



**Hitachi Freedom Storage™
Lightning 9900™ V Series**

**Remote Console – Storage Navigator™
User's Guide**

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- Added graphic examples:
 - Verisign® Security Warning panel
 - User Entry panel
 - User List Editor Panel, Permission tab
- Added information about the View and Modify modes
- Added information about extending the Modify mode timeout period
- Updated the ‘Probable Cause’ for the Storage Navigator Application error, in Table 7.1

Referenced Documents

- *Hitachi Lightning 9900™ V Series User and Reference Guide* (MK-92RD100)
- *Hitachi Lightning 9900™ V Series LUN Manager User's Guide* (MK-92RD105)
- *Hitachi Lightning 9900™ V Series LUN Expansion (LUSE)/Virtual LVI/LUN (VLL) User's Guide* (MK-92RD104)
- *Hitachi Lightning 9900™ V Series FlashAccess User's Guide* (MK-92RD102)
- *Hitachi Lightning 9900™ V Series Performance Monitor User's Guide* (MK-92RD133)
- *Hitachi Lightning 9900™ V Series CruiseControl User's Guide* (MK-92RD106)
- *Hitachi Lightning 9900™ V Series Priority Access User's Guide* (MK-92RD117)
- *Hitachi Lightning 9900™ V Series TrueCopy User's Guide* (MK-92RD108)
- *Hitachi Lightning 9900™ V Series ShadowImage User's Guide* (MK-92RD110)
- *Hitachi Lightning 9900™ V Series TrueCopy - S/390® User's Guide* (MK-92RD107)
- *Hitachi Lightning 9900™ V Series ShadowImage - S/390® User's Guide* (MK-92RD109)
- *Hitachi Lightning 9900™ V Series Parallel Access Volume User's Guide* (MK-92RD118)
- *Hitachi Lightning 9900™ V Series Hitachi Remote Console - Storage Navigator Error Codes* (MK-92RD132)
- *Hitachi Lightning 9900™ V Series Extended Copy Manager User's Guide* (MK-92RD137)
- *Hitachi Lightning 9900™ V Series DB Validator User's Guide* (MK-92RD140)
- *Hitachi Lightning 9900™ V Series SANTinel - S/390® User's Guide* (MK-92RD115)
- *Hitachi Lightning 9900™ V Series LDEV Guard User's Guide* (MK-92RD146)
- *Hitachi Lightning 9900™ V Series Hi-Copy User's Guide* (MK-93RD159)
- *Hitachi Lightning 9900™ V Series Open LDEV Guard User's Guide* (MK-93RD158)

Preface

This document provides instructions for installing and using the 9900V Storage Navigator web client Java™ applet program for the Lightning 9900™ V Series (9900V) subsystem. Please read this manual carefully to understand how to manipulate your 9900V storage subsystems using the Storage Navigator software, and maintain a copy that is accessible from the Storage Navigator computer for reference purposes. This document assumes that:

- the user has a background in data processing, and understands direct-access storage device (DASD) subsystems and their basic functions,
- the user is familiar with the Lightning 9900V subsystem, and has read and understands the *Hitachi Lightning 9900™ V Series User and Reference Guide* (MK-92RD100), and
- the user is familiar with the operating system (e.g., Windows®, HP-UX®, Solaris™, Red Hat® Linux®) and web browser software (e.g., Internet Explorer, Netscape®, or Mozilla™) on the system hosting the 9900V Storage Navigator remote console software.

Note: The term “9900V” refers to the entire Lightning 9900™ V Series subsystem family, unless otherwise noted. For further information on the 9900V subsystem, please contact your Hitachi Data Systems account team, or visit Hitachi Data Systems online at <http://www.hds.com>.

Note: The use of the Storage Navigator software and all other Hitachi Data Systems products is governed by the terms of your license agreement(s) with Hitachi Data Systems.

Note: This product includes software developed by the Apache Group for use in the Apache HTTP server project (<http://www.apache.org/>).

Note: The Storage Navigator screens shown in this document were captured on a Windows® system with the Internet Explorer web browser. The Storage Navigator screens may display differently on other operating systems and browsers.

Microcode Level

This document revision applies to 9900V microcode version 21-09-0X/XX and higher.

Comments

Please send us your comments on this document. Make sure to include the document title, number, and revision. Please refer to specific section(s) and paragraph(s) whenever possible.

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Contents

Chapter 1	Overview of Remote Console – Storage Navigator Operations.....	1
1.1	Lightning 9900™ V Series Web Server and Web Client	1
1.2	Lightning 9900™ V Series Subsystem	4
1.3	User Access Control	5
1.4	Storage Device List and User Account List.....	6
1.5	Important Terms and Concepts.....	7
Chapter 2	Installation Requirements and Procedures	9
2.1	System Requirements	9
2.2	Setting Up the Storage Navigator	12
2.3	Using the Storage Navigator	13
2.3.1	Storage Navigator Conventions.....	13
2.3.2	Keystroke and Navigation Conventions for the Storage Navigator.....	15
2.3.3	Conventions for Using the Storage Navigator on UNIX® Workstations.....	16
2.3.4	Notes on Using the Storage Navigator on Windows Server® 2003 Computers	18
2.4	Starting Up and Logging On To the 9900V	19
2.5	View Mode and Modify Mode.....	26
2.5.1	Changing Between View Mode and Modify Mode	26
2.5.2	Extending the Modify Mode Timeout Period	27
2.6	License Keys	28
2.7	Enabling and Disabling Options on the Storage Navigator (Administrator Only).....	30
2.7.1	Storage Navigator Options	30
2.7.2	License Key Tab	31
2.7.3	Enabling Storage Navigator Options Using a License Key Code	38
2.7.4	Enabling Storage Navigator Options Using a License Key File	39
2.7.5	Disabling Storage Navigator Options	41
Chapter 3	Performing Storage Navigator Operations.....	43
3.1	Storage Navigator Main Panel	44
3.1.1	Information Tab on the Storage Navigator Main Panel	44
3.1.1.1	Option Buttons (Common to All Storage Navigator Panels).....	45
3.1.1.2	Subsystem Information Icons (Common to All Storage Navigator Panels)	48
3.1.1.3	Device Information Box and Device View.....	50
3.1.1.4	The Capacity Box.....	51
3.1.1.5	Number of LDEVs Box, Apply and Cancel Buttons.....	54
3.1.2	Storage Navigator Main Panel, Status Tab.....	55
3.1.2.1	Controller Status Box	56
3.1.2.2	Disk Array Status Box	57
3.1.2.3	Status History Box.....	58
3.1.3	Launching the Desired Option	59
3.2	Editing the Storage Device List (Administrator Only)	60
3.2.1	Storage Device Panels	60
3.2.1.1	Storage Editor - Logon Panel	61
3.2.1.2	Storage List Editor Panel.....	62

3.2.2	Adding a Storage Device	63
3.2.3	Changing a Storage Device Entry	66
3.2.4	Deleting a Storage Device	68
3.3	Editing the User Account List (Administrator Only)	69
3.3.1	User Entry Tab on the Control Panel.....	69
3.3.2	Adding a New User	70
3.3.3	Changing User Write Access	72
3.3.4	Changing a User Password	74
3.3.5	Deleting a User	75
3.4	Setting the Storage Navigator Environment Parameters (Administrator Only)	76
3.5	Viewing the Log and Configuration Information (Administrator Only)	79
3.6	Downloading the Log and Configuration Files (Administrator Only)	80
3.7	Restoring Backup Files (Administrator Only).....	84
3.7.1	Restore Tab on the Control Panel	84
3.7.2	Restoring Backup Files (Administrator Only)	85
3.8	Viewing Your Own Write Access and Changing Your Own Password	88
3.8.1	Viewing Your Write Access	88
3.8.2	Changing Your Password	89
3.9	Extending Cache Memory and LUs Using the Just in Time Storage Functions	90
3.9.1	Just in Time Tab on the License Key/SNMP/Just in Time Panel	91
3.9.2	Extending LUs Using the Just in Time Storage LUN Function	93
3.9.3	Extending Cache Memory Using Just in Time Storage Cache Function	94
3.10	Downloading Trace Files Using the FD Dump Tool	95
3.11	Exporting Data Using the Export File Function	100
3.12	Uploading Files to SVP Using the FTP Client Function	104

Chapter 4 Setting SNMP Agent Properties..... 107

4.1	Overview of SNMP Agent Properties.....	107
4.2	SNMP Information Tab	108
4.3	SNMP Agent Operations	110
4.3.1	Adding SNMP Manager IP Addresses	110
4.3.2	Deleting SNMP Manager IP Addresses	111
4.3.3	Adding A Community Name.....	112
4.3.4	Deleting a Community Name	113
4.3.5	Changing a Community Name	114
4.3.6	Adding Community IP Addresses.....	115
4.3.7	Deleting a Community IP Address	116

Chapter 5 Enabling SSL-Encrypted Communication..... 117

5.1	Overview	117
5.2	SSL Definitions.....	118
5.3	Creating a Keypair	119
5.3.1	Creating a Private Key (.key file)	119
5.3.2	Creating a Public Key (.csr file)	120
5.4	Acquiring a Signed Certificate	121
5.4.1	Self-Signed Certificates	121
5.4.2	Signed and Trusted Certificates	121
5.5	Uploading the Signed Certificate to the SVP	121
5.6	Updating the Certificate	122

5.7	Setting the Web Browser to Accept Self-Signed Certificates	125
Chapter 6	Configuration File Loader	129
6.1	Overview of Configuration File Loader	129
6.2	Downloading Java™ Web Start	131
6.3	General Spreadsheet Conventions	133
6.3.1	Spreadsheet File Requirements	133
6.3.2	Spreadsheet Components	134
6.3.2.1	Spreadsheet Declaration	135
6.3.2.2	Function Tags	136
6.3.2.3	Configuration Definitions	137
6.3.2.4	Comments	139
6.3.2.5	New Settings Can Affect Other Settings	139
6.4	LUN Manager Spreadsheet Settings	140
6.4.1	Column Format	140
6.4.2	Port Settings	142
6.4.3	Setting the CHA Mode	144
6.4.4	Setting the Host Group	145
6.4.5	Setting the WWN Information	146
6.4.6	Setting the LU Path	147
6.4.7	Configuring the Command Devices	148
6.5	Configuration File Loader Operations	149
6.5.1	The Configuration File Loader Panel	149
6.5.2	Using Configuration File Loader	152
6.5.2.1	Downloading a Spreadsheet	152
6.5.2.2	Editing the Spreadsheet	154
6.5.2.3	Uploading the Spreadsheet	157
6.5.2.4	First Error Check	159
6.5.2.5	Second Error Check	160
6.5.2.6	Third Error Check	162
6.5.2.7	Implementing the Changes	162
Chapter 7	Troubleshooting	163
7.1	Troubleshooting	163
7.2	Calling the Hitachi Data Systems Support Center	167
	Acronyms and Abbreviations	169
	Index	171

List of Figures

Figure 1.1	Sample Storage Navigator and SVP Configuration	2
Figure 2.1	Examples of a Java™ Applet Window	14
Figure 2.2	Clearing the “Do Not Save Encrypted Pages to Disk” Checkbox.....	18
Figure 2.3	Logon Process.....	19
Figure 2.4	Storage Device List Panel.....	22
Figure 2.5	Enhanced Security Configuration Warning Message	22
Figure 2.6	Establishing Secure Connection Warning Panel	23
Figure 2.7	View Certificate Panel	23
Figure 2.8	Logon Panel.....	24
Figure 2.9	Website Content Blocked Message	24
Figure 2.10	Trusted Sites Panel	25
Figure 2.11	Message Panel (Storage Navigator Already Started).....	25
Figure 2.12	Display Nonsecure Warning Panel	25
Figure 2.13	View Mode (Unlocked and Locked).....	26
Figure 2.14	Mode Changing Confirmation Message.....	26
Figure 2.15	Modify Mode	26
Figure 2.16	Overview of License Keys and Option Installation.....	28
Figure 2.17	Trial Period Expiration Error Message	29
Figure 2.18	License Key Tab on the License Key/SNMP/Just in Time Panel	31
Figure 2.19	License Key Table.....	32
Figure 2.20	Total Storage Graphic.....	34
Figure 2.21	License Install Box.....	35
Figure 2.22	Install, Uninstall, Apply, and Cancel Buttons	36
Figure 2.23	Set Confirmation Message	38
Figure 2.24	Install/Uninstall Error Panel	40
Figure 2.25	Sample Install/Uninstall Error Detail Panel.....	40
Figure 3.1	Storage Navigator Main Panel, Information Tab	44
Figure 3.2	Option Launching Buttons	45
Figure 3.3	Subsystem Information Icons.....	48
Figure 3.4	Device Information Box and Device View	50
Figure 3.5	Capacity Box (Open Systems)	51
Figure 3.6	Capacity Box (Mainframe Systems).....	52
Figure 3.7	Number of LDEVs Box, Apply and Cancel Buttons	54
Figure 3.8	Storage Navigator Main Panel, Status Tab	55
Figure 3.9	Controller Status Box.....	56
Figure 3.10	Disk Array Status Box.....	57
Figure 3.11	Status History Box	58
Figure 3.12	Storage Device List Panel.....	60
Figure 3.13	Storage Editor - Logon Panel.....	61
Figure 3.14	Storage List Editor Panel	62
Figure 3.15	Storage Entry Panel.....	64
Figure 3.16	Register Device Confirmation Message	64
Figure 3.17	Registration Complete Message (IP Address)	65
Figure 3.18	Registration Complete Message (Host Name)	65
Figure 3.19	Security Alert Warning Panel (Leaving Secure Connection).....	65
Figure 3.20	Change Storage Entry Panel (IP Address)	67

Figure 3.21	Change Storage Entry Panel (Host Name)	67
Figure 3.22	Delete Device Confirmation Message	68
Figure 3.23	Control Panel, User Entry Tab	69
Figure 3.24	User Entry Panel	71
Figure 3.25	Register User Confirmation Message	71
Figure 3.26	User List Editor Panel, Permission Tab	73
Figure 3.27	Change Permission Confirmation Message	73
Figure 3.28	User Entry Panel (Password Tab)	74
Figure 3.29	Change Password Confirmation Message	74
Figure 3.30	Delete User Confirmation Message	75
Figure 3.31	Control Panel, Set Environment Tab	76
Figure 3.32	Control Panel, Log Tab	79
Figure 3.33	Control Panel, Download Tab	80
Figure 3.34	Download Panel	82
Figure 3.35	File Download Panel	82
Figure 3.36	Save As Panel	83
Figure 3.37	Download Complete Panel	83
Figure 3.38	Control Panel, Restore Tab	84
Figure 3.39	Backup File Not Found Panel	86
Figure 3.40	Password Check Panel	86
Figure 3.41	File Restoration Confirmation Panel	87
Figure 3.42	User Control Panel, Permission Tab	88
Figure 3.43	User Control Panel, Password Tab	89
Figure 3.44	License Key/ Just in Time/SNMP Panel, Just in Time Tab	91
Figure 3.45	On-Demand Menu Commands	93
Figure 3.46	Just in Time Confirmation Message	93
Figure 3.47	Download Trace Files Logon Panel	96
Figure 3.48	Download Trace Files Panel (Selecting Trace Files)	96
Figure 3.49	Compressing Files Panel	97
Figure 3.50	Download Trace Files Download Panel	97
Figure 3.51	File Download Panel	98
Figure 3.52	Save As Panel	98
Figure 3.53	Download Complete Panel	99
Figure 3.54	Export Data Files Panel (Selecting Data)	102
Figure 3.55	Export Data Files Panel (New Data)	102
Figure 3.56	Export Data Files Panel (Export Data)	103
Figure 3.57	Compress Files Confirmation Message	103
Figure 3.58	File Download (FTP Client) Panel	105
Figure 3.59	Sample Display on the Windows® Explorer Browser	105
Figure 3.60	Upload Panel	105
Figure 3.61	Opening Panel Using the Reference Button	106
Figure 3.62	Upload Success Panel	106
Figure 4.1	9900V SNMP Environment	107
Figure 4.2	SNMP Information Tab on the License Key/SNMP/Just in Time Panel	108
Figure 4.3	Adding SNMP Manager IP Address	110
Figure 4.4	Delete IP Address Pop-Up Menu	111
Figure 4.5	Add Community Pop-Up Menu	112
Figure 4.6	Add Community Panel	112
Figure 4.7	Delete Community Pop-Up Menu	113

Figure 4.8	Change Community Pop-Up Menu	114
Figure 4.9	Change Community Panel	114
Figure 4.10	Add Community IP Address Pop-Up Menu	115
Figure 4.11	Add Community IP Address Panel	115
Figure 4.12	Delete Community IP Address Pop-Up Menu.....	116
Figure 5.1	Creating a Public Key	120
Figure 5.2	Update Certificate Files Logon Panel.....	122
Figure 5.3	Update Certificate Files Start Panel	123
Figure 5.4	Update Certificate Files Completed Panel.....	123
Figure 5.5	Update Certificate Files Error Panel	124
Figure 5.6	Security Alert Panel (Unknown Security Certificate).....	125
Figure 5.7	Certificate Panel	126
Figure 5.8	Certificate Import Wizard Introduction Panel.....	126
Figure 5.9	Select Certificate Type Panel.....	127
Figure 5.10	Import Complete Panel	127
Figure 5.11	Add Certificate Panel	128
Figure 5.12	Import Successful Panel.....	128
Figure 6.1	Configuration File Loader Operation Flow Chart	130
Figure 6.2	Java™ Web Start Error Message (Java™ Web Start Required).....	131
Figure 6.3	Java™ Web Start Download Information.....	131
Figure 6.4	Reminder Message (Re-Start Storage Navigator).....	132
Figure 6.5	Java™ Web Start Opening Message	132
Figure 6.6	Sample Spreadsheet	133
Figure 6.7	Sample Index and Parameter Definition	138
Figure 6.8	Sample Configuration Definitions	138
Figure 6.9	Configuration File Loader Panel	149
Figure 6.10	Download Panel	153
Figure 6.11	Save Panel	153
Figure 6.12	Text Import Wizard Panel 1	154
Figure 6.13	Text Import Wizard Panel 2	155
Figure 6.14	Text Import Wizard Panel 3	155
Figure 6.15	Save As Panel.....	156
Figure 6.16	Upload Panel.....	158
Figure 6.17	Open Panel.....	158
Figure 6.18	Second Error Check Flow Chart.....	161

List of Tables

Table 1.1	Device Numbers for Each CU	8
Table 2.1	9900V Storage Navigator System Requirements for Windows®	10
Table 2.2	9900V Storage Navigator System Requirements for UNIX®	11
Table 2.3	Text Color and Font Type Displayed on Panels	14
Table 2.4	Logon Specifications and Restrictions.....	20
Table 2.5	Storage Navigator Options	30
Table 2.6	Calculating Volume Capacity	33
Table 2.7	Sample Estimation of Needed Capacity.....	33
Table 2.8	License Key Status Icons	37
Table 3.1	Disk Controller and Disk Array Unit Error Conditions	59
Table 3.2	SIM Severity Levels and Icons.....	59
Table 6.1	Spreadsheet File Formatting Requirements.....	134
Table 6.2	Spreadsheet Declaration Components	135
Table 6.3	LUN Manager Spreadsheet Format.....	141
Table 6.4	Available [Port] Tag Configuration Values.....	142
Table 6.5	Operations Affected By LUN Security Status.....	143
Table 6.6	Available Configuration Values for the [CHA] Tag	144
Table 6.7	Available Configuration Values for the [HostGroup] Tag.....	145
Table 6.8	Available Configuration Values for the [WWN] Tag	146
Table 6.9	Available Configuration Values for the [LUN] Tag	147
Table 6.10	Available Configuration Values for the [LDEV] Tag	148
Table 7.1	General Error Conditions	164-167
Table 7.2	Notes on UNIX® Operations	166

Chapter 1 Overview of Remote Console – Storage Navigator Operations

1.1 Lightning 9900™ V Series Web Server and Web Client

The Lightning 9900™ V Series Remote Console - Storage Navigator consists of a group of Java™ applet programs that enable the user to manage the 9900V subsystem. The Storage Navigator Java™ applet programs run on a web browser to provide a user-friendly interface for the 9900V web client functions. The 9900V service processor (SVP) is the notebook computer inside the subsystem that uses Java Virtual Machine™ (JVM™) to function as a web server. The 9900V Storage Navigator computer functions as a web client. Each time you log onto the Storage Navigator computer and connect to the SVP, a Java™ applet program is downloaded from the SVP to the Storage Navigator computer.

This document describes and provides instructions for using the licensed 9900V Hitachi Storage Navigator remote console software. The Storage Navigator software communicates directly with the 9900V subsystems via a local-area network (LAN) to obtain subsystem configuration and status information, and send user-requested commands to the subsystem. The Storage Navigator software displays the detailed subsystem information, and allows you to configure and perform operations on the 9900V subsystem.

The 9900V can be connected to two LANs. The 9900V-internal LAN is a private LAN that is used to connect the SVPs of multiple subsystems. Your intranet is a public LAN that allows you to access one or more SVPs from individual Storage Navigator computers. This configuration allows you to easily access and control the registered 9900V subsystems. In a SAN environment, where several subsystems may be connected together, you must designate a primary SVP, which can be either an SVP connected to a 9900V subsystem, or a web server with the exact same configuration as an SVP (see section 2.4).

Figure 1.1 illustrates the relationship between the Storage Navigator computer(s) and the SVP.

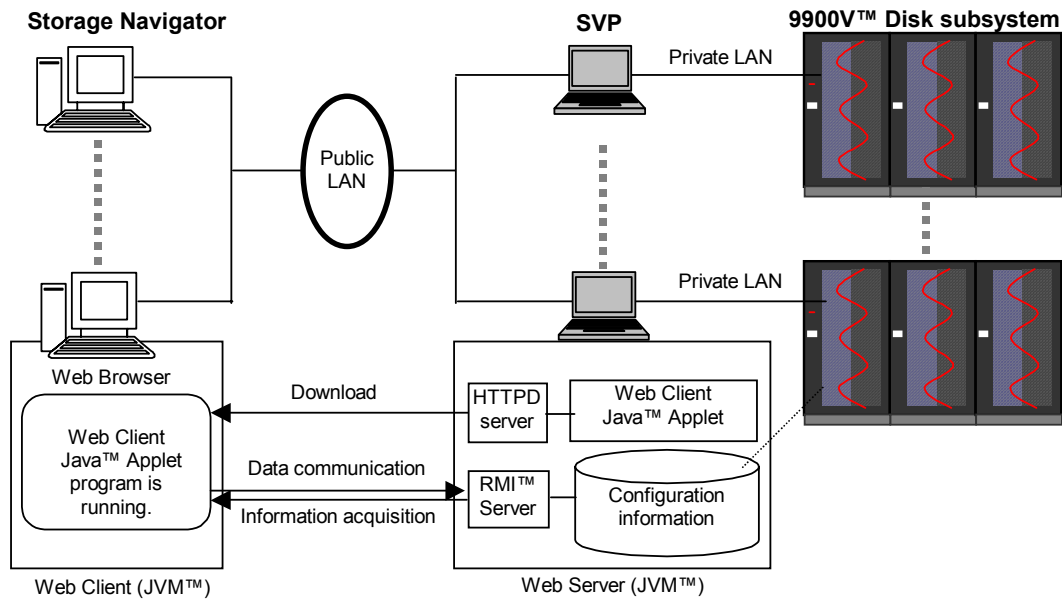


Figure 1.1 Sample Storage Navigator and SVP Configuration

Note: The use of the Storage Navigator software and all other Hitachi Data Systems products is governed by the terms of your license agreement(s) with Hitachi Data Systems.

The 9900V Storage Navigator Java™ applet program displays the configuration information for the attached 9900V subsystems and enables you to perform the following types of operations:

- Enabling and disabling options (see sections 2.5 through 2.7)
- Viewing the detailed information of the subsystem (see section 3.1.2)
- Launching the desired option (see section 3.1.3)
- Editing the storage device list (administrator only; see section 3.2)
- Editing the user account list (administrator only; see section 3.3)
- Setting the Storage Navigator environment parameters (administrator only; see section 3.4)
- Viewing the Storage Navigator log information (administrator only; see section 3.5)
- Downloading the log and configuration files (administrator only; see section 3.6)
- Restoring the storage device list, the user account list and the environment parameters (administrator only; see section 3.7)
- Viewing the Storage Navigator information and changing the password (see section 3.8)
- Extending cache memory and LUNs using the Just In Time functions (see section 3.9)
- Downloading Storage Navigator trace files using FD Dump Tool (see section 3.10)
- Exporting data to files using the Export File function (see section 3.11)
- Uploading files to the SVP using the FTP Client function (see section 3.12)
- Setting SNMP Agent properties (see Chapter 4)
- Enabling SSL-encrypted communication (see Chapter 5)
- Using Configuration File Loader (see Chapter 6)

Note: This document does not cover all 9900V Storage Navigator features or web client Java™ applet options (see Table 2.5). Please refer to the appropriate user's guide for more details about 9900V feature options. For further information on 9900V features and functions, please contact your Hitachi Data Systems account team.

1.2 Lightning 9900™ V Series Subsystem

The Lightning 9900V subsystem offers the following consolidated features to implement more efficient storage management systems in a large-scale storage area network (SAN) environment:

- **Improved capacity and scalability.** The 9900V subsystem supports up to 8,192 logical device (LDEV) addresses per subsystem, and can provide up to 138 TB of storage capacity.
- **Continuous data availability.** The 9900V subsystem employs the Hierarchical Star Network (Hi-Star™) architecture to improve total performance of internal data transfer. Hi-Star™ architecture uses high-speed crossbar switches among processors on channel adapter boards, processors on disk adapter boards, and cache memory. The 9900V subsystem also provides up to 64 fibre-channel interface paths or 32 serial-interface paths, and enables simultaneous data transfer through each path.
- **Connectivity for SAN infrastructure.** The 9900V subsystem can be configured for all-mainframe, all-open, or multiplatform operations. The 9900V supports fibre-channel ports and provides a variety of feature options to meet SAN requirements.
- **Subsystem scalability.** The architecture of the 9900V subsystem accommodates scalability to meet a wide range of capacity and performance requirements. The 9980V model includes one controller frame containing the control and operational components of the subsystem, and up to four disk array frames containing the storage components (disk drive arrays) of the subsystem. The 9970V model includes one frame containing the controller and disk components of the subsystem.

For further information on the 9900V subsystem, please refer to the *Hitachi Freedom Storage™ Lightning 9900™ V Series User and Reference Guide* (MK-92RD100), or contact your Hitachi Data Systems account team.

1.3 User Access Control

The Storage Navigator Java™ applet program provides three basic levels of user access:

- Administrator (root) access
- Restricted (write) access
- Ordinary user (view) access

Administrators have write access to all Storage Navigator functions. Certain functions are restricted to administrators, including the following:

- Enabling and disabling options (see section 2.7),
- Editing the storage device list (see section 3.2),
- Editing the user account list (see section 3.3),
- Setting the environmental parameters (see section 3.4),
- Viewing and downloading the log and configuration information (see sections 3.5 and 3.6), and
- Restoring backup files (see section 3.7).

The remaining functions are referred to as restricted functions, and non-administrators can be assigned write permission to one or more of these functions. The ability to assign different access permissions for each individual function allows maximum flexibility and control over the 9900V Storage Navigator functions. See section 3.3 for instructions on assigning write permissions for restricted functions.

1.4 Storage Device List and User Account List

The Storage Navigator administrator is responsible for registering storage devices with the primary SVP. This information is compiled into the storage device list, which includes information such as device name, IP address or host name, and device location. See section 3.2 for more details. You can display the storage device list on your web browser by accessing the following URL (where xxx.xxx.xxx.xxx is the IP address or host name of the primary SVP):

<http://xxx.xxx.xxx.xxx/cgi-bin/utility/sjc0000.cgi>

If you want to specify the SVP in the URL using the host name instead of IP address, you need to register the host name and IP address either to the DNS server or the hosts file of the Storage Navigator computer, as follows:

- DNS: You need to register the IP address and host name of the SVP to the DNS server that manages the network to which the SVP is connected.
- Hosts file: You need to enter the IP address and host name of the SVP to the hosts file of the Storage Navigator PC, which is in the following directory:
 - Windows®: C:\WINDOWS\system32\drivers\etc\hosts
 - UNIX® : /etc/hosts

If you will be using SSL-encrypted communication, you will need to use the server name (which is entered to the certificate as a common name) as the host name. See Chapter 5 for more details on SSL-encrypted communication.

The Storage Navigator Administrator is also responsible for entering users for each subsystem into the user account list, which is stored in that subsystem's SVP. The user account list includes information such as user ID, password, and write permission for each 9900V option. See section 3.3 for more details.

1.5 Important Terms and Concepts

The 9900V Storage Navigator user should be familiar with the following terms and concepts:

- **Disk controller frame.** The 9900V subsystem has one disk controller frame that controls all data access and storage operations. The 9900V provides up to 32 logical control unit (CU) images and supports 3990-6, 3990-6E, and 2105-F20 controller emulation types.
Note: The 3990-3 and 2105-E20 controller emulation types are not supported.
- **Disk array frame.** The 9980V subsystem can be configured with up to four disk array frames containing the storage components (disk drive arrays) of the subsystem. The 9970V subsystem consists of one frame containing both the disk controller and storage components.
- **Parity group.** A parity group (also called an array group) is a set of hard disk drives that are treated as one group. For example, a RAID-5 3D+1P parity group consists of four disk drives (3 data and 1 parity). A parity group contains both user data and parity information, and the parity information is used to automatically reconstruct the user data if one of the disk drives in the parity group becomes unavailable.
- **LDEV (logical device).** The 9900V subsystem supports a maximum of 8192 LDEVs. An LDEV used by mainframe hosts can be called a device, a logical volume image (LVI), or a volume. An LDEV used by open-system hosts can be called a device (for example, SCSI disk device or raw device) or a logical unit (LU or LUN). The 9900V subsystem supports a maximum of 512 LU paths per fibre-channel port.
- **Java™ applet program.** The 9900V Storage Navigator is provided as a Java™ applet program. When a Storage Navigator user accesses and logs on to the desired SVP, the Java™ applet is downloaded from the SVP (web server) to the Storage Navigator (web client) computer. The Java™ applet program runs on a web browser on the Storage Navigator system.
- **RMI™ (remote method invocation).** RMI™ is a remote procedure call that allows Java™ objects stored in the network to be run remotely. In the 9900V Storage Navigator network environment, the Storage Navigator downloads Java™ objects from the SVP.
- **CU (control unit).** The 9900V subsystem supports a maximum of 32 logical CU images numbered sequentially from 0-1F. Each CU image controls up to 256 LDEVs. LDEVs within the 9900V subsystem are accessed by a combination of CU image number and device number (00-FF). Table 1.1 lists the device numbers for each CU image.

Table 1.1 Device Numbers for Each CU

CU Number	Possible Device Numbers	CU Number	Possible Device Numbers
0	0:00 to 0:FF	10	10:00 to 10:FF
1	1:00 to 1:FF	11	11:00 to 11:FF
2	2:00 to 2:FF	12	12:00 to 12:FF
3	3:00 to 3:FF	13	13:00 to 13:FF
4	4:00 to 4:FF	14	14:00 to 14:FF
5	5:00 to 5:FF	15	15:00 to 15:FF
6	6:00 to 6:FF	16	16:00 to 16:FF
7	7:00 to 7:FF	17	17:00 to 17:FF
8	8:00 to 8:FF	18	18:00 to 18:FF
9	9:00 to 9:FF	19	19:00 to 19:FF
A	A:00 to A:FF	1A	1A:00 to 1A:FF
B	B:00 to B:FF	1B	1B:00 to 1B:FF
C	C:00 to C:FF	1C	1C:00 to 1C:FF
D	D:00 to D:FF	1D	1D:00 to 1D:FF
E	E:00 to E:FF	1E	1E:00 to 1E:FF
F	F:00 to F:FF	1F	1F:00 to 1F:FF

Chapter 2 Installation Requirements and Procedures

2.1 System Requirements

The 9900V Storage Navigator Java™ applet program is downloaded from the SVP to the Storage Navigator computer. The applet runs on the web browser of the Storage Navigator, and communicates with the attached 9900V subsystems via the TCP/IP network.

The 9900V Storage Navigator software has the following system requirements:

- Hitachi Lightning 9900V subsystem(s). The 9900V Storage Navigator can be attached to multiple subsystems of the same type (e.g., 9900V to 9900V).
Note: If you want to connect to more than one subsystem, you must log on to the SVP of each of the desired subsystems, and use individual web client Java™ applet programs on separate web browser windows.
- 9900V Storage Navigator computer(s). Table 2.1 and Table 2.2 list the system requirements for the 9900V Storage Navigator system, including the supported browsers and Java Runtime Environment™ version(s) for each operating system.
 - A web browser is required on the Storage Navigator computer/system.
 - Up to 32 Storage Navigator users can concurrently access the same 9900V subsystem, but only one user can be in **Modify** mode at a time. Users in **View** mode can view the subsystem information, but cannot make any changes. An administrator can see who is currently using the Storage Navigator by checking the logon access log (see section 3.5).
- LAN cables and connection:
 - Thinnet coaxial cable. For twisted-pair connections, contact the Hitachi Data Systems Support Center for assistance.
 - The total length of the LAN cables must not be greater than 185 meters (607 feet).
- 9900V license keys for Storage Navigator and other features

Table 2.1 9900V Storage Navigator System Requirements for Windows®

Item	Requirements		
Operating System	Windows NT® Service Pack 4 or later, or Windows® 2000	Windows XP® Service Pack 1 or later	Windows Server™ 2003
Processor (CPU)	400 MHz Pentium® or better	400 MHz Pentium® or better	Pentium III 550 MHz or better
Memory (RAM)	128 MB or more. (Note 1) 256 MB or more recommended.	128 MB or more. (Note 1) 256 MB or more recommended.	128 MB or more. (Note 1) 256 MB or more recommended.
Available hard drive space	150 MB or more	150 MB or more	150 MB or more
Monitor	High-Color 16-bit or better Resolution: 1024×768 or better	High-Color 16-bit or better Resolution: 1024×768 or better	High-Color 16-bit or better Resolution: 1024×768 or better
Keyboard and mouse	You cannot use the mouse wheel feature.	You cannot use the mouse wheel feature.	You cannot use the mouse wheel feature.
Ethernet LAN card for TCP/IP network	100BASE-T	100BASE-T	100BASE-T
Web browser	Internet Explorer 4.0, 5.x, or 6.0	Internet Explorer 6.0	Internet Explorer 6.0
Java Runtime Environment™	JRE™ 1.3.1_01, 1.4.1, or 1.4.2 (Note 2)	JRE™ 1.4.1 or 1.4.2 (Note 2)	JRE™ 1.4.2 (Note 2)

Note 1: If the RAM on the Storage Navigator PC is 128 MB or less, the maximum number of concurrent users for Storage Navigator and Export Tool is one. If multiple instances of Storage Navigator or Export Tool are to be started on the Storage Navigator PC, more than 256 MB of memory is recommended for the Storage Navigator PC.

Note 2: If JRE™ is not already installed on the Storage Navigator computer, it will be downloaded when you log onto the server. If you receive an error message (see Figure 2.1), you can download JRE™ from the Java™ web site at www.java.sun.com. If the Storage Navigator computer is not connected to the Internet, download the JRE™ install program onto another computer and then copy it onto the Storage Navigator computer. For instructions, see the JRE™ install guide.

- For Windows® systems, if JRE™ is installed successfully, the Java™ plug-in is in the Control Panel. Please confirm that you can activate the JRE™ by the plug-in icon.
- For UNIX® systems, please confirm that you can open the **ControlPanel.html** file in the directory where the Java Runtime Environment™ is installed.



Figure 2.1 Windows® Error Message

Table 2.2 9900V Storage Navigator System Requirements for UNIX®

Item	Requirements for Solaris®	Requirements for HP-UX®	Requirements for Red Hat® Linux®
Operating System	Solaris™ 8, or Solaris™ 9	HP-UX® 11.0, or HP-UX® 11i	Red Hat® Enterprise Linux® AS Version 2.1
Processor (CPU)	400 MHz Ultra SPARC™ II or better	440 MHz PA-8000	Pentium® III 600 MHz or better
Memory (RAM)	512 MB or more	512 MB or more	512 MB or more
Available hard drive space	150 MB or more	150 MB or more	150 MB or more
Monitor	Resolution: 1024×768 or greater	Resolution: 1024x768 or greater	Resolution: 1024x768 or greater
Keyboard & mouse	You cannot use the mouse wheel feature.	You cannot use the mouse wheel feature.	You cannot use the mouse wheel feature.
Ethernet LAN card for TCP/IP network	100BASE-T	100BASE-T	100BASE-T
Web browser	Solaris™ 8: Netscape® 4.7x or 6.2 (Note 1), Mozilla 1.2.1 (Note 2) Solaris™ 9: Mozilla 1.2.1 (Note 2) Netscape 6.2	Netscape 4.7x (Note 3), Mozilla 1.2.1_01	Mozilla 1.2.1 (Note 2)
Java Runtime Environment™	Solaris™ 8: JRE™ 1.3.1_02, 1.3.1_07, or 1.4.2 (Note 4) Solaris™ 9: JRE™ 1.4.2 (Note 4)	RTE1.3.1_02 or RTE1.4.1_03 (Note 5) Java Plug-in 1.3.1_02 (Note 6)	JRE™ 1.4.2

Note 1: You can download the Netscape® 4.7 browser for Solaris™ from the Netscape® web site at www.netscape.com.

Note 2: You can download Mozilla 1.2.1 from <http://www.mozilla.org/releases/old-releases-1.1-1.4rc3.html>.

Note 3: You can download the Netscape 4.7® browser for HP-UX® from the Hewlett-Packard® web site at <http://www.hp.com/workstations/risc/standard/software/netscape/index.html>.

Note 4: You can download JRE™ from the Java™ web site at www.java.sun.com.

- For Windows® systems, if JRE™ is installed successfully, the Java™ plug-in is in the Control Panel. Please confirm that you can activate the JRE™ by the plug-in icon.
- For UNIX® systems, please confirm that you can open the **ControlPanel.html** file in the directory where the Java Runtime Environment™ is installed.

Note 5: You can download RTE from the following web site. Please confirm that you can open the **ControlPanel.html** file in the directory where the RTE is installed.
http://www.hp.com/products1/unix/java/java2/sdkrte1_3/downloads/index.html.

Note 6: You can download Java Plug-in from the web site at <http://www.hp.com/products1/unix/java/java2/jpi/downloads/index.html>.

2.2 Setting Up the Storage Navigator

The Hitachi Data Systems representative installs the SVP software and LAN cabling. You will need to document the serial numbers (SNs) and IP addresses or host names of each 9900V subsystem, because these numbers are required for Storage Navigator operations.

Note: It is important to verify that you have a unique IP address or host name for each SVP, to avoid any conflicts. If a conflict occurs, obtain a unique IP address or host name for the desired 9900V subsystem. You can also contact the Hitachi Data Systems Support Center for assistance in assigning IP addresses or host names.

To connect to the desired 9900V SVP and use the Storage Navigator Java™ applet program, a web browser is required on the Storage Navigator computer. For instructions on editing the storage device list, see section 3.2.

To configure your web browser:

1. Make sure that the Storage Navigator is connected to a network via a LAN.

Caution: Using a modem for network connections is not supported.

2. Make sure that cookies are enabled on the browser.
3. Install Java Runtime Environment™. Refer to Table 2.1 for the appropriate version for your operating system.

Caution: Do not access any unreliable web sites from your Storage Navigator computer.

To configure Storage Navigator to connect over a firewall:

To enable the Storage Navigator to communicate with the 9900V SVP over a firewall, you must use the following TCP/IP port numbers:

- FTP: 21
- HTTP: 80
- SNMP: 161
- SNMP Trap: 162
- RMI: 1099
- 51099 (this is a port used by Storage Navigator for communication)
- 51100 (this is a port used by Storage Navigator for communication)

Note: When you connect the Storage Navigator and the SVP over a firewall, make sure to connect them through these TCP/IP ports to configure the firewall.

2.3 Using the Storage Navigator

2.3.1 Storage Navigator Conventions

- On most Storage Navigator panels, if you specify different settings for the values on the panel, the text color of that value changes to blue or the icon changes, but the changes are not implemented until you select **Apply**. Table 2.3 describes the text colors and font types displayed on the Storage Navigator panels.
- You can create and store up to 1,000 settings or operations before actually applying them to the 9900V subsystem. To avoid a possible error, do not apply more than 1,000 settings at a time.
- The layout of a Storage Navigator panel is reset when you select **Apply**, **Refresh** () , or when you switch tabs.
- When the microcode is being updated on the SVP, you must exit and restart all web browsers on the Storage Navigator.
- If a Storage Navigator user is in **Modify** mode, and is applying settings, you are not able to log onto the Storage Navigator until after those settings have been applied. A wait of longer than five minutes indicates an abnormal end, in which case you need to exit and restart the browser.
- When an internal process is being executed on the SVP (for example, a configuration change, option check, or an operational information acquisition), Storage Navigator processing might be temporarily delayed.
- If you reset the time of the clock on the Storage Navigator, clear the existing temporary Internet files of your web browser before logging on to the Storage Navigator.
- When the ShadowImage or ShadowImage S/390® quick-restore operation is being performed, a Storage Navigator panel may display old information (status before the quick restore operation) on logical volume (LDEV) configurations. In this case, wait until the quick restore operation completes, and then select **Refresh** () to update the Storage Navigator panel.
- If you request a change to the subsystem configuration while another change is being made, an error message is displayed.
 - If the error occurs while you are logging on or selecting the **Apply** button to implement changes, wait for a few minutes then retry the operation.
 - If the error occurs while you are either selecting a button to launch an option, switching between **Modify** mode and **View** mode, or switching tabs, wait for a few minutes then select **Refresh** () and retry the operation.
- If you remain in **Modify** mode for a certain period of time without making any changes (the default is 30 minutes), the subsystem releases the **Modify** mode, and you are returned to **View** mode (see section 3.4).

- **WARNING:** Do not change the screen resolution while you are displaying a Storage Navigator panel, or you may have unexpected results. Certain screen savers change the screen resolution automatically, so you should not use them while using Storage Navigator.
- **Note:** A Java Applet Window may display at the bottom of a screen item (such as a dialog box, popup menu, combo box, or tool tip) on a Storage Navigator panel (see Figure 2.2). This is not an error, so don't be concerned about it.

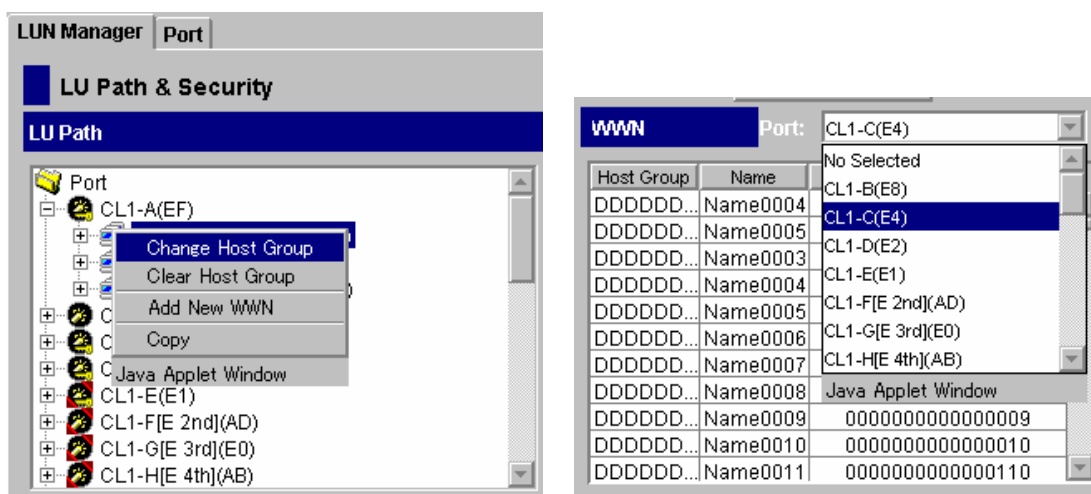


Figure 2.2 Examples of a Java™ Applet Window

Table 2.3 Text Color and Font Type Displayed on Panels

Color and font type	Description
Blue bold italic	Indicates that you have changed settings on the panel, but the changes are not yet implemented. To implement the changes, select the Apply button.
Red italic	Used for Performance Monitor, Cruise Control, Priority Access and Extended Copy Manager (e-Copy) For more information, please refer to the following documents: <i>Hitachi Lightning 9900™ V Series Performance Monitor User's Guide</i> (MK-92RD133) <i>Hitachi Lightning 9900™ V Series CruiseControl User's Guide</i> (MK-92RD106) <i>Hitachi Lightning 9900™ V Series Priority Access User's Guide</i> (MK-92RD117) <i>Hitachi Lightning 9900™ V Series Extended Copy Manager (e-Copy) User's Guide</i> (MK-92RD137)
Green bold	Used for the LUN Manager copy function. For more information please refer to <i>Hitachi Lightning 9900™ V Series LUN Manager User's Guide</i> (MK-92RD105).

2.3.2 Keystroke and Navigation Conventions for the Storage Navigator

The Storage Navigator has the following keystroke and navigation conventions:

- Table 2.3 describes the text colors and font types displayed on the Storage Navigator panels.
 - In general, you can select an object on a panel by left-clicking the mouse. Certain commands can be displayed by right-clicking an object. In some cases you can use the right mouse button to drag and drop an item. This is noted in the instructions for each operation. You can sort objects listed in a table by selecting the header of a column you want to sort.
 - You cannot use the mouse wheel feature.
 - As a general rule, you can only enter alphanumeric characters (ASCII codes) into a text box on Storage Navigator. There are certain exceptions, including the following:
" \ ; : * ? < > | / # & + = ,
Which symbols are and are not usable depends on the panel and the program product options. For further information, please refer to the corresponding sections or documents.
 - You cannot use the **Home**, **End**, or **Delete** keys for Storage Navigator operations.
 - Always use **Exit** () to close Storage Navigator panels. Do not close Storage Navigator panels by:
 - selecting **Close** () on the panel,
 - using the **File** or **Exit** commands, or
 - selecting **Alt+F4**.
- Note:** If you accidentally close the panels using one of these methods, wait for an RMI™ time-out, and then restart the Storage Navigator (see section 3.4).
- Do not use function or shortcut keys such as **F5**, **Ctrl+F**, **Esc**, and **Ctrl+A** for Storage Navigator operations, because these may have unintended consequences. For example, the **F5** key exits and restarts the Storage Navigator. If you select the **F5** key by accident, close all panels (including the Storage Device List panel), and then log on again.
 - Because of Java™ applet security safeguards, you cannot copy and paste objects (text) from other applications during Storage Navigator operations.
 - After dragging and dropping objects to another location or area, you might not be able to use the scroll bar on that location or area. If this occurs, close all panels, and then log in again.
 - You cannot drop an object to an area or location where no object exists.
- Note:** When you attempt to drop an object to an invalid area or location, no warning icon is displayed.
- To drag and drop adjacent objects, use the **Shift** key to select a group of objects. Hold down the **Ctrl** key while you select the last object in the group. then drag and drop the objects.
 - To drag and drop nonadjacent objects, use the **Ctrl** key to select a group of objects. Continue to hold the **Ctrl** key down while you drag and drop the objects.

- When you try to drag and drop multiple objects, the items may remain selected. If this happens, repeat the drop operation. On rare occasions, the shape of the icon (object) does not change after the drag and drop operation, but this is not a problem.
- If you move from a Storage Navigator panel to another Web page, selecting the **Back** button on your browser returns you to the Storage Navigator main panel, Information tab (see Figure 3.1).

2.3.3 Conventions for Using the Storage Navigator on UNIX® Workstations

When you use the Storage Navigator on UNIX® workstations, the following additional parameters apply:

- Storage Navigator panels:
 - You cannot change the window size.
 - The styles and colors of some panels are displayed differently from those panels displayed on Windows® systems.
- Netscape Navigator® browser:
 - If a java_vm process or a Netscape browser process becomes hung up, Storage Navigator performance becomes abnormal. Delete the abnormal process and continue with Storage Navigator operations.
 - When you use the Storage Navigator on the Japanese version of the Netscape® Navigator browser, enter the following commands using the X Server Emulator:

B Shell:

```
LANG=C
export LANG
```

C Shell:

```
setenv LANG C
```
- After installing the JRE™ file on UNIX® workstations, enter the following commands using the X Server Emulator:
 - B Shell:


```
PATH=$PATH:[JRE installation directory path]/jre/bin
export PATH
```
 - C Shell:


```
setenv PATH ${PATH}:[JRE installation directory
path]/jre/bin
```

- CruiseControl and Priority Access (Prioritized Port Control) panels:
 - You cannot drag and drop objects on the Hitachi CruiseControl and Priority Access (Prioritized Port Control) panels. You must use the buttons instead.
 - If you select the icon for the Storage Navigator main panel when you are using either Hitachi CruiseControl or Priority Access (Prioritized Port Control), these panels may be wholly or partially obscured behind the Storage Navigator main panel. Before you can use the Storage Navigator main panel, close these panels by selecting the  button. This terminates the process. If you want to continue the process, select the CruiseControl or Priority Access panel to bring it to the foreground.
 - The Close button () on the Hitachi CruiseControl panel and the Priority Access (Prioritized Port Control) panel remains active even if you select the **Apply** button, and the processing is being executed. If you select the  button after selecting the **Apply** button, the panel closes but processing continues.
 - For the first two operations only, the word “Processing” is displayed on the message dialog box of the Hitachi CruiseControl panel and the Priority Access (Prioritized Port Control) panel. This message does not appear for the third and later operations.
- When you use Storage Navigator on Solaris™ workstations:
You cannot drag and drop objects on the LUN Manager panel. You must use the buttons instead.
- When you use Storage Navigator on HP-UX® workstations:
If you select any part of the Storage Navigator main panel while a dialog box is displayed, that dialog box may be wholly or partially obscured behind the Storage Navigator main panel. Before you can use the Storage Navigator main panel, close the obscured dialog box first.

2.3.4 Notes on Using the Storage Navigator on Windows Server® 2003 Computers

If you are using a Windows Server® 2003 computer, you must first set the preferences in Internet Explorer® as follows:

1. In Internet Explorer®, select **Tools**, and then **Internet Options**. The Internet Options panel appears (see Figure 2.3).
2. Click the **Advanced** tab.
3. Clear the **Do not save encrypted pages to disk** check box.
4. Click **OK** to close the Internet Options panel.

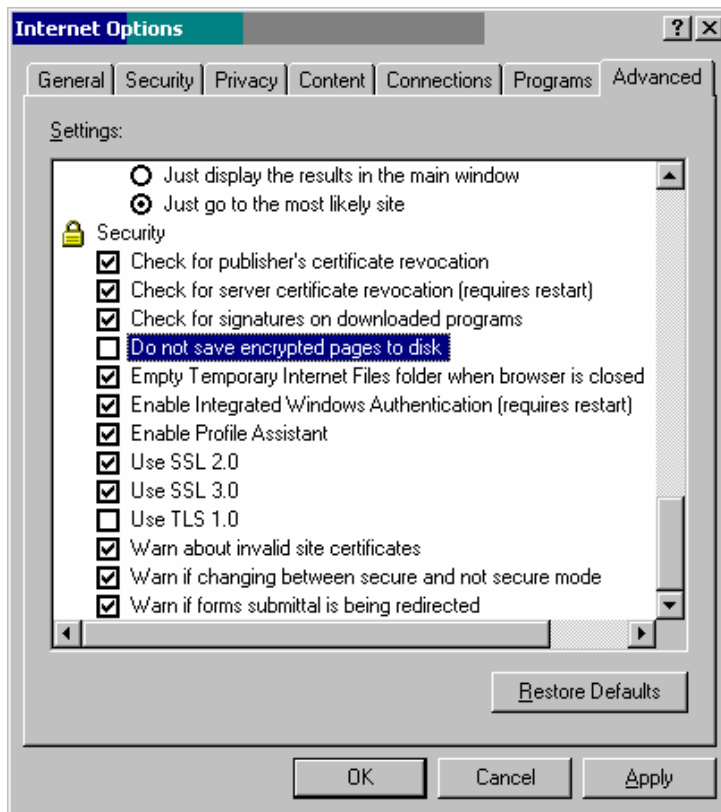


Figure 2.3 Clearing the “Do Not Save Encrypted Pages to Disk” Checkbox

2.4 Starting Up and Logging On To the 9900V

Important: Because the initial user ID has administrator-level access, one of the first tasks for the 9900V Storage Navigator administrator should be to change the password, in order to maintain protection of the administrator-only and restricted functions. If you are logging on to the 9900V for the first time, use the initial user ID and password to log on as an administrator. All user IDs and passwords are case-sensitive. If the administrator password is lost or forgotten, you must call the Hitachi Data Systems Support Center in order to regain access to the restricted functions.

All 9900V Storage Navigator (web client) users are required to log on to the Storage Navigator SVP (web server) with a valid user ID and password before executing the Storage Navigator Java™ applet program. You must have administrator access to register Storage Navigator users and assign or modify user access (see section 3.3).

Figure 2.4 shows an overview of the login process.

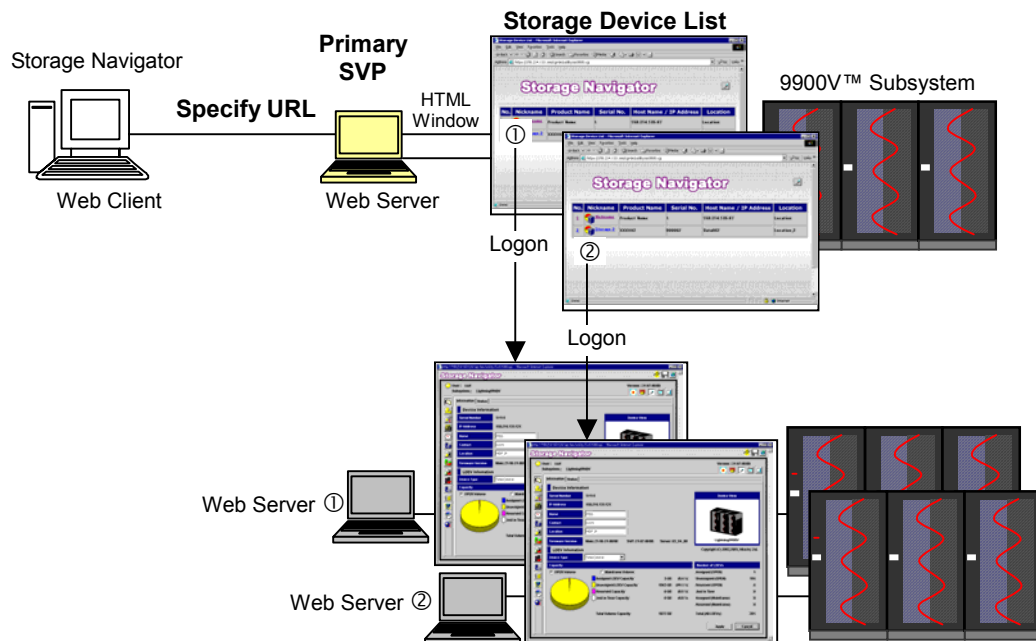


Figure 2.4 Logon Process

Table 2.4 Logon Specifications and Restrictions

Item	Specification
Maximum number of concurrent users	The 9900V can support up to 32 concurrent users, but only one user can be in Modify mode at a time. The exceptions are displaying the Performance Monitor panel and executing the Export Tool, in which cases the limit is two concurrent users.
Logging on to multiple web servers (SVPs)	The same user can concurrently log on to more than one web server, by opening an individual storage device list for each SVP, downloading the web client Java™ applet program from each SVP, and executing the Java™ applets on separate web browser windows. Note: If you execute multiple web client Java™ applet programs for multiple SVPs, insufficient memory may degrade performance.
Logging on to the same web server more than once concurrently	The same user (ID) may not have multiple concurrent sessions with the same web server (SVP).
Logon history	All logon information, including user ID, logon and logoff time, is recorded in the logon history, which can be viewed by the Storage Navigator administrator.
Automatic logoff operation	If the user cannot perform Storage Navigator operations for a specific period of time because of a network error, the user is be automatically logged off from the SVP. The default is one minute, but the Storage Navigator administrator can specify a different amount of time.

Note: You must add the desired subsystems to the storage device list on the primary SVP (web server), before logging on to any SVP. For instructions on editing the storage device list, see section 3.2. Refer to Table 2.4 for specifications and restrictions concerning logon operations.

To log onto a subsystem:

1. Log onto the Storage Navigator, and start your web browser.
2. To open the Storage Device List panel (see Figure 2.5), specify the URL of the primary SVP as follows: **http://xxx.xxx.xxx.xxx/cgi-bin/utility/sjc0000.cgi**
(where **xxx.xxx.xxx.xxx** is the IP address or host name of the primary SVP).
Note: If you are using a Windows Server® 2003 computer, the Enhanced Security Configuration Warning message may display (see Figure 2.7). If this message appears, select **In the future, do not show this message** then **OK**.
3. Select the hyperlink (either from the **No.** column or the **Nickname** column) of the desired SVP.
4. Because Storage Navigator is a Java™ applet, the first time that you log onto the server from a particular Storage Navigator computer, the Verisign® Security Warning panel displays (see Figure 2.6). Select **Always**, and you should not see this panel in the future.
5. If the SVP is set to support SSL-encrypted communication, the Establishing Secure Connection Warning panel (see Figure 2.8) displays. Select **OK**.
6. If the View Certificate panel (see Figure 2.9) displays, select the **View Certificate** button to verify that the certificate is correct, then select **Yes**. See Chapter 5 for more details on SSL-encrypted communication.
7. The Logon panel displays (see Figure 2.10). If you are using a Windows Server® 2003 computer, the Website Content Blocked message (see Figure 2.11) may appear. If this message appears, take the following steps:
 - a) Select **Add** in the message panel. The Trusted Sites panel appears (see Figure 2.12).
 - b) In **Add this Web site to the zone**, enter the URL of the SVP that you want to log onto.
 - c) If you do not know the URL, check the Storage Device List panel for the host name or the IP address of the SVP. For example, if the host name is **host01**, the URL is **http://host01**. If the IP address is **127.0.0.1**, the URL is **http://127.0.0.1**.
 - d) Select **Add**. The URL of the SVP is added to the list of trusted sites.
 - e) Select **Close**. The Trusted Sites panel closes.**Note:** You cannot log on to two or more SVPs from the same Storage Device List panel. If you try to start a second Storage Navigator session, a message panel is displayed (see Figure 2.13). This message appears even if you have not logged onto the primary SVP.
8. Enter the user ID and password.
9. Select **OK** to log on to the primary SVP.
10. If the SVP is set to support SSL-encrypted communication, the Display Nonsecure Warning panel (see Figure 2.14) may display, depending on which web browser you are using. If it displays, select **Yes**.
11. The Storage Navigator main panel (see Figure 3.1) displays.

Storage Navigator					
No.	Nickname	Product Name	Serial No.	Host Name / IP Address	Location
1	 Storage_1	XXXXX1	000001	127.0.0.1	Location_1
2	 Storage_2	XXXXX2	000002	Data002	Location_2
3	 Storage_3	XXXXX3	000003	127.0.0.3	Location_3

Figure 2.5 Storage Device List Panel

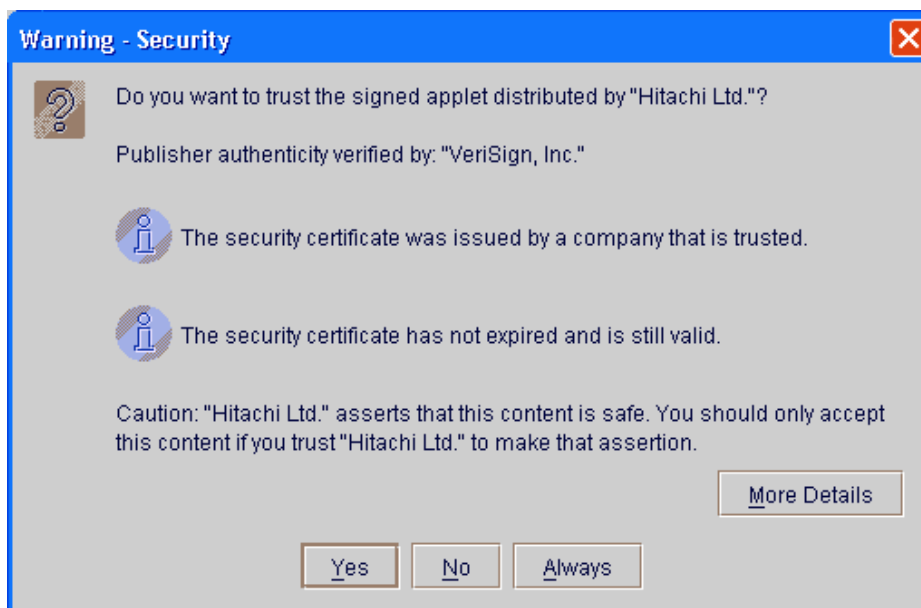


Figure 2.6 Verisign® Security Warning Panel

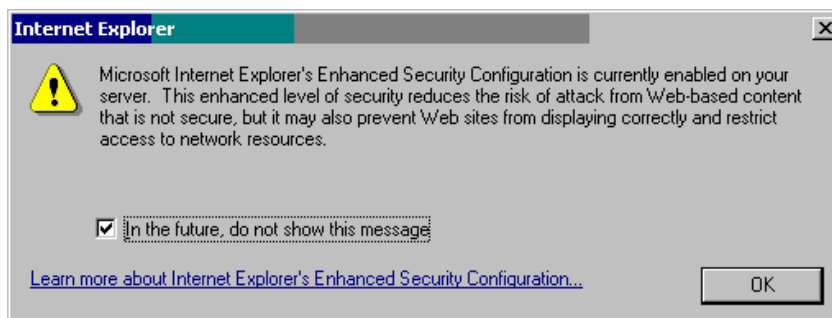


Figure 2.7 Enhanced Security Configuration Warning Message

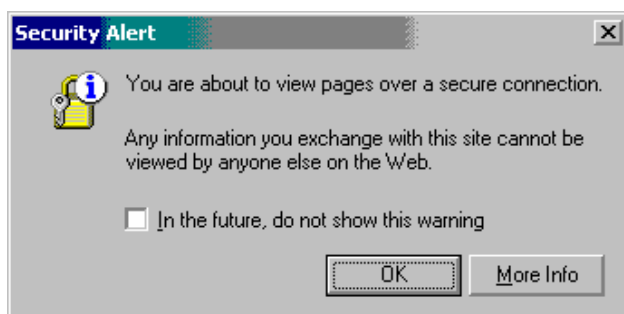


Figure 2.8 Establishing Secure Connection Warning Panel

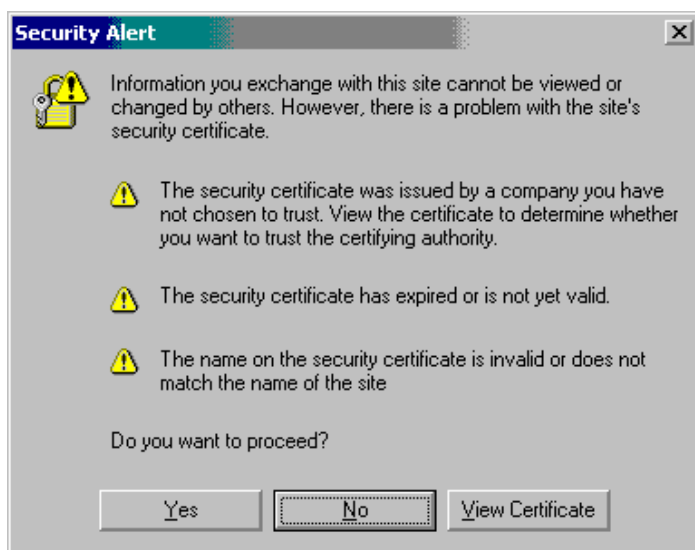


Figure 2.9 View Certificate Panel

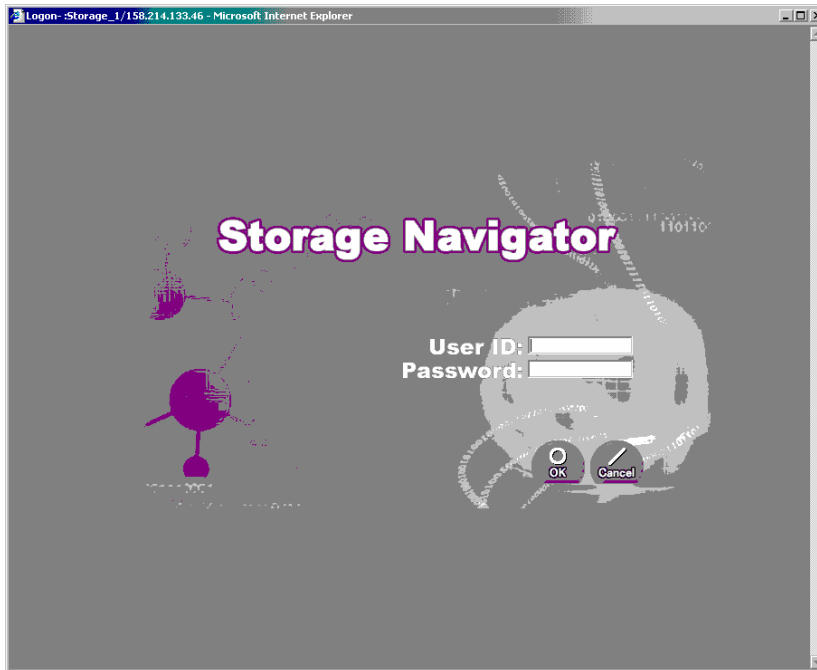


Figure 2.10 Logon Panel

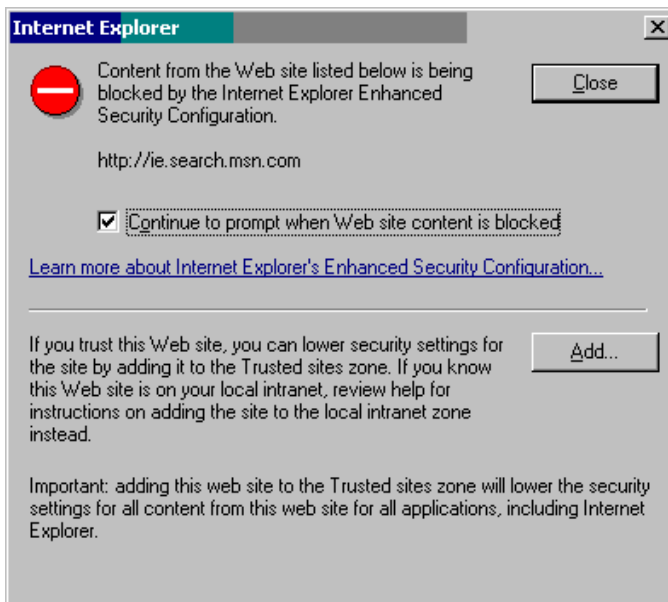


Figure 2.11 Website Content Blocked Message

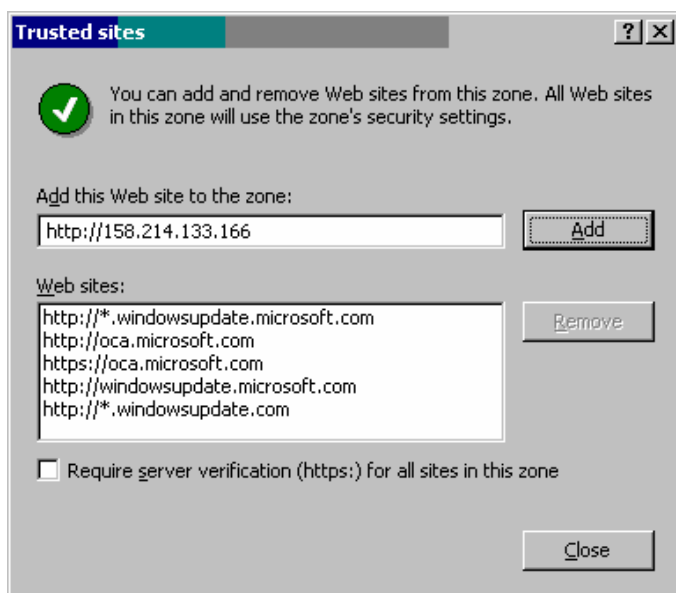


Figure 2.12 Trusted Sites Panel

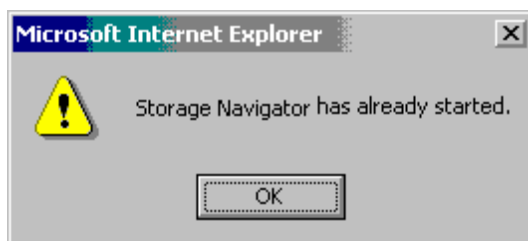


Figure 2.13 Message Panel (Storage Navigator Already Started)

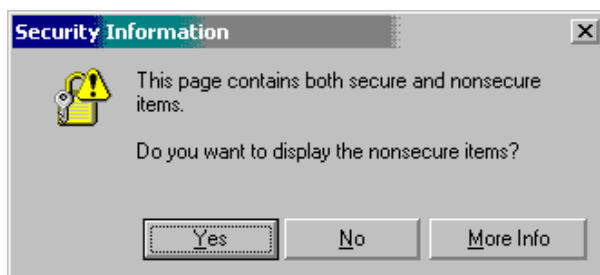


Figure 2.14 Display Nonsecure Warning Panel

2.5 View Mode and Modify Mode

2.5.1 Changing Between View Mode and Modify Mode

Note: You must have administrator or write access for the option that you want to use in **Modify Mode**.

To change between **View** mode and **Modify** mode:

1. Verify that the subsystem is unlocked. If all users are operating in **View** mode, the **Unlocked** icon (🔓) and the **View Mode** icon (🖋️) are displayed on the upper right of the Storage Navigator panels (see Figure 2.15). If a user is operating in **Modify** mode, or if subsystem maintenance is being performed, the **Locked** icon (🔒) is displayed, and you are not able to implement changes.
2. Select the **Mode Changing** icon, which should be in **View** mode (🖋️). Click on the icon, and a confirmation message displays (see Figure 2.16). Select **OK**. A progress bar showing the time remaining for **Modify** mode will be displayed next to the **Modify** mode icon (see Figure 2.18). For more information on the **Modify** mode timeout period, see section 2.5.
3. Once you are in **Modify** mode, the **Mode Changing** icon changes from a gray background to a yellow background (🖋️), and the **Locked** icon (🔒) is displayed (see Figure 2.17).
4. Once you have applied your desired changes, change back to **View** mode. Select the **Mode Changing** icon (🖋️). The confirmation message displays (see Figure 2.16). Select **OK** and you are returned to the **View** mode.



Figure 2.15 View Mode (Unlocked and Locked)

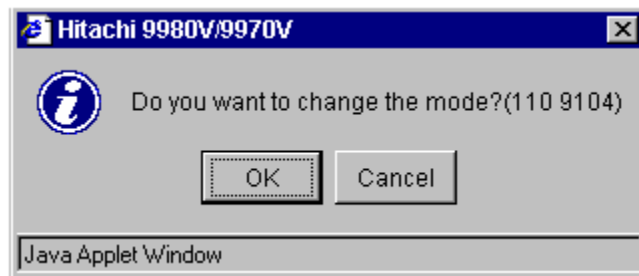


Figure 2.16 Mode Changing Confirmation Message



Figure 2.17 Modify Mode

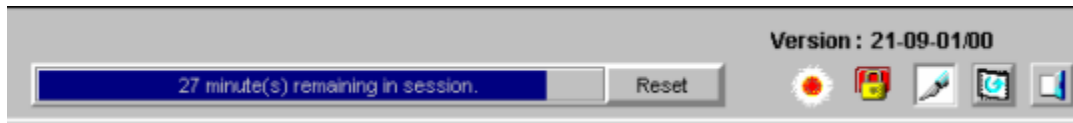


Figure 2.18 Modify Mode Timeout Indicator

2.5.2 Extending the Modify Mode Timeout Period

When you are in **Modify** mode, the time remaining before the mode is reset to **View** mode is displayed both as a progress bar and numerically (refer to Figure 2.18). The default for the **Modify** mode timeout period is 30 minutes. Once that time period expires, **Modify** mode is released.

By selecting the **Reset** button (to the right of the progress bar; refer to Figure 2.18), you can add another timeout period to the remaining time. For example, if the **Modify** mode timeout period is set at the default, which is 30 minutes, selecting the **Reset** button will extend the time remaining by 30 minutes.

To change or disable the **Modify** mode timeout period, see section 3.4. If you disable the timeout period, the progress bar will not be displayed.

2.6 License Keys

A license key is a text string that functions as a password, because it is entered into Storage Navigator and unlocks the protection of an option. Because each license key is generated with a subsystem serial number and option ID input, each subsystem requires a unique license key code. License key codes for each option (including the Java™ applet) and subsystem are provided at the time of purchase (see Figure 2.19.)

(1) Installing an Individual Option Using the License Key Code.

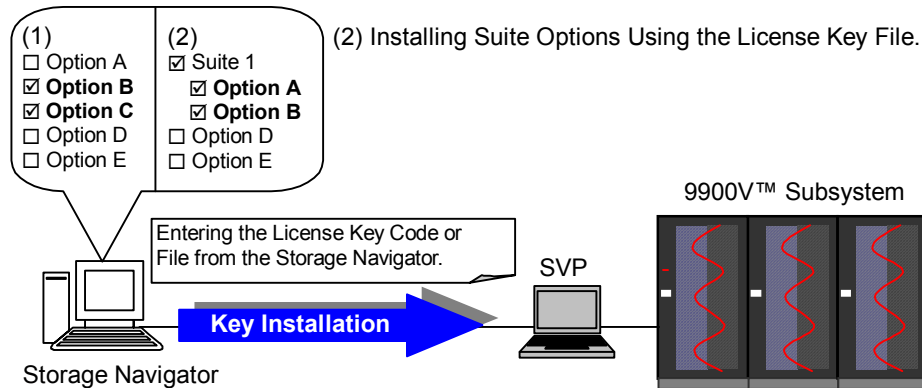


Figure 2.19 Overview of License Keys and Option Installation

There are three types of license keys: a permanent key, an emergency key, and a temporary key.

- A **permanent license key** is issued when the software license is purchased. It is used to enable the product indefinitely.
- An **emergency license key** is used in situations where the temporary key is set to expire in the near future, and the user cannot get the permanent key in time because of special circumstances (for example, a licensed server has crashed or there are problems with the communication infrastructure). An emergency key may also be used when a user who does not intend to purchase the option needs to undo a configuration change that was made during the lifetime of the temporary license key. An emergency key is effective for 10 days. **Note:** If you forcibly install an emergency key to an option that has already the permanent key, the license of that option expires in 10 days.

- A **temporary license key** is for trial use. 75 days after the temporary license key is installed (or when there are 45 days left before the expiration), a warning message is displayed on the Storage Navigator main panel when you either start the Storage Navigator or connect to a controller with the temporary license key. After 120 days, the temporary license key expires. A message that warns the user of the expiration of the license key is displayed, and the license key expiration is also reported to the host (see Figure 2.20).

For Hitachi TrueCopy - S/390®, Hitachi TrueCopy, ShadowImage, and LUN Manager, the expiration of a temporary license key has the following effects:

- No new configuration settings may be performed.
- The configuration settings that were made before the temporary license key expired remain in effect and cannot be deleted.
- **Note:** Non-configuration settings that were made before the temporary license key expired can be deleted from the SVP only (not from the Storage Navigator).

For Virtual LVI/LUN, LUN Expansion, FlashAccess, and Hitachi Parallel Access Volume, the expiration of a temporary license key has the following effects:

- No new configuration settings may be performed.
- The configuration settings that were made before the temporary license key expired remain in effect and cannot be deleted.

For Priority Access, the expiration of a temporary license key has the following effects:

- No monitoring functions may be performed.
- No new configuration settings (for example, upper-limit control, threshold control, or selection of port type) may be performed.
- Configuration settings that were made before the temporary license key expired may be expunged from the SVP only (not from the Storage Navigator). Contact your Hitachi Data Systems service representative (see section 7.2).

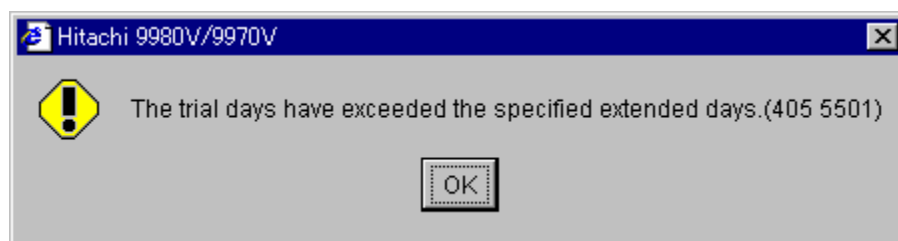


Figure 2.20 Trial Period Expiration Error Message

2.7 Enabling and Disabling Options on the Storage Navigator (Administrator Only)

2.7.1 Storage Navigator Options

Table 2.5 lists the options for the 9900V Storage Navigator.

Table 2.5 Storage Navigator Options

Option Name	Notes
Hitachi TrueCopy – S/390® Hitachi TrueCopy – S/390® Asynchronous	Hitachi TrueCopy – S/390® Asynchronous requires Hitachi TrueCopy – S/390®
Hitachi Extended Remote Copy	For controller emulation type 2105 only.
Hitachi TrueCopy Hitachi TrueCopy Asynchronous	Hitachi TrueCopy Asynchronous requires Hitachi TrueCopy.
Hitachi Hi-Copy	
Hitachi ShadowImage – S/390® Hitachi ShadowImage Hitachi ShadowImage – FlashCopy®	
Virtual LVI Virtual LUN	
LUN Expansion (LUSE)	Used only for open-systems devices.
LUN Manager	Used only for open-systems devices.
Performance Monitor Hitachi CruiseControl™ Priority Access	Hitachi CruiseControl™ and Priority Access require Performance Monitor.
FlashAccess – S/390® FlashAccess	Includes the Partial Cache Residence (PCR) function.
Hitachi Parallel Access Volume	Used only for S/390® devices.
Hitachi SANTinel - S/390® Hitachi SANTinel - S/390® Port Security	Used only for S/390® devices.
Extended Copy Manager (e-Copy)	Used only for open-systems devices. LUN Manager is not required to install e-Copy, but it is required to use it.
Storage Navigator Software (includes the Java API and the SNMP API)	Java™ applet programs that are downloaded from the SVP to the Storage Navigator.
Hitachi Multiplatform Backup/Restore	
DB Validator	Command Control Interface (CCI) is not required to install DB Validator, but it is required in order to use it. A permanent key is required.
LDEV Guard Open LDEV Guard	

Note: Contact your Hitachi Data Systems account team for the latest information on 9900V features and options.

Note: The license for the Storage Navigator software options is verified when you log on to the SVP. If you are not licensed to use a particular option, the icon for that option is grayed out.

2.7.2 License Key Tab

The **License Key** tab of the **License Key/SNMP/Just in Time** panel allows you to install and uninstall 9900V options for the connected subsystem. The **License Key** tab displays a list of 9900V options, and allows you to enter the license key code for a desired option. To open the **License Key** tab, log onto the Storage Navigator. From the Storage Navigator main panel (see Figure 3.1), select the **License Key/SNMP/Just in Time** icon (🔑) on the left side of the panel. The **License Key** tab is the default view (see Figure 2.21).

Note: If no Storage Navigator options have been installed, this panel opens automatically when you log on to the SVP.

Note: The option buttons (along the left side of the panel), and the subsystem information icons (in the top right corner of the panel), have been omitted. For a view of the entire screen, see Figure 3.1.

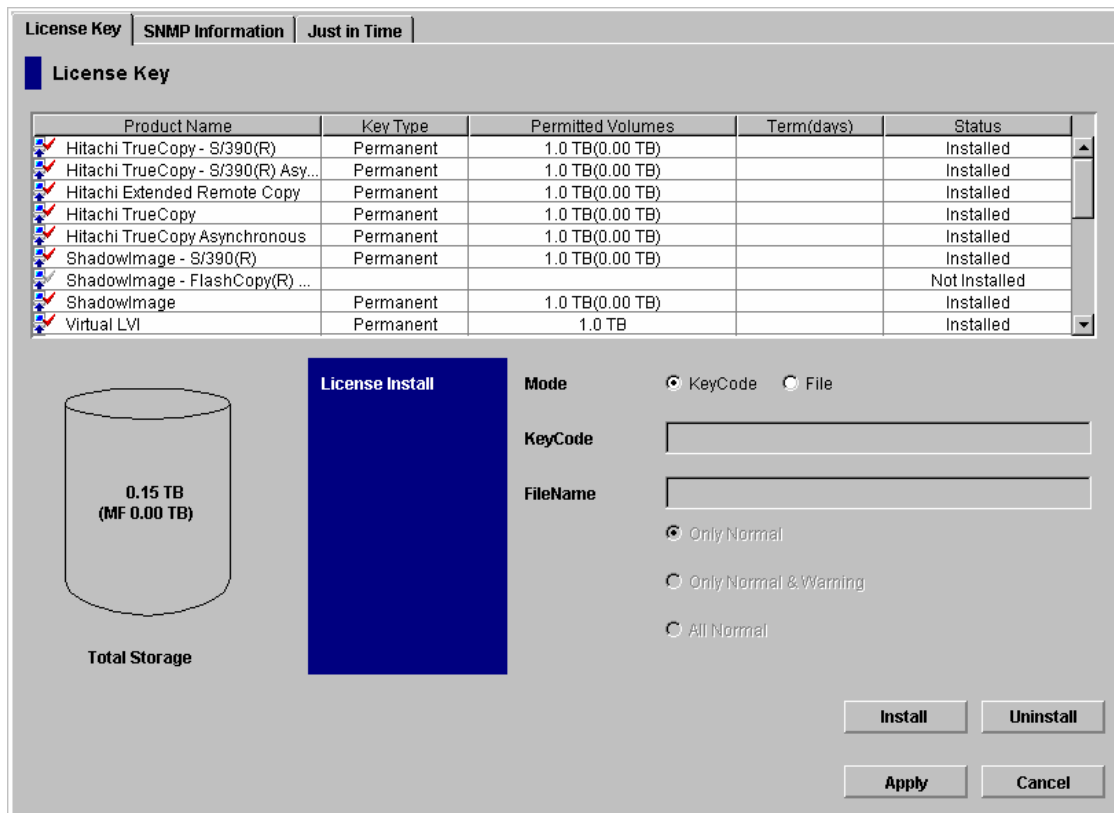
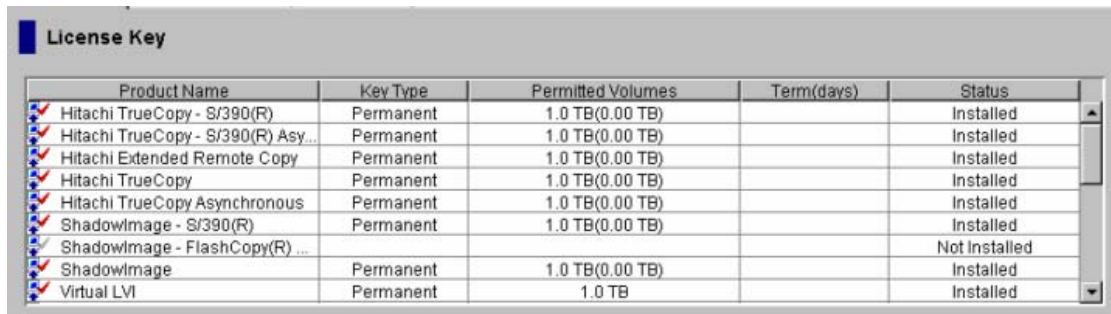


Figure 2.21 License Key Tab on the License Key/SNMP/Just in Time Panel

The **License Key** table is across the top of the **License Key** tab (see Figure 2.22).



Product Name	Key Type	Permitted Volumes	Term(days)	Status
 Hitachi TrueCopy - S/390(R)	Permanent	1.0 TB(0.00 TB)		Installed
 Hitachi TrueCopy - S/390(R) Asy...	Permanent	1.0 TB(0.00 TB)		Installed
 Hitachi Extended Remote Copy	Permanent	1.0 TB(0.00 TB)		Installed
 Hitachi TrueCopy	Permanent	1.0 TB(0.00 TB)		Installed
 Hitachi TrueCopy Asynchronous	Permanent	1.0 TB(0.00 TB)		Installed
 ShadowImage - S/390(R)	Permanent	1.0 TB(0.00 TB)		Installed
 ShadowImage - FlashCopy(R) ...				Not Installed
 ShadowImage	Permanent	1.0 TB(0.00 TB)		Installed
 Virtual LVI	Permanent	1.0 TB		Installed

Figure 2.22 License Key Table

The **License Key** table has the following features:

- The **Product Name** column includes:
 - Option name
 - Icon that indicates whether the option is available ( indicates **Installed**;  indicates **Not Installed**)
 - Icon that indicates whether the option is set to install or uninstall ( indicates **Install Set**,  indicates **Uninstall Set**)
- The **Key Type** column shows the license type: **Permanent**, **Temporary** or **Emergency**.
- The **Permitted Volumes** column shows the following:
 - Available capacity (licensed capacity)
 - Capacity that is already being used by the Hitachi TrueCopy, Hitachi Extended Remote Copy, LDEV Guard, Open LDEV Guard, Hi-Copy and ShadowImage options. For example, if this column displays 10.0TB (2.50TB), the licensed capacity is 10.0 TB and the capacity already being used is 2.50 TB. See Table 2.6 and Table 2.7 for more information on calculating volume capacities and estimating needed capacity.

Note: If the size is unlimited, **Unlimited** is displayed.

Note: Licensed capacities are calculated assuming that 1 kB = 1,024 bytes, 1 MB = 1,024 kB, 1 GB = 1,024 MB, and 1 TB = 1,024 GB.
- The **Term (days)** column shows the number of days that remain before the expiration of a temporary or emergency key. If the temporary or emergency key is no longer valid, the number of days that have elapsed since the expiration of the license key is displayed with a minus sign (-).

Continued on the following page.

- The **Status** column shows the current status of an option:
 - **Installed:** The option is available. The **Product Name** column displays the **Installed** icon (🖥️✅).
 - **Not Installed:** The option is not available. The **Product Name** column displays the **Not Installed** icon (🖥️❌).
 - **Not Enough:** The volume capacity is insufficient. The **Product Name** column displays the **Installed** icon (🖥️✅).
 - **Time Out:** The term has already expired for the temporary key. The **Product Name** column displays the **Not Installed** icon (🖥️❌).
 - **Reinstall Key:** The option is not installed. The **Product Name** column displays the **Not Installed** icon (🖥️❌).

Table 2.6 Calculating Volume Capacity

Volume Emulation Type	Formula for Calculating Volume Capacity
3380-x, 6586-x, OPEN-x	720 KB × (number of user cylinders)
3390-x, 6588-x	870 KB × (number of user cylinders)

Table 2.7 Sample Estimation of Needed Capacity

Item	Value
Volume emulation type	3390-3
Number of user cylinders	3,339
Number of volumes	2,048
Total volume capacity	$870 \text{ KB} \times 3,339 \times 2,048 = 5,949,296,640 \text{ kB}$ $5,949,296,640 \text{ KB} \div 1,024 = 5,809,860 \text{ MB}$ $5,809,860 \text{ MB} \div 1,024 = 5,673.70 \text{ GB}$ $5,673.70 \text{ GB} \div 1,024 = 5.54 \text{ TB}$
Estimated needed capacity	At least 6 TB

The **Total Storage** graphic is on the lower left corner of the **License Key** tab, and displays the total volume capacity currently available in the 9900V subsystem (see Figure 2.23).

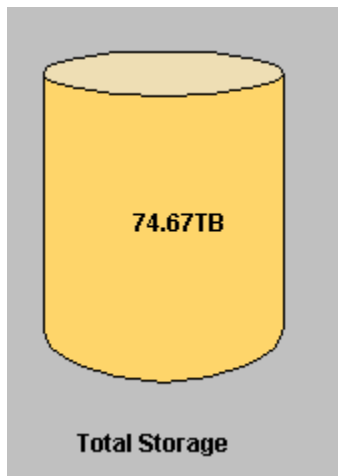


Figure 2.23 Total Storage Graphic

The **License Install** box is on the right side of the **License Key** tab (see Figure 2.24).

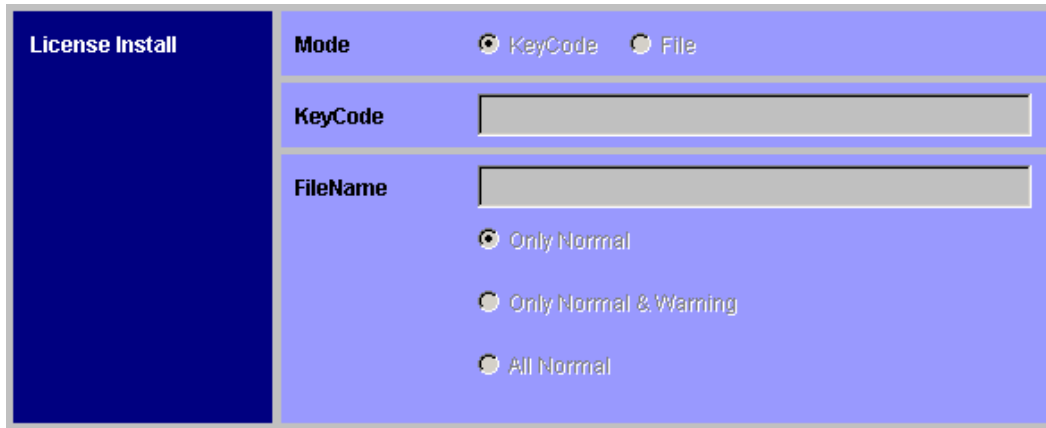


Figure 2.24 License Install Box

The **License Install** box has the following features:

- The **Mode** box allows you to select either the **Key Code** button or the **File** button.
 - **Key Code** enables the **Key Code** text box, which allows you to enter the license key for the selected option to be installed (see section 2.7.3).
Note: You cannot copy and paste text from other applications.
 - **File** enables the **File Name** text box, which allows you to enter the name of the desired license key file (see section 2.7.4).
Note: The license key file must be uploaded to the SVP. For instructions on uploading the license key file, see section 3.12.

The radio buttons on the lower right of the **License Install** box affect the display of the options in the **License Key** table (refer to Figure 2.22) as follows:

- **Only Normal** displays only successfully installed options. This is the default. **Note:** This will also display options that are installed but have insufficient licensed capacity.
- **Only Normal & Warning** displays both successfully installed options, and the following failed options:
 - if you are installing an emergency key for the option that has already been installed with a permanent key, or
 - if the licensed capacity is insufficient.
- **All Normal** displays options only if all options have been successfully installed. If installation of any of the options failed, no option is displayed. **Note:** This will also display options that are installed but have insufficient licensed capacity.

The buttons on the lower right of the **License Key** tab set up the options to be installed (see Figure 2.25).

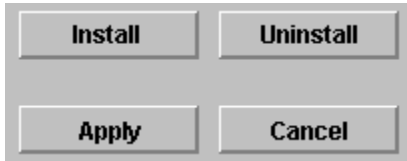


Figure 2.25 Install, Uninstall, Apply, and Cancel Buttons

- **Install** - changes the icon of the selected option from **Not Installed** (🖨️) to **Install Set** (🖨️✅). **Note:** The options are not actually installed until you select **Apply**.
- **Uninstall** - changes the icon of the selected option from **Installed** (🖨️✅) to **Uninstall Set** (🖨️❌). **Note:** The options are not actually uninstalled until you select **Apply**.
- **Apply** - implements the settings that were previously made using the **Install** or **Uninstall** buttons. Options with the status of **Install Set** change to **Installed**, and the options with the status of **Uninstall Set** change to **Not Installed**.
- **Cancel** - cancels the settings that were previously made using the **Install** or **Uninstall** buttons.

Table 2.8 License Key Status Icons

License Key Status	License Key Panel Display					
	Icon	Product Name (<i>Note 1</i>)	Key Type	Permitted Volume	Term (days)	Status
Not installed	 (Not Installed)	Option name	—	—	—	Not Installed
A Temporary key was installed, but has expired.	 (Not Installed)	Option name	—	—	(<i>Note 2</i>)	Time Out
Installed with the Permanent key, but the license capacity was insufficient.	 (Not Installed)	Option name	—	X.X TB (<i>Note 3</i>)	—	Not Enough
First installed with the Permanent key, then reinstalled with the Emergency key and the term expired.	 (Not Installed)	Option name	—	X.X TB (<i>Note 3</i>)	—	Not Installed
Installed with the unlimited Permanent key.	 (Installed)	Option name	Permanent	Unlimited	—	Installed
Installed with the limited Permanent key.	 (Installed)	Option name	Permanent	X.X TB (<i>Note 3</i>)	—	Installed
Installed with the Permanent key	 (Installed)	Option name	Emergency	Unlimited	(<i>Note 2</i>)	Installed
Installed with the Permanent key, and then reinstalled with the Emergency key.	 (Installed)	Option name	Emergency	X.X TB (<i>Note 3</i>)	(<i>Note 2</i>)	Installed
Installed with Emergency key.	 (Installed)	Option name	Emergency	—	(<i>Note 2</i>)	Installed
Installed with Temporary key.	 (Installed)	Option name	Temporary	—	(<i>Note 2</i>)	Installed
Installed with the Temporary key, and then reinstalled with the Permanent key, but the license capacity was insufficient,	 (Installed)	Option name	Temporary	X.X TB (<i>Note 3</i>)	(<i>Note 2</i>)	Installed
Installed with the Permanent key, and then reinstalled with the Temporary key although the license capacity was insufficient.	 (Installed)	Option name	Temporary	—	(<i>Note 2</i>)	Installed
Installed with the Enterprise key.	 (Installed)	Option name	Enterprise	—	—	Installed
The capacity insufficiency caused by PDEV expansion.	 (Installed)	Option name	Permanent	X.X TB (<i>Note 3</i>)	(<i>Note 2</i>)	Insufficient Capacity
The Expired status originated from the Insufficient status.	 (Installed)	Option name	Permanent	X.X TB (<i>Note 3</i>)	—	Expired

Note 1: See Table 2.5 for option names.

Note 2: *N* indicates the number of days remained before the expiration. If the key is no longer valid, the number of days that have elapsed after the expiration is displayed with a minus sign (-).

Note 3: For Hitachi TrueCopy, Hitachi Extended Remote Copy, ShadowImage LDEV Guard, Open LDEV Guard, and Hi-Copy options, “**X.X TB** (**X.XX TB**)” is displayed. *X* indicates the capacity.

2.7.3 Enabling Storage Navigator Options Using a License Key Code

To enable a 9900V Storage Navigator option by using the license key code:

1. Change to **Modify** mode (refer to section 2.5 if you need instructions).
2. Select **License Key/SNMP/Just in Time** (🔑) on the Storage Navigator main panel to open the License Key/SNMP/Just in Time panel (see Figure 2.21). The **License Key** tab is the default view.

Note: If no Storage Navigator options have been installed, this panel opens automatically when you log onto the SVP.

3. Select **Key Code** in the **Mode** box.
4. Select the desired option that you want to install in the list.

Note: You can only select one option at a time using this method. To install multiple options at a time, see section 2.7.4. The line of the selected option is displayed in reverse video.

5. In the **Key Code** box, enter the license key code.

Note: You cannot copy and paste text from other applications. To enable one or more Storage Navigator options using a license key file, see section 2.7.4.

6. Select the **Install** button. A confirmation message is displayed (see Figure 2.26).
7. Select **OK** to continue installing the option (or **Cancel**). The **Not Installed** icon (🔑) changes to **Install Set** (🔑). **Important:** To implement the setting, you must select the **Apply** button.

Note: A warning message is displayed in the following cases:

- If you are installing an emergency key for the option that has already been installed with a permanent key. If you install the emergency key, it expires in 10 days.
- If you are attempting to install an emergency key when the remaining lifetime of the option is more than 10 days. If you want to install the emergency key, select the **Forcibly Install Emergency Key** check box. If you do not want to install the emergency key, clear the **Forcibly Install Emergency Key** check box.

8. To apply the changes to the subsystem, select **Apply** (or **Cancel**). Select **OK** (or **Cancel**).

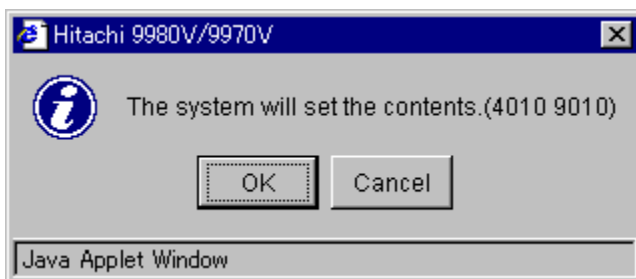


Figure 2.26 Set Confirmation Message

2.7.4 Enabling Storage Navigator Options Using a License Key File

You can also enable multiple options in a single procedure, using a license key file. The license key files are provided by Hitachi Data Systems. You must upload the desired license key file to the SVP before using the license key file to enable options on the Storage Navigator (see section 3.12 for instructions). License keys are 20 character random appearing alphanumeric text strings (e.g., "FFHKIMXENPOMNOPQR332"). The surrounding quotations marks are not part of the license key.

To install Storage Navigator options on the Storage Navigator using the license key file:

1. Log on to the SVP to open the Storage Navigator main panel.
2. Change to **Modify** mode.
3. Select **License Key/SNMP/Just in Time**  on the Storage Navigator main panel to open the License Key/SNMP/Just in Time panel. The **License Key** tab is the default view. **Note:** If no Storage Navigator options have been installed, this panel opens automatically when you log on to the SVP.
4. From the **Mode** box, select **File**.
5. In the **File Name** box, enter the name of the license key file that you previously uploaded to the SVP. **Note:** The file name can be up to 200 alphanumeric characters.
6. Select the registration mode (Only Normal, Only Normal & Warning, or All Normal).
7. A confirmation message is displayed (refer to Figure 2.26). Select **OK**. **Important:** To implement the setting, you must select the **Apply** button (see below).
8. If you want to apply the changes to the subsystem, select **Apply** (or **Cancel**). Select **OK** on the confirmation message.

Note: If installation fails or an error occurs during the installation, a message panel appears and lists the failed options (see Figure 2.27). To display the Install/Uninstall Error Detail panel (see Figure 2.28), select the failed option. Select **Detail**.

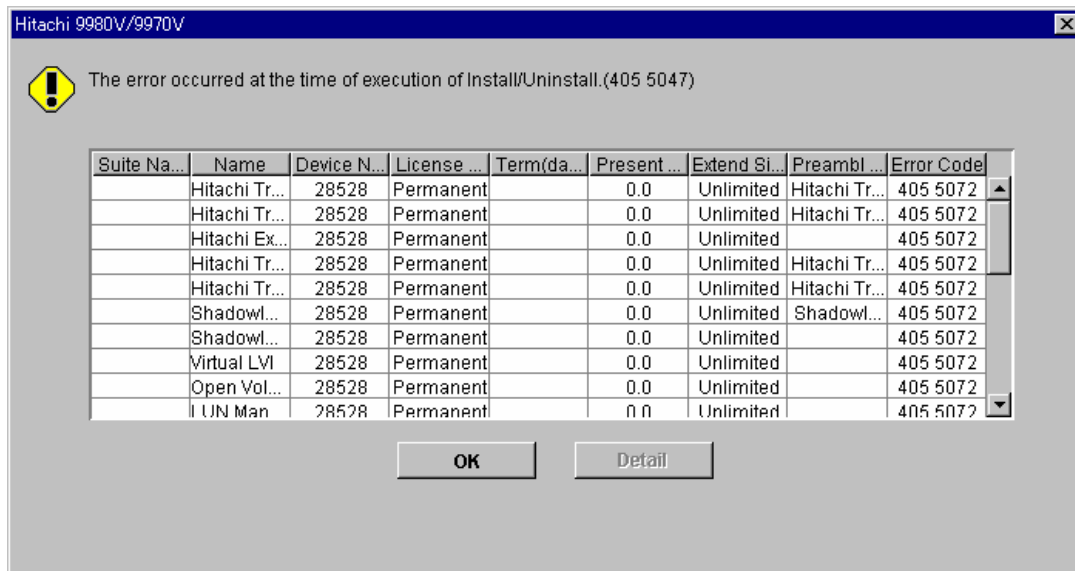


Figure 2.27 Install/Uninstall Error Panel

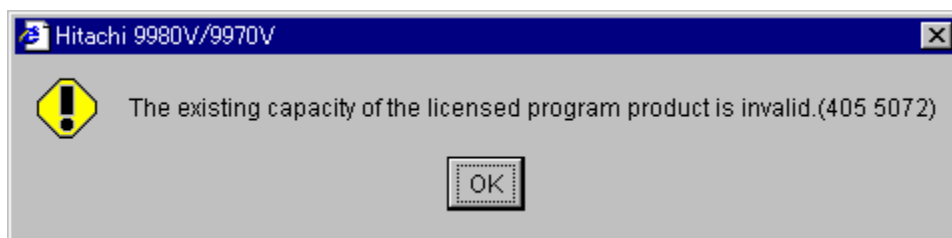


Figure 2.28 Sample Install/Uninstall Error Detail Panel

2.7.5 Disabling Storage Navigator Options

To disable Storage Navigator options on the Storage Navigator:

1. Log on to the SVP to open the Storage Navigator main panel (see Figure 3.1).
 2. Change to **Modify** mode.
 3. Select **License Key/SNMP/Just in Time**  on the Storage Navigator main panel. The **License Key** tab is the default view.
 4. Select the desired option that you want to uninstall in the list. The selected option is displayed in reverse video. Select **Uninstall**. A confirmation message is displayed (refer to Figure 2.26).
 5. Select **OK** (or **Cancel**). The **Installed** icon  changes to **Uninstall Set** .
- Important:** To implement the setting, you must select **Apply**.
6. Select **Apply** (or **Cancel**).
 7. Select **OK** (or **Cancel**). The status of the uninstalled option changes from **Installed** to **Not Installed**.

Caution: On rare occasions, a program product option that is displayed as **Not Installed** but still has available licensed capacity (shown as XX TB) might remain in the list. In this case, select that option, and select **Uninstall** to refresh the status of that option.

Caution for Open LDEV Guard: When you uninstall Open LDEV Guard, an error might occur even if the **Permitted Volumes** column of the License Key panel indicates that the licensed capacity is 0 TB (zero terabytes). To remove the error and continue uninstallation, take the following steps:

1. Open the Open LDEV Guard panel, and then find logical volumes that are unusable as S-VOLs (secondary volumes).
2. Change the settings of the logical volumes so that the logical volumes are usable as S-VOLs. See *Hitachi Freedom Storage™ Lightning 9900™ V Series Open LDEV Guard User's Guide* (MK-92RD158) for more information on Open LDEV Guard.
3. Return to the License Key panel and then uninstall Open LDEV Guard.

Chapter 3 Performing Storage Navigator Operations

You can perform the following types of operations on the 9900V Storage Navigator:

- Launching the desired option (see section 3.1.3)
- Editing the storage device list (see section 3.2)
- Editing the user account list (see section 3.3)
- Setting Storage Navigator environment parameters (see section 3.4)
- Viewing the Storage Navigator log information (see section 3.5)
- Downloading the log and configuration files (see section 3.6)
- Restoring the storage device list, the user account list, and the environment parameters (administrator only) (see section 3.7)
- Viewing the Storage Navigator information, and changing the password (see section 3.8)
- Extending cache memory and LUNs (see section 3.9)
- Downloading Storage Navigator trace files using FD Dump Tool (see section 3.10)
- Exporting data to files using the Export File function (see section 3.11)
- Uploading files to the SVP using the FTP Client function (see section 3.12)

3.1 Storage Navigator Main Panel

3.1.1 Information Tab on the Storage Navigator Main Panel

The Storage Navigator main panel (see Figure 3.1) opens automatically after you log on to the SVP. The **Information** tab is the default view.

Note: Until you have installed at least one Storage Navigator option, the **License Key/SNMP/Just in Time** panel opens. Once you have installed an option, the Storage Navigator main panel opens.

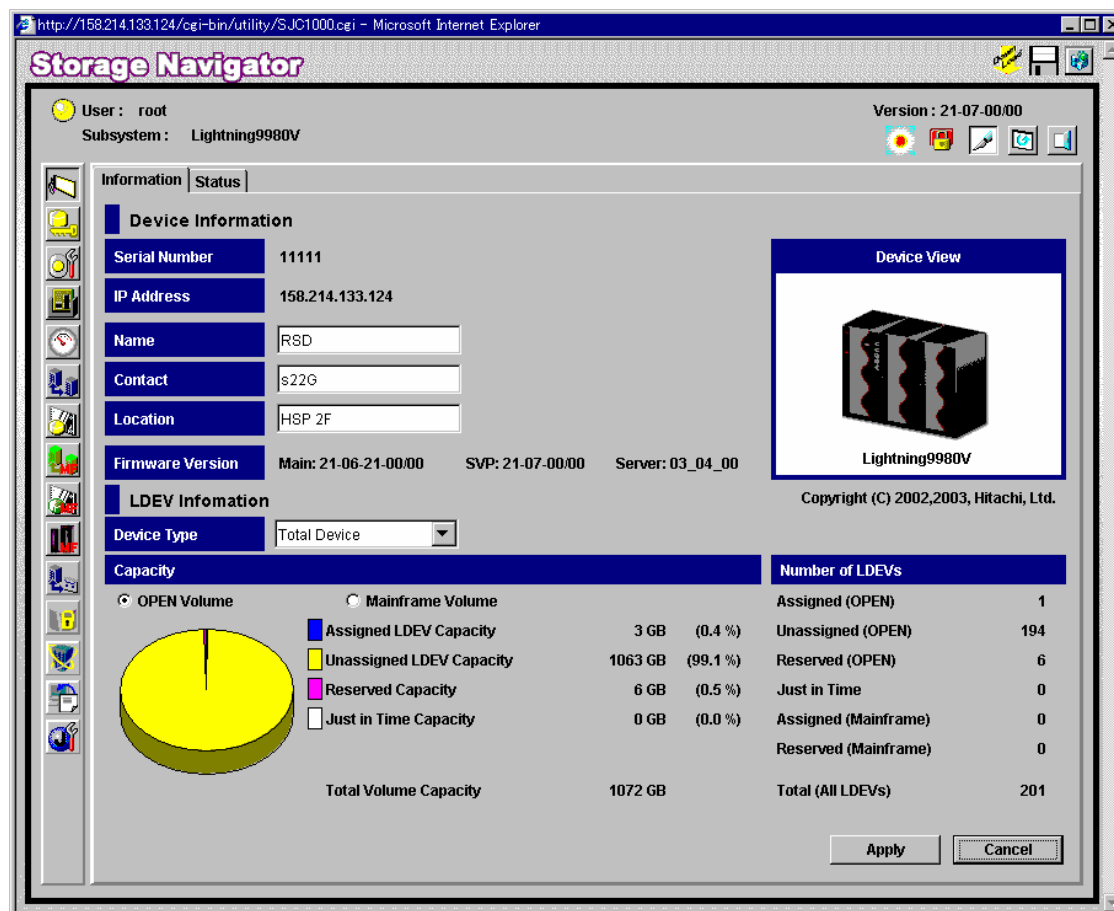


Figure 3.1 Storage Navigator Main Panel, Information Tab

3.1.1.1 Option Buttons (Common to All Storage Navigator Panels)

The **Option** buttons are displayed vertically on the left side of all of the Storage Navigator panels. Each button launches the corresponding option. If you float the cursor over an icon, the name of the corresponding option is displayed. Figure 3.2 defines the icons.

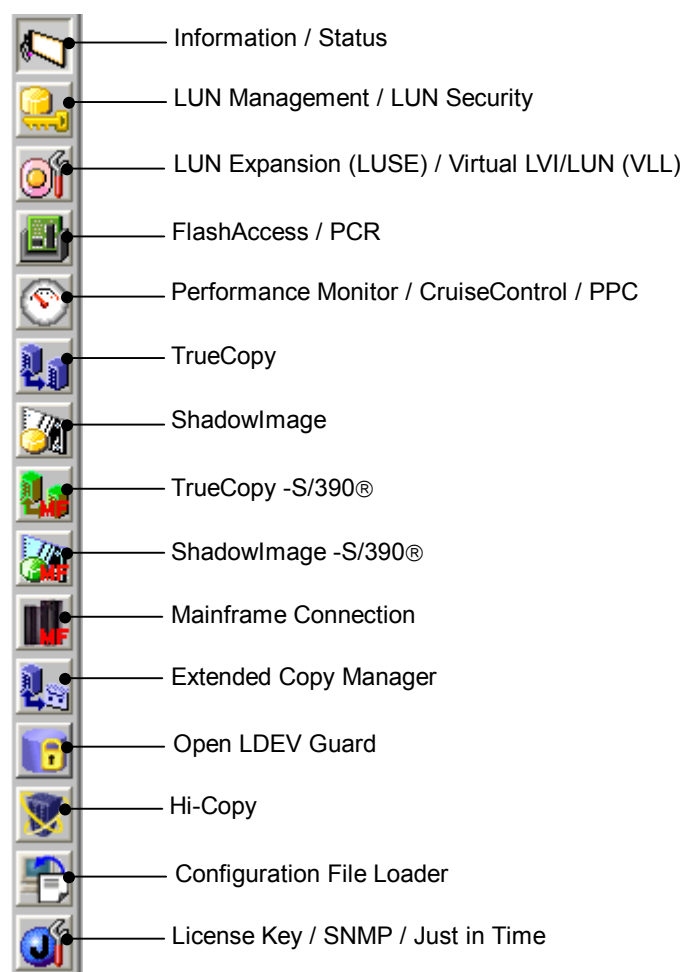


Figure 3.2 Option Launching Buttons

The option launching buttons have the following features:

- **Information/Status** () returns you to the Storage Navigator Main panel.
- **LUN Manager/LUN Security** () opens the LUN Manager/Port panel. See *Hitachi Freedom Storage™ Lightning 9900™ V Series LUN Manager User's Guide* (MK-92RD105) for more information on LUN Manager.
- **LUN Expansion (LUSE)/Virtual LVI/LUN (VLL)** () opens the LUSE/VLL panel. See *Hitachi Freedom Storage™ Lightning 9900™ V Series LUN Expansion (LUSE)/Virtual LVI/LUN (VLL) User's Guide* (MK-92RD104) for more information on LUN Expansion or Virtual LVI/LUN.
- **FlashAccess/PCR** () opens the FlashAccess panel. See *Hitachi Freedom Storage™ Lightning 9900™ V Series FlashAccess User's Guide* (MK-92RD102) for more information on FlashAccess.
- **Performance Monitor/CruiseControl/PPC** () opens the Performance Monitor/Monitoring Options panel. See *Hitachi Freedom Storage™ Lightning 9900™ V Series Performance Monitor User's Guide* (MK-92RD133), *Hitachi Freedom Storage™ Lightning 9900™ V Series CruiseControl User's Guide* (MK-92RD106), and *Hitachi Freedom Storage™ Lightning 9900™ V Series Priority Access User's Guide* (MK-92RD117) for more information on these program products.
- **TrueCopy** () opens the Pair Operations/RCU Operations/Asynchronous Operations/Usage Monitor panel. See *Hitachi Freedom Storage™ Lightning 9900™ V Series TrueCopy User's Guide* (MK-92RD108) for more information on TrueCopy.
- **ShadowImage** () opens the Main/History/Options panel. See *Hitachi Freedom Storage™ Lightning 9900™ V Series ShadowImage User's Guide* (MK-92RD110) for more information on ShadowImage.
- **TrueCopy - S/390®** () opens the Pair Operations/RCU Operations/Asynchronous Operations/Usage Monitor panel. See *Hitachi Freedom Storage™ Lightning 9900™ V Series TrueCopy - S/390® User's Guide* (MK-92RD107) for more information on TrueCopy - S/390®.
- **ShadowImage - S/390®** () opens the Main/History/Options panel. See *Hitachi Freedom Storage™ Lightning 9900™ V Series ShadowImage - S/390® User's Guide* (MK-92RD109) for more information on ShadowImage - S/390®.
- **Mainframe Connection** () opens the HPAV/Hitachi SANTinel - S/390®/LDEV Guard panel. See *Hitachi Freedom Storage™ Lightning 9900™ V Series Parallel Access Volume User's Guide* (MK-92RD118) for more information on HPAV. See *Hitachi Freedom Storage™ Lightning 9900™ V Series Hitachi SANTinel - S/390® User's Guide* (MK-92RD115) for more information on Hitachi SANTinel - S/390®. See *Hitachi Freedom Storage™ Lightning 9900™ V Series LDEV Guard User's Guide* (MK-92RD146) for more information on LDEV Guard.
- **Extended Copy Manager** () opens the Extended Copy Manager panel. See *Hitachi Freedom Storage™ Lightning 9900™ V Series Extended Copy Manager User's Guide* (MK-92RD137) for more information on Extended Copy Manager.

- **Open LDEV Guard** () opens the Open LDEV Guard panel. See *Hitachi Freedom Storage™ Lightning 9900™ V Series Open LDEV Guard User's Guide* (MK-92RD158) for more information on Open LDEV Guard.
- **Hi-Copy** () opens the Hi-Copy panel. See *Hitachi Freedom Storage™ Lightning 9900™ V Series Hi-Copy User's Guide* (MK-92RD159) for more information on Hi-Copy.
- **Configuration File Loader** () opens the Configuration File Loader panel. See Chapter 5 for more information on Configuration File Loader.
- **License Key/SNMP/Just in Time** () opens the License Key/SNMP/Just in Time panel. For more information on using license keys, refer to sections 2.5 through 2.7. For more information on using SNMP, see Chapter 4. For more information on using the Just in Time functions, see section 3.9.

3.1.1.2 Subsystem Information Icons (Common to All Storage Navigator Panels)

The subsystem information icons are on the top right corner of all of the Storage Navigator panels (see Figure 3.3).

Note: The information might not be displayed correctly when

- the exclusive lock is active, or
- SVP maintenance is in progress, or
- if SNMP operations are being performed.



Figure 3.3 Subsystem Information Icons

- **FTP Client** (📁) opens the File Download panel (see Figure 3.34). You can upload files from the Storage Navigator to the SVP using the FTP Client function. The FTP Client function is required when you use the license key file for installing multiple options. See section 3.12 for more information on the FTP Client function.
- **Export** (📄) opens the Export Data File panel (see Figure 3.54). You can export data (e.g., monitoring data used by Performance Monitor and Hitachi TrueCopy) to files using the Export File function. See section 3.10 for more information on the Export File function.
- **Option** (🌐) opens the Control Panel (see Figure 3.23), if you are logged in as an administrator. If you are logged in as an ordinary user, it opens the User Control Panel (see Figure 3.42). See section 3.3 for more information on the available administrator functions, and section 3.8 for more information on the available user functions.
- The **Version** entry shows the version of Storage Navigator Java™ applet program downloaded from the connected SVP (Web server). The Java™ applet program is downloaded each time the Storage Navigator connects to the SVP, so that the version is always consistent between the Storage Navigator and SVP.
- The **Wait Status** icon alternates between **Status** (☀️) and **Wait** (🌙), either after the **Refresh** button is selected, or while the subsystem is updating the information displayed on the panel.

- The exclusive lock icons indicate the operation mode of all currently logged-in users.
 - If all users are operating in **View** mode, the **Unlocked** icon () is displayed.
 - If a user is operating in the **Modify** mode, the **Locked** icon () is displayed.

Note: The display may show as **Locked** () when the SVP maintenance is in progress or if SNMP operations are being performed.

- The **Mode-Switching** buttons allow users to switch the operation mode between **View** mode () and **Modify** mode ()

Note: Only one user at a time can be in **Modify** mode. Make sure that the subsystem is not locked before attempting to switch to **Modify** mode. If you change modes a confirmation message is displayed.

- **Refresh** () displays the latest information on the Storage Navigator main panel.
- **Exit** () closes the Storage Navigator main panel. Use this button to exit Storage Navigator. Do not use the **Close** button ()

3.1.1.3 Device Information Box and Device View

The **Device Information** box and **Device View** are on the top of the **Information** tab (see Figure 3.4):

The screenshot displays a web interface with two tabs: 'Information' and 'Status'. The 'Information' tab is active, showing a 'Device Information' section with the following fields:

Serial Number	11111
IP Address	158.214.133.33
Name	RSD
Contact	S22G
Location	HSP2F
Firmware Version	Main: 21-04-30-00/ff SVP: 21-05-00/00 Server: 03_03_00

To the right of the 'Device Information' box is the 'Device View' box, which contains a 3D image of a device labeled 'Lightning9980V'.

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Figure 3.4 Device Information Box and Device View

- **Device Information:** Product name of the connected subsystem
- **Serial Number:** Serial number of the connected subsystem
- **IP Address:** IP address of the connected subsystem (SVP)
- **Name:** Device name of the connected subsystem. This can be changed if you are in **Modify** mode. This is a required field (maximum 255 alphanumeric characters). **Note:** Do not add a space before or after the device name, or you will cause an error when you select the **Apply** button.
Note: The device name is required to use the SNMP Agent. Make sure to document the device name, because the settings are cleared if the SVP is replaced.
- **Contact:** Device support contact information, such as personnel and telephone number, where you can inquire about the connected subsystem. You can change the contact information with the **Modify** mode. This is a required field (maximum 255 alphanumeric characters).
Note: The contact name is required to use SNMP Agent. Make sure to document the contact name, because the settings are cleared if the SVP is replaced.
- **Location:** Location of the connected subsystem. The Storage Navigator user can change the device location with the **Modify** mode. This is a required field (maximum 255 alphanumeric characters).
Note: The device location is required to use SNMP Agent. Make sure to document the device location, because the settings are cleared if the SVP is replaced.
- **Firmware Version Main:** Version of the microcode installed in the connected subsystem
- **Firmware Version SVP:** Version of the Storage Navigator Java™ applet program installed in the SVP of the connected subsystem
- **Firmware Version Server:** Version of the RMI™ server installed in the SVP of the connected subsystem

3.1.1.4 The Capacity Box

The Capacity box is on the lower left corner of the Storage Navigator Main panel.

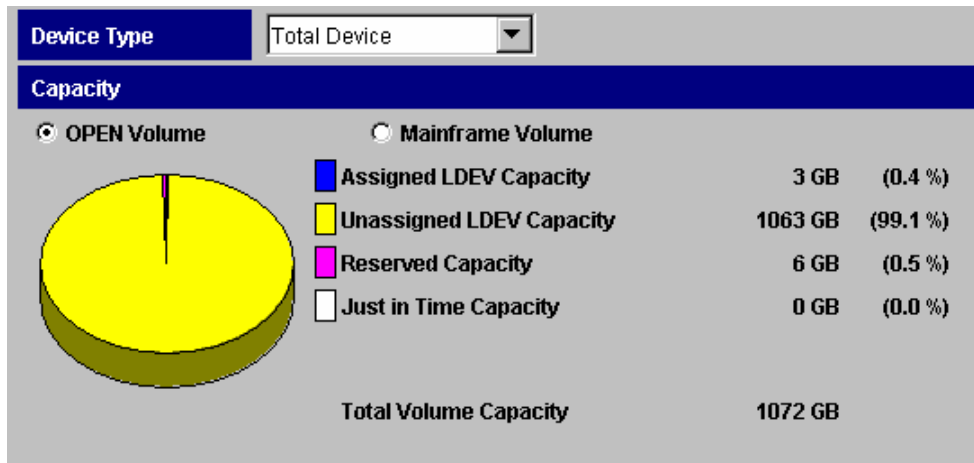


Figure 3.5 Capacity Box (Open Systems)

- The **Device Type** drop-down list allows you to select the type of volumes to be displayed, as follows:
 - **Total Device** displays information on all volume types.
 - **Internal Device Only** displays information on internal volumes only.
 - **Hi-Copy Device Only** displays information on Hi-Copy volumes only.
- The **OPEN Volume** button displays the volume capacity information for all available open-system volumes in the subsystem. If there are no open-system volumes, **No Volume** is displayed.
- The **Assigned LDEV Capacity** field displays information about the available open system volumes (LDEVs) in the subsystem that have assigned paths. The following information is displayed:
 - The capacity (in GB) of the assigned LDEVs. This includes LUSE volumes but not control cylinders.
 - The percentage of assigned open-system LDEVs compared to the total open-system capacity is displayed in parentheses and in the blue area of the pie chart.

- The **Unassigned LDEV Capacity** field displays information about the available open system volumes (LDEVs) in the subsystem that do not have assigned paths. The following information is displayed:
 - The capacity (in GB) of the unassigned LDEVs. This includes LUSE volumes, but does not include control cylinders, Just in Time Storage volumes, or Hitachi CruiseControl reserved volumes.
 - The percentage of unassigned open-system LDEVs compared to the total open-system capacity is displayed in parentheses and in the yellow area of the pie chart.
- The **Reserved Capacity** field displays information about the available open-systems volumes that are reserved for Hitachi CruiseControl. For further information on Hitachi CruiseControl, please refer to the *Lightning 9900™ V Series CruiseControl User's Guide* (MK-92RD106). The following information is displayed:
 - The capacity (in GB) of the reserved volumes
 - The percentage of reserved volumes compared to the total open-system capacity is displayed in parentheses and in the pink area of the pie chart.
- The **Just in Time Capacity** field displays information about the open-system volumes that are available for the Just in Time function. For further information about the Just in Time function, see section 3.9. The following information is displayed:
 - The capacity (in GB) of the Just in Time volumes
 - The percentage of Just in Time volumes compared to the total open-system capacity is displayed in parentheses and in the white area of the pie chart.
 - **Note:** If you select **Hi-Copy Device Only** in the **Device Type** drop-down list, the Just in Time Capacity field is not displayed.

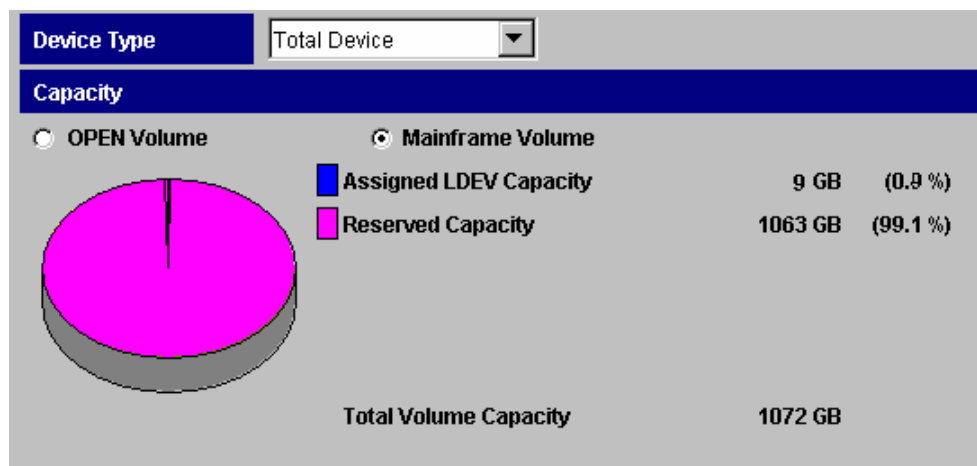
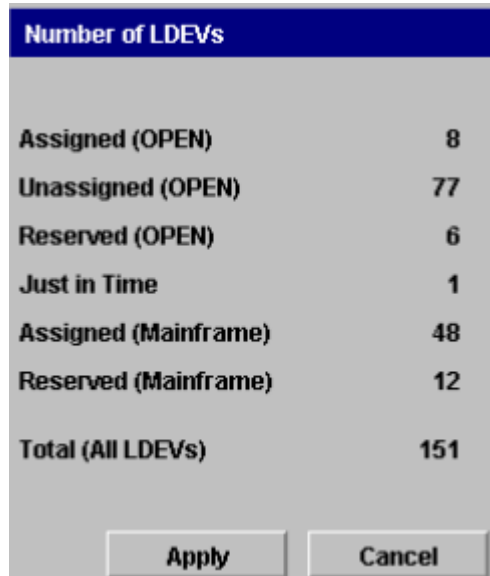


Figure 3.6 Capacity Box (Mainframe Systems)

- The **Device Type** drop-down list allows you to select the type of volumes to be displayed, as follows:
 - **Total Device** displays information on all volume types.
 - **Internal Device Only** displays information on internal volumes only.
 - **Hi-Copy Device Only** displays information on Hi-Copy volumes only.
- The **Mainframe Volume** button displays the volume capacity information for all available S/390® (mainframe) and HRX (multiplatform) volumes in the subsystem. If there are no mainframe or HRX volumes, **No Volume** is displayed.
- The **Assigned LDEV Capacity** field displays information about the available mainframe and HRX volumes in the subsystem that have assigned paths. The following information is displayed:
 - The capacity (in GB) of the assigned LDEVs
 - The percentage of assigned mainframe and HRX LDEVs compared to the total mainframe and HRX capacity is displayed in parentheses and in the blue area of the pie chart.
- The **Reserved Capacity** field displays information about the available mainframe and HRX volumes that are reserved for Hitachi CruiseControl. For further information on Hitachi CruiseControl, please refer to the *Lightning 9900™ V Series CruiseControl User's Guide* (MK-92RD106). The following information is displayed:
 - The capacity (in GB) of the reserved volumes
 - The percentage of reserved volumes compared to the total mainframe and HRX capacity is displayed in parentheses and in the pink area of the pie chart.

3.1.1.5 Number of LDEVs Box, Apply and Cancel Buttons

The Number of LDEVs box is on the lower right of the Storage Navigator Main panel.



Number of LDEVs	
Assigned (OPEN)	8
Unassigned (OPEN)	77
Reserved (OPEN)	6
Just in Time	1
Assigned (Mainframe)	48
Reserved (Mainframe)	12
Total (All LDEVs)	151

Apply Cancel

Figure 3.7 Number of LDEVs Box, Apply and Cancel Buttons

- **Assigned (OPEN)** displays the number of open-system volumes that have assigned paths. **Note:** For the purpose of counting paths, each LUSE volume is counted as a single volume.
- **Unassigned (OPEN)** displays the number of open-system volumes that do not have assigned paths. **Note:** This does not include Just in Time Storage volumes or Hitachi CruiseControl reserved volumes.
- **Reserved (OPEN)** displays the number of open-system volumes that are Hitachi CruiseControl reserved volumes.
- **Just in Time** displays the number of additional open-system volumes that are available to the user by the Just in Time Storage function (see section 3.9). **Note:** If you select **Hi-Copy Device Only** in the **Device Type** drop-down list, the Just in Time Capacity field is not displayed.
- **Assigned (Mainframe)** displays the number of S/390® and HRX volumes that have assigned paths. **Note:** This does not include Hitachi CruiseControl reserved volumes.
- **Reserved (Mainframe)** displays the number of S/390® and HRX volumes that are Hitachi CruiseControl reserved volumes.
- **Total (All LDEVs)** displays the total of all of the above volume types.
- **Apply** implements all of the changes or settings made on the Storage Navigator main panel.
- **Cancel** cancels the changes or settings made on the Storage Navigator main panel.

Note: If you input any changes, the text may change to *blue bold italics* or an icon may change. The changes are not actually implemented until you select **Apply**.

3.1.2 Storage Navigator Main Panel, Status Tab

The **Status** tab of the Storage Navigator main panel shows detailed information on the internal status of the connected subsystem, including the service information message (SIM) information that is being reported to the host. There are five SIM severity levels: good, service, moderate, serious, and acute (see Figure 3.9).

Note: The 9900V subsystem generates a SIM whenever it detects an error or service requirement. The status level displayed on the **Status** tab is based on the SIM information that is reported to the host. SIM information that is not reported to the host is not displayed on the **Status** tab (see Figure 3.8).

User : root
Subsystem : Lightning9980V
Version : 21-07-00/00

Status

Controller Status

Component	Status
Processor	Moderate
CSW	Good
Cache Memory	Good
Shared Memory	Serious
Power Supply	Moderate
Battery	Moderate
Fan	Good
Environment & Others	Serious

Disk Array Status

Component	Status
Power Supply	Good
Fan	Good
Environment & Others	Good
HDD	Good

Status History

Ref.Code	Error Level	Status	Date
307361	Moderate	Not Complete	2003/07/28 09:11:35
D45400	Serious	Not Complete	2003/07/17 20:09:44
D48402	Serious	Complete	2003/07/08 09:35:51
BF4411	Moderate	Not Complete	2003/06/26 09:13:18
BF4410	Moderate	Not Complete	2003/06/26 09:10:28
307341	Moderate	Not Complete	2003/06/25 14:58:29
307340	Moderate	Not Complete	2003/06/25 14:58:27

Figure 3.8 Storage Navigator Main Panel, Status Tab

3.1.2.1 Controller Status Box

The **Controller Status** box is on the upper left corner of the **Status** tab (see Figure 3.9).

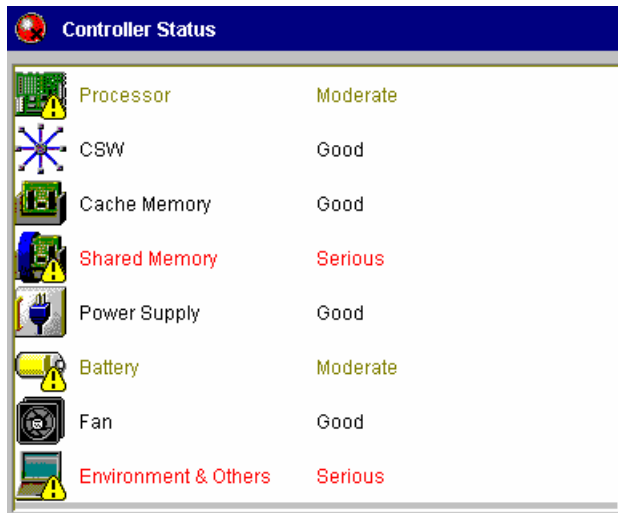


Figure 3.9 Controller Status Box

The **Controller Status** icon can be displayed as **Normal** (blue circle with a white dot), **Warning** (yellow circle with a black dot), or **Abnormal** (red circle with a black dot), according to the host SIM status. **Note:** The status level displayed on the **Status** panel is based on the SIM information that is reported to the host. SIM information not reported to the host is not displayed.

The **Controller Status** box shows the internal status levels of the following subsystem elements:

- Processor
- CSW (switch to control cache)
- Shared memory
- Power supply
- Battery
- Fan
- Environment & others

3.1.2.2 Disk Array Status Box

The Disk Array Status box is in the upper right of the Status tab.

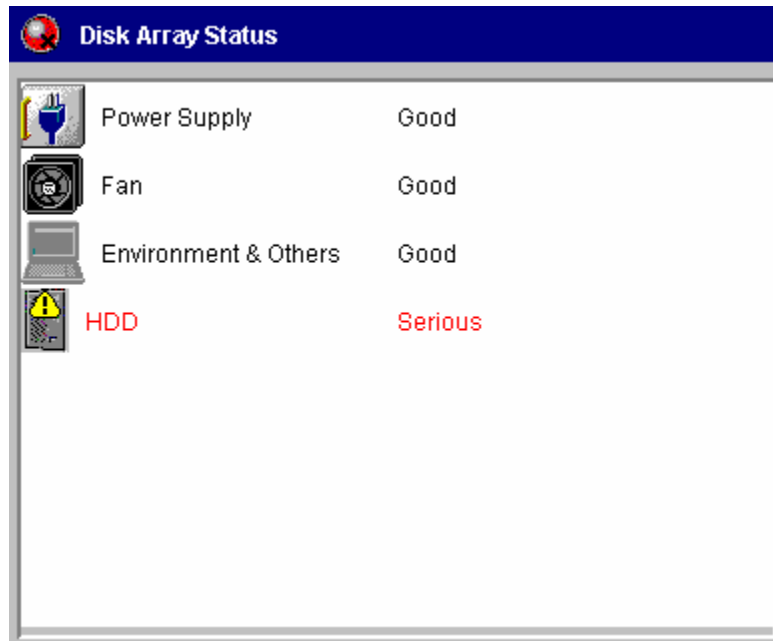


Figure 3.10 Disk Array Status Box

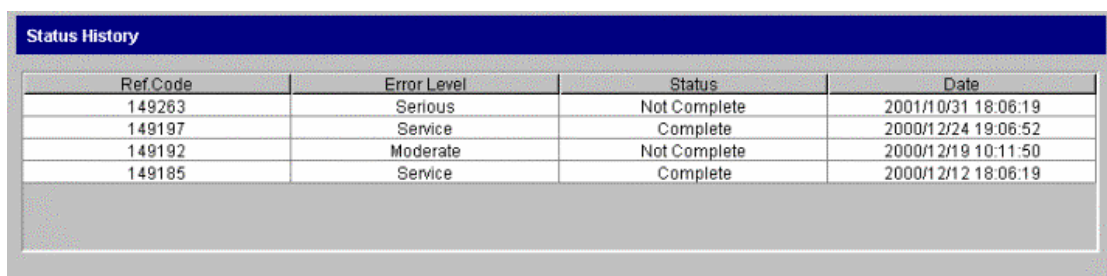
The Disk Array Status icon can be displayed as Normal (🟢), Warning (🟡), or Abnormal (🔴), according to the disk array SIM status.

The Disk Array Status box shows the internal status levels of the disk array unit (DKU) of the following items (see Figure 3.10).

- Power supply
- Fan
- Environment & Others
- Hard disk drives

3.1.2.3 Status History Box

The **Status History** box (see Figure 3.11) is on the lower half of the **Status** tab.



Ref.Code	Error Level	Status	Date
149263	Serious	Not Complete	2001/10/31 18:06:19
149197	Service	Complete	2000/12/24 19:06:52
149192	Moderate	Not Complete	2000/12/19 10:11:50
149185	Service	Complete	2000/12/12 18:06:19

Figure 3.11 Status History Box

The Status History box has the following features:

- **Ref. Code** displays the SIM Reference Code.
Note: For information on SIM reference codes, refer to the troubleshooting section of the *Hitachi Freedom Storage Lightning 9900V User and Reference Guide (MK92-RD100)*, or contact the Hitachi Data Systems Support Center.
- **Error Level** displays the following error levels:
 - **Service:** Does not require immediate attention, and is addressed during routine maintenance
 - **Moderate:** Does not require immediate attention, and is addressed during routine maintenance
 - **Serious:** Contact the Hitachi Data Systems Support Center (see section 7.2).
 - **Acute:** Contact the Hitachi Data Systems Support Center (see section 7.2).
- **Status** displays either **Complete** (if the SIM has been deleted from the SVP) or **Not Complete** (if the error has not been deleted).
- **Date** displays the date that the SIM occurred.

Table 3.1 lists the environmental errors that can occur. Table 3.2 gives detailed information on the service information message (SIM) severity levels and icons.

Table 3.1 Disk Controller and Disk Array Unit Error Conditions

Disk Controller Environment & Others Errors		Disk Array Unit Environment & Others Errors
Abnormal temperature	Environment monitor failure	Voltage alarm
Voltage alarm	Environment monitor unmatched	Voltage warning
Voltage warning	Keylock panel connection error	Forget-to-remove JP warning
AC warning	Keylock resistor error	Environment monitor failure
Forget-to-remove JP warning	Abnormal power supply in SVP	Environment monitor unmatched
DKCMAIN type unmatched	S-SVP failure	
Router failure	Trial term expiration	
TrueCopy / TrueCopy - S/390® failure	ShadowImage / ShadowImage - S/390® copy abnormal end	
Hi-Copy copy abnormal end		

Table 3.2 SIM Severity Levels and Icons

No.	Severity Level	Color of Icon	Description
1	Good	 Blue	No error occurs and the status is good.
2	Service	 Yellow	Service and Moderate do not require immediate attention and are addressed during routine maintenance.
3	Moderate		
4	Serious	 Red	Contact the Hitachi Data Systems Support Center (see section 7.2). Follow up with the Support Center to verify that the problem has been resolved.
5	Acute		

Note: Once the status becomes other than **Good**, all SIMs must be completed (resolved) from the SVP to restore the status to **Good**. Contact your Hitachi Data Systems service representative for assistance (see section 7.2).

3.1.3 Launching the Desired Option

- To launch a particular option, select the appropriate icon from the left side of any of the Storage Navigator panels. If you hold the mouse pointer over an icon, the option name is displayed.
- To return to the Storage Navigator main panel Information tab, select **Information / Status** (.
- To exit the Storage Navigator main panel, select **Exit** () from the upper right corner of the panel. The Storage Navigator automatically logs off from the connected SVP.

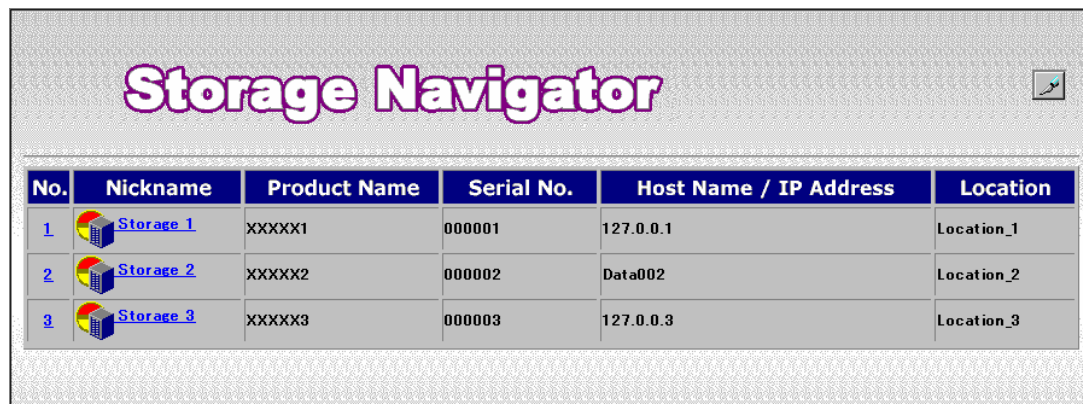
3.2 Editing the Storage Device List (Administrator Only)

The operations for editing a 9900V Storage Navigator storage device list include:

- Adding storage device entries (see section 3.2.2)
- Changing storage device entries (see section 3.2.3)
- Deleting storage device entries (see section 3.2.4)

3.2.1 Storage Device Panels

Either log in to the primary SVP, or log out of the Storage Navigator to access the Storage Device List panel (see Figure 3.12).



No.	Nickname	Product Name	Serial No.	Host Name / IP Address	Location
1	 Storage 1	XXXXX1	000001	127.0.0.1	Location_1
2	 Storage 2	XXXXX2	000002	Data002	Location_2
3	 Storage 3	XXXXX3	000003	127.0.0.3	Location_3

Figure 3.12 Storage Device List Panel

- **Edit** () opens the Storage Editor-Logon panel (see Figure 3.13), which allows you to open the Storage List Editor panel (see Figure 3.14).
- The hyperlink (in both the **No.** and the **Nickname** column) opens the main Logon panel (refer to Figure 2.10), which allows you to log in and open the Storage Navigator Main panel for that particular subsystem.
- The **No.** column gives a number to each subsystem.
- The **Nickname** column displays the nickname of each subsystem. The nickname can be up to 16 alphanumeric characters, excluding ", \, ;, :, *, ?, <, >, |, and /.
- The **Serial No.** column displays the serial number of the subsystem, which can be a 6-digit number from 1 to 65535.
- The **Host Name/IP Address** column displays either the IP address or the host name of the subsystem. The host name can be up to 255 alphanumeric characters, with a period as a break. **Note:** The host name of each subsystem must be different from other host names, but can be the same as the nickname for that subsystem. If the SVP is set to support SSL-encrypted communication, the host name must be the same as the name that is entered in the certificate as Common Name. See Chapter 5 for more details on SSL-encrypted communication

- The **Location** column can be up to 16 alphanumeric characters, excluding ", \, ;, :, *, ?, <, >, |, and /.

Note: Each of these fields is required.

3.2.1.1 Storage Editor – Logon Panel

Open the Storage Device List panel by selecting **Edit** () on the Storage Device List panel (refer to Figure 3.12).

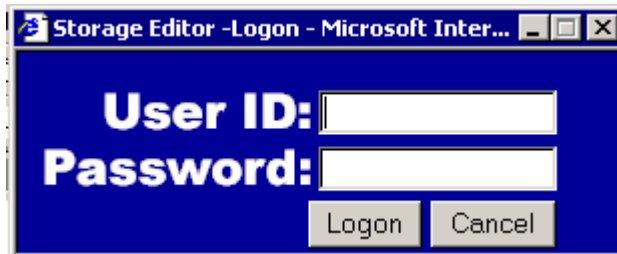


Figure 3.13 Storage Editor - Logon Panel

The Storage Editor - Logon panel has the following features:

- **User ID** field - Enter your administrator-level user name.
- **Password** field - Enter your administrator-level user password.
- **Logon** - Opens the Storage List Editor panel (see Figure 3.14)

3.2.1.2 Storage List Editor Panel

Open the Storage List Editor panel by selecting the **Logon** button on the Storage Editor - Logon Panel (refer to Figure 3.13).

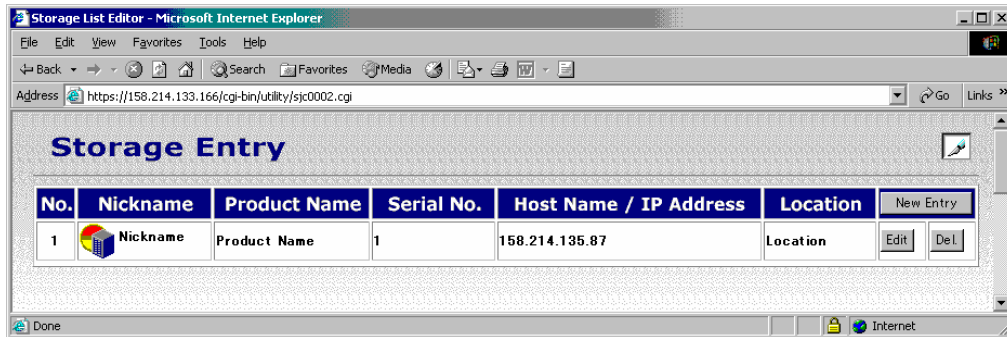


Figure 3.14 Storage List Editor Panel

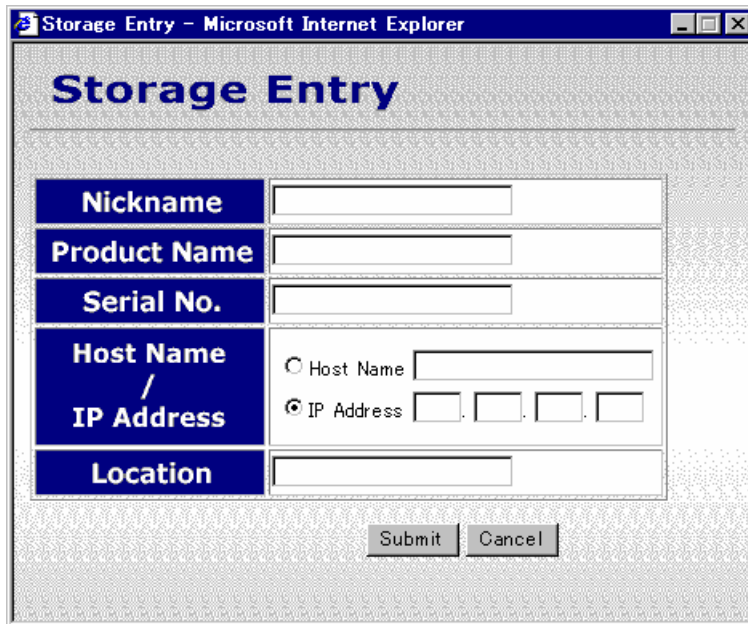
- **Storage Device List** () - returns you to the Storage Device List panel
- **New Entry** - opens the Storage Entry panel (see Figure 3.15), and allows you to add a new storage device entry. **Note:** You can register up to 500 storage device entries, but you cannot concurrently access that many storage devices.
- **Edit** - opens the Change Storage Entry panel (see Figure 3.20), and allows you to change the storage device entry
- **Del.** - deletes a storage device entry. **Note:** A confirmation message is displayed before a storage device entry is deleted.

3.2.2 Adding a Storage Device

To add a storage device:

1. Either log into the primary SVP, or log out of the Storage Navigator to access the Storage Device List panel (refer to Figure 2.5).
2. Instead of selecting an SVP from the list and opening the Storage Navigator Main panel, select **Edit** () to open the Storage Editor - Logon panel (refer to Figure 3.13).
3. On the Storage Editor - Logon panel, enter your user name and password, then select **Logon** to open the Storage List Editor panel (refer to Figure 3.14).
4. If the SVP is set to support SSL-encrypted communication, the Establishing Secure Connection Warning panel (refer to Figure 2.8) displays. Select **OK**.
5. If the View Certificate panel (refer to Figure 2.9) displays, select the **View Certificate** button to verify that the certificate is correct, then select **Yes**. See Chapter 5 for more details on SSL-encrypted communication.
6. Select **New Entry** to open the Storage Entry panel (see Figure 3.15).
7. On the Storage Entry panel, enter the following information about the subsystem that you want to add (all fields are required):
 - **Nickname and product name** (up to 16 alphanumeric characters, excluding ", \, ;, :, *, ?, <, >, |, and /.)
 - **Serial number** (number from 1 to 65535)
 - **Host name or IP address** Enter either the host name or the IP address, but not both. The host name can be up to 255 alphanumeric characters, with a period as a break. **Note:** The host names of each of the subsystems must be different from each of the other host names, but can be the same as the nickname for that subsystem. If the SVP is set to support SSL-encrypted communication, the host name must be the same as the name that is entered in the certificate as Common Name. See Chapter 5 for more details on SSL-encrypted communication.
 - **Location** (up to 16 alphanumeric characters, excluding ", \, ;, :, *, ?, <, >, |, and /.)
8. Select **Submit** to register the storage device entry. The Register Device Confirmation Message is displayed (see Figure 3.16).
9. Select **OK** to register (or **Cancel** to cancel). When the entry is registered successfully, the Registration Complete confirmation message is displayed (see Figure 3.17 and Figure 3.18).
10. Select **Close** to return to the Storage List Editor panel.
11. Select the Storage Device List button () to return to the Storage Device List panel.
12. If the SVP is set to support SSL-encrypted communication, the Security Alert Warning panel (see Figure 3.19) displays. Select **Yes** to display the Storage Device List panel.
13. The new storage device entry is added to the bottom of the list on the Storage Device List panel.

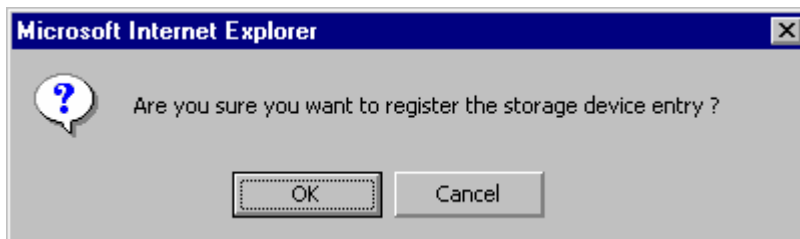
Caution: If you edit the storage device list, you must back up the Storage Navigator configuration file by downloading the file from the SVP. For instructions on downloading the configuration file, see section 3.6.

A screenshot of a web browser window titled "Storage Entry - Microsoft Internet Explorer". The page has a blue header with the text "Storage Entry". Below the header is a form with several input fields. The first four fields are labeled "Nickname", "Product Name", "Serial No.", and "Host Name / IP Address". The "Host Name / IP Address" field has two radio buttons: "Host Name" and "IP Address". The "IP Address" radio button is selected. Below these fields is a "Location" field. At the bottom of the form are "Submit" and "Cancel" buttons.

Nickname	
Product Name	
Serial No.	
Host Name / IP Address	☐ Host Name ☒ IP Address . . .
Location	

Submit Cancel

Figure 3.15 Storage Entry Panel

A screenshot of a Microsoft Internet Explorer dialog box. The title bar says "Microsoft Internet Explorer". The dialog box has a question mark icon and the text "Are you sure you want to register the storage device entry ?". At the bottom are "OK" and "Cancel" buttons.

Are you sure you want to register the storage device entry ?

OK Cancel

Figure 3.16 Register Device Confirmation Message

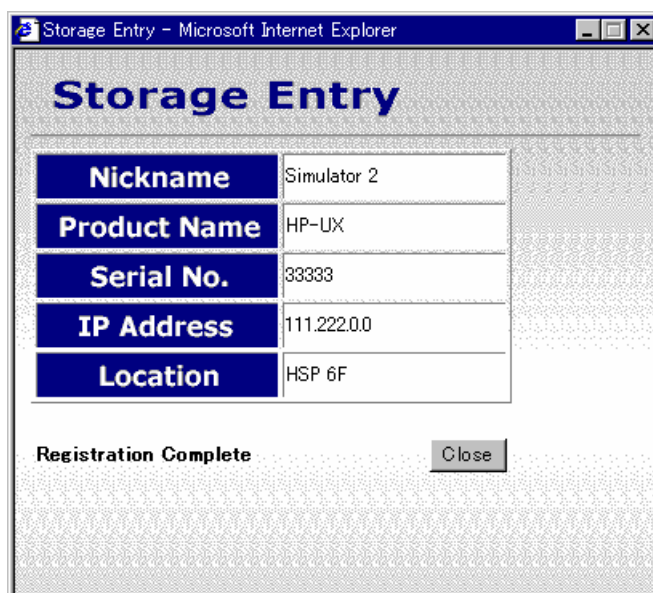


Figure 3.17 Registration Complete Message (IP Address)

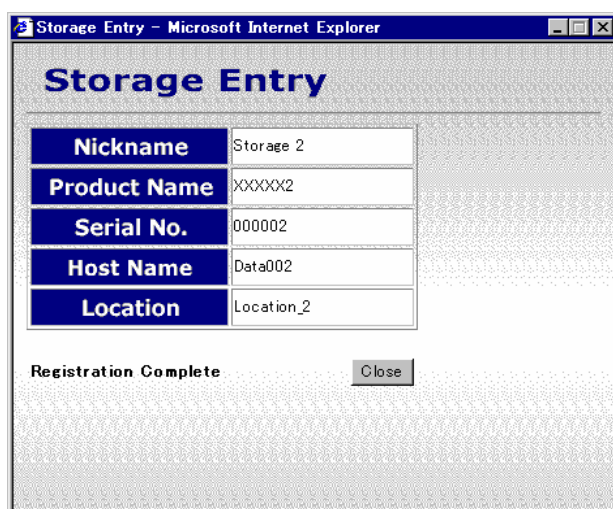


Figure 3.18 Registration Complete Message (Host Name)

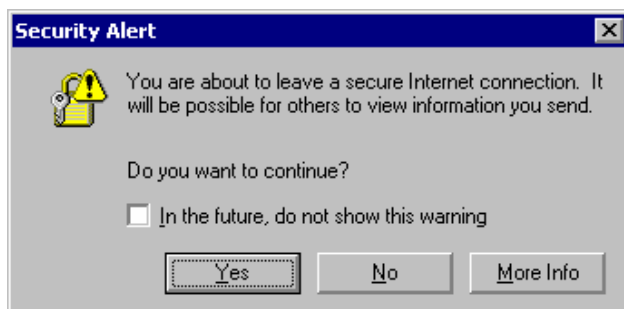


Figure 3.19 Security Alert Warning Panel (Leaving Secure Connection)

3.2.3 Changing a Storage Device Entry

To change a storage device entry:

1. Either log into the primary SVP, or log out of the Storage Navigator to access the Storage Device List panel (refer to Figure 2.5).
2. Instead of selecting an SVP from the list and opening the Storage Navigator Main panel, select Edit () to open the Storage Editor - Logon panel (refer to Figure 3.13).
3. On the Storage Editor - Logon panel, enter your user name and password, then select **Logon** to open the Storage List Editor panel (refer to Figure 3.14).
4. If the SVP is set to support SSL-encrypted communication, the Establishing Secure Connection Warning panel (refer to Figure 2.8) displays. Select **OK**.
5. If the View Certificate panel (refer to Figure 2.9) displays, select the **View Certificate** button to verify that the certificate is correct, then select **Yes**. See Chapter 5 for more details on SSL-encrypted communication.
6. Select the **Edit** button that is on the right side of the listing for the desired storage device to open the Change Storage Entry panel (see Figure 3.20 and Figure 3.21). Edit the desired storage device information.
7. Select **Submit** to register the change to the storage device.
8. When the entry is registered successfully, the Registration Complete confirmation message is displayed (refer to Figure 3.17 and Figure 3.18).
9. Select **Close** to return to the Storage List Editor panel.
10. Select the Storage Device List button () to return to the Storage Device List panel.
11. If the SVP is set to support SSL-encrypted communication, the Security Alert Warning panel (refer to Figure 3.19) displays. Select **Yes** to display the Storage Device List panel.
12. The new storage device entry is added to the end of the list on the Storage Device List panel.

Caution: If you edit the storage device list, you must back up the Storage Navigator configuration file by downloading the file from the SVP. For instructions on downloading the configuration file, see section 3.6.

Change Storage Entry - Microsoft Internet Explorer

Storage Entry

NO. 1

Nickname	Nickname
Product Name	Product Name
Serial No.	1
Host Name / IP Address	☐ Host Name ☒ IP Address 158 . 214 . 135 . 87
Location	Location

Submit Cancel

Figure 3.20 Change Storage Entry Panel (IP Address)

Change Storage Entry - Microsoft Internet Explorer

Storage Entry

NO. 2

Nickname	Storage 2
Product Name	XXXXXX2
Serial No.	000002
Host Name / IP Address	☒ Host Name Data002 ☐ IP Address . . .
Location	Location_2

Submit Cancel

Figure 3.21 Change Storage Entry Panel (Host Name)

3.2.4 Deleting a Storage Device

To delete a storage device:

1. Either log into the primary SVP, or log out of the Storage Navigator to access the Storage Device List panel (refer to Figure 2.5).
2. Instead of selecting an SVP from the list and opening the Storage Navigator Main panel, select **Edit** () to open the Storage Editor - Logon panel (refer to Figure 3.13).
3. On the Storage Editor - Logon panel, enter your user name and password, then select **Logon** to open the Storage List Editor panel (refer to Figure 3.14).
4. If the SVP is set to support SSL-encrypted communication, the Establishing Secure Connection Warning panel (refer to Figure 2.8) displays. Select **OK**.
5. If the View Certificate panel (refer to Figure 2.9) displays, select the **View Certificate** button to verify that the certificate is correct, then select **Yes**. See Chapter 5 for more details on SSL-encrypted communication.
6. Select the **Del.** button next to the storage device that you want to delete.
7. The Delete Device Confirmation message displays (see Figure 3.22). Select **OK** to delete the storage device from the Storage Device List panel.
8. Select the Storage Device List button () to return to the Storage Device List panel.
9. If the SVP is set to support SSL-encrypted communication, the Security Alert Warning panel (refer to Figure 3.19) displays. Select **Yes** to display the Storage Device List panel.

Caution: If you edit the storage device list, you must back up the Storage Navigator configuration file by downloading the file from the SVP. For instructions on downloading the configuration file, see section 3.6.

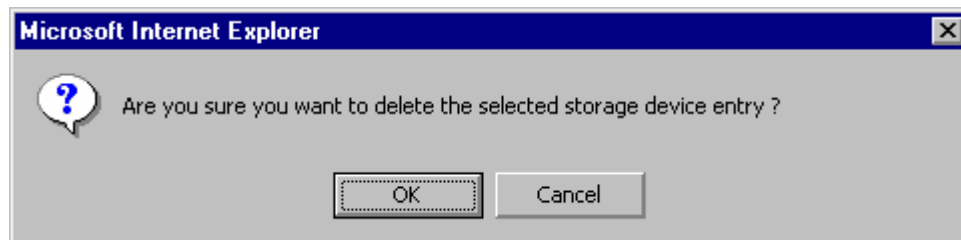


Figure 3.22 Delete Device Confirmation Message

3.3 Editing the User Account List (Administrator Only)

Important: You must log on as an administrator to edit the user account list. Non-administrators are permitted to view part of their user information and change their own passwords (see section 3.8).

All users of the Storage Navigator must be registered in the user account list of the connected subsystem (SVP) to log on and use the Storage Navigator Java™ applet program.

The operations for editing a 9900V Storage Navigator user account list include:

- Adding user entries (see section 3.3.2)
- Changing user entries (see sections 3.3.3 and 3.3.4)
- Deleting user entries (see section 3.3.5)

3.3.1 User Entry Tab on the Control Panel

To open the **User Entry** tab of the Control panel (see Figure 3.23), select **Option**  on the upper right corner of any of the Storage Navigator panels. The **User Entry** tab is the default view.

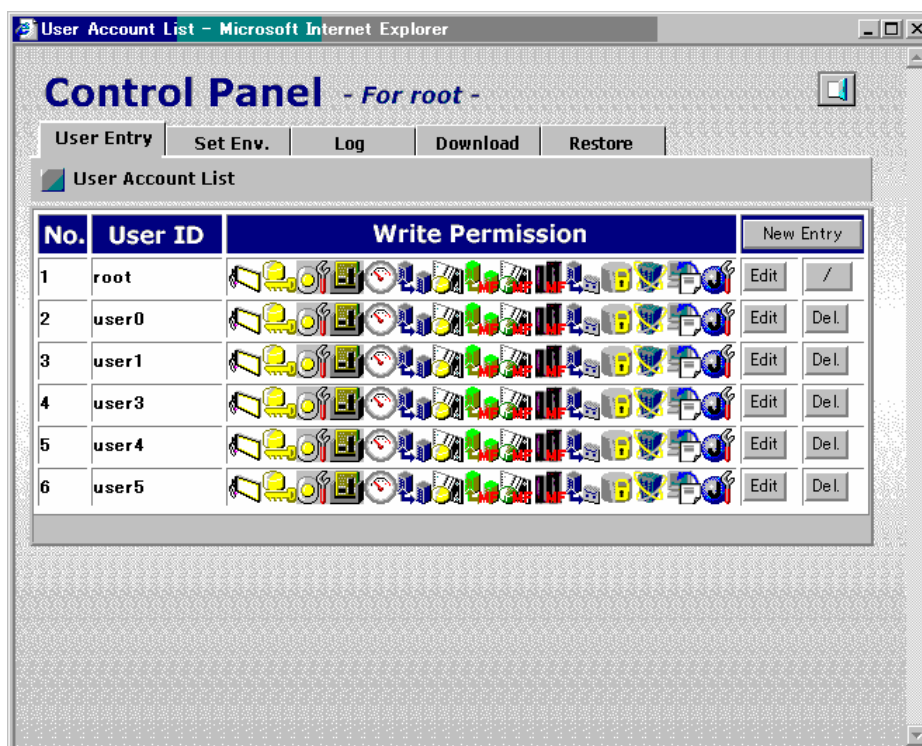


Figure 3.23 Control Panel, User Entry Tab

The **User Entry** Tab displays the User Account List, which includes the following information:

- **No.** displays the order of user entries. The root user (administrator) is displayed at the top of the user account list. **Note:** The administrator can register up to 500 users, including the root. The administrator sets the maximum number of users from the SVP.
- **User ID** displays the user name. Each user ID must be unique.
- **Write Permission** displays icons for each option for which that user has **Modify** access. See Figure 3.2 for a list of icons and their corresponding meanings.
- **New Entry** opens the User Entry panel (see Figure 3.24), which allows you to add a new user entry
- **Edit** opens the User List Editor panel (see Figure 3.26), which allows you to change the selected user entry
- **Del.** deletes the selected user entry. **Note:** The root user cannot be deleted from the user account list.
- **Exit** () closes the Control Panel

3.3.2 Adding a New User

To add a new user:

1. Select **Option** () on any of the Storage Navigator panels to open the Control panel. The **User Entry** tab is the default view.
2. Select **New Entry** to open the User Entry panel (see Figure 3.24). Enter the new user's ID and password on the User Entry panel. The user ID is displayed, but the passwords are not. Each entry can be up to 16 alphanumeric characters, (ASCII codes) except for some symbols, such as ", \, ;, :, ,, *, ?, <, >, |, /, #, &, + and =, can be used.
3. Select the appropriate option checkboxes to assign the desired write permissions to the user.
4. Select **Submit** to display the Register User Confirmation message (see Figure 3.25).
5. Select **OK** to register the new user entry (or **Cancel**). You are returned to the **User Entry** Tab of the Control panel. The new user is added to the user account list.

User Entry

User ID:

Password:

Re-enter Password:

Write Permission

☒ Information / Status	☒ Information		
☒ LUN Management / LUN Security	☒ LUN Manager	☒ Port	☒ User Authentication
☒ LUN Expansion (LUSE) / Virtual LVI/LUN (VLL)	☒ LUSE	☒ VLL	
☒ FlashAccess / PCR	☒ FlashAccess	☒ PCR	
☒ Performance Monitor / CruiseControl / PPC	☒ Performance Monitor	☒ CruiseControl	☒ PPC
☒ TrueCopy	☒ TrueCopy		
☒ ShadowImage	☒ ShadowImage		
☒ TrueCopy - S/390(R)	☒ TrueCopy - S/390(R)		
☒ ShadowImage - S/390(R)	☒ ShadowImage - S/390(R)		
☒ Mainframe Connection	☒ Hitachi Parallel Access Volume	☒ Hitachi SANTinel - S/390(R)	☒ LDEV Guard
☒ Extended Copy Manager	☒ Extended Copy Manager		
☒ Open LDEV Guard	☒ Open LDEV Guard		
☒ Hi-Copy	☒ Hi-Copy		
☒ Configuration File Loader	☒ Configuration File Loader		
☒ License Key / SNMP / Just in Time	☒ License Key	☒ SNMP Information	☒ Just in Time

Submit Reset

Figure 3.24 User Entry Panel

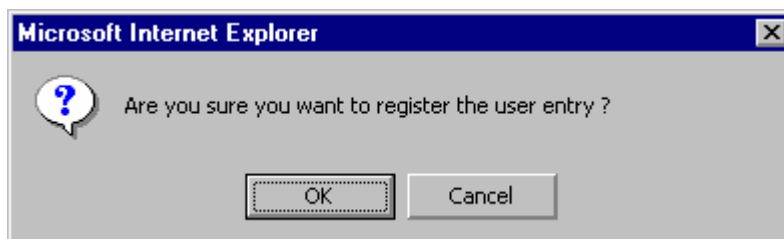


Figure 3.25 Register User Confirmation Message

3.3.3 Changing User Write Access

Note: You can change a user's write access and password, but not the user ID. To change the user ID, you must first delete the user entry. Add a new user entry with the desired user ID. If you make any change on a tab, you must select the **Submit** button to apply the change before you move to another tab.

To change the write access:

1. Select **Option** () on any of the Storage Navigator panels to open the Control panel. The **User Entry** tab is the default view.
2. On the **User Account** List, select **Edit** next to the user you want to change. The User List Editor panel displays. The **Permission** tab is the default view (see Figure 3.26).
3. Change the write permissions by either checking or clearing the checkboxes on the **Permission** tab.
4. Select **Submit**.
5. When the Change Permission Confirmation message (see Figure 3.27) is displayed, select **OK** to register the change (or **Cancel**).

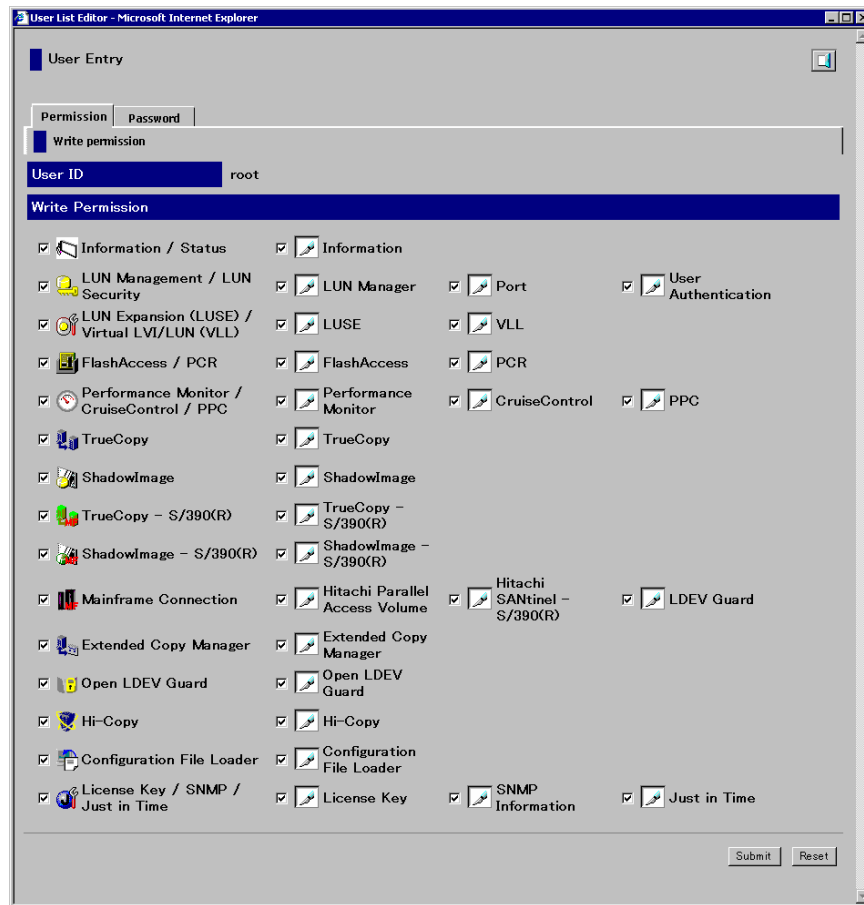


Figure 3.26 User List Editor Panel, Permission Tab

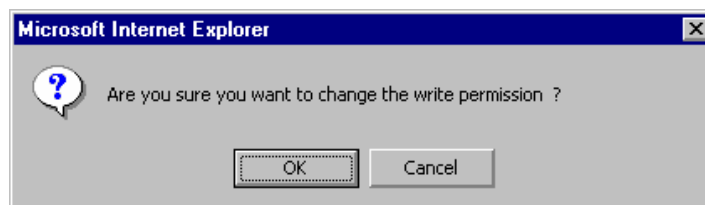
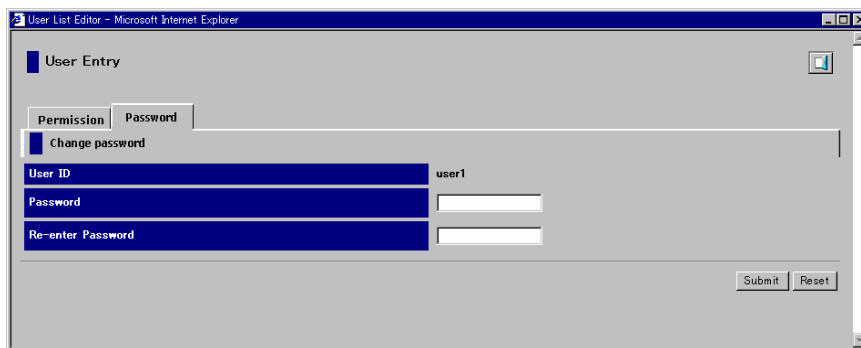


Figure 3.27 Change Permission Confirmation Message

3.3.4 Changing a User Password

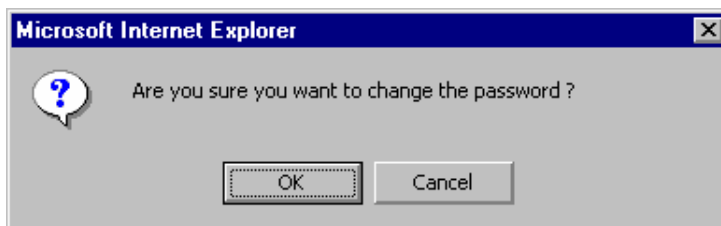
To change a user password:

1. Select **Option** () on any of the Storage Navigator panels to open the Control panel. The **User Entry** tab is the default view.
2. On the User Account List, select **Edit** next to the user you want to change. The User List Editor panel is displayed. The **Permission** tab is the default view.
3. Select the **Password** tab (see Figure 3.28).
4. Change the password by entering the new password twice.
Note: To change the administrator's password (root password), you must enter the current password before entering the new password. If the administrator password is lost or forgotten, you must call the Hitachi Support Center in order to regain access to the administrator-only functions.
5. Select **Submit**.
6. When the Change Password Confirmation panel is displayed (see Figure 3.29), select **OK** to register the change (or **Cancel**).



The screenshot shows a web browser window titled "User List Editor - Microsoft Internet Explorer". Inside, there's a "User Entry" section with two tabs: "Permission" and "Password". The "Password" tab is active, showing a "Change password" section. This section has three input fields: "User ID" (containing "user1"), "Password", and "Re-enter Password". At the bottom right of the form are "Submit" and "Reset" buttons.

Figure 3.28 User Entry Panel (Password Tab)



The screenshot shows a small dialog box titled "Microsoft Internet Explorer". It contains a question mark icon and the text "Are you sure you want to change the password?". At the bottom are "OK" and "Cancel" buttons.

Figure 3.29 Change Password Confirmation Message

3.3.5 Deleting a User

To delete a user:

1. Select **Option** () on any of the Storage Navigator panels to open the Control panel. The **User Entry** tab is the default view.
2. Select **Del.** next to the user you want to delete.
3. When the Delete User Confirmation message is displayed (see Figure 3.30), select **OK** to delete the user entry (or **Cancel**). The user is removed from the user account list.

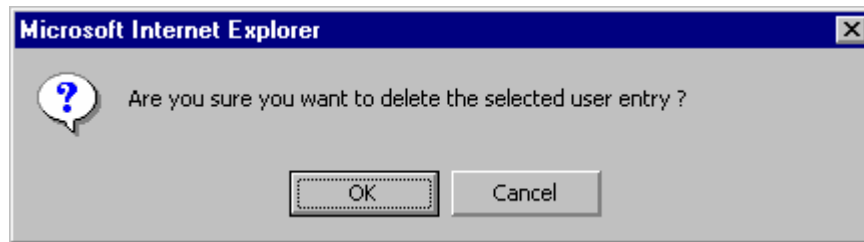


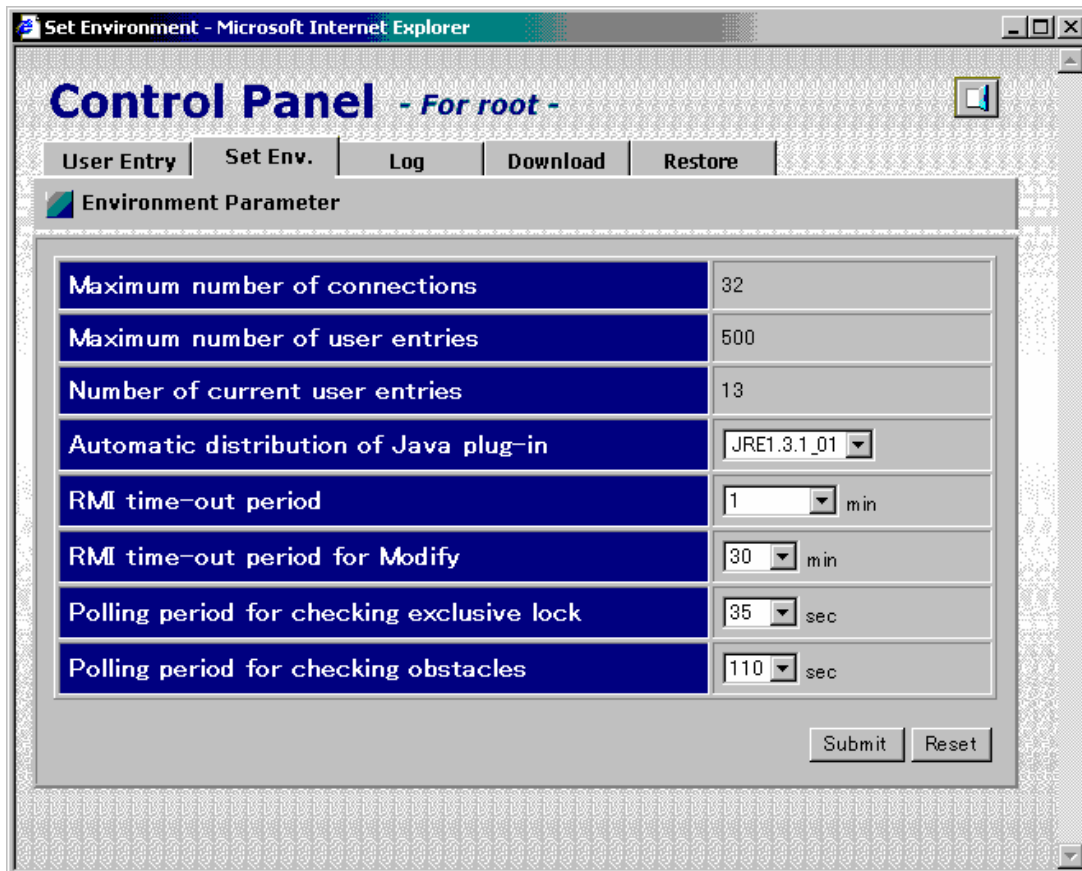
Figure 3.30 Delete User Confirmation Message

3.4 Setting the Storage Navigator Environment Parameters (Administrator Only)

The **Set Environment** tab of the Control panel (see Figure 3.31) allows you to set the following Storage Navigator environment parameters:

- Automatic distribution of the Java™ plug-in
- RMI™ time-out period
- RMI™ time-out period for **Modify** mode
- Polling period for checking exclusive lock
- Polling period for checking status and events

To access the **Set Environment** tab, select **Option** () on any of the Storage Navigator panels to open the Control panel. The **User Entry** tab is the default view. Select the **Set Env.** tab (see Figure 3.31).



Environment Parameter	
Maximum number of connections	32
Maximum number of user entries	500
Number of current user entries	13
Automatic distribution of Java plug-in	JRE1.3.1_01
RMI time-out period	1 min
RMI time-out period for Modify	30 min
Polling period for checking exclusive lock	35 sec
Polling period for checking obstacles	110 sec

Submit Reset

Figure 3.31 Control Panel, Set Environment Tab

The **Set Environment** tab of the Control Panel has the following features:

- **Maximum number of connections** - Sets the maximum number of Storage Navigator users that can concurrently connect to the same subsystem
Note: You cannot change this value from the Storage Navigator. Contact your Hitachi Data Systems service representative if you want to change the default setting.
- **Maximum number of user entries** - Sets the maximum number of user entries that can be registered in the user account list of a subsystem
Note: You cannot change this value from the Storage Navigator. Contact your Hitachi Data Systems service representative.
- **Number of current user entries** - Shows the number of user entries currently registered in the user account list
- **Automatic distribution of the Java™ plug-in** - Java Runtime Environment (JRE™) is required to use Storage Navigator. If a computer that is being used as a Storage Navigator does not have JRE™, the SVP can distribute and install the appropriate JRE™ automatically when the user logs on to the SVP.
 - The default is JRE1.3.1_01. You can select JRE1.3.1_01 or JRE1.4.1 from the drop-down list (refer to Table 2.1). *Note:* You cannot disable this parameter.
- **RMI™ time-out period** - If the user cannot access the SVP for a certain period of time because of a network error, the RMI™ time-out logs the user off of the SVP. This has the following parameters:
 - Specify **1 minute**, **5 - 60 minutes** in 5-minute increments, **70 to 120 minutes** in 10-minute increments, or **One day** (24 hours). The default is one minute.
 - Specify **NO** to disable this parameter. *Note:* If you specify **NO** as the value of the RMI™ time-out period, the user is not logged off automatically when an error occurs. This might prevent that user from logging in again. This setting is not recommended under ordinary circumstances.
 - The value of the RMI™ time-out period must be greater than the value set for the smallest polling period, either for checking exclusive lock or for checking obstacles (see below for those parameters). For example, specify a value of the RMI™ time-out period parameter to satisfy the following condition: **RMI™ time-out period > min [A, B]**, when **A = Polling period for checking exclusive lock**, **B = Polling period for checking obstacles**, and **min [A, B]** indicates the minimum value selected from **A** and **B**.
 - *Note:* You cannot disable this parameter.
- **RMI™ time-out for Modify mode** - If a user is in **Modify** mode but does not make any changes that access the RMI™ server for a specified period of time, **Modify** mode is released, and the **View** mode is displayed.
 - The default time period is **30 minutes**. You can specify between **10 and 60 minutes** in 10-minute increments, or between **120 and 360 minutes** in 60-minute increments.
 - Specify **No** to disable this feature.

- **Polling period for checking exclusive lock** - If multiple users are viewing the subsystem information in **View** mode, while one user is changing the information in **Modify** mode, the SVP can monitor the user who is changing the subsystem information. The **Locked** and **Unlocked** icons (refer to section 3.1.1) are automatically updated either when the subsystem is polled or when a user who is in **Modify** mode logs out from the Storage Navigator.

Note: The shorter the time period you specify, the more frequently the Lock/Unlock status is updated, but this does increase network traffic.

- The default time period is **35 seconds**. You can specify **5 - 60** in 5-second increments, or **70 to 120** in 10-second increments.
 - Specify **NO** to disable this parameter.
- **Polling period for checking obstacles** - Specify a time interval to monitor the Disk Controller and Disk Array Unit status, which is displayed by the **status lamp** icon on the **Status** tab of the Storage Navigator main panel.
 - The default time period is 110 seconds. You can specify **5 - 60** seconds in 5-second increments, **110**, or **120** for the parameter.
 - You can also specify **NO** to disable this parameter.
- **Submit** - Applies the Storage Navigator settings
- **Reset** - Resets the Storage Navigator settings to the defaults

To set the Storage Navigator environment parameters:

1. To access the **Set Environment** tab, select **Option** () on any of the Storage Navigator panels to open the Control panel. The **User Entry** tab is the default view. Select the **Set Env.** tab (refer to Figure 3.31).
2. Specify the Storage Navigator parameters as required.
3. Select **Submit**.
4. When a confirmation message is displayed, select **OK** (or **Cancel**).
5. Select **Exit** () to close the Control panel.

3.5 Viewing the Log and Configuration Information (Administrator Only)

The **Log** tab of the Control panel allows an administrator to view the Storage Navigator log information, including the access log, the error log, and the operation log.

To access the **Log** tab, select **Option** () on any of the Storage Navigator panels to open the Control panel. The **User Entry** tab is the default view. Select the **Log** tab (see Figure 3.32).

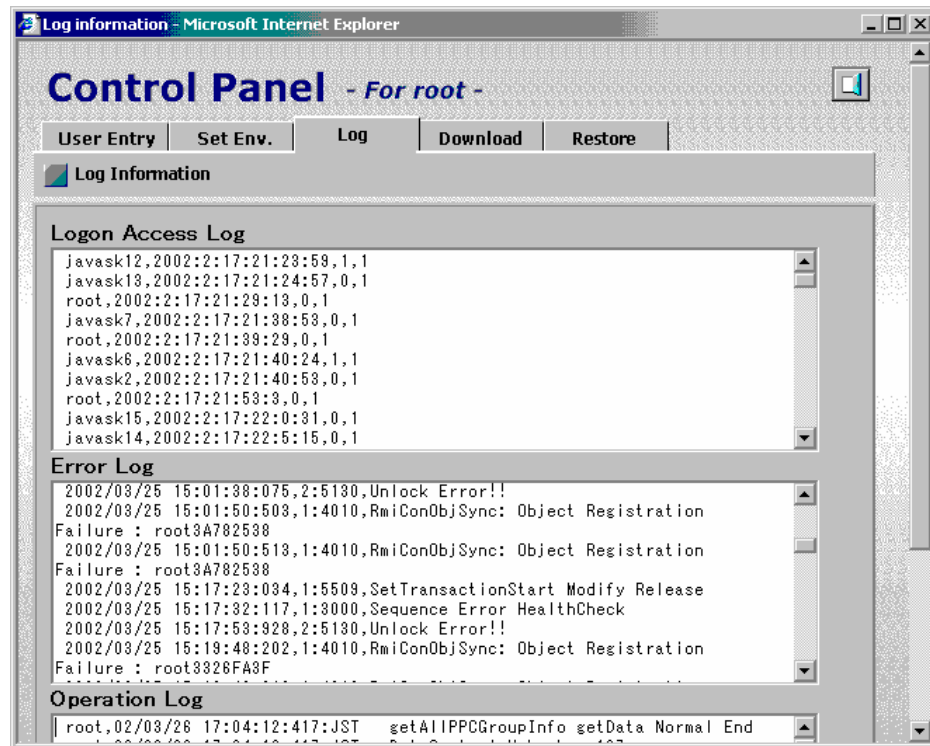


Figure 3.32 Control Panel, Log Tab

The **Log** tab of the Control panel displays the following features:

- **Logon Access Log** - User ID, logon and logoff date and time, and flag for all users who log on to the SVP
- **Error Log** - Date and time of error, error code, error type, and description of the RMI™ objects
- **Operation Log** - User ID, date and time of the operation, and operation type (method)

To view the Storage Navigator log information:

1. To access the **Log** tab, select **Option** () on any of the Storage Navigator panels to open the Control panel. The **User Entry** tab is the default view. Select the **Log** tab.
2. View the information on the **Log** tab.
3. Select the **Exit** button () to close the Control panel.

3.6 Downloading the Log and Configuration Files (Administrator Only)

The **Download** tab of the Control panel allows you to download Storage Navigator log files, including the error log, the access log, or the operation log. You can also download the Storage Navigator configuration information, including the storage device list, the user account list, or the environment parameter list.

To access the **Download** tab, select **Option** () on any of the Storage Navigator panels to open the Control panel. The **User Entry** tab is the default view. Select the **Download** tab (see Figure 3.33).

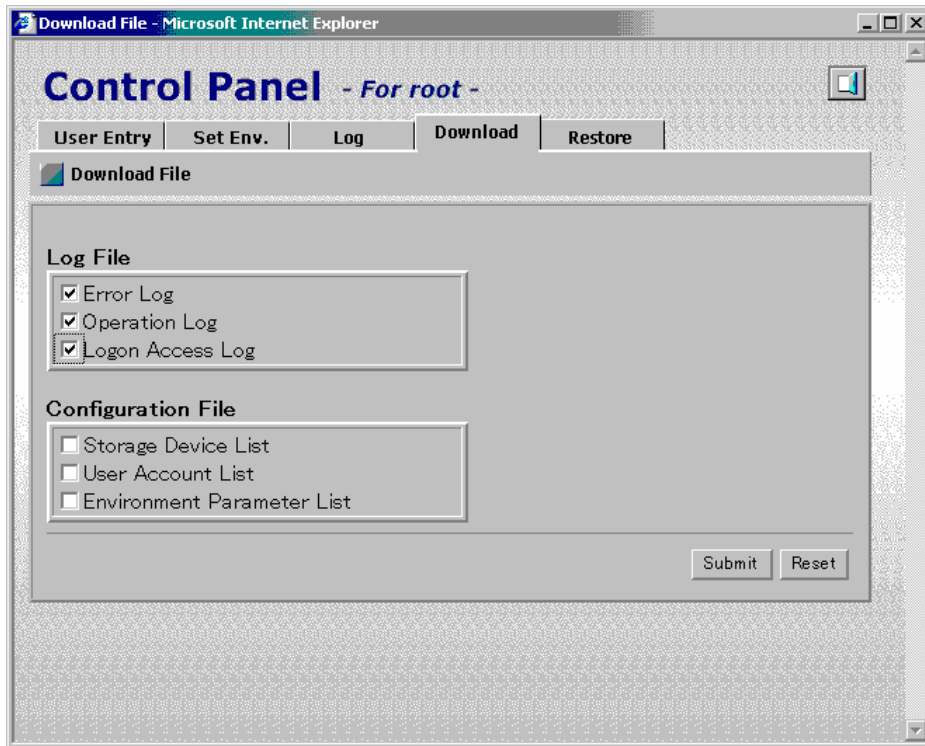


Figure 3.33 Control Panel, Download Tab

The Control panel, **Download** tab has the following features:

- **Log File** box - displays the following checkboxes:
 - Error Log
 - Operation Log
 - Logon Access Log
- **Configuration File** box - displays the following checkboxes:
 - Storage Device List
 - User Account List
 - Environment Parameter List
- **Submit** - opens the Download panel (see Figure 3.34) to download the selected files
- **Reset** - clears all the checkboxes

To download log and configuration files:

1. To access the **Download** tab, select **Option** () on any of the Storage Navigator panels to open the Control panel. The **User Entry** tab is the default view. Select the **Download** tab.
2. Check the checkboxes of the desired files.
3. Select **Submit**. The Download panel (see Figure 3.34) opens.
4. Confirm that the selected files are marked with a colored icon. Select **Download**. The File Download panel (see Figure 3.35) opens.
5. Select **Save this file to disk** and **OK**. The Save As panel (see Figure 3.36) opens.

Note: The compressed file to be downloaded is named automatically, but you can change the name.
6. Specify the name of a folder to save the compressed file. Select **Save**. When the download is complete, the Download Complete panel appears (see Figure 3.37)
7. Select **Close** to close the Download Complete panel.
8. Decompress the downloaded file (*.tgz) as required. **Note:** To create the *.tgz file, the directory structure is first archived using the **tar** command and then compressed using the **gzip** command. To decompress the *.tgz file, you will need to use a tool that supports both **tar** and **gzip** commands. For instructions on how to decompress the file, refer to the manual or online help of the file-compression and extraction tool that you are using.

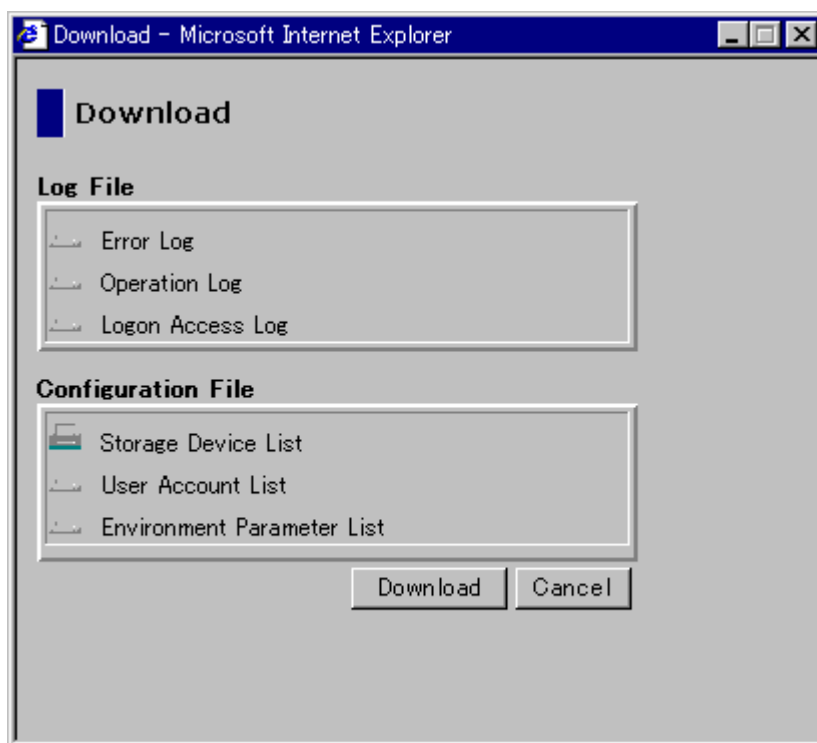


Figure 3.34 Download Panel

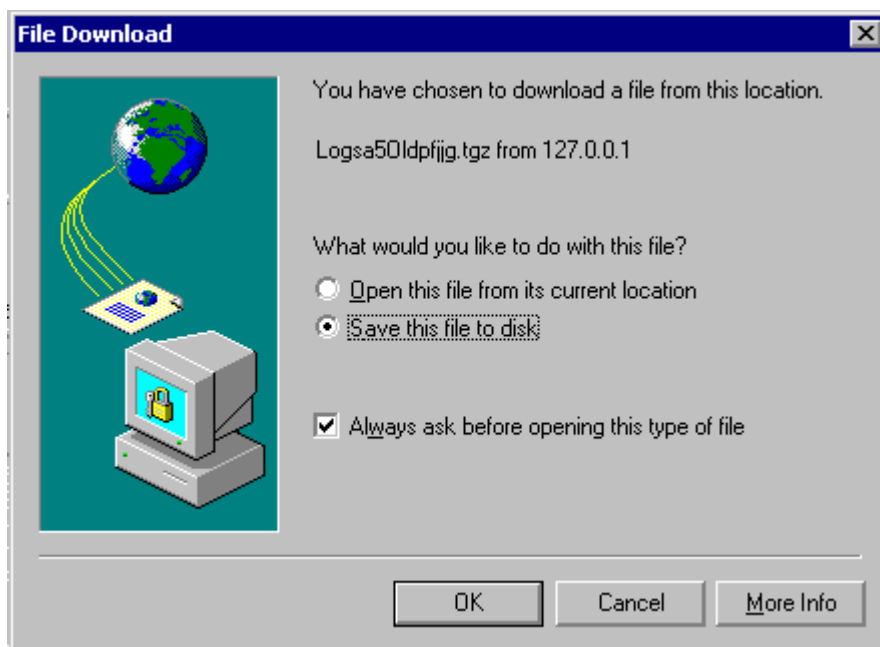


Figure 3.35 File Download Panel

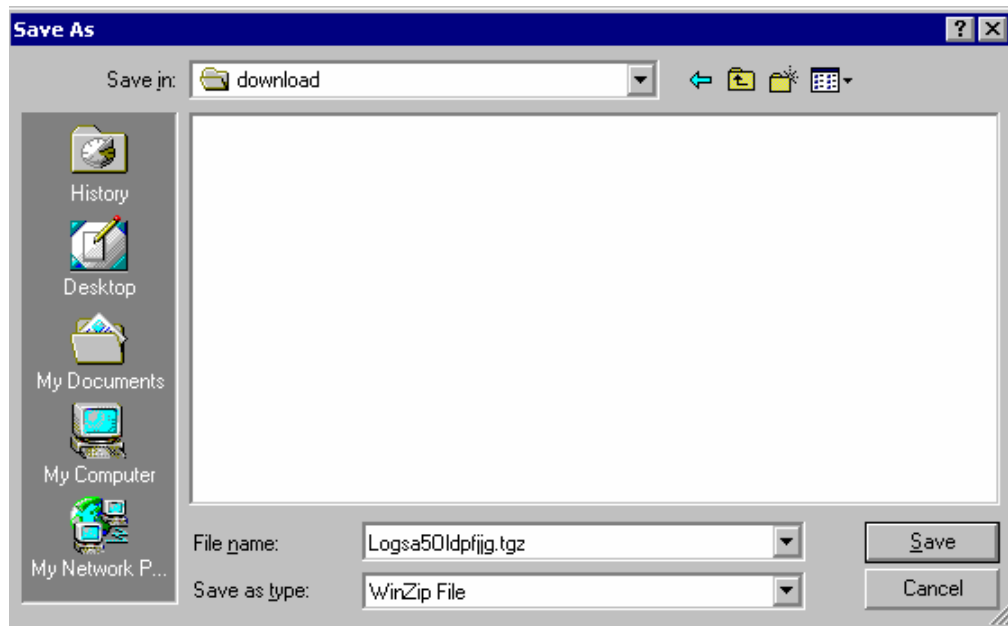


Figure 3.36 Save As Panel

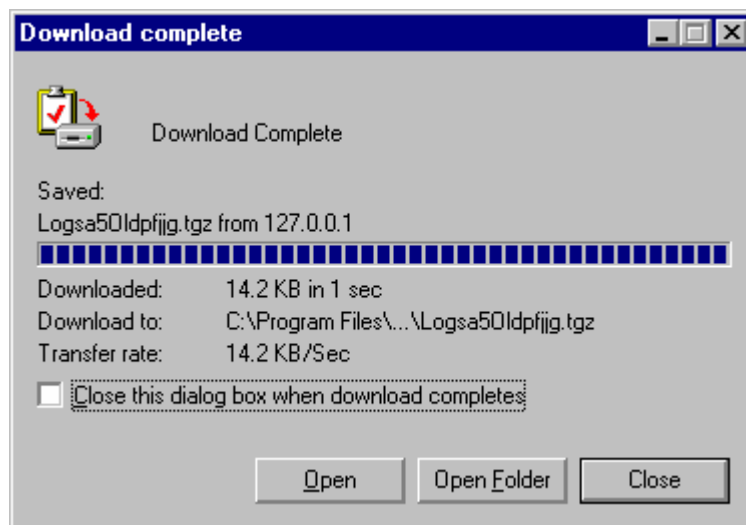


Figure 3.37 Download Complete Panel

3.7 Restoring Backup Files (Administrator Only)

3.7.1 Restore Tab on the Control Panel

To open the **Restore** tab of the Control panel (see Figure 3.38), select **Option** (🌐) on the upper right corner of any of the Storage Navigator panels. The **User Entry** tab is the default view. Select the **Restore** tab.

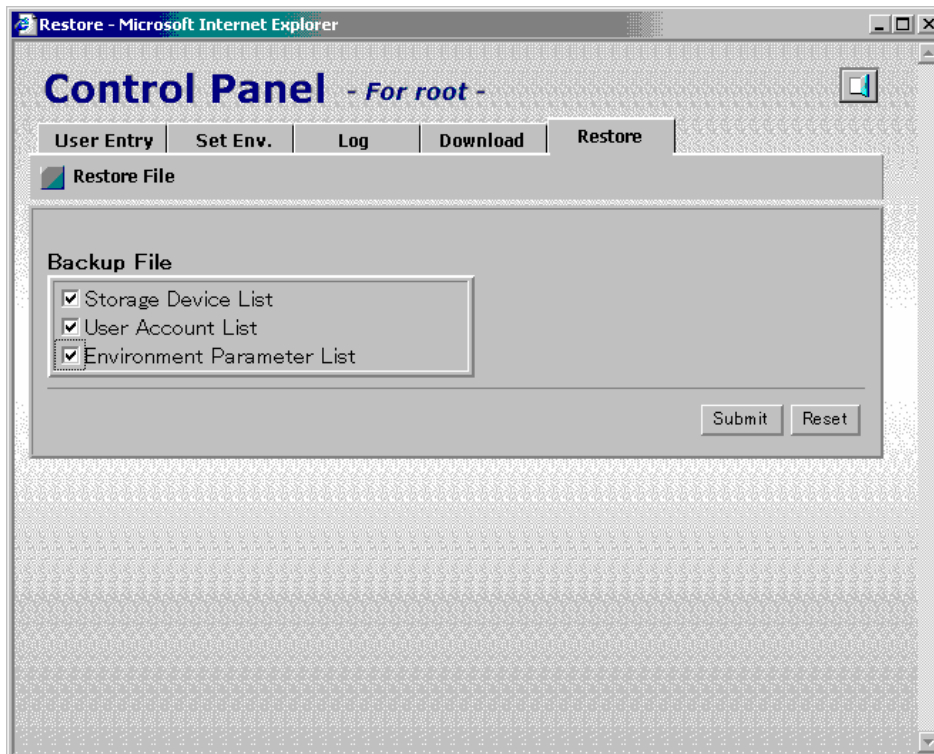


Figure 3.38 Control Panel, Restore Tab

The **Restore** tab has the following characteristics:

- **Backup File** - Select one or more of the following lists to be restored:
 - Storage Device List
 - User Account List (requires the administrator password for that list)
 - Environment Parameter List
- **Submit** - starts restoring the selected files
- **Reset** - clears all the checkboxes

3.7.2 Restoring Backup Files (Administrator Only)

WARNING: This operation requires extreme caution, because if you forget the password or make an error in either uploading or downloading the files, you could cause an unrecoverable error. The FTP client function just uploads the specified files, and does not verify that the files are correct. Contact the Hitachi Data Systems Support Center if you need assistance (see section 7.2).

Before you can restore any type of configuration, you must have already uploaded the following files to the SVP using the FTP Client function (see section 3.12):

- Storage device list (**strlist.cvs**)
- Environment parameters (**env.cvs**)
- User account list (**userlist.cvs**)

To restore configuration files:

1. To access the **Set Environment** tab, select **Option** () on any of the Storage Navigator panels to open the Control panel. The **User Entry** tab is the default view (refer to Figure 3.23). Select the **Restore** tab (refer to Figure 3.38).

Note: If you have not previously uploaded the configuration files to the SVP, the Backup File Not Found panel (see Figure 3.39) is displayed.

2. Select the checkboxes of the files that you want to restore.
3. Click **Submit**.
4. If you selected the **User Account List** checkbox, the Password check panel (see Figure 3.40) opens. Enter the administrator (root) password of the desired user account twice.
5. Select **Submit** on the Password check panel. The password that is entered becomes the administrator (root) password after the file-restore process.

Note: If the password is not correct, the user account list cannot be restored.

6. The File Restoration Confirmation panel (see Figure 3.41) opens. Confirm the process has been successfully completed. Select **Close** to close the panel.

Note: When the file restoration process is successfully completed, the SVP backup file is deleted.

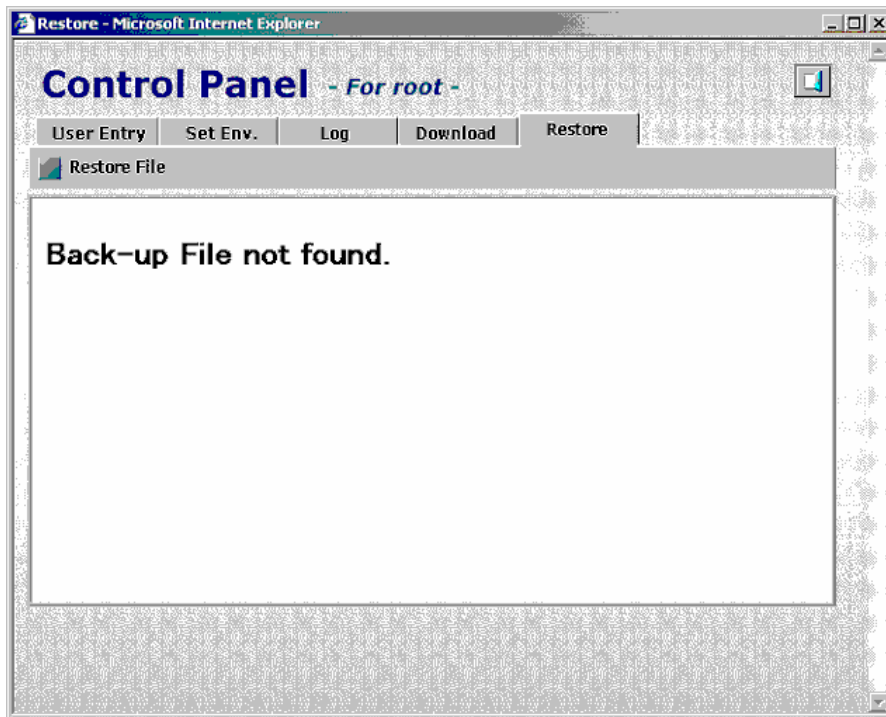


Figure 3.39 Backup File Not Found Panel

The image shows a web browser window titled 'Password check - Microsoft Internet Explorer'. The main content area has a title 'Password check' in a blue box. Below the title are three input fields with blue labels: 'User ID', 'Password', and 'Re-enter Password'. The 'User ID' field contains the text 'root'. The 'Password' and 'Re-enter Password' fields are empty. Below these fields is a text prompt: 'Please enter the password of backup user list.' At the bottom right of the form are two buttons: 'Submit' and 'Cancel'.

Figure 3.40 Password Check Panel

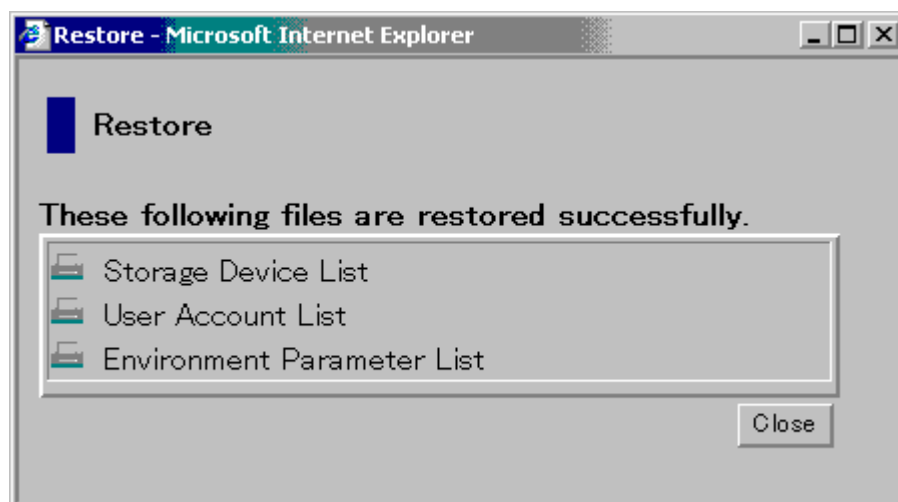


Figure 3.41 File Restoration Confirmation Panel

3.8 Viewing Your Own Write Access and Changing Your Own Password

3.8.1 Viewing Your Write Access

To view your own write permissions for the Storage Navigator options:

1. Log on as a non-administrator to the SVP to open the Storage Navigator main panel.
2. Select **Option** () to open the User Control panel. The **Permission** tab is the default view (see Figure 3.42). Your write permissions should be displayed.
3. Select **Exit** () to close the panel and return to the Storage Navigator main panel.

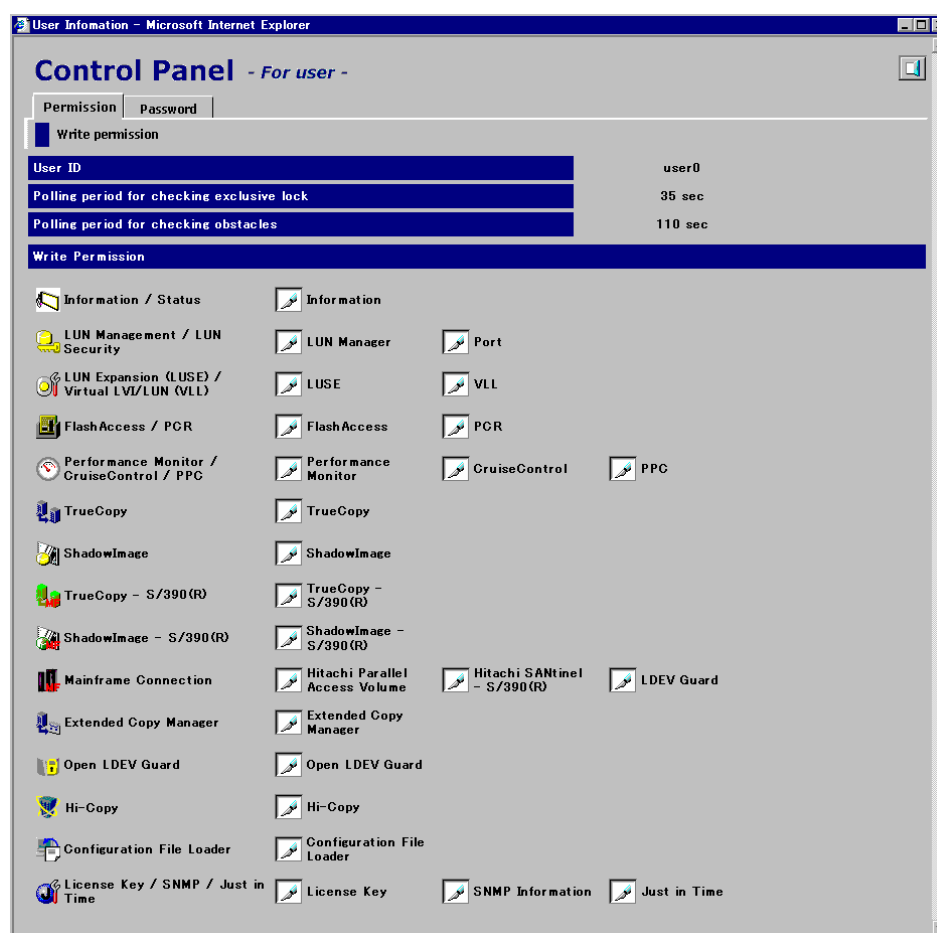
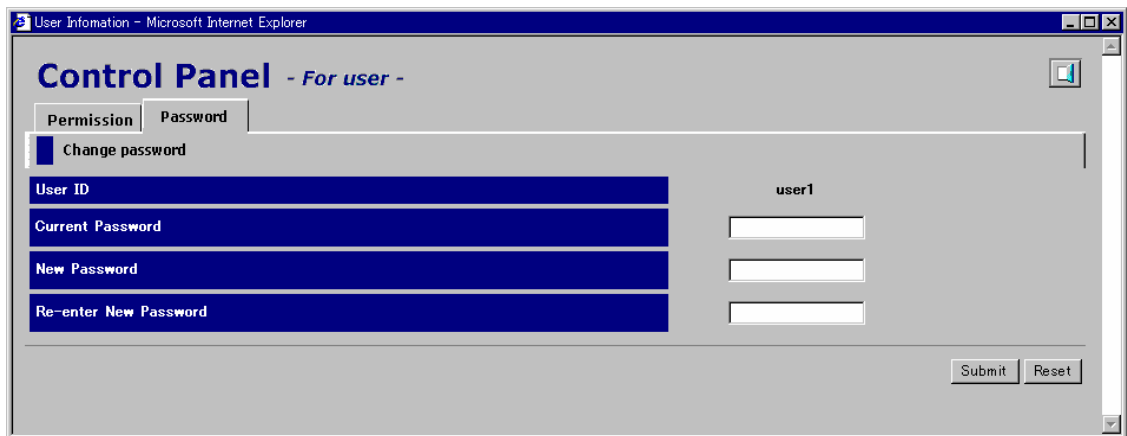


Figure 3.42 User Control Panel, Permission Tab

3.8.2 Changing Your Password

To change your own password:

1. Log on as a non-administrator to the SVP to open the Storage Navigator main panel.
2. Select **Option** () to open the User Control panel. The **Permission** tab is the default view (see Figure 3.42).
3. Select the **Password** tab (see Figure 3.43).
4. Enter the current password in the **Current Password** box. Enter the new password in the **New Password** and **Re-enter New Password** boxes.
5. Select **Submit**.
6. When a confirmation message is displayed, select **OK**. The new password is registered, and the information on the **Password** tab is reset.
7. Select **Exit** () to close the User Information panel.



The screenshot shows a web browser window titled "User Information - Microsoft Internet Explorer". The main content area is titled "Control Panel - For user -". There are two tabs: "Permission" and "Password". The "Password" tab is selected, and a sub-tab "Change password" is visible. The form contains four input fields on the left: "User ID", "Current Password", "New Password", and "Re-enter New Password". The "User ID" field is pre-filled with "user1". To the right of these fields are three empty input boxes corresponding to the "Current Password", "New Password", and "Re-enter New Password" labels. At the bottom right of the form are "Submit" and "Reset" buttons.

Figure 3.43 User Control Panel, Password Tab

3.9 Extending Cache Memory and LUs Using the Just in Time Storage Functions

Important: There is an extra charge for making subsystem configuration changes using the Just in Time Storage functions.

WARNING: Once you have extended the cache memory or the LUs using the Just in Time Storage functions, you are not able to undo your request.

The 9900V subsystem is equipped with additional cache memory, and LUs that are ordinarily not available. You can access some or all of the additional capacity by using the Just in Time Storage functions. Once this additional capacity is released, the additional memory and/or LUs are available for normal use. You can set the Just in Time Storage functions using the Storage Navigator, as described in this section. The Just in Time Storage functions can also be set by Hitachi Data Systems representatives on a fee-for-service basis. Contact your Hitachi Data Systems representative for more information.

The Just In Time Storage operations include:

- Extending the number of LUs using the Just in Time Storage LUN function (see section 3.9.2)
- Extending cache memory using the Just in Time Storage Cache function (see section 3.9.3)

3.9.1 Just in Time Tab on the License Key/SNMP/Just in Time Panel

The **Just in Time** tab allows you to increase the number of LUs and cache memory using the Just In Time Storage functions. To open the **Just in Time** tab, select **License Key/SNMP/Just In Time** (🔑) on the Storage Navigator main panel. Select the **Just in Time** tab (see Figure 3.44).

Note: The option buttons (along the left side of the panel) and the subsystem information icons (in the top right corner of the panel) have been omitted from the screen shot. Refer to Figure 3.1 for an illustration.

Note: If there is a maintenance operation in progress on the SVP, the information on the Just in Time panel might not be updated when the operations are completed. If this is the case, close and then reopen the Just in Time panel after the maintenance operation is finished.

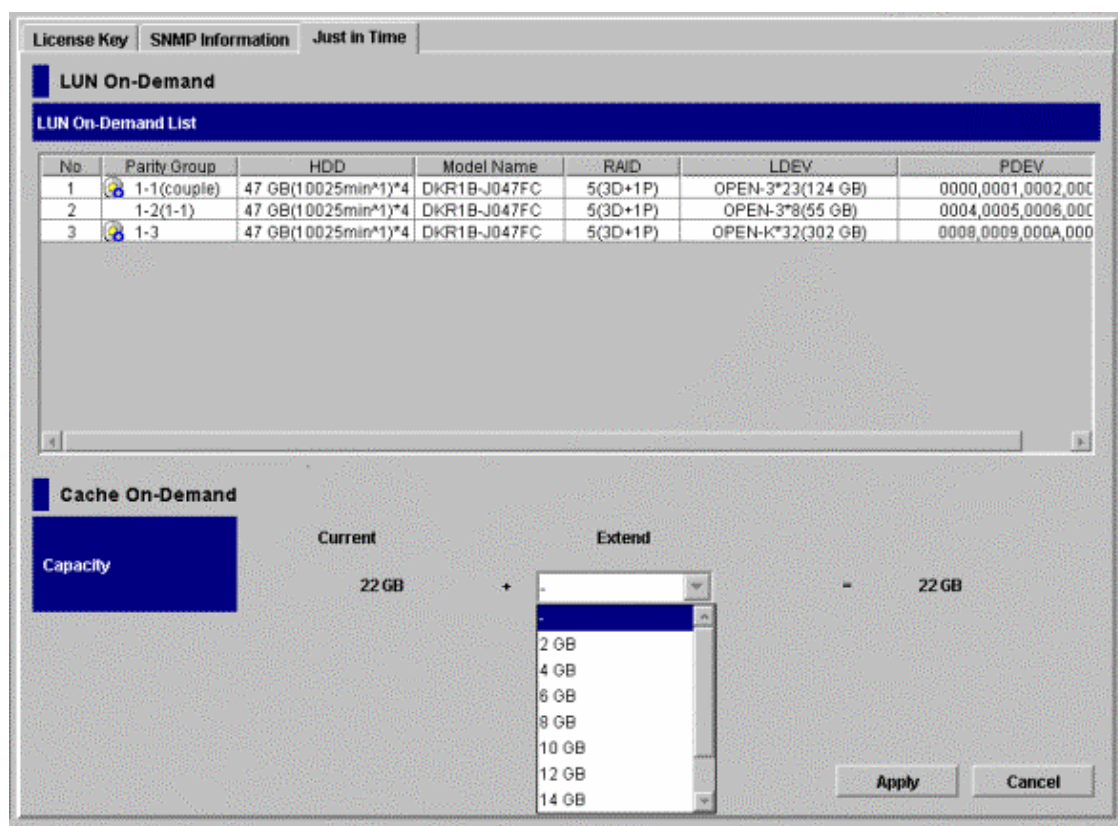


Figure 3.44 License Key/ Just in Time/SNMP Panel, Just in Time Tab

The **Just in Time** tab of the License Key/Just in Time/SNMP panel has the following features:

- **LUN On-Demand** - Displays a list of parity groups that are available for the Just In Time LUN function (**LUN On-Demand List**):
 - **No.:** Lists the serial numbers
 - **Parity Group:** Lists the parity group numbers
 - Available** (): Indicates that the parity group is available for extension by the Just in Time LUN function
 - Not Available** (): Indicates that the parity group has already been specified for extension by the Just in Time LUN function
 - **HDD:** Lists the capacity and speed of the disk volume: X GB (Y min¹)*Z (where X = capacity of disk volume, Y = speed, and Z = number of PDEVs)
 - **Model Name:** Lists the PDEV models of parity groups
 - **RAID:** Lists the RAID levels of the parity groups
 - **LDEV:** Lists the emulation types of LDEVs in each parity group, the numbers of LDEVs, and their available capacity
 - **PDEV** - Lists the PDEV numbers of all PDEVs in each parity group
 - **Note:** In the **LUN On-Demand** section, the capacity of disk volume shows one of the disk volumes in gigabytes (10⁹ bytes). Even if previous versions of Storage Navigator show different capacity for the specific disk models, the available capacity is the same.
- **Cache On-Demand** - Displays the **Extend** box and fields that shows the current and total cache capacity in gigabytes
- The **Extend** drop-down box - Allows you to select the incremental cache capacity in gigabytes
- The **Apply** button implements the settings.
- The **Cancel** button cancels the settings.

3.9.2 Extending LUs Using the Just in Time Storage LUN Function

To extend the LUNs on the 9900V subsystem:

1. Log on as an administrator to open the Storage Navigator main panel.
2. Select **License Key/Just in Time/SNMP** (🔑) on the Storage Navigator main panel. Select the **Just in Time** tab (refer to Figure 3.44).
3. In the **Parity Group** column of the **LUN On-Demand List**, right-click on the desired parity group with the **Available** (🔑) icon. The **On-Demand OFF → ON** menu (see Figure 3.45) is displayed.
4. Select the **On-Demand OFF → ON** command.
5. The Just In Time confirmation panel appears (see Figure 3.46), reminding you that there is a charge for access to the additional parity group. Select **OK** to agree, or **Cancel** to disagree.
6. Confirm that the **Available** (🔑) icon of the selected parity group in the **Parity Group** column has changed to the **Not Available** (🔒) icon. **Important:** To implement the setting, you must select the **Apply** button (see below).
7. **Note:** If you have changed the status of a wrong parity group by mistake, right-click on the parity group to display the **On-Demand ON → OFF** menu. Select the **On-Demand ON → OFF** command (refer to Figure 3.45). The **Not Available** (🔒) icon changes back to the **Available** (🔑) icon.
8. To apply the changes to the subsystem, select **Apply** (or **Cancel**). Select **OK**.



Figure 3.45 On-Demand Menu Commands

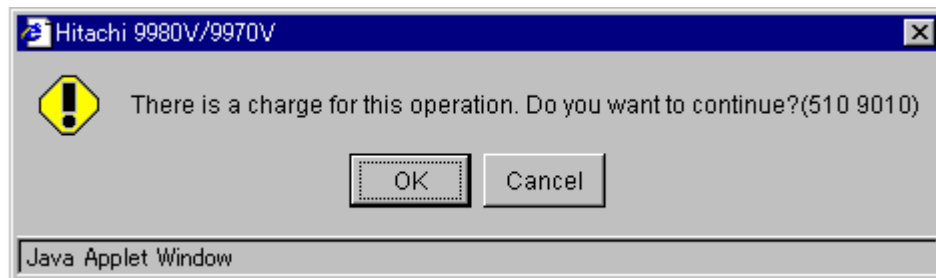


Figure 3.46 Just in Time Confirmation Message

3.9.3 Extending Cache Memory Using Just in Time Storage Cache Function

To extend the cache memory on the 9900V subsystem:

1. Log on as an administrator to open the Storage Navigator main panel (refer to Figure 3.1).
2. Select **License Key/Just in Time/SNMP**  on the Storage Navigator main panel. Select the **Just in Time** tab (refer to Figure 3.44).
3. Select a desired incremental value (cache capacity) from the **Extend** combo box.
4. The **On-Demand OFF → ON** menu (refer to Figure 3.45) is displayed. Select the **On-Demand OFF -> ON** command.
5. When the Just In Time confirmation panel appears (refer to Figure 3.46), reminding you that there is a charge for access to the additional cache capacity, select **OK** to agree, or select **Cancel** to disagree.
6. If you want to apply the changes to the subsystem, select **Apply**. Select **OK**. If you want to cancel the changes, select **Cancel**.

WARNING: Once you select the **OK** button, you cannot cancel or undo your request, and you will be charged for access to the additional capacity.

3.10 Downloading Trace Files Using the FD Dump Tool

The 9900V Storage Navigator supports the **FD Dump Tool** function. The FD Dump Tool function is available to all users, and enables users to download the 9900V Storage Navigator configuration information from the SVP either onto a floppy disk or onto a hard disk drive. The downloaded information (trace files) can be used by Hitachi Data Systems service personnel to diagnose problems related to Storage Navigator operations for troubleshooting purposes.

Caution: If another user (including an SVP user) is using the **FD Dump Tool** function or **Export File** function, or a maintenance operation is being performed, you cannot download trace files using the **FD Dump Tool** function.

Note: The FD Dump Tool performs the equivalent of an FDCOPY at the SVP. The subsystem microprocessors are NOT dumped by use of the FD Dump Tool or FDCOPY, so any pre-existing dump info in the SVP files at the time of the FD DUMP will be gathered. This dump data may be old and not valid for troubleshooting a current problem, unless you performed DUMP process at the SVP immediately before performing the FDCOPY, FD DUMP Tool, or Rapid Autodump.

To download the Storage Navigator configuration information (trace files) from the SVP:

1. Specify the following URL to open the Download Trace Files Logon panel (see Figure 3.47): **http://xxx.xxx.xxx.xxx/cgi-bin/utility/stc0000.cgi**. (**Note:** xxx.xxx.xxx.xxx is the IP address or the host name of the SVP you want download files.)
2. Select **Logon** to open the Download Trace Files, Selecting Trace Files panel (see Figure 3.48).
3. Select **Normal Trace**, then select **Next >>**. This compresses the file (see Figure 3.49). When the file is compressed, the Download Trace Files Download panel (see Figure 3.50) is displayed.
4. Select **Download**. The File Download panel (see Figure 3.51) is displayed.
5. Select **Save this file to disk**. Select **OK**. The Save As panel (see Figure 3.52) is displayed.
6. Specify the download destination. Select **Save**. When the file is downloaded successfully, the **Download Complete** panel (see Figure 3.53) is displayed.

Note: If the web browser ends abnormally due to a time-out or an error, wait for about 10 minutes. Restart the **FD Dump Tool** function. From the Download Trace Files, Selecting Trace Files panel (refer to Figure 3.48), select **Existing Trace File**.

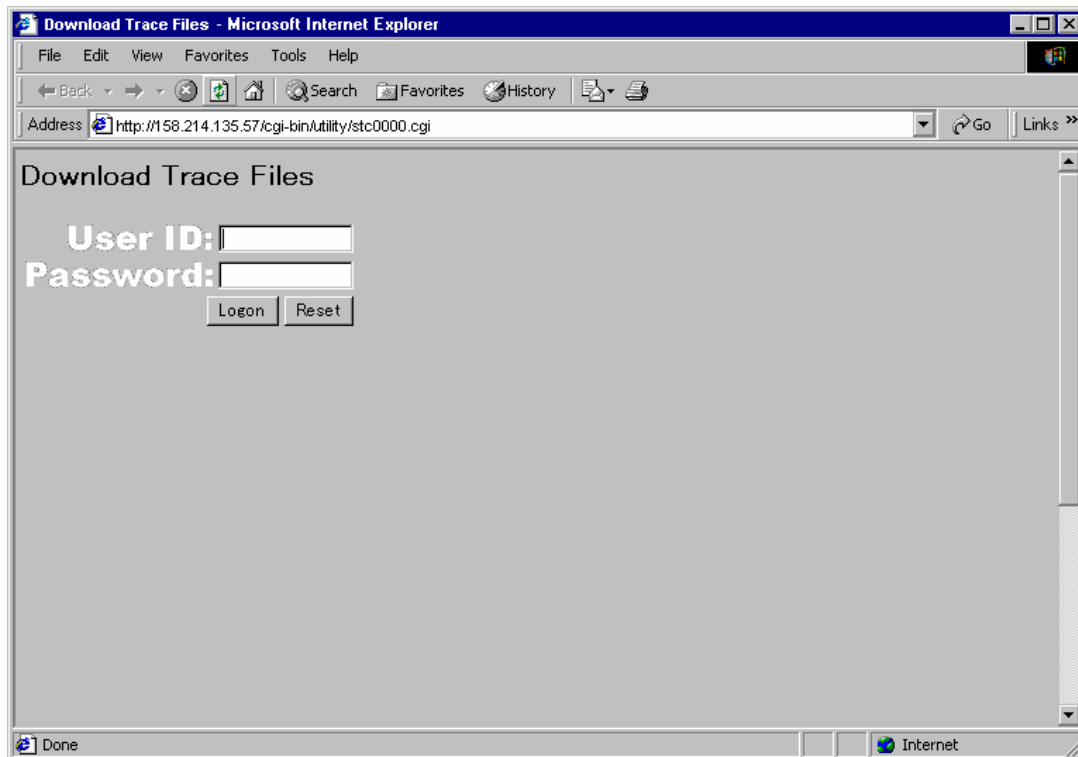


Figure 3.47 Download Trace Files Logon Panel

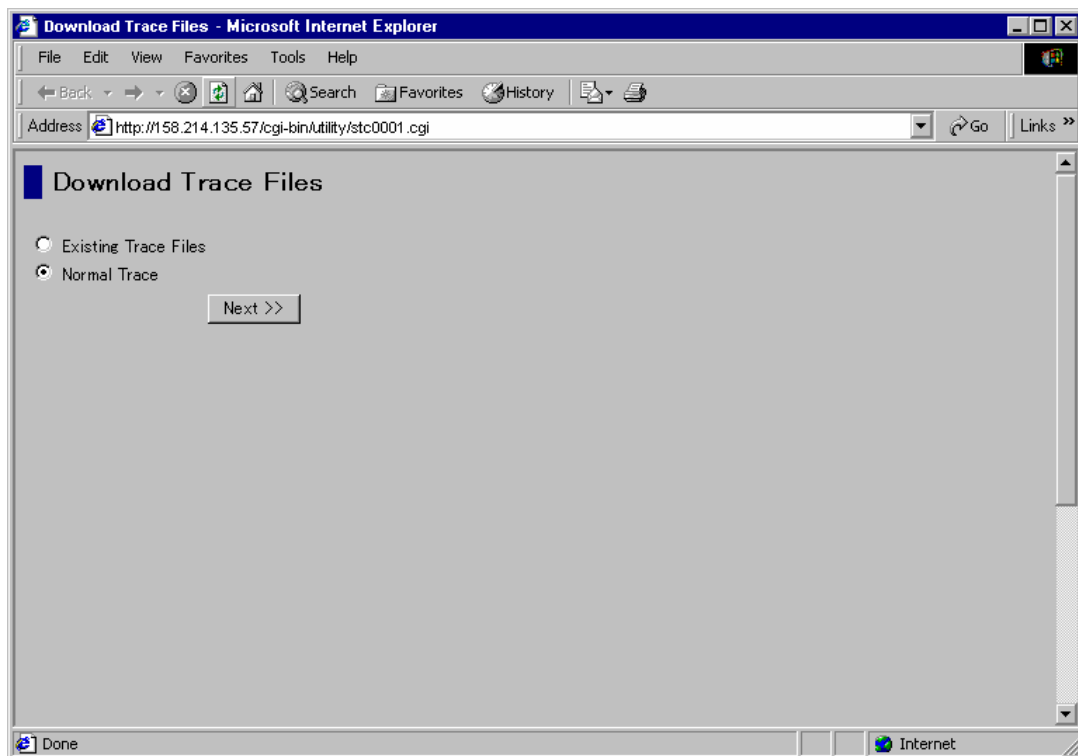


Figure 3.48 Download Trace Files Panel (Selecting Trace Files)

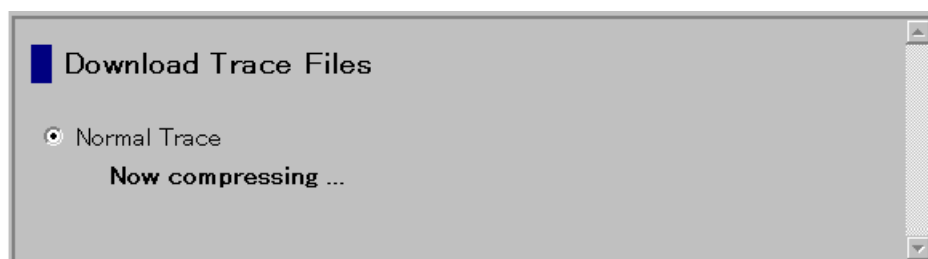


Figure 3.49 Compressing Files Panel



Figure 3.50 Download Trace Files Download Panel

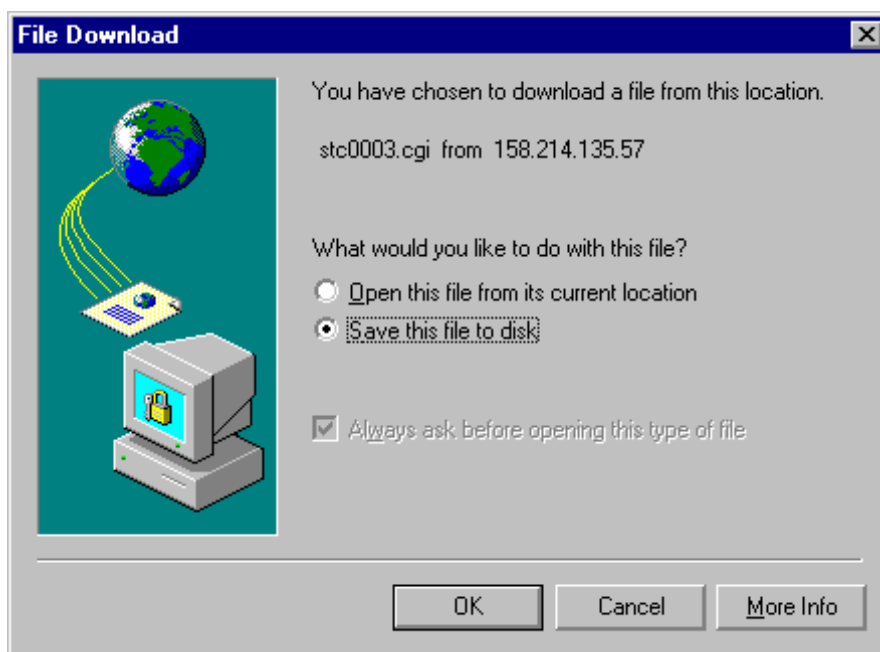


Figure 3.51 File Download Panel

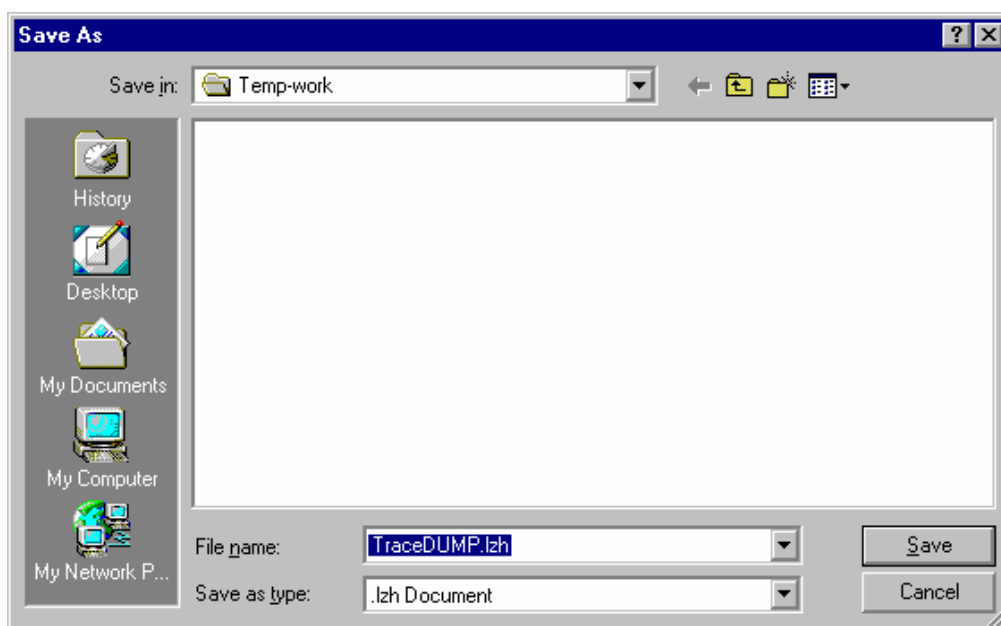


Figure 3.52 Save As Panel

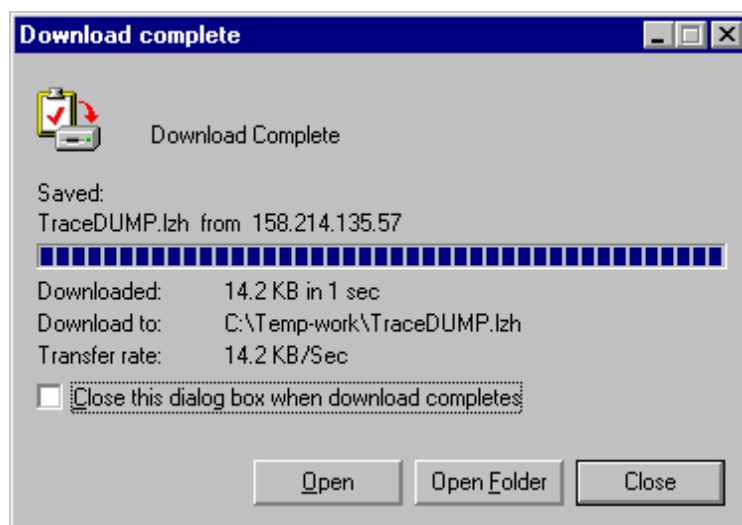


Figure 3.53 Download Complete Panel

3.11 Exporting Data Using the Export File Function

The Export File function enables users to export data used by Storage Navigator options such as Hitachi CruiseControl, Priority Access, Hitachi TrueCopy, and Hitachi TrueCopy - S/390® to files.

Note: Keep the following points in mind before using the Export File function:

- You cannot use the Export File function when another user (including the SVP) is using the FD Dump Tool or Export File function, or when maintenance operations are being performed on the SVP.
- The web browser sometimes ends abnormally while downloading a file. If this occurs, restart the Export File function, and retry the operation.
- The File Export function is a browser application, so each operation panel exists individually. Other panel operations are available during file export operations. If you accidentally select the **Cancel** button on another panel during the file compression process, close the Compressing File panel (select the **Close** button). Wait for about 10 minutes. Restart the Export File function (select **Existing Export Data**).
- The export files created using the Performance Manager selections (Port/WWN, LDEV CU00 - CU1F, and Physical) and the Remote Copy Usage selection are intended for use by the Technical Support Center, or by developers analyzing the performance of remote copy operations. These files are not intended for customer use.
- For information about how the customer can analyze the Performance Monitor data and configuration, please refer to *Hitachi Freedom Storage™ Lightning 9900™ V Series Performance Monitor User's Guide* (MK-92RD133).
- For information about how to use the information from the remaining three selections in the **Remote Copy** section of the Export Data Files screen, please refer to the following documents:
 - **Remote Copy Script:** See *Hitachi Freedom Storage™ Lightning 9900™ V Series TrueCopy S/390® User's Guide* (MK-92RD107).
 - **Remote Copy Snapshot:** See *Hitachi Freedom Storage™ Lightning 9900™ V Series TrueCopy - S/390® User's Guide* (MK-92RD107).
 - **Remote Copy History:** See *Hitachi Freedom Storage™ Lightning 9900™ V Series TrueCopy - S/390® User's Guide* (MK-92RD107), or *Hitachi Freedom Storage™ Lightning 9900™ V Series TrueCopy User's Guide* (MK-92RD108).

To export data to a file using the Export File function:

1. On the Storage Navigator main panel, select the **Export** button () to open the Export Data Files panel (see Figure 3.54).
2. On the Export Data Files panel, select the button for the desired data. For example, select the **Remote Copy Usage** button to export the remote copy usage data.
3. Select **Next >>** to open the Export Data Files panel (see Figure 3.55).
 - If you are exporting a new data file, select **Export Data** on the Export Data Files panel.
 - If you are exporting a file that has previously been exported, select **Existing Export Data** on the Export Data Files panel (see Figure 3.56).
4. Select **Download**. If you are exporting new data, the Compress Files confirmation message opens (see Figure 3.57).
5. Select **OK**. A file compression processing starts, and the Compressing File panel is displayed (refer to Figure 3.49). When the file has been compressed, the File Download panel is displayed (refer to Figure 3.51).

Note: An error occurs if another user is using the **FD DUMP Tool** or **Export File** function, or maintenance operations are being performed on the SVP. If this occurs, wait until the other uses are finished, and then retry the operation.

Note: If file compression takes too long, the browser may time out. Close the Compressing Files panel (using the close () button), and restart the export operation (step 1).

Note: If you accidentally select **Cancel** during file compression, close the Compressing Files panel, wait a while, then download the file again.

6. On the File Download panel (refer to Figure 3.51), select **Save this file to disk**. Select **OK** (or select **Cancel** to cancel your request to export the file).
7. On the **Save As** panel (refer to Figure 3.52), specify the download destination. Select **Save** (or select **Cancel** to cancel your request to export the file). When the file is downloaded successfully, the Download Complete panel is displayed (refer to Figure 3.53).

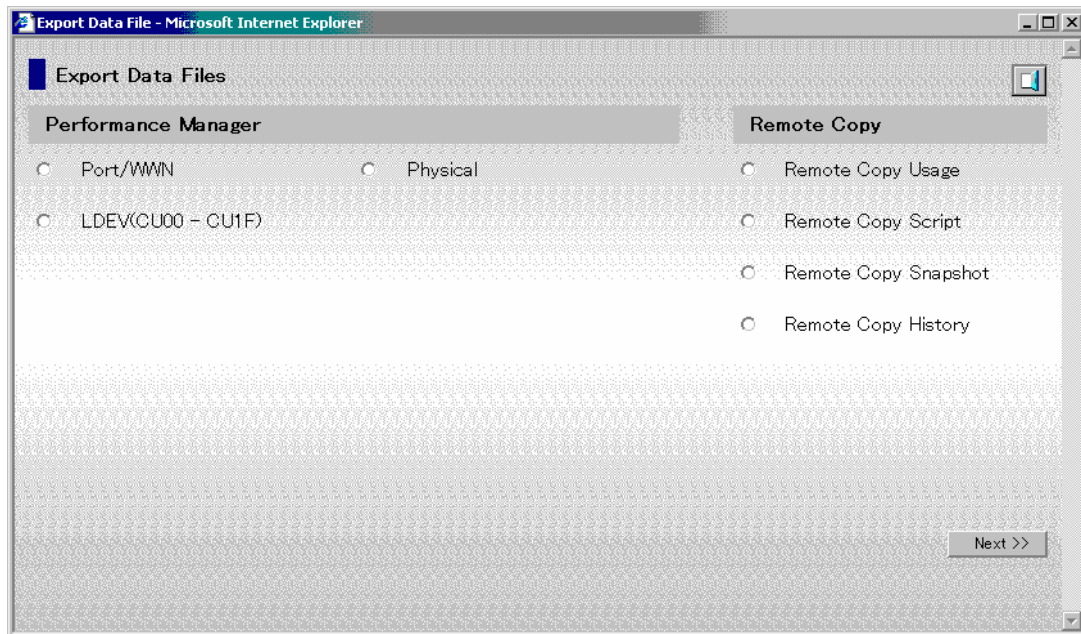


Figure 3.54 Export Data Files Panel (Selecting Data)

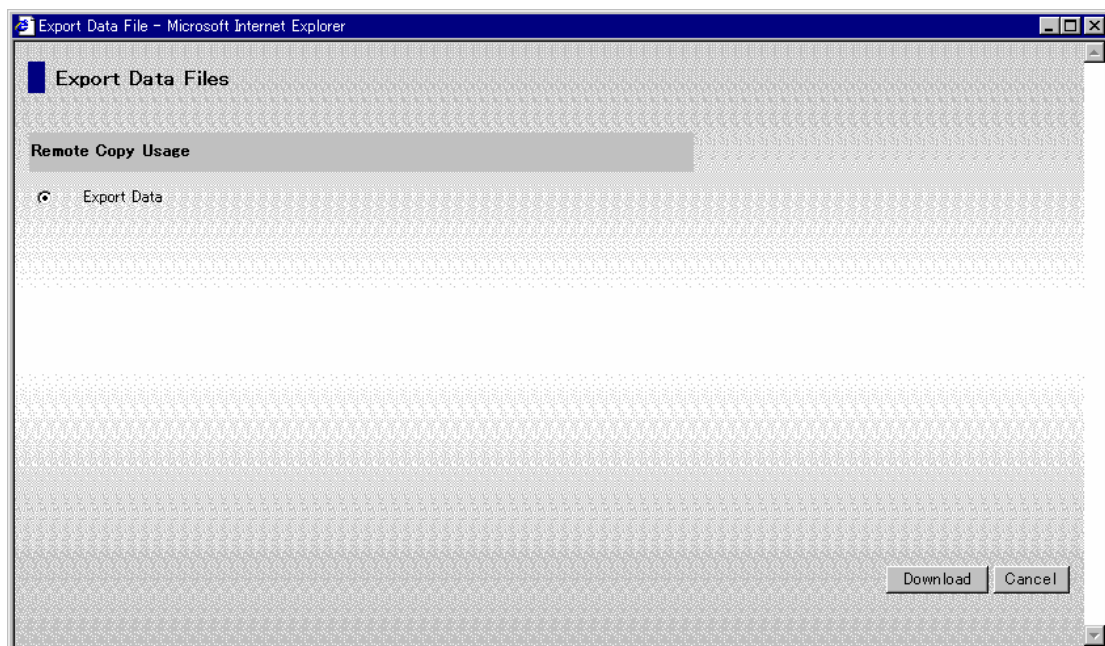


Figure 3.55 Export Data Files Panel (New Data)

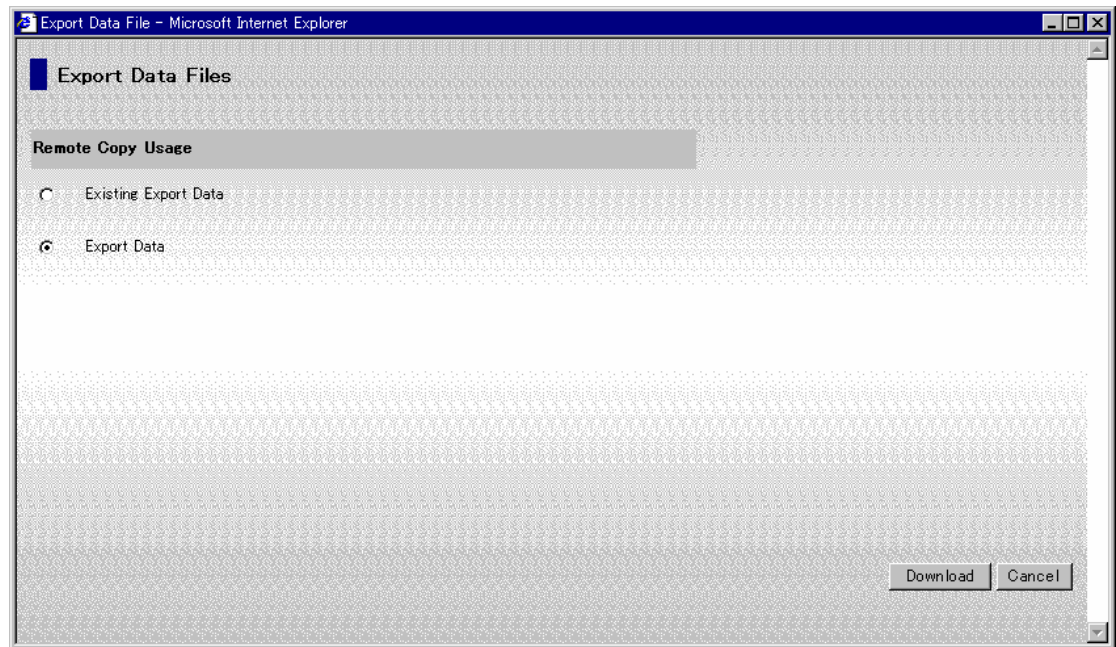


Figure 3.56 Export Data Files Panel (Export Data)

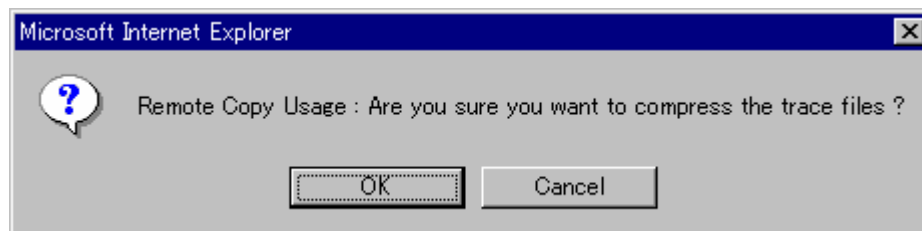


Figure 3.57 Compress Files Confirmation Message

3.12 Uploading Files to SVP Using the FTP Client Function

The 9900V Storage Navigator supports the **FTP Client** function. The **FTP Client** function enables users to upload files from the Storage Navigator to the desired SVP. These include the license key file for installing multiple options (refer to section 2.7), script files used by Hitachi TrueCopy - S/390®, and the private and public keys for SSL-enabled communication (see section 5.5).

Note: Because of Java™ applet program restrictions, the web server (SVP) cannot directly access data on the web client (Storage Navigator). Therefore, the **FTP Client** function is required to upload data from the Storage Navigator to the SVP.

To upload files to the SVP using the FTP Client function:

1. On the Storage Navigator main panel, select **FTP Client** () to open the File Download (FTP Client) panel (see Figure 3.58).
2. Select the **FTP Client (jar file)** hyper link to download the **spfc-01_00.jar** file onto a directory on the Storage Navigator.

Note: If you use the FTP Client function from the SVP, you must save the file in the **c:\dkc200\tmp** directory.

- For the Windows® operating system, select the **FTP Client run batch for Win32** hyperlink to download the **spfc_win32.cmd** file onto the same directory.
 - For UNIX® systems, select the **FTP Client run batch for UNIX** hyperlink to download the **spfc_unix.sh** file onto the same directory.
3. Select **Exit** ()
 4. Open your browser to display the downloaded files (see Figure 3.59). Do one of the following to open the Upload panel (see Figure 3.60):
 - On Windows® systems open the Explorer panel to display the downloaded files (see Figure 3.49). Select and double-click the **spfc_win32.cmd** file.
 - On UNIX® systems open the X Server Emulator console panel to display the downloaded files in the current directory. Execute the following command:
/spfc_unix.sh
 5. On the Upload panel, do the following:
 - In the **SVP IP Address** box, either enter the IP address of the SVP, or select the existing IP address from the list.
 - In the **File Name on Client** box, enter the full path name of the file to be uploaded, or select the file by using the **Reference** button (see Figure 3.61). You can enter up to 200 alphanumeric characters.
 - Select **Upload**.
 6. When the file is uploaded, a confirmation message is displayed (see Figure 3.62).

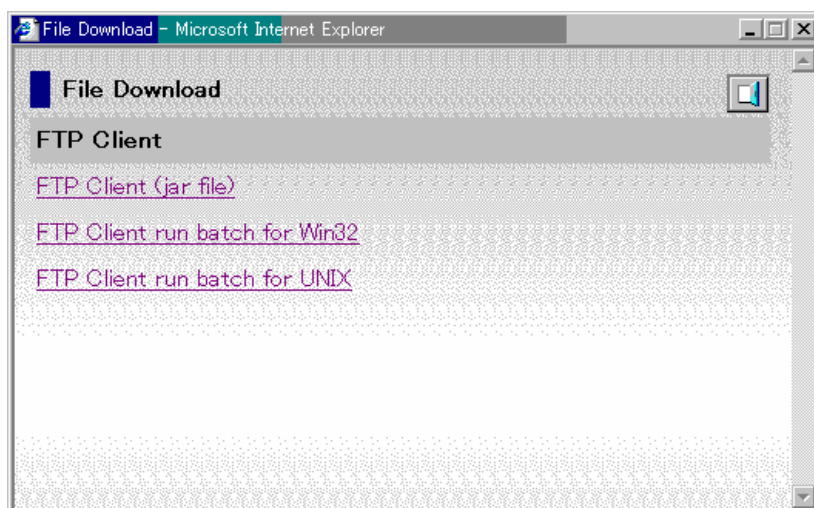


Figure 3.58 File Download (FTP Client) Panel

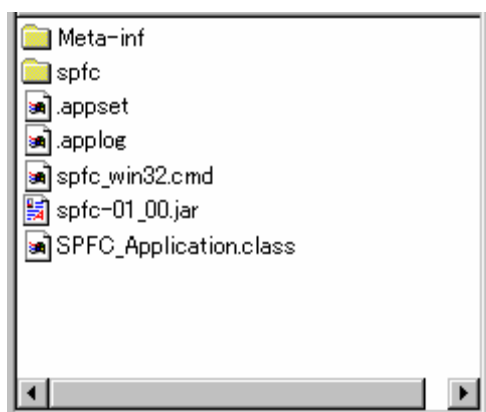


Figure 3.59 Sample Display on the Windows® Explorer Browser

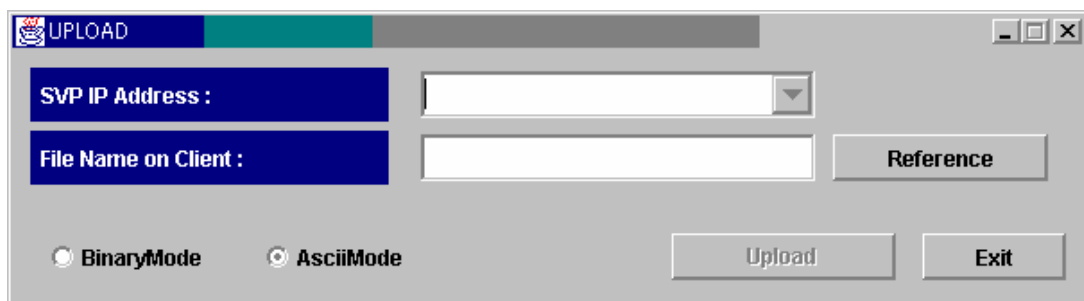


Figure 3.60 Upload Panel

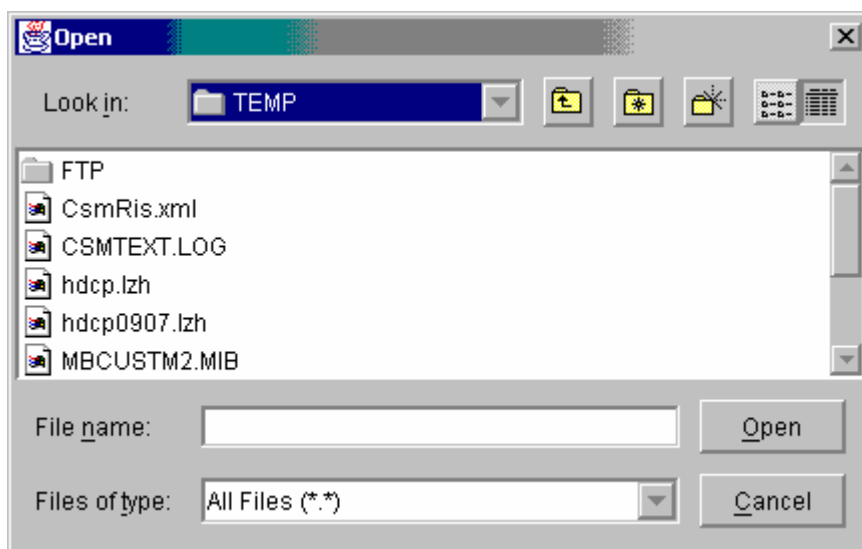


Figure 3.61 Opening Panel Using the Reference Button

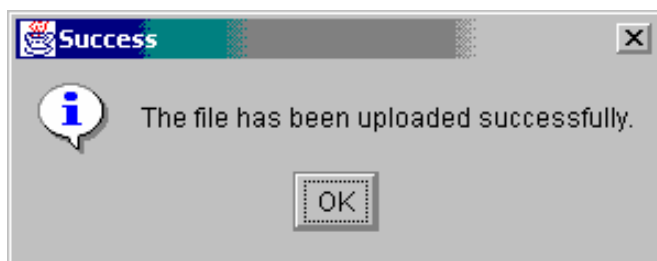


Figure 3.62 Upload Success Panel

Chapter 4 Setting SNMP Agent Properties

4.1 Overview of SNMP Agent Properties

WARNING: Before setting SNMP Agent properties, be sure that both the Hitachi SNMP API and the Microsoft SNMP agent are installed on the 9900V SVP, to allow the SNMP agent to run as a daemon program.

The Simple Network Management Protocol (SNMP) is an industry-standard method for storage and communication devices. It is used to transfer status and management commands across TCP/IP networks. The SNMP agent (SNMP) performs error-reporting operations requested by the SNMP manager for 9900V subsystem(s). SNMP properties are usually set from the SVP, but you can also set the SNMP properties for the connected 9900V subsystem using the Storage Navigator. For a flowchart of the 9900V SNMP environment, see Figure 4.1.

You can perform the following SNMP functions using the Storage Navigator:

- Add and delete SNMP Manager IP addresses (see sections 4.3.1 and 4.3.2)
- Add, delete, and change communities (see sections 4.3.3 through 4.3.5)
- Add, delete, and change IP addresses of communities (see sections 4.3.6 through 4.3.7)

Note: To set the SNMP properties, you must register the SNMP system group information including the device name, contact information, and location of the subsystem to be managed on the **Information** tab of the Storage Navigator main panel.

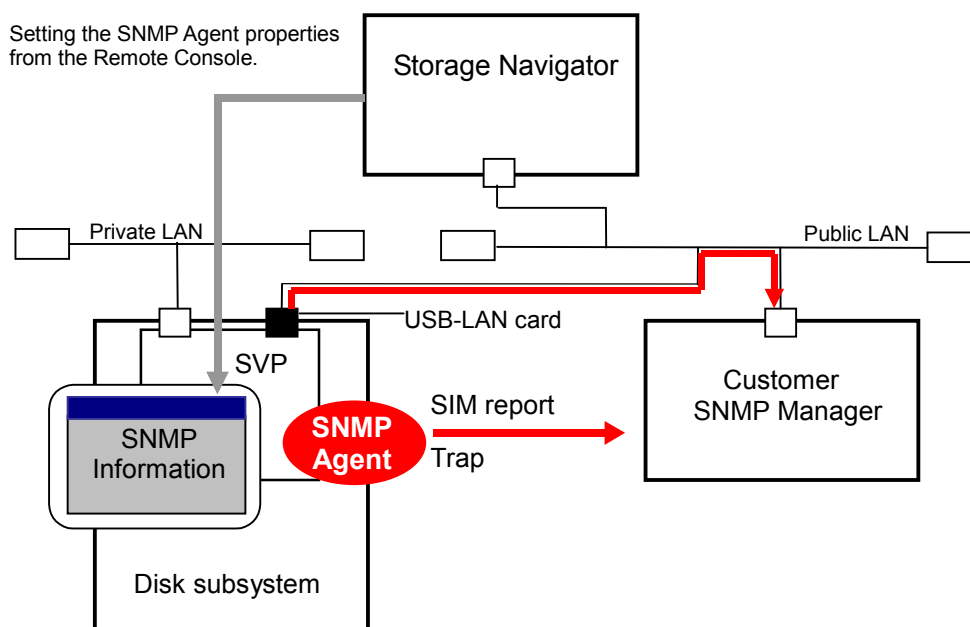


Figure 4.1 9900V SNMP Environment

4.2 SNMP Information Tab

The **SNMP Information** tab allows you to extend the number of LUs and cache memory using the Just In Time Storage functions. To open the **SNMP Information** tab, select **License Key/SNMP/Just In Time** () on the Storage Navigator main panel. Select the **SNMP Information** tab (see Figure 4.2).

Note: The option buttons (along the left side of the panel) and the subsystem information icons (in the top right corner of the panel) have been omitted from the screen shot. Refer to Figure 3.1 for an illustration.

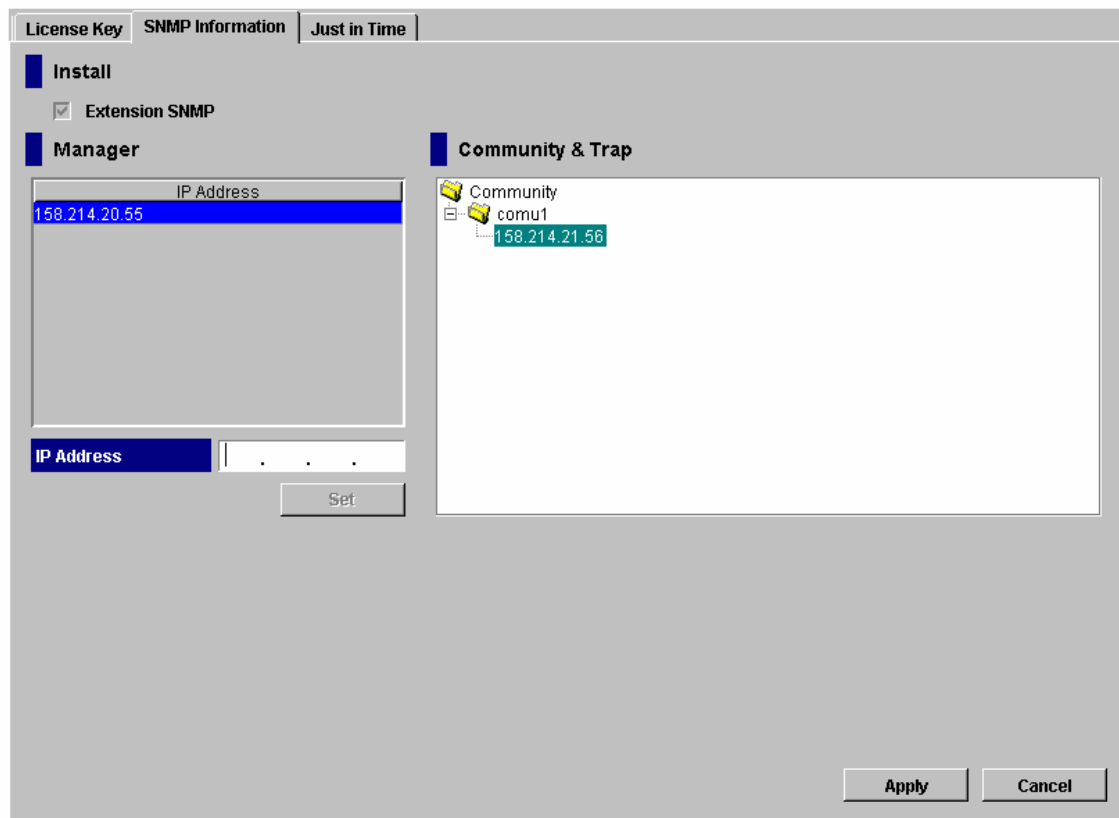


Figure 4.2 SNMP Information Tab on the License Key/SNMP/Just in Time Panel

The SNMP Information tab has the following features:

- The **Extension SNMP** checkbox - selected if the SNMP Agent feature is enabled. This must be selected in order for you to perform SNMP operations from the Storage Navigator.
Note: This must be set from the SVP. Contact your Hitachi Data Systems account team for assistance.
- The **Manager** section - allows you to add and delete SNMP manager information (see section 4.3.1 for instructions)
 - The **IP Address** list box: Displays the IP addresses of the registered SNMP managers from which the SNMP agent accepts requests. If no manager is registered, the SNMP agent accepts requests from all managers. You can register up to 32 managers.
 - The **IP Address** text box: Enter the IP address that you want to register as an SNMP manager. The value of each number in the IP address must be from 0 to 255 inclusive.
 - The **Set** button: Adds the new IP address to the **IP Address** list box
- The **Community & Trap** section - Add, delete, or change SNMP trap information. The registered IP address is the trap destination for the specified community.
 - Each community can have more than one defined IP address (see sections 4.3.3 and 4.3.6 for instructions).
 - You can register up to 32 community names and up to 32 IP addresses per community name.
 - You can use up to 180 alphanumeric characters for a community name.
- **Apply** - implements the settings made on this panel
- **Cancel** - cancels the settings made on this panel

4.3 SNMP Agent Operations

Note: To set the SNMP Agent properties from the Storage Navigator, you must select the **Extension SNMP** checkbox from the connected SVP. You must have the write permission to change the SNMP Agent properties.

4.3.1 Adding SNMP Manager IP Addresses

To add SNMP Manager IP addresses:

1. Change to **Modify** mode.
2. Select **License Key/SNMP/Just in Time** (🔑).
3. Select the **SNMP Information** tab (refer to Figure 4.2).
4. Enter the desired numerical IP address (see Figure 4.3) in the **IP Address** text box.
5. Select **Set** to add the new IP address. The new IP address is added to the **IP Address** list, but the changes are not implemented until you select **Apply**.
6. If you want to apply the changes to the subsystem, select **Apply** (or **Cancel**). Select **OK** on the confirmation message.

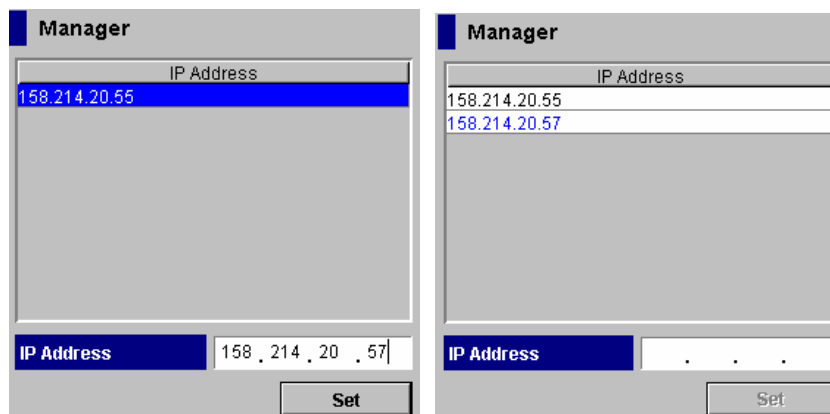


Figure 4.3 Adding SNMP Manager IP Address

4.3.2 Deleting SNMP Manager IP Addresses

To delete a SNMP Manager IP address:

1. Change to **Modify** mode.
2. Select **License Key/SNMP/Just in Time** ().
3. Select the **SNMP Information** tab).
4. Left-click one or more unwanted IP addresses in the **IP Address** list box to select them. Right-click to display the **Delete IP Address** pop-up command (see Figure 4.4).
5. Select the **Delete IP Address** command.
6. A confirmation message is displayed. Select **OK** to request the delete IP address operation(s), or select **Cancel** to cancel.
7. If you want to apply the changes to the subsystem, select **Apply**. Select **OK**. If you want to cancel the changes, select **Cancel**.

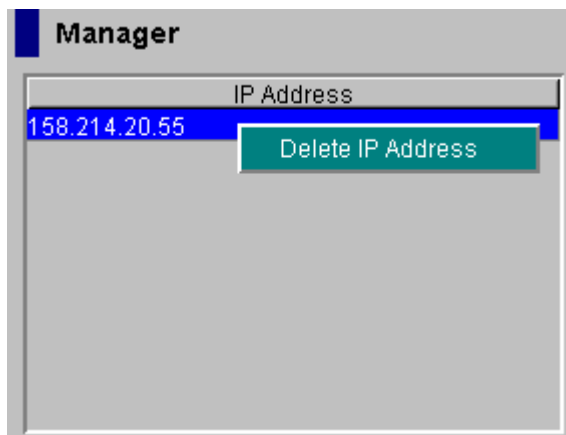


Figure 4.4 Delete IP Address Pop-Up Menu

4.3.3 Adding A Community Name

To add a community name:

1. Change to **Modify** mode.
2. Select **License Key/SNMP/Just in Time** (). Select the **SNMP Information** tab.
3. In the **Community & Trap** box, select and right-click on **Community**. The **Add Community** pop-up menu is displayed (see Figure 4.5).
4. Select the **Add Community** command. The **Community** panel (see Figure 4.6) is displayed.
5. In the **Community** text box, enter the desired community name (up to 180 alphanumeric characters, excluding " * \$ ^ | < > ? % & \ and space).
6. Select **OK**. The new community name is displayed in the **Community & Trap** box, but the changes are not yet implemented in the subsystem.
7. If you want to add one or more IP addresses to the new community, refer to section 4.3.6.
8. If you want to apply the changes to the subsystem, select **Apply**. Select **OK** (or **Cancel**).

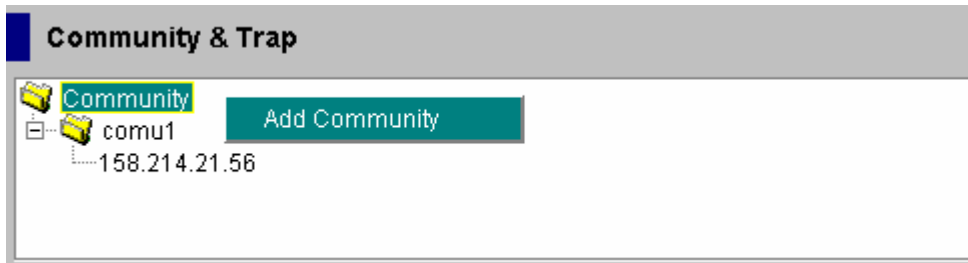


Figure 4.5 Add Community Pop-Up Menu

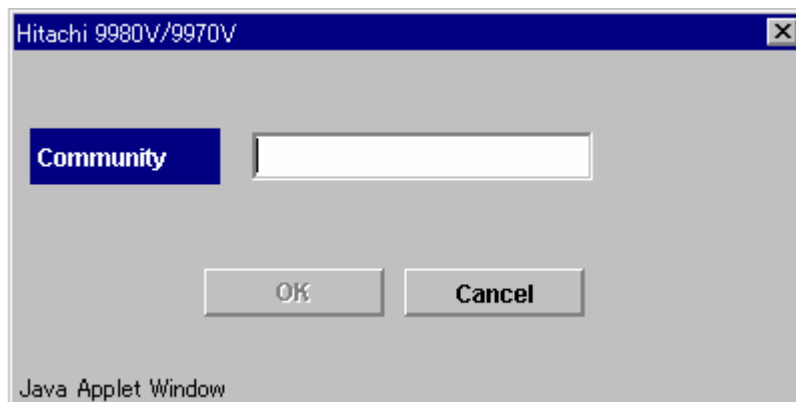


Figure 4.6 Add Community Panel

4.3.4 Deleting a Community Name

To delete a community name:

1. Change to **Modify** mode.
2. Select **License Key/SNMP/Just in Time** ().
3. Select the **SNMP Information** tab.
4. In the **Community & Trap** box, select the unwanted community. Right-select using the mouse. The **Delete Community** popup menu is displayed (see Figure 4.7).
5. Select the **Delete Community** command. A confirmation message is displayed.
6. Select **OK** to delete (or **Cancel**). The selected community is deleted from the **Community & Trap** box, but the setting is not yet implemented in the subsystem.
7. If you want to apply the changes to the subsystem, select **Apply**. Select **OK** (or **Cancel**).

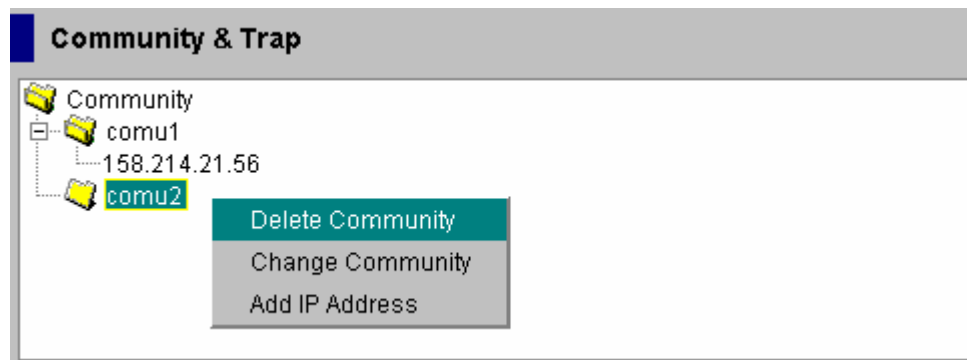


Figure 4.7 Delete Community Pop-Up Menu

4.3.5 Changing a Community Name

To change a community name:

1. Change to **Modify** mode (refer to section 2.5 if you need instructions).
2. Select **License Key/SNMP/Just in Time** ().
3. Select the **SNMP Information** tab.
4. Select the community name that you want to change in the **Community & Trap** box, right-select using the mouse. The **Change Community** popup menu is displayed (see Figure 4.8).
5. Select the **Change Community** command. The Change Community panel is displayed (see Figure 4.9).
6. In the **Community** text box, overwrite the old community name with a new community name (up to 180 alphanumeric characters, excluding " * \$ ^ | < > ? % & \ and space).
7. Select **OK**. The changed community name is displayed in the **Community & Trap** box, but the changes are not yet implemented in the subsystem.
8. If you want to apply the changes to the subsystem, select **Apply**. Select **OK** (or **Cancel**).



Figure 4.8 Change Community Pop-Up Menu

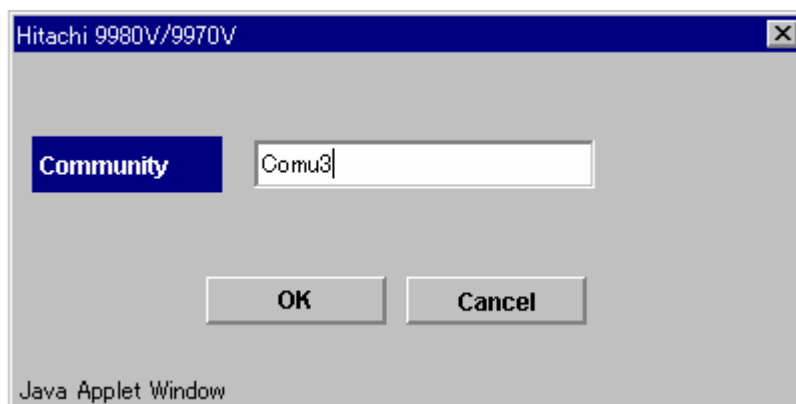


Figure 4.9 Change Community Panel

4.3.6 Adding Community IP Addresses

To add a community IP address:

1. Log on to open the Storage Navigator main panel, select the License Key/SNMP/Just in Time button (). Select the SNMP Information tab. The SNMP Information panel is displayed (see Figure 4.2).
2. Select the desired community that you want to add and right-click. The popup menu is displayed (see Figure 4.10).
3. Select the Add IP Address command. The Add IP Address panel is displayed (see Figure 4.11).
4. In the IP Address box, enter a new IP address or select the existing IP address.
5. Select OK. The new IP address is displayed in the Community & Trap box, but the change is not yet implemented to the subsystem.
6. If you want to apply the changes to the subsystem, select **Apply**. Select **OK**. If you want to cancel the changes, select **Cancel**.

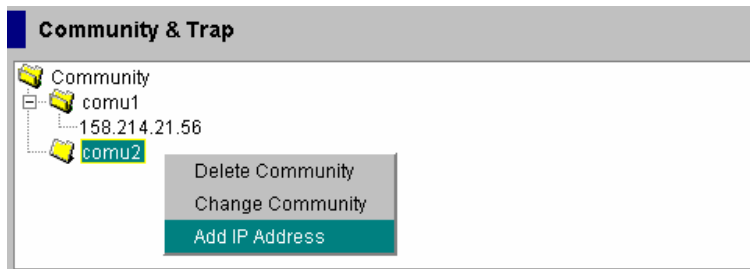


Figure 4.10 Add Community IP Address Pop-Up Menu

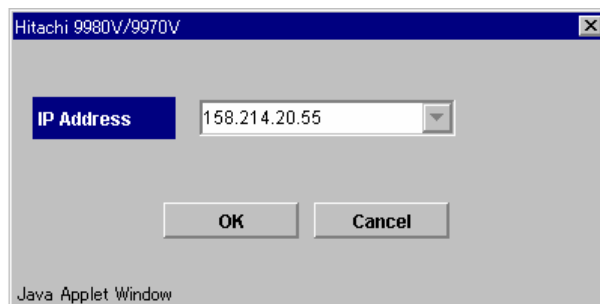


Figure 4.11 Add Community IP Address Panel

4.3.7 Deleting a Community IP Address

To delete a community IP address:

1. Change to **Modify** mode.
2. Select **License Key/SNMP/Just in Time** ().
3. Select the **SNMP Information** tab.
4. In the **Community & Trap** box, select the unwanted community IP address. Right-click to display the **Delete IP Address** pop-up menu (see Figure 4.12).
5. Select the **Delete IP Address** command. A confirmation message is displayed.
6. Select **OK** to delete (or **Cancel**). The selected IP address is deleted from the **Community & Trap** box, but the change is not yet implemented on the subsystem.
7. If you want to apply the changes to the subsystem, select **Apply** (or **Cancel**). Select **OK** on the confirmation message.



Figure 4.12 Delete Community IP Address Pop-Up Menu

Chapter 5 Enabling SSL-Encrypted Communication

5.1 Overview

The 9900V supports SSL-encrypted communication to improve security of remote operations from a Storage Navigator to a Lightning 9900V subsystem. By setting SSL-encrypted communication, the User ID and Password required for logging on to the Storage Navigator are encrypted to provide a higher level of security.

The 9900V SVP must be changed to Apache, which supports SSL, in order to perform SSL-encrypted communication. The Hitachi Data Systems service personnel will do the operation to change the SVP to the SSL-supported Apache.

This chapter describes and provides instructions for enabling SSL-encrypted communication:

- SSL Definitions (see section 5.2)
- Creating a keypair (see section 5.3)
- Acquiring a signed SSL certificate (see section 5.4)
- Importing the SSL certificate (see section 5.5)
- Updating the SSL certificate in the SVP (see section 5.6)
- Setting your web browser to accept self-signed certificates (see section 5.7)

5.2 SSL Definitions

Important: If you enable SSL, you must make sure that the key pair and associated server certificate do not expire. If either the key pair or the server certificate expires, users will be unable to connect to the SVP. SSL requires that the SVP be set up to use the Apache™ HTTP server. This will be performed by Hitachi Data Systems representatives.

Note: Server certificates require the use of a host name instead of an IP address when you add or change a storage device (refer to sections 3.2.2 and 3.2.3).

This chapter uses the following terms:

- **Secure Sockets Layer (SSL)** is a protocol first developed by Netscape® to securely transmit data over the Internet. Two SSL-enabled peers use their Private and Public Keys to establish a secure communication session, with each peer encrypting transmitted data with a randomly generated and agreed-upon symmetric key.
- A **keypair** is two mathematically-related cryptographic keys consisting of a Private Key and its associated Public Key.
- A **Server Certificate** (sometimes also called a Digital Certificate) forms an association between an identity (in this case the SVP server) and a specific keypair. A Server Certificate is used to identify the SVP server to a client so that the server and client can communicate using SSL. Server Certificates come in two basic types:
 - **Self-signed:** This is the case where you generate your own certificate, so that the subject of the certificate is the same as the issuer of the certificate. If the communication between Storage Navigator computers and the SVP is on an internal LAN behind a firewall, you may find that this option provides sufficient security. See section 5.4.1 for more information on self-signed certificates.
 - **Signed and Trusted:** When a Certificate Signing Request (CSR) is generated and sent to a well-known and trusted Certificate Authority (CA) for signing, and is then signed and returned by the Certificate Authority, your certificate is considered signed and trusted. One such Certificate Authority is VeriSign® (<http://www.verisign.com/>). See section 5.4.2 for more information on signed and trusted certificates. This adds extra cost and requirements.

Enabling SSL requires the following steps:

- Creating a keypair (see section 5.3)
- Acquiring a signed SSL certificate (see section 5.4)
- Importing the SSL certificate (see section 5.5)
- Updating the SSL certificate in the SVP (see section 5.7)
- Setting your web browser to accept self-signed certificates (see section 5.7)

5.3 Creating a Keypair

To enable SSL, you will need to create a keypair. These instructions use Windows® 2000 as an example.

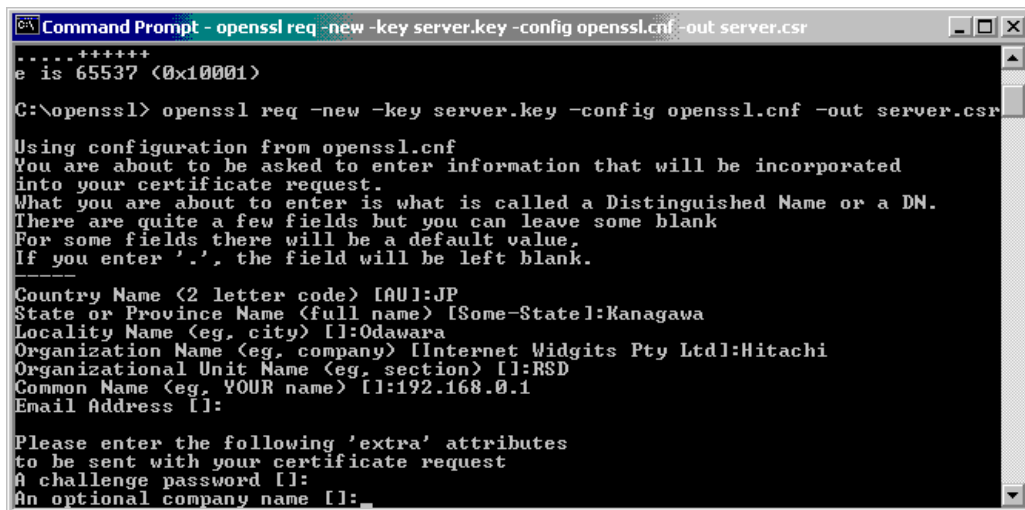
If you are using Solaris™ or HP-UX®, you will need to download software for creating a keypair, e.g., OpenSA (<http://www.opensa.org/>) or OpenSSL (<http://www.openssl.org/>) and follow the manufacturer's instructions.

5.3.1 Creating a Private Key (.key file)

1. You will need the CD-ROM for SSL, which is provided by Hitachi Data Systems. It includes **openssl.exe**, **SSLeay32.dll** and **libeay32.dll**. Copy the entire contents of the **openssl** folder to your c: drive (or other drive of your choice).
2. Release the read-only attribute from the **openssl** folder.
3. Open a command prompt.
4. Navigate to the directory where you copied the folder, and execute the following command:
C:\openssl> openssl genrsa -out server.key 1024
5. This will create a file called **server.key** in the **openssl** folder. This file becomes the Private Key.

5.3.2 Creating a Public Key (.csr file)

1. Open a command prompt, and execute the following command:
`c:\openssl> openssl req -new -key server.key -config openssl.cnf -out server.csr`
2. Enter the following information (Figure 5.1 is an example; enter your own information):
 - Country Name (2 letter code)
 - State or Province Name
 - Locality Name (e.g., city)
 - Organization Name (e.g., company)
 - Organization Unit Name (e.g., department name)
 - Common Name: If you are going to create a self-signed certificate, enter the IP address of the web server (SVP). If you are going to obtain a signed and trusted certificate, the server name must be the same as the host name of the storage device (refer to sections 3.2.2 and 3.2.3).
 - Email Address: (not entered in the example)
 - Challenge password (optional)
 - Company name (optional)



```
Command Prompt - openssl req -new -key server.key -config openssl.cnf -out server.csr
.....+++++
e is 65537 (0x10001)

C:\openssl> openssl req -new -key server.key -config openssl.cnf -out server.csr

Using configuration from openssl.cnf
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
-----
Country Name (2 letter code) [AU]:JP
State or Province Name (full name) [Some-State]:Kanagawa
Locality Name (eg, city) []:Odawara
Organization Name (eg, company) [Internet Widgits Pty Ltd]:Hitachi
Organizational Unit Name (eg, section) []:RSD
Common Name (eg, YOUR name) []:192.168.0.1
Email Address []:

Please enter the following 'extra' attributes
to be sent with your certificate request
A challenge password []:
An optional company name []:
```

Figure 5.1 Creating a Public Key

5.4 Acquiring a Signed Certificate

5.4.1 Self-Signed Certificates

1. Open a command prompt, and execute the following command:
`C:\openssl> openssl x509 -req -days 10000 -in server.csr -signkey server.key -out server.crt`
2. This creates a **server.crt** file in the **openssl** folder, which is valid for 10000 days. This is the signed Public Key, which is also referred to as a self-signed certificate.

5.4.2 Signed and Trusted Certificates

If you want to create a signed and trusted certificate, you need to create a certificate signing request (CSR), send that file to a Certificate Authority (CA), and request that the CA issue a signed and trusted certificate. Each certificate authority has its own procedures and requirements, and there is generally a cost for doing so. The signed and trusted certificate is the signed Public Key.

5.5 Uploading the Signed Certificate to the SVP

In order to use SSL-encrypted communication, you need to upload both the Private Key and the signed Server Certificate (Public Key) to the Web server (SVP). Refer to section 3.12 for instructions on using the FTP Client function to upload files.

5.6 Updating the Certificate

1. Start the Storage Navigator computer, and launch your web browser.
2. To open the Update Certificate Files logon panel, specify the following URL:
http://xxx.xxx.xxx.xxx/cgi-bin/utility/ssc0000.cgi (where xxx.xxx.xxx.xxx is the IP address or host name of the SVP).
3. If the SVP is set to support SSL-encrypted communication, the Establishing Secure Connection Warning panel (refer to Figure 2.8) displays. Select **OK**.
4. If the View Certificate panel (refer to Figure 2.9) displays, select the **View Certificate** button to verify that the certificate is correct, then select **Yes**.
5. The Update Certificate Files Logon panel (see Figure 5.2) will display. Enter an administrator user ID and password, then select **Logon**.
6. The Update Certificate Files Start panel (see Figure 5.3) will display. Select **OK** to start the update process, or select **Cancel** to cancel and return to the Logon panel.
7. When the update completes, the web server will restart to refresh to the updated certificate. When the web server has restarted successfully, the Update Certificate Files Completed panel (see Figure 5.4) will display.
8. If an error occurs during the process, an error message will be displayed (see Figure 5.5).
9. Select **OK** to return to the Logon panel, then complete the logon process as usual. Refer to section 2.4 if you need instructions.

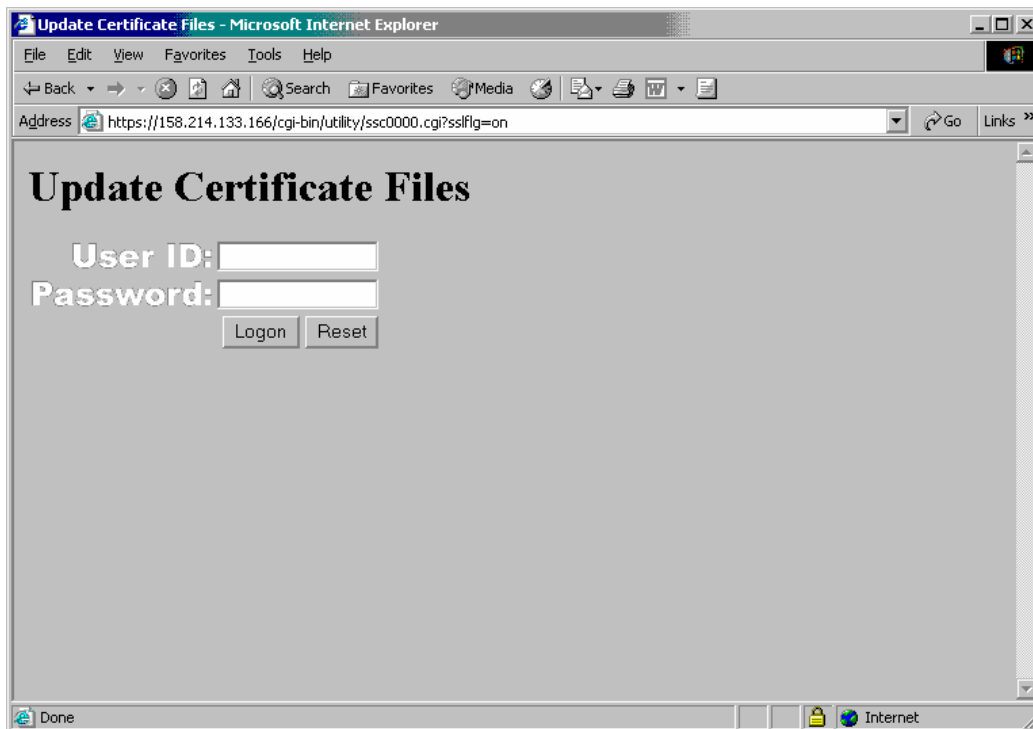


Figure 5.2 Update Certificate Files Logon Panel

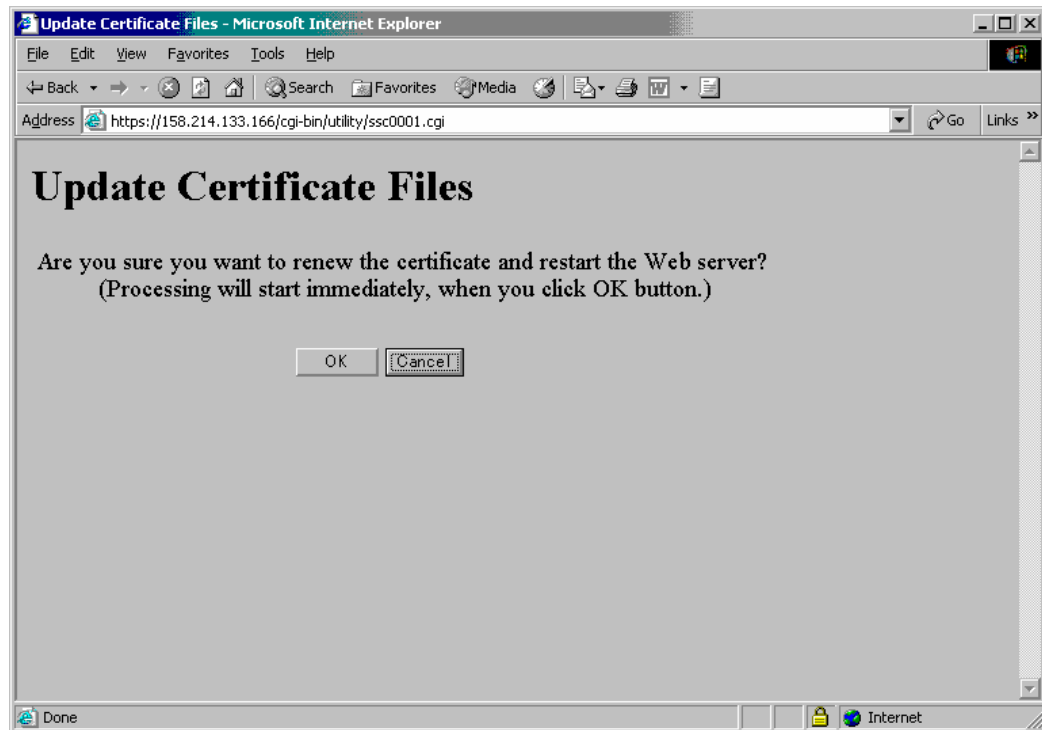


Figure 5.3 Update Certificate Files Start Panel

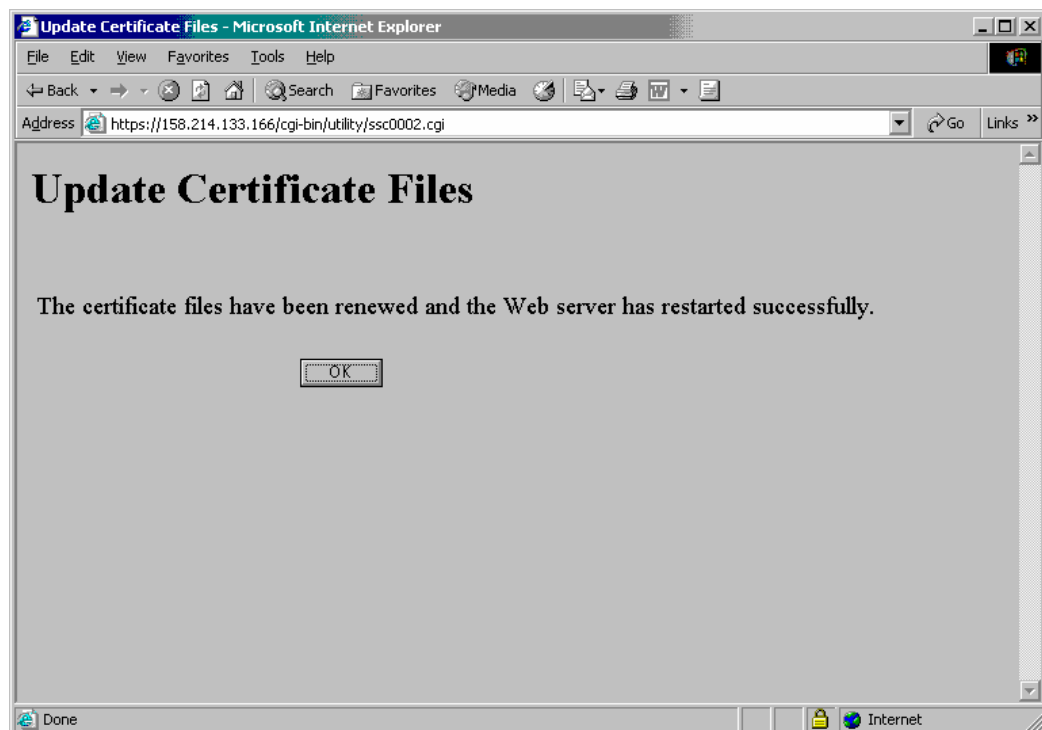


Figure 5.4 Update Certificate Files Completed Panel

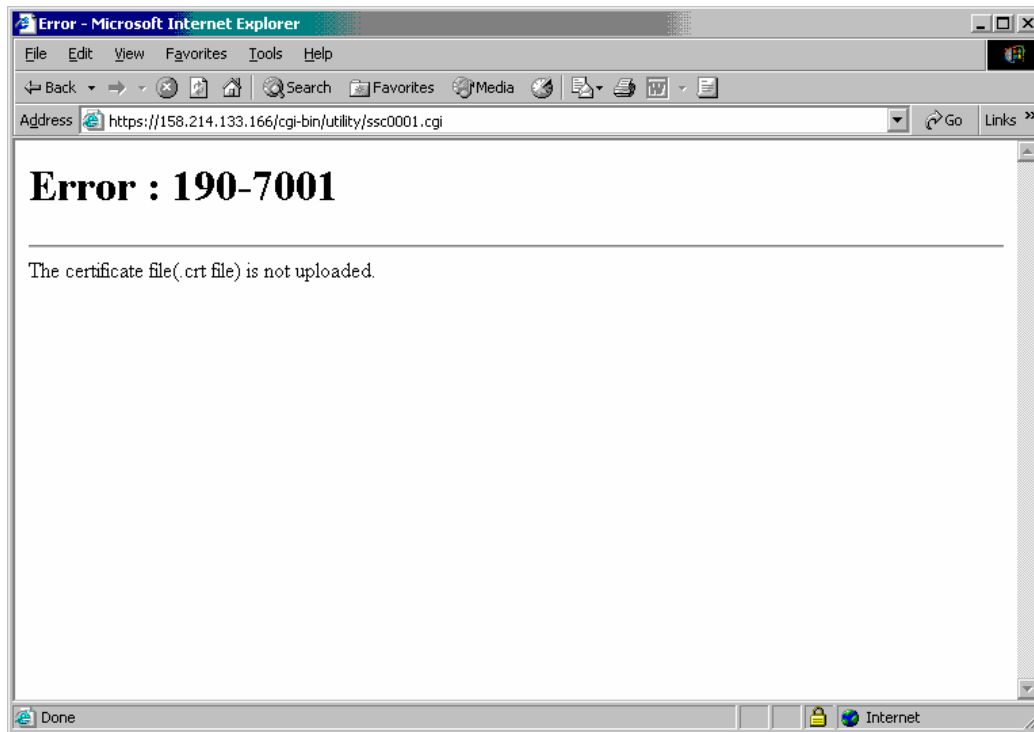


Figure 5.5 Update Certificate Files Error Panel

5.7 Setting the Web Browser to Accept Self-Signed Certificates

If you are using a self-signed certificate, your web browser will display a warning message when it connects to an SSL-enabled SVP. If you want this message to not display, you will need to import the certificate to the web browser.

Note: These sample instructions assume the use of Internet Explorer® 6.0.

1. Log on to the Storage Navigator using a secure connection (specify the URL using **https**).
2. The Security Alert panel (see Figure 5.6) displays. Select **View Certificate**.
3. The Certificate panel (see Figure 5.7) displays. The **General** tab is the default view. Select **Install Certificate**.
4. The Certificate Import Wizard Introduction panel (see Figure 5.8) displays. Select **Next**.
5. The Select Certificate Type panel (see Figure 5.9) displays. Select **Automatically select the certificate store based on the type of certificate**, then select **Next**.
6. The Import Complete panel (see Figure 5.10) displays. Select **Finish**.
7. The Add Certificate panel (see Figure 5.11) displays. Select **Yes** to add the certificate to the Root Store, or select **No** to cancel.
8. The Import Successful panel (see Figure 5.12) displays. Select **OK**.
9. You are returned to the Security Alert panel (refer to Figure 5.6). Select **Yes**. **Note:** This panel will no longer appear, beginning with the next time that you open your browser.



Figure 5.6 Security Alert Panel (Unknown Security Certificate)



Figure 5.7 Certificate Panel



Figure 5.8 Certificate Import Wizard Introduction Panel

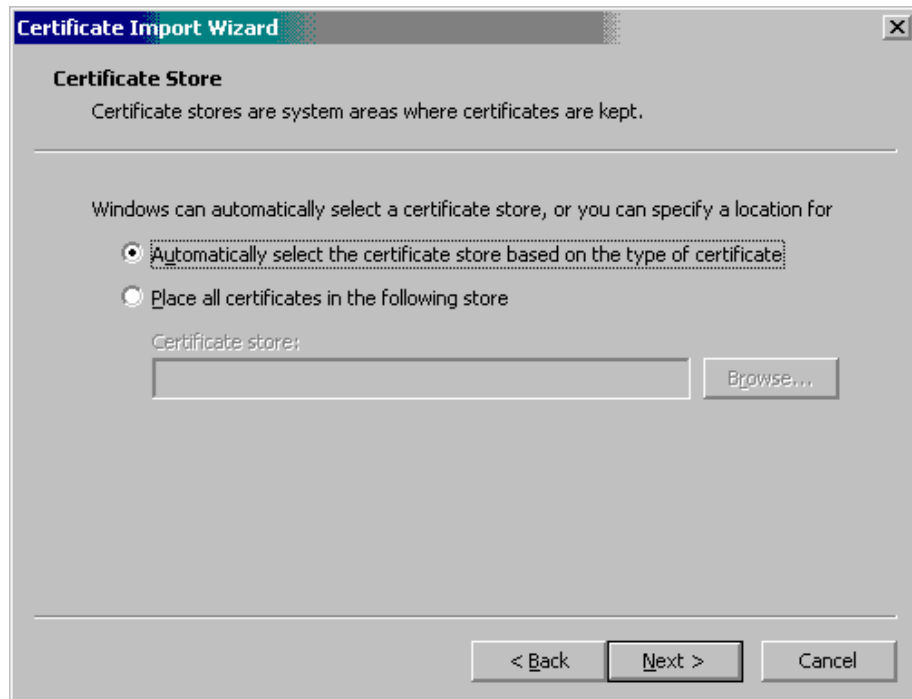


Figure 5.9 Select Certificate Type Panel

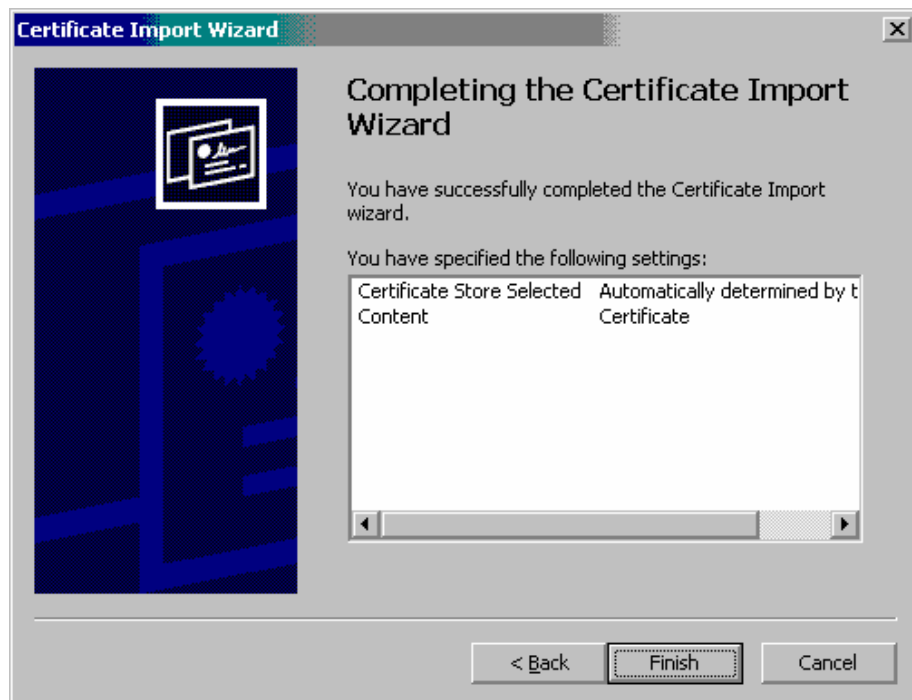


Figure 5.10 Import Complete Panel

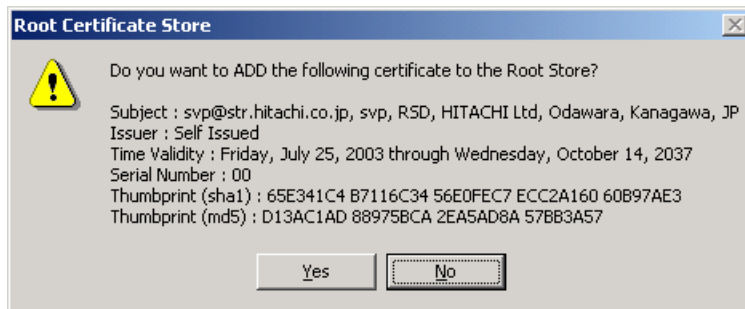


Figure 5.11 Add Certificate Panel

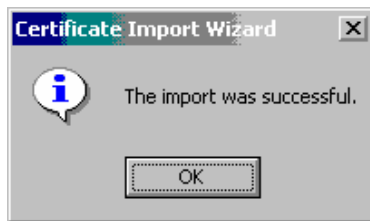


Figure 5.12 Import Successful Panel

Chapter 6 Configuration File Loader

6.1 Overview of Configuration File Loader

This chapter contains the following topics:

- Overview (see section 6.1)
- Downloading Java™ Web Start (see section 6.2)
- General spreadsheet conventions (see section 6.3)
- LUN Manager spreadsheet conventions (see section 6.4)
- Configuration File Loader operations (see section 6.5)

Configuration File Loader is used to make large-scale or “batch” changes to the LUN Manager configuration of the 9900V subsystem, using either a text editor or spreadsheet software to edit configuration definition files and apply the changes. You can apply the same configuration definition file to different subsystems, and you can define the configuration when you are offline.

Note: The instructions in this chapter assume the use of Microsoft Excel® 2000, and it is recommended for best compatibility.

Note: Java™ Web Start version 1.0.1 or 1.2 is required to run Configuration File Loader. The minimum microcode version required is 21-04-31. See section 6.2 for instructions on downloading Java™ Web Start.

Currently Configuration File Loader supports only LUN Manager functions. For further information on LUN Manager, please refer to the *Hitachi Lightning 9900™ V Series LUN Manager User's Guide* (MK-92RD105).

Figure 6.1 is a flow chart of Configuration File Loader operations.

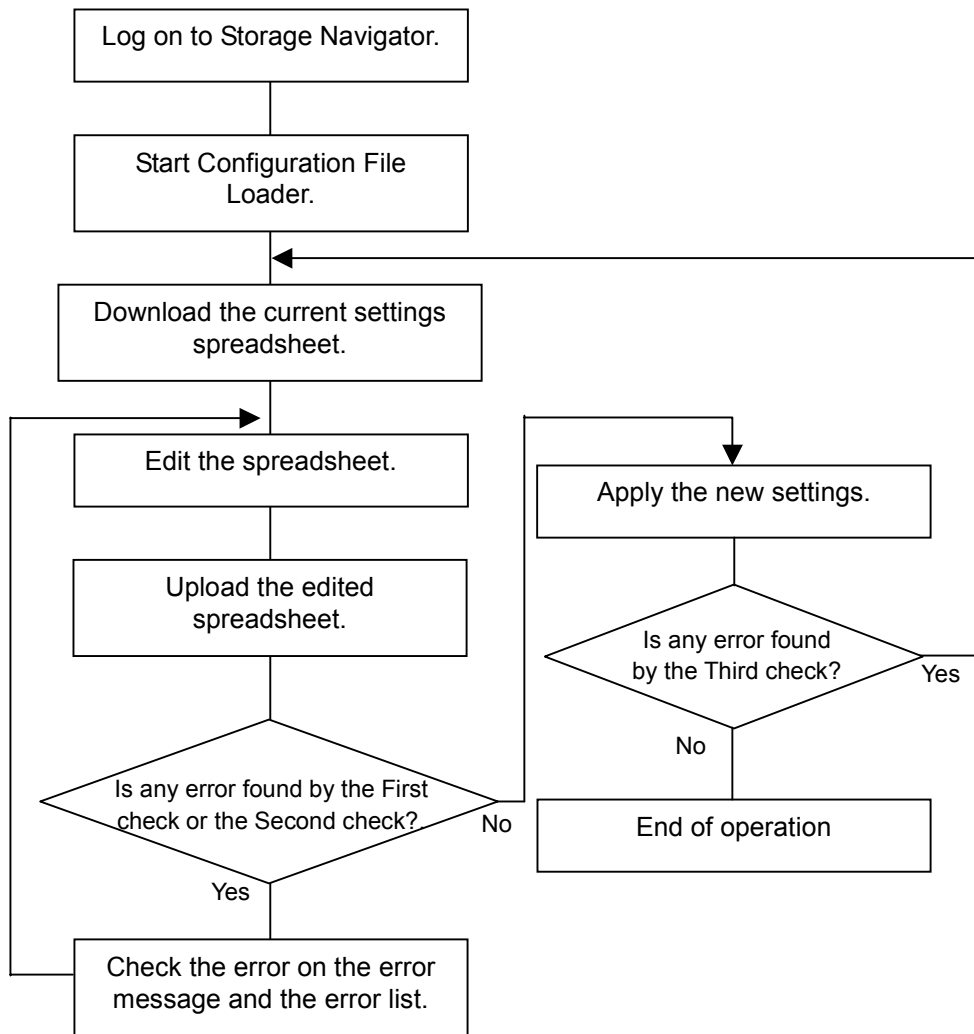


Figure 6.1 Configuration File Loader Operation Flow Chart

6.2 Downloading Java™ Web Start

In order to upload and download a spreadsheet file, you need to install Java™ Web Start™ on the Storage Navigator computer. If you try to start Configuration File Loader without first installing Java Web Start on the Storage Navigator computer, you will see an error message (see Figure 6.2). Select **Yes** to open another web browser, which will display a link that allows you to download Java™ Web Start (see Figure 6.3). **Note:** The Storage Navigator computer must be connected to the Internet in order to complete the download. Follow the instructions on the site to download Java™ Web Start.

When you close the Java™ Web Start download site information panel, a message is displayed telling you to re-start your management session (see Figure 6.4). When you select **OK**, you will need to exit and re-log in to Storage Navigator.

The first time you download a spreadsheet file, you will see a message asking if you want to install and run Configuration File Loader (see Figure 6.5). Select **Start** to continue.

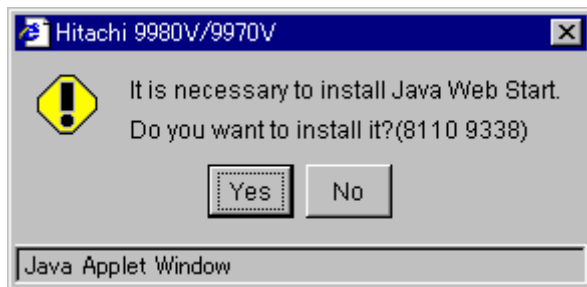


Figure 6.2 Java™ Web Start Error Message (Java™ Web Start Required)

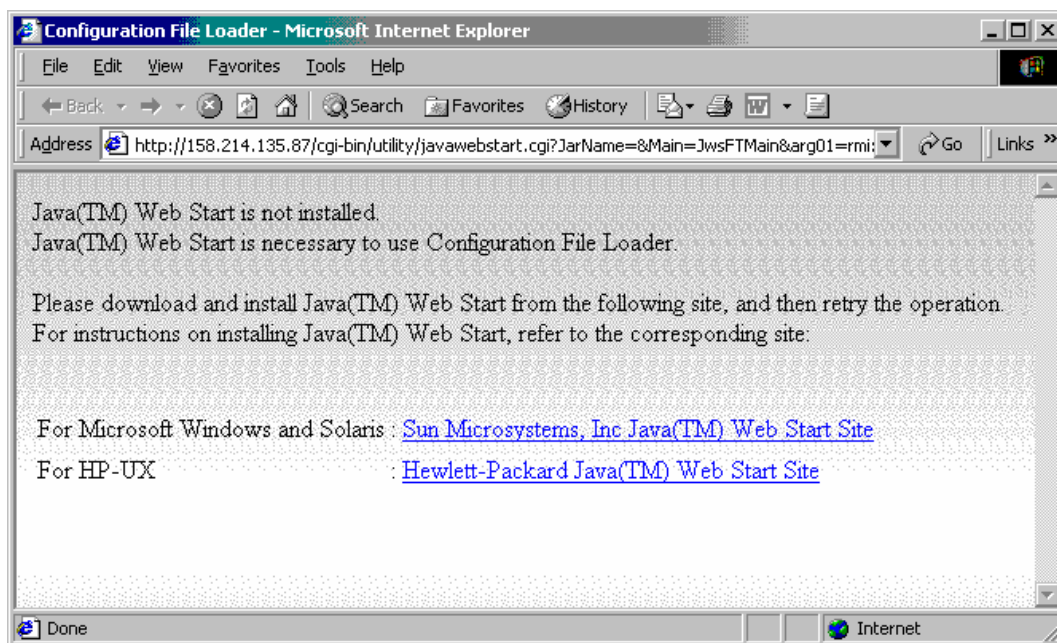


Figure 6.3 Java™ Web Start Download Information

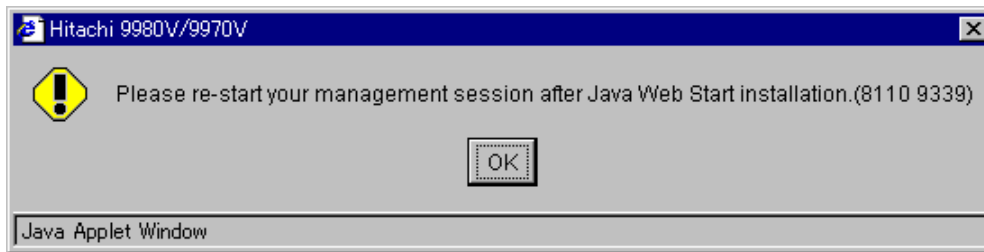


Figure 6.4 Reminder Message (Re-Start Storage Navigator)

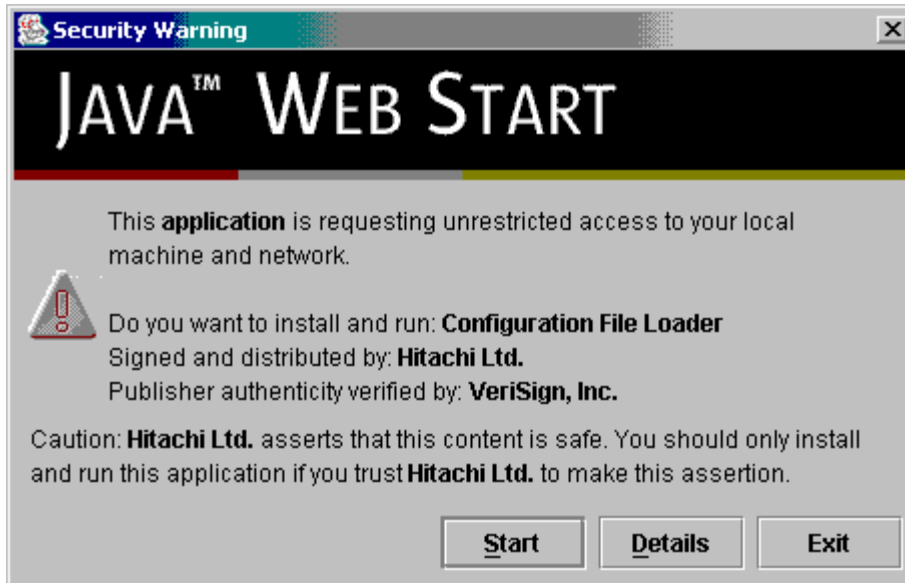


Figure 6.5 Java™ Web Start Opening Message

6.3 General Spreadsheet Conventions

6.3.1 Spreadsheet File Requirements

You will need to write the spreadsheet according to specific rules and in a specific format. Figure 6.6 shows an example of a spreadsheet.

Declaration											
#Version 03_00_01, LUN, Change											
[Port]											
#Port	Switch	AL-PA	Fabric	Conn	Speed						
1A	OFF	EF	OFF	FC-A	Auto	1A	ON	EF	OFF	FC-AL	Auto
[CHA]											
#CHA	PCB					#CHA	PCB				
CHA-1	HighSpeed					CHA-1	Standard				
[Host Group]											
#Port	Grp ID	Name	Host			#Port	Grp ID	Name	Host		
			Mode						Mode		
1A	00	Grp00	01			1A	00	Grp00	00		
1A	01	Grp01	00			1A	01	Grp01	01		
1A	02	Grp02	00								
[WWN]											
#Port	Grp ID	WWN	Name			#Port	Grp ID	WWN	Name		
1A	00	00000000	AA_2								
		00000001									
[LUN]											
#Port	Grp ID	LUN#	CU#	LD EV#		#Port	Grp ID	LUN#	CU#	LD EV#	

Current Configuration Definition (including a blank column) New Configuration Definition (user settings)

Figure 6.6 Sample Spreadsheet

All of the formatting requirements in Table 6.1 must be satisfied.

Table 6.1 Spreadsheet File Formatting Requirements

Item	Requirements
File type	Text file
File name	Extension must be ".spd". Maximum number of letters for the file name is 32 including the extension. The following symbols cannot be used for the file name: \ / : , ; * ? " < > and space. File path must be under 255 letters.
Maximum number of rows in a spreadsheet	70,000 rows
End-of-line character	Linefeed code must be put in the end of each row.
Maximum number of letters in a row	Maximum number of letters in a row is 128 bytes, including the linefeed code at the end.
Case-sensitivity	Settings are not case-sensitive, except for WWN and host group.
Format (for more information on the required format, see section 6.4)	The following parameters should be written in hexadecimal numbers: Host group (host storage domain) ID, host mode, LUN, CU, LDEV. Tab codes and a series of spaces before or after comma are ignored.

6.3.2 Spreadsheet Components

The spreadsheet consists of the following components:

- Spreadsheet Declaration (see section 6.3.2.1)
- Function tags (see section 6.3.2.2)
- Configuration definition(s) (see section 6.3.2.3)
- Comments (see section 6.3.2.4)

6.3.2.1 Spreadsheet Declaration

The spreadsheet declaration is required, and is written at the beginning of the spreadsheet. Certain parts of the declaration will have already been written in the downloaded current spreadsheet. If the declaration line is incorrect, an error occurs and the spreadsheet file will be rejected.

Note: The spreadsheet declaration line is **not** case-sensitive.

- Format (variables are shown in *italics*):
`#!Version Version number,Program Product,Process mode`
- **Example:**
`#!Version 03_02_00,LUN,Change`

Table 6.2 describes the spreadsheet declaration components.

Table 6.2 Spreadsheet Declaration Components

Component	Description
#!	Indicates the declaration line. Cannot be changed.
Version	Indicates that the Remote Method Invocation (RMI) version number follows. Cannot be changed.
(One byte space)	Required between the version and the version number.
Version number	RMI version number.
, (comma with no spaces)	Follows the RMI version number
Program Product	Indicates the required program product. LUN indicates LUN Manager.
, (comma with no spaces)	Follows the program product
Process mode	Indicates the required process mode. The only mode that is currently available is Change , which indicates adding, changing, or deleting. When the downloaded spreadsheet file is opened, the process mode is not yet stated.

6.3.2.2 Function Tags

Before you write the settings, you need to state the function of the parameter. This is called a **function tag**, which is formatted as a string that is in brackets ([]). The type and order of the function tag are determined by the program product. Function tags have the following characteristics:

- At least one function tag is required in a spreadsheet.
- The function tag must be written at the very beginning of the row.
- If a function tag is already on the current spreadsheet and does not need to be changed, it must be deleted from the new spreadsheet so it is not processed. If the function tag remains in the spreadsheet, and no new settings for the tag are written, the settings are processed as deleted. {Port}, {CHA} and [LDEV] tags do not support a delete operation, so if no new setting is written for these functions an error occurs.
- Any other comments and settings written in the same row as the function tag are ignored.
- The row after the function tag indicates the required setting items (CHA and PCB Mode in the example) for the function. The setting items are separated by commas.

– **Example:**

```
[CHA]
#CHA,PCB Mode
```

- The existing settings for the function are written. The existing settings row, which starts with “#\$”, is recognized as a comment row.

Caution: The settings in the rows that start with “#\$” are not allowed to change.

– **Example:**

```
[LUN]
#Port,HostGroup,LUN,CU,LDEV (items to be changed)
#$1C,0,1,1,1 (existing settings row)
```

- An example of the declaration and the function tag is as follows.

```
#!/Version 03_00_02,LUN,Change
[Port]
[CHA]
[HostGroup]
[WWN]
[LUN]
[LDEV]
```

6.3.2.3 Configuration Definitions

There are three types of configuration definitions: adding new settings, deleting current settings, and changing current settings.

- **Adding new settings.** You can add new settings if the current settings area of the spreadsheet is blank (see Figure 6.8).
- **Deleting current settings.** You can delete existing current settings by making the new settings area blank.
- **Changing current settings.** You can change existing current settings by writing a different setting in the new settings area. The format of the existing setting and the new settings must be the same

The configuration definition consists of the index and the parameter (see Figure 6.7). The index is fixed for each function tag, so it must be the same for both the current settings and the new settings. By modifying the settings in the parameter, you can add, delete, or change the settings.

You can write the configuration definition either between a function tag and another function tag, or between a function tag and the end of the file. A configuration definition allows you to set the parameters (adding, deleting, or changing) for the subsystem. A row of configuration definitions can be divided into the current settings area, a blank column, and the new settings area.

Configuration definition settings must comply with the following:

- The current settings area and the new settings area must be in exactly the same format, with a blank column in between.
- The maximum number of columns for the settings depends on the program product, and is stated in the declaration row.
- The number of the available columns for each function tag depends on the number of parameters that can be set for each function and on the version of the spreadsheet.
- When the current spreadsheet file is downloaded, the new settings area is left blank. All of the columns should be separated by commas.
- You may not change the indexes, and all of the specified index settings indexes must match the actual settings.
- Do not write the identical index more than once in the same function tag.
- If you want to change some but not all of the settings on the same function tag, for those settings that you don't want to change you need to copy and paste the current settings to the new settings area. Otherwise, those settings will be processed as deleted.

6.3.2.4 Comments

You can also type comment rows in the spreadsheet by beginning a row with the # character. The comment row can consist of any characters in any language. A row that includes only a linefeed code is also recognized as a comment row.

■ **Example:**

```
# (comment)
# Change CHA settings (comment)
[CHA](function tag)
# CHA,PCB Mode (comment)
# (linefeed)
# (linefeed)
CHA-1P,Standard (indicating changes)
CHA-1Q,Standard (indicating changes)
```

6.3.2.5 New Settings Can Affect Other Settings

As a general rule, the settings are applied to the subsystem one at a time, in the order they appear in the spreadsheet. This means that the settings of the prior function tags can affect the following function tags. For example, if you were to delete a host group in the [HostGroup] tag, the path settings related to the deleted host group would also be automatically deleted. If you then write the new settings for the automatically deleted path in the [LUN] tag or the [WWN] tag, an error would occur.

6.4 LUN Manager Spreadsheet Settings

The following LUN Manager functions can be defined by using Configuration File Loader:

- **Port Settings** allow you to change the settings for arbitrated loop-physical address (AL-PA), data transfer speed (host speed), and topology. You can also change the LUN Security setting. See section 6.4.2.
- **Channel Adapter (CHA) settings** allow you to change the PCB mode. See section 6.4.3.
- **Host Group Settings** allow you to create, delete, or change the host group. See section 6.4.4.
- **WWN settings** allow you to add, delete or change the WWN information. See section 6.4.4.
- **LU path settings** allow you to add, delete, or change LU paths. See section 6.4.6.
- **Command Device settings** and set or release the command device and command device security. See section 6.4.7.

6.4.1 Column Format

The LUN Manager spreadsheet allows you to write the settings for port, CHA mode, host group, WWN, path definition, and command devices. The format of the LUN Manager spreadsheet is as follows:

- 1st column to 6th column: Current settings area
- 7th column: Blank column
- 8th column to 13th column: New settings area

The number of columns used depends on the function tag. If a particular function tag requires less than six columns, the unused columns are left blank.

Table 6.3 describes the format of the LUN Manager spreadsheet.

Table 6.3 LUN Manager Spreadsheet Format

	Function Tag					
Column	[Port]	[CHA]	[HostGroup]	[WWN]	[LUN]	[LDEV]
1st	Port	CHA	Port	Port	Port	CU
2nd	Security Switch	PCB Mode	Group ID	Group ID	Group ID	LDEV
3rd	AL-PA	Blank	Name	WWN	LUN	Command Device
4th	Fabric		Host mode	Name	CU	Command Device Security
5th	Connection		Blank	Blank	LDEV	Blank
6th	Channel speed				Blank	
7th	Blank					
8th	Port	CHA	Port	Port	Port	CU
9th	Security Switch	PCB Mode	Group ID	Group ID	Group ID	LDEV
10th	AL-PA	Blank	Name	WWN	LUN	Command Device
11th	Fabric		Host mode	Name	CU	Command Device Security
12th	Connection		Blank	Blank	LDEV	Blank
13th	Channel speed				Blank	

Note: When the LUN Manager spreadsheet is downloaded, the settings are written up to the 7th column (blank column).

For detailed information on LUN Manager, including the available values and the relationships between each function, please refer to the *Hitachi Lightning 9900™ V Series LUN Manager User's Guide* (MK-92RD105). LUN Manager spreadsheets must conform to those parameters.

6.4.2 Port Settings

The [Port] tag allows you to set the port information and the change the security switch (LUN security) to ON or OFF. You can change the [Port] tag definitions, but may not add or delete them.

Table 6.4 lists the items and values available for the [Port] tag.

Table 6.4 Available [Port] Tag Configuration Values

Column	Item	Available Value
1st, 8th (Index)	Port	Set one of the following: 1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1J, 1K, 1L, 1M, 1N, 1P, 1Q, 1R, 2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2J, 2K, 2L, 2M, 2N, 2P, 2Q, 2R, 3A, 3B, 3C, 3D, 3E, 3F, 3G, 3H, 3J, 3K, 3L, 3M, 3N, 3P, 3Q, 3R, 4A, 4B, 4C, 4D, 4E, 4F, 4G, 4H, 4J, 4K, 4L, 4M, 4N, 4P, 4Q, 4R,
2nd, 9th	Security Switch (LUN Security)	ON or OFF
3rd, 10th	AL-PA	Set with hexadecimal numbers in two digits.
4th, 11th	Fabric	ON or OFF
5th, 12th	Connection	FC-AL or P to P
6th, 13th	Channel Speed	Set one of the following: 1, 2, or Auto

Note: When you change the port settings, you may not change the PCB mode if it is either High Speed or High Speed (2 Port). Attempting to do so will cause an error.

If LUN security is set to OFF, there are restrictions on certain operations, as described in Table 6.5.

Table 6.5 Operations Affected By LUN Security Status

Function Type	Operation	LUN Security Status			
		ON → OFF	ON → ON	OFF → ON	OFF → OFF
Host group	Adding	Yes	Yes	Yes	No
	Changing the name	Yes	Yes	Yes	No
	Changing the host mode	Yes	Yes	Yes	No
	Changing the host mode for Group 00	Yes	Yes	Yes	Yes
	Deleting	Yes	Yes	Yes	Yes
	Deleting the settings for Group 00 Note	Yes	Yes	Yes	Yes
WWN	Adding	Yes	Yes	Yes	No
	Changing	Yes	Yes	Yes	No
	Deleting	Yes	Yes	Yes	Yes
LUN	Adding	Yes	Yes	Yes	No
	Changing	Yes	Yes	Yes	No
	Deleting	Yes	Yes	Yes	Yes

Note: If WWN and LU path definition under the Group 00 are deleted, the host mode becomes 00 and the group name is changed to the default, which is the “port name-host group number”.

6.4.3 Setting the CHA Mode

The [CHA] tag allows you to set the channel adapter mode. The [CHA] tag is available only for changing settings. You cannot add or delete the settings with the [CHA] tag definitions. Mainframe settings are not written on the downloaded spreadsheet.

Table 6.6 lists the available configuration definitions for the [CHA] tag.

Table 6.6 Available Configuration Values for the [CHA] Tag

Column	Item	Available Values
1st, 8th (Index)	CHA	The available values are different between the MC subsystem and the SC subsystem. One of the following can be set: - For MC subsystem: CHA-1P, CHA-1Q, CHA-1R, CHA-1S, CHA-2V, CHA-2W, CHA-2X, CHA-2Y - For SC subsystem: CHA-1C, CHA-1D, CHA-1F, CHA-2G, CHA-2J, CHA-2K
2nd, 9th	PCB Mode	One of the following can be set: -Standard: Standard mode -High Speed: High Speed mode -High Speed 2: High Speed (2 port) mode
3rd—6th, 10th—13th	Blank	

6.4.4 Setting the Host Group

The [HostGroup] tag allows you to add, delete, or change the host group information. The following parameters apply:

- You can delete the settings for host group 0 (zero), but the host group itself cannot be deleted. If you delete all the settings for host group 0, the settings revert to the default settings.
- When you delete a host group, the WWN and path definition of that host group are automatically deleted. Therefore, if you write the settings for a host group that is deleted in the [LUN] tag or [WWN] tag, an error occurs.
- When you want to add or change the host group, the security switch of the related port must be **ON**. If the security switch is **OFF**, you need to set the security switch **ON** in the [Port] tag. However, you can change the host mode of the host group 0, even if the security switch of the port is **OFF**.

Table 6.7 lists the items and values available for the [HostGroup] tag.

Table 6.7 Available Configuration Values for the [HostGroup] Tag

Column	Item	Available Values
1st, 8th (Index)	Port	One of the following can be set: 1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1J, 1K, 1L, 1M, 1N, 1P, 1Q, 1R, 2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2J, 2K, 2L, 2M, 2N, 2P, 2Q, 2R, 3A, 3B, 3C, 3D, 3E, 3F, 3G, 3H, 3J, 3K, 3L, 3M, 3N, 3P, 3Q, 3R, 4A, 4B, 4C, 4D, 4E, 4F, 4G, 4H, 4J, 4K, 4L, 4M, 4N, 4P, 4Q, 4R
2nd, 9th (Index)	Group ID	00 - 7F. Set with hexadecimal numbers in two digits.
3rd, 10th	Group Name	Up to eight ASCII characters (letters, numerals, and symbols). The setting is case-sensitive.
4th, 11th	Host Mode	00 - 1F
5th, 6th, 12th, 13th	Blank	

6.4.5 Setting the WWN Information

The [WWN] tag allows you to add, delete, or change the WWN information. Table 6.8 lists the items and values available for the [WWN] tag.

Table 6.8 Available Configuration Values for the [WWN] Tag

Column	Item	Available Values
1st, 8th (Index)	Port	One of the following can be set: 1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1J, 1K, 1L, 1M, 1N, 1P, 1Q, 1R, 2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2J, 2K, 2L, 2M, 2N, 2P, 2Q, 2R, 3A, 3B, 3C, 3D, 3E, 3F, 3G, 3H, 3J, 3K, 3L, 3M, 3N, 3P, 3Q, 3R, 4A, 4B, 4C, 4D, 4E, 4F, 4G, 4H, 4J, 4K, 4L, 4M, 4N, 4P, 4Q, 4R
2nd, 9th (Index)	Group ID	00 - 7F. Set with hexadecimal numbers in two digits.
3rd, 10th	WWN	Set with hexadecimal numbers in 16 digits.
4th, 11th	Name	Up to eight ASCII characters (letters, numerals, and symbols). The setting is case-sensitive.
5th, 6th, 12th, 13th	Blank	

6.4.6 Setting the LU Path

The [LUN] tag allows you to set the LU path definition and add, delete, or change LU paths.

Table 6.9 lists the items and values available for the [LUN] tag.

Table 6.9 Available Configuration Values for the [LUN] Tag

Column	Item	Available Values
1st, 8th (Index)	Port	One of the following can be set: 1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1J, 1K, 1L, 1M, 1N, 1P, 1Q, 1R, 2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 2J, 2K, 2L, 2M, 2N, 2P, 2Q, 2R, 3A, 3B, 3C, 3D, 3E, 3F, 3G, 3H, 3J, 3K, 3L, 3M, 3N, 3P, 3Q, 3R, 4A, 4B, 4C, 4D, 4E, 4F, 4G, 4H, 4J, 4K, 4L, 4M, 4N, 4P, 4Q, 4R
2nd, 9th (Index)	Group ID	00 - F. Use two-digit hexadecimal numbers.
3rd, 10th (Index)	LUN #	00 - FF. Use two-digit hexadecimal numbers.
4th, 11th	Control Unit (CU) #	00 - 1F. Use two-digit hexadecimal numbers.
5th, 12th	LDEV #	00 - FF. Use two-digit hexadecimal numbers.
6th, 13th	Blank	

6.4.7 Configuring the Command Devices

The [LDEV] tag allows you to change the command device settings. You cannot add or delete command device settings with the [LDEV] tag definitions.

Note: When the command device (Cmd .Dev) is **OFF**, and the command device security (Cmd. Sec) is **ON**, an error occurs.

Note: You can set the command device **OFF**, regardless of the existence of the LU path.

Table 6.10 lists the values available for the [LDEV] tag.

Table 6.10 Available Configuration Values for the [LDEV] Tag

Column	Item	Available Value
1st, 8th (Index)	CU #	00 - 1F. Set with hexadecimal numbers in two digits.
2nd, 9th (Index)	LDEV #	00 - FF. Set with hexadecimal numbers in two digits.
3rd, 10th	Cmd. Dev (Command Device)	ON or OFF
4th, 11th	Cmd. Sec (Command Device Security)	ON or OFF
5th, 6th, 12th, 13th	Blank	

6.5 Configuration File Loader Operations

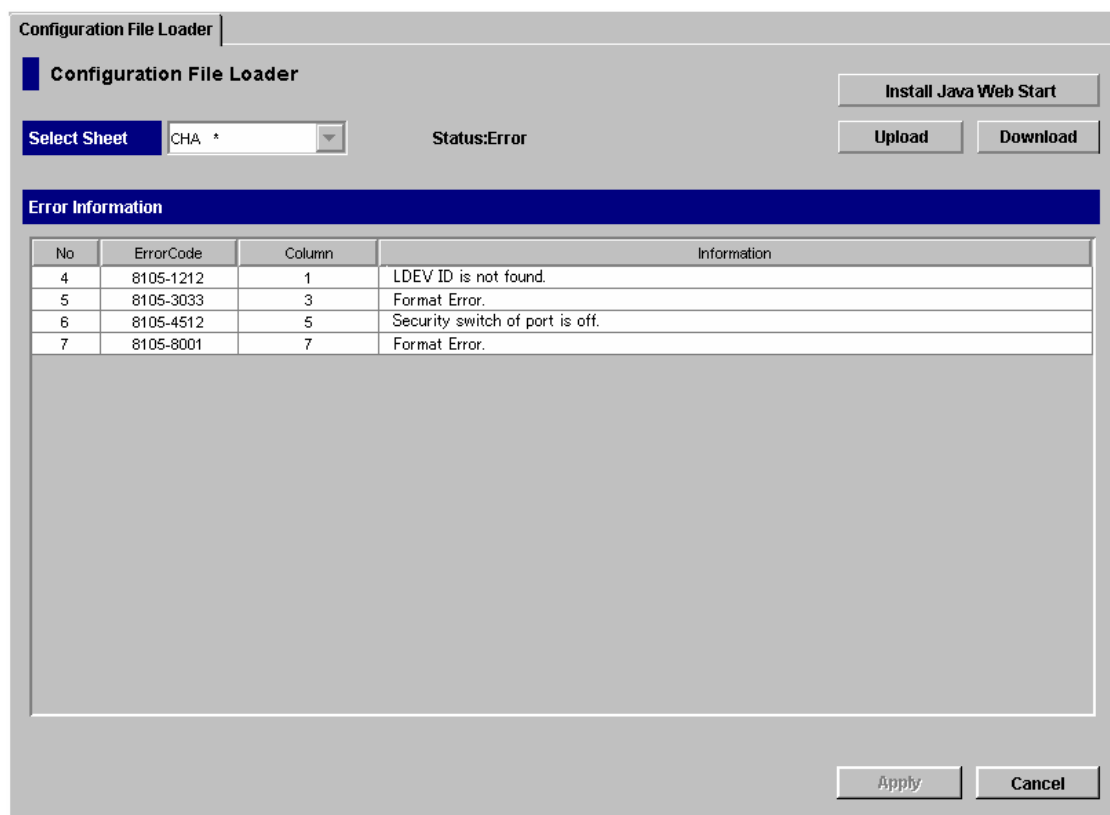
6.5.1 The Configuration File Loader Panel

The **Configuration File Loader** panel (see Figure 6.9) opens when you start Configuration File Loader. From this panel, you can download a spreadsheet file with the current configuration information, and upload a file in with the new configuration. You can also see the status and the error information of the uploaded file before you apply the changes.

Note: If you use Mozilla™ as your web browser, you will need to install Java Web Start®. The following message will display when you start Configuration File Loader:

Attention: If Java™ Web Start is not installed, the [Upload] and [Download] buttons do nothing. To install Java™ Web Start, please refer to the Configuration File Loader User's Guide.

For instructions on installing Java™ Web start, refer to section 6.2. To open the Configuration File Loader panel, select the Configuration File Loader icon () on the Storage Navigator main panel (refer to Figure 3.1). **Note:** The option buttons (along the left side of the panel) and the subsystem information icons (in the top right corner of the panel) have been omitted from the screen shot.



No	ErrorCode	Column	Information
4	8105-1212	1	LDEV ID is not found.
5	8105-3033	3	Format Error.
6	8105-4512	5	Security switch of port is off.
7	8105-8001	7	Format Error.

Figure 6.9 Configuration File Loader Panel

The **Configuration File Loader** panel has the following features:

- The **Select Sheet** drop-down box is available after you have uploaded a spreadsheet, and allows you to select the function that you want to display. An asterisk (*) is displayed after one or more of the function items that has an error. The available functions are as follows:
 - Port
 - CHA
 - HostGroup
 - WWN
 - LUN
 - Logical device (LDEV)

Note: Function items not stated in the spreadsheet will not be listed.

- The **Status** field displays whether or not there is an error in the uploaded spreadsheet. If there are no errors, the **Apply** button becomes available. The available status conditions are:
 - Error
 - Ready
- The **Install Java Web Start** button is displayed if you use Mozilla™ as your web browser. When you select the Install Java Web Start button, information panel for Java Web Start Download Site is displayed. Refer to section 6.2 for instructions on installing Java Web Start™.
- The **Upload** button allows you to upload the edited spreadsheet file. For instructions on uploading the spreadsheet file, see section 6.5.2.3. **Note:** If you use the Mozilla™ web browser, the Download Manager panel may display when you select the **Upload** button. If this occurs, close the Download Manager panel and continue the operation.
- The **Download** button allows you to download the current spreadsheet file. For instructions on downloading the spreadsheet file, see section 6.5.2.1. **Note:** If you use the Mozilla™ web browser, the Download Manager panel may display when you select the **Download** button. If this occurs, close the Download Manager panel and continue the operation.

- The **Error Information** table is displayed when the uploaded spreadsheet has errors. Use the **Select Sheet** drop-down box to display the error information on a specific function. The information displayed is as follows:
 - **No.:** The row number that includes the error
 - **Error Code:** The part code and error number, e.g., 8105 (part code) - 1212 (error number)
 - **Column:** The column number that includes the error. When the error column cannot be specified, “-” is displayed.
 - **Information:** The error message. Please refer to the 9900V document *Hitachi Lightning 9900™ V Series Remote Console Error Codes (MK-92RD132)* for the error codes and error messages displayed on the list.
- The **Apply** button becomes available only when a spreadsheet without detected errors is uploaded, and implements the settings in the uploaded spreadsheet.
- The **Cancel** button cancels the settings and returns you to the original status of the **Configuration File Loader** tab.

6.5.2 Using Configuration File Loader

6.5.2.1 Downloading a Spreadsheet

Note: If Java™ Web Start is not installed on your Storage Navigator computer, you will need to install it before using Configuration File Loader. Refer to section 6.2 for instructions.

1. Log on to the Storage Navigator computer and change to **Modify** mode (refer to section 2.5 if you need instructions).
2. Select the **Configuration File Loader** button () to open the Configuration File Loader main panel (refer to Figure 6.9).

3. Select the **Download** button to open the Download panel.

Note: When you download the spreadsheet file for the first time, a message panel indicating that the process uses the Java™ Web Start is displayed (refer to Figure 6.5). Select the **Start** button to open the Download panel (see Figure 6.10).

Note: If you use the Mozilla™ web browser, the Download Manager panel may display when you select the **Download** button. If this occurs, close the Download Manager panel and continue the operation.

4. You can either enter the name of the spreadsheet directory directly in the **File Name on Client** box, or you can select the **Reference** button to open the Save panel (see Figure 6.11), which allows you to select the directory for the spreadsheet file. The following rules apply for the file name:
 - The file extension must be “.spd”.
 - The maximum number of characters including the extension is 32.
 - The following symbols cannot be used for the file name:
 \ / : , ; * ? “ < > | and space.
 - The file path must be under 255 letters.
5. Once you have specified the directory and file name, select the **Save** button to close the Save panel and return to the Download panel. The specified directory is displayed in the **File Name on Client** box and the **Download** button becomes available.
6. Select the **Download** button to download the spreadsheet file and close the Download panel.
7. If you want to cancel the downloading operation, select the **Exit** button on the Download panel.
8. After you have downloaded the spreadsheet file, you can log off from Storage Navigator if you want, but it is not required.

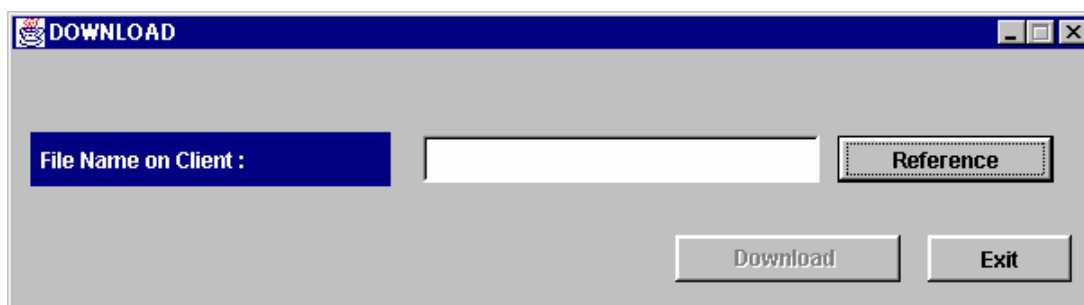


Figure 6.10 Download Panel

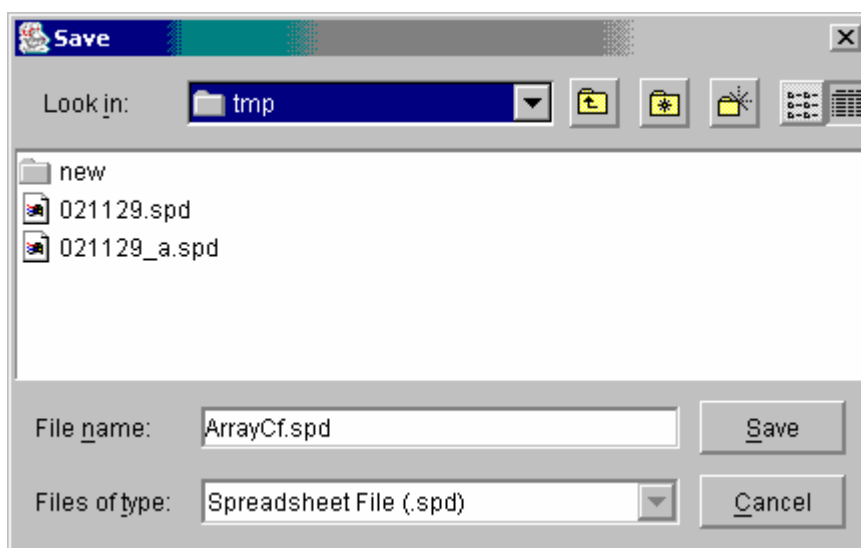


Figure 6.11 Save Panel

6.5.2.2 Editing the Spreadsheet

Note: These instructions assume the use of Microsoft® Excel 2000. If you use a different spreadsheet software, all values must be displayed in text format.

1. Launch Microsoft® Excel 2000 and open the downloaded spreadsheet.
2. The Text Import Wizard Panel 1 opens (see Figure 6.12).
3. Set your chosen parameters, and then select **Next** to continue. The Text Import Wizard Panel 2 (see Figure 6.13) opens.
4. Set your chosen parameters, and then select **Next** to continue. The Text Import Wizard Panel 3 (see Figure 6.14) opens. Set your chosen parameters, and then select **Finish**. The spreadsheet will open with all the values in the text format.
5. Edit the spreadsheet in accordance with the allowable parameters. Refer to sections 6.3 and 6.4 for details.
6. Once you have edited the spreadsheet, you need to save and close the file. Enclose the file name within quotation marks, with an **.spd** extension. Select **CSV (comma delimited) (*.csv)** in the **Save as type** drop-down box, then save the file. See Figure 6.15 for an example.

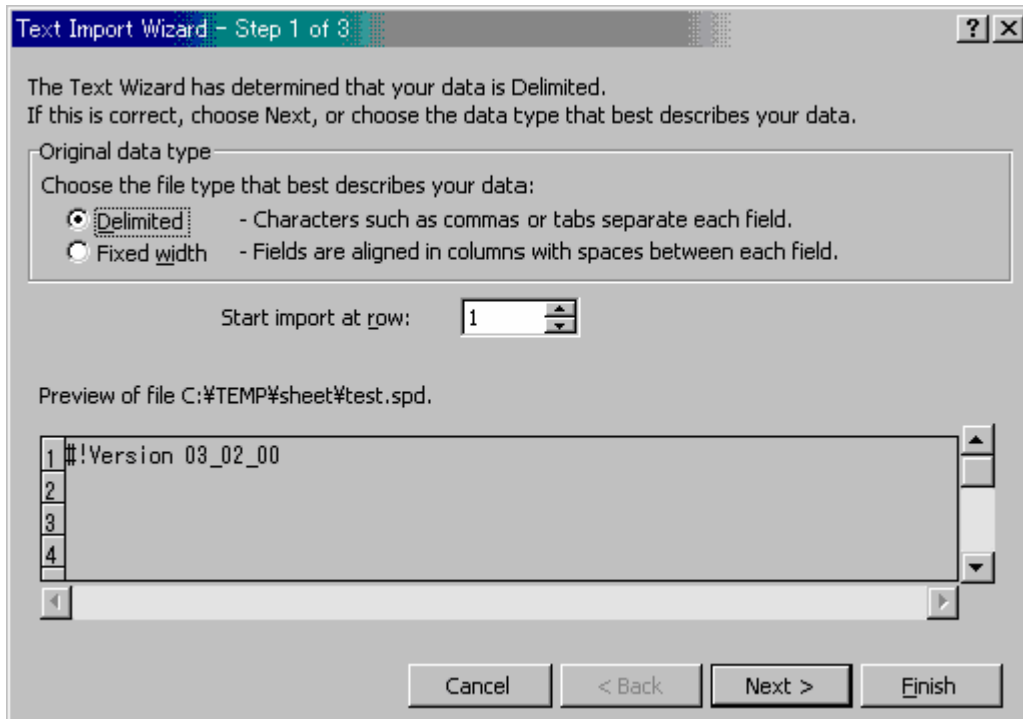


Figure 6.12 Text Import Wizard Panel 1

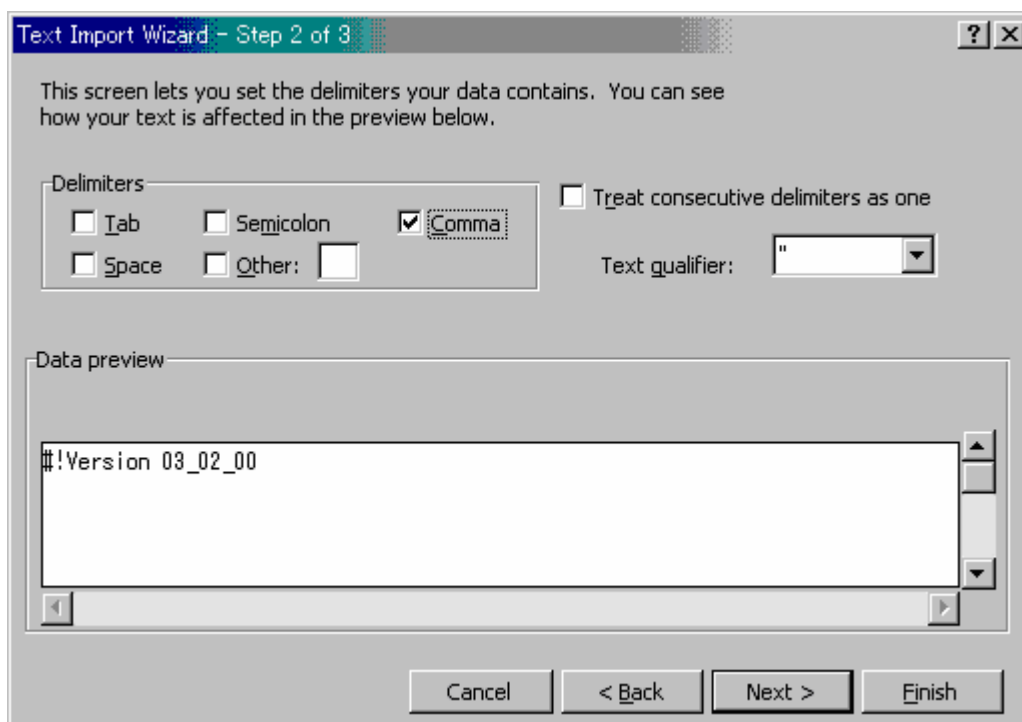


Figure 6.13 Text Import Wizard Panel 2

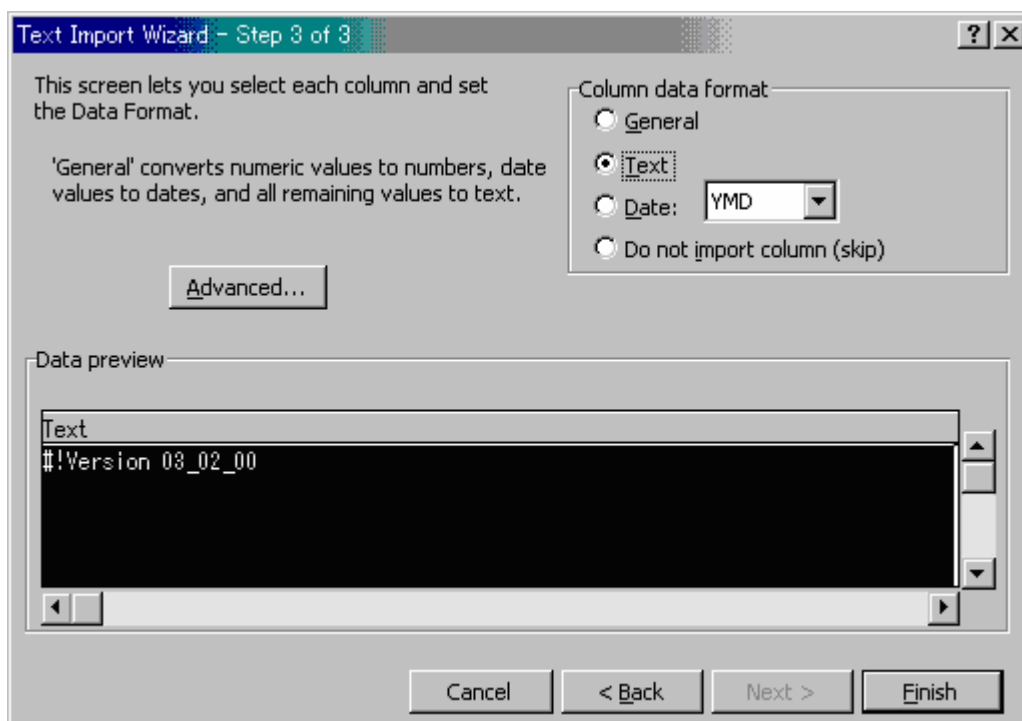


Figure 6.14 Text Import Wizard Panel 3

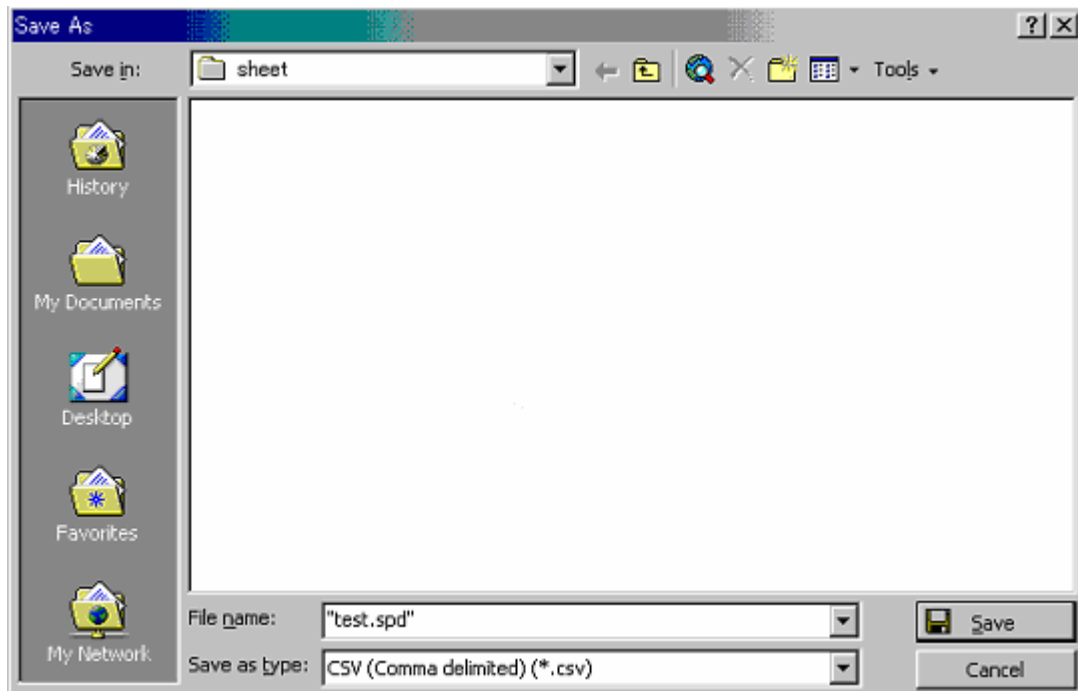


Figure 6.15 Save As Panel

6.5.2.3 Uploading the Spreadsheet

After you have edited the spreadsheet, you will upload the spreadsheet file. The **Upload** button allows you to upload the edited spreadsheet file.

To upload the spreadsheet file:

1. From the Configuration File Loader tab, select the **Upload** button to open the Upload panel (see Figure 6.16). **Note:** If you use the Mozilla™ web browser, the Download Manager panel may display when you select the **Upload** button. If this occurs, close the Download Manager panel and continue the operation.
2. On the **Upload** panel, assign the CSV format to the spreadsheet file that you want to upload (the file extension must be “.spd”). You can either enter the spreadsheet file name directly in the **File Name on Client** box, or you can select the **Reference** button to access the Open panel (see Figure 6.17). The same naming conventions apply as for downloading the file.
3. If you have elected to use the Open panel, specify the spreadsheet file to upload, then select the **Open** button to close the Open panel and return to the Upload panel.
4. On the Upload panel, the directory of the specified spreadsheet file is displayed in the **File Name on Client** box and the **Upload** button becomes available.
5. Select the **Upload** button to upload the spreadsheet file and close the panel.
6. If you want to cancel the uploading operation, select the **Exit** button on the Upload panel.

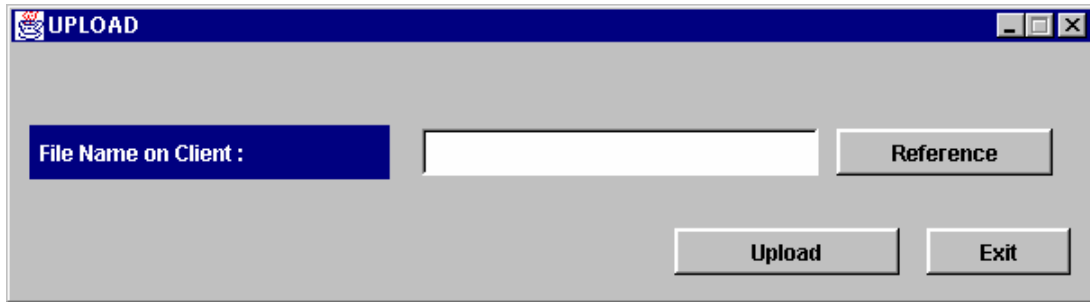


Figure 6.16 Upload Panel

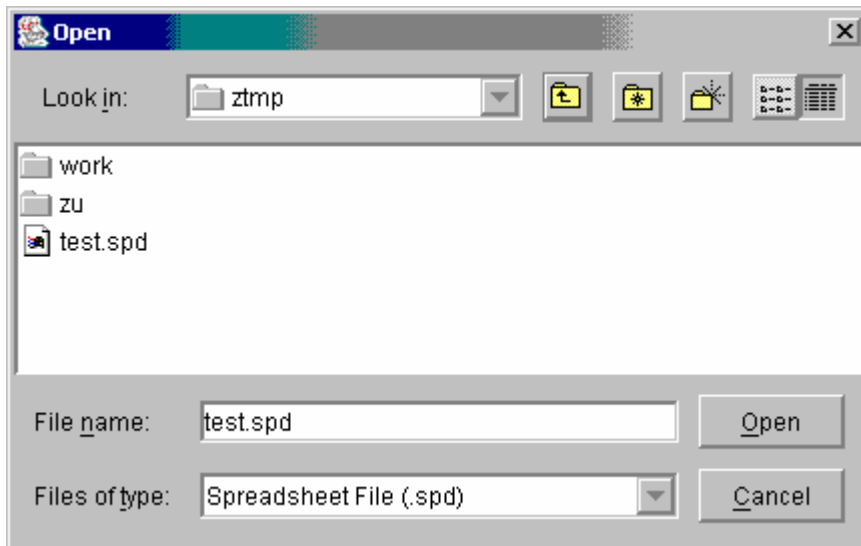


Figure 6.17 Open Panel

6.5.2.4 First Error Check

The first error check is performed when the spreadsheet file is uploaded. The first error check verifies that the spreadsheet is properly formatted. If there is an error, the spreadsheet is rejected, and an error message is displayed. Errors detected at this level include the following:

- The first row of the spreadsheet (the declaration line) is not correctly written, or the stated program product is not installed. For more information on the declaration line, refer to section 6.3.2.1.
- The spreadsheet file is not in text file format (the file is a binary file).
- There is no function tag in the spreadsheet. For more information on the function tag, refer to section 6.3.2.2.
- The file name is incorrect (e.g., the extension is not “.spd”, or the file name exceeds the maximum number of letters).
- The number of letters in a row exceeds 128.
- The number of rows in a spreadsheet exceeds 70,000.

If the spreadsheet includes errors, either an error message is displayed or error information is listed in the **Error Information** list. Revise the spreadsheet according to the error messages, and then upload the corrected spreadsheet file.

6.5.2.5 Second Error Check

In the second check, the spreadsheet settings are verified. Any errors found are displayed on the **Error Information** list. This second check is performed before the **Apply** button becomes available. Figure 6.18 shows the flow of the second check.

The second error check is performed only when no error is found by the first error check. The current settings are compared to the uploaded settings and checked for logical consistency. Note that certain errors can only be detected by the third check. Errors detected at the second level include the following:

- A function tag is not supported.
- A setting value is incorrect or omitted.
- The setting range is incorrect. The correct ranges are as follows:
 - CU: 00 - 1F
 - LDEV: 00 - FF
 - LUN: 00 - FF
 - Group ID: 00 - 7F
 - Host Mode: 00 - 1F

When you upload a spreadsheet with no errors detected, the panel displays **Ready** above the error information list, and the **Apply** button becomes available.

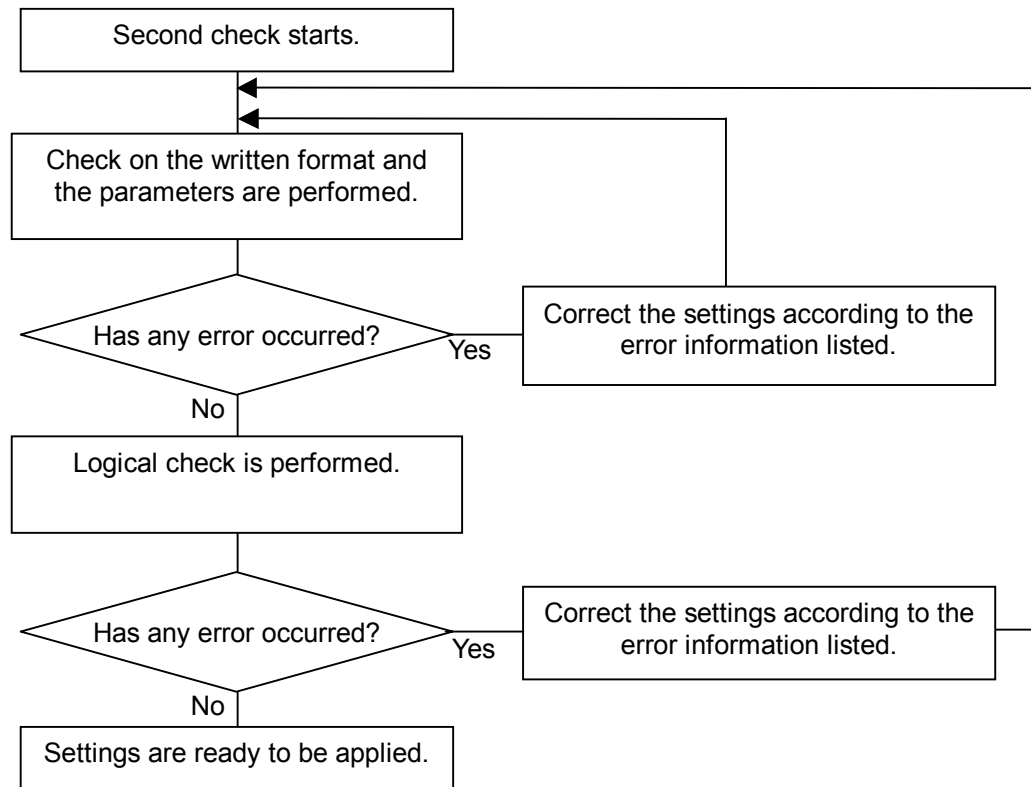


Figure 6.18 Second Error Check Flow Chart

6.5.2.6 Third Error Check

The third check is performed after the **Apply** button is selected. Errors detected at this level include the following:

- There is no difference between the current configuration definition and the configuration definition on the uploaded spreadsheet. The spreadsheet is accepted, but no operation will be performed.
- The [Port] tag is on the spreadsheet, but the [CHA] tag is not, and the new port settings and the current PCB mode settings of the [CHA] tag do not match.
- The [CHA] settings are not stated on the spreadsheet, so the error cannot be detected at the second check.
- You are trying to delete a LUN that is needed to process input/output (I/Os).

6.5.2.7 Implementing the Changes

If no errors are found on the third error check, the settings in the spreadsheet are applied to the subsystem.

Chapter 7 Troubleshooting

7.1 Troubleshooting

- For troubleshooting information on the 9900V subsystem, please refer to the *Hitachi Lightning 9900™ V Series User and Reference Guide* (MK-92RD100).
- For information on the 9900V Storage Navigator software error codes, please refer to the *Hitachi Lightning 9900™ V Series Hitachi Remote Console - Storage Navigator Error Codes* (MK-92RD132).
- See Table 7.1 for general error conditions.
- See Table 7.2 for notes on UNIX® operations.

The user is responsible for the operation and normal maintenance of the computer(s) that host the 9900V Storage Navigator software. Here are some guidelines for troubleshooting 9900V Storage Navigator software operations:

- **Check the cabling and the LAN.** Verify that both the computer and LAN cabling are firmly attached, and that the LAN is operating properly.
- **Reboot the computer.** Close any programs that are not responding. If necessary, reboot the computer. Restart the 9900V Storage Navigator - Storage Navigator Java™ applet program.
- **Check for any General Error Conditions.** Check the troubleshooting information in the *Hitachi Lightning 9900V Hitachi Remote Console - Storage Navigator User's Guide*. The document lists general error conditions, and provides recommended resolution for each condition. If you are still unable to resolve an error condition, please call the Hitachi Data Systems Support Center for assistance (see section 7.2 for contact information).
- **Check the status lamp on the Storage Navigator Main Panel (Status Tab).** If the lamp becomes yellow (🟡) or red (🔴), confirm the severity level of the error on the Status panel. If you are unable to resolve an error condition, please contact the Hitachi Data Systems Support Center (see section 7.2).
- **Download the Storage Navigator trace files using the FD Dump Tool.** If you are unable to resolve an error condition, copy the 9900V Storage Navigator configuration information onto diskette using the FD Dump Tool (see section 3.10 for instructions). Contact the Hitachi Data Systems Support Center (see section 7.2), and give this information to the Hitachi Data Systems service personnel.

Table 7.1 General Error Conditions (continues on the next page)

Error Condition	Probable Cause / Recommended Action
Application Error	
The Storage Navigator experiences an error.	Save the Java™ log file on the Storage Navigator, and report to the Hitachi Data Systems Support Center. The name of the log file is "plugin*.trace". Search for the log file in the disk of the Storage Navigator PC. The examples of the log file location for Windows® computers are as follows: - For JRE1.3.1_01, JRE1.4.1 c:\Documents and Settings\logon user ID*.trace - For JRE1.4.2 c:\Documents and Settings\logon user ID\Application Data\Sun\Java\Deployment\log*.trace Restart the Storage Navigator.
Only the Exit and Refresh buttons are effective when accessing the SVP from the Storage Navigator.	The SVP might not be ready or perform some write processes from the other system. Wait for a while, and then select the Refresh button.
An error (10,6027) occurs when accessing the SVP from the Storage Navigator.	Contact Hitachi Data Systems Technical Support Center.
Abnormal End / No Response	
An internal error occurs, or a web browser ends abnormally (forcibly).	Close all panels (including the Storage Device List panel). Log on to the Storage Navigator again. If the same error occurs, restart the Storage Navigator computer.
A network error occurred. There is no response to an operation even after 30 minutes passed.	Restart the Storage Navigator computer.
If you open the Java console panel by selecting the Java icon on the system tray while logging on to the Storage Navigator, the browser and Java console may become hung up.	Do not open the Java console panel while logging on to the Storage Navigator. If the browser and Java console become hung up, restart the Storage Navigator computer.
A network error occurred while logging on to the Storage Navigator.	Close all panels (including the Storage Device List panel). Log on to the Storage Navigator again. If the same error occurs, check the network environment.
A network error occurred. There is no response to an operation even after 30 minutes have passed.	Restart the Storage Navigator computer. Note: Certain operations may take over 30 minutes, for example when several Storage Navigator computers are running simultaneously.
Incorrect Display/ Nonoperation	
After dragging and dropping objects to another location or area, the scroll bar on that location becomes unusable.	Close all panels including the Storage Device List panel, and then log on to the Storage Navigator again.
A focus disappears from the edit box.	Close all panels including the Storage Device List panel. Log on to the Storage Navigator again.
The display of the web browser becomes incorrect, because some GUI items such as labels and icons cannot be downloaded properly.	Log off from the Storage Navigator, and then re-log in. If this error occurs before you logon to the Storage Navigator, close all panels including the Storage Device List panel. Log on to the Storage Navigator.
A Storage Navigator panel is incorrectly closed by – selecting  on the panel, – using the commands such as File and Exit on the web browser, or – pressing the Alt and F4 keys.	Wait for an RMI™ time-out (default is 1 minute). Close all panels including the Storage Device List panel, and then restart the Storage Navigator.

Table 7.1 General Error Conditions (continued)

Error Condition	Probable Cause/Recommended Action
Incorrect Display/ Nonoperation (continued)	
The Storage Navigator performance is slow or extremely slow.	Confirm the memory size of the Storage Navigator computer (256 MB or more is recommended), open the Java™ Plug-in Control Panel from Control Panel, and then set a memory size to use in the Java Execution Parameter box on the Java™ Plug-in Control Panel. For example, set as follows: - For 256 MB: -Xmx268435456 - For 512 MB: -Xmx536870912
Even though you have selected the Apply button to execute the operation, the new settings are not displayed on the Storage Navigator panel.	Select Refresh () on the Storage Navigator panel.
A Storage Navigator panel is forcibly closed by selecting  on the panel or by some other means, while the processing which takes time, such as LDEV formatting, is in progress.	Close all panels including the Storage Device List panel, wait until the processing which has been in progress finishes, and then restart the Storage Navigator.
Maintenance/Other	
The program on the SVP is updated.	Exit all web browsers on the Storage Navigator. Restart the browsers. If in doubt, you should exit and restart the browsers.
The time of the clock on the Storage Navigator is reset.	Clear cache (the existing temporary Internet files) of the web browser before logging on to the Storage Navigator.
Storage Navigator processing is temporarily delayed.	An internal process (example: configuration change, Program Product check, operational information acquisition) may be executing on the SVP (web server).
If you are unable to resolve an error condition.	Copy the 9900V Storage Navigator configuration information onto floppy disk(s) using the FD Dump Tool (refer to section 3.10), and contact the Hitachi Data Systems Support Center (see section 7.2).

Table 7.2 Notes on UNIX® Operations

Error Condition	Probable Cause / Recommended Action
When you switch panels from one panel to the Storage Navigator panel, the Storage Navigator panel is not redrawn.	Close all panels, including the Storage Device List panel, and then log on to the Storage Navigator again.
If you select (click on) the Storage Navigator main panel while displaying a dialog box, the dialog box disappears (hides) behind the Storage Navigator main panel.	Select (click on) the dialog box again.
If you select (click on) the Storage Navigator main panel while using Hitachi CruiseControl or Priority Access (Prioritized Port Control), these panels disappear (hide) behind the Storage Navigator main panel.	Select the Hitachi CruiseControl panel or the Priority Access (Prioritized Port Control) panel again.
Press  on the Hitachi CruiseControl panel and the Priority Access (Prioritized Port Control) panel remains active, even if you select Apply , and the process is being executed. In this case, the panels are closed if you select  .	Even if the panels are closed, the processing continues normally.
The Web browser is forcibly (abnormally) closed.	If the Netscape browser or the Java™ virtual machine hangs abnormally, you must delete the abnormal processes before you can continue the Storage Navigator operations.

7.2 Calling the Hitachi Data Systems Support Center

If you need to call the Hitachi Data Systems Support Center, make sure you can provide as much information about the problem as possible. Include the circumstances surrounding the error or failure, the 9900V Storage Navigator configuration information saved in the floppy diskette(s) by the **FD Dump Tool**, the exact content of any messages displayed on the Storage Navigator, and the severity levels and reference codes displayed on the **Status** tab of the Storage Navigator main panel (refer to Figure 3.8).

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

CCI	Command Control Interface
CU	control unit
DASD	direct access storage device
FTP	File Transfer Protocol
Hi-Star™	Hierarchical Star Network
IBM®	International Business Machines Corporation
IP	Internet Protocol
JRE™	Java Runtime Environment
JVM™	Java Virtual Machine
LAN	local-area network
LDEV	logical device
LU	logical unit (also called device emulation or device type)
LUN	logical unit number, logical unit
OS	operating system
P-VOL	primary volume
RAID	redundant array of independent disks
RAID-1/-5	specific RAID architectures
RCU	remote control unit
RIO	remote IO
RMI™	remote method invocation
SCSI	small computer system interface
SIM	service information message
SNMP	simple network management protocol
SSL	secure socket layer
S-VOL	secondary volume
SVP	service processor
sync	synchronous
VOL	volume

Index

9900V

- important terms and concepts, 7
- logging in
 - specifications (table), 21
- 9900V SNMP environment, 109
- 9900V subsystem
 - logging in, 20
 - overview, 4

A

- Add Certificate panel, 130
- Add Community IP Address Panel, 117
- Add Community IP Address pop-up menu, 117
- Add Community panel, 114
- Add Community pop-up menu, 114
- adding
 - community IP addresses, 117
 - community names, 114
 - SNMP managers, 112
 - storage devices, 63-66
 - users, 71-72

B

- Backup File Not Found panel, 87
- backup files, restoring, 86

C

- Certificate Import Wizard Introduction panel, 128
- Certificate panel, 128
- Change Community panel, 116
- Change Community pop-up menu, 116
- Change Password confirmation message, 75
- Change Permission confirmation message, 74
- Change Storage Entry panel, Host Name, 68
- Change Storage Entry panel, IP Address, 68
- changing
 - community name, 116
 - storage device entry, 67
 - user password, 75
 - user write access, 72-74
 - your own password, 90
- community IP addresses
 - adding, 117
 - deleting, 118
- community name
 - adding, 114
 - changing, 116
 - deleting, 115
- Compress Files confirmation message, 104
- Compressing Files panel, 98

Configuration File Loader, 131-64

- Configuration File Loader panel, 151-53
- downloading Java™ Web Start, 133-34
- operations, 153-64
 - downloading spreadsheet, 154
 - editing spreadsheet, 156
 - first error check, 161
 - implementing the changes, 164
 - second error check, 162
 - third error check, 164
 - uploading spreadsheet, 159
- overview, 131-32
 - flow diagram, 132
- spreadsheet components, 136-41
 - comments, 141
 - configuration definition, 139
 - function tags, 138
 - sample configuration definitions, 140
 - sample index and parameter, 140
 - spreadsheet declaration (table), 137
 - spreadsheet declarations, 137
- spreadsheet conventions, 135-50
 - file requirements, 135
 - format requirements (table), 136
 - LUN Manager CHA mode, 146
 - LUN Manager CHA values, 146
 - LUN Manager column format, 142
 - LUN Manager column format (table), 143
 - LUN Manager command device values, 150
 - LUN Manager command devices, 150
 - LUN Manager host group, 147
 - LUN Manager host group values, 147
 - LUN Manager LU path values, 149
 - LUN Manager LU paths, 149
 - LUN Manager port tag configuration, 144
 - LUN Manager ports and LUN security, 144
 - LUN Manager spreadsheets, 142-50
 - LUN Manager WWN, 148
 - LUN Manager WWN values, 148
 - LUN Security, 145
 - sample spreadsheet, 135
- configuring
 - for firewall, 12
 - web browser, 12
- Control Panel, Download tab, 81
- Control Panel, Log tab, 80
- Control Panel, Restore tab, 85
- Control Panel, Set Environment tab, 77

Control panel, User Entry tab, 70

control unit (CU)

definition, 7

conventions

Storage Navigator

text color and font type, 14

Creating a public key (illustration), 122

CU device numbers

table, 8

customer support, 169

D

data files, exporting, 100-104

Delete Community IP Address pop-up menu, 118

Delete Community pop up menu, 115

Delete Device confirmation message, 69

Delete IP Address pop-up menu, 113

deleting

community IP address, 118

community name, 115

SNMP manager, 113

storage device, 69

user, 76

device numbers for each CU

table, 8

disabling options, 41

Download Complete panel, 84, 100

Download panel, 83

Download Trace Files Download panel, 98

Download Trace Files Logon panel, 97

Download Trace Files panel (selecting trace files), 97

downloading

Java™ Web Start, 133-34

log and configuration files, 80-84

trace files, 95-100

E

editing

storage device list, 59-69

user account list, 69-76

enabling options, 29-41

license key code, 38

license key file, 39

environment parameters, 76-79

setting, 79

error conditions, 59, 166

Export Data Files panel (export data), 104

Export Data Files panel (new data), 103

Export Data Files panel (selecting data), 103

exporting data files, 100-104

extending cache memory

Just in Time Storage, 95

extending LUs

Just in Time Storage, 94

F

FD Dump tool, 96

File Download (FTP Client) panel, 106

File Download panel, 83, 99

File Restoration Confirmation panel, 88

files, uploading to SVP, 104-7

firewall

configuring for, 12

flow diagram

Configuration File Loader, 132

I

Import Complete panel, 129

Import Successful panel, 130

Information tab

device information box and device view, 50

option buttons, 45

subsystem information icons, 48

Install/Uninstall Error panel, 40

instructions

acquiring a signed certificate, 123

adding a community name, 114

adding a user, 71-72

adding community IP addresses, 117

adding SNMP managers, 112

adding storage devices, 63-66

changing a community name, 116

changing a storage device entry, 67

changing user password, 75

changing user write access, 72-74

creating a keypair (private key), 121

creating a keypair (public key), 122

deleting a community name, 115

deleting a storage device, 69

deleting a user, 76

deleting community IP addresses, 118

deleting SNMP manager, 113

disabling options, 41

downloading

trace files using FD Dump tool, 95-100

downloading log and configuration files, 82

editing user account list, 69-76

enabling options with license key code, 38

enabling options with license key file, 39

exporting data files, 101

extending

LUs using Just In Time Storage, 94

extending cache memory using Just In Time Storage, 95

restoring backup files, 86

setting environment parameters, 79

- setting the web browser for self-signed certificate, 127
- updating the certificate, 124
- uploading files to SVP, 105
- uploading the signed certificate, 123

instructions changing your own password, 90

IP address

- community, 117, 118

J

Java™ applet

- definition, 7

Java™ applet window, 14

Just in Time confirmation message, 94

Just In Time Storage, 90-95

- extending cache memory, 95
- extending LUs, 94

K

keystroke and navigation conventions, 15

L

launching options, 59

License Key tab, 31

License Key tab.icons (table), 37

License Key tab.install buttons, 36

License Key tab.License Install box, 35

License Key tab.License key table, 32

License Key/ Just in Time/SNMP Panel, Just in Time tab, 92

License Key/SNMP/Just in Time panel

- SNMP Information tab, 110

License Key/SNMP/Just In Time panel

- License Key tab, 30-37

license keys, 28

- expiration of temporary key, 29

log and configuration files, 80

- downloading, 80-84
- restoring, 84-88

logical device

- definition, 7

logical unit (LU)

- definition, 7

M

mode changing confirmation message, 27

modify mode, 27

O

On-Demand Menu Commands, 94

options

- disabling, 41
- enabling, 29-41
- enabling with license key code, 38

- enabling with license key file, 39
- launching, 59

overview

- 9900V subsystem, 4
- web server and client, 1

P

parity group

- definition, 7

password

- changing your own, 90

Password Check panel, 87

R

Register Device Confirmation message, 65

Register User confirmation message, 72

Registration Complete message, 66

restoring

- backup files, 86
- log and configuration files, 84-88

RMI

- definition, 7

S

Save As panel, 84, 99

Security Alert panel (Unknown Security Certificate), 127

Select Certificate Type panel, 129

Set confirmation message, 38

setting

- environment parameters, 79

setting environment parameters, 76-79

SIM severity levels and icons, 59

SNMP

- adding a community name, 114
- adding community IP addresses, 117
- adding SNMP managers, 112
- changing a community name, 116
- deleting a community name, 115
- deleting community IP addresses, 118
- deleting SNMP managers, 113

SNMP Agent properties, 109

SSL-encrypted communication, 119-30

- acquiring a signed certificate, 123
- creating a keypair, 121-22
- creating a keypair (private key), 121
- creating a keypair (public key), 122
- definitions, 120
- overview, 119
- setting the web browser for self-signed certificate, 127
- updating the certificate, 124
- uploading the signed certificate, 123

Status tab

- Controller Status box, 56
- Disk Array Status box, 57
- Status History box, 58
- storage device list
 - adding storage devices, 63-66
 - changing a storage device entry, 67
 - deleting a storage device, 69
 - editing, 59-69
 - primary SVP IP address, 6
- Storage Device List panel, 61
- Storage Editor - Logon panel, 62
- Storage Entry panel, 65
- Storage List Editor panel, 63
- Storage Navigator
 - configuring
 - for firewall, 12
 - configuring the web browser, 12
 - conventions, 13
 - text color and font type, 14
 - enabling options, 29-41
 - keystroke and navigation conventions, 15
 - license keys, 28
 - setup, 12
 - SSL-encrypted communication, 119-30
 - acquiring a signed certificate, 123
 - creating a keypair, 121-22
 - creating a keypair (private key), 121
 - creating a keypair (public key), 122
 - definitions, 120
 - overview, 119
 - setting the web browser for self-signed certificate, 127
 - updating the certificate, 124
 - uploading the signed certificate, 123
 - system requirements, 9-11
 - system requirements for UNIX®
 - table, 11
 - system requirements for Windows®
 - table, 10
 - UNIX® conventions, 17
 - Windows Server® 2003 conventions, 19
- Storage Navigator and SVP configuration, 2
- Storage Navigator main panel
 - Information tab, 44-55
 - Status tab, 55-59
- Storage Navigator main panel, Information tab, 44
- Storage Navigator main panel, Status tab, 55
- support center, 169
- system requirements for Storage Navigator, 9-11
- system requirements for UNIX®, 11
- system requirements for Windows®, 10

T

- technical support, 169
- temporary license key
 - effect of expiration, 29
- trace files
 - downloading, 95-100
- troubleshooting, 165
 - general error conditions, 166
 - UNIX® Operations, 168

U

- Update Certificate Files Completed panel, 125
- Update Certificate Files Error panel, 126
- Update Certificate Files Logon panel, 124
- Update Certificate Files Start panel, 125
- Upload panel, 106
- Upload Success panel, 107
- uploading files to SVP, 104-7
- user access levels
 - definition, 5
- user account list, 6
 - adding a user, 71-72
 - changing user write access, 72-74
 - deleting a user, 76
 - editing, 69-76
- User Control Panel, Password tab, 90
- User Control Panel, Permission tab, 89
- User Entry panel, 72
- User Entry panel (Password tab), 75
- User List Editor Panel, Permission tab, 74
- user password
 - changing, 75

V

- view mode, 27
- viewing
 - your own write access, 89

W

- web browser
 - configuring, 12
- web server and client
 - overview, 1
- write access, viewing, 89

