HITACHI
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Hitachi HiCommand™ Device Manager
Web Client User's Guide

HiCommand™ Device Manager Version 2.3

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Document Revision Level

Revision	Date	Description
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Source Documents for this Revision

- *Software Requirements Specification, HiCommand Device Manager R2.3*, Feb 12, 2003
- MK-91HC001-6b (Hitachi SSD and HDS reviews of this document)

Changes in this Revision

- **Added full support for managing 9900 LUN groups and WWN groups:** LUN groups and WWN groups are now discovered and displayed and can be added, modified, and deleted as needed from within HiCommand™ Device Manager. The Convert/Delete LUN Group, Convert/Delete WWN Group, and Config Check operations have been removed.
- **Revised storage group operations for improved functionality:**
  - Each line item now displays a path (previously LU). The Add Storage, Delete Storage, and Move Storage operations now apply to paths instead of LDEVs.
  - The LUNs in a storage group are no longer restricted to the same port. The port, Host Storage Domain (9900V, 9500V), and LUN information for each path is now displayed, and the number of LUNs in a group is now displayed.
  - The LUNs in a storage group can now have different LUN security settings (previously same LUN security). The LUN security for each path is now displayed.
  - The Move Storage operation now allows paths to be moved between groups while online (i.e., without deleting and adding actual paths to LDEVs).
  - LUSE devices can now be moved between storage groups (previously not supported).

- The Delete Storage operation now removes only the specified path(s) without affecting other path(s) to the same LU.
- A new option for the Delete Storage and Delete Group operations allows you to remove the paths from the group while keeping the access paths to the LDEVs.
- Changed the display of unallocated storage: The new All Storage/My Storage group displays all LUs available to the user organized by subsystem with an Allocated subgroup (LUNs) and an Unallocated subgroup (LDEVs/LUs) under each subsystem.

- **ShadowImage and TrueCopy integration:** Added display of ShadowImage (SI) and TrueCopy (TC) information for Hitachi storage subsystems (9900V, 9900, 9500V, 9200), including copy type (SI or TC), copy role (primary or secondary volume), copy status, volume attribute (CVS and/or LUSE), and command device.
- **HiCommand Tuning Manager integration:** Added a link-and-launch function to the HiCommand Tuning Manager software (Tools menu).
- **HiCommand Base integration:** HiCommand Base provides features that are common to all HiCommand Suite products (Device Manager, Tuning Manager, etc.), including user authentication and event/error logging.
- **Updates common to the Lightning 9900V, Thunder 9500V, and Thunder 9200 subsystems:**
  - LUSE devices can now be created using unallocated LDEVs (no path required) (new Create LUSE button on the Logical View of an Unallocated group).
  - Unallocated LUSE devices (no access paths) can now be canceled (new Delete LUSE button on the Logical View of an Unallocated group).
  - Added support for compound LUSE devices (LUSE device within a LUSE device).
- **Updates common to the Lightning 9900V and Lightning 9900 subsystems:**
  - The Create LDEV operation now adds the space required for the control area (125 MB for OPEN-V, 20 MB for other LU types) to the size specified by the user.
- **Updates specific to the Lightning 9900V storage subsystem:**
  - The Create LDEV operation supports the new OPEN-V LU type (maximum size is 2 TB with automatic LUSE above 60 GB).
  - Storage can now be moved into an empty group (supported for other subsystems).
  - The Storage Navigator link-and-launch function now allows direct access to the individual storage management functions (e.g., TrueCopy, FlashAccess).
- **Updates specific to the Lightning 9900 storage subsystem:**
  - The LUN group information is now displayed for each LUN in a storage group.
  - The Port Information panel now allows you to modify the LUN group and WWN group information for a port.
- **Updates specific to the Thunder 9500V storage subsystem:**
  - Added display of 9500V mode (LUN Security or LUN Management) to Physical View.
  - Added display of Host Storage Domain, Extended Mode (Host Mode2), and LUN Security to the Port Information panel.

Referenced Documents

- *HiCommand™ Device Manager Server Installation and Configuration Guide*, MK-91HC002
  HiCommand™ Device Manager Server Security Guide, MK-91HC003
  HiCommand™ Device Manager Agent Installation Guide, MK-92HC019
  HiCommand™ Device Manager Command Line Interface (CLI) User's Guide, MK-91HC007
  HiCommand™ Device Manager Error Codes, MK-92HC016
- *Hitachi Lightning 9900™ V Series User and Reference Guide*, MK-92RD100
  Hitachi Lightning 9900™ V Series Remote Console – Storage Navigator User's Guide, MK-92RD101
  Hitachi Lightning 9900™ V Series LUN Manager User's Guide, MK-92RD105
  Hitachi Lightning 9900™ V Series LUN Expansion (LUSE) and Virtual LVI/LUN User's Guide, MK-92RD104
- *Hitachi Lightning 9900™ User and Reference Guide*, MK-90RD008
  Hitachi Lightning 9900™ Remote Console User's Guide, MK-90RD003
  Hitachi Lightning 9900™ LUN Manager, LUSE, and SANtinel User's Guide, MK-91RD049
  Hitachi Lightning 9900™ Virtual LVI/LUN User's Guide, MK-90RD005
- *Hitachi Thunder 9500™ V Series User and Reference Guide*, MK-92DF601
  Hitachi Thunder 9500™ V Series Resource Manager 9500V User's Guide, MK-92DF605
  Hitachi Thunder 9500™ V Series SANtinel User's Guide, MK-92DF613
- *Hitachi Thunder 9200™ User and Reference Guide*, MK-90DF504
  Hitachi Thunder 9200™ Resource Manager 9200 User's Guide, MK-90DF505
  Hitachi Thunder 9200™ LUN Security 9200 User's Guide, MK-91DF554
- *Sun™ StorEdge™ T3 Disk Tray Configuration Guide*, 806-4210

Preface

This document describes and provides instructions for using the HiCommand™ Device Manager Web Client software for the Hitachi Freedom Storage™ and Sun™ StorEdge™ RAID subsystems. This document assumes that:

- The user has a background in data processing and understands peripheral storage device subsystems and their basic functions.
- The user has read and understands the user guide for the subsystem: *Hitachi Lightning 9900™ V Series User and Reference Guide*, *Hitachi Lightning 9900™ User and Reference Guide*, *Hitachi Thunder 9500™ V Series User and Reference Guide*, *Hitachi Thunder 9200™ User and Reference Guide*, *Sun™ StorEdge™ T3 Disk Tray Configuration Guide*.
- The user has read and understands the user guide(s) for the subsystem configuration functions (e.g., *Lightning 9900™ V Series LUN Manager User's Guide*, *Thunder 9200™ Resource Manager 9200 User's Guide*, *StorEdge™ T3 Disk Tray Configuration Guide*).
- The user has read and understands the user guide(s) for the data management functions (e.g., *Hitachi Lightning 9900™ Virtual LVI/LUN User's Guide*).
- The user is familiar with the operating system which hosts the HiCommand™ Device Manager Web Client software (e.g., Solaris™ OS, Windows NT® OS).

Note: The term "9900V" refers to the entire Lightning 9900™ V Series subsystem family (e.g., 9980V, 9970V), unless otherwise noted. The term "9900" refers to the entire Lightning 9900™ subsystem family (e.g., 9960, 9910), unless otherwise noted. The term "9500V" refers to the entire Thunder 9500V subsystem family (e.g., 9570V, 9580V), unless otherwise noted.

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Note: The use of the Sun™ StorEdge™ T3 array and all other Sun™ products is governed by the terms of your license agreement(s) with Sun™ Microsystems.

Software Version

This document revision applies to HiCommand™ Device Manager version 2.3.

COMMENTS

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Thank you!

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Chapter 1 Overview of HiCommand™ Device Manager

1.1 Overview of HiCommand™ Device Manager

HiCommand™ Device Manager consolidates storage operations and manages capacity for several models of RAID storage arrays, including Hitachi Freedom Storage™ and Sun™ StorEdge™ disk arrays. Targeted for users managing multiple storage arrays in open or shared environments, HiCommand™ Device Manager quickly discovers the key configuration attributes of storage systems and allows users to begin proactively managing complex and heterogeneous storage environments quickly and effectively using an easy-to-use browser-based GUI. HiCommand™ Device Manager enables remote storage management over secure IP connections and does not have to be direct-attached to the storage system. HiCommand™ Device Manager is a component of the HiCommand™ family of software products, Hitachi Data Systems' storage management framework.

HiCommand™ Device Manager provides a consistent, easy-to-use, and easy-to-configure set of interfaces for managing storage from a common GUI over an IP connection. The HiCommand™ Device Manager system includes the HiCommand™ Device Manager Server(s), the storage array(s) connected to the Servers, and the HiCommand™ Device Manager clients. The HiCommand™ Device Manager Web Client provides a web-distributed client for real-time interaction with the storage arrays being managed. The HiCommand™ Device Manager Command Line Interface (CLI) is targeted for expert users who prefer a character-based interface to create their own automation scripts.

HiCommand™ Device Manager gives storage administrators easier access to the existing array configuration, monitoring, and data management features and allows users to perform important operations such as adding/deleting storage, configuring volume paths, configuring fibre-channel ports, creating custom-size volumes, and managing LUN security.

Designed as an open framework, HiCommand™ Device Manager provides a set of application programming interfaces (APIs) which allow industry-leading software vendors to seamlessly integrate their applications with HiCommand™ Device Manager. Software vendors are writing to the HiCommand™ Device Manager APIs, including Sun™ Microsystems, VERITAS™, Microsoft®, BMC, Computer Associates™, and InterSAN™. Users can also "plug in" existing or new applications to the HiCommand™ Device Manager system. HiCommand™ Device Manager provides 'link-and-launch' integration with the Sun™ StorEdge Resource Management Suite software (SRM). Please contact your Hitachi Data Systems account team for the latest information on HiCommand™ Device Manager development partners.

HiCommand™ Device Manager provides user-defined hierarchical group management for disk storage. HiCommand™ Device Manager displays detailed information on the configuration of the storage arrays added to the HiCommand™ Device Manager Server and provides subsystem alert presentation. You can also configure HiCommand™ Device Manager to monitor and display volume usage statistics using the HiCommand™ Device Manager Agent (optional). HiCommand™ Device Manager's built-in report facility compiles and presents key information in preformatted reports (HTML) and as comma-separated values for export.

HiCommand™ Device Manager provides several levels of access and functionality for users:

- Access Control: Support for the System Administrator, Storage Administrator, guest user.
- Storage Management: Storage configuration and manipulation.
- System support: Web Client support, user administration, Agent activity, and security.

Note: The use of the HiCommand™ Device Manager product and all Hitachi Data Systems products is governed by the terms of your license agreement(s) with Hitachi Data Systems.

Note: The use of the Sun™ StorEdge™ T3 array and all Sun™ products is governed by the terms of your license agreement(s) with Sun™ Microsystems.

1.2 New Functions in HiCommand™ Device Manager 2.3

HiCommand™ Device Manager 2.3 provides the following new functions:

- Integration with HiCommand™ Suite Common Component to provide single sign-on capability and integrated logging for multiple HiCommand™ suite products.
- Display of ShadowImage and TrueCopy information for Hitachi storage subsystems.
- Link-and-launch function with single-sign on for HiCommand™ Tuning Manager.
- Support for the 9900V OPEN-V LU type with automatic LUSE configuration over 60 GB.
- Display of 9500V LUN Management mode, LUN Security mode, Extended Mode (Host Mode2), and Host Storage Domain.
- Display of and capability to modify 9900 LUN group and WWN group information.
- Support for compound LUSE devices (LUSE device within LUSE device, 9900V and 9500V).

HiCommand™ Device Manager 2.3 provides the following enhancements to existing functions:

- The link-and-launch function for 9900V Storage Navigator now provides direct access to the 9900V storage management functions (e.g., TrueCopy, FlashAccess, ShadowImage).
- Storage group operations now apply to paths instead of LDEVs/LUs, and the LUNs in a storage group are no longer restricted to the same port and the same LUN security settings. These changes provide the following improvements:
  - The Delete Storage operation now removes only the specified path(s) without affecting other paths to the same LDEV.
  - The Move Storage operation can now be performed while the LDEVs are online.
  - The LUNs in a storage group can now have different LUN security settings.
  - A new option for the Delete Storage and Delete Group operations allows you to remove the LUNs from the group while keeping the access paths to the LDEVs.
  - Storage (LUNs) can now be moved into an empty storage group.
  - LUSE devices can now be moved between storage groups (only the paths are moved).
- The Create LDEV operation now automatically adds the space required for the control area, making all of the user-specified space available for user data.
- LUSE devices can now be created using unallocated LDEVs (no path required), and unallocated LUSE devices (no access paths) can now be canceled (9900V, 9500V, 9200).

1.3 HiCommand™ Device Manager Software Components

The HiCommand™ Device Manager system consists of the following software components (see Figure 1.1):

- **HiCommand™ Suite Common Component.** HiCommand™ Device Manager 2.3 introduces integration with the HiCommand™ Suite Common Component, which provides features that are common to all HiCommand™ suite products. Single sign-on (SSO) user authentication and integrated event/error logging are now provided for HiCommand™ Device Manager and HiCommand™ Tuning Manager (version 1.1 and higher). Each HiCommand™ product now includes HiCommand™ Suite Common Component.
  - **Single sign-on.** Integrated single sign-on is used during the link & launch operation (see section 2.5). The already authenticated user ID and password are available to the launched HiCommand™ software, so that users do not need to re-enter their user ID and password. User privileges are maintained across HiCommand™ products.
  - **Common logging.** The HiCommand™ Suite Common Component integrated logging feature provides a common log repository for the various logs of the HiCommand™ suite products.
- **Server.** The HiCommand™ Device Manager Server is LAN-attached to the storage arrays and controls HiCommand™ Device Manager operations based on requests from the HiCommand™ Device Manager clients. The HiCommand™ Device Manager clients (e.g., Web Client, CLI, third-party application) communicate with the HiCommand™ Device Manager Server, and the HiCommand™ Device Manager Agent sends information to the HiCommand™ Device Manager Server.

  Note: For further information on the HiCommand™ Device Manager Server, refer to the *HiCommand™ Device Manager Server Installation and Configuration Guide*, MK-91HC002.
- **Clients:**
  - **Web Client.** The HiCommand™ Device Manager Web Client provides a web-based user interface for HiCommand™ Device Manager functions. The Web Client is a stand-alone Java™-based application which is deployed using the Java™ Web Start software. The Web Client communicates with and runs as a client of the HiCommand™ Device Manager Server.

    This document describes and provides instructions for installing and using the HiCommand™ Device Manager Web Client software.
  - **Command Line Interface (CLI).** The HiCommand™ Device Manager CLI enables you to perform HiCommand™ Device Manager operations by issuing commands from the system command line prompt. The HiCommand™ Device Manager CLI communicates with and runs as a client of the HiCommand™ Device Manager Server.

    Note: For further information on the HiCommand™ Device Manager CLI, please refer to the *HiCommand™ Device Manager Command Line Interface (CLI) User's Guide* (MK-91HC007).
  - **Third-party application.** HiCommand™ Device Manager supports third-party applications by providing an application program interface (API) that developers can use to interface with the HiCommand™ Device Manager Server. For details, please contact Hitachi Data Systems.

- **Agent (optional).** The HiCommand™ Device Manager Agent runs on the host server that is attached to one or more storage subsystems, collects data on the configuration and utilization of the attached storage, and sends this information to the HiCommand™ Device Manager Server. The HiCommand™ Device Manager clients display this information for the user when it is available on the Server. For further information on the HiCommand™ Device Manager Agent, please refer to the *HiCommand™ Device Manager Agent Installation Guide* (MK-92HC019).

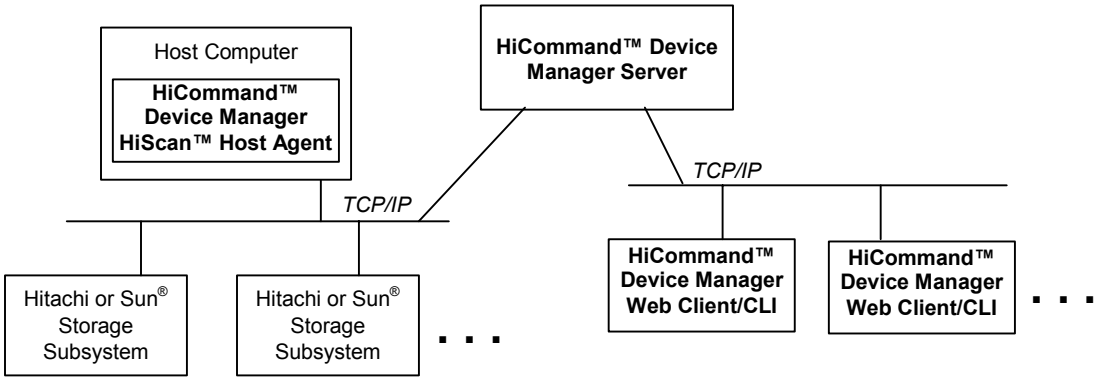


Figure 1.1 HiCommand™ Device Manager System and Software Components

1.4 Important Terms and Concepts

HiCommand™ Device Manager users should be familiar with the following terms and concepts:

- **Storage Group:** A user-defined set of paths (LUNs) which can be manipulated as a group. The LUNs in a storage group must physically reside in the same storage subsystem. A storage group cannot contain another group. Storage groups are displayed on the Logical View and Host View.
- **Logical Group:** A user-defined group of groups. A logical group can contain subordinate logical groups and/or storage groups containing LUNs. A logical group does not contain storage. Logical groups are displayed on the Logical View.
- **User Group:** A user-defined set of users which can be manipulated as a group. Users in a user group can only see and manage the logical groups, hosts, and volumes which are assigned to that user group. User groups are displayed on the User Group Administration panel (restricted to System and Local Administrators).
- **LUN Group:** A LUN security group on a 9900 subsystem. HiCommand™ Device Manager allows the user to manage LUN groups.
- **Host:** A user-defined set of worldwide names (WWNs) which represent a physical host server with one or more fibre-channel host bus adapters, each of which may have one or two ports with unique WWNs.
- **WWN Group:** A WWN group on a 9900 subsystem. HiCommand™ Device Manager allows the user to manage WWN groups.
- **Host Storage Domain:** An existing host group on a 9900V subsystem configured using the LUN Manager software on the 9900V Storage Navigator. HiCommand™ Device Manager displays the host storage domain information for the 9900V subsystem.
- **Logical View:** A display of the user-defined logical groups in HiCommand™ Device Manager. Top-level groups can be expanded to display the subgroups. The Logical View displays all storage managed by HiCommand™ Device Manager independent of the physical location of the storage. The Logical View can be structured as desired by the user (e.g., by platform, organizational department, etc.).
- **Physical View:** A display of the physical configuration information for the storage subsystems, for example: serial number, number and type(s) of ports, location and capacity of installed array groups, LDEVs and paths, and amount of cache memory.
- **Host View:** A display of the user-defined hosts in HiCommand™ Device Manager and the detailed storage information for each host, including allocated capacity and storage groups in use. The Host View displays allocated storage grouped by host server and by storage group.
- **Array (parity) group:** A set of hard disk drives which have the same capacity and are treated as one RAID unit. An array group contains user data and parity information, which ensures user data integrity in the event of a disk drive failure in the array group.

- **Discrete/normal VDEV:** Discrete VDEV configuration (9900V RAID5 7D+1P only) involves using two parity groups to create a VDEV (array group in HiCommand™ Device Manager). A normal VDEV is created on a single parity group.
- **LDEV:** A logical device on a storage subsystem. An **unallocated** LDEV is not mapped to a LUN (no access path). An **allocated** LDEV has one or more access paths (LUNs).
- **LU/volume:** A logical unit on a storage subsystem. In most cases an LU, or volume, is the same as an LDEV. An exception is a LUN Expansion (LUSE) device, which is an LU consisting of multiple LDEVs.
- **Volume path/LUN:** A path to an LU (volume) in a storage subsystem which maps the LU to a port and LU number (LUN). Each LU can have one or more paths, and each path can have different LUN security settings.
  - The Hitachi Lightning 9900™ V Series subsystem supports a maximum of **8,192** paths.
  - The Lightning 9900™ subsystem supports a maximum of **4,096** paths.
  - The Thunder 9500™ V Series subsystem supports a maximum of **1,024** paths.
  - The Thunder 9200™ subsystem supports a maximum of **64** paths.
  - The Sun™ StorEdge™ T3 array supports a maximum of **4** paths (partner-pair configuration).

Chapter 2 HiCommand™ Device Manager Operations

HiCommand™ Device Manager operations include:

- User groups and user access levels (see section 2.1),
- Storage management operations (see section 2.2),
- Subsystem and volume configuration operations (see section 2.3),
- Data management operations (see section 2.4),
- Link-and-Launch operations (see section 2.5),
- Report operations (see section 2.6), and
- System security operations (see section 2.7).

2.1 User Groups and User Access Levels

HiCommand™ Device Manager provides three levels of user access (see Table 2.1): system administrator, storage administrator, and guest. Each HiCommand™ user is identified by user ID (login name) and password during the login process. HiCommand™ Device Manager also allows you to define user groups tailored to your specific access requirements. See section 5.6 for instructions on performing user group operations. See section 5.7 for instructions on performing user account operations.

The basic levels of HiCommand™ Device Manager user access are:

- **System Administrator.** The System Administrator(s) is/are responsible for creating user accounts and user groups and assigning user access capabilities for HiCommand™ Device Manager. System Administrators have access to all HiCommand™ Device Manager functions, including storage configuration and data management operations as well as user group and user account operations. System Administrators can control HiCommand™ Device Manager user access on an object-by-object basis. A user assigned to a user group as "Local System Administrator" has System Administrator access for the resources assigned to that user group.
- **Storage Administrator.** The Storage Administrator(s) can perform all storage configuration and data management operations. Storage Administrators do not have access to the HiCommand™ Device Manager user operations. A user assigned to a user group as "Local Storage Administrator" has Storage Administrator access for the resources assigned to that user group.
- **Guest User.** Guest users can view the existing HiCommand™ Device Manager and subsystem information, including alerts and historical performance data collected by HiCommand™ Device Manager. Guest users do not have access to any HiCommand™ Device Manager operations. A user assigned to a user group as "Local Guest" has Guest access for the resources assigned to that user group.
- **Peer.** This group is only utilized via the HiCommand™ Device Manager Agent and HiCommand™ Suite Common Component. Peer users are not allowed to use the Web Client.

Note: HiCommand™ Device Manager users with the authority to administer other users cannot give other users greater authority than their own level of authority.

Note: Users assigned to a user-defined user group can access and operate only the resources (logical groups, hosts, LDEVs) that are assigned to the user group (see also section 5.6).

Table 2.1 HiCommand™ Device Manager User Groups

User Type	Description
System Administrator	Manages HiCommand™ Device Manager Web Client user accounts and user groups.
Storage Administrator	Performs storage configuration and management functions.
Guest User	Has view privileges only.
Peer	Reserved for peer connections: The **HaUser** user is for HiCommand™ Device Manager Agent only. The **hbase** user is for HiCommand™ Suite Common Component only.

2.2 Storage Management Operations

HiCommand™ Device Manager allows you to perform storage management operations for the storage on the subsystems which have been added to HiCommand™ Device Manager.

- **Storage Groups.** HiCommand™ Device Manager allows you to create and manage groups of LUNs (volume paths). The LUNs assigned to a storage group can be manipulated as a group. Storage groups must contain logical devices from the same storage subsystem. A storage group can contain only LUNs, not other groups.

- **Logical Groups.** HiCommand™ Device Manager allows you to create and manage one or more storage groups under a logical group. A logical group can contain storage groups containing LUNs or additional logical groups. This additional level of grouping creates a file-system approach to storage management and allows you to tailor your HiCommand™ Device Manager system to your operational environment.

- **User Groups.** HiCommand™ Device Manager allows you to create and manage one or more user groups. Each user group is associated with one or more logical groups, hosts, and LDEVs, which will be visible to the users in the user group. When you add a new user and specify the user group for the new user, this user will only be able to access the resources (logical groups, hosts, LDEVs) associated with that user group.

2.3 Subsystem and Volume Configuration Operations

The HiCommand™ Device Manager 2.3 Web Client enables you to view and manage the configuration of Hitachi Lightning 9900™ V Series (9900V), Hitachi Lightning 9900™, Hitachi Thunder 9500™ V Series, Hitachi Thunder 9200™, and Sun™ StorEdge™ T3 array storage subsystems from a web browser.

HiCommand™ Device Manager 2.3 provides the following functions for all supported storage subsystems:

- **Subsystem Discovery.** When you add a subsystem to HiCommand™ Device Manager, the HiCommand™ Device Manager Server discovers the storage subsystem on the HiCommand™ Device Manager system network and determines its identity (e.g., serial number, IP address) and configuration.
- **Configuration Display.** HiCommand™ Device Manager displays detailed configuration information for each storage subsystem added, including: logical volume and physical disk drive information, array groups, RAID levels, ports, cache memory, microcode levels, and other subsystem-specific information (e.g., capacity for 9200 and T3, number and type of back-end array processors (ACPs) for 9900V and 9900).
  - **LUN Scan.** The LUN Scan operation (see section 6.1.3) examines all LUNs on the subsystem and automatically creates a hierarchy of logical groups and storage groups within the top-level LUN Scan logical group. A LUN Scan should be performed immediately after a subsystem discovery and after a subsystem Refresh operation.
  - **Refresh.** The Refresh operation (see section 6.1.4) rediscovers a storage subsystem. Perform a Refresh operation when changes have been made to the storage subsystem other than through the HiCommand™ Device Manager system.
- **Alert Presentation.** HiCommand™ Device Manager displays SNMP traps, errors, and other conditions for each storage subsystem which has been added to the HiCommand™ Device Manager Server (see section 6.1.5).

2.3.1 Configuration Operations for the Lightning 9900™ V Series Subsystem

The Lightning 9900™ V Series subsystem provides many benefits and advantages as well as advanced new features for the user, including double or more scalability from the 9900 subsystem in both capacity and performance. The 9900V subsystem supports an intermix of fibre-channel, ESCON®, and FICON™ host attachment for heterogeneous environments and provides high performance, high reliability, and high scalability in network-attached storage (NAS) and storage-area network (SAN) environments. The 9900V subsystem employs and improves upon the key characteristics of generations of successful Hitachi disk storage subsystems to achieve the highest level of performance and reliability currently available. The advanced components, functions, and features of the Lightning 9900™ V Series represent an integrated approach to data retrieval and storage management.

HiCommand™ Device Manager supports the following subsystem and volume configuration functions for the Hitachi Lightning 9900V subsystem:

- **Configure Ports.** HiCommand™ Device Manager allows you to configure the host mode and fibre topology settings for the fibre-channel ports on the Lightning 9900V subsystem (see section 6.2.1).
- **Configure Adapters.** HiCommand™ Device Manager allows you to configure the speed mode for the fibre-channel adapters on the 9900V subsystem (see section 6.2.4). Standard mode is the default mode. High-speed mode provides faster access speed by using more processors to handle data access. However, high-speed mode limits the number of available ports to one port on the channel adapter (CHA) board.
- **Create/Delete LDEVs.** HiCommand™ Device Manager allows you to create new LDEVs and delete existing LDEVs on the Hitachi 9900V subsystem (see sections 6.3.4, 6.3.5). You can create standard OPEN-x LDEVs or custom-size Virtual LVI/LUN devices which are smaller than standard LDEVs (minimum size = 36,000 KB for other than OPEN-V, 48,000 KB for OPEN-V).
- **Configure LUN Expansion (LUSE).** HiCommand™ Device Manager allows you to configure custom-size LUSE volumes on the Hitachi 9900V subsystem. A LUSE device is a combined LU which can be from 2 to 36 times larger than a standard OPEN-x LU. LUSE devices are created from unallocated LDEVs (see sections 6.4 and 6.6.1).

2.3.2 Configuration Operations for the Lightning 9900™ Subsystem

The Hitachi Lightning 9900™ subsystem provides high-speed response, continuous data availability, scalable connectivity, and expandable capacity for heterogeneous storage environments. The Lightning 9900™ is designed for use in 7×24 data centers that demand high-performance, non-stop operation. The 9900 is compatible with industry-standard software and supports concurrent attachment to multiple host systems and platforms. The 9900 subsystem can operate with multihost applications and host clusters and is designed to handle very large databases as well as data warehousing and data mining applications that store and retrieve terabytes of data. The Lightning 9900™ provides up to 32 host interface ports and can be configured for all-open, multiplatform, or all-mainframe operations.

HiCommand™ Device Manager 2.3 supports the following subsystem and volume configuration functions for the Hitachi Lightning 9900™ subsystem:

- **Configure Ports.** HiCommand™ Device Manager allows you to configure the host mode and fibre topology settings for the fibre-channel ports on the Lightning 9900™ subsystem (see section 6.2.1).
- **Configure Adapters.** HiCommand™ Device Manager allows you to configure the speed mode for the fibre-channel adapters on the Lightning 9900™ subsystem (see section 6.2.4). Standard mode is the default mode. High-speed mode provides faster access speed by using more processors to handle data access. However, high-speed mode limits the number of available ports to half of the ports on the channel adapter board.
- **Configure LUN and WWN Groups.** HiCommand™ Device Manager allows you to configure the LUN groups and WWN groups on the Lightning 9900™ subsystem, including adding, deleting, and modifying LUN groups and WWN groups (see sections 6.2.2 and 6.2.3).
- **Create/Delete LDEVs.** HiCommand™ Device Manager allows you to create new LDEVs and delete existing LDEVs on the Lightning 9900™ subsystem (see sections 6.3.4, 6.3.5). You can create standard OPEN-x LDEVs or custom-size **Virtual LVI/LUN** devices which are smaller than standard LDEVs (minimum size = 36,000 KB).
- **LUN Expansion (LUSE).** HiCommand™ Device Manager allows you to configure custom-size LUSE volumes on the Lightning 9900™ subsystem. A LUSE device is a combined LU which can be from 2 to 36 times larger than a standard OPEN-*x* LU. LUSE devices are created from unallocated LDEVs (see sections 6.4 and 6.6.1).

2.3.3 Configuration Operations for the Thunder 9500™ V Series Subsystem

The Hitachi Thunder 9500™ V Series subsystem is a high-performance, medium-capacity storage array with added features designed to reduce the possibility of data loss due to the failure of any single component. Disk array installation and setup are simplified using the Resource Manager 9500V program included with the subsystem. Many parts are replaceable while the disk array is online. Cache memory has a battery backup to preserve cache contents in the event of a power failure.

HiCommand™ Device Manager 2.3 supports the following subsystem and volume configuration functions for the Hitachi Thunder 9500™ V Series subsystem:

- **Configure Ports.** HiCommand™ Device Manager allows you to configure the host mode and fibre topology settings for the fibre-channel ports on the Thunder 9500V subsystem (see section 6.2.1).
- **Create/Delete Array Groups.** HiCommand™ Device Manager allows you to create new array groups and delete existing array groups on the Thunder 9500V subsystem (see sections 6.3, 6.3.6).
- **Create/Delete LDEVs.** HiCommand™ Device Manager allows you to create new LDEVs (internal LUs) and delete existing LDEVs on the Thunder 9500V subsystem (see sections 6.3.4, 6.3.5).
- **Configure Spare Drives.** HiCommand™ Device Manager allows you to configure the spare drives on the Thunder 9500V subsystem (see section 6.3.3).
- **LUN Expansion (LUSE).** HiCommand™ Device Manager allows you to configure custom-size LUSE volumes on the Thunder 9500V subsystem. A LUSE device is a combined LU which can be larger than a standard LU. LUSE devices are created from unallocated LDEVs (see sections 6.4 and 6.6.1).

Note: The 9500V subsystem provides two functions to increase the size of an LU: Unified LU, and LU Expansion. HiCommand™ Device Manager 2.3 supports the Unified LU function, which concatenates different LDEVs to create a larger size LU. The LU Expansion function, which increases LU size without concatenating other LDEVs, is not yet supported.

2.3.4 Configuration Operations for the Thunder 9200™ Subsystem

The Hitachi Thunder 9200™ is a high-performance, medium-capacity storage array with added features designed to reduce the possibility of data loss due to the failure of any single component. Disk array installation and setup are simplified using the Resource Manager 9200 program included with the subsystem. Many parts are replaceable while the disk array is online. Cache memory has a battery backup to preserve cache contents in the event of a power failure.

HiCommand™ Device Manager 2.3 supports the following subsystem and volume configuration functions for the Hitachi Thunder 9200™ subsystem:

- **Configure Ports.** HiCommand™ Device Manager allows you to configure the host mode and fibre topology settings for the fibre-channel ports on the Thunder 9200™ subsystem (see section 6.2.1).
- **Create/Delete Array Groups.** HiCommand™ Device Manager allows you to create new array groups and delete existing array groups on the Thunder 9200™ subsystem (see sections 6.3, 6.3.6).
- **Create/Delete LDEVs.** HiCommand™ Device Manager allows you to create new LDEVs (internal LUs) and delete existing LDEVs on the Thunder 9200™ subsystem (see sections 6.3.4, 6.3.5).
- **Configure Spare Drives.** HiCommand™ Device Manager allows you to configure the spare drives on the Thunder 9200™ subsystem (see section 6.3.3).
- **LUN Expansion (LUSE).** HiCommand™ Device Manager allows you to configure custom-size LUSE volumes on the Thunder 9200™ subsystem. A LUSE device is a combined LU which can be larger than a standard LU. LUSE devices are created from unallocated LDEVs (see sections 6.4 and 6.6.1).

Note: The 9200 subsystem provides two functions to increase the size of an LU: Unified LU, and LU Expansion. HiCommand™ Device Manager 2.3 supports the Unified LU function, which concatenates different LDEVs to create a larger size LU. The LU Expansion function, which increases LU size without concatenating other LDEVs, is not yet supported.

2.3.5 Configuration Operations for the Sun™ StorEdge™ T3 Array

The Sun™ StorEdge™ T3 disk tray is a high-performance storage device that provides a RAID architecture for modular, scalable data storage. The StorEdge™ T3 disk tray contains the controller card and nine disk drives with fibre-channel connectivity to the data host. The disk tray includes redundant, hot-swappable components and automatic notification of failed components. The disk tray can be used either as a standalone storage unit or as a building block, interconnected with other StorEdge™ T3 disk trays and configured in various ways to provide a storage solution optimized to the host application.

The StorEdge™ T3 supports either one or two array groups either with, or without, a spare drive. Each array group may contain exactly one LU, and the LU is mounted on (connected to) the single port of the T3. For example, all nine drives of a T3 may be configured into a single RAID group and LU with a capacity of approximately 585 GB (for the standard 73-GB disk drives). Or, the T3 array may be configured into two RAID groups and LDEVs: one group of five disk drives, and a second group of four disk drives. A third example would be two four-drive RAID groups and one spare drive (4+4+1).

In the optional *partner-pair* configuration, one T3 is physically placed on top of another, and the two T3 units are interconnected via cables. In this configuration, the pair of T3s may be managed externally as a single unit, appearing to be a single storage array with 18 disk drives, two controllers, and two ports. With up to two array groups and two LDEVs per T3 array, a partner-paired T3 unit can have between two and four LDEVs.

In the partner-pair configuration, the T3 supports the multipathing option. When the multipathing option is on, LDEVs on either individual T3 array may be exposed through the port on the partner T3 in addition to the port on the T3 in which the LU physically exists. ***Note:*** HiCommand™ Device Manager cannot turn the T3 multipathing option on or off. This must be done using the T3's standard telnet interface (please refer to the T3 user documentation).

In most cases, a new T3 array is configured with one large LU. If this is your desired configuration, no additional steps are necessary with HiCommand beyond discovering the array and performing the LUN Scan. If you want to reconfigure the array, you will have to delete the existing LU and array group before reconstructing the array as desired.

HiCommand™ Device Manager 2.3 supports the following subsystem and volume configuration functions for the Sun™ StorEdge™ T3 array:

- **Create/Delete Array Group.** HiCommand™ Device Manager allows you to create new array groups and delete existing array groups on the Sun™ StorEdge™ T3 array (sections 6.3.2, 6.3.6).
- **Create/Delete LDEV.** HiCommand™ Device Manager allows you to create new LDEVs and delete existing LDEVs on the Sun™ StorEdge™ T3 storage array (see sections 6.3.4, 6.3.5).
- **Configure Spare Drives.** HiCommand™ Device Manager allows you to configure the spare drive on the Sun™ StorEdge™ T3 storage array (see section 6.3.2). On the T3, you can add a spare drive (optionally) at the same time as new array group creation. The spare drive is deleted when you delete the array group which is associated with the spare drive.

2.4 Data Management Operations

HiCommand™ Device Manager allows you to perform data management operations such as path assignment and LUN security (if available) on the subsystems which have been added to HiCommand™ Device Manager.

2.4.1 Data Management Operations for the Lightning 9900™ V Series Subsystem

LUN Management. HiCommand™ Device Manager enables you to perform the following LUN management functions on the 9900V subsystem:

- **Add/Delete Volume Path.** HiCommand™ Device Manager allows you to add and delete volume paths (i.e., port, host storage domain, LUN) for the LDEVs on the connected 9900V subsystems. The 9900V subsystem supports a maximum of 8,192 volume paths.

  Note on High Availability: HiCommand™ Device Manager allows you to configure multiple paths to volumes as needed for path failover capability.

LUN Security. HiCommand™ Device Manager enables you to perform the following LUN security functions on the 9900V subsystem:

- **Secure/Unsecure Volumes.** HiCommand™ Device Manager allows you to secure and unsecure volumes (LUNs) as needed (i.e., add host(s) to or remove host(s) from a host storage domain). After a LUN has been secured, only hosts with the specified WWNs are permitted to access the LUN.

For further information on 9900V LUN management and LUN security, please refer to the *Hitachi Lightning 9900™ V Series LUN Manager User's Guide* (MK-92RD105).

2.4.2 Data Management Operations for the Lightning 9900™ Subsystem

LUN Management. HiCommand™ Device Manager 2.3 enables you to perform the following LUN management functions on the 9900 subsystem.

- **Add/Delete Volume Path.** HiCommand™ Device Manager allows you to add and delete volume paths (i.e., port, LUN) for the LDEVs on the connected 9900 subsystems. The Hitachi Lightning 9900™ subsystem supports a maximum of 4,096 volume paths.

  Note on High Availability: HiCommand™ Device Manager allows you to configure multiple paths to volumes as needed for path failover capability.

LUN Security. HiCommand™ Device Manager enables you to perform the following LUN security (Hitachi SANtinel) functions on the 9900 subsystem.

- **Configure LUN Groups.** HiCommand™ Device Manager allows you to configure LUN groups, including adding, deleting, and modifying LUN groups.
- **Configure WWN Groups.** HiCommand™ Device Manager allows you to configure WWN groups, including adding, deleting, and modifying WWN groups. The WWNs assigned to a WWN group can be manipulated as a group.
- **Secure/Unsecure Volumes.** HiCommand™ Device Manager allows you to secure and unsecure volumes (LUNs) as needed. After a LUN has been secured, only hosts with the specified WWNs are permitted to access the LUN.

For further information on 9900 LUN management and LUN security, please refer to the *Hitachi Lightning 9900™ LUN Manager User's Guide* (MK-90RD003).

2.4.3 Data Management Operations for the Thunder 9500™ V Series Subsystem

LUN Management. HiCommand™ Device Manager 2.3 enables you to perform the following LUN management functions on the Thunder 9500V subsystem:

- **Add/Delete Volume Path.** HiCommand™ Device Manager allows you to add and delete volume paths (i.e., port, LUN) for the LDEVs on the connected 9500V subsystems. The Hitachi Thunder 9500V subsystem supports a maximum of 1,024 volume paths.

  Note on High Availability: HiCommand™ Device Manager allows you to configure multiple paths to volumes as needed for path failover capability.

LUN Security. HiCommand™ Device Manager enables you to perform the following LUN security functions on the Thunder 9500V subsystem:

- **Secure/Unsecure Volumes.** HiCommand™ Device Manager allows you to secure and unsecure volumes (LUNs) as needed. After a LUN has been secured, only the specified WWN(s) is/are permitted to access the LUN.

For further information on 9500V LUN management and LUN security, please refer to the *Hitachi Thunder 9500™ V Series Resource Manager 9500V User's Guide* (MK-92DF605) and *Hitachi Thunder 9500™ V Series SANtinel User's Guide* (MK-92DF613).

2.4.4 Data Management Operations for the Thunder 9200™ Subsystem

LUN Management. HiCommand™ Device Manager 2.3 enables you to perform the following LUN management functions on the Thunder 9200™ subsystem.

- **Add/Delete Volume Path.** HiCommand™ Device Manager allows you to add and delete volume paths (i.e., port, LUN) for the LDEVs on the connected 9200 subsystems. The Hitachi Thunder 9200™ subsystem supports a maximum of 64 volume paths.

  Note on High Availability: HiCommand™ Device Manager allows you to configure multiple paths to volumes as needed for path failover capability.

LUN Security. HiCommand™ Device Manager enables you to perform the following LUN security functions on the 9200 subsystem:

- **Secure/Unsecure Volumes.** HiCommand™ Device Manager allows you to secure and unsecure volumes (LUNs) as needed. After a LUN has been secured, only the specified WWN(s) is/are permitted to access the LUN.

For further information on 9200 LUN management and LUN security, please refer to the *Hitachi Thunder 9200™ Resource Manager 9200 User's Guide* (MK-90DF505).

2.4.5 Data Management Operations for the Sun™ StorEdge™ T3 Array

LUN Management. HiCommand™ Device Manager 2.3 enables you to perform the following LUN management functions on the StorEdge™ T3 array.

- **Add/Delete Volume Path.** HiCommand™ Device Manager allows you to add and delete volume paths (i.e., port, LUN) for the LDEVs on the connected T3 arrays. The Sun™ StorEdge™ T3 array (partner-pair configuration) supports a maximum of eight volume paths (four LUNs on two ports).

  Note on High Availability: HiCommand™ Device Manager allows you to configure multiple paths to volumes as needed for path failover capability.

For further information on T3 LUN management, please refer to the *Sun™ StorEdge™ T3 Disk Tray Configuration Guide* (806-4210).

2.5 Link-and-Launch Operations

The HiCommand™ Device Manager link-and-launch feature allows administrators to easily move across storage management software for a full view of their storage resources. HiCommand™ Device Manager 2.3 provides link-and-launch integration with the following software applications (see Figure 2.2 and Figure 2.1):

- **HiCommand™ Tuning Manager:** select the Tool menu, and then select Tuning Manager. Tuning Manager provides information for centrally managing a network environment that contains a SAN. The Tuning Manager software monitors the entire network and collects key performance data from storage subsystems. Tuning Manager simplifies network management work and helps reduce maintenance costs.

  The availability of launched Tuning Manager features depends on the privileges of the logged-in HiCommand™ Device Manager user:

  - The System Administrator and Storage Administrator can launch HiCommand™ Tuning Manager, and all features of Tuning Manager are available.
  - Guest users can launch Tuning Manager but are restricted to viewing only.
  - Local users (Local System Administrator, Local Storage Administrator, Local Guest) cannot launch Tuning Manager. A future release of Tuning Manager will support access corresponding to the HiCommand™ access (i.e., My Storage definitions).

  Important: In order to launch Tuning Manager, you must set the application start-up information to HiCommand Suite Common Component. Please see the *HiCommand Device Manager Server Installation and Configuration Guide* (MK-91HC002) for instructions on setting up the application start-up information.

- **Hitachi Dynamic Link Manager (HDLM):** on the Host View select the desired host, and then select the Dynamic Link Manager button.
- **Storage Navigator:** on the Physical View select the desired 9900V subsystem, select Storage Navigator, and then select the desired function (e.g., FlashAccess, TrueCopy).
- **StorEdge SRM**. The Sun™ StorEdge™ Resource Management Suite (SRM) software provides simple, easy-to-use reports of the logical and physical attributes associated with multi-vendor storage environments. Reports generated from this software can help administrators accurately assess current conditions and view trending analysis to make informed decisions to optimize their storage environment. SRM provides a similar link to HiCommand™ Device Manager.

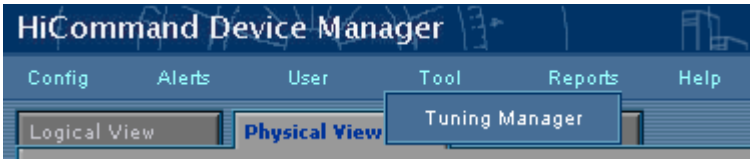


Figure 2.1 Link-and-Launch Menu Command for HiCommand™ Tuning Manager

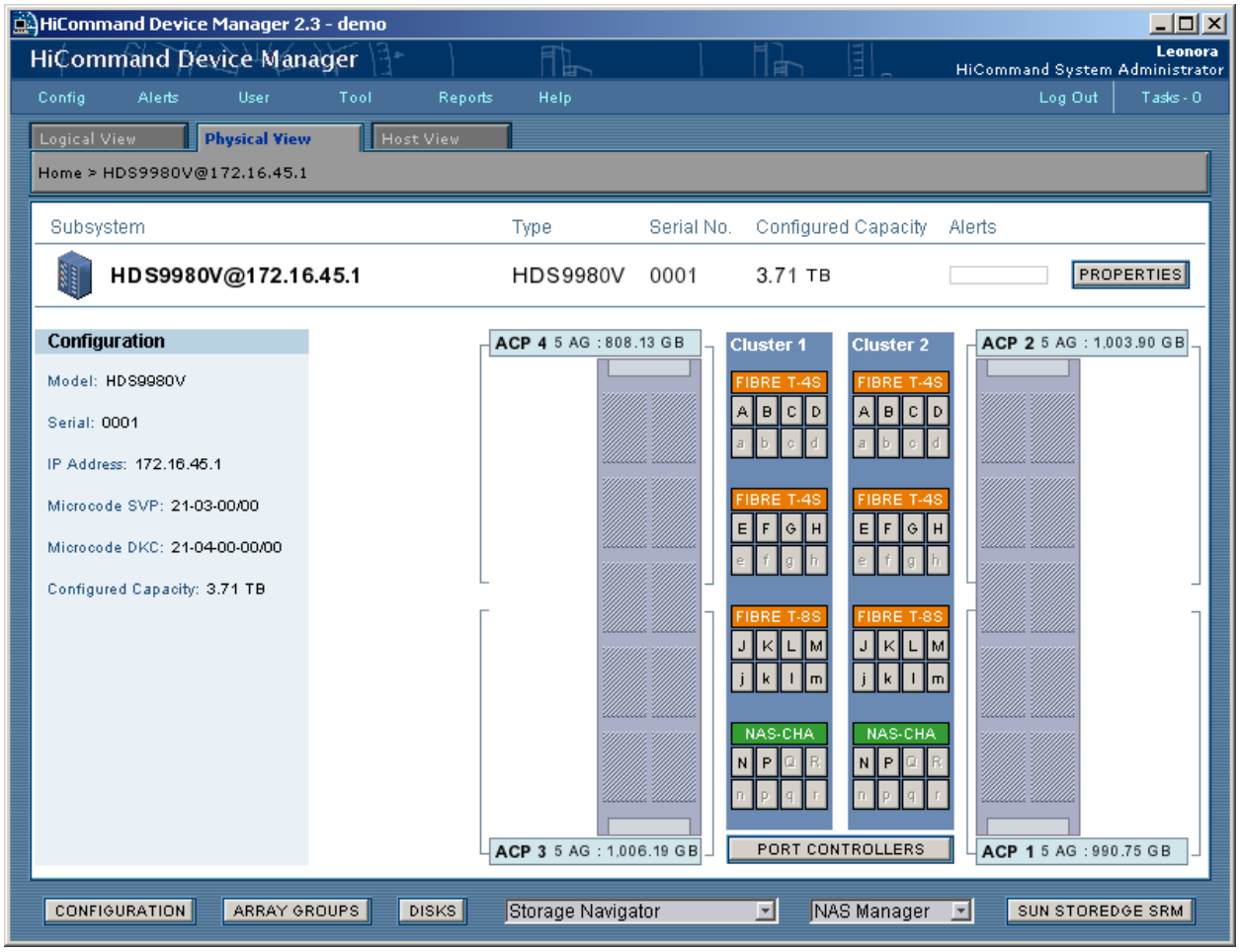


Figure 2.2 Link-and-Launch Buttons

2.6 Report Operations

HiCommand™ Device Manager provides a built-in reporting function which allows the user to generate reports in HTML format and as comma-separated value (CSV) files (see section 5.9).

The HiCommand™ Device Manager reports include:

- Physical configuration of the storage arrays being managed by HiCommand™ Device Manager,
- Storage utilization organized and presented by host,
- Storage utilization organized and presented by logical group, and
- HiCommand™ Device Manager users and permissions.

2.7 System Security Operations

HiCommand™ Device Manager can be deployed securely in a variety of operational environments, including private LAN, virtual private network (VPN), corporate intranet, and even public internet. The security features for HiCommand™ Device Manager communications (e.g., between Web Client and Server) can be customized for your operational environment.

HiCommand™ Device Manager provides an end-to-end security context between the user and HiCommand™ Device Manager Server which prevents message tampering and provides privacy, user authentication, and nonrepudiation. Messages between the HiCommand™ Device Manager Web Client and HiCommand™ Device Manager Server are secured when the server is running in security mode 2 (SSL/TSL). The HiCommand™ Suite Common Component single sign-on feature (see section 1.3) maintains user authentication across HiCommand™ products.

HiCommand™ Device Manager also provides an audit log of all operations and allows you to combine and archive the audit logs for historical analysis. The HiCommand™ Suite Common Component integrated logging feature (see section 1.3) provides a common log repository for the various logs of the HiCommand™ suite products.

For further information on the HiCommand™ Device Manager security operations, please refer to the *HiCommand™ Device Manager Server Security Guide* (MK-91HC003).

Chapter 3 Installing the HiCommand™ Device Manager Web Client

This chapter describes the requirements and procedures for installing the HiCommand™ Device Manager Web Client software.

- Requirements for Web Client operations (section 3.1)
- Preparing to install the Web Client (section 3.2)
- Installing the Java™ Web Start software (section 3.3)
- Configuring the Java™ Web Start software for Client/Server operations (section 3.4)
- Installing the Web Client software (section 3.5)
- Deinstalling the Web Client software (section 3.6)

3.1 Requirements for Web Client Operations

The requirements for HiCommand™ Device Manager Web Client operations are:

- **Storage Subsystems.** Before adding a storage subsystem to HiCommand™ Device Manager using the Web Client (or other client), you must make sure that the subsystem is configured for HiCommand™ Device Manager operations. See section 4.2 for subsystem configuration requirements.

  Important: HiCommand Device Manager does not support mainframe volumes (e.g., 3390-3) or Hitachi RapidXchange (HRX) volumes (e.g., 3390-3C, OPEN-***x***-FMT).

- **HiCommand™ Device Manager Server.** The HiCommand™ Device Manager Server must be installed, configured, and fully operational. Please refer to the *HiCommand™ Device Manager Server Installation and Configuration Guide* (MK-91HC002).

  HiCommand™ Tuning Manager integration: For integration with HiCommand™ Tuning Manager (single sign-on, common logging), the HiCommand™ Device Manager Server (version 2.3 and higher) and the HiCommand™ Tuning Manager Server (version 1.1 and higher) must be installed on the same server.

- **Platform for HiCommand™ Device Manager Web Client.** The HiCommand™ Device Manager Web Client is a Java™-based application. HiCommand™ Device Manager 2.3 supports the following operating systems for the Web Client:
  - Microsoft® Windows® 2000 Professional, Server, or Advanced Server with Service Pack 2 or later
  - Microsoft® Windows NT® Workstation or Server 4.0 with Service Pack 6a or later
  - Sun™ Solaris™ 8, SPARC® platform only

- **Browser for HiCommand™ Device Manager Web Client.**
  - Microsoft® Internet Explorer 5 or Netscape® Navigator® 4.7 is required.
  - For SSL protocol (secure connections), Microsoft® Internet Explorer 5.5 or Netscape® Navigator® 4.76 is required.
  - To view the Web Client online help, the web browser must be Java™-enabled.

- **Java™ software versions.** The HiCommand™ Device Manager Web Client requires the following Java™ software (downloaded from the HiCommand™ Device Manager Server):
  - Java™ Web Start version 1.0.1
  - Java™ Runtime Environment version 1.3.1_06

- **Agent (optional).** The HiCommand™ Device Manager Agent is not required for HiCommand™ Device Manager operations. If the host agent is not installed, HiCommand™ Device Manager will not display the storage usage and file system statistics. For further information on the Agent, please refer to the *HiCommand™ Device Manager Agent Installation Guide* (MK-92HC019).

3.2 Preparing to Install the Web Client

Before installing the HiCommand™ Device Manager Web Client software, you need to:

1. **Server installation.** Make sure that the HiCommand™ Device Manager Server has been installed and configured properly as described in the *HiCommand™ Device Manager Server Installation and Configuration Guide*. The HiCommand™ Device Manager Agent is optional; see the *HiCommand™ Device Manager Agent Installation Guide*.

   Note: HiCommand™ Device Manager Server installation (version 2.3 and higher) includes installation of the HiCommand™ Suite Common Component common component.

   HiCommand™ Tuning Manager integration: For integration with HiCommand™ Tuning Manager (single sign-on and common logging), the HiCommand™ Device Manager Server and the HiCommand™ Tuning Manager Server (version 1.1 and higher) must be installed on the same server.

2. **Server location.** Write down the URL and/or IP address of the HiCommand™ Device Manager Server. You will need this information to install the HiCommand™ Device Manager Web Client software. ***Important:*** Always make sure that only one HiCommand™ Device Manager Server at a time is actively managing a single storage subsystem.

3. **Release Notes, Readme.** Always read the HiCommand™ Device Manager Release Notes and ReadMe files before beginning.

4. **Deinstall previous versions.** If a previous version of HiCommand™ Device Manager Web Client is installed, deinstall the following software before installing version 2.3:

   - Java™ 2 Runtime Environment (JRE),
   - Java™ Web Start, and
   - HiCommand™ Device Manager.

   For further information on deinstallation, see section 3.6.

3.3 Installing the Java™ Web Start Software

HiCommand™ Device Manager utilizes client-server architecture to support application distribution management. This web-distribution framework is used to install and automatically update the HiCommand™ Device Manager Web Client user interface software on a user's computer system. The HiCommand™ Device Manager Web Client software is installed using the Sun™ Java™ Web Start application.

Important: To install and host the HiCommand™ Device Manager Web Client, the Java™ Web Start and Java™ 2 Runtime Environment (JRE) software products must be installed first.

The Java™ Web Start software (JWS) allows you to launch Java™-based applications like HiCommand™ Device Manager directly from the web. A Java™-based application can be launched in three different ways:

- From a Web browser by selecting (clicking on) a link.
- From the Java™ Web Start built-in Application Manager (Windows® systems only), which tracks recently used applications and provides quick access to favorite applications.
- From desktop icons or the **Start** menu (Windows® systems only).

3.3.1 Installing on a Windows® System

HiCommand™ Device Manager 2.3 requires the Java™ Web Start version 1.0.1 and Java™ Runtime Environment (JRE) version 1.3.1_06 software. The Java™ Web Start software and a platform-specific installer for the JRE software can be downloaded from the HiCommand™ Device Manager Server. You can also download a platform-specific installer for the JRE software from the Sun™ JRE website: http://java.sun.com/j2se/1.3/download.html.

Note: You must install the Java™ Web Start software from the HiCommand™ Device Manager Server to enable the Web Client software to be installed and updated automatically.

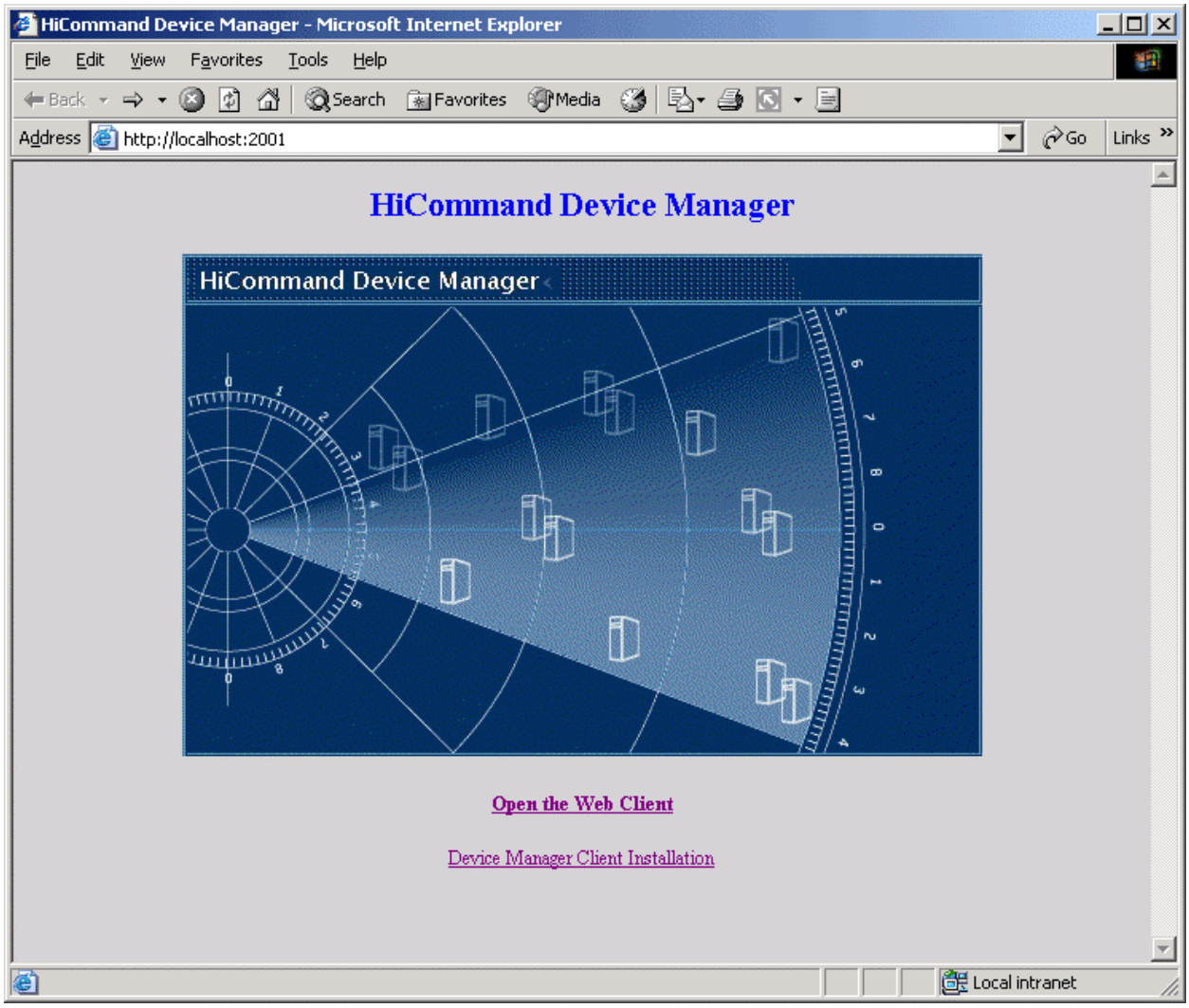
Important: You must install JRE before Java™ Web Start (Java™ Web Start requires JRE). To install the Java™ Runtime Environment (JRE) software:

1. Launch the web browser, and enter the IP address for your HiCommand™ Device Manager Server with port 2001 specified (see Figure 3.1): **http://<hicmdserver>:2001**
2. When the HiCommand™ Device Manager Server home page appears, select the **HiCommand™ Device Manager Client Installation** link.
3. The Server page displays the JRE and Java™ Web Start installers distributed with Device Manager (see Figure 3.2). Select and download **Java™ Runtime Environment (version 1.3.1) for Windows** (e.g., save it on the desktop) (see Figure 3.3).
4. Launch the downloaded executable installation package, and follow the instructions on screen. Install JRE in the default directory: **C:\Program Files\JavaSoft\JRE\1.3.1_06**

To install the Java™ Web Start software from the HiCommand™ Device Manager Server:

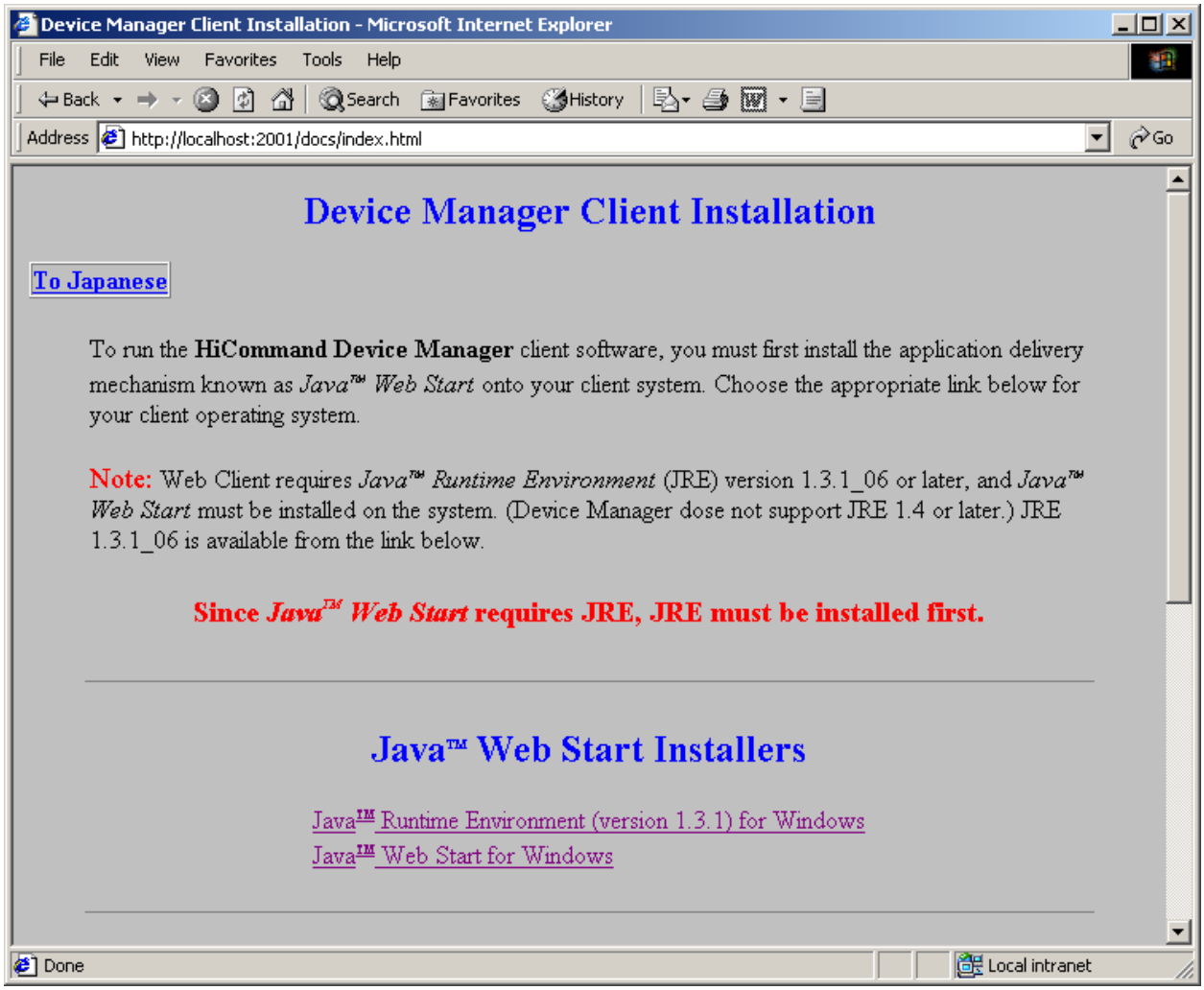
1. Launch the web browser, and enter the IP address for your HiCommand™ Device Manager Server with port 2001 specified (see Figure 3.1): **http://<hicmdserver>:2001**
2. When the HiCommand™ Device Manager Server home page appears, select the **HiCommand™ Device Manager Client Installation** link.
3. The HiCommand™ Device Manager Server page displays a list of JRE and Java™ Web Start installers distributed with HiCommand™ Device Manager (see Figure 3.2). Select and download the desired installer (e.g., save it on the desktop) (see Figure 3.5).
4. Launch the Java™ Web Start installer, read the license agreement, and select **Accept**.
5. When prompted for the installation directory, select the default directory (**c:\Program Files\Java Web Start**) (see Figure 3.6).
6. Select **Next**. The application files are loaded, and the system settings are updated (see Figure 3.7).
7. You are notified when installation is complete (see Figure 3.8).
   Important: You need to read and understand the Java™ Web Start **Readme** file.

   If JRE is not installed, an error is displayed (see Figure 3.9). You need to install JRE prior to installing the Java™ Web Start software. ***Note:*** Java™ Web Start will not start if JRE was installed after JWS. You need to reinstall Java™ Web Start after JRE installation.



Note: This screen shows a local host. You must enter the IP address of your HiCommand™ Device Manager Server, if not local.

Figure 3.1 HiCommand™ Device Manager Server Home Page on a Windows® System



Note: This screen shows a sample IP address. You must enter the IP address of your HiCommand™ Device Manager Server.

Figure 3.2 Selecting the Installer

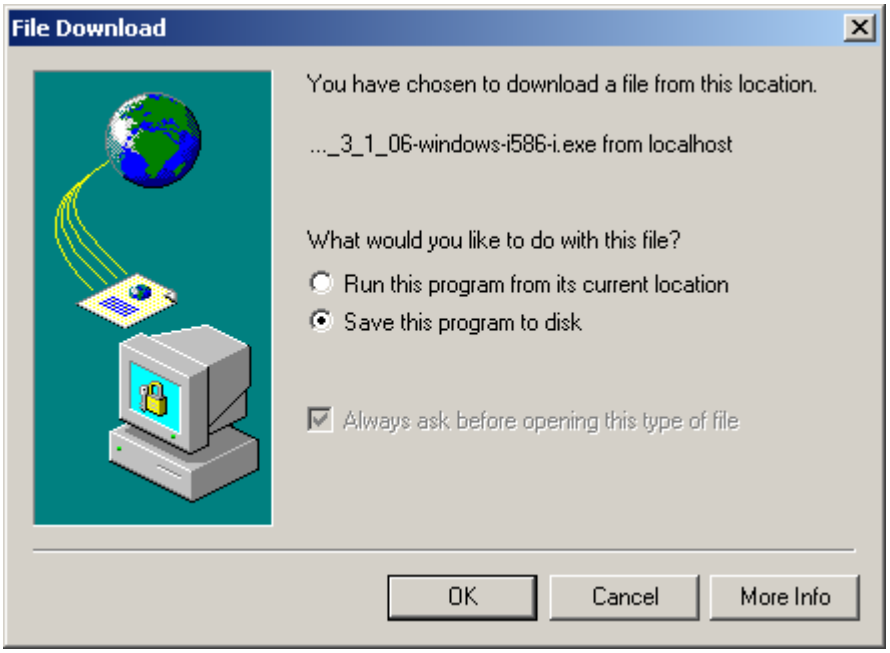


Figure 3.3 Downloading the Java™ Runtime Environment Installer

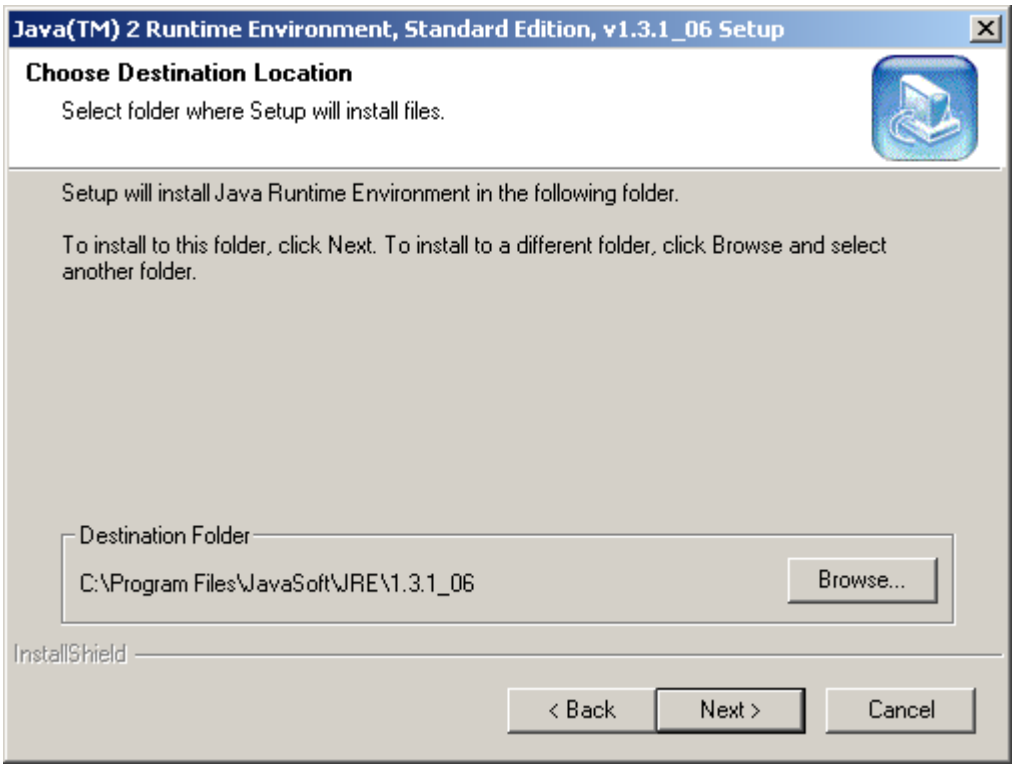


Figure 3.4 Selecting the Java™ Runtime Environment Installation Directory

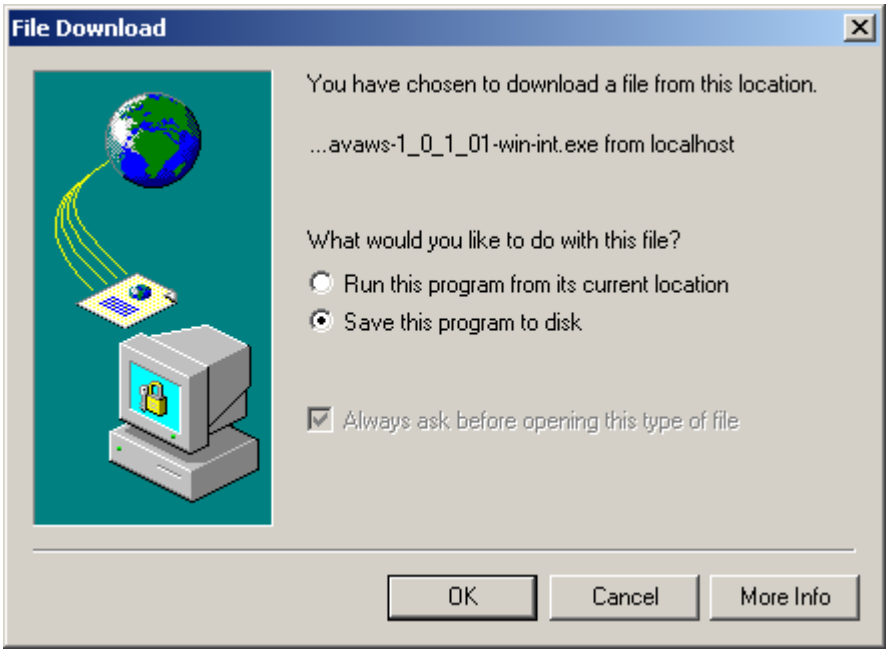


Figure 3.5 Downloading the Java™ Web Start Installer

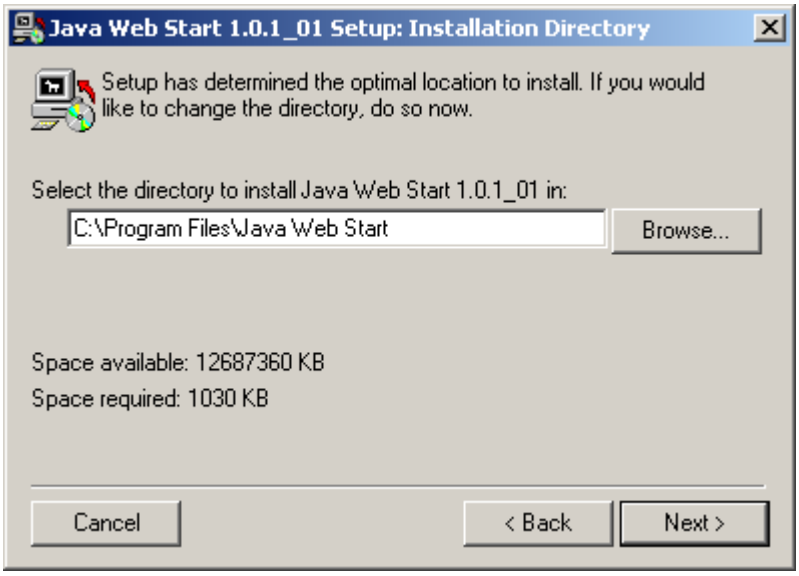


Figure 3.6 Selecting the Java™ Web Start Installation Directory

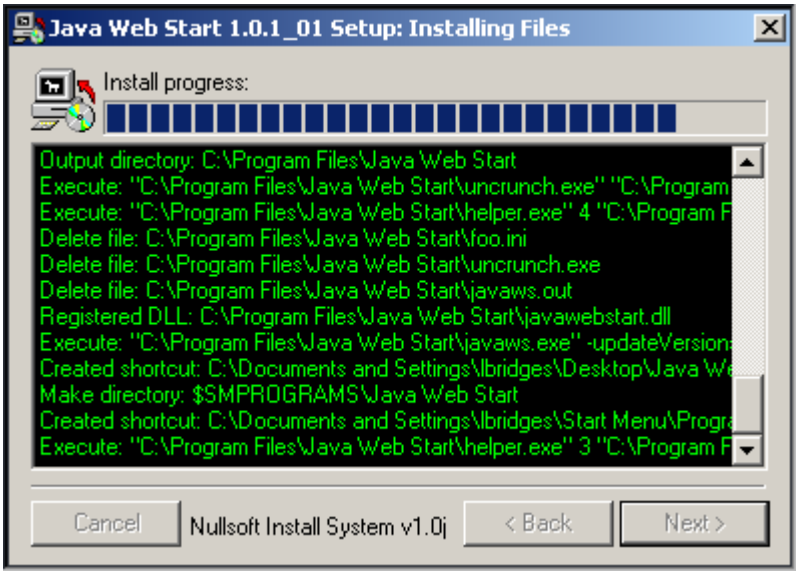


Figure 3.7 Installing the Java™ Web Start Files

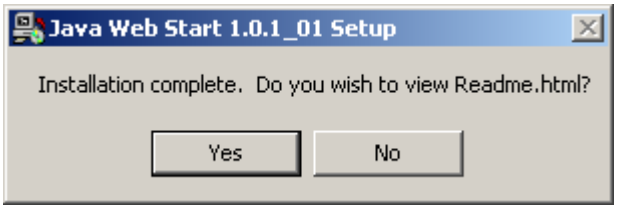


Figure 3.8 Completing Java™ Web Start Installation

Figure 3.9 Java Web Start™ Installation Error

3.3.2 Installing on a Solaris™ System

HiCommand™ Device Manager 2.3 Web Client requires the Java™ Web Start version 1.0.1 and Java™ Runtime Environment (JRE) version 1.3.1_06 software. These Java™ software products are available for download from the HiCommand™ Device Manager Server. You can also download a platform-specific installer for the JRE software from the Sun™ JRE website: http://java.sun.com/j2se/1.3/download.html.

The Java™ Web Start software allows you to launch Java™-based applications like HiCommand™ Device Manager directly from the web as follows:

- From a Web browser by selecting (clicking on) a link, or
- From the Java™ Web Start built-in Application Manager.

Important: You must install JRE before Java™ Web Start (Java™ Web Start requires JRE).

To install the JRE software from the HiCommand™ Device Manager Server:

1. If you are installing the Web Client on the same system as the HiCommand™ Device Manager Server, you do not need to install the JRE software. It was installed during Server installation and stored in the "/<installdir>/HiCommand/jre" directory. Go to the next set of instructions for installing the Java™ Web Start software.
2. Launch the web browser, and enter: **http://<hicmdserver>:2001/webstart/installers** (<*hicmdserver*> is the IP address/URL for your HiCommand™ Device Manager Server).

   If prompted for a user ID and password, enter the System Administrator user ID and password (default = **system** and **manager**). ***Note:*** Password is case-sensitive.

   Note: If you are not able to connect to the HiCommand™ Device Manager Server home page, please see the troubleshooting information in Table 7.1.
3. Select the file (j2re-1_3_1_06-solsparc.sh), and download it to a temporary directory (e.g., /usr/tmp, /tmp, or /var/tmp). ***Note:*** It is strongly recommended to use a directory other than root ("/"), as the file is large, and typically, the root directory is not allocated much space.
4. Execute the shell script to install the JRE software. Follow the directions on screen. Write down the location of the JRE software. You will need it for Java™ Web Start installation.

To install the Java™ Web Start software from the HiCommand™ Device Manager Server:

1. Create a suitable directory for the Java™ Web Start software under the current user's home directory (e.g. mkdir -p $HOME/utils/webstart).

2. Launch the web browser, and enter **http://<hicmdserver>:2001/webstart/installers** (<*hicmdserver*> is the IP address/URL for your HiCommand™ Device Manager Server).

   If prompted for a user ID and password, enter the System Administrator user ID and password (default = **system** and **manager**). ***Note:*** Password is case-sensitive.

   Note: If you are not able to connect to the HiCommand™ Device Manager Server home page, please see the troubleshooting information in Table 7.1.

   Select the Java™ Web Start installer link to begin the download:
   http://<hicmdserver>:2001/webstart/installers/javaws-1_0_1_01-solsparc-int.zip

3. When the Save As panel appears, save the file **javaws-1_0_1_01-solsparc-int.zip** to $HOME/utils/webstart. Or copy the file to $HOME/utils/webstart as follows:
   cd /<installdir>/HiCommand/HiCommandServer/docroot/webstart/installers
   cp javaws-1_0_1_01-solsparc-int.zip $home/utils/webstart

   Caution: Use the Netscape® Save-As function only if you are familiar with this process (e.g., behavior of Save As and Selection fields). Select **Save As**, go to the download destination where you created the Java™ Web Start installation directory, use the default filename, and select **Save**. ***Note:*** Depending on how you specify the destination, the Netscape® filter field does not always reflect where you are along with the file name you previously selected. By default **Save As** wants to put the file in the root directory.

4. When the download is complete, unzip the Java™ Web Start installer (see Figure 3.10). At a shell prompt, change your working directory to the temporary directory where you saved the Java™ Web Start installer, and enter:
   unzip javaws-1_0_1_01-solsparc-int.zip

5. Change the working directory. Before executing the install script file (**install.sh**), change your working directory to the directory into which you want to install Java™ Web Start (e.g., enter **cd /opt** to go to and install Java™ Web Start in the **/opt** directory).

6. Exit the browser completely (do not just close the window). You are now ready to install the HiCommand™ Device Manager Web Client.

7. Run the Java™ Web Start installer. Execute the **install.sh** shell script.* The installer creates the **javaws** subdirectory and installs the Java™ Web Start files into it. Follow the steps, including identifying a previously installed JRE. The installation creates an individual user's **.mailcap**, **.mimetypes** and **.javaws** directories and points a **.javaws/javaws.cfg** file to the binary installed.

   ****Note:*** If you are installing the HiCommand™ Device Manager Web Client on the HiCommand™ Device Manager Server:
   When you run **install.sh**, point webstart to the "/<installdir>/HiCommand/jre" directory when prompted by this message: *"In order to use Java™ Web Start you must have a version of Java 2 standard edition installed. If you do not, you can download one from http://java.sun.com. Please enter the path of your installation (for example /usr/local/java/jdk1.2):"*

8. Exit and restart the web browser, and connect to HiCommand™ Device Manager again.

9. Select **Open the HiCommand™ Device Manager Client**. ***Note:*** If the File Download panel opens, this means that the Java™ Web Start software has been deinstalled. You need to download and install the Java Web Start software again (steps 1-8 above).
10. Exit the browser completely (do not just close the window). You are now ready to install the HiCommand™ Device Manager Web Client as described in the next section.

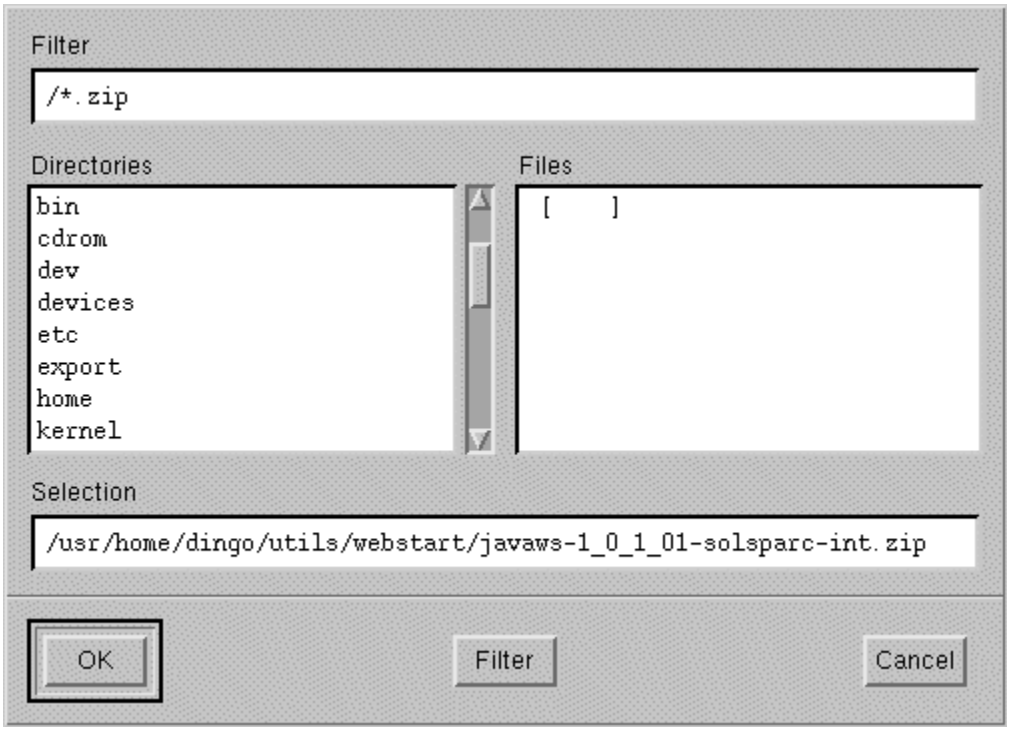


Figure 3.10 Downloading the Java™ Web Start Software for Solaris™ Systems

3.4 Configuring the Java™ Web Start Software for Client/Server Operations

You can configure the Java™ Web Start and the applications launched from it using the Java™ Web Start Application Manager. Configure the Java™ Web Start software as follows:

- Proxy configuration (section 3.4.1)
- Setting up logging at the device manager client (section 3.4.2)
- Configuring JRE (section 3.4.3)
- Clearing the cache in Java™ Web Start (section 3.4.4)

3.4.1 Proxy Configuration

WARNING: If the Java™ Web Start software is configured to use a proxy, the Web Client will not function properly. If more than one client connects to a HiCommand™ Device Manager Server through a network proxy, only one client will receive alert messages. When this client logs out, it unsubscribes to messages for the client at the IP address of the proxy server, which also unsubscribes all other clients using that proxy server for messages, making all of the client operating environments unstable.

To configure the proxy settings for the Java™ Web Start software:

1. Start the Java™ Web Start Application Manager.
   - For Windows® systems, select the Java™ Web Start shortcut on the desktop, or select Java™ Web Start in the **Programs** menu.
   - For Solaris™ systems, invoke the **javaws** command from the Java™ Web Start installation directory.
2. Select the **File** menu, select **Preferences**, and select the **General** tab.
3. Select the **Manual** button. The Java™ Web Start set the Use Browser and set the address and port of the proxy server can be configured by the browser. If automatic configuration is used for the browser proxy configuration (e.g., **automatic configuration** in Internet Explorer), Java™ Web Start does not configure its proxy properly. Manual configuration is required for this case.
4. Enter the address and port of the proxy server in the **HTTP Proxy** and **HTTP Port** boxes.
5. Select the **OK** button, and exit the Java™ Web Start Application Manager.

Note: When proxy is configured for Java™ Web Start, the User Authentication dialog is displayed when the Web Client is launched. User Authentication is not connected with the Web Client login dialog. You need to wait for the Web Client login dialog to be displayed, and then enter user and password on the Web Client User Authentication dialog.

3.4.2 Setting Up Logging at the Device Manager Client

Java™ Web Start has the function of output log file. The log file contains the standard output that is produced by the launched application(s). The Web Client log can be recorded to a file by setting the property file for HiCommand™ Device Manager and applying this function. See the *HiCommand™ Device Manager Server Installation and Configuration Guide* for information on setting the property file.

When you launch Hitachi Dynamic Link Manager (HDLM) from the HiCommand™ Device Manager Web Client (see section 2.5), Java™ Web Start collects these logs as well. To collect the logs, you must set up log collection in Java™ Web Start.

To configure the Java™ Web Start logging function:

1. Start the Java™ Web Start Application Manager.
2. Select the **File** menu, select **Preferences**, and select the **Advanced** tab (Figure 3.11).
3. If desired, select the **Show Java Console** box to display the messages that are output to the log. This setting is optional.
4. Select the **Log Output** box to output the log to a file. This setting is required.
5. Enter the desired log file name in the **Log File Name** field, or select the **Choose Log File Name** button to select an existing log file name. This entry is required.
6. Select the **OK** button to save your changes. The log will be output to the specified file.

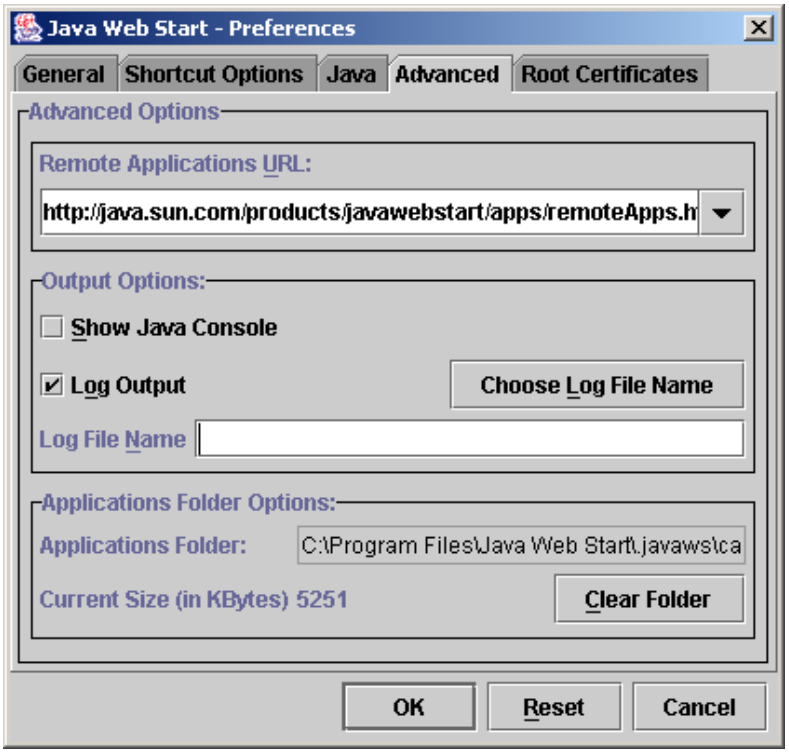


Figure 3.11 Configuring Device Manager Logging on Java™ Web Start

3.4.3 Configuring JRE

The installation directory of JRE 1.3.1_06 differs from that of the previous JRE version, so you need to perform the following JRE configuration to ensure that the Java™ Web Start software operates properly.

Note: If you deinstalled the previous version of JRE before installing JRE v1.3.1_06 and Java™ Web Start (as described in section 3.3), JRE should already be configured. Confirm that JRE version 1.3.1_06 is specified in the **Java Runtime Versions** list on the Java Web Start Preferences panel (see Figure 3.14). If a previous version (or nothing) is listed, you must perform the following procedure.

To configure JRE:

1. Start the Java™ Web Start application manager.
2. Select the **File** menu, and then select **Preferences**.
3. On the Java Web Start – Preferences panel, select the **Java** tab (see Figure 3.12).
4. Select the **Find…** button to open the JRE Finder panel, and select the **Next** button.
5. Specify the JRE 1.3.1_06 installation directory, and then select the **Next** button (see Figure 3.13). A dialog box appears, notifying you that the JRE is found.
6. Select the **Next** button. You are returned to the **Java** tab of the Preferences panel. Confirm that 1.3.1_06 is added in the **Java Runtime Versions** list (see Figure 3.14).
7. If applicable, select the previous version of JRE in the **Java Runtime Versions** list, and then select the **Remove** button.
8. Select **OK** to save your changes, and exit the Java™ Web Start application manager.

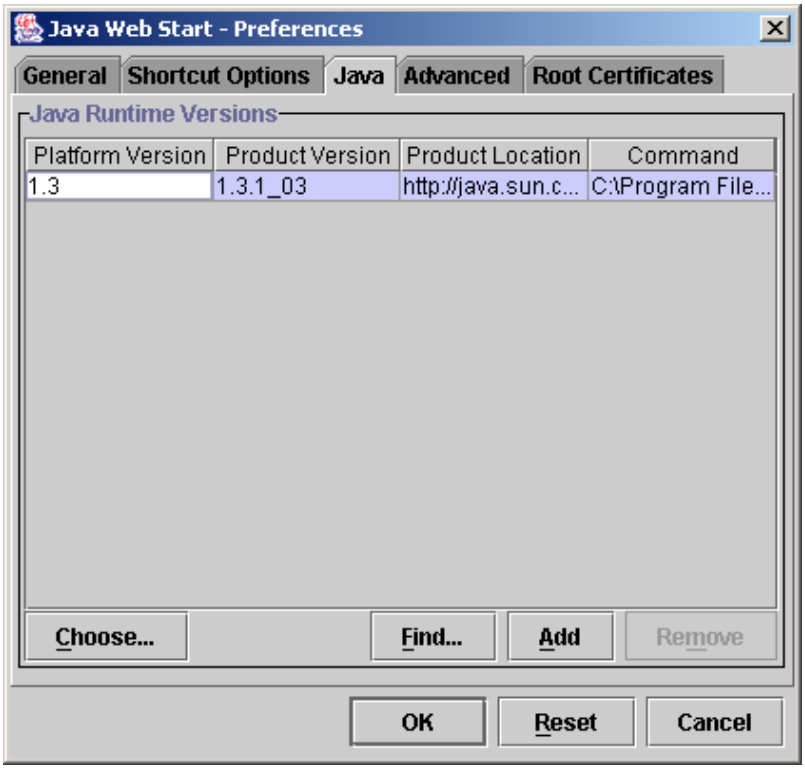


Figure 3.12 Configuring JRE – Opening the Java™ Preferences

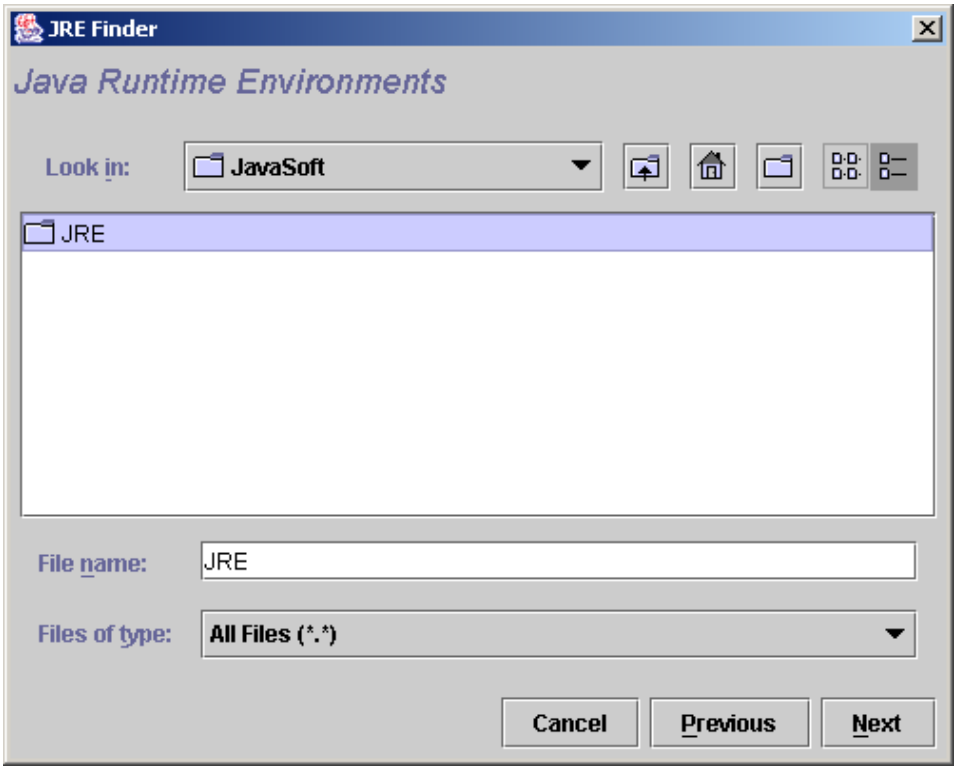


Figure 3.13 Configuring JRE – Finding the JRE 1.3.1_06 Installation Directory

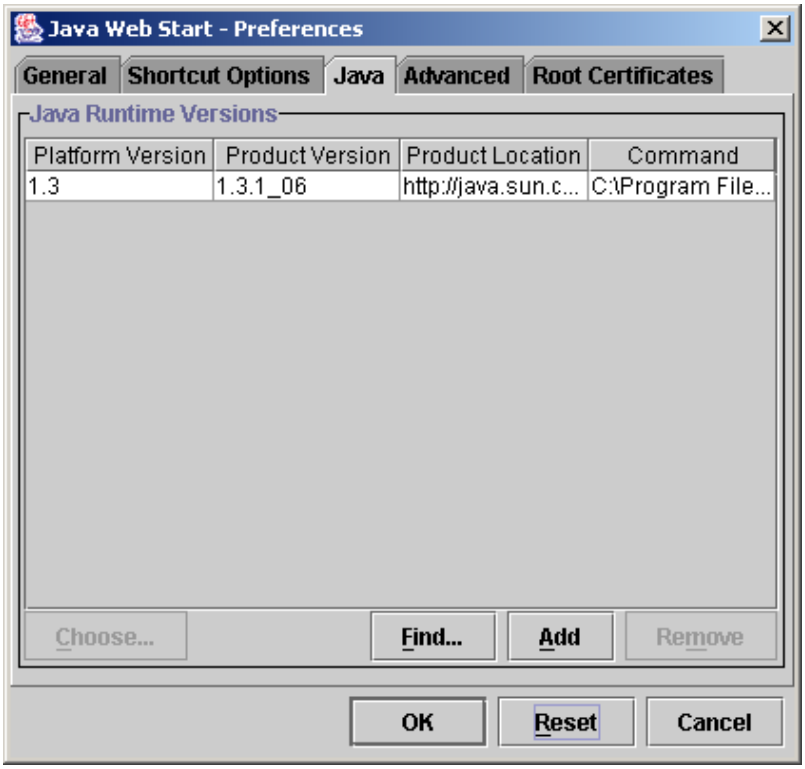


Figure 3.14 Configuring JRE – Completion

3.4.4 Clearing the Cache in Java™ Web Start

If a previous version of HiCommand™ Device Manager Web Client for Solaris™ was installed, you may not be able to download the latest version of the Web Client, even when upgrading Device Manager. In such a case, you need to clear the cache in Java™ Web Start in order to download the latest version of the Web Client from the Device Manager Server.

Caution: The following operation clears all resources downloaded by Java Web Start. To start applications using Java Web Start, you will need to download those resources again.

To clear the cache in Java™ Web Start:

1. Start the Java™ Web Start application manager.
2. Select the **File** menu, and then select **Preferences**.
3. Select the **Advanced** tab.
4. Select the **Clear Folder** button to open the Clear Applications Folder panel.
5. Select the **Yes** button.
6. Select **OK** to save your changes, and exit the Java™ Web Start application manager.

3.5 Installing the Web Client Software

After you have installed the Java™ Web Start software from the HiCommand™ Device Manager Server, you are ready to install the HiCommand™ Device Manager Web Client.

To install the HiCommand™ Device Manager Web Client:

1. Launch the web browser, and enter the IP address/URL for the HiCommand™ Device Manager Server with port 2001 specified (refer to Figure 3.1):
   http://<hicmdserver>:2001
2. When the HiCommand™ Device Manager Server home page opens, select **Open the HiCommand Client**.

   Note: If you are not able to connect to the HiCommand™ Device Manager Server home page, please see the troubleshooting information in Table 7.1.
3. The HiCommand™ Device Manager Web Client software starts installing automatically (see Figure 3.15).

   Note: If you are not able to download the Web Client on a Solaris™ system, you may need to clear the cache in Java™ Web Start (see section 3.4.4 for instructions).
4. When the Security Warning panel opens (see Figure 3.16), select **Start** to continue.
5. You are notified when installation is complete.
6. Before starting the HiCommand™ Device Manager Web Client, make sure to configure the Java™ Web Start software as described in the next section to ensure proper communication between this Web Client and the HiCommand™ Device Manager Server.

Automatic Web Client Updates: You do not need to manually update the HiCommand™ Device Manager Web Client application. Each time the Web Client application is invoked, the Java™ Web Start software checks to ensure that the locally cached application is the latest version available from the HiCommand™ Device Manager Server. If not, it downloads and invokes the newer version.

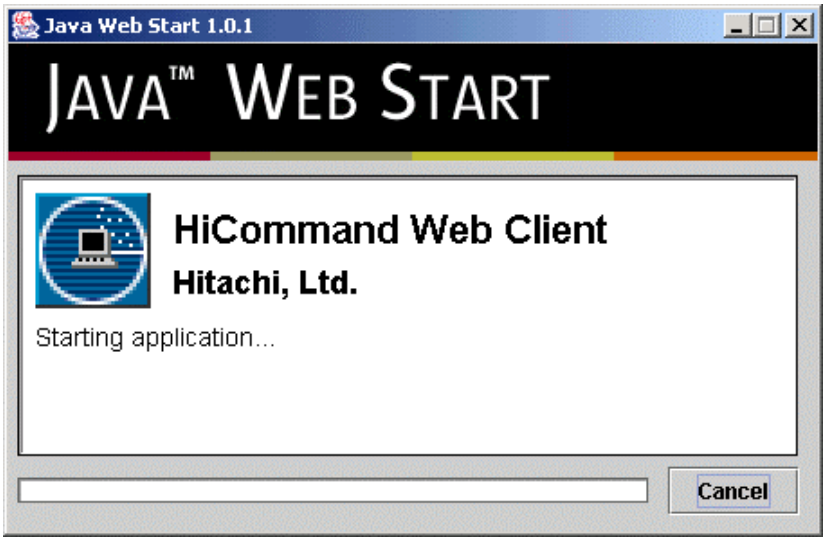


Figure 3.15 Java™ Web Start 1.0.1 Panel

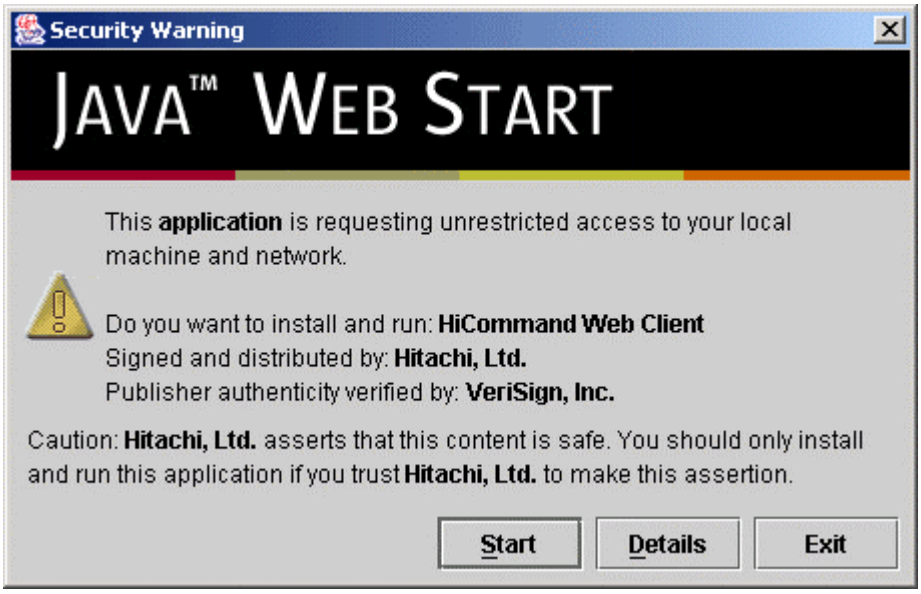


Figure 3.16 Java™ Web Start Setup Security Warning Panel

3.6 Deinstalling the HiCommand™ Device Manager Web Client Software

3.6.1 Windows® Deinstallation

To deinstall the HiCommand™ Device Manager Web Client:

1. Open the **Add/Remove Programs** control panel, select **HiCommand Web Client** (see Figure 3.17), and then select **Change/Remove** (or **Add/Remove…** for Windows® 95/98). This removes the Web Client shortcut from the **Start** menu and desktop.
2. Start the Java™ Web Start Application Manager, and select **HiCommand Web Client** (see Figure 3.18).
3. Select the **Application** menu, and select the **Remove Application** command.

To deinstall the Java™ Web Start software on a Windows® system, please use **Add/Remove Programs** in the Control Panel. For a complete removal of all components, remove: **Java Web Start** and **Java 2 Runtime Environment** (see Figure 3.19).

Caution: Do not remove the Java™ Web Start or JRE software if other applications on the system use this software.

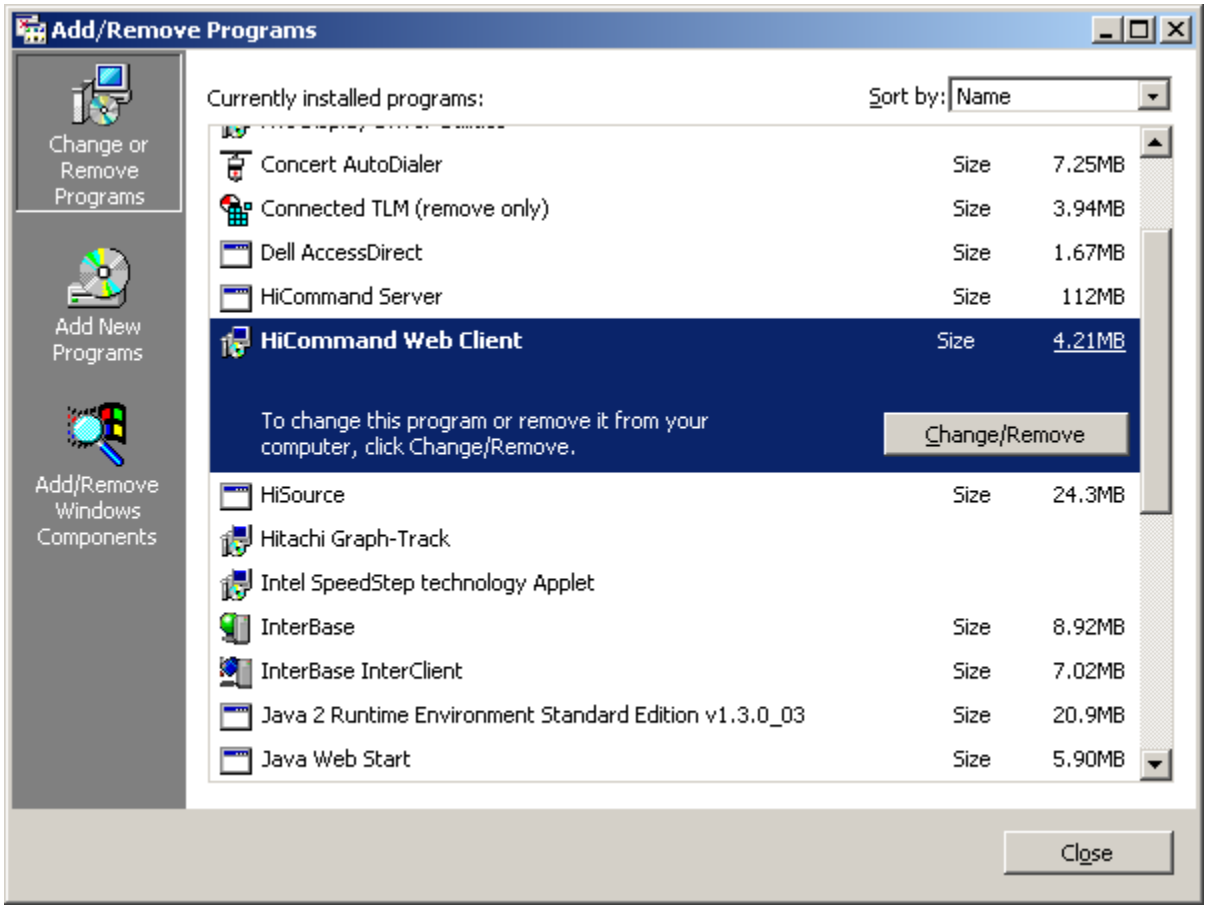


Figure 3.17 Deinstalling Web Client – Windows® System

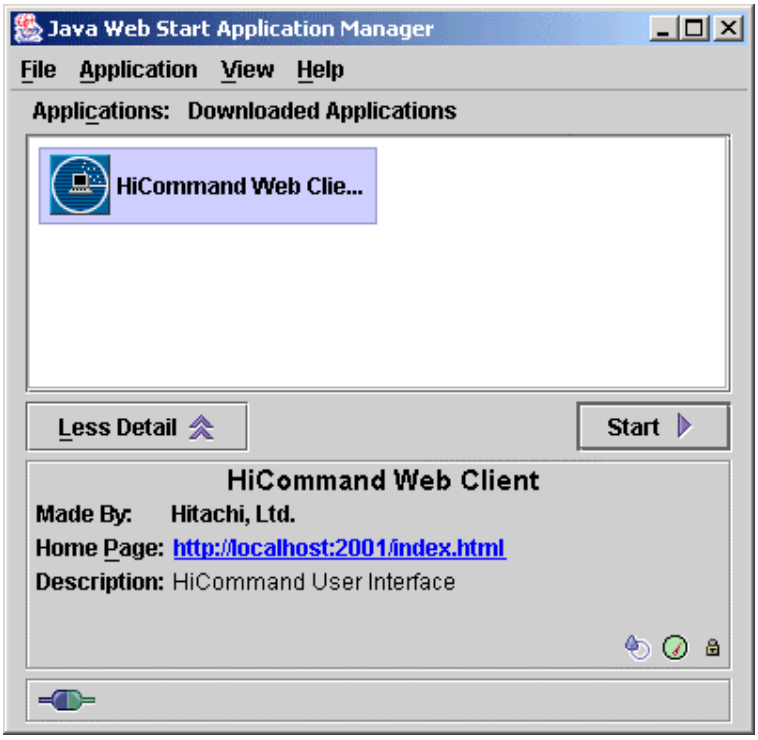


Figure 3.18 Deinstalling Web Client – Java™ Web Start Application Manager

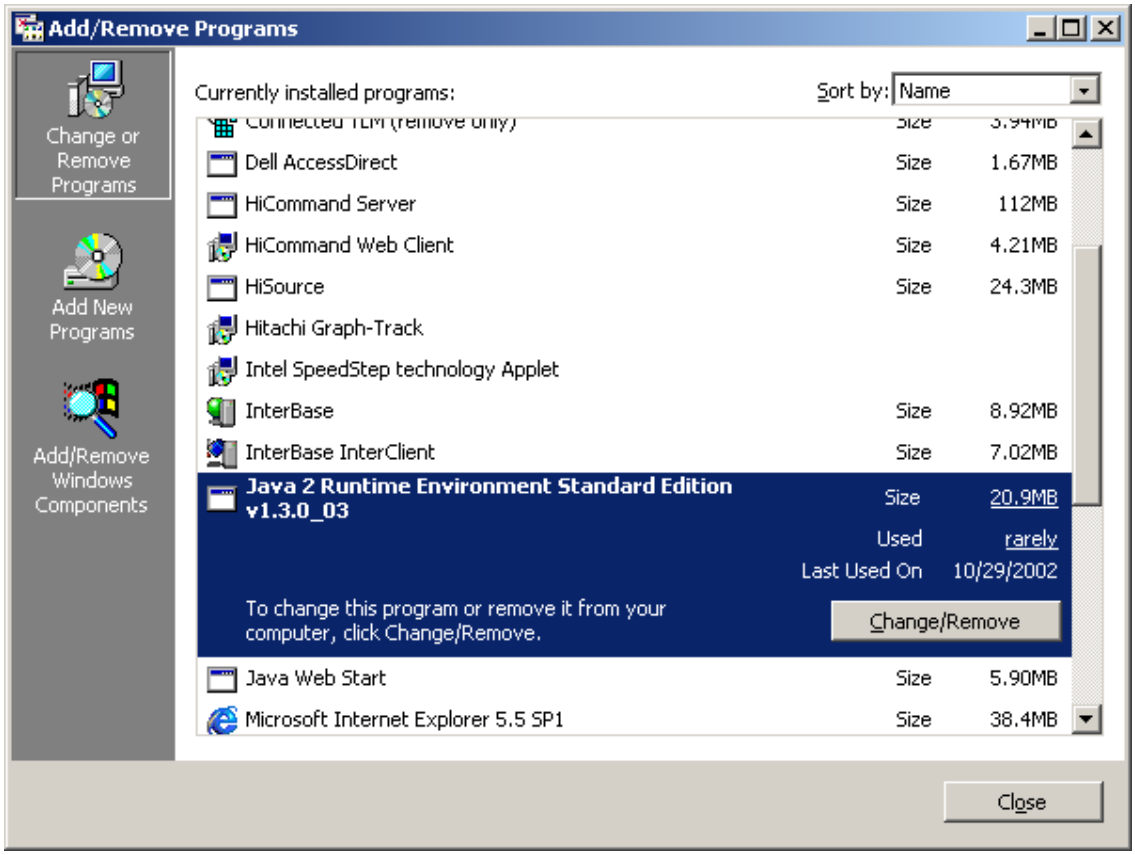


Figure 3.19 Deinstalling JRE and Java Web Start™ – Windows® System

3.6.2 Solaris™ Deinstallation

To deinstall the Java™ Web Start software on a Solaris™ system (e.g., moving the HiCommand™ Device Manager installation):

1. Launch the Netscape® browser, and edit the Netscape® preferences as follows: In the **Navigator** section, select **Applications**, and find and delete any entries for "application/x-java-jnlp-file" and "Java Web Start".
2. In Netscape® Preferences, under **Advanced | Cache**, clear the disk cache.
3. Exit the Netscape® browser completely (do not merely close the window).
4. Remove the Java™ Web Start installation directory (e.g., rm -rf /opt/javaws).
5. Optionally, search the file system (especially user's home directories) for files named **.mime.types** and **mime.types** (e.g., find / -name .mime.types -print), and edit them to remove any entries for "application/x-java-jnlp- file" and "Java Web Start".
6. Optionally, search the file system (especially user's home directories) for files named **.mailcap** (e.g., find / -name .mailcap -print), and edit them to remove the "Java Web Start" section.

Chapter 4 Preparing for & Starting HiCommand™ Device Manager Operations

4.1 Preparing to Start HiCommand™ Device Manager Operations

Before starting HiCommand™ Device Manager operations, you need to perform the following tasks:

1. Make sure that the HiCommand™ Device Manager Server is installed, configured, and fully operational. Write down the IP address of the HiCommand™ Device Manager Server. For further information on the HiCommand™ Device Manager Server, please refer to the *HiCommand™ Device Manager Server Installation and Configuration Guide* (MK-91HC002).

2. Make sure that the Java™ Web Start and HiCommand™ Device Manager Web Client software have been installed and configured properly as described in Chapter 3.

3. Make sure that you have read the **ReadMe** file(s) and **Release Notes** for the version you installed.

4. ***Optional:*** Install the HiCommand™ Device Manager Agent. The Agent is not required for HiCommand™ Device Manager Web Client operations. If the Agent is not installed, the HiCommand™ Device Manager Web Client will not display storage usage and file system statistics. For further information on the Agent, please refer to the *HiCommand™ Device Manager Agent Installation Guide* (MK-92HC019).

5. Make sure that the storage subsystems are configured for HiCommand™ Device Manager operations as specified in section 4.2 below.

6. Write down the IP address of each storage subsystem that you want to manage using HiCommand™ Device Manager. You will need the IP address to add the subsystem to HiCommand™ Device Manager.

7. Write down the port WWN of each host accessing data on the subsystems. You will need the WWNs to add hosts to HiCommand™ Device Manager.

8. Identify the System Administrator(s) and Storage Administrator(s). You need to set up the HiCommand™ Device Manager user accounts right away to control access.
   - The System Administrator(s) is/are responsible for creating user accounts and user groups and assigning user access capabilities for HiCommand™ Device Manager.
   - The Storage Administrator(s) is/are responsible for performing storage configuration and data management operations.

4.2 Storage Subsystem Requirements

Important: Before a storage subsystem can be added to the HiCommand™ Device Manager Server using the Web Client (or other client), you must:

- Make sure that the subsystem is properly configured for HiCommand™ Device Manager operations (see sections 4.2.1 through 4.2.5 below).
- Make sure that the subsystem is properly configured and attached to the host server(s). For important information on the configuration requirements for host attachment, refer to the Configuration Guide for the subsystem and host platform (e.g., *Hitachi Lightning 9900™ V Series Sun™ Solaris™ Configuration Guide*).

4.2.1 Configuring the 9900V for HiCommand™ Device Manager Operations

The 9900V subsystem configuration requirements for HiCommand™ Device Manager 2.3 are:

- DKC microcode 21-01-50/00 or later.
- LAN cables and connections between the SVP and the HiCommand™ Device Manager Server. ***Note:*** The Server is connected on a public LAN. Use the PING test to verify connectivity between the SVP and Server.
- The Remote Console – Storage Navigator feature must be installed on each subsystem to be accessed by the HiCommand™ Device Manager.
- The Java™ API and SNMP API must be installed on each subsystem to be accessed by the HiCommand™ Device Manager.
- If you want to be able to configure the fibre-channel ports and configure and secure LUNs on the 9900V, the LUN Manager feature must be installed on the subsystem.
- If you want to be able to create expanded LUNs on the 9900V, the LUN Expansion (LUSE) feature must be enabled on the subsystem.

4.2.2 Configuring the 9900 for HiCommand™ Device Manager Operations

The 9900 subsystem configuration requirements for HiCommand™ Device Manager 2.3 are:

- If using LUSE or Virtual LVI/LUN: DKC microcode **01-15-39-00/05** or later.
  If not using LUSE or Virtual LVI/LUN: DKC microcode **01-13-19** or later.

  Note: Please consult with your service representative to determine the appropriate microcode level to use for your operational environment.

- LAN cables and connections between the SVP and the HiCommand™ Device Manager Server. ***Note:*** The Server is not connected on the private RAID-internal LAN, but on a second public LAN. Use the PING test to verify connectivity between the SVP and Server.
- Hitachi SNMP Agent and LUN Manager features must be enabled on each subsystem. See the *Hitachi Lightning 9900™ Remote Console User's Guide* (MK-90RD003) for more information on installation and license key requirements.
- If you want to be able to create expanded LUNs, the LUN Expansion (LUSE) feature must be enabled on each subsystem.
- If you want to be able to secure LUNs on the 9900, the Hitachi SANtinel™ feature must be enabled on each subsystem.
- Static IP address for the SVP. ***Note:*** Use the IP address of the SNMP Kit Ethernet adapter for HiCommand™ Device Manager, not the IP address on the RAID-internal LAN.
- SNMP configured as follows. See the *Hitachi Lightning 9900™ Remote Console User's Guide* (MK-90RD003) for more information on SNMP.
  - HiCommand™ Device Manager Server's IP address (to send traps to the HiCommand™ Device Manager Server).
  - **Extension SNMP** checked on the **Install** tab of the SNMP Properties panel, indicating that SNMP is installed on the subsystem.
  - Community string (usually **public**, but check with the Storage Administrator).
  - SNMP port of the SVP configured with customer's IP address.

  Note: If SNMP is disabled over the routers, you need to be in the same IP Subnet/VLAN.

4.2.3 Configuring the 9500V for HiCommand™ Device Manager Operations

The 9500V subsystem configuration requirements for HiCommand™ Device Manager 2.3 are:

- Microcode 0651 or later.

  Note: Please consult with your service representative to determine the appropriate microcode level to use for your operational environment.

- The Ethernet management interface must be configured to use a static IP address. ***Note:*** The DAMP allows the array to be configured to use DHCP. Make sure that this option is NOT selected.
- If you want to be able to secure LUNs on the 9500V, the LUN Security feature must be purchased and enabled using the DAMP.
- If Password Protection is installed and enabled, you will need the Password Protection user ID and password to add the subsystem to HiCommand™ Device Manager.
- The "M-TID, M-LUN" target ID mode must be configured using the DAMP.

Note: The 9500V subsystem has a facility for reserving LUNs for internal devices that are not defined on the 9500V. These LUNs may not be assigned to storage on the port where these LUNs have been reserved. If you attempt to allocate storage on a port using one of these reserved LUNs, HiCommand™ Device Manager will respond with an error message such as "The LUN 03 is already reserved for the non-existing LDEV 0:14 on port 0A."

4.2.4 Configuring the 9200 for HiCommand™ Device Manager Operations

The 9200 subsystem configuration requirements for HiCommand™ Device Manager 2.3 are:

- For 128 LUNs/port configuration: Microcode 355E or later.
  Otherwise: Microcode 0559 or later.

  Note: Please consult with your service representative to determine the appropriate microcode level to use for your operational environment.
- Fibre-channel ports must be configured with host mode = Inquiry page 83h.
  SCSI ports are not supported.
- The 9200 controller LAN port must be configured with the customer's IP address (note that a change requires reboot).
- The Ethernet management interface must be configured to use a static IP address.
  Note: The DAMP allows the array to be configured to use DHCP. Make sure that this option is NOT selected.
- If you want to be able to secure LUNs on the 9200, the LUN Security feature must be purchased and enabled using the DAMP.
- If Password Protection is installed and enabled, you will need the Password Protection user ID and password to add the subsystem to HiCommand™ Device Manager.
- The "M-TID, M-LUN" target ID mode must be configured using the DAMP.

Note: The 9200 subsystem has a facility for reserving LUNs for internal devices that are not defined on the 9200. These LUNs may not be assigned to storage on the port where these LUNs have been reserved. If you attempt to allocate storage on a port using one of these reserved LUNs, HiCommand™ Device Manager will respond with an error message such as "The LUN 03 is already reserved for the non-existing LDEV 0:14 on port 0A."

4.2.5 Configuring the T3 Array for HiCommand™ Device Manager Operations

The Sun™ StorEdge™ T3 array configuration requirements for HiCommand™ Device Manager 2.3 are:

- Firmware revision 1.1.7, 1.1.8, or 2.0.0. ***Note:*** Please consult with your service representative to determine the appropriate firmware level to use for your operational environment.
- HiCommand™ Device Manager supports management of T3 arrays either in a standalone (single tray) configuration or in partner-paired groups.
- Initial installation of T3 must be done through the T3 array's native telnet interface as described in the Sun™ documentation.
- Make note of the root password. HiCommand™ Device Manager will need the root password in order to manage the T3 disk array (entered when adding the array).

4.3 Starting Up and Logging In to HiCommand™ Device Manager

After you have prepared for HiCommand™ Device Manager operations as described in section 4.1 above, you can start HiCommand™ Device Manager operations. The System Administrator must log in first.

To start up and log in to HiCommand™ Device Manager:

1. From your web browser, enter the IP address/URL of the HiCommand™ Device Manager Server:
   http://<hicmdserver>:2001 (<*hicmdserver*> = IP address of HiCommand™ Device Manager Server)
2. When the HiCommand™ Device Manager Server home page appears (see Figure 4.1), select **Open the HiCommand Client**.
3. When the Login panel appears (see Figure 4.2), enter your user ID (login name) and password, and select **Login**. The default user ID and password for the System Administrator are **system** and **manager** (the password is case-sensitive).
4. The HiCommand™ Device Manager main console (see Figure 4.3) provides access to all HiCommand™ Device Manager functions. See section 4.4 for instructions on starting HiCommand™ Device Manager operations.

Note: This screen shows a local host. You must enter the IP address of your HiCommand™ Device Manager Server, if not local.

Figure 4.1 HiCommand™ Device Manager Home Page (Windows® browser shown)

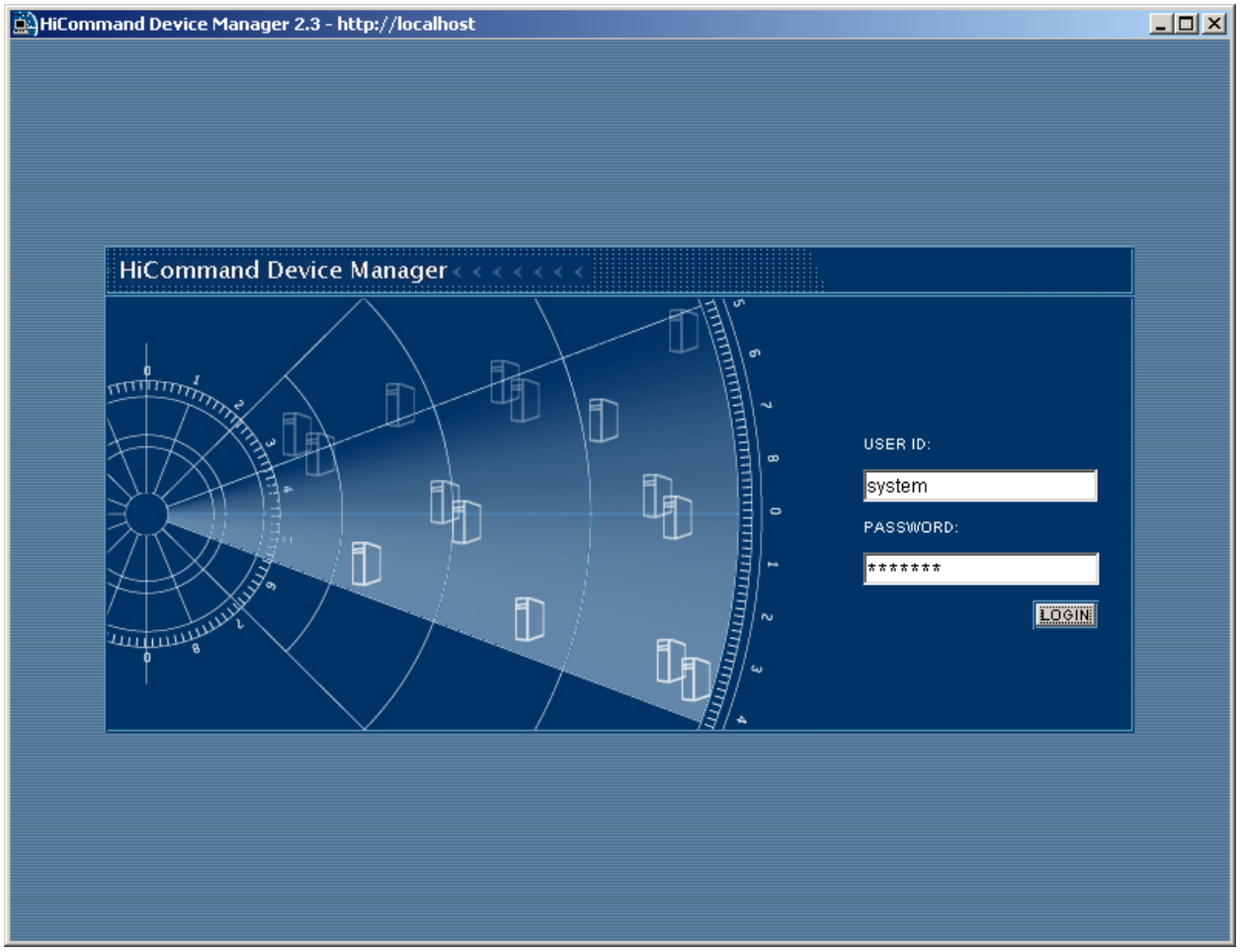


Figure 4.2 HiCommand™ Device Manager Login Panel

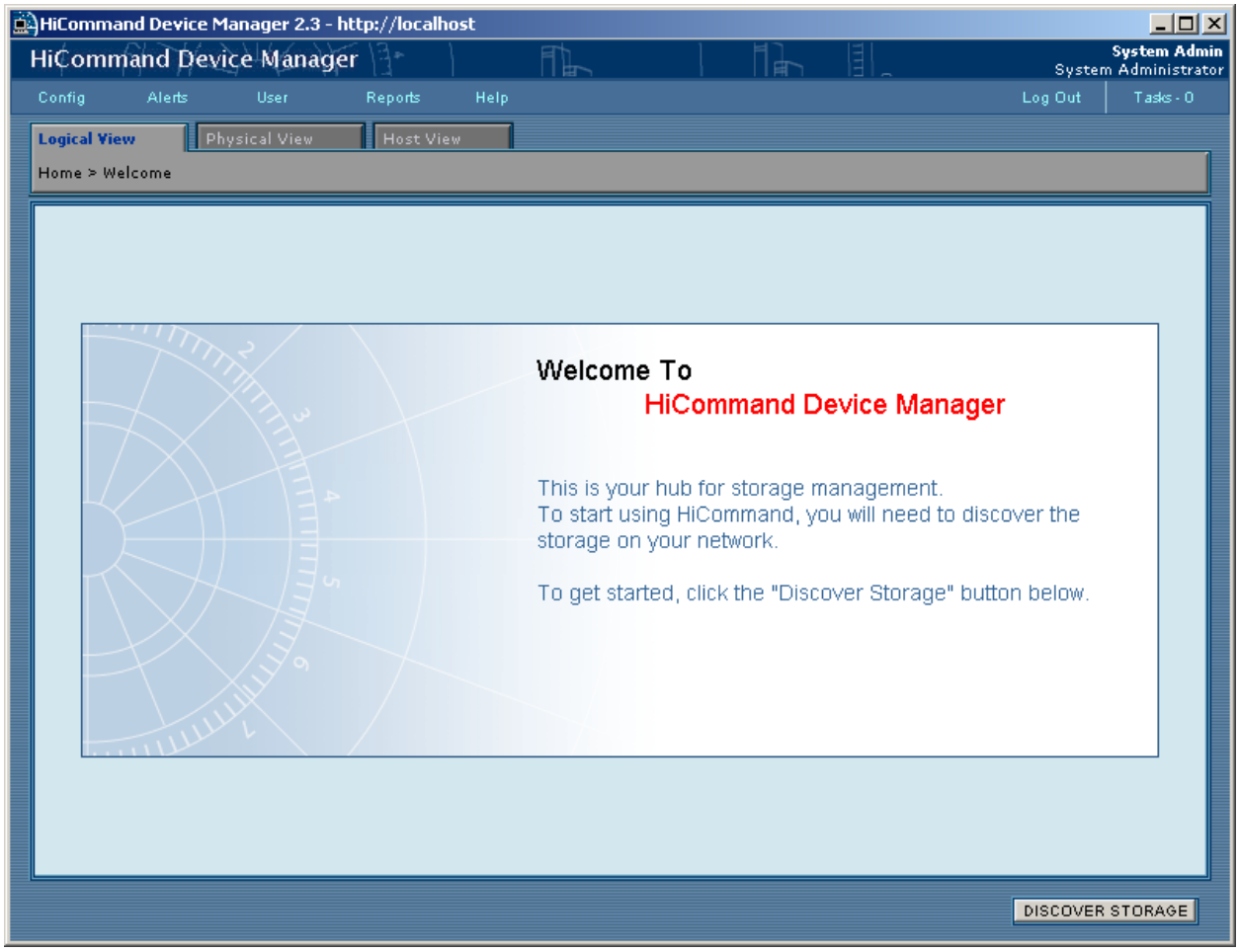


Figure 4.3 HiCommand™ Device Manager Main Console – Initial Start-Up

4.4 Starting HiCommand™ Device Manager Operations

After you have installed HiCommand™ Device Manager, prepared for HiCommand™ Device Manager operations, and logged in to the HiCommand™ Device Manager Server, you are ready to start HiCommand™ Device Manager operations. This section provides an overview of the tasks required to set up and start using HiCommand™ Device Manager.

The System Administrator should log in first to set up the HiCommand™ Device Manager users and access privileges. To prevent unauthorized access, make sure to change the default System Administrator login (or delete it after adding at least one System Administrator).

Important: The HiCommand™ Device Manager Server must have exclusive access to a subsystem. Always make sure that only one HiCommand™ Device Manager Server at a time is actively managing any single subsystem. For the 9900V and 9900 subsystems, HiCommand™ Device Manager and the Remote Console cannot both access the same subsystem at the same time, and the SVP must be in View mode.

To start HiCommand™ Device Manager operations:

1. Log in to HiCommand™ Device Manager as a System Administrator (see section 5.5).
2. If desired, create the logical group hierarchy for your storage groups (see section 5.8). Storage groups can be nested within logical groups or at the top level as needed. A logical group cannot be nested within a storage group. HiCommand™ Device Manager allows you to reconfigure your group hierarchy as needed (e.g., add and delete groups, change the level/parent of a group). ***Note:*** If desired, you can use the group hierarchy created by the LUN Scan operations, instead of creating your own logical groups.
3. Add the connected storage subsystems to HiCommand™ Device Manager (see section 6.1.1). Devices which do not have any paths are placed in the Unallocated group for the subsystem.
4. Perform a LUN Scan operation on each newly-discovered subsystem to create the LUN Scan logical group hierarchy and categorize the existing LUNs (see section 6.1.3). These LUNs are placed in the LUN Scan group organized by subsystem and port.
5. Either now or later, review the list of hosts (see section 6.5), and add hosts as needed (see section 6.5.1). HiCommand™ Device Manager automatically created a unique host (e.g., host0) for each WWN found securing any LUN. You can rename these hosts to more easily identify them, and you can also combine WWNs that are on a single physical host.
6. Add the desired user groups and users and assign user access capabilities (see sections 5.6 and 5.7). ***Note:*** Make sure to change the default System Administrator login as soon as possible to protect your HiCommand™ Device Manager system security.
7. After completing steps (2) through (6), you are ready to perform storage group operations (see section 6.6), such as adding and moving storage, adding and deleting volume paths, and configuring LUN security.

Chapter 5 Performing HiCommand™ Device Manager System Operations

The HiCommand™ Device Manager system operations include:

- Main console and menu bar (see section 5.1),
- Logical View (see section 5.2),
- Physical View (see section 5.3),
- Host View (see section 5.4),
- Log in/out operations (see section 5.5),
- User group operations (see section 5.6),
- User account operations (see section 5.7),
- Logical group operations (see section 5.8), and
- Report operations (see section 5.9).

5.1 HiCommand™ Device Manager Main Console and Menu Bar

The HiCommand™ Device Manager main console (see Figure 5.1) provides access to all HiCommand™ Device Manager functions. To open the HiCommand™ Device Manager main console, start up and log in to HiCommand™ Device Manager.

The HiCommand™ Device Manager main console provides access to:

- The HiCommand™ Device Manager main console menu bar (see section 5.1.1),
- The HiCommand™ Device Manager Logical View (see section 5.2),
- The HiCommand™ Device Manager Physical View (see section 5.3), and
- The HiCommand™ Device Manager Host View (see section 5.4).

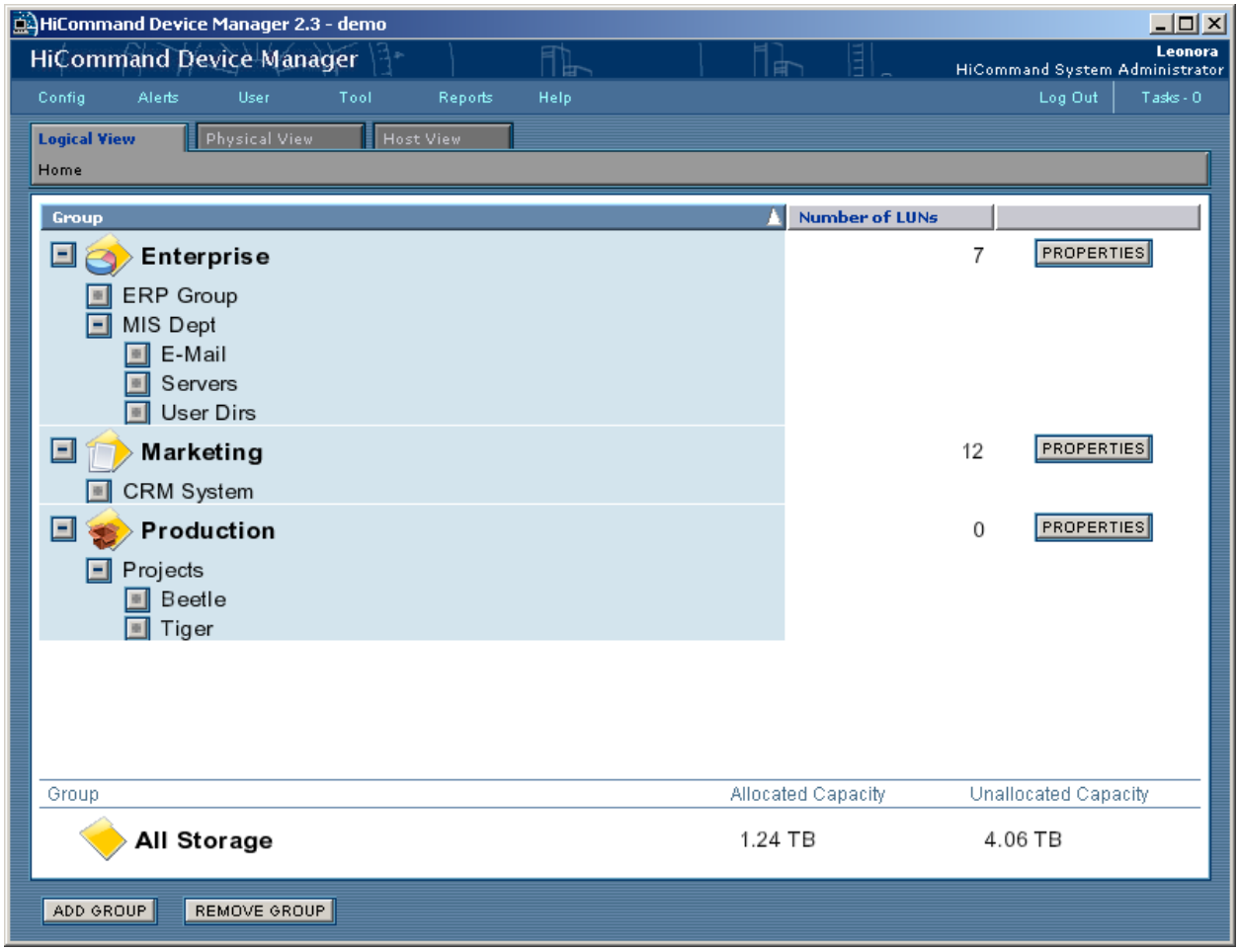


Figure 5.1 HiCommand™ Device Manager Main Console

5.1.1 Main Console Menu Bar

The menu bar on the HiCommand™ Device Manager main console (see Figure 5.2) provides access to the following functions:

- **Config** menu:
  - **Groups**: Opens the Logical Group List panel (see section 5.6), which allows you to add, edit, and delete logical groups.
  - **Subsystems** (System users only): Opens the Subsystem List panel (see section –), which allows you to add, edit, and delete subsystems.
  - **Hosts**: Opens the Host List panel (see section 6.5), which allows you to add, edit, and delete hosts.
- **Alerts** (System users only) – Opens the Alerts panel (see section 6.1.5), which displays alerts for all subsystems added to HiCommand™ Device Manager and provides access to detailed alert information.
- **User** menu:
  - **Users:** If you are logged in as a System Administrator or Local Administrator, this opens the User Administration panel (see section 5.7), which allows you to add, edit, and delete users. If you are logged in as a Storage Administrator, this opens the User Properties panel (see section 5.7.3), which allows you to change your own user properties and password. If you are logged in as a guest, you can only view the User Properties panel for guest (read-only).
  - **User Groups:** If you are logged in as a System Administrator or Local Administrator, this opens the User Group Administration panel (see section 5.6), which allows you to add, edit, and delete user groups.
- **Tool –** Provides link-and-launch access to HiCommand™ Tuning Manager (see section 2.5).
- **Reports** (System users only) – Provides access to the built-in HiCommand™ Device Manager reports (see section 5.9).
- **Help** – Provides access to the online help for the HiCommand™ Device Manager Web Client user interface, and displays the HiCommand™ Device Manager software version information (Help-About). ***Note:*** A Java™-enabled web browser is required to view the Web Client online help.
- **Log Out** – Allows you to log out of HiCommand™ Device Manager (see section 5.5).
- **Tasks** – Displays the number of HiCommand™ Device Manager tasks being processed for the current user, and opens the Operations in Progress panel (see Figure 5.3). The Operations in Progress panel displays detailed information on the tasks: type of operation (e.g., add storage), affected storage array, affected logical group, and start time.

System user:

Local user:

Figure 5.2 Menu Bar on the HiCommand™ Device Manager Main Console

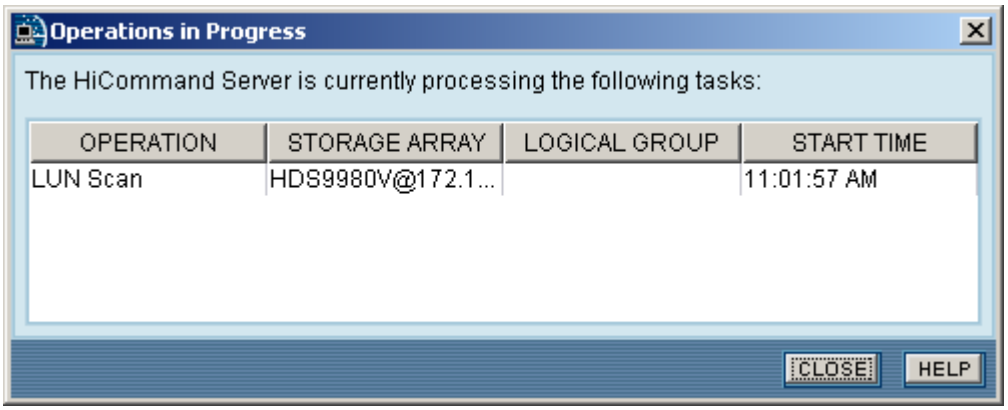


Figure 5.3 Operations in Progress Panel (Task List)

5.2 Logical View

The Logical View on the HiCommand™ Device Manager main console displays the logical groups and storage groups defined by the user as well as detailed information on the contents of the groups. To access the Logical View, select the **Logical View** tab on the HiCommand™ Device Manager main console.

The Logical View provides the following views: top level, logical group level, storage group level, and storage detail level.

5.2.1 Logical View – Top Level

The top level of the Logical View (see Figure 5.4), indicated by **Home** on the Logical View tab, displays the top-level groups and allows you to add and remove groups. HiCommand™ Device Manager displays the following information for each logical group:

- Group icon and name
- Total number of LUNs

The **Add Group** and **Remove Group** buttons open the Logical Group List panel (see section 5.8), which allows you to add and delete logical groups and storage groups. The **Properties** button opens the Group Properties panel (see section 5.8.2), which displays and allows you to change the group properties (name, parent group). Select the desired logical group to display the logical group level information (see next section).

You can sort the information on the Logical View by selecting the column to sort on. The selected column is highlighted, and the sort order (ascending or descending) is indicated by the arrow in the column's heading. The screen in Figure 5.4 shows the groups sorted by name in ascending alphabetical order. To reverse the order, select the highlighted column.

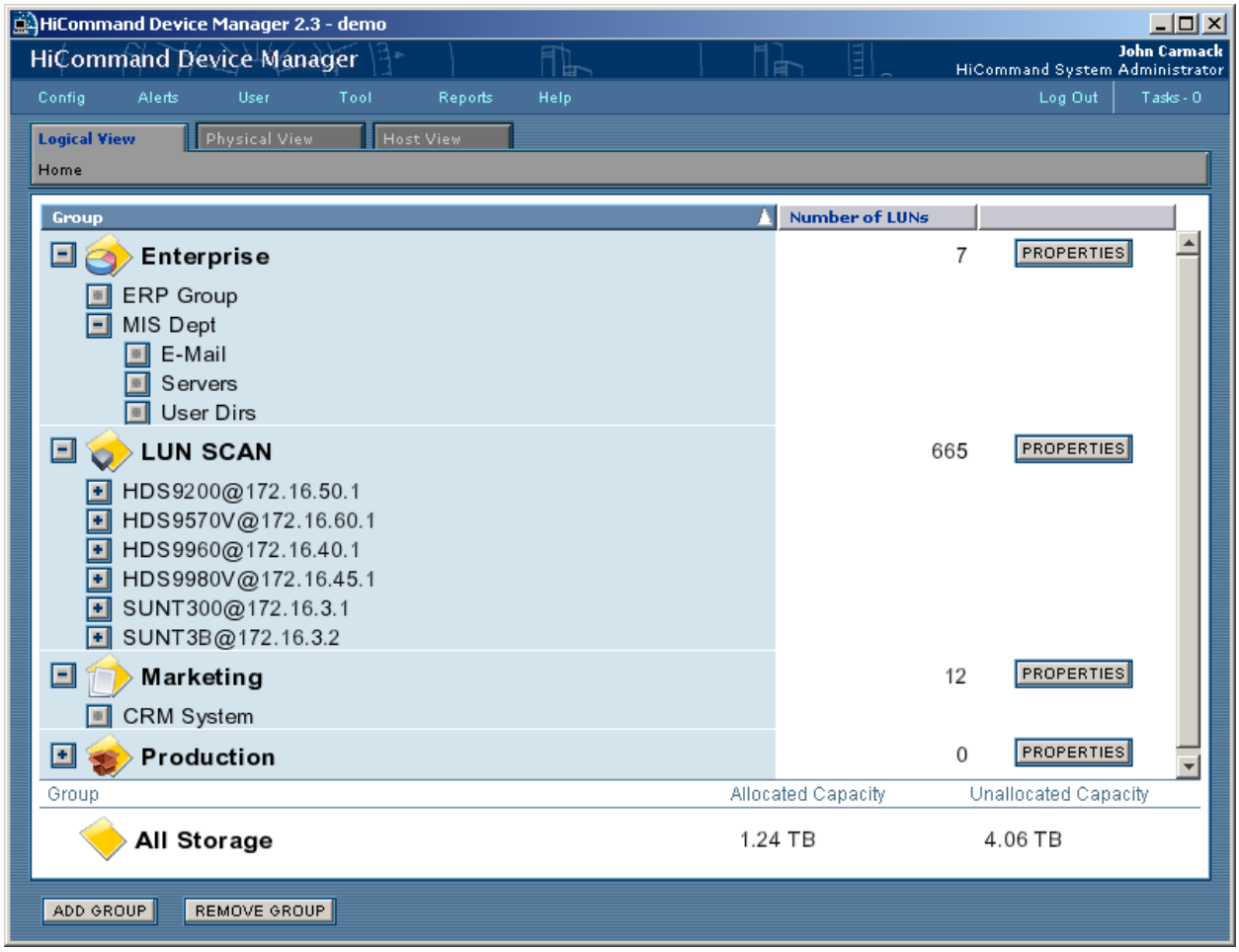


Figure 5.4 Logical View – Top Level

5.2.2 Logical View – Logical Group Level

The logical group level of the Logical View (see Figure 5.5) displays the contents of the selected logical group, which can be storage groups as well as other logical groups, and allows you to add and remove groups. The **Properties** button for a group opens the Group Properties panel (see section 5.8.2), which allows you to change the group properties (icon, parent group, name). The **Add Group** button (bottom left) opens the Group Properties panel to allow you to add a logical group under the selected group (see section 5.8.1).

Select the desired storage group to display the storage group level information (see next section).

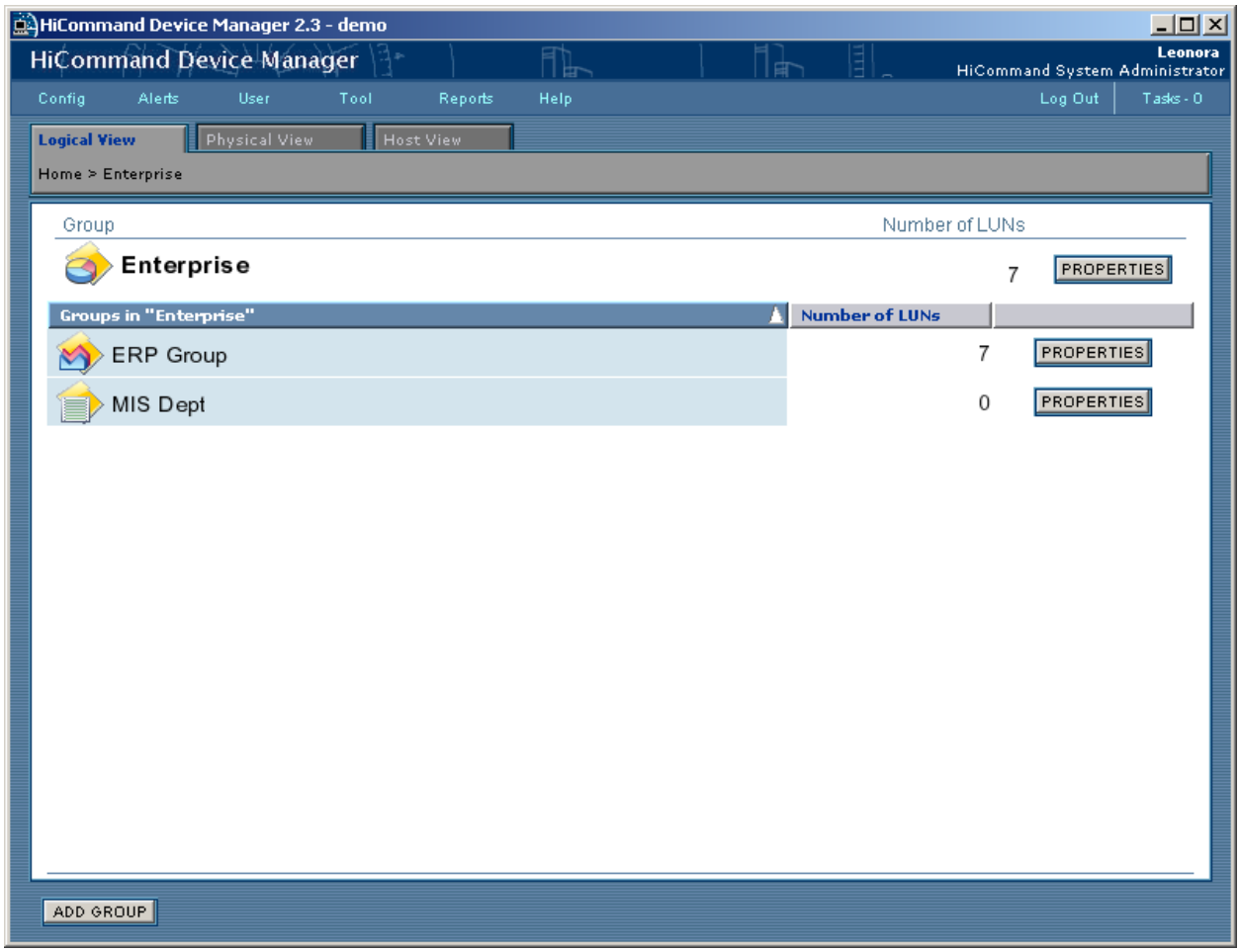


Figure 5.5 Logical View – Logical Group Level

5.2.3 Logical View – Storage Group Level

The storage group level of the Logical View (see Figure 5.6) displays the contents of the selected storage group and allows you to add, move, and remove storage for the group. A storage group is a user-defined collection of LDEVs in a subsystem which can be managed as a group. HiCommand™ Device Manager displays the following information for the selected storage group. You can sort the information by selecting the column to sort on.

- **Storage group info:** storage group name, subsystem name, and number of LUNs.
- **LUN info:** (A LUSE device contains more than one LDEV.)

  9900V subsystem: LDEV ID (CU:LDEV), port/host storage domain/LUN, host(s), emulation type, capacity, volume attribute (LUSE, CVS, LUSE(CVS)), command device, copy type (SI, TC, TCA), copy role (P-VOL, S-VOL), and copy status. If the Device Manager Agent is installed, the file system, usage statistics, and time of last Agent update are also displayed.

  9900 subsystem: LDEV ID (CU:LDEV), port/LUN, LUN group, host(s), emulation type, capacity, volume attribute (LUSE, CVS, LUSE(CVS)), command device, copy type (SI, TC, TCA), copy role (P-VOL, S-VOL), and copy status. If the Agent is installed, the file system, usage statistics, and time of last Agent update are also displayed.

  9500V subsystem: LDEV, port/LUN, host(s), capacity, volume attribute (LUSE, CVS, LUSE(CVS)), command device, copy type (SI, TC, TCA), copy role (P-VOL, S-VOL), and copy status. If the Agent is installed, the file system, usage statistics, and time of last Agent update are also displayed.

  9200 subsystem: LDEV, port/LUN, host(s), capacity, volume attribute (LUSE, CVS, LUSE(CVS)), command device, copy type (SI, TC, TCA), copy role (P-VOL, S-VOL), and copy status. If the Agent is installed, the file system, usage statistics, and time of last Agent update are also displayed.

  T3 array LDEV info: LDEV, port/LUN, host(s), and capacity. If the Agent is installed, the file system, usage statistics, and time of last Agent update are also displayed.

Note: When a host name is displayed in red text, this indicates that the host is not listed in the HiCommand™ Device Manager host table (i.e., it has not been added to Device Manager).

Note: This view may display the capacity of a LUSE device as smaller than the sum of the LDEVs within the LUSE. This does not affect the actual capacity. (This situation occurs because the LDEV and LUSE capacity values are rounded off when calculated for this view.)

The **Properties** button opens the Group Properties panel (see section 6.6), which allows you to change the group properties (parent group, name, icon). The **Add Storage** button allows you to add new storage to the storage group (see section 6.6.1). The **Delete Storage** button allows you to delete the selected storage from the storage group (see section 6.6.3). The **Move Storage** button allows you to move the selected storage from this group to another storage group (see section 6.6.2). The **Modify Security** button allows you to modify the LUN security for the selected storage (see section 6.6.4).

Select the desired LUN to display the storage detail level information (see next section).

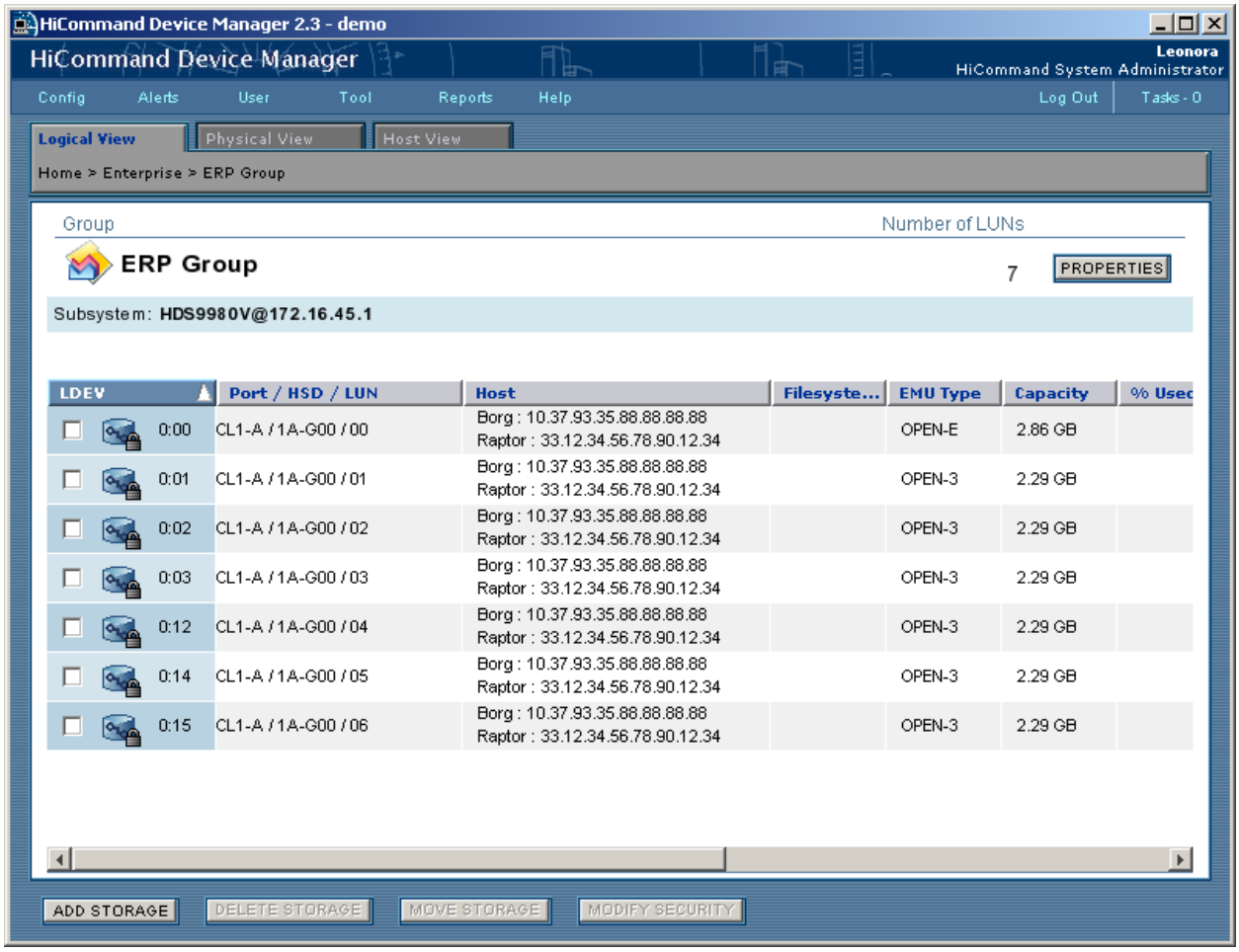


Figure 5.6 Logical View – Storage Group Level (9900V shown)

5.2.4 Logical View – Storage Detail Level

The storage detail level of the Logical View (see Figure 5.7, Figure 5.8, Figure 5.9) displays the detailed array group and volume information for the selected storage group.

- **Storage Detail information for 9900V:**
  - **Array Group Info:** ACP pair, array group ID, disk size, RAID level, device emulation, free space, and largest space.
  - **LDEV list:** LDEV ID (CU:LDEV), capacity, LUSE info (if applicable), port(s).
  - **Detail** tab: LDEV ID, capacity, emulation type, copy type (SI, TC, TCA), volume attribute (LUSE, CVS, LUSE(CVS)), command device.
  - **Path Info** tab: LDEV ID, port/HSD/LUN, host(s), capacity. If the Agent is installed, the file system, bus/TID/LUN, usage statistics, and time of last Agent update are also displayed.
  - **Pair Info** tab: copy type (SI, TC, TCA), copy status, fence level, P-VOL and S-VOL (specified by LDEV ID, subsystem type, subsystem serial number, and array group).
- **Storage Detail information for 9900:**
  - **Array Group Info:** ACP pair, array group ID, disk size, RAID level, device emulation, free space, and largest space.
  - **LDEV list:** LDEV ID (CU:LDEV), capacity, LUSE info (if applicable), port(s).
  - **Detail** tab: LDEV ID, capacity, emulation type, copy type (SI, TC, TCA), volume attribute (LUSE, CVS, LUSE(CVS)), command device.
  - **Path Info** tab: LDEV ID, port/LUN, host(s), capacity. If the Agent is installed, the file system, bus/TID/LUN, usage statistics, and time of last Agent update are displayed.
  - **Pair Info** tab: copy type (SI, TC, TCA), copy status, fence level, P-VOL and S-VOL (specified by LDEV ID, subsystem type, subsystem serial number, and array group).
- **Storage Detail information for 9500V:**
  - **Array Group Info:** array group ID, disk size, RAID level, free space, largest space.
  - **LDEV list:** LDEV ID (CU:LDEV), capacity, LUSE info (if applicable), port(s).
  - **Detail** tab: LDEV ID, capacity, emulation type, copy type (SI, TC, TCA), volume attribute (LUSE, CVS, LUSE(CVS)), command device.
  - **Path Info** tab: LDEV ID, port/LUN, host(s), capacity. If the Agent is installed, the file system, bus/TID/LUN, usage statistics, and time of last Agent update are displayed.
  - **Pair Info** tab: copy type (SI, TC, TCA), copy status, fence level, P-VOL and S-VOL (specified by LDEV ID, subsystem type, subsystem serial number, and array group).

- **Storage Detail information for 9200:**
  - **Array Group Info:** array group ID, disk size, RAID level, free space, largest space.
  - **LDEV list:** LDEV ID (CU:LDEV), capacity, LUSE info (if applicable), port(s).
  - **Detail** tab: LDEV ID, capacity, emulation type, copy type (SI, TC, TCA), volume attribute (LUSE, CVS, LUSE(CVS)), command device.
  - **Path Info** tab: LDEV ID, port/LUN, host(s), capacity. If the Agent is installed, the file system, bus/TID/LUN, usage statistics, and time of last Agent update are displayed.
  - **Pair Info** tab: copy type (SI, TC, TCA), copy status, fence level, P-VOL and S-VOL (specified by LDEV ID, subsystem type, subsystem serial number, and array group).
- **Storage Detail information for T3:**
  - **Array Group Info:** array group ID, disk size, RAID level.
  - **LDEV list:** LDEV ID (CU:LDEV), capacity, port(s).
  - **Detail** tab: LDEV ID, capacity, emulation type (OPEN). Copy type, volume attribute, and command device are not applicable to the T3.
  - **Path Info** tab: LDEV ID, port/LUN, host(s), capacity. If the Agent is installed, the file system, bus/TID/LUN, usage statistics, and time of last Agent update are displayed.

Note: When a host name is displayed in red text, this indicates that the host is not listed in the HiCommand™ Device Manager host table (i.e., it has not been added to Device Manager).

Note on LUSE devices: LUSE devices contain more than one LDEV. The main LDEV of a LUSE device is displayed on this view, and the sub-LDEVs are shown in the LDEV drop-down list (the main LDEV is listed first). The sub-LDEVs are indicated by (LUSE) in the upper panel.

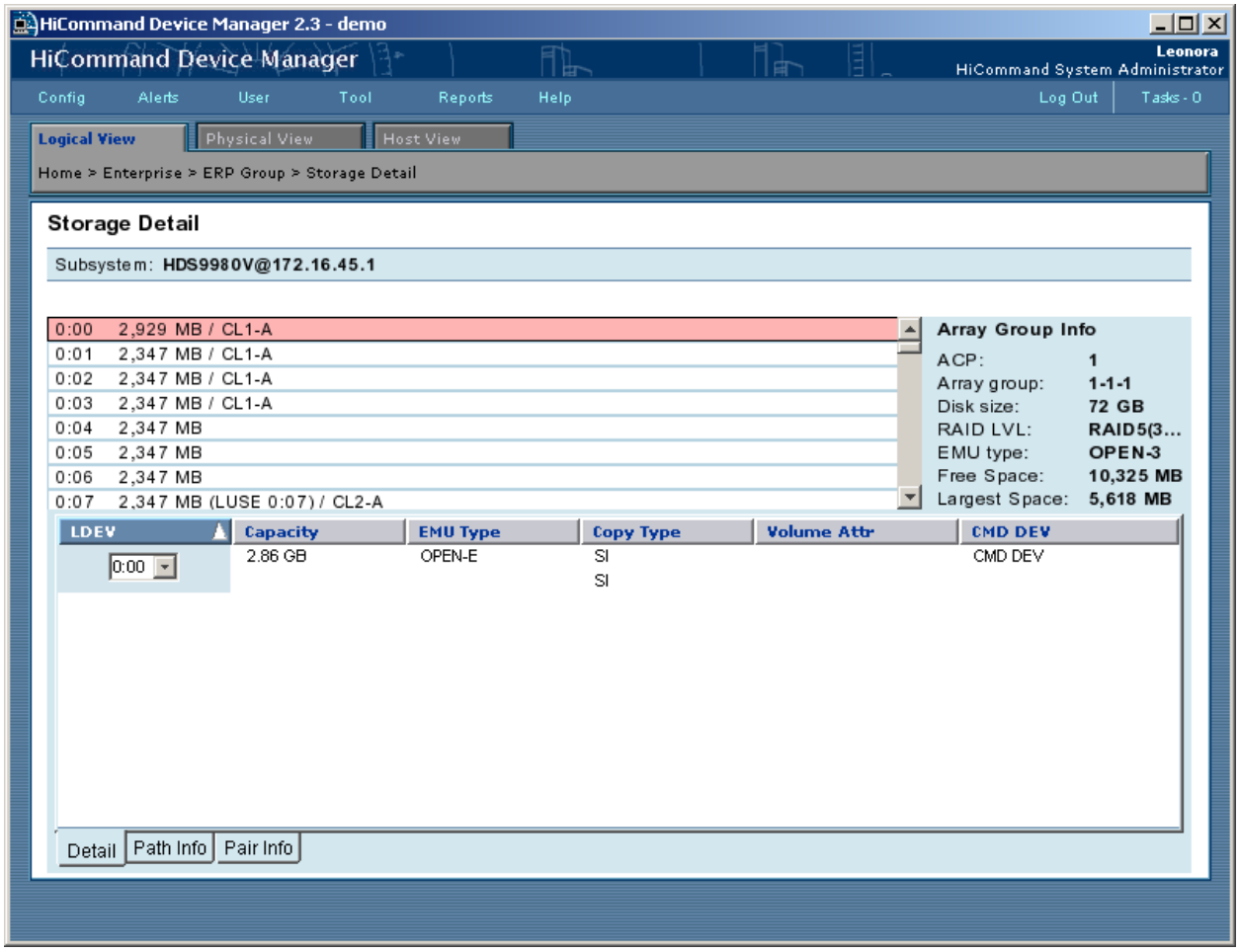


Figure 5.7 Logical View – Storage Detail Level, Detail Tab (9900V subsystem shown)

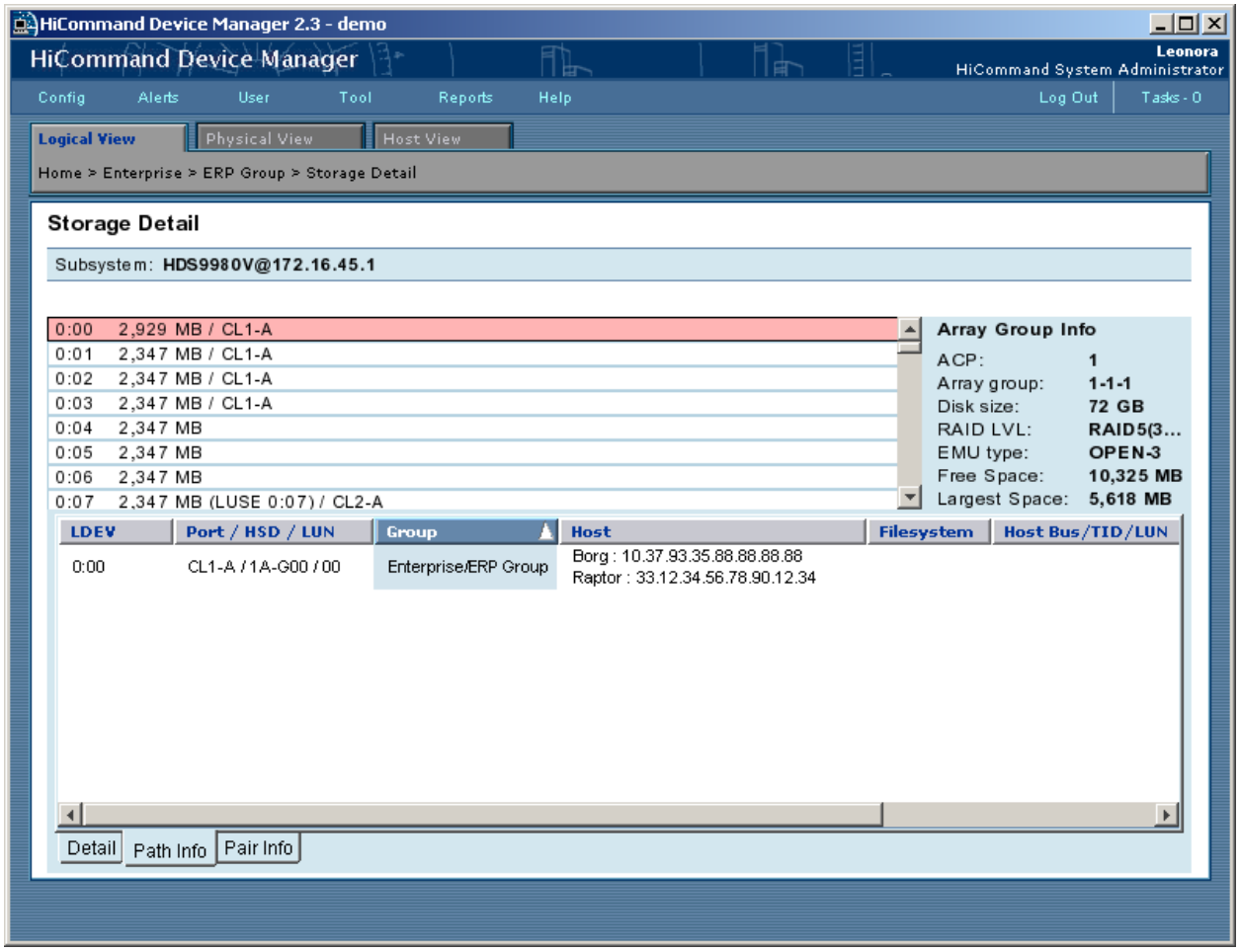


Figure 5.8 Logical View – Storage Detail Level, Path Info Tab (9900V subsystem shown)

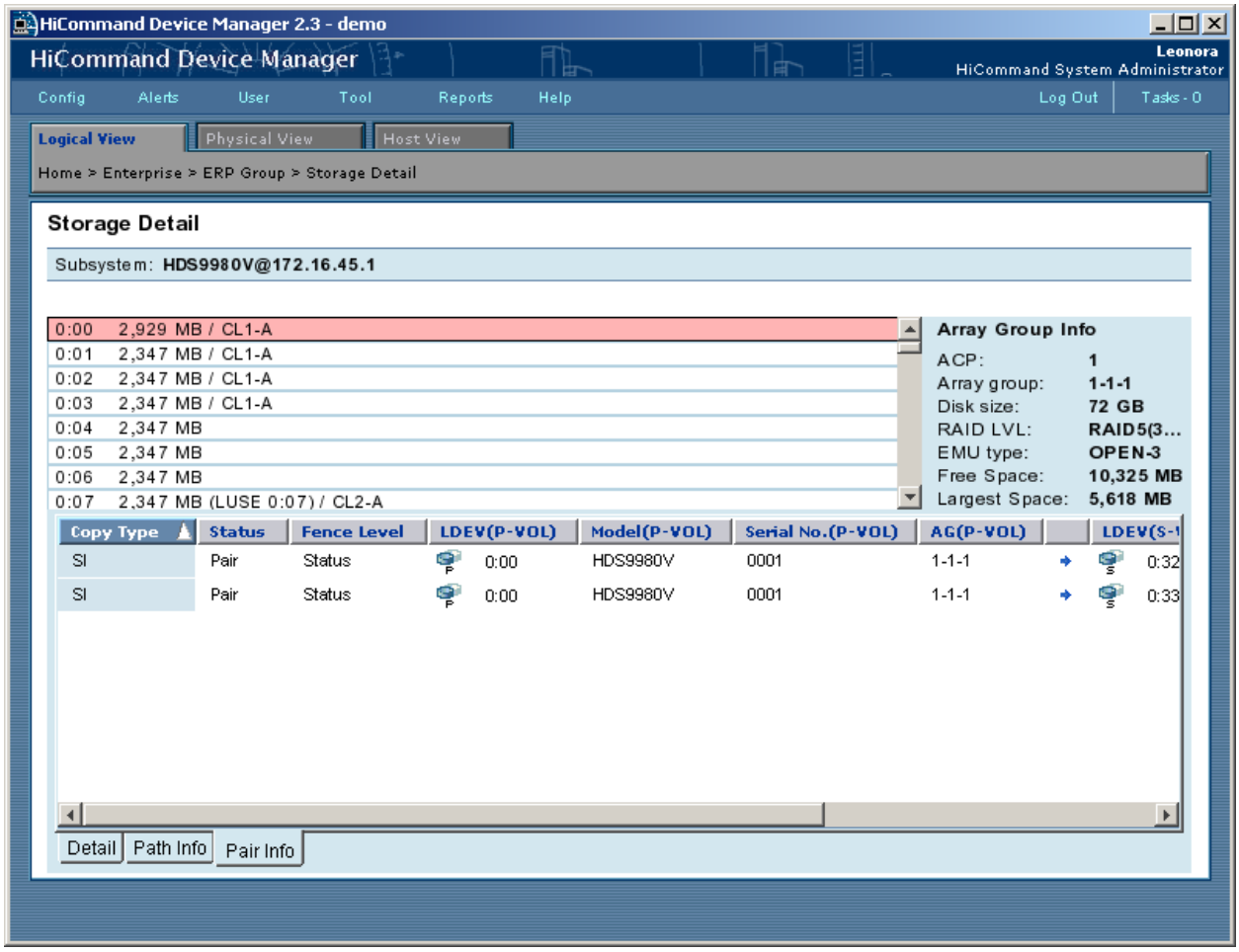


Figure 5.9 Logical View – Storage Detail Level, Pair Info Tab (9900V subsystem shown)

5.3 Physical View

The Physical View on the HiCommand™ Device Manager main console (see Figure 5.10) displays the subsystems which have been added to HiCommand™ Device Manager and provides access to the detailed subsystem configuration information. To access the Physical View, select the **Physical View** tab on the HiCommand™ Device Manager main console.

Note: Local users do not have access to the Physical View. The System Administrator and Storage Administrator can view the detailed subsystem information. Guest users can view the subsystem list but do not have access to the detailed subsystem information.

HiCommand™ Device Manager displays the following summary information for each subsystem: name, type (model), serial number, configured capacity, and alerts. If any alerts have been received for this subsystem, they are displayed as red marks in the **Alerts** bar. You can select the Alerts bar for a subsystem to display the alerts for that subsystem.

You can sort the subsystems on the Physical View by selecting the desired column to sort on. The selected column is highlighted, and the sort order (ascending or descending) is indicated by the arrow in the column's heading. The screen in Figure 5.10 shows the subsystems sorted by name in ascending order. To switch the sort order, select the highlighted column.

The Physical View of each subsystem provides access to the link-and-launch applications (see section 2.5). The Physical View also provides access to the port, array group, and LDEV operations for the subsystem (see sections 6.2, 6.3, and 6.4).

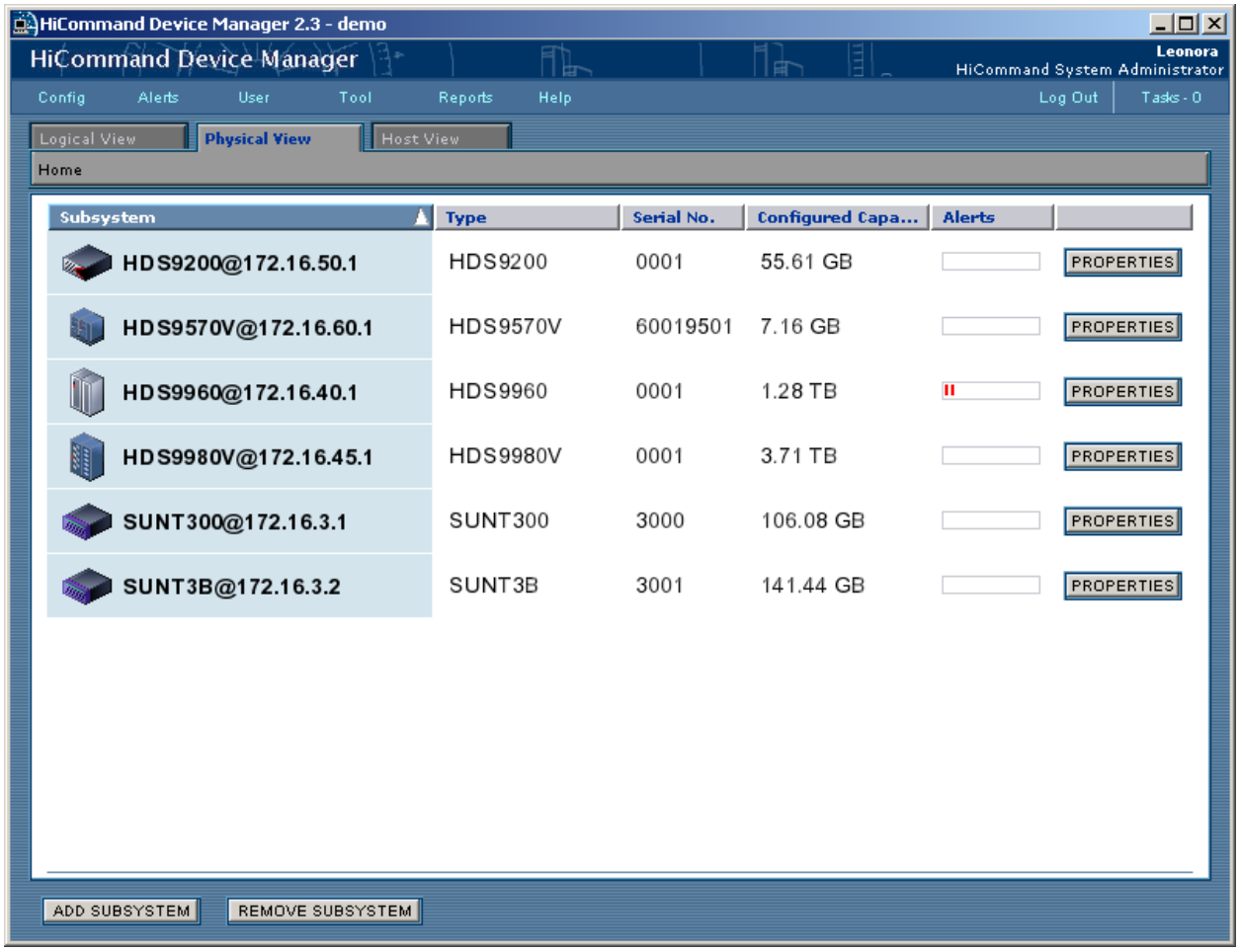


Figure 5.10 Physical View on the HiCommand™ Device Manager Main Console

5.3.1 Viewing the Lightning 9900™ V Series Configuration Information

To view the configuration information for the Hitachi Lightning 9900™ V Series subsystem:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator, and select **Physical View** to view the connected subsystems.
2. Select the desired 9900V subsystem to display the configuration information (serial number, IP address, microcode, capacity) and a physical representation of a subsystem's main components (see Figure 5.11): installed ports, ACPs, and array frames.
3. To view the array group information, select the **Array Groups** button (see Figure 5.12). To view the disk information, select the **Disks** button (see Figure 5.13).
4. To view the detailed port information, select the desired port (e.g., click on **A** in Cluster 1) to open the Port Information panel (see Figure 5.14). See sections 6.2.1, 6.2.2, and 6.2.3 for further information and instructions on configuring the 9900V ports.
5. To view or change the channel adapter mode, select the **Port Controllers** button to open the Port Controller panel (see Figure 5.15). See section 6.2.4 for further information and instructions on configuring the fibre-channel adapters.
6. To view the detailed frame information, select the **Array Groups** button, and then select the **View** button on the desired array frame. The Frame Information (Overview) panel opens (see Figure 5.16) and displays the following frame information:
   - Subsystem name
   - ACP ID (array domain)
   - Frame ID
   - Parity groups. If "coupled (PG number)" is displayed next to the parity group number, this PG and coupled PG are configured as a discrete VDEV (see Figure 5.17).

   Note: The Frame Information panel may display the total capacity of parity groups as smaller than the sum of the array group capacity values. This does not affect the actual capacity. (This situation occurs because the capacity values are rounded off when calculated for this panel.)
7. To view the detailed parity group information, select the desired parity group on the Frame Information (Overview) panel. The Frame information (Detail) panel opens (see Figure 5.18) and displays the following information for the selected parity group:
   - Array group ID (e.g., 1-1, 1-2, 1-3, etc.)
   - Number and capacity of HDDs in group, e.g., 4x47GB = four 47-GB HDDs
   - Capacity of the array group
8. To view the detailed array group information, select the desired array group on the Frame Information (Detail) panel to open the LDEV Information panel (see Figure 5.19). The LDEV Information panel displays the storage detail level information (refer to section 5.2.4 and Figure 5.7, Figure 5.8, Figure 5.9).

   Note on LUSE devices: A LUSE device contains more than one LDEV. The main LDEV of a LUSE device is displayed, and the sub-LDEVs are shown in the LDEV drop-down list (the main LDEV is listed first). The sub-LDEVs are indicated by (LUSE) in the upper panel.

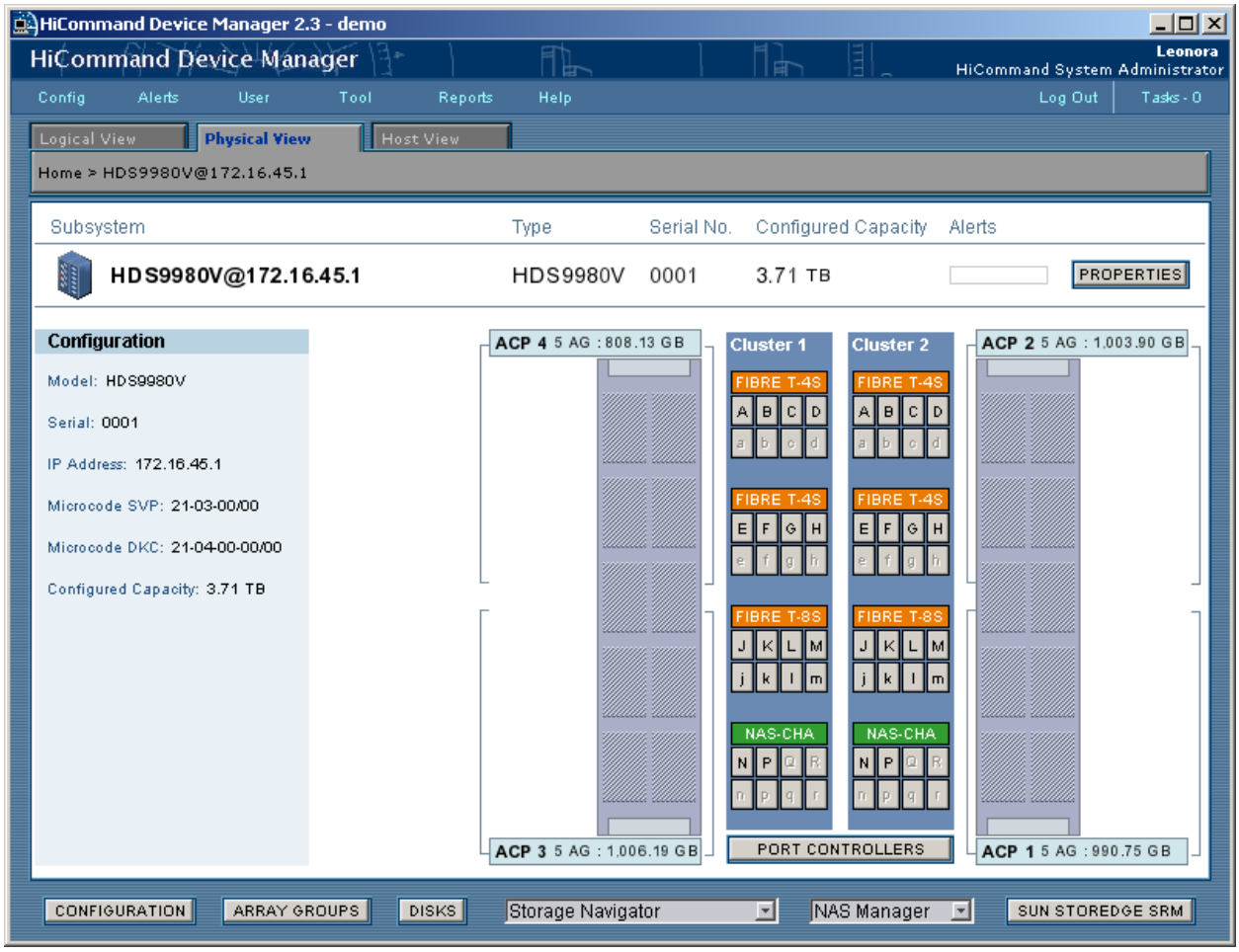


Figure 5.11 Subsystem Configuration Information for the Lightning 9900™ V Series

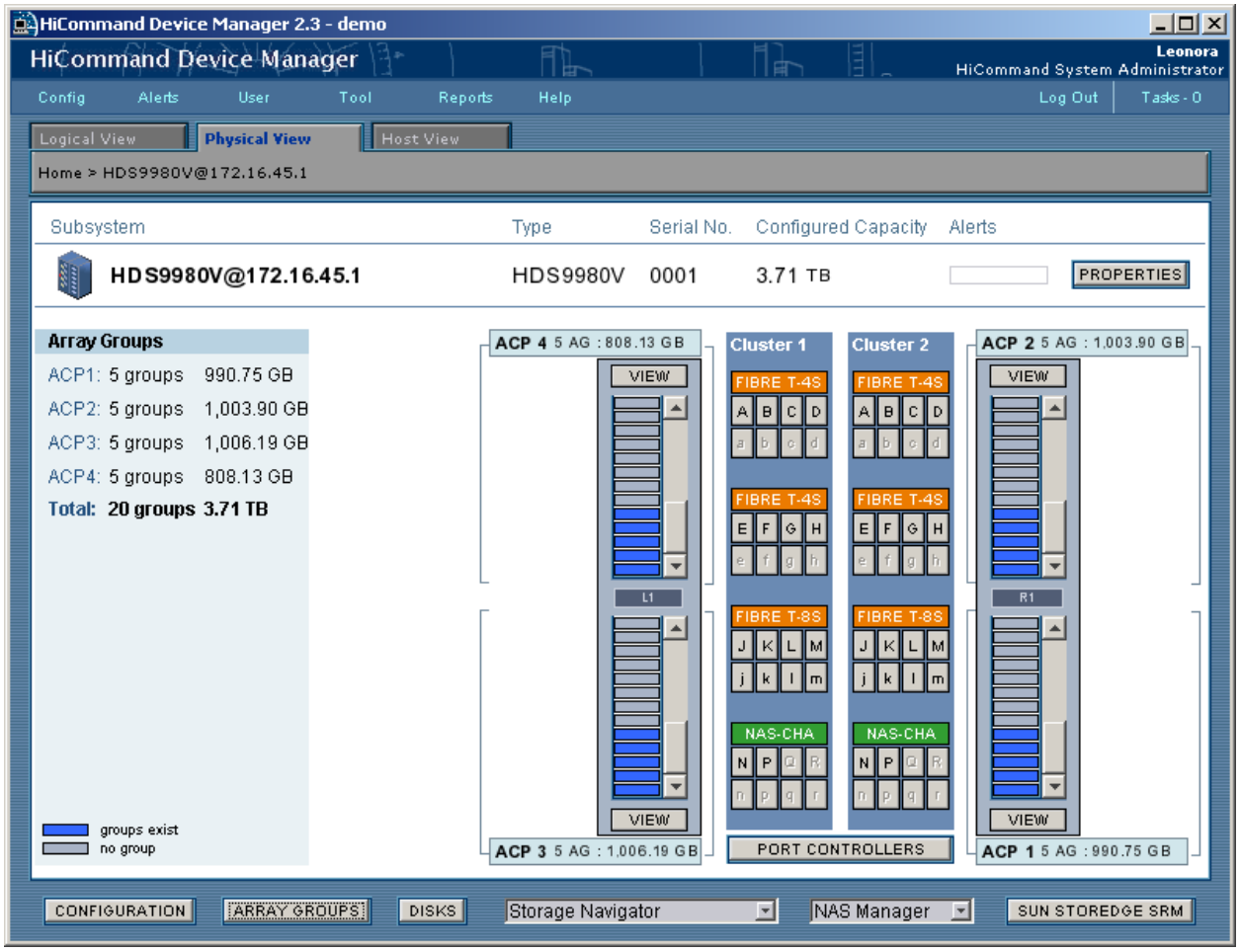


Figure 5.12 Array Group Information for the Lightning 9900™ V Series

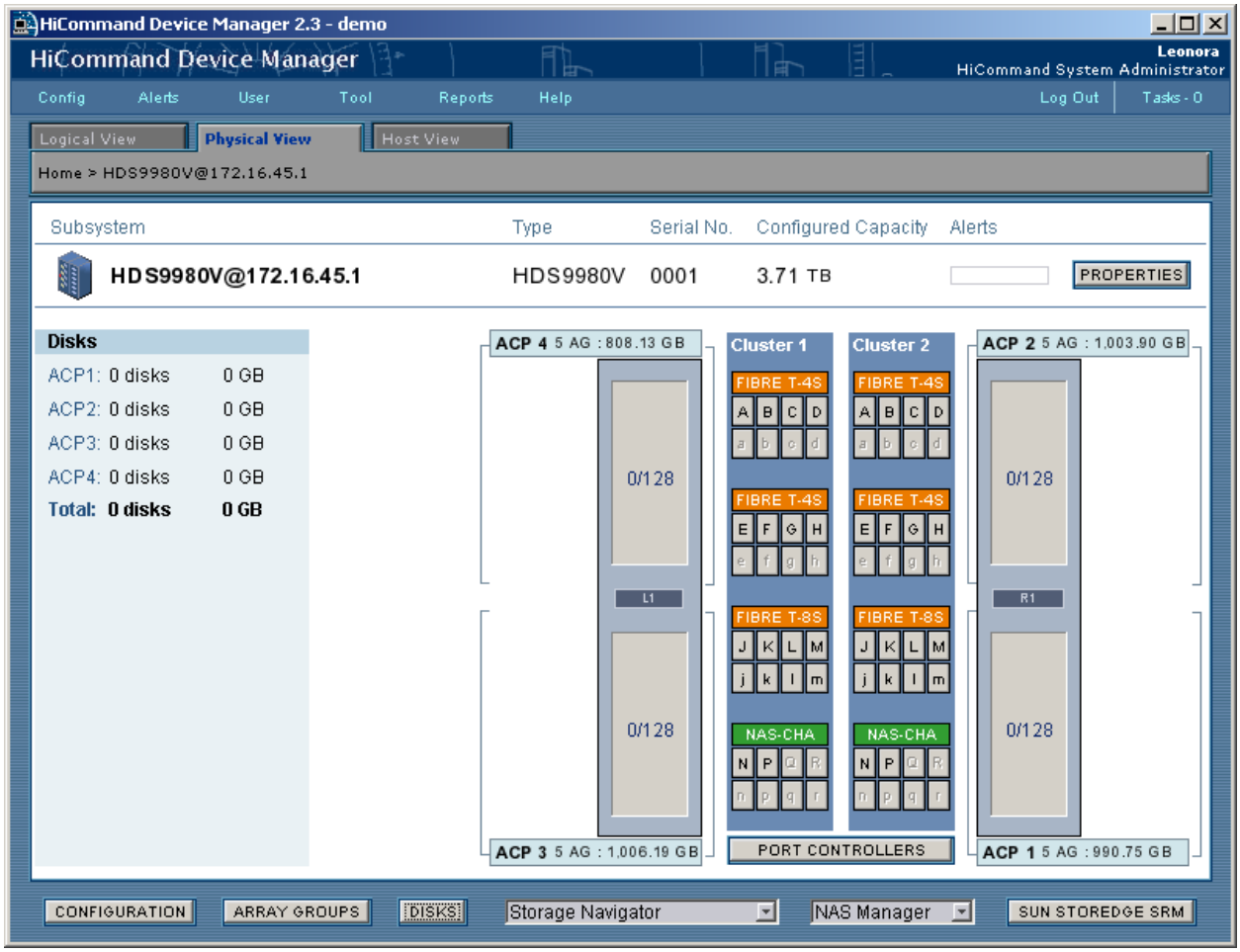


Figure 5.13 Disk Information for the Lightning 9900™ V Series

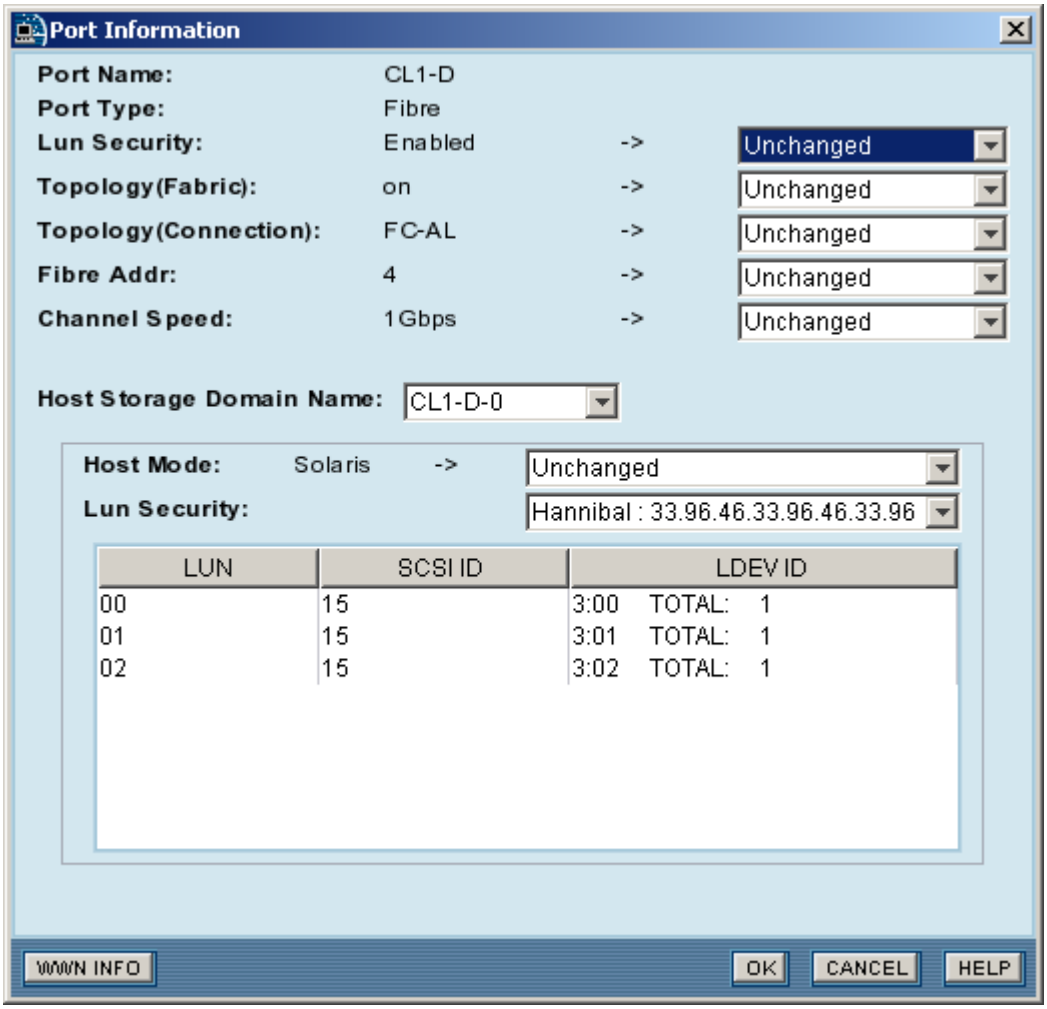


Figure 5.14 Port Information Panel for the Lightning 9900™ V Series

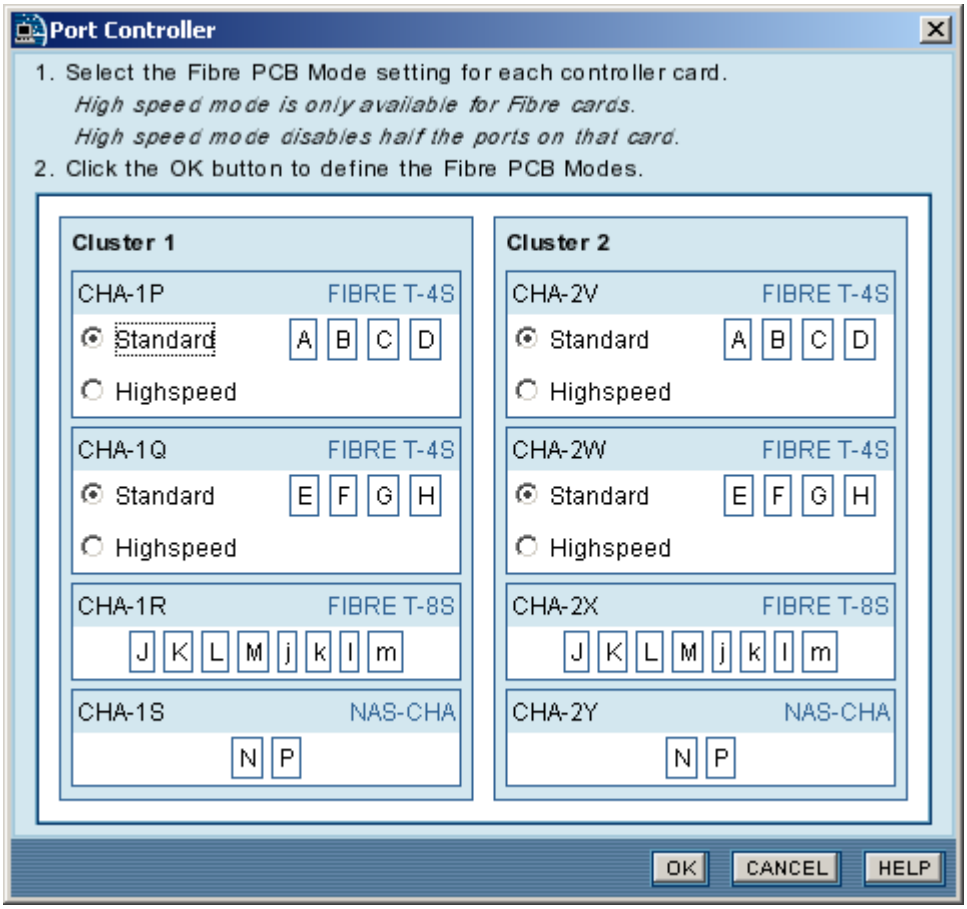


Figure 5.15 Port Controller Panel for the Lightning 9900™ V Series

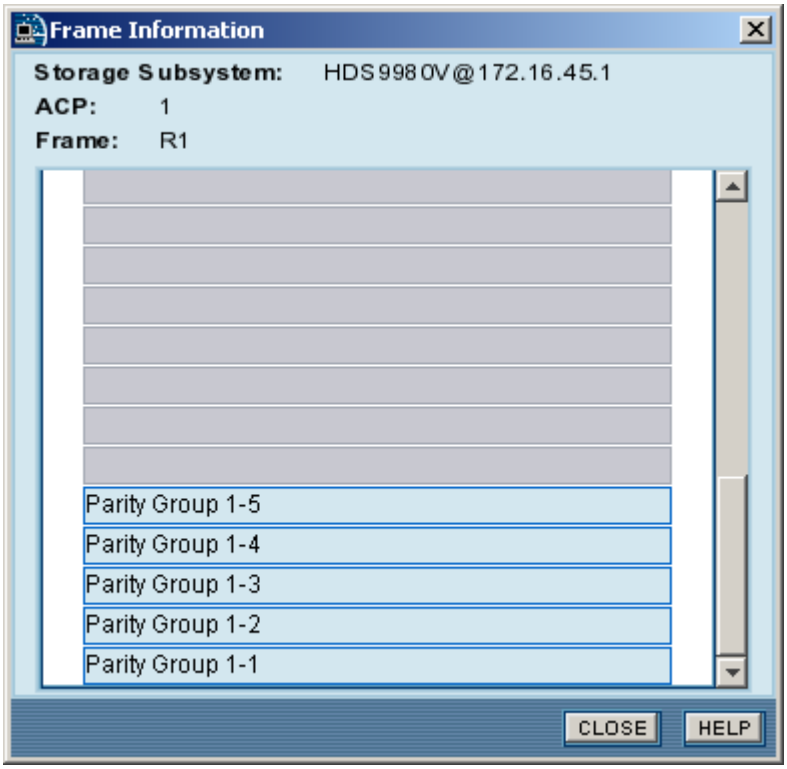


Figure 5.16 Frame Information (Overview) Panel for the Lightning 9900™ V Series

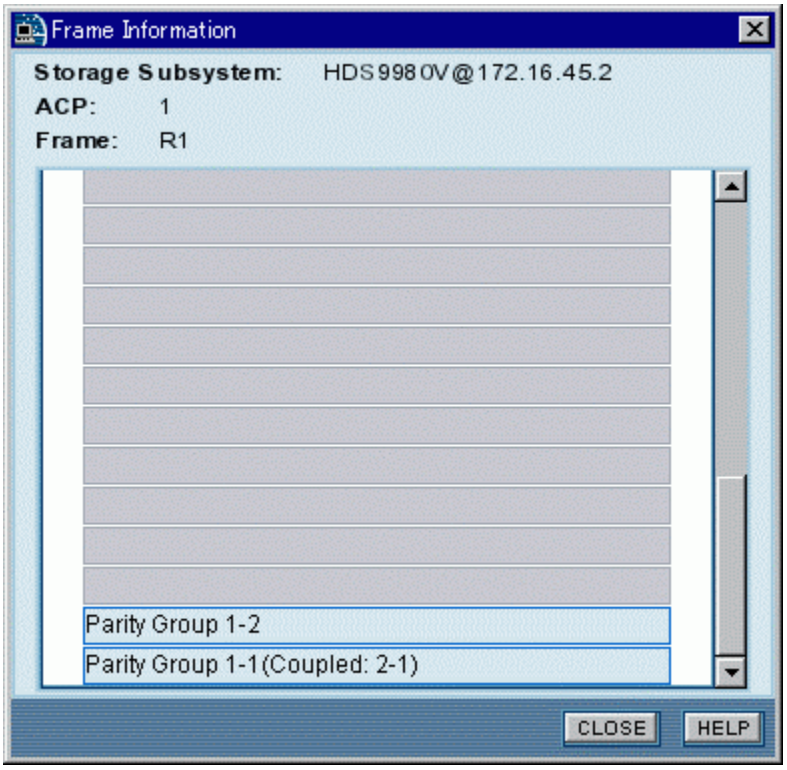


Figure 5.17 Frame Information (Overview) Panel Showing Discrete VDEV Configuration

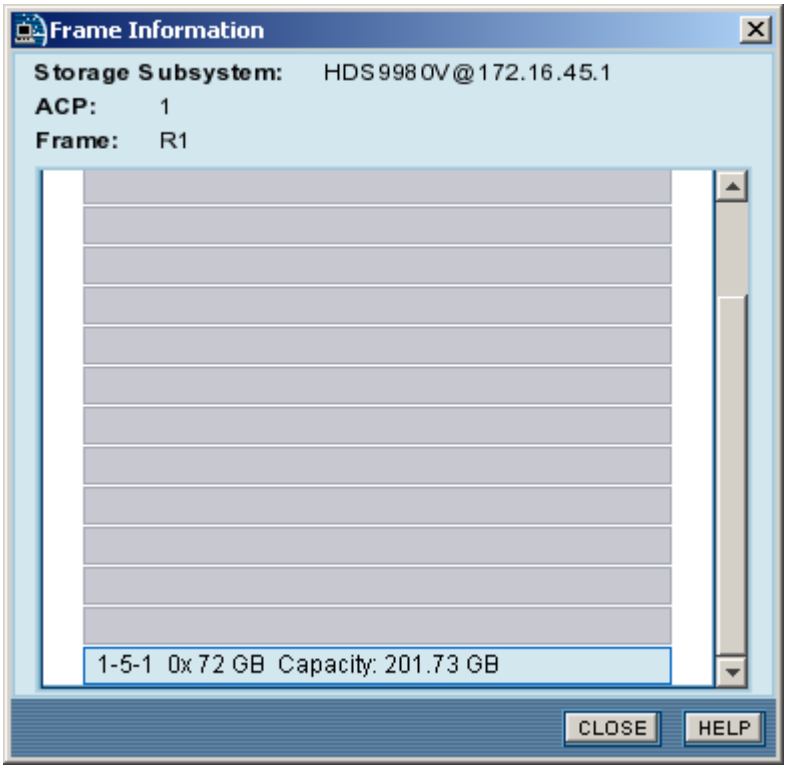


Figure 5.18 Frame Information (Detail) Panel for the Lightning 9900™ V Series

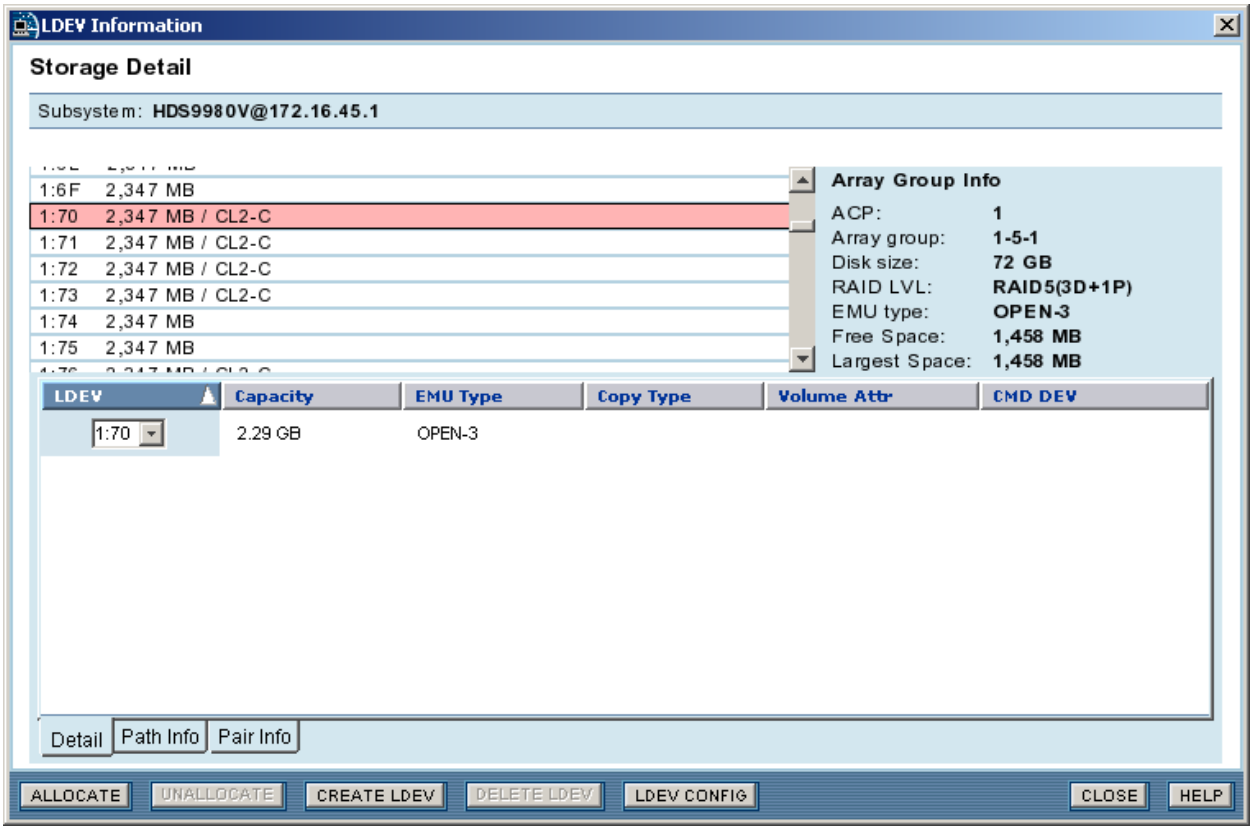


Figure 5.19 LDEV Information Panel for the Lightning 9900™ V Series

5.3.2 Viewing the Lightning 9900™ Configuration Information

To view the configuration information for the Hitachi Lightning 9900™ subsystem:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator, and select **Physical View** to view the connected subsystems.
2. Select the desired 9900 subsystem to display the configuration information (S/N, IP address, microcode, capacity, cache) and a physical representation of a subsystem's main components (see Figure 5.20): installed ports, ACPs, and array frames.
3. To view the array group information, select the **Array Groups** button (see Figure 5.21). To view the disk information, select the **Disks** button (see Figure 5.22).
4. To view the detailed port information, select the desired port (e.g., click on **A** in **Cluster 1**) to open the Port Information panel (see Figure 5.23). See sections 6.2.1, 6.2.2, and 6.2.3 for further information and instructions on configuring the 9900 ports.
5. To view or change the channel adapter mode, select the **Port Controllers** button to open the Port Controller panel (see Figure 5.24). See section 6.2.4 for further information and instructions on configuring the fibre-channel adapters.
6. To view the detailed frame information, select the **Array Groups** button, and then select the **View** button on the desired array frame. The Frame Information panel opens (see Figure 5.25) and displays the following frame information:
   - Subsystem name
   - ACP ID (array domain)
   - Frame ID
   - Information for each array group (AG) in the frame:
     Array group ID (e.g., 1-1, 1-2, 1-3, etc.)
     Number and capacity of HDDs in group, e.g., 4x47GB = four 47-GB HDDs
     Capacity of each array group

   Note: The Frame Information panel may display the total capacity of array groups as smaller than the sum of the array group capacity values. This does not affect the actual capacity. (This situation occurs because the capacity values are rounded off when calculated for this panel.)
7. To view the detailed array group information, select the desired array group on the Frame Information panel to open the LDEV Information panel (see Figure 5.26). The LDEV Information panel displays the storage detail level information (refer to section 5.2.4 and Figure 5.7, Figure 5.8, Figure 5.9).

   Note on LUSE devices: A LUSE device contains more than one LDEV. The main LDEV of a LUSE device is displayed, and the sub-LDEVs are shown in the LDEV drop-down list (the main LDEV is listed first). The sub-LDEVs are indicated by (LUSE) in the upper panel.

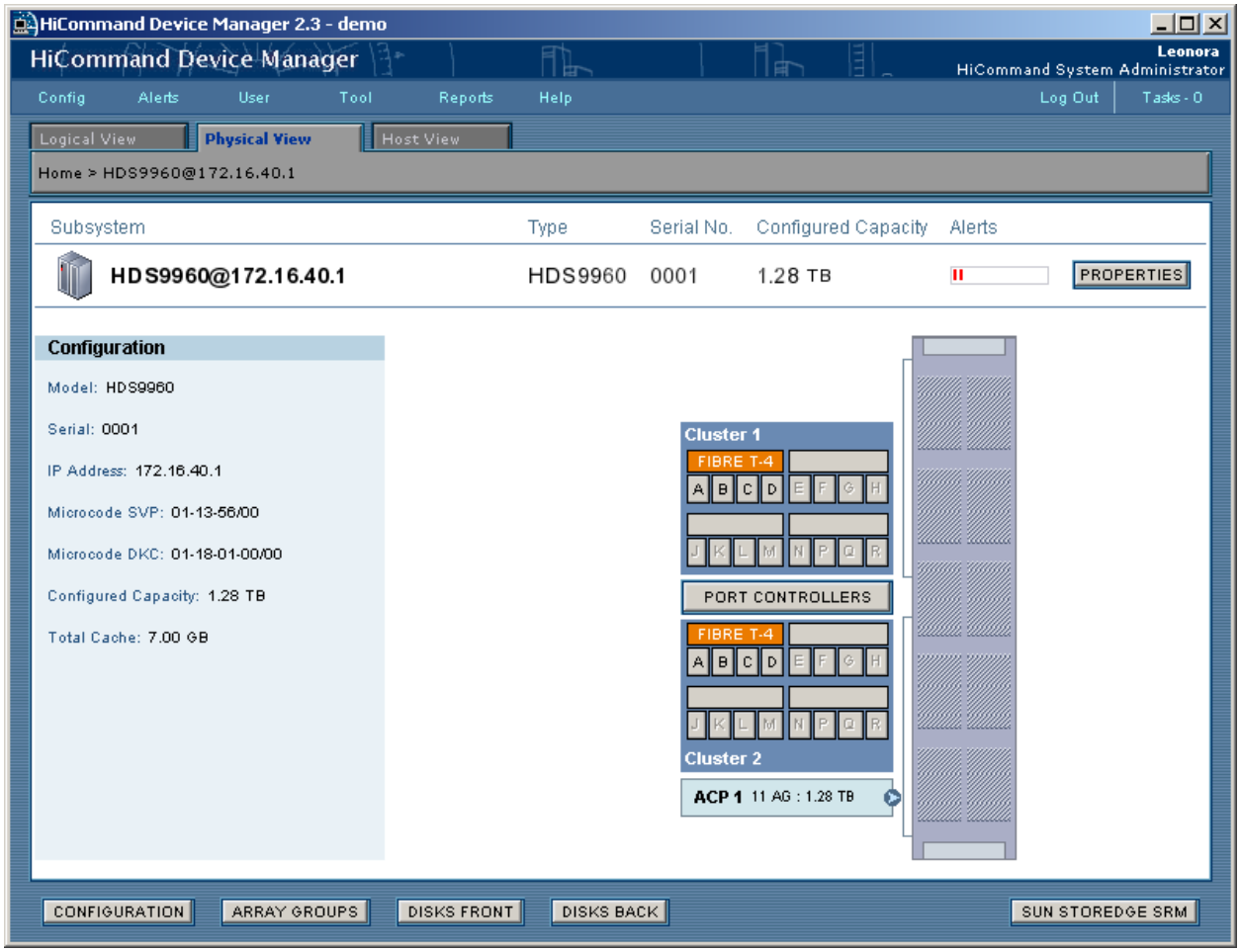


Figure 5.20 Subsystem Configuration Information for the Lightning 9900™

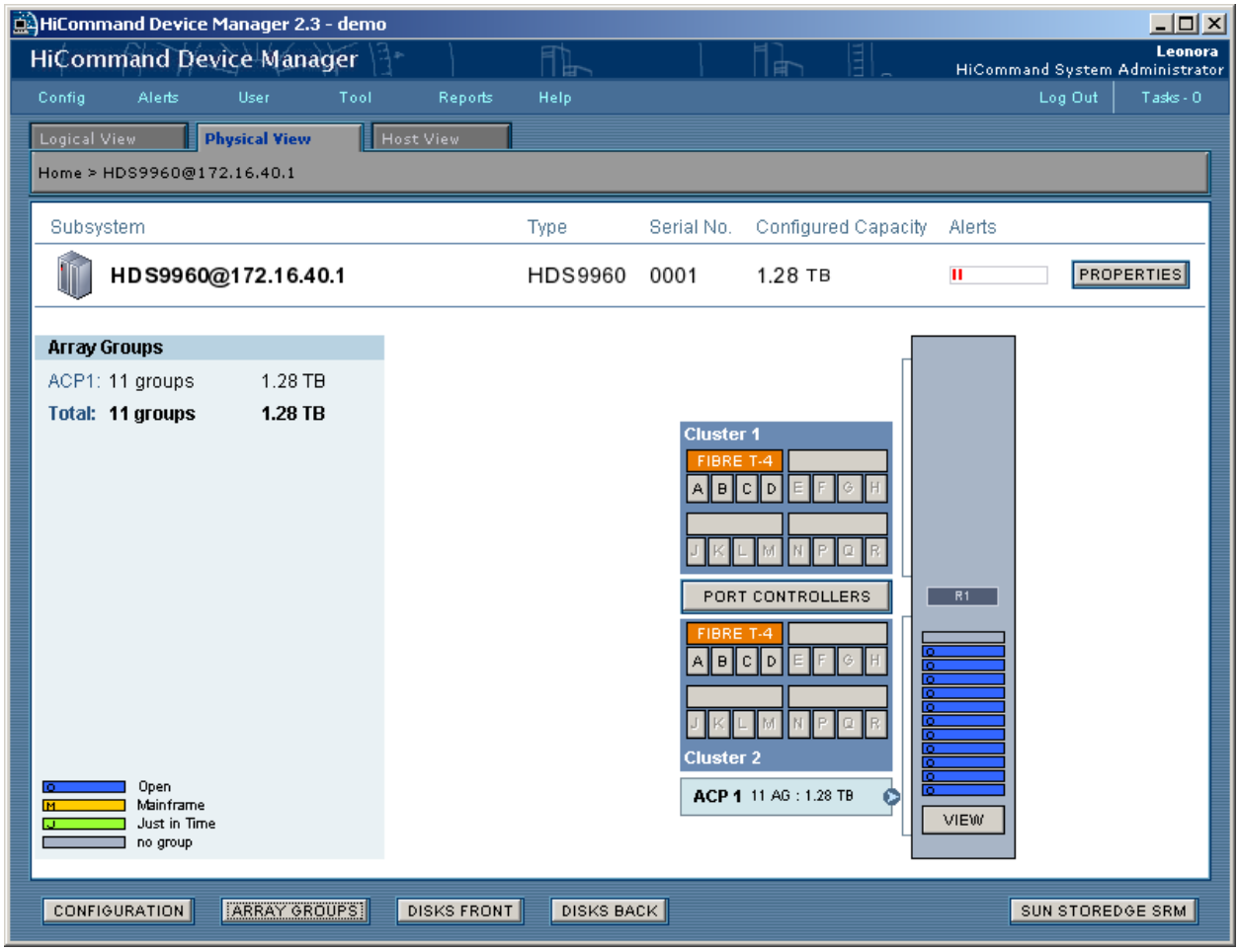


Figure 5.21 Array Group Information for the Lightning 9900™

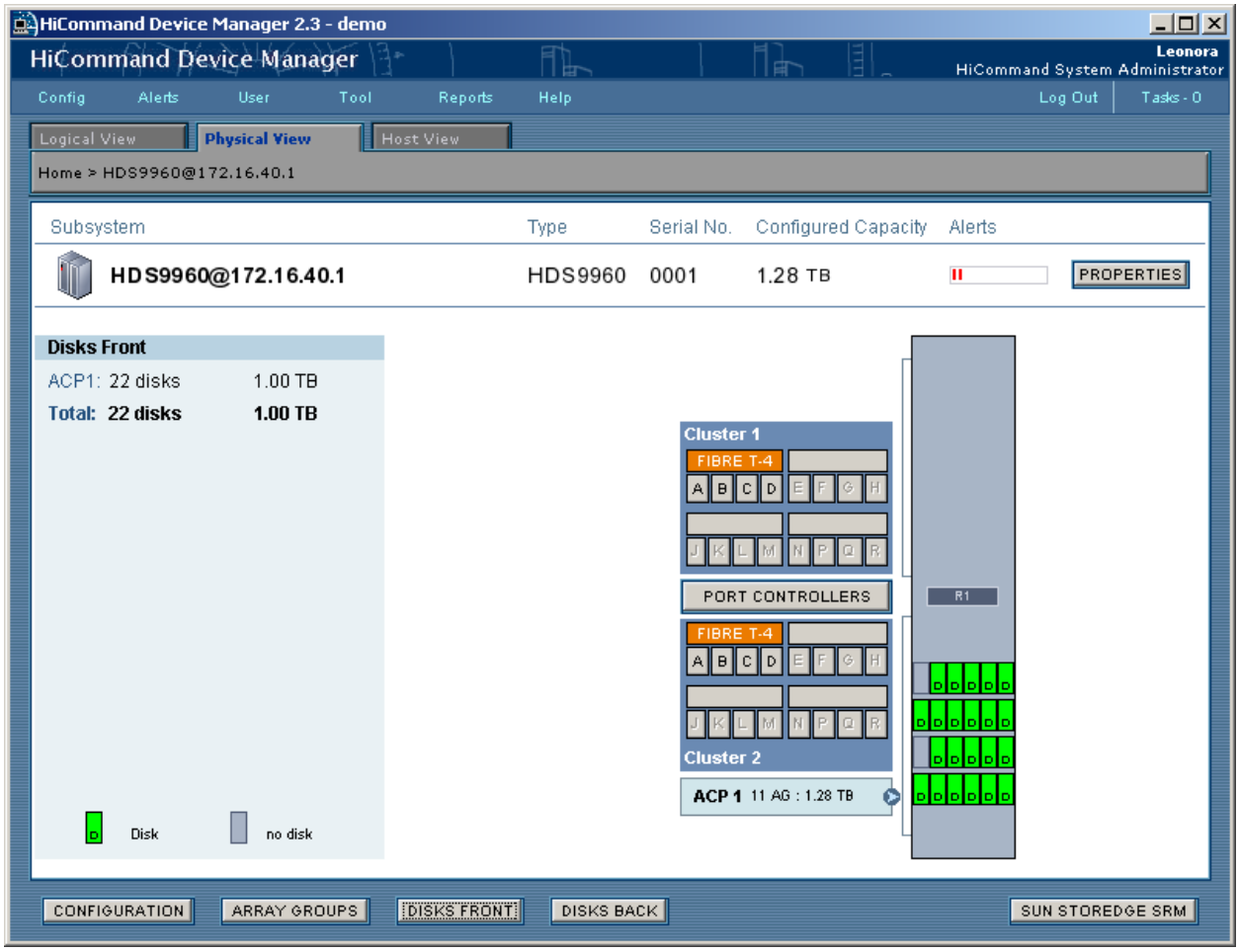


Figure 5.22 Disk Information for the Lightning 9900™

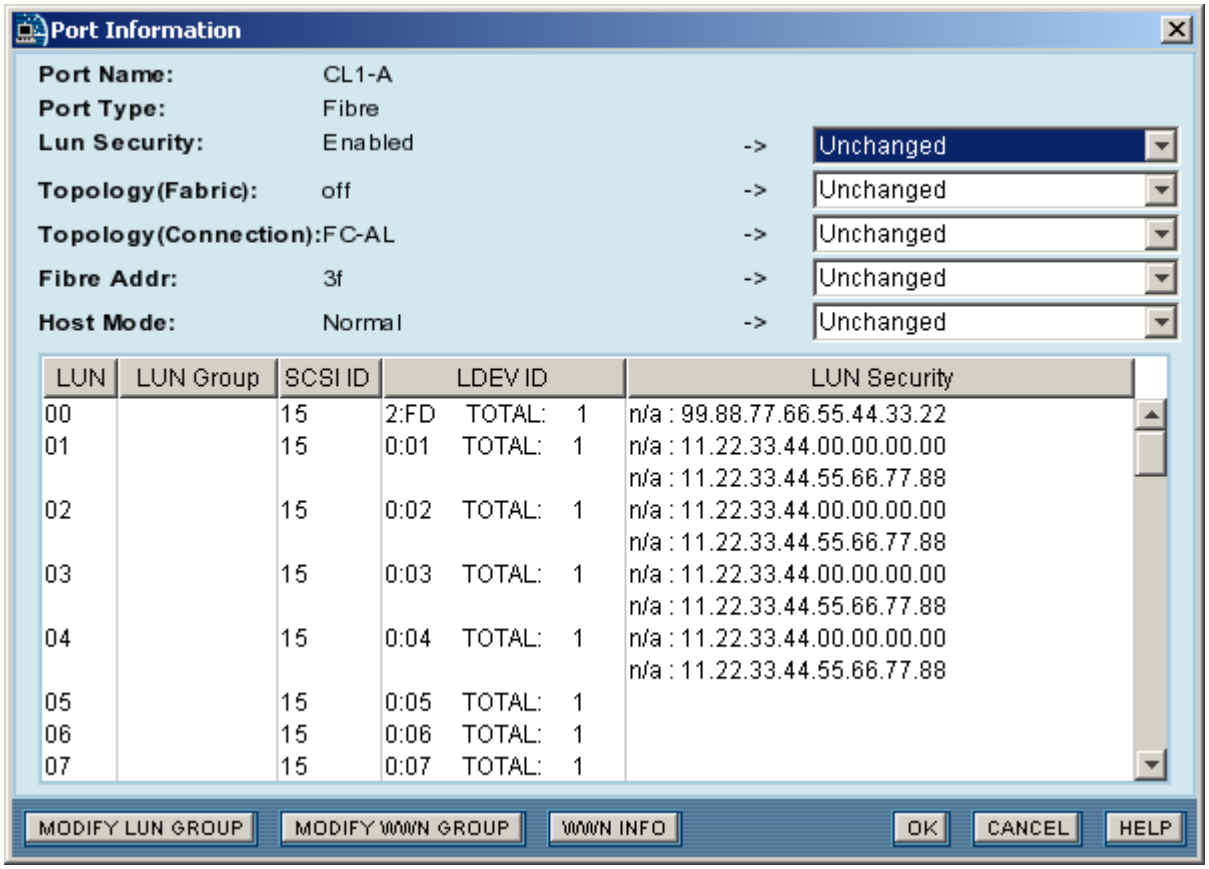


Figure 5.23 Port Information Panel for the Lightning 9900™

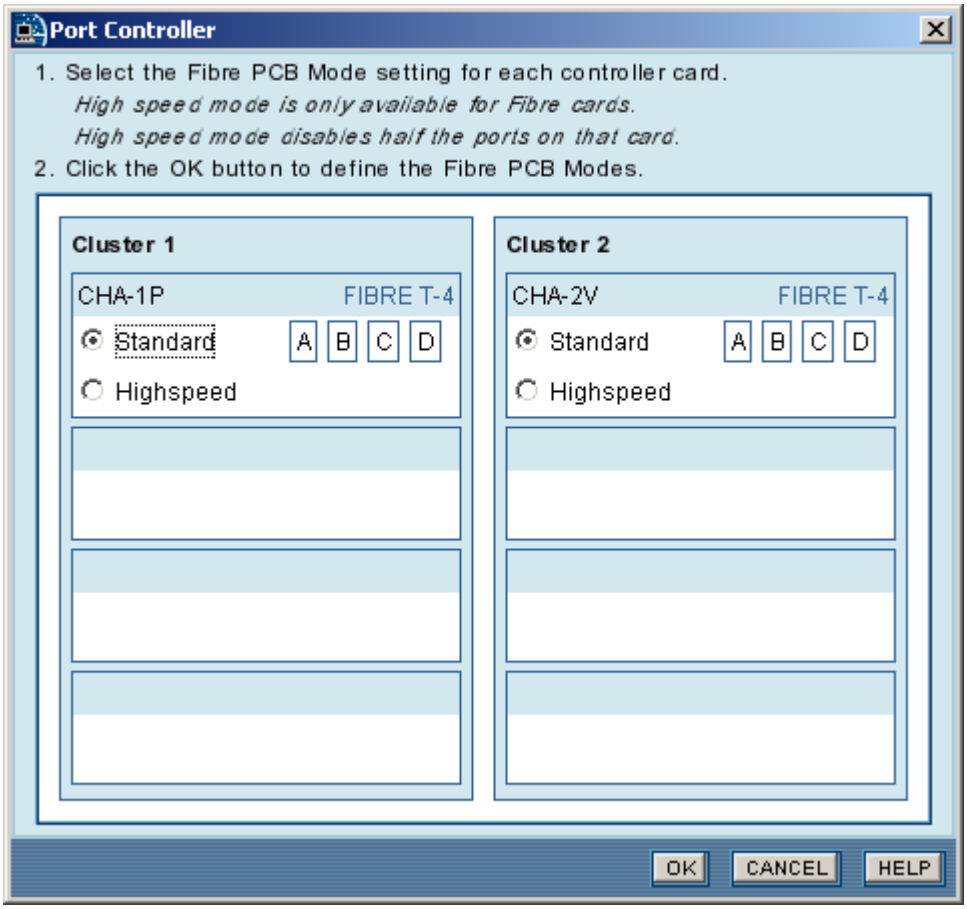


Figure 5.24 Port Controller Panel for the Lightning 9900™

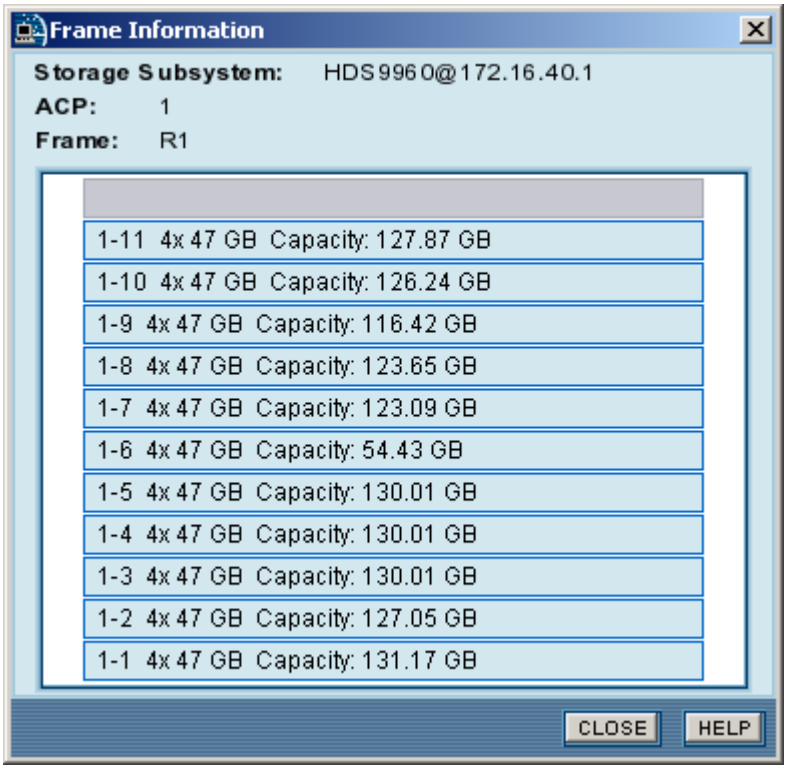


Figure 5.25 Frame Information Panel for the Lightning 9900™

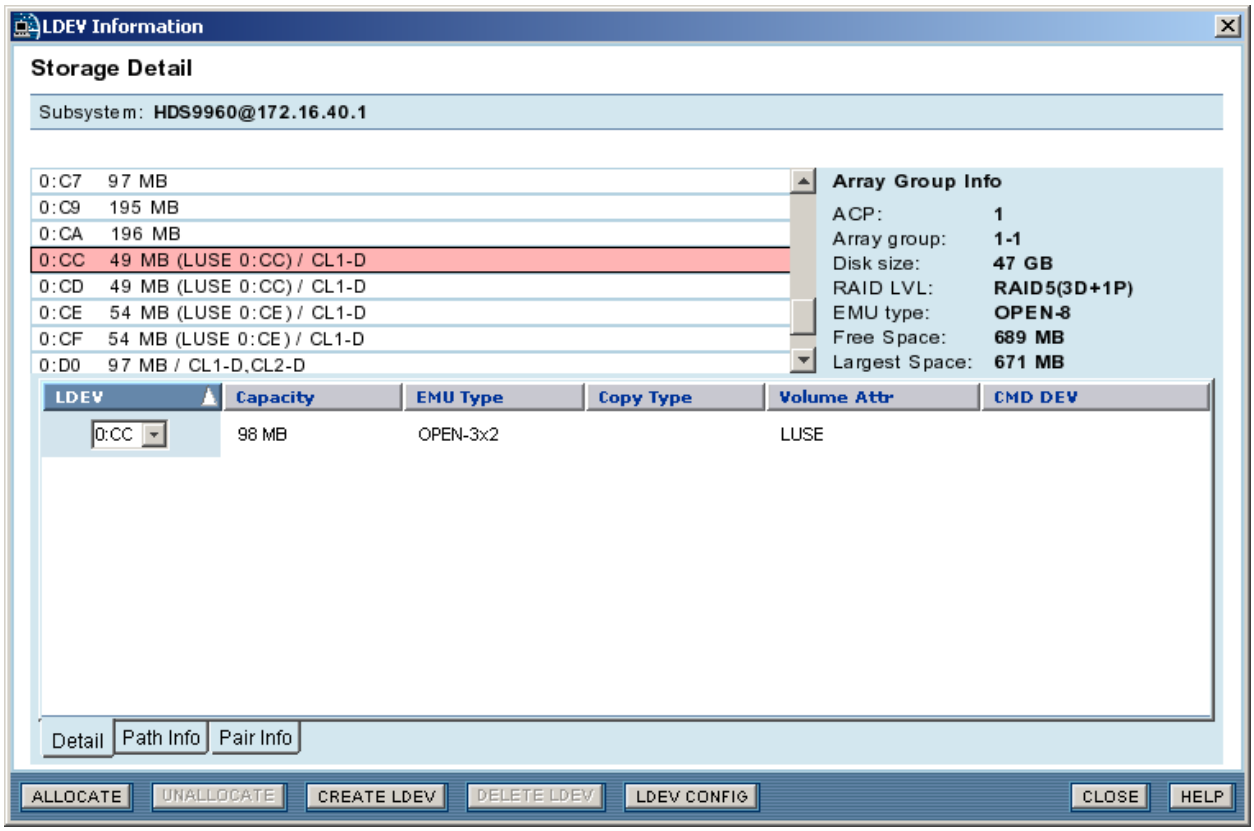


Figure 5.26 LDEV Information Panel for the Lightning 9900™

5.3.3 Viewing the Thunder 9500™ V Series Configuration Information

To view the configuration information for the Hitachi Thunder 9500™ V Series subsystem:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator, and select **Physical View** to view the connected subsystems.
2. Select the desired 9500V subsystem to display a physical representation of a subsystem's main components (see Figure 5.27). HiCommand™ Device Manager displays the configuration information (serial number, IP addresses, microcode, capacity, cache memory), disk and array group information (number and layout of disks and array groups), and port information.

   The **New** button allows you to add a new array group (see section 6.3.1).
   The **Delete** button allows you to delete an existing array group (see section 6.3.6).
   The **Spare** button allows you to configure the spare drives (see section 6.3.3).
   The **View** button opens the LDEV Information panel (see step (5) below).
3. To view the detailed port information, select the desired port (e.g., click on **A** in **CHA 0**) to open the Port Information panel (see Figure 5.28). See section 6.2.1 for further information and instructions on configuring the 9500V ports.
4. To view the detailed array group information, select the desired array group on the Physical View, and then select **View**. The LDEV Information panel opens (see Figure 5.29) and displays the following information:
   - Rows on left: LUNs in array group with capacity and port(s).
   - Array group ID, HDD size, RAID level, free space, largest space.
5. To view the detailed LDEV information, select the desired LDEV on the LDEV Information panel. The LDEV Information panel displays the storage detail level information (refer to section 5.2.4 and Figure 5.7, Figure 5.8, Figure 5.9).

   Note on LUSE devices: A LUSE device contains more than one LDEV. The main LDEV of a LUSE device is displayed, and the sub-LDEVs are shown in the LDEV drop-down list (the main LDEV is listed first). The sub-LDEVs are indicated by (LUSE) in the upper panel.

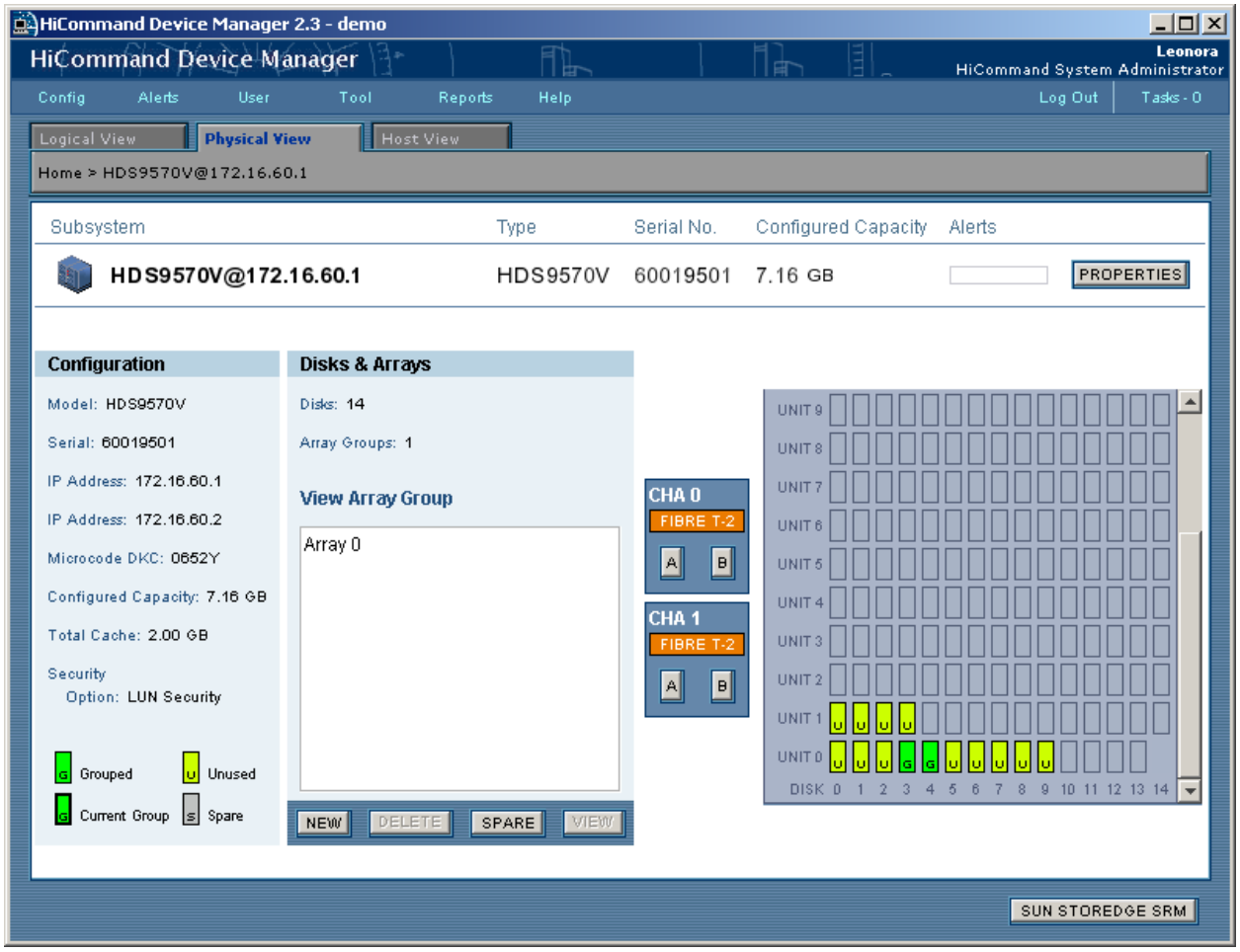


Figure 5.27 Subsystem Configuration Information for the Thunder 9500™ V Series

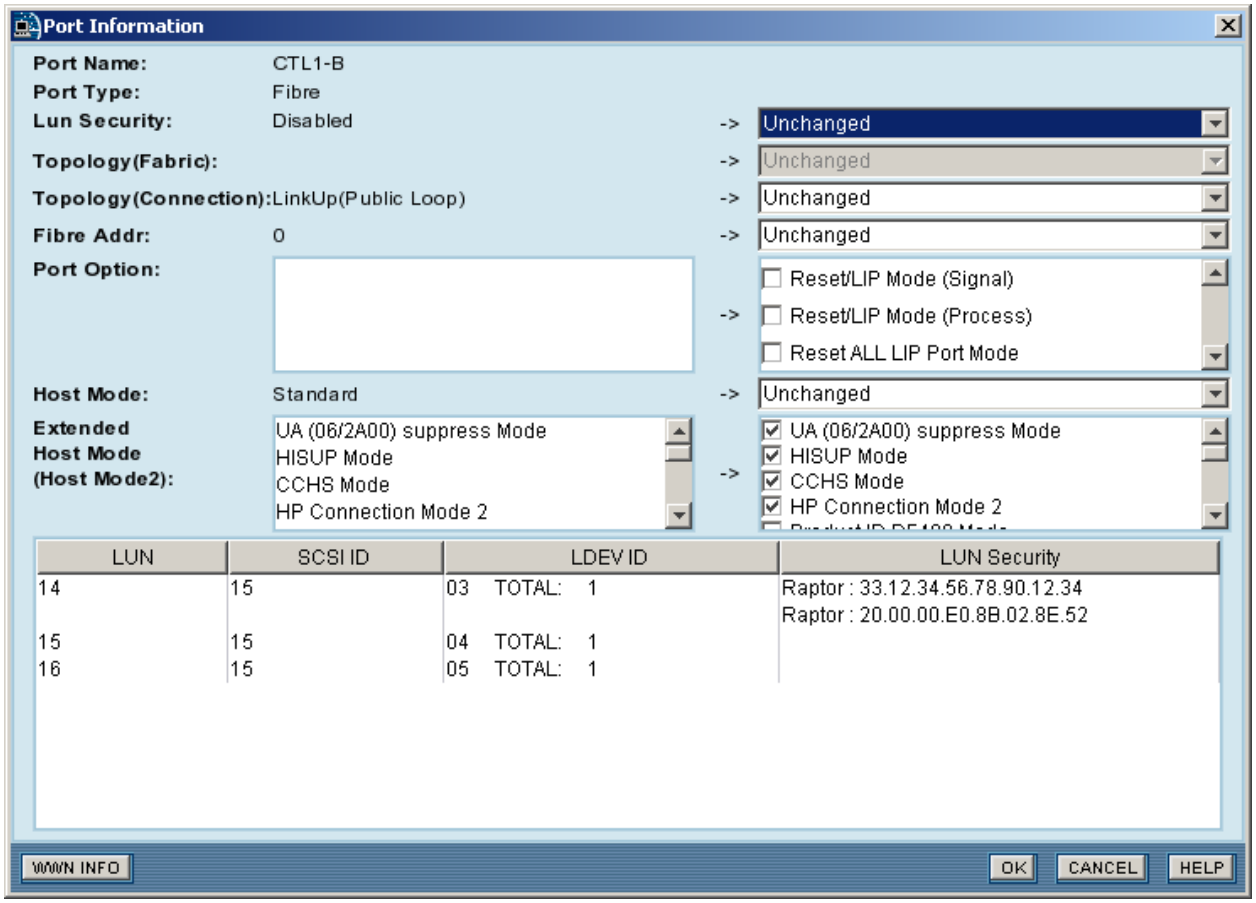


Figure 5.28 Port Information Panel for the Thunder 9500™ V Series

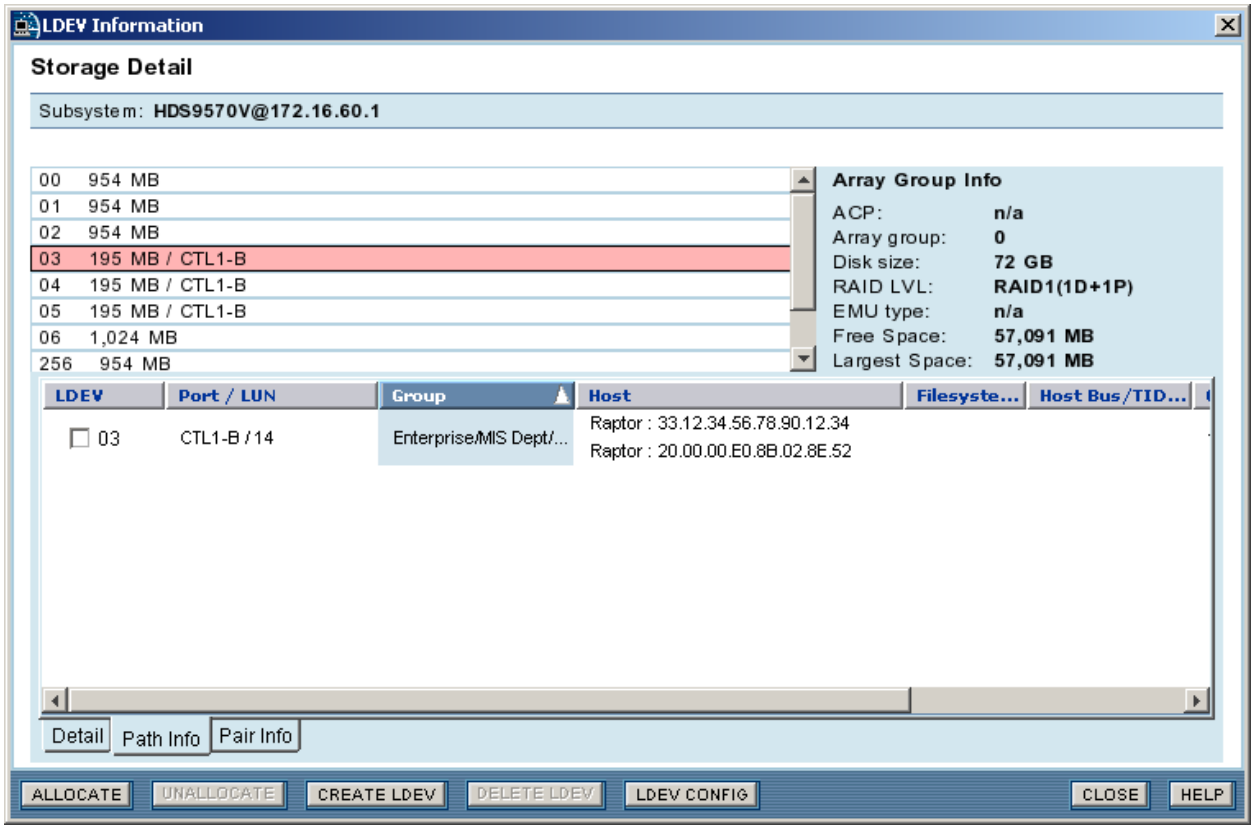


Figure 5.29 LDEV Information Panel for the Thunder 9500™ V Series (Path Info tab)

5.3.4 Viewing the Thunder 9200™ Configuration Information

To view the detailed configuration information for the Hitachi Thunder 9200™ subsystem:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator, and select **Physical View** to view the connected subsystems.
2. Select the desired 9200 subsystem to display a physical representation of a subsystem's main components (see Figure 5.30). HiCommand™ Device Manager displays the configuration information (serial number, IP addresses, microcode, capacity, cache memory), disk and array group information (number and layout of disks and array groups), and port information.

   The **New** button allows you to add a new array group (see section 6.3.1).
   The **Delete** button allows you to delete an existing array group (see section 6.3.6).
   The **Spare** button allows you to configure the spare drives (see section 6.3.3).
   The **View** button opens the LDEV Information panel (see step (5) below).
3. To view the detailed port information, select the desired port (e.g., click on **A** in **CHA 0**) to open the Port Information panel (see Figure 5.31). See section 6.2.1 for further information and instructions on configuring the 9200 ports.
4. To view the detailed array group information, select the desired array group on the Physical View, and then select **View**. The LDEV Information panel opens (see Figure 5.32) and displays the following information:
   - Rows on left: LUNs in array group with capacity and port(s).
   - Array group ID, HDD size, RAID level, free space, largest space.
5. To view the detailed LDEV information, select the desired LDEV on the LDEV Information panel. The LDEV Information panel displays the storage detail level information (refer to section 5.2.4 and Figure 5.7, Figure 5.8, Figure 5.9).

   Note on LUSE devices: A LUSE device contains more than one LDEV. The main LDEV of a LUSE device is displayed, and the sub-LDEVs are shown in the LDEV drop-down list (the main LDEV is listed first). The sub-LDEVs are indicated by (LUSE) in the upper panel.

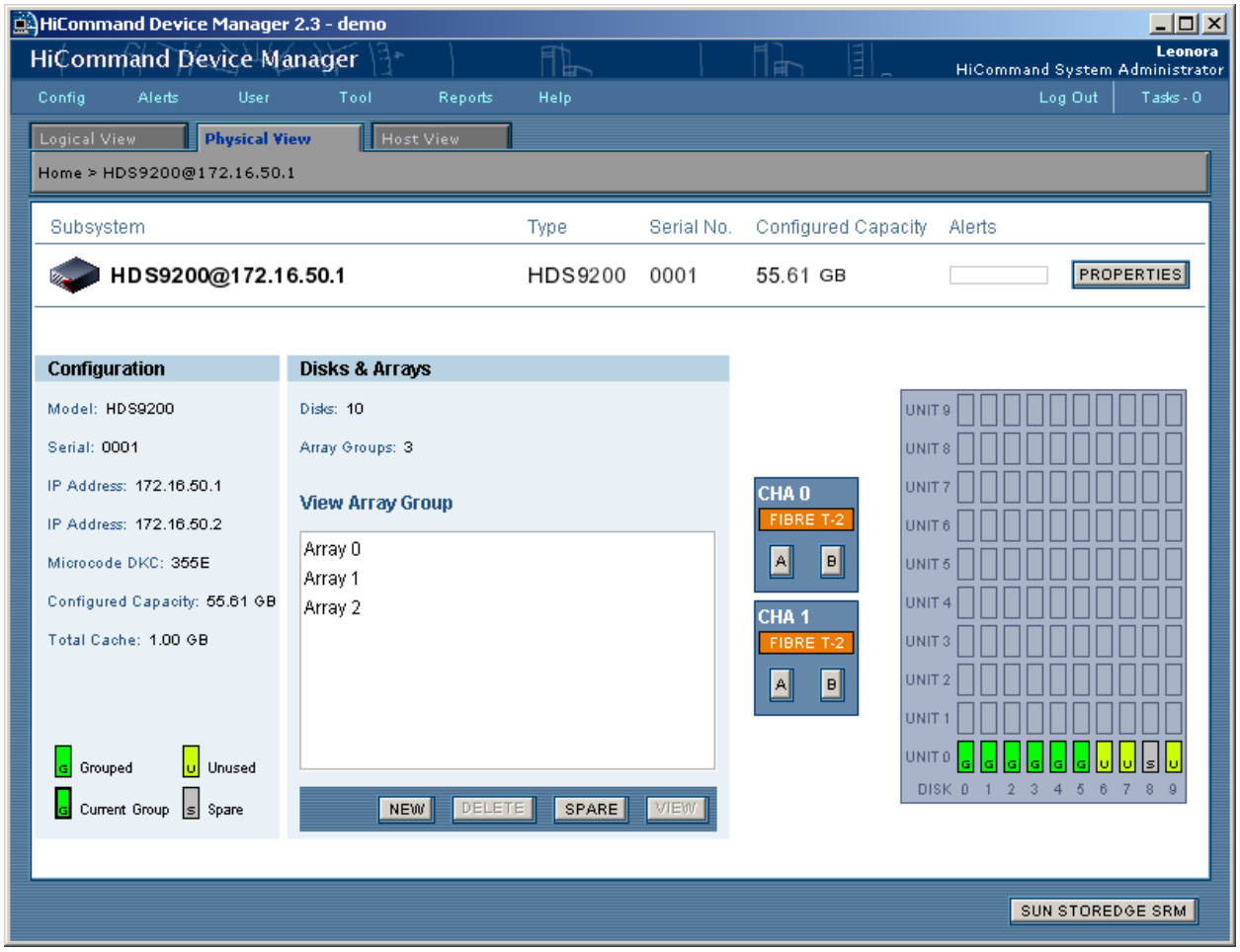


Figure 5.30 Subsystem Configuration Information for the Thunder 9200™

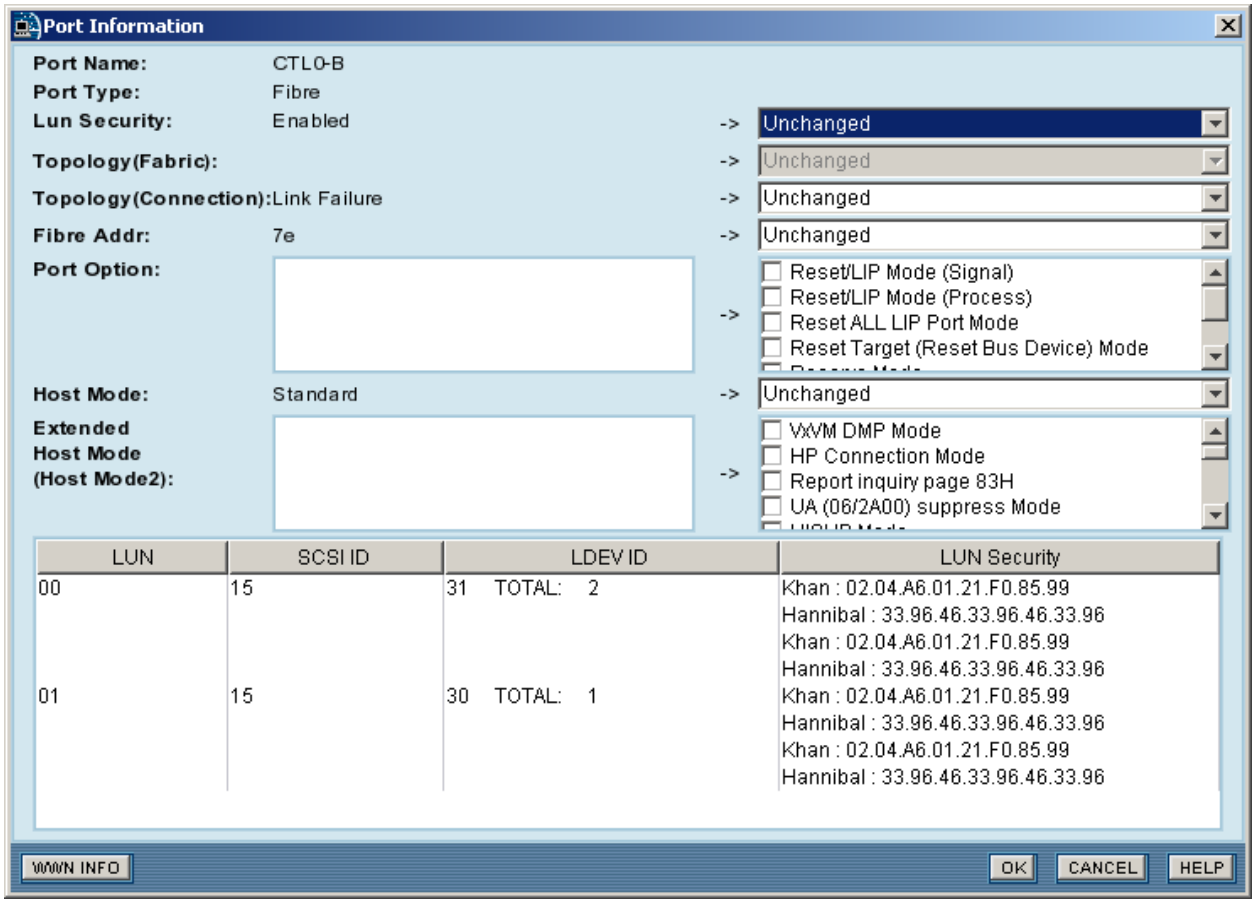


Figure 5.31 Port Information Panel for the Thunder 9200™

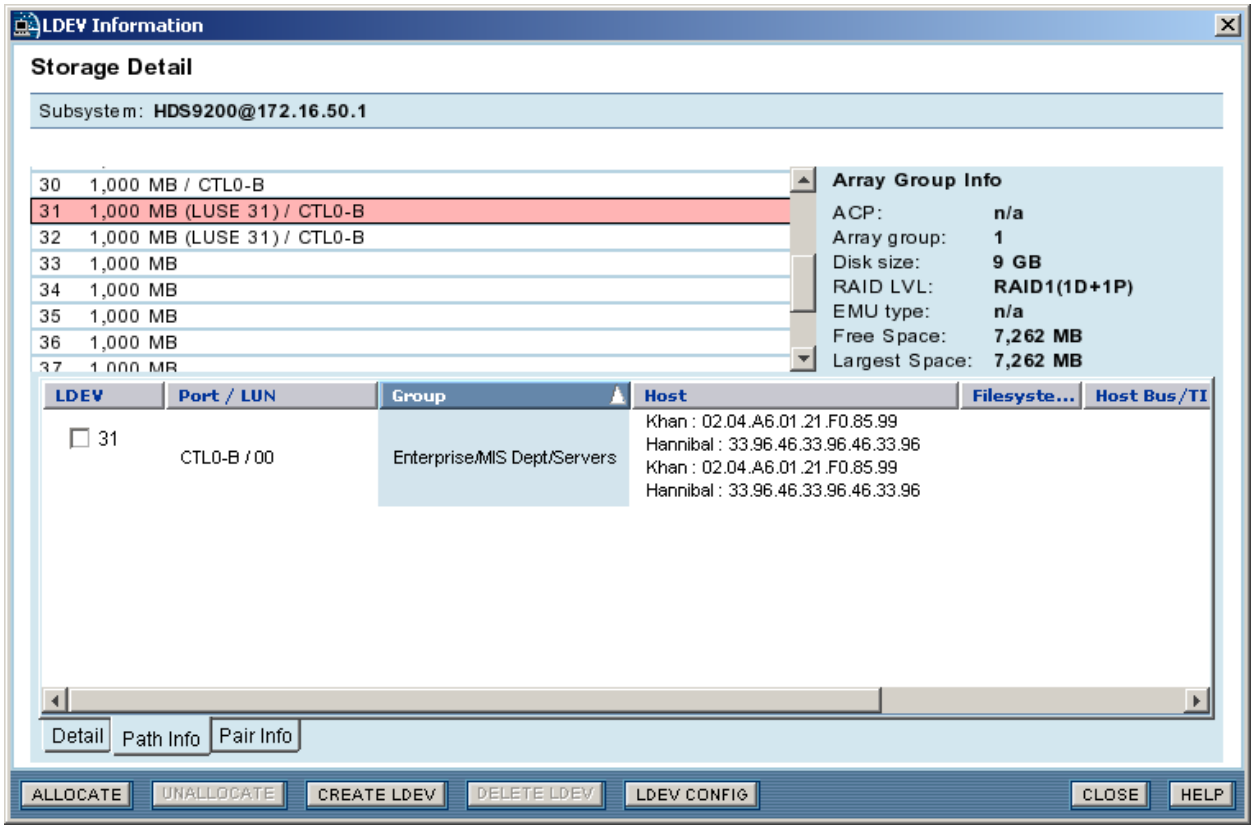


Figure 5.32 LDEV Information Panel for the Thunder 9200™

5.3.5 Viewing the StorEdge™ T3 Configuration Information

To view the detailed configuration information for the Sun™ StorEdge™ T3 disk array:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator, and select **Physical View** to view the connected subsystems.
2. Select the desired StorEdge™ T3 array to display a physical representation of the array's main components (see Figure 5.33). HiCommand™ Device Manager displays the configuration information (serial number, IP address, microcode, capacity, cache memory, multipath), disk and array group information (number and layout of disks and array groups), and ports.

   The **New** button allows you to add a new array group (see section 6.3.2).
   The **Delete** button allows you to delete an existing array group (see section 6.3.6).
   The **View** button opens the LDEV Information panel (see step (5) below).
3. To view the detailed port information, click on the desired port to open the Port Information Panel (see Figure 5.34).
4. To view the detailed LDEV information, select the desired array group, and then select **View** to open the LDEV Information panel (see Figure 5.35). The LDEV Information panel displays the storage detail level information (refer to section 5.2.4).

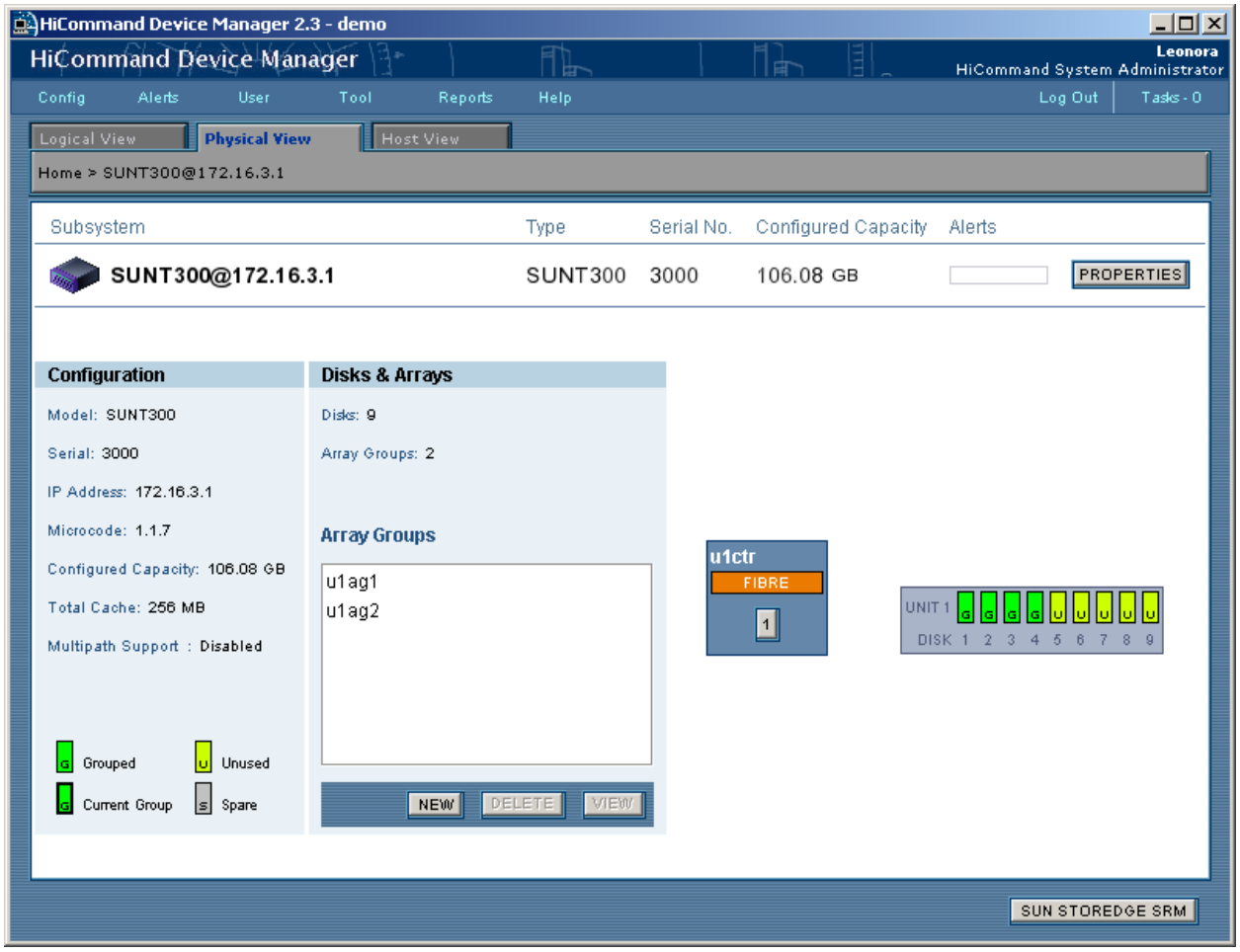


Figure 5.33 Physical View of the Sun™ StorEdge™ T3 Array

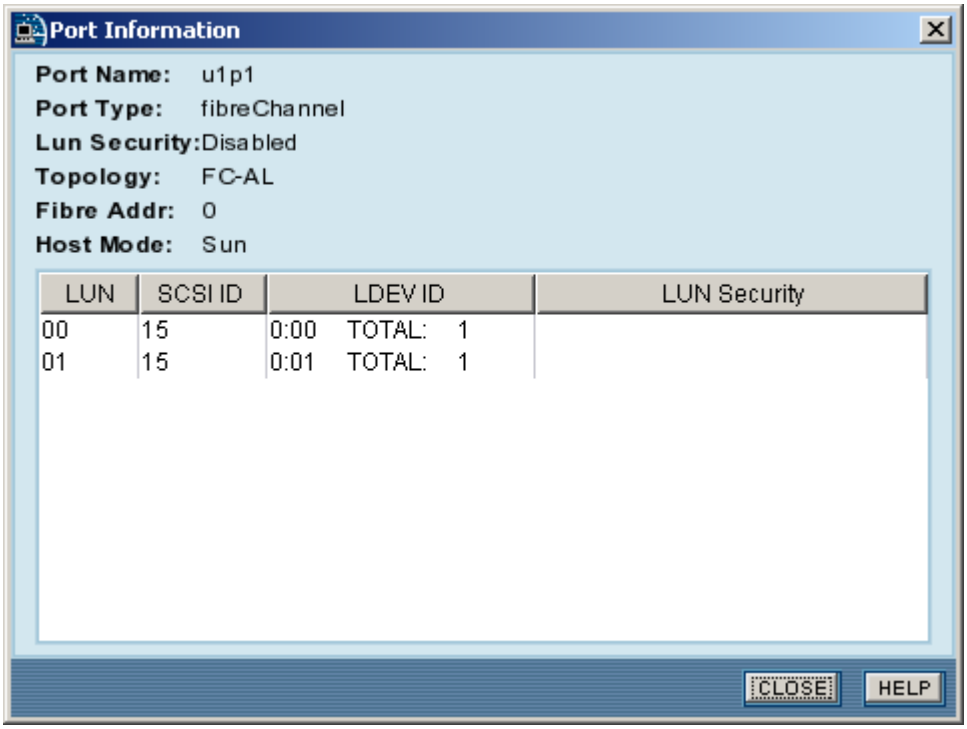


Figure 5.34 Port Information Panel for the Sun™ StorEdge™ T3 Array

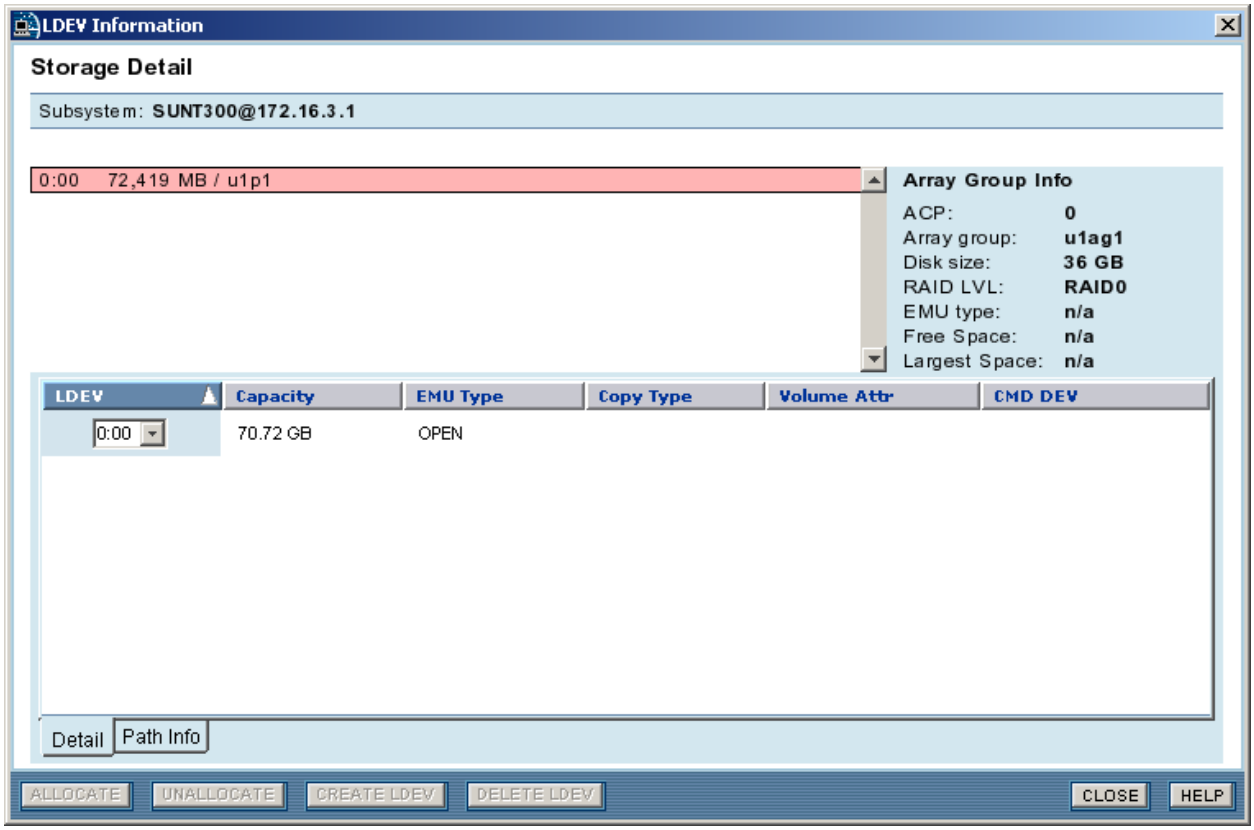


Figure 5.35 LDEV Information Panel for the Sun™ StorEdge™ T3 Array

5.4 Host View

The Host View on the HiCommand™ Device Manager main console displays the hosts that have been added to HiCommand™ Device Manager and provides access to detailed storage information for each host. To access the Host View, select the **Host View** tab on the HiCommand™ Device Manager main console.

The Host View provides the following views: top level, host level, and storage detail level.

5.4.1 Host View – Top Level

The top level of the Host View (see Figure 5.36), indicated by **Home** on the Host View tab, displays the hosts and allows you to add and remove hosts. HiCommand™ Device Manager displays the following summary information for each host: name, IP address, and allocated capacity. The **Properties** button opens the Host Properties panel (see section 6.5), which allows you to add and delete WWNs for the selected host.

You can sort the hosts on the Host View by selecting the desired column to sort on. The selected column is highlighted, and the sort order (ascending or descending) is indicated by the arrow in the column's heading. The screen in Figure 5.36 shows the hosts sorted by name in ascending order. To switch the sort order, select the highlighted column.

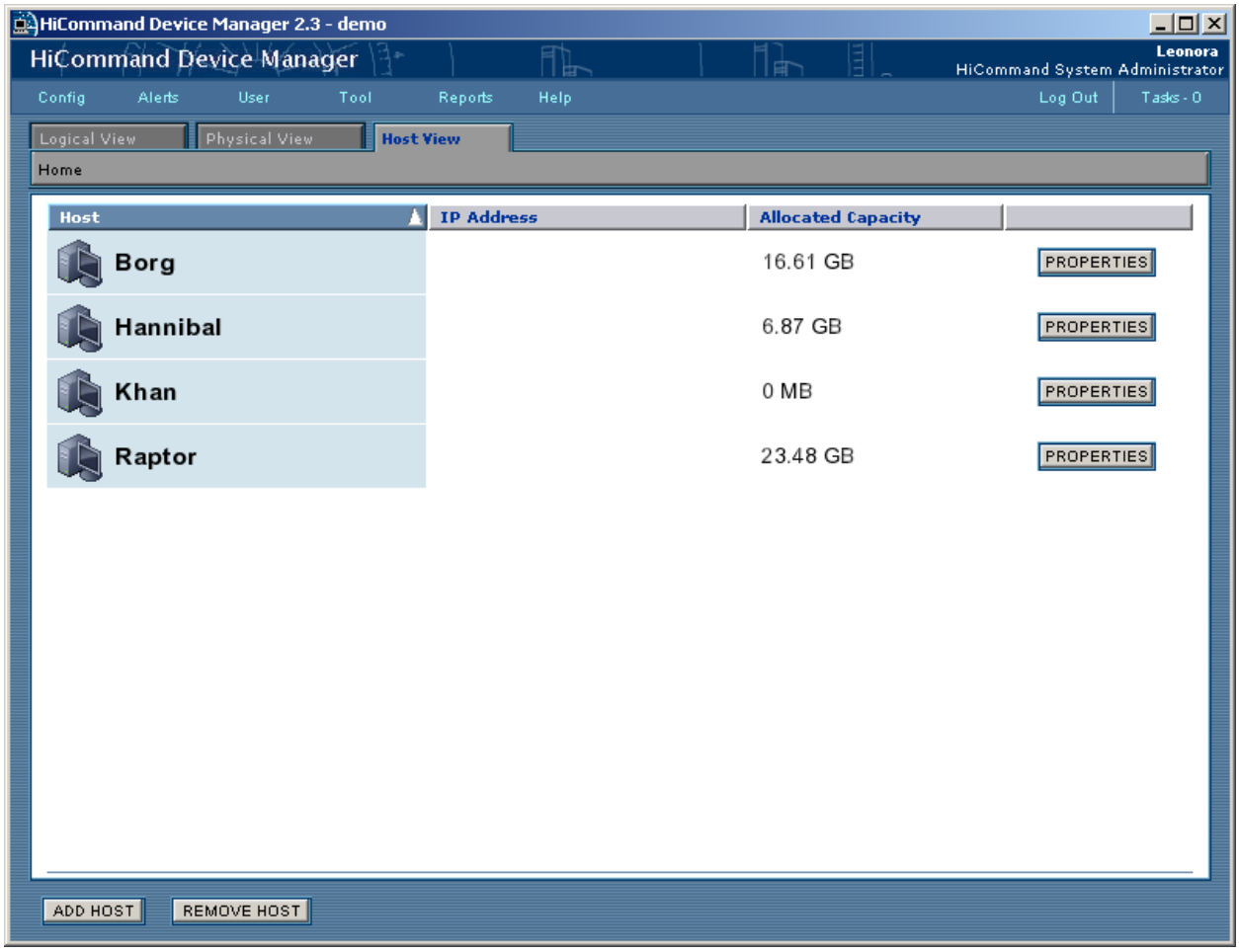


Figure 5.36 Host View on HiCommand™ Device Manager Main Console

5.4.2 Host View – Host Level

The host level of the Host View (see Figure 5.37) displays the selected host's WWNs and the storage group(s) associated with the host, and allows you to add, delete, and move the storage associated with the host. The **Dynamic Link Manager** button provides link-and-launch access to the Hitachi Dynamic Link Manager software on the selected host.

Note: When a host name is displayed in red text, this indicates that the host is not listed in the HiCommand™ Device Manager host table (i.e., it has not been added to Device Manager).

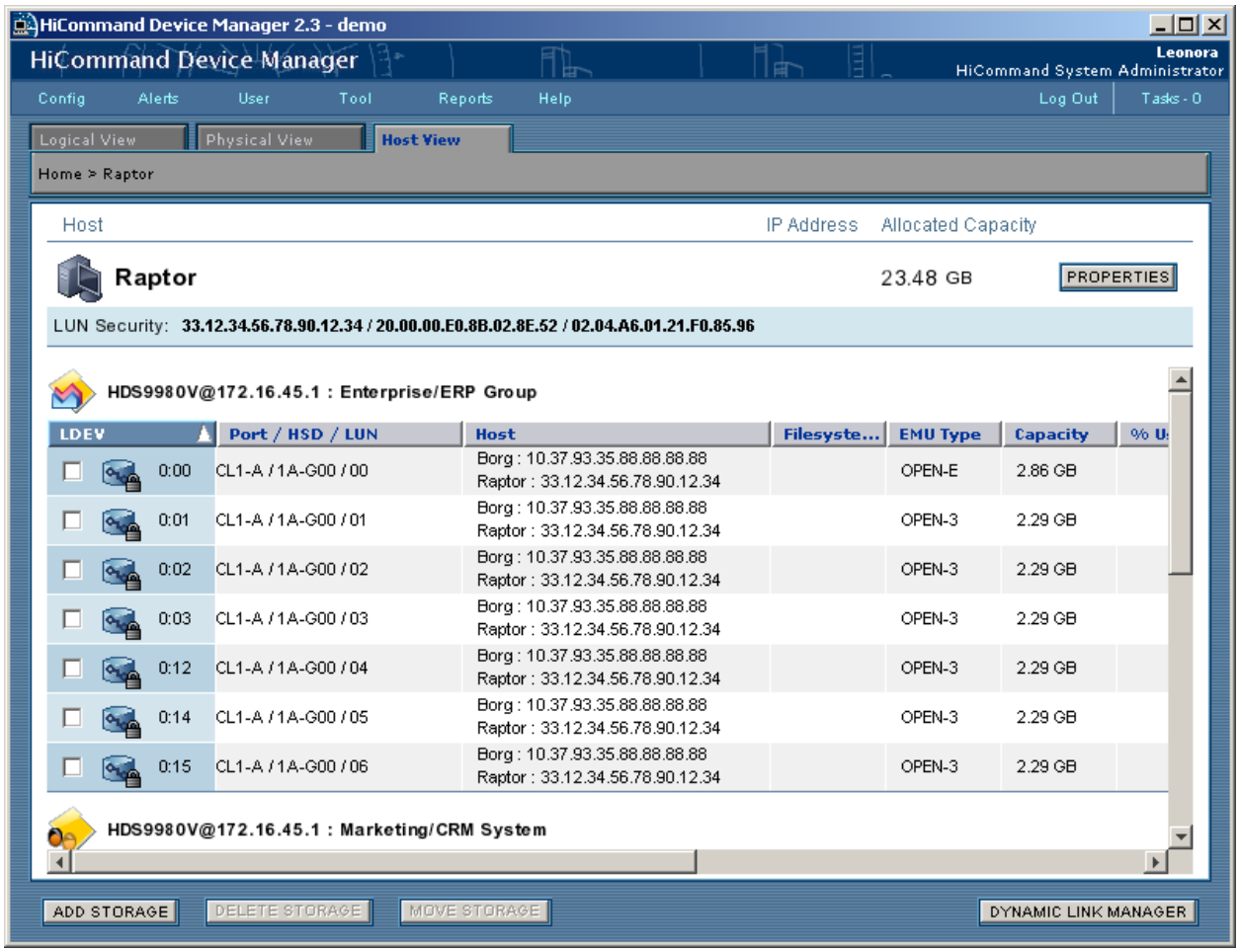


Figure 5.37 Host View – Host Level

5.4.3 Host View – Storage Detail Level

The storage detail level of the Host View (see Figure 5.38) displays the detailed array group and volume information for the selected storage group. For a description of the storage detail information, please refer to section 5.2.4.

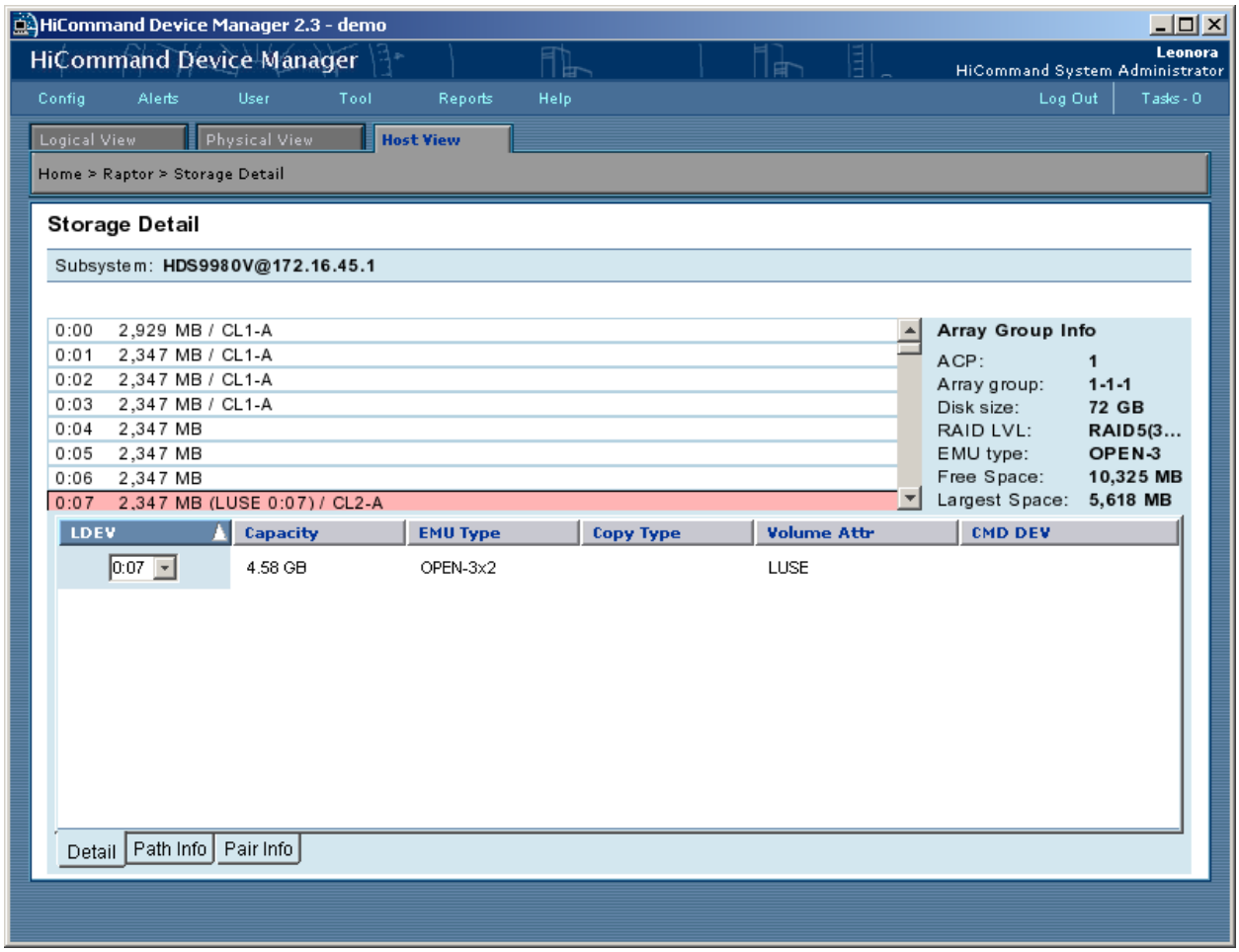


Figure 5.38 Host View – Storage Detail Level (9900 subsystem shown)

5.5 Logging In and Out of HiCommand™ Device Manager

Each HiCommand™ Device Manager user must log in as an authorized user or as a guest user. The System Administrator is responsible for assigning user access privileges.

Important: Always make sure that only one HiCommand™ Device Manager Server at a time is actively managing any single subsystem.

Logging in. For instructions on starting up and logging in to HiCommand™ Device Manager, please refer to section 5.5.

Logging out. Each HiCommand™ Device Manager user must log out of HiCommand™ Device Manager when finished performing operations to prevent unauthorized use of HiCommand™ Device Manager. HiCommand™ Device Manager maintains an audit log of all user actions to enable verification and traceability of HiCommand™ Device Manager operations.

To log out of HiCommand™ Device Manager:

1. On the HiCommand™ Device Manager main console, select **Log Out** in the menu bar.
2. When the confirmation panel appears (see Figure 5.39), select **Yes** to log out, or select **No** to cancel your request to log out of HiCommand™ Device Manager.

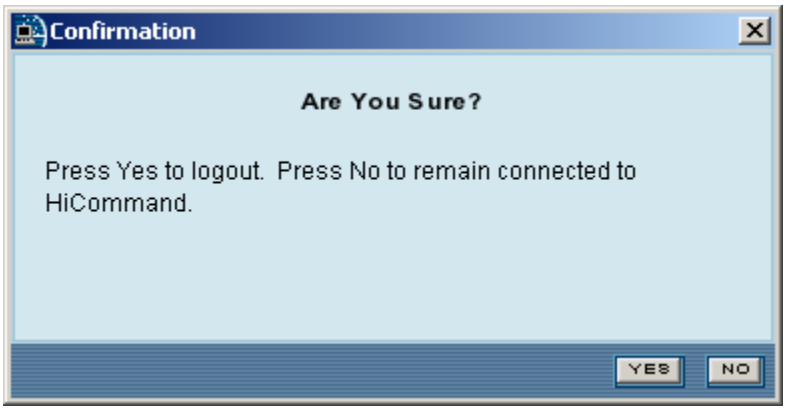


Figure 5.39 Logging Out of HiCommand™ Device Manager

5.6 User Group Operations

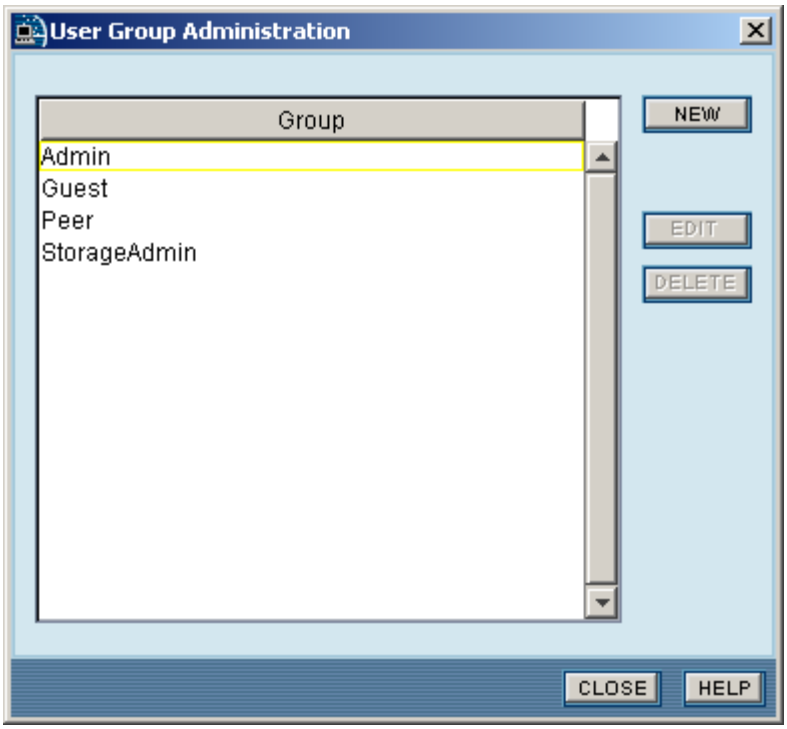
The System Administrator and Local Administrator perform the user group operations. The user group operations enable the System/Local Administrator to control access to resources (storage and hosts) on HiCommand™ Device Manager. The System Administrator has access to all user groups. The Local Administrator has access to the assigned user group and its descendant user group(s). The guest user does not have access to this function.

The user group is closely related to the logical group and inherits the logical group hierarchy. For example, if logical group A has a subgroup B, and user group A is assigned to logical group A and user group B is assigned to logical group B, users in user group A have access to all resources (hosts and LDEVs) for both user group A and user group B. The Local Administrator for user group A can control users in both user group A and user group B. User group B is a descendant of user group A.

The HiCommand™ user group operations include:

- Adding a user group (see section 5.6.1),
- Viewing and editing user group properties (see section 5.6.2), and
- Deleting a user group (see section 5.6.3).

The User Group Administration panel (see Figure 5.40) allows you to manage user groups. The **New** button allows you to add a new user group. The **Edit** button allows you to edit the selected user group. The **Delete** button allows you to delete the selected user group. To open the User Group Administration panel, log in as System/Local Administrator, select the **User** menu, and select **User Groups**.



Note: This screen shows the default user groups that are present upon initial start-up.

Figure 5.40 User Group Administration Panel

5.6.1 Adding a User Group

The System Administrator can add new user groups as needed. The Local Administrator can add new descendant user groups to the assigned user group. The Storage Administrator and guest user do not have access to this function.

Note: Before adding a new user group, make sure that the logical group to be associated with the user group has been added to the HiCommand™ Device Manager (see section 5.8.1). After a new user group has been added, you cannot change its assigned logical group.

To add a new HiCommand™ Device Manager user group:

1. Log in to HiCommand™ Device Manager as a System Administrator or Local Administrator.
2. Select the **User** menu, and then select **User Groups** to open the User Group Administration panel (refer to Figure 5.40).
3. Select **New** to open the User Group Properties panel (see Figure 5.41).
4. Enter the name for the new user group and a description (optional). The following characters cannot be used in the group name: ", ', /, ?, >, <, ;, :, !, @, #, $, %, ^, &, *, (,), +, |, }, {, }, [, ~, space, Euro currency sign
5. Select the **Logical Group** tab, and select the logical group to be associated with the new user group. The selected logical group will be the home group of the new user group, and all LUNs and subgroups in this logical group will be accessible to users in the new user group.
6. Select the **Host** tab, and select the hosts to be associated with the new user group.
7. Select the **LDEV** tab, select the subsystem, and select the LDEVs to be associated with the new user group.
8. When the group, host, and LDEV information for the new group is correct, select **Save** to save your changes. HiCommand™ Device Manager adds the new user group and returns you to the User Group Administration panel, which now displays the new user group.

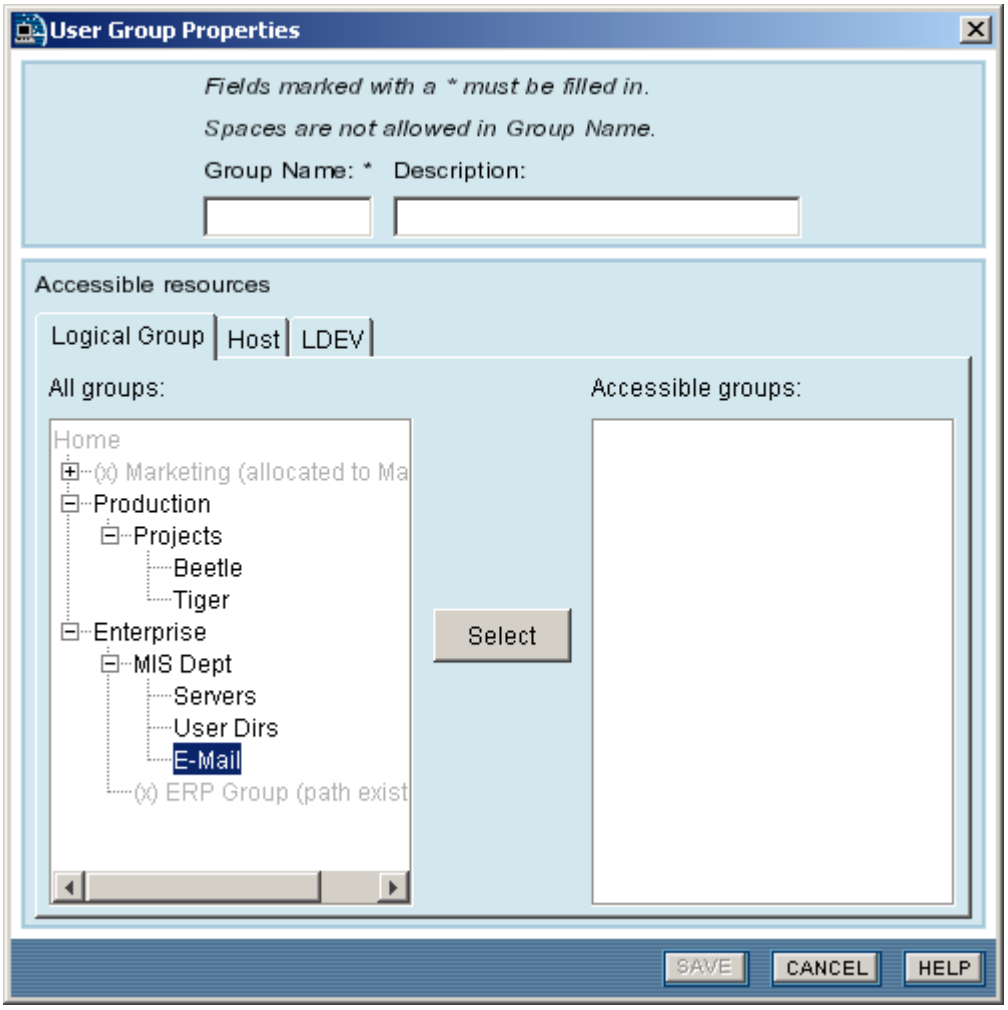


Figure 5.41 Adding a New User Group

5.6.2 Viewing and Editing User Group Properties

The System Administrator can edit the user group properties and change the resources of all user-defined user groups. The system-defined user groups (Admin, StorageAdmin, Guest, Peer) cannot be modified. The Local Administrator can modify the user group properties and change the resources of the assigned user group and its descendant user groups.

To view and edit the HiCommand™ user group properties:

1. Log in to HiCommand™ Device Manager as System Administrator or Local Administrator.
2. Select the **User** menu, and then select **User Groups** to open the User Group Administration panel (refer to Figure 5.40).
3. Select the desired user group, and select **Edit** to open the User Group Properties panel (see Figure 5.42).
4. Make the desired changes (if any) on the User Group Properties panel. You can edit the description, hosts, and LDEVs.
5. Select **Save** to save your changes and update the user group record.

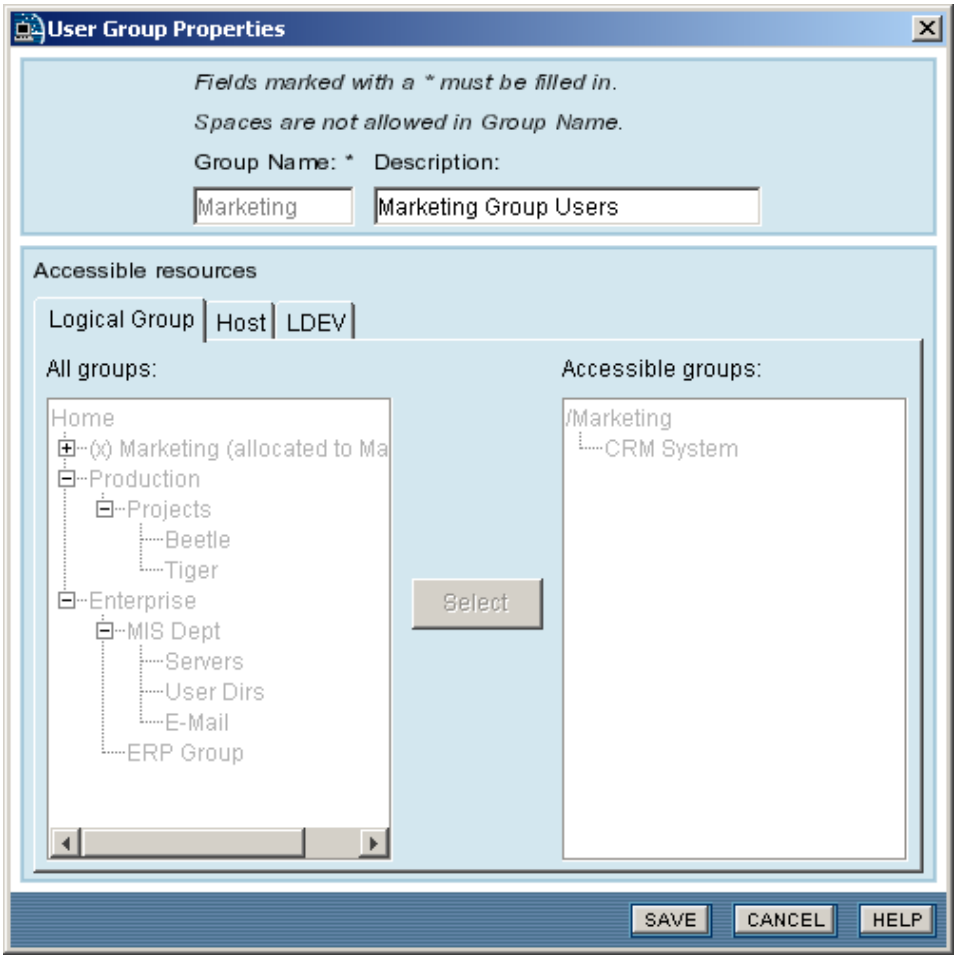


Figure 5.42 Editing User Group Properties – Logical Groups

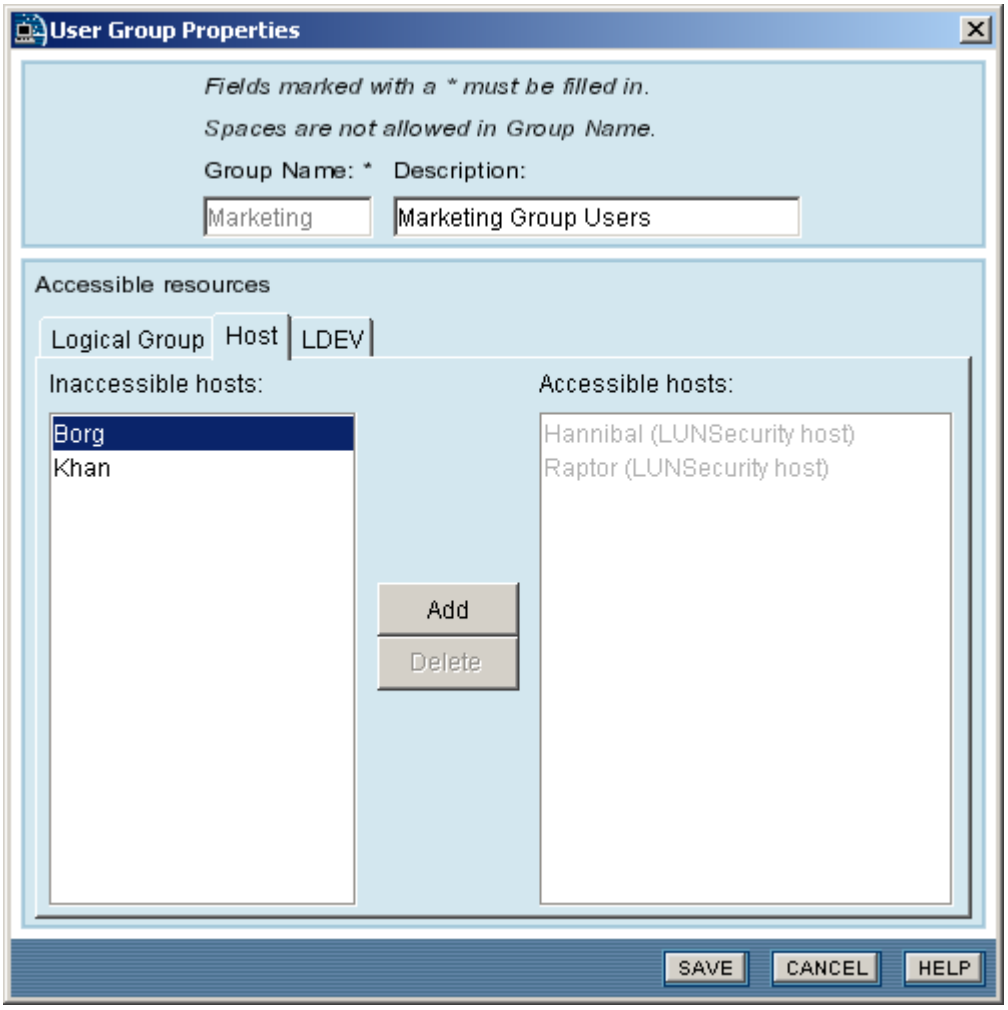


Figure 5.43 Editing User Group Properties – Hosts

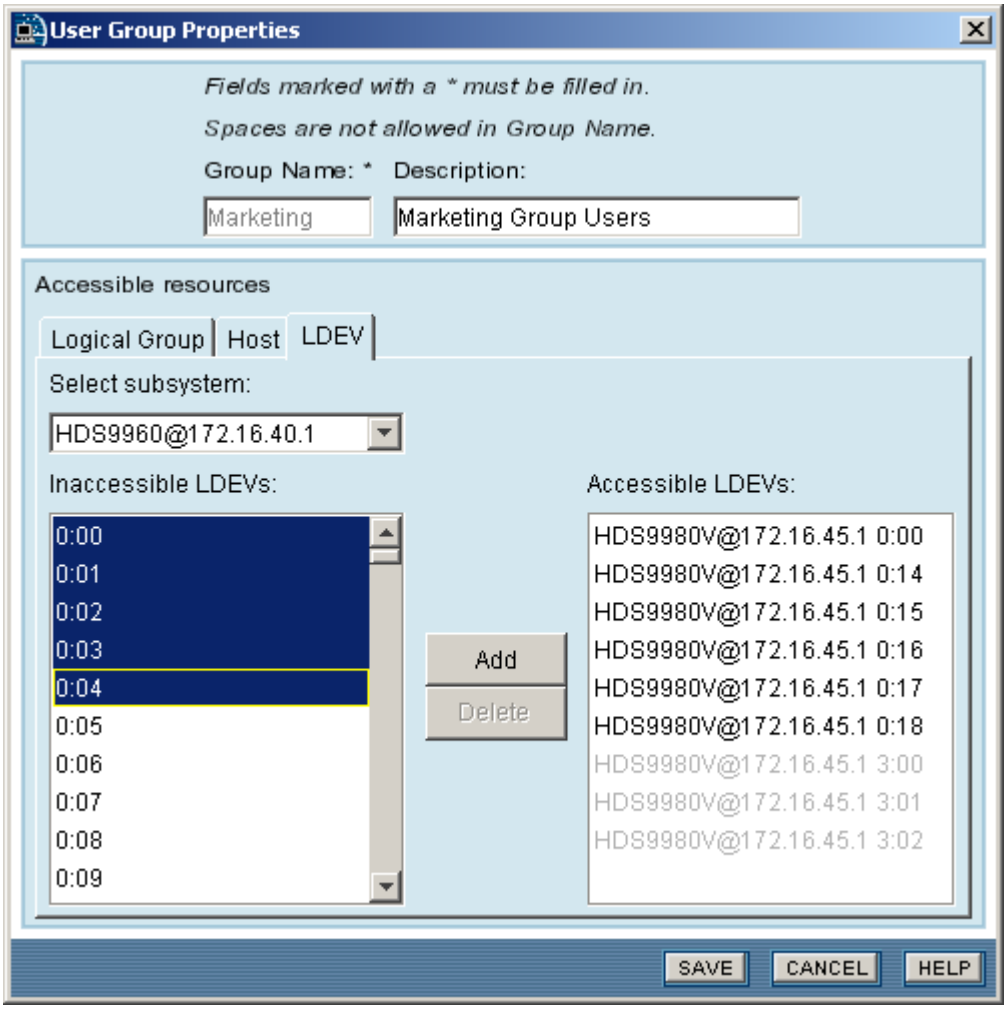


Figure 5.44 Editing User Group Properties – LDEVs

5.6.3 Deleting a User Group

The System Administrator can delete existing user-defined user groups as needed. The system-defined user groups (Admin, StorageAdmin, Guest, Peer) cannot be deleted. The Local Administrator can delete descendant user groups of the assigned user group. The Storage Administrator and guest user do not have access to this function.

Note: Before you can delete a user group, users belonging to that user group must not be logged in to HiCommand™ Device Manager and must have been logged out for several (up to ten) minutes.

To delete a user group from the HiCommand™ Device Manager Server:

1. Make sure that users belonging to the user group to be deleted are not logged in to HiCommand™ Device Manager and have been logged out for at least ten minutes.
2. Log in to HiCommand™ Device Manager as a System Administrator or Local Administrator.
3. Select the **User** menu, and select **User Groups** to open the User Administration panel.
4. Select the user group to be deleted, and then select **Delete**.

   Note: If the selected user group has descendant user groups, those user groups will also be deleted.

   Note: Users in the selected user group and its descendant groups (if any) will be deleted.
5. When the confirmation panel appears (see Figure 5.45), select **Yes** to delete the specified user group, or select **No** to cancel your request to delete the user group.

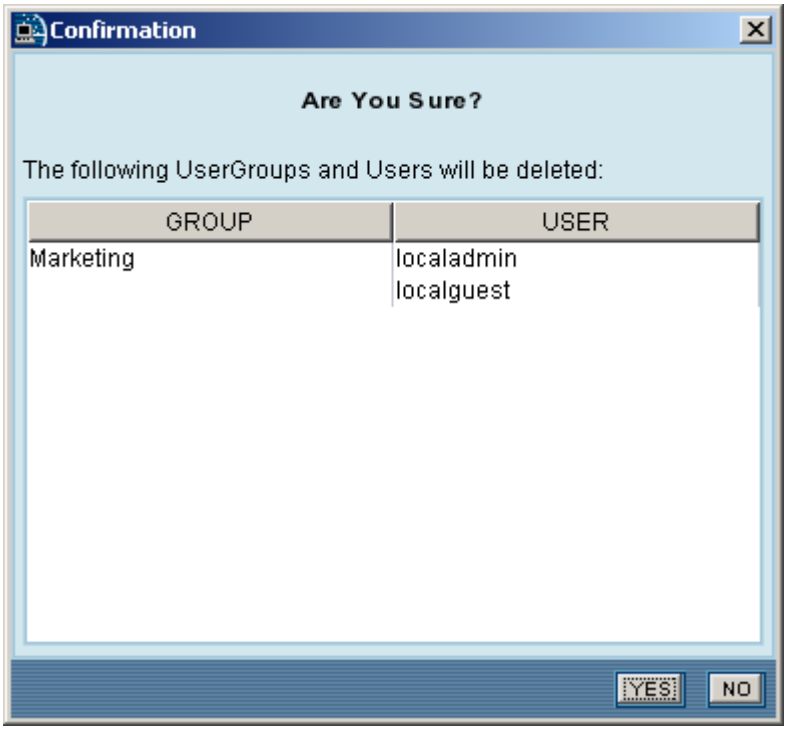


Figure 5.45 Deleting a User Group – Confirmation

5.7 User Account Operations

The System Administrator and Local Administrator perform the user account operations. The Local Administrator can perform user account operations for users in the assigned user group and its descendant user groups. The Storage Administrator and guest user do not have access to these functions.

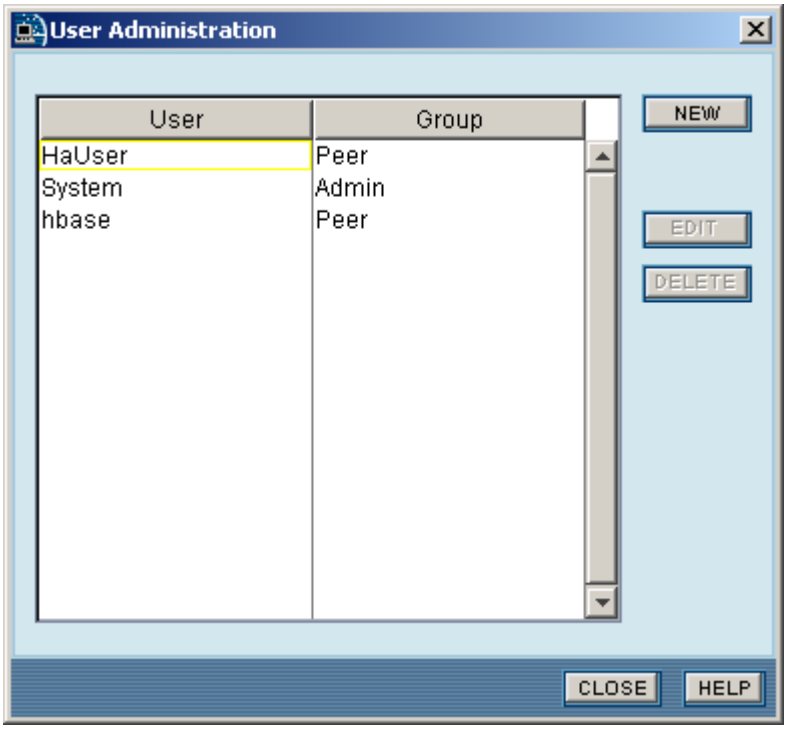
HiCommand™ Device Manager maintains a database of authorized users and an audit log of all user actions. HiCommand™ Device Manager allows all users to change their own password and user properties (first name, last name, and description). System users are users who are assigned to a system user group (Admin, StorageAdmin, Guest). Local users are users who are assigned to a user-defined user group with the role of Local System Administrator, Local Storage Administrator, or Local Guest.

The HiCommand™ Device Manager user account operations include:

- Adding a user (see section 5.7.1),
- Viewing and editing user properties (see section 5.7.2),
- Changing your password (see section 5.7.3), and
- Deleting a user (see section 5.7.4).

The User Administration panel (see Figure 5.46) allows the System/Local Administrator to add and delete HiCommand™ Device Manager users and edit the HiCommand™ Device Manager user properties as needed. To open the User Administration panel, log on as a System or Local Administrator, select the **User** menu on the HiCommand™ Device Manager main console menu bar, and then select **Users**. (If you are not logged in as a System or Local Administrator, the User Properties panel opens when you select **User-Users**.)

The User Administration panel lists each user by user ID (login name) and user group. The **New** button allows you to add a new HiCommand™ Device Manager user. The **Edit** button allows you to edit the information for the selected HiCommand™ Device Manager user. The **Delete** button allows you to delete the selected HiCommand™ Device Manager user.



Note: This screen shows the default users who are present upon initial start-up.

Figure 5.46 User Administration Panel

5.7.1 Adding a User

The System Administrator can add new HiCommand™ Device Manager users as needed. The Local Administrator can add new users to the assigned user group and its descendant user groups. The Storage Administrator and guest user do not have access to this function.

Note: Before adding a new user, make sure that the desired user group has been added (see section 5.6.1). After a new user has been added, you cannot change the assigned user group.

To add a new HiCommand™ Device Manager user:

1. Log in to HiCommand™ Device Manager as a System or Local Administrator.
2. Select the **User** menu, and then select **Users** to open the User Administration panel.
3. Select **New** to open the User Properties panel (see Figure 5.47).
4. Enter the following information for the new HiCommand™ Device Manager user:
   - **Login Name**. ***Note:*** The login name (user ID) must be at least four characters in length and is not case-sensitive (i.e., "USER1" and "user1" cannot both be used).
   - **Description** (optional) (e.g., job title).
   - **Password**, and **Confirm Password**. ***Note:*** The password is case-sensitive and must be at least four characters in length.
   - **First Name** (optional)
   - **Last Name** (optional)
   - **User Group**. Select one of the system user groups (Admin, Guest, StorageAdmin) or a user-defined user group.
   - **Role** (user-defined groups only). Select Local Administrator, Local Guest, or Storage Administrator. The Local Administrator can modify user accounts, descendant user groups, and storage associated with the specified user group. The Storage Administrator can modify storage associated with the specified user group. The Local Guest user can only view storage information for the specified user group.
5. Select **Save** to save your changes. HiCommand™ Device Manager adds the new user record and returns you to the User Administration panel, which now displays the new HiCommand™ Device Manager user.

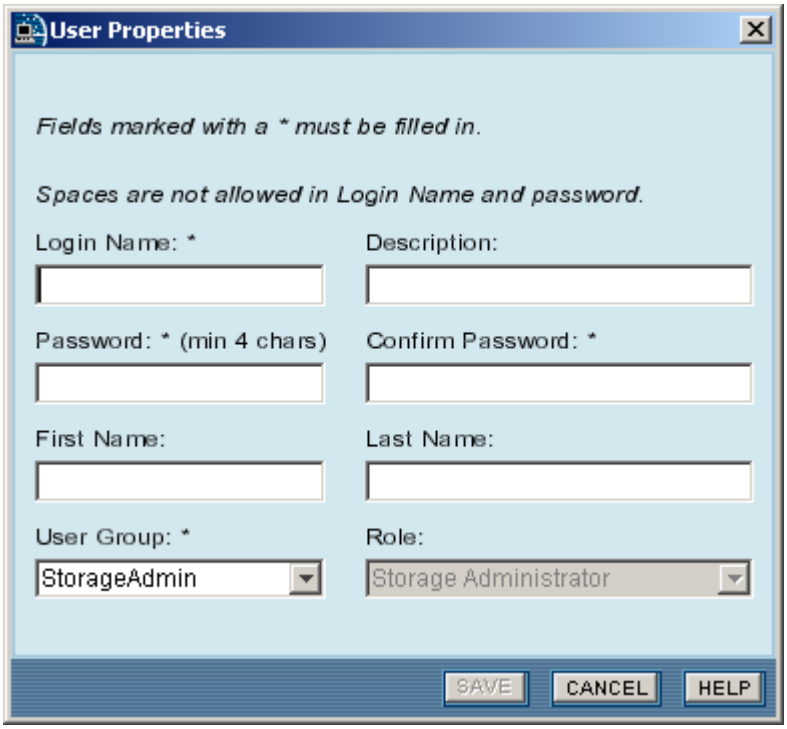


Figure 5.47 Adding a New User

5.7.2 Viewing and Editing User Properties

All HiCommand™ Device Manager users can view and edit their own user properties. The System Administrator can edit the user properties of all users. The Local Administrator can edit the user properties of the users in the specified user group and its descendant user groups.

To view and edit the HiCommand™ Device Manager user properties:

1. Log in to HiCommand™ Device Manager.
2. Select the **User** menu, and then select **Users**.
3. If you are not logged in as an Administrator, the User Properties panel opens. If you are logged in as a System Administrator or Local Administrator, the User Administration panel opens. Select the desired user, and select **Edit** to open the User Properties panel (see Figure 5.48).
4. Make the desired changes (if any) on the User Properties panel. All users can edit their own first name, last name, and description. For instructions on changing the password, see section 5.7.3.

   Note: The login name cannot be modified.
5. Select **Save** to save your changes. HiCommand™ Device Manager updates the user record. If you are logged in as a System Administrator or Local Administrator, you are returned to the User Administration panel.

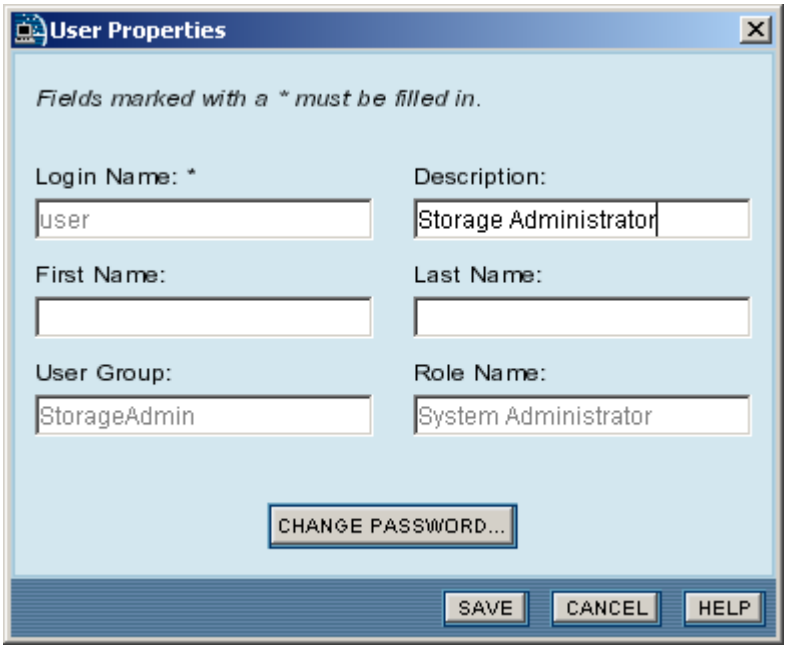


Figure 5.48 Editing User Properties

5.7.3 Changing Your Password

HiCommand™ Device Manager allows all users to change their own password. You cannot change your login name.

To change your HiCommand™ Device Manager Web Client user password:

1. Log in to HiCommand™ Device Manager.
2. Select the **User** menu, and then select **Users**.
3. If you are logged in as an Administrator, the User Administration panel opens. Select yourself, and then select **Edit**. If you are not logged in as an Administrator, the User Properties panel opens.
4. On the User Properties panel, select **Change Password…** to open the Change Password panel (see Figure 5.49).
5. Enter the new password in the **Password** and **Confirm Password** fields, and select **Save**. ***Note:*** The password is case-sensitive and must be at least four characters in length.
6. Select **Save** to close the User Properties panel. HiCommand™ Device Manager changes the password in the HiCommand™ Device Manager system database. If you are logged in as an Administrator, you are returned to the User Administration panel.

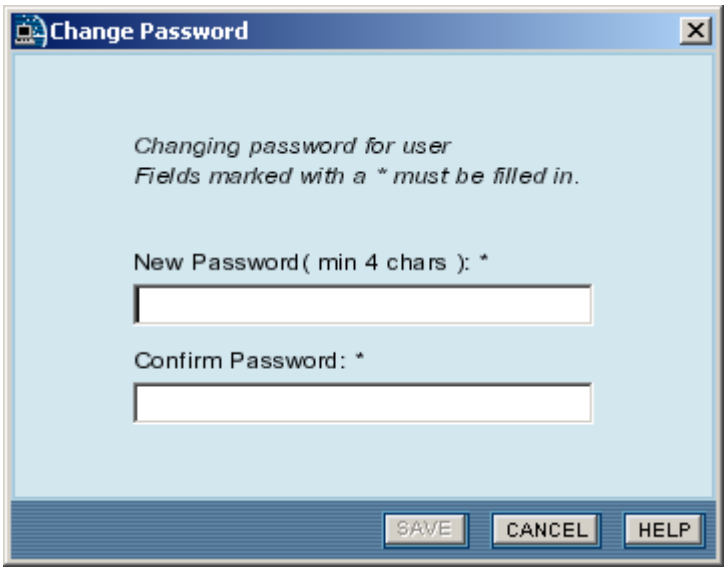


Figure 5.49 Changing Your Password – Entering New Password

5.7.4 Deleting a User

The System Administrator can delete existing HiCommand™ Device Manager users as needed. The Local Administrator can delete existing users in the assigned user group and its descendant user groups. The Storage Administrator and guest user do not have access to this function.

Note: Before you can delete a HiCommand™ Device Manager user, that user must not be logged in to HiCommand™ Device Manager and must have been logged out for several (up to ten) minutes. If these requirements are not met, HiCommand™ Device Manager will not allow you to delete the user.

To delete a user from the HiCommand™ Device Manager Server:

1. Make sure that the user to be deleted is not logged in to HiCommand™ Device Manager and has been logged out for at least ten minutes.
2. Log in to HiCommand™ Device Manager as a System Administrator or Local Administrator.
3. Select the **User** menu, and then select **Users** to open the User Administration panel.
4. Select the user to be deleted, and then select **Delete**.

   WARNING: Do not delete the users in the Peer group (HaUser, hbase). If you delete the HaUser, the Agents will not be able to report their information to the HiCommand™ Device Manager Server. If you delete the hbase user, you will not be able to use the single sign-on (SSO) function (see section 1.3). For further information on SSO, refer to the *HiCommand™ Device Manager Server Installation and Configuration Guide*.
5. When the confirmation panel appears (see Figure 5.50), select **Yes** to delete the user, or select **No** to cancel your request to delete the user.

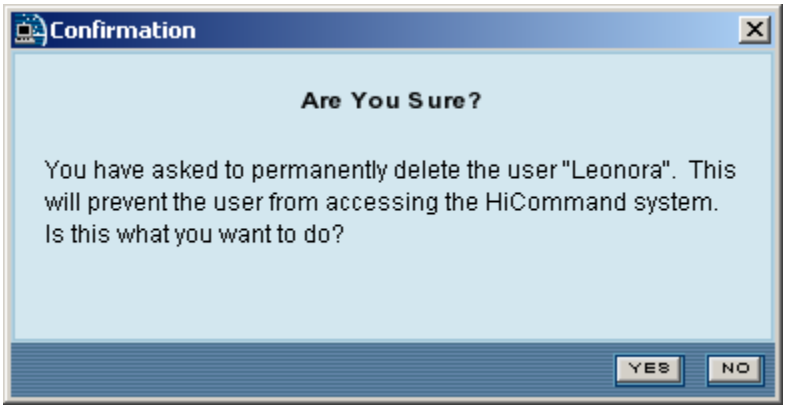


Figure 5.50 Deleting a User – Confirmation

5.8 Logical Group Operations

HiCommand™ Device Manager allows you to create a hierarchy of logical groups and assign storage to these groups. Logical groups can contain one or more logical groups or one or more storage groups. Storage groups contain LUNs (paths to volumes). Storage groups can be nested within logical groups or at the top level. A logical group cannot be nested within a storage group.

The **All Storage/My Storage** logical group contains all LDEVs that are under the management of the logged-in user. If you are logged in as a system user, the **All Storage** group is displayed. If you are logged in as a local user, the **My Storage** group is displayed. This group is always present and cannot be deleted. The **All Storage/My Storage** group is organized by storage subsystem, and each subsystem group contains an **Allocated** storage group and an **Unallocated** storage group.

- **Allocated group:** Displays the LUs/LDEVs in the specified subsystem that are available to the logged-in user and have one or more paths assigned to them. When you add a new subsystem or perform a Refresh on an existing subsystem (see section 6.1.4), LUs/LDEVs that have paths assigned to them are placed in this group.
- **Unallocated group:** Displays the LUs/LDEVs that are available to the logged-in user and do not have any paths assigned to them. When you add a new subsystem or perform a Refresh on an existing subsystem (see section 6.1.4), HiCommand™ Device Manager places the LUs/LDEVs that do not have any paths assigned to them in this group.

The **LUN Scan** logical group is created when you perform the first LUN Scan operation (see section 6.1.3). The LUN Scan group contains a logical group for each subsystem on which a LUN Scan operation has been performed. Each LUN Scan subsystem group contains storage groups of LUNs organized by port. The groups within the LUN Scan group are normal logical groups and storage groups that can be renamed, deleted, and so on.

The System Administrator and Storage Administrator can perform logical group operations. The guest user can only view the group information. The logical group operations include:

- Adding a logical group (see section 5.8.1),
- Viewing and editing the logical group properties (see section 5.8.2), and
- Deleting a logical group (see section 5.8.3).

The Logical Group List panel (see Figure 5.51) allows the System Administrator and Storage Administrator to add and delete HiCommand™ Device Manager logical groups and edit the HiCommand™ Device Manager group information as needed. To open the Logical Group List panel, select **Config - Groups** on the HiCommand™ Device Manager main console menu bar. The guest user does not have access to this function.

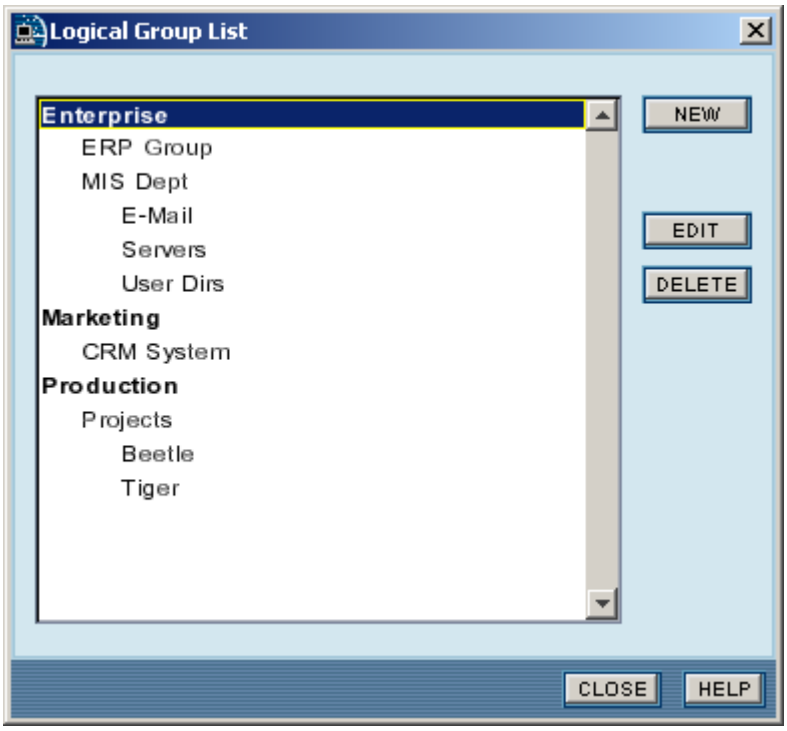


Figure 5.51 Logical Group List Panel

The Logical Group List panel displays the existing HiCommand™ Device Manager logical groups and storage groups by name. Groups which contain other groups are logical groups. Groups at the bottom level of any group hierarchy are storage groups. For example, in Figure 5.51 above **ERP Group** is a storage group at level 2, and **E-Mail** and **Servers** are storage groups at level 3.

The **New** button allows you to add a new HiCommand™ Device Manager logical group. The **Edit** button allows you to edit the information for the selected HiCommand™ Device Manager group. The **Delete** button allows you to delete the selected HiCommand™ Device Manager group.

5.8.1 Adding a Logical Group

Logical groups can contain one or more logical groups or one or more storage groups. The System Administrator and Storage Administrator can add logical groups. The guest user does not have access to this function.

To add a logical group to HiCommand™ Device Manager:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator.
2. Start the add group process using either the menu bar or the Logical View:
   - Select **Config - Groups** on the menu bar to open the Logical Group List panel, and then select **New** to open the Group Properties panel (see Figure 5.52).
   - On the Logical View, select the desired parent group for the new group (if any), and then select **Add Group** to open the Group Properties panel (see Figure 5.52).
3. If you used the menu bar to start the add group process, you need to select the desired parent group for the new group (select **None** to add a new group at the top level). If you used the Logical View to start the add group process, the parent group is already entered according to your selection. If it is not correct, select the desired parent group.
4. Enter the desired name for the new group. ***Note:*** The group name is not case-sensitive. For example, "GROUP1" and "group1" refer to the same logical group.
5. Select the desired icon for the new group.
6. When the information displayed on the Group Properties panel is correct, select **Save** to add the new group. HiCommand™ Device Manager creates the new group and returns you to your starting location (Logical Group List panel, or Logical View).

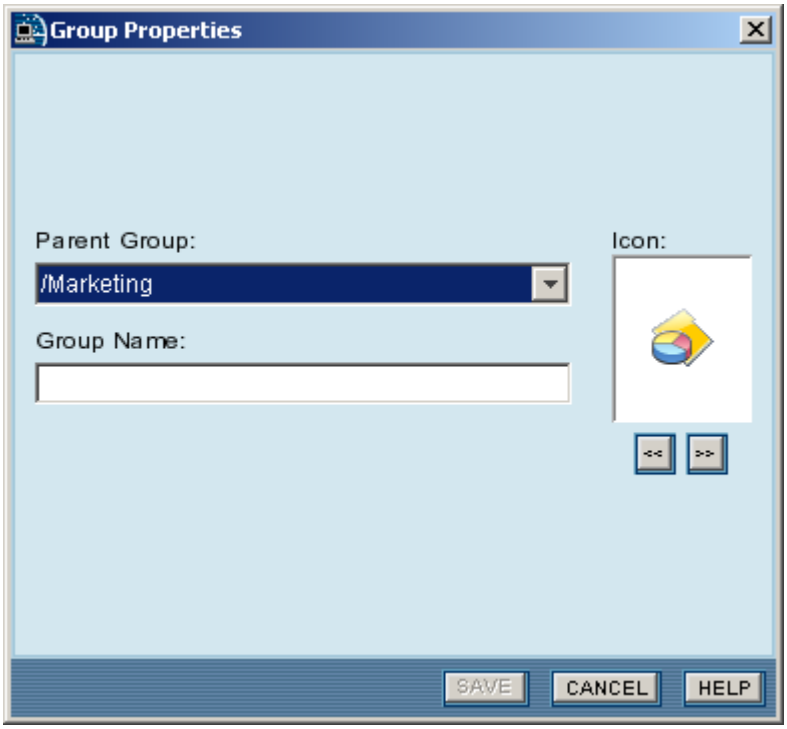


Figure 5.52 Adding a New Group

5.8.2 Viewing and Editing Logical Group Properties

The System Administrator and Storage Administrator can edit the logical group properties. The guest user does not have access to this function.

To edit the logical group information:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator.
2. Select the **Logical View** tab to view the logical groups. HiCommand™ Device Manager displays the top-level logical groups. Expand top-level groups (click on +) as needed to view subgroups. HiCommand™ Device Manager displays the number of LUNs in each logical group.
3. Select the **Properties** button for the desired logical group to open the Group Properties panel (see Figure 5.53).
4. Edit the properties (name, parent group, and icon) of the logical group as needed. The group name is not case-sensitive. For example, "GROUP1" and "group1" refer to the same logical group and cannot both be used.

   Note: If the logical group being edited or any of its descendant logical groups is assigned to a user group, and you change the parent group property, the following changes will be applied:

   - If ascendants of the logical group being edited are assigned to a user group, the resources of that user group and its descendant groups will be removed from the resources of the ascendant user groups.
   - If the new parent group or any ascendant group of the new parent group is assigned to a user group, the resources of that user group and its descendant groups will be added to the resources of the new ascendant user groups.
   - See section 5.6.1 for further information on adding user groups.
5. Select **Save** to save your changes. HiCommand™ Device Manager modifies the logical group properties and returns you to the HiCommand™ Device Manager main console Logical View.

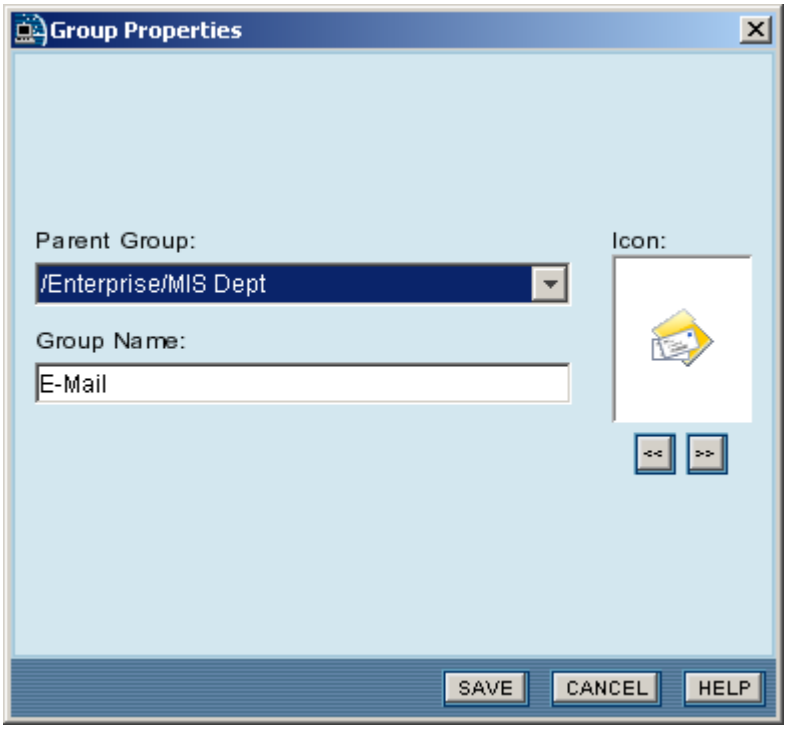


Figure 5.53 Viewing and Editing Logical Group Properties

5.8.3 Deleting a Logical Group

The System Administrator and Storage Administrator can delete a logical group. When you delete a group which contains LUNs, you can choose to keep or delete the LUNs (access paths to the LUs). The guest user does not have access to this function.

To delete a logical group from HiCommand™ Device Manager:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator.
2. Open the Logical Group List panel (refer to Figure 5.51): select **Config - Groups** on the menu bar, or select the **Remove Group** button on the Home view of the Logical View.
3. On the Logical Group List panel, select the group to be deleted, and select **Delete**.
4. HiCommand™ Device Manager displays the requested delete group operation (see Figure 5.54). If the group or any of its subgroups contains LUNs, all LUNs in the group(s) are listed (see Figure 5.55).

   Caution: To delete a storage group without deleting the access paths to the LUNs, you must select the **Keep access path** box. If this option is not selected, the delete group operation removes the specified access paths to the LUs.
5. After selecting the desired access path option, select **Yes** to delete the group (select **No** to cancel your request to delete the group). HiCommand™ Device Manager deletes the group and returns you to the Logical Group List panel.

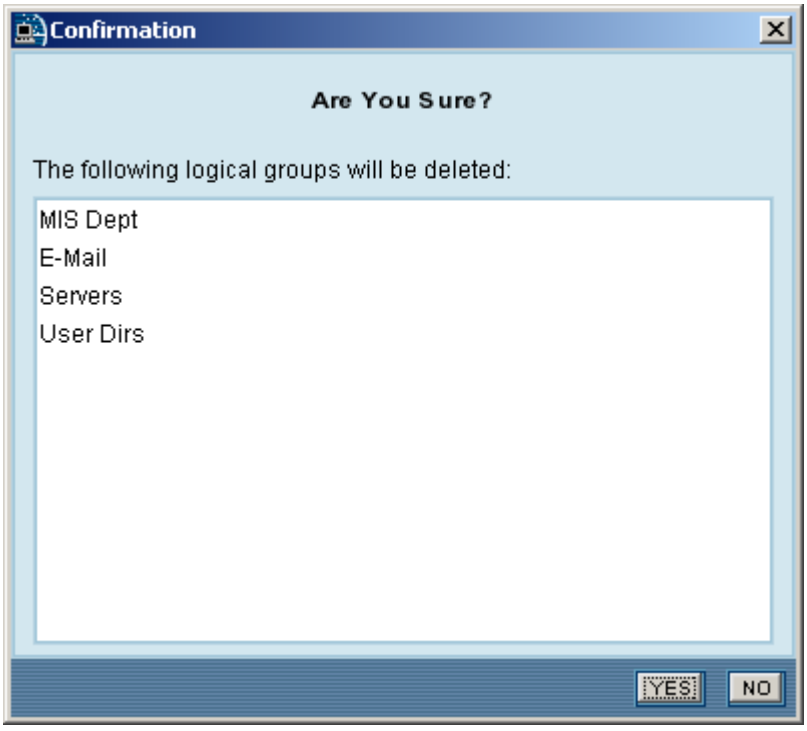


Figure 5.54 Deleting a Logical Group without LUNs

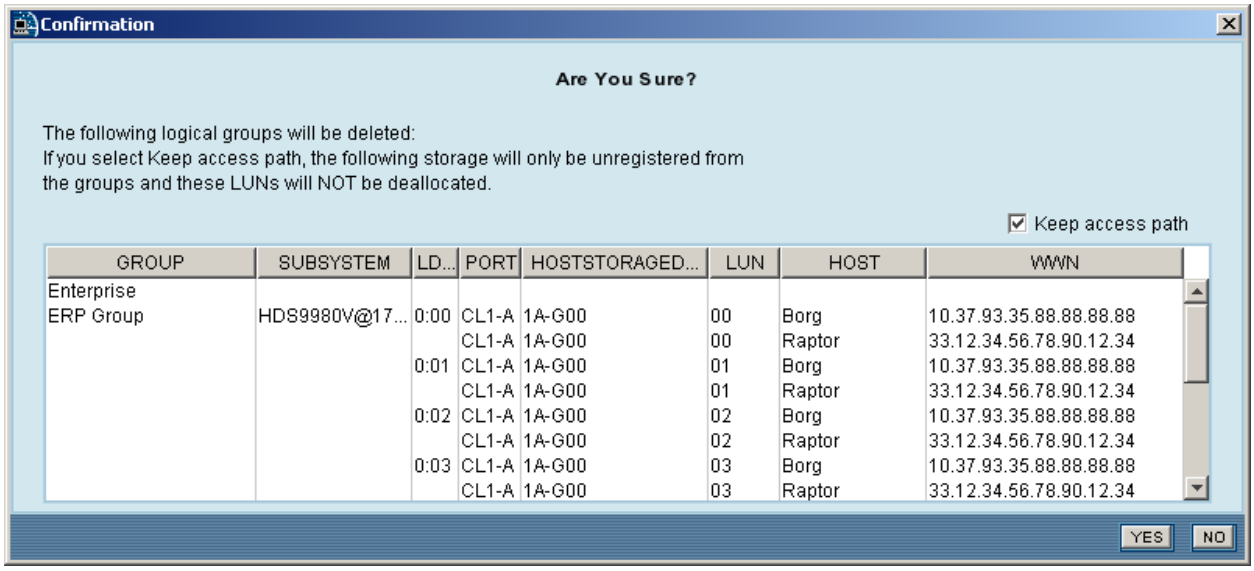


Figure 5.55 Deleting a Logical Group with LUNs

5.9 Report Operations

The HiCommand™ Device Manager System users can perform report operations. To access the reports, select **Reports** on the HiCommand™ Device Manager menu bar, and enter your HiCommand™ Device Manager user name and password to open the Reports page (see Figure 5.56). You need to log in to the reports function only once per HiCommand™ Device Manager session, and your login ID determines your access privileges. If you are logged in as a Local or guest user, you do not have access to the reports.

The HiCommand™ Device Manager Reports page lists and provides access to the HiCommand™ Device Manager reports. The reports are available in **HTML** format or as comma-separated values (**CSV**) which can be used in a spreadsheet program (e.g., Microsoft® Excel software). HiCommand™ Device Manager provides the following reports:

- Physical configuration of storage subsystem (see section 5.9.1),
- Storage utilization by host (see section 5.9.2),
- Storage utilization by logical group (see section 5.9.3), and
- Users and permissions (not available to guest users) (see section 5.9.4).

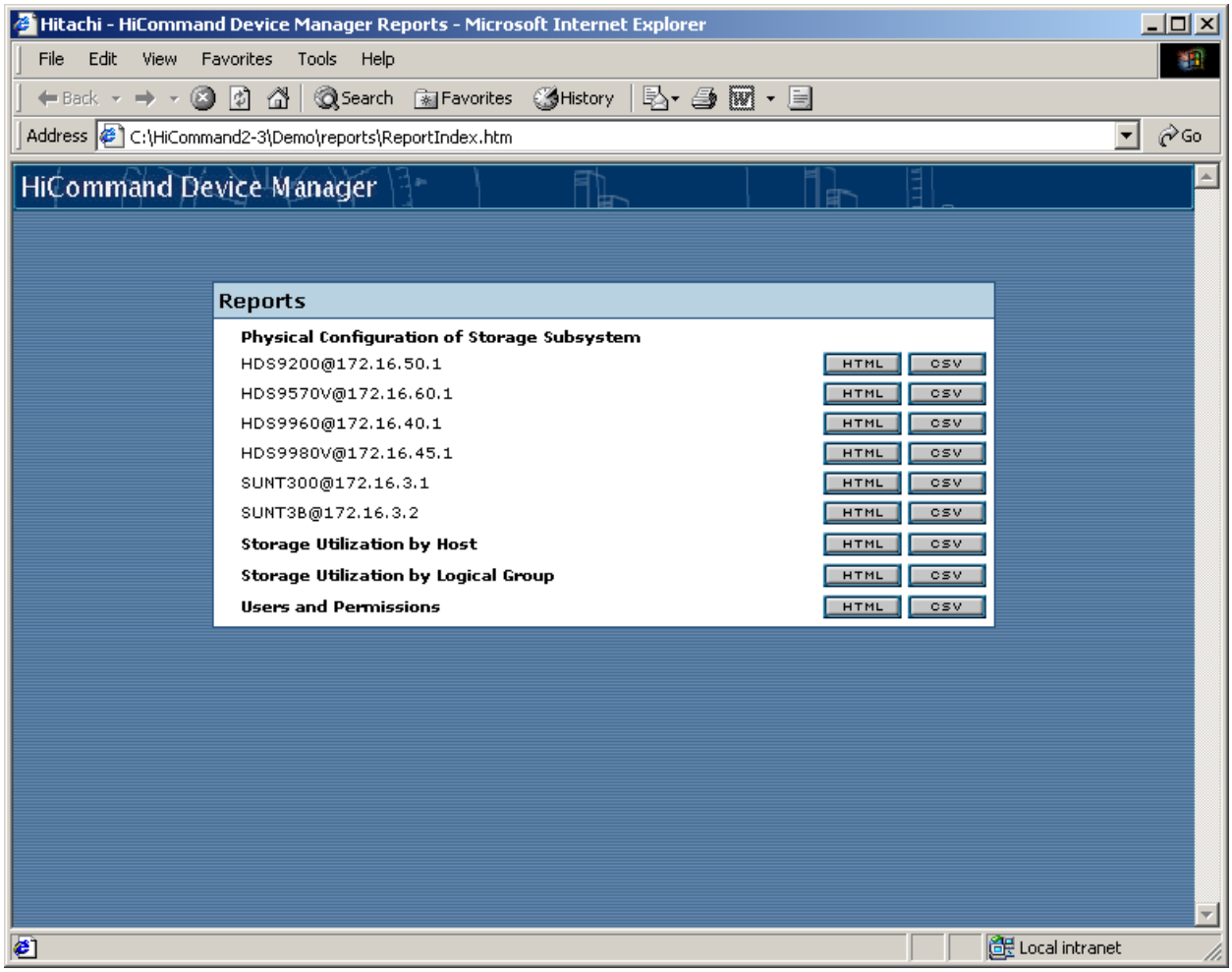


Figure 5.56 Reports Page

5.9.1 Physical Configuration of Storage Subsystem Report

The Physical Configuration of Storage Subsystem report displays and provides detailed information on the physical configuration of each subsystem added to the HiCommand™ Device Manager Server. The HTML report (see Figure 5.57, Figure 5.58) shows a graphic representation of the subsystem's configuration and components. The CSV report (see Figure 5.59) provides the detailed subsystem information as comma-separated values.

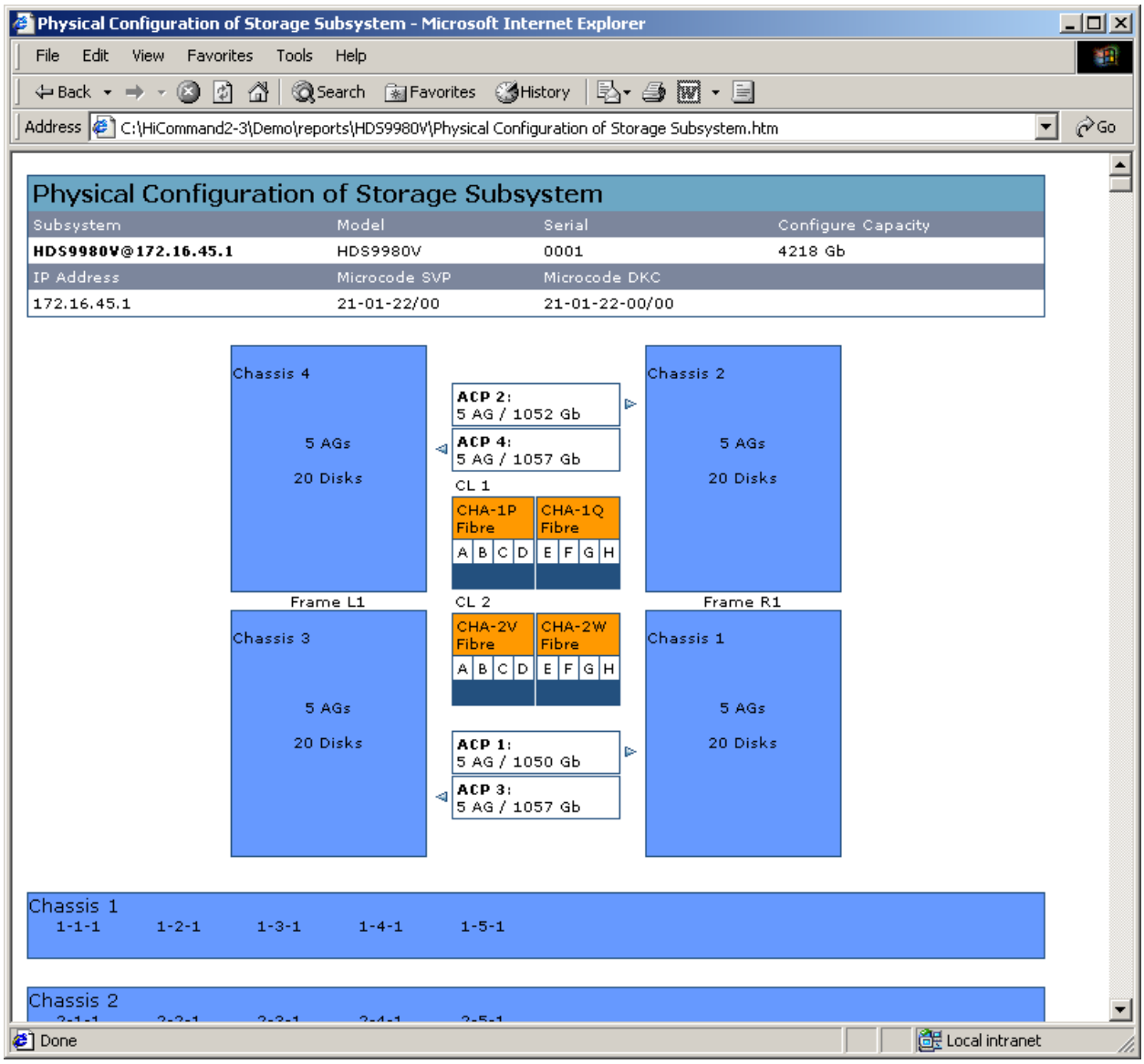


Figure 5.57 Physical Configuration of Storage Subsystem Report – HTML (9900V shown)

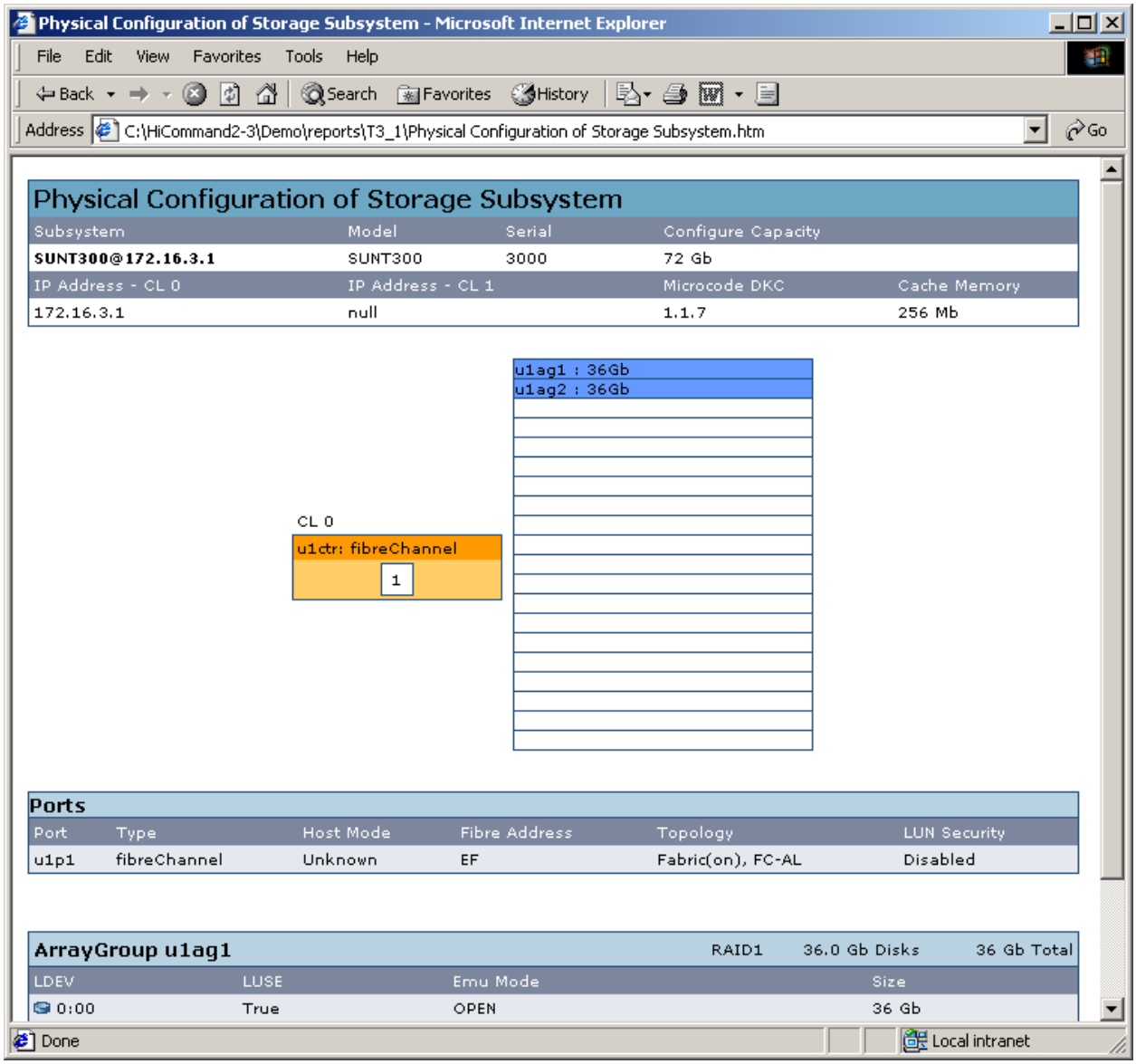
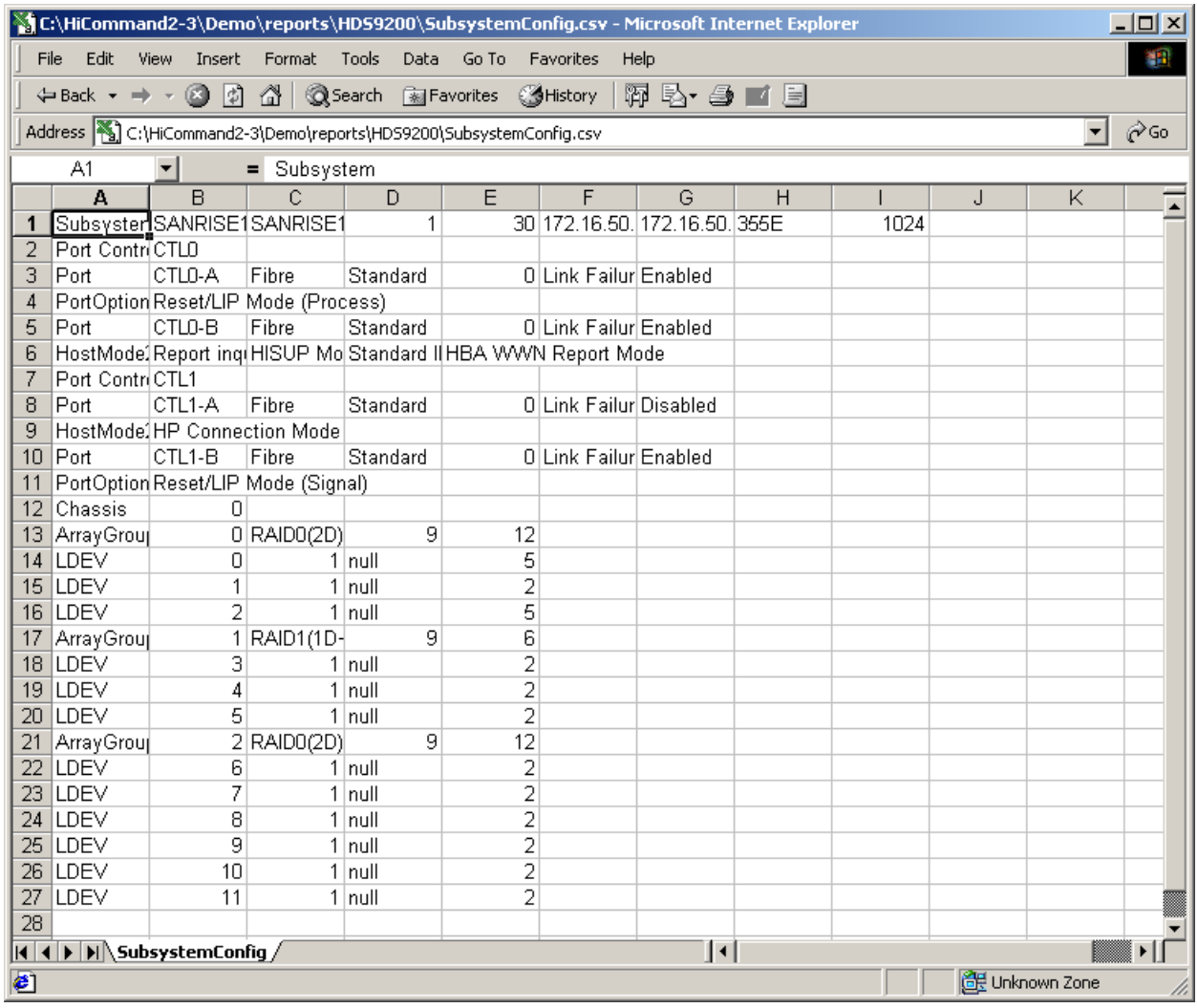


Figure 5.58 Physical Configuration of Storage Subsystem Report – HTML (T3 shown)



	A	B	C	D	E	F	G	H	I	J	K
1	Subsyster	SANRISE1	SANRISE1	1	30	172.16.50.	172.16.50.	355E	1024		
2	Port Contr	CTL0									
3	Port	CTL0-A	Fibre	Standard	0	Link Failur	Enabled				
4	PortOption	Reset/LIP	Mode (Process)								
5	Port	CTL0-B	Fibre	Standard	0	Link Failur	Enabled				
6	HostMode2	Report inq	HISUP Mo	Standard II	HBA WWN Report Mode						
7	Port Contr	CTL1									
8	Port	CTL1-A	Fibre	Standard	0	Link Failur	Disabled				
9	HostMode2	HP Connection Mode									
10	Port	CTL1-B	Fibre	Standard	0	Link Failur	Enabled				
11	PortOption	Reset/LIP	Mode (Signal)								
12	Chassis	0									
13	ArrayGrou	0	RAID0(2D)	9	12						
14	LDEV	0	1	null	5						
15	LDEV	1	1	null	2						
16	LDEV	2	1	null	5						
17	ArrayGrou	1	RAID1(1D-	9	6						
18	LDEV	3	1	null	2						
19	LDEV	4	1	null	2						
20	LDEV	5	1	null	2						
21	ArrayGrou	2	RAID0(2D)	9	12						
22	LDEV	6	1	null	2						
23	LDEV	7	1	null	2						
24	LDEV	8	1	null	2						
25	LDEV	9	1	null	2						
26	LDEV	10	1	null	2						
27	LDEV	11	1	null	2						
28											

Figure 5.59 Physical Configuration of Storage Subsystem Report – CSV (9200 shown)

5.9.2 Storage Utilization by Host Report

The Storage Utilization by Host report displays storage utilization statistics and detailed storage information for each host added to the HiCommand™ Device Manager Server (see Figure 5.60). The storage utilization statistics for each host include capacity (GB) currently in use by host operating system(s) and percentage of capacity in use by host(s). The storage information for each host includes allocated storage displayed by storage group and LUN.

Note: The host Agent provides the storage utilization statistics. If the Agent is not installed on a host, HiCommand™ Device Manager will not receive storage utilization statistics for that host.

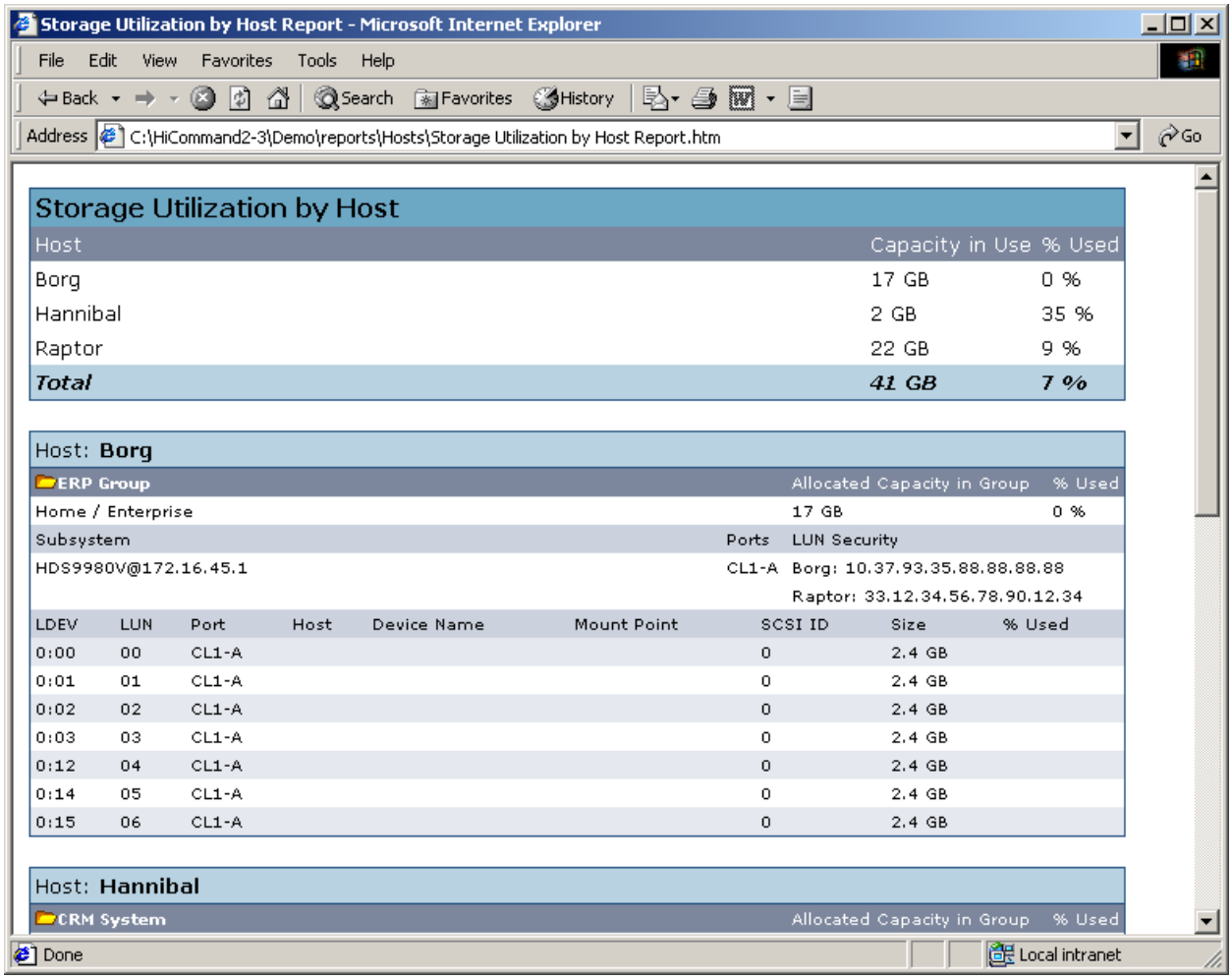


Figure 5.60 Storage Utilization by Host Report (HTML shown)

5.9.3 Storage Utilization by Logical Group Report

The Storage Utilization by Logical Group report (see Figure 5.61) displays the following information:

- For each subsystem added to the HiCommand™ Device Manager Server: subsystem name, model, serial number, IP address, configured capacity, allocated capacity, and percentage of allocated capacity in use by the host operating system(s).
- For each logical group added to the HiCommand™ Device Manager Server: group name and level, capacity, and percentage of capacity in use by the host operating system(s).

Note: The host Agent provides the storage utilization statistics. If the Agent is not installed on a host, HiCommand™ Device Manager will not receive utilization data for the storage accessed by that host.

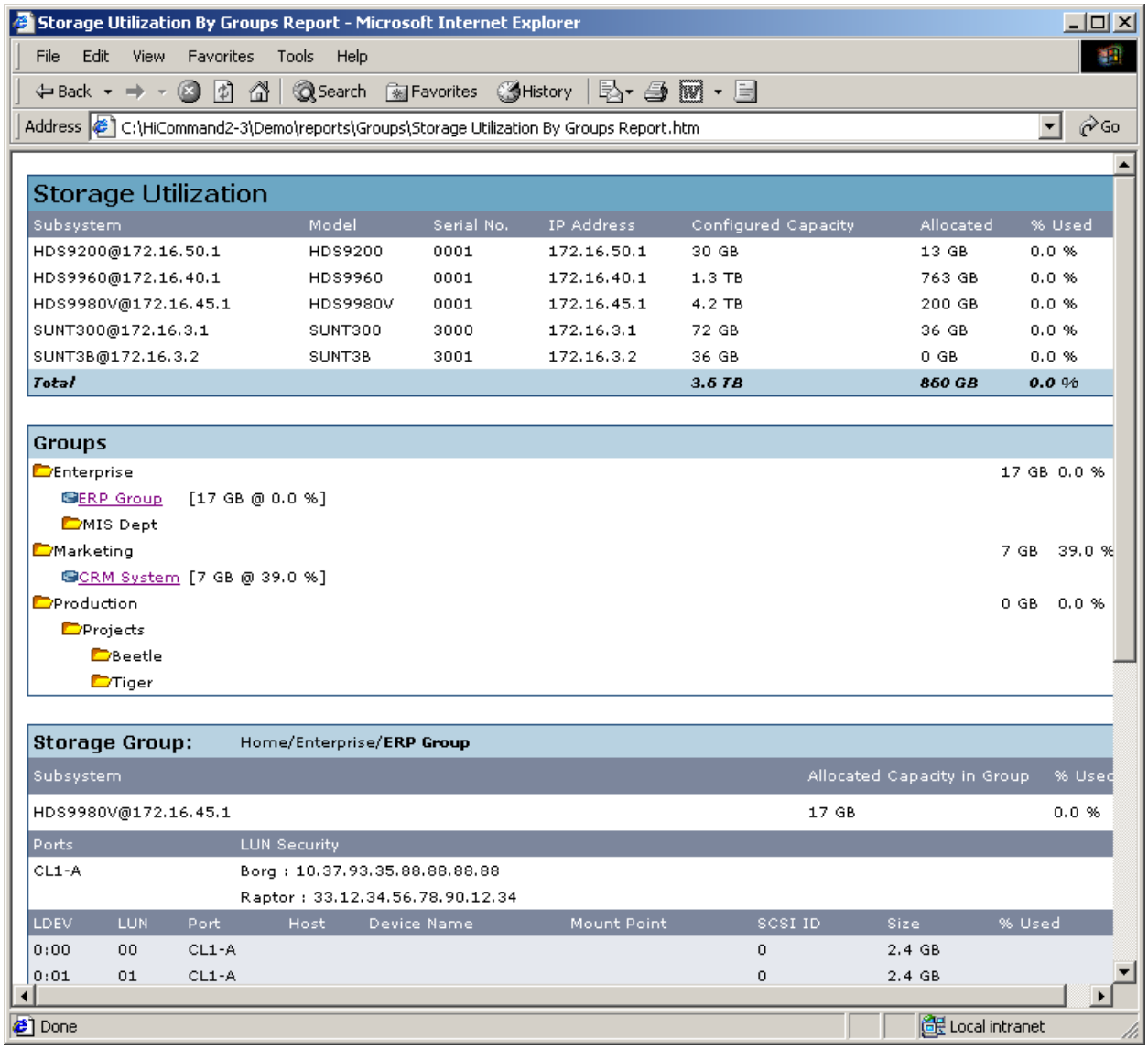


Figure 5.61 Storage Utilization by Logical Group Report (HTML shown)

5.9.4 Users and Permissions Report

The Users and Permissions report (see Figure 5.62) displays the following information for the HiCommand™ Device Manager users:

- User groups added to the HiCommand™ Device Manager Server,
- Number of users in each group, and
- Properties of each user (login name, last name, first name, description) in each user group.

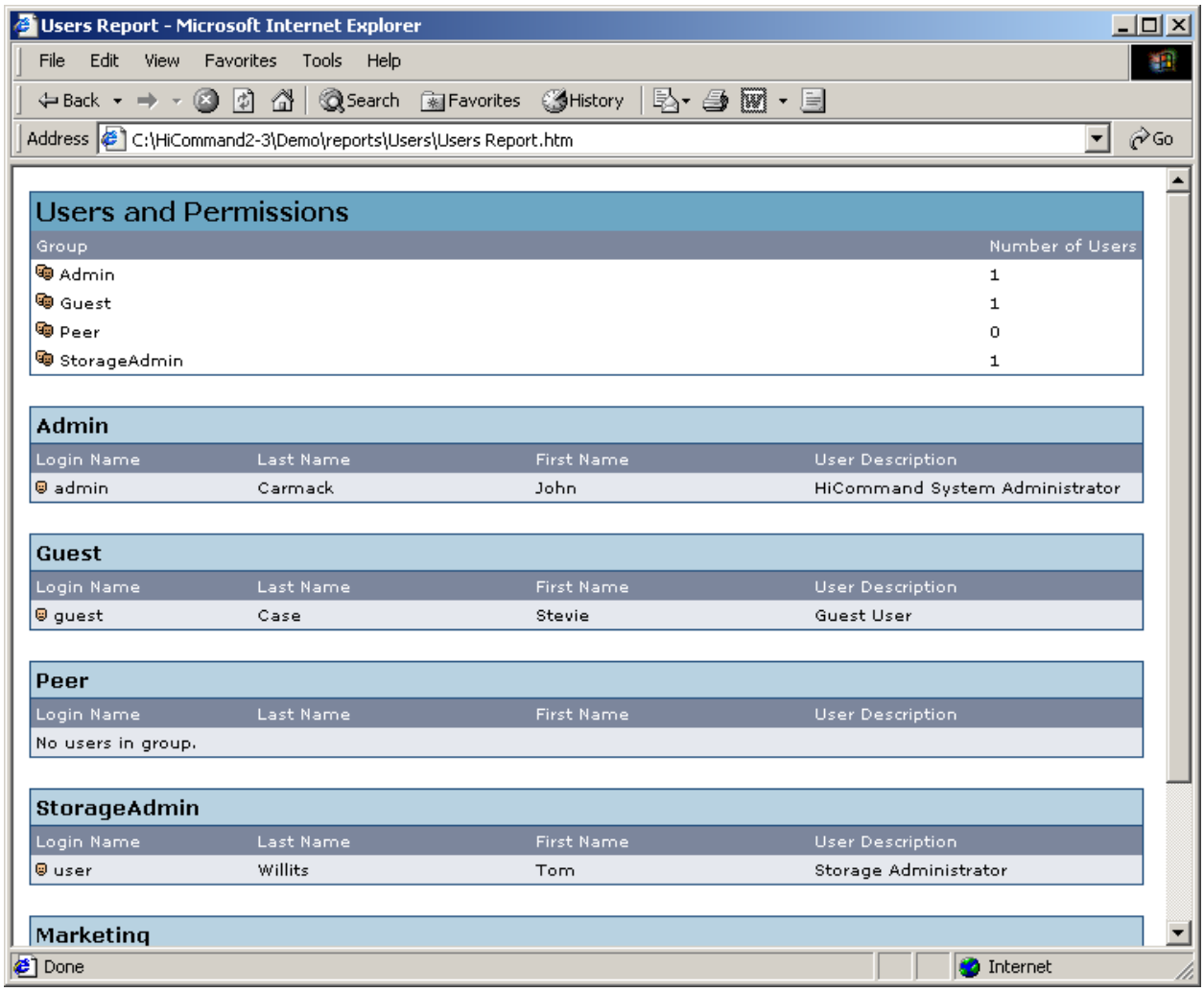


Figure 5.62 Users and Permissions Report (HTML shown)

Chapter 6 Performing HiCommand™ Device Manager Storage Operations

The HiCommand™ Device Manager storage operations include:

- Subsystem operations (see section 6.1),
  - Adding a storage subsystem (see section 6.1.1),
  - Viewing and editing storage subsystem properties (see section 6.1.2),
  - Performing a LUN Scan operation (see section 6.1.3),
  - Performing a Refresh operation (see section 6.1.4),
  - Viewing and deleting alerts (see section 6.1.5), and
  - Deleting a storage subsystem (see section 6.1.6).
- Port operations (see section 6.2),
  - Configuring the 9900V, 9900, 9500V, and 9200 ports (see section 6.2.1),
  - Managing LUN groups (9900 only) (see section 6.2.2),
  - Managing WWN groups (9900 only) (see section 6.2.3), and
  - Configuring the 9900V and 9900 fibre-channel adapters (see section 6.2.4).
- Array group operations (see section 6.3),
  - Creating an array group on the 9500V and 9200 (see section 6.3.1),
  - Creating an array group (with or without a spare drive) on the T3 (see section 6.3.2),
  - Configuring spare drives on the 9500V and 9200 (see section 6.3.3),
  - Creating an LDEV (see section 6.3.4),
  - Deleting an LDEV (see section 6.3.5), and
  - Deleting an array group (see section 6.3.6).
- LDEV operations (see section 6.4),
  - Creating LUSE devices (see section 6.4.1),
  - Deleting LUSE devices (see section 6.4.2),
  - Allocating storage (see section 6.4.3), and
  - Unallocating storage (see section 6.4.4).
- Host operations (see section 6.5), and
  - Adding a host (see section 6.5.1),
  - Viewing and editing host properties (see section 6.5.2), and
  - Deleting a host (see section 6.5.3).
- Storage group operations (see section 6.6).
  - Adding storage to a storage group (see section 6.6.1),
  - Moving storage from one group to another (see section 6.6.2),
  - Deleting storage from a group (see section 6.6.3), and
  - Modifying the LUN security of one or more LUN(s) in a group (see section 6.6.4).

6.1 Subsystem Operations

The System Administrator and/or Storage Administrator can perform subsystem operations. Local and guest users do not have access to this function. The HiCommand™ Device Manager subsystem operations include:

- Adding a storage subsystem (see section 6.1.1),
- Viewing and editing storage subsystem properties (see section 6.1.2),
- Performing a LUN Scan operation (see section 6.1.3),
- Performing a Refresh operation (see section 6.1.4),
- Viewing and deleting alerts (see section 6.1.5), and
- Deleting a storage subsystem (see section 6.1.6).

The Storage Subsystem List panel (see Figure 6.1) allows System Administrators and Storage Administrators to add subsystems to and delete subsystems from HiCommand™ Device Manager and edit subsystem properties. To open the Storage Subsystem List panel, select **Config - Subsystems** on the HiCommand™ Device Manager menu bar. The guest user does not have access to these functions.

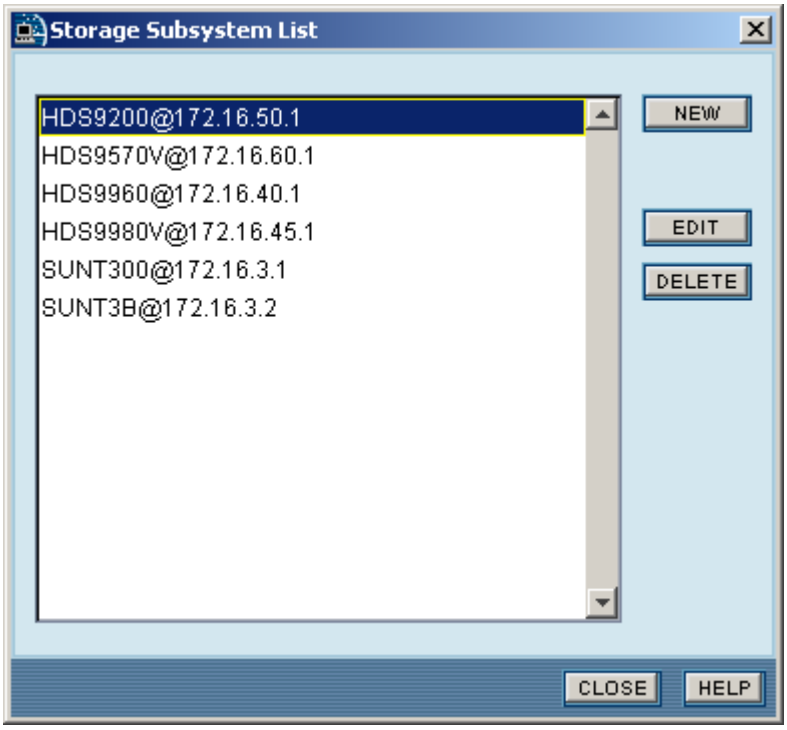


Figure 6.1 Storage Subsystem List Panel

6.1.1 Adding a Storage Subsystem

The System Administrator and Storage Administrator can add a subsystem to HiCommand™ Device Manager. Local and guest users do not have access to this function.

When you add a subsystem, HiCommand™ Device Manager locates the subsystem, performs an initial configuration check, creates a logical group for the subsystem in the All Storage/ My Storage group, creates the Allocated and Unallocated storage groups under the subsystem, and lists the LUNs in the Allocated group (each path on a separate line) and the LDEVs/LUs without paths in the Unallocated group (each LDEV/LU on a separate line).

Note: The add subsystem operation is complex and may take a while.

To add a storage subsystem to HiCommand™ Device Manager:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator.
2. If no subsystems have been added to HiCommand™ Device Manager, select the **Discover Storage** button in the bottom right corner of the HiCommand™ Device Manager Welcome panel (see Figure 6.2).

   After one or more subsystems have been discovered, the Welcome panel is no longer displayed. Instead, select **Config – Subsystem** on the menu bar to open the Storage Subsystem List panel, and select **New** to open the Add Storage Subsystem panel.
3. On the Add Storage Subsystem panel, select the type of subsystem to be added (e.g., HDS9900) (see Figure 6.3, Figure 6.4, Figure 6.5, Figure 6.6, Figure 6.7).
4. Enter the IP address(es) of the storage subsystem. ***Note:*** If an IP address translation server (e.g., firewall) exists between the HiCommand™ Device Manager Server and the subsystem, you need to specify the IP address that is accessible from the HiCommand™ Device Manager Server.
5. Enter the other required information:
   - For the 9900V, enter the user ID and password (for Storage Navigator).
   - For the 9900, enter the SNMP community name (e.g., public) for the subsystem.
   - For the 9500V and 9200 subsystem, enter the user ID and password if the Password Protection feature is enabled on the subsystem.
   - For the T3, enter the user name and password. ***Note:*** For T3 the user ID is usually "root", and the default password must be changed, so make sure to enter the correct password. The T3 array comes pre-configured with a "guest" user ID which does not require a password to be set. Do not use the guest account for management by HiCommand™ Device Manager, because the guest user only has read access to the array and cannot change the configuration.
6. Select **OK** to add the subsystem. HiCommand™ Device Manager locates the subsystem on the network and performs the subsystem discovery (see Figure 6.8). While this operation is in process, you can perform other operations (including discovering other subsystems).
7. Perform a LUN Scan operation on the newly discovered subsystem (see section 6.1.3). When you perform a LUN Scan immediately after adding a subsystem, HiCommand™ Device Manager creates a hierarchy of logical groups and storage groups organized by port to contain all of the existing LUNs on the subsystem.

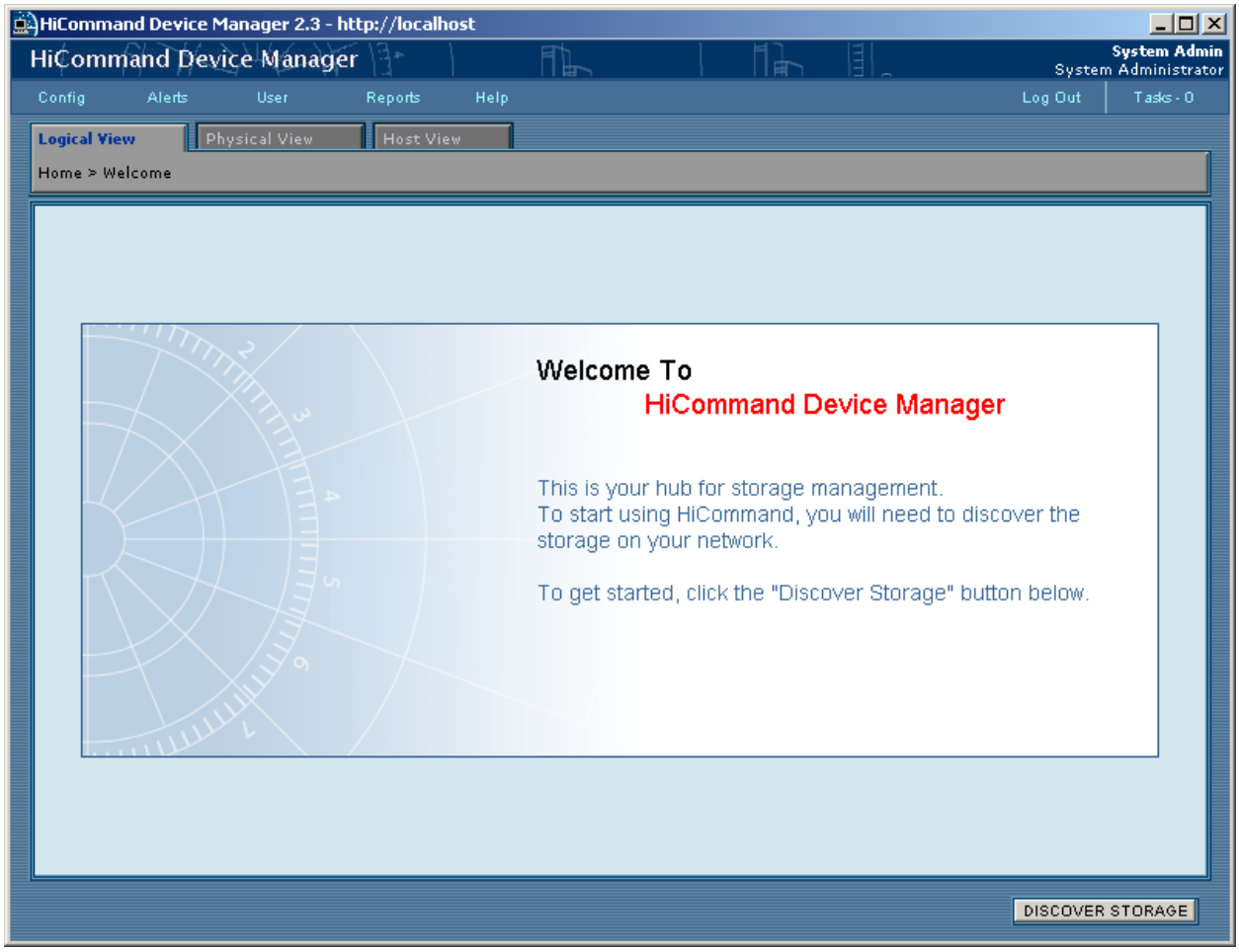


Figure 6.2 Discover Storage on HiCommand™ Device Manager Main Console

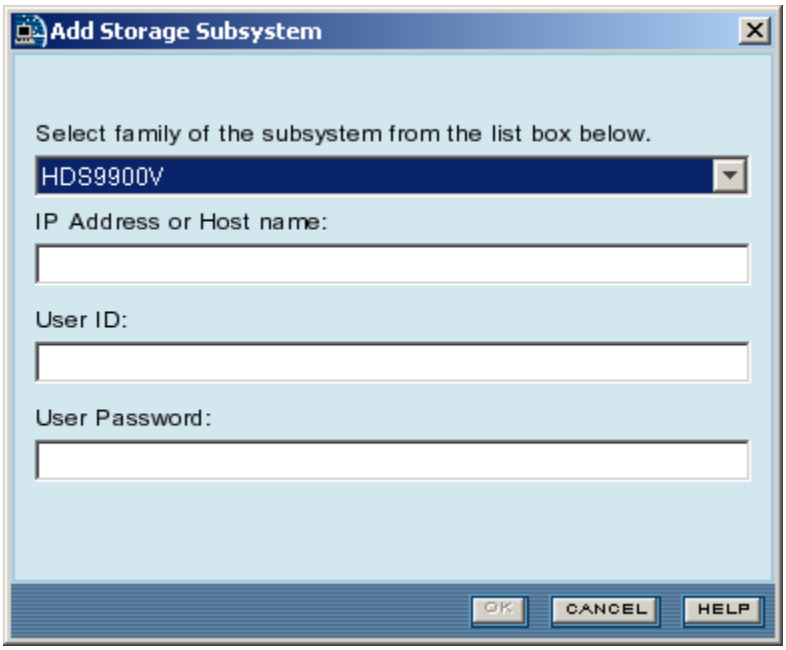


Figure 6.3 Adding a Storage Subsystem – Lightning 9900™ V Series

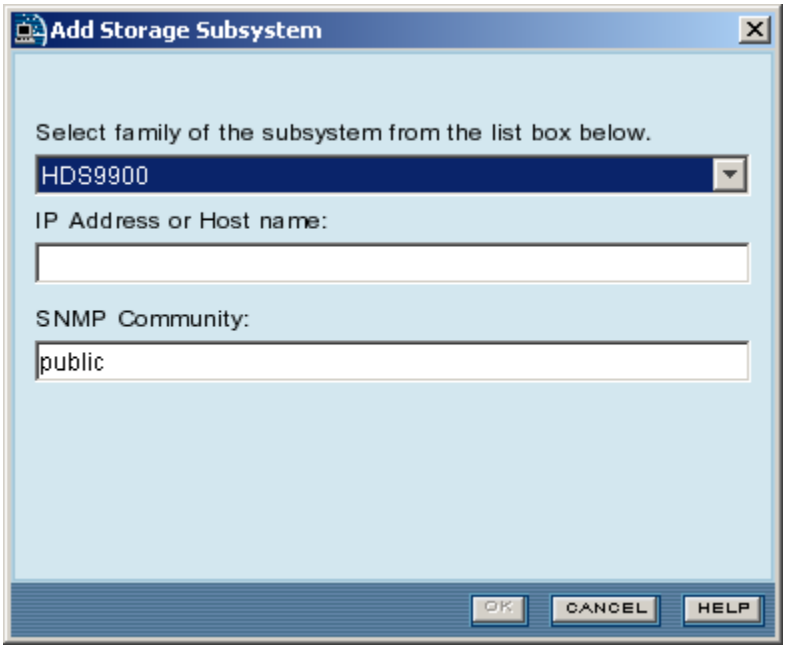


Figure 6.4 Adding a Storage Subsystem – Lightning 9900™

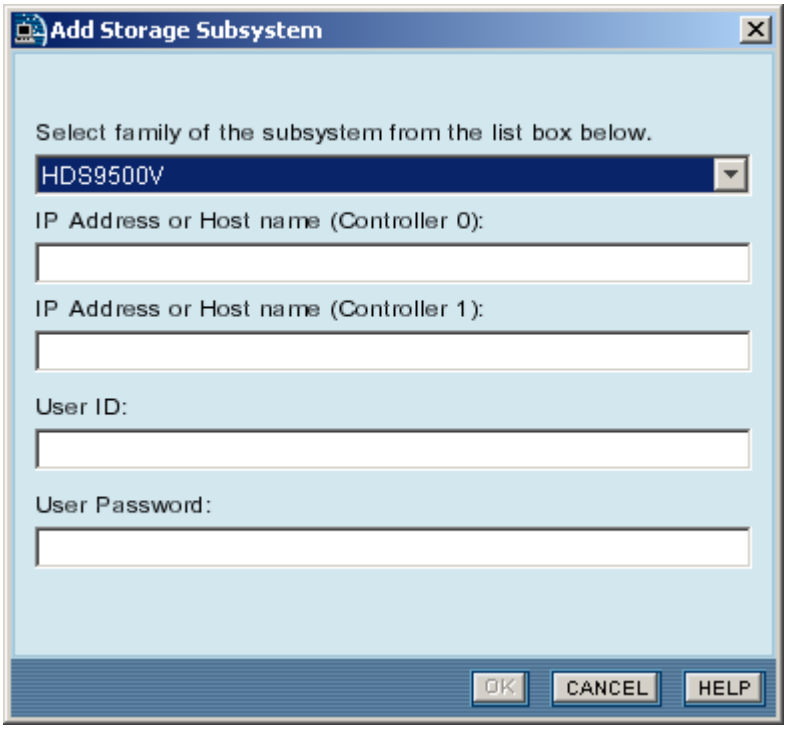


Figure 6.5 Adding a Storage Subsystem – Thunder 9500™ V Series

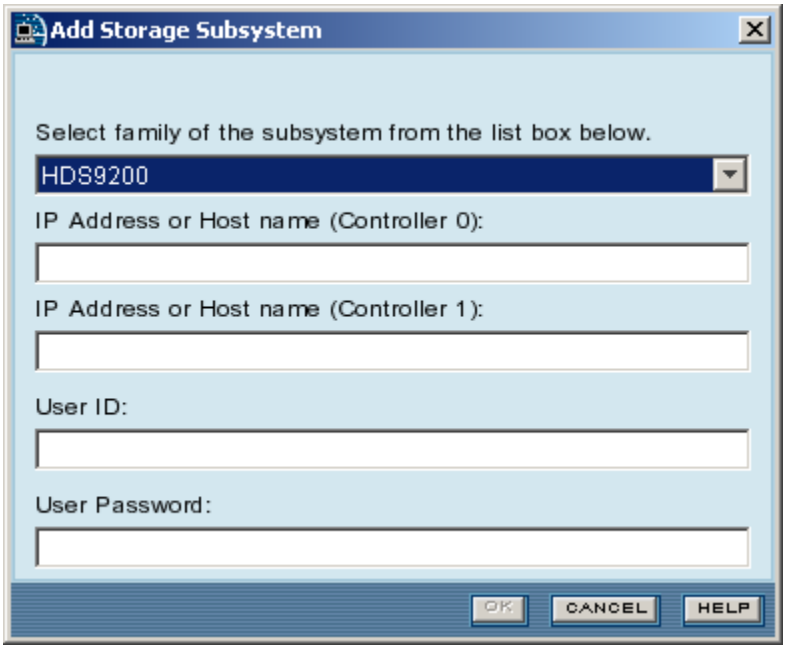


Figure 6.6 Adding a Storage Subsystem – Thunder 9200™

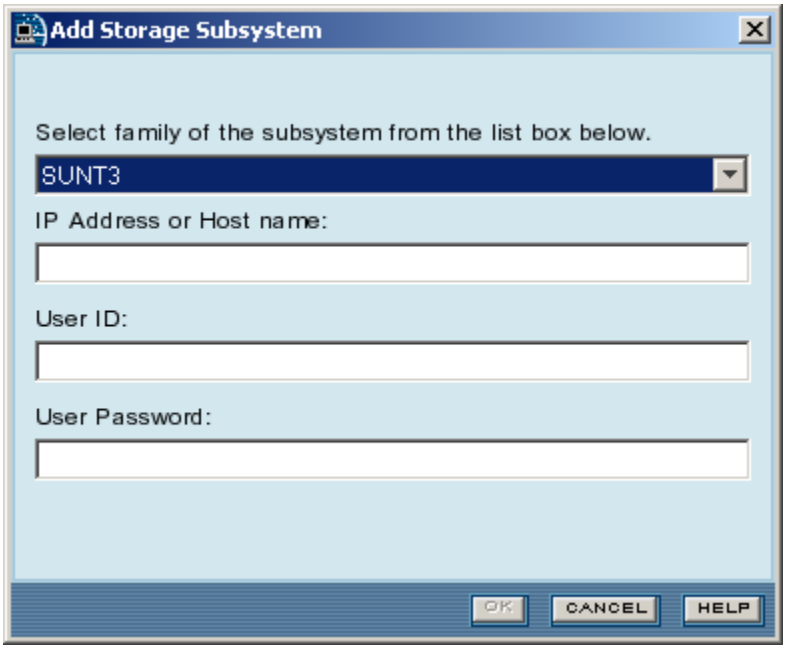


Figure 6.7 Adding a Storage Subsystem – StorEdge™ T3

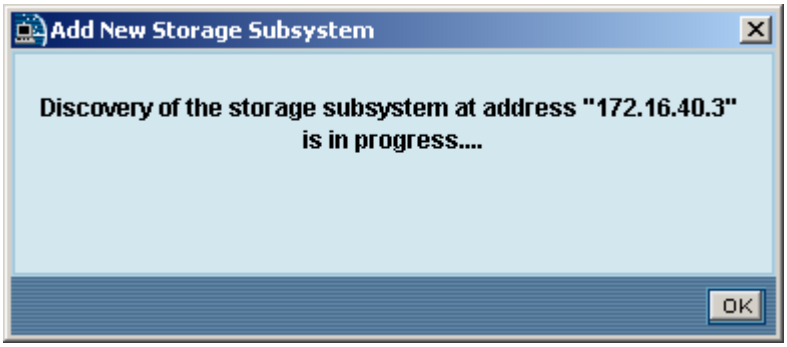


Figure 6.8 Adding a Storage Subsystem – Discovery in Progress

6.1.2 Viewing and Editing Storage Subsystem Properties

The System Administrator and Storage Administrator can view and edit the subsystem properties. Local and guest users do not have access to this function.

The Storage Subsystem Properties panel (see Figure 6.9, Figure 6.10, Figure 6.11, Figure 6.12, and Figure 6.13) displays the properties of the selected subsystem. You can open the Storage Subsystem Properties panel in either of two ways:

- Select the **Config** menu, select **Subsystems** to open the Storage Subsystem List panel, select the desired subsystem, and then select the **Edit** button.
- Select the **Physical View**, and select the **Properties** button for the desired subsystem.

The **LUN Scan** button allows you to perform a LUN Scan operation (see section 6.1.3). The **Refresh** button allows you to perform a Refresh operation (see section 6.1.4). The **Change Password** button allows you to change the password used by HiCommand™ Device Manager to access the subsystem (not applicable to 9900). This option does not change the password which is registered in the 9900V subsystem.

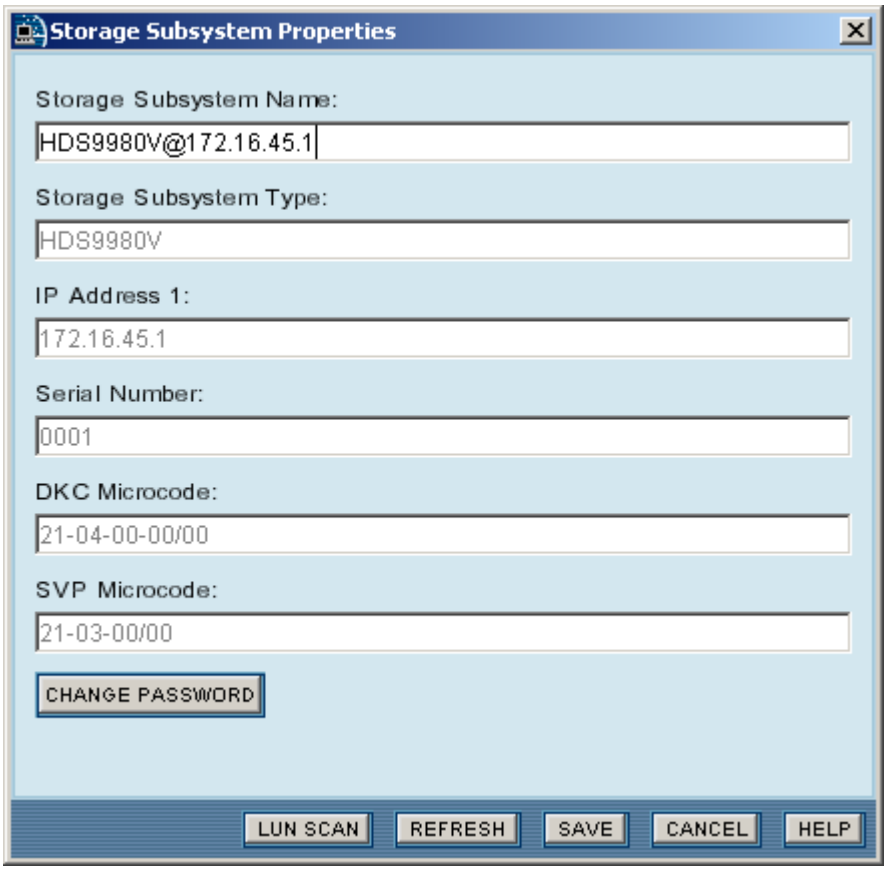


Figure 6.9 Storage Subsystem Properties Panel – Lightning 9900™ V Series

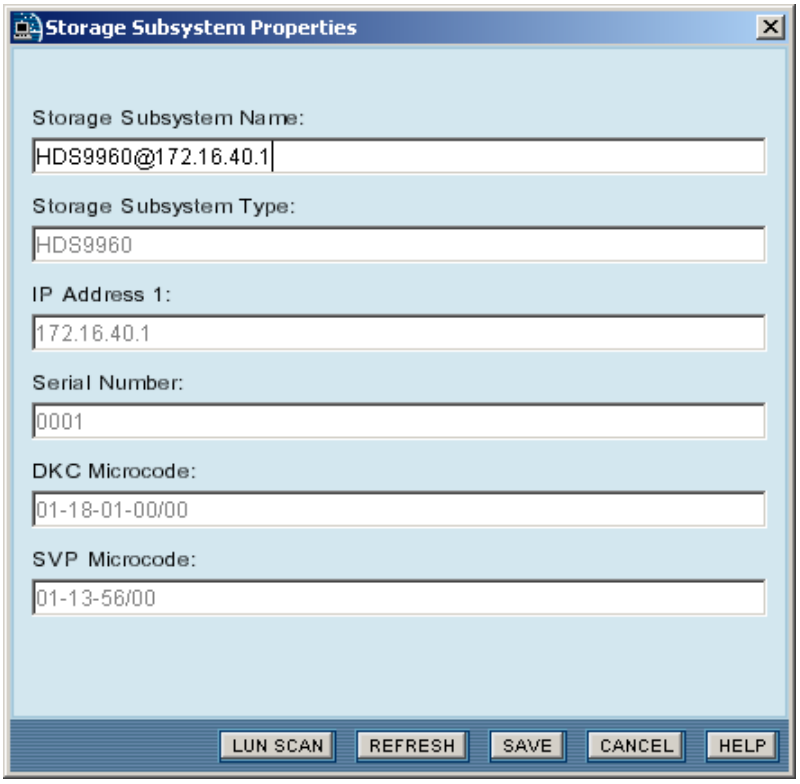


Figure 6.10 Storage Subsystem Properties Panel – Lightning 9900™

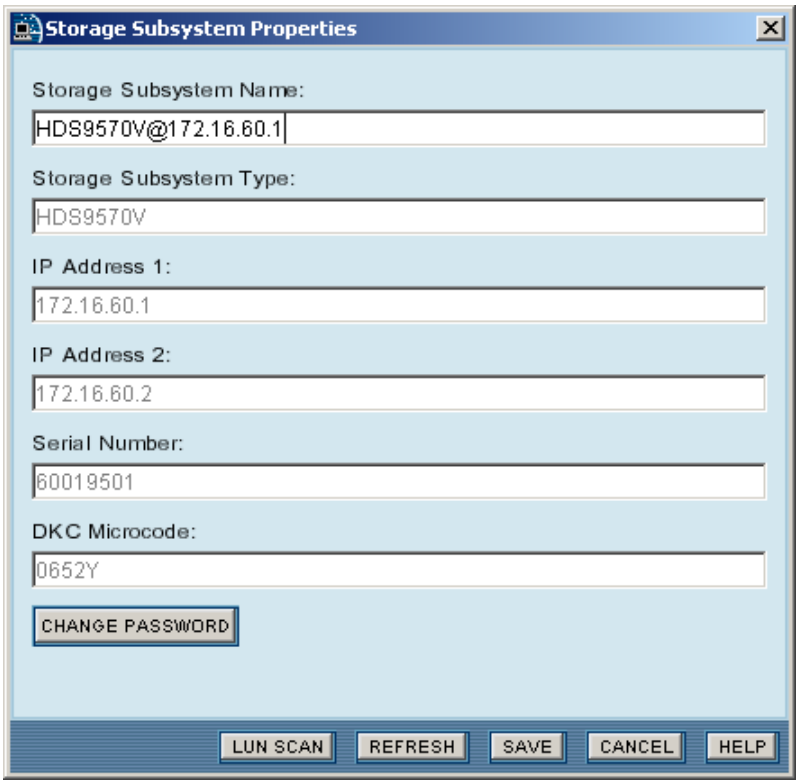


Figure 6.11 Storage Subsystem Properties Panel – Thunder 9500™ V Series

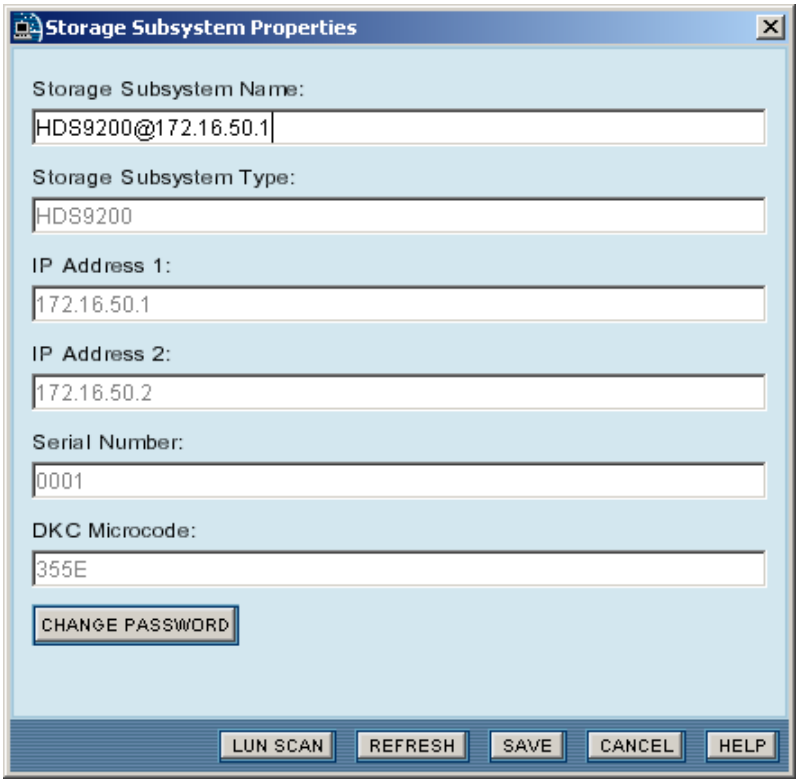


Figure 6.12 Storage Subsystem Properties Panel – Thunder 9200™

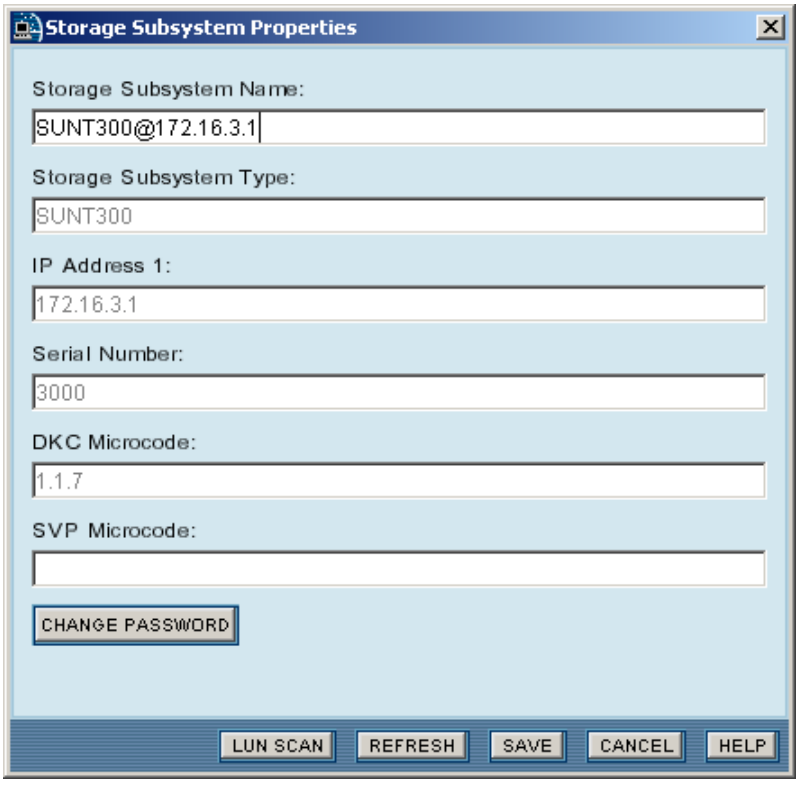


Figure 6.13 Storage Subsystem Properties Panel – StorEdge™ T3

6.1.3 Performing a LUN Scan Operation

The System Administrator and Storage Administrator can perform LUN Scan operations. Local and guest users do not have access to this function.

After initial subsystem discovery, none of the LUNs defined on the storage array are associated with a (user-defined) storage group. When you perform a LUN Scan immediately after adding a subsystem, HiCommand™ Device Manager creates a hierarchy of logical groups and storage groups to contain all of the existing LUNs on the subsystem. The LUN Scan operation creates the LUN Scan top-level group and a logical group for the subsystem inside the LUN Scan group, and then places the LUNs into storage groups organized by port inside the subsystem group. The LUNs in the LUN Scan group are available for use in HiCommand™ Device Manager and can be moved to new or existing storage groups if desired.

To perform a LUN Scan operation:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator.
2. Open the Storage Subsystem Properties panel (refer to Figure 6.9 – Figure 6.13):
   - From the menu bar: Select **Config – Subsystems** to open the Storage Subsystem List panel (refer to Figure 6.1), select the desired subsystem, and then select **Edit**.
   - From the View panes: Select the **Physical View**, and then select the **Properties** button for the desired subsystem.
3. Select **LUN SCAN**. HiCommand™ Device Manager scans the selected subsystem for LUNs not assigned to any storage group and places these LUNs into the **LUN Scan** group.
4. When the LUN Scan operation is complete (see Figure 6.14), select the **Logical View** tab, select the **LUN Scan** group (see Figure 6.15), and select the subsystem group. The LUNs are in storage groups organized by port.
5. After the LUN Scan operation, you can leave the LUNs in the LUN Scan storage groups and manage the storage there, or you can create your own logical groups and move the LUNs from the LUN Scan group into your customized groups.

   To move LUNs to another group, select the desired LUNs in the LUN Scan group, and then select **Move Storage** (see section 6.6.2 for instructions).

   To delete LUNs, select the desired LUNs in the LUN Scan group, and then select **Delete Storage** (see section 6.6.3 for instructions).

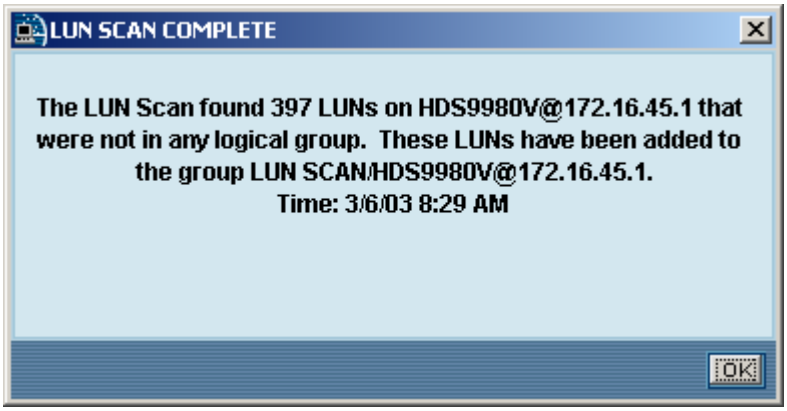


Figure 6.14 LUN Scan Complete Message

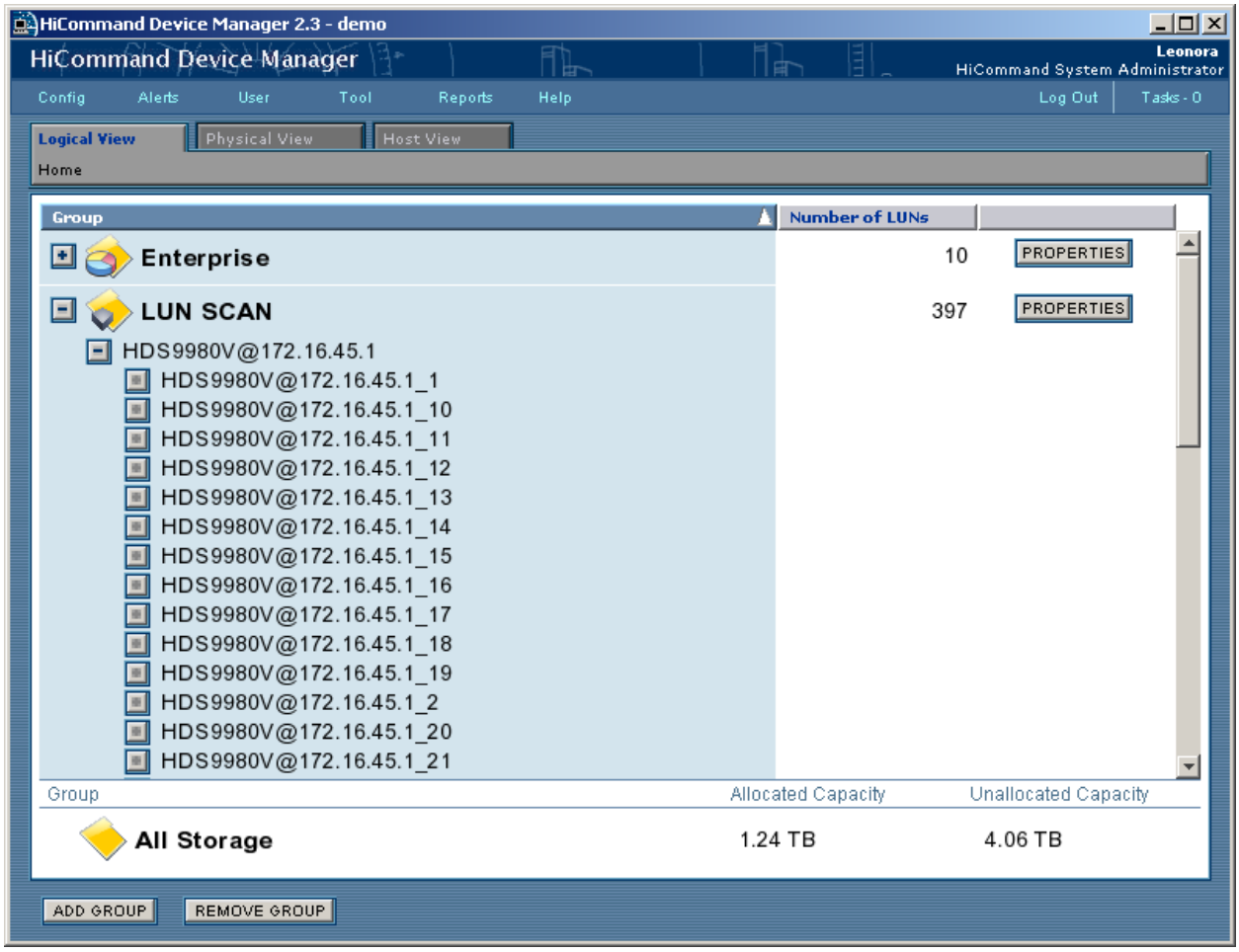


Figure 6.15 LUN Scan Group

6.1.4 Performing a Refresh Operation

The System Administrator and Storage Administrator can perform Refresh operations. Local and guest users do not have access to this function. A Refresh operation rediscovers the storage subsystem. You should perform a Refresh operation when changes have been made to a storage subsystem other than through the HiCommand™ Device Manager system (e.g., after adding new disk drives, after adding new ShadowImage pairs using Storage Navigator).

To perform a Refresh operation:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator.
2. Select **Config** - **Subsystems** on the menu bar to open the Storage Subsystem List panel (refer to Figure 6.1).
3. Select the desired subsystem on the Storage Subsystem List panel, and select **Edit** to open the Storage Subsystem Properties panel (refer to Figure 6.9 – Figure 6.13).
4. Select the **Refresh** button to start the Refresh operation (see Figure 6.16). HiCommand™ Device Manager notifies you when the Refresh operation is complete (see Figure 6.17).

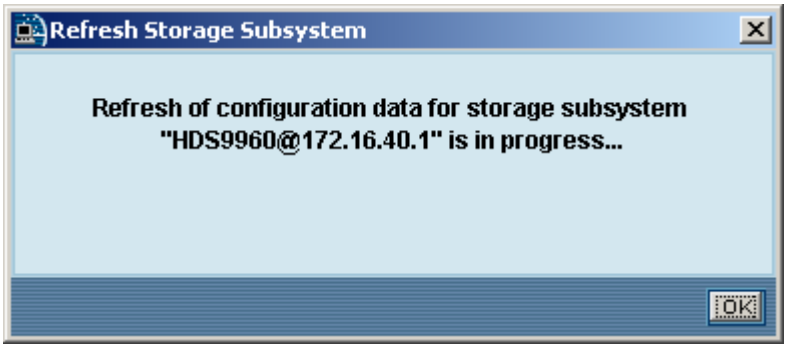


Figure 6.16 Refresh Operation In Progress

Figure 6.17 Refresh Operation – Completion

6.1.5 Viewing and Deleting Alerts

HiCommand™ Device Manager System users can view the storage subsystem alerts. The System Administrator and Storage Administrator can delete alerts from the HiCommand™ Device Manager Server. Local and guest users do not have access to this function.

An alert can indicate an SNMP trap, error, or other unexpected condition. The Alerts panel (see Figure 6.18) displays the following information for each alert:

- **Description** of the alert.
- **Severity**. Possible values for the 9900V and 9900 subsystem are: No Error (1), Acute (2), Serious (3), Moderate (4), and Service (5). Other subsystems have different values.
- **Source** (subsystem name).
- **Time of alert** (time that the alert was received by the HiCommand™ Device Manager Server).

To view all alerts for all subsystems, select **Alerts** on the HiCommand™ Device Manager menu bar to open the Alerts panel.

To view the alerts for a specific subsystem, go to the Physical View, and select the **Alerts** bar for the subsystem to open the Alerts panel.

To view detailed information on a specific alert, select the **Detail** button to open the Alert Detail panel (see Figure 6.19).

To delete an alert from the HiCommand™ Device Manager Server, select the alert and then select **Delete**.

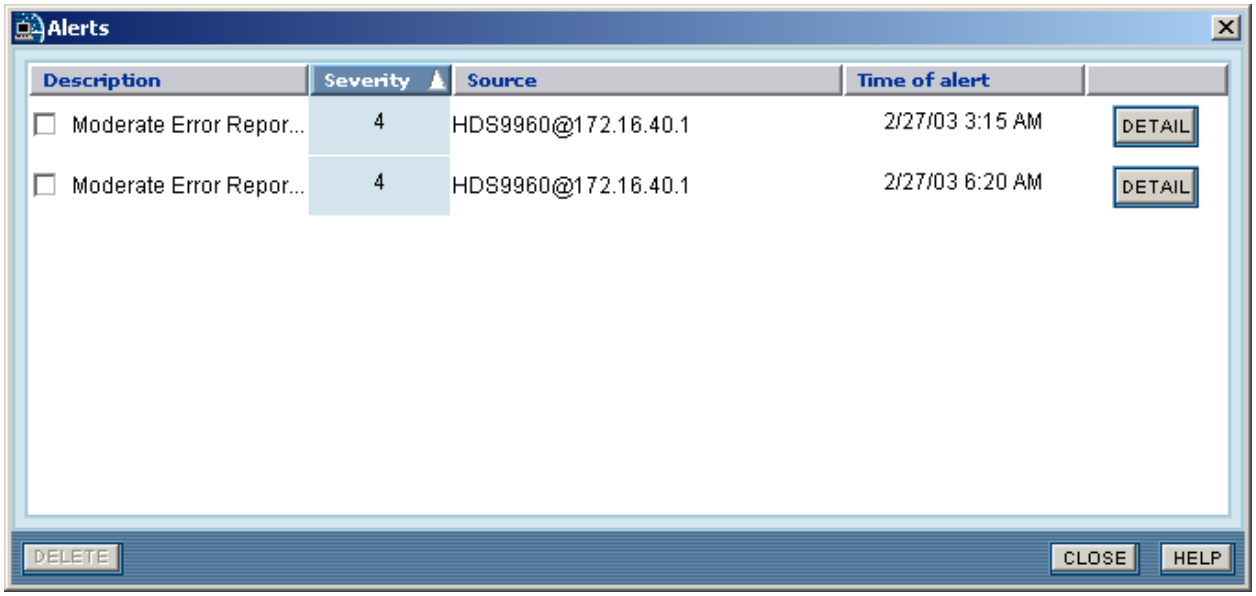


Figure 6.18 Alerts Panel

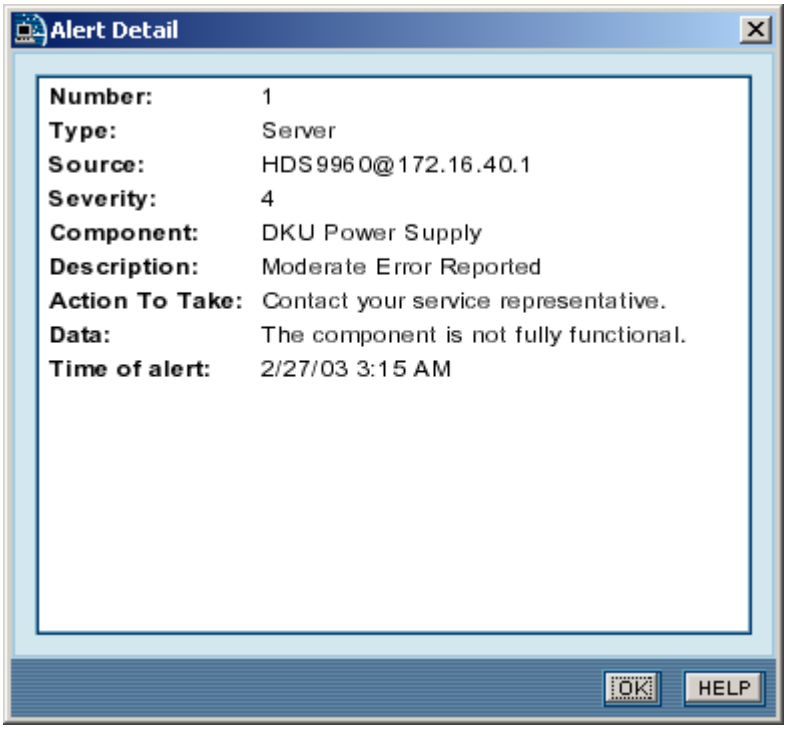


Figure 6.19 Alert Detail Panel

6.1.6 Deleting a Storage Subsystem

The System Administrator and Storage Administrator can delete a storage subsystem from HiCommand™ Device Manager. Local and guest users do not have access to this function.

Note: Deleting a subsystem from HiCommand™ Device Manager does not affect the subsystem.

To delete a subsystem from the HiCommand™ Device Manager system:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator.
2. Select **Config – Subsystems** on the menu bar, or select **Remove Subsystem** on the Physical View to open the Storage Subsystem List panel (refer to Figure 6.1).
3. Select the desired subsystem, and then select **Delete**.
4. When the confirmation panel appears (see Figure 6.21), select **Yes** to delete the subsystem, or select **No** to cancel your request to delete the subsystem.

   HiCommand™ Device Manager deletes the subsystem and all related LUNs, components, and storage groups from the HiCommand™ Device Manager system and returns you to the Subsystem List panel. The deleted subsystem is no longer displayed.

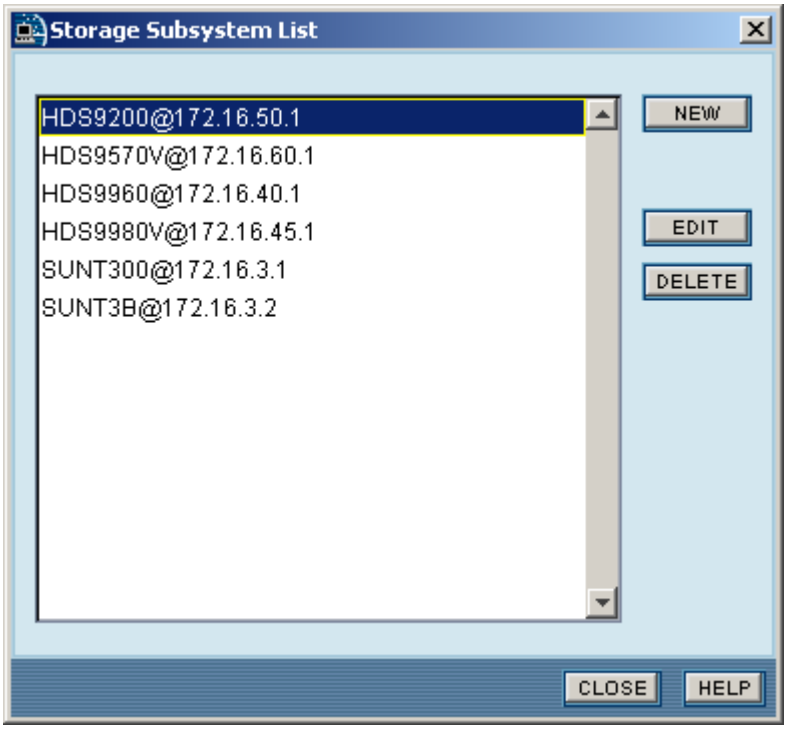


Figure 6.20 Deleting a Storage Subsystem – Selecting the Subsystem

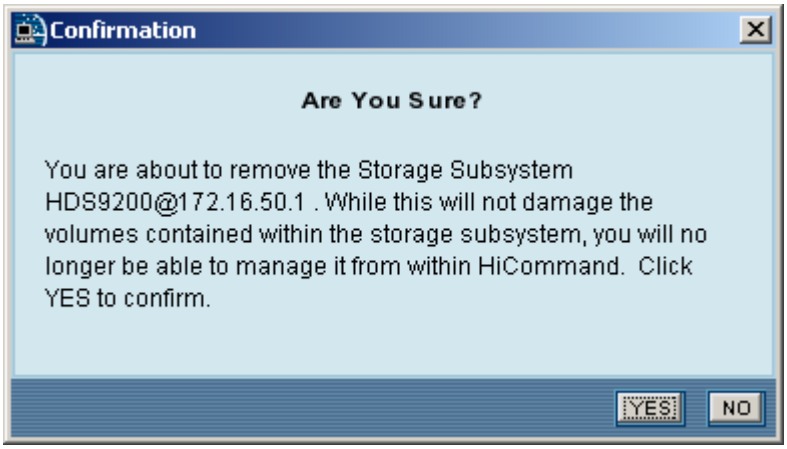


Figure 6.21 Deleting a Storage Subsystem – Confirmation

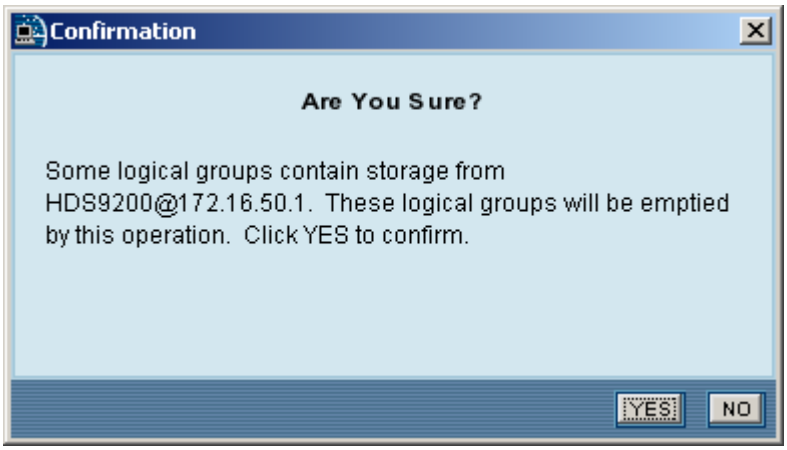


Figure 6.22 Deleting a Storage Subsystem – Warning

6.2 Port Operations

The System Administrator and Storage Administrator can perform port operations. Local and guest users do not have access to this function.

The HiCommand™ Device Manager port operations include:

- Configuring the 9900V, 9900, 9500V, and 9200 ports (see section 6.2.1),
- Managing LUN groups (9900 only) (see section 6.2.2),
- Managing WWN groups (9900 only) (see section 6.2.3), and
- Configuring the 9900V and 9900 fibre-channel adapters (see section 6.2.4).

6.2.1 Configuring the Ports (9900V, 9900, 9500V, and 9200)

The System Administrator and Storage Administrator can configure the fibre-channel ports on the Lightning 9900™ V Series, Lightning 9900™, Thunder 9500™ V Series, and Thunder 9200™ subsystems. Local and guest users do not have access to this function.

The Port Information panel (see Figure 6.23 – Figure 6.27) displays the detailed port information and allows you to configure the port. To open the Port Information panel, select the Physical View, select the desired subsystem, and select the desired port (e.g., click on **A** in Cluster 1 for port CL1-A).

Table 6.1 lists the available AL-PA values ranging from 01 to EF.

Table 6.1 Available AL-PA Values

EF	CD	B2	98	72	55	3A	25
E8	CC	B1	97	71	54	39	23
E4	CB	AE	90	6E	53	36	1F
E2	CA	AD	8F	6D	52	35	1E
E1	C9	AC	88	6C	51	34	1D
E0	C7	AB	84	6B	4E	33	1B
DC	C6	AA	82	6A	4D	32	18
DA	C5	A9	81	69	4C	31	17
D9	C3	A7	80	67	4B	2E	10
D6	BC	A6	7C	66	4A	2D	0F
D5	BA	A5	7A	65	49	2C	08
D4	B9	A3	79	63	47	2B	04
D3	B6	9F	76	5C	46	2A	02
D2	B5	9E	75	5A	45	29	01
D1	B4	9D	74	59	43	27	
CE	B3	9B	73	56	3C	26	

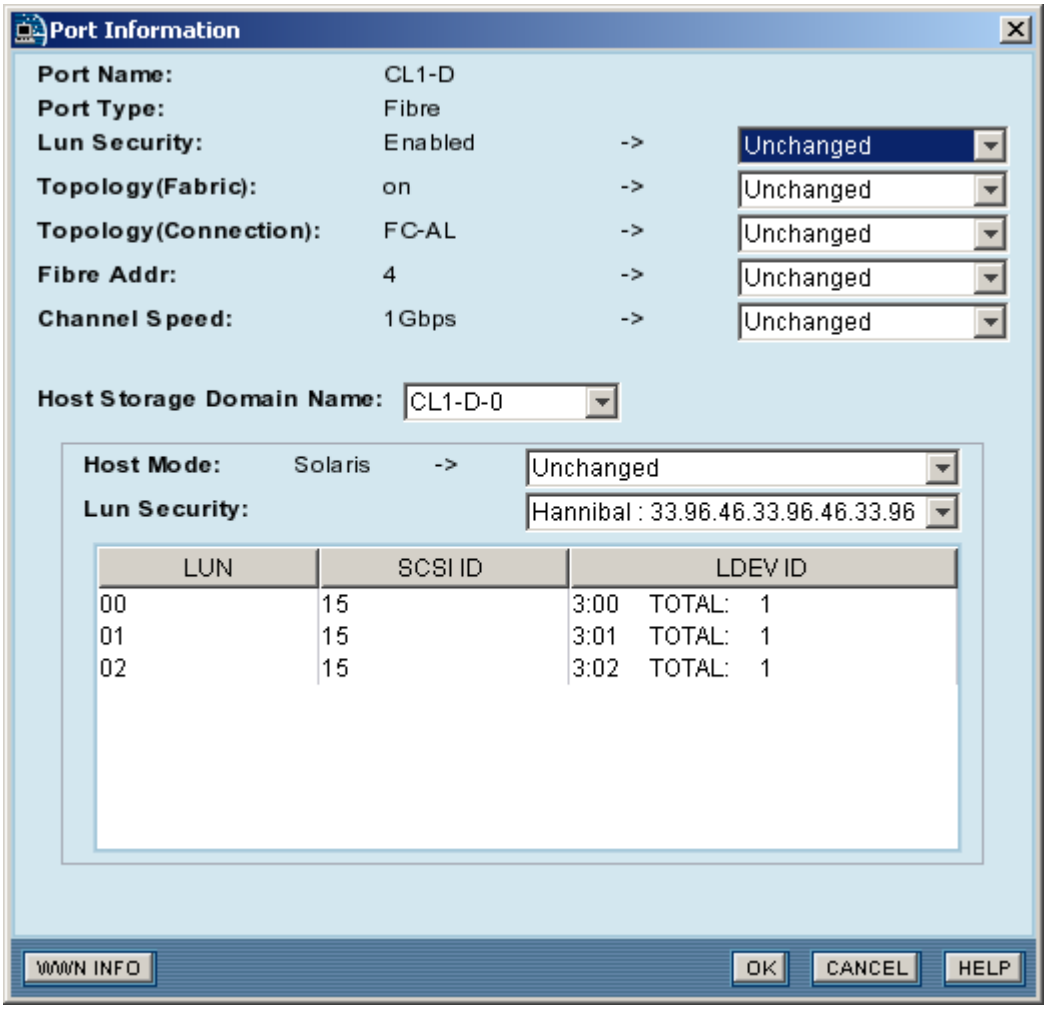


Figure 6.23 Port Information Panel for the Lightning 9900™ V Series

Lightning 9900™ V Series: For further information on the 9900V port settings, please refer to the 9900V Configuration Guide for the attached platform (e.g., *Hitachi Lightning 9900™ V Series Windows NT® Configuration Guide*), or contact your Hitachi Data Systems team.

- **Port settings:**
  - **LUN security:** Enable or disable LUN security for all LUNs on the port. To secure LUNs, select enabled. If no LUN security at all is desired, you can select disabled.
  - **Topology (Fabric):** On, Off.
  - **Topology (Connection):** FC-AL, Point-to-point.
  - **Fibre Addr:** In fabric environments, the port address is assigned automatically by fabric switch port number and is not controlled by the 9900V port settings. In arbitrated loop environments, the port address is set by entering an AL-PA (or loop ID). Refer to Table 6.1 for the available AL-PA values.
  - **Channel speed:** 1 GB/s, 2 GB/S, or auto (cannot be modified for some port types).

- **Host storage domain settings:**
  - **Host mode:** Solaris™, HP®, AIX®, Windows®, NetWare®, etc. Select the host mode for the connected platform to enable the host to "see" all LUNs on the port.
  - **Lun Security:** Host name/WWN for each WWN in the selected host storage domain.
- **WWN Info button:** Displays the WWN(s) registered to the port (Figure 6.24).

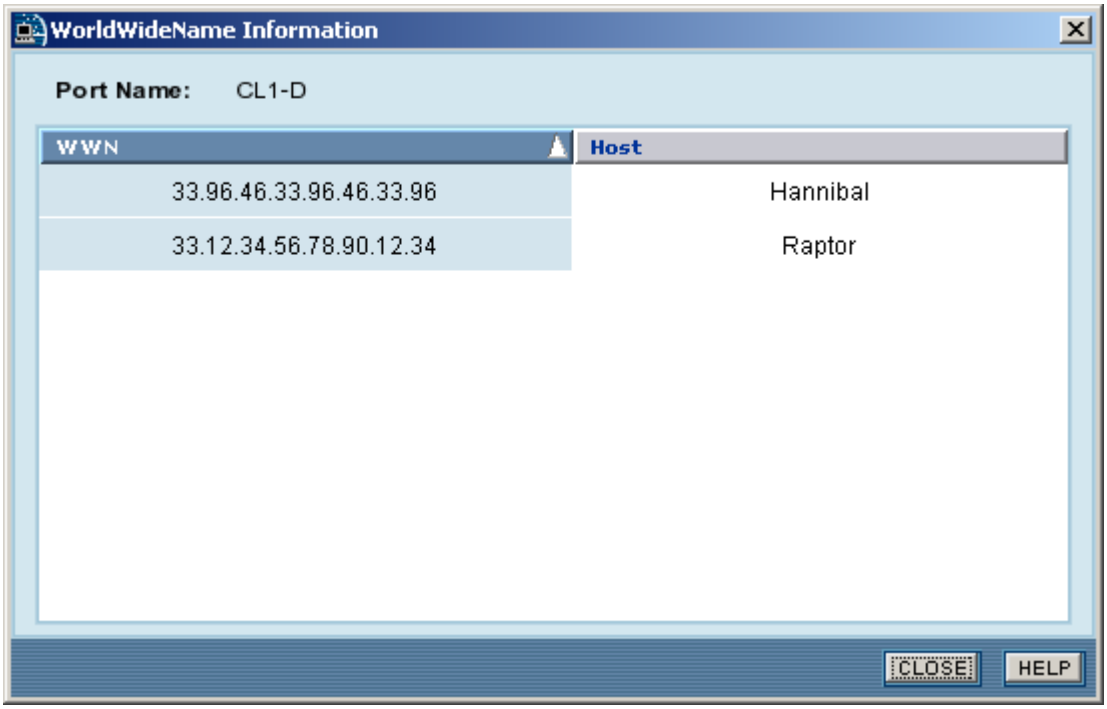


Figure 6.24 WorldWideName Information Panel for the 9900V

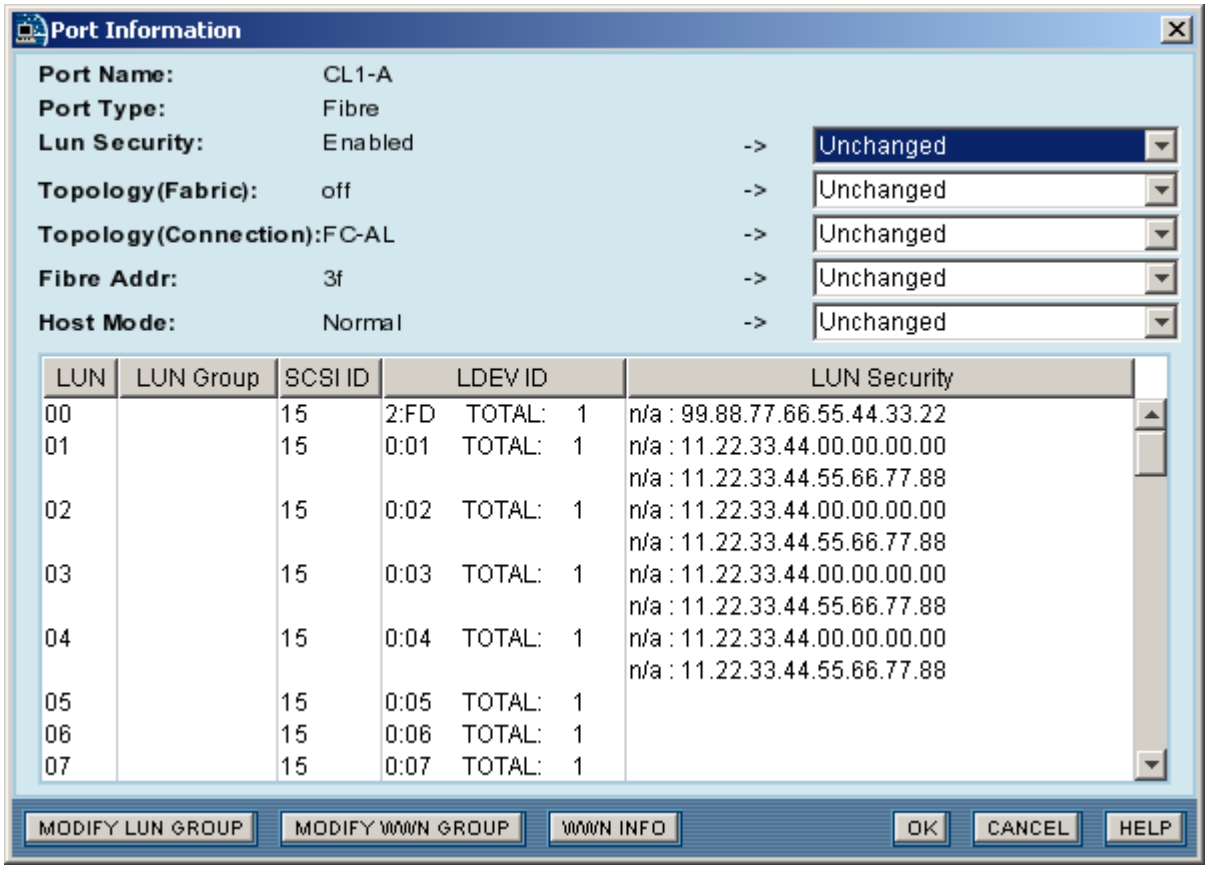


Figure 6.25 Port Information Panel for the Lightning 9900™

Lightning 9900™: For further information on the 9900 port settings, please refer to the 9900 Configuration Guide for the attached platform (e.g., *Hitachi Lightning 9900™ HP-UX® Configuration Guide*), or contact your Hitachi Data Systems team.

- **LUN security:** Enable or disable LUN security for all LUNs on the port. To secure LUNs, select enabled. If no LUN security at all is desired, you can select disabled.
- **Topology (Fabric):** On, Off.
- **Topology (Connection):** FC-AL, Point-to-point.
- **Fibre address.** In fabric environments, the port address is assigned automatically by fabric switch port number and is not controlled by the 9900 port settings. In arbitrated loop environments, the port address is set by entering an AL-PA (or loop ID). Refer to Table 6.1 for the available AL-PA values.
- **Host mode:** Solaris™, HP®, AIX®, Windows®, NetWare®, etc. Select the host mode for the connected platform to enable the host to "see" all LUNs on the port.
- **Modify LUN Group:** Opens the Modify LUN Group panel (see section 6.2.2).
- **Modify WWN Group:** Opens the Modify WWN Group panel (see section 6.2.3).
- **WWN Info button:** Displays the WWN(s) registered to the port and the WWN Group to which each WWN belongs (if any).

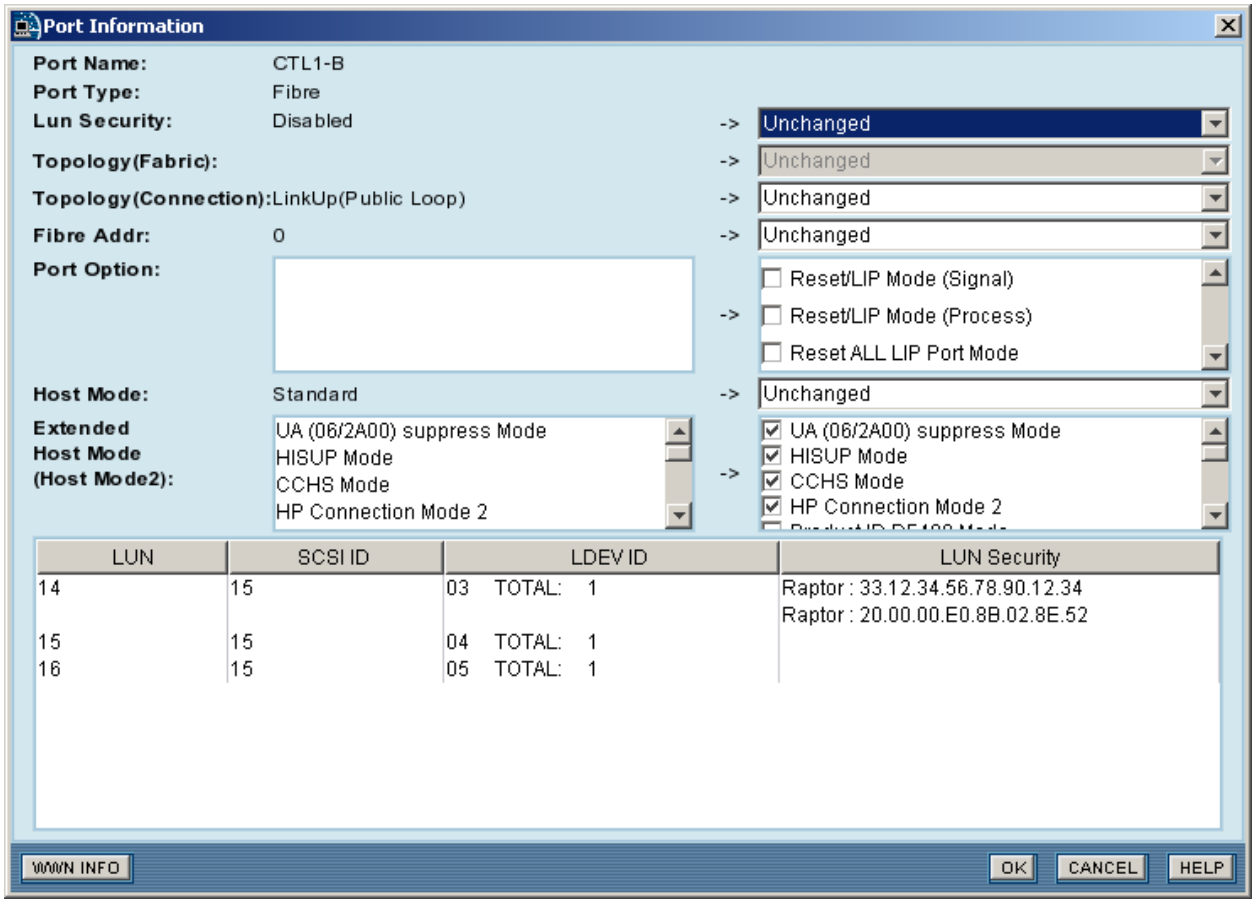


Figure 6.26 Port Information Panel for the Thunder 9500™ V Series

Thunder 9500™ V Series: For further information on the 9500V port settings, please refer to the 9500V Configuration Guide for the attached platform (e.g., *Hitachi Thunder 9500™ V Series Solaris™ Configuration Guide*), or contact your Hitachi Data Systems account team.

- **LUN security:** Enable or disable LUN security for all LUNs on the port. To secure LUNs, select enabled. If no LUN security at all is desired, you can select disabled.
- **Topology (Fabric):** N/A.
- **Topology (Connection):** Loop or Point-to-Point.
- **Fibre address.** In fabric environments, the port address is assigned automatically by fabric switch port number and is not controlled by the 9500V port settings. In arbitrated loop environments, the port address is set by entering an AL-PA (also called loop ID). Refer to Table 6.1 for the available AL-PA values.
- **Port Option:** Optional settings on the port that describe how the host accesses the port. Multiple options can be selected.
- **Host mode:** Standard, Open VMS, Wolfpack, TRESPASS, etc. Select the host mode for the connected platform to enable the host to "see" all LUNs on the port.
- **Extended Host Mode (Host Mode2):** Optional settings on the port that describe how the host accesses the port. Multiple options can be selected.
- **WWN Info button:** Displays the WWN(s) registered to the port.

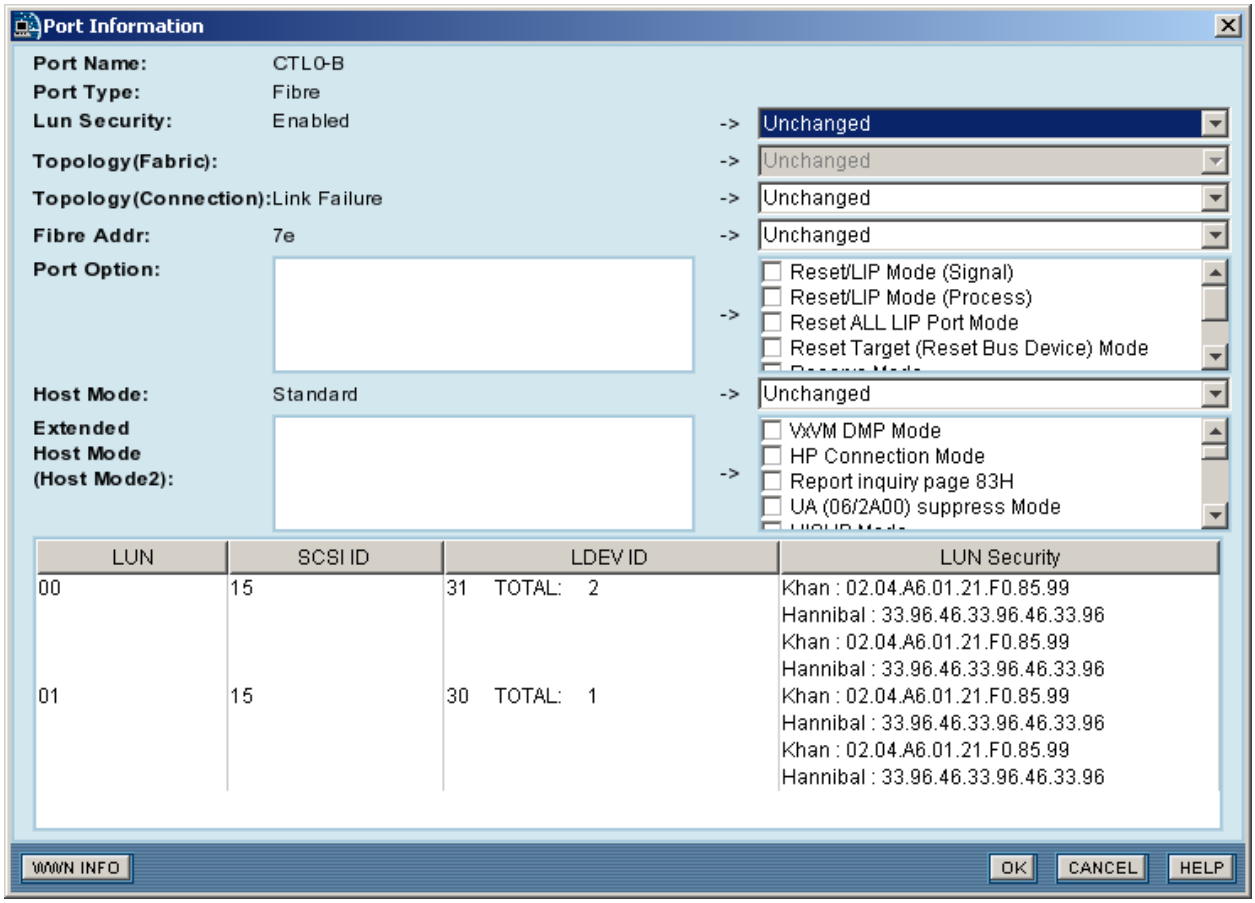


Figure 6.27 Port Information Panel for the Thunder 9200™

Thunder 9200™: For further information on the 9200 port settings, please refer to the 9200 Configuration Guide for the attached platform (e.g., *Hitachi Thunder 9200™ Solaris™ Configuration Guide*), or contact your Hitachi Data Systems team.

- **LUN security:** Enable or disable LUN security for all LUNs on the port. To secure LUNs, select enabled. If no LUN security at all is desired, you can select disabled.
- **Topology (Fabric):** N/A.
- **Topology (Connection):** Loop or Point-to-Point.
- **Fibre address.** In fabric environments, the port address is assigned automatically by fabric switch port number and is not controlled by the 9200 port settings. In arbitrated loop environments, the port address is set by entering an AL-PA (also called loop ID). Refer to Table 6.1 for the available AL-PA values.
- **Port Option:** Optional settings on the port that describe how the host accesses the port. Multiple options can be selected.
- **Host mode:** Standard, Open VMS, Wolfpack, TRESPASS, etc. Select the host mode for the connected platform to enable the host to "see" all LUNs on the port.
- **Extended Host Mode (Host Mode2):** Optional settings on the port that describe how the host accesses the port. Multiple options can be selected.
- **WWN Info button:** Displays the WWN(s) registered to the port.

To configure the ports on a 9900V, 9900, 9500V, or 9200 subsystem:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator.
2. Select **Physical View** to view the connected subsystems.
3. Select the subsystem which contains the ports that you want to configure.
4. Select the desired port (e.g., CL1-A, CTL0-A) to open the Port Information panel.
5. Select the desired settings for the port (see descriptions above). For the 9900 subsystem you can also configure the LUN groups and WWN groups associated with the port (see sections 6.2.2 and 6.2.3 for instructions).
6. When you are finished making changes to the port configuration, select **Save**.

   WARNING: If applicable, a warning notifies you that the requested changes may disable host access to the storage on that port (see Figure 6.28).
7. When the confirmation panel appears (see Figure 6.29), review the changes CAREFULLY. Select **Yes** to change the port settings as specified, or select **No** to cancel your request.
8. HiCommand™ Device Manager notifies you when the requested operations are complete. You are returned to the Physical View of the selected subsystem.

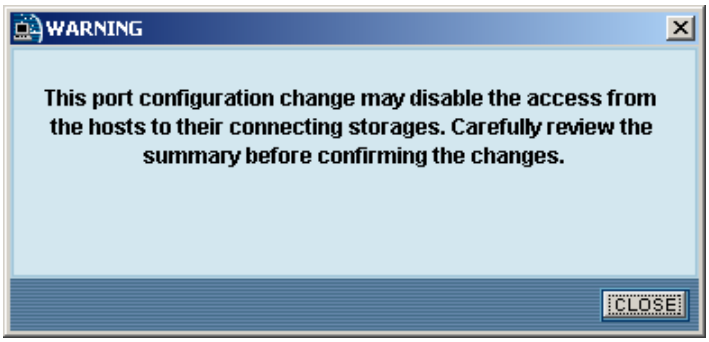


Figure 6.28 Configuring the Ports – Warning

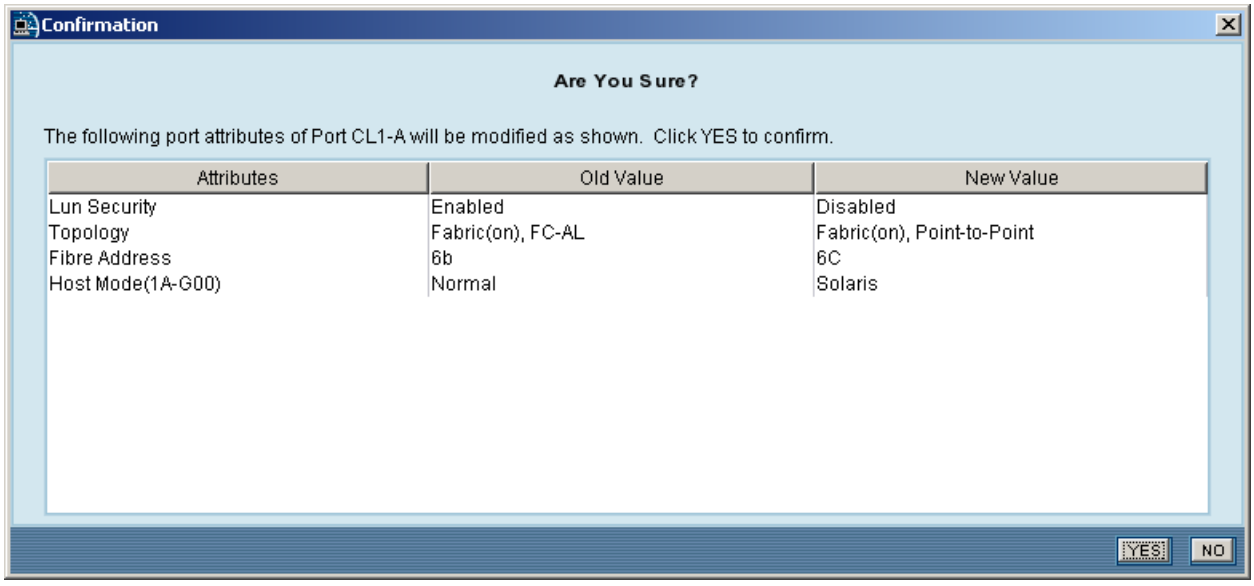


Figure 6.29 Configuring the Ports – Confirmation

6.2.2 Managing LUN Groups

HiCommand™ Device Manager System users can manage LUN groups on the 9900 subsystem. Local users do not have access to this function.

The Modify LUN Group panel (see Figure 6.30) allows you to add, modify, and delete LUN groups for each 9900 port. To open the Modify LUN Group panel, open the Port Information panel for the desired port (see section 6.2.1), and select the **Modify LUN Group** button.

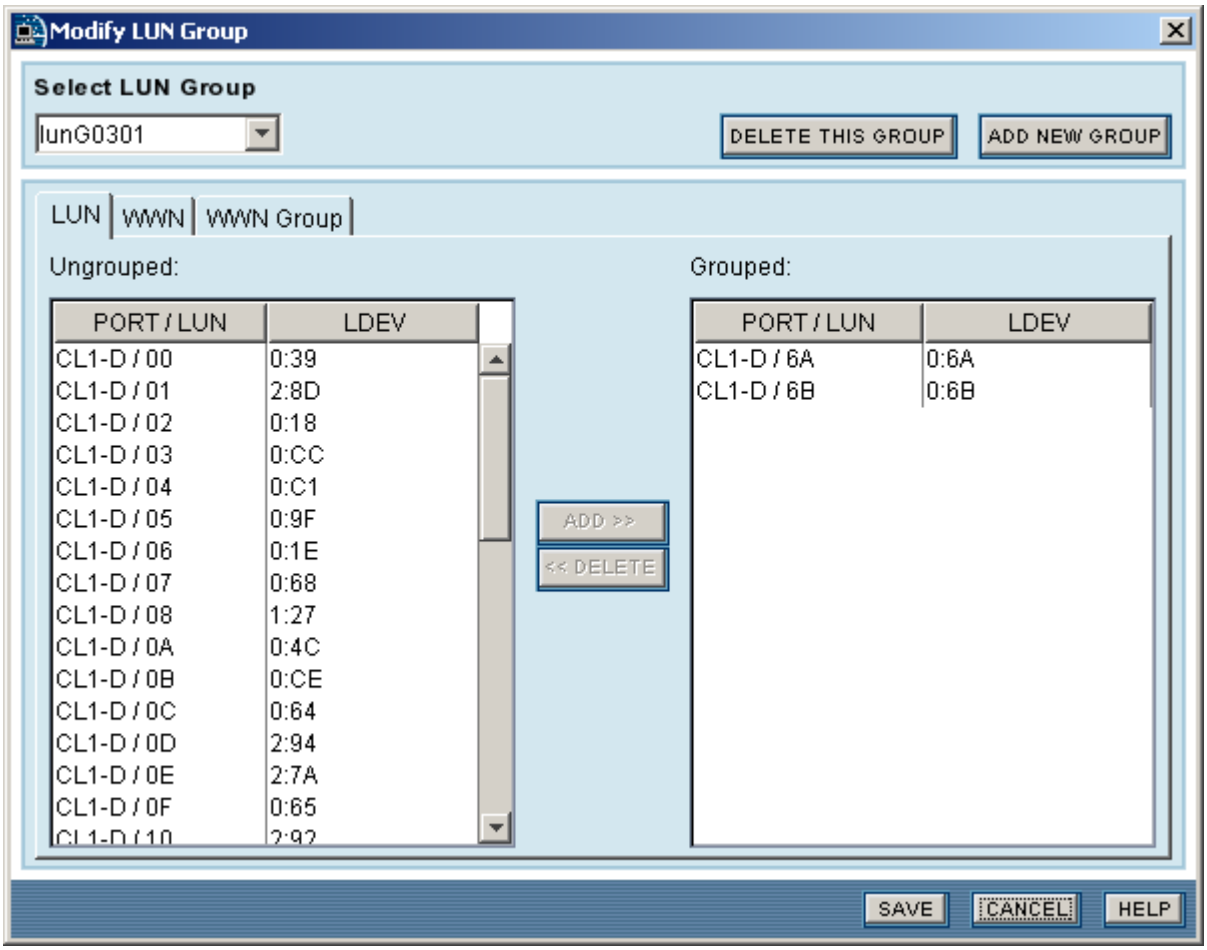


Figure 6.30 Modify LUN Group Panel

The **Select LUN Group** drop-down list box allows you to select the desired LUN group. The **Delete This Group** button allows you to delete the selected LUN group. The **Add New Group** button allows you to add a new LUN group to the selected port. The **Save** button saves your changes on this panel and returns you to the Port Information panel.

- **LUN** tab: The **Ungrouped** list box displays the LUN(s) that can be added to the selected LUN group. The **Grouped** list box displays the LUN(s) in the selected LUN group. The **Add>>** button moves the selected LUN(s) to the **Grouped** list. The **<<Delete** button moves the selected LUN(s) to the **Ungrouped** list.

- **WWN** tab: The **Unsecured** list box displays the WWN(s) that can be added to the selected LUN group. The **Secured** list box displays the WWN(s) in the selected LUN group. The **Add>>** button moves the selected WWN(s) to the **Secured** list. The **<<Delete** button moves the selected WWN(s) to the **Unsecured** list.
- **WWN Group** tab: The **Unsecured** list box displays the WWN group(s) that can be added to the selected LUN group. The **Secured** list box displays the WWN group(s) in the selected LUN group. The **Add>>** button moves the selected WWN group(s) to the **Secured** list. The **<<Delete** button moves the selected WWN group(s) to the **Unsecured** list.

To add a new LUN group:

1. Log in to HiCommand™ Device Manager as a System user (System Administrator, Storage Administrator, or Guest).
2. Select the Physical View, select the desired 9900 subsystem, and then select the desired port to open the Port Information panel (refer to Figure 5.23).
3. Select **Modify LUN Group** to open the Modify LUN Group panel (refer to Figure 6.30).
4. Select **Add New Group**, enter the desired name for the new LUN group, and select **OK** (see Figure 6.31).
5. On the **LUN** tab of the Modify LUN Group panel, add the desired LUN(s) to the new LUN group: select the desired LUN(s) in the **Ungrouped** list, and select **Add>>** to move the selected LUN(s) to the **Grouped** list (see Figure 6.32). If necessary, use the **<<Delete** button to move LUN(s) back into the **Ungrouped** list.
6. On the **WWN** tab of the Modify LUN Group panel, add the desired WWN(s) to the new LUN group: select the desired host WWN(s) in the **Unsecured** list, and select **Add>>** to move the selected WWN(s) to the **Secured** list (see Figure 6.33). If necessary, use the **<<Delete** button to move WWN(s) back into the **Unsecured** list.
7. On the **WWN Group** tab of the Modify LUN Group panel, add the desired WWN group(s) to the new LUN group: select the desired WWN group(s) in the **Unsecured** list, and select **Add>>** to move the selected WWN group(s) to the **Secured** list (see Figure 6.34). If necessary, use **<<Delete** to move WWN group(s) back into the **Unsecured** list.
8. When you have added all desired LUN(s), WWN(s), and WWN group(s) to the new LUN group, select **Save**, or select **Cancel** to cancel your request to add a new LUN group.

   WARNING: Read the important warning on host access (see Figure 6.35), and make sure to take the affected LUN(s) (listed on final confirmation panel) offline before continuing.
9. When the confirmation panel appears (see Figure 6.36), select **Yes** to add the new LUN group, or select **No** to cancel your request to add the new LUN group.

Figure 6.31 Adding a New LUN Group – Entering the Name

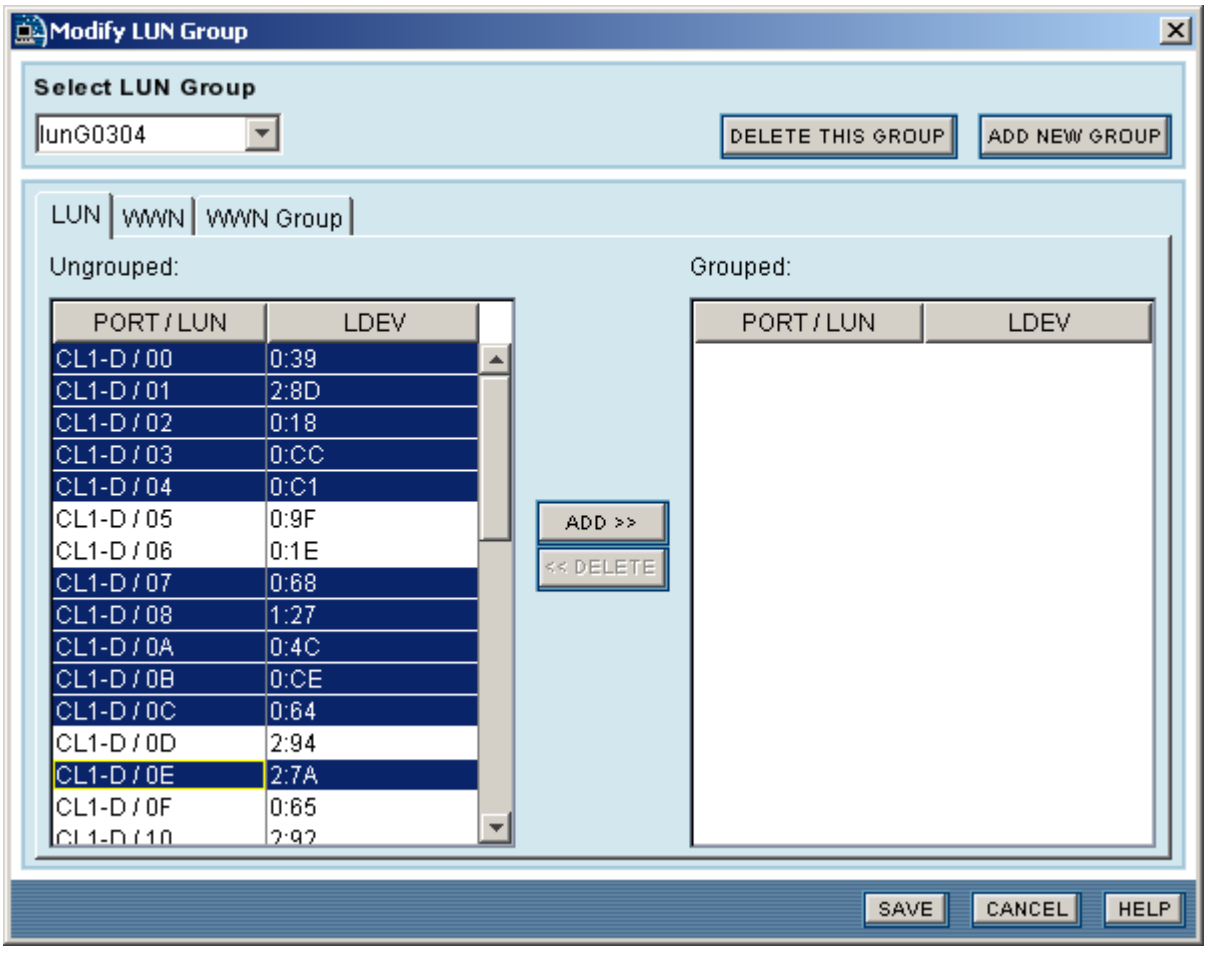


Figure 6.32 Adding a New LUN Group – Selecting the LUN(s)

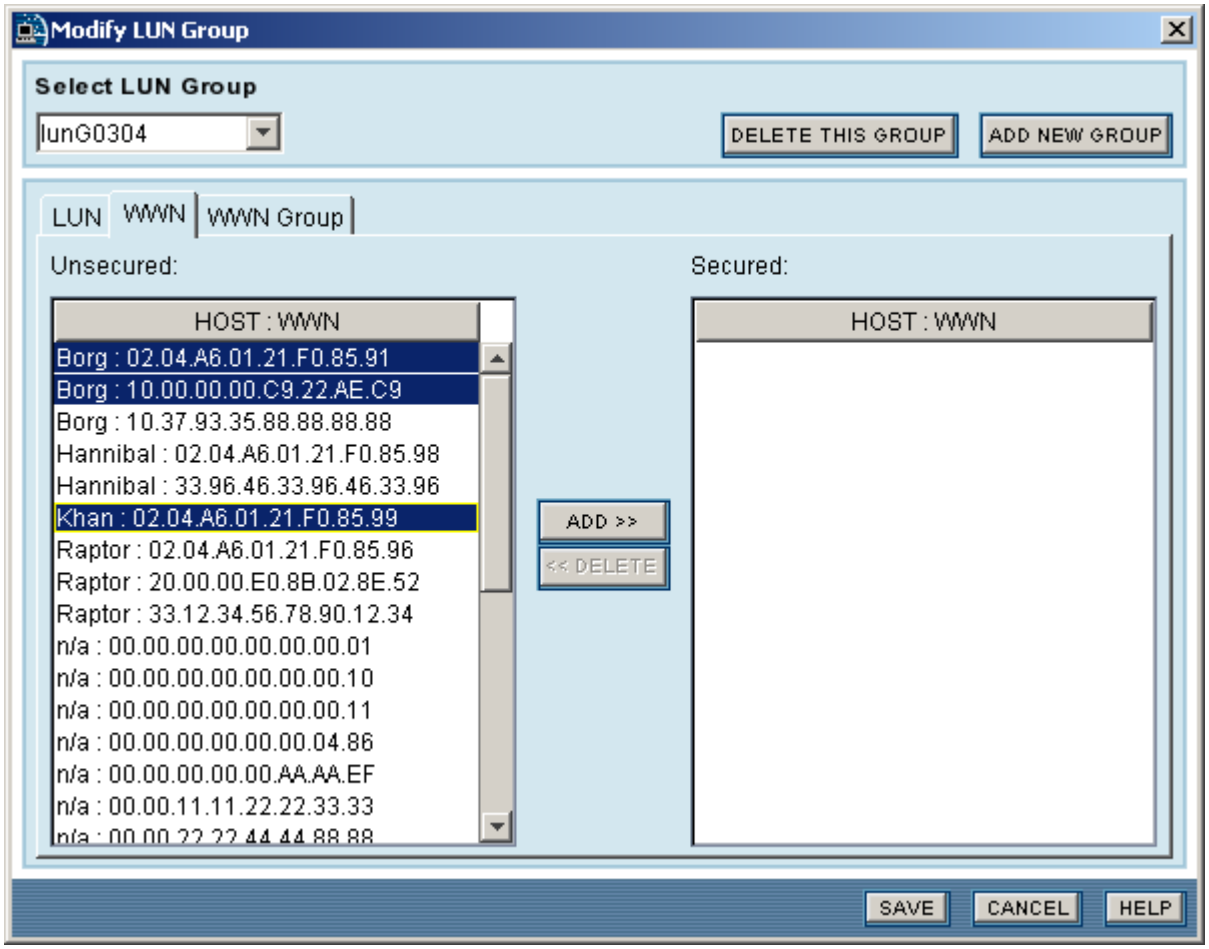


Figure 6.33 Adding a New LUN Group – Selecting the WWN(s)

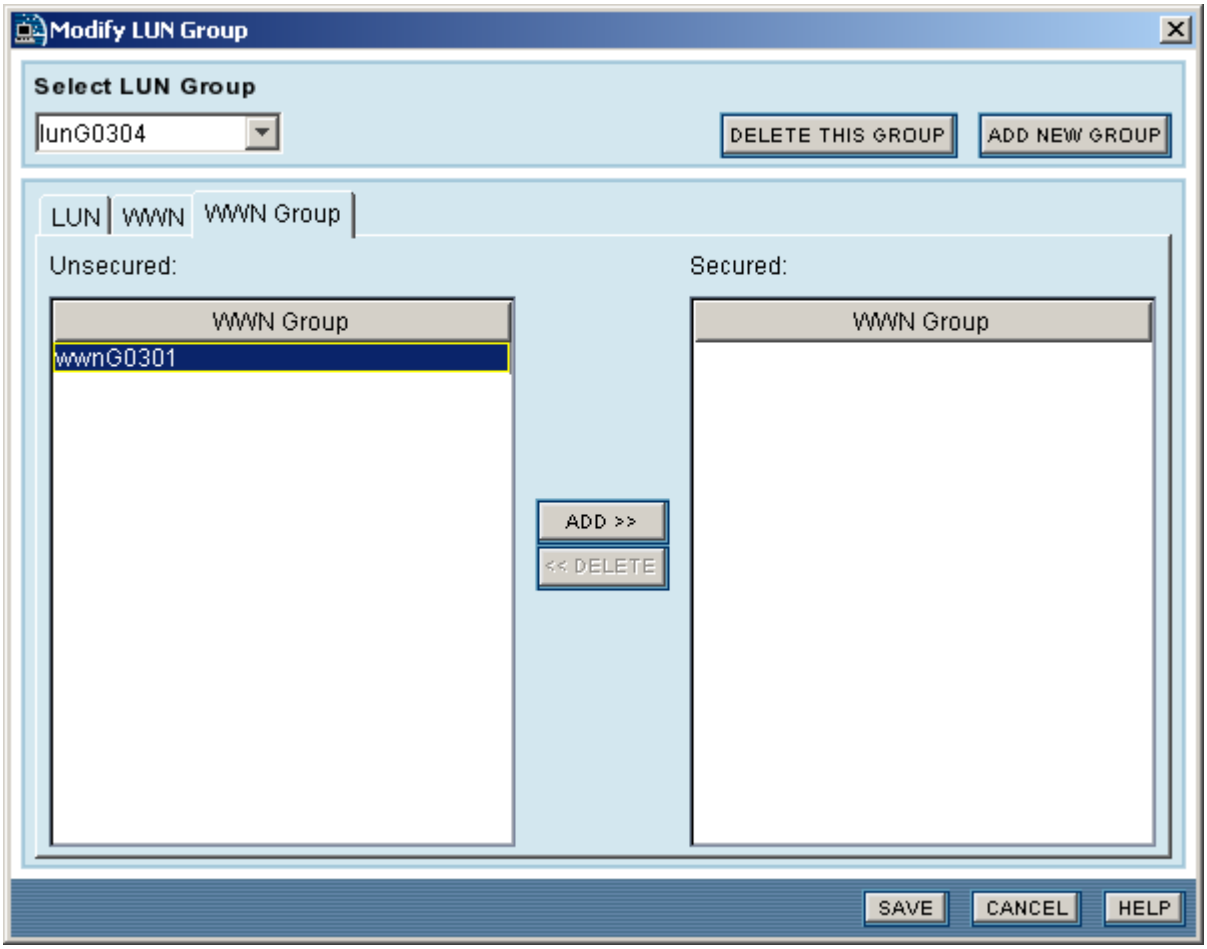


Figure 6.34 Adding a New LUN Group – Selecting the WWN Group(s)

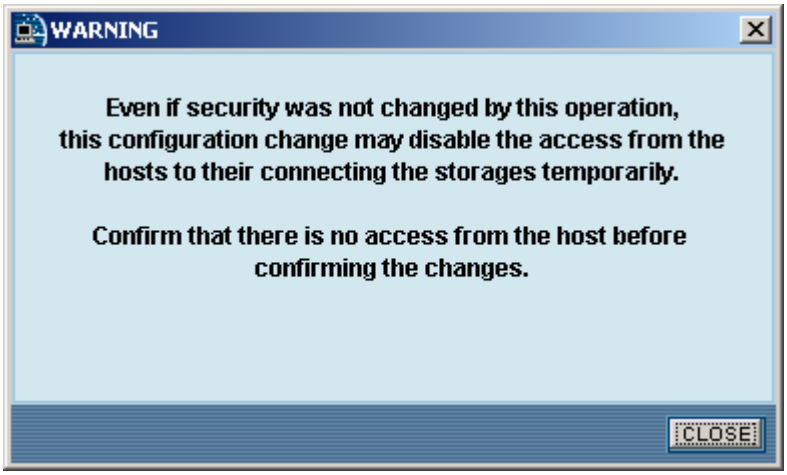


Figure 6.35 Adding a New LUN Group – Warning on Host Access

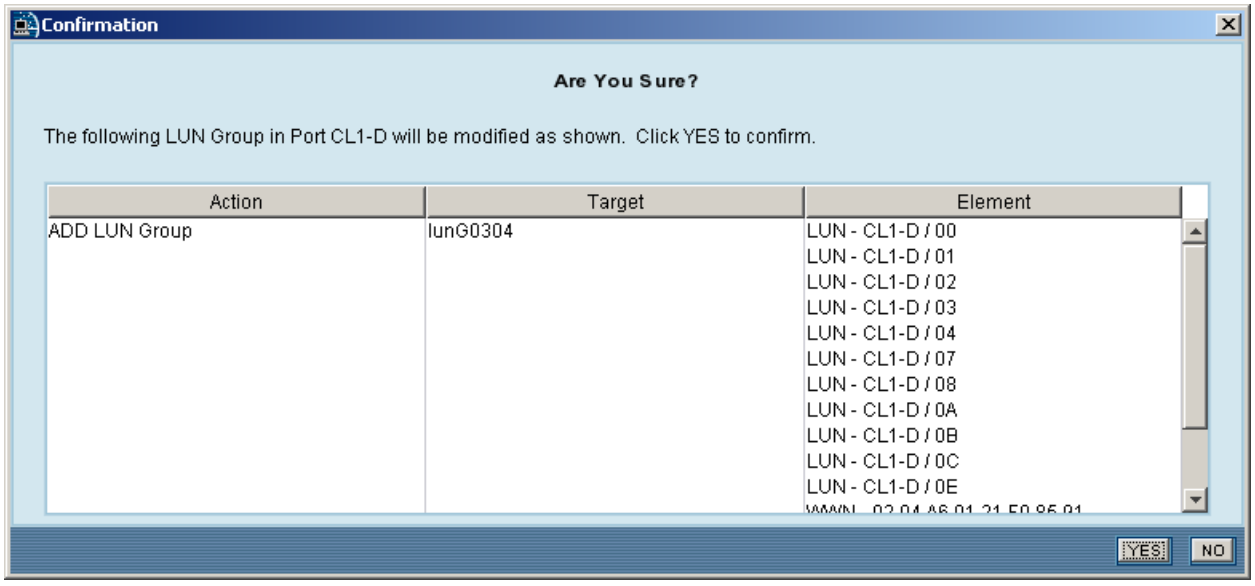


Figure 6.36 Adding a New LUN Group -- Confirmation

To modify an existing LUN group:

1. Log in to HiCommand™ Device Manager as a System user (System Administrator, Storage Administrator, or Guest).
2. Select the Physical View, select the desired 9900 subsystem, and select the desired port to open the Port Information panel (refer to Figure 5.23).
3. Select **Modify LUN Group** to open the Modify LUN Group panel (refer to Figure 6.30).
4. Select the desired LUN group, and make the desired changes to the LUN group. Select the **LUN** tab to add/delete LUN(s), select the **WWN** tab to add/delete WWN(s), and select the **WWN Group** tab to add/delete WWN group(s).
5. When the **Modify LUN Group** panel displays the desired changes for the selected LUN group, select **Save**, or select **Cancel** to cancel your request to modify the LUN group.

   WARNING: Read the important warning on host access (see Figure 6.37), and make sure to take the affected LUN(s) (listed on the confirmation panel) offline before continuing.
6. When the confirmation panel appears (see Figure 6.38), select **Yes** to modify the LUN group, or select **No** to cancel your request to modify the LUN group.

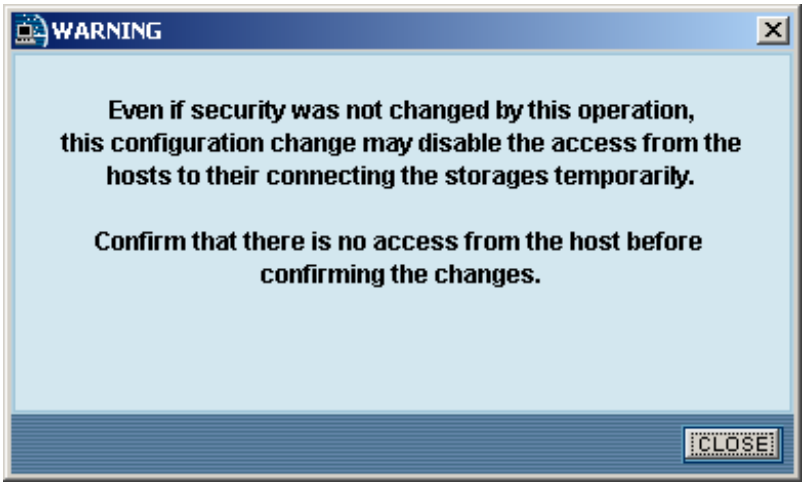


Figure 6.37 Modifying a LUN Group – Warning on Host Access

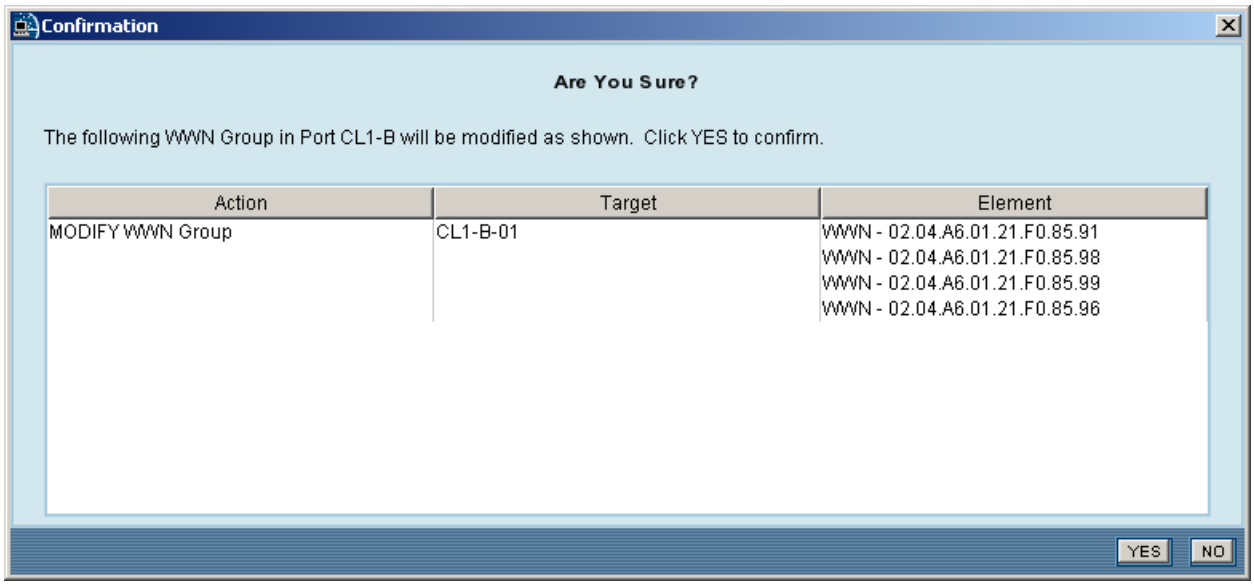


Figure 6.38 Modifying a LUN Group

To delete a LUN group:

1. Log in to HiCommand™ Device Manager as a System user (System Administrator, Storage Administrator, or Guest).
2. Select the Physical View, select the desired 9900 subsystem, and select the desired port to open the Port Information panel (refer to Figure 5.23).
3. Select **Modify LUN Group** to open the Modify LUN Group panel (refer to Figure 6.30).
4. Select the desired LUN group, select the **Delete This Group** button, and select **Yes** on the confirmation panel (see Figure 6.39) (or select **No** to cancel your request to delete the LUN group).

   If you selected **Yes**, the LUN group to be deleted is no longer displayed on the Modify LUN Group panel (see Figure 6.40).
5. Select **Save** on the Modify LUN Group panel to delete the LUN group, or select **Cancel** to cancel your request to delete the LUN group.
6. When the confirmation panel appears (see Figure 6.41), select **Yes** to delete the LUN group. To cancel your request to delete the LUN group, select **No** on the confirmation panel, and then select **Cancel** on the Modify LUN Group panel.

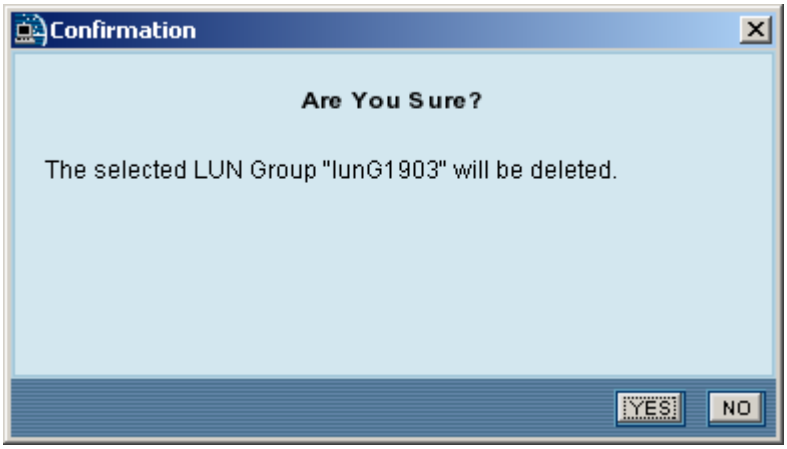


Figure 6.39 Deleting a LUN Group – First Confirmation

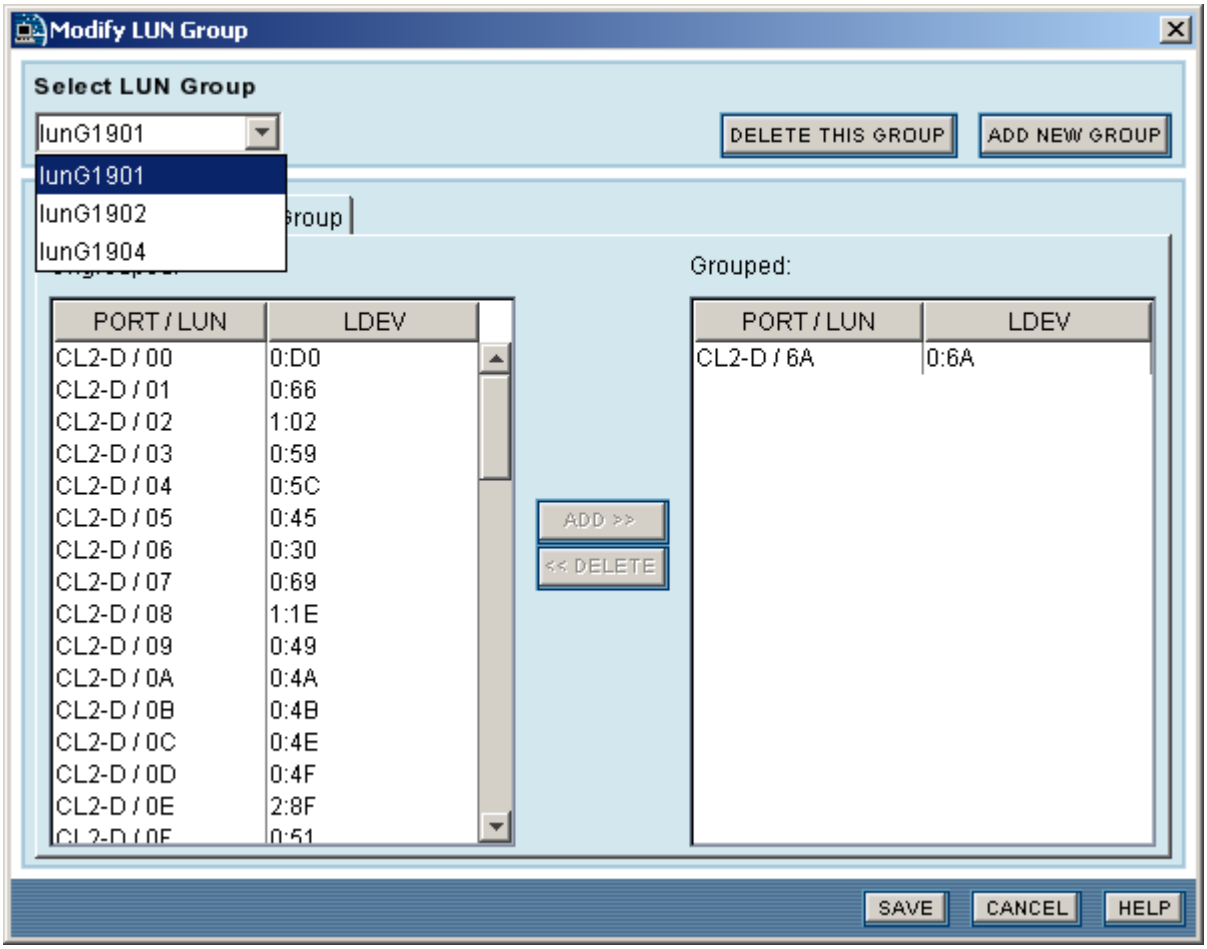


Figure 6.40 Deleting a LUN Group – Group Removed from Panel

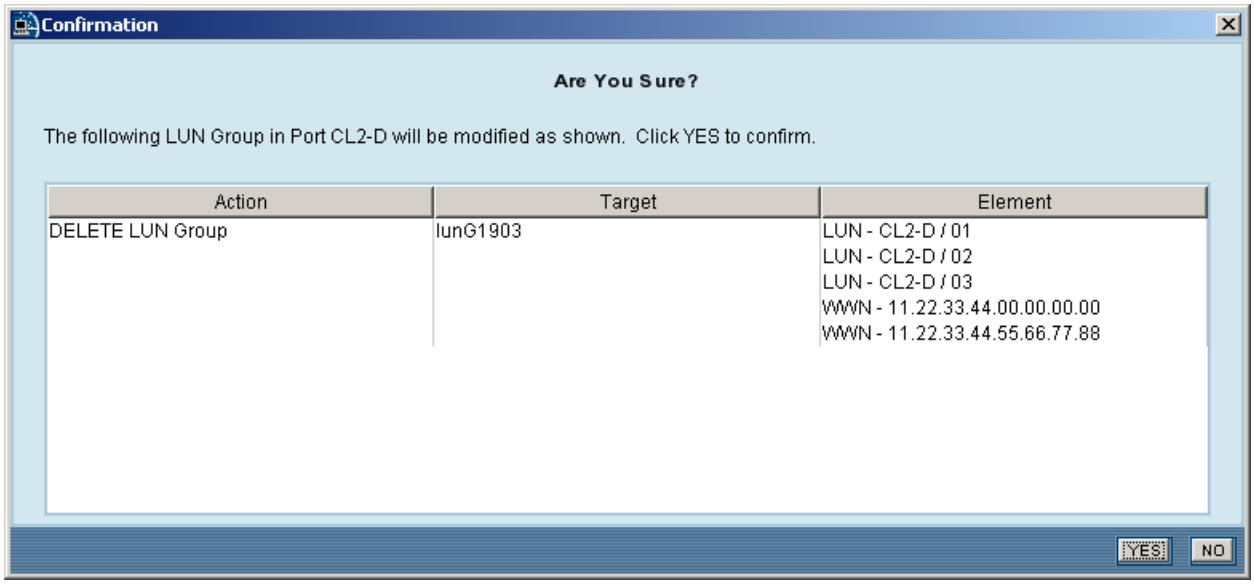


Figure 6.41 Deleting a LUN Group – Final Confirmation

6.2.3 Managing WWN Groups

HiCommand™ Device Manager System users can manage WWN groups on the 9900 subsystem. Local users do not have access to this function.

The Modify WWN Group panel (see Figure 6.42) allows you to add, modify, and delete WWN groups for each 9900 port. To open the Modify WWN Group panel, open the Port Information panel for the desired port (see section 6.2.1), and select the **Modify WWN Group** button.

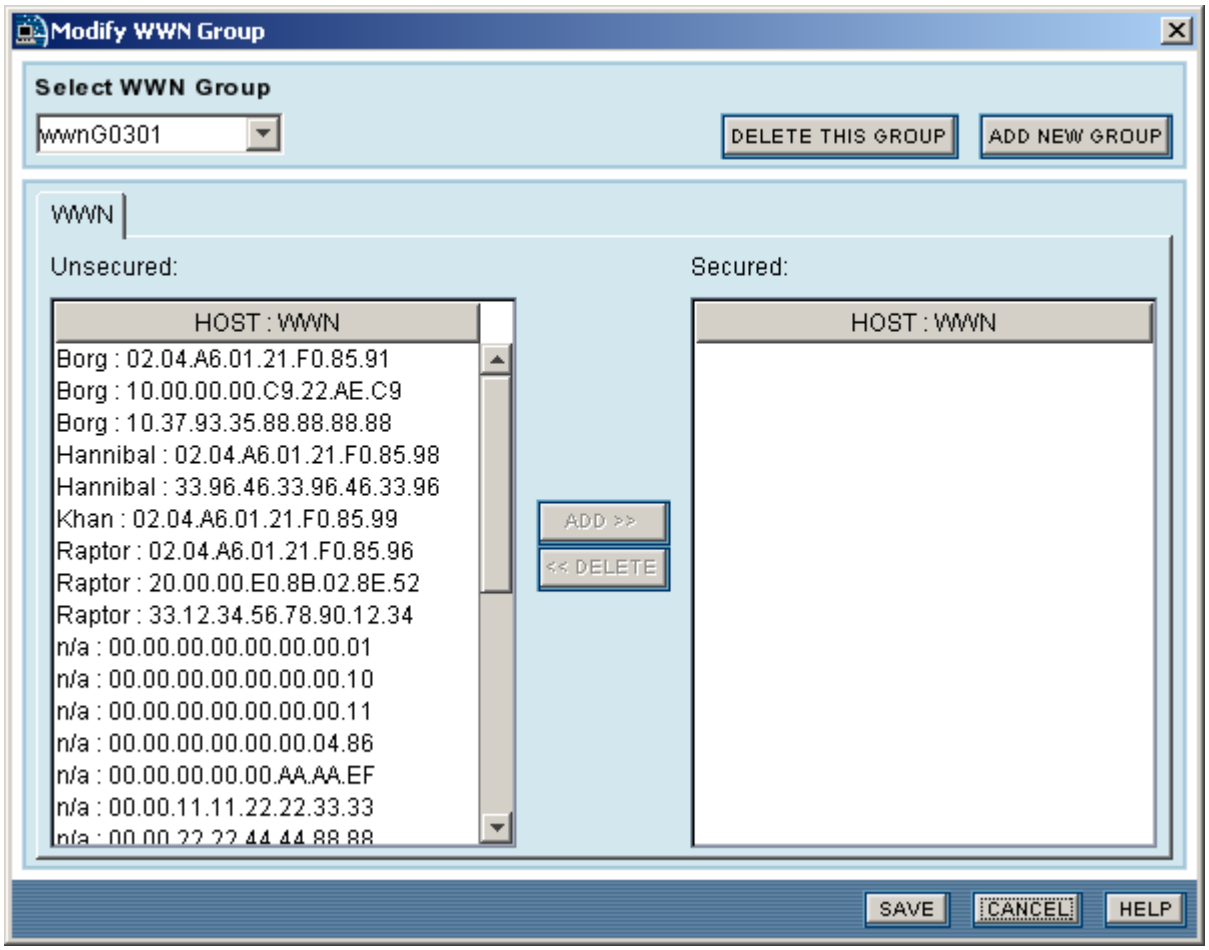


Figure 6.42 Modify WWN Group Panel

The **Select WWN Group** drop-down list box allows you to select the desired WWN group. The **Delete This Group** button allows you to delete the selected WWN group. The **Add New Group** button allows you to add a new WWN group to the selected port. The **Unsecured** list box displays the WWN(s) which can be added to the selected WWN group. The **Secured** list box displays the WWN(s) in the selected WWN group. The **Add>>** button moves the selected WWN(s) to the **Secured** list. The **<<Delete** button moves the selected WWNs to the **Unsecured** list. The **Save** button saves your changes on this panel and returns you to the Port Information panel.

To add a new WWN group:

1. Log in to HiCommand™ Device Manager as a System user (System Administrator, Storage Administrator, or Guest).
2. Select the Physical View, select the desired 9900 subsystem, and select the desired port to open the Port Information panel (refer to Figure 5.23).
3. Select **Modify WWN Group** to open the Modify WWN Group panel (refer to Figure 6.42).
4. Select **Add New Group**, enter the desired name for the new WWN group, and select **OK** (see Figure 6.43).
5. On the Modify WWN Group panel select the desired host WWN(s) in the **Unsecured** list, and select **Add>>** to move the selected WWN(s) to the **Secured** list (see Figure 6.44). If necessary, use the **<<Delete** button to move WWN(s) back into the **Unsecured** list.
6. When the **Secured** list displays the desired WWN(s) for the new group, select **Save** (or select **Cancel** to cancel your request to add a new WWN group).
7. When the confirmation panel appears (see Figure 6.45), select **Yes** to add the new WWN group, or select **No** to cancel your request to add the new WWN group.

Figure 6.43 Adding a New WWN Group – Entering the Name

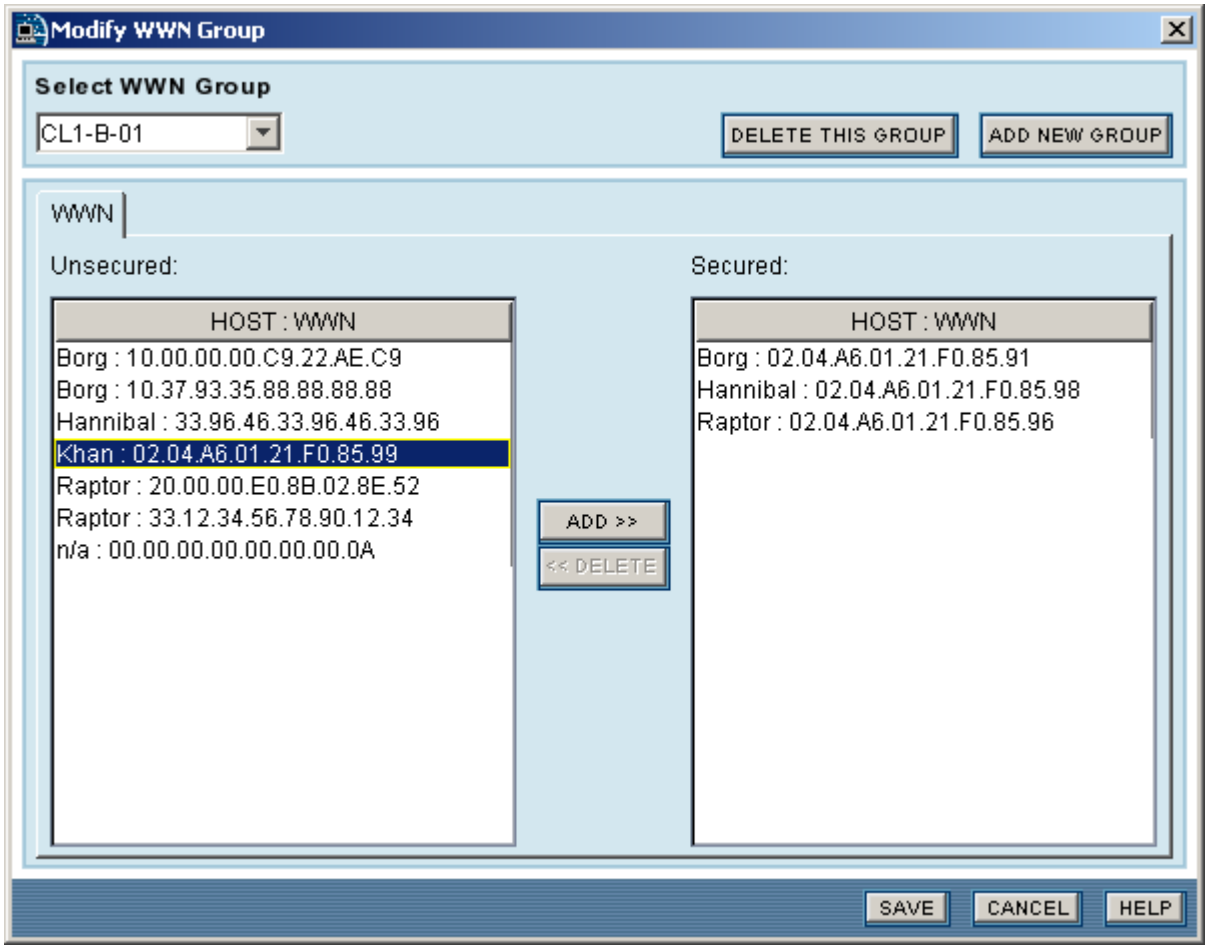


Figure 6.44 Adding a New WWN Group – Selecting the WWN(s)

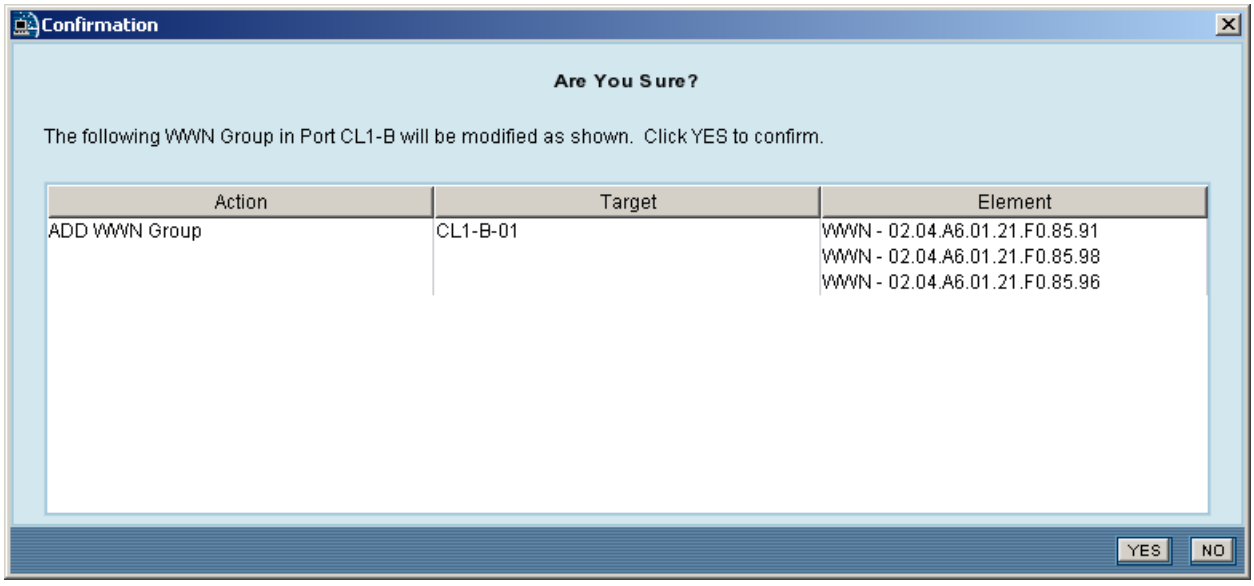


Figure 6.45 Adding a New WWN Group -- Confirmation

To modify an existing WWN group:

1. Log in to HiCommand™ Device Manager as a System user (System Administrator, Storage Administrator, or Guest).
2. Select the Physical View, select the desired 9900 subsystem, and select the desired port to open the Port Information panel (refer to Figure 5.23).
3. Select **Modify WWN Group** to open the Modify WWN Group panel (refer to Figure 6.42).
4. Select the desired WWN group, and use the **Add>>** and **<<Delete** buttons to add WWN(s) to and delete WWN(s) from the selected WWN group (see Figure 6.46).
5. When the **Secured** list displays the desired WWN(s) for the selected WWN group, select **Save** (or select **Cancel** to cancel your request to modify the WWN group).
6. When the confirmation panel appears (see Figure 6.47), select **Yes** to modify the WWN group, or select **No** to cancel your request to modify the WWN group.

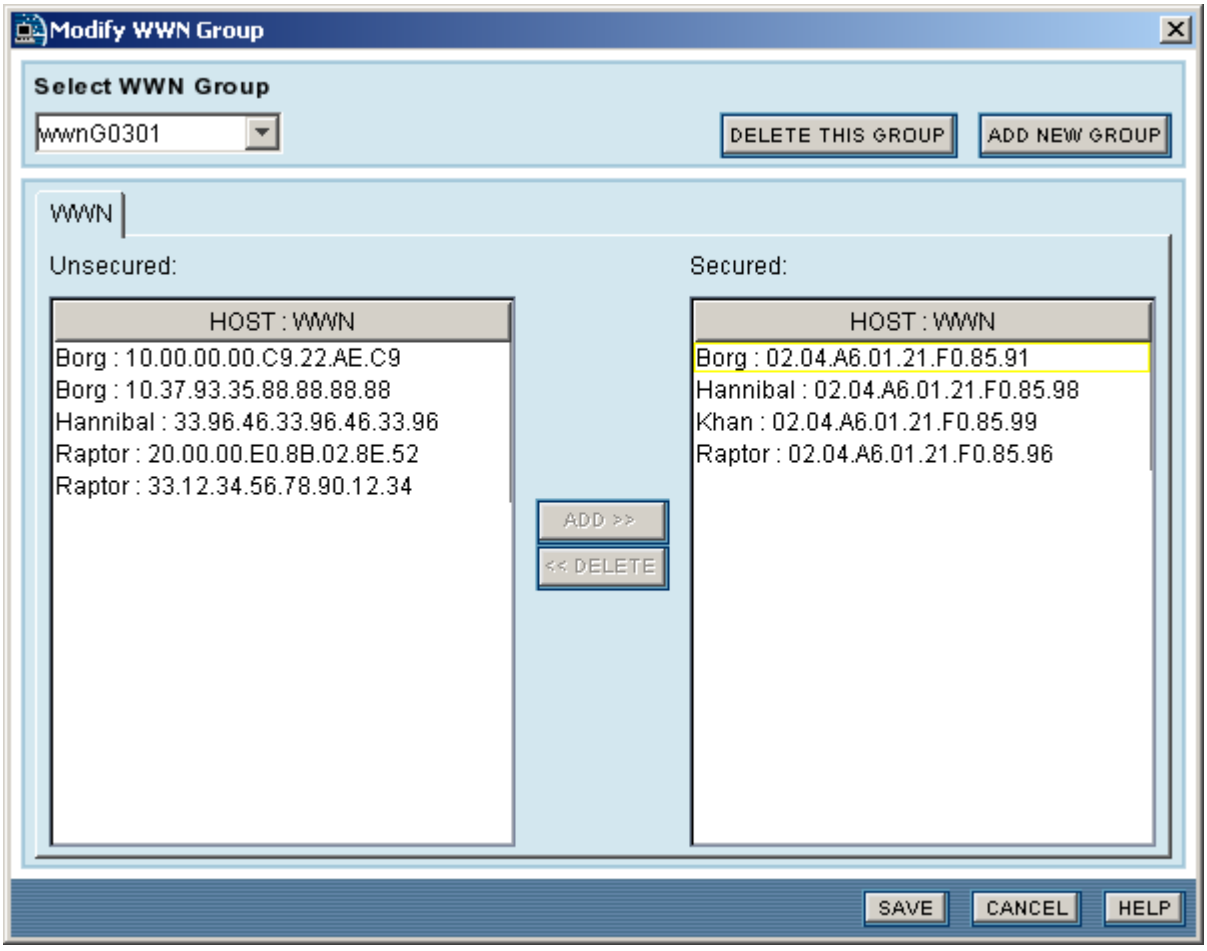


Figure 6.46 Modifying a WWN Group – Adding/Deleting WWN(s)

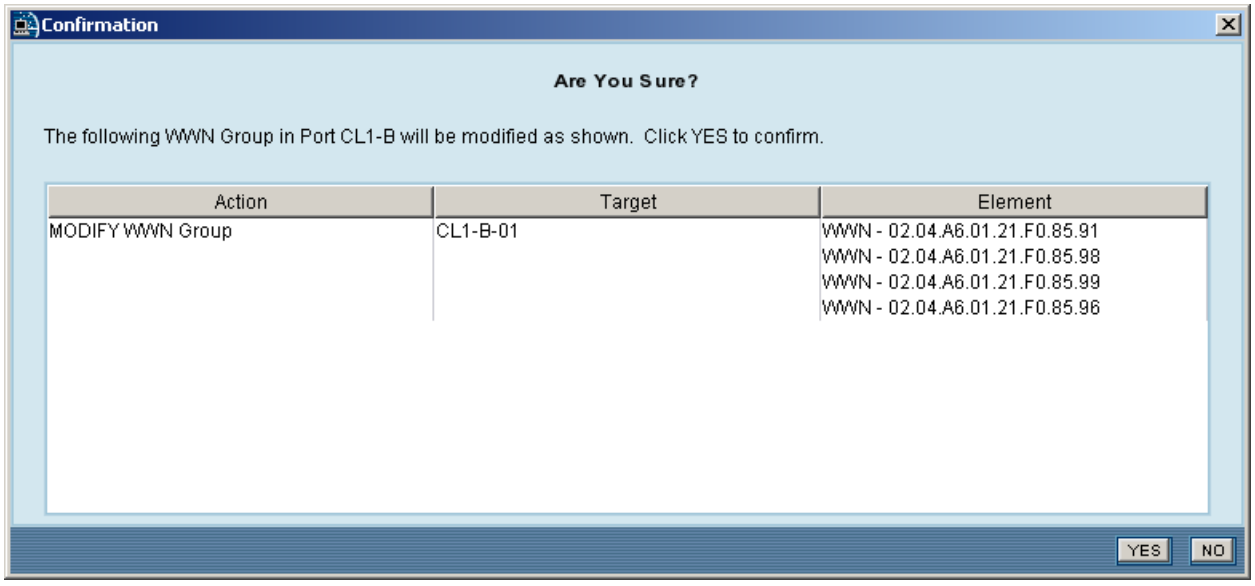


Figure 6.47 Modifying a WWN Group -- Confirmation

To delete a WWN group:

1. Log in to HiCommand™ Device Manager as a System user (System Administrator, Storage Administrator, or Guest).
2. Select the Physical View, select the desired 9900 subsystem, and select the desired port to open the Port Information panel (refer to Figure 5.23).
3. Select **Modify WWN Group** to open the Modify WWN Group panel (refer to Figure 6.42).
4. Select the desired WWN group, select the **Delete This Group** button, and then select **Yes** on the confirmation panel (see Figure 6.48) (or select **No** to cancel your request to delete the WWN group).

   If you selected **Yes**, the group to be deleted is no longer displayed on the Modify WWN Group panel (see Figure 6.49).
5. Select **Save** on the Modify WWN Group panel to continue (or select **Cancel** to cancel your request to delete the WWN group).
6. When the confirmation panel appears (see Figure 6.50), select **Yes** to delete the WWN group. To cancel your request to delete the WWN group, select **No** on the confirmation panel, and then select **Cancel** on the Modify WWN Group panel.

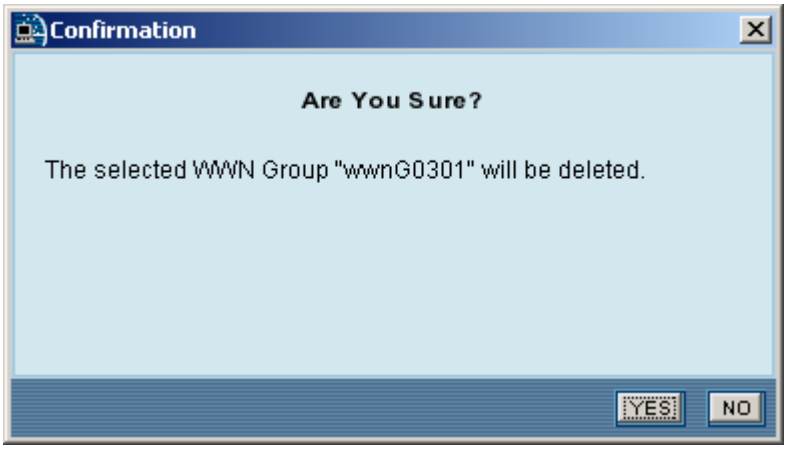


Figure 6.48 Deleting a WWN Group – First Confirmation

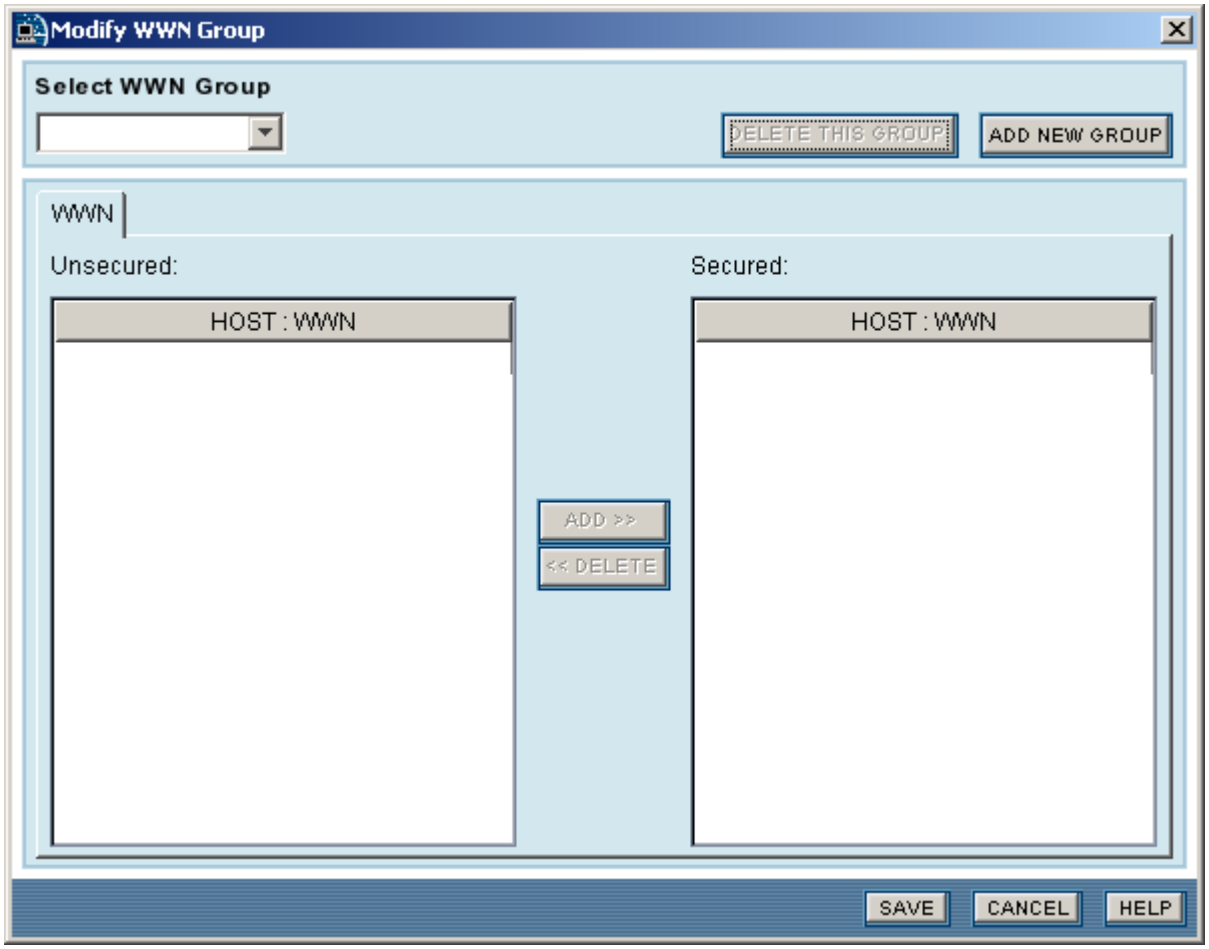


Figure 6.49 Deleting a WWN Group – Group Removed from Panel

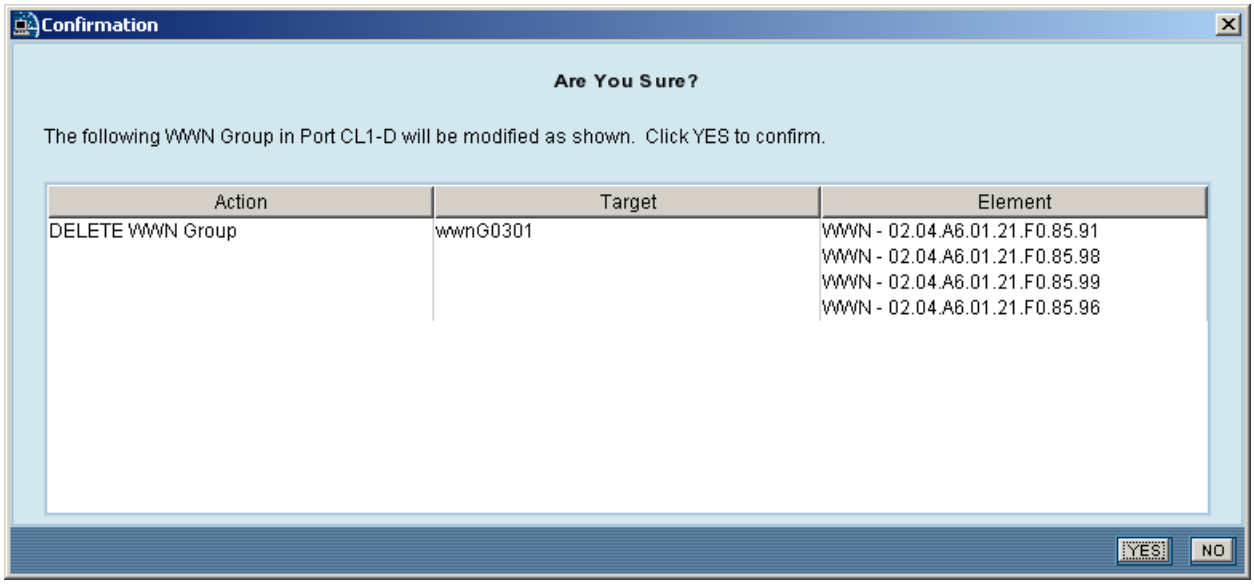


Figure 6.50 Deleting a WWN Group – Final Confirmation

6.2.4 Configuring the Fibre-Channel Adapters (9900V, 9900)

The System Administrator and Storage Administrator can configure the fibre-channel adapters on the Lightning 9900™ V Series and Lightning 9900™ subsystems. Local and guest users do not have access to this function.

Standard mode is the default mode. High-speed mode provides faster access speed by using more processors to handle data access. However, high-speed mode limits the number of available ports on the channel adapter card (one port for 9900V, half of the ports for 9900). Servers or switches attached to these ports must be changed for this configuration. Once the subsystem and attached servers or switches are configured for high-speed mode, you can use HiCommand™ Device Manager to change the mode of the channel adapter. Please contact your Hitachi Data Systems representative for assistance in planning and implementing high-speed port access.

For further information on the 9900V channel adapter settings, please refer to the *Hitachi Lightning 9900™ V Series LUN Manager User's Guide* (MK-92RD105). For further information on the 9900 channel adapter settings, please refer to the *Hitachi Lightning 9900™ LUN Manager User's Guide* (MK-91RD049).

WARNING: Before changing the setting of a channel adapter, make sure that the subsystem is equipped with channel adapters capable of high-speed mode, and that you are aware of the impact and the procedure for connecting hosts to a channel adapter in high-speed mode.

To configure the speed mode of the fibre-channel adapters in the 9900V or 9900 subsystem:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator.
2. Select **Physical View** to view the connected subsystems.
3. Select the subsystem for which you want to configure the adapter mode.
4. Select the **Port Controller** button to open the Port Controller panel (see Figure 6.51, Figure 6.52).
5. Make the desired channel adapter mode changes, and select **OK**.
6. When the confirmation panel appears (see Figure 6.53), review the changes CAREFULLY. Select **Yes** to change the modes as specified, or select **No** to cancel your request.
7. HiCommand™ Device Manager notifies you when the requested operations are complete. You are returned to the Physical View of the selected subsystem.

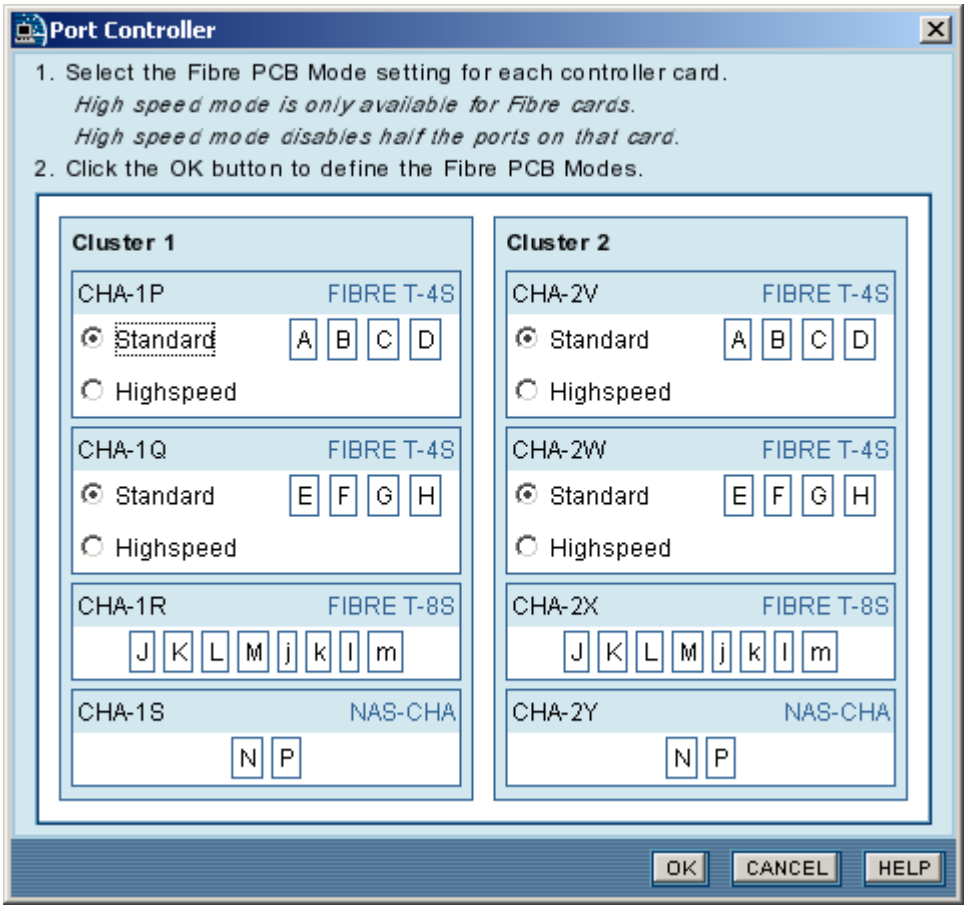


Figure 6.51 Changing the 9900V Channel Adapter Mode

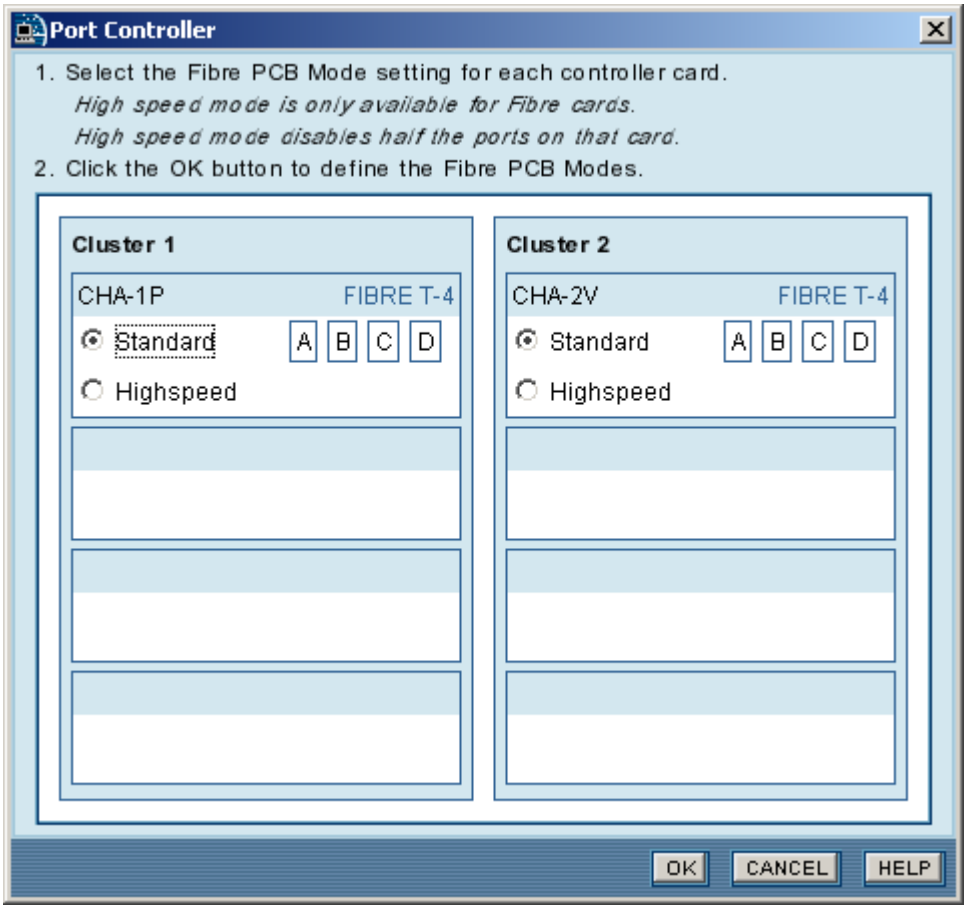


Figure 6.52 Changing the 9900 Channel Adapter Mode

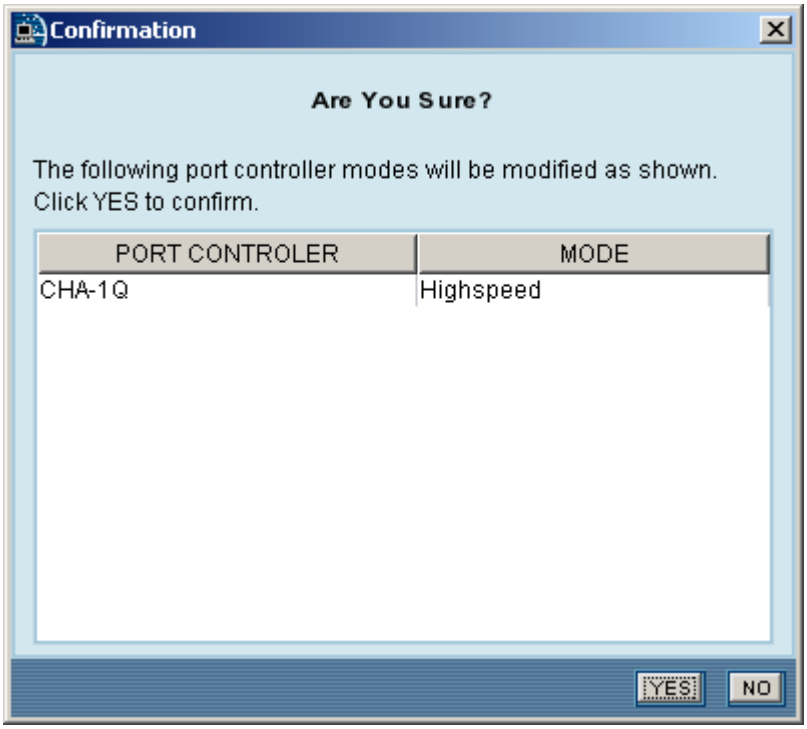


Figure 6.53 Changing the 9900V or 9900 Channel Adapter Mode – Confirmation

6.3 Array Group Operations

The System Administrator and Storage Administrator can perform array group operations. Local and guest users do not have access to this function.

The HiCommand™ Device Manager array group operations include:

- Creating an array group on the 9500V and 9200 (see section 6.3.1),
- Creating an array group (with or without a spare drive) on the T3 (see section 6.3.2),
- Configuring spare drives on the 9500V and 9200 (see section 6.3.3),
- Creating an LDEV (see section 6.3.4),
- Deleting an LDEV (see section 6.3.5), and
- Deleting an array group (9500V, 9200, T3) (see section 6.3.6).

6.3.1 Creating a New Array Group on the Thunder 9500V and 9200 Subsystem

The System Administrator and Storage Administrator can create new array groups on the 9500V and 9200 subsystem. Local and guest users do not have access to this function.

When you create a new array group on the 9500V or 9200, you select the RAID level, width, depth, and disks for the new array group. The spare drives on the 9500V/9200 are configured separately (see section 6.3.3). To use a new 9500V or 9200 array group, you must create LDEV(s) in the group (see section 6.3.4).

To create a new array group in an existing Thunder 9500V or 9200 subsystem:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator.
2. Select **Physical View** to view the connected subsystems.
3. Select the 9500V or 9200 subsystem in which you want to create a new array group.
4. Select **New** in the **Disks & Arrays** box. The Create Array Group panel displays the current array group configuration (G=grouped, U=unused, S=spare).
5. Select the desired RAID level, width, and depth, and then select (check) the disk that you want to assign as the top disk in the new array group. The other disks are selected automatically according to the RAID level, width, and depth settings (see Figure 6.54).
6. When the information displayed on the Create Array Group panel is correct, select **OK**.
7. When the confirmation panel appears (see Figure 6.55), select **Yes** to create the new array group, or select **No** to cancel your request to create a new array group.

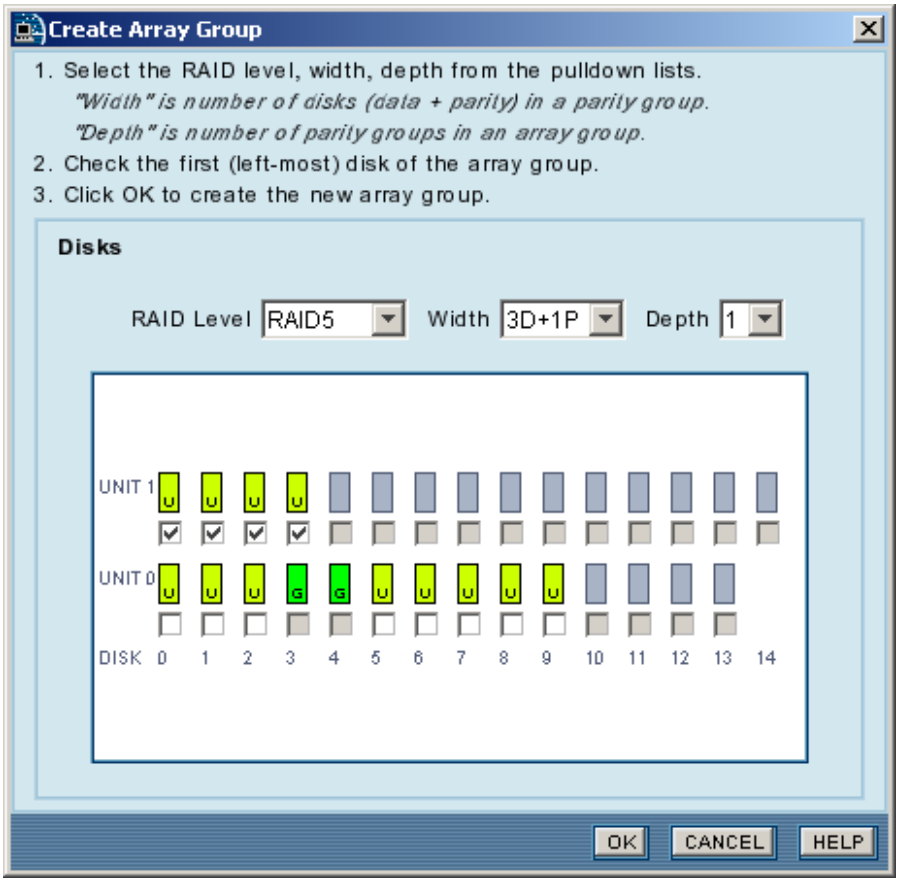


Figure 6.54 Creating an Array Group – Selecting Array Group Parameters

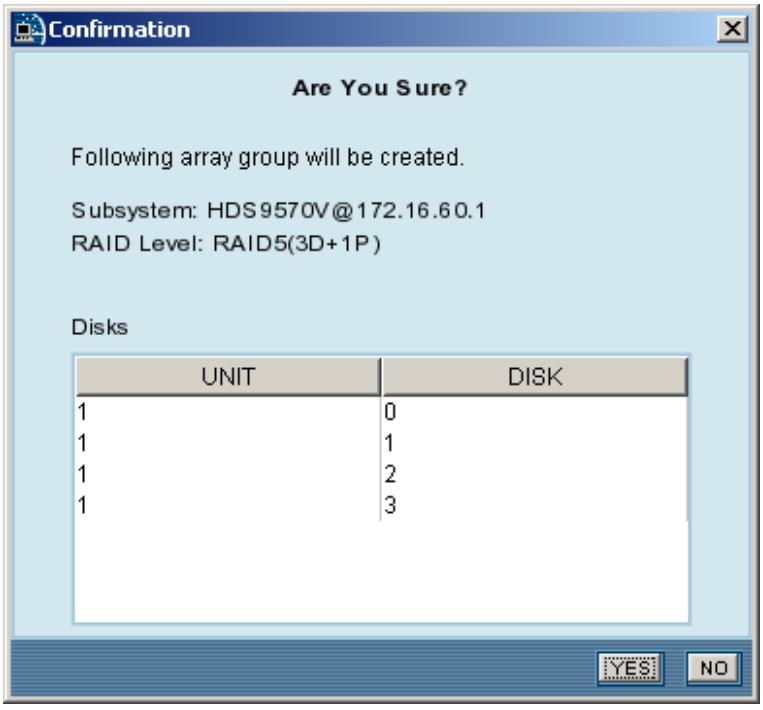


Figure 6.55 Creating an Array Group – Confirmation

6.3.2 Creating an Array Group on the StorEdge™ T3 Array

The System Administrator and Storage Administrator can create new array groups on the T3 array. Local and guest users do not have access to this function.

A single T3 array can have a maximum of two array groups, one LDEV per array group, and one spare drive (drive 9 only). When you create a new array group on the T3, you select the RAID level, width, and disks for the new array group. If desired, you can also create a spare drive at the same time as the new array group (if drive 9 is available).

On the T3, you can only define a spare drive at the same time that you create an array group. If you create two array groups on the array, the spare drive is available to both array groups and can back up either group in case of a drive failure, but the spare drive is still associated with one of the array groups. If you delete the array group with which the spare drive was created, the spare is deleted and is no longer available to the other array group. You must create a second array group with the spare drive to regain use of the spare drive.

Note: Array group creation on the T3 array may take a while (up to an hour) to complete, depending on the size and RAID type of the array group being creating. This performance is the same as when you create an array group using the T3's management interface.

To create a new array group for the StorEdge™ T3 array (with or without a spare drive):

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator.
2. Select **Physical View** to view the connected subsystems.
3. Select the T3 array in which you want to create a new array group.
4. Select **New** in the **Disks & Arrays** box. The Create Array Group panel displays the current array group and spare configuration.
5. Select the desired RAID level and width, and select (check) the unused disk that you want to assign as the top disk in the new array group. The other disks are automatically selected according to the RAID level and width settings (see Figure 6.56).
6. If you want to create a spare drive with the new array group, check the **Use Spare** box.
7. When the information displayed on the Create Array Group panel is correct, select **OK**.
8. When the confirmation panel appears (see Figure 6.57), select **Yes** to create the new array group, or select **No** to cancel your request to create a new array group.

Note: To use the new array group, you must create an LDEV in the group (see section 6.3.4).

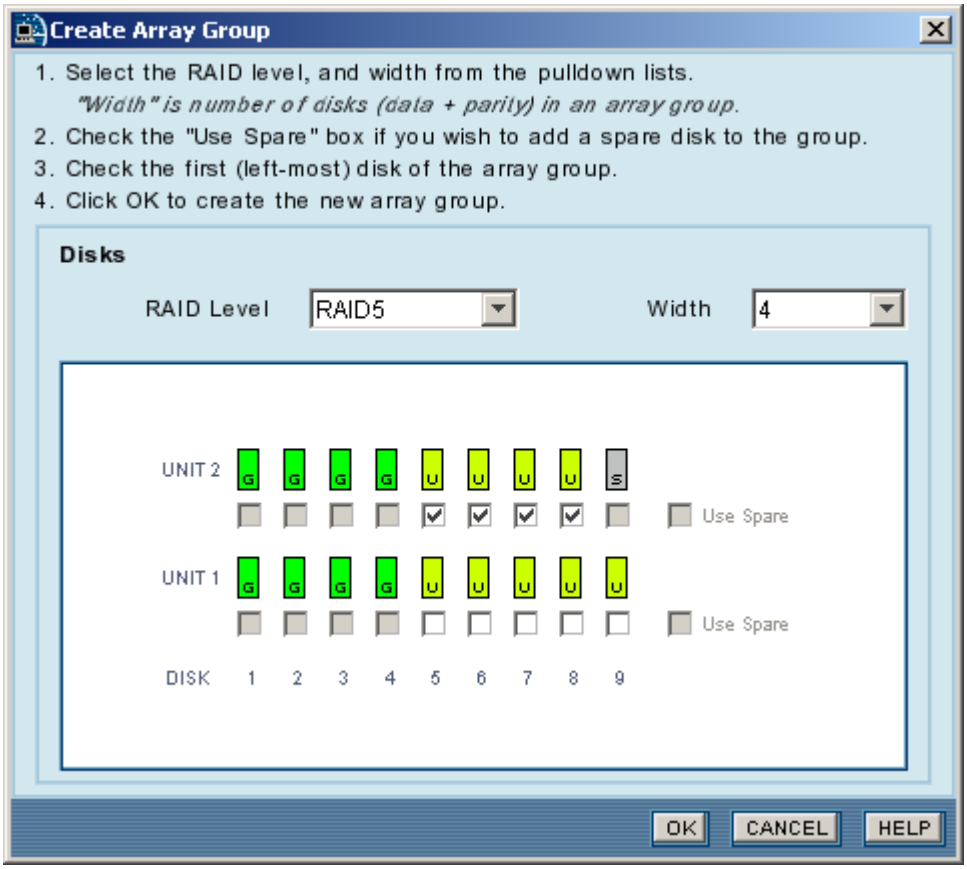


Figure 6.56 Creating an Array Group (T3)

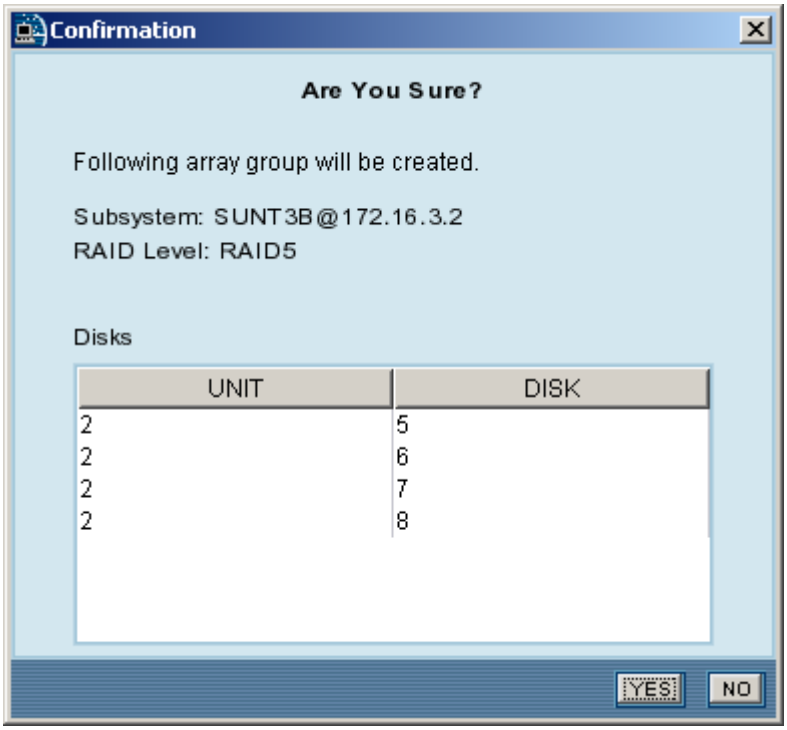


Figure 6.57 Creating an Array Group (T3) – Confirmation

6.3.3 Configuring Spare Drives on the Thunder 9500V and 9200 Subsystem

The System Administrator and Storage Administrator can configure (add and release) the spare drives on the 9500V and 9200 subsystems. Local and guest users do not have access to this function.

When you configure the spare drives on the 9500V/9200, you can add new spare drive(s) and/or release existing spare drive(s). When you release a spare drive, the drive changes to unused and is available for assignment to a new array group.

To add and/or release one or more spare drives in a 9500V or 9200 subsystem:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator.
2. Select **Physical View** to view the connected subsystems.
3. Select the 9500V or 9200 subsystem in which you want add new spare drive(s) and/or release existing spare drives.
4. Select **Spare** in the **Disks & Arrays** box. The Spare Drive panel displays the current spare drive configuration (see Figure 6.58).
5. Select (check) the unused disk(s) that you want to configure as new spare drive(s), and deselect (uncheck) the spare drive(s) that you want to release.
6. When the information on the Spare Drive panel is correct, select **OK**.
7. When the confirmation panel appears, select **Yes** to create the specified new spare drive(s), or select **No** to cancel your request to create new spare drive(s).

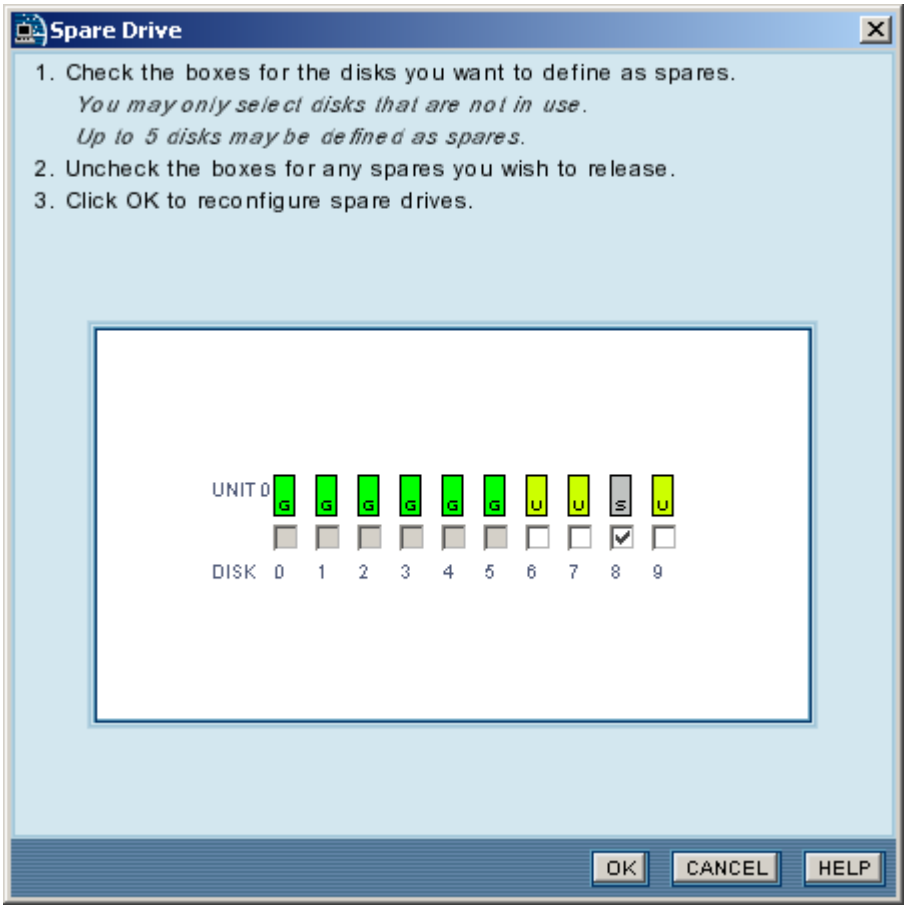


Figure 6.58 Creating and/or Releasing Spare Drives

6.3.4 Creating an LDEV

The System Administrator and Storage Administrator can create an LDEV. Local and guest users do not have access to this function.

When you create an LDEV, you select an existing array group with free space and specify the desired LDEV parameters (device size and type for 9900V/9900, device size and controller for 9500V/9200, preset for T3). HiCommand™ Device Manager automatically adds the new LDEV to the Unallocated group for the subsystem.

For the 9900V and 9900 subsystems, you can create an LDEV that is a standard LU, or you can create a custom-size LDEV that is smaller than the standard LU. Table 6.2 lists the capacities for the standard LU types on the 9900V and 9900 subsystems. ***Note:*** LUN Expansion (LUSE) devices are created from existing unallocated LDEVs (see section 6.4 or 6.6.1).

HiCommand™ Device Manager 2.3 uses the following convention for capacity values:

KB = 1024 bytes
MB = 1024 KB
GB = 1024 MB
TB = 1024 GB

Table 6.2 Minimum and Maximum Capacities of Standard LU Types

LU Type	OPEN-K	OPEN-3	OPEN-8	OPEN-9	OPEN-E	OPEN-V
Minimum Capacity	35 MB (36,000 KB)	35 MB (36,000 KB)	35 MB (36,000 KB)	35 MB (36,000 KB)	35 MB (36,000 KB)	46 MB (48,000 KB)
Maximum Capacity	1787 MB	2347 MB	7007 MB	7042 MB	13893 MB	2 TB with automatic LUSE above 60 GB

Note: The 9900V and 9900 subsystems may not support the same LU types. Some LU types are not available on some platforms. Please ask your Hitachi Data Systems representative for the latest information on LU type support.

To create a new LDEV:

1. Log in to HiCommand™ Device Manager as a System or Storage Administrator.
2. On the Physical View, select the desired subsystem, and then open the LDEV Information panel for the array group in which you want to create the LDEV:
   - For 9900V, select **Array Groups**, select **View** on the desired frame, select the desired array group on the Frame Information (Overview) panel, and then select the desired array group again on the Frame Information (Detail) panel.
   - For 9900, select **Array Groups**, select **View** on the desired frame, and then select the desired array group on the Frame Information panel.
   - For 9500V and 9200, select the desired array group, and then select **View**.
   - For T3, select the desired array group under **Array Groups**, and then select **View**.
3. On the LDEV Information panel for the desired array group, select the **Create LDEV** button (see Figure 6.59).

4. For 9900V, 9900, 9500V, and 9200, the Make LDEV/LU panel opens (see Figure 6.60 and Figure 6.61). Enter the desired parameters, and then select **OK**.
   - For 9900V/9900, enter the desired device size (refer to Table 6.2), and select the device type. The size cannot be larger than the size of the selected device type, except for OPEN-V. When you enter a size larger than 60 GB for an OPEN-V LDEV, HiCommand™ Device Manager applies LUSE automatically.
   - For 9500V/9200, enter the desired device size, and select the desired default controller. ***Note:*** The LDEV capacity will be equal to or larger than the specified device size, because the device size is rounded up at the 9500V/9200 subsystem.
   - For T3, the device size is preset to the array group size.
5. When the confirmation panel appears (see Figure 6.62, Figure 6.63, Figure 6.64), select **Yes** to create the LDEV, or select **No** to cancel your request to create the LDEV.
6. HiCommand™ Device Manager notifies you when the operation is complete and displays the LDEV ID of the new LDEV. The new LDEV is displayed on the LDEV Information panel and is also listed in the Unallocated group for the subsystem.

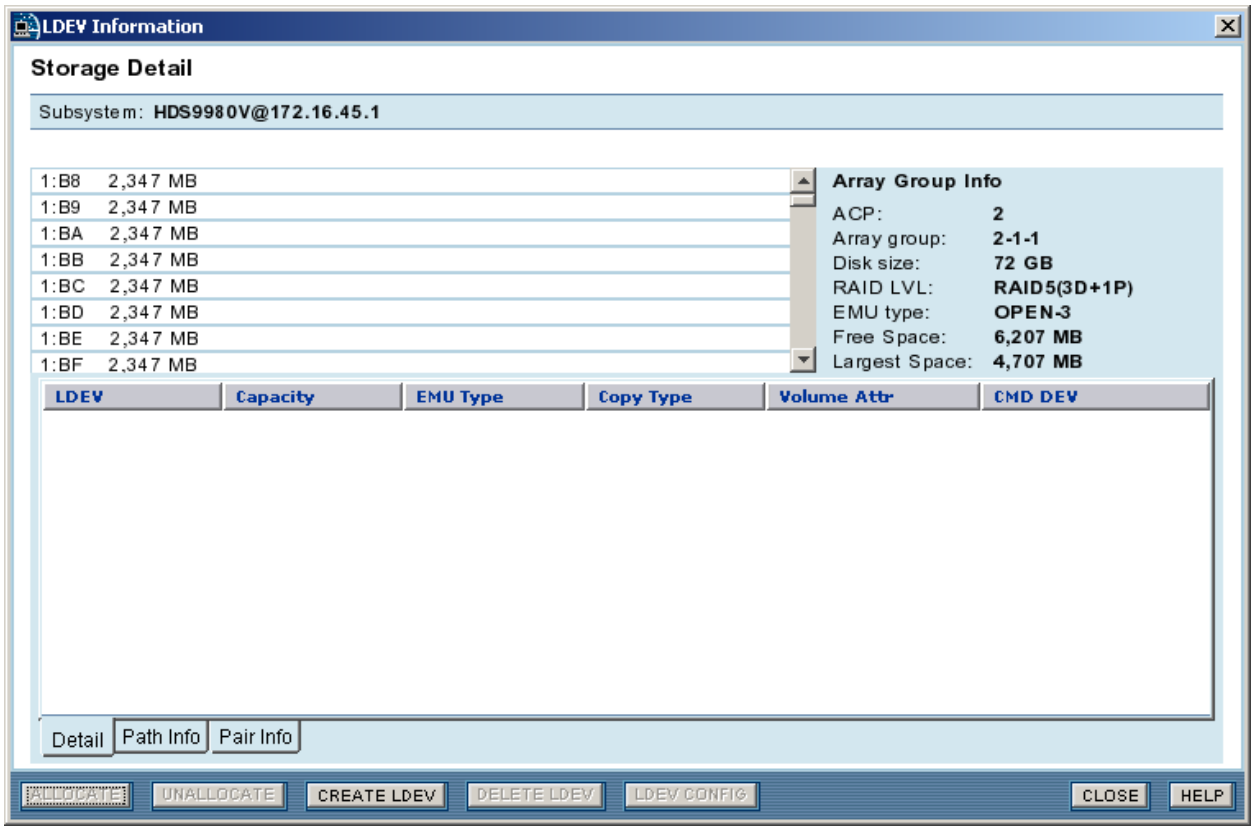


Figure 6.59 Creating an LDEV (9900V shown)

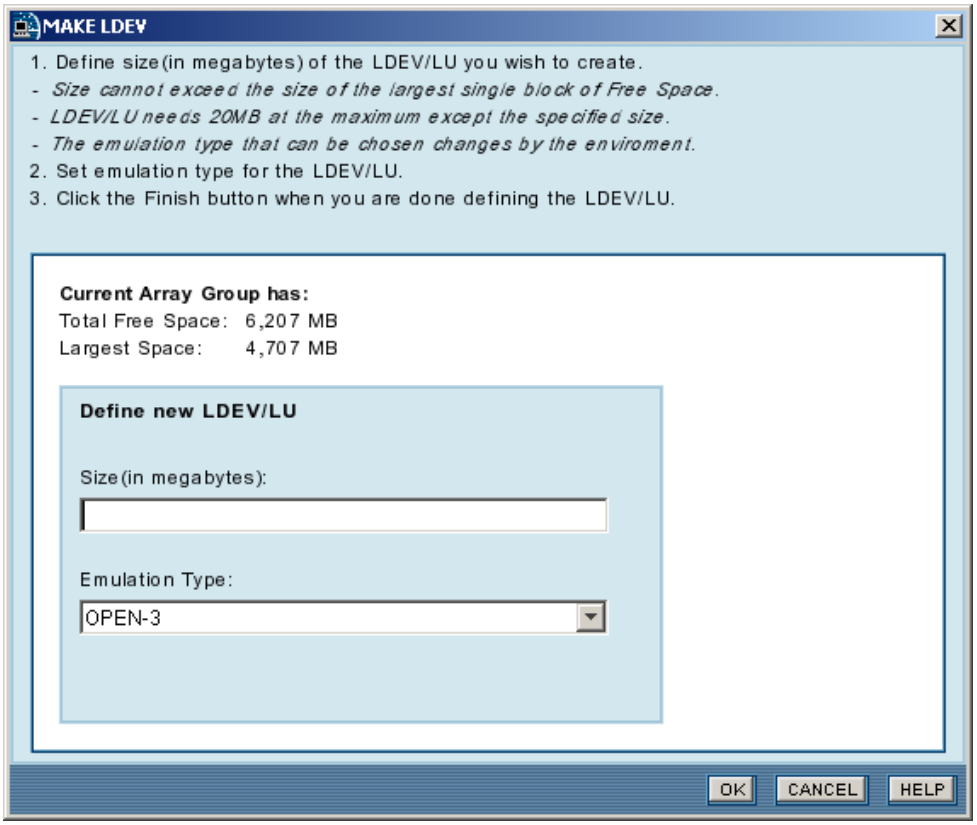


Figure 6.60 Creating an LDEV – Entering the Size and Device Type (9900V, 9900)

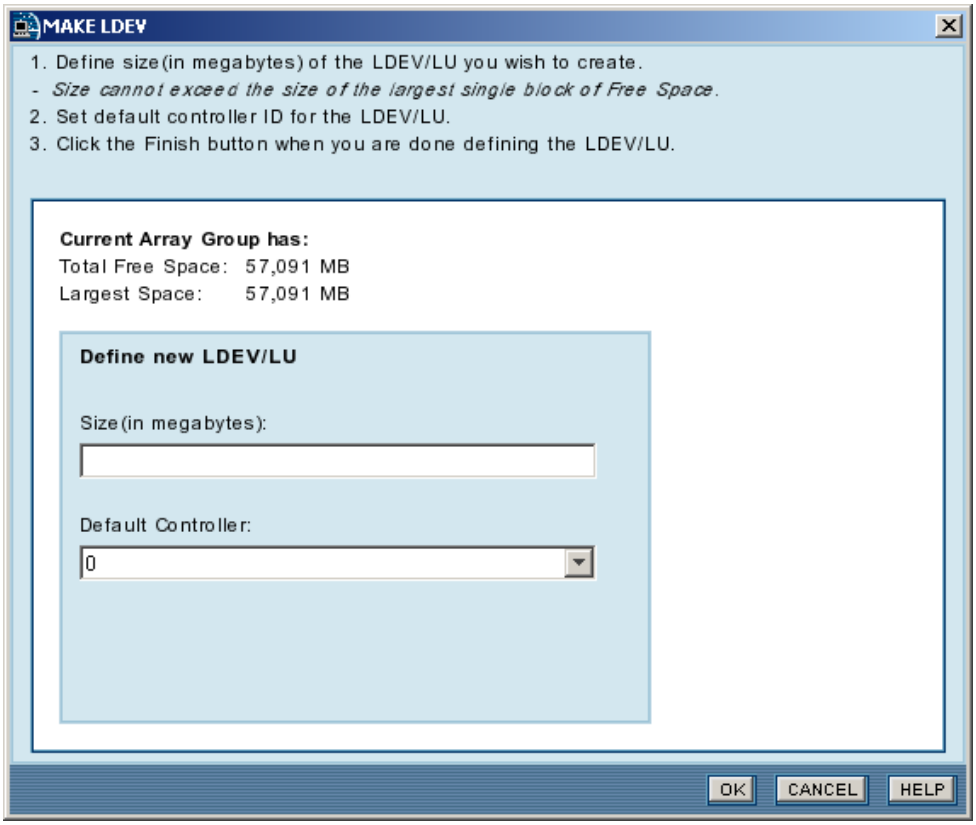


Figure 6.61 Creating an LDEV – Entering the Size and Controller (9500V, 9200)

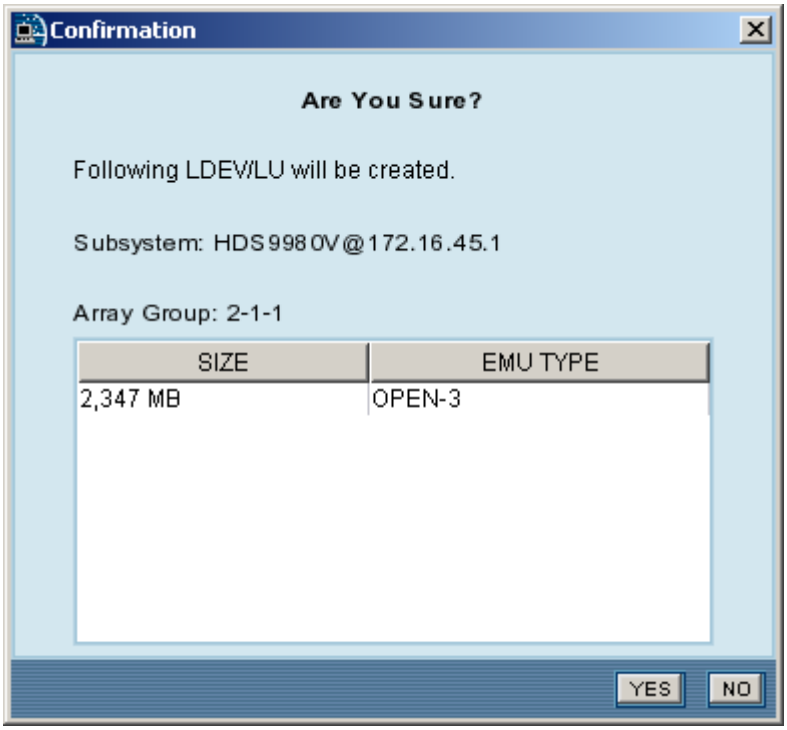


Figure 6.62 Creating an LDEV – Confirmation for 9900V and 9900

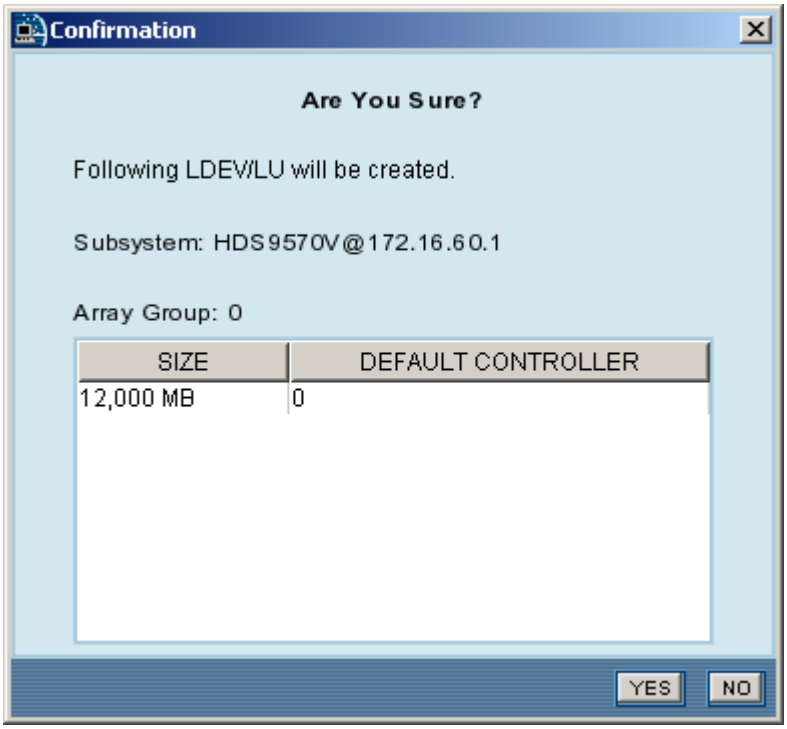


Figure 6.63 Creating an LDEV – Confirmation for 9500V and 9200

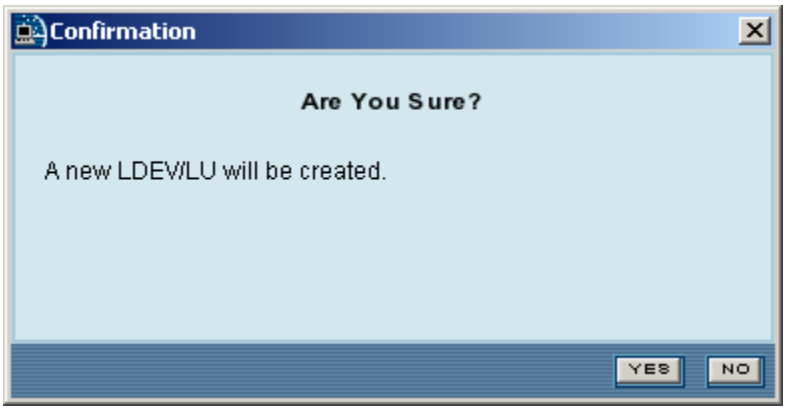


Figure 6.64 Creating an LDEV – Confirmation for T3

6.3.5 Deleting an LDEV

> ***WARNING:*** The delete LDEV operation is destructive. The data on the LDEV to be deleted will be lost. The user is responsible for backing up the data before performing this operation.

The System Administrator and Storage Administrator can delete LDEVs. Local and guest users do not have access to this function. When you delete an LDEV, the free space in the array group increases by the size of the LDEV deleted.

Note for 9500V and 9200 only: You can only delete the last LDEV that was created.

To delete an LDEV:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator.
2. Make sure that the LDEV to be deleted is no longer in use, that the data has been backed up, and that all access paths to the LDEV have been removed.
3. On the Physical View, select the desired subsystem, and then open the LDEV Information panel for the array group in which you want to delete the LDEV:
   - For 9900V, select **Array Groups**, select **View** on the desired frame, select the desired array group on the Frame Information (Overview) panel, and then select the desired array group again on the Frame Information (Detail) panel.
   - For 9900, select **Array Groups**, select **View** on the desired frame, and then select the desired array group on the Frame Information panel.
   - For 9500V and 9200, select the desired array group, and then select **View**.
   - For T3, select the desired array group under **Array Groups**, and then select **View**.
4. On the LDEV Information panel for the desired array group, select the desired LDEV, and then select the **Delete LDEV** button (refer to Figure 6.59). If the **Delete LDEV** button is not available, one or more paths to the LDEV still exist.
5. When the confirmation panel appears (see Figure 6.65), select **Yes** to delete the LDEV, or select **No** to cancel your request to delete the LDEV.

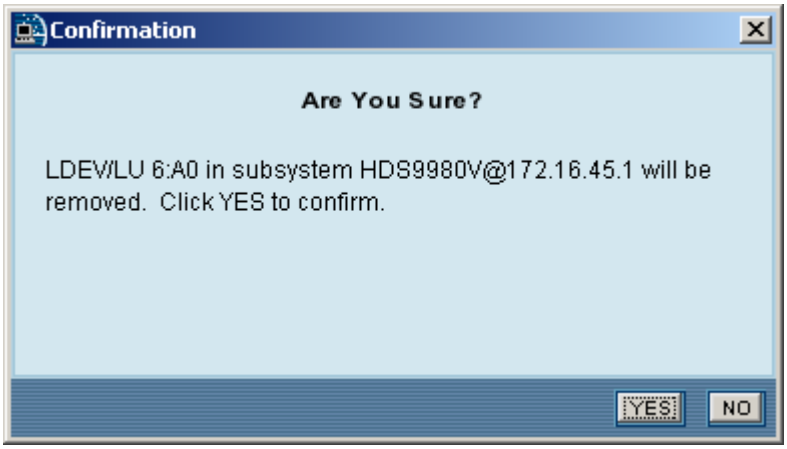


Figure 6.65 Deleting an LDEV – Confirmation

6.3.6 Deleting an Array Group (9500V, 9200, and T3)

> ***WARNING:*** The delete array group operation is destructive. The data stored on the devices in the array group will be lost. The user is responsible for backing up the data before performing this operation.

The System Administrator and Storage Administrator can delete an array group on the 9500V subsystem, 9200 subsystem, and T3 array. Local and guest users do not have access to this function. When you delete an existing array group, the data on the disks in the array group is deleted, and the disks are then displayed as unused disks.

Caution: For the T3, if you delete the array group which is associated with the spare drive, the spare drive is also deleted and is no longer available to the other array group.

To delete an array group on the 9500V, 9200, or T3 array:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator.
2. Make sure that the LDEVs in the array group to be deleted are no longer in use and that the data has been backed up.
3. Select **Physical View** to view the connected subsystems.
4. Select the 9500V, 9200, or T3 array in which you want to delete an array group.
5. In the **Disks & Arrays** box, select the array group that you want to delete, and then select **Delete**.
6. When the confirmation panel appears (see Figure 6.66), select **Yes** to delete the selected array group, or select **No** to cancel your request to delete an array group.

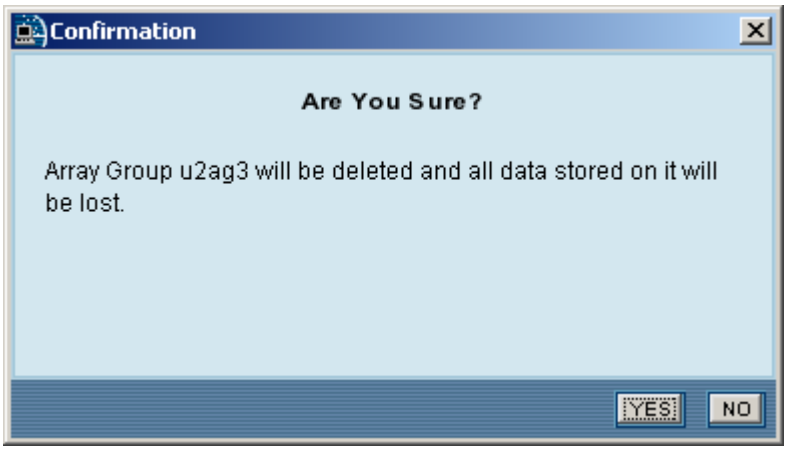


Figure 6.66 Deleting an Array Group – Confirmation

6.4 LDEV Operations

The System Administrator and Storage Administrator can perform LDEV operations. Local and guest users do not have access to this function.

The HiCommand™ Device Manager LDEV operations include:

- Creating LUSE devices (see section 6.4.1),
- Deleting LUSE devices (see section 6.4.2),
- Allocating storage (see section 6.4.3), and
- Unallocating storage (see section 6.4.4).

6.4.1 Creating LUSE Devices

The System Administrator, Storage Administrator, Local System Administrator, and Local Storage Administrator can create LUSE devices on the Hitachi storage subsystems. The guest user does not have access to this function.

LUSE devices are created from unallocated LDEVs. The Logical View of an Unallocated storage group (under All Storage/My Storage) provides access to the create/delete LUSE operations. You can also create LUSE devices during the add storage operation (see 6.6.1).

Requirements: LUSE devices have the following requirements:

- **9900V and 9000 LUSE requirements:**
  - The LDEVs in a LUSE device must be located in the same control unit.
  - The LDEVs in a LUSE device must be the same size.
  - The LDEVs in a LUSE device must be the same emulation type (e.g., OPEN-3, OPEN-8, OPEN-9, OPEN-K, OPEN-E, OPEN-L, OPEN-M). ***Note:*** OPEN-V LUSE devices are created during the create LDEV process (see section 6.3.4).
  - The LDEVs in a LUSE device must be the same RAID level.
  - The LDEVs in a LUSE device must be either Customized Volumes or Normal Volumes (intermix of custom and normal volumes is not allowed). An intermix of LDEVs and pre-existing LUSE devices is allowed when all LDEVs are the same size and emulation type (e.g., OPEN-3 + OPEN-3*3 LUSE + OPEN-3*2 LUSE = OPEN-3*6 LUSE).
  - Volumes reserved for CruiseControl cannot be used for a LUSE device.
  - For the 9900V, the LUN Manager and LUN Expansion (LUSE) features must be enabled. For the 9900, the LUN Manager, Hitachi SANtinel, and LUN Expansion (LUSE) features must be enabled.
- **9500V and 9200 LUSE requirements:**
  - The default controller for the LDEVs in a LUSE device must be same.
  - RAID 0 volumes cannot be used for a LUSE device.
  - The maximum LUSE device size is 2 TB.
  - A LUSE device that is created by DAMP tool cannot be used as a LUSE device.

- The blockade or unformatted volume cannot be used for the LUSE device.
- For 9200 microcode level 055D or earlier, LDEV #0 cannot be used as sub-LDEV. (For microcode level 055E and later, LDEV #0 can be used as main LDEV and sub-LDEV.)
- The Resource Manager and LUN Security features must be enabled.

To create a LUSE device:

1. Log in to HiCommand™ Device Manager as a System Administrator, Storage Administrator, Local System Administrator, or Local Storage Administrator.
2. On the Logical View, select the **All Storage**/**My Storage** group, select the desired subsystem, and then select the **Unallocated** group for that subsystem.
3. Select the desired unallocated LDEVs and/or LUSE devices, and select the **Create LUSE** button (see Figure 6.67). You can select LDEVs and pre-existing LUSE devices when all LDEVs are the same size and emulation.
4. On the Create LUSE panel select the devices and use the **Create LUSE>>>** button to create the desired LUSE device(s) in the **LUSE LU(s)** list. Use the **<<<Uncreate LUSE** button as needed to remove LUSE LUs and re-enable the LDEVs/LUs in the **Devices** list.

   Note: You cannot delete/reconstruct existing LUSE LUs during this procedure. You must delete a LUSE LU in order to use the individual LDEVs.
5. When the information on the Create LUSE panel is correct, select the **Finish** button, or select **Cancel** to cancel your request to create LUSE device(s).
6. When the confirmation panel appears (see Figure 6.69),select **Yes** to create the specified LUSE device(s), or select **No** to cancel your request.

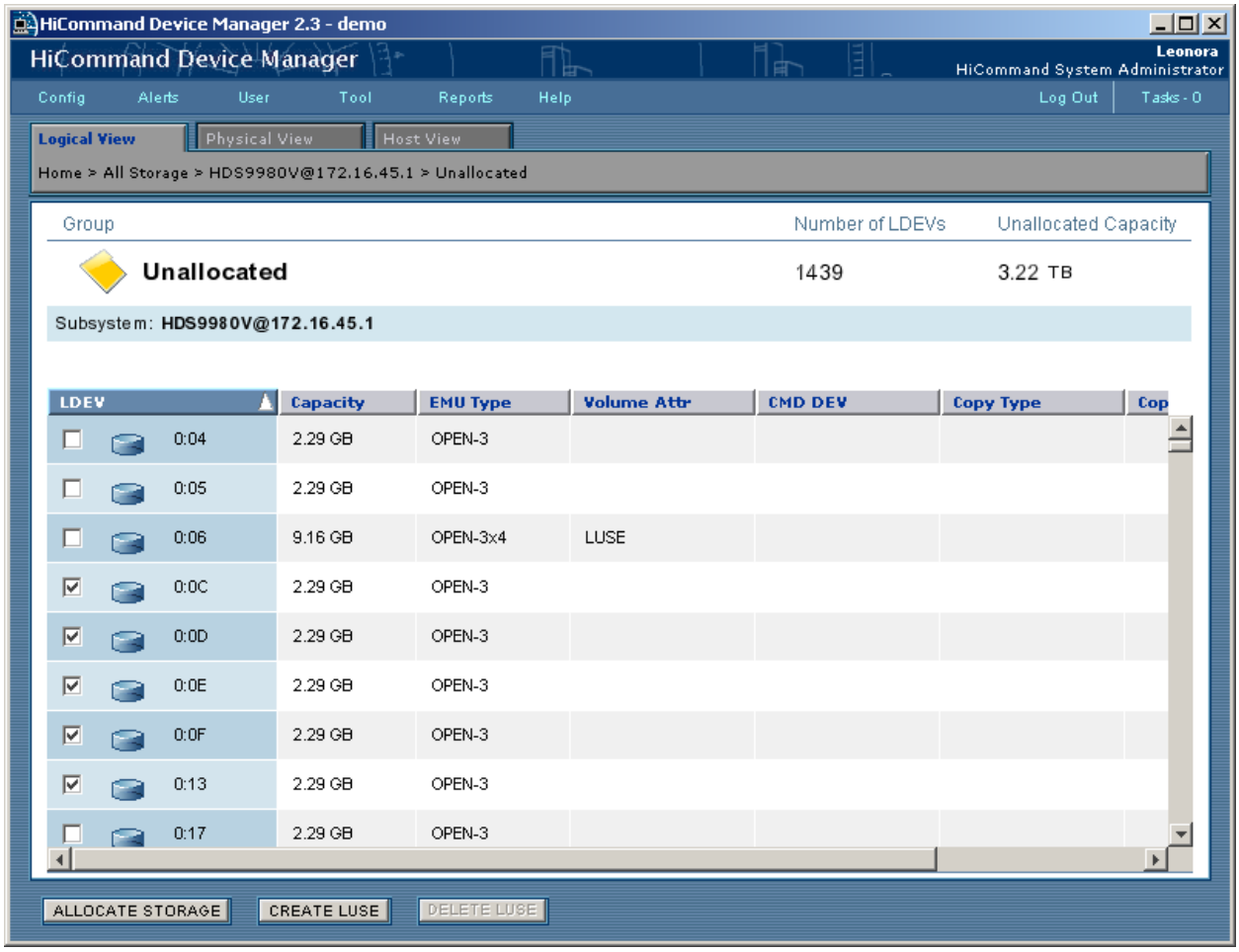


Figure 6.67 Creating/Deleting LUSE Devices

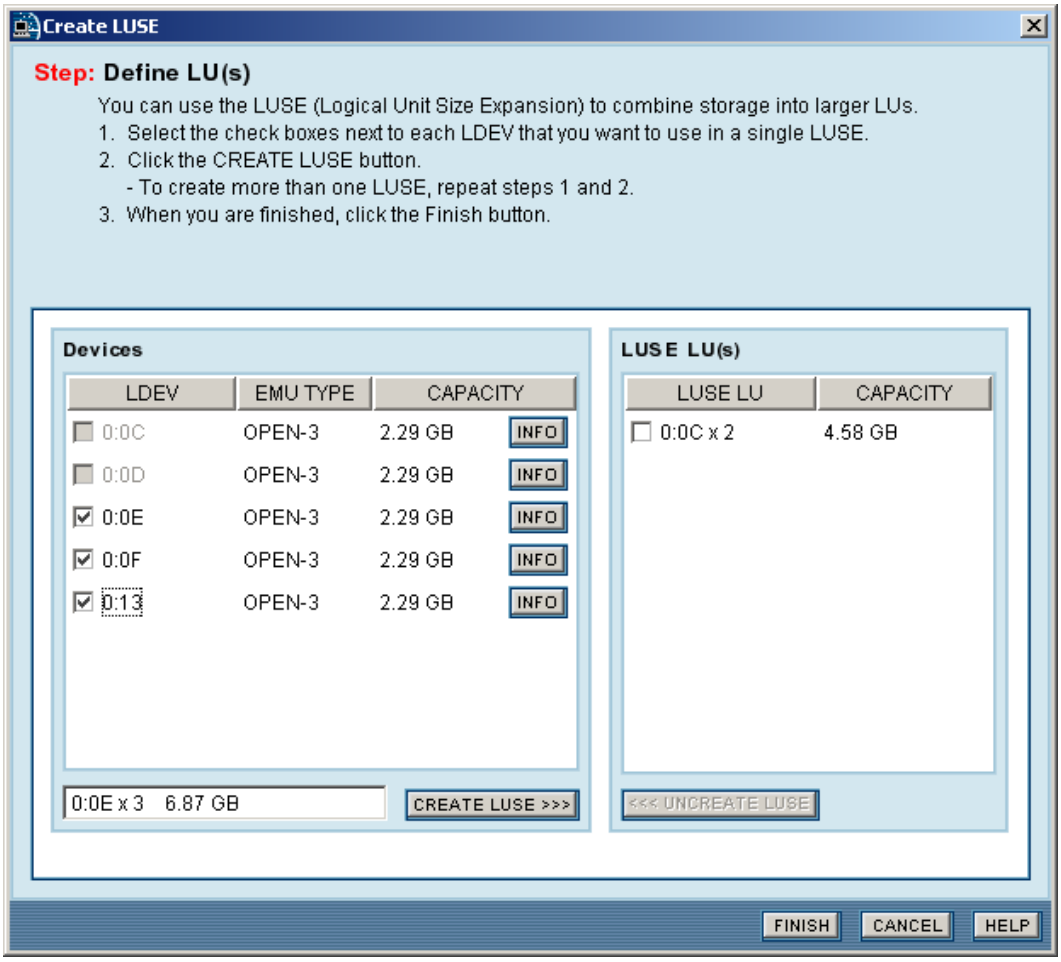


Figure 6.68 Creating LUSE Devices – Selecting the LDEVs

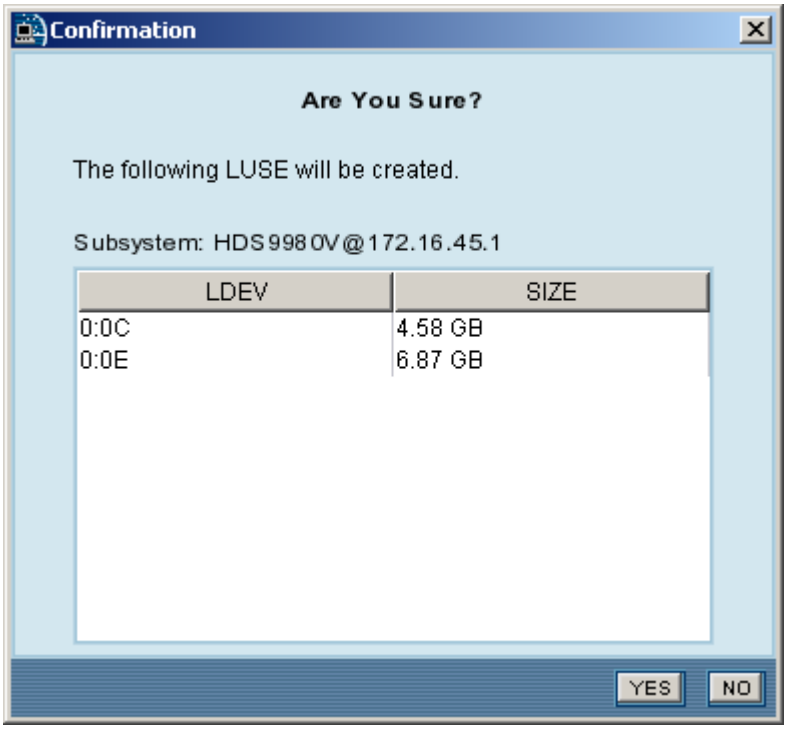


Figure 6.69 Creating LUSE Devices – Confirmation

6.4.2 Deleting LUSE Devices

The System Administrator, Storage Administrator, Local System Administrator, and Local Storage Administrator can delete LUSE devices on the Hitachi storage subsystems. The guest user does not have access to this function.

To delete a LUSE device:

1. Log in to HiCommand™ Device Manager as a System Administrator, Storage Administrator, Local System Administrator, or Local Storage Administrator.
2. On the Logical View, select the **All Storage/My Storage** group, select the desired subsystem, and then select the **Unallocated** group for that subsystem.
3. Select the desired LUSE device(s), and then select the **Delete LUSE** button.
4. When the confirmation panel appears (see Figure 6.70), select **Yes** to delete the LUSE device(s), or select **No** to cancel your request to delete the LUSE device(s).

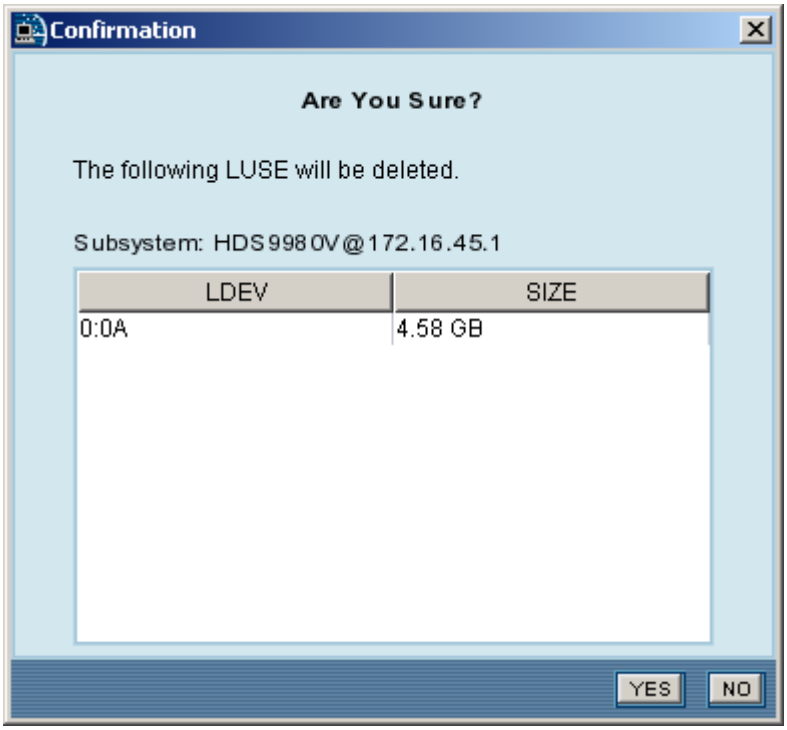


Figure 6.70 Deleting LUSE Devices – Confirmation

6.4.3 Allocating Storage

The System Administrator, Storage Administrator, Local System Administrator, and Local Storage Administrator can allocate storage. The guest user does not have access to this function.

When you allocate storage, you assign one or more access paths (port/LUN) to LDEV(s), and you can optionally secure the new LUN(s) to host WWN(s). You can allocate LDEVs that are unallocated or already allocated.

To allocate storage:

1. Log in to HiCommand™ Device Manager as a System Administrator, Storage Administrator, Local System Administrator, or Local Storage Administrator.
2. On the Logical View, select the **All Storage**/**My Storage** group, select the desired subsystem, and then select the **Allocated** or **Unallocated** group for that subsystem.

   Note: You can also allocate storage from the Physical View: select the desired subsystem, and then select the desired array group.
3. Select the desired LDEV(s), and select the **Allocate Storage** button (see Figure 6.71).
4. On the Define Port/Host Connections panel (see Figure 6.72), select the desired port(s) and (optionally) the desired host WWN(s) to secure to the LDEV(s). When the desired port(s) and/or port/host connection(s) are displayed, select **Next** to continue.
5. On the Define LU(s) panel (see Figure 6.73), create the desired LUSE device(s) from the unallocated LDEV(s) (if any). When the desired LUSE device(s) (if any) are displayed, select **Next** to continue.
6. On the Assign Host/Port Connections panel (see Figure 6.74), assign the LDEV(s) to the desired port(s) and/or port/host connection(s). When the desired connection(s) are displayed, select **Next** to continue.
7. On the Assign LUNs panel (see Figure 6.75), assign the desired LUN to each new path. You can use the preselected LUN or select the desired LUN for each path. When the desired path(s) are displayed, select **Finish** to continue.
8. The Summary of Changes panel displays the requested allocate storage operations and asks you to confirm the requested operations (see Figure 6.76). Select **Confirm** to add the specified path(s), or select **Cancel** to cancel your allocate storage request. If you need to make any changes, select **Back** to return to the previous panel(s).

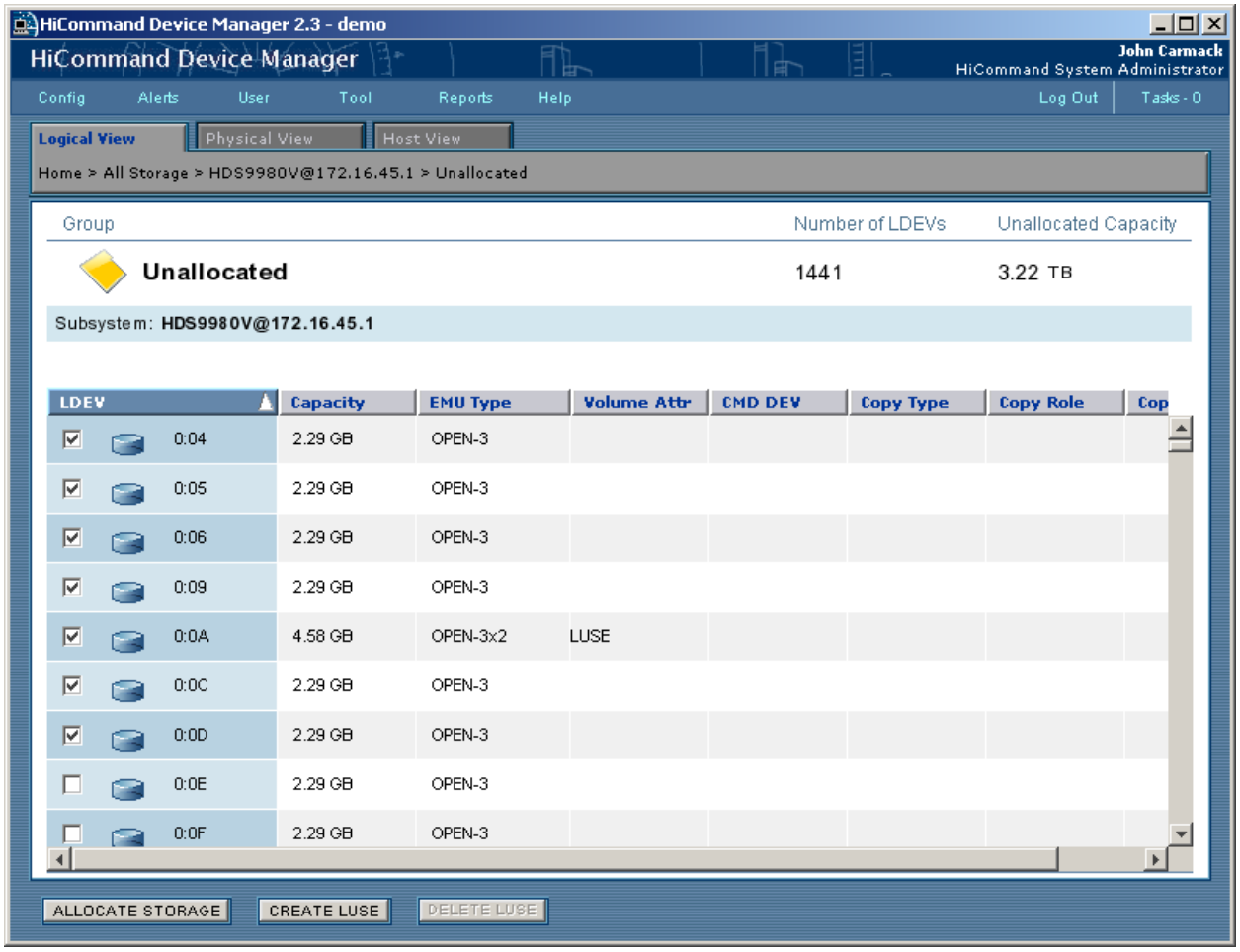


Figure 6.71 Allocating Storage – Selecting the LDEV(s)

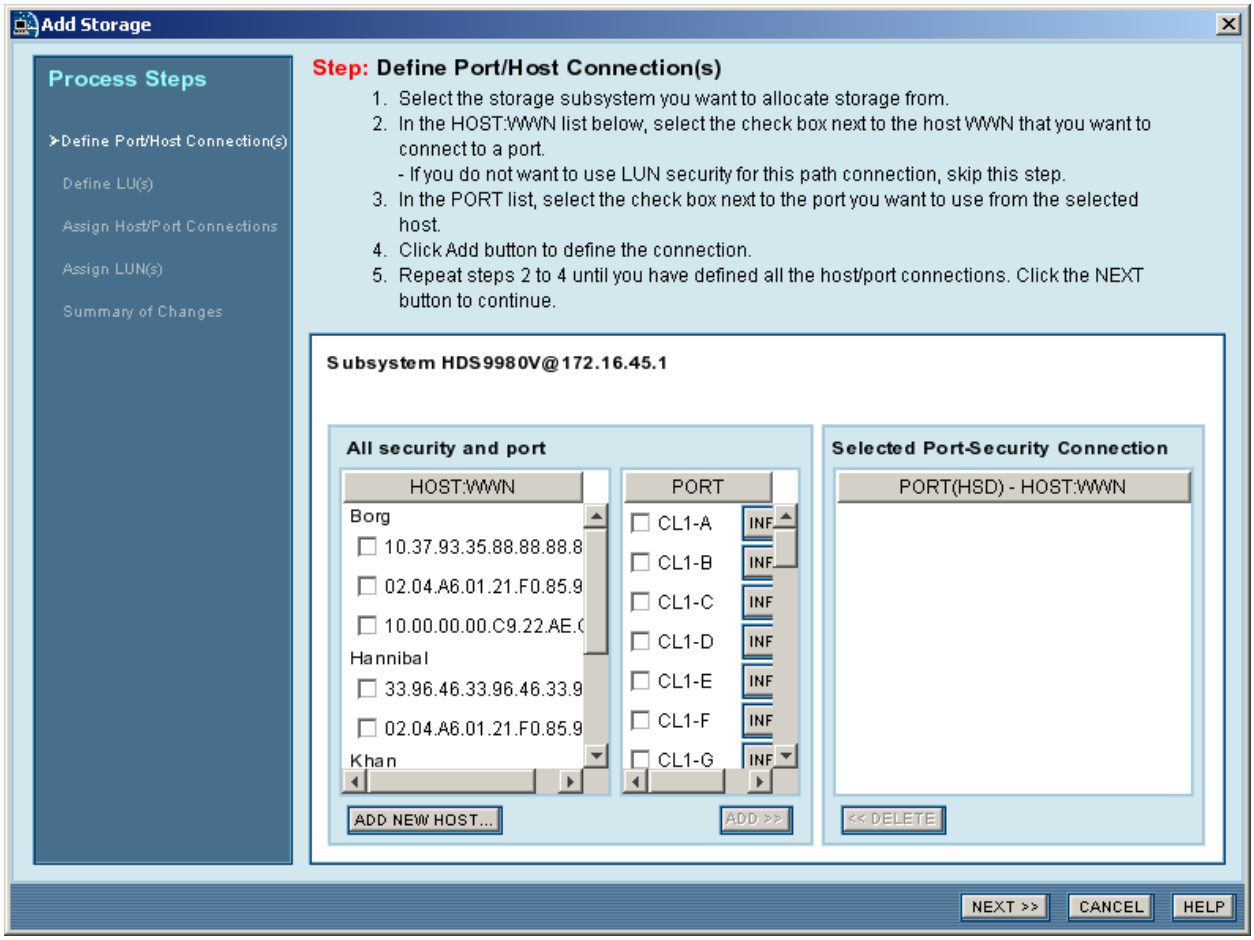


Figure 6.72 Allocating Storage – Defining Port/Host Connections

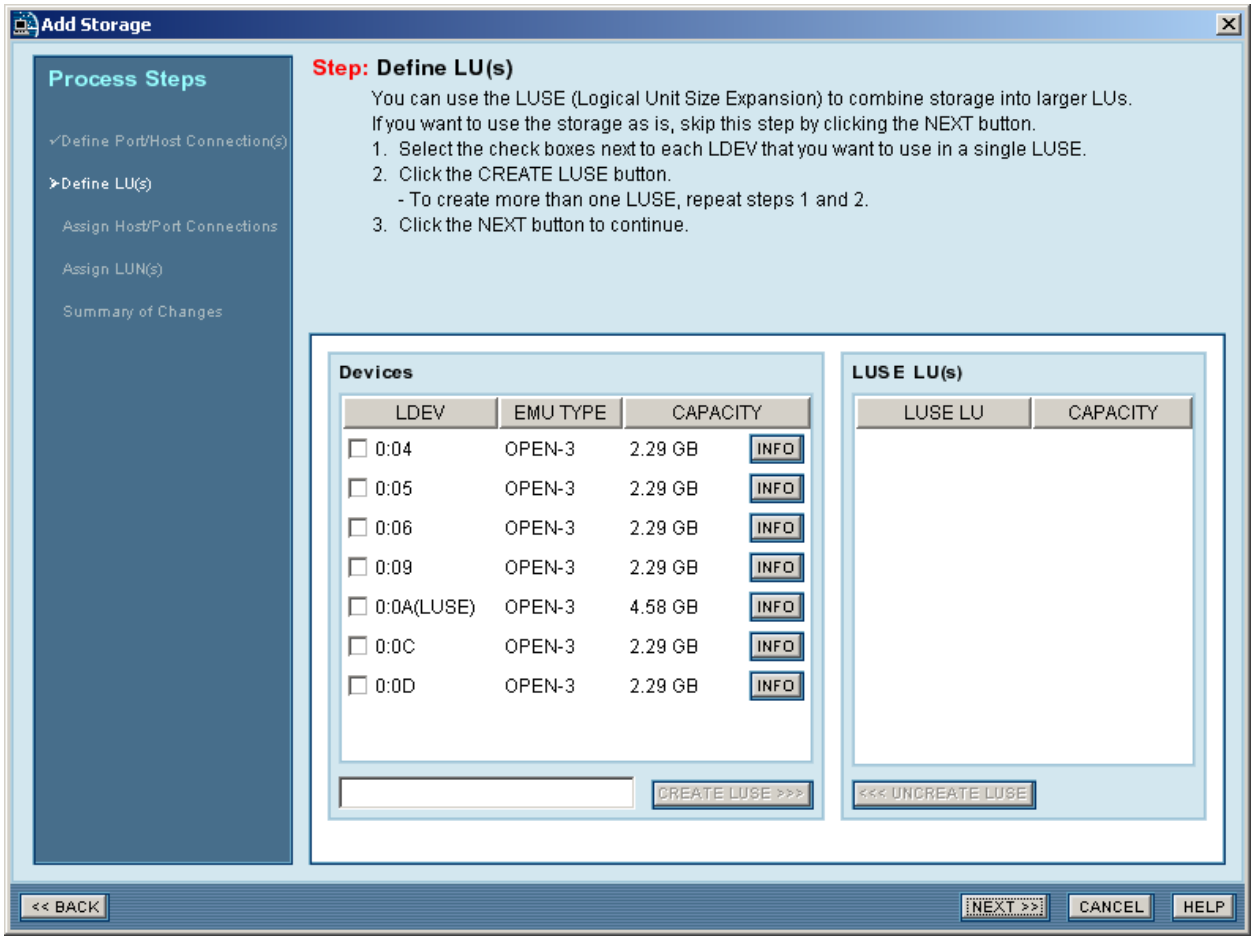


Figure 6.73 Allocating Storage – Creating LUSE Devices (optional)

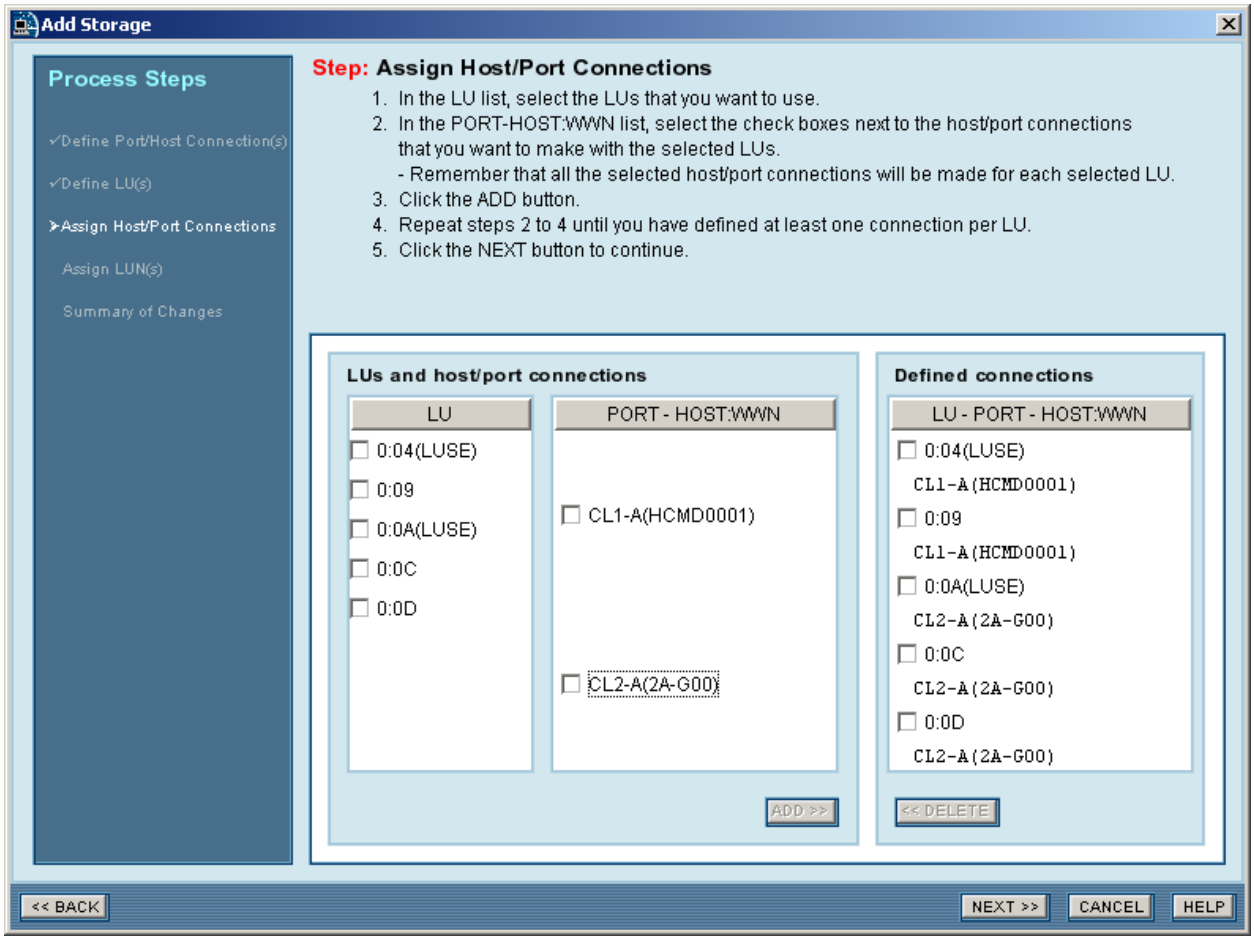


Figure 6.74 Allocating Storage – Assigning Host/Port Connections

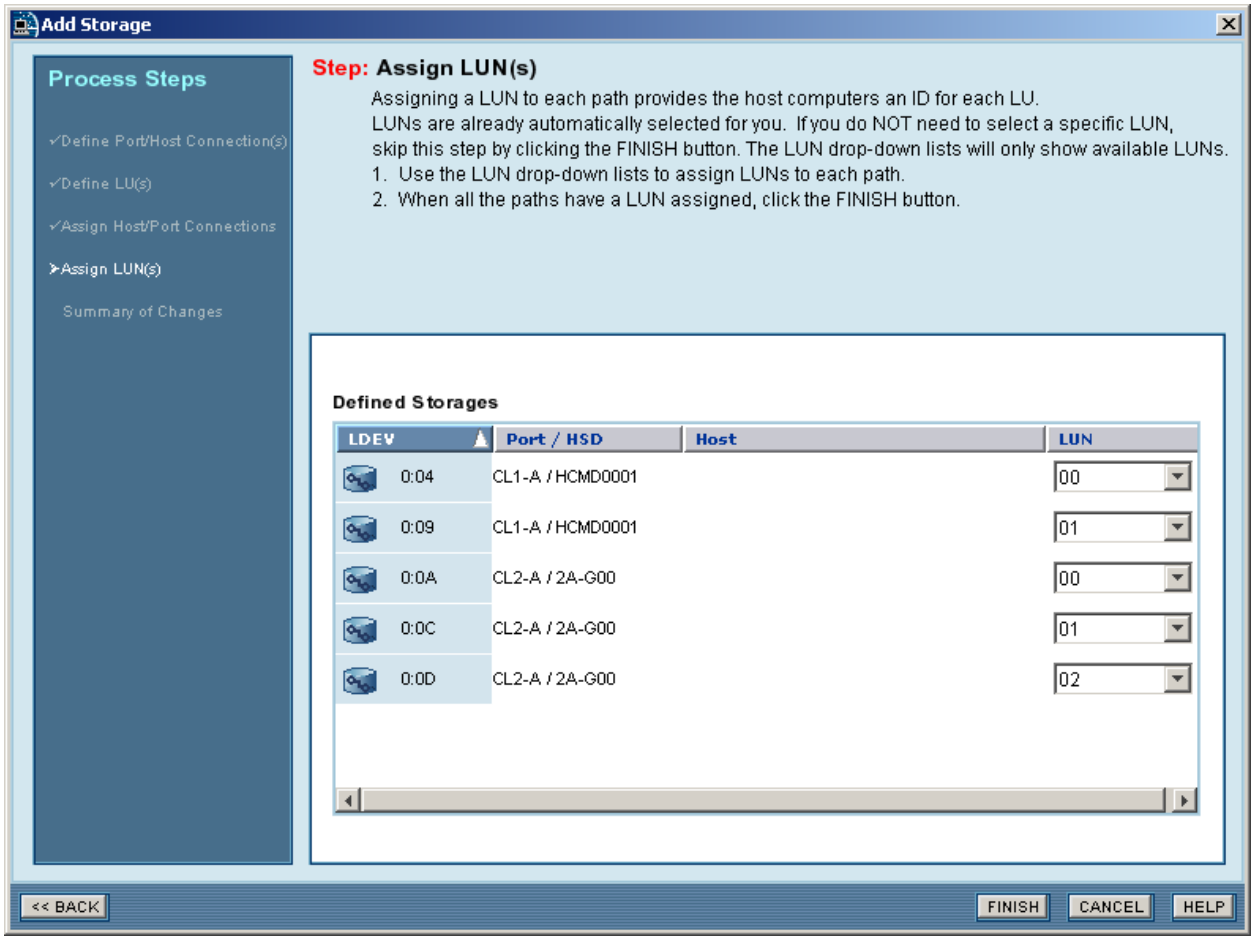


Figure 6.75 Allocating Storage – Assigning LUNs

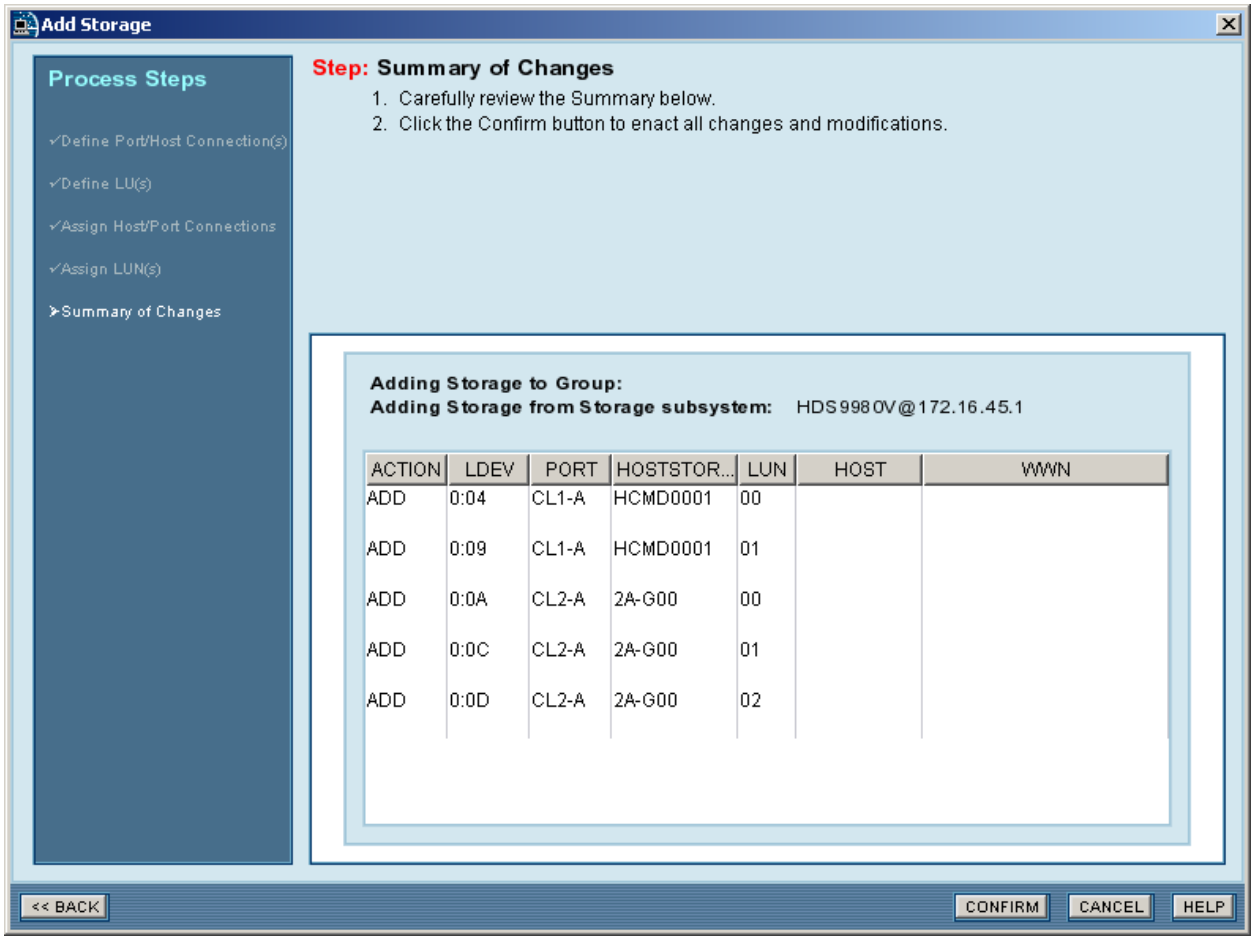


Figure 6.76 Allocating Storage – Confirmation

6.4.4 Unallocating Storage

The System Administrator, Storage Administrator, Local System Administrator, and Local Storage Administrator can unallocate storage. The guest user does not have access to this function.

When you unallocate storage, you remove one or more access paths from an LDEV. When you unallocate a LUSE device, you can also optionally delete the LUSE device to make the individual LDEVs available for use.

Note: If you want to unallocate LUNs for more than one LDEV/LU, use the Logical View. If you use the Physical View, you can only unallocate LUNs for one LDEV at a time.

To unallocate storage:

1. Log in to HiCommand™ Device Manager as a System Administrator, Storage Administrator, Local System Administrator, or Local Storage Administrator.
2. From the Logical View, select the **All Storage**/**My Storage** group, select the desired subsystem, and then select the **Allocated** group for that subsystem.

   From the Physical View, select the desired subsystem, and open the LDEV Information panel for the desired array group: For 9900V/9900 select **Array Groups**, select the array group, and select the array group again on the Frame Information panel. For 9500V, 9200, and T3, select the desired array group, and select **View**.
3. From the **Allocated** group, select the desired LUN(s), and select **Unallocate Storage**.

   From the LDEV Information panel, select the **Path Info** tab, select the desired LDEV in the LDEV list, select the desired LUN(s), and then select the **Unallocate** button.
4. When the confirmation panel appears (see Figure 6.77), select **Yes** to delete the specified LUN(s), or select **No** to cancel your request to unallocate storage.
5. If you selected LUSE device(s), HiCommand™ Device Manager allows you to keep or delete the LUSE device(s) (see Figure 6.78). Select **Delete LUSE** to delete the LUSE device(s), or select **Keep LUSE** to keep the LUSE device(s).

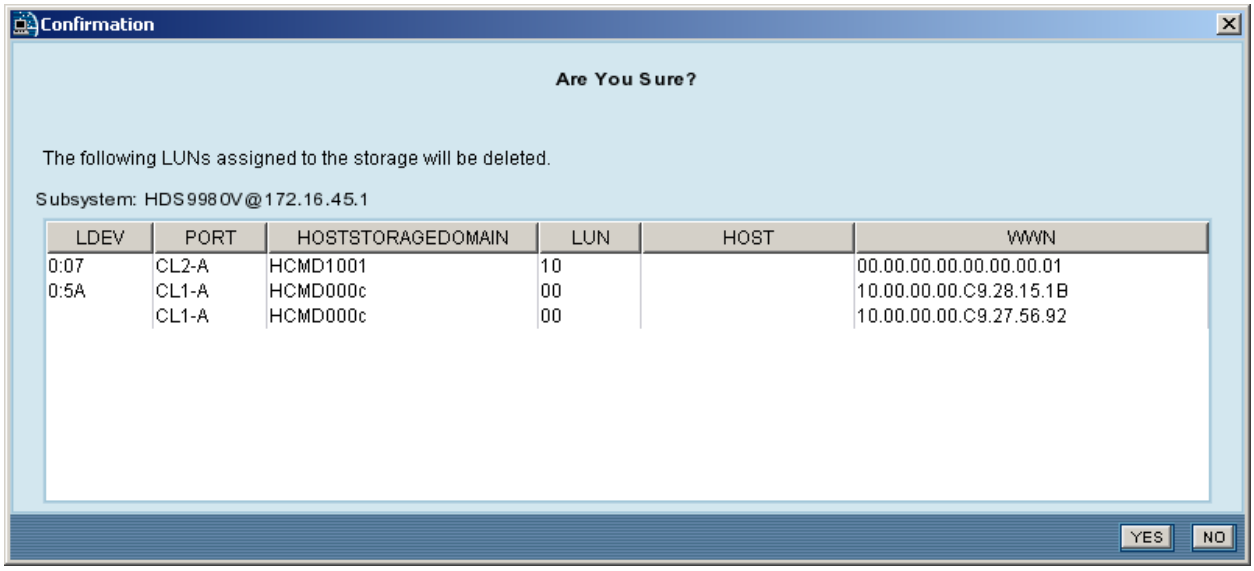


Figure 6.77 Unallocating Storage – Confirmation

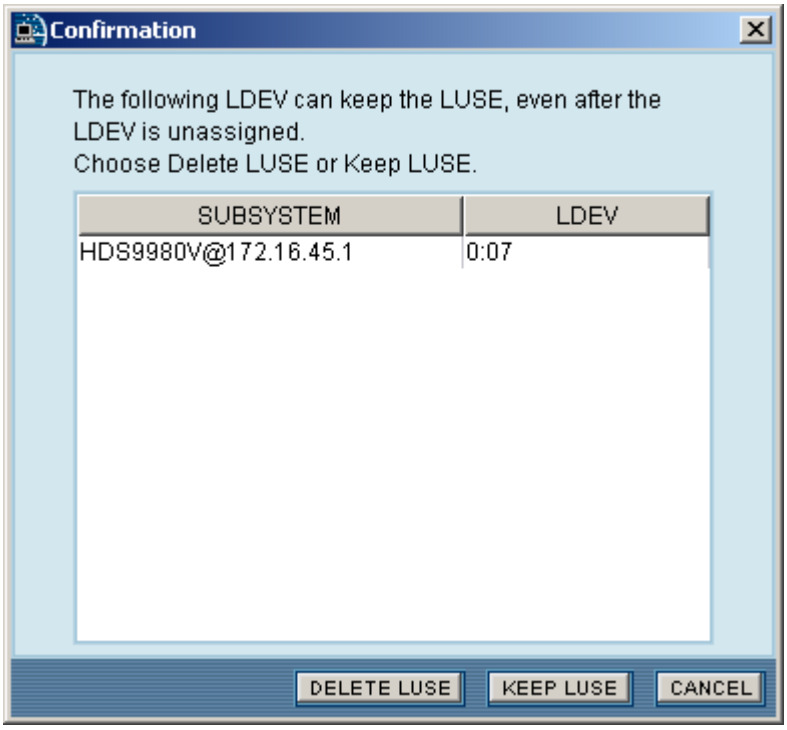


Figure 6.78 Unallocating Storage – Deleting LUSE Devices

6.5 Host Operations

The HiCommand™ Device Manager host operations are performed by the System Administrator, Storage Administrator, Local System Administrator, and Local Storage Administrator. The guest user can only view the host information.

A HiCommand™ Device Manager host is a user-defined set of one or more WWNs that can be manipulated as a group. The HiCommand™ Device Manager host operations include:

- Adding a host (see section 6.5.1),
- Viewing and editing host properties (see section 6.5.2), and
- Deleting a host (see section 6.5.3).

The Host List panel (see Figure 6.79) allows System Administrators and Storage Administrators to add and delete HiCommand™ Device Manager hosts and edit the host properties (name, WWNs) as needed. To open the Host List panel, select **Config** – **Hosts** on the menu bar.

The Host List panel displays each HiCommand™ Device Manager host by name.
The **New** button allows you to add a new HiCommand™ Device Manager host.
The **Edit** button allows you to edit the selected HiCommand™ Device Manager host (e.g., add/delete WWNs).
The **Delete** button allows you to delete the selected HiCommand™ Device Manager host.

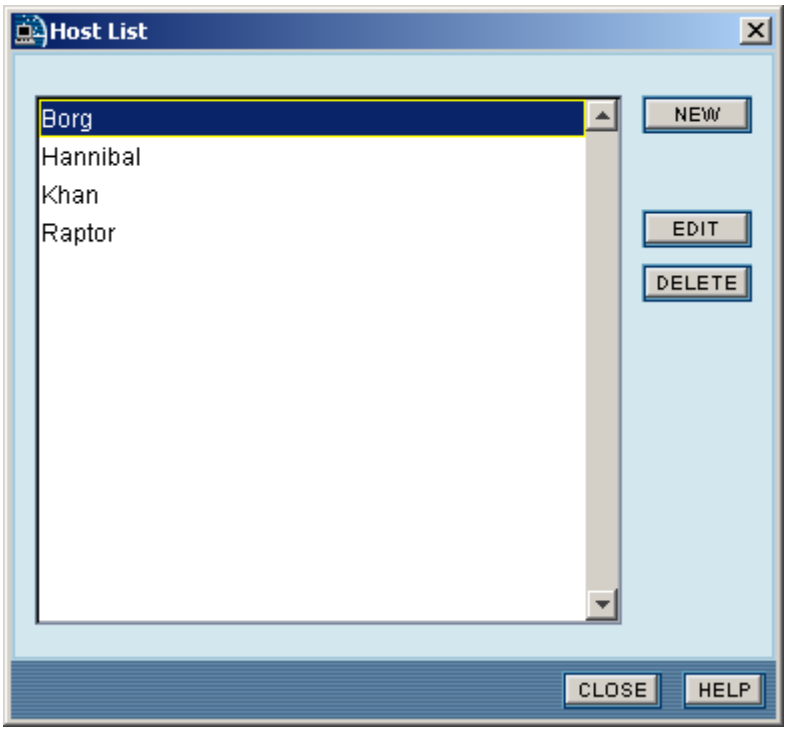


Figure 6.79 Host List Panel

6.5.1 Adding a Host

The System Administrator, Storage Administrator, Local System Administrator, and Local Storage Administrator can add hosts to HiCommand™ Device Manager. The guest user does not have access to this function.

When you add a host, you identify the host system and its associated world wide names (WWNs) to the HiCommand™ Device Manager system. Once a host has been added to HiCommand™ Device Manager, you can use this information to secure LUNs using the WWNs of this host.

To add a host to HiCommand™ Device Manager:

1. Log in to HiCommand™ Device Manager as a System Administrator, Storage Administrator, Local System Administrator, or Local Storage Administrator.
2. Open the Host Properties panel (see Figure 6.80):
   - From the menu bar: Select **Config – Hosts** to open the Host List panel (refer to Figure 6.79), and then select **New**.
   - From the View panes: Select the **Host View**, and then select **Add Host**.
3. Enter the name for the new host. ***Note:*** The host name is not case-sensitive. For example, "HOST-1" and "host-1" refer to the same host and cannot both be used.
4. Select **Add** to open the Add WWN panel, enter a WWN associated with this host, and select **OK** (see Figure 6.81). Repeat to add each WWN for this host. ***Note:*** You must enter at least one WWN for the new host.
5. When you are finished adding WWNs, review the information on the Host Properties panel (see Figure 6.82). When the information is correct, select **Save** to add the specified host, or select **Cancel** to cancel your request to add a new host.

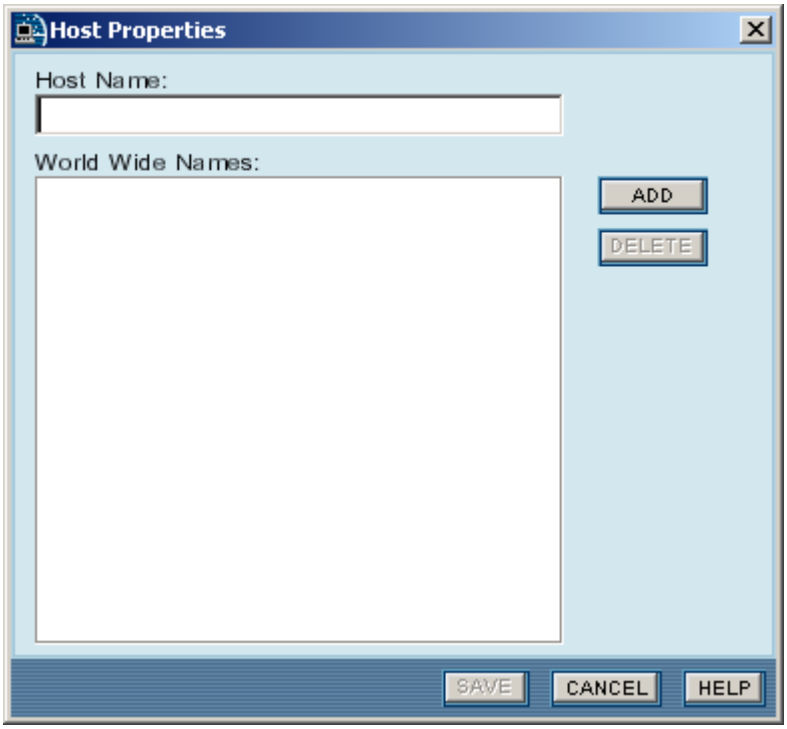


Figure 6.80 Adding a Host – Entering the Name

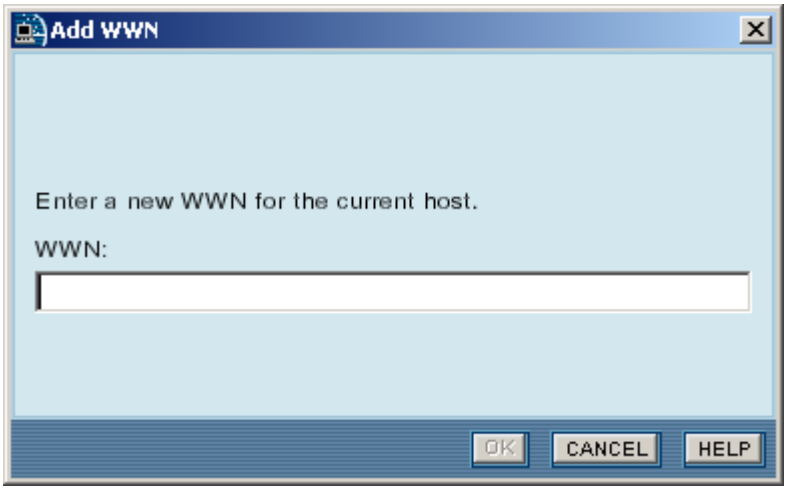


Figure 6.81 Adding a Host – Entering the WWN(s)

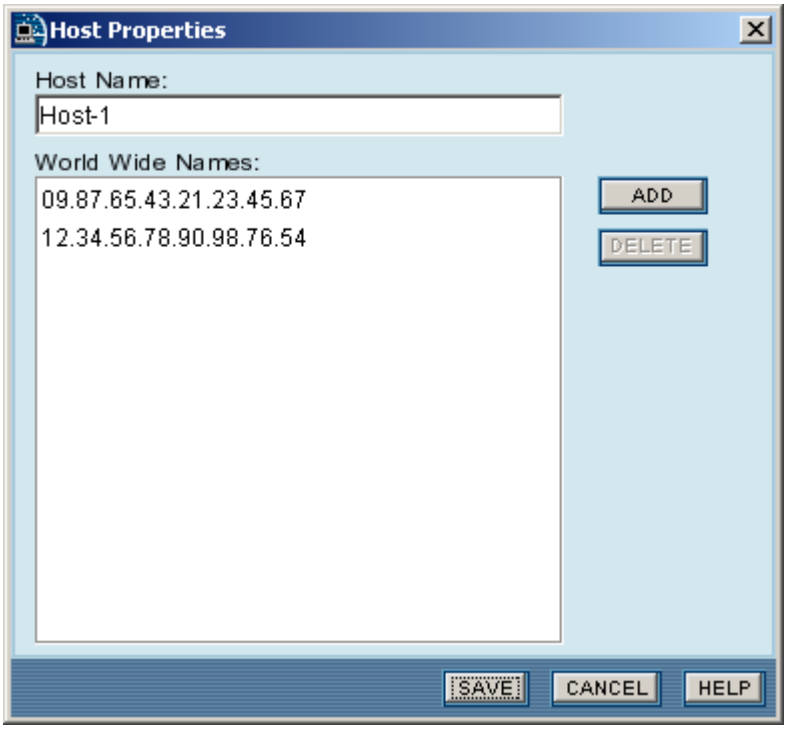


Figure 6.82 Adding a Host – Confirming and Saving

6.5.2 Viewing and Editing Host Properties

The System Administrator, Storage Administrator, Local System Administrator, and Local Storage Administrator can edit the existing host properties as needed. The guest user can only view the host properties.

To edit the properties of a HiCommand™ Device Manager host:

1. Log in to HiCommand™ Device Manager as a System Administrator, Storage Administrator, Local System Administrator, or Local Storage Administrator.
2. Open the Host Properties panel (see Figure 6.83):
   - From the menu bar: Select **Config – Hosts** to open the Host List panel (refer to Figure 6.79), select the desired host, and then select **Edit**.
   - From the View panes: Select the **Host View**, and select the **Properties** button for the desired host.
3. Make the desired changes on the Host Properties panel:
   - To add a WWN to the host, select **Add**, enter the WWN on the Add WWN panel (see Figure 6.84), and select **OK** to return to the Host Properties panel.
   - To delete a WWN, select the WWN, and then select **Delete**.
   - To change the host name, edit the text under **Host Name**.
4. When you are done making changes, select **Save** on the Host Properties panel to save your changes (or select **Cancel** to cancel your request to edit the host).
5. If you added new WWN(s) to a host which has secured LUNs, HiCommand™ Device Manager displays and asks you to select and confirm the associated LUN security changes (see Figure 6.85, Figure 6.86).
6. After you have selected/confirmed the associated LUN security changes (if any), HiCommand™ Device Manager asks you for final confirmation (see Figure 6.87 and Figure 6.88). Select **Yes** to modify the host as specified, or select **No** to cancel your request to modify the host.

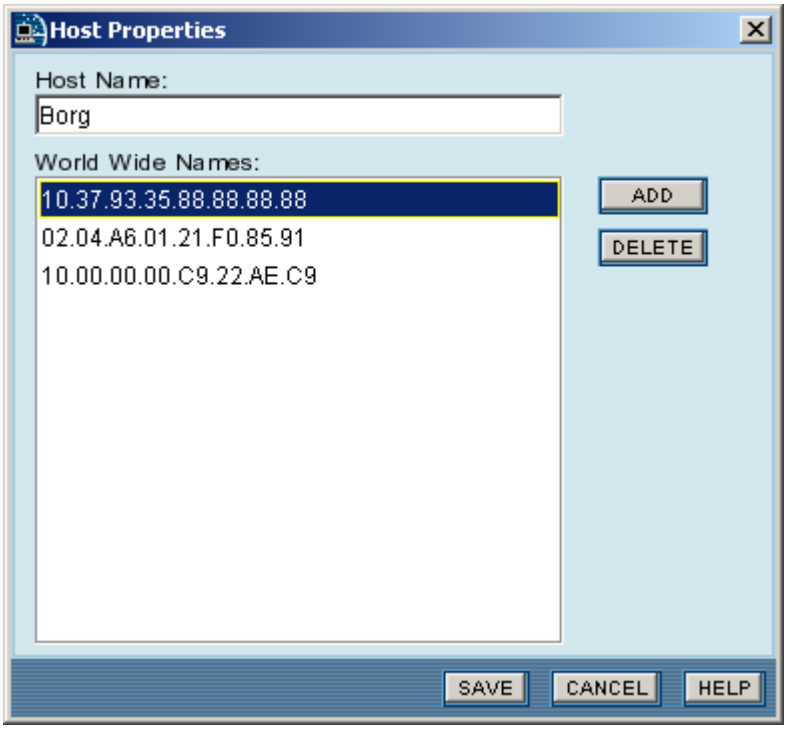


Figure 6.83 Editing Host Properties

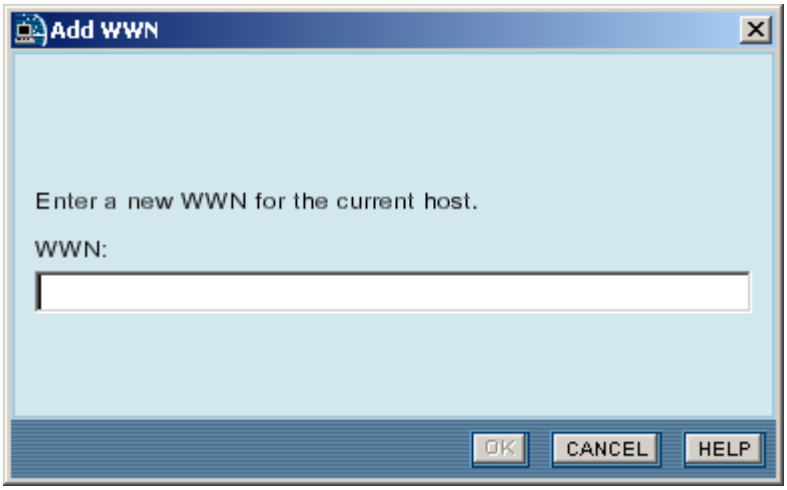


Figure 6.84 Editing Host Properties – Adding a WWN

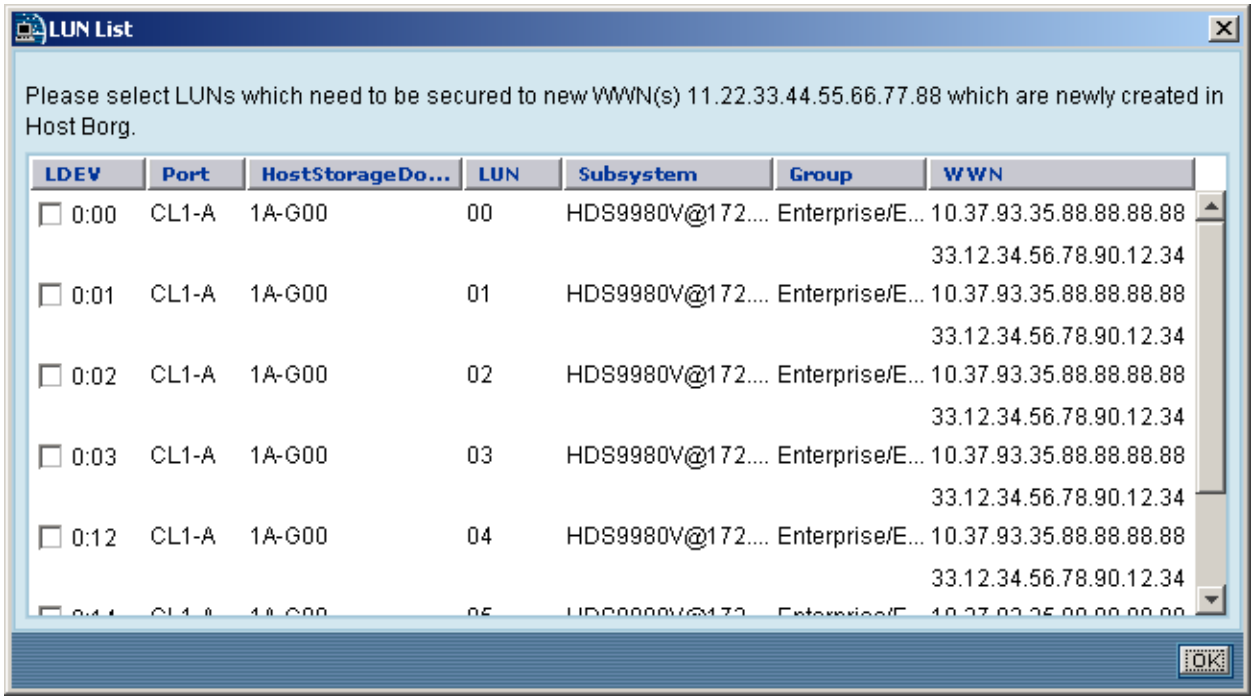


Figure 6.85 Editing Host Properties – Selecting LUN Security Changes

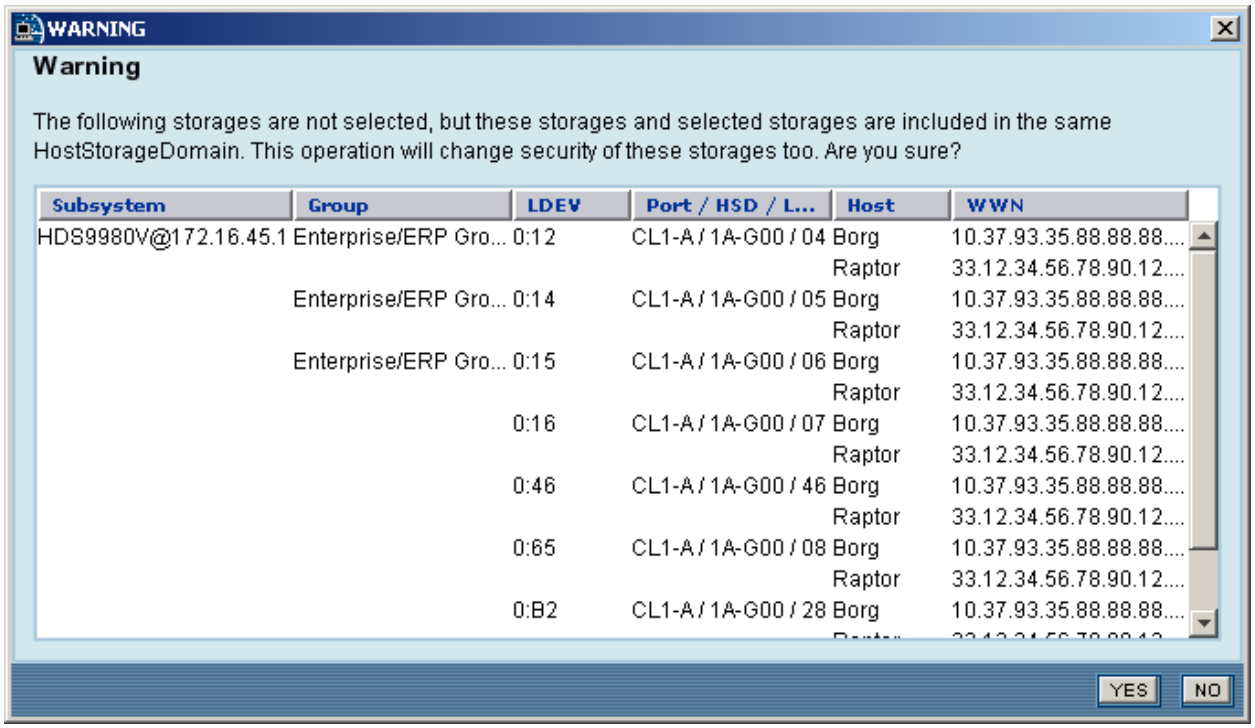


Figure 6.86 Editing Host Properties – Confirming LUN Security Changes

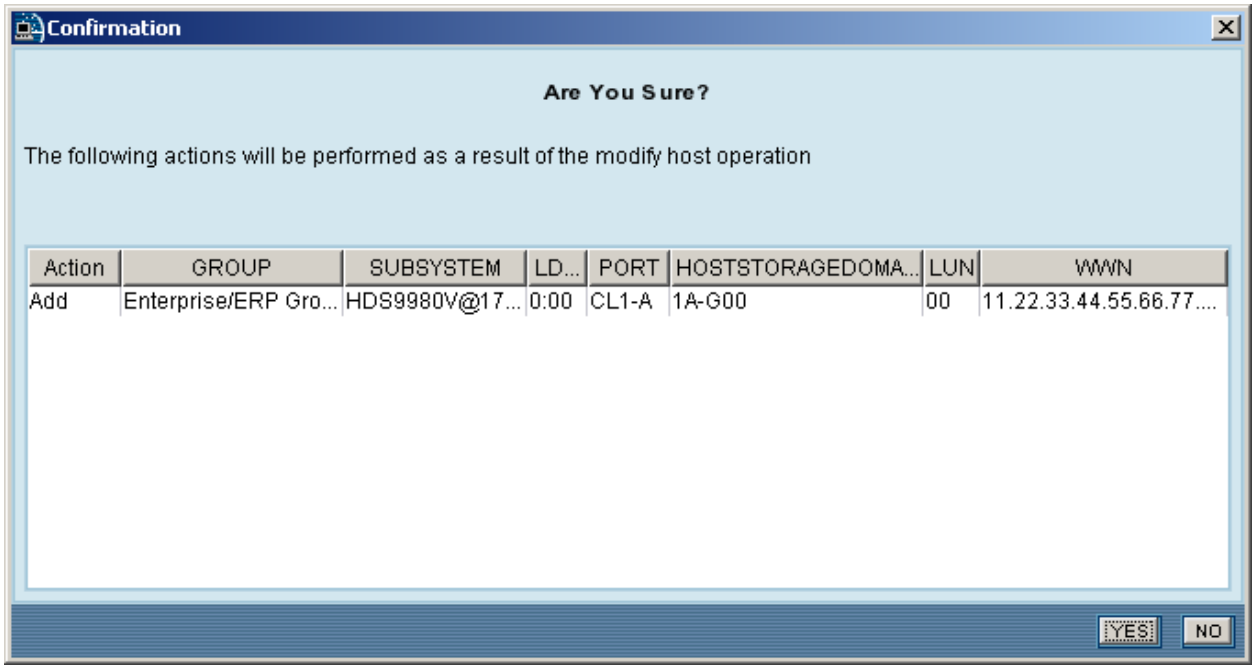


Figure 6.87 Editing Host Properties – Confirming WWN Addition

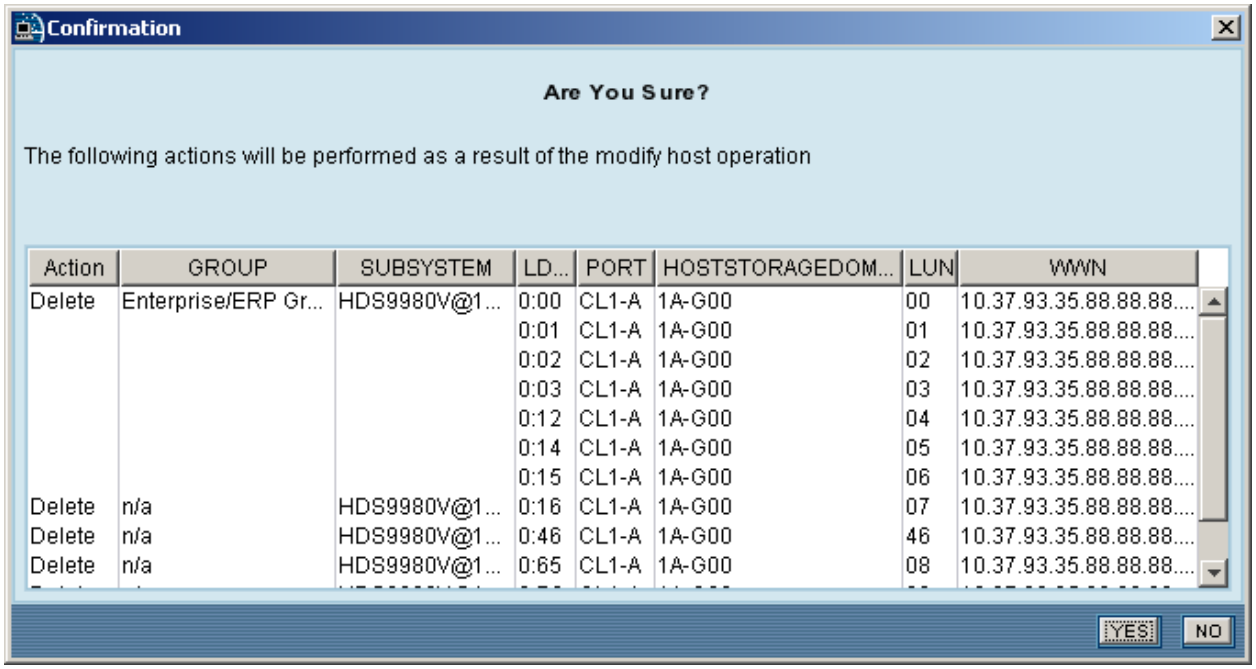


Figure 6.88 Editing Host Properties – Confirming WWN Deletion

6.5.3 Deleting a Host

The System Administrator, Storage Administrator, Local System Administrator, and Local Storage Administrator can delete an existing HiCommand™ Device Manager host, as long as it is not securing any LUNs. The guest user does not have access to this function.

To delete a host from the HiCommand™ Device Manager system:

1. Log in to HiCommand™ Device Manager as a System Administrator, Storage Administrator, Local System Administrator, or Local Storage Administrator.
2. Select **Config** - **Hosts** on the menu bar to open the Host List panel (refer to Figure 6.79).
3. Select the host to be deleted, and then select **Delete**.
4. HiCommand™ Device Manager displays the LUN security changes associated with the delete host operation (if any) (see Figure 6.89) and asks you to confirm the delete host operation. Select **Yes** to delete the host, or select **No** to cancel your request to delete the host.

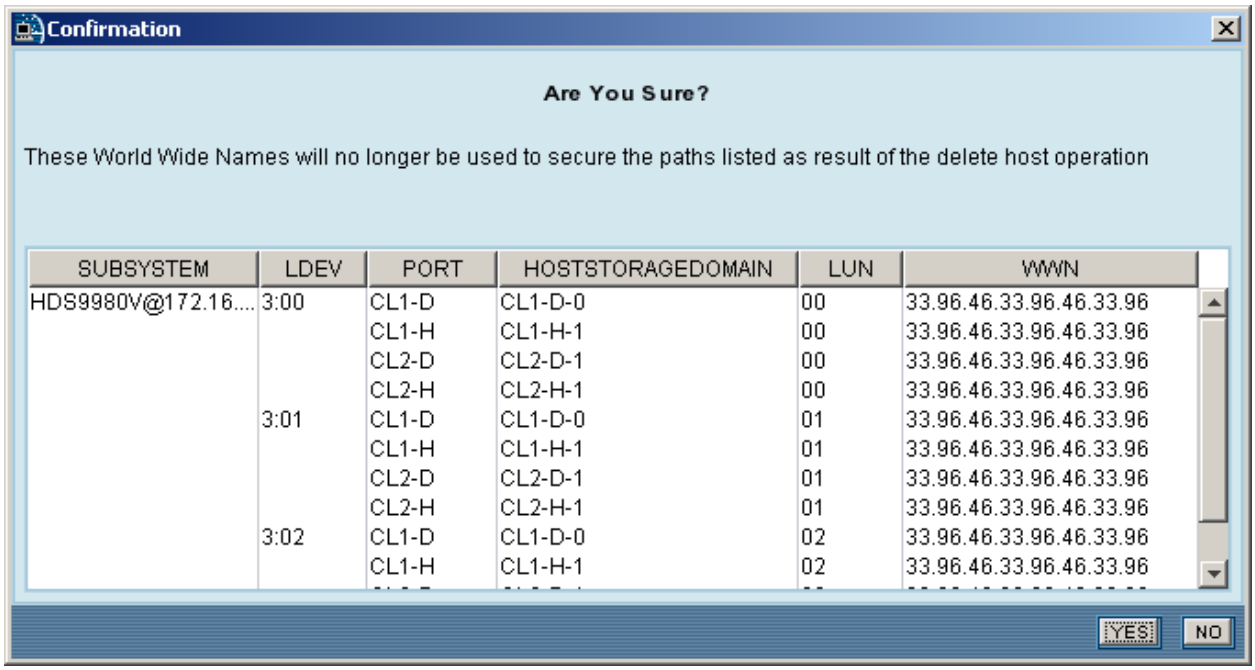


Figure 6.89 Deleting a Host – Confirmation

6.6 Storage Group Operations

The System Administrator, Storage Administrator, Local System Administrator, and Local Storage Administrator can perform storage group operations. The guest user can only view the storage group information.

A HiCommand™ Device Manager storage group is a user-defined set of LUNs that can be manipulated as a group. The HiCommand™ Device Manager storage group operations include:

- Adding storage to a storage group (see section 6.6.1),
- Moving storage from one group to another (see section 6.6.2),
- Deleting storage from a group (see section 6.6.3), and
- Modifying the LUN security of one or more LUN(s) in a group (see section 6.6.4).

Note: For instructions on adding and deleting storage groups, please refer to section 5.8.

Note: When an error occurs during a storage group operation, HiCommand™ Device Manager might ask you to perform the Refresh operation. If you cannot perform a Refresh operation (e.g., Local System Administrator, Local Storage Administrator), please ask the HiCommand™ Device Manager System Administrator to perform the Refresh operation.

6.6.1 Adding Storage to a Storage Group

The System Administrator, Storage Administrator, Local System Administrator, and Local Storage Administrator can add storage to a storage group. The guest user does not have access to this function.

When you add storage, you add one or more LUNs (access paths) to a storage group. You can add allocated and/or unallocated storage to a storage group. During this process you can optionally create LUSE device(s) and secure the LUNs to host WWNs.

Note: If an error occurs during a storage group operation, HiCommand™ Device Manager might ask you to perform the Refresh operation. If you do not have access to the Refresh operation (e.g., Local or guest user), please ask the HiCommand™ Device Manager System Administrator to perform the Refresh operation.

To add storage to a storage group:

1. Log in to HiCommand™ Device Manager as a System Administrator or Storage Administrator.
2. Select **Logical View** to view the logical groups, select the desired storage group, and then select the **Add Storage** button (see Figure 6.90).
3. If the selected group is empty, the Define Port/Host Connections panel opens. You will perform steps 4, 5, 6, 7, 8, 9.

   If the selected group contains LUNs with the same ports and hosts assigned to them, the Select Add Storage Operation panel opens (see Figure 6.91). Select the desired type of add storage operation, and then select **Next**.

   - Option 1: The Allocate Storage panel opens. You will perform steps 5, 6, 8, and 9.
   - Option 2: The Select Ports panel opens. You will perform steps 4, 8, and 9.
   - Option 3: The Define Port/Host Connections panel opens. You will perform steps 4, 5, 6, 7, 8, and 9.
4. Define Port/Host Connections panel or Select Ports panel (see Figure 6.92).
   Select the desired subsystem (available only for an empty group), select the desired port(s) and/or port/host connection(s) for the storage to be added. The **Info** buttons for the 9900V display the host storage domain information for the ports. When the port and port/host information is correct, select **Next** to continue. For option 2, go to step 8.

   Note: If you selected option 3, you will be able to assign each LUN to different port/host connections as needed, so make sure to select all desired port/host connections.

   Note: Each 9900V port has its own host storage domains with LUN security settings. The same WWN can only be assigned to one host storage domain on each port.

5. Allocate Storage panel (see Figure 6.94).
   Enter the ID(s) of the LDEV(s) that you want to add, and select **Next** to continue.
   - **Browse:** Select the desired LDEV(s) from a list of available LDEVs on the selected subsystem (see Figure 6.95). Use **Browse** when configuring LUSE devices.
   - **Find Storage:** Enter the total capacity that you want to add, or enter the number and type of devices (e.g., OPEN-3) to add. Select **Advanced Options** to find storage based on RAID level, disk drive type, and/or ACP pair (see Figure 6.96).

     If you used one of the **Find Storage** options, the Storage Found panel displays the storage that matches your search criteria (see Figure 6.97). Select **Next** to continue, or select **Back** to go back to the Allocate Storage panel.
6. Define LUs panel (see Figure 6.97) (not applicable to the T3 array).
   If you do not want to create LUSE devices, select **Next** to continue.
   To optionally create LUSE devices from unallocated LDEVs, select the desired LDEVs for each LUSE device, and select the **Create LUSE>>>** button. The **Info** button opens the LDEV Information panel. When the LUSE information is correct, select **Next** to continue. For option 1, go to step 8.

   Note: See section 6.4 for LUSE device requirements.
7. Assign Host/Port Connections panel (see Figure 6.99) (not applicable to the T3 array).
   The host/port connection(s) that you selected on the Define Port/Host Connection panel are displayed. Select the desired LDEV/LU(s), select the desired host/port connection(s), and select **Add**. Repeat as needed. When you are finished assigning connections, select **Next** to continue.
8. Assign LUN(s) panel (see Figure 6.100) (not applicable to the T3 array).
   The LDEVs/LUs and host/port connections that you selected on the Assign Host/Port Connections panel are displayed. Verify the preselected LUNs, or enter the desired LUNs. When you are finished assigning LUNs, select **Finish**.
9. The Summary of Changes panel displays the requested add storage operations and asks you to confirm the requested operations (see Figure 6.100). Select **Confirm** to add the storage as specified, or select **Cancel** to cancel your add storage request. If you need to make any changes, select **Back** to return to the previous panel(s).

Note: The 9200 subsystem has a facility for reserving LUNs for internal devices that are not defined on the 9200. These LUNs may not be assigned to storage on the port where these LUNs have been reserved. If you attempt to allocate storage on a port using one of these reserved LUNs, LUN security will be automatically configured without any user action.

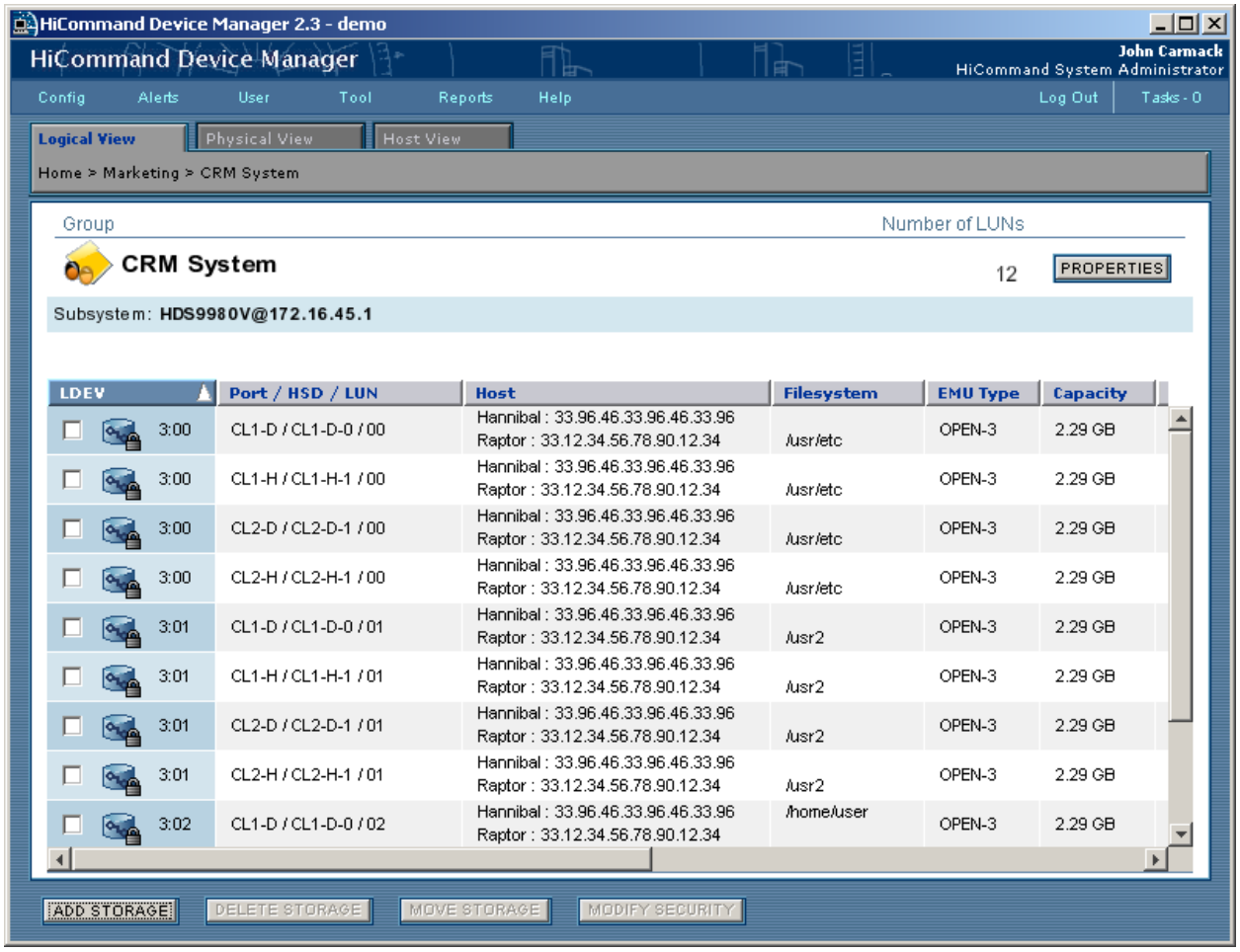


Figure 6.90 Adding Storage – Selecting an Existing Group First

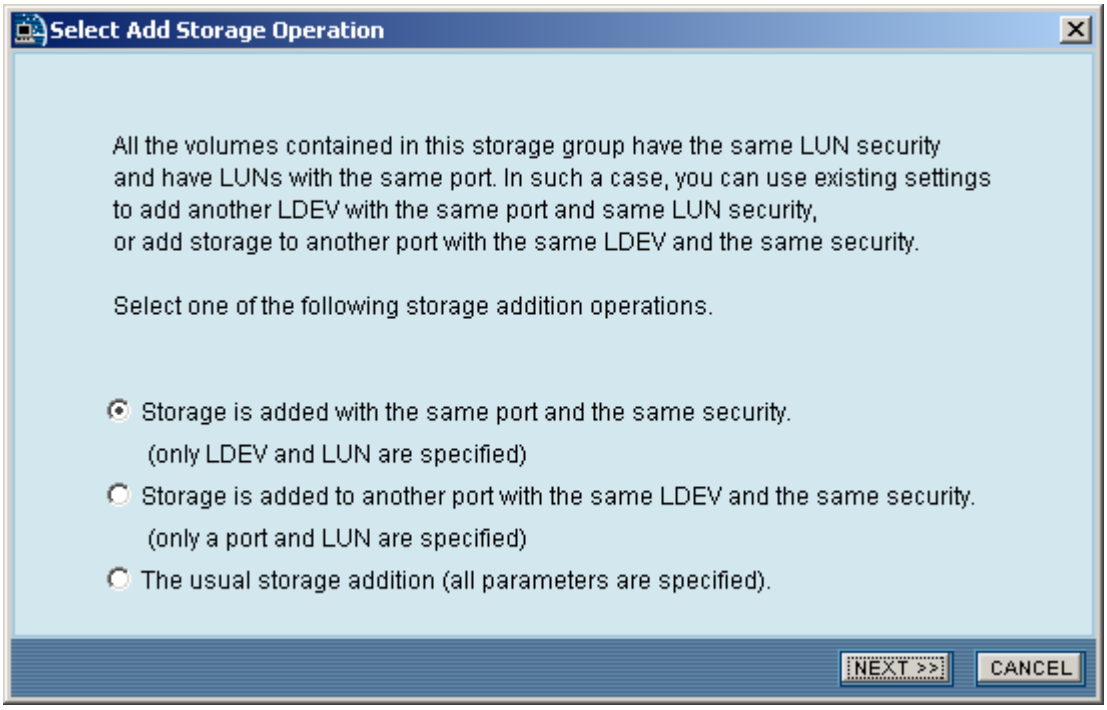
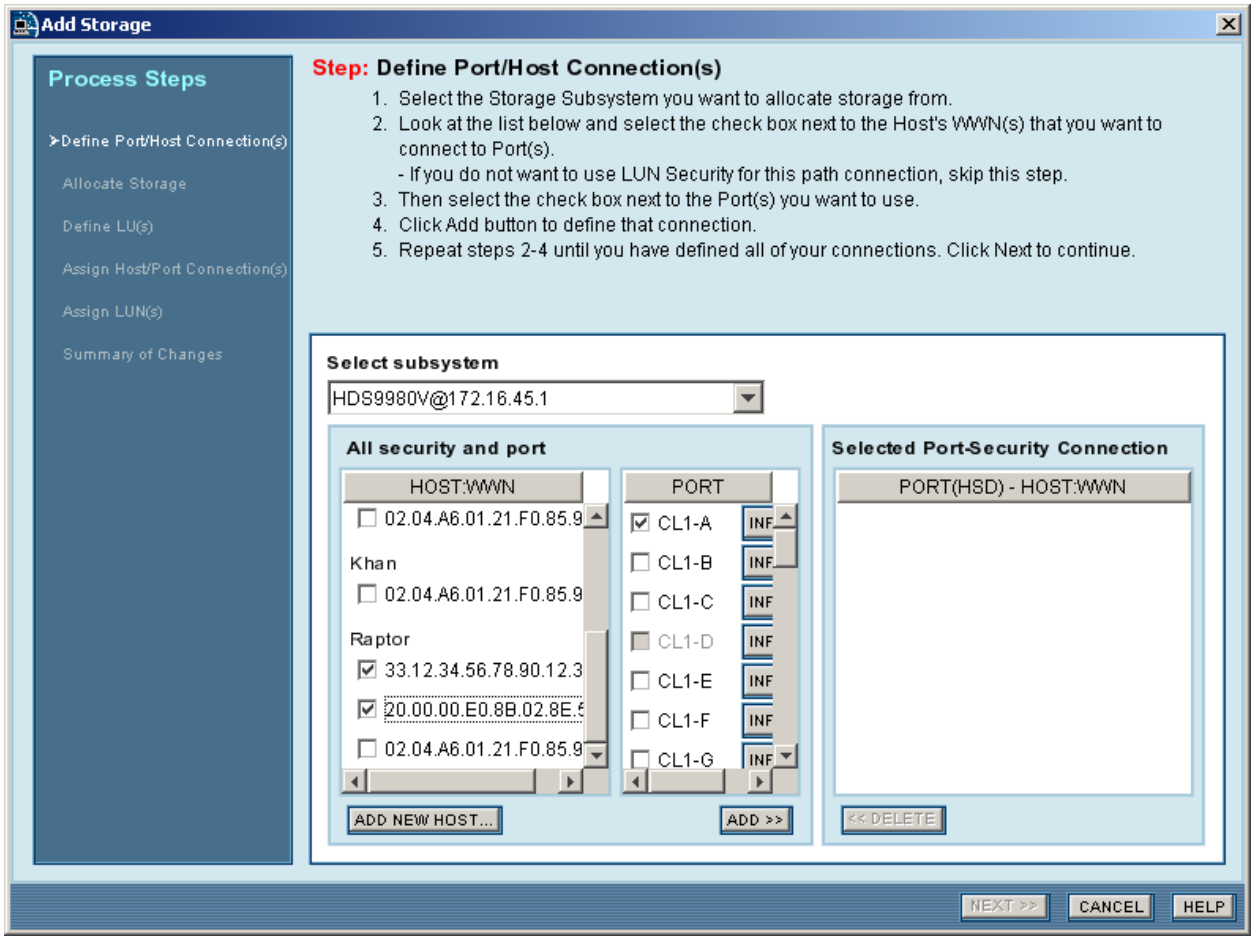


Figure 6.91 Adding Storage – Selecting the Type of Add Storage Operation



Note: You can only select the subsystem if the selected storage group is empty.

Figure 6.92 Adding Storage – Selecting the Subsystem, Port(s), and WWN(s)

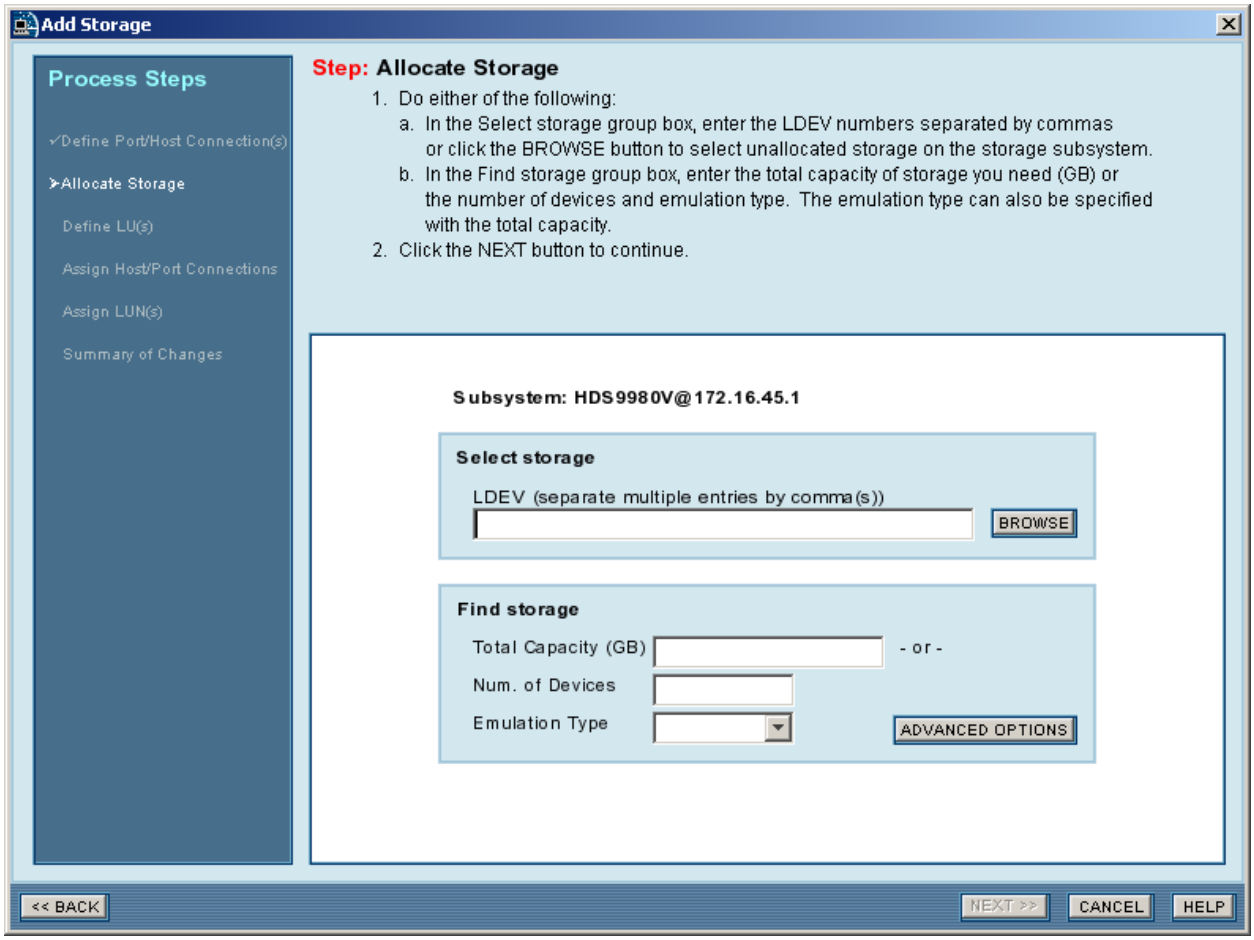


Figure 6.93 Adding Storage – Selecting the LDEV(s)/LU(s)

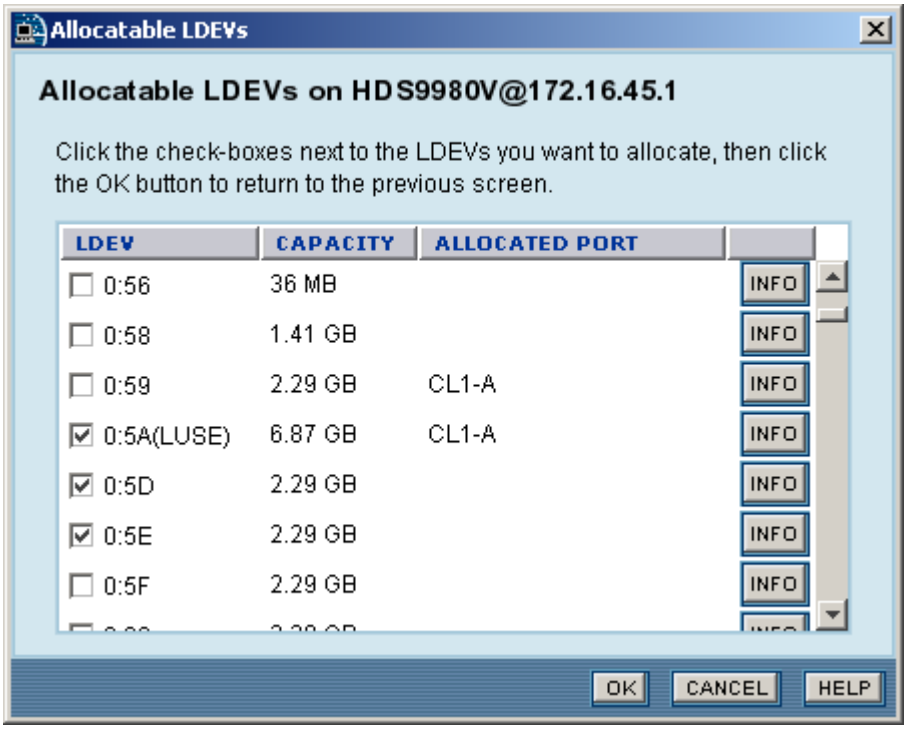


Figure 6.94 Adding Storage – Browsing for LDEV(s) and LU(s)

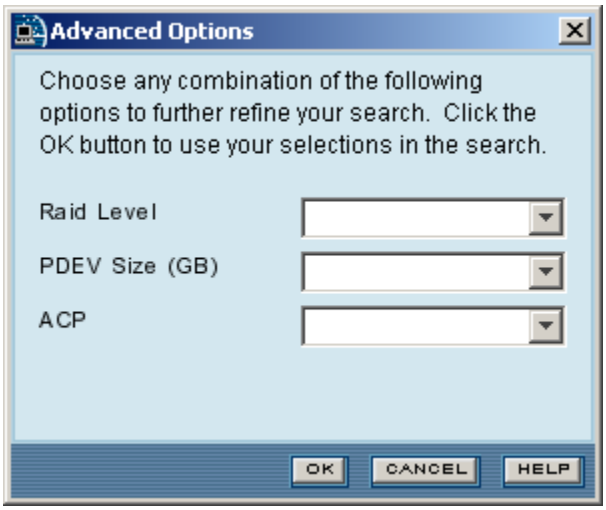


Figure 6.95 Adding Storage – Advanced Options for Finding Storage

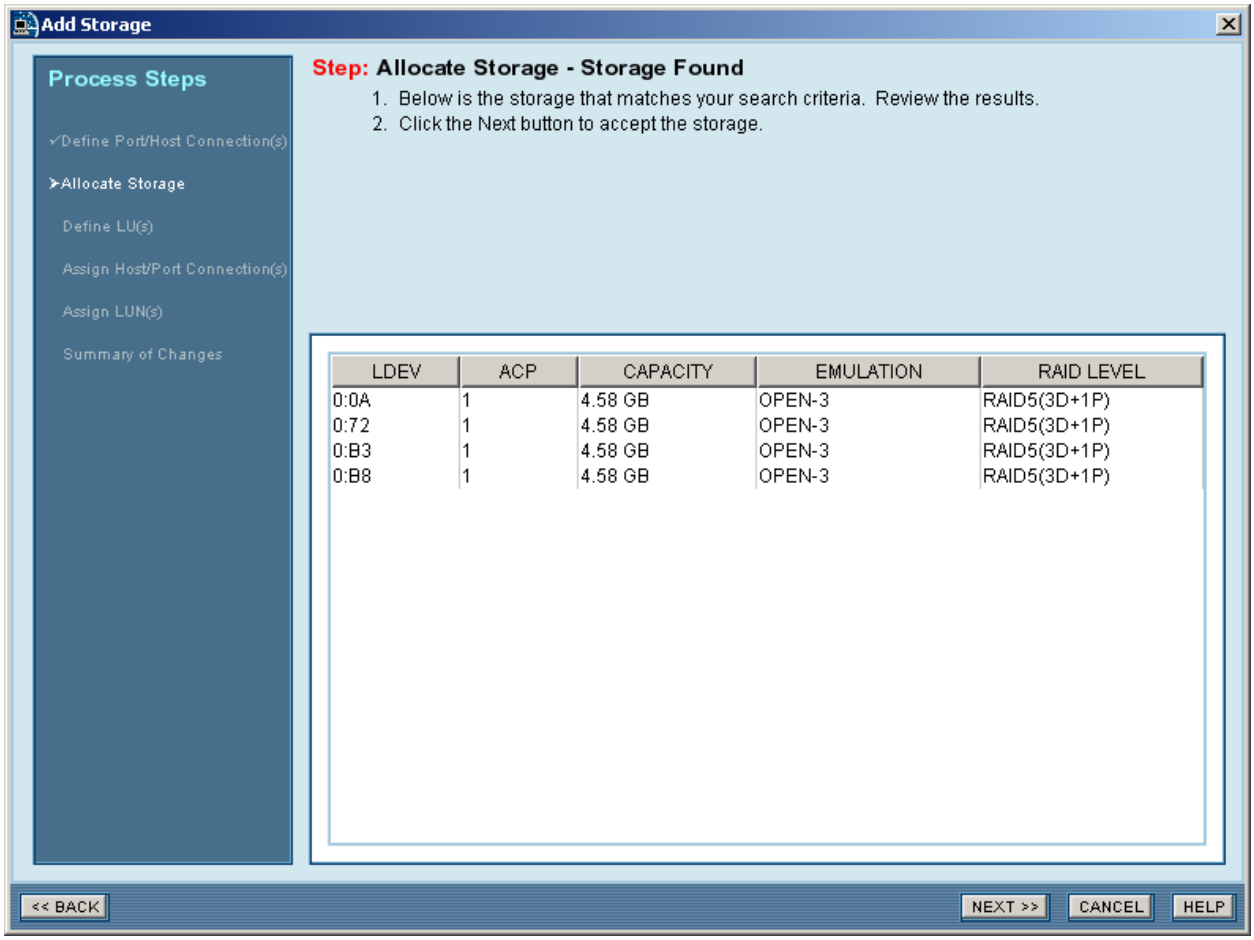


Figure 6.96 Adding Storage – Storage Found

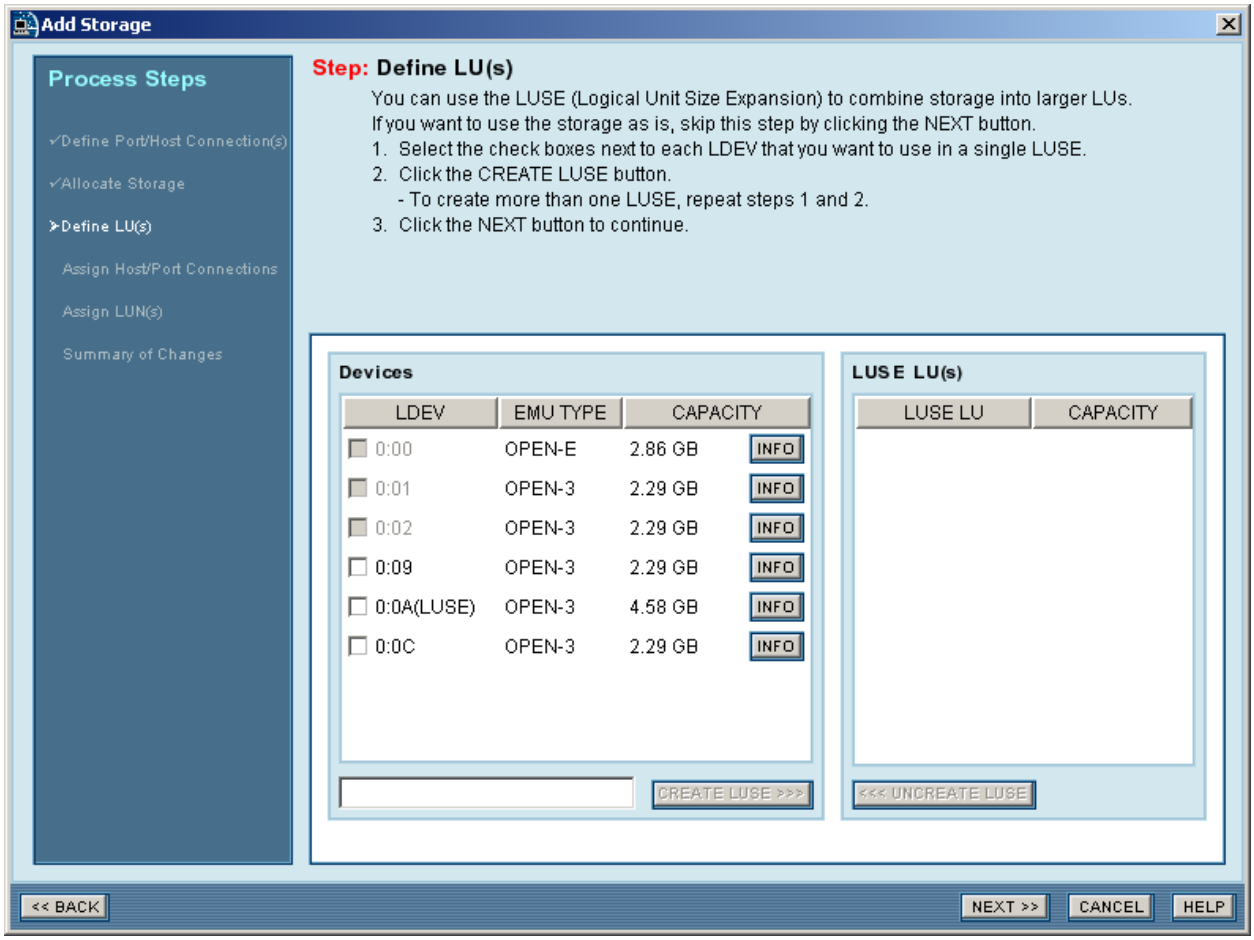


Figure 6.97 Adding Storage – Creating LUSE Devices

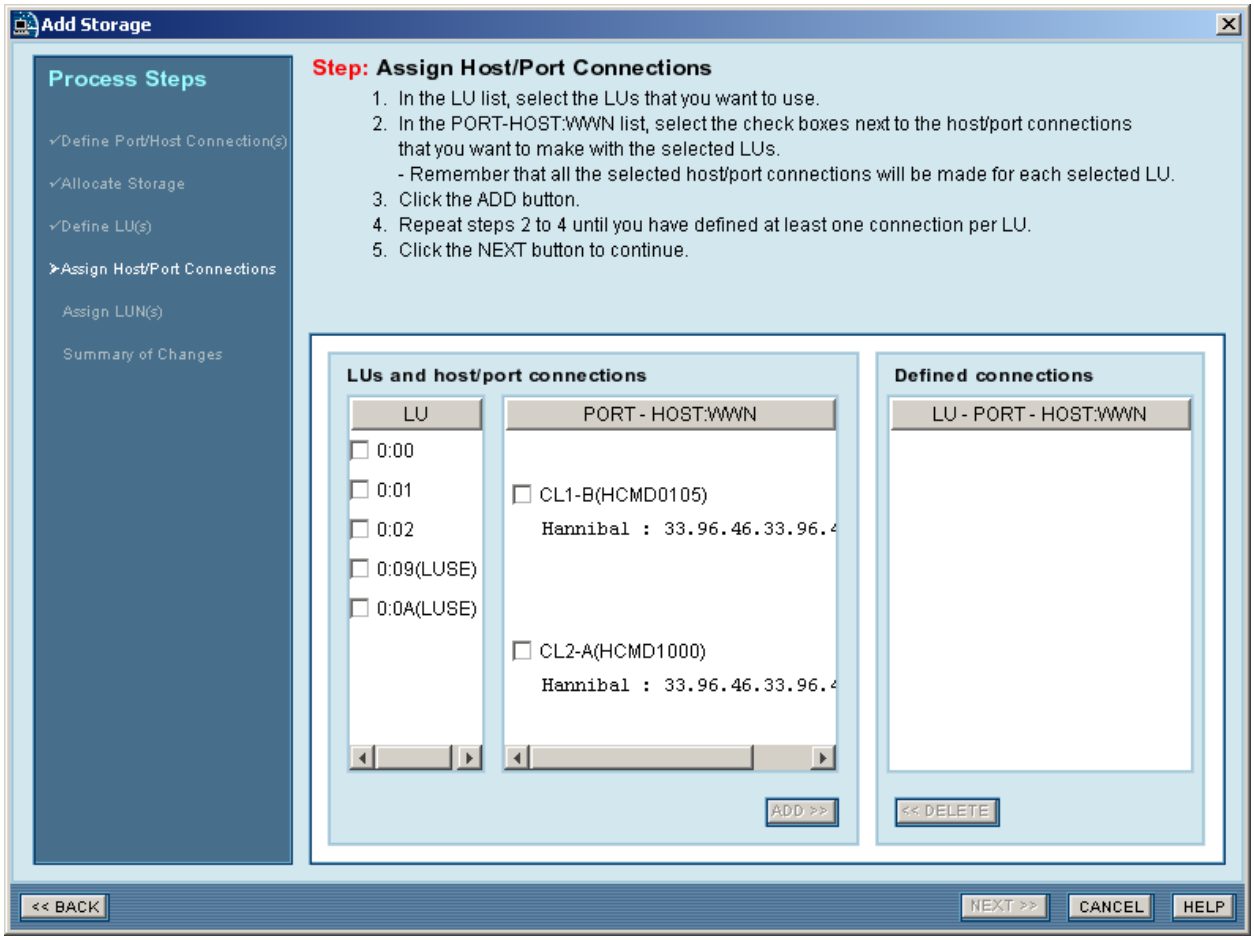


Figure 6.98 Adding Storage – Assigning Host/Port Connection(s)

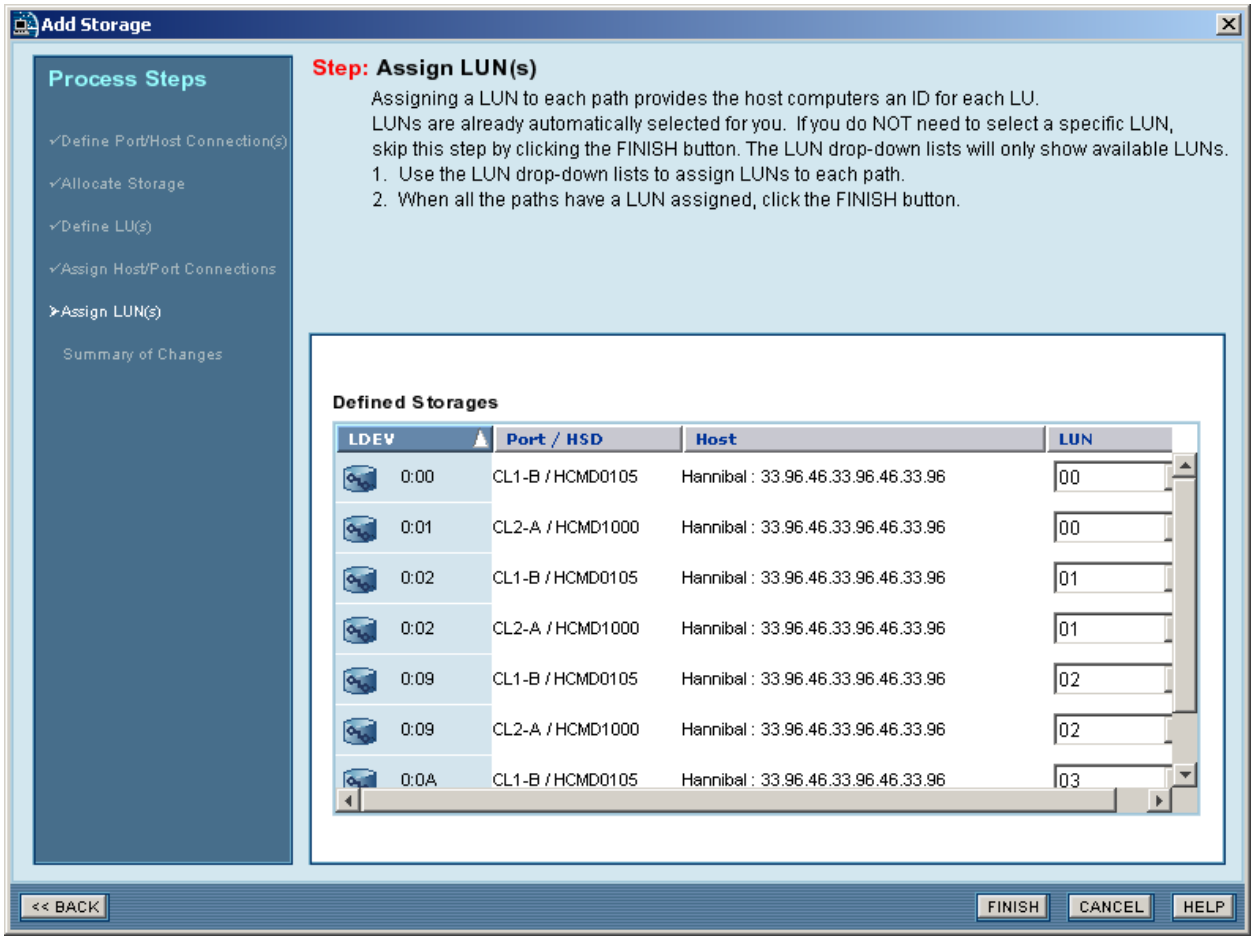


Figure 6.99 Adding Storage – Assigning LUNs

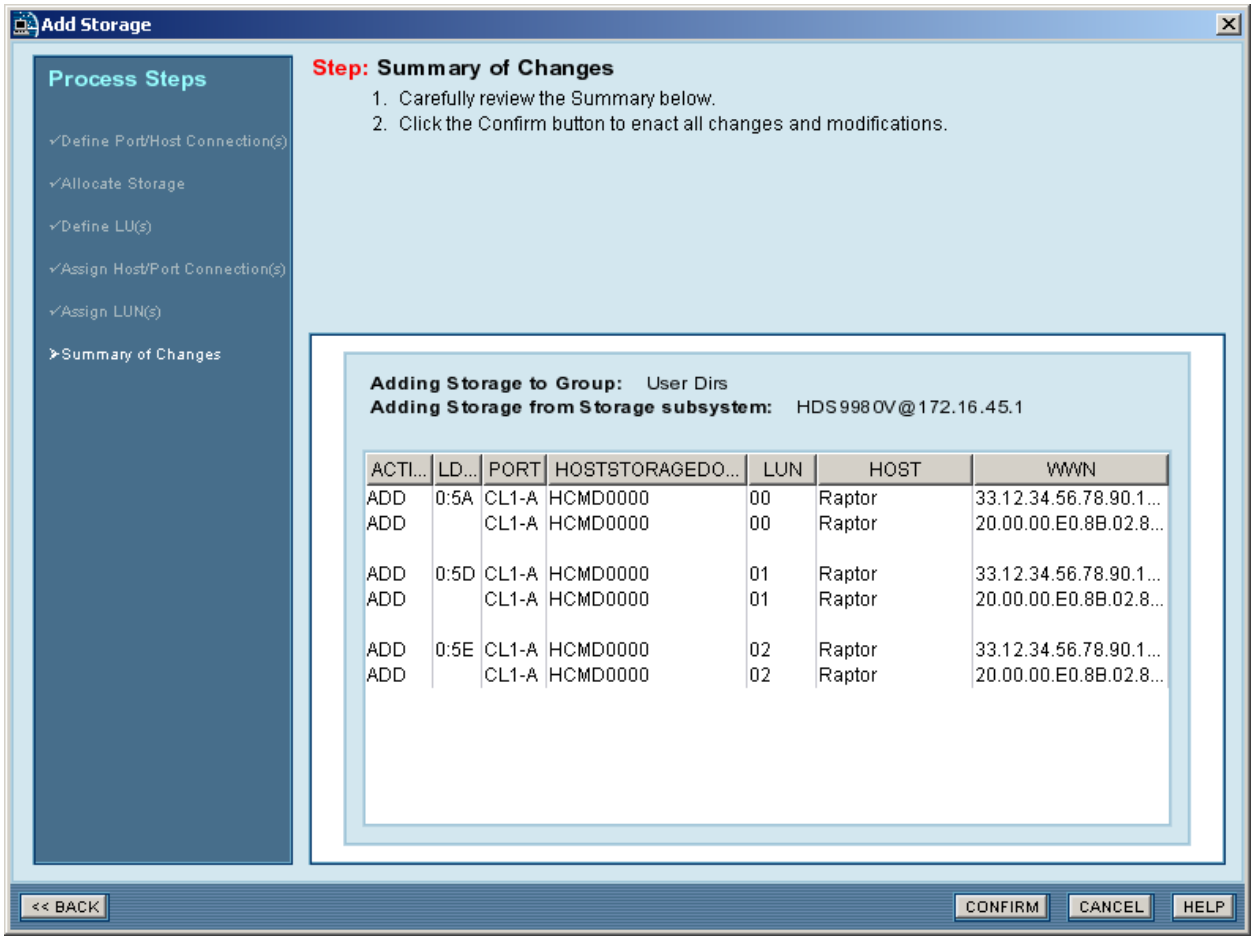


Figure 6.100 Adding Storage – Confirmation

6.6.2 Moving Storage from One Group to Another

The System Administrator, Storage Administrator, Local System Administrator, and Local Storage Administrator can move storage (LUNs) from one storage group to another. The guest user does not have access to this function.

When you move storage, you move the selected LUNs (paths) from the source storage group to the target storage group. Both storage groups (source and target) must be on the same storage subsystem. The access paths to the LUs are not affected by this operation.

To move one or more LUNs (paths) from one storage group to another:

1. Log in to HiCommand™ Device Manager as System Administrator, Storage Administrator, Local System Administrator, or Local Storage Administrator.
2. Select **Logical View** to view the logical groups, and select the storage group that contains the LUN(s) that you want to move. If the LUN(s) are not yet assigned to any user-defined storage group, go to the **Allocated** group for the subsystem.
3. From user-defined group: Select the desired LUN(s), and select **Move Storage**.

   From Allocated group: Select the desired LDEV(s), and select **Move to Group**. If any of the selected LDEV(s) has more than one access path, the Select Paths panel opens (see Figure 6.101). Select the desired path(s), and then select **OK**.
4. On the Logical Group List panel (see Figure 6.102), select the desired target storage group (or create a new group if desired), and select **Next** to continue. Groups with LUNs in the same subsystem as the selected LUN(s) are available for selection. For instructions on creating a new group, see section 5.8.1.
5. When the confirmation panel appears (see Figure 6.103), select **Yes** to move the LUN(s) as specified, or select **No** to cancel your request to move the LUN(s).

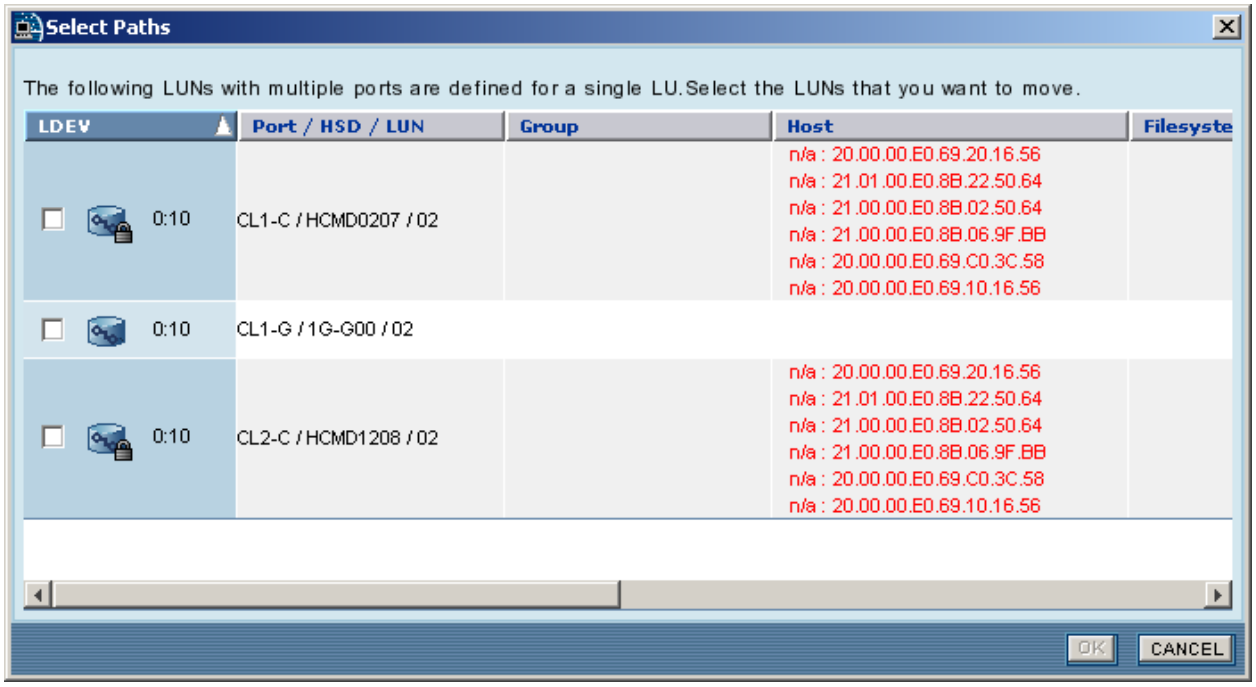


Figure 6.101 Moving Storage – Selecting the Path(s)

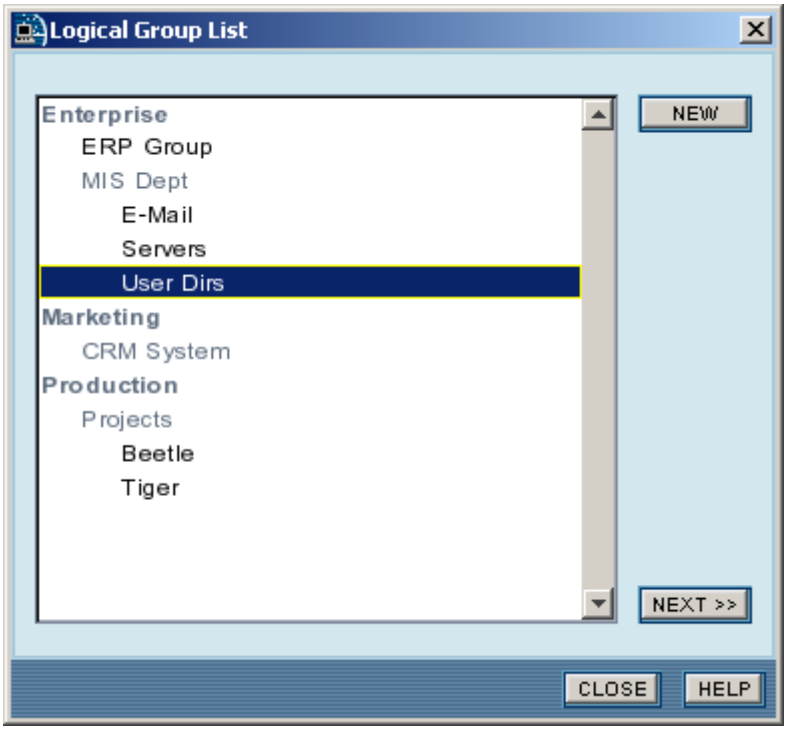


Figure 6.102 Moving Storage – Selecting the Target Group

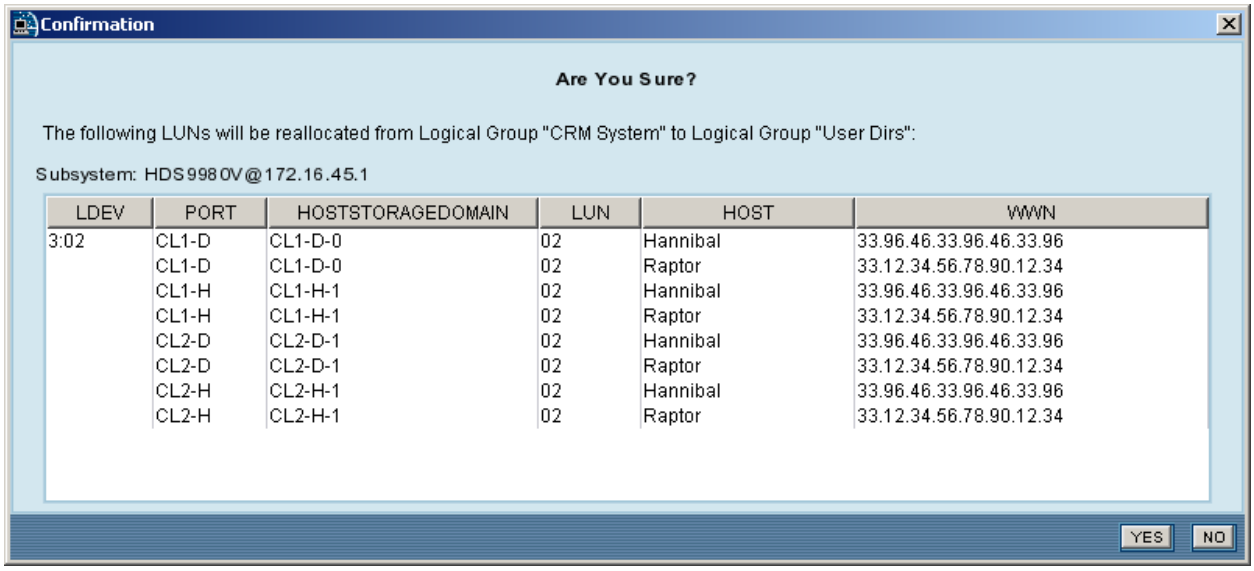


Figure 6.103 Moving Storage – Confirmation

6.6.3 Deleting Storage from a Group

The System Administrator, Storage Administrator, Local System Administrator, and Local Storage Administrator can delete storage (LUNs) from an existing storage group. The guest user does not have access to this function.

When you delete storage, you remove the selected LUN(s) from the storage group. During the delete storage operation, you can choose to keep or delete the LUN(s) (access paths) themselves.

Caution: Before deleting a LUN (access path), make sure that the path is no longer in use.

To delete storage (LUNs) from a storage group:

1. Log in to HiCommand™ Device Manager as System Administrator, Storage Administrator, Local System Administrator, or Local Storage Administrator.
2. Select **Logical View** to view the logical groups. Expand the groups as needed to view the subgroups and storage groups. Select the desired storage group.

   Note: The unallocate operation allows you to remove paths from LUs (see section 6.4.4).
3. Select the LUN(s) to be deleted, and then select **Delete Storage**.
4. When the confirmation panel appears (see Figure 6.104), review the requested operations. Make sure to select the **Keep access path** box if you want to keep the specified path(s) to the LU(s).
5. Select **Yes** to delete the specified LUN(s) from the specified group, or select **No** to cancel your request to delete storage. LDEVs/LUs with no remaining paths are now listed in the Unallocated group of the subsystem.

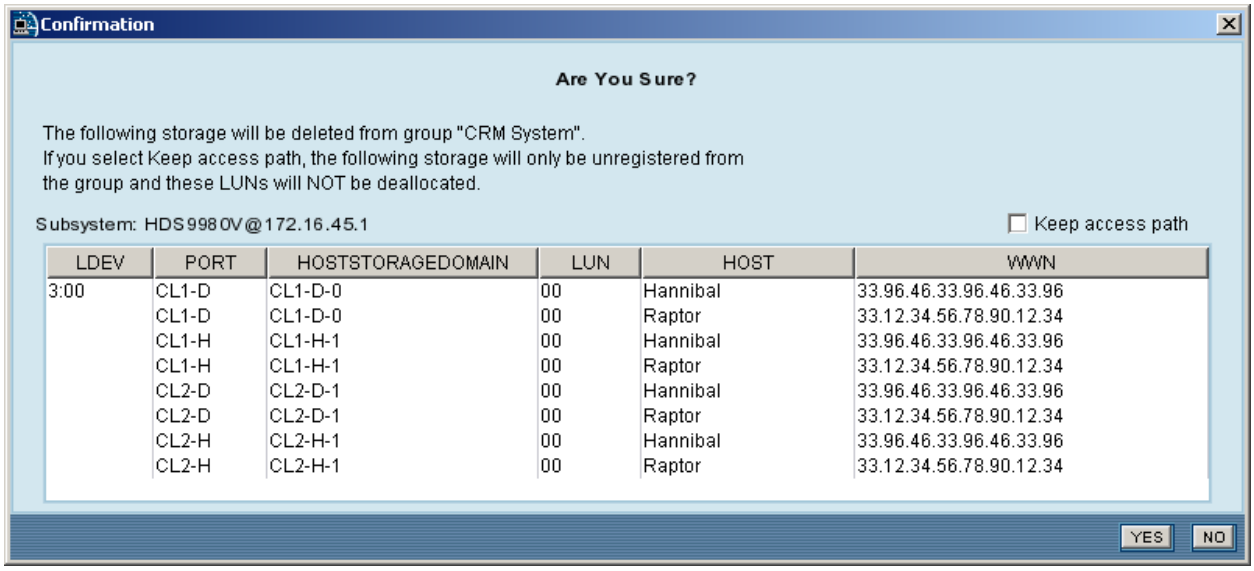


Figure 6.104 Deleting Storage – Confirmation

6.6.4 Modifying LUN Security

The System Administrator, Storage Administrator, Local System Administrator, and Local Storage Administrator can modify the LUN security of the LUN(s) in a storage group. The guest user does not have access to this function.

When you add a host WWN to a LUN, you secure that LUN to that WWN. When you remove a host WWN from a LUN, you unsecure that LUN from that WWN. For the 9900V, a secured group (i.e., a logical group containing secured LUNs) constitutes one host group (host storage domain) on the specified 9900V port. When you reach the maximum number of host groups on a port, you must use another port for securing storage. The 9900V supports a maximum of 128 host groups per port and 8,192 host groups for the entire subsystem.

Note: For 9900V, the LUN Manager feature must be enabled. For 9900, the Hitachi SANtinel feature must be enabled. For 9500V and 9200, the LUN Security feature must be enabled.

To modify the LUN security of one or more LUN(s):

1. Log in to HiCommand™ Device Manager as System Administrator, Storage Administrator, Local System Administrator, or Local Storage Administrator.
2. Select **Logical View** to view the logical groups. Expand the groups as needed to view the subgroups and storage groups.
3. Select the desired storage group, select the desired LUN(s), and then select the **Modify Security** button.
4. The Select Hosts panel (see Figure 6.105) displays the available host(s). The host(s) that are already secured to the selected LUN(s) are preselected. To add a new host, select **Add New Host…**, and add the new host and its WWN(s) (see section 6.5.1).

   Select the host(s) that you want to secure and/or unsecure from the selected LUN(s), and select **Next** to continue.
5. The Select WWNs panel (see Figure 6.106) displays the WWN(s) for the selected host(s). The WWN(s) that are already secured to the LUN(s) are preselected. Select the WWN(s) that you want to secure to the LUN(s), deselect the WWN(s) that you want to unsecure from the LUN(s), and then select **Next** to continue.
6. If you selected some but not all LUNs in a 9900V host storage domain, HiCommand™ Device Manager displays the rest of the LUNs in the host storage domain and asks you to confirm the additional LUN security changes (see Figure 6.107). Select **Yes** to continue.
7. HiCommand™ Device Manager displays a warning and asks you to review your changes carefully before confirming them (see Figure 6.108). Select **Close** to continue.
8. The Summary of Changes panel displays the requested LUN security changes and asks you to confirm the requested operations (see Figure 6.109). Select **Confirm** to modify the LUN security as specified, or select **Cancel** to cancel your request. If you need to make any changes, select **Back** to return to the previous panel(s).

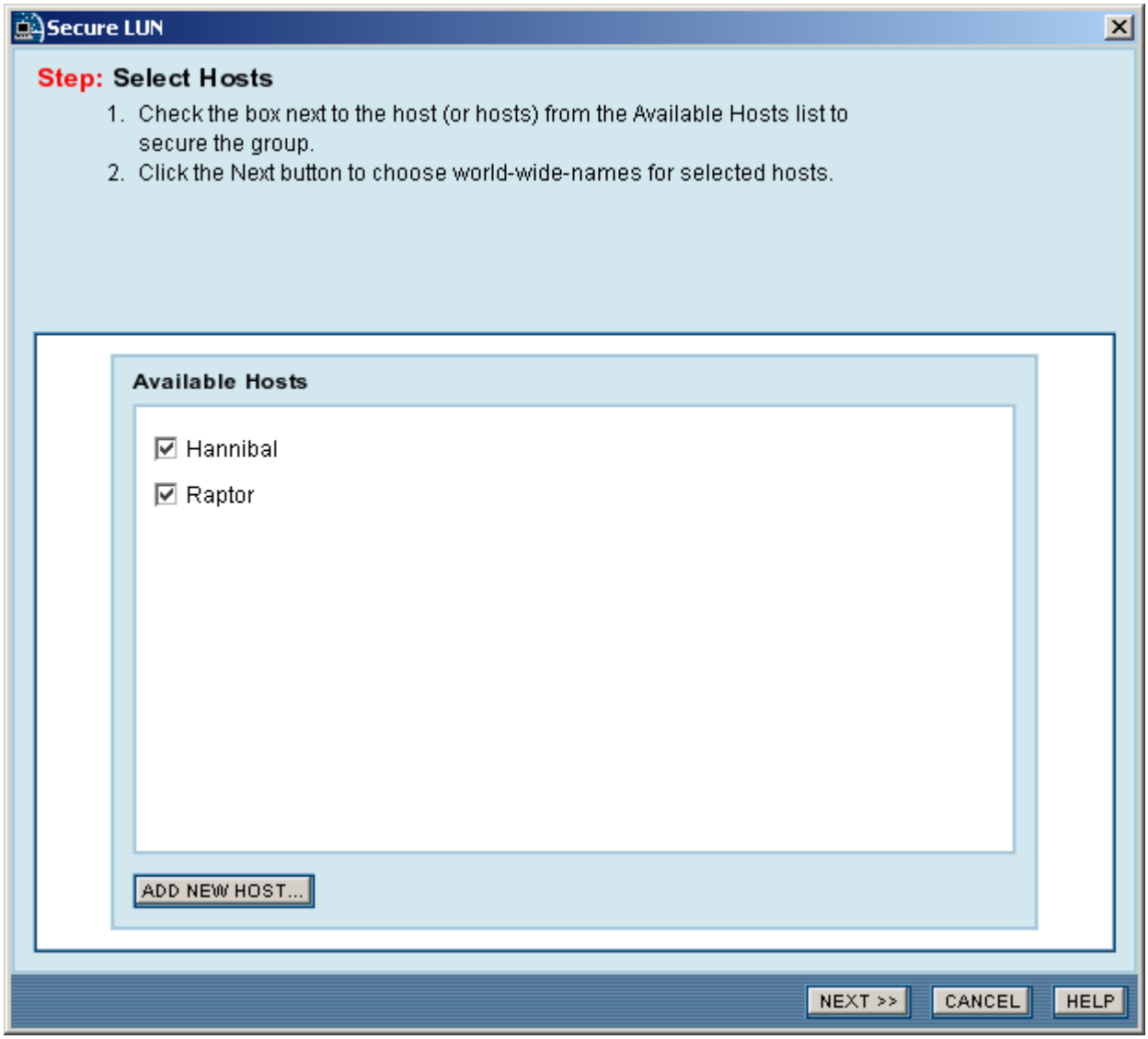


Figure 6.105 Modifying LUN Security – Selecting the Host(s)

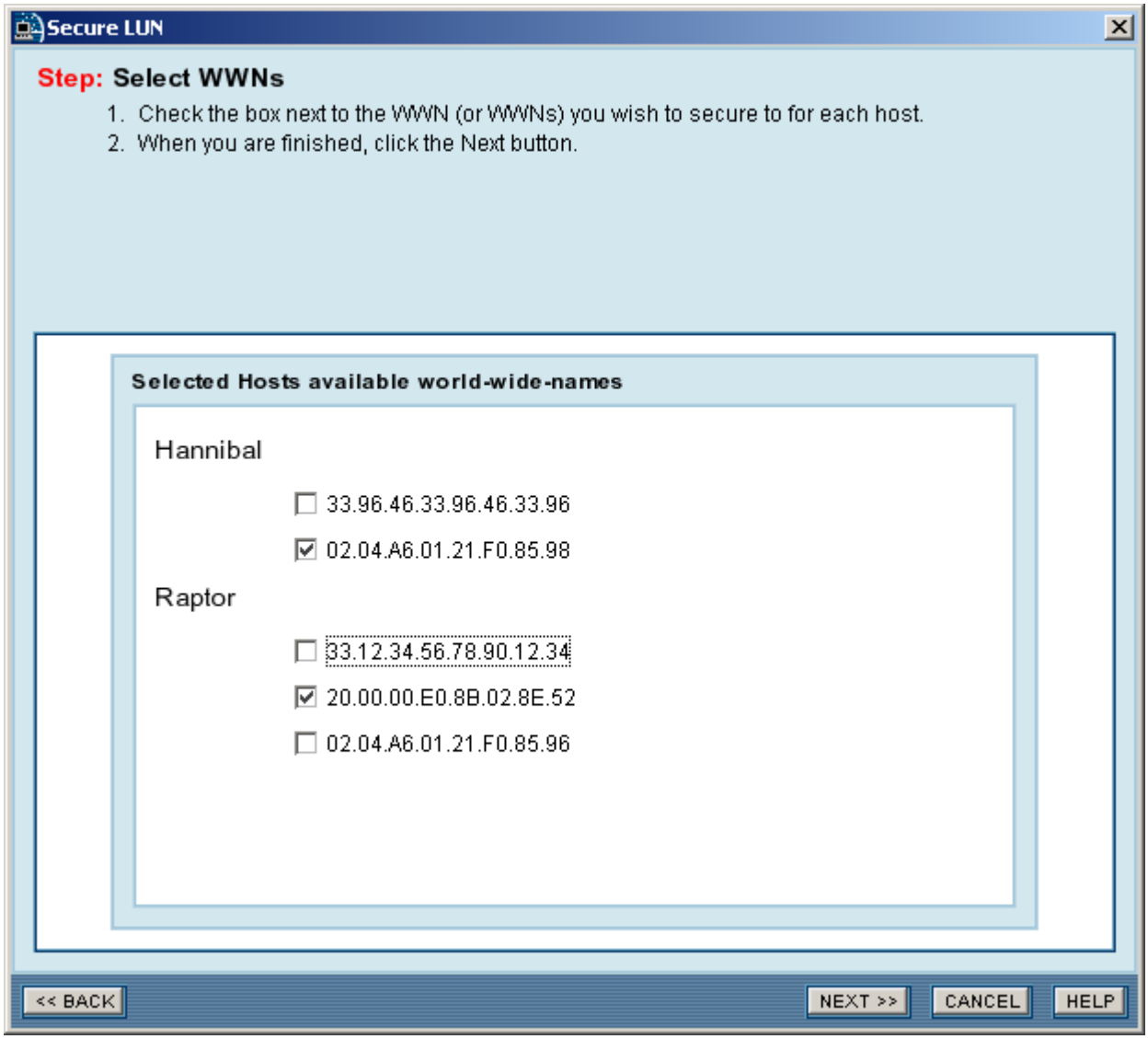


Figure 6.106 Modifying LUN Security – Selecting the WWN(s)

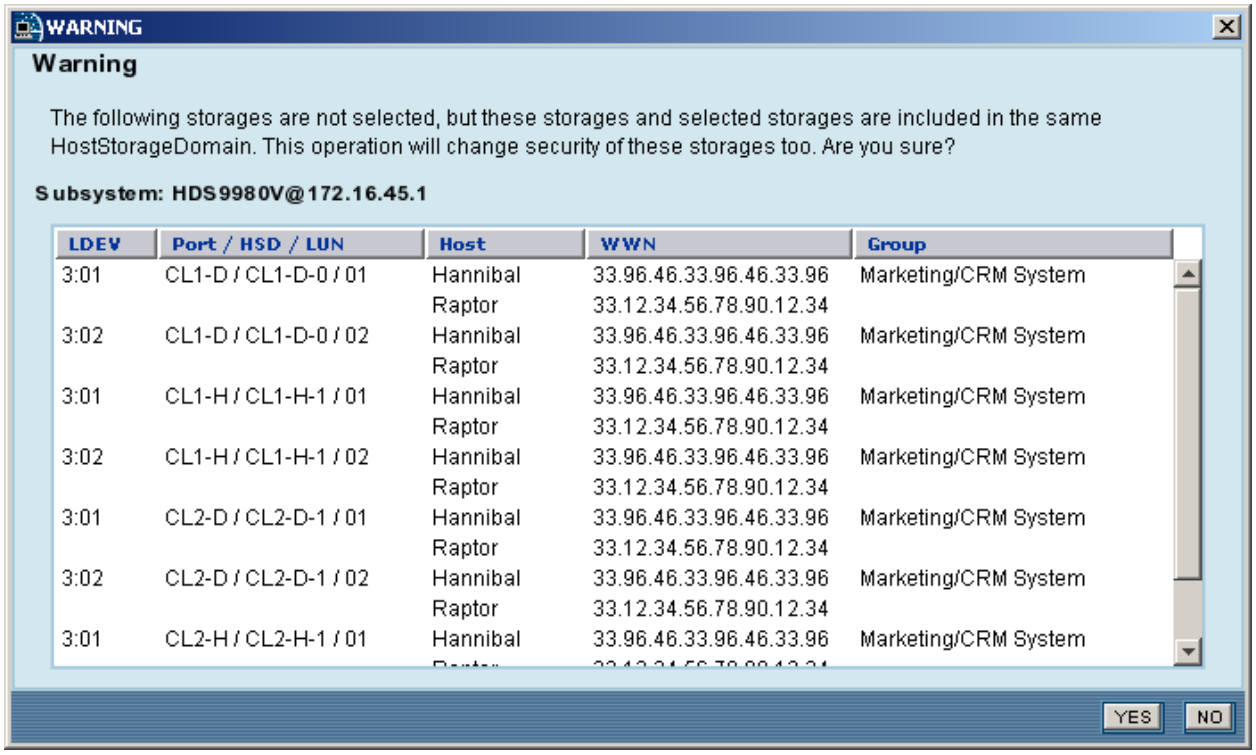


Figure 6.107 Modifying LUN Security – Host Storage Domain Warning

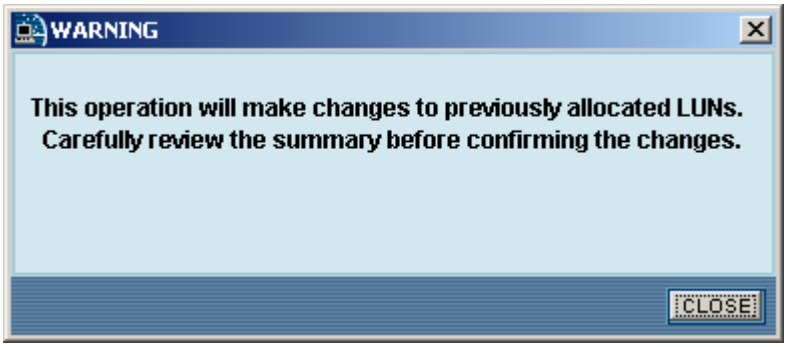


Figure 6.108 Modifying LUN Security – Warning

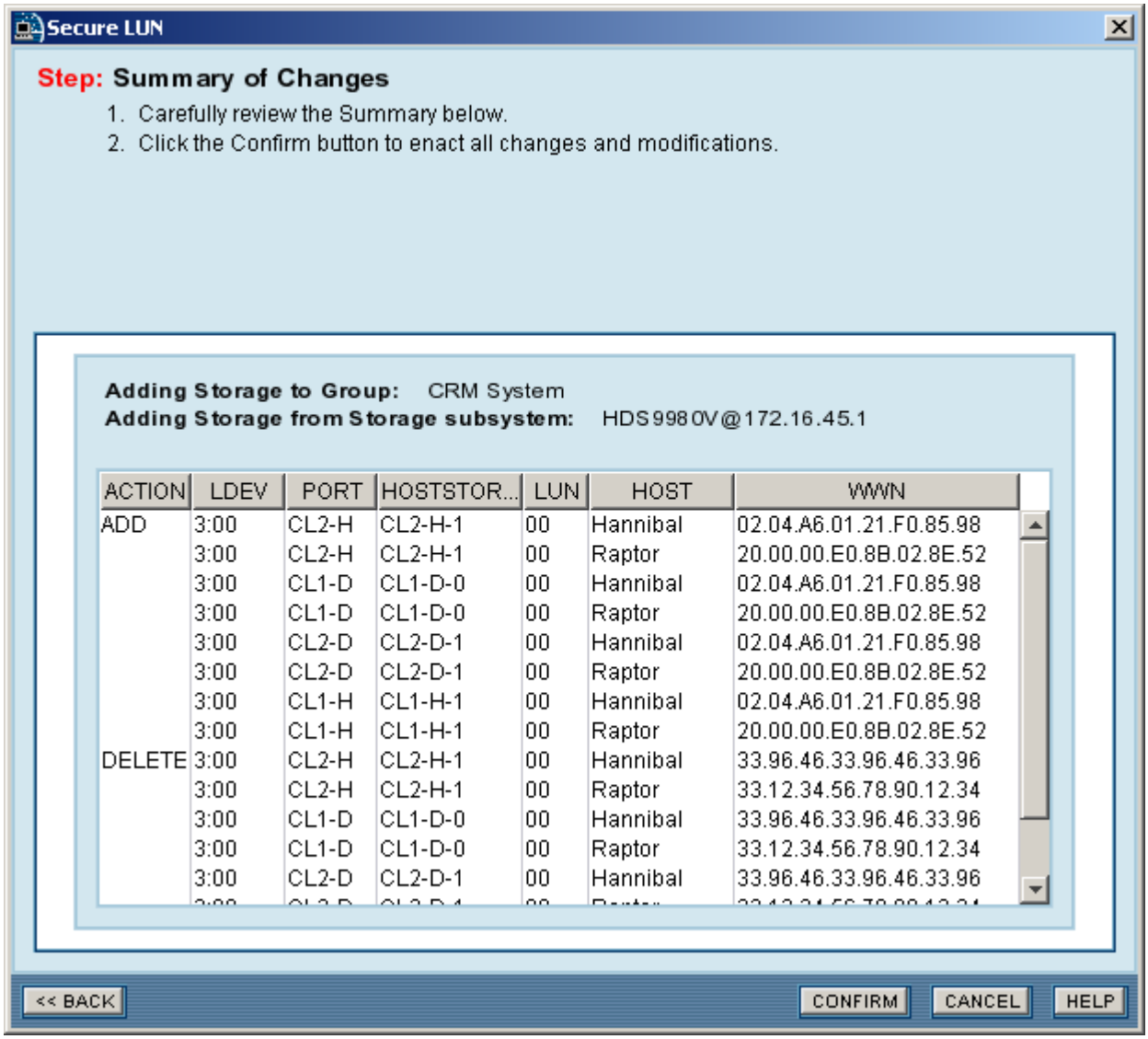


Figure 6.109 Modifying LUN Security – Confirmation

Chapter 7 Troubleshooting for the HiCommand™ Device Manager Web Client

If there is a problem with the HiCommand™ Device Manager Web Client interface, first make sure that the problem is not being caused by the PC or LAN hardware or software, and try restarting the PC.

For general troubleshooting information for the HiCommand™ Device Manager Web Client, see section 7.1. For a description of the error messages displayed by the Web Client, see section 7.2. If you need to call the Hitachi Data Systems Support Center, please see section 7.3 for instructions.

7.1 General Troubleshooting

If you are having trouble with the HiCommand™ Device Manager Web Client, first make sure the problem is not occurring at the HiCommand™ Device Manager Server. Please refer to the *HiCommand™ Device Manager Server Installation and Configuration Guide* (MK-91HC002) for further information on troubleshooting HiCommand™ Device Manager Server problems.

Important: Make sure to read the HiCommand™ Device Manager **ReadMe** file. Always make sure that only one HiCommand™ Device Manager Server at a time is actively managing a single subsystem.

Table 7.1 provides general troubleshooting information for the HiCommand™ Device Manager Web Client. In general, difficulties installing and running the Web Client can be due to problems with the Java Web Start™ software and/or with proxies on the local network.

Table 7.1 General Troubleshooting Information (continues on the following pages)

Problem	Description
Cannot find the HiCommand™ Device Manager Server home page.	Make sure that the HiCommand™ Device Manager Server system and software are up and running. When running the Web Client on the same system as the Server, a potential hazard is the resolution of the host "localhost". Generally "localhost" resolves to the loopback address (127.0.0.1), which can cause problems for the Java™ Web Start software. Use the primary local IP address instead.
Cannot load the HiCommand™ Device Manager Server home page. Error message: The requested item could not be loaded by the proxy. Proxy server's network connection was refused by the server: <IP address>:2001. The server may not be accepting connections or may be busy. Try connecting again later.	The browser may have a proxy in place that is not allowing the traffic to go through. For Internet Explorer browser: go to Tools->Internet Options, select Connections, click on "LAN Settings" button, then click on the Advanced button on the Local Area Network (LAN) Settings. In the Exceptions section, enter the IP address of the HiCommand™ Device Manager Server (123.456.78.9). Entries must be separated by semicolons. Click OK all the way out, and restart the browser. For Netscape® browser: select Edit->Preferences, select Advanced category, click on **+** to expand, and select Proxies. Select Manual Proxy Configuration, and select View.... Enter the IP address in the box under Exceptions. ***Note:*** If the browser is not set to "Use a proxy server", this is not the source of the problem. Look for other network connectivity issues such as firewalls and routers.

Table 7.1 General Troubleshooting Information (continued)

Problem	Description
Solaris™ installation fails with messages "InterBase Server was not properly installed. Try re-installing InterBase Server..." and "InterClient was not installed properly…".	You may be using the graphical installation mode without an adequate windowing environment on your system, or without the executable /usr/dt/bin/dtterm in your path. Use the command-line installation mode instead by invoking the installer from a command prompt. For example: /cdrom/cdrom0/solaris/install.sh -i console
The Java™ Web Start software is unable to launch the HiCommand™ Device Manager Web Client. Error message: Unable to launch HiCommand Web Client.	Might be caused by old or partial installation of the Java™ Web Start software. Reinstall the JWS software as described in Chapter 3. Also make sure the proxies in Java™ Web Start are configured properly: 1. Start the Java™ Web Start Application Manager (select the JWS icon on desktop or in Start menu, for Solaris™ go to the Java™ Web Start installation directory and enter the **javaws** command). 2. From the **File** menu, choose **Preferences**, select the **General** tab, and configure the proxies so Java™ Web Start can find the HiCommand™ Device Manager Server according to the URL used in your browser. Select **Manual**, and add the exact URL to the **No Proxy Hosts** box. For example, if the URL is ://localhost:2001, then the name in the **No Proxy Hosts** box must be **localhost**.
The File Download panel appears when you invoke the Web Client application.	The Java Web Start™ software may have been previously installed and removed. When JWS was removed, the association between the file extension ".JNLP" and the JWS application may not have been removed. When the link to the .JNLP file is selected, the operating system tries to run but does not find JWS. To resolve this situation, run the installer for JWS again (the "full Java Web Start Installer").
Cannot add subsystem. Failed during initialization (was Unable to Find Device). DESCRIPTION: Add Subsystem fails with error message: Failed during initialization of SNMP connection at IP Address "123.456.78.9" CAUSE: Cannot connect to the device.	Verify that you can you ping the IP address from the HiCommand™ Device Manager Server workstation (not client workstation). Verify the SNMP configuration on the SVP, and make sure that the correct community name is specified in HiCommand™ Device Manager (should match community name entered when configuring the SNMP Agent). A common community name is public (HiCommand™ Device Manager default). Make sure that: Access by IP address is not limited, or Access is limited by IP address and the HiCommand™ Device Manager Server is added to the list. For further information on SNMP troubleshooting for HiCommand™ Device Manager, please refer to the *HiCommand™ Device Manager Server Installation and Configuration Guide* (MK-91HC002). For further information on 9900V and 9900 SNMP configuration, please refer to the *Remote Console User's Guide* for the subsystem.
Subsystem discovery does not complete successfully.	For 9900V and 9900, make sure that the Remote Console is not connected to the subsystem. HiCommand™ Device Manager and the Remote Console cannot both access the same subsystem at the same time.
Cannot connect with storage subsystem.	On the HiCommand™ Device Manager Server check for LAN problems and/or SNMP problems. Please refer to the *HiCommand™ Device Manager Server Installation and Configuration Guide* for further information on SNMP troubleshooting. Make sure that the 9900V or 9900 SVP is in View mode.
Very slow subsystem discovery process.	Microcode level on 9900 does not support FTP transfer mechanism. The FTP port in 9900 SVP must be enabled. To start up FTP daemon, left click on **ftp demon** icon in task bar. ***Note:*** The FTP daemon is not usually running on the SVP.
9900 subsystem discovery does not finish.	HiCommand™ Device Manager may not be able to connect to the 9900 subsystem by SNMP. Please contact your network administrator.
Slow SNMP response.	Microcode level on subsystem does not support "command complete".
Cannot add/delete volume paths. Cannot convert unallocated LUs.	For 9900V and 9900 make sure that the LUN Manager feature is enabled. For 9500V and 9200 make sure that the Resource Manager feature is enabled and that the microcode level is correct.
Cannot secure/unsecure LUs.	Make sure that the LUN security feature is enabled (LUN Manager for 9900V, Hitachi SANtinel for 9900, LUN Security for 9500V and 9200).

Table 7.1 General Troubleshooting Information (continued)

Problem	Description
Web Client does not receive alert messages from HiCommand™ Device Manager Server.	Make sure that the Java™ Web Start software has been configured for Client/Server operations (do not use proxy) as described in section 3.4.
You entered the correct password, but HiCommand™ Device Manager tells you that the password you entered was not correct.	Log off and then log back in to HiCommand™ Device Manager, making sure to enter the correct password on the HiCommand™ Device Manager Login panel. Do not use the Java™ Web Start User Authentication panel. Always log in using the HiCommand™ Device Manager Login panel.
The error "The storage array is under configuring by another user" is output on 9900V operation.	Please wait at least 5 minutes, and then retry. If this error continues to occur, please contact the Customer Support Dept.
The create LDEV operation on a T3 takes a very long time (e.g., an hour).	HiCommand™ Device Manager may determine that the array group needs to be initialized and will initialize it. This can take up to an hour to perform. Normally it is not necessary, and the create LDEV operation will complete quickly.

7.2 Error Messages

HiCommand™ Device Manager displays an error message when an error condition occurs (see Figure 7.1). The error message includes the error level (indicates the severity of the error), error code, and error message. The error code range indicates the type of error.

The *HiCommand™ Device Manager Error Codes* document (MK-92HC016) lists and describes the HiCommand™ Device Manager error messages and provides instructions for resolving the error conditions. If you are unable to resolve an error condition, please call the Hitachi Data Systems Support Center for assistance (see section 7.3).

Note: HiCommand™ Device Manager sends all error notifications, including Server errors, to the HiCommand™ Device Manager client (e.g., Web Client, CLI, third-party application).

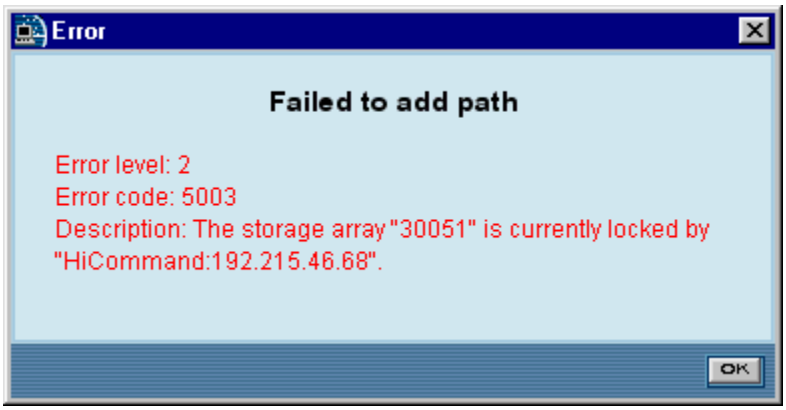


Figure 7.1 Sample Error Message

7.3 Calling the Support Center

If you need to call the Hitachi Data Systems Support Center, make sure to provide as much information about the problem as possible, including the circumstances surrounding the error or failure and the exact content of any error messages displayed on the HiCommand™ Device Manager PC and/or host system.

The worldwide Hitachi Data Systems Support Centers are:

- Hitachi Data Systems North America/Latin America
  San Diego, California, USA
  1-800-348-4357
- Hitachi Data Systems Europe
  Contact Hitachi Data Systems Local Support
- Hitachi Data Systems Asia Pacific
  North Ryde, Australia
  011-61-2-9325-3300

Acronyms and Abbreviations

ACP	array control processor (back-end array processor on the 9900V and 9900)
AG	array group
API	application program interface
CA	Computer Associates™
CHA	channel adapter
CHIP	client-host interface processor (front-end channel processor for 9900V, 9900)
CLI	command line interface
CSV	comma-separated value
CU	control unit
DAMP	Disk Array Management Program (for Hitachi Thunder 9200™ subsystem)
DHCP	dynamic host configuration protocol
DKC	disk controller (applicable to 9900V and 9900 subsystems)
DNS	domain name system
ESCON®	Enterprise System Connection
GB	gigabytes (1024 MB)
Gbps	gigabits per second
HA	high availability
HBA	host bus adapter
HDD	hard disk drive
HSD	Host Storage Domain
HTTP	hypertext transfer protocol
JRE	Java™ Runtime Environment
JWS	Java™ Web Start software
KB	kilobytes (1024 bytes)
LAN	local-area network
LCP	local control port
LDEV	logical device
LU	logical unit
LUN	logical unit number, logical unit
LUSE	LUN Expansion, LU Size Expansion
MB	megabytes (1024 KB)
NAS	network-attached storage
PC	personal computer
PG	parity group
RAID	redundant array of independent disks
SAN	storage-area network
SCSI	small computer systems interface

SI	ShadowImage
SNMP	simple network management protocol
SRM	StorEdge™ Resource Manager
SSL	secure socket layer
SSO	single sign-on
SVP	service processor
TB	terabytes (1024 GB)
TC	TrueCopy
TCA	TrueCopy Asynchronous
TCP/IP	transmission control protocol/internet protocol
TID	target ID
VPN	virtual private network
WWN	worldwide name
XML	extensible markup language