Note: The new event must begin after the current time, which is indicated by the dotted vertical line.

- To edit an existing event, double-click the event. If the event is recurring, select **Open this occurrence** to edit only the one instance of the event, or select **Open the series** to edit the entire recurring series, and then click **OK**.

Note: You cannot edit an event that occurred in the past.

Note: You can also right-click an existing event to see options for editing an event.

Figure 119 Adding a New Event



2 Define the start and, if applicable, the end of the event.

- Specify the **Start Date** and **Start Time** using the pop-up calendar and drop-down box.
- (Replication throttle events only) Specify the **End Date** and **End Time**. The end date and time must occur after the start date and time.

Note: For a new event, you can click and drag to adjust the start and end time. For an existing event, you can drag the event to change when it occurs. You can also drag the left or right edge of the event to adjust the start or end time.

3 Enter a brief description of the event in the **Description** box. (This description will display on the schedule view.)

4 Specify options specific to the type of event. See the following sections:

- [Scheduling a Share for Replication](#) on page 217
- [Scheduling Replication Throttling](#) on page 218
- [Scheduling E-mail Reports](#) on page 220
- [Scheduling Healthchecks](#) on page 220

- [Scheduling Space Reclamation](#) on page 221
- 5 (Required for healthchecks and space reclamation) Specify when and how often the event reoccurs (see [Setting Recurrence for a Scheduled Event](#) on page 221).
 - 6 Click **Apply**.
 - 7 Refresh the browser window to make sure the event settings are applied.

Caution: When adding multiple events of the same type, make sure the events do not overlap. If two events of the same type overlap, the later event takes precedence over the earlier event.

Note: After a system reboot, all open-ended events (for example, replication) will restart at their next scheduled time. Events with end times (for example, replication throttle) that are past their start time will have their end action occur.

Scheduling a Share for Replication

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

Note: Note: To schedule a share for replication, you must first add one or more replication targets (see [Replication Configuration](#) on page 169). In addition, you must add one or more shares with deduplication enabled and at least one target selected (see [NAS Summary](#) on page 152).

Note: Disabling replication for a share, or deleting a share, does not delete any scheduled replication events for that share. If you no longer want to schedule the share for replication, manually delete the schedule (see [Deleting a Scheduled Event](#) on page 222).

To configure a replication schedule for a share:

- 1 On the **Scheduler** page, add or edit an event in the **NAS Replication** row (see [Adding or Editing a Scheduled Event](#) on page 215).
- 2 In the **Share** drop-down box, select the share to schedule for replication.
Only shares that are enabled for deduplication appear in the drop-down box.

Note: Scheduling a share that has replication disabled will automatically enable replication.

- 3 In the **Target** drop-down box, select the replication target you want to replicate the share to.
- 4 Click **OK**.
- 5 (Optional) Specify when and how often the event reoccurs (see [Setting Recurrence for a Scheduled Event](#) on page 221).
- 6 Click **Apply**.

Scheduling Replication Throttling

During replication throttling, the DXi4000 limits the amount of source replication data it sends to not exceed a specified maximum bandwidth. Schedule replication throttling to control the amount of network bandwidth used by source replication at certain times. For example, you might configure replication throttling to occur during planned backup times to avoid network contention.

Note: For more information about configuring the DXi4000 for replication, see [DXi4000 Replication](#) on page 85.

To schedule replication throttling:

- 1 On the **Scheduler** page, add or edit an event in the **Replication Throttle** row (see [Adding or Editing a Scheduled Event](#) on page 215).
- 2 Specify the maximum allowed bandwidth by entering a value in the **Bandwidth** box and selecting the units in the drop-down box (**KB/s** or **MB/s**). The lowest value you can set is 32 KB/s. The highest value you can set is 125 MB/s.

Caution: Do not set the maximum allowed bandwidth to a value that is lower than necessary. If the maximum allowed bandwidth is set to the lowest value, large replication jobs may fail.

During the replication throttle event, the DXi will limit the amount of data it sends during source replication so that it does not exceed the specified bandwidth. After the replication throttle event ends, the DXi will no longer throttle the sending of source replication data (until the next replication throttle event occurs).

Do *not* configure a throttle schedule if a constant throttle is enabled (see [Enabling System Throttling](#) on page 176). The scheduled replication throttling bandwidth settings take precedence over the constant throttle value. (The currently active replication throttle rate appears on the **Home** page under **Current Activity**.)

- 3 (Optional) Specify when and how often the event reoccurs (see [Setting Recurrence for a Scheduled Event](#) on page 221).
- 4 Click **Apply**.

About Replication Throttling Statistics

Keep in mind the following information when observing actual network bandwidth usage during a replication throttle event:

- During a replication throttle event, only outgoing replication data traffic is throttled, not other outgoing traffic. Because of this, you may observe network usage to be higher than the specified maximum bandwidth. Differences in the sampling time period may also cause discrepancies between the specified maximum bandwidth and observed traffic.
- If the DXi is configured to use a bonded network interface for replication traffic, load balancing is determined independently by the bonding mode selected for the interface (see [Network](#) on page 223). Because of this, you may need to sum the values for all slave devices in the bonded interface to calculate the overall outgoing traffic rate.
- The replication throttle bandwidth maximum is specified in KB/s or MB/s, so depending on the statistic or report you are observing, you may need to convert the bandwidth maximum to Kb/s or Mb/s in order to correctly compare it to the observed values.

Scheduling E-mail Reports

The DXi4000 can automatically generate a report with system status data or with configuration data and send it to all configured e-mail recipients.

Note: To enable the DXi4000 to send e-mail, you must specify an outgoing e-mail server (see [Server](#) on page 255). In addition, you must specify one or more recipients (see [Email Reports](#) on page 256).

To configure a schedule for e-mail reports:

- 1 On the **Scheduler** page, add or edit an event in the **Email Reports** row (see [Adding or Editing a Scheduled Event](#) on page 215).
- 2 In the **Report Type** drop-down box, select the type of e-mail report to schedule (**Status** or **Configuration**).
- 3 (Optional) Specify when and how often the event reoccurs (see [Setting Recurrence for a Scheduled Event](#) on page 221).
- 4 Click **Apply**.

Scheduling Healthchecks

During healthchecks, the DXi4000 performs tests to verify the health and integrity of the data deduplication blockpool. Schedule healthchecks regularly to make sure the system is healthy and operating correctly. When you schedule healthchecks, only the healthchecks that are currently enabled are run.

Note: For more information about enabling healthchecks, see [Healthchecks](#) on page 280.

To configure a schedule for healthchecks:

- 1 On the **Scheduler** page, add or edit an event in the **Healthchecks** row (see [Adding or Editing a Scheduled Event](#) on page 215).
- 2 Specify when and how often the event reoccurs (see [Setting Recurrence for a Scheduled Event](#) on page 221).

Caution: For correct system operation, healthchecks *must* be run at regular intervals (at least once a week). You can schedule healthchecks to occur daily or weekly but not monthly or yearly. Also, recurrence is required.

3 Click **Apply**.

Scheduling Space Reclamation

During space reclamation, the DXi4000 deletes unneeded tags from the blockpool to free up disk space. Schedule space reclamation regularly to make sure there is enough disk space to store data.

Caution: Because space reclamation can affect system performance, avoid running space reclamation during known backup periods.

Note: For more information about space reclamation, see [Space Reclamation](#) on page 287.

To configure a schedule for space reclamation:

- 1 On the **Scheduler** page, add or edit an event in the **Space Reclamation** row (see [Adding or Editing a Scheduled Event](#) on page 215).
- 2 Specify when and how often the event reoccurs (see [Setting Recurrence for a Scheduled Event](#) on page 221).

Caution: For correct system operation, space reclamation *must* be run at regular intervals (at least once a week). You can schedule space reclamation to occur daily or weekly but not monthly or yearly. Also, recurrence is required.

3 Click **Apply**.

Setting Recurrence for a Scheduled Event

To specify when and how often the event reoccurs:

- 1 On the **Scheduler** page, add or edit an event (see [Adding or Editing a Scheduled Event](#) on page 215).
- 2 In the **Repeats** drop-down box, select **Does not repeat** to disable recurrence. Or to enable recurrence, select how often the event reoccurs:

Note: Healthchecks and space reclamation must occur at least every seven days or once a week.

- **Daily** - Specify the recurrence interval in days.
 - **Weekly** - Specify the recurrence interval in weeks, and select the days the event occurs on.
- 3 For recurring events, specify how long the recurrence continues (**forever**, for a certain number of occurrences, or **until** a specific date).

Note: For healthchecks and space reclamation, recurrence is always **forever**.

- 4 Click **Apply**.

Deleting a Scheduled Event

To delete an event occurrence or event series.

- 1 On the **Scheduler** page, right-click an event.
- 2 On the pop-up menu, select an option:
 - **Delete this occurrence** - Remove the selected occurrence in an event series from the schedule.
 - **Delete all occurrences** - Remove the entire event series from the schedule.

The event or series is deleted from the schedule and will no longer occur.

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.

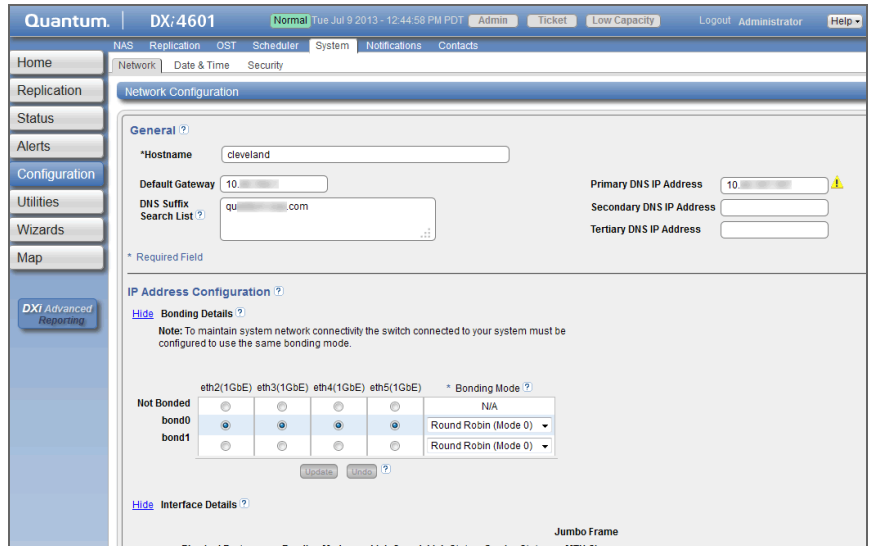
Network configuration information is entered during initial setup DXi4000. You should consult your network administrator before making any changes to the network settings.

Caution: Changing the network configuration requires a system reboot to allow all system services to function correctly. Changing the network configuration requires a system reboot immediately after the changes are applied.

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 (see [Figure 120](#)).

Figure 120 Network Configuration



Configuring the Network

Using the **Network** page, each physical Ethernet port in the DXi can be configured as a separate device. In addition, you can create bonded devices (logical ports) consisting of two or more physical ports. For each port or device, you can specify the MTU (Maximum Transmission Unit) frame size.

After you define devices (single port or bonded), you can create up to ten network interfaces for each device. Each interface has its own IP address information. In addition, you can configure the following options for each interface:

- Assign the interface to a VLAN (Virtual Local Area Network).
- Indicate whether the interface IP address will be used to externally identify the system (external host IP address).
- Specify the types of traffic allowed on the interface (management, replication, or data).
- Specify the NAT address that the interface is mapped to if it is used for replication through a NAT firewall.
- Add routing information for an interface to enable connectivity with devices on different subnets.

Note: You can choose to allow any traffic type (management, replication, or data) on an interface. In this case, the routing of different traffic types, as well as firewall capability, must be controlled using the network infrastructure (routers and switches) that the DXi is connected to.

Configuring the network includes the following major steps:

Note: Before configuring the network, work with your network administrator to determine the network settings that will be required to properly integrate the DXi4000 with your company's network.

- 1 [Configuring General Network Settings](#) on page 225
- 2 [Configuring Bonding Details](#) on page 227
- 3 [Configuring Interface Details](#) on page 228
- 4 [Configuring Interface IP Addresses](#) on page 229
- 5 [Configuring Interface Routing](#) on page 232
- 6 [Applying Network Settings](#) on page 234

Configuring General Network Settings

Under **General**, enter the following network information as provided by your network administrator (see [Figure 121](#)):

Figure 121 Network Page:
General

The screenshot shows a web-based configuration interface for network settings. The title is "General" with a help icon. The fields are as follows:

- * Hostname:** A text input field containing the value "punch".
- Default Gateway:** A text input field containing the value "10." followed by a greyed-out area.
- DNS Suffix Search List:** A text input field with a question mark icon to its right.
- Primary DNS IP Address:** A text input field containing the value "10." followed by a greyed-out area and a yellow warning triangle icon.
- Secondary DNS IP Address:** An empty text input field.
- Tertiary DNS IP Address:** An empty text input field.

At the bottom left of the form area, there is a legend: "* Required Field".

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.

The **Hostname** cannot be blank and must contain only letters [A–Z, a–z], numbers [0–9], and hyphens [-].

- **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, or you are using an external NTP server, you must specify a default gateway.

- **DNS Suffix Search List** - (Optional) The domain list to search when resolving domain names.

The list may be either a single domain name or a comma-separated list of up to 6 domain names. The first domain name listed is used as the local domain. Domain names must contain only letters [A–Z, 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: The **DNS 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 159.

Configuring Bonding Details

Under **IP Address Configuration > Bonding Details**, configure bonded devices (see [Figure 122](#)):

Figure 122 Network Page: Bonding Details

IP Address Configuration ?

[Hide](#) Bonding Details ?

Note: To maintain system network connectivity the switch connected to your system must be configured to use the same bonding mode.

	eth2(1GbE)	eth3(1GbE)	eth4(1GbE)	eth5(1GbE)	* Bonding Mode ?
Not Bonded	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	N/A
bond0	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Round Robin (Mode 0) ▼
bond1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Round Robin (Mode 0) ▼

?

- 1 If necessary, click the **Show** link to show the bonding details table.
- 2 For each available bonded device (**bond0**, **bond1**, and so on), select two or more Ethernet ports with the same link speed to assign to the bond. Or select **Not Bonded** to leave a port unassigned to any bond.

If no ports are assigned to a bond, the bond cannot be configured. That is, settings cannot be entered for the bond in the **Interface Details** or **IP Address** tables because no Ethernet ports are assigned to the device.

All ports assigned to the same device 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** device. A bonded device can contain two or more ports.

- 3 For each bonded device, 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 DXi 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 DXi frame reception and transmission is controlled by the LACP between the bonded ports and the Ethernet switch ports.
- **Active Backup (Mode 1)** - This option does not require switch configuration but may not provide the same level of load balancing and performance as other bonding modes. Only one port in the bond is active at a time. If the active port fails, another port becomes active to take its place. Because only the MAC address of the active port is visible to the Ethernet switch, the switch does not require additional configuration.

4 Click **Update** to save the changes you made to the **Bonding Details** table. (Clicking **Update** does not yet apply the new network settings to the DXi4000.)

Click **Undo** to revert to all current Bonding Details changes to the last update.

Configuring Interface Details

Under **IP Address Configuration > Interface Details**, configure jumbo Ethernet frame settings for each port or device (see [Figure 123](#)):

Figure 123 Network Page: Interface Details

Hide Interface Details ?						Jumbo Frame
Physical Ports	Bonding Mode	Link Speed	Link Status	Carrier Status	MTU Size	
eth2	eth2	N/A	1GbE	Up	Up	1500 ▾
eth3	eth3	N/A	1GbE	Up	Up	1500 ▾
bond0	eth4,eth5	Round Robin (Mode 0)	1GbE	Up	Up	1500 ▾

- 1 If necessary, click the **Show** link to show the interface details table.
- 2 For each device, select the MTU (Maximum Transmission Unit) frame size in the **Jumbo Frame MTU Size** drop-down box.
 - **1500 MTU** - (Default) The standard (STD) MTU frame size of 1,500 bytes is used.
 - **9000 MTU** - The jumbo MTU frame size of 9,000 bytes is used. (For best performance, make sure the entire network path to the DXi is configured to use 9000 MTU.)
- 3 Click **Update** to save the changes you made to the **Interface Details** table. (Clicking **Update** does not yet apply the new network settings to the DXi4000.)

Click **Undo** to revert to all current Interface Details changes to the last update.

Configuring Interface IP Addresses

Under **IP Address Configuration > IP Address Table**, configure one or more network interfaces for each port or device (physical Ethernet port or bonded device) (see [Figure 124](#)):

Figure 124 Network Page: IP Address Table

IP Address Table

Note: A maximum of 10 IP addresses per interface are allowed.

If replication is performed across public network with source and target DXi behind NAT routers, you must configure this DXi's NAT IP Address.

	IP Config		VLAN ID	External		Gateway	Replication NAT IP Config		Traffic Type Allowed				
	Type	Interface		Host IP	IP Address		Netmask	NATed	NAT IP Address	Mgmt	Repl	Data	Any
eth5	Static	<input type="radio"/> eth5:1 <small>Add IP</small>	-	-	10.10.10.1	255.255.255.0	10.10.10.1	-		-	-	-	✓
bond0	Static	<input type="radio"/> bond0:2 <small>Add IP</small>	-	-	10.10.10.1	255.255.255.0	10.10.10.1	-		-	-	-	✓

Update Delete Undo ?

- 1 Click **Add IP** to add a network interface to a device.
- Or select an interface to edit the IP address, netmask, gateway and traffic type. (To select an interface, click the radio button next to the interface index name, for example, **bond0:2**.)

Note: A maximum of 10 IP addresses are allowed per device. All IP addresses in the IP Address Table (added or modified) must be valid and unique, and must have a valid gateway and netmask.

- 2 In the **VLAN ID** column, select the check box to enable VLAN tagging for the interface. (Or clear the check box to disable VLAN tagging for the interface.)

VLAN tagging allows you to assign an interface to a virtual local area network (VLAN). With VLAN tagging, you can route different traffic types (management, data, and replication) over different VLANs, making sure traffic types do not mix.

If VLAN tagging is enabled, enter the **VLAN Tag ID** for the interface. (Valid values are 2 to 4094. You can assign only one tag ID to an interface.)

Note: The maximum allowed number of VLAN tag IDs is 64. If you attempt to add more than 64 VLAN tag IDs, an error displays.

Note: To maintain connectivity, the switch ports connected to the DXi must be configured to accept the correct VLAN tag ID.

Caution: If VLAN tagging is enabled for an interface, DXi Advanced Reporting is unable to collect and record statistics for traffic moving over the VLAN interface (for example, eth1.400). Statistics are still collected for the base device (for example, eth1.)

- 3 In the **External Host IP** column, select the check box to designate the interface as an external host IP. This associates the interface IP address with the host name of the DXi, and the DXi is externally identified by the host IP. The following restrictions apply:
- You can designate only one external host IP for the network configuration.
 - You must specify a traffic type of **Mgmt** (management) or **Any** for the external host IP interface.

- You must specify a valid **Default Gateway** in the **General** section. In addition, the external host IP must be on the same subnet as the **Default Gateway** to ensure external communication.
- 4 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 of the DXi4000. (This is usually not the same as the default gateway.)
 - 5 If necessary, specify NAT (Network Address Translation) settings for the interface:

Note: You *must* specify a NAT IP address if the DXi4000 is a replication target *and* replication is performed across a public network, with the source and target located behind NAT-enabled routers.

- **NATed** - Select the check box if the IP address of the DXi is translated by a firewall to a NAT IP address when the DXi communicates to the outside world.
 - **NAT IP Address** - The IP address used to access the DXi from the public network. The router that connects the DXi to the Internet performs Network Address Translation that maps the IP address of the DXi to the NAT IP address, providing a valid replication interface for a source DXi.
- 6 Select the check box for each type of network traffic allowed on the interface (segmentation):

Note: At least one interface must allow management traffic.

Note: If the DXi is configured for source or target replication, you should configure at least one interface to allow replication traffic (select **Repl** or **Any**) before applying changes to network settings.

Note: If you configure segmentation for non-bonded interfaces (Ethernet ports) that are on the same subnet, all traffic will use the lowest numbered Ethernet port first, no matter how segmentation is configured. To avoid this issue, create bonded interfaces, and then select the desired traffic type for each bonded interface.

- **Mgmt** - Select to allow management traffic.
 - **Repl** - Select to allow replication traffic.
 - **Data** - Select to allow data traffic.
 - **Any** - Select to allow all types of traffic (management, replication, and data).
- 7 Click **Update** to save the changes you made to the **IP Address** table. (Clicking **Update** does not yet apply the new network settings to the DXi4000.)

Click **Delete** to remove IP address information for the selected interface. Or click **Undo** to revert all current IP Address Table changes to the last update.

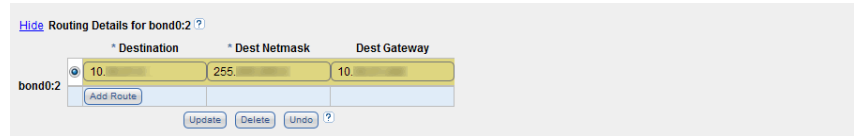
Note: When you add a network interface, a default route (via the default gateway) is automatically created for the interface after network settings are applied and the DXi reboots. For example, if you add an interface with IP address 10.20.185.172, a route with the destination IP address 10.20.185.0 is automatically added. If you delete the default route, it is automatically added again the next time network settings are applied and the DXi reboots. For more information about interface routing, see [Understanding Interface Routing](#) on page 234.

Configuring Interface Routing

Some network configurations require that you specify routing details for an interface. You need to specify routing details if the host or client the interface connects to is on a different subnet that is not reachable using the default gateway. You also need to specify routing details if you have configured multiple network segments (replication, data, or management) on the same subnet. For more information and examples, see [Understanding Interface Routing](#) on page 234.

Under **IP Address Configuration > Routing Details**, enter routing information for one or more interfaces (see [Figure 125](#)):

Figure 125 Network Page: Routing Details



- 1 In the **IP Address Table** (above routing details), select an interface to add or modify routing data. (To select an interface, click the radio button next to the interface index name, for example, **bond0:2**.)

After selecting an interface in the **IP Address Table**, the **Routing Details** table below expands to display available routes (if any).

Note: A maximum of 8 routes per interface are allowed.

- 2 If necessary, click the **Show** link to show the routing details table.
- 3 Click **Add Route** to add a route to the selected interface.
Or select a route to edit its settings.
- 4 Enter the following network information as provided by your network administrator:
 - **Destination** - The destination network for the route.
 - **Dest Netmask** - The network mask for the route.
 - **Dest Gateway** - The gateway IP address used for *outgoing* traffic sent from the interface to a host or client. (This is usually not the same as the default gateway.)

Note: The destination gateway of each route *must* match the subnet of at least one configured IP address listed in the **IP Address Table**. If no match is found, an error displays stating that the route's destination gateway is not reachable.

Note: In the example shown in [Figure 126](#), to reach a host on the 10.50.50.x subnet, you would enter 10.50.50.0 for destination network, 255.255.255.0 for the destination netmask, and 10.20.20.1 as the destination gateway.

- 5 Click **Update** to save the changes you made to the **Routing Details** table. (Clicking **Update** does not yet apply the new network settings to the DXi4000.)

Click **Delete** to remove IP routing information for the selected interface. Or click **Undo** to revert all current Routing Details changes to the last update.

Applying Network Settings

For network changes to take effect, you must apply the changes, finalize the confirmation, and reboot the system. To apply all changed settings on the **Network** page to the DXi4000, click **Apply** at the bottom of the page. Follow the prompts to confirm the changes and reboot the system.

Note: To revert all network settings to the initial state and undo all changes, click the **Reset** button.

Understanding Interface Routing

For a network on the interface to communicate with a host located on a different subnet, you must specify routing information in the **Routing Details** section. Routing is used to direct outgoing traffic from a network interface on the DXi to an IP address in another subnet by means of a destination gateway. Responses from the destination are routed back to the DXi using the gateway specified for the interface in the **IP Address Table** section.

In addition, when configuring segmented network interfaces, if the source DXi replication, data, and management interfaces are on the same subnet, you must add a host route on the source DXi to make sure the replication interface is correctly selected when replicating data to the target DXi.

See the following examples for details:

- [Example 1: Segments and Target on Different Subnets](#)

- [Example 2: Segments and Target on the Same Subnet](#)
- [Example 3: Segments on the Same Subnet and Target on a Different Subnet](#)

Example 1: Segments and Target on Different Subnets

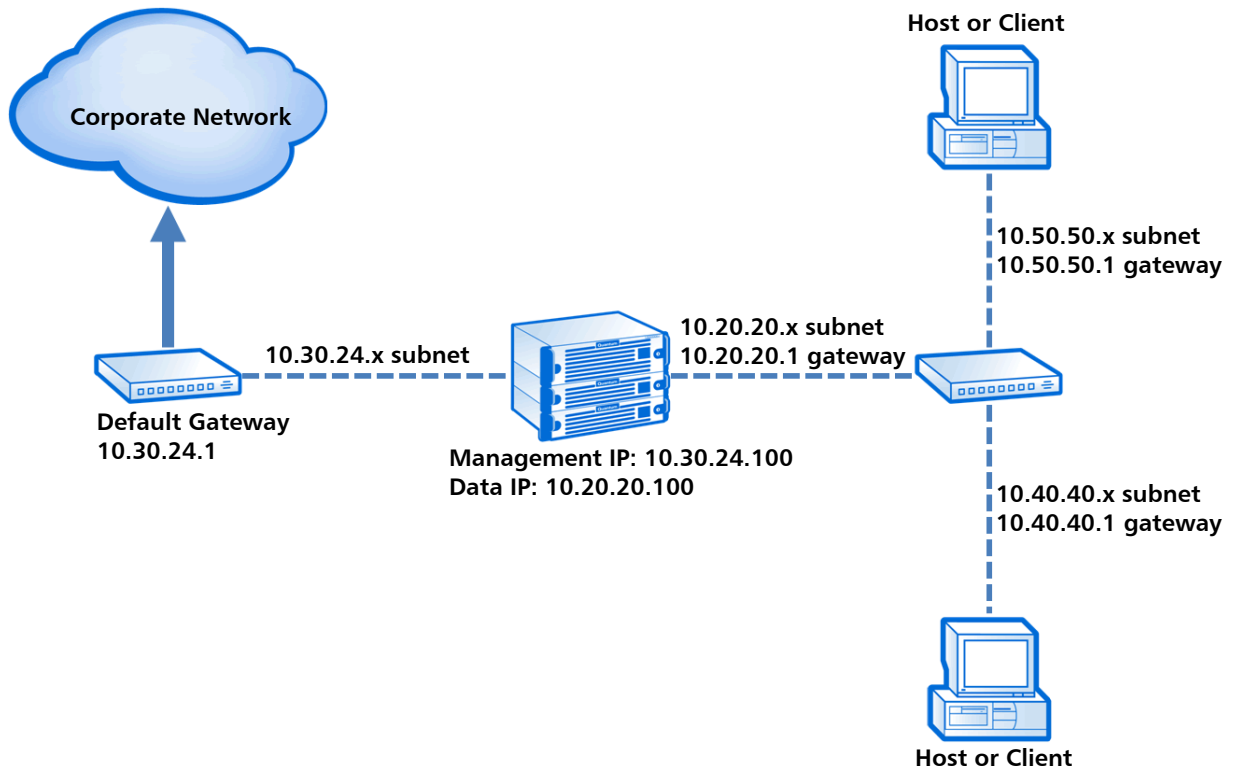
In the example below (see [Figure 126](#)), the DXi has two segmented interfaces, one for management traffic and one for data traffic:

- The management interface is assigned to the 10.30.24.x subnet in the **IP Address Table** section. This subnet connects to the corporate network by mean of the default gateway (10.30.24.1).
- The data interface is assigned to the 10.20.20.x subnet in the **IP Address Table** section. This subnet connects to a gateway at 10.20.20.1.
- Using the data interface, the DXi needs to connect to a backup host that is on the 10.50.50.x subnet. Because this host is not on the same subnet as the data interface, the DXi cannot communicate with the host unless you specify routing information in the **Routing Details** section.

In this example, you would specify 10.50.50.0 for destination network, 255.255.255.0 for the destination netmask, and 10.20.20.1 as the destination gateway.

Note: The gateway specified in the **IP Address Table** section is for *incoming* traffic to the interface. The gateway specified in the **Routing Details** section is for *outgoing* traffic from the interface.

Figure 126 Interface Routing: Example 1



Example 2: Segments and Target on the Same Subnet

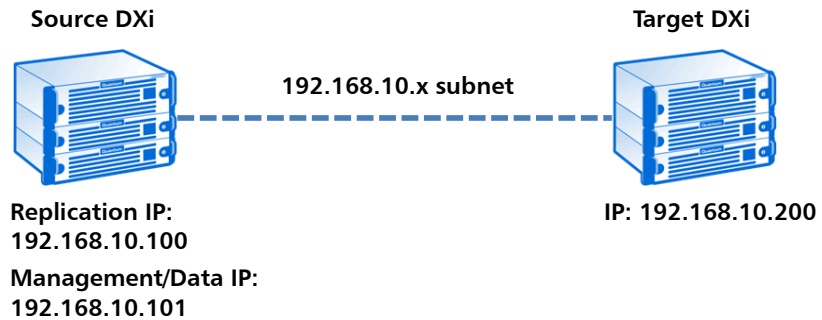
In the example below (see [Figure 127](#)), the DXi has two segmented interfaces, one for data and management traffic, and one for replication traffic:

- The source DXi management/data IP address, the source DXi replication IP address, and the target DXi IP address are all on the same subnet (192.168.10.x).
- To make sure the replication segment is used when communicating with the target DXi, you must add a host route in the **Routing Details** section on the source DXi.

In this example, you would specify the following routing details for the replication interface on the source DXi:

- **Destination** - Use the IP address of the target DXi (192.168.10.200).
- **Dest Netmask** - Use 255.255.255.255.
- **Dest Gateway** - Use the replication IP address of the source DXi (192.168.10.100).

Figure 127 Interface Routing:
Example 2



Example 3: Segments on the Same Subnet and Target on a Different Subnet

In the example below (see [Figure 128](#)), the DXi has two segmented interfaces, one for data and management traffic, and one for replication traffic:

- The source DXi management/data IP address and the source DXi replication IP address are on the same subnet (192.168.10.x). The target DXi IP address is on a different subnet (192.168.20.x)
- To make sure the replication segment is used when communicating with the target DXi, you must add a network route in the **Routing Details** section on the source DXi.

In this example, you would specify the following routing details for the replication interface on the source DXi:

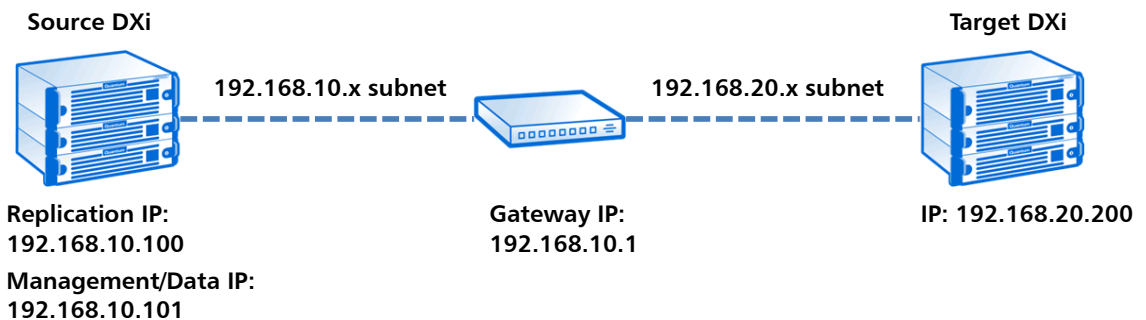
- **Destination** - Use the subnet of the target DXi (192.168.20.0).
- **Dest Netmask** - Use 255.255.255.0.

- **Dest Gateway** - Use the IP address of the gateway (192.168.10.1).
- In addition, to enable communication with the target DXi by means of the gateway, you must add a second host route in the **Routing Details** section on the source DXi.

In this example, you would specify a second set of routing details for the replication interface on the source DXi:

- **Destination** - Use the IP address of the gateway (192.168.10.1).
- **Dest Netmask** - Use 255.255.255.255.
- **Dest Gateway** - Use the replication IP address of the source DXi (192.168.10.100).

Figure 128 Interface Routing: Example 3



Backpanel Locations

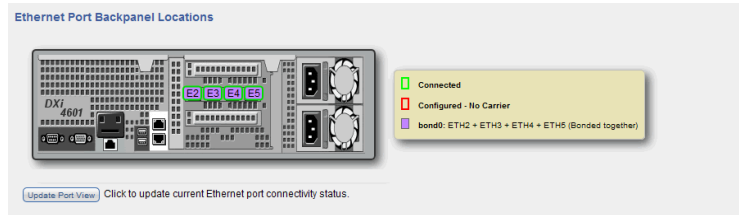
The **Backpanel Locations** section at the bottom of the **Network** page displays a graphical representation of the Ethernet ports as they appear on the rear of the system (see [Figure 129](#)).

The diagram indicates the current bonding configuration and connectivity status for all Ethernet ports.

- Ports that are bonded together in an interface are shaded the same color.

- A green border indicates a port is connected to a network.
- A red border indicates a port is configured but is not connected to a network.
- Click **Update Port View** to update the information on the diagram.

Figure 129 Network Page: Backpanel Locations



Date & Time

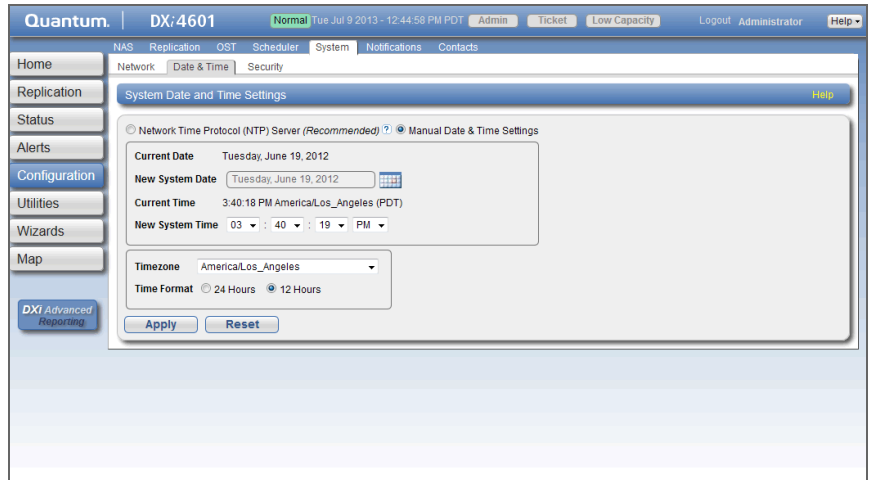
The **Date & Time** page allows you to set the system date and time of the DXi4000. You can specify a Network Time Protocol (NTP) server to synchronize the system time with, or you can manually enter the date and time.

Caution: Changing the date and time settings requires a system reboot immediately after the changes are applied. Wait for at least 15 minutes before logging back in.

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 159).

To access the **Date & Time** page, on the **System** page, click the **Date & Time** tab (see [Figure 130](#)).

Figure 130 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 223). 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](#)
- [Security Notice](#)

Web & CLI Passwords

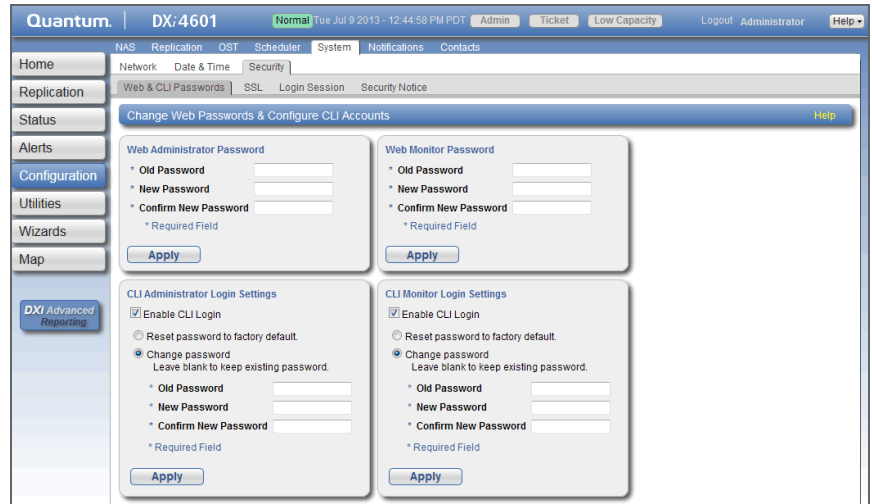
The **Web & CLI Passwords** page allows you to change the account passwords for the remote management console (Web) and the command line interface (CLI). You can also enable or disable the CLI account.

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 131](#)).

Figure 131 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 242).
- Enable or disable CLI access for the administrator or monitor account (see [Enabling CLI Accounts](#) on page 243).
- Change the administrator or monitor password for CLI access (see [Changing CLI Passwords](#) on page 243).
- Reset the CLI administrator or monitor password to the factory default (see [Resetting CLI Passwords](#) on page 244).

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. Alphanumeric characters and special characters are allowed.

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. Alphanumeric characters and special characters are allowed.

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:

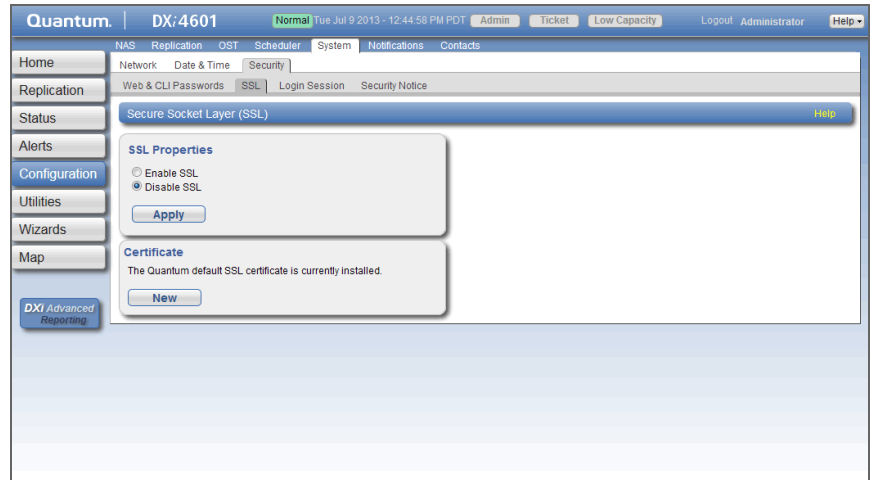
- 1 Under **CLI Administrator Login Settings** or under **CLI Monitor Login Settings**, select the **Reset password to factory default** option.
- 2 Click **Apply**.

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 132](#)).

Figure 132 SSL Page



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

- Enable or disable SSL on the DXi4000 (see [Enabling SSL](#) on page 245).

Note: If you enable SSL, see [Server Authentication Warnings](#) on page 246 for important information about Web browser settings.

- Install a new SSL certificate (see [Installing an SSL Certificate](#) on page 246).

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

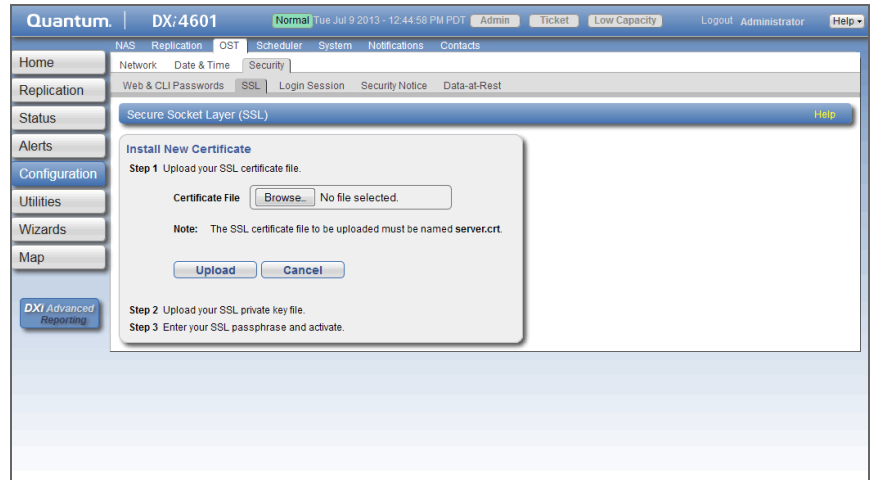
You can purchase and install your own custom SSL certificate in order to take advantage of server authentication in addition to encrypted communication on the DXi4000.

To install an SSL certificate:

1 Under **Certificate**, click **New**.

The **Install New Certificate** page displays (see [Figure 133](#)).

Figure 133 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 passphrase 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.

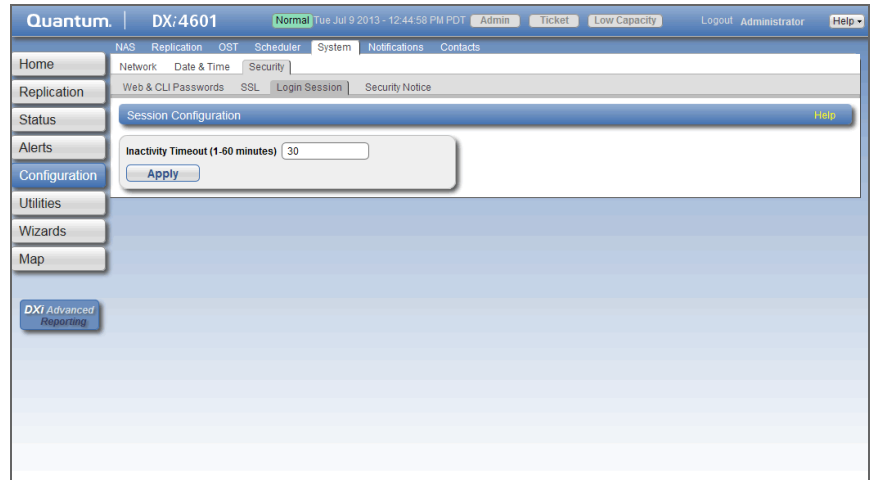
Login Session

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 134](#)).

Figure 134 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**.

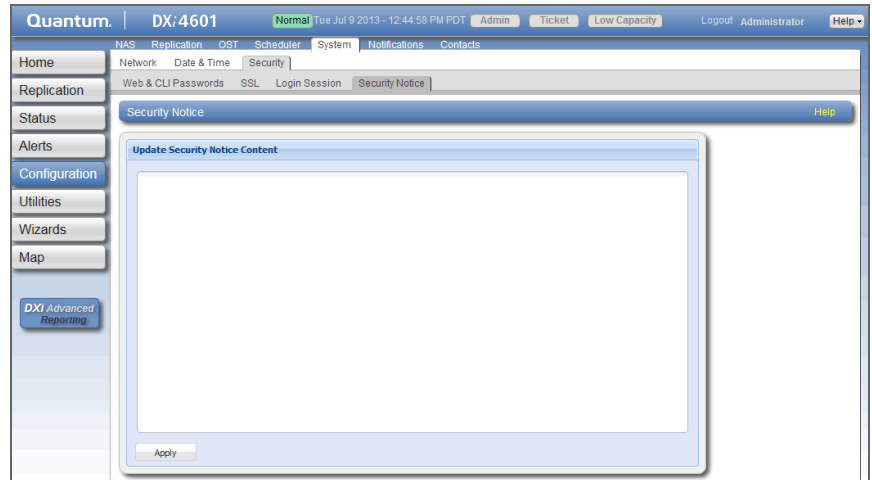
Security Notice

The **Security Notice** page allows you to specify a message that will appear to all users when logging on to the remote management console or the CLI (command line interface).

If a security notice message has been specified, the user must accept the message in order to begin using the system. If no security notice has been specified, the user can use the system immediately after logging on.

To access the **Security Notice** page, on the **Security** page, click **Security Notice** (see [Figure 135](#)).

Figure 135 Security Notice Page



To add or update a security notice message, enter the message in the box and 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 141.

To access the **Email** page, on the **Notifications** page, click the **Email** tab.

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

- [Recipients](#)
- [Server](#)
- [Test](#)
- [Email Reports](#)

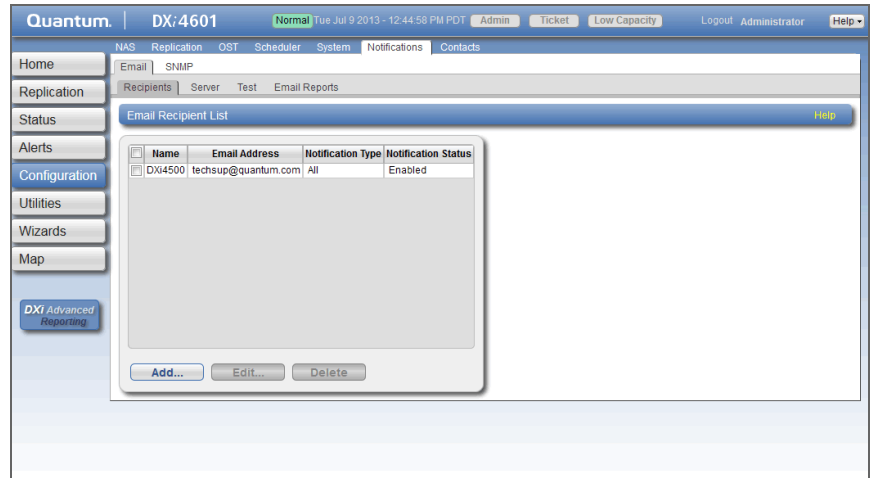
Recipients

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 255).

To access the **Recipients** page, on the **Email** page, click the **Recipients** tab (see [Figure 136](#)).

Figure 136 Recipients Page



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

- View information about e-mail recipients (see [Email Recipient List](#) on page 251).
- Add an e-mail recipient (see [Adding an E-mail Recipient](#) on page 252).
- Edit an e-mail recipient (see [Editing an E-mail Recipient](#) on page 253).
- Delete an e-mail recipient (see [Deleting an E-mail Recipient](#) on page 254).

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

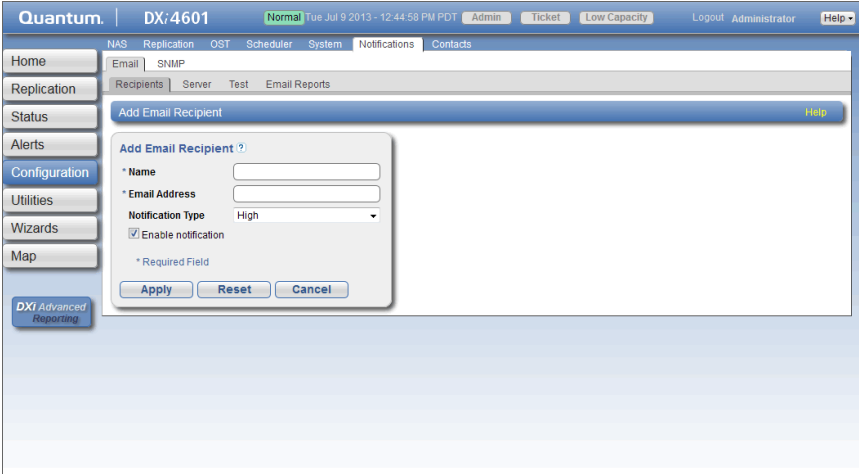
Add an e-mail recipient to send notifications about administration alerts or service tickets to the recipient by e-mail.

To add an e-mail recipient:

- 1 Click **Add**.

The **Add Email Recipient** page displays (see [Figure 137](#)).

Figure 137 Add Email Recipient Page



The screenshot shows the Quantum DXi4000 web interface. The top navigation bar includes 'Quantum', 'DXi:4601', and system status indicators like 'Normal', 'Tue Jul 9 2013 - 12:44:58 PM PDT', 'Admin', 'Ticket', 'Low Capacity', 'Logout', 'Administrator', and 'Help'. The main menu on the left lists 'Home', 'Replication', 'Status', 'Alerts', 'Configuration', 'Utilities', 'Wizards', and 'Map'. The 'Configuration' menu is expanded to show 'Email', 'SNMP', 'Recipients', 'Server', 'Test', and 'Email Reports'. The 'Add Email Recipient' dialog box is open, featuring the following fields and options:

- * Name**: A text input field.
- * Email Address**: A text input field.
- Notification Type**: A dropdown menu currently set to 'High'.
- Enable notification**: A checked checkbox.
- * Required Field**: A label indicating that the Name and Email Address fields are mandatory.
- Buttons**: 'Apply', 'Reset', and 'Cancel' buttons.

- 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 138](#)).

Figure 138 Edit Email Recipient Page

The screenshot shows the Quantum DXi4000 web interface. The top navigation bar includes 'Quantum | DXi4601' and various system status indicators like 'Normal', 'Admin', 'Ticket', 'Low Capacity', 'Logout', and 'Administrator'. A left sidebar contains navigation tabs: Home, Replication, Status, Alerts, Configuration, Utilities, Wizards, and Map. The main content area displays the 'Edit Email Recipient' dialog box. The dialog box has a title 'Edit Email Recipient ?' and contains the following fields: 'Name' (DXi4500), '* Email Address' (techsup@quantum.com), and 'Notification Type' (All). There is a checked checkbox for 'Enable notification' and a note '* Required Field'. At the bottom of the dialog are 'Apply', 'Reset', and 'Cancel' buttons. A 'DXi Advanced Reporting' button is visible in the bottom left corner of the main interface.

- 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**.

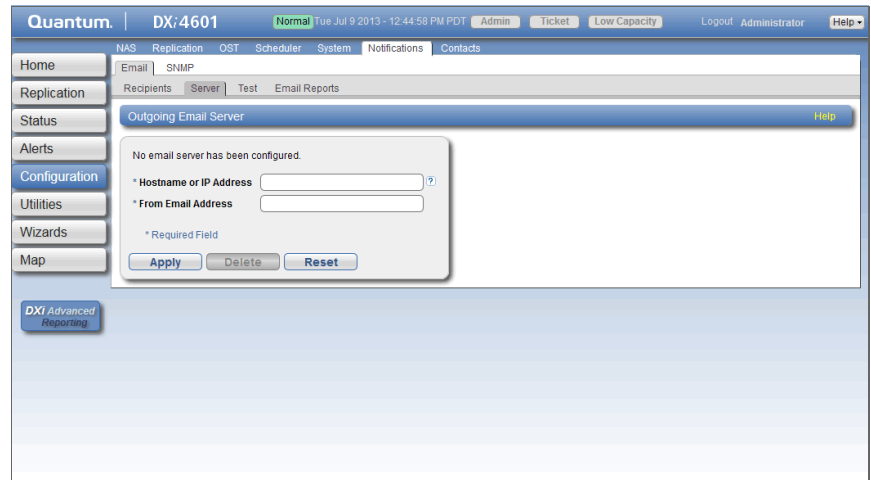
Note: You can select multiple recipients to delete at once.

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 139](#)).

Figure 139 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 223).

- 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.

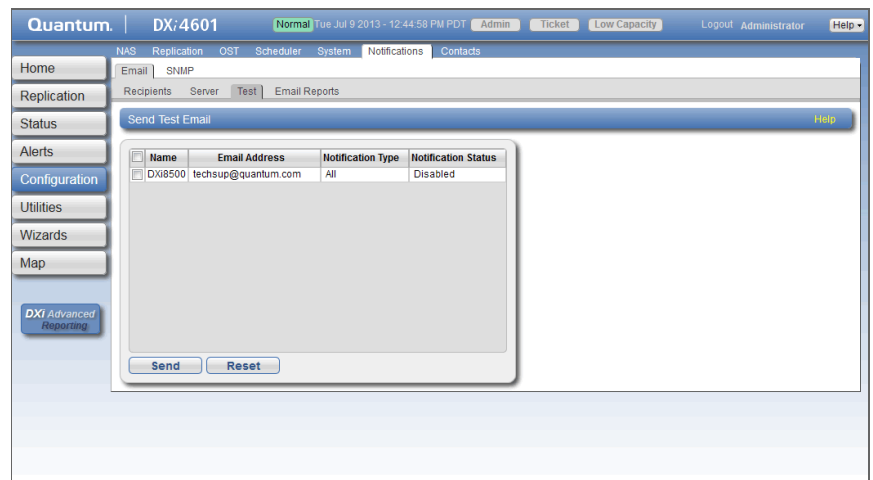
3 Click **Apply**.

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 140](#)).

Figure 140 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 253). Also make sure that the outgoing e-mail server is correct (see [Server](#) on page 255).

Email Reports

The **Email Reports** page allows you to specify the e-mail recipients for automatically generated reports. You can also generate reports on demand.

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 255).

To access the **Email Reports** page, on the **Email** page, click the **Email Reports** tab.

The **Email Reports** page contains the following tabs:

- [Recipients](#)
- [On Demand](#)

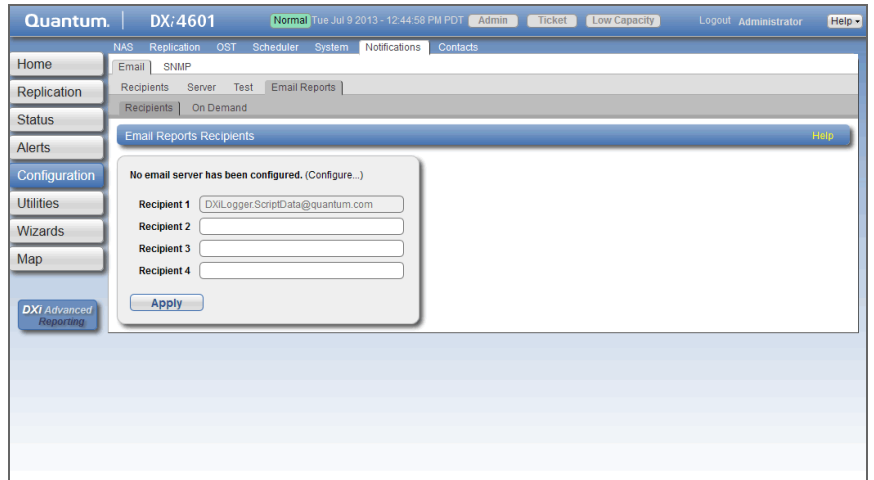
Recipients

The **Recipients** page allows you to specify the e-mail recipients who will receive all scheduled status data and configuration data reports.

Note: To configure the schedule when e-mail reports are sent, use the **Configuration > Scheduler** page (see [Scheduling E-mail Reports](#) on page 220).

To access the **Recipients** page, on the **Email Reports** page, click the **Recipients** tab (see [Figure 141](#)).

Figure 141 Recipients Page



Enter the e-mail addresses of up to three recipients in the boxes, and then click **Apply**. When the DXi generates scheduled e-mail reports, they will be sent to the specified addresses.

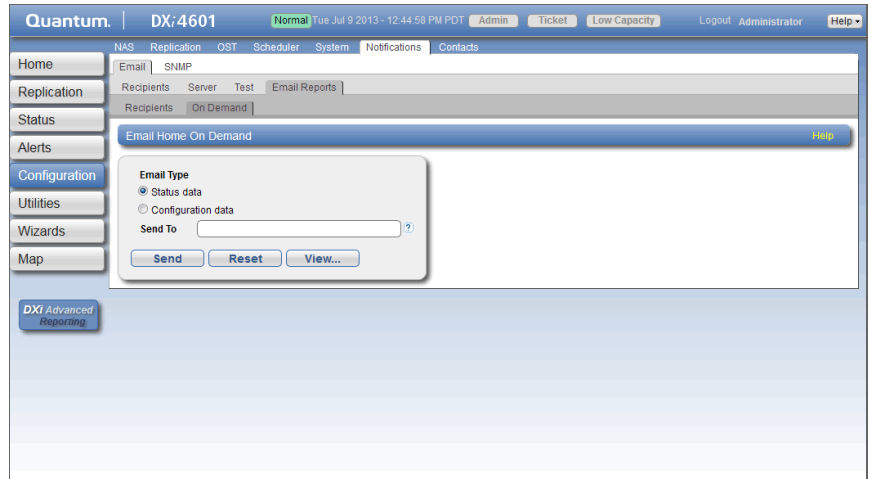
Note: You cannot edit the first recipient.

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 Reports** page, click the **On Demand** tab (see [Figure 142](#)).

Figure 142 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 259).
- View a configuration data report (see [Viewing Configuration Data](#) on page 259).

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.
An e-mail address is required for sending **Configuration data**. For **Status data**, if you do not enter an e-mail address, the report is sent to `DXiLogger.ScriptData@quantum.com`.
- 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:

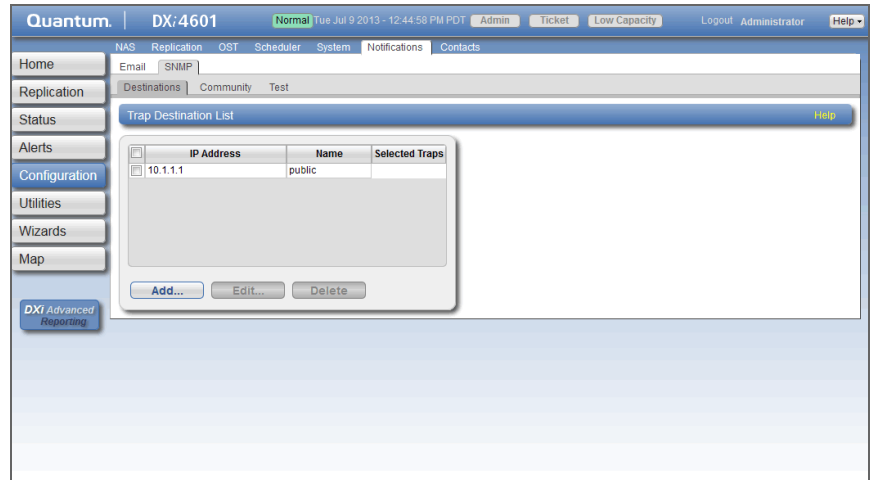
- [Destinations](#)
- [Community](#)
- [Test](#)

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 143](#) on page 261).

Figure 143 Destinations Page



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

- View information about SNMP destinations (see [Trap Destination List](#) on page 261).
- Add an SNMP destination (see [Adding a Destination](#) on page 261).
- Edit an SNMP destination (see [Editing a Destination](#) on page 263).
- Delete an SNMP destination (see [Deleting a Destination](#) on page 264).

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.

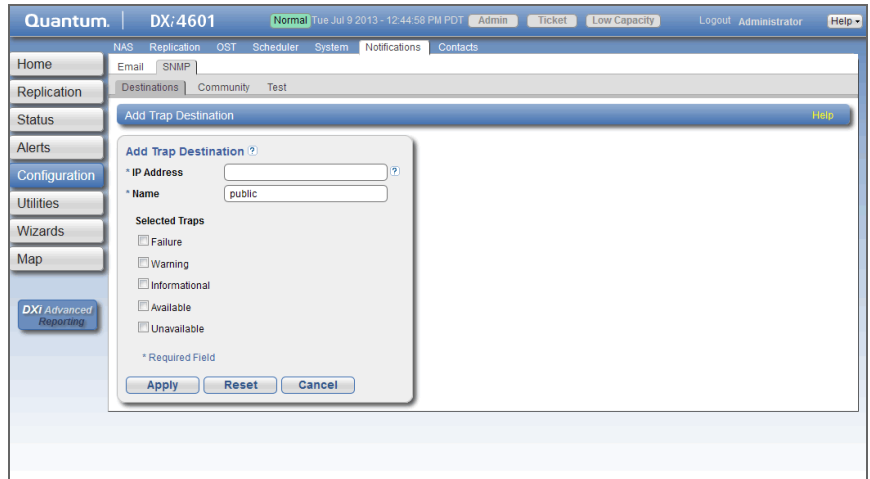
Note: You can add up to 5 destinations.

To add a destination:

- 1 Click **Add**.

The **Add Trap Destination** page displays (see [Figure 144](#)).

Figure 144 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 223).

- **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

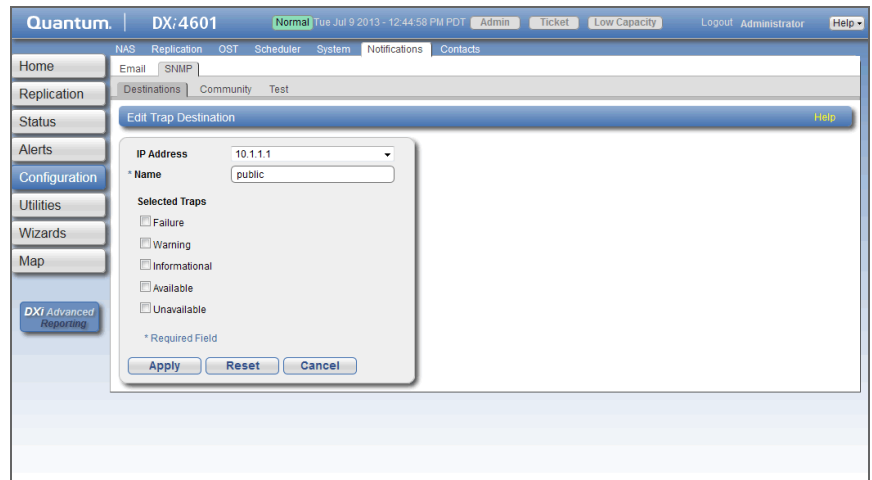
Edit an SNMP destination to change the name of the destination or the types of traps the DXi4000 sends to the destination.

To edit a destination:

1 Click **Edit**.

The **Edit Trap Destination** page displays (see [Figure 145](#)).

Figure 145 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**.

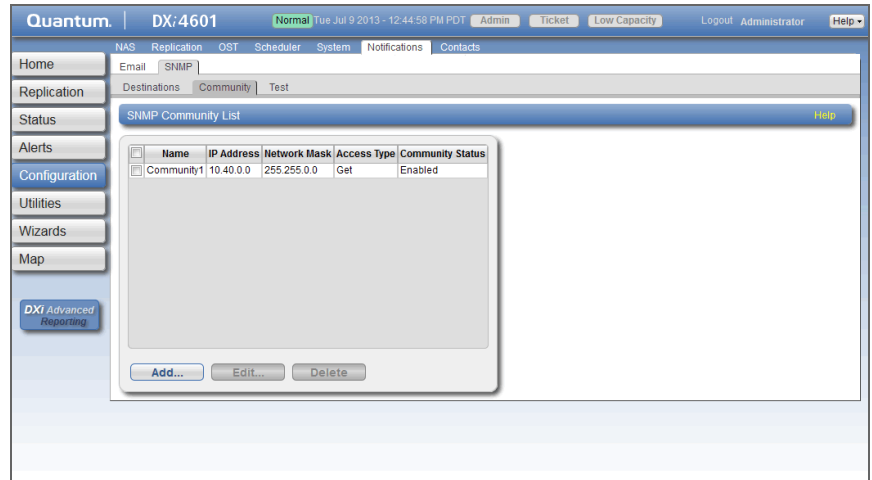
Note: You can select multiple destinations to delete at once.

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 146](#)).

Figure 146 Community Page



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

- View information about SNMP communities (see [SNMP Community List](#) on page 265).
- Add an SNMP community (see [Adding a Community](#) on page 265).
- Edit an SNMP community (see [Editing a Community](#) on page 267).
- Delete an SNMP community (see [Deleting a Community](#) on page 269).

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.

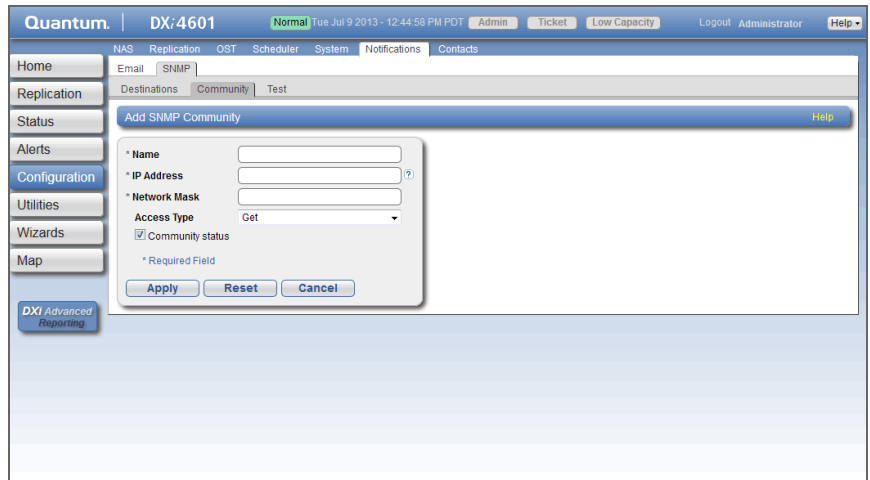
Note: If no communities are defined, the SNMP agent is not accessible.

To add a community:

- 1 Click **Add**.

The **Add SNMP Community** page displays (see [Figure 147](#)).

Figure 147 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

IP Address / Network Mask	Result
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 147](#)).

Figure 148 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

IP Address / Network Mask	Result
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**.

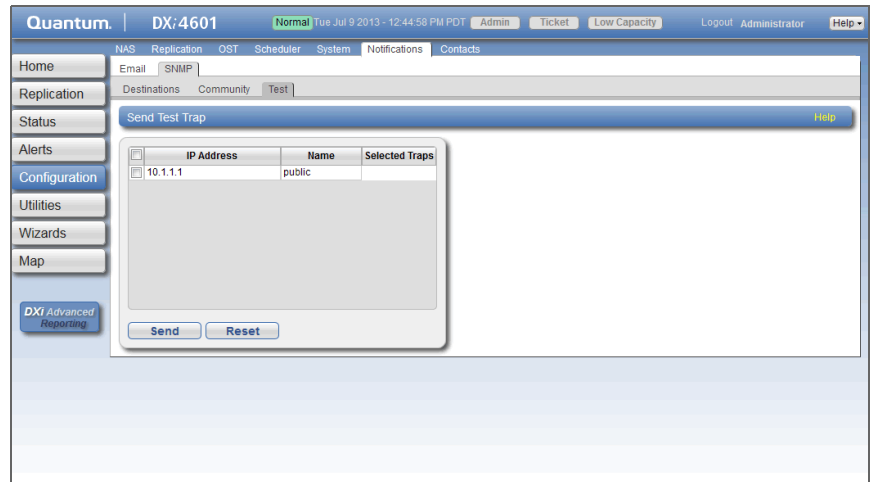
Note: You can select multiple communities to delete at once.

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 149](#)).

Figure 149 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 263). Also make sure that the community information is correct (see [Community](#) on page 264).

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 150](#)).

Figure 150 Company Page

The screenshot shows the Quantum DXi4000 web interface. The top navigation bar includes 'Quantum', 'DXi:4601', 'Normal', 'Tue Jul 9 2013 - 12:44:58 PM PDT', 'Admin', 'Ticket', 'Low Capacity', 'Logout', 'Administrator', and 'Help'. Below this is a secondary navigation bar with 'NAS', 'Replication', 'OST', 'Scheduler', 'System', 'Notifications', and 'Contacts'. The 'Contacts' tab is active, and the 'Company' sub-tab is selected. The main content area is titled 'Company Information' and contains a form with the following fields: 'Company Name', 'Street', 'City', 'State', 'Postal Code', 'Country', 'DXi4520 Location', and 'Support Contract'. An 'Apply' button is located at the bottom of the form. A left sidebar contains navigation links: 'Home', 'Replication', 'Status', 'Alerts', 'Configuration', 'Utilities', 'Wizards', 'Map', and a 'DXi Advanced Reporting' button.

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.

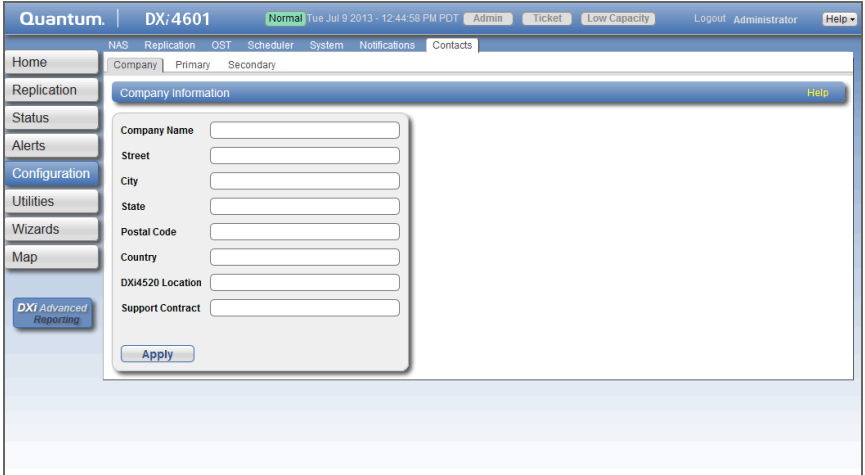
2 Click **Apply**.

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 151](#)).

Figure 151 Primary and Secondary Pages



The screenshot shows the Quantum DXi4000 web interface. The top navigation bar includes 'Home', 'Replication', 'Status', 'Alerts', 'Configuration', 'Utilities', 'Wizards', and 'Map'. The 'Configuration' menu is expanded, showing 'Company Information' as the selected option. The 'Company Information' form contains the following fields: Company Name, Street, City, State, Postal Code, Country, DXi4520 Location, and Support Contract. An 'Apply' button is located at the bottom of the form. The interface also displays the user's role as 'Administrator' and the system status as 'Normal'.

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, managing space reclamation, and securely erasing the system. 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](#)
- [Secure Shred](#)
- [License Keys](#)
- [Software Upgrades](#)
- [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 152](#)).

Figure 152 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, click the link 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.

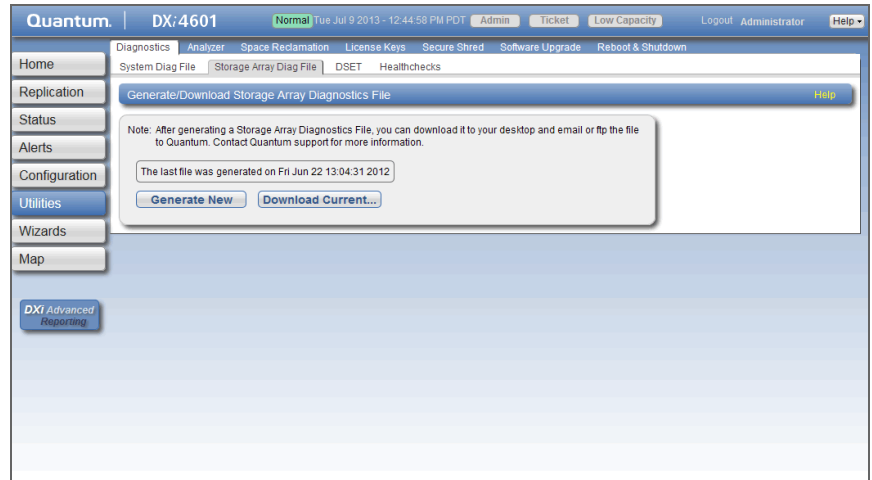
- 4 Click **Save** or **OK** to download the file.

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 153](#)).

Figure 153 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, click the link 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 154](#)).

Figure 154 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.

Note: You may see error or warning messages in the status text as the DSET report is generated. This is expected and does not indicate a problem with the report.

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 or FTP 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 enable and disable healthchecks.

Note: To configure the DXi4000 to automatically run the healthchecks at specified intervals, use the **Configuration > Scheduler** page (see [Scheduling Healthchecks](#) on page 220).

To access the **Healthchecks** page, on the **Diagnostics** page, click the **Healthchecks** tab.

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

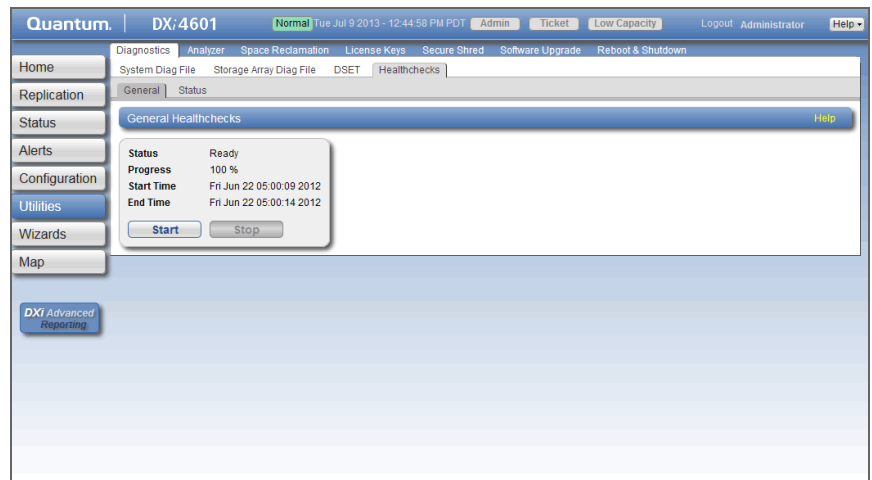
- [General](#)
- [Status](#)

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 281).

To access the **General** page, on the **Healthchecks** page, click the **General** tab (see [Figure 155](#)).

Figure 155 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

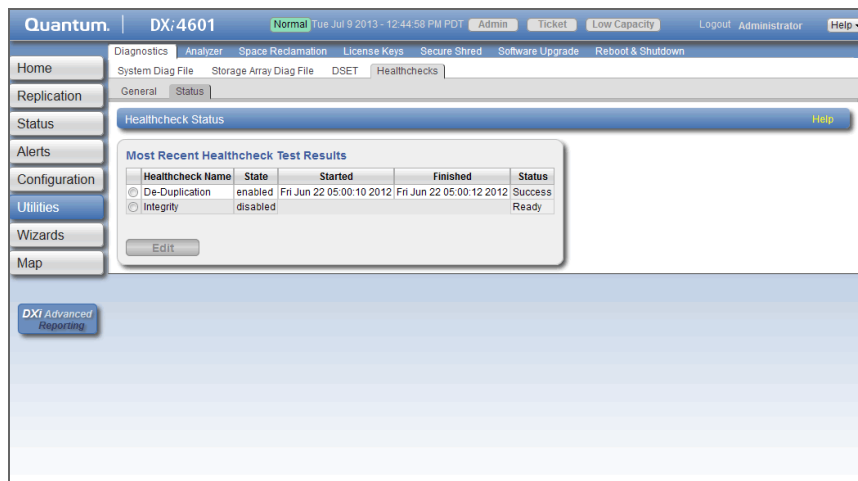
The **Status** page allows you to view information about the most recent test results for each healthcheck. You can also enable or disable a healthcheck.

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 156](#)).

Figure 156 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**).

Note: If running a healthcheck results in the Contact Support status, contact Quantum Customer Support for further assistance.

To enable or disable a healthcheck:

- 1 Select the healthcheck and click **Edit**.

The **Edit Healthcheck** page displays (see [Figure 157](#)).

Figure 157 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.

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:

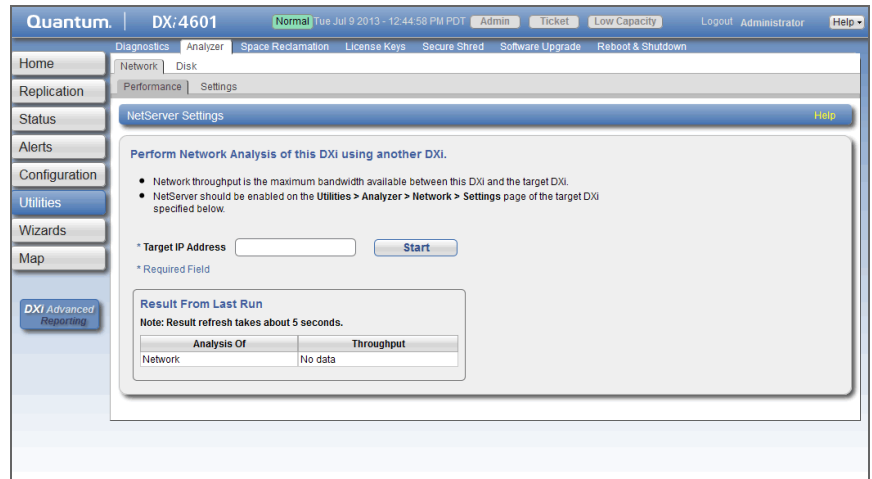
- [Performance](#)
- [Settings](#)

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 158](#)).

Figure 158 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 285).

- 2 Click **Start**.

The throughput result is displayed under **Result From Last Run** in MB/s.

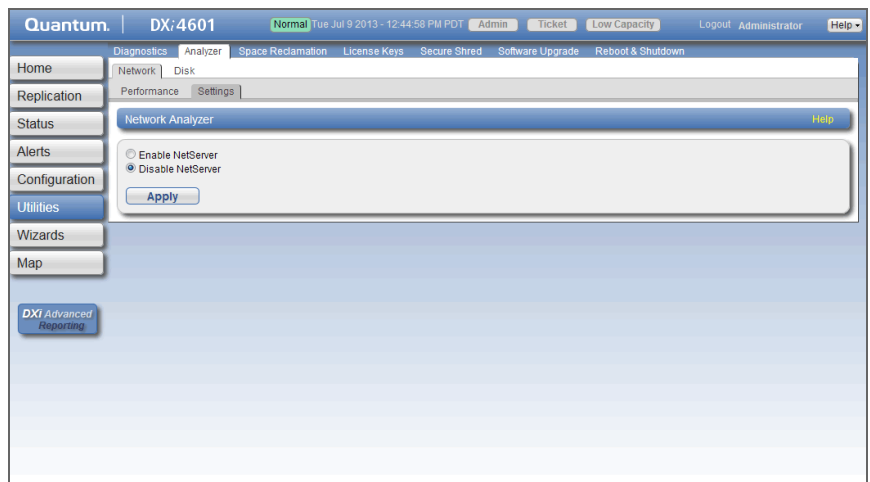
Note: It takes approximately 5 seconds to refresh the results.

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 284).

To access the **Settings** page, on the **Network Analyzer** page, click the **Settings** tab (see [Figure 159](#)).

Figure 159 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**.

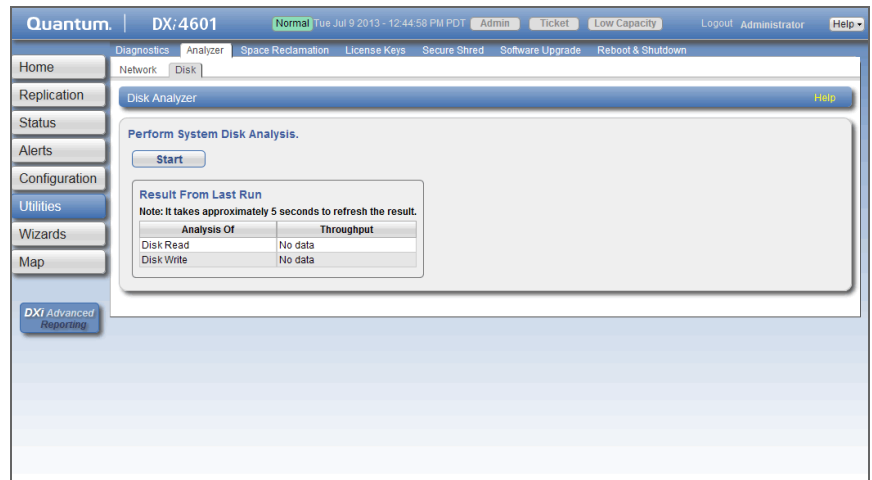
Note: You should disable NetServer on the target system when you are done analyzing network performance.

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 160](#)).

Figure 160 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 or stop space reclamation. You can also monitor the progress of space reclamation activity.

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.

Caution: For correct system operation, space reclamation *must* be run at regular intervals (at least once a week). Quantum recommends creating a schedule to automatically run space reclamation (see [Scheduling Space Reclamation](#) on page 221). Because space reclamation can affect system performance, avoid running space reclamation during known backup periods.

The space reclamation process can include up to four stages (see [Space Reclamation Status](#) on page 289).

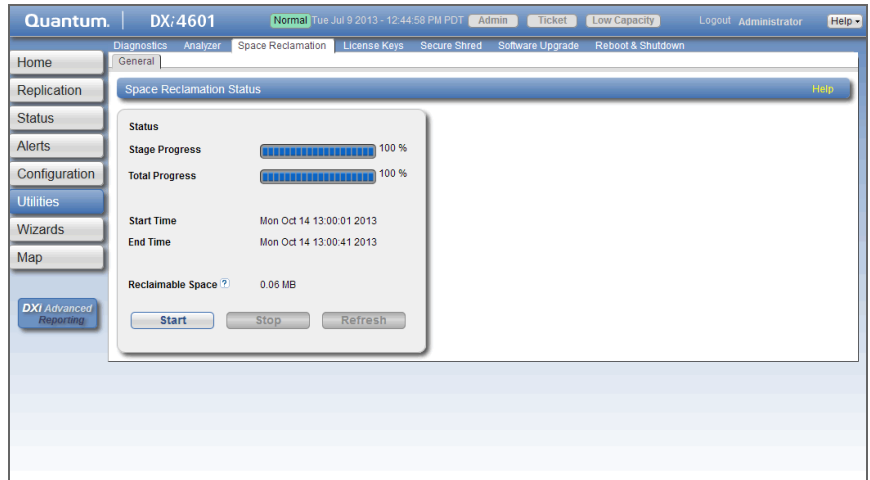
- **New or Normal Mode** - To increase performance, when space reclamation is initiated on the **Space Reclamation** page or as a scheduled event, only Stage 2 (Calculating Deletion Candidates) and Stage 3 (Deleting New Candidates) are run.

Note: Stage 1 and 4 are not required in Normal mode because the DXi can automatically compact reclaimable space as needed and use it to store new deduplicated data.

- **Low Space or Legacy Mode** - When disk capacity is low, space reclamation is automatically started to free up disk space. In this case, all four stages of space reclamation are run.

To access the **Space Reclamation** page, click the **Utilities** menu, and then click the **Space Reclamation** tab (see [Figure 161](#)).

Figure 161 Space Reclamation Page



The **Space Reclamation** 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 289).
- **Stage Progress** - The progress of the current space reclamation stage.
- **Total Progress** - The overall progress of space reclamation activity.
- **Start Time** - The time space reclamation started.
- **End Time** - The time space reclamation ended.
- **Reclaimable Space** - The disk space that is occupied by outdated deduplicated data and which will be automatically reused if additional space for new deduplicated data is needed. Displays **Pending** when space reclamation is running.

Note: Because the DXi can automatically use reclaimable space to store new deduplicated data, space reclamation statistics may be affected (appear lower) if ingest occurs at the same time as space reclamation.

Use the **Space Reclamation** page to perform the following tasks:

- To start space reclamation, click **Start**.
- To stop space reclamation, click **Stop**.

- To update the display while space reclamation is running, click **Refresh**.

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 Interrupt by User - Cannot be interrupted at this time** - Because the system is in a Low Space state, space reclamation cannot be stopped. Wait for space reclamation to finish freeing up disk space.
- **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** - Deleting New Candidates.
- **Stage 4 of 4** - Reclaim Disk Space.

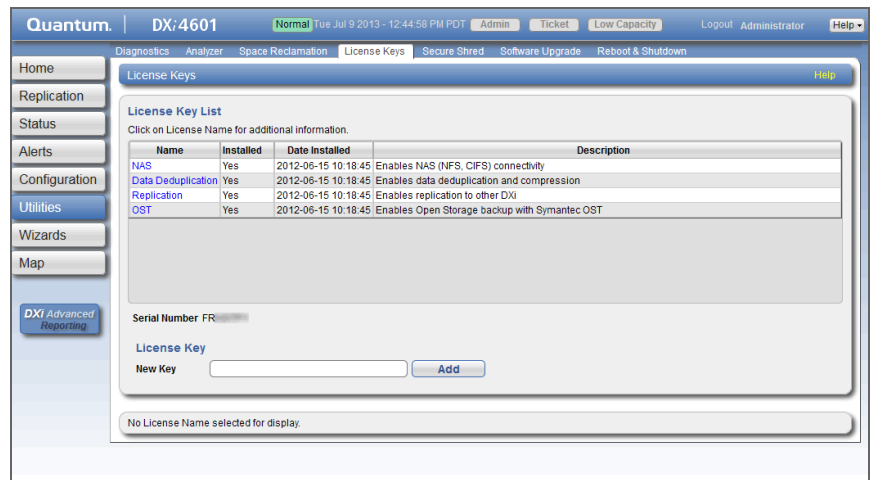
License Keys

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 that 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 291.

To access the **License Keys** page, click the **Utilities** menu, and then click the **License Keys** tab (see [Figure 162](#)).

Figure 162 License Keys Page



Use the **License Keys** page to perform the following tasks:

- View information about available and installed licenses (see [License Key Information](#) on page 290).
- Add a license key (see [Adding a License Key](#) on page 291).

License Key Information

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 291.
- **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 291).

- **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.

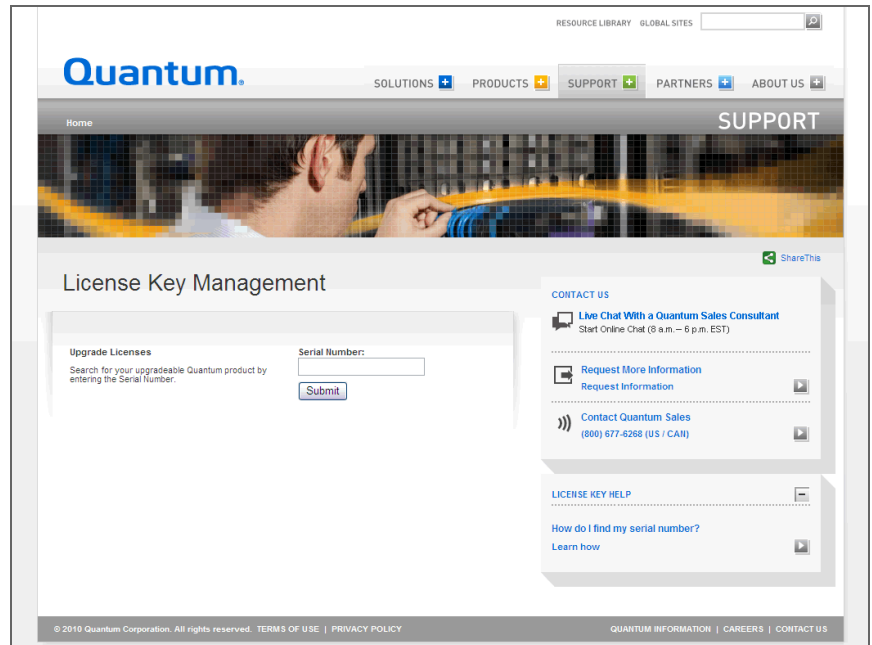
Contact your Quantum sales representative to purchase a storage capacity upgrade license. After you purchase the license, you will receive a License Certificate containing an authorization code.

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 163](#)).

Figure 163 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 **License Keys** page, above the **New Key** box.

- 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 162](#)).

- 7 Enter the license key in the **New Key** box, and then click **Add**.

The license key is added to the system.

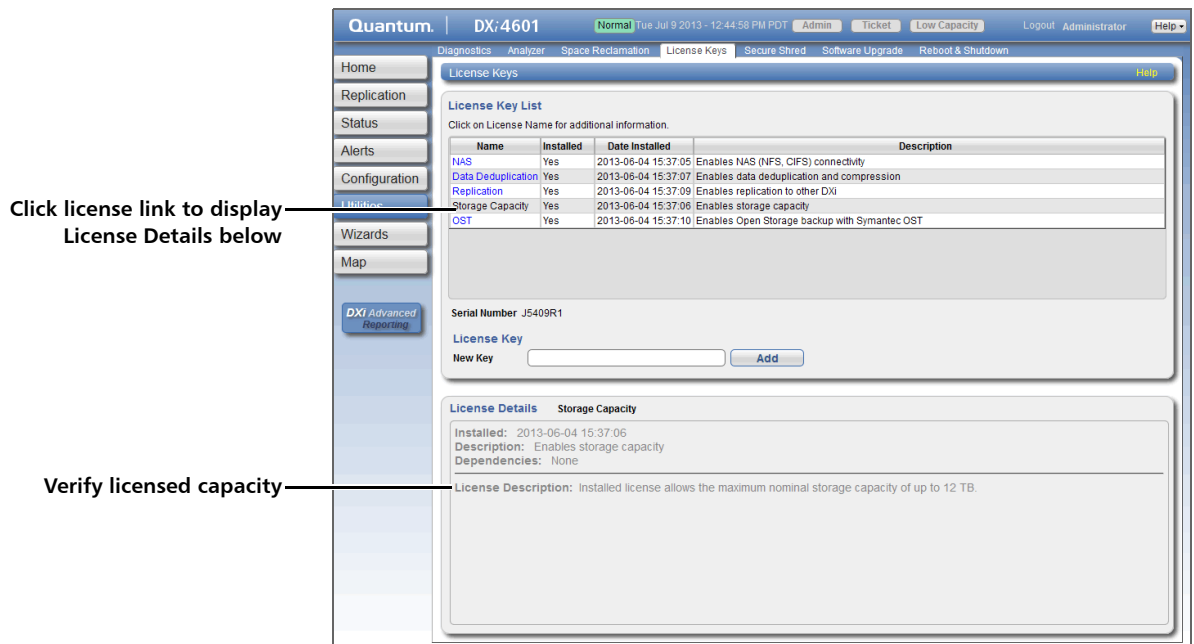
- 8 Reboot the DXi to complete the storage capacity upgrade (see [Reboot & Shutdown](#) on page 305).

Caution: Stop all backup, restore, and replication jobs before rebooting. The new storage capacity will not be available until you reboot the DXi.

- 9 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 164](#)). Verify that the licensed capacity equals the total purchased capacity, including the new capacity upgrade.

Figure 164 License Details



Secure Shred

The **Secure Shred** page allows you to securely and permanently erase sensitive data stored on the DXi4000. To securely erase data, first delete files on NAS shares or storage servers, then start secure shred. During secure shred, all residual data associated with the deleted files is securely erased from the disk drives by performing a single-pass overwrite with zeros.

While secure shred is running, the DXi4000 operates in limited mode. This means you cannot perform backups or restores, all scheduled jobs (including replication jobs) are stopped, and you cannot access or use any other features of the DXi. If necessary, you can cancel secure shred at any time and return the DXi to normal operation.

Caution: The secure shred process can take multiple days to complete.

To access the **Secure Shred** page, click the **Utilities** menu, and then click the **Secure Shred** tab (see [Figure 165](#)).

Figure 165 Secure Shred Page



To securely erase data on the DXi4000:

- 1 Delete the data you want to securely erase:
 - Delete files on NAS shares, or delete the shares (see [NAS](#) on page 151).
 - Delete backup images on OST logical storage units (LSUs), or delete the LSUs and storage servers (see [OST](#) on page 180).
- 2 Run space reclamation from the **Utilities > Space Reclamation** page (see [Space Reclamation](#) on page 287).
- 3 Make sure all replication and backup jobs are completed (see [DXi4000 Replication](#) on page 85).
- 4 On the **Secure Shred** page, click **Start Shred**.
A warning message displays.
- 5 Click **Yes**.

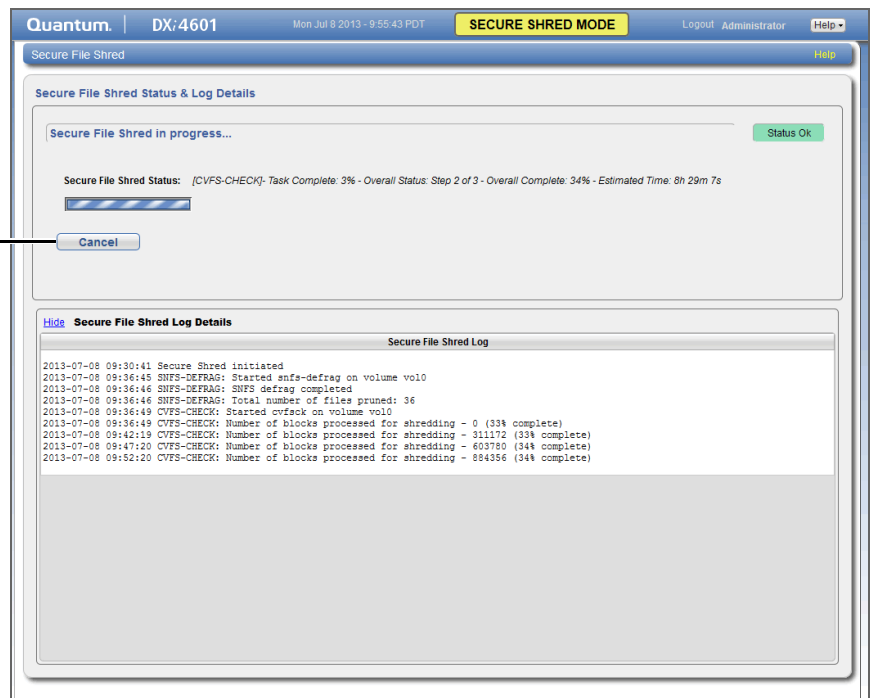
The system reboots and begins the secure shred process. This process can take multiple days to complete.

- 6 To check the status of secure shred, log onto the DXi4000 to view the limited **Secure Shred Mode** interface (see [Figure 166](#)).
 - The **Secure File Shred Log** displays details about the secure shred progress. Click **Hide** to hide the log.
 - To cancel the secure shred process, click **Cancel**. The DXi reboots and resumes normal operation.
 - When the secure shred process is complete, the **Reboot** button displays.

Note: You must log on as an Admin user to cancel secure shred or reboot the system.

Figure 166 Secure Shred Mode Interface

When secure shred is complete, Cancel changes to Reboot



- 7 Click **Reboot** to finalize the secure shred process and reboot the DXi.

After the DXi finishes rebooting, you can resume normal system operation.

Software Upgrades

Software upgrades allow you to update the software running on the DXi4000 to the latest version. Software upgrades can include new features as well as bug fixes.

There are two methods for upgrading the DXi software:

- **Check for an upgrade (Home page)** - The DXi can automatically check for software upgrades on the **Home** page, or you can manually perform an upgrade check (see [Checking For Software Upgrades](#) on page 297). If an upgrade is found, you can choose to download and install it.

This is the recommended method for upgrading, but it requires that the DXi be able to access the Internet.

- **Upload a software upgrade file (Software Upgrade page)** - You can download a software upgrade file from the Quantum Service and Support Web site and then manually upload it to the DXi using the **Software Upgrade** page (see [Uploading a Software Upgrade File](#) on page 302).

You can use this method if the DXi cannot access the Internet.

Note: Uploading a software upgrade file may be useful if you are upgrading multiple DXi systems, as the file only needs to be downloaded once. Also, this method assures that all systems will be running the same software version following the upgrade.

Checking For Software Upgrades

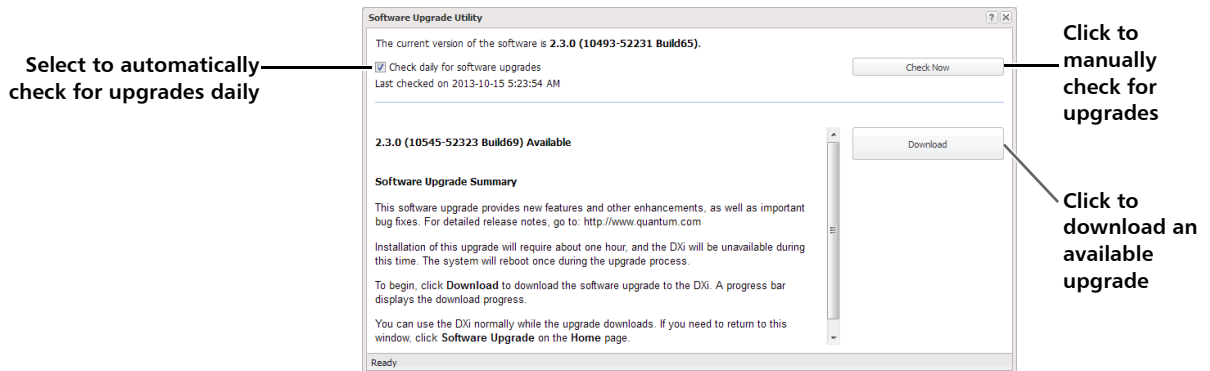
The **Software Upgrade Utility** (accessible from the **Home** page) allows you to check for available DXi software upgrades and, if available,

download and install them. You can also configure the DXi4000 to automatically check for software upgrades.

Note: To check for and download software upgrades, the DXi must be able to access the Internet. If the DXi cannot access the Internet, see [Uploading a Software Upgrade File](#) on page 302.

To access the **Software Upgrade Utility**, click **Home** on the main menu, and then click the **Software Upgrade** link (see [Figure 167](#)).

Figure 167 Software Upgrade Utility



Use the **Software Upgrade Utility** to perform the following tasks:

- Configure the DXi4000 to automatically check for software upgrades (see [Automatically Checking for Upgrades](#) on page 298).
- Manually check for software upgrades (see [Manually Checking for Upgrades](#) on page 299).
- Download and install available software upgrades (see [Downloading and Installing Upgrades](#) on page 299).

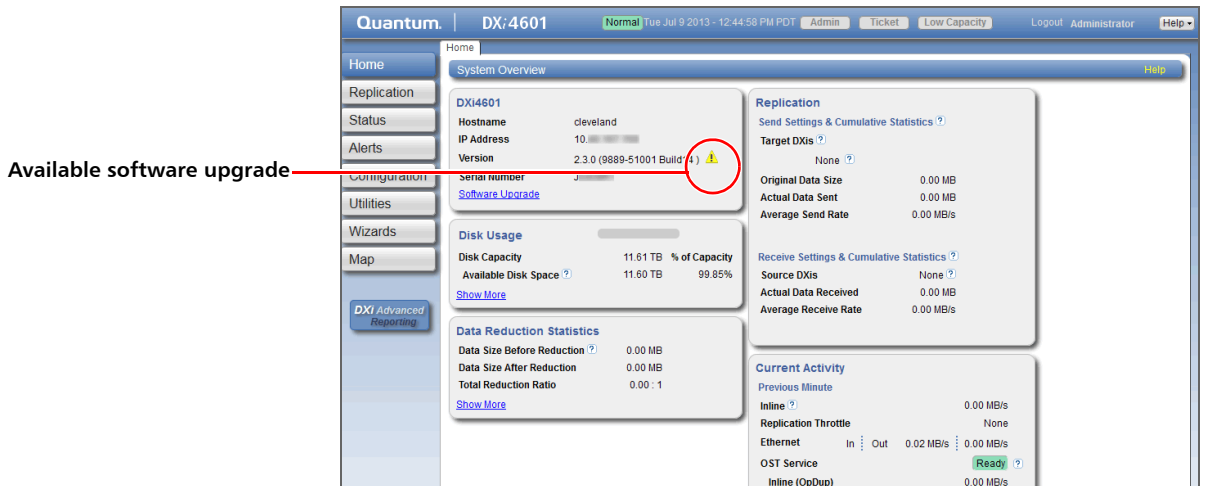
Automatically Checking for Upgrades

The DXi4000 can automatically check for available software upgrades on a daily basis. If a software upgrade is found, you will be notified by an admin alert as well as by a Quick Tip icon on the **Home** page, next to

the current software version (see [Figure 168](#)).

On the **Software Upgrade Utility**, select the **Check daily for software upgrades** check box to enable automatic upgrade checking. Automatic upgrade checking is enabled by default. To disable automatic upgrade checking, clear the **Check daily for software upgrades** check box (not recommended).

Figure 168 Home Page -
Software Upgrade Available



Manually Checking for Upgrades

To check for available software upgrades at any time, on the **Software Upgrade Utility**, click **Check Now**.

If a software upgrade is available, you can read information about the contents of the upgrade and, if you choose, download and install it.

Downloading and Installing Upgrades

If a software upgrade is available (after automatically or manually checking for upgrades), a summary describing the upgrade displays on the **Software Upgrade Utility**.

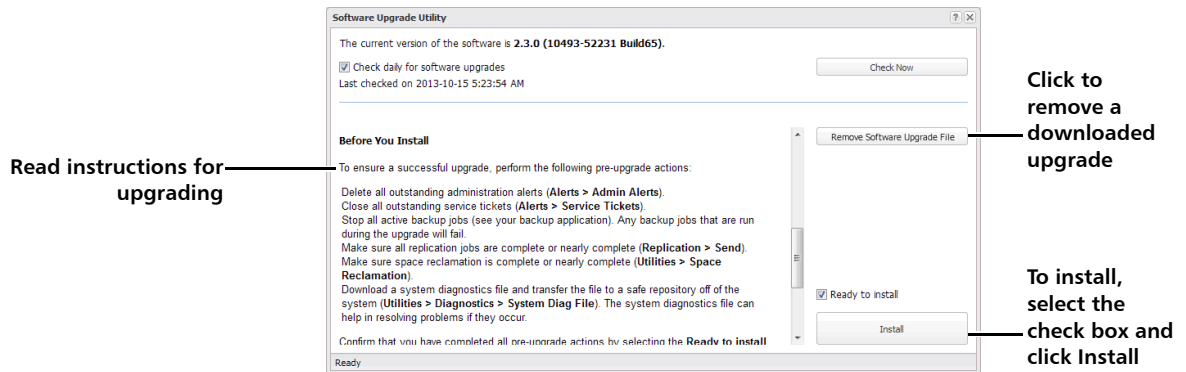
To download and install an available software upgrade:

1 On the **Software Upgrade Utility**, click **Download**.

The bottom status bar displays download progress. It will take several minutes to download the upgrade, depending on network speeds. You can use the DXi normally while the upgrade downloads. If you need to return to this window, click **Software Upgrade** on the **Home** page.

When the download is complete, a list of pre-upgrade actions displays (see [Figure 169](#)). These are important actions you should take prior to installing the upgrade.

Figure 169 Software Upgrade Utility - Software Upgrade Downloaded



2 To ensure the system is healthy before upgrading, read and follow the instructions in each of the pre-upgrade actions. The pre-upgrade actions can differ depending on the type of upgrade, but typical actions include the following:

- Address and delete all outstanding administration alerts (see [Admin Alerts](#) on page 141).
- Resolve and close all outstanding service tickets (see [Service Tickets](#) on page 143).

Note: Quantum recommends taking the following actions before upgrading.

- Stop all active backup jobs (see your backup application). Any backup jobs that are run during the upgrade will fail.
 - Make sure all replication jobs are complete (see [DXi4000 Replication](#) on page 85). If replication or synchronization jobs are nearly complete, Quantum recommends allowing them to complete before upgrading.
 - Make sure space reclamation is complete (see [Space Reclamation](#) on page 287). If space reclamation is nearly complete, Quantum recommends allowing it to complete before upgrading.
 - Download a system diagnostics file and transfer the file to a safe repository off of the DXi (see [System Diag File](#) on page 276). The system diagnostics file can help in resolving problems if they occur.
- 3 Confirm that you have completed all pre-upgrade actions by selecting the **Ready to install** check box.

Note: The **Ready to install** check box and the **Install** button are disabled if there are any outstanding administration alerts or service tickets.

- 4 To begin the upgrade process, click **Install**.

Read the onscreen information to learn what to expect during the upgrade. The bottom status bar displays installation progress, and a message displays if a reboot is required.

Depending on the type of upgrade, the DXi may be placed in service mode for about an hour. While in service mode, the system will shut down all backup and replication services. If necessary, the DXi will restart one or more times to complete the upgrade.

Note: If you decide not to install the software upgrade after downloading it, click **Remove Software Upgrade File** to remove the current download from the DXi.

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.

Uploading a Software Upgrade File

The **Software Upgrade** page allows you to upload and install a software upgrade file on the DXi4000. Use this upgrade method if the DXi cannot access the Internet.

Before you begin, download the software upgrade file on a computer connected to the Internet, and then copy the software upgrade file (.fw) to the computer you will use to access the DXi remote management console. You can download the software upgrade file and release notes from the Quantum Service and Support Web site:

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

To access the **Software Upgrade** page, click the **Utilities** menu, and then click the **Software Upgrade** tab (see [Figure 170](#)).

Figure 170 Software Upgrade Page



To upload a software upgrade file:

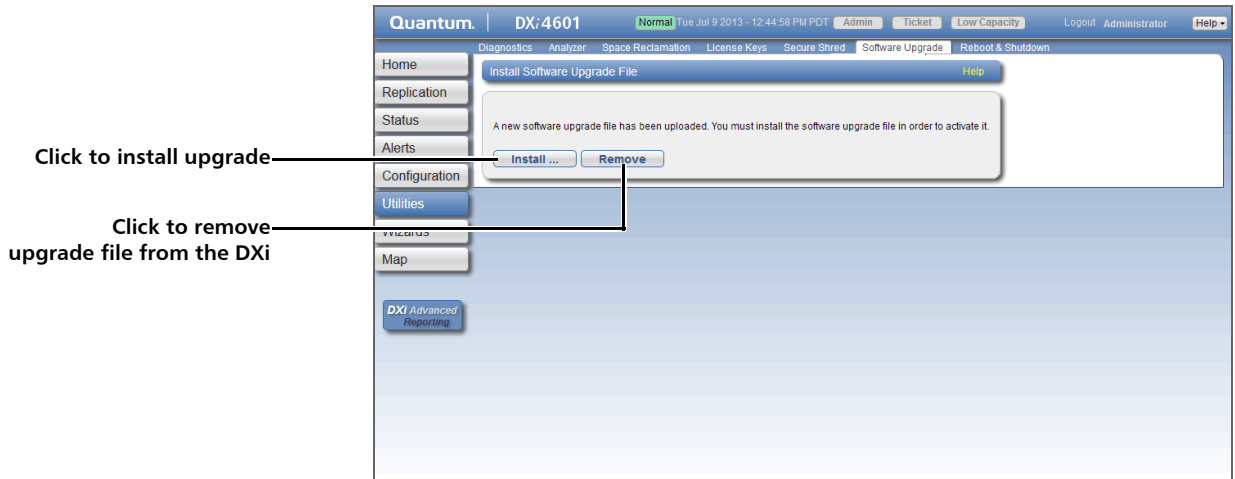
- 1 Click the **Browse** button to browse the system and locate the software upgrade file.
- 2 Click **Upload**.
- 3 Click **Start** to begin the upload process.

Do not close the window until the uploading and unpacking process is complete. An **Information** message displays stating the software upgrade file was uploaded successfully.

- 4 Click **OK**.

The **Software Upgrade** page indicates that a software upgrade file has been uploaded (see [Figure 171](#)).

Figure 171 Software Upgrade Page - Software Upgrade File Uploaded



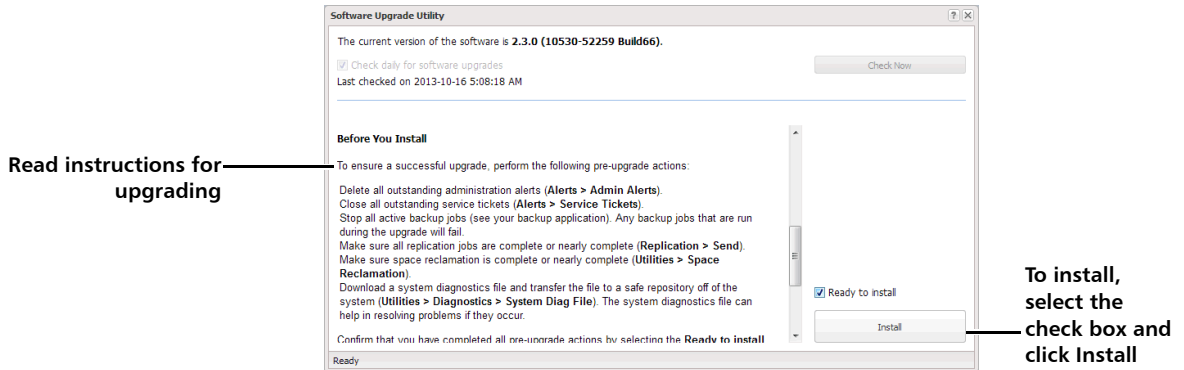
5 Click Install.

Note: If necessary, click the link to delete any outstanding administration alerts before proceeding.

Note: If you decide not to install the software upgrade file after uploading it, click **Remove** on the **Utilities > Software Upgrade** page to remove the uploaded software upgrade file from the DXi.

The **Software Upgrade Utility** displays (see [Figure 172](#)).

Figure 172 Software Upgrade Utility - Software Upgrade File Uploaded



6 To ensure the system is healthy before upgrading, read and follow the instructions in each of the pre-upgrade actions. The pre-upgrade actions can differ depending on the type of upgrade, but typical actions include the following:

- Address and delete all outstanding administration alerts (see [Admin Alerts](#) on page 141).
- Resolve and close all outstanding service tickets (see [Service Tickets](#) on page 143).

Note: Quantum recommends taking the following actions before upgrading.

- Stop all active backup jobs (see your backup application).
- Make sure all replication jobs are complete (see [DXi4000 Replication](#) on page 85). If replication or synchronization jobs are nearly complete, Quantum recommends allowing them to complete before upgrading.
- Make sure space reclamation is complete (see [Space Reclamation](#) on page 287). If space reclamation is nearly complete, Quantum recommends allowing it to complete before upgrading.

- Download a system diagnostics file and transfer the file to a safe repository off of the DXi (see [System Diag File](#) on page 276). The system diagnostics file can help in resolving problems if they occur.
- 7 After you have completed all pre-upgrade actions, confirm that you are ready to continue by selecting the **Ready to install** check box.

Note: The **Ready to install** check box and the **Install** button are disabled if there are any outstanding administration alerts or service tickets.

- 8 To begin the upgrade process, click **Install**.

Read the on-screen information to learn what to expect during the upgrade. The bottom status bar displays installation progress, and a message displays if a reboot is required.

Depending on the type of upgrade, the DXi may be placed in service mode for about an hour. While in service mode, the system will shut down all backup and replication services. If necessary, the DXi will restart one or more times to complete the upgrade.

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.

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 173](#)).

Caution: Before shutting down the DXi4000, make sure that all backup and replication jobs are finished, and that space reclamation activity is complete.

Figure 173 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**.

3 Close the browser window.

Note: Shutting down the system can take up to 15 minutes. Only the node will completely shut down. When rebooting, the system can take approximately 30 minutes to start up, depending on the amount of installed storage capacity.



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	<ul style="list-style-type: none"> • DXi4510 - 2.2 TB usable for data storage • DXi4520 - 4.4 TB usable for data storage • DXi4601 - Expandable storage capacity up to 12 TB: <ul style="list-style-type: none"> • 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) <p>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 291). To purchase a storage capacity upgrade license, contact your Quantum sales representative.</p>

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: NFS version: NFSv2 and NFSv3 Note: Samba version: 3.6.12
Hardware	Model 4510/4520/4601 4 ports 100/1000BASE-T 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, CSA 60950-1-03/UL 60950-1	

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	<p>EN55024/KN24:</p> <p>EN 61000-3-2 - Harmonic current emissions test</p> <p>EN 61000-3-3 - Voltage fluctuations and flicker in low-voltage supply systems test</p> <p>EN 55024:1998 - Information technology equipment - Immunity characteristics - Limits and methods of measurements</p> <p>EN 61000-4-2 - Electrostatic discharge immunity test</p> <p>EN 61000-4-3 - Radiated, radio-frequency, electromagnetic field immunity test</p> <p>EN 61000-4-4 - Electrical fast transient/burst immunity test</p> <p>EN 61000-4-5 - Surge immunity test</p> <p>EN 61000-4-6 - Immunity to conducted disturbances, induced by radio-frequency fields</p> <p>EN 61000-4-8 - Power frequency magnetic field immunity test</p> <p>EN 61000-4-11 - Voltage dips, short interruptions and voltage variations immunity test</p>

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 information about troubleshooting the DXi4000, see the following sections:

- [DXi4000 Status and Problem Reporting](#)
- [General Troubleshooting Actions](#)
- [Common Problems and Solutions](#)

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 143.

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 121.

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 276.

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 xxvi).
FATAL ERROR Unable to start blockpool! Message displays.	Contact your Quantum Customer Support representative (see Getting More Information or Help on page xxvi).

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 xxvi).
One power supply is not functioning.	Determine which power supply has failed by observing the fault LED on the power supply. Contact your Quantum Customer Support representative to arrange for service (see Getting More Information or Help on page xxvi).
Both power supplies are not functioning.	Determine which power supply has failed by observing the fault LED on the power supply. Contact your Quantum Customer Support representative to arrange for service (see Getting More Information or Help on page xxvi).

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 xxvi).
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 xxvi).
A hard drive is not responding	Determine which drive has failed by observing the 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 xxvi).
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
<p>The Ethernet link light on the DXi4000 is not lit when a cable is connected to a hub or switch.</p>	<p>Check to make sure the Ethernet cable is not a cross-over cable. Use only "straight" CAT-6 Ethernet cables.</p> <p>Port on the hub or switch is not active or damaged.</p> <p>Port on the DXi4000 is damaged. Contact the Quantum Customer Support department (see Getting More Information or Help on page xxvi).</p>
<p>The Ethernet link light on the switch or hub is not lit when a cable is connected to DXi4000 system.</p>	<p>Check to make sure the Ethernet cable is not a cross-over cable. Use only "straight" CAT-6 Ethernet cables.</p> <p>Port on the hub or switch is not active or damaged.</p> <p>Port on the DXi4000 is damaged. Contact the Quantum Customer Support department (see Getting More Information or Help on page xxvi).</p>
<p>DXi4000 system is not visible on the Ethernet network.</p>	<p>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 xxvi).</p>

Problem	Corrective Action
DXi4000 remote management pages are not visible.	<p>IF you cannot connect to the DXi4000 remote management pages, verify that the following network settings for the DXi4000 are correct:</p> <ul style="list-style-type: none"> • Hostname • IP addresses • Default gateway • Subnet mask • Domain name (optional)
An Ethernet cable is removed during normal operation.	<p>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.</p> <p>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.</p>

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.	<p>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.</p>

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. The 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.

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 xxvi).



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 receive 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.

