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Hitachi Universal Storage Platform V
Hitachi Universal Storage Platform VM
Hitachi Storage Navigator User's Guide

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Hitachi Data Systems

MK-96RD621-08

Contents

Preface

This document provides instructions for installing and using the Storage Navigator Web client Java™ applet on the Hitachi Universal Storage Platform V and Hitachi Universal Storage Platform VM storage systems.

Please read this document carefully to understand how to use this product, and maintain a copy for reference purposes.

This preface includes the following information:

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

Intended Audience

This document is intended for system administrators, Hitachi Data Systems representatives, and Authorized Service Providers who are involved in installing, configuring, and operating the Hitachi Universal Storage Platform V and Hitachi Universal Storage Platform VM storage systems.

This document assumes the following:

- The user has a background in data processing and understands RAID storage systems and their basic functions.
- The user is familiar with the Hitachi Universal Storage Platform V and Hitachi Universal Storage Platform VM storage systems and has read the *Universal Storage Platform V and Universal Storage Platform VM User and Reference Guide*.

Product Version

This document revision applies to USP V/VM microcode 60-03-0*x* and higher.

Document Revision Level

Revision	Date	Description
MK-96RD621-01	May, 2007	Initial release
MK-96RD621-02	July, 2007	Revision 2, supersedes and replaces MK-96RD621-01
MK-96RD621-03	September, 2007	Revision 3, supersedes and replaces MK-96RD621-02
MK-96RD621-04	November, 2007	Revision 4, supersedes and replaces MK-96RD621-03
MK-96RD621-05	January, 2008	Revision 5, supersedes and replaces MK-96RD621-04
MK-96RD621-06	March 2008	Revision 6, supersedes and replaces MK-96RD621-05
MK-96RD621-07	April 2008	Revision 7, supersedes and replaces MK-96RD621-06
MK-96RD621-08	May 2008	Revision 8, supersedes and replaces MK-96RD621-07

Source Documents for this Revision

- MK-96RD621-07a-RSD-V02
- MK-96RD621-08a-RSD-V03

Changes in This Revision

- Added a note in (Keystrokes and Navigation).
- Added a note in (Configuring Storage Navigator over a Firewall).
- Added a note about modify mode in Extending the Modify Mode Timeout Period.
- Added Database Validator option in Storage Navigator Options.
- Updated permission information in Permission for Accessing Local Client Files.
- Updated Logging In to a Storage System and General Error Conditions and Recommended Actions.
- Added notes throughout this document to contact Hitachi Data Systems Support Center for Volume Migration support.
- Added support for Windows Server 2008 in Requirements for Windows.

Document Organization

The following table provides an overview of the contents and organization of this document. Click the chapter title in the left column to go to that chapter. The first page of each chapter provides links to the sections in that chapter.

Chapter	Description
Chapter 1 - About Storage Navigator Operations	Provides an overview of the Storage Navigator functions.
Chapter 2 - Installation Requirements and Procedures	Describes the installation requirements and procedures for the Storage Navigator.
Chapter 3 - Using the Storage Navigator GUI	Describes the windows of the Storage Navigator GUI.
Chapter 4 - Performing Storage Navigator Operations	Describes how to perform Storage Navigator operations.
Chapter 5 - Using the Storage Navigator CLI	Describes how to use Storage Navigator command line interface commands.
Chapter 6 - Troubleshooting	Describes how to troubleshoot problems with the Storage Navigator.
Acronyms and Abbreviations	Defines the acronyms and abbreviations used in this document.
Index	Lists the topics in this document in alphabetical order.

Referenced Documents

Hitachi Universal Storage Platform V/VM:

- *Hitachi Audit Log User and Reference Guide,* MK-96RD606
- *Hitachi Cache Residency Manager User's Guide,* MK-96RD609
- *Hitachi Compatible Mirroring for IBM® FlashCopy User's Guide,* MK-96RD614
- *Hitachi Compatible PAV for IBM® z/OS® User's Guide,* MK-96RD608
- *Hitachi Compatible Replication for IBM XRC User's Guide,* MK-96RD610
- *Hitachi Copy-on-Write Snapshot User's Guide,* MK-96RD607
- *Hitachi Database Validator User's Guide,* MK-96RD611
- *Hitachi Data Retention Utility User's Guide,* MK-96RD612
- *Hitachi Dynamic Provisioning User's Guide,* MK-96RD641
- *Hitachi LUN Expansion User's Guide,* MK-96RD616
- *Hitachi LUN Manager User's Guide,* MK-96RD615
- *Hitachi Multiplatform Backup User's Guide,* MK-98RD6713
- *Hitachi Performance Manager User's Guide,* MK-96RD617
- *Hitachi ShadowImage User's Guide,* MK-96RD618
- *Hitachi ShadowImage for IBM z/OS User's Guide,* MK-96RD619
- *Hitachi SNMP Agent User and Reference Guide,* MK-96RD620
- *Hitachi Storage Navigator Messages,* MK-96RD613
- *Hitachi TrueCopy User's Guide,* MK-96RD622
- *Hitachi TrueCopy for IBM z/OS User's Guide,* MK-96RD623
- *Hitachi Universal Replicator User's Guide,* MK-96RD624
- *Hitachi Universal Replicator for IBM z/OS User's Guide,* MK-96RD625
- *Hitachi Universal Volume Manager User's Guide,* MK-96RD626
- *Hitachi Virtual LVI/LUN and Volume Shredder User's Guide,* MK-96RD630
- *Hitachi Virtual Partition Manager User's Guide,* MK-96RD629
- *Hitachi Volume Retention Manager User's Guide,* MK-96RD627
- *Hitachi Volume Security User's Guide,* MK-96RD628

Document Conventions

The terms "Universal Storage Platform V" and "USP V" refer to all models of the Hitachi Universal Storage Platform V, unless otherwise noted.

The terms "Universal Storage Platform VM" and "USP VM" refer to all models of the Hitachi Universal Storage Platform VM, unless otherwise noted.

This document uses the following typographic conventions:

Convention	Description
Bold	Indicates text on a window, other than the window title, including menus, menu options, buttons, fields, and labels. Example: Click **OK**.
Italic	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: copy *source-file target-file* Angled brackets (< >) are also used to indicate variables.
`screen/code`	Indicates text that is displayed on screen or entered by the user. Example: `# pairdisplay -g oradb`
< > angled brackets	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: `# pairdisplay -g <group>` Italic font is also used to indicate variables.
[ ] square brackets	Indicates optional values. Example: [a | b] indicates that you can choose a, b, or nothing.
{ } braces	Indicates required or expected values. Example: { a | b } indicates that you must choose either a or b.
| vertical bar	Indicates that you have a choice between two or more options or arguments. Examples: [a | b] indicates that you can choose a, b, or nothing. { a | b } indicates that you must choose either a or b.
underline	Indicates the default value. Example: [a | b]

This document uses the following icons to draw attention to information:

Icon	Meaning	Description
	Note	Calls attention to important and/or additional information.
	Tip	Provides helpful information, guidelines, or suggestions for performing tasks more effectively.
	Caution	Warns the user of adverse conditions and/or consequences (e.g., disruptive operations).
	WARNING	Warns the user of severe conditions and/or consequences (e.g., destructive operations).

Convention for Storage Capacity Values

Physical storage capacity values (e.g., disk drive capacity) are calculated based on the following values:

1 KB = 1,000 bytes
1 MB = $1{,}000^2$ bytes
1 GB = $1{,}000^3$ bytes
1 TB = $1{,}000^4$ bytes
1 PB = $1{,}000^5$ bytes

Logical storage capacity values (e.g., logical device capacity) are calculated based on the following values:

1 KB = 1,024 bytes
1 MB = $1{,}024^2$ bytes
1 GB = $1{,}024^3$ bytes
1 TB = $1{,}024^4$ bytes
1 PB = $1{,}024^5$ bytes
1 block = 512 bytes

Getting Help

If you need to call the Hitachi Data Systems Support Center, make sure to provide as much information about the problem as possible, including:

- The circumstances surrounding the error or failure.
- The exact content of any error message(s) displayed on the host system(s).
- The data in the CCI error log file and trace data (all files in the HORCM_LOG directory).
- The service information messages (SIMs), including reference codes and severity levels, displayed by Storage Navigator and/or logged at the host.

The Hitachi Data Systems customer support staff is available 24 hours/day, seven days a week. If you need technical support, please call:

- United States: (800) 446-0744
- Outside the United States: (858) 547-4526

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.

- **E-mail:** doc.comments@hds.com
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Thank you! (All comments become the property of Hitachi Data Systems Corporation.)

1

About Storage Navigator Operations

This chapter provides an overview of the Storage Navigator functions.

- ☐ Overview of Storage Navigator
- ☐ Storage Navigator Features
- ☐ User Access Levels
- ☐ Storage Device List
- ☐ Overview of Audit Logs
- ☐ Overview of Configuration File Loader Operations
- ☐ Overview of SSL-Encrypted Communications
- ☐ Important Terms and Concepts

Overview of Storage Navigator

The Hitachi Universal Storage Platform V and Hitachi Universal Storage Platform VM (herein after referred to as USP V/VM) Storage Navigator enables users to remotely manage the storage system. This section describes how the Storage Navigator accesses the storage system.

The storage system has a computer called a service processor (SVP) that is used for maintenance. The Storage Navigator accesses the SVP to obtain storage system configuration and status information, and send user-requested commands to the storage system. The Storage Navigator consists of a group of Java™ application programs that run on the Java Virtual Machine™ (JVM™). The SVP functions as a Web server on the JVM, while the Storage Navigator functions as a Java client. The Java client that runs the Storage Navigator is called a Storage Navigator computer.

The Storage Navigator communicates with SVPs on the storage systems via a local-area network (LAN). The supported interfaces between the Storage Navigator and the SVP are graphical user interface (GUI) and command line interface (CLI).

Storage Navigator GUI

The Storage Navigator GUI allows users to perform operations on the storage system using the Storage Navigator windows displayed on a Web browser.

The SVP contains Java applications that function as the Storage Navigator on Java clients. Each time you log into the Storage Navigator and connect to the SVP, a Java application is downloaded from the SVP to the Storage Navigator computer.

The USP V/VM can be connected to two LANs. The USP V/VM-internal LAN is a private LAN that is used to connect the SVPs of multiple storage systems. 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 storage system. In a SAN environment, where several storage systems may be connected together, you must designate a primary SVP, which can be either an SVP connected to a storage system, or a Web server with the exact same configuration as an SVP (see Starting Up and Logging Into Storage Navigator).

The following figure shows an example of Storage Navigator computer and SVP configuration.

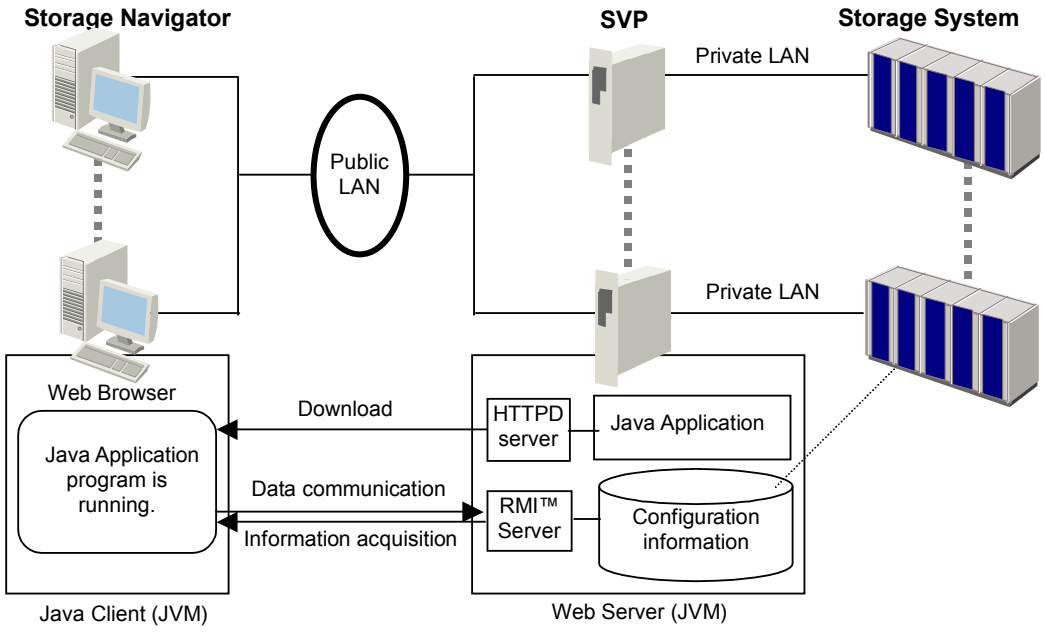


Figure 1-1 Example of Storage Navigator Computer and SVP Configuration

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

Storage Navigator CLI

The Storage Navigator Command Line Interface (CLI) allows you to perform commands on the storage system using the command prompt. To use the Storage Navigator CLI, you need to install certain files on the Storage Navigator computer.

The current version of the Storage Navigator CLI can be used to perform only specific operations of specific program products. For details on the Storage Navigator CLI, see Using the Storage Navigator CLI.

Storage Navigator Features

Storage Navigator enables you to perform the following operations:

- View the storage system information
  - You can register multiple storage systems into one list (see Storage Device List).
  - You can view the storage system and the LDEV information on the Information window (see Information Window).

  - You can view the mounted condition of the ports on the Port Status window (see Port Status Window).
  - You can view the specified values of the LUN, the LDEV, and the port on the Basic Information Display dialog box, which is a different window from the Storage Navigator main window (see Basic Information Display Dialog Boxes).
- Use program product options and functions
  - You can remotely operate program product options and functions to the storage system.
    See the appropriate user's guide for more details about USP V/VM feature options. For instructions on installing, see Enabling and Disabling Storage Navigator Options. For instructions on launching, see Launching the Desired Option.
  - You can save the settings of some program product options to a spreadsheet file, or you can specify multiple settings all together in a spreadsheet file (see Overview of Configuration File Loader Operations).
  - You can specify the property of SNMP agent remotely to the SVP (see the *SNMP Agent User and Reference Guide*).
  - You can virtually partition the built-in cache memory or storage (see the *Virtual Partition Manager User's Guide*).
- Consider security
  - You can register user accounts of Storage Navigator and specify the operation authority to each account (see User Access Levels).
  - You can check the current number of user accounts and set the time out period with the Storage Navigator environment parameters (see Set Env. Dialog Box).
  - You can display a warning message to unauthorized access on the Storage Navigator login window (see Login Message Window).
  - You can view the audit logs which list the user's log in history (see Overview of Audit Logs).
  - You can encrypt the communication between the Storage Navigator and the SVP (see Overview of SSL-Encrypted Communications).
- Gather necessary information for troubleshooting
  - You can view the error history of the storage system (see Status Window).
  - You can download trace files (see Downloading Trace Files Using the FD Dump Tool).
  - You can back up and restore the setting information of Storage Navigator (see Download Dialog Box and Restore Dialog Box).

User Access Levels

To use Storage Navigator, you first need a user account. The user account of Storage Navigator contains the following information.

- User ID
- User type
- Password
- Operation authority

For Storage Navigator, a user account of user ID "root" is initially set. By default, the operation authority for all functions of Storage Navigator and program product options is given to the root user account. You cannot delete the root user account. You may register up to 500 user accounts including the root user account for Storage Navigator.

You have to set user ID, user type and password when you set up a user account. An operation authority can be set for each registered user account. To register the user account, or to set an operation authority, use the Account window. For further information on the procedures of registering the user account and of setting the operation authority for Storage Navigator, see Account Window. The following sections describe the user types and the operation authorities.

User Types

Storage Navigator provides two types of user access levels: storage administrator and storage partition administrator. You can decide the user type when you register the user account. The operating range of the storage system varies by the user type, as described below.

- A storage administrator can operate the entire storage system. Only storage administrator can perform the **Storage Device List**, **Control Panel**, **Audit log**-related operations of Storage Navigator, and the Storage Navigator CLI commands. The root user account, which is the default Storage Navigator user account, is a kind of storage administrator.
- A storage partition administrator can operate a Storage Management Logical Partition (SLPR) allocated by Storage Navigator. A storage partition administrator cannot perform the **Storage Device List**, **Control Panel**, **Audit log**-related operations of Storage Navigator, and the Storage Navigator CLI commands.

  A storage partition administrator can use only a part of program product options.

  For further information on an SLPR or details of the program product options that a storage partition administrator can use, see to the *Virtual Partition Manager User's Guide*.

Operation Authority

As you set user ID and password when you register a user account, you can also set various types of operation authorities for registered user account. In Storage Navigator, the operation authority might be called "role".

The types of operation authorities that can be set to each user account are as follows.

- Account administrator role (user account operation authority)

  Account administrator role has the authority to operate the window that can be used for managing Storage Navigator user accounts.

  All users can change their own passwords and view the details of settings of their own user accounts. However, if you want to change the password of another user account, or details of settings of other user account, you need the modification authority of the account administrator role.

  You cannot change the account administrator role settings that are set for the user account of user ID "root".

  For each user account, you may select the following three types of account administrator role authority:

  - **Modify:** If you have this authority, you can add and delete all user accounts and change the setting details, except the user ID "root". The user account of user ID "root" can change the "root" account password. However, they cannot change the operational authority for Account administrator role, because **Modify** has been set for the user account of user ID "root".
  - **View:** If you have this authority, you can view the operation authority of all user accounts. You cannot add, change and delete the user accounts. However, you can change your own password.
  - **Disable:** You cannot view or change settings of other user accounts. However, you can change your password, and view the operation authorities for your user account.

- Audit log administrator role (audit log operation authority)

  Audit log administrator role has the authority to perform the audit log and to perform the syslog-related operation. You can set the audit log administrator role for the storage administrator user account.

  For each user account, you may select the following three types of audit log administrator role authority:

  - **Modify:** If you have this authority, you can download an audit log file by using the button for audit log file download, and configure the FTP servers and manually transfer the audit log file by using the Audit Log window. You can also configure the syslog servers and download the syslog file by using the Syslog window. The operation authority "Modify" has been set for the user account of user ID "root".

  - **View:** If you have this authority, you can download an audit log file by using the button for audit log file download. You can also view the settings on the Syslog window or the Audit Log window, and download the syslog file by using the Syslog window. However, you are not allowed to change the setting of the Syslog window and the Audit Log window. You cannot manually transfer the audit log file by using the Audit Log window either.
  - **Disable:** You have no operation authority for the audit log. You cannot use the audit log file download button, the Syslog window, and the Audit Log window.

- Storage administrator role (storage operation authority)

  Storage administrator role has the authority to perform the **Storage Device List** operation, the operation using program product options and the operations of Set Env. dialog box. For each user account, you may select the following two types of storage administrator role authority:

  - **Enable:** You have authority to perform the **Storage Device List** operations, the operations using program product options and the operations for the Set Env. dialog box.
    Only the user accounts for which the storage administrator role authority is set to "Enable" can be used to set the details of the operation authority for each program product option. The operation authority "Enable" has been set for the user account of user ID "root" and for that account "Modify" authority is set for the operations of all program product options.
  - **Disable:** You do not have authority to perform the **Storage Device List** operations, the operations using program product options and Set Env. dialog box operations. For the operation authority for each function, the "Modify" authority might be set. However, if "Disable" is set for the authority of storage administrator role, the operation authority for each function also will be disabled.

- Operation authority for each function

  You can set the operation authority for Storage Navigator or for each function among the program product options. To set the operation authority of functions for each user account, set "Enable" for the storage administrator role. For each user account, you may select the following two types of operation authority.

  - **Modify:** You can perform the operations of each function.
  - **View:** You can view the window for each function. However, you cannot perform the operation.

Storage Device List

The Storage 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 Editing the Storage Device List for more details.

You can display the storage device list on your Web browser by accessing the URL of the primary SVP which includes an IP address of a host name of the primary SVP. If you want to specify a host name instead of IP address, you need to register a host name. For details on registering a host name, see Registering the Primary SVP Host Name.

Overview of Audit Logs

The Audit Log function allows you to record the access and configuration changes made to your storage system. The audit log can be used to investigate when an incorrect setup is performed or when a trouble occurs in the storage system.

You can view the audit log by:

- Transferring the audit log to FTP servers
- Transferring the audit log to syslog servers
- Downloading the audit log to the Storage Navigator computer

You can download two files with different formats to the Storage Navigator computer. The file that has the same format as the audit log transferred to syslog servers is called **syslog file**. The file that has the same format as the audit log transferred to FTP servers is called **audit log file**.

The following figure shows an overview of the audit log operations.

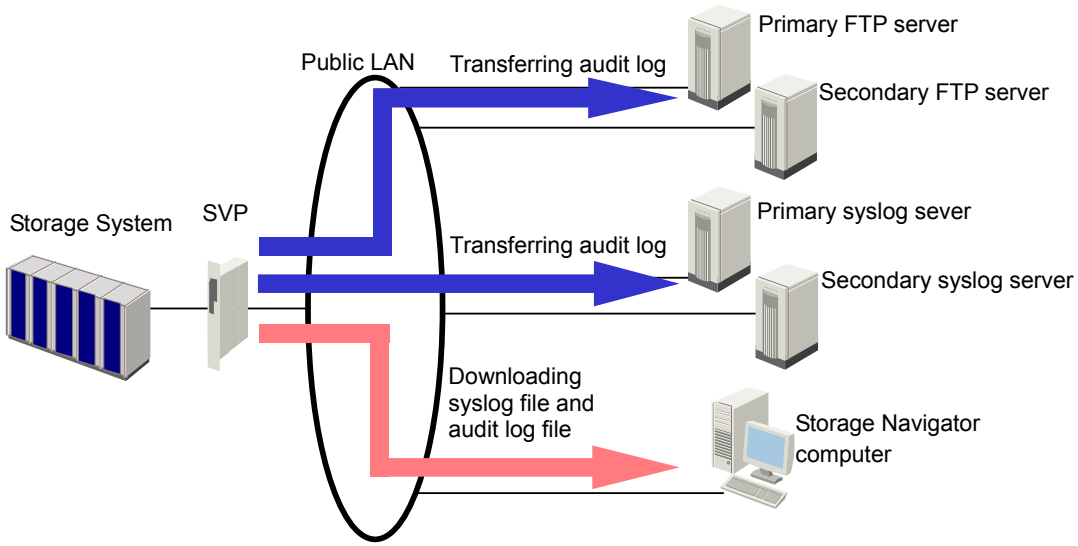


Figure 1-2 Overview of the Audit Log Operations

You can transfer audit logs to FTP servers or syslog servers after connecting these servers through the LAN to the SVP of the storage system. A maximum of two FTP servers and two syslog servers can be connected to the SVP. The first one is named primary FTP server or primary syslog server. The second one is named secondary FTP server or secondary syslog server.

The audit log is stored in the SVP. Older data is deleted from the audit log file when the number of lines of saved data reaches a maximum quantity.

If you configure FTP server settings, the audit log will be automatically transferred to the FTP server when the number of lines in the file reaches the threshold.

If you configure syslog server settings, the audit log will be always transferred to the syslog server.

To transfer the audit log to servers, configure server settings using the Syslog window or the Audit Log window. Please see the *Audit Log Reference Guide* for how to configure server settings in each window.

Overview of Configuration File Loader Operations

The Configuration File Loader is used to make large-scale or "batch" changes to the configuration of certain program product options, using either a text editor or spreadsheet software to edit configuration definition files (spreadsheet files) and apply the changes to the storage system. You can apply the same spreadsheet file to different storage systems, and you can define the configuration in the spreadsheet when you are offline.

How to apply a spreadsheet to the storage system differs depending on the program products. The following table shows program products supporting spreadsheets and how to apply a spreadsheet.

Table 1-1 Program Products Supporting Spreadsheets and How to Apply a Spreadsheet

Program Products Supporting Spreadsheets	How to Apply a Spreadsheet
LUN Manager	The Configuration File Loader window
Volume Retention Manager	
Universal Replicator for IBM z/OS	The Storage Navigator CLI
Universal Volume Manager	

For further information, see the document for each program product.

Overview of SSL-Encrypted Communications

In order to improve security of remote operations from a Storage Navigator to a storage system, you can set up SSL-encrypted communication. By setting SSL-encrypted communication, the User ID and Password required for logging in to the Storage Navigator are encrypted, and you can have a higher level of security for the communication.

For detailed information on the SSL-encrypted communication, see the *Encrypted communications User's Guide*.

You need to change the SVP (Web server) 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.

Important Terms and Concepts

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

- **Disk controller frame**. The USP V/VM storage system has one disk controller frame that controls all data access and storage operations. The USP V/VM storage system provides up to 256 logical control units (CU) and supports 3990-6, 3990-6E, 2105-F20, and 2107 controller emulation types. For USP V/VM program products, a maximum of 255 CUs are available.

Note: The 3990-3 and 2105-E20 controller emulation types are not supported.

- **Logical disk controller frame (LDKC).** The USP V/VM storage system controls CUs in groups of 256. This group is called a logical disk controller frame (LDKC). There is one LDKC for the USP V/VM storage system and the LDKC is numbered zero (0).

  One LDKC controls up to 256 CUs, however, only 255 CUs are available for the USP V/VM program products. Therefore, up to 65,280 volumes are available for the USP V/VM program products.

- **Disk array frame**. The disk array frame of the storage system contains the storage components (hard disk drive arrays).

- **Parity group**. A parity group (also called 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 USP V/VM storage system supports a maximum of 65,536 LDEVs. However, up to 65,280 volumes are available for the USP V/VM program products.

  An LDEV can be called a volume. An LDEV used by mainframe hosts can be called a device, logical volume image (LVI). An LDEV used by open-system hosts can be called a device (for example, SCSI disk device, raw device) or a logical unit (LU).

Note: Only up to 32,640 LDEVs are available for some of the USP V/VM functions or program products.

- **LU (logical unit)**. An LDEV used by open-system hosts is called an LU. An open-system LU on fibre-channel interface can be mapped to one or more LDEVs.

- **CU (control unit)**. The USP V/VM storage system supports a maximum of 256 logical CUs numbered sequentially from 00–FF. Each CU controls up to 256 LDEVs. LDEVs within the USP V/VM storage system are accessed by a combination of CU number (00-FF) and device number (00–FF).

  However, the CU number FF is reserved for the Command Control Interface (CCI) operation. Therefore the CUs that can be used for the USP V/VM program products operation are up to CU number FE. This means that the number of CUs that can be used for the USP V/VM program products operation are 255 per LDKC at the maximum.

  The following table shows the example of the device numbers for CU.

Table 1-2 Example of Device Numbers for Each CU

CU Number	Possible Device Numbers	CU Number	Possible Device Numbers	CU Number	Possible Device Numbers	CU Number	Possible Device Numbers
0	0:00 to 0:FF	10	10:00 to 10:FF	20	20:00 to 20:FF	30	30:00 to 30:FF
1	1:00 to 1:FF	11	11:00 to 11:FF	21	21:00 to 21:FF	31	31:00 to 31:FF
2	2:00 to 2:FF	12	12:00 to 12:FF	22	22:00 to 22:FF	32	32:00 to 32:FF
3	3:00 to 3:FF	13	13:00 to 13:FF	23	23:00 to 23:FF	33	33:00 to 33:FF
4	4:00 to 4:FF	14	14:00 to 14:FF	24	24:00 to 24:FF	34	34:00 to 34:FF
5	5:00 to 5:FF	15	15:00 to 15:FF	25	25:00 to 25:FF	35	35:00 to 35:FF
6	6:00 to 6:FF	16	16:00 to 16:FF	26	26:00 to 26:FF	36	36:00 to 36:FF
7	7:00 to 7:FF	17	17:00 to 17:FF	27	27:00 to 27:FF	37	37:00 to 37:FF
8	8:00 to 8:FF	18	18:00 to 18:FF	28	28:00 to 28:FF	38	38:00 to 38:FF
9	9:00 to 9:FF	19	19:00 to 19:FF	29	29:00 to 29:FF	39	39:00 to 39:FF
A	A:00 to A:FF	1A	1A:00 to 1A:FF	2A	2A:00 to 2A:FF	3A	3A:00 to 3A:FF
B	B:00 to B:FF	1B	1B:00 to 1B:FF	2B	2B:00 to 2B:FF	3B	3B:00 to 3B:FF
C	C:00 to C:FF	1C	1C:00 to 1C:FF	2C	2C:00 to 2C:FF	3C	3C:00 to 3C:FF
D	D:00 to D:FF	1D	1D:00 to 1D:FF	2D	2D:00 to 2D:FF	3D	3D:00 to 3D:FF
E	E:00 to E:FF	1E	1E:00 to 1E:FF	2E	2E:00 to 2E:FF	3E	3E:00 to 3E:FF
F	F:00 to F:FF	1F	1F:00 to 1F:FF	2F	2F:00 to 2F:FF	3F	3F:00 to 3F:FF

- **Java application program**. The USP V/VM Storage Navigator is provided as a Java application program. When a Storage Navigator user accesses and logs in to the desired SVP, the Java application is downloaded from the SVP (Web server) to the Storage Navigator (Java client) computer. The Java application program runs on a Web browser on the Storage Navigator computer.
- **RMI™ (remote method invocation)**. RMI is a remote procedure call that allows Java objects stored in the network to be run remotely. In the USP V/VM Storage Navigator network environment, Storage Navigator downloads Java objects from the SVP.

2

Installation Requirements and Procedures

This chapter describes the installation requirements and procedures for Storage Navigator:

- ☐ System Requirements
- ☐ Setting Up Storage Navigator
- ☐ Storage Navigator Conventions
- ☐ Starting Up and Logging Into Storage Navigator
- ☐ License Keys

System Requirements

The USP V/VM Storage Navigator Java application program is downloaded from the SVP to the Storage Navigator computer. The application runs on the Web browser of the Storage Navigator computer, and communicates with the attached USP V/VM storage systems via the TCP/IP network.

The USP V/VM Storage Navigator software requires the following:

- USP V/VM storage system(s).

  Storage Navigator can be attached to multiple storage systems of the same type (such as, USP V).

  To connect to more than one storage system, you must log in to the SVP for each of the desired storage systems, and use individual Java application programs on separate Web browser windows.

- Storage Navigator computer(s).

  For the requirements for the Storage Navigator computers, see Requirements for Windows for the Windows® operating systems and see Requirements for UNIX for the UNIX® operating systems.

  - A Web browser is required on the Storage Navigator computer.
  - Up to 32 Storage Navigator users can concurrently access the same storage system.

- LAN cable 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).

- License keys for Storage Navigator and other program products.

Requirements for Windows

This section explains the requirements for the USP V/VM Storage Navigator computer and the supported Web browsers and Java Runtime Environment™ (JRE™) version(s) for the Windows operating systems.

Table 2-1 Storage Navigator Computer Requirements for Windows

Item	Requirement for Windows Systems		
Operating System	Windows 2000 (Service Pack 2 or later)	Windows XP (Service Pack 2 or later) Windows Server® 2003 Windows Server 2003 R2 Windows Server 2008	Windows Vista™
Processor (CPU)	Intel® Pentium® 4 2.4 GHz or better Recommended: Pentium 4 3 GHz or better	▪ Pentium 4 2.4 GHz or better Recommended: Pentium 4 3 GHz or better ▪ AMD64/EMT64	▪ Pentium 4 2.4 GHz or better Recommended: Pentium 4 3 GHz or better ▪ AMD64/EMT64
Memory (RAM)	512 MB or more Recommended: 1 GB	512 MB or more (Note) Recommended: 1 GB	1 GB or more Recommended: 2 GB
Available hard drive space	300 MB or more	300 MB or more	300 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 1000BASE-T	100BASE-T 1000BASE-T	100BASE-T 1000BASE-T
Note: When you use JRE 6.0 Update 1 as Java Runtime Environment, 1 GB is required for the memory.			

Table 2-2 Supported Web Browser and Java Runtime Environment for Windows

Operating System	CPU	Web Browser	Java Runtime Environment
Windows 2000 (SP2)	Pentium 4	Internet Explorer 5.0 (SP3)	JRE 5.0 Update 11 (1.5.0_11)
Windows XP (SP2)	Pentium 4	Internet Explorer 6.0 (SP2)	JRE 1.4.2_08 JRE 5.0 Update 6 (1.5.0_06) JRE 5.0 Update 7 (1.5.0_07) JRE 5.0 Update 11 (1.5.0_11)
		Internet Explorer 7.0	JRE 6.0 Update 1 (1.6.0_01)
	AMD64/EMT64 (Note 1)	Internet Explorer 6.0 (SP2)	JRE 5.0 Update 11 (1.5.0_11)
		Internet Explorer 7.0	JRE 6.0 Update 1 (1.6.0_01)
Windows Server 2003	Pentium 4	Internet Explorer 6.0 (SP2)	JRE 5.0 Update 7 (1.5.0_07) JRE 5.0 Update 11 (1.5.0_11)
		Internet Explorer 7.0	JRE 6.0 Update 1 (1.6.0_01)
	AMD64/EMT64 (Note 1)	Internet Explorer 6.0 (SP2)	JRE 5.0 Update 11 (1.5.0_11)
		Internet Explorer 7.0	JRE 6.0 Update 1 (1.6.0_01)
Windows Server 2003 R2	Pentium 4 AMD64/EMT64 (Note 1)	Internet Explorer 6.0 (SP2)	JRE 5.0 Update 11 (1.5.0_11)
		Internet Explorer 7.0	JRE 6.0 Update 1 (1.6.0_01)
Windows Vista	Pentium 4 AMD64/EMT64 (Note 1)	Internet Explorer 7.0 (Note 2)	JRE 6.0 Update 1 (1.6.0_01) JRE 6.0 Update 2 (1.6.0_02)

Notes:

1: When you use AMD64/EMT64 as a CPU, the 32-bit version of Internet Explorer and the 32-bit version of JRE are required.

2: When the SVP supports Internet Protocol Version 6 (IPv6), you can specify IPv6 addresses.

If JRE is not installed on the Storage Navigator computer, the following version of JRE will be installed on the Storage Navigator computer when a user logs into Storage Navigator:

- JRE 5.0 Update 11 for Internet Explorer 5.0 or 6.0
- JRE 6.0 Update 1 for Internet Explorer 7.0

Requirements for UNIX

This section explains the requirements for the USP V/VM Storage Navigator computer and the supported Web browsers and JRE version(s) for the UNIX operating systems.

Table 2-3 Storage Navigator Computer Requirements for UNIX

Item	Requirement for UNIX Systems		
Operating System	Solaris™ 8, Solaris 9, or Solaris 10	HP-UX 11.0, HP-UX 11i, or HP-UX 11.31	Red Hat Enterprise Linux AS Ver2.1 and Ver4.0
Processor (CPU)	Solaris 8, Solaris 9 800 MHz UltraSPARC® II or better Solaris 10AMD 64/EMT64T	HP-UX 11.0, HP-UX 11i 800 MHz PA-8000 or better HP-UX 11.31 Itanium 2	Pentium 4 2.4 GHz or better (Recommended: Pentium 4 3 GHz or better)
Memory (RAM)	512 MB or more Recommended: 1 GB	512 MB or more Recommended: 1 GB	512 MB or more Recommended: 1 GB
Available hard drive space	300 MB or more	300 MB or more	300 MB or more
Monitor	Resolution: 1024×768 or better	Resolution: 1024×768 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 1000BASE-T	100BASE-T 1000BASE-T	100BASE-T 1000BASE-T

Table 2-4 Supported Web Browser and Java Runtime Environment for UNIX

Operating System	Web Browser	Java Runtime Environment
Solaris 8 Solaris 9	Mozilla™ 1.4	JRE 5.0 Update 11 (1.5.0_11)
Solaris 10	Mozilla 1.7	JRE 5.0 Update 11 (1.5.0_11) JRE 6.0 Update 1 (1.6.0_01) (Note)
HP-UX 11.0 HP-UX 11.11	Mozilla 1.7.12_00	RTE 5.0.07 (1.5.0_07)
HP-UX 11.31	Mozilla 1.7.13	RTE 5.0.07 (1.5.0_07)
Red Hat Enterprise Linux AS Ver2.1 Red Hat Enterprise Linux AS Ver4.0	Mozilla 1.4	JRE 5.0 Update 11 (1.5.0_11)
Note: When the SVP supports IPv6, you can specify IPv6 addresses.		

Setting Up Storage Navigator

The Hitachi Data Systems representative installs the SVP software and LAN cabling. Document the serial numbers (SNs) and IP addresses of each USP V/VM, because these numbers are required for Storage Navigator operations.

It is important to verify that you have a unique IP address for each SVP, to avoid any conflicts. If a conflict occurs, determine the SVP IP addresses of all connected storage systems, and obtain a unique IP address for the desired storage system. You can also contact the Hitachi Data Systems Support Center for assistance in assigning IP addresses.

Configuring the Web Browser

To connect to the desired USP V/VM SVP and use the Storage Navigator Java application program, a Web browser is required on the Storage Navigator computer. How to configure your Web browser may differ depending on the version of your OS or your Web browser. For details on how to configure your Web browser, please refer to the online help for your Web browser.

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

To configure your Web browser:

1. Make sure that the Storage Navigator computer 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.

   For Internet Explorer, select **Tools**, **Internet Options** from the menu bar of the Web browser, and then click the **Privacy** tab. Click **Advanced** in the middle of the Privacy dialog box. In the Advanced Privacy Settings dialog box, configure as follows:

   - Check the **override automatic cookie handling** option
   - Select **Accept** for **First-party Cookies**
   - Select **Accept** for **Third-party Cookies**
   - Check the **Always allow session cookies** option

   For Mozilla, do not select the **Disable cookies** option.

3. Make sure that your Web browser does NOT block pop-up windows.

For Internet Explorer, clear the **Block pop-ups** check box on the bottom of the Privacy dialog box.

For Mozilla, clear the **Block Pop-up Windows** check box.

4. Install Java Runtime Environment (see System Requirements for the appropriate version for your operating system). Download JRE from the Java Web site at http://java.sun.com/products/archive/. If the Storage Navigator computer is not connected to the Internet, download JRE install program, and then copy the install program to install JRE on the Storage Navigator computer. For the procedure to install JRE, follow the instructions on the JRE install guide.
   - For Windows systems, if JRE is installed successfully, the Java is displayed in the Control Panel. Please confirm that you can activate the JRE by the Java icon.
   - For UNIX systems, please confirm that you can open the ControlPanel.html file in the directory where JRE is installed.

   If JRE is not installed on the Storage Navigator computer running on Windows, JRE is automatically installed via the Internet when you log in to Storage Navigator.
5. On the Web browser, display the storage device list (see Storage Device List Dialog Box) and register the storage system information (see Editing the Storage Device List).
6. Add the URL of the storage device list and Tool Panel (see Tool Panel) to the favorites or bookmarks of your Web browser.

Configuring Storage Navigator over a Firewall

When connecting Storage Navigator and the SVP over a firewall, make sure to connect them through the following TCP/IP port numbers to configure the firewall:

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

Caution: If the operating system of your Storage Navigator computer is Windows Vista, you must configure a firewall so that Storage Navigator and the SVP can communicate through these ports because Window Vista uses a firewall by default.

Registering the Primary SVP Host Name

If you want to use the host name instead of IP address to specify the SVP in the URL of the Storage Device List, you need to register the host name and IP address to the DNS server, or you need to register them to the host file of the Storage Navigator computer, which is the client PC.

Register the host name to the DNS server or the hosts file as follows:

- DNS setting: 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 setting: Add the IP address and host name of the SVP to the host file of the Storage Navigator computer. The general directory of the hosts file is as follows:
  - Windows XP: C:\WINDOWS\system32\drivers\etc\hosts
  - UNIX: /etc/hosts

You can register any host name to DNS server or the hosts file, but there are restrictions on the letters you can use for the host name (see Storage Device List Dialog Box).

If you acquire the public key certificate for the SSL-encrypted communication from the CA (Certificate Authority), you will need to register the server name, which is entered to the certificate as Common Name, as the host name to the DNS server or the hosts file. For the SSL-encrypted communication, see the *Encrypted communications User's Guide.*

Configuring Java

This section describes the procedures to configure Java for each JRE version. You need to configure Java to enable trace and logging to save the Java log file when an application error occurs in the Storage Navigator computer. Also, to prevent unexpected complications when the microprogram is updated, we recommend that you disable caching.

Caution: To allow Storage Navigator to access the SVP via a proxy server using HTTP, set the proxy server on your Web browser. After the setting, Storage Navigator accesses the SVP using the proxy server.

If you have set the SVP as an exception on the proxy setting of the Web browser, it means that the proxy server is not used for accessing the SVP. In this case, make the setting for Java the same as the Web browser setting.

JRE 1.4

For JRE 1.4, you do not need to enable trace and logging because trace and logging are enabled by default.

To disable caching and configure proxy setting for the Java execution:

1. Start Java (TM) Plug-in Control Panel.
   - For Windows: Go to the Windows Control Panel and double-click the Java Plug-in icon.
   - For UNIX: Do one of the following:

     Launch the Java (TM) Plug-in Control Panel executable file. The file is stored in one of the following locations:

     ```
     <SDK installation directory>/jre/bin/ControlPanel
     <SDK installation directory>/bin/ControlPanel
     <JRE installation directory>/bin/ControlPanel
     ```

     or

     Use your Web browser to display the Control Panel page. The file is stored in one of the following locations:

     ```
     <SDK installation directory>/jre/ControlPanel.html
     <JRE installation directory>/ControlPanel.html
     ```
2. Click the **Cache** tab to display the Cache dialog box.
3. Clear the **Enable Caching** check box on the Cache dialog box (see Figure 2-1).
4. If necessary, configure the proxy setting on the Proxies dialog box as the Web browser setting.
5. Click **Apply**.
6. Click  to close Java (TM) Plug-in Control Panel.

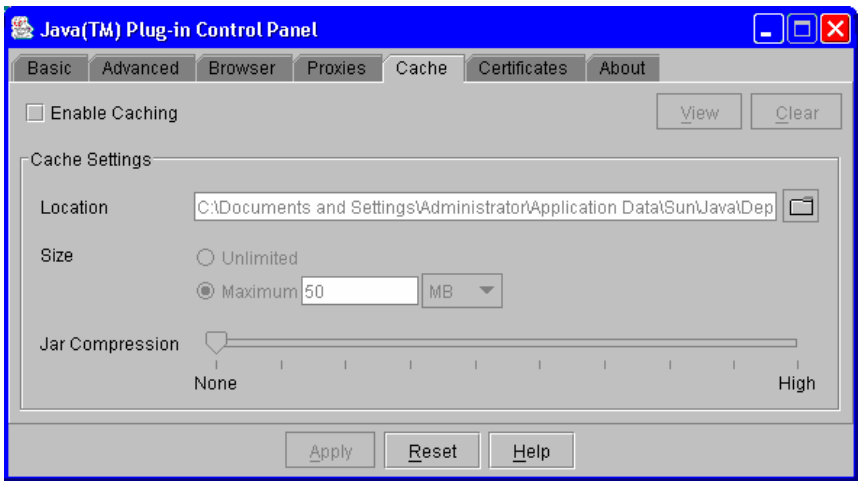


Figure 2-1 Cache Dialog Box of Java (TM) Plug-in Control Panel

JRE 5.0 or JRE 6.0

To enable trace, disable caching, and configure proxy setting for the Java execution:

1. Start Java Control Panel.
   - For Windows: Go to the Windows Control Panel and double-click the Java icon.
   - For UNIX: Do one of the following:

     Execute the Java Control Panel executable file. The file is stored in one of the following locations:

     ```
     <SDK installation directory>/jre/bin/ControlPanel
     <SDK installation directory>/jre/ControlPanel
     <JDK installation directory>/jre/ControlPanel
     ```

     or

     Use your Web browser to display the Control Panel page. The file is stored in one of the following locations:

     ```
     <SDK installation directory>/jre/ControlPanel.html
     <JDK installation directory>/ControlPanel.html
     ```
2. Click the **Advanced** tab of Java Control Panel.
3. Double-click **Debugging** in the tree.
4. Under **Debugging**, select the **Enable tracing** check box and the **Enable logging** check box (see Figure 2-2).
5. Click the **General** tab of Java Control Panel.
6. Click **Settings** in Temporary Internet Files to display the Temporary Files Settings dialog box.
7. Do the following in the Temporary Files Settings dialog box.
   - For JRE 5.0: Select **Maximum** in the **Amount of disk space to use** and enter zero (**0**) (see Figure 2-3).
   - For JRE 6.0: Clear **Keep temporary files on my computer.** check box (see Figure 2-4).
8. Click **OK** to close the Temporary Files Settings dialog box.
9. If necessary, configure the proxy setting on the Network Settings dialog box as the Web browser setting.
   To display this dialog box, click the **General** tab of Java Control Panel and click the **Network Settings** button**.**
10. Click **Apply**.
11. Click **OK** to close Java Control Panel.

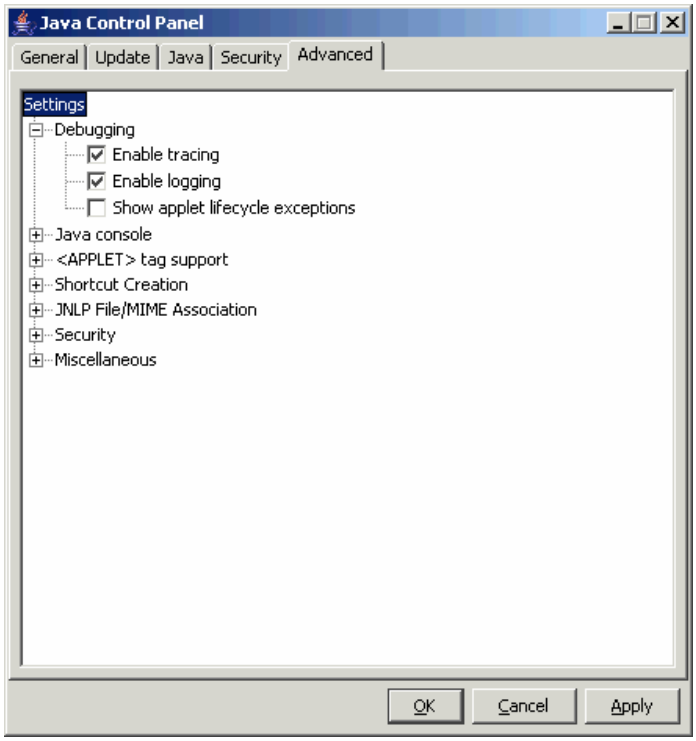


Figure 2-2 Advanced Dialog Box

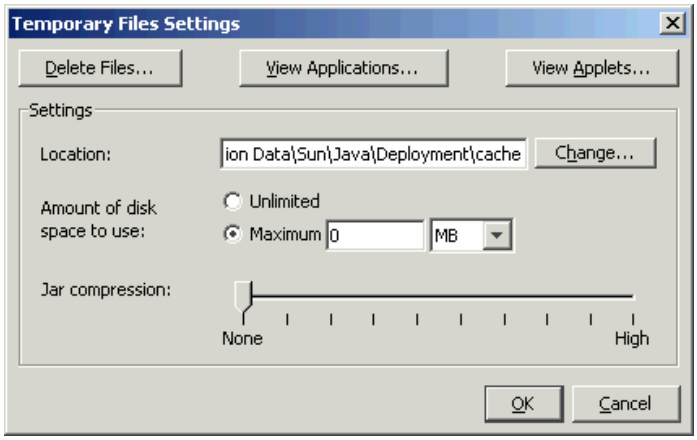


Figure 2-3 Temporary Files Settings Dialog Box (For JRE 5.0)

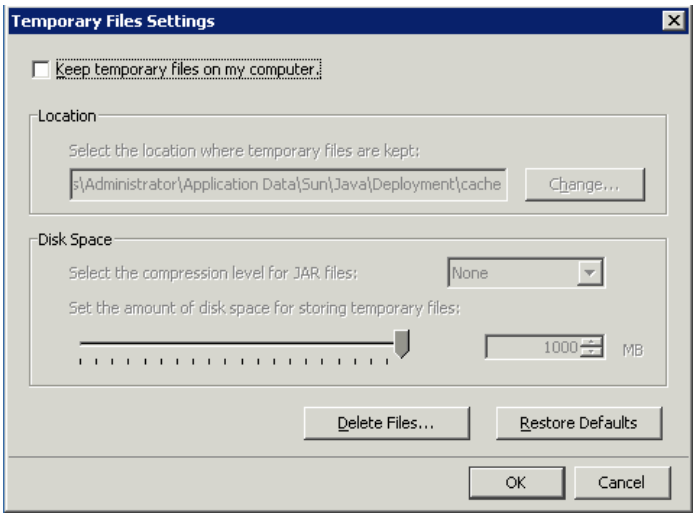


Figure 2-4 Temporary Files Settings Dialog Box (For JRE 6.0)

Configuring Communications over only IPv6

Internet Protocol Version 6 (IPv6) can also be used for communications between a Storage Navigator computer and an SVP. To communicate over only IPv6, both a Storage Navigator computer and an SVP must be configured to use only IPv6 for communications. For information on how to configure an SVP, contact the Hitachi Data Systems Support Center (see Calling the Hitachi Data Systems Support Center).

If you want to use both IPv4 and IPv6 for communications, do not apply the setting described in this section. In this case, IPv4 has a priority over IPv6.

This section explains how to configure a Storage Navigator computer when its operating system is Windows Vista or Solaris 10 operating systems. For other operating systems, please contact the developers of the operating systems.

- For Windows Vista

  To configure a computer to use only IPv6 for communications:

1. Select the Windows **Control Panel**, **Network and Sharing Center**, and then **Manage network connections**.
2. Select and right-click a network that connects an SVP, and click **Properties** in the pop-up menu.
3. Click **Continue** if the User Account Control dialog box appears.

   The Networking dialog box (Figure 2-5) displays properties of the selected network.
4. Clear the **Internet Protocol Version 4 (TCP/IPv4)** check box.
5. Click **OK** to close the dialog box.

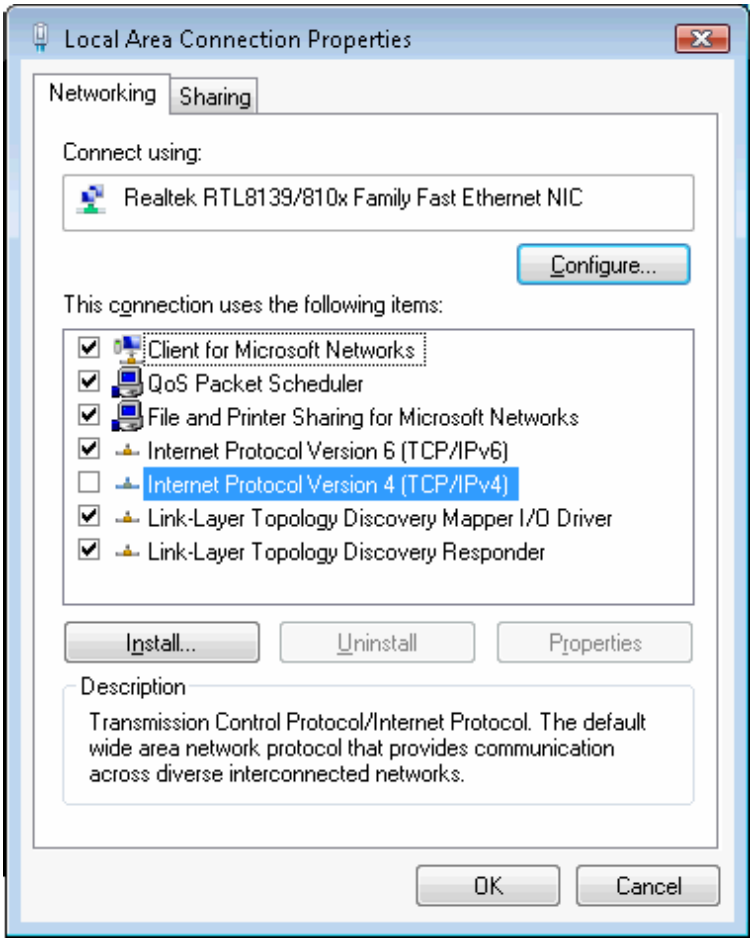


Figure 2-5 Networking Dialog Box (for Windows Vista)

- For Solaris 10

  To configure a computer to use only IPv6 for communications:

1. Start the console.
2. Execute the following command.

```
ifconfig network-interface-name inet down
```

Storage Navigator Conventions

General Parameters

- On most Storage Navigator windows, if you specify different settings for the values on the window, the text color of that value changes to blue or the icon changes, but the changes are not implemented until you click **Apply**. Table 2-5 describes the text colors and font types displayed on the Storage Navigator windows.

Table 2-5 Text Color and Font Type Displayed on Windows

Color and font type	Description
Blue bold italic	Indicates that you have changed settings on the window, but the changes are not yet implemented. To implement the changes, click **Apply**.
Red italic	Used for Performance Monitor and Server Priority Manager. For more information, see the *Performance Manager User's Guide.*
Green bold	Used for the copy function of LUN Manager. For more information, see the *LUN Manager User's Guide*.

- You can create and store up to 20,000 settings or operations before actually applying them to the storage system. To avoid a possible error, do not apply more than 20,000 settings at a time.
- The layout of a Storage Navigator window is reset when you click **Apply**, **Cancel**, **Refresh** () on the **File** menu, **Refresh All** () on the **File** menu, or when you switch tabs.
- When you click **Refresh All** () on the **File** menu, the information in the SVP is also updated. Therefore, the processing caused by **Refresh All** () on the **File** menu takes time until it has been completed.
- If there is difference between the configuration information displayed on the Storage Navigator and the actual configuration information that can be recognized from the host, the configuration information displayed on the Storage Navigator may be updated by clicking **Refresh All** () on the **File** menu.
- Do not change the clock time of the Storage Navigator computer while you are using Storage Navigator.

  Log in to Storage Navigator again after you have changed the clock time of the Storage Navigator computer.
- When the microprogram is being updated on the SVP, you must exit and restart all Web browsers on the Storage Navigator.
- If a Storage Navigator user is applying settings, you are not able to log into 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 request a change to the storage system configuration while another change is being made, an error message is displayed.
  - If the error occurs while you are logging in or clicking **Apply** to implement changes, wait for a few minutes, and retry the operation.
  - If the error occurs while you are either switching between **Modify** mode and **View** mode, or switching tabs, wait for a few minutes then click **Refresh** () on the **File** menu 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 storage system releases the **Modify** mode, and you are returned to **View** mode. You can also change the timeout period. After the **Modify** mode is released, the error occurs with the following timing: clicking **Apply**, **Refresh** () on the **File** menu, **Refresh All** () on the **File** menu, or mode changing buttons (). You can see Storage Navigator information.
- When the ShadowImage or ShadowImage for IBM z/OS quick restore operation is being performed, a Storage Navigator window 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 click **Refresh** () on the **File** menu, or **Refresh All** () on the **File** menu to update the Storage Navigator window.
- Do not adjust your computer display while using Storage Navigator (for example, changing the screen resolution or logging in by using the Remote Desktop feature of Microsoft®). If you do so and see unexpected results, return to normal display by restarting Storage Navigator.

Note: Certain screen savers change the screen resolution automatically, so you should not use them while using Storage Navigator.

- Make sure that the Storage Navigator computer does not enter standby or hibernate mode while using Storage Navigator.

  For example, do not manually switch to standby or hibernate mode. Also, do not configure the Storage Navigator computer to automatically enter standby or hibernate mode if no operation is performed for a certain period of time.

  If the Storage Navigator computer enters standby or hibernate mode, and then returns to normal mode, you need to restart Storage Navigator.
- If software that has an auto login function is installed in your Storage Navigator computer, you need to disable the auto login function.
  The auto login function automatically submits a user ID and password by using the autocomplete function of a Web browser, so that users can automatically log in to a program.

Keystrokes and Navigation

- Table 2-5 lists and describes the text colors and font types displayed on the Storage Navigator windows.
- In general, you can select an object on a window by clicking the mouse. Certain commands can be displayed by right-clicking an object. In some cases you can use the 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.
- You cannot use the **Home**, **End**, or **Delete** keys for Storage Navigator operations.
- Do not hold down the arrow keys or the Enter key for a while when a tree or list is selected. Instead, press these keys multiple times.
- As a general rule, you can only enter alphanumeric characters (ASCII codes) into a text box. There are certain exceptions, including the following:
  ” \ ; : * ? < > | / # & + = ,
  Which symbols are and are not usable depends on the window and the program product options. For further information, see the corresponding sections or documents.
- 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 windows, and then log in again.
- You cannot drop an object to an area or location where no object exists. 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. 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.

See Troubleshooting for troubleshooting (errors and actions during operations on the Storage Navigator computer).

UNIX

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

- Storage Navigator windows:
  - You cannot change the window size.
  - The styles and colors of some windows are displayed differently from those windows displayed on Windows systems.
- Mozilla browser:
  - If a java_vm process or a Mozilla 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 Mozilla 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 shell:

  B Shell:

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

  C Shell:

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

- Volume Migration and Server Priority Manager windows:
  - You cannot drag and drop objects on the Volume Migration and Server Priority Manager windows. You must use the buttons instead.
  - If you select the icon for the Storage Navigator main window when you are using either Volume Migration or Server Priority Manager, these windows may be wholly or partially obscured behind the Storage Navigator main window. Before you can use the Storage Navigator main window, close these windows by clicking the ✕ button. This terminates the process. If you want to continue the process, select the Volume Migration or Server Priority Manager window to bring it to the foreground.
  - The Close button (✕) on the Volume Migration window and the Server Priority Manager window remains active even if you click **Apply**, and the processing is being executed. If you click the ✕ button after clicking **Apply**, the window closes but processing continues.

  - For the first two operations only, the word "Loading..." is displayed on the message dialog box of the Volume Migration window and the Server Priority Manager window. This message does not appear for the third and later operations.

- When you use the Storage Navigator on UNIX workstations, you cannot drag and drop objects on the LUN Manager window. You must use the buttons instead.
- When you use the Storage Navigator on HP-UX workstations, if you select any part of the Storage Navigator main window while a dialog box is open, that dialog box may be wholly or partially obscured behind the Storage Navigator main window. Before you can use the Storage Navigator main window, close the obscured dialog box first.

Windows Server 2003

If you are using a Windows Server 2003 computer, the following operations will be necessary. When you use the Storage Navigator for the first time, you must perform the following operation in Internet Explorer before using the Storage Navigator.

1. Select **Tools** and then **Internet Options** from the menu bar of Internet Explorer. The Internet Options dialog box appears.
2. Click the **Advanced** tab. The Advanced dialog box appears (see Figure 2-6).
3. Clear the **Do not save encrypted pages to disk** check box.
4. Click **OK** to close the Advanced dialog box.

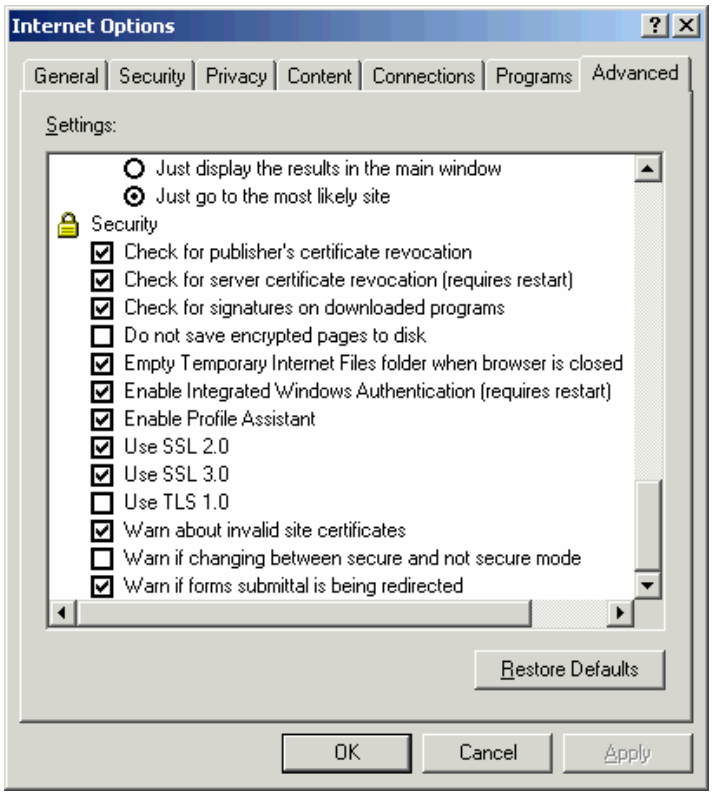


Figure 2-6 Advanced Dialog Box (Internet Options, Internet Explorer)

If a page is not displayed because of an "Invalid syntax error", you must register the URL of the desired SVP to the trusted site with the following procedures.

1. Select **Tools** and then **Internet Options** from the menu bar of Internet Explorer.

   The Internet Options dialog box appears.

2. Click the **Security** tab.

   The Security dialog box appears (see Figure 2-7).

3. Click Trusted sites.
4. Click **Sites**.

   The Trusted sites dialog box appears (see Figure 2-8).

5. Input the URL of the desired SVP to the **Add this Web site to the zone:** box.
6. Click **Add**.
7. Click **Close** to close the Trusted sites dialog box.
8. Click **OK** to close the Security dialog box.

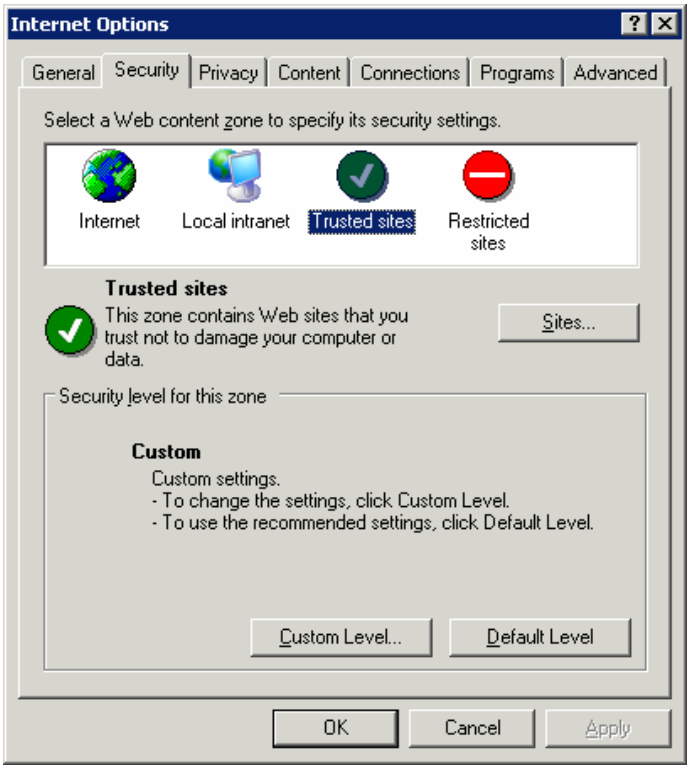


Figure 2-7 Security Dialog Box (Internet Options, Internet Explorer)

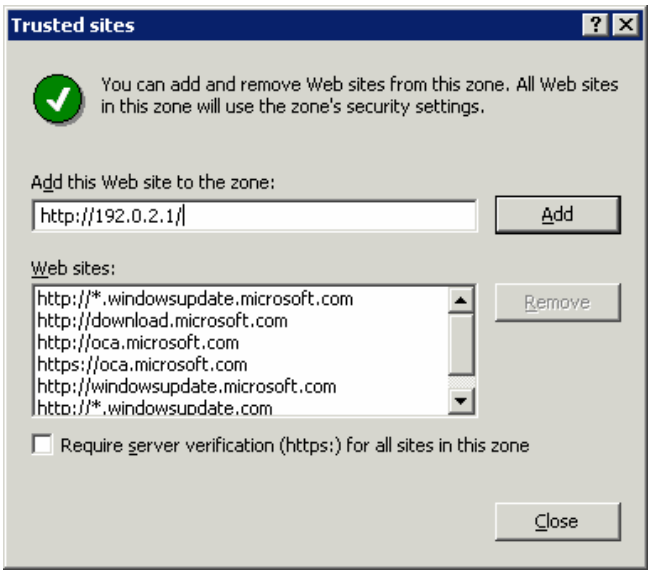


Figure 2-8 Trusted sites Dialog Box (Internet Explorer)

Starting Up and Logging Into Storage Navigator

This section explains overview of login procedure and how to log in to a storage system.

Overview of Login Procedures

Important: Because the initial user ID "root" has root administrator authority, one of the first tasks for the Storage Navigator root administrator should be to change the password, in order to maintain protection of the root-only and restricted functions. If you are logging in to Storage Navigator for the first time, use the initial user ID (root) and password (root) to log in as a storage administrator, and then change the password. Note that you cannot change the user name for the root user ID. All user IDs and passwords are case-sensitive. If the root 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 USP V/VM Storage Navigator (Java client) users are required to log in to the Storage Navigator SVP (Web server) with a valid user ID and password before executing the Storage Navigator Java application program. A storage administrator with the **Account Administrator Role** set to **Modify** can register the Storage Navigator user accounts (see Account Window).

The following figure shows an overview of the log in process.

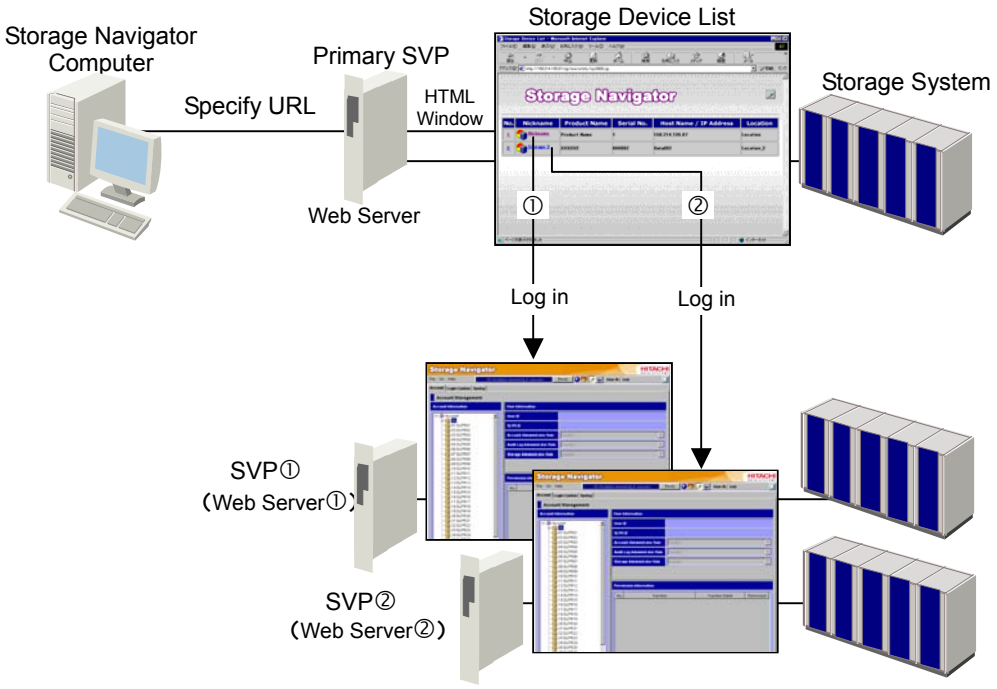


Figure 2-9 Log in Process

Table 2-6 Specifications and Restrictions Concerning Login Operations

Item	Specification
Maximum number of concurrent users	The USP V/VM can support up to 32 concurrent users. The exceptions are displaying the Performance Monitor window and executing the Export Tool, where the limit is two concurrent users.
Logging in to multiple SVPs (Web servers)	The same user can concurrently log in to more than one SVP, by opening a storage device list, downloading the Java application program from each SVP, and executing the Java application on separate Web browser windows. If you execute multiple Java application programs for multiple SVPs, insufficient memory may degrade performance.
Logging in to the same SVPs (Web servers) more than once concurrently	The same user (ID) may not have multiple concurrent sessions with the same SVPs (Web servers).
Security measure	If you have failed to log in three times with the same user ID, Storage Navigator stops replying for one minute. However, it is not a system failure.
Login history	All login information, including user ID, login and logoff time, is recorded in the audit log file, so that unauthorized access can be detected.
Automatic logout operation	In case a user cannot normally log out, you can set the user to be automatically logged out from the SVP after a specific period of time. This period of time can be specified by the storage administrator with the **Storage Administrator Role** set to **Enable.**

Permission for Accessing Local Client Files

Java applications have a security feature that prohibits the Java applications from accessing local files on client computers. To use Storage Navigator, you must give Storage Navigator permission to access local files on your computer.

The following figure shows the concept of the Java application security.

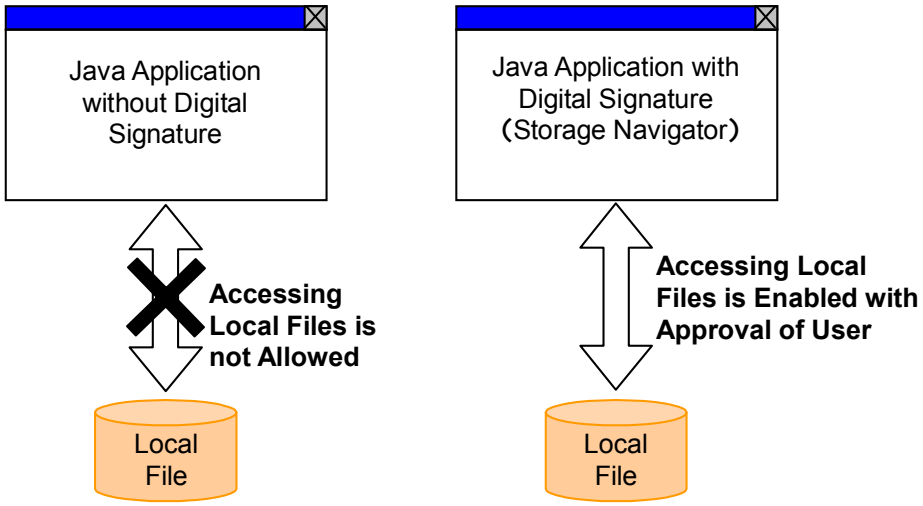


Figure 2-10 Concept of Java Application Security

The figure shows that Storage Navigator with digital signature can access local files with user approval. The Storage Navigator digital signature has an expiration date and it might be expired depending on the Storage Navigator version that you use. Even though the digital signature is expired, you can continue using Storage Navigator.

The dialog box that appears when you log in to Storage Navigator depends on the JRE versions. Refer to the following description and take the appropriate action in the displayed dialog box.

- For JRE 1.4

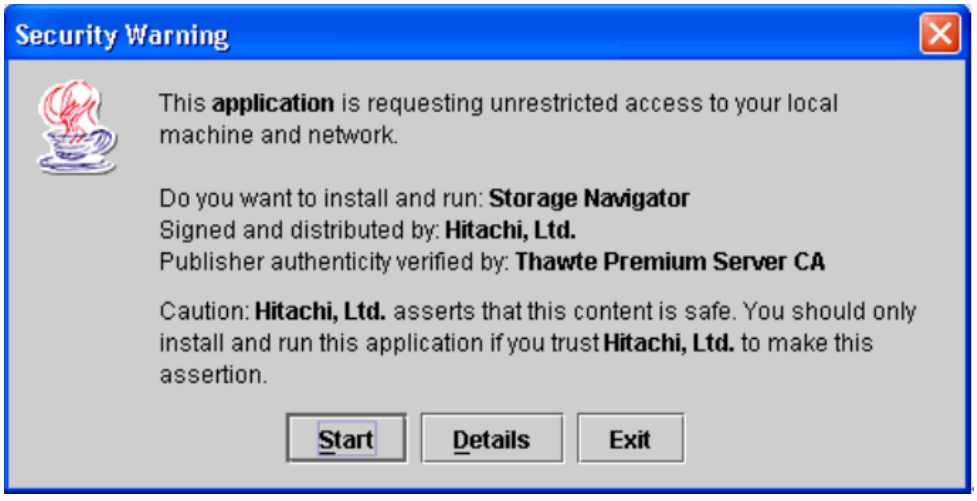


Figure 2-11 Security Warning Dialog Box (for JRE 1.4)

The items on this dialog box are as follows:

- **Start** allows you to log in to Storage Navigator (regardless of whether the digital signature is expired).
- **Details** allows you to view detailed information about the Java application.
- **Exit** prohibits you from using Storage Navigator.

- For JRE 5.0 or JRE 6.0

  One of the following dialog boxes will be displayed depending on your operational environment.

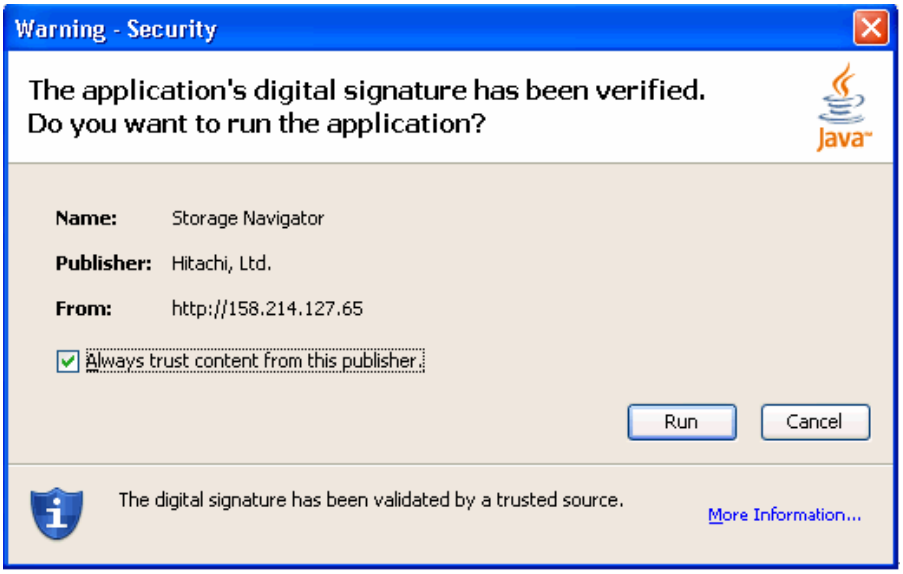


Figure 2-12 Warning - Security Dialog Box (for JRE 5.0)

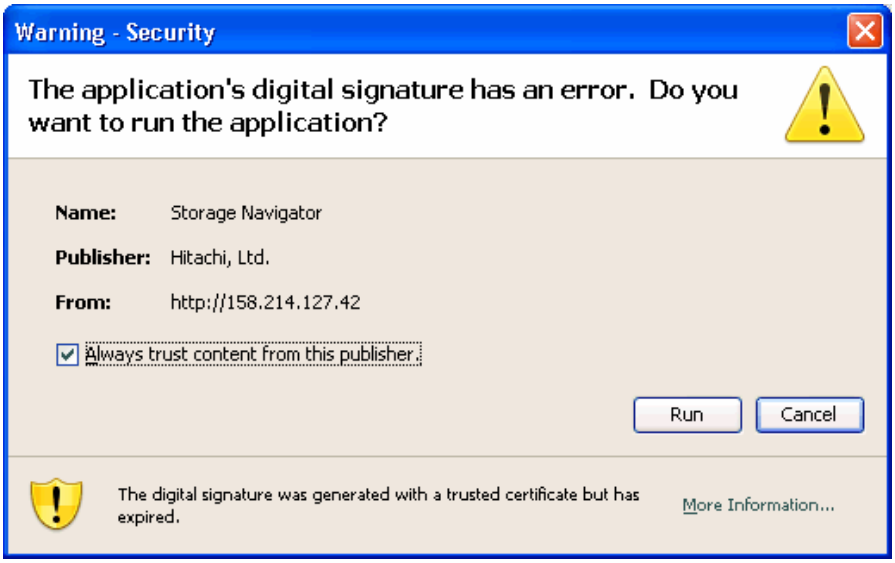


Figure 2-13 Warning - Security Dialog Box When Digital Signature is Expired (for JRE 5.0)

The items on these dialog boxes are as follows:

- **Always trust content from this publisher.**

  Selecting the **Always trust content from this publisher** check box means that you approve Storage Navigator as a secure Java application and that local file access is ensured from now on (regardless of whether the digital signature is expired).

  If you select the **Always trust content from this publisher** check box and click **Run**, Storage Navigator is always allowed to access the local files and you will not see this dialog box again.
- **Run** allows you to log in to Storage Navigator (regardless of whether the digital signature is expired).
- **Cancel** prohibits you from using Storage Navigator.

Logging In to a Storage System

You must add the desired storage systems to the Storage Device List on the primary SVP (Web server), before logging in to any SVP. You must be a storage administrator with the **Storage Administrator Role** set to **Enable** to edit the Storage Device List. See Editing the Storage Device List for instructions. See Table 2-6 for specifications and restrictions concerning log in operations.

To log in to a storage system:

1. Start the Storage Navigator computer, and start your Web browser.
2. To open the Storage Device List dialog box, specify the URL of the primary SVP (see Storage Device List Dialog Box).

Caution: When logged in to Storage Navigator from the **Storage Device List** of one SVP, do not display the **Storage Device List** of another SVP in the same Web browser or your will start two sessions and Storage Navigator will not function properly.

Note: If you are using a Windows Server 2003 computer, a message may appear informing you that the enhanced security configuration is enabled on the computer. If this message appears, click **In the future, do not show this message** and **OK**.

3. Click the hyperlink (either in the **No.** column or the **Nickname** column) of the desired SVP. The following actions might be required depending on your operational environment. After these actions are completed, the Login dialog box appears (see Figure 2-14).

   If a dialog box appears and asks whether you want to run the application, follow the instruction in Permission for Accessing Local Client Files.

If the SVP is set to support SSL-encrypted communication, security messages might appear. For details, see Using SSL-Encrypted Communication.

If you are using a Windows Server 2003 computer, a message as shown in Figure 2-18 may appear. If this message appears, take the steps described in Using Windows Server 2003.

If you are using Windows and the JRE is not installed on the Storage Navigator computer, JRE is automatically installed via the Internet when you log in to Storage Navigator. However, an error such as shown by Figure 2-15 can occur because of the condition of the download server. If an error occurs, download JRE from the Java Web site (see Configuring the Web Browser).

4. Type the user ID and password.

Note: If you have failed to log in three times with the same user ID, Storage Navigator stops replying for one minute. However, it is not a system failure.

5. Click **Login** to log in to the primary SVP.

   The Storage Navigator main window opens (see Figure 3-1).

   If the SVP is set to support SSL-encrypted communication, the Security Information dialog box may appear (depending on the Web browser you use). If it displays, click **Yes** to open the Storage Navigator main window.

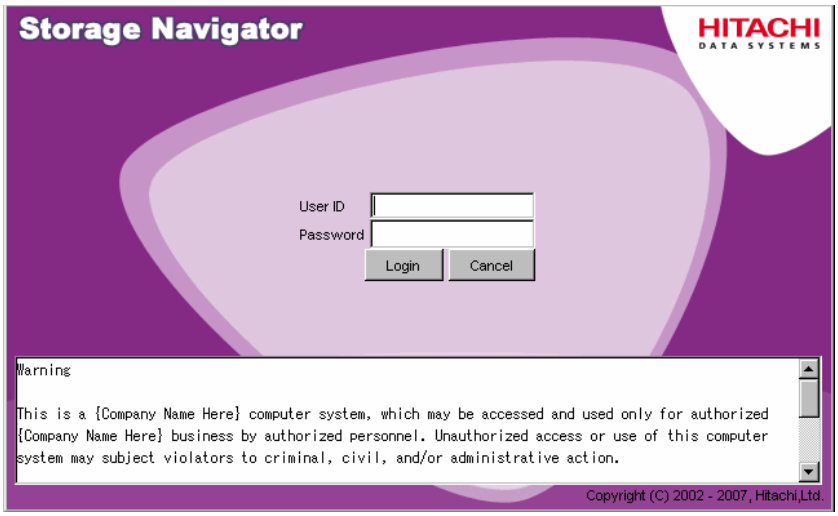


Figure 2-14 Login Dialog Box

Figure 2-15 Error Message on JRE Installation

Using SSL-Encrypted Communication

If the SVP is set to support SSL-encrypted communication, the Security Alert dialog box (see Figure 2-16) is displayed when you log in to Storage Navigator or when you log in to dialog boxes from Storage Device List or Tool Panel. Click **OK** on the Security Alert dialog box. Furthermore, the Security Alert dialog box for the certificate (see Figure 2-17) may also be displayed. If the Security Alert dialog box for the certificate is displayed, click **View Certificate** to confirm that the certificate is correct, and click **Yes**.

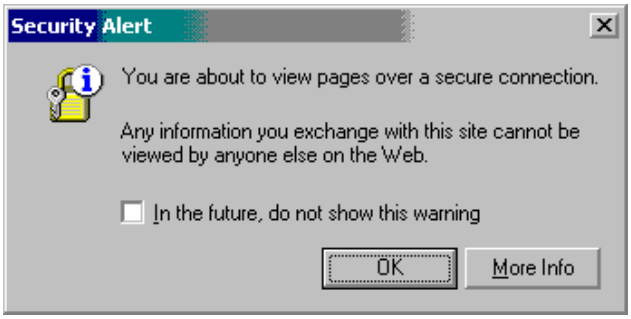


Figure 2-16 Security Alert Dialog Box

* Displayed statements and icons may be different.

Figure 2-17 Security Alert Dialog Box for the Certificate

Using Windows Server 2003

If you are using a Windows Server 2003 computer, a message as shown in Figure 2-18 may appear during the login operation. If this message appears, take the following steps.

1. Click **Add** in the message dialog box.

   The Trusted Sites dialog box appears (see Figure 2-8).

2. In **Add this Web site to the zone**, enter the URL of the SVP that you want to log in.

   If you do not know the URL, check the Storage Device List dialog box 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`.

3. Click **Add**.

   The URL of the SVP is added to the **Web sites** list.

4. Click **Close**.

   The Trusted Sites dialog box closes.

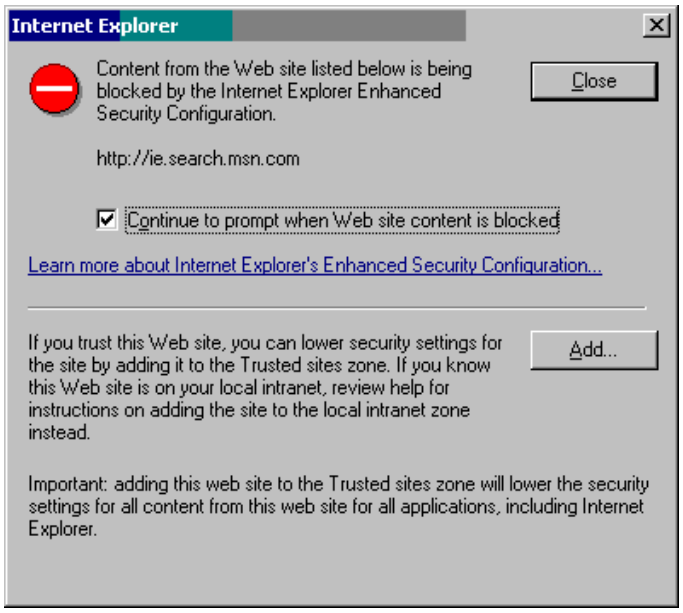


Figure 2-18 Internet Explorer Message (This May Appear When You Log into the SVP from a Windows Server 2003 Computer)

Changing Between View Mode and Modify Mode

Storage Navigator has two modes of operation: **Modify** mode and **View** mode.

- **View** mode is for viewing the settings of the storage system. The operation mode is in the View mode when you log in to Storage Navigator.
- **Modify** mode locks the setting operation of other users so that the other users cannot change the settings of the storage system.

  You must operate in the **Modify** mode to change the settings of the storage system. You also need the operation authority of the function to change the settings of the storage system. For detailed information on setting the operation authority, see Changing User Operation Authority.

Only one user can be in the **Modify** mode for each storage system. While a storage administrator is in the **Modify** mode, all other users can only view the storage system information in the **View** mode. If the storage system is partitioned, only one user can be in the **Modify** mode for each SLPR. Any other users in the allocated SLPR can only view the storage system information in the **View** mode. Some dialog boxes are not displayed in **View** mode. To view such information in **View** mode, view the Basic Information display dialog box.

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

1. Verify that the icon is displayed, which indicates that the storage system is unlocked.

2. Click the **Mode Changing** icon, which should be in **View** mode ( ). 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. Also the progress bar that shows the remaining time period for **Modify** mode is displayed on the Storage Navigator main window (see Extending the Modify Mode Timeout Period).
3. Once you have applied your desired changes, change back to **View** mode. Click the **Mode Changing** icon ( ).

Extending the Modify Mode Timeout Period

When you change from the **View** mode to the **Modify** mode, a progress bar showing the **Modify** mode timeout period appears on the Storage Navigator main window.

Figure 2-19 Progress Bar Showing the Modify Mode Timeout

The progress bar shows the remaining time period in which the **Modify** mode is available. The remaining time period for the **Modify** mode is also numerically displayed on the progress bar. The default of the Modify mode timeout period is 30 minutes. You can click the **Reset** button on the right of the progress bar to extend the **Modify** mode time period. For example, if the **Modify** mode timeout period is set as 30 minutes (default), the **Modify** mode time period is extended for 30 minutes, as you click the **Reset** button.

If you do not access the SVP while in **Modify** mode, the progress bar decreases. When you reach the specified **Modify** mode timeout period, **Modify** mode is released.

Note: If **Modify** mode is released due to time out, the settings made but not yet applied to the storage system will be canceled on some windows. Therefore, make sure that you have enough time remaining in **Modify** mode to complete your work by clicking **Reset** while you are using the following windows:

- V-VOL window
- All windows and dialog boxes used for TrueCopy, Universal Replicator, and ShadowImage operations
- All windows and dialog boxes used for TrueCopy for IBM z/OS, Universal Replicator for IBM z/OS, and ShadowImage for IBM z/OS operations
- Volume Security window
- All windows and dialog boxes used for Universal Volume Manager operations

- License Key window

You can change the default **Modify** mode timeout period with the **RMI time-out period for Modify** parameter on the Set Env. dialog box. You have to log in as a storage administrator with the **Enable** authority of **Storage Administrator Role** to change the setting of **RMI time-out period for Modify**. See Setting the Environment Parameters for instructions). If you disable this parameter by specifying **NO**, the progress bar that shows the **Modify** mode timeout period is not displayed on the Storage Navigator main window even though the mode is changed to **Modify**.

License Keys

A license key is a textual key 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 storage system serial number and option ID input, each storage system requires a unique license key code. License key codes for each option (including the Java application) and storage system are provided when you purchase program product options.

To input license key, enter a license key code or a license key file which the multiple license key codes are written in. The license key file is provided when you purchase program product options.

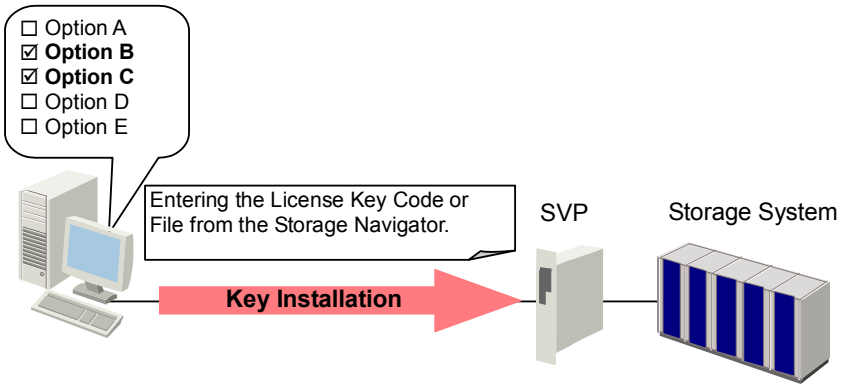


Figure 2-20 Overview of License Keys and Option Installation

The following table describes the types of license keys:

Table 2-7 License Key

Type	Description	Expiration	Usable Capacity
Temporary	License key for trial use (Try & Buy).	120 days	No upper limit
Permanent	License key for purchase.	No limit	Each program product option has an upper limit of the volume capacity that can be used.
Term	License key for purchase. Note that only days when the program product option is activated with the Term key are deducted from 365 days.	365 days	Each program product option has an upper limit of the volume capacity that can be used.
Emergency	License key for emergency use.	30 days	No upper limit

Temporary Key

A temporary 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 window when you start the Storage Navigator option. 120 days after the temporary license key is installed, 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. After the temporary key has expired, you cannot re-install the temporary key for 180 days.

- When the license key of a program product expires, the license key of the program product which requires the expired program product will be also disabled.
- For TrueCopy for IBM z/OS, TrueCopy, ShadowImage for IBM z/OS, 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. 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, Cache Residency Manager for IBM z/OS, Cache Residency Manager, Compatible PAV , and Compatible Hyper PAV, 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 Server Priority Manager, 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.

Permanent Key

A permanent key is purchased if you want to use program product options indefinitely. A permanent key has an upper limit of volume capacity that can be used for each program product option.

Before purchasing the permanent key, you need to estimate the volume capacity that can be used for the program product option. This volume capacity is called the licensed capacity. If you add volumes and the available amount of volume capacity exceeds the licensed capacity, **Capacity Insufficient** will be displayed in **Status** in the License Key window. In this case, you need to purchase the additional license to cover the capacity shortage within 30 days. For details on the licensed capacity, see Licensed Capacity.

If you use Dynamic Provisioning, the licensed capacity might become insufficient even though you did not add any volumes. When you use Dynamic Provisioning, see the *Dynamic Provisioning User's Guide* for details on the license capacity.

Term Key

A term key is purchased if you want to use the program product option for specified days.

- The term key is available for 365 days.
- You can set the term key to enable or to disable for each program product option.

  Only days when the program product option is enabled with the Term key are deducted from 365 days when the date changes.
  For example, if the term key is set enable for 150 days and set disable for 100 days since you installed the license key, the remaining days are 215 days, which is calculated by 365 minus 150, although 250 days have passed in total.

  You can save the expiration of the term key by setting the term key to disable when you are not using the program product option.
- The term key, as same as the permanent key, has a limit of the volume capacity that can be used for each program product option.

If you add volumes and the available amount of volume capacity exceeds the licensed capacity, **Capacity Insufficient** will be displayed in **Status** in the License Key window. In this case, you need to purchase the additional license to cover the capacity shortage within 30 days. For details on the licensed capacity, see Licensed Capacity.

If you use Dynamic Provisioning, the licensed capacity might become insufficient even though you did not add any volumes. When you use Dynamic Provisioning, see the *Dynamic Provisioning User's Guide* for details on the license capacity.

- If the term key has expired, you can install program product option with another license key.

  When the term key has expired, **Not Installed** is displayed in the **Status** in the License Key window. You can install the temporary key, the term key, the emergency key, or the permanent key to the program product option in this status.

- When the license key of a program product (A) expires, the license key of the program product (B) which requires the expired program product (A) will be also disabled.

  In this case, **Not Enough** is displayed in the **Status** of the program product (B) in the License Key window.

Emergency Key

An emergency license key is used in situations where the temporary key or the term 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 key or the term key.

- An emergency key is effective for 30 days.

  If you forcibly install an emergency key to an option that has already the permanent key or the term key, the license of that option will expire in 30 days.

- When the license key of a program product expires, the license key of the program product which requires the expired program product will be also disabled.

Licensed Capacity

The licensed capacity is volume capacity which you are licensed to use with the program product option. You need to estimate the amount of volume capacity which you want to use with the program product option before you purchase the permanent key or the term key. The licensed capacity has three types depending on the program product option.

This section explains the licensed capacity type and how to estimate the licensed capacity. For details on which licensed capacity type should be estimated for the program product option, see Storage Navigator Options.

The licensed capacity has three types:

- Used capacity

  The licensed capacity is calculated from the capacity that the program product option will use. See below for how to calculate the licensed capacity

- Mounted Capacity

  The licensed capacity is calculated from the capacity mounted in the entire disk drive of the storage system. For details on how to calculate the licensed capacity, contact the Hitachi Data Systems service personnel.

- Unlimited Capacity

  You can use the program product option regardless of the volume capacity.

The following explains how to calculate the licensed capacity based on the used capacity. The method for calculating volume capacity depends on volume emulation types.

Table 2-8 Methods for Calculating Capacity of a Volume

Volume Emulation Type	Formula for Calculating Capacity of a Volume
3380-x	720 KB × (The number of user cylinders)
3390-x	870 KB × (The number of user cylinders)
OPEN-x	Same as the capacity that you specified when creating the volume.
Note: In the left column of this table, "x" indicates a number or a letter. For example, OPEN-x refers to emulation types such as OPEN-3 and OPEN-V.	

You can use the formulae in Table 2-8 to estimate capacity for purchase. An example is given below:

Table 2-9 An Example of Estimating Capacity for Purchase

Item	Value
Volume emulation type	3390-3
Number of user cylinders	3,339
Number of volumes	2,048
Total capacity of all the volumes	870 KB × 3,339 × 2,048 = 5,949,296,640 KB 5,949,296,640 KB ÷ 1,024 = 5,809,860 MB 5,809,860 MB ÷ 1,024 = 5,673.70 GB 5,673.70 GB ÷ 1,024 = 5.54 TB
Estimated capacity for purchase	At lease 6 TB

Storage Navigator Options

The following table lists the options for the Storage Navigator and the licensed capacity type. Only some of the Storage Navigator options are available to storage partition administrators. For the available options to storage partition administrators, see the *Virtual Partition Manager User's Guide*.

Table 2-10 Storage Navigator Options

Option Name	Licensed Capacity	Notes
Storage Navigator Software (includes the Java API and the SNMP Agent)	Mounted Capacity	Java application programs that are downloaded from the SVP to the Storage Navigator.
LUN Manager	Mounted Capacity	Used only for open-systems devices.
Virtual LVI Virtual LUN	Mounted Capacity	
Open Volume Management	Mounted Capacity	Used only for open-systems devices (including LUN Expansion).
Volume Shredder	Mounted Capacity	
Cache Residency Manager for IBM z/OS Cache Residency Manager	Mounted Capacity	
Performance Monitor Volume Migration Server Priority Manager	Mounted Capacity	Volume Migration and Server Priority Manager require Performance Monitor. For information on Volume Migration, contact the Hitachi Data Systems Support Center (see Calling the Hitachi Data Systems Support Center).
Volume Migration V2	Mounted Capacity	For information on Volume Migration V2, contact the Hitachi Data Systems Support Center (see Calling the Hitachi Data Systems Support Center).
TrueCopy TrueCopy Asynchronous	Used capacity	TrueCopy Asynchronous requires TrueCopy.
TrueCopy for IBM z/OS TrueCopy Asynchronous for IBM z/OS	Used capacity	TrueCopy Asynchronous for IBM z/OS requires TrueCopy for IBM z/OS.
Universal Replicator	Used capacity	Universal Replicator requires TrueCopy.
Universal Replicator for IBM z/OS	Used capacity	Universal Replicator for IBM z/OS requires TrueCopy for IBM z/OS.
Disaster Recovery Extended	Unlimited	Disaster Recovery Extended is required when you run the 3-Data Center (3DC) system using TrueCopy and Universal Replicator, or when you run the 3DC system using TrueCopy for IBM z/OS and Universal Replicator for IBM z/OS.
ShadowImage for IBM z/OS	Used capacity	

Option Name	Licensed Capacity	Notes
ShadowImage	Used capacity	If you use V-VOLs of Dynamic Provisioning as P-VOLs or S-VOLs of ShadowImage, the license capacity of ShadowImage will be calculated using the used volume capacity (used pool capacity).
Compatible FlashCopy®	Used capacity	
Copy-on-Write Snapshot	Used capacity	Copy-on-Write Snapshot requires ShadowImage.
Dynamic Provisioning	Used capacity	The license capacity of Dynamic Provisioning will be calculated using the capacity of the Dynamic Provisioning pool.
Compatible PAV	Used capacity	
Compatible Hyper PAV	Unlimited	Compatible Hyper PAV requires Compatible PAV.
Volume Security Volume Security Port Option	Mounted Capacity	
Volume Retention Manager	Mounted Capacity	
Compatible XRC	Used capacity	For controller emulation types 2105 and 2107 only.
Data Retention Utility	Mounted Capacity	
Universal Volume Manager	Used capacity	
Virtual Partition Manager	Unlimited	You may use up to four CLPRs without the Virtual Partition Manager license key. For how to create a CLPR, see the *Virtual Partition Manager User's Guide.*
Database Validator	Mounted Capacity	Command Control Interface (CCI) is not required to install Database Validator, but it is required to use it. Permanent key is required because no temporary key is provided.

Contact your Hitachi Data Systems account team for the latest information on USP V/VM features and options.

The license for the Storage Navigator software options is verified when you log in to the SVP. If you are not licensed to use a particular option, the option is grayed out. If a license for a particular option is expired or the licensed capacity is insufficient, the SIM severity level is displayed at the bottom of the Storage Navigator main window.

3

Using the Storage Navigator GUI

This chapter describes the windows of the Storage Navigator GUI.

You can start the Storage Navigator GUI by accessing the following URLs which you registered to your Web browser.

- **Storage Device List** (see Storage Device List Dialog Box)
  You can open the Storage Navigator main window from the Storage Device List. When you perform operations on the Storage Navigator main window, other windows (see License Key Window to Configuration File Loader Window) or Basic Information Display dialog box (see Basic Information Display Dialog Boxes) are displayed.
- **Tool Panel** (see Tool Panel)
  You can open Control Panel (see Control Panel) or windows for SSL-encrypted communications.

Common Elements of the Storage Navigator Main Windows

The Storage Navigator main window (see Figure 3-1) opens automatically after a user logs in to the SVP. Until you have installed the Storage Navigator option, the License Key window on the Storage Navigator main window opens automatically. Once you have installed the option, the Information window opens when you log in to the SVP.

When you log in to Storage Navigator for the first time, the License Key window and the Account window are available by the default setting of Storage Navigator.

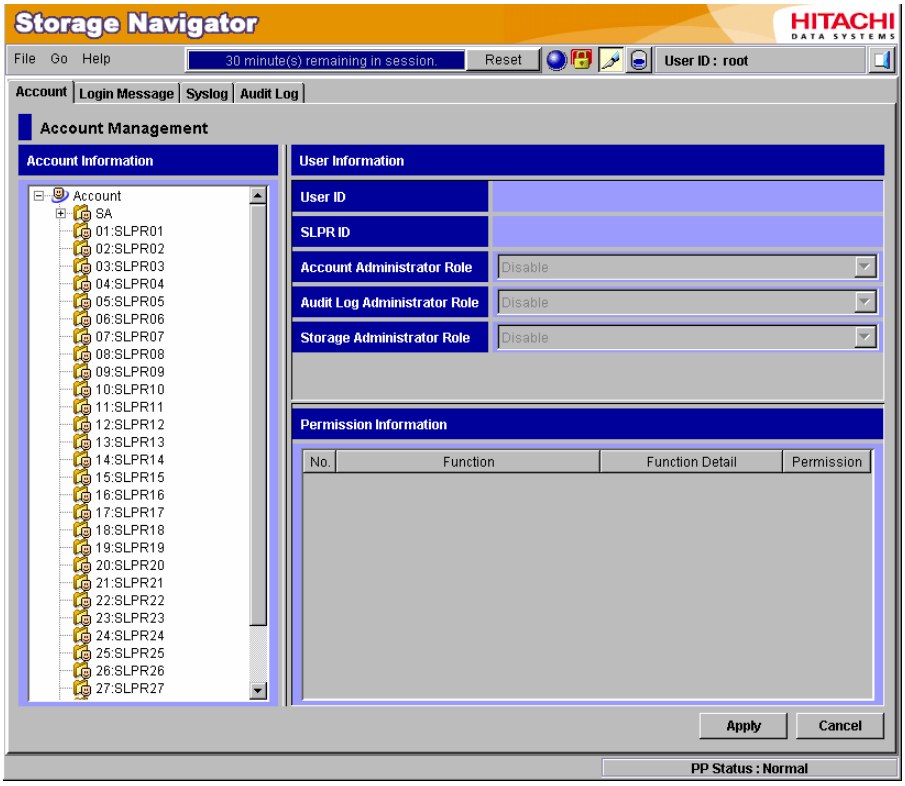


Figure 3-1 Storage Navigator Main Window

The Storage Navigator main window has the following features:

- **File** menu (see File Menu)
- **Go** menu (see Go Menu)
- **Help** menu (see Help Menu)
- Icons (see Icons)
- The **Apply** button makes all the changes or settings made on the Storage Navigator main window effective.
  This button is active only when you are in the **Modify** mode.

- The **Cancel** button cancels the changes or settings made on the Storage Navigator main window.
  This button is active only when you are in the **Modify** mode.
- **PP Status** displays the SIM severity level. **PP Status** is displayed if a SIM occurs related to a program product license because the license is expired or the licensed capacity is insufficient. However only the storage administrator with the **Enable** authority of **Storage Administrator Role** will be able to see the display.

  PP Status can display any of the following SIM severity level statuses:

  - 

  - 

  - 

  - 

  - 

  If **PP Status : Normal** is displayed, no SIM has occurred. If any other status is displayed, view either the License Key window or the Status window to identify which program product has a problem. You may find that you need to consider purchasing the license.

  When multiple SIMs occur, only the SIM with the highest severity is displayed. For the difference between SIM severity levels, see Status Window.

File Menu

When you click the **File** menu, the following commands are displayed.

- The **Basic Information** command () displays the Basic Information Display dialog box which displays the basic configuration information on the storage system. The Basic Information Display dialog box is displayed as another window apart from the Storage Navigator main window, therefore it can be displayed regardless of the operation of the Storage Navigator options. For details on the Basic Information Display dialog box, see Basic Information Display Dialog Boxes.
- The **Refresh All** command () allows you to update the information on the SVP and then display the latest information on the Storage Navigator main window. As you click this command, all information displayed on the Storage Navigator is reacquired from the storage system, therefore it takes time until the processing caused by this command has been completed.
  - The **Refresh All** command is only displayed, when you log in as a storage administrator. The **Refresh All** command becomes available, when you have changed to the **Modify** mode.

  - While the updating processing caused by the **Refresh All** command is in progress, the system status keeps changing and other users are not allowed to operate from the Storage Navigator windows. The maintenance operation of the storage system or the SVP operation by the service personnel are not allowed, either. Therefore, the use of the **Refresh All** command is not recommended, unless error recovery is required.
  - The Storage Navigator windows may not be properly displayed even though you have selected the **Refresh All** command, while the maintenance operation of SVP is in progress.

- The **Refresh** command () displays the latest information on the Storage Navigator main window.

  The information might not be displayed correctly when the exclusive lock is effective or SVP maintenance is in progress.

- The **Logout** command () closes the Storage Navigator main window.

Go Menu

The **Go** menu allows you to start the desired window. When you click the **Go** menu, the program product option names and function names are displayed. Each name in the **Go** menu has a submenu which displays tab names of the corresponding options or functions.

The contents of the **Go** menu differs depending on the operation authority of the user account. For the contents of the **Go** menu, see Permission Information List.

Help Menu

When you click the **Help** menu, the following command is displayed.

- The **About** command opens the About dialog box which displays the storage system information.

  The About dialog box has the following features:

  - **Subsystem**: Product name of the connected storage system.
  - **Serial Number**: Serial number of the connected storage system.
  - **IP Address**: IP address of the connected storage system (SVP).
  - **Name**: Device name of the connected storage system that you set in the Information window (see Device Information).
  - **Contact**: Contact information that you set in the Information window.
  - **Location**: Location of the connected storage system that you set in the Information window.
  - **Main Version**: Version of the microprogram installed in the connected storage system.

- **SVP Version**: Version of the Storage Navigator Java application installed in the SVP of the connected storage system.
  The Java application is downloaded at each time the Storage Navigator computer connects to the SVP, so that the version is always consistent between the Storage Navigator computer and SVP.
- **Server Version**: Version of the RMI server installed in the SVP of the connected storage system.

Icons

This section explains icons displayed on the Storage Navigator main window.

- The status lamp icons ( : **Normal**,  : **Warning**,  : **Abnormal**) indicate the storage system error status by color (blue: normal, yellow: warning, red: abnormal) according to the host SIM status. For details, check the Status window (see Status Window).
- The exclusive lock icons ( : **Unlocked**,  : **Locked**) indicate the operation mode of all currently logged-in users.

  If all users are viewing the information in the view mode, the blue unlocked-shaped icon () is displayed. If a user is operating in the **Modify** mode, the red locked-shaped icon () is displayed. The status might not be displayed correctly when the exclusive lock is effective or SVP maintenance is in progress.

  One storage partition administrator for each SLPR can change to the **Modify** mode. While a storage administrator is in the **Modify** mode, any other storage partition administrator cannot change to the **Modify** mode.
- The mode-switching buttons ( : **View**,  : **Modify**) allow users to switch the operation mode (**Modify** ⇔ **View**). The button always shows the current user operation mode. To change the modes, click the button.

  You cannot switch to the **Modify** mode while any other user is operating in the **Modify** mode. Make sure to confirm the exclusive lock icon before switching to the **Modify** mode.
- The **Audit:Normal** button (), the **Audit:Warning** button () or the **Audit:Wraparound** button () allows you to download the audit log file.
  - While the lines of the saved data in the audit log file is under the threshold, the **Audit:Normal** button is displayed.
  - When the lines of the saved data in the audit log file exceeds the threshold, the **Audit:Warning** button is displayed.
  - When the lines of the saved data in the audit log file has exceeded the threshold and reached the maximum number of the lines that can be saved, the **Audit:Wraparound** button is displayed.

To use these buttons to download the audit log file, you need to log in with the user account of a storage administrator. **Audit Log Administrator Role** need to be set to **Modify** or **View** for the setting of the operation authority for the user account. For detailed information on the audit log file, please see the *Audit Log User and Reference Guide*.

Even though the FTP server settings are completed, the **Audit:Warning** button or the **Audit:Wraparound** button might remain displayed on the Storage Navigator main window. This is due to the failure of transfer of the audit log file. See Audit Log Window for how to resolve the problem.

- The **User ID** column shows the user ID of the currently logged-in user. When you have logged in as a storage partition administrator, the SLPR number and name are displayed at the right of the user ID in the format of "< SLPR number : SLPR name>".
- The **Logout** button () closes the Storage Navigator main window.

License Key Window

The License Key window allows you to install and uninstall USP V/VM options for the connected storage system. The License Key window displays a list of USP V/VM options, and allows you to enter the license key code for a desired option. For detail operations on the License Key window, see Enabling and Disabling Storage Navigator Options.

To open the License Key window, log into the Storage Navigator, and then select **Go**, **Environmental Settings**, and **License Key** from the menu bar of the Storage Navigator main window. If no Storage Navigator options have been installed, this window opens automatically when you log in to the SVP.

If storage partition administrators want to use the program product options for their own SLPRs, the program product options have to be installed by the storage administrators from the License Key window, and then the licensed capacity for each program product option has to be allocated to SLPRs by the storage administrators from the License Key Partition Definition window. For the description of the License Key Partition Definition window and the procedure of allocating licensed capacity to the SLPRs, see the *Virtual Partition Manager User's Guide*.

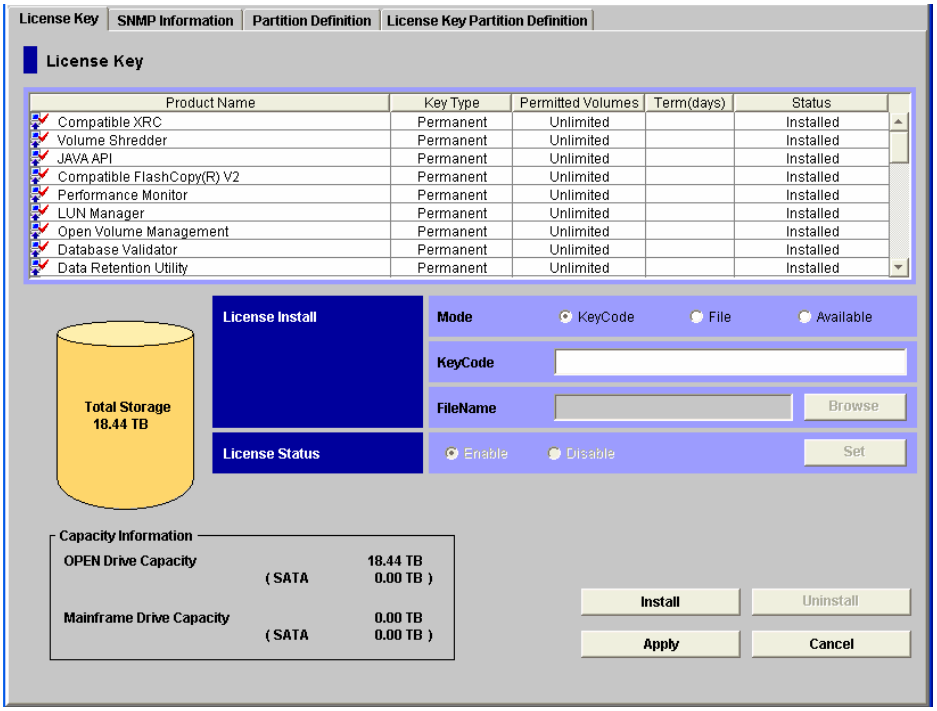


Figure 3-2 License Key Window

The License Key window has the following features:

- License Key List (see License Key List)
- **Total Storage**

  The **Total Storage** graphic is on the left of the License Key window, and displays the total volume capacity currently available in the storage system.
- **Capacity Information**

  OPEN Drive Capacity displays the capacity of open system drives in the **Total Storage**. **Mainframe Drive Capacity** displays the capacity of mainframe drives in the **Total Storage**.

  The capacity of SATA drives in each capacity is displayed in parentheses.
- **License Install** (see License Install Box)
- **License Status** (see License Status Box)
- **Install**: changes the row of the selected option or the options that can be installed using the **Available** button to the ***blue bold italics*** and also changes the displayed status to ***Install***. The options are not actually installed until you click **Apply**.

- **Uninstall**: changes the row of the selected option to ***blue bold italics*** and also changes the displayed status to ***Uninstall***. The options are not actually installed until you click **Apply**.
- **Apply**: implements the settings made using **Install** or **Uninstall** to the storage system. The status of installed options changes to **Installed**, and the status of uninstalled option changes to **Not Installed**.
- **Cancel**: cancels the settings made using the **Install** or **Uninstall** buttons. If you input any changes, the text may be displayed in ***blue bold italics*** or an icon may change. The changes are not actually implemented until you click **Apply** (see Storage Navigator Conventions.

License Key List

The **License Key** list is across the top of the License Key window. The **License Key** list has the following features:

- The **Product Name** column includes:
  - Option name
  - Icon that indicates whether the option is available (indicates **Installed**; indicates **Not Installed**)
- The **Key Type** column shows the license type: **Permanent**, **Term**, **Temporary** or **Emergency**. When no license key is installed, **Not Installed** is displayed.
- The **Permitted Volumes** column shows the following information: *XX*TB(*YY*TB)
  - *XX*: available capacity (licensed capacity)
  - *YY*: capacity that is already being used by the TrueCopy, ShadowImage, Volume Retention Manager, and Data Retention Utility.

  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.

  If the size is unlimited, **Unlimited** is displayed in this column.

  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 key, an emergency key, or a term key. After the temporary key has expired, the number of days that remain before you can re-install the temporary key is displayed.
- The **Status** column shows the current status of an option:
  - **Installed**: The option is available. The **Product Name** column displays the **Installed** icon ( ).

- **Installed (Disable)**: Installation is complete, but the license is set to disable. The **Product Name** column displays the **Not Installed** icon ( ).
  This status might be displayed if an error occurs after you install option(s). Resolve the error and enable the license.
- **Not Installed**: The option is not available. The **Product Name** column displays the **Not Installed** icon ( ).
- **Not Enough**: Installation is complete, but the license capacity is insufficient. This status is also displayed when the license key of this program product is installed but the license key of the prerequisite program product is expired. The **Product Name** column displays the **Not Installed** icon ( ).
- **Capacity Insufficient**: The licensed capacity is insufficient because hard disk drives are added, or pairs have been created by a program product such as TrueCopy. The license expires in 30 days. The **Product Name** column displays the **Installed** icon ( ). Please purchase the licenses before the license key expires.
- **Time Out**: The term has already expired for the temporary key. The **Product Name** column displays the **Not Installed** icon ( ). When the status is **Time Out**, you cannot re-install the temporary key.

The following table explains the icons shown on the License Key window.

Table 3-1 License Key Status Icons

License Key Status	License Key Window Display					
	Icon	Product Name (Note 1)	Key Type	Permitted Volume	Term (days)	Status
Not installed.	(Not Installed).	Option name	Not Installed	–	–	Not Installed
Installed with the **Permanent** key.	(Installed)	Option name	Permanent	Unlimited or ***X*** TB (Note 3)	–	Installed
Installed with the **Term** key and set to enable.	(Installed)	Option name	Term	Unlimited or ***X*** TB (Note 3)	(Note 2)	Installed

License Key Status	License Key Window Display					
	Icon	Product Name (Note 1)	Key Type	Permitted Volume	Term (days)	Status
Installed with the **Term** key and set to disable.	(Not Installed).	Option name	Term	Unlimited or ***X*** TB (Note 3)	–	Installed (Disable)
Installed with the **Temporary** key.	(Installed)	Option name	Temporary	–	(Note 2)	Installed
Installed with the **Emergency** key.	(Installed)	Option name	Emergency	–	(Note 2)	Installed
A **Temporary** key was installed, but has expired.	(Not Installed).	Option name	Temporary	–	(Note 2)	Time Out
A **Term** key or an **Emergency** key was installed, but has expired.	(Not Installed)	Option name	Not Installed	–	–	Not Installed
Installed with the **Permanent** key or the **Term** key, but the licensed capacity was insufficient.	(Not Installed).	Option name	Permanent or Term	***X*** TB (Note 3)	–	Not Enough
The capacity insufficiency caused by PDEV expansion.	(Installed)	Option name	Permanent or Term	***X*** TB (Note 3)	(Note 2)	Capacity Insufficient
Installed with the **Temporary** key, and then reinstalled with the **Permanent** key, but the license capacity was insufficient.	(Installed)	Option name	Temporary	***X*** TB (Note 3)	(Note 2)	Installed
Installed with the **Permanent** key, then reinstalled with the **Emergency** key.	(Installed)	Option name	Emergency	Unlimited or ***X*** TB (Note 3)	(Note 2)	Installed

"–" indicates that nothing is displayed.

Note 1: See Storage Navigator Options for option names.

Note 2: The **Term** column shows the number of days remained before the expiration.

Note 3: You will be charged for the capacity that you use for program products such as the copying options (e.g., TrueCopy and ShadowImage), Volume Retention Manager, and Data Retention Utility. For these program products, "***X*** TB (***Y*** TB)" is displayed. ***X*** indicates the licensed capacity, and ***Y*** indicates the used capacity.

License Install Box

License Install is on the right side of the License Key window.

License Install has the following features:

- **Mode** allows you to select one of the following buttons: **Key Code**, the **File**, or **Available**.
  - **Key Code** enables the **Key Code** text box, which allows you to enter the license key for the selected option to be installed (see Enabling Options Using a License Key Code). You cannot copy and paste text from other applications.

- **File** enables the **File Name** text box and the **Browse** button, which allow you to enter the name of the desired license key file (see Enabling Options Using a License Key File). When you click **Browse**, the dialog box to select the license key file is displayed. As you select the desired license key file on the displayed dialog box, you can enter the license key file name in the **File Name** text box.
- **Available** enables you to install available options automatically. The **Available** button can be used only when the licensed capacity exceeds the mounted (or used) capacity because the disk drives are reduced, or because the pairs are deleted by a program product such as TrueCopy.

License Status Box

License Status is on the bottom right of the License Key window.

You can set the license to enable or disable, to each program product option listed in the license key list. If you select a certain program product option from the license key list, select any of the options below and click **Set**, you can set the option to enable or disable.

- **Enable**: You can use the program product option.
  If you set **Enable** to an option with the term key, the available days of term key will lessen one day when you set **Enable**. When the setting is applied, **Installed** is displayed.
- **Disable**: You cannot use the program product option.
  If you set **Disable** to an option with the term key, the available days of term key will not lessen when you set **Disable**. When the setting is applied, **Installed (Disable)** is displayed.

Information Window

The Information window displays information on the connected storage system.
To open the Information window, log into the Storage Navigator, and then select **Go**, **System Information** and **Information** from the menu bar of the Storage Navigator main window. A storage partition administrator can view the Information window, but cannot change the information on the Information window.

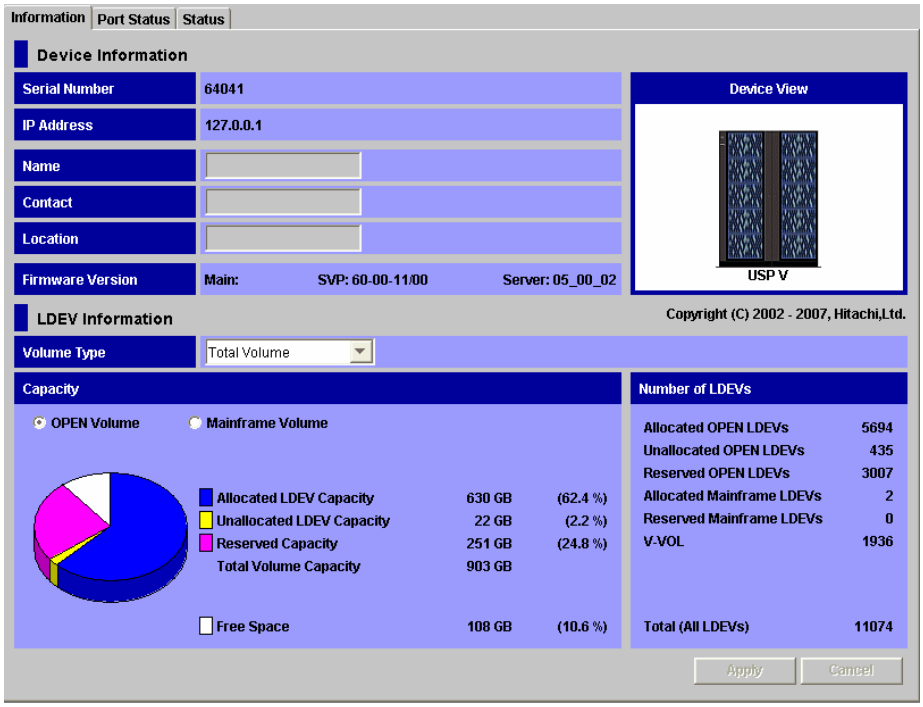


Figure 3-3 Information Window

The Information window has the following features:

- **Device Information** (see Device Information)
- **LDEV Information** (see LDEV Information)
- The **Apply** button makes all the changes or settings made on the Storage Navigator main window effective.

  This button is active only when you select the **Modify** mode.
- The **Cancel** button cancels the changes or settings made on the Storage Navigator main window.

  This button is active only when you select the **Modify** mode.

If you input any changes, the text may be displayed in ***blue bold italics*** or an icon may change (see Table 2-5). The changes are not actually implemented until you click **Apply**.

Device Information

Device Information is the upper part of the Information window.

- **Serial Number**: Serial number of the connected storage system.
- **IP Address**: IP address of the connected storage system (SVP).
- **Name**: Device name of the connected storage system. The Storage Navigator user can change the device name with the **Modify** mode. You must enter a device name using up to 180 alphanumeric characters (ASCII codes), except for some symbols, such as ", \, ;, :, ,, *, ?, <, >, |, /, ^, &, and %. You can also use a space, except for before and after the device name. If you enter a space before or after the device name, an error occurs when you click Apply. The device name is required to use SNMP Agent. For detailed information on SNMP, please see the *SNMP Agent User and Reference Guide*.

  Make sure to document the device name, because the settings will be cleared when the SVP is replaced.
- **Contact**: Contact information such as personnel and telephone number where you can inquire about the connected storage system. The Storage Navigator user can change the contact information with the **Modify** mode. You must enter the contact information using up to 180 alphanumeric characters (ASCII codes), except for some symbols, such as ", \, ;, :, ,, *, ?, <, >, |, /, ^, &, and %. You can also use a space, except for before and after the contact information. If you enter a space before or after the contact information, an error occurs when you click **Apply**. The contact name is required to use SNMP Agent. For detailed information on SNMP, please see the *SNMP Agent User and Reference Guide*.

  Make sure to document the contact name, because the settings will be cleared when the SVP is replaced.
- **Location**: Location of the connected storage system. The Storage Navigator user can change the device location with the **Modify** mode. You must enter a device location using up to 180 alphanumeric characters (ASCII codes), except for some symbols, such as ", \, ;, :, ,, *, ?, <, >, |, /, ^, &, and %. You can also use a space, except for before and after the location. If you enter a space before or after the location, an error occurs when you click **Apply**. The device location is required to use SNMP Agent. For detailed information on SNMP, please see the *SNMP Agent User and Reference Guide*.

  Make sure to document the device location, because the settings will be cleared when the SVP is replaced.
- **Firmware Version:**

  - **Main**: Version of the microprogram installed in the connected storage system.
  - **SVP**: Version of the Storage Navigator Java application program installed in the SVP of the connected storage system.
  - **Server**: Version of the RMI server installed in the SVP of the connected storage system.
- **Device View**: Product name and visual image (picture) of the connected storage system.

LDEV Information

LDEV Information is the lower part of the Information window (see Figure 3-4). If you have logged in as a storage partition administrator, the information on the allocated SLPR is displayed instead of the one on the whole storage system.

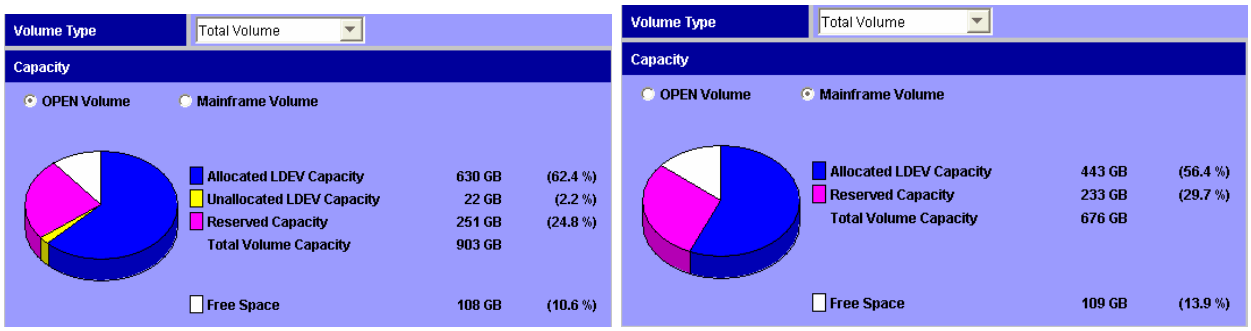


Figure 3-4 Volume Type and Capacity in LDEV Information

Volume Type

You can select the type of volume capacity information from the **Volume Type** list. The type which can be selected from the list is as follows:

- **Total Volume**: information on the all the volumes is displayed.
- **Internal Volume Only**: information only on the internal volumes is displayed.
- **External Volume Only**: information only on the external volumes is displayed.

Capacity

- The **OPEN Volume** button displays the volume capacity information (capacity by volume type, pie chart, total capacity) on open system volumes in the storage system. The displayed information does not include the capacity of V-VOL. When there is no open system volume, **No Volume** is displayed.
- The **Mainframe Volume** button displays the volume capacity information (capacity by volume type, pie chart, total capacity) on zSeries®, S/390® (mainframe), and multiplatform volumes in the storage system. The displayed information does not include the capacity of V-VOL. When there is no zSeries®and S/390® volume, **No Volume** is displayed.
- Pie chart and capacity by volume type when **OPEN Volume** is selected:

  The following capacities are displayed in MB, when the **Total Volume Capacity** is 10 GB or less than 10GB. The following capacities are displayed in GB, when the **Total Volume Capacity** is more than 10 GB. The percentages (%) of the following capacities relative to total capacity of open system volumes are also displayed in parentheses.

  - **Allocated LDEV Capacity**: displays the capacity of open system volumes (LDEVs) that have assigned paths and are available to the user. This capacity also includes all LDEVs that consist of LUSE volumes, but does not include control cylinders. This capacity is displayed in the pie chart by blue area ().
  - **Unallocated LDEV Capacity**: displays the capacity of open system volumes (LDEVs) that do not have assigned paths and are available to the user. This capacity does not include control cylinders, reserved volumes of Volume Migration, journal volumes, pool volumes, or system disks. This capacity is displayed in the pie chart by yellow area ().
  - **Reserved Capacity**: displays the capacity of the following volumes among open volumes (LDEVs). This capacity does not include reserved volumes of ShadowImage.
    - Reserved volumes of Volume Migration (For information on Volume Migration, contact the Hitachi Data Systems Support Center (see Calling the Hitachi Data Systems Support Center).)
    - Journal volumes (see the *Universal Replicator User's Guide*)

- Pool volumes (see the *Copy-on-Write Snapshot User's Guide* or *Dynamic Provisioning User's Guide*)
- System disks (see *Virtual LVI/LUN (VLL) & Volume Shredder User's Guide*)

This capacity is displayed in the pie chart by pink area (▮).

– **Free Space**: displays free space that users can use for configuring open system volumes (LDEVs). This is displayed in the pie chart by white area (□).

- Pie chart and capacity by volume type when **Mainframe Volume** is selected:

  The following capacities are displayed in MB, when the **Total Volume Capacity** is 10 GB or less than 10GB. The following capacities are displayed in GB, when the **Total Volume Capacity** is more than 10 GB. The percentages (%) of the following capacities relative to total capacity of zSeries®, S/390®, and multiplatform volumes are also displayed in parentheses.

  – **Allocated LDEV Capacity**: displays the capacity of zSeries®, S/390®,and multiplatform volumes (LDEVs) that have assigned paths and are available to the user. This capacity does not include reserved volumes of Volume Migration, journal volumes, or system disks. This capacity is displayed in the pie chart by blue area (▮).

  – **Reserved Capacity**: displays the capacity of the following volumes among zSeries®, S/390®, and multiplatform volumes (LDEVs). This capacity does not include reserved volumes of ShadowImage for IBM z/OS.

    - Reserved volumes of Volume Migration (For information on Volume Migration, contact the Hitachi Data Systems Support Center (see Calling the Hitachi Data Systems Support Center).)
    - Journal volumes (see the *Universal Replicator for Mainframe User's Guide*)
    - System disks (see *Virtual LVI/LUN (VLL) & Volume Shredder User's Guide*)

    This capacity is displayed in the pie chart by pink area (▮).

  – **Free Space**: displays free space that users can use for configuring zSeries®, S/390®, and multiplatform volumes (LDEVs). This is displayed in the pie chart by white area (□).

- **Total Volume Capacity** displays the sum of allocated, unallocated (open system volume only), and reserved volume capacities.

Number of LDEVs

The **Number of LDEVs** are on the lower right of the Storage Navigator main window.

- **Allocated OPEN LDEVs**: displays the number of open system volumes (LDEVs) that have assigned paths. Each of LDEVs that consist of a LUSE volume is also counted as one volume.
- **Unallocated OPEN LDEVs**: displays the number of open system volumes (LDEVs) that do not have assigned paths. This number does not include reserved volumes of Volume Migration, journal volumes, pool volumes, or system disks.
- **Reserved OPEN LDEVs**: displays the number of reserved volumes of Volume Migration, journal volumes, pool volumes, and system disks among open system volumes (LDEVs). This number does not include reserved volumes of ShadowImage.
- **Allocated Mainframe LDEVs**: displays the number of zSeries®, S/390®, and multiplatform volumes (LDEVs) that have assigned paths. This number does not include reserved volumes of Volume Migration, journal volumes, pool volumes, or system disks.
- **Reserved Mainframe LDEVs**: displays the number of reserved volumes of Volume Migration, journal volumes, and system disks among zSeries®, S/390®, and multiplatform volumes (LDEVs). This number does not include reserved volumes of ShadowImage for IBM z/OS.
- **V-VOL**: displays the number of V-VOLs which are virtual volumes (LDEVs) that do not consume the actual disk capacity. V-VOLs are currently used for Copy-on-Write Snapshot and Dynamic Provisioning. For details, please see the *Copy-on-Write Snapshot User's Guide* or the *Dynamic Provisioning User's Guide*.
- **Total (All LDEVs)**: displays the sum of allocated OPEN LDEVs, unallocated OPEN LDEVs, reserved OPEN LDEVs, allocated Mainframe LDEVs, reserved Mainframe LDEVs, and V-VOLs.

Port Status Window

The Port Status window displays the port information using the image of the ports mounted on the storage system.

To open the Port Status window, log into the Storage Navigator, and then select **Go**, **System Information** and **Port Status** from the menu bar of the Storage Navigator main window. A storage partition administrator cannot display the Port Status window.

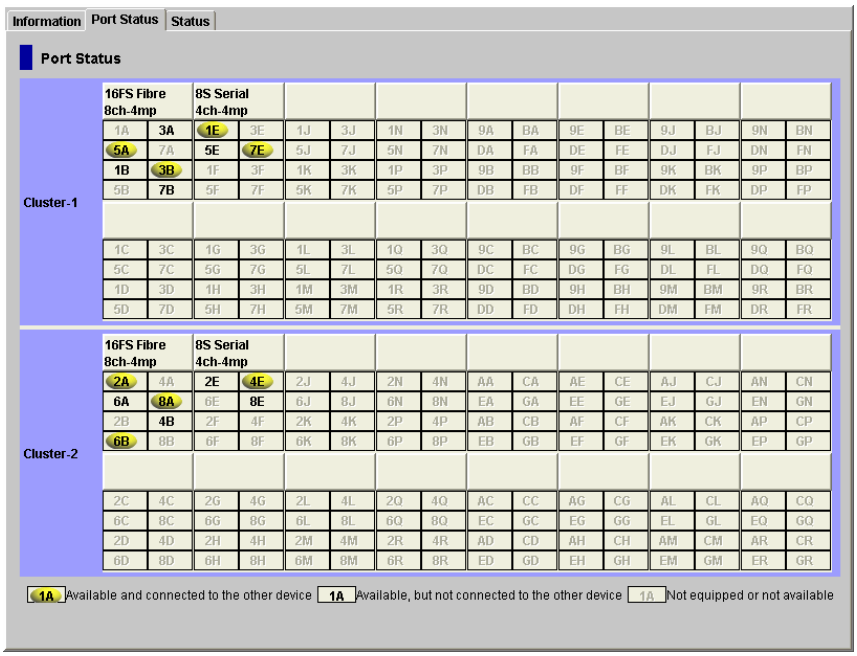


Figure 3-5 Port Status Window

Cluster-1 and **Cluster-2** in the Port Status window indicate the clusters. The ports of the **Cluster-1** are listed on the upper part, and the ports of the **Cluster-2** are listed on the lower part of the **Port Status**.

Each cluster has up to 16 PCBs (Printed Circuit Board) and the name of each PCB is displayed on the header of the port list. The icons show the port name, port LED status, and equipment information of port. The icons displayed indicate following information:

- 1E: This port is equipped and currently used. the cable is properly set. This port is available for the operation.
- 5E: This port is equipped and available for the operation.
- 5J: This port is not equipped or not available.

Status Window

The Status window displays the internal statuses (according to the SIM information reported to the host) of the connected storage system. The storage system generates a service information message (SIM) whenever it detects an error or service requirement.

The status history is listed in the **Status** list on the Status window. The icon displayed at the upper right of the Storage Navigator main window indicates the error level of the disk controller status or the disk array unit status. The icon indicates the one of more severe error level.

To open the Status window, log into the Storage Navigator, and then select **Go**, **System Information** and **Status** from the menu bar of the Storage Navigator main window. A storage partition administrator cannot display the Status window.

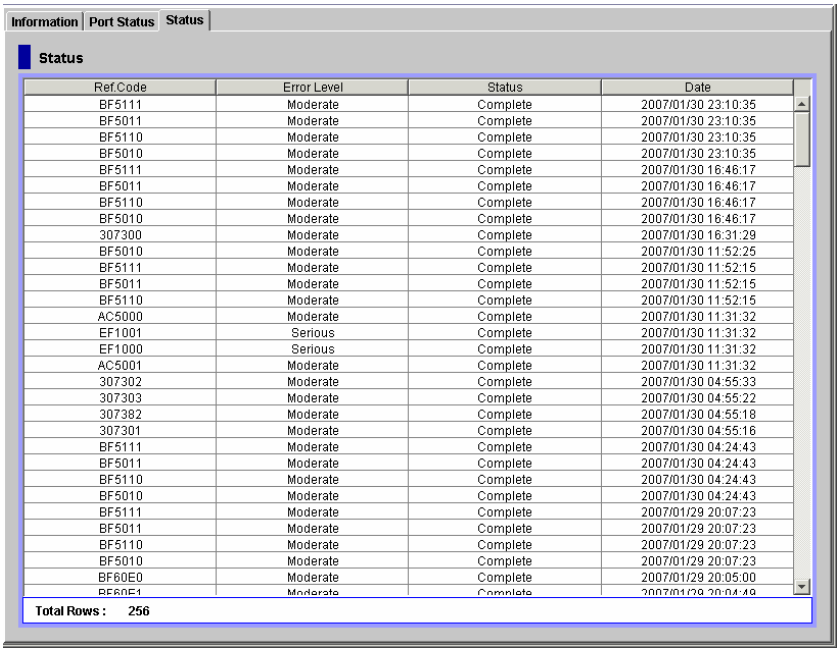


Figure 3-6 Status Window

The Status window has the following features:

- **Ref. Code** displays the SIM Reference Code.

  When the SIM reference codes in the following table are displayed, you are required to resolve the error. For details on how to resolve the error, see the *Copy-on-Write Snapshot User's Guide* or the *Dynamic Provisioning User's Guide.*

Table 3-2 SIM Reference Codes

Reference Codes (Note)	Description
601XXX	These reference codes are for Copy-on-Write Snapshot.
602XXX	
620XXX	These reference codes are for Dynamic Provisioning.
621XXX	
622XXX	
630XXX	
Note: XXX indicates the pool ID.	

- **Error Level** displays the error levels (see Table 3-3).
- **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.
- **Total Rows** displays the total number of rows that are listed.

Table 3-3 Severity Level

Severity Level	Description
Good	No error occurs and the status is good.
Service	Service and Moderate do not require immediate attention and are addressed during routine maintenance.
Moderate	
Serious	Contact the Hitachi Data Systems Support Center. Follow up with the Support Center to verify that the problem has been resolved. See Troubleshooting for further information on troubleshooting.
Acute	
Note: When the status becomes other than **Good**, all SIMs must be completed (resolved) from the SVP to restore the status to **Good**.	

Detail Dialog Box

As you select a row in the **Status** list, right-click, and click the **Detail** command in the pop-up menu, the detailed information on the error is displayed on the Detail dialog box (see Figure 3-7). The Detail dialog box includes the information of **Error Section** and **Error Detail** of the selected row in addition to the information of the **Status** list.

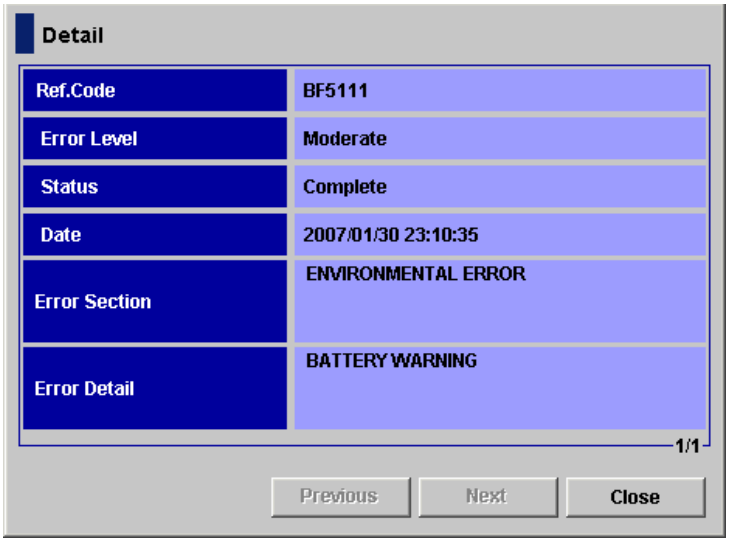


Figure 3-7 Detail Dialog Box

Account Window

The Account window allows you to register new user accounts or view and change the setting of the registered user accounts. The operations that can be performed in the Account window differ depending on the operation authority which is set for the account administrator role.

To open the Account window, log into the Storage Navigator, and then select **Go**, **Security** and **Account** from the menu bar of the Storage Navigator main window.

This section describes the components of the Account window. For the procedures of operations that can be performed from the Account window, see Managing the User Accounts. For information on user accounts of Storage Navigator, see User Access Levels.

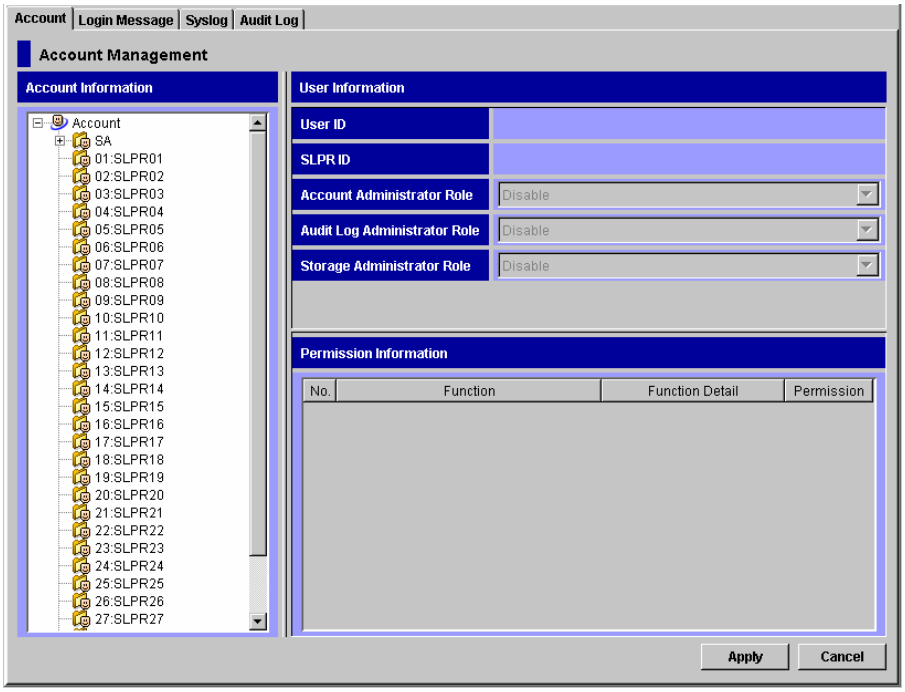


Figure 3-8 Account Window

The Account window has the following features:

- **Account Information** Tree (see Account Information Tree)
- **User Information** (see User Information)
- **Permission Information** List (see Permission Information List)
- The **Apply** button makes all the changes or settings made for user accounts effective. This button is not available in the view mode.
- The **Cancel** button cancels the changes or settings for user accounts. This button is not available in the view mode.

Account Information Tree

On the left of the Account window, the **Account Information** tree is displayed. The **Account Information** tree consists of an **SA** folder and SLPR folders that are numbered from **01** to **31**. As you open a folder, the user IDs of the user accounts that are registered in the folder are displayed. When you log in to Storage Navigator, the icon is displayed next to your user ID, and the icon is displayed for the other users. The icon is displayed for the users which the user accounts are set to disable.

On **User Information** and the **Permission Information** list of the Account window, the setting of the user account you select on the **Account Information** tree is displayed. When you want to register new user accounts, you start the operation from the **Account Information** tree. You register the user accounts of storage administrator into the **SA** folder, and you register the user accounts of storage partition administrator into any folder that has the number and the name of the SLPR to which you want to register the user accounts. For the procedure to register new user accounts, see Adding a New Storage Device.

User Information

On the upper right of the Account window, **User Information** is displayed. You can edit and view the authority of registered user accounts on **User Information**.

User Information consists of the following items:

- **User ID**: The user ID that is set when the user account has been registered is displayed.
- **SLPR ID**: **SLPR ID** indicates the user type of the user account. **SA** is displayed for the storage administrators. For the storage partition administrators, the number and the name of the SLPR to which the user account is registered is displayed in the format of "number : name".
- **Account Administrator Role**: From the list, you can select the operation authority for the Storage Navigator user accounts (which means the operation authority for the Account window). However, you are not allowed to change the setting of **Account Administrator Role** for the user ID "root".

  All users can change their own passwords and view the setting of their own user accounts. However, **Account Administrator Role** must be set to **View** or **Modify** to view or modify other user accounts. The kinds of authority you can select from the list are as follows:

  - **Disable**: The user can neither view nor modify the settings of other user accounts.
  - **View**: The user can only view the operation authority of other user accounts.
  - **Modify**: The user can add and delete user accounts, and can change the settings of other user accounts.
- **Audit Log Administrator Role**: From the list, you can select the operation authority for the audit log and syslog operations. However, the authority is not allowed to be set for the user accounts of the storage partition administrators. The kinds of authority you can select from the list are as follows:

- **Disable**: Users cannot perform any operation related to the audit log. For the user accounts of the storage partition administrators, **Disable** is set and you are not allowed to change the setting. Users cannot perform the following additional actions:
  - Users cannot use the buttons to download the audit log file.
  - Users cannot view the Syslog window or the Audit Log window.
- **View**: Users can perform the following actions:
  - View the settings on the Syslog window or the Audit Log window.
  - Use the buttons to download the audit log file.
  - Use the Syslog window to download the syslog file.

  Users are restrained from the following actions:
  - Users are not allowed to change settings on either the Syslog window or the Audit Log window.
  - Users cannot use the Audit Log window to manually transfer the audit log file.
- **Modify**: Users can perform the following actions:
  - Use the buttons to download the audit log file.
  - Use the Audit Log window to configure the FTP servers.
  - Use the Audit Log window to manually transfer the audit log file.
  - Use the Syslog window to configure the syslog servers.
  - Use the Syslog window to download the syslog file.

- **Storage Administrator Role**: From the list, you can select the operation authority for the operation of the **Storage Device List**, operation using the program product options, and operation of the Set Env. dialog box. The kinds of authority you can select from the list are as follows:
  - **Disable**: The user is not allowed to perform the operation of the **Storage Device List**, operation using the program product options, and operation of the Set Env. dialog box.
  - **Enable**: The user can perform the operation of the **Storage Device List**, operation using the program product options, and operation of the Set Env. dialog box. If you want to set the kind of permission for each function in the **Permission Information** list, you need to set **Enable**.

Permission Information List

Under **User Information**, the **Permission Information** list is displayed. You can set or view the kind of permission for each function of the program product options in the **Permission Information** list. You need to set **Storage Administrator Role** to **Enable** for the user accounts for which you want to set the permission in the **Permission Information** list.

You can sort each column of the **Permission Information** list in the ascending or descending order of the ASCII codes by selecting each header of the list. The **Permission Information** list consists of the following items:

- **No.**: Serial number of the **Permission Information** list.
- **Function** and **Function Detail**: The lists of the program product options and functions. In the **Permission Information** list, you can set the kind of permission to each function which requires the Storage administrator role as shown in Table 3-4.

  For the user accounts of the storage administrators, you can set the permission for all of the functions. For the storage partition administrators, the available functions are different from those of storage administrators'. Table 3-4 also shows the availability of each function for the storage partition administrators.
- **Permission**: Kind of permission for the operation of each function. There are two kinds of permission as follows:
  - **Modify**: The user can use the function to perform the operation.
  - **View**: The user can view the main windows for each function, but is not allowed to perform the operation.

  As you select and right-click a row (or rows) of the function for which you want to set the permission, the popup menu is displayed and you can select **Modify** or **View**.

The following table illustrates operation authority which is required to perform each function. This table also illustrates if a storage partition administrator can perform each function.

Table 3-4 Operation Authority Required to Perform Each Function

Icon	Function	Function Detail	Availability of Functions for Storage Partition Administrator	Operation Authority Required to Perform Functions
	System Information	Information	View only.	Storage administrator role
		Port Status	Not available	
		Status	Not available	
	LUN Manager	LUN Manager	Available	
		Port	Available	
		Authentication	Available	
	LUN Expansion / VLL	LUN Expansion	Available	
		VLL	Available	
		Pool	Not available	
		V-VOL	Not available	
	Cache Residency Manager	Cache Residency	Available	
	Performance Manager	Performance Monitor	Available	
		Volume Migration	Not available	
		Server Priority Manager	Not available	
	TrueCopy	TrueCopy	Not available	
	Universal Replicator	Universal Replicator	Not available	
	ShadowImage	ShadowImage	Not available	
	TrueCopy for IBM z/OS	TrueCopy for IBM z/OS	Not available	
	Universal Replicator for IBM z/OS	Universal Replicator for IBM z/OS	Not available	
	ShadowImage for IBM z/OS	ShadowImage for IBM z/OS	Not available	
	Mainframe Connection	Compatible PAV	Not available	
		Volume Security	Not available	
		Volume Retention Manager	Not available	
		XRC	Not available	
	Data Retention Utility	Data Retention	Available	

Icon	Function	Function Detail	Availability of Functions for Storage Partition Administrator	Operation Authority Required to Perform Functions
	Universal Volume Manager	Universal Volume Manager	Not available	
	Configuration File Loader	Configuration File Loader	Not available	
	Security	Account	Available	Account administrator role
		Login Message	Not available	
		Syslog	Not available	Audit log administrator role
		Audit Log	Not available	
	Environmental Settings	License Key	Not available	Storage administrator role
		SNMP Information	Not available	
		Partition Definition	Not available	
		License Key Partition Definition	Not available	

Login Message Window

The Login Message window allows you to specify login caution messages displayed in the Storage Navigator login dialog box (see Figure 2-14) and Tool Panel (see Figure 3-21). The operations that can be performed in the Login Message window differ depending on the operation authority which is set for the account administrator role.

To open the Login Message window, log into the Storage Navigator, and then select **Go**, **Security** and **Login Message** from the menu bar of the Storage Navigator main window. A storage partition administrator cannot display the Login Message window.

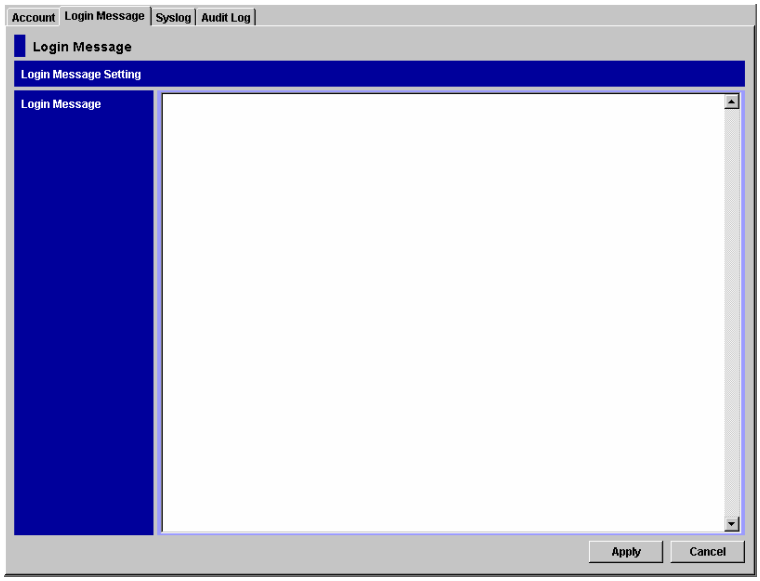


Figure 3-9 Login Message Window

The Login Message window has the following features:

- Login Message

  You can enter alphanumeric characters (ASCII codes) and some symbols. You can enter up to 2,408 letters. The message that you entered in this text box will be displayed in the Storage Navigator login window.

- The **Apply** button makes all the changes or settings made effective. This button is not available in the View mode.
- The **Cancel** button cancels the changes or settings. This button is not available in the View mode.

Syslog Window

The Syslog window allows you to configure syslog servers to transfer the audit log or download a syslog file to Storage Navigator computer.

UDP is required for transferring the audit log to syslog servers. To transfer the audit log to syslog servers, consider the characteristics of UDP when you design a network. For detailed information on syslog, refer to the RFC3164 published by IETF.

Only the storage administrator can configure a syslog server for transferring audit log or download the syslog file. Before a syslog server can be configured, the **Audit Log Administrator Role** needs to be set to **Modify** for that storage administrator's user account. If the **Audit Log Administrator Role** is set to **View**, the storage administrator can view the Syslog window and download the syslog file, but not change settings of the Syslog window. For the procedure on how to change settings in the Syslog window, see the *Audit Log User and Reference Guide.*

To open the Syslog window, log into the Storage Navigator, and then select **Go**, **Security** and **Syslog** from the menu bar of the Storage Navigator main window. A storage partition administrator cannot display the Syslog window.

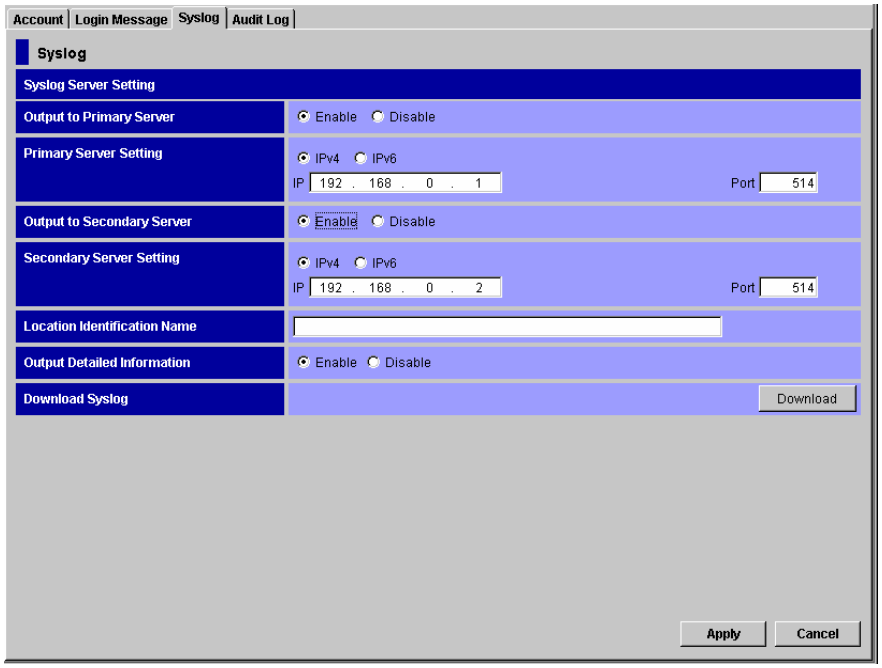


Figure 3-10 Syslog Window

The Syslog window has the following features:

- **Output to Primary Server:** You can specify whether to transfer the audit log to the primary syslog server. To transfer the audit log, select **Enable**. To not transfer the audit log, select **Disable**.
- **Primary Server Setting:** You can set an IP address and a port number for the primary syslog server. Once you set **Output to Primary Server** to **Enable**, **IP** and **Port** become available. For both **IP** and **Port**, the defaults have been entered, so change them as needed.

  You can set either IPv4 address or IPv6 address for IP address. However, only IPv4 address is available when the operating system of your SVP is Windows XP.

  - To set an IPv4 address, select **IPv4**. For **IP**, enter four integers in the range of 0 to 255 (for example, *nnn.nnn.nnn.nnn*, where *n* is a number). Only enter numbers. Do not enter the intervening periods.
  - To set an IPv6 address, select **IPv6**. For **IP**, enter eight hexadecimal numbers in the range of 0 to FFFF (for example, *hhhh:hhhh:hhhh:hhhh:hhhh:hhhh:hhhh:hhhh*, where *h* is a hexadecimal digit). Only enter hexadecimal numbers. Do not enter the intervening colons.
  - For **Port**, enter one integer in the range of 1 to 65,535.
- **Output to Secondary Server:** You can specify whether to transfer the audit log to the secondary syslog server. To transfer the audit log, select **Enable**. To not transfer the audit log, select **Disable**.
- **Secondary Server Setting:** You can set an IP address and a port number for the secondary syslog server. Once you set **Output to Secondary Server** to **Enable**, **IP** and **Port** become available. For both **IP** and **Port**, the defaults have been entered, so change them as needed. The restriction for the available values is the same as that of **Primary Server Setting**.
- **Location Identification Name:** You can name, as you like, the storage system that transfers the audit log to syslog servers, so that you can identify the storage system. You can enter 32 one-byte characters at the maximum. Available characters are alphabets (A-Z and a-z), numeric (0-9), and symbols (including ! " # $ % & ' ( ) = - ~ ^ | \ { } [ ] @ ` : ; * + _ ? / < > .). However, a comma (,) and a space cannot be used.
- **Output Detailed Information:** You can set whether to transfer the detailed information of the audit log file to the syslog server. If you want to transfer the detailed information to the syslog server, select **Enable**. If you do not, select **Disable**. In the syslog file that is stored in the SVP, the detailed information is always stored regardless of this setting.
- **Download Syslog:** Downloads the syslog file to the Storage Navigator computer.
- **Apply:** Allows you to make all the settings made on the Syslog window effective. This button is available only when you are in the **Modify** mode.

- **Cancel:** Allows you to cancel all the settings made on the Syslog window in the **Modify** mode. This button is available only when you are in the **Modify** mode.

Audit Log Window

The Audit Log window allows you to configure FTP servers and manually transfer the audit log file to the FTP servers.

Only the storage administrator can configure FTP servers or manually transfer the audit log file to the FTP servers. Before an FTP server can be configured, the **Audit Log Administrator Role** needs to be set to **Modify** for that storage administrator's user account. If the **Audit Log Administrator Role** is set to **View**, the storage administrator can view the Audit Log window, but not change settings of the Audit Log window or manually transfer the audit log file to the FTP servers.

A SIM occurs to notify a storage administrator of the failure of a FTP transfer. This can occur when the audit log file is not successfully transferred to any FTP server due to the failures of either the FTP server or LAN. You can view the SIM in the Status Window. The reference code for a failed FTP transfer is **7C0300**. If a SIM occurs, perform the following operations:

- Resolve the error condition on the FTP server or LAN, and then manually transfer the audit log file by clicking **Transfer** in the Audit Log window. After that, complete the SIM in the Audit Log window.
- If the error condition cannot be resolved, download the audit log file to the Storage Navigator computer by clicking **Audit:Warning** or **Audit:Wraparound** in the Storage Navigator main window.

To open the Audit Log window, log into the Storage Navigator, and then select **Go**, **Security** and **Audit Log** from the menu bar of the Storage Navigator main window. Storage partition administrators cannot display the Audit Log window.

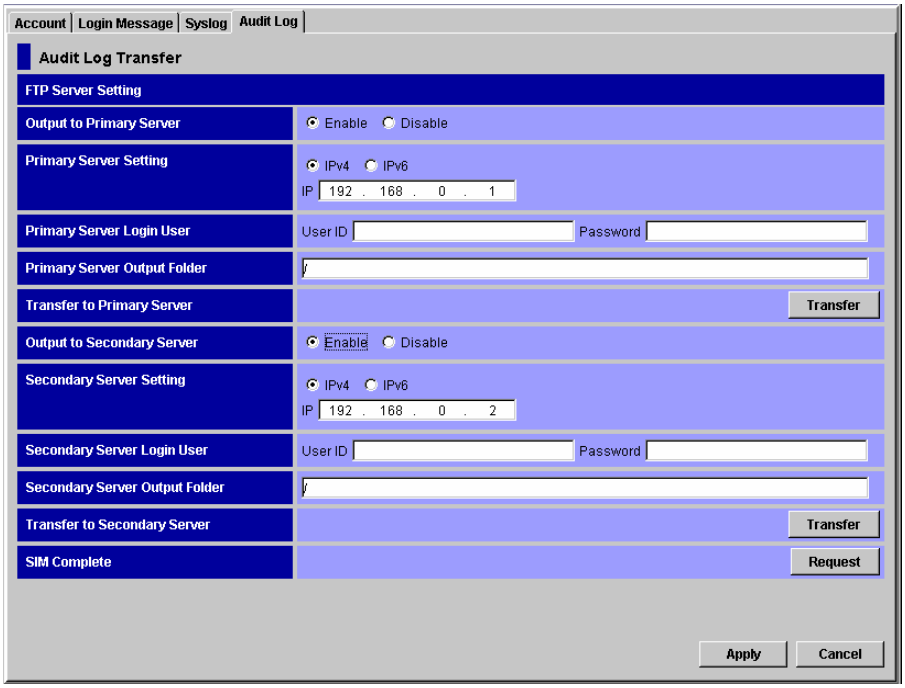


Figure 3-11 Audit Log Window

The Audit Log window has the following features:

- **Output to Primary Server:** You can specify whether to transfer the audit log file to the primary FTP server. To transfer the file, select **Enable**. To not transfer the file, select **Disable**.
- **Primary Server Setting:** You can set an IP address for the primary FTP server. Once you set **Output to Primary Server** to **Enable**, **IP** becomes available. The default IP address has been entered, so change it as needed.

  You can set either IPv4 address or IPv6 address for IP address. However, only IPv4 address is available when the operating system of your SVP is Windows XP.

  - To set an IPv4 address, select **IPv4**. For **IP**, enter four integers in the range of 0 to 255 (for example, *nnn.nnn.nnn.nnn*, where *n* is a number). Only enter numbers. Do not enter the intervening periods.
  - To set an IPv6 address, select **IPv6**. For **IP**, enter eight hexadecimal numbers in the range of 0 to FFFF (for example, *hhhh:hhhh:hhhh:hhhh:hhhh:hhhh:hhhh:hhhh*, where *h* is a hexadecimal digit). Only enter hexadecimal numbers. Do not enter the intervening colons.
- **Primary Server Login User:** You can set **UserID** and **Password** to log into the primary FTP server. You can enter up to 256 alphanumeric characters and symbols (ASCII codes) for user ID and password.

- **Primary Server Output Folder:** You can set the folder location to save the audit log file. The folder location should be relative to a home directory of a FTP server user. The default setting (/) is the home directory. You can enter up to 256 alphanumeric characters and symbols (ASCII codes) for the output folder.
- **Transfer to Primary Server:** When you click **Transfer**, the audit log file is transferred to the primary FTP server according to the settings selected on the Audit Log window. You can transfer the current audit log file without waiting for the audit log file to reach the threshold size for automatic transfer.
- **Output to Secondary Server:** You can specify whether to transfer the audit log file to the secondary FTP server. To transfer the file, select **Enable**. To not transfer the file, select **Disable**.
- **Secondary Server Setting:** You can set an IP address for the secondary FTP server. Once you set **Output to Secondary Server** to **Enable**, **IP** becomes available. The default IP address has been entered, so change it as needed. The restriction for the available values is the same as that of **Primary Server Setting**.
- **Secondary Server Login User:** You can set **User ID** and **Password** to log into the secondary FTP server. The restriction for the available values is the same as that of **Primary Server Login User**.
- **Secondary Server Output Folder:** You can set the folder location to save the audit log file. The folder location should be relative to a home directory of a FTP server user. The default setting and the restriction for the available values are the same as those of **Primary Server Output Folder**.
- **Transfer to Secondary Server:** When you click **Transfer**, the audit log file is transferred to the secondary FTP server according to the settings selected on the Audit Log window. You can transfer the current audit log file without waiting for the audit log file to reach the threshold size for automatic transfer.
- **SIM Complete:** The **Request** button allows you to complete (resolve) the SIM which occurs when transfer of audit logs to any FTP servers fails. Resolve the error condition, manually transfer the audit log file by clicking **Transfer**, and then complete the SIM. The SIM status will change to **Complete**.
  Important: If you do not complete the SIM, the SIM will not occur the next time an FTP transfer fails.
- **Apply:** The **Apply** button allows you to make all the settings made on the Audit Log window effective. This button is available only when you are in the modify mode.
- **Cancel:** The **Cancel** button allows you to cancel all the settings made on the Audit Log window in the modify mode. This button is available only when you are in the modify mode.

Configuration File Loader Window

The Configuration File Loader window allows you to export a spreadsheet file with the current configuration information, and import a file with the new configuration. You can also see the status and the error information of the imported file before you apply the changes. For the procedure in the Configuration File Loader window, see Using Configuration File Loader.

To open the Configuration File Loader window, log into the Storage Navigator, and then select **Go**, **Configuration File Loader** and **Configuration File Loader** from the menu bar of the Storage Navigator main window. A storage partition administrator cannot display the Configuration File Loader window.

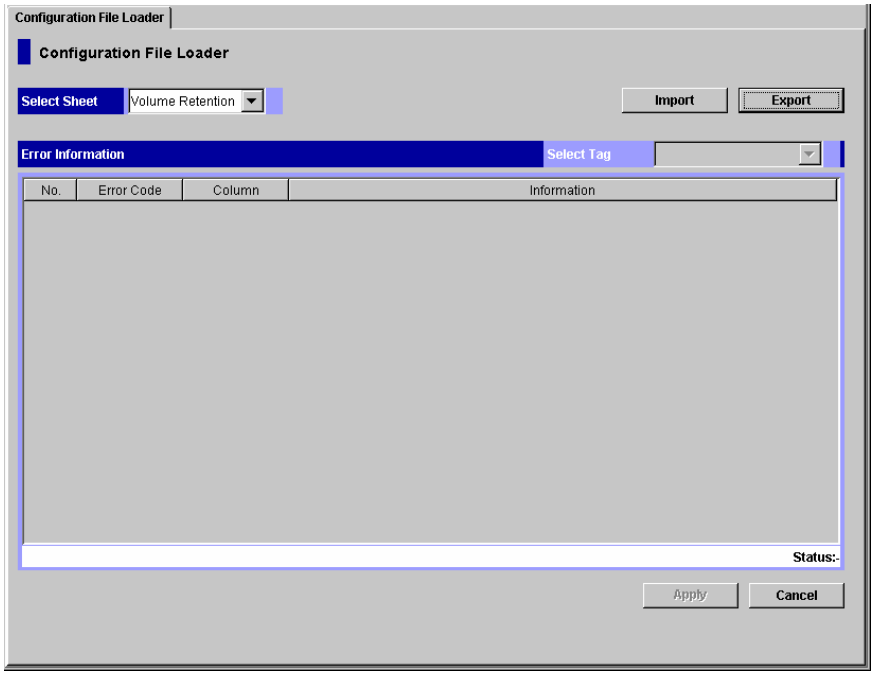


Figure 3-12 Configuration File Loader Window

The Configuration File Loader window has the following features:

- The **Select Sheet** list allows you to select the program product option for which you want to import or export a spreadsheet file.
- The **Import** button allows you to import the edited spreadsheet file. For instructions on importing the spreadsheet file, see Importing the Spreadsheet.
  If you use the Mozilla Web browser, the Download Manager dialog box may display when you click **Import**. If this occurs, close the Download Manager dialog box and continue the operation.

- The **Export** button allows you to export the current spreadsheet file. For instructions on exporting the spreadsheet file, see Exporting the Spreadsheet.
  If you use the Mozilla Web browser, the Download Manager dialog box may display when you click **Export**. If this occurs, close the Download Manager dialog box and continue the operation.
  - **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 see the *Storage Navigator Messages* for the error codes and error messages displayed on the list.
- The **Select Tag** list is available after you have imported a spreadsheet, and allows you to select the function tag that you want to display. An asterisk (*) is displayed after one or more of the function tags that has an error.
- The **Status** field displays whether or not there is an error in the imported spreadsheet. If there are no errors, the **Apply** button becomes available. The available status conditions are:
  - **Error**
  - Ready
- The **Apply** button becomes available only when a spreadsheet without detected errors is imported, and implements the settings in the imported spreadsheet.
- The **Cancel** button cancels the settings and returns you to the original status of the Configuration File Loader window.

Basic Information Display Dialog Boxes

The Basic Information Display dialog box displays the basic configuration information of the storage system. When you log in as a storage partition administrator, the information on the allocated SLPR is displayed. The Basic Information Display dialog box is another dialog box that is displayed apart from the Storage Navigator main window, therefore it can be displayed regardless of the operation of the Storage Navigator options. For example, when you perform the setting operation of one of the Storage Navigator options, you may need to check the existing setting information on the ports or LUNs. In such situation, you can display the Basic Information Display dialog box and look at the basic configuration information, at the same time you can perform the operation.

To open the Basic Information Display dialog box, log into the Storage Navigator, and then select **File**, and **Basic Information** from the menu bar of the Storage Navigator main window. For detailed information about each dialog box, see the following subsections.

Following is the description on the Basic Information Display dialog box:

- The information displayed on the Basic Information Display dialog box is updated :
  - When the tab is clicked on the Basic Information Display dialog box and the displayed dialog box is changed.
  - When the **Refresh** command () on the menu bar of the Storage Navigator main window is selected.
  - When the tab is clicked on the Storage Navigator windows during the operation of the product option and the displayed window is changed.
  - When the **Apply** button is clicked on the Storage Navigator main window.
  - When the operation mode is changed from the **View** mode to the **Modify** mode on the Storage Navigator main window.

Common Elements

Basic Information Display dialog box displays the following items.

- If the volume is a LUSE volume, you can display the detailed information of the LUSE volume. If you select a LUSE volume in the list of the LUN dialog box or the LDEV dialog box and right-click, the **Detail Information** command is displayed. As you click the **Detail Information** command, the detailed information of the LUSE volume is displayed. For the description on the displayed information, see Detail Information Dialog Box.
- **LDKC:CU:LDEV** column displays the LDKC number, the CU number, and the LDEV number. These numbers are separated by colons (:).
  - An LDEV number that ends with the pound or gate symbol (#) indicates that the LDEV is an external volume (e.g. **00:00:01 #**). For details regarding the external volumes, see the *Universal Volume Manager User's Guide*.
  - An LDEV number that ends with a "**V**" mark indicates that the LDEV is a Copy-on-Write Snapshot virtual volume (e.g. **00:00:01 V**). For details regarding virtual volumes, see the *Copy-on-Write Snapshot User's Guide*.
  - An LDEV number that ends with a "**X**" mark indicates that the LDEV is a Dynamic Provisioning virtual volume (e.g. **00:00:01 X**). For details regarding virtual volumes, see the *Dynamic Provisioning User's Guide*.

  The icons have the following meaning:

Table 3-5 Icons in the LDKC:CU:LDEV column

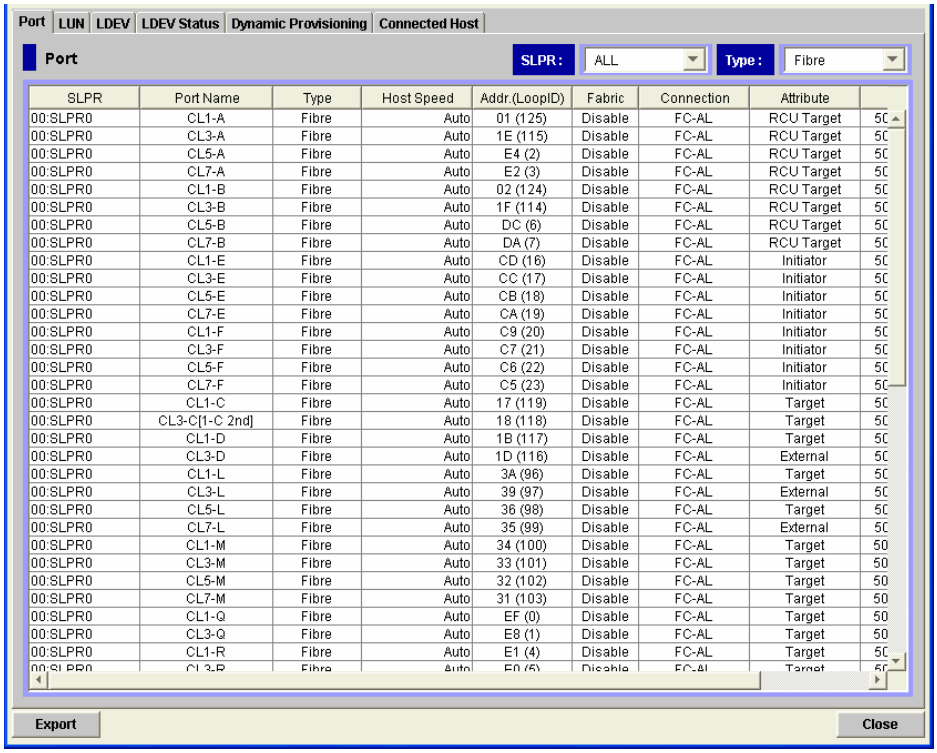
Icons	Description
	Normal LDEV
	Expanded (LUSE) volume
	Reserved volume of Volume Migration
	Variable sized volume (CV)
	Secured LDEV
	Remote command device
	Command device
	Command device to which the command device security is applied

- You can export the information displayed on the Basic Information Display dialog box as a comma-separated values (CSV) file using the **Export** button at the lower left of the Basic Information Display dialog box.
  To export the information displayed on the Basic Information Display dialog box as a CSV file:

1. Click **Export** at the lower left of the Basic Information Display dialog box. The dialog box for selecting file is displayed.
2. Specify the file name and location to save the file on the displayed dialog box.
3. Click **Save**. When the saving processing finishes, the procedure is complete.
4. Click **Close** on the lower right of the Basic Information Display dialog box.

Port Dialog Box

The information displayed on the **Port** dialog box can be switched using the **SLPR** list or **Type** list. The following figure is an example of the **Port** dialog box when **Fibre** is selected by the **Type** list.



SLPR	Port Name	Type	Host Speed	Addr.(LoopID)	Fabric	Connection	Attribute
00:SLPR0	CL1-A	Fibre	Auto	01 (125)	Disable	FC-AL	RCU Target
00:SLPR0	CL3-A	Fibre	Auto	1E (115)	Disable	FC-AL	RCU Target
00:SLPR0	CL5-A	Fibre	Auto	E4 (2)	Disable	FC-AL	RCU Target
00:SLPR0	CL7-A	Fibre	Auto	E2 (3)	Disable	FC-AL	RCU Target
00:SLPR0	CL1-B	Fibre	Auto	02 (124)	Disable	FC-AL	RCU Target
00:SLPR0	CL3-B	Fibre	Auto	1F (114)	Disable	FC-AL	RCU Target
00:SLPR0	CL5-B	Fibre	Auto	DC (6)	Disable	FC-AL	RCU Target
00:SLPR0	CL7-B	Fibre	Auto	DA (7)	Disable	FC-AL	RCU Target
00:SLPR0	CL1-E	Fibre	Auto	CD (16)	Disable	FC-AL	Initiator
00:SLPR0	CL3-E	Fibre	Auto	CC (17)	Disable	FC-AL	Initiator
00:SLPR0	CL5-E	Fibre	Auto	CB (18)	Disable	FC-AL	Initiator
00:SLPR0	CL7-E	Fibre	Auto	CA (19)	Disable	FC-AL	Initiator
00:SLPR0	CL1-F	Fibre	Auto	C9 (20)	Disable	FC-AL	Initiator
00:SLPR0	CL3-F	Fibre	Auto	C7 (21)	Disable	FC-AL	Initiator
00:SLPR0	CL5-F	Fibre	Auto	C6 (22)	Disable	FC-AL	Initiator
00:SLPR0	CL7-F	Fibre	Auto	C5 (23)	Disable	FC-AL	Initiator
00:SLPR0	CL1-C	Fibre	Auto	17 (119)	Disable	FC-AL	Target
00:SLPR0	CL3-C[1-C 2nd]	Fibre	Auto	18 (118)	Disable	FC-AL	Target
00:SLPR0	CL1-D	Fibre	Auto	1B (117)	Disable	FC-AL	Target
00:SLPR0	CL3-D	Fibre	Auto	1D (116)	Disable	FC-AL	External
00:SLPR0	CL1-L	Fibre	Auto	3A (96)	Disable	FC-AL	Target
00:SLPR0	CL3-L	Fibre	Auto	39 (97)	Disable	FC-AL	External
00:SLPR0	CL5-L	Fibre	Auto	36 (98)	Disable	FC-AL	Target
00:SLPR0	CL7-L	Fibre	Auto	35 (99)	Disable	FC-AL	External
00:SLPR0	CL1-M	Fibre	Auto	34 (100)	Disable	FC-AL	Target
00:SLPR0	CL3-M	Fibre	Auto	33 (101)	Disable	FC-AL	Target
00:SLPR0	CL5-M	Fibre	Auto	32 (102)	Disable	FC-AL	Target
00:SLPR0	CL7-M	Fibre	Auto	31 (103)	Disable	FC-AL	Target
00:SLPR0	CL1-Q	Fibre	Auto	EF (0)	Disable	FC-AL	Target
00:SLPR0	CL3-Q	Fibre	Auto	E8 (1)	Disable	FC-AL	Target
00:SLPR0	CL1-R	Fibre	Auto	E1 (4)	Disable	FC-AL	Target

Figure 3-13 Port Dialog Box (Basic Information Display, when Fibre is Selected)

The displayed items on the Port dialog box are as follows:

- **SLPR** list**:**

  You can display the information on a particular SLPR as you select the SLPR in the **SLPR** list. If you have logged in as a storage partition administrator, only the information on the allocated SLPR is displayed, and you cannot select other SLPRs in this list.

- **Type** list:

  You can select a port type and the information only on the selected port type is displayed on the Port list. One of the following ports can be selected:

  – Fibre: The information only on the fibre ports is displayed.

  – Serial: The information only on the serial ports is displayed.

  – Mfibre: The information only on the Mfibre ports is displayed.

- **Port** list:

  The information on the port that is selected by the **Type** list is displayed. Following are the displayed items for each port type. For more detailed information about the displayed items, please see the *LUN Manager User's Guide*.

  – The displayed items when **Fibre** is selected by the **Type** list:

    SLPR: SLPR number and SLPR name.

    Port Name: Port name.

    Type: Type of port, which is Fibre, is displayed.

    Host Speed: Data transfer speed for fibre-channel ports. The unit is Gbps (Gigabits per second).

    Addr. (Loop ID): Address and Loop ID of port.

    Fabric: Indicates whether a Fabric switch is used. Enable or Disable is displayed.

    Connection: Topology. FC-AL or P-to-P is displayed.

    Attribute: Port attribute. Initiator, Target, RCU Target, or External is displayed.

    WWN: WWN of host bus adapter.

  – The displayed items when **Serial** is selected in the **Type** list:

    SLPR: SLPR number and SLPR name.

    Port Name: Port name.

    Type: Type of port, which is Serial, is displayed.

    Attribute: Port attribute. LCP is displayed.

– The displayed items when **Mfibre** is selected in the **Type** list:

SLPR: SLPR number and SLPR name.

Port Name: Port name.

Type: Type of port, which is Mfibre, is displayed.

Attribute: Port attribute. HTP is displayed.

WWN: WWN of Mfibre Port.

LUN Dialog Box

The information on the open-system volumes is displayed on the LUN dialog box. For more detailed information about the displayed items, see the *LUN Manager User's Guide*.

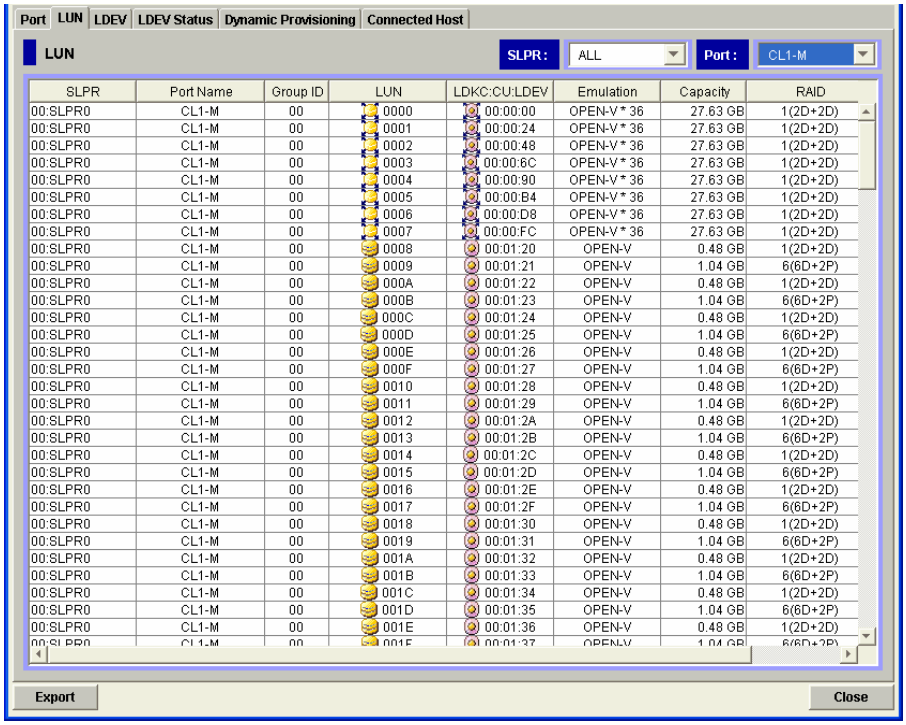


Figure 3-14 LUN Dialog Box (Basic Information Display)

The displayed items on the LUN dialog box are as follows:

- **SLPR** list:

  You can display the information on a particular SLPR as you select the SLPR in the **SLPR** list. If you have logged on as a storage partition administrator, only the information on the allocated SLPR is displayed, and you cannot select other SLPRs in this list.

- **Port** list:

You can select the port for which the information to be listed from the list.

- **LUN** list:

  Following items are displayed in the **LUN** list:

  - **SLPR:** SLPR number and SLPR name.
  - **Port Name**: Port name.
  - **Group ID**: The group number of the host group.
  - **LUN**: LUNs (logical unit numbers) assigned to logical volumes.

    The icon  indicates a logical volume to which an LU path is defined.

    The icon  indicates an expanded LU.

    The icon  indicates a remote command device.

    The icon  indicates a command device.

    The icon  indicates command device security.
  - **LDKC:CU:LDEV**: From the left the LDKC number, the CU number, and the LDEV number are displayed. For detailed information, see Common Elements.
  - **Emulation**: Emulation type.

    For an expanded (LUSE) volume, the number of the LDEVs which consist of the LUSE volume is displayed after the emulation type (such as, OPEN-V * 3).

    For a DP-VOL, "(0V)" might be displayed after the emulation type (such as, OPEN-V (0V)).
  - **Capacity**: Volume capacity. For an expanded (LUSE) volume, the total capacity of the LDEVs which consist of the LUSE volume is displayed.
  - **RAID**: RAID level.
  - **Paths**: Number of LU paths.

LDEV Dialog Box

For more detailed information about the displayed items, see the *Virtual LVI/LUN and Volume Shredder User's Guide*.

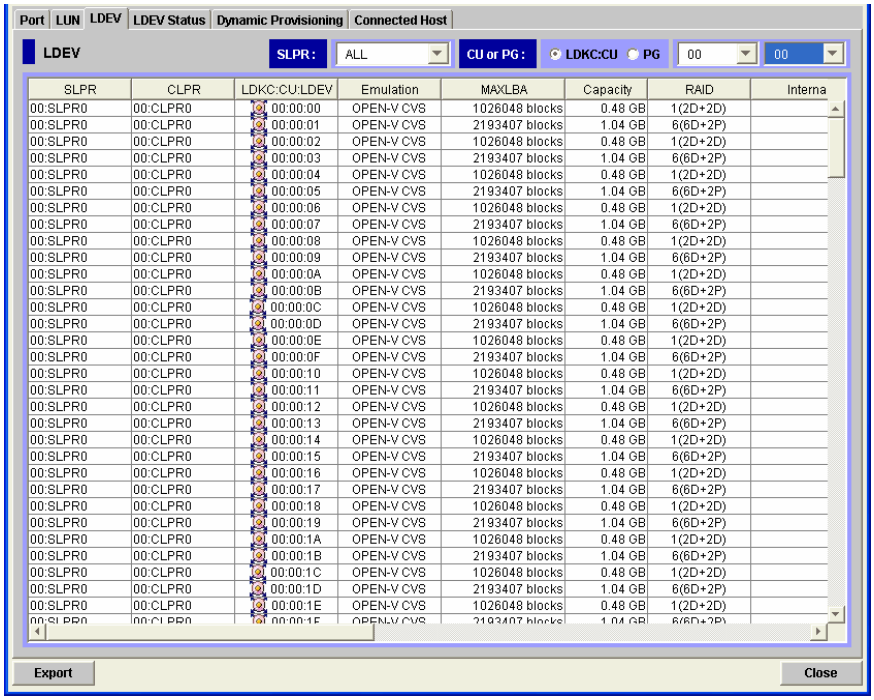


Figure 3-15 LDEV Dialog Box (Basic Information Display)

The displayed items on the LDEV dialog box are as follows:

- **SLPR** list:

  You can display the information on a particular SLPR as you select the SLPR in the **SLPR** list. If you have logged on as a storage partition administrator, only the information on the allocated SLPR is displayed, and you cannot select other SLPRs in this list.

- **CU or PG**:

  You can choose which information to display in the **LDEV** list.

  - If you click **CU**, two lists are displayed. You can select a LDKC from the list on the left, and a CU from the list on the right.
  - If you click **PG**, one list is displayed. You can select the parity group to display from the list.

- **LDEV** list:

Following items are displayed in the **LDEV** list:

- **SLPR:** SLPR number and SLPR name.
- **CLPR:** CLPR number and CLPR name.
- **LDKC:CU:LDEV**: From the left the LDKC number, the CU number, and the LDEV number are displayed. For detailed information, see Common Elements.
- **Emulation**: Emulation type.

  For an expanded (LUSE) volume, the emulation type of the each LDEV is displayed.

  For a DP-VOL, "(0V)" might be displayed after the emulation type (such as, OPEN-V (0V)).
- **MAX LBA**: LDEV size recognized by a host.
- **Capacity**: Volume capacity. Open-system volumes are displayed in gigabyte (GB), mainframe volume are displayed in cylinder (Cyl). For an expanded (LUSE) volume, the capacity of the each LDEV is displayed.
- **RAID**: RAID level.
- **Internal Volume Information**: The hard disk type of internal volume is displayed as follows:

  The blank indicates fibre-channel drive.

  An asterisk (*) indicates SATA drive.

  A hyphen (-) indicates external volume.
- **Parity Group**: Parity group.
- **Paths**: Number of LU paths.
- **Attribute:** The attribute set for the volume is displayed as follows:

  Pool (X): The volume is set as a pool volume (pool-VOL). X indicates pool ID.

  V-VOL: The volume is set as a virtual volume (V-VOL) for Copy-on-Write Snapshot.

  DP-VOL: The volume is set as a virtual volume (V-VOL) for Dynamic Provisioning.

  Reserved LDEV: The volume is set as a reserved volume of Volume Migration.

  JNL Volume: The volume is set as a journal volume.

  System Disk: The volume is set as a system disk.
- **External Volume Information**: Information on the external volume is displayed in the format of Vendor/ Product name/ Serial number/ Hard disk type. The hard disk type is displayed as follows:

  The blank indicates fibre-channel drives.

  An asterisk (*) indicates BD or SATA drive.

  A hyphen (-) indicates internal volume.

- **External Paths:** Number of LU paths that are set for the external volume.
- **Cache Mode**: Cache Mode set for the external volume when it was mapped.

LDEV Status Dialog Box

The statuses of volumes are displayed on the LDEV Status dialog box. For more detailed information about the displayed items, see the *Virtual LVI/LUN and Volume Shredder User's Guide*.

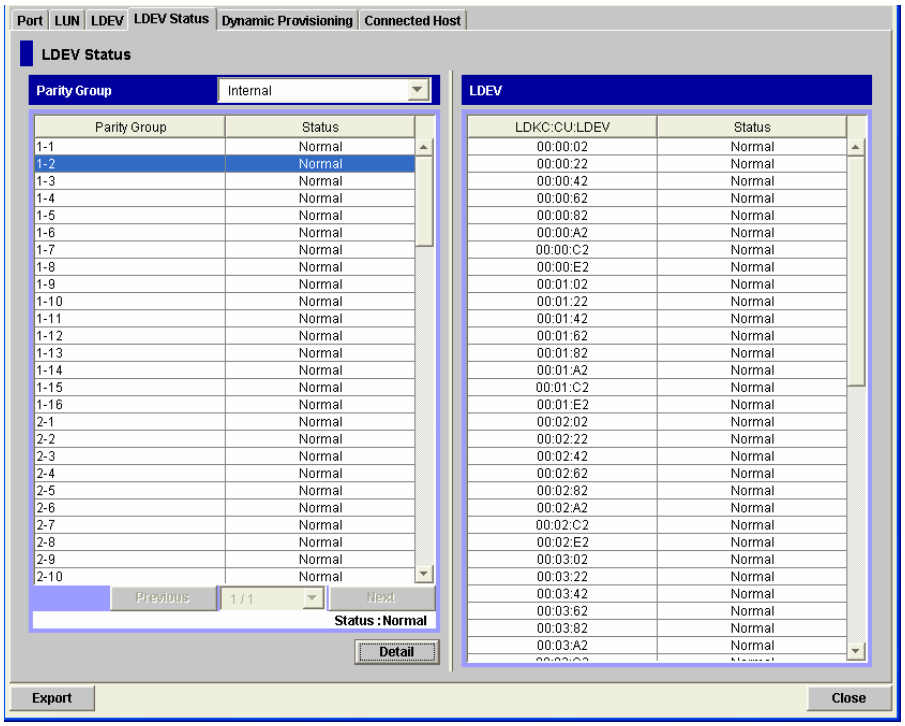


Figure 3-16 LDEV Status Dialog Box (Basic Information Display)

The displayed items on the LDEV Status dialog box are as follows:

- List:

  You can select which disk group to display in the **Parity Group** list.

- **Parity Group** list:

  The **Parity Group** list displays all the parity groups that belong to the disk group you have selected. The following items are displayed in the **Parity Group** list:

  - **Parity Group**: A parity group number is displayed.
  - **Status**: A status of all the volumes in the parity group is displayed.

Table 3-6 Status of All Volumes in a Parity Group

Status	Description
Normal	All the volumes are in a normal status.
Blocked	All the volumes are in a blocked status.
Format	All the volumes are being formatted.
Preparing Quick Format	All the volumes are being prepared for Quick Format.
Normal (Quick Format)	Quick Format is in progress. When a parity group contains both the **Normal** and **Normal (Quick Format)** statuses, the list also displays **Normal (Quick Format)**.
Correction Access	The access attributes of all the volumes are being changed.
Copying	Data in all the volumes are being copied.
Read Only	Hosts can only read the volumes.
Shredding	The shredding operation is in progress.
Unknown	The system does not recognize the status of any volumes.
Warning	Some volumes are not in a normal status.
-	The statuses of the volumes are none of the above.

- Page Switching Area:

  The **Parity Group** list displays up to 4,096 parity groups per page. When more parity groups are defined, use the following functions to see the entire list:

  - List: Displays the current page number. It also allows you to display the desired page.
  - **Previous** button: Displays the previous page.
  - **Next** button: Displays the next page.

- **Status** Area:

  The **Status** area displays the status of the disk group that you have selected in the list.

  - **Normal**: All the volumes are in a normal status.
  - **Warning**: Not all the volumes are in a normal status.

- **Detail** button:

  When you select a parity group in the **Parity Group** list and click **Detail**, all the LDEVs in the parity group are displayed in the **LDEV** list.

- **LDEV** List:

  The following items are displayed in the **LDEV** list:

  - **LDKC:CU:LDEV**: From the left the LDKC number, the CU number, and the LDEV number are displayed. For detailed information, see Common Elements.
  - **Status**: A status of a volume is displayed.

Table 3-7 Status of a Volume

Status	Description
Normal	The volume is in a normal status.
Blocked	The volume is in a blocked status.
Format	The volume is being formatted.
Preparing Quick Format	The volume is being prepared for Quick Format.
Normal (Quick Format)	Quick Format is in progress.
Correction Access	The access attribute of the volume is being changed.
Copying	Data in the volume is being copied.
Read Only	Hosts can only read the volume.
Shredding	The shredding operation is in progress.
Unknown	The system does not recognize the status of the volume.

Dynamic Provisioning Dialog Box

The information on the Dynamic Provisioning volumes is displayed on the Dynamic Provisioning dialog box. For detailed information about the displayed items, see the *Dynamic Provisioning User's Guide*.

Connected Host Dialog Box

The information on mainframe hosts is displayed on the Connected Host dialog box.

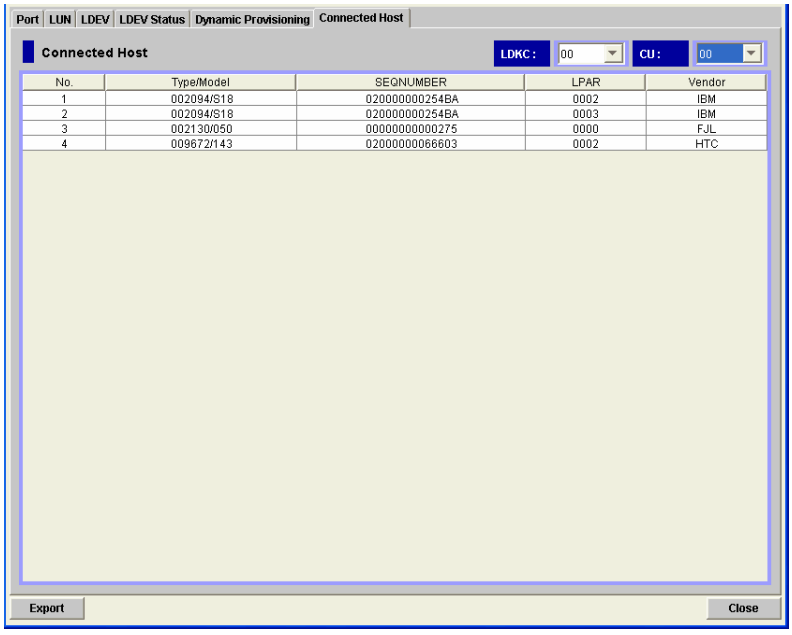


Figure 3-17 Connected Host Dialog Box (Basic Information Display)

The displayed items on the Connected Host dialog box are as follows:

- **LDKC** list:

  You can select the LDKC for which the information to be listed from the list.

- **CU** list:

  You can select the CU for which the information to be listed from the list.

- **Connected Host** list:

  Following items are displayed in the **Connected Host** list:

  - **No.**

    Indicates the sequential number of the list.

  - **Type/Model**

    Indicates the type and the model number of a host (or a channel extender).

  - **SEQNUMBER**

    Indicates the node ID of a host (or a channel extender).

  - **LPAR**

    Indicates a logical partition number of a host.

  - **Vendor**

    Indicates the vendor of the host. This column can display **FJT** (Fujitsu), **IBM**, **HTC** (Hitachi), and **CNT(Ex)**. If **CNT(Ex)** appears, the table row indicates the type, the model number, and the node ID of a channel extender.

Detail Information Dialog Box

If you select a LUSE volume in the list of the LUN dialog box (see Figure 3-14) or the LDEV dialog box (see Figure 3-15) and right-click, the **Detail Information** command is displayed. As you click **Detail Information**, the detailed information of the LUSE volume is displayed on the Detail Information dialog box.

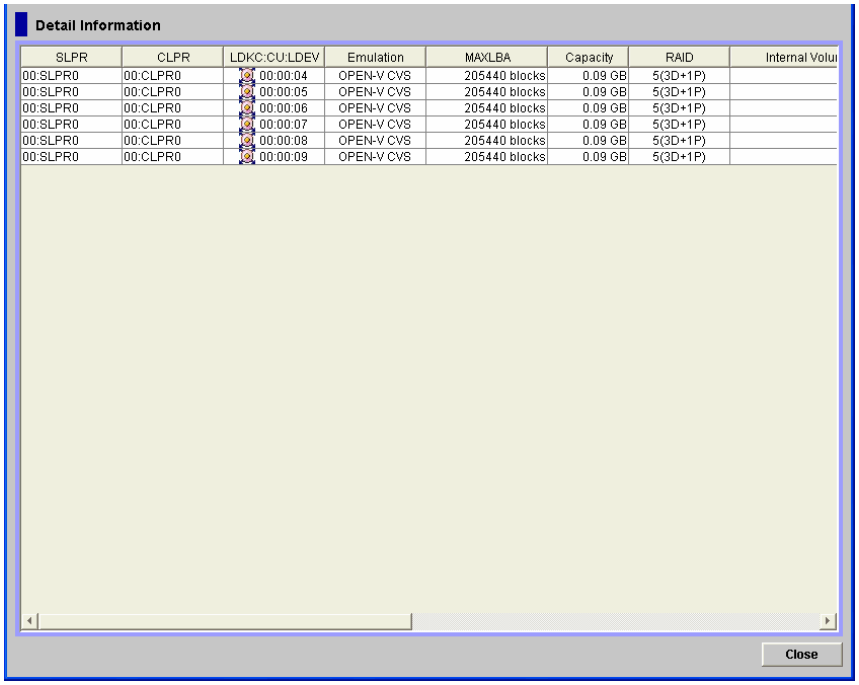


Figure 3-18 Detail Information Dialog Box (Basic Information Display)

The Detail Information dialog box displays the same items as the **LDEV** list in the LDEV dialog box of the Basic Information Display dialog box (see LDEV Dialog Box).

Storage Device List Dialog Box

The Storage Device List shows a list of storage systems.

To open the **Storage Device List** dialog box, access the following URL on the Web browser of the Storage Navigator computer:

```
http://xxx.xxx.xxx.xxx/cgi-bin/utility/sjc0000.cgi
```

or

```
http://xxx.xxx.xxx.xxx/
```

xxx.xxx.xxx.xxx is the IP address or the host name of the SVP.

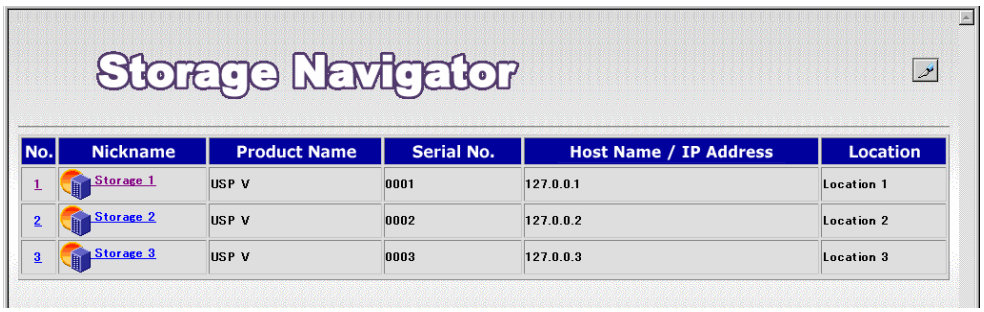


Figure 3-19 Storage Device List Dialog Box

The Storage Device List dialog box has the following features:

- The **Edit** button ( ) opens the Storage List Editor dialog box (see Figure 3-20), which allows you to edit storage device entries. You must enter your user ID and password on the login dialog box, before the Storage List Editor dialog box opens.

Table 3-8 Information on Storage Device List

Item	Description	Format
Nickname	The nickname to identify the storage system. Enter different nicknames when you register multiple storage systems to the Storage Device list.	Up to 16 alphanumeric characters (ASCII codes) except for some symbols such as ", \, ;, :, *, ?, <, >, |, and /.
Product Name	The product name of the storage system.	Select a product name from the list.
Serial No.	The serial number of the storage system.	The numeric in less than 6 digits, from 1 to 99999.
Host Name OR IPv4 Address OR IPv6 Address (Choose one)	The host name, or The IP address of the storage system's SVP. ▪ You need to decide the host name which is unique and does not overlap with any other host names which are already used. However, the host name can be same as the Nickname. If the SVP is set to support the SSL-encrypted communication, the host name must be the same as the name that is entered in the certificate as Common Name. See Registering the Primary SVP Host Name for the SSL-encrypted communication. ▪ IPv6 addresses can be specified when the operating system of the SVP is Windows Vista.	▪ For a host name: The host name can be specified within 255 letters, and following letters can be used: Alphabets (A to Z and a to z), numbers (0 to 9), hyphen (-), and period as break. ▪ For an IPv4 address: *nnn.nnn.nnn.nnn*, where *n* is a number. ▪ For an IPv6 address: *xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx*, where x is a hexadecimal digit.
Location	The location of the storage system.	Up to 16 alphanumeric characters (ASCII codes) except for some symbols such as ", \, ;, :, *, ?, <, >, |, and /.
Note: You cannot omit any information on the storage device list.		

Storage List Editor Dialog Box

The Storage List Editor dialog box allows a storage administrator to add a new storage system entry or to change the registered entry. For detailed operation authority required to edit the Storage Device List or detailed operations on the Storage List Editor dialog box, see Editing the Storage Device List.

You can access the Storage List Editor dialog box by clicking **Edit** on the Storage Device List dialog box (see Figure 3-19), and logging in as a storage administrator.

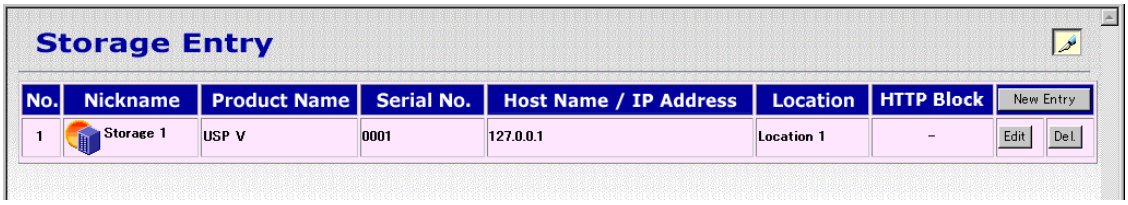


Figure 3-20 Storage List Editor Dialog Box

The Storage List Editor dialog box has the following features:

- The **Logout** button () returns you to the Storage Device List dialog box.
- The **New Entry** button opens the Storage Entry dialog box (see Figure 4-1), which allows you to add a new storage system entry.
  You can register up to 500 storage system entries. You cannot concurrently access 500 storage systems.
- The **Edit** button opens the Change Storage Entry dialog box (see Figure 4-2), which allows you to change the storage system entry.
- The **Del.** button deletes a storage system entry.

Tool Panel

Tool Panel allows you to launch multiple dialog boxes which enable you to specify environment parameters of Storage Navigator, or configure SSL-encrypted communications. We recommend that you add Tool Panel to your favorites of Web browser.

To open the Tool Panel, access the following URL on the Web browser of the Storage Navigator computer:
`http://xxx.xxx.xxx.xxx/cgi-bin/utility/toolpanel.cgi`

xxx.xxx.xxx.xxx is the IP address or the host name of the primary SVP.

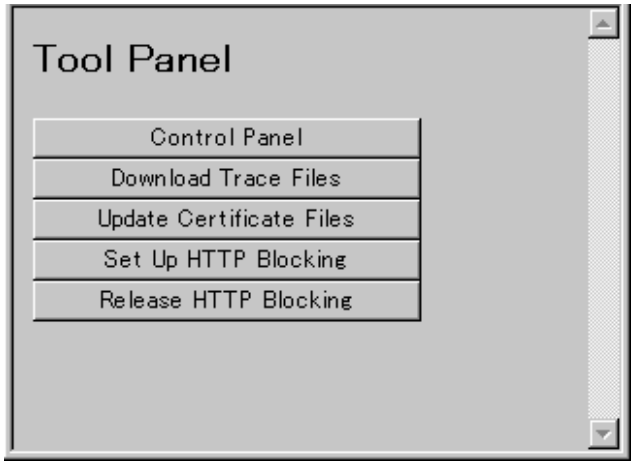


Figure 3-21 Tool Panel

The Tool Panel has the following features:

- Control Panel (see Control Panel)
- Download Trace Files (see Downloading Trace Files Using the FD Dump Tool)
- Update Certificate Files (see the *Encrypted communications User's Guide*)
- Set Up HTTP Blocking (see the *Encrypted communications User's Guide*)
- Release HTTP Blocking (see the *Encrypted communications User's Guide*)

Control Panel

From the Storage Navigator Control Panel, the storage administrator can set Storage Navigator environment parameters, download files of configuration information, and restore the downloaded backup files of the Storage Navigator configuration information.

To open the Storage Navigator Control Panel, click **Control Panel** in the Tool Panel dialog box(see Tool Panel) and log in from the displayed dialog box. Only the storage administrators can open Control Panel.

Set Env. Dialog Box

The Set Env**.** dialog box allows a storage administrator to set the Storage Navigator environment parameters. For detailed operation authority required for the Set Env**.** dialog box, or detailed operations on the Set Env**.** dialog box, see Setting the Environment Parameters.

To open the Set Env**.** dialog box, click the **Set Env**. tab in Control Panel.

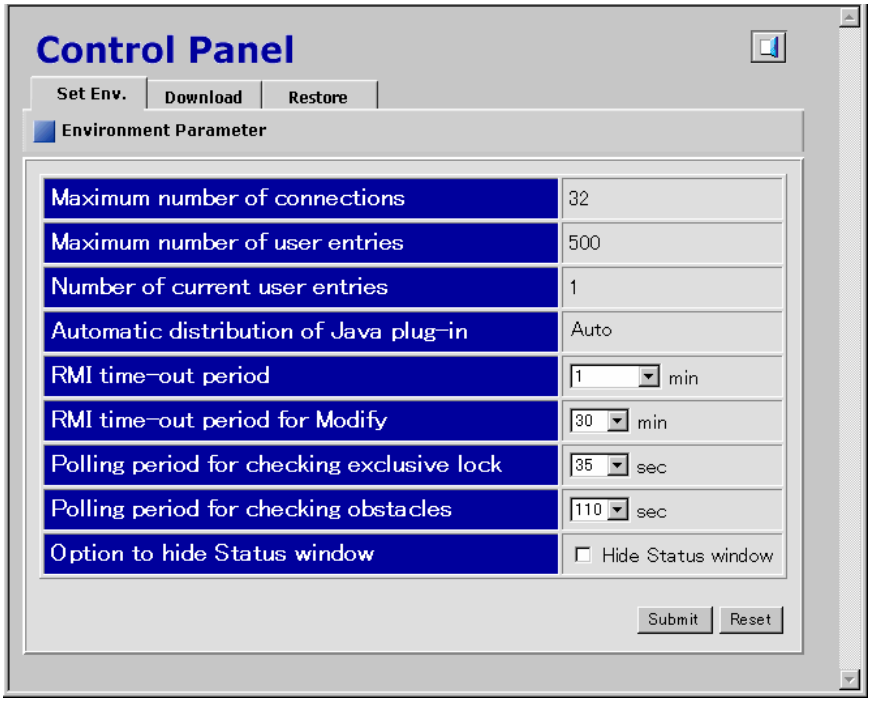


Figure 3-22 Set Env. Dialog Box (Control Panel)

The Set Env. dialog box has the following features:

- **Maximum number of connections -** The maximum number of Storage Navigator users who can concurrently connect to the same storage system.

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 -** The maximum number of user entries that can be registered in the user account list of a storage system.

  You cannot change this value from the Storage Navigator. Contact your Hitachi Data Systems service representative if you want to change the default setting.

- **Number of current user entries -** The number of user accounts currently registered in the user account list.

- **Automatic distribution of Java plug-in -** The Java Runtime Environment (JRE) is required to use Storage Navigator, but if a Storage Navigator computer (Java client) does not have the JRE, the following will be executed when the user logs in to the SVP.
  - For Windows: the SVP automatically distributes and installs the appropriate JRE into that Storage Navigator computer.
  - For UNIX: the SVP automatically opens the appropriate Web page to download the JRE into that Storage Navigator computer.

- **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 out of the SVP. This has the following parameters:
  - The default is **1 minute**. You can specify **1** minute, **5** – **60** minutes in 5-minute increments, **70** to **120** minutes in 10-minute increments, or **One day** (24 hours).
  - 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 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***.

  You cannot disable this parameter.

- **RMI time-out period for Modify -** 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 appears.
  - 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 parameter.

- **Polling period for checking exclusive lock -** Specify the polling period for monitoring who is changing information while in **Modify** mode when other users are viewing the storage system information in **View** mode. The **Locked** and **Unlocked** icons are automatically updated either when a user who is in **Modify** mode logs out from Storage Navigator or changes to **View** mode (see Icons).
  - The default time period is **35 seconds**. You can specify **5** to **60** in 5-second increments, or **70** to **120** in 10-second increments. The shorter the time period you specify, the more frequently the Lock/Unlock status is updated, but this does increase network traffic.
  - 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 window of the Storage Navigator main window.
  - The default time period is **110 seconds**. You can specify **5** to **60** seconds in 5-second increments, and **70** to **120** seconds in 10-second increments for the parameter.
  - Specify **NO** to disable this parameter. We recommend that you select **NO** when the check box of **Option to hide Status window** is selected.
- **Option to hide Status window -** Specify whether to display the Status window (see Figure 3-6). If the **Hide Status window** check box is selected, the **Status** tab does not appear in the Storage Navigator main window. By default, the check box is cleared. We recommend that you select **NO** for **Polling period for checking obstacles** when the check box of **Option to hide Status window** is selected.
- **Submit -** Submits the settings that you have set.

  You need to log out from Storage Navigator once and log in again for the new settings to take effect.
- **Reset -** Resets Storage Navigator settings to the defaults.

Download Dialog Box

The Download dialog box allows a storage administrator to download files containing the Storage Navigator configuration information.

To open the Download dialog box, click the **Download** tab in Control Panel.

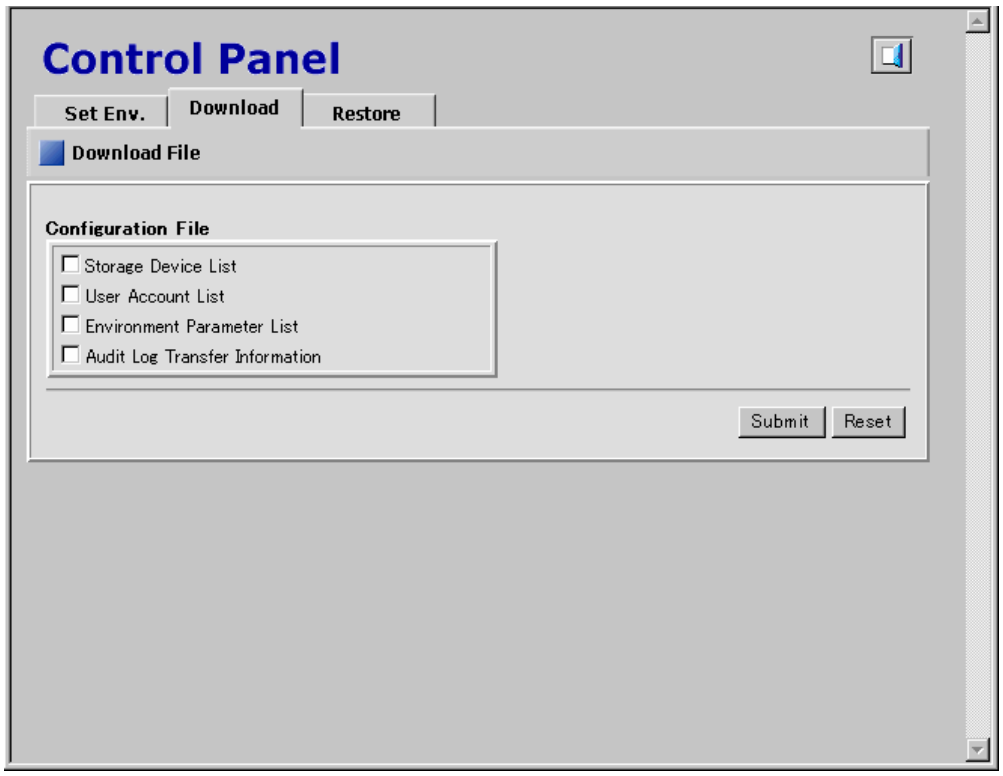


Figure 3-23 Download Dialog Box (Control Panel)

The Download dialog box has the following features:

- In the **Configuration File** box, the check boxes indicate the configuration files that can be downloaded. Select a check box and click **Submit** to download the file containing the desired information. The files that you can download depend on the operation authority set for your user account. The files and authority required to download are as follows:
  - **Storage Device List**: A storage administrator with the **Storage Administrator Role** set to **Enable** can download the file containing the contents of the **Storage Device List**.
  - **User Account List**: A storage administrator with the **Account Administrator Role** set to **Modify** or **View** can download the file containing the list of user accounts (settings on the Account window).

- **Environment Parameter List**: A storage administrator with the **Storage Administrator Role** set to **Enable** can download the file containing the Storage Navigator environment parameters (settings of the Set Env. dialog box).
- **Audit Log Transfer Information**: A storage administrator with the **Audit Log Administrator Role** set to **Modify** or **View** can download the file containing the settings of the Syslog window and the Audit Log window.

- The **Submit** button opens the Download File dialog box (see Figure 4-6) to download the selected files.
- The **Reset** button clears all the check boxes.

Restore Dialog Box

The Restore dialog box allows a storage administrator to restore configuration files that were previously backed up.

To open the Restore dialog box, click the **Restore** tab in Control Panel.

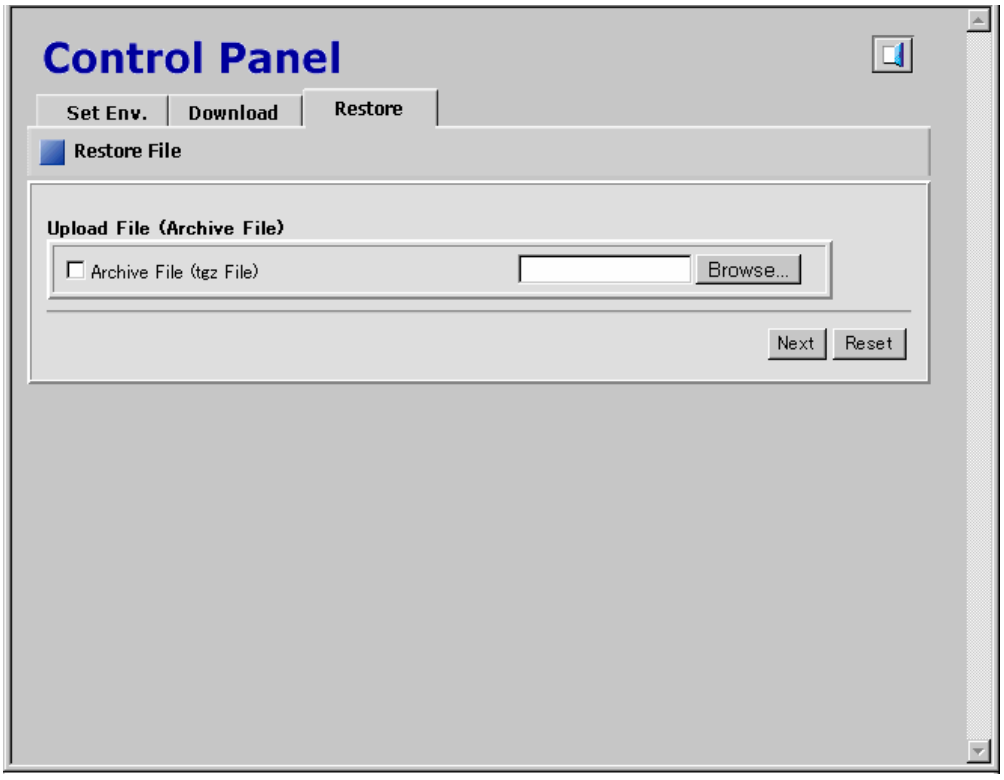


Figure 3-24 Restore Dialog Box (Control Panel)

The Restore dialog box has the following features:

- **Upload File (Archive File):** Select the **Archive File (tgz File)** check box and specify the compressed file (backup file), which has previously been downloaded from the Download dialog box in the Control Panel. The file extension must be **tgz**. To specify the directory of the backup file, click **Browse** and then select the location.

  The files that you can restore depend on the operation authority set for your user account, even if you specify a compressed file that contains all configuration files. The files and authority required to restore are as follows:

  - To restore the **Storage Device List**, the **Storage Administrator Role** must be set to **Enable**.
  - To restore the user account list, the **Account Administrator Role** must be set to **Modify**.
  - To restore the environment parameters, the **Storage Administrator Role** must be set to **Enable**.
  - To restore the audit log and syslog settings, the **Audit Log Administrator Role** must be set to **Modify**.
- The **Next** button takes you to the next step of restoring backup files, where you will specify the restoring file in **Upload File**, and then you can click **Next**.
- The **Reset** button clears all the check boxes and text boxes.

4

Performing Storage Navigator Operations

This chapter describes how to perform Storage Navigator operations:

- ☐ Editing the Storage Device List
- ☐ Enabling and Disabling Storage Navigator Options
- ☐ Launching the Desired Option
- ☐ Managing the User Accounts
- ☐ Setting the Environment Parameters
- ☐ Downloading the Configuration Files
- ☐ Restoring Backups of the Configuration Files
- ☐ Downloading Trace Files Using the FD Dump Tool
- ☐ Using Configuration File Loader

Editing the Storage Device List

Cautions:

- Only a storage administrator with the **Enable** authority of **Storage Administrator Role** can edit the storage device list.
- If you edit the storage device list to change the settings, you must back up the Storage Navigator configuration file by downloading the file from the SVP. For instructions on downloading the configuration file, see Downloading the Configuration Files.

Adding a New Storage Device

To add a new storage device (storage system):

1. On the Web browser of the Storage Navigator computer, access the URL of the primary SVP to open the Storage Device List dialog box.
2. On the Storage Device List dialog box, click the **Edit** button ().
   The login dialog box is displayed.
3. Enter the user ID and password, and click **Login**.

   The Storage List Editor dialog box is displayed (see Figure 3-20).

   If the SVP is set to support SSL-encrypted communication, security messages might appear. For details, see Using SSL-Encrypted Communication.
4. Click **New Entry** to open the Storage Entry dialog box (see Figure 4-1).
5. On the Storage Entry dialog box, fill in all the information about a storage system you want to add. See Table 3-8 for detail on format.
   - You can enter only one of these (a host name, IPv4 address, or IPv6 address) for **Host Name / IP Address**.
   - You can use **HTTP Block** to block HTTP communication in the environment supporting the encrypted communication by SSL communication (HTTPS). For more detailed information, see the *Encrypted Communications User's Guide*.
6. Click **Submit** to register the entry.
   A confirmation message is displayed.
7. Click **OK** to register, or click **Cancel** to cancel.
   When the entry is registered successfully, a completion message is displayed.
8. Click **Close**.
   The new entry is added to the end of the list on the Storage List Editor dialog box.
9. On the Storage List Editor dialog box, click the **Logout** button ().

   You return to the Storage Device List dialog box.

If the SVP is set to support SSL-encrypted communication, the Security Alert dialog box is displayed before the Storage Device List dialog box appears. Click **Yes** to display the Storage Device List dialog box. The new entry is added to the end of the list on the Storage Device List dialog box.

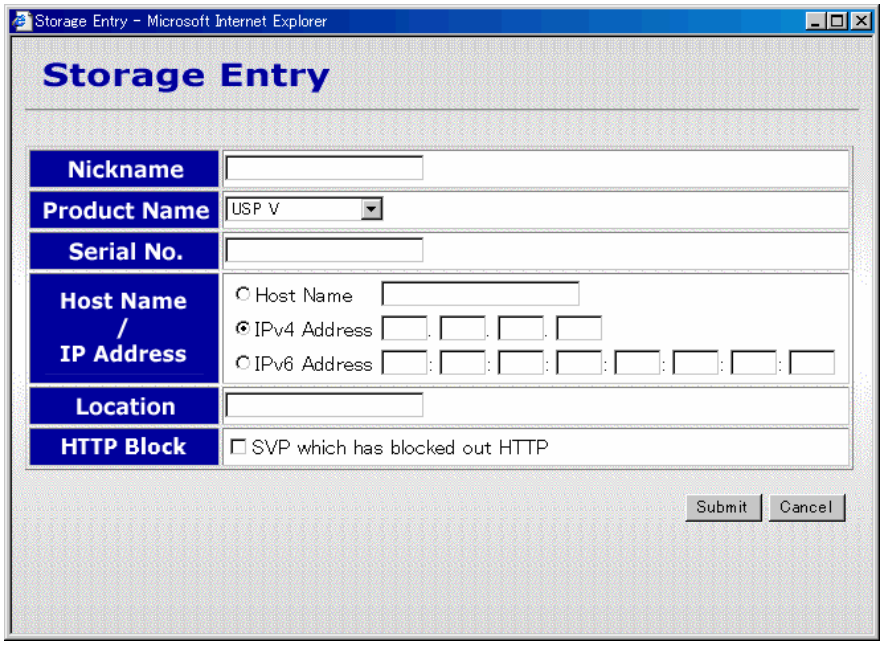


Figure 4-1 Storage Entry Dialog Box

Changing a Storage Device

To change a storage device (storage system):

1. On the Web browser of the Storage Navigator computer, access the URL of the primary SVP to open the Storage Device List dialog box.
2. On the Storage Device List dialog box, click the **Edit** button (). The login dialog box is displayed.
3. Enter the user ID and password, and click **Login**.

   The Storage List Editor dialog box is displayed (see Figure 3-20).

   If the SVP is set to support SSL-encrypted communication, security messages might appear. For details, see Using SSL-Encrypted Communication.
4. Click **Edit** of the desired storage system in the list to open the Change Storage Entry dialog box (Figure 4-2).
5. On the Change Storage Entry dialog box, change the storage system information.
   - You can enter only one of these (a host name, IPv4 address, or IPv6 address) for **Host Name / IP Address**.

- You can use **HTTP Block** to block HTTP communication in the environment supporting the encrypted communication by SSL communication (HTTPS). For more detailed information, see the *Encrypted Communications User's Guide*.

6. Click **Submit** to register the change to the storage system.
   A confirmation message is displayed.
7. Click **OK** to register the change, or click **Cancel** to cancel.
   When the change is registered successfully, a completion message is displayed.
8. Click **Close**.
   The changed information is displayed on the Storage List Editor dialog box.
9. On the Storage List Editor dialog box, click the **Logout** button ( ).

   You return to the Storage Device List dialog box.

   If the SVP is set to support SSL-encrypted communication, the Security Alert dialog box is displayed before the Storage Device List dialog box appears. Click **Yes** to display the Storage Device List dialog box. The changed information is displayed on the Storage Device List dialog box.

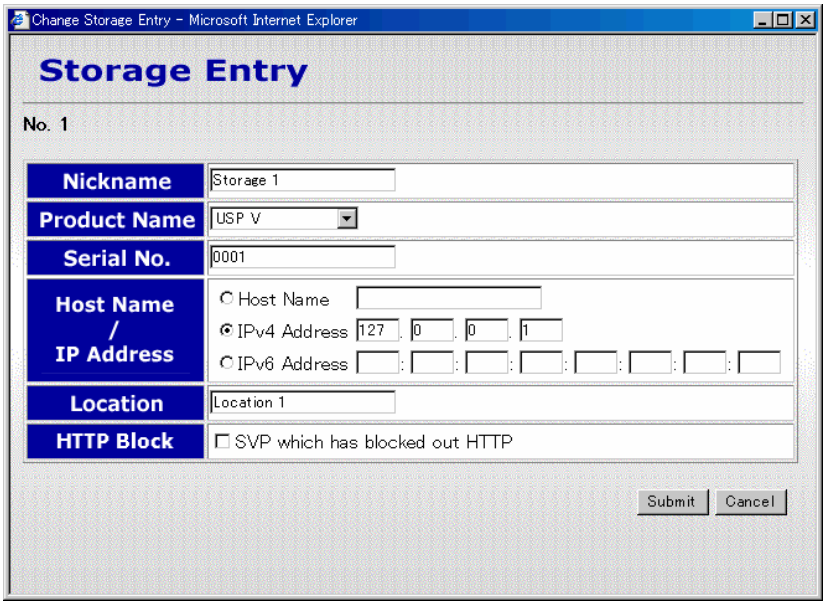


Figure 4-2 Change Storage Entry Dialog Box (When IP Address is Set)

Deleting a Storage Device

To delete a storage device (storage system):

1. On the Web browser of the Storage Navigator computer, access the URL of the primary SVP to open the Storage Device List dialog box.
2. On the Storage Device List dialog box, click the **Edit** button (). The login dialog box is displayed.
3. Enter the user ID and password, and click **Login**.

   The Storage List Editor dialog box is displayed (see Figure 3-20).

   If the SVP is set to support SSL-encrypted communication, security messages might appear. For details, see Using SSL-Encrypted Communication.
4. Click **Del.** of the desired storage system in the list.
5. When a confirmation message is displayed, click **OK** to delete the storage system.
   The storage system is deleted from the list on the Storage List Editor dialog box.
6. On the Storage List Editor dialog box, click the **Logout** button ().

   You return to the Storage Device List dialog box.

   If the SVP is set to support SSL-encrypted communication, the Security Alert dialog box is displayed before the Storage Device List dialog box appears. Click **Yes** to display the Storage Device List dialog box. The storage system is deleted from the list on the Storage Device List dialog box.

Enabling and Disabling Storage Navigator Options

To activate the program product options of USP V/VM on Storage Navigator, the program product options need to be installed using license keys. This section describes the program product options on Storage Navigator, and the procedures of installing and uninstalling the program product options from the License Key window (see License Key Window).

Only the storage administrators can install and uninstall the program product options.

If storage partition administrators want to use the program product options for their own SLPRs, the program product options have to be installed by the storage administrators using the License Key window, and then the licensed capacity for each program product option has to be allocated to SLPRs using the License Key Partition Definition window by the storage administrators. For the description of the License Key Partition Definition window and the procedure of allocating licensed capacity to the SLPRs, see the *Virtual Partition Manager User's Guide*.

Enabling Options Using a License Key Code

To enable a USP V/VM Storage Navigator option by using the license key code:

1. Log into the Storage Navigator and open the License Key window (see License Key Window).
2. Change to **Modify** mode (see Changing Between View Mode and Modify Mode if you need instructions).
3. Select **Key Code** in Mode.
4. In **Key Code**, enter the license key code. You cannot copy and paste text from other applications.
5. Click **Install**.
   The row of the installed option changes to ***blue bold italics*** and the **Status** column changes to ***Install***.
   - ***Important:*** To implement the setting, you must click **Apply**.
   - If you want to disable the term key, perform the operations which are described in Enabling or Disabling a License.
   - When you want to enable some other options, repeat the steps from 3 to 5.
6. Click **Apply** (or **Cancel**).

   The status of the enabled options changes to **Installed**.

   Warning messages are displayed in the following cases:
   - The error code # 405 5503 is displayed if you install an emergency key for the option that has already been installed with a permanent key. If you install the emergency key, it expires in 30 days.

- The error code #405 5501 is displayed if you install an emergency key when the option has already been installed with a temporary key and the remaining lifetime of the option is more than 30 days. You cannot install an emergency key under these circumstances.

For details on these error codes, see the *Storage Navigator Messages.*

Enabling 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.

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

1. Log into the Storage Navigator and open the License Key window (see License Key Window).
2. Change to **Modify** mode.
3. From **Mode**, click **File**.

   The **Browse** button becomes available.
4. Click **Browse** to display the dialog box, and select the license key file (the file extension is "plk") to be used for installing options on the displayed window.

   The selected file name is displayed in the **File Name** text box.

   The file name must be up to 200 alphanumeric characters (ASCII codes), except for some symbols, such as ", \, ;, :, ,, *, ?, <, >, |, /,. You need to be careful with the license key file name.
5. Click **Install**. The time taken for installing depends on the number of license key codes that you install. For example, if you install 30 key codes, it takes about three minutes. If you install 1000 key codes, it may take more than 60 minutes.
6. Click **Apply** (or Cancel).

   The status of the enabled options changes to **Installed**.

   If installation fails or an error occurs during the installation, a message dialog box appears and lists the failed options (see Figure 4-3). To display the error detail in the dialog box, select the failed option and then click **Detail**.

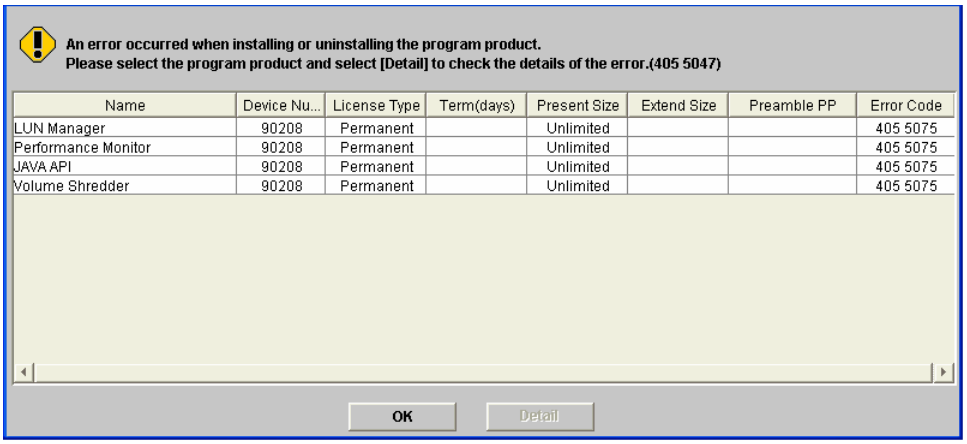


Figure 4-3 Install/Uninstall Error Dialog Box

Enabling Options Automatically

When the licensed capacity exceeds the mounted capacity (or used capacity) because of the reduction of disk drives, you can automatically enable only the available Storage Navigator options with permanent keys using the **Available** button.

Whether the options can be enabled or not using the **Available** button depends on the relationship between the mounted capacity of the disk drives and the licensed capacity. The following table shows the condition of availability of the **Available** button.

Table 4-1 Condition to Enable Available Button

Relationship between Mounted Capacity of Disk Drives and Licensed Capacity	Availability of the Available Button
Mounted capacity ≤ Licensed capacity	Available
Mounted capacity > Licensed capacity	Not available

To install Storage Navigator options automatically on the Storage Navigator using the **Available** button:

1. Log into the Storage Navigator and open the License Key window (see License Key Window).
2. Change to **Modify** mode.
3. From Mode, click **Available**.
4. Click **Install**.

   In the **License Key** list, the row of the options that can be enabled changes to ***blue bold italics*** and the **Status** column changes to ***Install***.
5. Click Apply (or Cancel).

   The status of the enabled options changes to **Installed**.

Enabling or Disabling a License

When you want to enable or disable the term key, you set enable or disable for the **License Status**. You can also set enable for the license when you install more than one program product options at once, however, some program product options are not available because the requirements for these program product options are not satisfied. In such a case, you need to satisfy the requirements first, then set enable for the license.

To set enable or disable to the license:

1. Log into the Storage Navigator and open the License Key window (see License Key Window).
2. Change to **Modify** mode (see Changing Between View Mode and Modify Mode if you need instructions).
3. Select a desired option that you want to set in the list.
4. Select **Enable** or **Disable** in License Status.
5. Click **Set**.

   The row of the selected option changes to ***blue bold italics***. If you set to disable, the **Status** column changes to ***Install (Disable)***. If you set to enable, the **Status** column changes to ***Install***.
6. When you want to enable or disable some other options, repeat the steps from 3 to 5.
7. Click **Apply** (or **Cancel**).

   The status of the program product options is changed.

Disabling Storage Navigator Options

To disable Storage Navigator options on the Storage Navigator:

1. Log into the Storage Navigator and open the License Key window (see License Key Window).
2. Change to **Modify** mode.
3. Select the desired option that you want to uninstall in the list.
   The selected option is displayed in reverse video.
4. From Mode, click **Key Code**.
5. Click **Uninstall**.
   A confirmation message is displayed.
6. Click **OK** (or **Cancel**).
   The row of the selected option changes to blue bold italics and also changes the displayed status to Uninstall.
7. When you want to disable some other option, repeat the steps from 3 to 6.
8. Click **Apply** (or **Cancel**).

   The status of the uninstalled option changes from **Installed** to **Not Installed**.

Cautions:

- 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 reset the information of the option.
- When you uninstall Data Retention Utility, an error might occur even if the **Permitted Volumes** column of the License Key window indicates that the licensed capacity is **0TB** (zero terabyte).

To remove the error and continue uninstallation, take the following steps:

1. Open the Data Retention Utility window and then find logical volumes that are unusable as S-VOLs (secondary volumes). For detailed instructions, see the Data Retention Utility User's Guide.
2. Change the settings of the logical volumes so that the logical volumes are usable as S-VOLs. For detailed instructions, see the Data Retention Utility User's Guide.
3. Return to the License Key window and then uninstall Data Retention Utility.

Launching the Desired Option

You must install the options (see Enabling and Disabling Storage Navigator Options) to use the options.

To launch a particular option, select **Go**, ***option name or function name***, and then ***the tab name of each window*** from the menu bar of the Storage Navigator main window.

The **Go** menu displays the name of program product options or functions (see Permission Information List). Each names in the **Go** menu has a submenu which displays the tab name of the options or the functions.

Managing the User Accounts

To manage user accounts, you use the Account window (see Account Window). The operations that can be performed in the Account window differ depending on the operation authority which is set for the account administrator role.

Caution: If you have changed the setting of user accounts, you must back up the Storage Navigator configuration file by downloading the file from the SVP. For instructions on downloading the configuration file, see Downloading the Configuration Files.

Registering New Users

You can newly register a user account by using the Account window. You may register up to 500 users including the user ID "root" for Storage Navigator. To register a new user account, log in with a user account of which **Modify** is set for **Account Administrator Role**.

When you register new user account, you have to decide the user ID of the user account to register, the password for logging in Storage Navigator, and the operation authority to set.

You can use the following characters for setting a user ID and password.

- User ID

  For setting a user ID, you can use up to 256 alphanumeric characters (ASCII codes) and the following symbols (! # $ % & ' * + - . / = ? @ ^ _ ` { | } ~). You cannot register multiple instances of the same user ID.

- Password

  For setting password, you can use all the alphanumeric characters (ASCII codes). Password must be from 6 to 256 characters.

To register a new user account:

1. Log in to Storage Navigator, and open the Account window (see Figure 3-8).
2. Change to **Modify** mode (see Changing Between View Mode and Modify Mode).
3. In the **Account Information** tree, select the folder to which you want to register a user account.
   To register a user account as a storage administrator, select the **SA** folder.
   To register a user account as a storage partition administrator, select the folder of SLPR No. to which you want to register the user account.
4. Right-click the folder to which you want to register a user account. Then, click the **New User** command**.**
   The New User dialog box (see Figure 4-4) is displayed.
5. In the New User dialog box, register the following items.
   - **User ID**: Enter the user ID of user account which you want to register.
   - **Password**: Enter the password to be used to log in to Storage Navigator.
   - **Re-enter Password**: Enter the password again for confirmation.
6. Click **Set** on the New User dialog box.
   The New User dialog box is closed, and then the icon and a user ID of the registered user account are displayed in the **Account Information** tree.
   - To change the password of registered user account, select a user ID in the **Account Information** tree, and right-click to perform the **Change Password** command.
   - To delete the registered user account, select a user ID in the **Account Information** tree, and right-click to perform the **Delete User** command.
7. In the **Account Information** tree, select the user ID of registered user account.
8. Set the authority of Account Administrator Role, Audit Log Administrator Role and Storage Administrator Role by selecting from their each list.
9. Set the operation authority of each function in the **Permission Information** list if **Enable** is set for **Storage Administrator Role**.
   To set the operation authority of each function:
   a. Select the row to which you want to set the operation authority. You can also select plural rows by using the **Shift** key or **Ctrl** key.
   b. Select the operation authority either **View** or **Modify** by right-clicking. The selected authority is displayed on the **Permission** column.
10. To register plural user accounts at a time, repeat step 3 to step 9.
11. Click **Apply**.
    The settings are applied to the storage system.

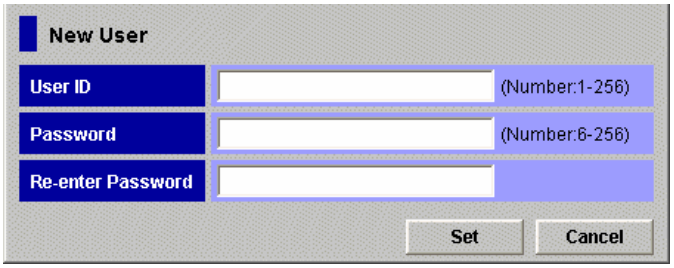


Figure 4-4 New User Dialog Box

Changing User Passwords

All users can change the passwords of their own user accounts. To change the user accounts of others, log in with a user account of which **Modify** is set for **Account Administrator Role**.

For setting password, you can use all the alphanumeric characters (ASCII codes). Password must be from 6 to 256 characters.

To change the password of user account:

1. Log in to Storage Navigator, and open the Account window (see Figure 3-8).
2. Change to **Modify** mode (see Changing Between View Mode and Modify Mode).
3. In the Account Information tree, open the folder to which user account that you want to change password is registered.
4. In the Account Information tree, select the user ID of user account of which you want to change the password.
5. Right-click the mouse and then click the **Change Password** command. The Change Password dialog box (Figure 4-5) is displayed.
6. In the Change Password dialog box, enter the passwords as follows.
   - **Current Password**: Enter the current password. The current password is required when **Modify** is not set for **Account Administrator Role** of your user account.
   - **New Password**: Enter the new password.
   - **Re-enter New Password**: Enter the new password again for confirmation.
7. Click **Set** on the Change Password dialog box.
   The Change Password dialog box is closed, and you return to the Account window.
8. Click **Apply**.
   The settings are applied to the storage system.

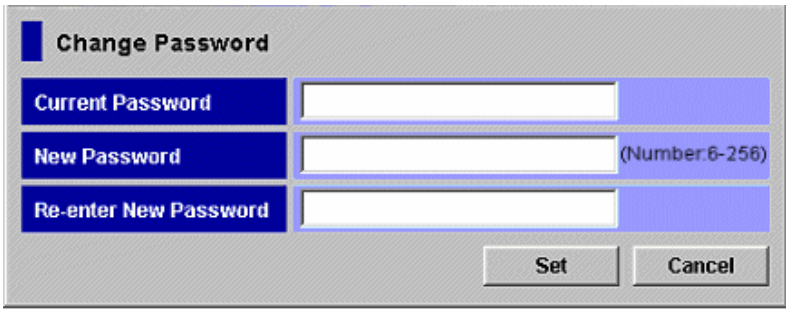


Figure 4-5 Change Password Dialog Box (when Modify is not set for Account Administrator Role)

Changing User Operation Authority

To change the operation authority of user account, log in with a user account of which **Modify** is set for **Account Administrator Role**.

To change the operation authority of the user account which is set to disable, you need to set the user account to enable, change the operation authority of the user account, and then set the user account to disable.

To change the operation authority of user account:

1. Log in to Storage Navigator, and open the Account window (see Figure 3-8).
2. Change to **Modify** mode (see Changing Between View Mode and Modify Mode).
3. In the Account Information tree, open the folder to which user account of which you want to change the operation authority is registered.
4. In the Account Information tree, select the user ID of user account of which you want to change the operation authority. In the User Information and Permission Information lists, the operation authority of the selected user account is displayed.
5. Set the operation authority of Account Administrator Role, Audit Log Administrator Role and Storage Administrator Role by selecting from their each list.
6. Set the operation authority of each function in the **Permission Information** list if **Enable** is set for the operation authority of **Storage Administrator Role**.
   To set the operation authority of each function:
   a. Select the row to which you want to set the operation authority. You can also select plural rows by using the **Shift** key or **Ctrl** key.
   b. Right-click the mouse and then select the operation authority either **View** or **Modify**.
      The selected authority is displayed on the column of **Permission**.

7. To change the operation authority of plural user accounts at a time, repeat step 3 to step 6.
8. Click **Apply**.
   The settings are applied to the storage system.

Enabling or Disabling User Accounts

To set a user account to enable or disable, log in with a user account of which **Modify** is set for **Account Administrator Role**.

When you set a user account to disable, you cannot change the operation authority of the user account. To change the operation authority of the user account which is set to disable, you need to set the user account to enable, change the operation authority of the user account, and then set the user account to disable.

To set a user account to enable or disable:

1. Log in to Storage Navigator, and open the Account window (see Figure 3-8).
2. Change to **Modify** mode (see Changing Between View Mode and Modify Mode).
3. In the Account Information tree, open the folder to which user account that you want to set enable or disable is registered.
4. In the Account Information tree, select the user ID of user account which you want to set enable or disable.
5. Right-click the mouse, and then click the **Enable -> Disable** command to set disable or the **Disable -> Enable** command to set enable.
   You return to the Account window.
   When you set to disable, the icon of user ID to be set will change to the icon in the **Account Information** tree. When you set to enable, the icon of user ID to be set will change to the icon in the **Account Information** tree.
6. Click **Apply**.
   The settings are applied to the storage system.

Deleting Users

To delete a user account, log in with a user account of which **Modify** is set for **Account Administrator Role**. You cannot delete the user account of user ID "root".

To delete a user account:

1. Log in to Storage Navigator, and open the Account window (see Figure 3-8).
2. Change to **Modify** mode (see Changing Between View Mode and Modify Mode).
3. In the Account Information tree, open the folder to which user account that you want to delete is registered.
4. In the Account Information tree, select the user ID of user account which you want to delete.
5. Right-click the mouse and then click the **Delete User** command.
   You return to the Account window. In the Account Information tree, the icon of user ID to be deleted will change to the icon  .
   To cancel deleting the user, select a user ID in the Account Information tree, and right-click to click the Restore user command.
6. Click **Apply**.
   The settings are applied to the storage system.

Setting the Environment Parameters

Cautions:

- To set the environment parameters, you need to log in as a storage administrator with the **Enable** authority of **Storage Administrator Role**.
- If you edit the Storage Navigator environment parameters to change the settings, you must back up the Storage Navigator configuration file by downloading the file from the SVP. For instructions on downloading the configuration file, see Downloading the Configuration Files.

The **Set Env.** dialog box of the **Control Panel** (see Set Env. Dialog Box) allows you to set the following Storage Navigator environment parameters:

- RMI time-out period
- RMI time-out period for **Modify** mode
- Polling period for checking exclusive lock
- Polling period for checking status and events
- Option to hide Status window

To set the Storage Navigator environment parameters:.

1. On the Tool Panel of the Storage Navigator, click **Control Panel** to open the Control Panel. The login dialog box is displayed.
2. Enter the user ID and password and click **Login**. The Control Panel of the Storage Navigator is displayed.

   If the SVP is set to support SSL-encrypted communication, security messages might appear. For details, see Using SSL-Encrypted Communication.
3. Click **Set Env.** tab to open the Set Env. dialog box.
4. Specify the Storage Navigator parameters as required.
5. Click **Submit**.
6. When a confirmation message is displayed, click **OK** (or **Cancel**).
7. When a message indicating completion of submitting new environment parameters is displayed, click **OK** to close the message.
8. Click **Exit** () to close the Control Panel.

Caution: You need to log out from Storage Navigator once and log in again to make the new parameters take effect.

Downloading the Configuration Files

You must log in with the user account of the storage administrator to download the Storage Navigator configuration files. The kinds of configuration files that can be downloaded depend on the operation authority set for the user account. For the required operation authority to download each configuration files, see Download Dialog Box.

To download configuration files:

1. On the Tool Panel of the Storage Navigator computer, click **Control Panel** to open the Control Panel.

   The login dialog box is displayed.

2. Enter the user ID and password and click **Login**.

   The Control Panel of the Storage Navigator is displayed.

   If the SVP is set to support SSL-encrypted communication, security messages might appear. For details, see Using SSL-Encrypted Communication.

3. Click the **Download** tab to open the Download dialog box (see Download Dialog Box).
   The kinds of the configuration files that can be downloaded depend on the operation authority that is set for the user account. Therefore, the displayed check boxes depend on each user account according to the setting of each operation authority.

4. Select the check boxes of the desired files.

5. Click **Submit**.
   The Download File dialog box (see Figure 4-6) opens.

6. On the Download File dialog box, confirm that the selected files are marked with a colored icon, and then click **Download**.
   The File Download dialog box opens.

7. On the File Download dialog box, click **Save**.
   The Save As dialog box opens. The compressed file to be downloaded is automatically named, however, you can change the name.

8. Specify the name of a folder to save the compressed file, and click **Save**.
   When download is complete, the Download Complete dialog box appears.

9. Click **Close** to close the Download Complete dialog box.

10. Decompress the downloaded file (***.tgz**) as required.
    To create the *.tgz file, the directory tree is archived using the tar command and then compressed using the gzip command. To decompress the *.tgz file, please use the tool supporting the tar and gzip. For how to decompress the file, refer to the manual or online help of the tool you use.

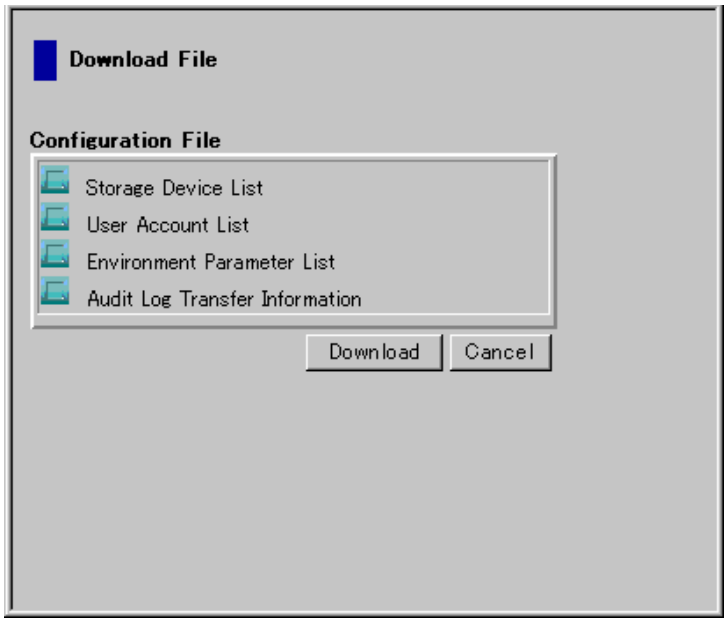


Figure 4-6 Download File Dialog Box After the Files are Selected

Restoring Backups of the Configuration Files

This section describes the procedure to restore the configuration files. For the procedure to download the configuration files, see Downloading the Configuration Files.

You must log in with the user account of the storage administrator to restore the backup files of the Storage Navigator configuration files. The kinds of configuration files that can be restored depend on the operation authority set for the user account. For the required operation authority to restore each configuration files, see Restore Dialog Box.

To restore the configuration files:

1. On the Tool Panel of the Storage Navigator computer, click **Control Panel** to open the Control Panel.

   The login dialog box is displayed.

2. Enter the user ID and password and click **Login**.

   The Control Panel of the Storage Navigator is displayed.

   If the SVP is set to support SSL-encrypted communication, security messages might appear. For details, see Using SSL-Encrypted Communication.

3. Click the **Restore** tab to open the Restore dialog box (see Restore Dialog Box).

4. Select the check boxes of Archives File and click **Browse** to specify the directory of the file.

5. Click **Next**.
   The message to assure uploading file is displayed.
6. Click **OK** on the message dialog box to display the set status of the Restore dialog box (see Figure 4-7).
   The kinds of the configuration file that can be restored depend on the operation authority that is set for the user account. Therefore, the displayed check boxes depend on each user account according to the setting of each operation authority.
7. Select the check boxes of the configuration files to restore for Backup File of the Restore dialog box.
8. Click **Submit**.
   The message dialog box to assure the restoring file is displayed.
9. Click **OK** on the message dialog box.
   When the User Account List check box is selected, the Password check dialog box (Figure 4-8) is displayed. When the check box other than User Account List check box is selected, go on to the step 11.
10. Enter the storage administrator password of the desired user account list twice, and click **Submit** on the Password check dialog box.
    The Restore File dialog box (Figure 4-9) is displayed.

    If the password is not correct, the user account list cannot be restored. The password entered becomes the password for the storage administrator of the corresponding user account after the restoring process.
11. Confirm the restoring process has been completed successfully on the Restore File dialog box.
12. Click **Close** on the Restore **File** dialog box to close the dialog box. When the restoring process is completed successfully, the backup file of the SVP is deleted.

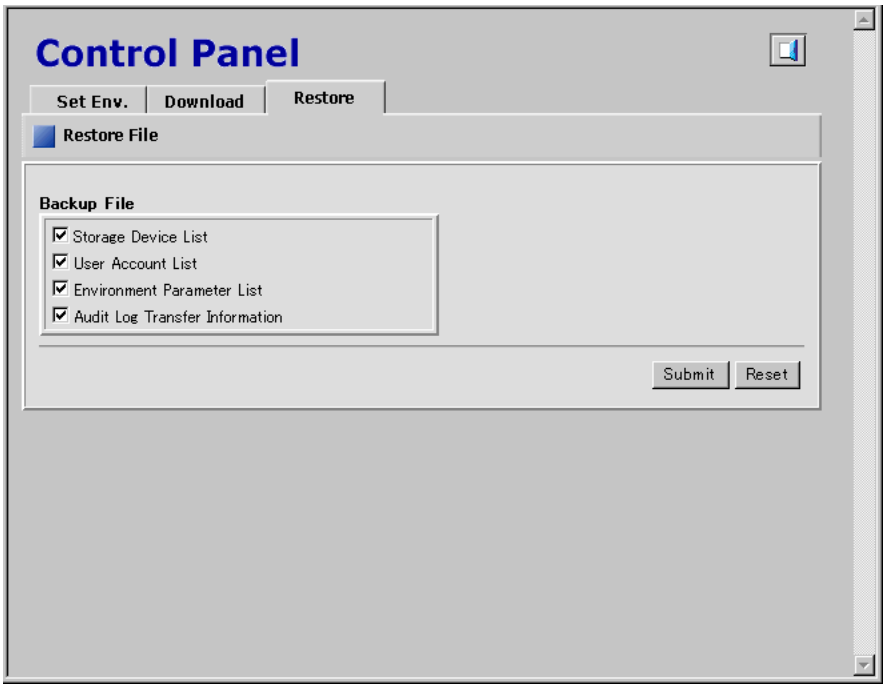


Figure 4-7 Restore Dialog Box (when the backup files is set to be restored)

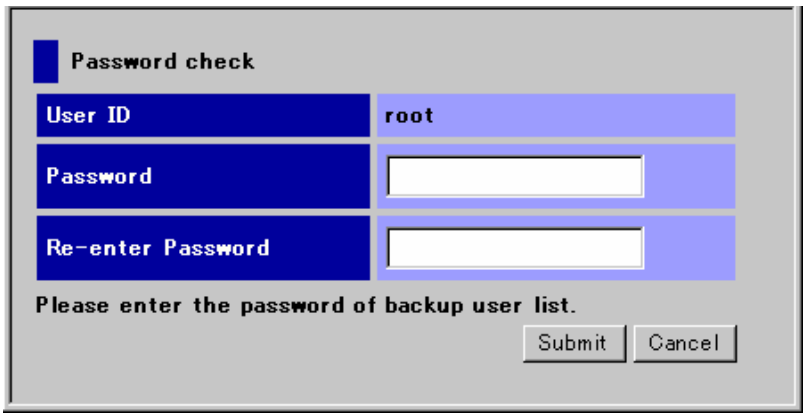


Figure 4-8 Password Check Dialog Box

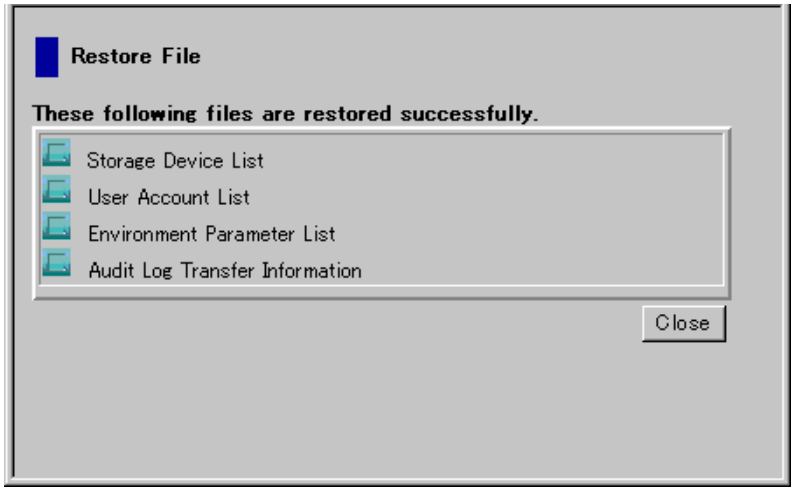


Figure 4-9 Restore File Dialog Box

Downloading Trace Files Using the FD Dump Tool

The USP V/VM Storage Navigator supports the **FD Dump Tool**. The FD Dump Tool is available to only storage administrators, and allows them to download the 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.

If you are unable to resolve an error condition, first copy the Storage Navigator configuration information onto floppy disk(s) using the **FD Dump Tool**. Contact the Hitachi Data Systems Support Center (see Calling the Hitachi Data Systems Support Center), and give the information on the floppy disk(s) to the Hitachi Data Systems service personnel.

Cautions:

- If another user (including SVP user) is using the **FD Dump Tool**, or a maintenance operation is being performed, you cannot download trace files using the **FD Dump Tool**.
- If you want to download trace files to see the configuration information, select the **Refresh All** ( ) command from the menu bar of the Storage Navigator first to refresh the configuration information, and then use the **FD Dump Tool** to perform the downloading operation.

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

1. On the Tool Panel of the Storage Navigator computer, click **Download Trace Files** to open the Download Trace Files dialog box. The login dialog box is displayed.

2. Enter the user ID and password and click **Login**. The Download Trace Files dialog box is displayed (see Figure 4-10).

   If the SVP is set to support SSL-encrypted communication, security messages might appear. For details, see Using SSL-Encrypted Communication.
3. Click Normal Trace.
4. Click **Next >>**. The message that confirms the execution of compression of the trace files is displayed.
5. Click **OK**. A file compression processing starts (see Figure 4-11). When the file is compressed, the Download Trace Files dialog box(see Figure 4-12) for starting download is displayed.
6. Click **Download**. The File Download dialog box is displayed.
7. On the File Download dialog box, click **Save this file to disk**, and then click **OK**. The Save As dialog box is displayed.
8. Specify the download destination, and then click **Save**. When the file is downloaded successfully, the Download complete dialog box is displayed.

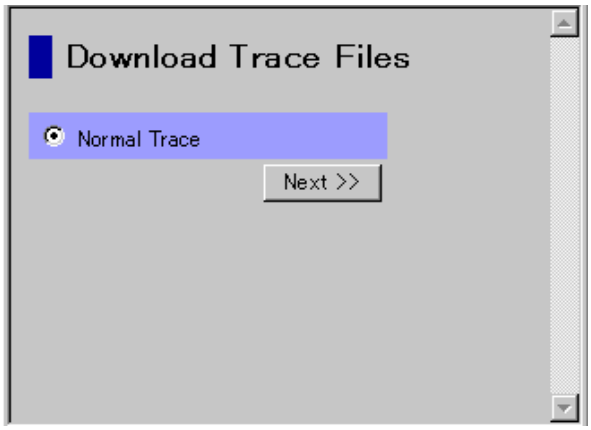


Figure 4-10 Download Trace Files Dialog Box 1 for Selecting Trace Files

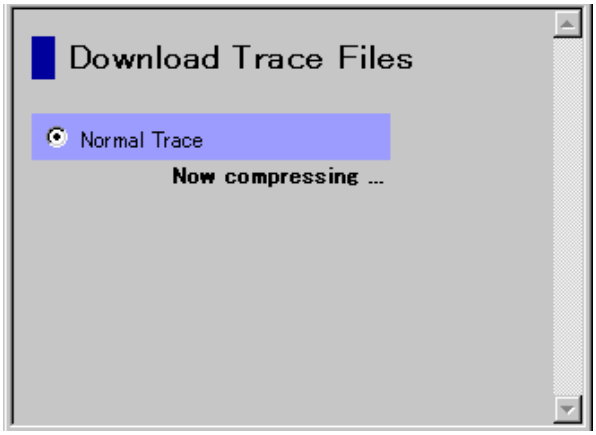


Figure 4-11 Download Trace Files Dialog Box 2 for Compressing

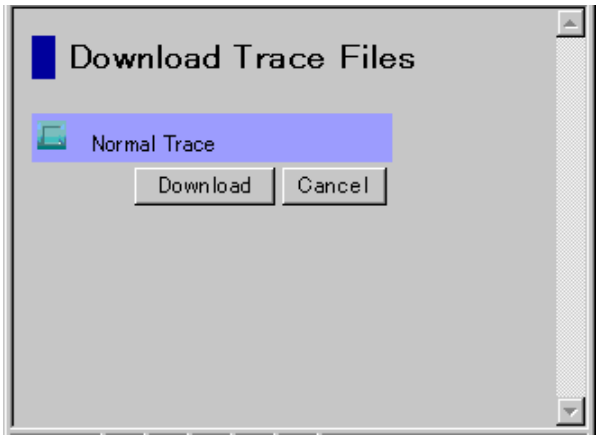


Figure 4-12 Download Trace Files Dialog Box 3 for Starting Download

Using Configuration File Loader

This section explains how to export or import a spreadsheet file using Configuration File Loader. For the format of a spreadsheet file, see the documentation of the program products supporting Configuration File Loader.

The instructions in this section assume the use of Microsoft Excel® 2000. Microsoft Excel is recommended for best compatibility.

Exporting the Spreadsheet

To export the spreadsheet file:

1. Log in to Storage Navigator, and open the Configuration File Loader window (see Configuration File Loader Window).
2. Change to **Modify** mode (see Changing Between View Mode and Modify Mode).
3. Select the program product option that you want to export from the Select Sheet list.
4. Click **Export** to open the Export dialog box (for the example of LUN Manager, see Figure 4-13).
   If you use the Mozilla Web browser, the Download Manager dialog box may display when you click **Export**. If this occurs, close the Download Manager dialog box and continue the operation.
5. You can either enter the name of the spreadsheet directory directly in **File Name on Client**, or you can click **Browse** to open the Save dialog box, which allows you to specify 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.
6. Once you have specified the directory and file name, click **Save** to close the Save dialog box and return to the Export dialog box. The specified directory is displayed in **File Name on Client** and the **Export** button becomes available.
7. Click **Export** to export the spreadsheet file and close the Export dialog box. If you want to cancel the exporting operation, click **Close** on the Export dialog box.
8. After you have exported the spreadsheet file, you can log out from Storage Navigator if you want, but it is not required.

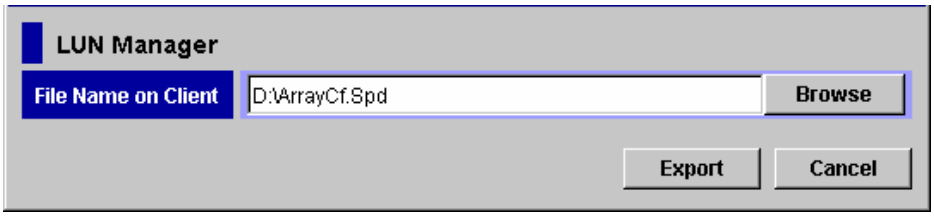


Figure 4-13 Export Dialog Box

Editing the Spreadsheet

The instructions explained in this section assume the use of Microsoft Excel 2000. If you use different spreadsheet software, all values must be displayed in text format.

To edit the spreadsheet file:

1. Launch Microsoft Excel, click **File** and **Open**, then open the exported spreadsheet.

   The Text Import Wizard - Step 1 of 3 dialog box is displayed.

2. Set the original data type as shown in Figure 4-14, and then click **Next** to continue.

   The Text Import Wizard - Step 2 of 3 dialog box is displayed.

3. Set the delimiters as shown in Figure 4-15, and then click **Next** to continue.

   The Text Import Wizard - Step 3 of 3 dialog box is displayed.

4. Set the text data format to all columns in the Text Import Wizard - Step 3 of 3 dialog box.

Note: Each row has a different number of columns in a spreadsheet. When you set the data format, you need to select the row which has the largest number of columns in the spreadsheet. If the data format is not set to text, the data might be converted to a numeric number and be displayed.

To set the text data format:

a) Scroll down to the bottom of the **Data preview**, and find a row with the largest number of columns.

b) Select all columns of the row which you found at step a), and select the **Text** in the **Column data format** (see Figure 4-16).

5. Make sure the header of all columns in **Data preview** is displayed as **Text**, and then click **Finish**.

   The spreadsheet opens with all the values in the text format.

6. Edit the spreadsheet in accordance with the allowable parameters.

   For details, see the document of each program product.

7. 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 (for example, "spreadsheet1a.spd"). Select **CSV (comma delimited) (*.csv)** in the **Save as type** list, then save the file.

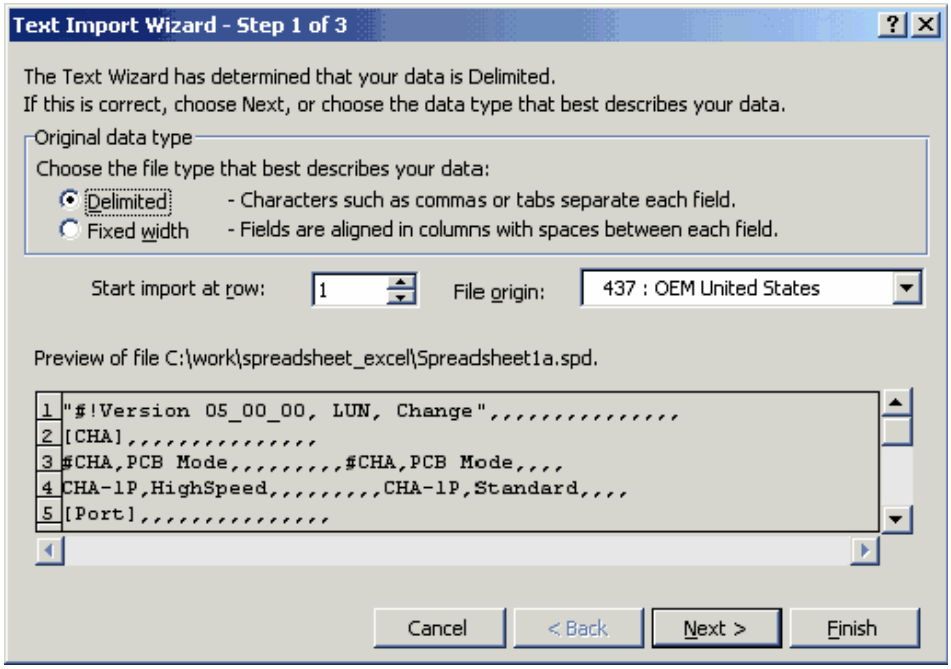


Figure 4-14 Text Import Wizard - Step 1 of 3 Dialog Box

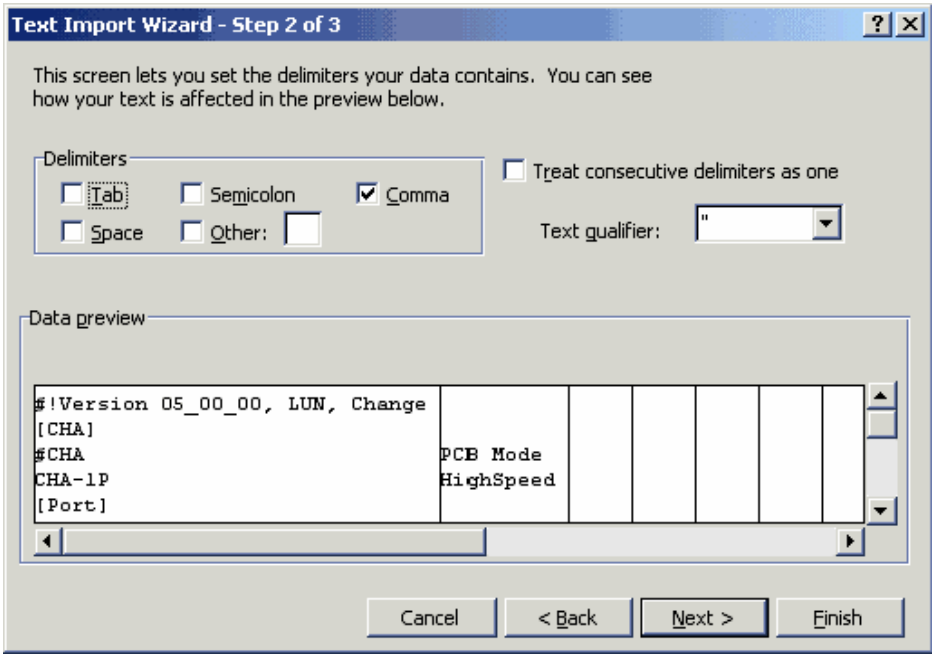


Figure 4-15 Text Import Wizard - Step 2 of 3 Dialog Box

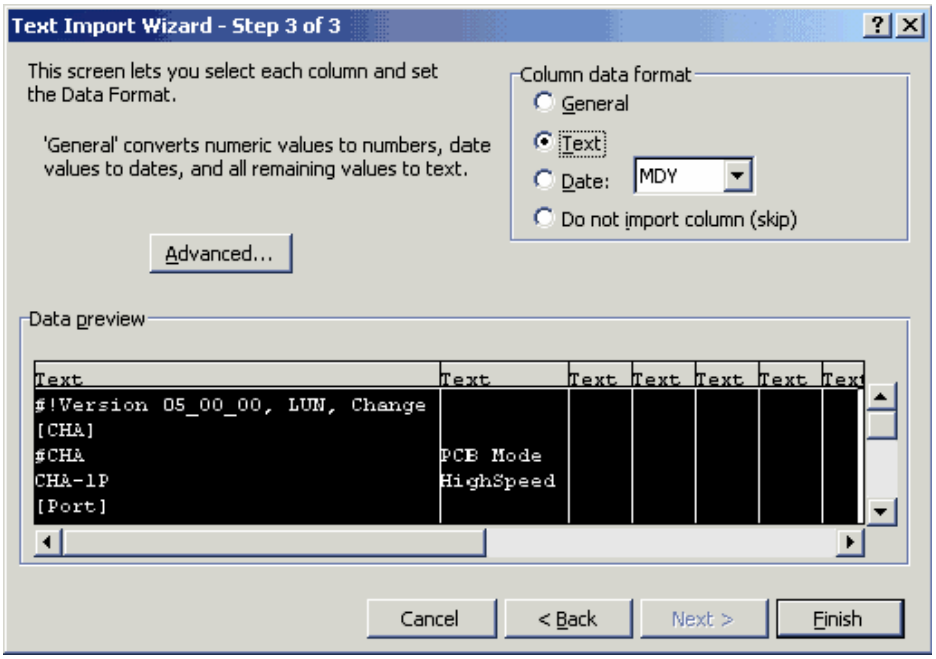


Figure 4-16 Text Import Wizard - Step 3 of 3 Dialog Box

Note: In the **Data preview**, select the row with the largest number of columns.

Importing the Spreadsheet

After you have edited the spreadsheet, you will import the spreadsheet file to the storage system.

To import the spreadsheet file:

1. Log in to Storage Navigator, and open the Configuration File Loader window (see Configuration File Loader Window).
2. Change to **Modify** mode (see Changing Between View Mode and Modify Mode).
3. Select the program product option that you want to import from the Select Sheet list.
4. Click **Import** to open the Import dialog box (for the example of LUN Manager, see Figure 4-17).
   If you use the Mozilla Web browser, the **Download Manager** dialog box may display when you click **Import**. If this occurs, close the **Download Manager** dialog box and continue the operation.
5. Assign the CSV format to the spreadsheet file that you want to import (the file extension must be ".spd"). You can either enter the spreadsheet file name directly in **File Name on Client**, or you can click **Browse** to access the Open dialog box. The same naming conventions apply as for exporting the file.
6. If you have selected to use the Open dialog box, specify the spreadsheet file to import, then click **Open** to close the Open dialog box and return to the Import dialog box.

   On the Import dialog box, the directory of the specified spreadsheet file is displayed in **File Name on Client** and the **Import** button becomes available.
7. Click **Import** (or **Cancel** to cancel).

   The Import dialog box is closed and the spreadsheet file is checked.
8. Click **Apply** in the Configuration File Loader window.

   The spreadsheet file is imported to the storage system.

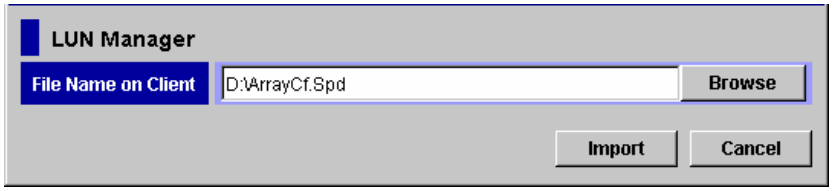


Figure 4-17 Import Dialog Box

5

Using the Storage Navigator CLI

This chapter describes Storage Navigator CLI that allows you to perform operations by entering commands from the command line of a Storage Navigator computer (for example, from a Windows command prompt or a UNIX shell prompt).

Overview of Storage Navigator CLI

The Storage Navigator CLI enables users to perform operations on the storage system by entering commands at the command line rather than using the Storage Navigator GUI. For the current microprogram version, Universal Replicator for IBM IBM z/OS and Universal Volume Manager support Storage Navigator CLI.

The Storage Navigator CLI has the following advantages compared to using the Storage Navigator GUI:

- Batch processing

  The Storage Navigator CLI shortens the operation time because it does not involve any interactive user operation. This benefits users when large-scale changes are required to the storage system.

- Interoperability with other programs

  The Storage Navigator CLI provides the commands that allow you to:

  – save storage system configuration in a CFL spreadsheet

  – change storage system configuration by using a CFL spreadsheet

  – check a CFL spreadsheet before applying configuration to the storage system

  You can assemble these commands in your batch/script files such as Windows batch files or UNIX shell scripts.

- Checking function

  The Storage Navigator CLI provides the checking command. If a CFL spreadsheet has an error, you can easily find out what is the problem with the spreadsheet by looking at the checking results in the CFL spreadsheet.

Storage Navigator CLI Operations

The Storage Navigator CLI enables you to:

- configure the storage system by using a spreadsheet
- save the storage system configurations in spreadsheet(s)

The following figure describes these operation procedures:

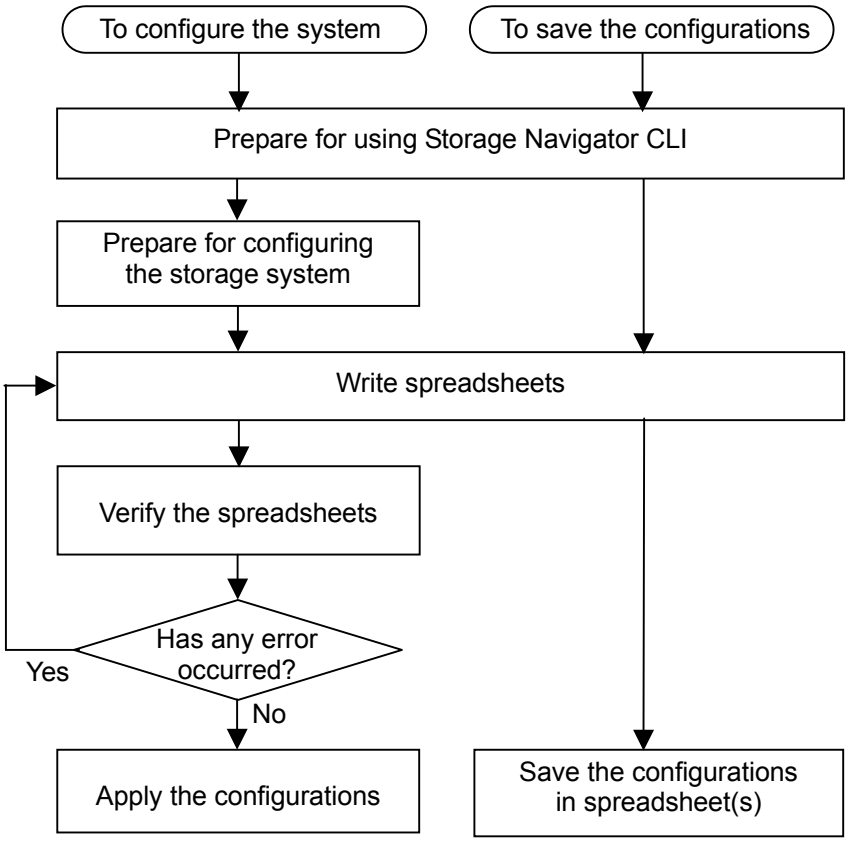


Figure 5-1 Operation Procedures Using the Spreadsheets

The operations using the spreadsheets include the following steps:

- Prepare for using Storage Navigator CLI

  This step is required when using Storage Navigator CLI for the first time.

- Prepare for configuring the storage system

  Some program products require preparation of the storage system using the Storage Navigator windows, before actually applying the configuration using spreadsheets. For details, see the documents for program products supporting the Storage Navigator CLI.

- Write spreadsheets

  Spreadsheet templates are provided for each program product. Make a copy of the template, and modify the copy of the spreadsheet template to define the storage system configuration. Change the file name so that the file name is 32 characters or less including the extension.

  The template files are divided into two types:

  – The file name ends with "_def": you can use the file without changing the contents.

  - The file name ends with "_def_": you need to change the contents before executing commands.

  For details about templates or configurations, see the documents for program products supporting the Storage Navigator CLI. For general conventions of spreadsheets, see Spreadsheet File Conventions.

- Verify the spreadsheets, apply the configurations, and save the configurations in spreadsheet(s)

  To perform these operations, use the Storage Navigator CLI commands.

Preparing for using Storage Navigator CLI

This section describes the preparation for using Storage Navigator CLI.

Requirements for Storage Navigator CLI

Using the Storage Navigator CLI requires the following:

- Storage Navigator program product
- Storage Navigator computer(s) (see System Requirements for details)
- Storage administrators with the following operation authority:
  - Storage administrator role: **Enable**
  - Configuration File Loader permission: **Modify** or **View** (depending on which command to execute)

  Storage partition administrators cannot perform Storage Navigator CLI commands.
- JAR file for Storage Navigator CLI

  A JAR file for Storage Navigator CLI is stored in the CD for program products. See Installing Storage Navigator CLI for how to install the file.
- Java security policy file

  You need a file called Java.policy to use the Storage Navigator CLI. The Java.policy file is stored in the CD for program products. See Changing Java Security Policy for details.
- User authentication file

  Storage Navigator CLI users must create a user authentication file. When multiple users use Storage Navigator CLI, a user authentication file is required for each user. See Creating a User Authentication File for how to create the file.
- Spreadsheet software or a text editor (Microsoft Excel is recommended)

Installing Storage Navigator CLI

To install Storage Navigator CLI on the Storage Navigator computer:

1. Create a new directory on the Storage Navigator computer to store Storage Navigator CLI.
2. Insert the CD for program products into the CD-ROM drive (For UNIX, mount the CD).
3. Locate the CFLCLITool directory in the CD, and then copy the directory to the newly created directory.

The newly created directory (referred to as the CLI installation directory) contains the following files and subdirectories:

- CFLCLITool\JSanCLI.jar: The Storage Navigator CLI JAR file
- CFLCLITool\java.policy: A Java policy file used for Storage Navigator CLI
- CFLCLITool\sample\: Batch files used for executing commands.
- CFLCLITool\template\: Templates for spreadsheets.

Changing Java Security Policy

The Java security policy needs to be changed to execute the Storage Navigator CLI commands. To change the policy, do one of the following:

- Use the policy file that Storage Navigator CLI provides as a user policy file

  If you use this policy file, the security policy changes only when you execute the Storage Navigator CLI commands. The policy file is stored in the CLI installation directory.

- Edit the default policy file (java.policy)

  Add the following description in the Java policy file (java.policy):

```
grant {
              permission java.security.AllPermission;
};
```

  For details about the policy file, refer to the Java documentation.

Creating a User Authentication File

A user authentication file is an encrypted file containing a user ID and a password. To start Storage Navigator CLI, a user authentication file is required for each user. Before using Storage Navigator CLI, users must create a user authentication file by using a command. This section explains how to create a user authentication file.

After creating a user authentication file, you must use the security feature of your operating system to set an appropriate access authority to the user authentication file so that only the user who created the file can access the file. If other users can access the file, unauthorized changes might be made into the storage system.

To create a user authentication file:

1. Log into a Storage Navigator computer with the user account of the storage administrator.
2. Copy a batch file for executing a command to the same directory as JSanCLI.jar.

   If the operating system of your Storage Navigator computer is Windows, copy the file whose extension is ".bat". If it is UNIX, copy the file whose extension is ".sh".

   Copy source:

   CLI-installed-directory\CFLCLITool\sample\mkatfile.bat

   CLI-installed-directory\CFLCLITool\sample\mkatfile.sh

   Copy destination:

   CLI-installed-directory\CFLCLITool\
3. If your operating system is UNIX and a shell program is installed in a directory other than "/bin", modify the batch file that you copied earlier.

   Open the batch file and change "#! /bin/csh" in the first line to the directory that a shell program is installed (such as /usr/bin/csh).
4. Start the command prompt and then move to the following directory.

   CLI-installed-directory\CFLCLITool\
5. Execute the batch file in the following format. For UNIX, enter ".sh" after mkatfile (that is, mkatfile.sh).

```
mkatfile△SVP-ip-address△user-id△password > myAuthentication.txt
```

   Specify the following items:

   - SVP-ip-address: specify the IP address of the SVP. To use an IPv6 address, enclose the IPv6 address in square brackets [ ] .
   - user-id: specify the user ID of the storage administrator.
   - password: specify the password of the storage administrator.

   When you execute the command, a user authentication file named "myAuthentication.txt" is created in the current directory.

   You can rename this user authentication file. Only single-byte characters can be specified for the file name. Extension must be ".txt". If you rename the file, you need to change the name of the user authentication file written in the batch file.
6. Set an appropriate access authority to the user authentication file that you created.

Make sure that only the user who created the file can access the file.

Example:

- In this example for Windows, "myAuthentication.txt" is created from the information such as the IP address (158.214.135.127), user ID (root), and password (root).

```
mkatfile 158.214.135.127 root root >myAuthentication.txt
```

- In this example for Windows, "myAuthentication.txt" is created from the information such as the IP address (fe80::20a:e4ff:fe8f:20b5), user ID (root), and password (root).

```
mkatfile [fe80::20a:e4ff:fe8f:20b5] root root >myAuthentication.txt
```

Modifying a Batch File

The batch files provided by Storage Navigator to be used for executing the Storage Navigator CLI commands can be manually modified, if necessary. The batch files are as follows:

Table 5-1 Batch Files for Executing the Storage Navigator CLI Commands

Directory	File Name	Description
CFLCLITool\sample	cflchk	a batch file for the CFLCHK command.
	cflget	a batch file for the CFLGET command.
	cflset	a batch file for the CFLSET command.

Before executing the Storage Navigator CLI commands, copy the batch files provided by Storage Navigator to the CFLCLITool directory (the same directory as JSanCLI.jar), and then modify the file if necessary. The file with the ".bat" extension is for Windows, and the file with the ".sh" extension is for UNIX.

The following examples show a batch file for the CFLSET command. The "↵" symbol indicates the end of a command line.

For Windows:

```
java -jar -Djava.security.policy=java.policy JSanCLI.jar myAuthentication.txt CFLSET %1 %2
↵
```

For UNIX:

```
#! /bin/csh ↵
java -jar -Djava.security.policy=java.policy JSanCLI.jar myAuthentication.txt CFLSET $1 $2
↵
```

The following items may need to be changed in some cases:

- The installation directory of a shell program

  If your operating system is UNIX and a shell program is installed in a directory other than "/bin", you need to change "#! /bin/csh" in the first line to the installation directory of a shell program (such as /usr/bin/csh).

- The user authentication file name

  If you rename the user authentication file, you need to change "myAuthentication.txt" to the file name that you specified.

  When you store the user authentication file in a directory other than "CFLCLITool" (for example, user's home directory), you need to specify the relative or absolute path. Only single-byte characters can be specified for a path or file name. No double-byte characters can be specified.

The termination codes that Storage Navigator CLI returns when a batch file is executed are as follows:

- 0: The command finished successfully.
- other than 0: The command finished abnormally (An error occurred).

If you want to use a reference to a termination code in your batch file, do the following:

- For a Windows batch file, write %**errorlevel**% in the batch file.
- For a UNIX Bourne shell script, write %**?** in the shell script.
- For a UNIX C shell script, write %**status** in the shell script.

The following example is a reference to a termination code used in a Windows batch file. When this batch file is executed and Storage Navigator CLI returns the termination code other than 0, the command prompt displays a message indicating the command failed. When this batch file is executed and Storage Navigator CLI returns the termination code 0, the command prompt displays a message indicating the command finished successfully.

```
java -Djava.security.policy=java.policy -jar JSanCLI.jar myAuthentication.txt CFLGET %1 %2
↵
if %errorlevel% NEQ 0 echo COMMAND FAILED. ↵
if %errorlevel% EQU 0 echo COMMAND SUCCESSFUL. ↵
```

Command Reference

The Storage Navigator CLI supports the following commands:

Table 5-2 Storage Navigator CLI Commands

Command Name	Description	Operation Authority for Configuration File Loader
CFLCHK	Checks the spreadsheet.	Modify or View
CFLGET	Saves the storage system configurations in spreadsheet(s).	Modify or View
CFLSET	Applies the configurations in a spreadsheet to the storage system.	Modify

Only single-byte characters can be specified for a path or file name. No double-byte characters can be specified.

This section uses the following conventions:

- △: Indicates a single space.
- *Italic*: Indicates a variable.

CFLCHK Command

Syntax

CFLCHK△*input-file-name*△*output-file-name*

Description

The CFLCHK command verifies the spreadsheet (for example, this command checks whether the spreadsheet is properly formatted or whether the parameters are properly specified). The check result will be saved in the output file that you specify when you execute the CFLCHK command.

By executing the CFLCHK command before executing the CFLSET command, you can verify that the spreadsheet has no error.

Operands

input-file-name

Specifies the name of the spreadsheet that you want to verify, including a relative path or an absolute path. The maximum length of the file name is 240 characters.

output-file-name

Specifies the output file name of the spreadsheet that contains the check result, including a relative path or an absolute path. The maximum length of the file name is 240 characters.

If you specify the same name as the input file, the input file will be overwritten.

Example

When the following example for Windows is executed, the file "ExtStorage_VolumeOperation.spd" is verified and the check result is saved in the file "ExtStorage_VolumeOperation_Result.spd".

```
CFLCHK ExtStorage_VolumeOperation.spd ExtStorage_VolumeOperation_Result.spd
```

For UNIX, add ".sh" to CFLCHK (that is, CFLCHK.sh).

CFLGET Command

Syntax

CFLGET△*input-file-name*△*output-file-directory*

Description

The CFLGET command saves the storage system information requested from the input file in a spreadsheet.

Two types of files are stored in the directory.

- A file containing the execution result (the file name is "*input-file-name*_Result.spd")
- Files containing the storage system information (the names of the files are written in the "*input-file-name*_Result.spd")

Operands

input-file-name

Specifies the name of the spreadsheet that contains the information you want to save, including a relative path or an absolute path. The maximum length of the file name is 240 characters.

output-file-directory

Specifies the directory that stores output files, including a relative path or an absolute path. The maximum length of the directory name is 150 characters.

Example

When the following example for Windows is executed, the configurations specified in the file "ExternalStorage_Get.spd" is exported to the "C:\CFLoutput" directory. This directory stores output file(s) such as "ExternalStorage_Get_Result.spd".

```
CFLGET ExternalStorage_Get.spd C:\CFLoutput
```

For UNIX, add ".sh" to CFLGET (that is, CFLGET.sh).

CFLSET Command

Syntax

CFLSET△*input-file-name*△*output-file-name*

Description

The CFLSET command applies the configurations in the spreadsheet to the storage system. The execution result will be saved in the output file that you specify when you execute the CFLSET command.

It is recommended that you execute the CFLCHK command before executing the CFLSET command. Even though the CFLCHK command verifies that the spreadsheet has no error, errors might occur in the following cases when you execute the CFLSET command:

- When a communication error occurs
- When volumes or pairs are not ready to accept any configuration changes
- When another user is manipulating the storage system in Modify mode

Operands

input-file-name

Specifies the name of the spreadsheet that you want to verify, including a relative path or an absolute path. The maximum length of the file name is 240 characters.

output-file-name

Specifies the output file name of the spreadsheet, including a relative path or an absolute path. The maximum length of the file name is 240 characters.

This output file includes the execution result. If you specify the same name as the input file, the input file will be overwritten.

Example

When the following example for Windows is executed, the file "ExtStorage_VolumeOperation.spd" is applied and the execution result is saved in the file "ExtStorage_VolumeOperation_Result.spd".

```
CFLSET ExtStorage_VolumeOperation.spd ExtStorage_VolumeOperation_Result.spd
```

For UNIX, add ".sh" to CFLSET (that is, CFLSET.sh).

Spreadsheets

This section explains general conventions for creating spreadsheets for use with Storage Navigator CLI.

Spreadsheet templates are provided with Storage Navigator for your use. Make a copy of a template and edit it to write a spreadsheet. For details about the template file names, see the documents for program products that support the Storage Navigator CLI.

Spreadsheet File Conventions

Create a spreadsheet according to the following conventions.

Table 5-3 Spreadsheet Conventions

Item	Conventions
File type	Text file
File name	The extension must be ".spd". The maximum number of characters for the file name is 32 including the extension. The following symbols cannot be used for the file name: \ / : , ; * ? " < > | and space. The maximum length of the file path is 240 characters.
Maximum number of rows in a spreadsheet	65,536 rows, including comment rows.
End-of-line symbol	Add a linefeed code at the end of each line.
Maximum number of letters in a row	512 bytes, including the linefeed code at the end.
Case sensitivity	Case-insensitive.
Format	▪ Separate each parameter with a comma (,). ▪ Add a semicolon (;) at the end of the line where a parameter is written. ▪ Tab codes and a series of spaces before or after comma are ignored.

Spreadsheet Components

The spreadsheet for use with Storage Navigator consists of the following components:

- Declaration
- Operation Tags
- Parameters
- Comments

The following figure is an example of a spreadsheet.

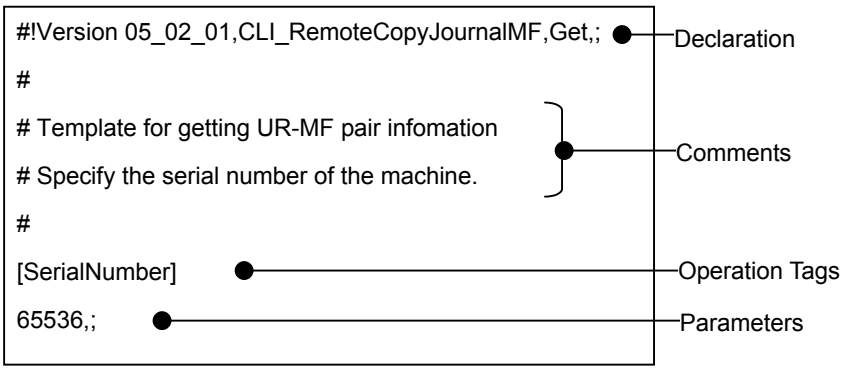


Figure 5-2 Example of a Spreadsheet

Declaration

The declaration is required at the beginning of a spreadsheet. You need to change some items in the declaration because some items in the declaration differ depending on the program products you use or the settings you configure in a spreadsheet. For details, see the documents for program products that support the Storage Navigator CLI.

- Format (variables are shown in *italics*):

  #!Version *Version number*,*Program product*,*Type*,;

- Example:

  #!Version 05_02_01,CLI_RemoteCopyJournalMF,Get,;

The following items of the declaration need to be changed. Do not change anything else.

- Version number

  Specify the spreadsheet version number. A single-byte space is required between "#!Version" and the version number.

- Program product

Specify the program product that you use a spreadsheet for.

- Type

  Specify the configuration type of a spreadsheet.

Operation Tags

A tag to label settings (parameters) is required for a spreadsheet. This tag is called an operation tag, which is formatted as a string in square brackets ([ ]). Operation tags are already written in the templates.

Operation tags have two types: common operation tags for all program products and program-product-specific operation tags. For details on common operation tags, see Common Operation Tags. For program-product-specific operation tags, see the documents for program products that support the Storage Navigator CLI.

Operation tags have the following characteristics:

- At least one program-product-specific operation tag is required in a spreadsheet.
- Common operation tags must be written first (before program-product-specific operation tags are written).

  An error occurs if program-product-specific operation tags are written before common operation tags.
- Some combinations of operation tags cannot be used in the same spreadsheet.

  In this case, you need to prepare multiple spreadsheets. For details, see the documents for program products that support the Storage Navigator CLI.

Parameters

You can specify the configuration of the storage system as a parameter. Each parameter must be separated with a comma (,). A semicolon (;) is required at the end of the line where a parameter is written. Note that a comma is required as separator even before the semicolon.

An example of writing a parameter is as follow:

```
[SerialNumber]
65536,;
```

Parameters might be written in a hierarchy structure for a certain program product. The identifier (+) is required at the beginning of a line, and must appear in the following order:

1. +,
2. +,+,
3. +,+,+,

The actual parameters depend on the program products. For detailed information about parameters, see the documents for program products that support the Storage Navigator CLI.

Comments

You can also type comments in a spreadsheet. Comments can consist of any characters in any language.

The line that begins with the # character or includes only a linefeed code is recognized as a comment. Do not insert any space or character before the # character.

Common Operation Tags

Operation tags are divided into two types: common operation tags for all program products and program-product-specific operation tags. For program-product-specific operation tags, see the documents for program products that support the Storage Navigator CLI.

SerialNumber Tag

The SerialNumber tag, which is a common operation tag, allows you to verify that the serial number in the spreadsheet matches the serial number of the storage system. It is recommended that you write the SerialNumber tag to prevent possible misuses of spreadsheets.

Table 5-4 Parameters of the SerialNumber Tag

Column in Spreadsheet	Parameter	Setting	Range of Values	Number of Characters
A	SerialNumber	Serial number of the storage system.	00000 to 99999	5 decimal digits or less

Execution Results

The execution results of the Storage Navigator CLI commands are exported to the following area in the output file.

- After the semicolon on each row
- The row below the row where an error occurred

The following table describes the exported contents.

Table 5-5 Exported Contents of the Execution Results

Row	Description	Exported Content
Declaration	Indicates the overall result of the spreadsheet.	Normal end: Finished normally. Warning(xxxx-yyyyy): Errors occurred on some rows. Error(xxxx-yyyyy): Errors occurred on every row.
Parameter	Indicates the result of the line with a parameter.	For the CFLCHK command: Check OK: Finished normally. Check NG(xxxx-yyyyy): An error occurred on this row. For the CFLGET or CFLSET command: Normal end: Finished normally. Error(xxxx-yyyyy): An error occurred on this row.

(xxxx-yyyyy) indicates part codes and error codes. For details about these codes, see *the Storage Navigator Messages*.

Examples of execution results are as follows:

- Case 1: An operation tag has an error

  The following example shows execution results when an operation tag has an error. To identify where an error occurred, find the row above the row that begins with the "#^" characters. In this example, an error occurred in the SuspendPair tag.

```
#!Version 05_02_01,CLI_RemoteCopyJournalMF,PairOperation,;Error(6505-66004)

[SerialNumber]
64040,;Check OK

[Suspend-Pair]
#^,;Check NG(6505-66004)
00,04,40,01,P-VOL,00,64040,Group,Disable,Flush,;
```

- Case 2: A parameter has an error

  The following example shows execution results when a parameter has an error. To identify where an error occurred, find all the rows that display an error after the semicolon. In this example, errors occurred on the first and fourth row in the SuspendPair tag.

```
#!Version 05_02_01,CLI_RemoteCopyJournalMF,PairOperation,;Warning(1305-66578)

[SerialNumber]
64040,;Normal end

[SuspendPair]
00,04,40,01,P-VOL,00,64041,Volume,Disable,Flush,;Error(6505-58075)
00,04,41,01,P-VOL,00,64040,Volume,Disable,Flush,;Normal end
00,04,42,01,P-VOL,00,64040,Volume,Disable,Flush,;Normal end
00,04,43,01,P-VOL,00,64041,Volume,Disable,Flush,;Error(6505-58075)
```

- Case 3: Parameters are described in a hierarchy structure

The following example shows execution results when parameters are described in a hierarchy structure. To identify where an error occurred, find the last row with an error. In this example, an error occurred in the second layer that begins with "+,".

```
#!Version 05_02_01,CLI_ExternalStorage,VolumeOperationFibre,;Error(1305-66578)

[SerialNumber]
65536,;Normal end

[AddVolumeSetting]
1,1A,60060E8004F81370,0000,E1-1,Normal,00,OPEN-V,Disable,Enable,;Error(605-66797)
+,1B,60060E8004F81371,0001,;Error(605-66695)
+,+,00,00,00,96000,0004,;
```

- Not only the layer with an error but also the upper layers display an error, even though the upper layers do not have any errors. For example, the first layer that begins with "1" displays an error even though it has no error.
- Parameters in the lower layers than the layer with an error are not verified or applied. No execution results are displayed either.

6

Troubleshooting

This chapter describes how to troubleshoot problems with the Storage Navigator:

- ☐ General Troubleshooting
- ☐ Calling the Hitachi Data Systems Support Center

General Troubleshooting

For troubleshooting information on the storage system, see the *User and Reference Guide*. For a complete list of Storage Navigator error codes, see the *Storage Navigator Messages*.

The user is responsible for the operation and normal maintenance of the Storage Navigator computer. Here are some guidelines for troubleshooting the Storage Navigator computer:

- **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 Storage Navigator computer and restart the Storage Navigator Java application program.
- **Check for any General Error Conditions.** Table 6-1 describes some general error conditions, along with the recommended resolution for each item. If you are still unable to resolve an error condition, call the Hitachi Data Systems Support Center for assistance (see Calling the Hitachi Data Systems Support Center for contact information).
- **Check the status lamp on the Storage Navigator main window.** If the color of the lamp becomes yellow () or red (), confirm the severity level of the disk controller and disk array unit on the Status window (see Status Window). If you are unable to resolve an error condition, contact the Hitachi Data Systems Support Center.
- **Download the Storage Navigator trace files using the FD Dump Tool.** If you are unable to resolve an error condition, first copy the USP V/VM Storage Navigator configuration information onto floppy disk(s) using the FD Dump Tool (see Downloading Trace Files Using the FD Dump Tool). Contact the Hitachi Data Systems Support Center (see Calling the Hitachi Data Systems Support Center), and give the information on the floppy disk(s) to the Hitachi Data Systems service personnel.

General Error Conditions and Recommended Actions

Table 6-1 General Error Conditions

Error Condition	Probable Cause / Recommended Action
Application Error	
The Storage Navigator experiences an error.	Save the Java trace file and log file on the Storage Navigator, and report to the Hitachi Data Systems Support Center. Then restart the Storage Navigator. The examples of the file location are as follows: For Windows: - c:\Documents and Settings*logon user ID*\Application Data\Sun\Java\Deployment\log*.trace - c:\Documents and Settings*logon user ID*\Application Data\Sun\Java\Deployment\log*.log For UNIX: - *user home directory*\.java\deployment\log*.trace - *user home directory*\.java\deployment\log*.log
Only the **Exit** button, the **Refresh** and **Refresh All** commands 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 click the **Refresh** command in the **File** menu. If the SVP is not restored even though you have clicked the **Refresh** command, click the **Refresh All** command.
Only the **Exit** button and the **Refresh All** command are effective when accessing the SVP from the Storage Navigator.	An error may have occurred in the SVP. Click **Refresh All** command in the **File** menu. If the SVP is not restored even though you have clicked the **Refresh All** command, log in to Storage Navigator again.
Storage Navigator does not start even though you try to start it many times.	Close all the windows of your Web browser and then clear cache of both Java and Web browser. For instructions on how to clear cache of both Java and Web browser, see Clearing Cache of Java and Web Browsers.
An error (1,7050) occurs and Storage Navigator does not start when accessing the SVP from the Storage Navigator computer.	The version of Storage Navigator installed on the Storage Navigator computer might not match the SVP version. Close all the windows of your Web browser and then clear cache of both Java and Web browser. For instructions on how to clear cache of both Java and Web browser, see Clearing Cache of Java and Web Browsers. In addition, if a proxy is used for network connections, the proxy cache may store the older version of the program. If the problem still remains after you clear cache of both Java and Web browser, please contact your network administrator.

Error Condition	Probable Cause / Recommended Action
An error (10,6027) occurs when accessing the SVP from the Storage Navigator computer. Or an error (10,6027) occurs and Storage Navigator terminates while you are using Storage Navigator.	The probable causes are as follows: The SVP (Web server) might have been restarted. Wait for 10 minutes or so, and then restart Storage Navigator. The version of Storage Navigator installed on the Storage Navigator computer might not match the SVP version. Close all the windows of your Web browser and then clear cache of both Java and Web browser. For instructions on how to clear cache of both Java and Web browser, see Clearing Cache of Java and Web Browsers. The Storage Navigator computer might have entered standby or hibernate mode. Restart Storage Navigator. If a proxy is used for network connections, the proxy cache may store the older version of the program. If the problem still remains after you clear cache of both Java and Web browser, please contact your network administrator. If none of the above actions solve the problem, save the Java trace file and log file on the Storage Navigator, and report to the Hitachi Data Systems Support Center. Then restart the Storage Navigator. The examples of the log file location are as follows: For Windows : - c:\Documents and Settings*logon user ID*\Application Data\Sun\Java\Deployment\log*.trace - c:\Documents and Settings*logon user ID*\Application Data\Sun\Java\Deployment\log*.log For UNIX: - *user home directory*\.java\deployment\log*.trace - *user home directory*\.java\deployment\log*.log
An error (1 4011) occurs while you are using Storage Navigator.	The clock time of the Storage Navigator computer might have been changed. Log in to Storage Navigator again.

Error Condition	Probable Cause / Recommended Action
Abnormal End / No Response	
Storage Navigator does not respond. Storage Navigator may be hung up in the following cases: - When you move a window displayed in front of the Storage Navigator main window, the area behind the window remains gray and does not go back to normal for a long period of time. - The whole Storage Navigator window is displayed in gray and does not go back to normal for a long period of time. - You cannot perform any operation for a long period of time even though the dialog box that says **Loading...** is not displayed. - The dialog box that says **Loading...** is displayed when the window switches, however, you cannot move the dialog box or perform any operation for a long period of time.	Exit the Storage Navigator by pressing **Ctrl** key, **Alt** key, **Shift** key, and **D** key all at once. If you still cannot exit the Storage Navigator, restart the Storage Navigator computer, or terminate the Storage Navigator process with the following method. For Windows: Exit all applications which use Java, and then start the task manager and terminate javaw.exe and javaws.exe. For UNIX: Exit all applications which use Java, and then terminate javaw and javaws by kill command. If you exit the Storage Navigator using the method above after you logged into the Storage Navigator, wait for an RMI time-out, and then restart the Storage Navigator (see Setting the Environment Parameters).
Java console is grayed out and does not start when you try to start Storage Navigator.	Restart the Storage Navigator computer, or terminate the Storage Navigator process with the following method. For Windows: Exit all applications which use Java, and then start the task manager and terminate javaw.exe and javaws.exe. For UNIX: Exit all applications which use Java, and then terminate javaw and javaws by kill command.
An internal error occurs, or a Web browser ends abnormally (forcibly).	Close all dialog boxes. Log in 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. ⚠***Note:*** An operation may take over 30 minutes depending on the use condition. For example, when several Storage Navigator computers are running, it may take a lot of time.

Error Condition	Probable Cause / Recommended Action
Storage Navigator does not respond. Storage Navigator may be hung up in the following cases: - When you move a window displayed in front of the Storage Navigator main window, the area behind the window remains gray and does not go back to normal for a long period of time. - The whole Storage Navigator window is displayed in gray and does not go back to normal for a long period of time. - You cannot perform any operation for a long period of time even though the dialog box that says **Loading...** is not displayed. - The dialog box that says **Loading...** is displayed when the window switches, however, you cannot move the dialog box or perform any operation for a long period of time.	Exit the Storage Navigator by pressing **Ctrl** key, **Alt** key, **Shift** key, and **D** key all at once. If you still cannot exit the Storage Navigator, restart the Storage Navigator computer, or terminate the Storage Navigator process with the following method. For Windows: Exit all applications which use Java, and then start the task manager and terminate javaw.exe and javaws.exe. For UNIX: Exit all applications which use Java, and then terminate javaw and javaws by kill command. ⚠***Note:*** If you exit the Storage Navigator using the method above after you logged into the Storage Navigator, wait for an RMI time-out, and then restart the Storage Navigator (see Setting the Environment Parameters).
Java console is grayed out and does not start when you try to start Storage Navigator.	Restart the Storage Navigator computer, or terminate the Storage Navigator process with the following method. For Windows: Exit all applications which use Java, and then start the task manager and terminate javaw.exe and javaws.exe. For UNIX: Exit all applications which use Java, and then terminate javaw and javaws by kill command.
An internal error occurs, or a Web browser ends abnormally (forcibly).	Close all dialog boxes. Log in 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. ⚠***Note:*** An operation may take over 30 minutes depending on the use condition. For example, when several Storage Navigator computers are running, it may take a lot of time.
The Storage Navigator computer is suddenly rebooted.	Restart the Storage Navigator computer.
If you open the Java console dialog box by selecting the Java icon on the system tray while logging in to the Storage Navigator, the browser and Java console may become hung up.	Do not open the Java console dialog box while logging in to the Storage Navigator. If the browser and Java console become hung up, restart the Storage Navigator computer.
A network error occurred while logging in to the Storage Navigator.	Close all dialog boxes. Log in to the Storage Navigator again. If the same error occurs, check the network environment.
The message indicating the login processing has been displayed and there is no response.	The SVP may be set as an exception on the proxy setting of the Web browser. Make same setting on the following dialog boxes. For JRE 1.4: the Proxies dialog box of the Java (TM) Plug-in Control Panel For JRE 5.0 or JRE 6.0: the Network Configuration dialog box that can be opened from the General dialog box of the Java Control Panel

Error Condition	Probable Cause / Recommended Action
During the Storage Navigator operation, the Internet Explorer Web browser suddenly disappears (Internet Explorer suddenly ends).	Restart the Storage Navigator computer.
Incorrect Display/ Disoperation during the Storage Navigator Operation	
You have clicked the **Basic Information** command (), and then you have opened the setting dialog box of the other program product before the displaying processing (acquiring information for the Basic Information Display dialog box) has not been finished. As a result, the Basic Information Display dialog box remains in the status of displaying processing and does not reply.	Close the setting dialog box of the other program product that is opened. After the processing of displaying the Basic Information Display dialog box has been finished, re-open the setting dialog box for the program product.
The commands in the **Go** menu are not clickable.	The required program product options might not be installed or an error might occur on the window which is displayed by clicking the command. Make sure that all the required program product options are installed. If they are installed, perform one of the following operations. - Click the **Refresh** command in the **File** menu - Click the **Refresh All** command in the **File** menu - Log in to the Storage Navigator again
After dragging and dropping objects to another location or area, the scroll bar on that location becomes unusable.	Close all dialog boxes, and then log in to the Storage Navigator again.
The items in a list are not synchronized with a scroll bar.	Click the scroll buttons ( or ) above and below the scroll bar.
A focus disappears from the edit box.	Close all dialog boxes, and then log in 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 out from the Storage Navigator, and then log in again. If this error occurs before you log in to the Storage Navigator, close all dialog boxes and then log in to the Storage Navigator.
The characters are unreadable because they are overlapped or garbled.	Log out from the Storage Navigator, and then log in again.
The characters are garbled in a window that a tree is displayed.	Click the **Refresh** command in the **File** menu.
When you switch windows from one window to the Storage Navigator window, the Storage Navigator window is not redrawn.	Close all windows, and then log in to the Storage Navigator again.
Even though you have clicked **Apply** to execute the changing settings operation, the new settings are not displayed on the Storage Navigator window.	Click the **Refresh** command in the **File** menu.

Error Condition	Probable Cause / Recommended Action
The dialog box that says **Loading...** is displayed for a long period of time.	A Storage Navigator message dialog box other than the dialog box that says **Loading...** might be displayed behind this window. Press **Alt** key and **Tab** key to switch the dialog box. If the dialog box that says **Loading...** remains displayed for several hours after you apply the settings to the storage system, contact the Hitachi Data Systems Support Center (see Calling the Hitachi Data Systems Support Center).
A Storage Navigator window is forcibly closed while the processing which takes time, such as LDEV formatting, is in progress.	Close all windows, wait until the processing which has been in progress finishes, and then restart the Storage Navigator.
Incorrect Display/ Disoperation during the Web Browser Operation	
The page is not displayed because of an Invalid syntax error.	Input the URL of the desired SVP to the **Trusted sites** of **Internet Options** dialog box. See Windows Server 2003.
Maintenance / Others	
The program on the SVP is updated.	Exit all Web browsers on the Storage Navigator computer, and then restart the browsers. If in doubt, you should exit and restart the browsers.
Storage Navigator processing is temporarily delayed.	An internal processing (e.g., configuration change, P.P. check, operational information acquisition, etc.) might be being executed on the SVP (Web server).
An error occurred because a digital signature or security certificate is expired.	You can continue using Storage Navigator even though the digital signature for the Storage Navigator Java application is expired. For the operation on the displayed dialog box, see Permission for Accessing Local Client Files.
If you are unable to resolve an error condition.	Copy the Storage Navigator configuration information onto floppy disk(s) using the **FD Dump Tool** (see Downloading Trace Files Using the FD Dump Tool), and contact the Hitachi Data Systems Support Center (see Calling the Hitachi Data Systems Support Center).
Note on the Operation on the UNIX	
If you click on the Storage Navigator main window while a dialog box is displayed, the dialog box will disappear (hide) behind the Storage Navigator main window.	Click on the dialog box once more.
If you click on the Storage Navigator main window while the Volume Migration window and the Server Priority Manager window are displayed, these windows will disappear (hide) behind the Storage Navigator main window.	Click on the Volume Migration window and the Server Priority Manager window once more.
The ☒ button on the Volume Migration window and the Server Priority Manager window remains active, even if you click **Apply** and the processing is being executed. In this case, the windows are closed if you click ☒ .	Even if the windows are closed, the processing will continue normally.

Error Condition	Probable Cause / Recommended Action

The Web browser is incorrectly displayed because the GUI items such as labels and icons cannot be downloaded properly.
The part of the buttons cannot be displayed, which is out of the window.
	When you use the Storage Navigator on the Japanese Mozilla, enter the following commands using the X Server Emulator. Log out from the Storage Navigator once, and then log in to the Storage Navigator again.
	B Shell:
	`LANG=C`
	`export LANG`
	C Shell:
	`setenv LANG C`

The Web browser is forcibly (abnormally) closed.	If a "java_vm" process and a "mozilla" process remain abnormally because of the hang-up of the Mozilla, the Storage Navigator performance becomes abnormal. If this occurs, you must delete the abnormal processes first before you can continue the Storage Navigator operations.

Clearing Cache of Java and Web Browsers

When an error occurs on Storage Navigator, clear cache of both Java and Web browser to solve the problem if necessary.

- For JRE 1.4: To clear cache, click **Clear** on the upper right of the Cache dialog box of the Java(TM) Plug-in Control Panel (see JRE 1.4).
- For JRE 5.0 or JRE 6.0: To clear cache, click **Delete the temporary files** on the bottom of the General dialog box of the Java Control Panel.
- For Internet Explorer: To clear cache, select **Tools** and **Internet Options** from the menu bar of Internet Explorer, and then click the **General** tab. Click **Delete Files** in the middle of the General dialog box.
- For Mozilla: To clear cache, select **Edit** and then **Preferences** from the menu bar of Mozilla. In the displayed dialog box, click **Advanced** and **Cache**, and then click **Clear Cache**.

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 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 computer, and severity levels and reference codes displayed on the Status window of the Storage Navigator main window (see Status Window).

Worldwide Hitachi Data Systems Support Centers are:

- Hitachi Data Systems North America/Latin America
  San Diego, California, USA
  1-800-446-0744
- Hitachi Data Systems Europe
  Contact Hitachi Data Systems Local Support
- Hitachi Data Systems Asia Pacific
  North Ryde, Australia
  61-2-9325-3300

Acronyms and Abbreviations

CCI	command control interface
CLPR	cache logical partition
CPU	central processing unit
CSV	comma-separated values
CU	control unit
CV	custom-sized volume
Cyl	cylinder
DKC	disk controller
DNS	domain name system
EMT64T	Extended Memory 64 Technology
FTP	File Transfer Protocol
Hi-Star	Hierarchical Star Network
HTTP	HyperText Transfer Protocol
IBM	International Business Machines Corporation
IETF	Internet Engineering Task Force
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
LVI	logical volume image
OS	operating system
RAID	redundant array of independent disks
RAID-1/-5	specific RAID architectures
RAM	Random Access Memory
RCU	remote control unit
RFC	Request For Comment
RMI	remote method invocation

SAN	storage area network
SCSI	small computer system interface
SIM	service information message
SNMP	simple network management protocol
SN	Serial Number
SPARC	Scalable Processor Architecture
SSL	secure socket layer
S VOL	secondary volume
SVP	service processor
TCP/IP	Transmission Control Protocol / Internet Protocol
UDP	User Datagram Protocol
URL	uniform resource locator
V-VOL	virtual volume
VOL	volume

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