



Hitachi Universal Storage Platform V Hitachi Universal Storage Platform VM Hitachi Volume Retention Manager User's Guide

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Preface

This document describes and provides instructions for using the Volume Retention Manager software to configure and perform Volume Retention Manager Operations on the Hitachi Universal Storage Platform V and Hitachi Universal Storage Platform VM storage system.

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:

- [Intended Audience](#)
- [Product Version](#)
- [Document Revision Level](#)
- [Changes in this Revision](#)
- [Document Organization](#)
- [Referenced Documents](#)
- [Document Conventions](#)
- [Convention for Storage Capacity Values](#)
- [Getting Help](#)
- [Comments](#)

Notice: The use of Volume Retention Manager 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 system.

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*.
- The user is familiar with the Storage Navigator software for the Universal Storage Platform V and Hitachi Universal Storage Platform VM storage system and has read the *Storage Navigator User's Guide*.

Product Version

This document revision applies to USP V/VM microcode 60-04-0x and higher.

Document Revision Level

Revision	Date	Description
MK-96RD627-P	February 2007	Preliminary Release
MK-96RD627-00	April 2007	Initial Release, supersedes and replaces MK-96RD627-P
MK-96RD627-01	May 2007	Revision 1, supersedes and replaces MK-96RD627-00
MK-96RD627-02	September 2007	Revision 2, supersedes and replaces MK-96RD627-01
MK-96RD627-03	May 2008	Revision 3, supersedes and replaces MK-96RD627-02
MK-96RD627-04	November 2008	Revision 4, supersedes and replaces MK-96RD627-03

Source Documents for this Revision

- MK-96RD627-04c

Changes in this Revision

- Updated the tables and description of the Volume Retention Manager Window graphical user interface (GUI), and the Volume Retention Manager Window was updated to show the new **XRC** tab (see [Volume Retention Manager Window](#)).

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
Overview of Volume Retention Manager Operations	Provides an overview of Volume Retention Manager operations.
Preparing for Volume Retention Manager Operations	Specifies the requirements for Volume Retention Manager and provides instructions for preparing for Volume Retention Manager operations.
Using the Volume Retention Manager GUI	Describes the Volume Retention Manager GUI.
Performing Volume Retention Manager Operations	Provides instructions for performing Volume Retention Manager operations.
Volume Retention Manager Spreadsheets	Describes Volume Retention Manager spreadsheets and the settings for using Configuration File Loader.
Usage Scenarios	Describes a usage scenario (use case) for Volume Retention Manager.
Troubleshooting	Provides troubleshooting information for Volume Retention Manager and instructions for calling technical support.
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:

- *User and Reference Guide*, MK-96RD635
- *Storage Navigator User's Guide*, MK-96RD621

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 .
<i>Italic</i>	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: copy <i>source-file target-file</i> Note: 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> Note: 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: [<u>a</u> 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 = 1,000² bytes
- 1 GB = 1,000³ bytes
- 1 TB = 1,000⁴ bytes
- 1 PB = 1,000⁵ bytes

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

- 1 KB = 1,024 bytes
- 1 MB = 1,024² bytes
- 1 GB = 1,024³ bytes
- 1 TB = 1,024⁴ bytes
- 1 PB = 1,024⁵ 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 exact content of any error message(s) displayed by Storage Navigator.
- 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
- **Fax:** 858-695-1186
- **Mail:**
Technical Writing, M/S 35-10
Hitachi Data Systems
10277 Scripps Ranch Blvd.
San Diego, CA 92131

Thank you! (All comments become the property of Hitachi Data Systems.)

Overview of Volume Retention Manager Operations

The Hitachi Volume Retention Manager software (VRM) enables users to protect mainframe data in the Hitachi Universal Storage Platform V (USP V) and Hitachi Universal Storage Platform VM (USP VM) storage systems from I/O operations performed by mainframe hosts. By default, mainframe volumes are subject to read and write operations by hosts. Because of this, data is exposed to damage or loss if a mainframe host performs erroneous write operations, and confidential data could be compromised, read, or copied if read operations are allowed. Using Volume Retention Manager, you assign access attributes to logical volumes to restrict read and/or write operations as needed and prevent unauthorized access to data.

This chapter gives an overview of Volume Retention Manager operations.

- [Access Attributes](#)
- [Volume Retention Manager Spreadsheets](#)
- [Interoperability with other Products](#)

Access Attributes

To restrict read and write operations, an access attribute must be assigned to each logical volume. Volume Retention Manager enables you to assign one of the following access attributes to each logical volume:

- **Read/Write**

If a logical volume has the *Read/Write* attribute, mainframe hosts can perform both read and write operations on the logical volume. All mainframe volumes have the Read/Write attribute by default.

- **Read Only**

If a logical volume has the *Read Only* attribute, mainframe hosts can perform read operations but cannot perform write operations on the logical volume.

- **Protect**

If a logical volume has the Protect attribute, mainframe hosts cannot access the logical volume. Mainframe hosts cannot perform either read nor write operations on the logical volume.

Volume Retention Manager does not allow you to assign access attributes to:

- Open-system volumes.
- Logical devices that are not mapped to physical devices.

To assign access attributes to logical volumes, you use Storage Navigator to start Volume Retention Manager and then set access attributes in the Volume Retention Manager window. You can also use a spreadsheet. Figure 1-1 is an excerpt from the Volume Retention Manager window. This example shows access attributes of the logical volumes *00*, *01*, and *02*.




LDEV	Attribute	Emulation	Capacity	
 00	Protect	3390-9	10,017 Cyl	▲
 01	Protect	3390-9	10,017 Cyl	
 02	Protect	3390-9	10,017 Cyl	

Figure 1-1 Example of an Access Attribute List in the Volume Retention Manager Window

Volume Retention Manager Spreadsheets

You can use Configuration File Loader to set access attributes. Configuration File Loader allows you to save access attribute settings in a file (called spreadsheet), and to set access attributes concurrently to multiple logical volumes using a spreadsheet. Configuration File Loader makes the following operations easier:

- Changing access attributes for many logical volumes at once
- Applying the same access attributes for multiple storage system
- Changing access attributes according to a volume usage

For example, you can change access attributes for daytime and nighttime. For an example of Volume Retention Manager spreadsheet usage, see [Volume Retention Manager Spreadsheet Use Example](#).

You can set access attributes for all or for specified logical volumes (LDEVs) in a Logical DKC (LDKC). For details on Volume Retention Manager spreadsheets, see [Volume Retention Manager Spreadsheets](#).

Interoperability with other Products

This section explains notes on using Volume Retention Manager with other products.

Volume Security

- If a logical volume is secured by Volume Security, you must ensure that the logical volume has the Read/Write attribute. If you still want to assign another access attribute to the logical volume, you must use Volume Security to remove security from the logical volume.
- If a logical volume has the Read Only attribute or the Protect attribute, you must *not* use Volume Security to secure the logical volume. If you still want to use Volume Security to secure the logical volume, you must assign the Read/Write attribute to the logical volume.

Performance Monitor and Volume Migration

Some program products are likely to start automatically at the time specified by the user. For example, if a Volume Migration user or a Performance Monitor user specifies the time for starting the monitor, the monitor will automatically start at the specified time.

If any program product that can start automatically is enabled, you must do one of the following:

- Perform Volume Retention Manager operations when the program is not running.
- Cancel the setting of the program start time.

TrueCopy for z/OS® and Universal Replicator for z/OS®

- It is not recommended to assign an access attribute to a logical volume that is in use by TrueCopy for z/OS (TCz) or Universal Replicator for z/OS (URz). If you assign an access attribute to such a volume, the job may end abnormally. If you still want to assign an access attribute to such a volume, you must assign the same access attribute to both the main volume (M-VOL) and the remote volume (R-VOL).
- When creating a TCz or URz pair and using a read-only volume as the main volume (M-VOL), use a remote volume (R-VOL) on a storage system on which Volume Retention Manager is enabled. If the R-VOL must be on a storage system on which Volume Retention Manager is *not* enabled, you must do either of the following:
 - Change the access attribute of the M-VOL to Read/Write
 - Disable Volume Retention Manager on the main site
- If you use TCz or URz to create a pair, the main volume (M-VOL) and the remote volume (R-VOL) will have the same access attribute. Even if you suspend or delete the pair, access attribute for these volumes will not change.
- If a remote copy pair is suspended during a TCz or URz copy operation and you want to enable the R-VOL read option on the RCU (mode 20), you must ensure that the access attribute of the R-VOL is Read/Write before you enable the R-VOL read option. If the access attribute of the R-VOL is Read-Only, mode 20 will be disabled. Also, operations such as REFORMAT and REFVTOC cannot be performed for overwriting volume serial numbers.
- If a logical volume has the *Protect* attribute, the logical volume can neither be used as an M-VOL nor an R-VOL.

ShadowImage for z/OS® and Compatible FlashCopy®

If a logical volume has the *Protect* attribute, the logical volume cannot be used as a source volume (S-VOL) or as a target volume (T-VOL) for ShadowImage for z/OS, Compatible FlashCopy, or Compatible FlashCopy V2.

Preparing for Volume Retention Manager Operations

This chapter specifies the requirements for Volume Retention Manager and provides instructions for preparing for Volume Retention Manager Operations.

- [System Requirements](#)
- [Prerequisites and Restrictions for Volume Retention Manager](#)
- [Installing and Uninstalling Volume Retention Manager](#)
- [Starting the Volume Retention Manager](#)

System Requirements

The following are needed to use the Volume Retention Manager:

- Hitachi Universal Storage Platform V (USP V) storage system or Hitachi Universal Storage Platform VM (USP VM) storage system
- Storage Navigator (Storage Navigator computer)
- License key for Hitachi Volume Retention Manager

To perform Volume Retention Manager operations, you must use the Storage Navigator software to install Volume Retention Manager using the license key. For instructions, see the *Storage Navigator User's Guide*.

Supported Volume Emulation Types

Volume Retention Manager supports the following volume emulation types:

Table 2-1 Supported Volume Emulation Types

Supported Volume Emulation Types	Description
3390-3, -3R, -9, -L, -M 3380-3 *	These logical volumes can be used only by mainframe hosts.
3390-3A, 3390-3B, 3390-3C 3390-9A, 3390-9B, 3390-9C 3390-LA, 3390-LB, 3390-LC 3390-MA, 3390-MB, 3390-MC 3380-3A, 3380-3B, 3380-3C *	These logical volumes can be used by mainframe hosts and open-systems hosts. Notes: <ul style="list-style-type: none">▪ You must ensure that the access attribute of these logical volumes is <i>Read/Write</i>.▪ Access attributes only take effect when mainframe hosts access logical volumes. Access attributes does not take effect when open-system hosts access logical volumes.
* Use of 3380 LVIs is restricted to Fujitsu OS environments.	

Prerequisites and Restrictions for Volume Retention Manager

Follow these guidelines when using the Volume Retention Manager:

- Do not perform Volume Retention Manager operations if any other program product is running.
- Do not assign an access attribute to a logical volume if any job is manipulating data on the logical volume. If you assign an access attribute to such a logical volume, the job will possibly end abnormally.

Installing and Uninstalling Volume Retention Manager

You need to install Volume Retention Manager using the license key to perform Volume Retention Manager operations on the Storage Navigator computer.

Start Storage Navigator for the desired storage system, and enable the Volume Retention Manager options on the Storage Navigator computer and on each storage system using the license key. For instructions, see the *Storage Navigator User's Guide*.

For information on uninstalling Volume Retention Manager, see the *Storage Navigator User's Guide*.

Starting the Volume Retention Manager

This section describes how to start the Volume Retention Manager.



WARNING: Do not perform Volume Retention Manager operations if any other program product is running.

To start Volume Retention Manager:

1. Log in to the SVP to open the Storage Navigator main window.

To assign access attributes, you must use a user account that has the write permission (For example, the Administrator account). If you use a user account that does not have the write permission, you can view access attributes but you cannot assign access attributes.

2. Select **Go, Mainframe Connection**, and then **Volume Retention Manager** from the menu bar of the Storage Navigator main window.

The Volume Retention Manager window appears.

3. Switch to Modify Mode.

If you are going to implement any changes for Volume Retention Manager, you must be in **Modify** mode. If you are in **View** mode, you can look at access attributes in the Volume Retention Manager window, but cannot implement any changes.

For details on how to log in to the SVP or details on Modify Mode, see the *Storage Navigator User's Guide*.

Using the Volume Retention Manager GUI

This chapter describes the various elements of the Volume Retention Manager graphical user interface (GUI):

- [Volume Retention Manager Window](#)
- [VTOC Area dialog box](#)
- [Volume Retention dialog box](#)

This chapter describes only the Volume Retention Manager window and associated dialog boxes. For general information on Storage Navigator features, see the *Storage Navigator User's Guide*.

Volume Retention Manager Window

The Volume Retention Manager window (see Figure 3-1) displays the Volume Retention Manager information for the connected USP V/VM storage system and provides access to all Volume Retention Manager operations.

To open the Volume Retention Manager window, on the Storage Navigator menu bar click **Go**, select **Mainframe Connection**, and then select **Volume Retention Manager**.

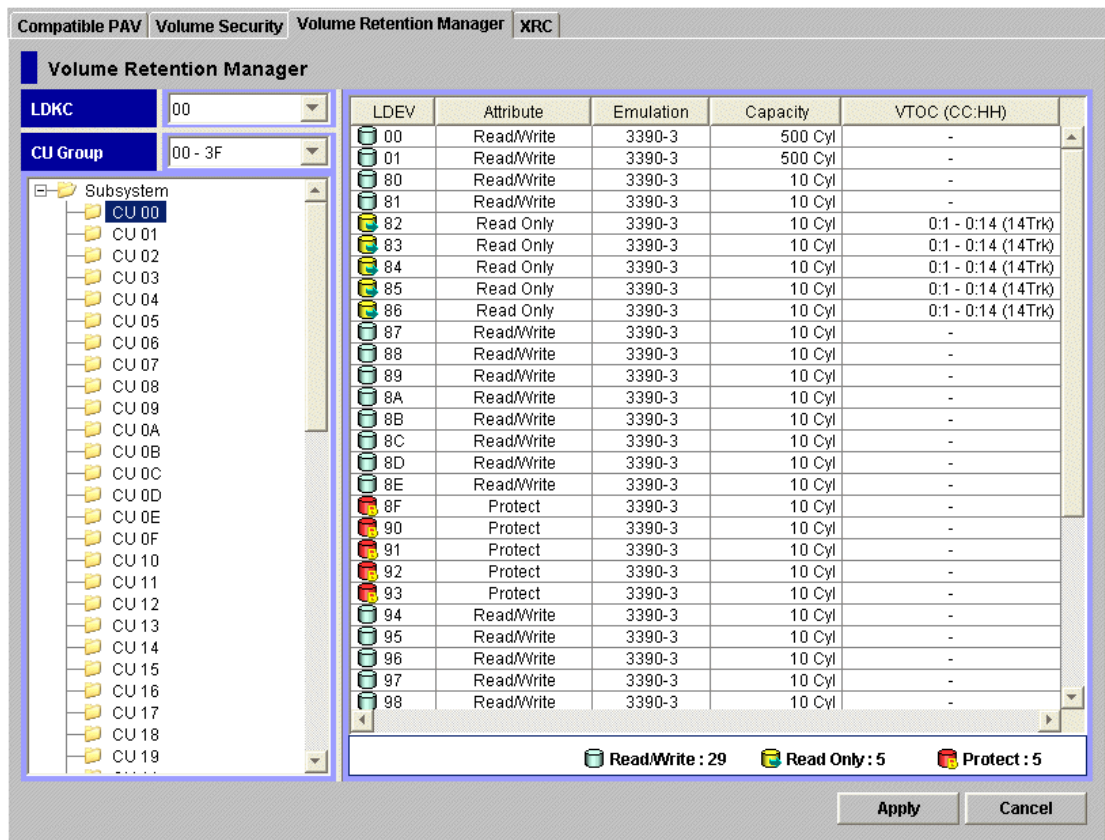








Figure 3-1 Volume Retention Manager Window

Item	Description
LDKC	Select the LDKC (00 or 01) that contains the desired CU group(s).
CU Group	Select the CU group that contains the desired CU(s). Choose from the following CU groups: <ul style="list-style-type: none"> ▪ 00-3F ▪ 40-7F ▪ 80-BF ▪ C0-FE
Tree	Select the CU in the connected storage system that contains the desired LDEV(s). The LDEVs in the selected CU group are listed in the Volume list. The tree displays only the CUs to which the user has access. If you are logged in to Storage Navigator as a storage partition administrator, the tree displays only the CUs in the SLPR that you manage.
Volume list	Lists the LDEVs in the selected CU and provides detailed information on each LDEV. For details, see Volume list .
Volume icons	Provides a summary of the access attribute information for the LDEVs in the selected CU: <ul style="list-style-type: none"> ▪  Read/Write: Number of LDEVs in the selected CU that have the Read/Write access attribute. ▪  Read Only: Number of LDEVs in the selected CU that have the Read Only attribute. ▪  Protect: Number of LDEVs in the selected CU that have the Protect attribute.
Apply	Applies the requested Volume Retention Manager settings to the storage system.
Cancel	Discards the requested Volume Retention Manager settings without applying them to the storage system.

Volume list

The Volume list on the Volume Retention Manager window displays the LDEVs in the selected CU and provides detailed information on each LDEV.

Item	Description
LDEV	Displays the LDEV ID and an icon that indicates the attribute:  : Indicates an LDEV that has the Read/Write attribute.  : Indicates a volume that has the Read Only attribute.  : Indicates a volume that has the Protect attribute. If an LDEV ID is displayed with a pound symbol (for example, 00#), the LDEV is an external volume.
Attribute	Displays the access attribute of the LDEV: Read/Write , Read Only , or Protect .
Emulation	Displays the device emulation type of the LDEV (e.g., 3390-3, 3390-9A). For further information on supported device emulation types, see the <i>USP V/VM User and Reference Guide</i> .
Capacity	Displays the capacity (in cylinders) of the LDEV.
VTOC (CC:HH)	Displays the range of the VTOC area (CC:HH – CC:HH) and the number of tracks in the VTOC area. For example, 0:1-0:14(14Trk) indicates the following: <ul style="list-style-type: none">▪ The range of the VTOC area is from cylinder 0 head 1 to cylinder 0 head 14.▪ The number of tracks in the VTOC area is 14.

VTOC Area Dialog Box

The VTOC Area dialog box (see Figure 3-2) enables the user to change the size of the volume table of contents (VTOC) for specific LDEVs in the connected storage system. To open the VTOC Area dialog box, select the desired LDEV(s) in the Volume list, and right-click and select **VTOC** in the pop-up menu.

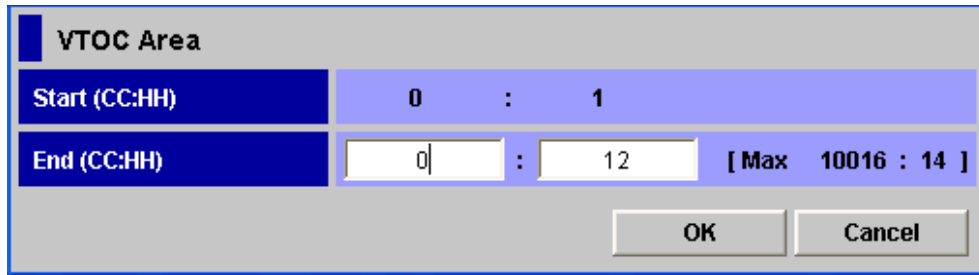


Figure 3-2 VTOC Area Dialog Box

Item	Description
Start (CC:HH)	Starting location (CC:HH) of the VTOC. You cannot change the starting location.
End (CC:HH)	Indicates the current ending location (CC:HH) of the VTOC, and allows you to change the ending location as desired. Max indicates the maximum CC:HH values that can be entered for the ending location.
OK	Saves the requested VTOC change, and closes the VTOC Area dialog box. The requested change is displayed on the Volume Retention Manager window. To apply the requested change to the storage system, you must select Apply in the Volume Retention Manager window.
Cancel	Closes the VTOC Area dialog box without saving the requested VTOC change.

Volume Retention Dialog Box

The Volume Retention dialog box (see Figure 3-3) enables the user to export access attributes to a spreadsheet file for specific LDKCs and CUs in the connected storage system.

To open the Volume Retention dialog box, open the Configuration File Loader window, select **Volume Retention** from the **Select Sheet** drop-down list, and then click **Export**.

Figure 3-3 Volume Retention Dialog Box

Item	Description
File Name on Client	Enables you to specify a target file to save a spreadsheet file. When you click Reference , the dialog box to specify a folder and file name appears.
LDKC	Select the LDKC which you want to export to a spreadsheet file. You can select either 00 or 01.
CU Group	Select the CU which you want to export to a spreadsheet file. You can select one of the following items: <ul style="list-style-type: none"> ▪ ALL: Exports the defined LDEVs which belong to all CUs. ▪ 00-3F: Exports the defined LDEVs which belong to the CUs from 00 to 3F. ▪ 40-7F: Exports the defined LDEVs which belong to the CUs from 40 to 7F. ▪ 80-BF: Exports the defined LDEVs which belong to the CUs from 80 to BF. ▪ C0-FE: Exports the defined LDEVs which belong to the CUs from C0 to FE.
Export	Exports the settings to a spreadsheet file and closes the Volume Retention dialog box.
Cancel	Closes the Volume Retention dialog box without exporting the settings to a spreadsheet file.

Performing Volume Retention Manager Operations

This chapter provides instructions for performing Volume Retention Manager operations.

- [Setting Access Attributes](#)
- [Specifying the VTOC Size](#)
- [Using Volume Retention Manager Spreadsheets to Set Access Attributes](#)
- [Exporting Access Attribute Settings to a Spreadsheet](#)

Setting Access Attributes

To set access attributes of logical volumes and apply the settings to the storage system, take the following steps:



WARNING: Do not assign an access attribute to a logical volume if any job is manipulating data on the logical volume. If you assign an access attribute to such a logical volume, the job could end abnormally.

To set the access attributes of one or more logical volumes:

1. Ensure that the Storage Navigator is in Modify mode.
For details, see the *Storage Navigator User's Guide*.
2. In the Volume Retention Manager window, select an LDKC number from the **LDKC** drop-down list.
3. From the **CU Group** drop-down list, select a group that a CU belongs to. The tree displays a list of CUs in the specified CU group.
4. Select a CU from the tree.
The table displays a list of logical volumes in the specified CU.
5. From the table, select and right-click a logical volume whose access attribute you want to change.
A pop-up menu is displayed.
6. From the pop-up menu, select **Attribute** to display a submenu. Then, select the desired access attribute from the submenu.

The logical volume is displayed in italics and in blue when the access attribute changes. The volume icon also changes when the access attribute changes.
If you want to change access attribute of other logical volumes, repeat this step.
7. If you want to change access attributes of logical volumes in other CU images, repeat steps 2 to 6. If not, go to the next step.



Caution: Here, the settings in the window have not been applied to the storage system.

8. Click **Apply** in the Volume Retention Manager window.
A message appears and asks whether you want to apply the settings to the storage system.
9. Click **OK**. The settings are applied to the storage system.

11	Read/Write	3390-9	10,017 Cyl
12	Read/Write	3390-9	10,017 Cyl
13	Read/Write	0-9	10,017 Cyl
14	Read/Write	0-9	10,017 Cyl
15	Read/Write	0-9	10,017 Cyl
16	Read	0-9	10,017 Cyl
17	Read/Write	3390-9	10,017 Cyl

Figure 4-1 Using Pop-up Menus to Change an Access Attribute

Specifying the VTOC Size

When a host accesses a logical volume, the volume table of contents (VTOC) in the logical volume is updated to include updated access logs. If *Read Only* attribute is assigned to a logical volume, you can resize the VTOC in the logical volume by following the procedure below:

To specify the size of the VTOC in a logical volume:

1. Ensure that the Storage Navigator is in Modify mode. For details, see the *Storage Navigator User's Guide*.
2. In the Volume Retention Manager window, select an LDKC number from the **LDKC** drop-down list.
3. From the **CU Group** drop-down list, select a group that a CU belongs to. The tree displays a list of CUs in the specified CU group.
4. Select a CU from the tree. The table displays a list of logical volumes in the specified CU.
5. From the table, select one or more read-only logical volumes and right-click the selection. A pop-up menu is displayed. If you want to select two or more logical volumes, you must select logical volumes that have the same capacity.
6. From the pop-up menu, select **VTOC**. The VTOC Area dialog box appears (see Figure 3-2).
7. Use the **End (CC:HH)** text boxes to specify the ending position of the VTOC. The text box on the left enables you to enter the cylinder number. The text box on the right enables you to enter the head number.

The starting position of the VTOC cannot be changed and is always *0: 1*, which indicates the cylinder number *0* and the head number *1*.

8. Click **OK** in the VTOC Area dialog box. The logical volume is displayed in italics and in blue.



Caution: Here, the change to the VTOC size has not been applied to the storage system.

9. Click **Apply** in the Volume Retention Manager window. A message appears and asks whether you want to apply the change to the storage system.

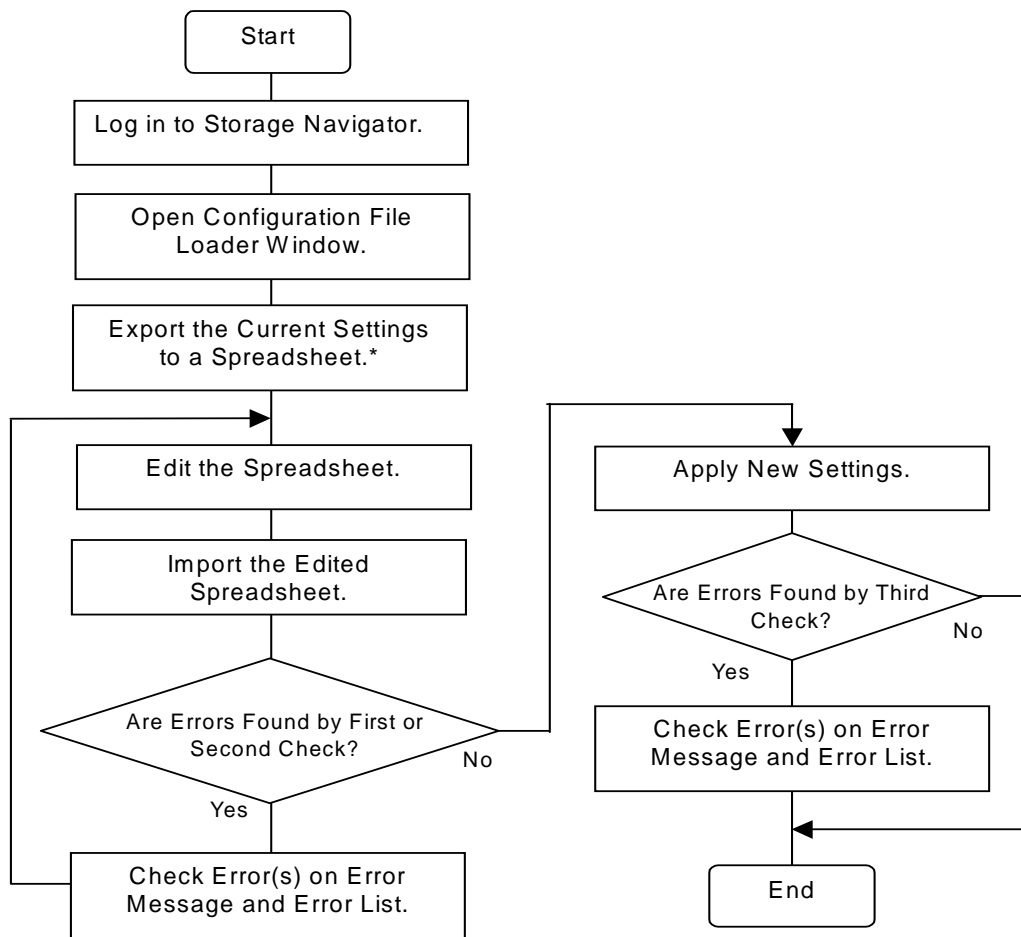
10. Click **OK** to apply the change to the storage system.

Using Volume Retention Manager Spreadsheets to Set Access Attributes

There are two ways to set access attributes with Volume Retention Manager spreadsheets:

- Create a new spreadsheet
- Export a spreadsheet with the current settings and edit the exported spreadsheet

The following figure shows a flow chart of setting access attributes with Volume Retention Manager spreadsheets.



* This is not necessary when you create a new spreadsheet.

Figure 4-2 Volume Retention Manager Spreadsheets Flow Chart

To set access attributes with Volume Retention Manager spreadsheets:

1. Log in to Storage Navigator. For details, see the *Storage Navigator User's Guide*.
2. [Export the current access attribute settings to a spreadsheet](#). This operation is not necessary when you create a new spreadsheet.
3. Edit the spreadsheet.

Use either a text editor or a spreadsheet software to edit spreadsheets. When you edit a spreadsheet, follow the [Volume Retention Manager spreadsheet conventions](#). For how to open or save a spreadsheet, see the *Storage Navigator User's Guide*.

4. Import the edited spreadsheet.

For details, see the *Storage Navigator User's Guide*. When an error occurs, check the error and fix the spreadsheet.

5. In the Configuration File Loader window, click **Apply**. The specified contents in the spreadsheet file are applied to the storage system.

When an error occurs, check the error. The settings are applied to the storage system one by one for each volumes (LDEVs), so the volume that an error occurs needs to be applied again.

Exporting Access Attribute Settings to a Spreadsheet

This section explains how to export access attribute settings to a spreadsheet. For details on importing a spreadsheet, see the *Storage Navigator User's Guide*.

To export access attribute settings to a spreadsheet:

1. Click **Go**, **Configuration File Loader**, and then **Configuration File Loader** on the menu bar of the Storage Navigator main window.

The Configuration File Loader window appears (see Figure 4-3). For details on the Configuration File Loader window, see the *Storage Navigator User's Guide*.

2. Change to **Modify** Mode.

For details, see the *Storage Navigator User's Guide*.

3. Select **Volume Retention** from **Select Sheet** drop-down list and then click **Export**.

The Volume Retention dialog box appears (see Figure 3-3).

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.

4. In the Volume Retention dialog box, specify the following:
 - **File Name On Client**: Specify where to save a spreadsheet by clicking **Reference**.
 - **LDKC**: Select the LDKC which you want to export to a spreadsheet from a drop-down list.
 - **CU Group**: Select the CU range which you want to export to a spreadsheet from a drop-down list.
5. Click **Export** to export a spreadsheet file and to close the Volume Retention dialog box.

To cancel the exporting operation, click **Cancel** in the Volume Retention dialog box.

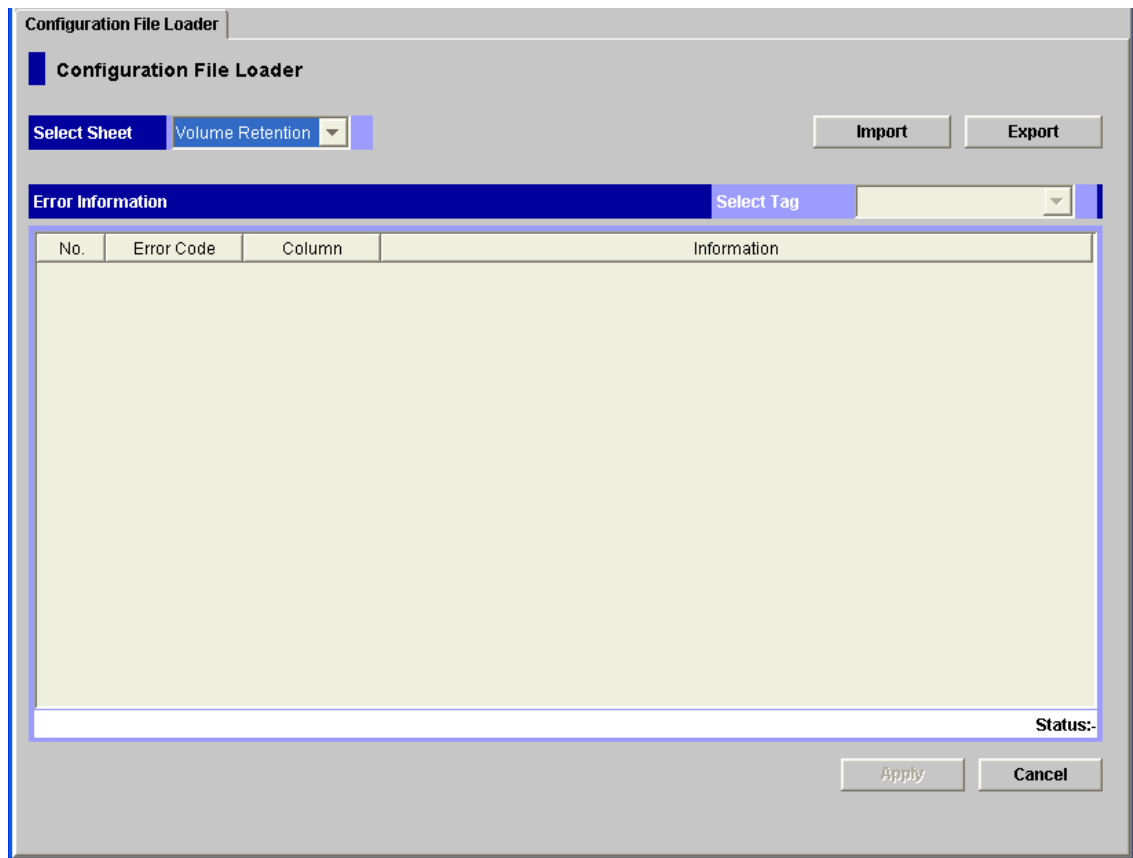


Figure 4-3 Configuration File Loader Window

Volume Retention Manager Spreadsheets

Volume Retention Manager allows you to set access attributes using Configuration File Loader. This chapter describes Volume Retention Manager spreadsheets and the settings for using Configuration File Loader. For details on importing spreadsheets, see the *Storage Navigator User's Guide*.

- [Volume Retention Manager Spreadsheet Conventions](#)
- [Volume Retention Manager Spreadsheet](#)
- [Volume Retention Manager Spreadsheet Settings](#)
- [Error Check](#)

Volume Retention Manager Spreadsheet Conventions

You will need to write a spreadsheet according to specific rules and in a specific format.

Spreadsheet File Formatting Requirements

All of the formatting requirements in Table 5-1 must be satisfied.

Table 5-1 Spreadsheet File Formatting Requirements

Item	Requirements
File type	Text file
File name	Extension must be ".spd". Maximum number of letters for the file name is 32 including the extension. The following symbols cannot be used for the file name: \ / : , ; * ? " < > and space. File path must be under 255 letters.
Maximum number of rows in a spreadsheet	70,000 rows
End-of-line character	Linefeed code must be put in the end of each row.
Maximum number of letters in a row	Maximum number of letters in a row is 128 bytes, including the linefeed code at the end.
Case-sensitivity	Settings are not case-sensitive.
Format	The following parameters should be written in one or two-digit hexadecimal numbers: CU, LDEV. Tab codes and a series of spaces before or after comma are ignored.

Spreadsheet Components

The spreadsheet consists of the following components:

- Spreadsheet Declaration
- Function tags
- Configuration definitions
- Comments

Spreadsheet Declaration

The spreadsheet declaration is required, and should be written at the beginning of the spreadsheet. The spreadsheet declaration line is **not** case-sensitive. Certain parts of the declaration will have already been written in the exported spreadsheet. If the declaration line is incorrect, an error occurs and the spreadsheet file will be rejected.

- Format (variables are shown in *italics*):
#!Version Version number,Program Product
- **Example:**
#!Version 05_00_00,VR,

Table 5-2 describes the spreadsheet declaration components.

Table 5-2 Spreadsheet Declaration Components

Component	Description
#!	Indicates the declaration line. Cannot be changed.
Version	Indicates that the Remote Method Invocation (RMI) version number follows. Cannot be changed.
(One byte space)	Required between the <i>version</i> and the version number.
Version number	RMI version number.
, (comma with no spaces)	Follows the RMI version number
Program Product	Indicates the required program product. VR indicates Volume Retention Manager.
, (comma with no spaces)	Follows the RMI version number

Function Tags

Before you write the settings, you need to state the function of the parameter. This is called a **function tag**, which is formatted as a string in brackets ([]).

Function tags have the following characteristics:

- At least one function tag is required in a spreadsheet.
- The function tag must be written at the very beginning of the row and any other comments and settings written in the same row as the function tag are ignored.
- The row after the function tag indicates the required setting items (CU, LDEV and Attribute in the example) for the function. The setting items are separated by commas.

Example:

```
[Attributes]
#CU,LDEV,Attribute(Read/Write,Read Only,Protect)
01,00,Read/Write
```

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

```
#!Version 05_00_00,VR,  
[Serial Number]  
[LDKC]  
[Attribute]
```

Configuration Definitions

You can write the configuration definition either between a function tag and another function tag, or between a function tag and the end of the file. A configuration definition allows you to set access attributes for the storage system.

Configuration definition settings must comply with the following:

- The maximum number of columns for the settings depends on the program product, and is stated in the declaration row.
- Do not write the identical configuration definition more than once in the same function tag.

Comments

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

Volume Retention Manager Spreadsheet

```
#!Version 05_00_00,VR,  
  
[Serial Number]  
#Serial Number  
63507  
  
[LDKC]  
#LDKC  
00  
  
[Attribute]  
#CU,LDEV,Attribute(Read/Write,Read Only,Protect)  
01,00,Read/Write  
01,01,Read Only  
01,02,Protect
```

Volume Retention Manager Spreadsheet Settings

You can write the following function tags and parameters in a Volume Retention Manager spreadsheet. The Serial Number tag and the LDKC tag can be omitted, but the Attribute tag is required.

- [Serial Number]
Specify the serial number of the storage system.
- [LDKC]
Specify the LDKC (00 or 01) which you want to set access attributes. If you do not specify, 00 is used by default.
- [Attribute]
Specify CU, LDEV, and access attributes. You can write settings from 1 LDEV up to 65,280 LDEVs. Specify the following for access attributes:
 - Read/Write
 - Read Only
 - Protect

Error Check

To apply the access attributes to the storage system, error checks are performed three times. This section describes each of these checks.

First Error Check

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

- The first row of the spreadsheet (the [declaration](#) line) is not correctly written.
- The spreadsheet file is not in text file format (the file is a binary file).
- There is no [function tag](#) in the spreadsheet.
- The file name is incorrect (e.g., the extension is not ".spd", or the file name exceeds the maximum number of letters).
- The number of letters in a row exceeds 127.
- The number of rows in a spreadsheet exceeds 70,000.

Second Error Check

In the second check, the spreadsheet settings are verified. Any errors found are displayed on the **Error Information** list. This second check is performed before the **Apply** button becomes available. Figure 5-1 shows the flow of the second check.

The second error check consists of two different types of checks. These checks are shown in Figure 5-1 as Level 1 and Level 2. The Level 2 check is performed only when no error is found by the Level 1 check. Each level of the check of the second error check detects the following errors:

- Level 1 check (the format and parameters are checked):
 - A function tag is not supported.
 - A setting value is incorrect or omitted.
 - The setting range is incorrect. The correct ranges are as follows:
CU: 00 - FE
LDEV: 00 - FF
- Level 2 check:

The current settings are compared to the imported settings and checked for logical consistency. Note that certain errors can only be detected by the third check.

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

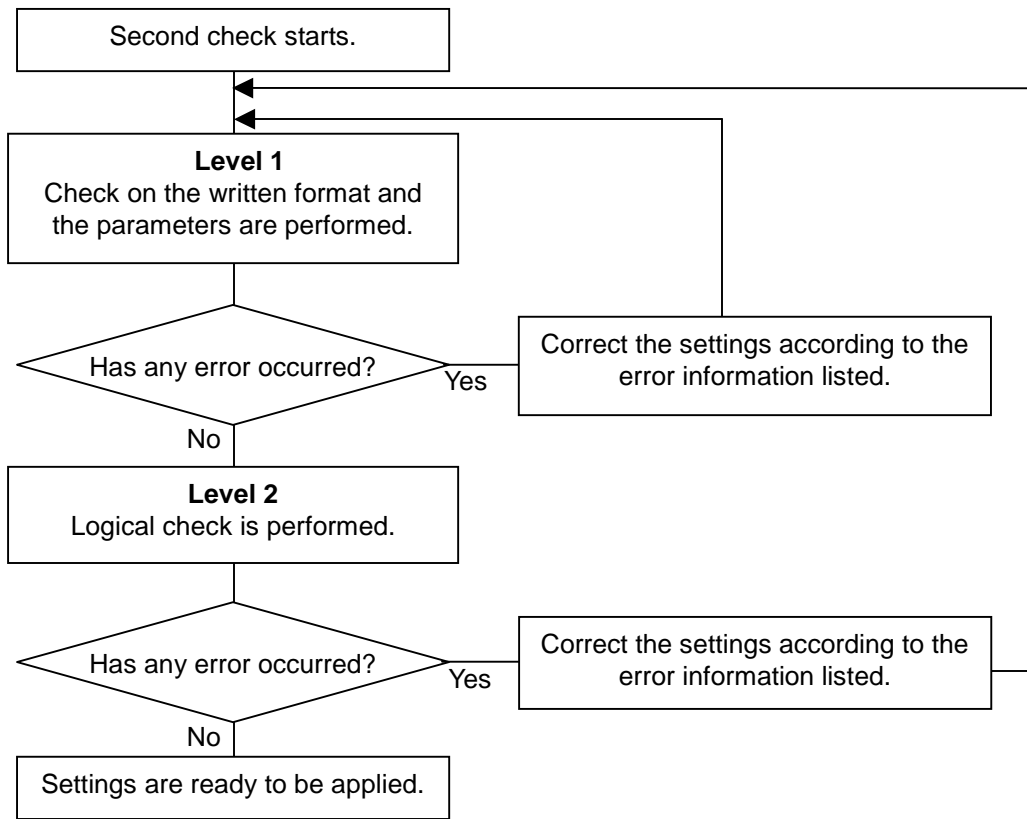


Figure 5-1 Second Error Check Flow Chart

Third Error Check

The third check is performed for each LDEV after the **Apply** button is selected. If an error occurs in applying settings for a LDEV, an error message is displayed but the rest of apply settings is continued. The third check detects errors when volumes (LDEVs) are one of the following:

- Undefined logical volumes (LDEVs that are not mapped to physical devices)
- Volume usable by open-systems (except multiplatform volumes)
- Journal volumes
- Compatible FlashCopy V2 volumes
- System Disk volumes
- Logical volumes that are configured as command devices
- The case of which the program product has not been installed (except when you change the access attribute to Read/Write)

Usage Scenario

This chapter describes a usage scenario (use case) for Hitachi Volume Retention Manager.

- [Volume Retention Manager Spreadsheet Use Example](#)

Volume Retention Manager Spreadsheet Use Example

After you finish setting access attributes in the Volume Retention Manager window, you can save the settings in a spreadsheet. If you create spreadsheets and save in Storage Navigator computer, you will be able to change access attributes of all logical volumes quickly and easily.

Figure 6-1 is an example of a computer system that uses two spreadsheets (Ptn_1 and Ptn_2). In Ptn_1, the logical volume *Idev1* has the *Read/Write* attribute, and the logical volume *Idev2* has the *Protect* attribute. In Ptn_2, *Idev1* has the *Read Only* attribute, and *Idev2* has the *Read/Write* attribute. The system administrator applies Ptn_1 to the storage system in the daytime, and applies Ptn_2 in the nighttime. In the daytime, all the hosts can read from and write to *Idev1*, but can neither read from nor write to *Idev2*. In the nighttime, all hosts can only read data from *Idev1*, but can read from and write to *Idev2*.

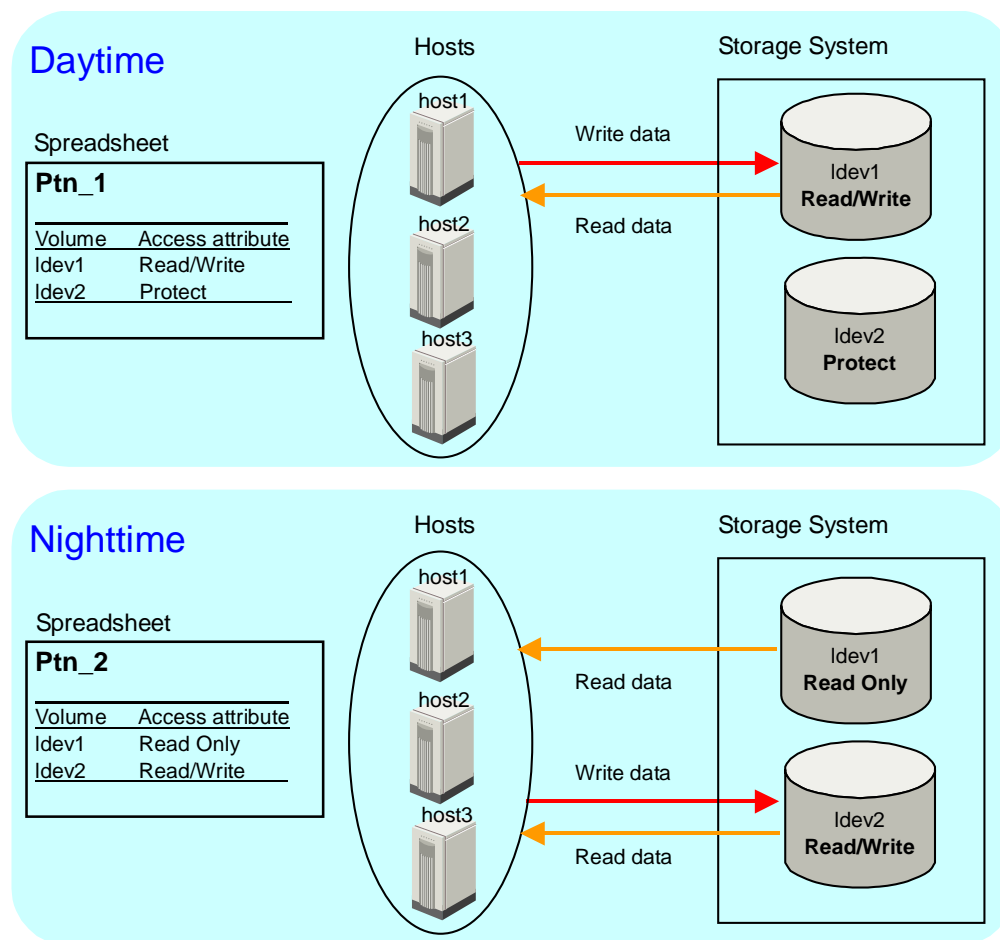


Figure 6-1 Spreadsheets Example

Troubleshooting

This chapter provides troubleshooting information for Volume Retention Manager and instructions for calling technical support.

- [Troubleshooting](#)
 - [Calling the Hitachi Data Systems Support Center](#)
-
- When a host computer attempts to write data to a read-only logical volume, the write operation fails and the host receives a Write Inhibit report that the host cannot write data because of the access attribute.
 - When a host computer attempts to read data from or write data to a logical volume that has the Protect attribute, the attempted access is rejected and an intervention request is reported to the host. The intervention request indicates that the host cannot access the logical volume because of the access attribute.

Troubleshooting

If an error occurs with Volume Retention Manager, the Error Detail dialog box appears. The Volume Retention Manager window displays error locations and error messages.

The Error Detail dialog box does not display Storage Navigator error messages. To find information about Storage Navigator errors and solutions, see the *Storage Navigator User's Guide*.

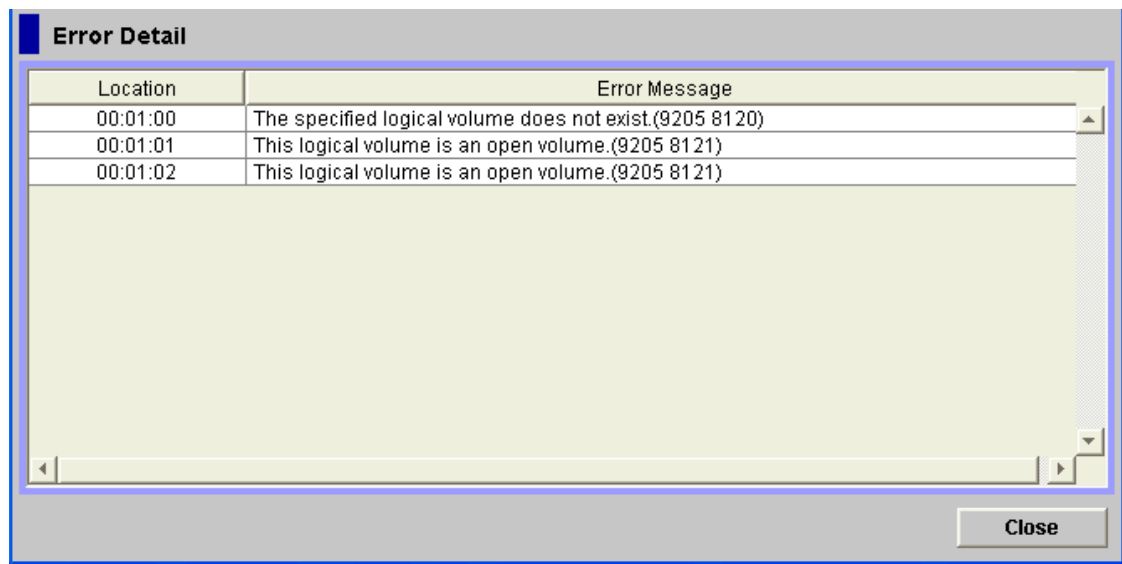


Figure 7-1 Error Detail Dialog Box

The Error Detail dialog box displays the following items:

- **Location:** This column indicates where error occurred. If an error occurs with a logical volume, this column displays the LDKC number, the CU number and the LDEV number.
- **Error Message:** This column displays error messages. For information on removing errors, see the *Storage Navigator Messages*.
- **Close:** This button closes the Error Detail dialog box.

Contacting the Hitachi Data Systems Support Center

If you need to contact 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 exact content of any error message(s) displayed on the Storage Navigator.
- The remote service information messages (R-SIMs) logged on the Storage Navigator computer and the reference codes and severity levels of the recent R-SIMs.

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



Acronyms and Abbreviations

CC	cylinder number
CU	control unit
DKC	disk controller
GB	gigabytes (see Convention for Storage Capacity Values)
GUI	graphical user interface
HH	head number
I/O	input/output
ID	identification
KB	kilobytes (see Convention for Storage Capacity Values)
LDEV	logical device
LDKC	logical DKC
M-VOL	main volume (used for TrueCopy for z/OS volumes)
max	maximum
MB	megabytes (see Convention for Storage Capacity Values)
min	minimum, minutes
PB	petabytes (see Convention for Storage Capacity Values)
R-VOL	remote volume (used for TrueCopy for z/OS volumes)
RMI	Remote Method Invocation
S-VOL	source volume (used for ShadowImage for z/OS volumes)
sec	seconds
SIM	service information message
SIz	ShadowImage for z/OS
SVP	service processor
T-VOL	target volume (used for ShadowImage for z/OS volumes)
TB	terabytes (see Convention for Storage Capacity Values)
TCz	TrueCopy for z/OS
URz	Universal Replicator for z/OS
USP V	Universal Storage Platform V
USP VM	Universal Storage Platform VM
vol	Volume
VTOC	volume table of contents



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