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Hitachi Universal Storage Platform V
Hitachi Universal Storage Platform VM
Hitachi Virtual Partition Manager User's Guide

Hitachi Data Systems

MK-96RD629-11

Contents

Preface

This document describes and provides instructions for using the Hitachi Virtual Partition Manager™ software to configure and perform operations on the Hitachi Universal Storage Platform V and Hitachi Universal Storage Platform VM (USP V/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:

- ☐ [Intended Audience](#)
- ☐ [Product Version](#)
- ☐ [Document Revision Level](#)
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- ☐ [Document Organization](#)
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Notice: The use of Virtual Partition 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 USP V/VM storage systems.

This document assumes the user:

- Has a background in data processing and understands RAID storage systems and their basic functions.

- Is familiar with the Universal Storage Platform V and/or VM storage system and has read the *Universal Storage Platform V/VM User and Reference Guide*.

- IS familiar with the Storage Navigator software for the Universal Storage Platform V/VM and has read the *Storage Navigator User's Guide*.

- Is is familiar with the operating system and web browser software on the system hosting the Storage Navigator software.

Product Version

This document revision applies to Universal Storage Platform V/VM microcode 60-08-0*x* and higher.

Document Revision Level

Revision	Date	Description
MK-96RD629-01	May 2007	Initial release
MK-96RD629-02	September 2007	Revision 2, supersedes and replaces MK-96RD629-01
MK-96RD629-03	November 2007	Revision 3, supersedes and replaces MK-96RD629-02
MK-96RD629-04	January 2008	Revision 4, supersedes and replaces MK-96RD629-03
MK-96RD629-05	May 2008	Revision 5, supersedes and replaces MK-96RD629-04
MK-96RD629-06	August 2008	Revision 6, supersedes and replaces MK-96RD629-05
MK-96RD629-07	November 2008	Revision 7, supersedes and replaces MK-96RD629-06
MK-96RD629-08	June 2009	Revision 8, supersedes and replaces MK-96RD629-07
MK-96RD629-09	November 2009	Revision 9, supersedes and replaces MK-96RD629-08
MK-96RD629-10	December 2010	Revision 10, supersedes and replaces MK-96RD629-09
MK-96RD629-10	April 2011	Revision 11, supersedes and replaces MK-96RD629-10

Source Documents for this Revision

- MK-96RD629-10
- MK-96RD629-11a

Changes in this Revision

- Added new section detailing system option modes available for use with Virtual Partition Manager (see System Option Modes).

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 - Overview of Virtual Partition Manager	Provides an introduction to Virtual Partition Manager.
Chapter 2 - About Virtual Partition Manager	Provides a detailed description of Storage Logical Partition (SLPR) and Cache Logical Partition (SLPR).
Chapter 3 - Preparing for Virtual Partition Manager Operations	Discusses the preparation needed for Virtual Partition Manager operations.
Chapter 4 - Using the Virtual Partition Manager GUI	Describes the windows that comprise the Virtual Partition Manager GUI.
Chapter 5 - Virtual Partition Manager Operations	Provides detailed instructions for Virtual Partition Manager operations.
Chapter 6 - Troubleshooting	Describes some troubleshooting methods if you have problems with Virtual Partition Manager.
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 and VM:

- *Hitachi Cache Residency Manager User's Guide,* MK-96RD609

- *Hitachi Command Control Interface User and Reference Guide,* MK-96RD644

- *Hitachi Data Retention User's Guide*, MK-96RD612

- *Hitachi LUN Expansion User's Guide,* MK-96RD616

- *Hitachi LUN Manager User's Guide,* MK-96RD615

- *Hitachi Performance Manager User's Guide*, MK-96RD616

- *Hitachi ShadowImage for IBM® z/OS® User Guide,* MK-96RD619

- *Hitachi ShadowImage User Guide,* MK-96RD618

- *Hitachi Storage Navigator Messages,* MK-96RD613

- *Hitachi Storage Navigator User's Guide,* MK-96RD621

- *Hitachi Universal Replicator for IBM z/OS User's Guide*, MK-96RD625

- *Hitachi Universal Replicator User's Guide*, MK-96RD624

- *Hitachi Virtual LVI/LUN and Volume Shredder User's Guide,* MK-96RD630

- *User and Reference Guide,* MK-96RD635

Document Conventions

The terms "Universal Storage Platform V" and "Universal Storage Platform VM" refer to all models of the Hitachi Universal Storage Platform V and VM storage systems, 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: [<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 kilobyte (KB) = 1,000 bytes
> 1 megabyte (MB) = $1,000^2$ bytes
> 1 gigabyte (GB) = $1,000^3$ bytes
> 1 terabyte (TB) = $1,000^4$ bytes
> 1 petabyte (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 (2^{10}) bytes
> 1 MB = 1,024 KB or $1,024^2$ bytes
> 1 GB = 1,024 MB or $1,024^3$ bytes
> 1 TB = 1,024 GB or $1,024^4$ bytes
> 1 PB = 1,024 TB or $1,024^5$ 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 exact content of any error message(s) displayed on Storage Navigator.

- The Storage Navigator configuration information (use the FD Dump Tool). This information is used by service personnel for troubleshooting purposes.

- The service information messages (SIMs), including reference codes and severity levels, displayed by Storage Navigator.

The Hitachi Data Systems customer support staff is available 24 hours aday, seven days a week. If you need technical support, please log on to the Hitachi Data Systems Portal for contact information: https://portal.hds.com

Comments

Please send us your comments on this document: doc.comments@hds.com Include the document title, number, and revision, and refer to specific section(s) and paragraph(s) whenever possible.

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

Overview of Virtual Partition Manager

This chapter provides an introduction to Virtual Partition Manager:

☐ [Introduction to Virtual Partition Manager](#)
☐ [Benefits of Virtual Partition Manager](#)
☐ [Feature Highlights](#)

Introduction to Virtual Partition Manager

Hitachi Virtual Partition Manager enables data center administrators to perform logical partitioning of ports, cache, and disk capacity, including external storage, on the USP V/VM to create independently managed and secure Private Virtual Storage Machines. These logical partitions help maintain quality of service by acting as dedicated storage resources that are independently managed and reserved for specific applications.

Large data centers typically support a high volume of users, systems, and applications—each with constantly changing requirements for storage capacity, throughput, priority, security, and access, as well as management and control. Traditionally, isolated storage systems could be dedicated to specific applications, but only at the cost of flexibility and ease of management. With decentralized access and control, however, departments can manage their storage systems individually.

Hitachi storage—specifically the Hitachi Universal Storage Platform V and Hitachi Universal Storage Platform VM (herein after referred to as USP V/VM) — addresses these issues by enabling consolidation, aggregation, and management of large sets of diverse, highly dynamic stored data. By virtualizing storage resources into a single pool, the USP V/VM facilitates flexibility and manageability for IT administrators.

Virtual Partition Manager software complements the USP V/VM by allowing IT departments to isolate, segment, and control storage for specific applications, servers, or users. Administrators can treat logical partitions as if they were separate storage machines, helping them maintain data security and integrity. The software also allows administrators to grant decentralized access and control of specific partitions to departmental IT managers—a feature that can enhance manageability and free data center administrators to focus on corporate-level projects.

By dedicating resources to each partition as needed, administrators also can maintain high quality of service for all users. Resources can be allocated based on business requirements and dynamically reconfigured in real time to meet changing needs.

Customers can use Virtual Partition Manager software to create up to 32 Private Virtual Storage Machines on the USP V/VM. With the ability to manage each partition as its own storage system, IT managers can operate storage in a utility like fashion, negotiating and providing different quality of service by application and charging back business units for storage usage.

Benefits of Virtual Partition Manager

Improves Security

Virtual Partition Manager restricts access to data and resources from users and storage administrators without authorization to that partition. It also restricts access from users and administrators to data and resources outside of their authorized partition.

Assures Quality of Service

Virtual Partition Manager dedicates resources (e.g., cache, disk) for exclusive use by specific applications to maintain priority and quality of service for business-critical applications. You can secure and/or restrict access to storage resources to ensure confidentiality for specific applications. You can also use Virtual Partition Manager to adjust data storage resources dynamically to satisfy changing business requirements.

Matches Storage Resources to Business Requirements

Virtual Partition Manager matches data to appropriate storage resources based on availability, performance, capacity, and cost. It improves flexibility by allowing dynamic changes to cache partitions while in use.

Enables Departmental View of Storage

A departmental view of storage delivers accountability and chargeback, facilitates departmental management and control within partitions, and permits centralized control over departments.

Feature Highlights

Virtual Partition Manager logically partitions a virtualized storage pool on the USP V/VM, consisting of internal and externally attached storage resources (regardless of physical location), into multiple independently managed storage machines. It allows allocatation of storage resources to specific applications, and allows partitioning and isolation of that storage from access by users, applications, and administrators of other partitions.

In addition, Virtual Partition Manager reconfigures partitions dynamically, in real time, without disruption of service. It also allows allocation of platform software licenses for use by partition administrators.

About Virtual Partition Manager

This chapter provides a detailed description of Storage Logical Partition (SLPR) and Cache Logical Partition (SLPR).

☐ Storage Logical Partition (SLPR)

☐ Cache Logical Partition (CLPR)

The USP V/VM storage systems can connect multiple hosts, and can be shared by multiple users, such as different departments or even different companies. This can cause conflicts among the various users. For example, if a particular host issues a lot of I/O requests, the I/O performance of other hosts may decrease. If the various administrators have different storage policies and procedures, or issue conflicting commands, that can cause difficulties.

Virtual Partition Manager has two main functions: storage logical partition (SLPR) and cache logical partition (CLPR). The storage logical partition function allows you to divide the available storage among various users, to lessen conflicts over usage. The cache logical partition function allows you to divide the cache into multiple virtual cache memories, to lessen I/O contention.

If no storage partition operations have occurred, the storage system will have Storage Logical Partition 0 (SLPR 0), which is a pool of all of the resources of the storage system (e.g., cache logical partitions and ports). SLPR 0 will contain Cache Logical Partition 0 (CLPR 0), which is a pool of all of the cache and all parity groups in the storage system. The only users who have access to SLPR 0 and CLPR 0 are storage administrators.

Storage Logical Partition (SLPR)

A USP V/VM can be shared among several groups that may have different storage administrators. This can cause problems if those administrators have differing or conflicting storage procedures, or if two or more administrators attempt to perform operations on the same logical volume, such as LUN Expansion (LUSE) or Virtual LVI/LUN (VLL). The storage logical partition function can allocate the storage system resources into two or more virtual storage systems, each of which can be accessed only by the storage administrator, the storage partition administrator for that storage logical partition, and the users for that partition. You can create up to 32 storage logical partitions in one storage system, including the default SLPR 0. There is no maximum or minimum size for a SLPR. See Creating a Storage Logical Partition for instructions on creating storage logical partitions. Including SLPR 0, you can have up to four SLPRs without purchasing an additional license key.

Figure 2-1 illustrates a storage system that is divided into two virtual partitions, so that the storage administrator of each storage logical partition can only access that partition.
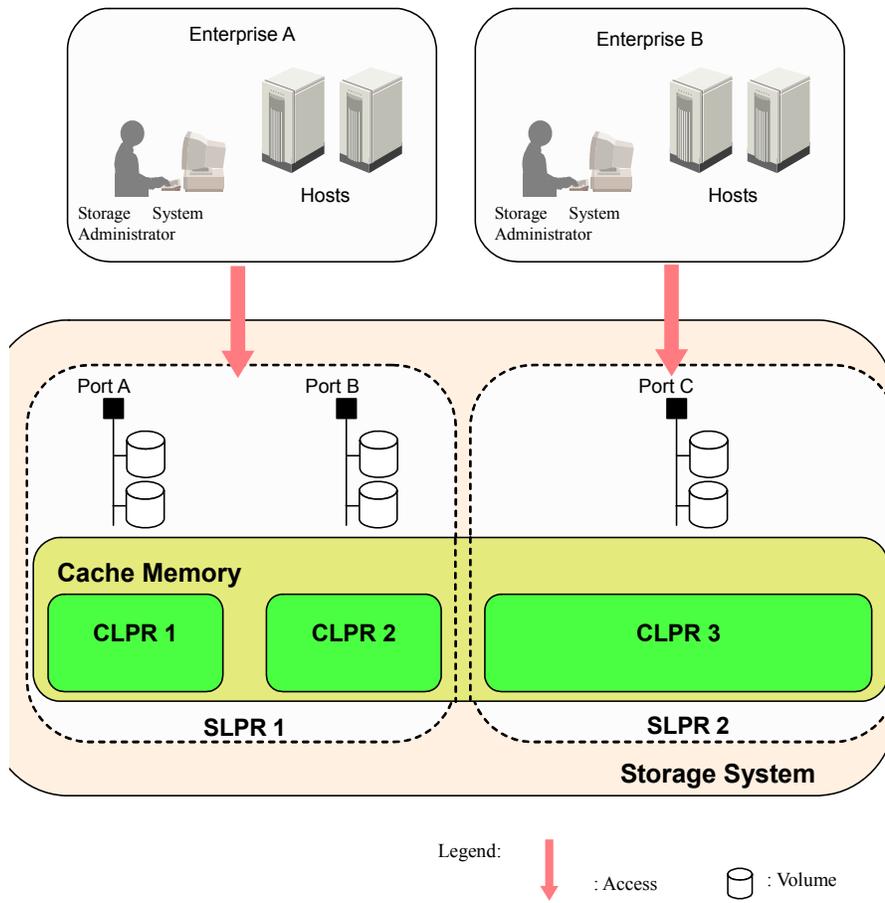
Figure 2-1   Storage Logical Partition (SLPR)
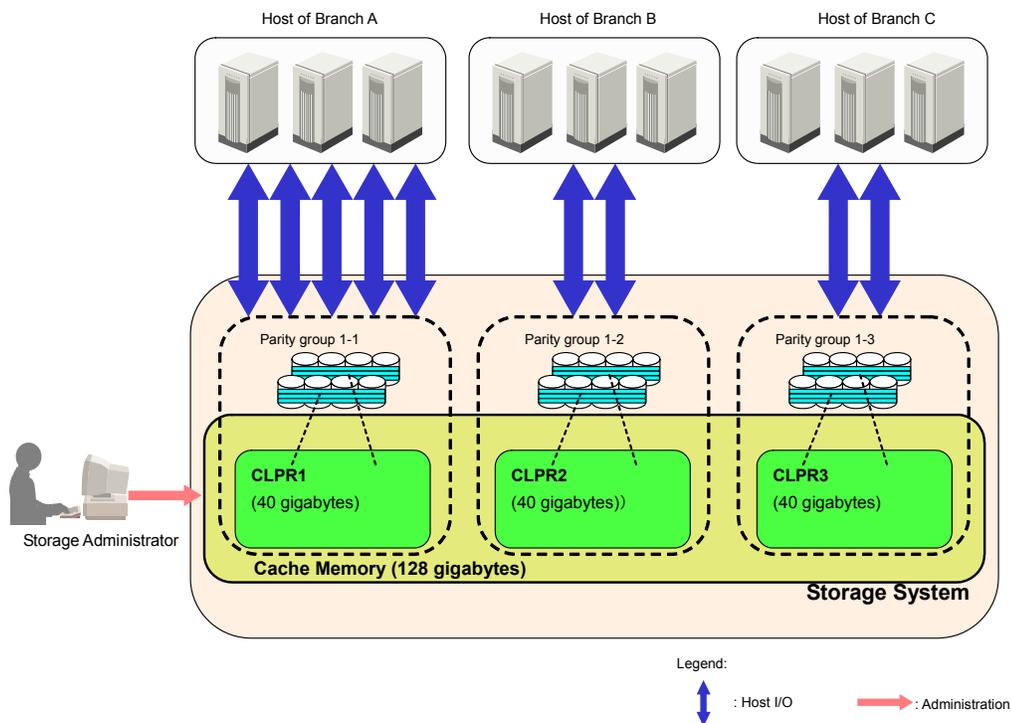
Cache Logical Partition (CLPR)

If one disk storage system is shared with multiple hosts, and one host reads or writes a large amount of data, read and write data can require enough of the cache memory to affect other users. The cache logical partition function creates two or more virtual cache memories, with each allocated to a different host. This prevents contention for cache memory. Including CLPR 0, you can have up to four CLPRs without purchasing an additional license key. Parity groups containing LDEVs that belong to the optional LDKC can be allocated to a CLPR.

To add cache memory to the storage system, use the Standard Cache Access Model mode or the High Performance Cache Access Model mode. If your storage system has any additional printed circuit boards (PCBs), you must install the cache memory with the High Performance Cache Access Model mode. If you want to use Cache Residency Manager, you can set up the required cache area in one or more CLPRs. For more information on Cache Residency Manager, see the *Cache Residency Manager User's Guide*. For more information about additional cache memories, please call the Hitachi Data Systems Technical Support Center (see Creating a Cache Logical Partition).

Figure 2-2 illustrates the use of cache memory within a corporation. In this example, the cache memory is partitioned into three segments of 40 GB each, which are each allocated to a branch office. The host of branch A has a heavy I/O load. Because the cache memory is partitioned, that heavy I/O load does not impact the cache memory for the other two branches.

You can create up to 32 cache logical partitions in one storage subsystem, including the default CLPR 0. See Creating a Cache Logical Partition for instructions on creating cache logical partitions.

Figure 2-2 illustrates cache logical partition:

Figure 2-2   Cache Logical Partition (CLPR)

Table 2-1 lists the recommended cache capacity, which is determined by the CLPR data capacity.

Table 2-1   CLPR Data Capacity and the Recommended Cache Capacity

CLPR Data Capacity	Recommended Cache Capacity
Less than 720 GB	4 GB or more
720 GB or more	8 GB or more
2,900 GB or more	12 GB or more
8,650 GB or more	16 GB or more
14,400 GB or more	20 GB or more
20,160 GB or more	24 GB or more
128,000 GB or more	28 GB or more
146,000 GB or more	32 GB or more
182,000 GB or more	40 GB or more
218,000 GB or more	48 GB or more
254,000 GB or more	56 GB or more
290,000 GB or more	64 GB or more
326,000 GB or more	72 GB or more

To calculate the data capacity:

The number of 3D+1P parity groups x capacity of one HDD x 3

+ the number of 6D+2P parity groups x capacity of one HDD x 6

+ the number of 7D+1P parity groups x capacity of one HDD x 7

+ the number of 2D+2D parity groups x capacity of one HDD x 2

To calculate the cache capacity for a CLPR:

Cache capacity (GB) = recommended cache capacity (GB) +
↑ (cache residency capacity (MB) / 2,048) ↑ x 2 GB

System Option Modes

To provide greater flexibility, the USP V/VM storage system has additional operational parameters called system option modes (SOMs) that allow you to tailor your USP V/VM to your unique operating requirements. The SOMs are set on the service processor (SVP) by your Hitachi Data Systems representative.

To set and manage the SOMs

1. Review the SOMs for your operational environment. The SOMs are described in detail in the *User and Reference Guide*.

2. Work with your Hitachi Data Systems team to make sure the appropriate SOMs are set on your storage system.

3. Check each new revision of the *User and Reference Guide* to see if there are any SOM changes that may apply to your operational environment. If so, contact your Hitachi Data Systems team.

The following table lists and describes SOMs applicable to Virtual Partition Manager. For a complete list of all SOMs for the USP V/VM, see the *User and Reference Guide*. This SOM information may have changed since this document was published. Contact your Hitachi Data Systems team for the latest SOM information.

Mode	Description
454	When making a destage schedule for CLPRs, controls whether the average workload of all the CLPRs is used, or the highest workload of all of the CLPRs is used.
	CLPR (function of Virtual Partition Manager) partitions the cache memory in the storage system into multiple virtual cache areas, and assigns the partitioned virtual cache for each use. If a large amount of cache is required for a specific use, it can minimize the impact on other uses. The CLPR function works as follows depending on whether this SOM is ON or OFF.
	ON: The average workload of all the CLPRs is used to make the destage schedule.
	OFF (default): The highest workload of those of the CLPRs is used to make the destage schedule.
	Note: The priority of the destage processing for a specific CLPR in the overloaded status decreases and the overloaded status is not released so that TOV (MIH) may occur.

Mode	Description
505	Controls whether to speed up changing CLPR cache assignment, and reduce the processing time. **ON:** Speed up changing CLPR cache assignment (maximum 1 minute per 1 GB). **OFF (default):** Speed of changing CLPR cache assignment is normal (maximum 5 minutes per 1 GB). ***Note:*** While the CLPR configuration is being changed (changing CLPR cache assignment, migrating parity group between CLPRs), host I/O performance may be degraded.

3

Preparing for Virtual Partition Manager Operations

This chapter discusses the preparation needed for Virtual Partition Manager operations.

☐ Storage Administrator and Storage Partition Administrator Privileges

☐ Possible Interacting and Conflicting Functions

Storage Administrator and Storage Partition Administrator Privileges

After the Virtual Partition Manager license key has been installed for the Storage Navigator Java™ API, a storage administrator with write permission for Virtual Partition Manager can then log on to the storage system and allocate license capacities to various storage logical partitions as needed, using the License Key Partition Definition panel. See The License Key Partition Definition Window for a description of the window, and Partitioning and Allocating Licensed Capacity to Storage Logical Partitions for instructions on allocating license key capacity to the SLPRs.

You will need to either purchase an unlimited license for an option, or allocate the license capacity for that option among the various SLPRs. You will also need to enable or disable each option for each of the storage logical partitions. You cannot use an option in SLPRs until the license capacity has been allocated.

Performance Monitor has different parameters. Once you have the Performance Monitor option on the storage system, a storage administrator can monitor information for the entire storage system, whether or not the license has been allocated to each SLPR. If a storage partition administrator wants to use Performance Monitor, the Performance Monitor license must be allocated to that SLPR.

A storage partition administrator has authority only within the assigned storage logical partition. Only storage administrators can make settings for SLPR0. The storage administrator can also assign write permission for one or more of the following functions:

- Open Volume Management
- Volume Shredder
- Data Retention Utility
- LUN Manager
- Cache Residency Manager
- Performance Monitor
- Storage Navigator
- JAVA™ API

Administrator access for the USP V/VM is divided into two types:

- **Storage Administrators** manage the entire storage system and all of its resources, can create and manage storage logical partitions and cache logical partitions, and assign access permission for storage partition administrators. Storage administrators have sole access to the following functions:

- – Accessing Storage Logical Partition 0 (SLPR 0) and Cache Logical Partition 0 (CLPR 0).
- – Managing mainframe volumes.
- • **Storage Partition Administrators** can view and manage only those resources that have been assigned to a specific storage logical partition. Storage partition administrators have access only to the functions listed below. If a storage partition administrator is not granted write access to a particular function, view access is available.
    - − System Information
        - • Information (Read Only)
    - − LUN Manager
        - • LUN Manager
        - • Port
        - • Authentication
    - − LUN Expansion/VLL
        - • LUN Expansion
        - • VLL
    - − Cache Residency
        - • Cache Residency
    - − Performance Manager
        - • Performance Monitor
    - – Data Retention Utility
        - • Data Retention
    - – Security
        - • Account

For detailed information on each function, see the manual of each program product. For instructions on creating storage partition administrators and granting write access to one or more products, see the *Storage Navigator User's Guide*. For information about the functions that are not available for storage partition administrators, also see the *Storage Navigator User's Guide*.
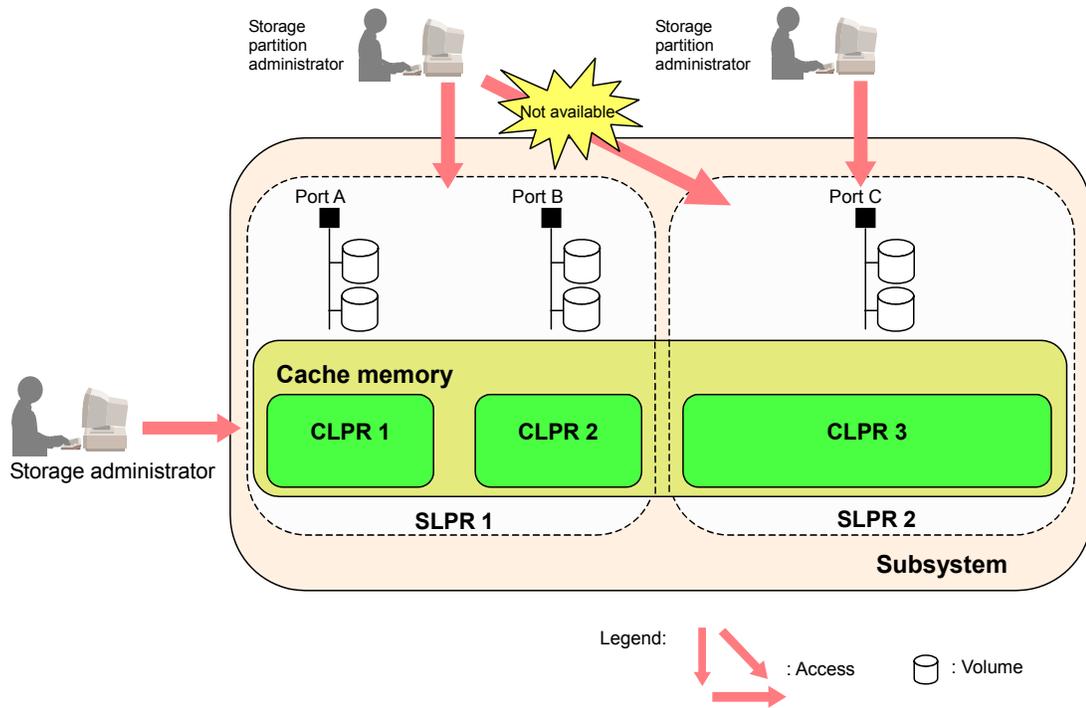
Figure 3-1   **Storage Administrator and Storage Partition Administrator Privileges**

Possible Interacting and Conflicting Functions

It is possible for actions taken by a storage administrator to interact and conflict with actions taken by a partition storage administrator.

⚠ **WARNING:** If you are using Command Control Interface (CCI), you must use command device security for the affected logical volumes, to prevent CCI commands from having effects across SLPR boundaries. For more information on CCI, see the *Hitachi Command Control Interface User and Reference Guide*. For more information on securing command devices, see the *LUN Manager User's Guide*.

Before a storage administrator or storage partition administrator can create a customized volume (CV) using the Virtual LVI/LUN function, the storage administrator must allocate the CU numbers to the SLPR. This is necessary so that the storage partition administrator can allocate LDEVs to those CU numbers when creating a customized volume. For more information on the VLL function, see the *Virtual LVI/LUN User's Guide*.

⚠ **WARNING:** Making settings across SLPR boundaries is strongly discouraged, because you could cause unintended and serious consequences, including having a storage partition administrator be unable to perform one or more functions. If you attempt to make settings across more than one SLPR, a warning message appears. If you do make settings across SLPR boundaries, be extremely careful to avoid conflicts in LDKC, CU and volume numbers across the various storage logical partitions.

For example, if a storage administrator performs any of the following types of actions across SLPR boundaries, this could cause serious problems for the storage partition administrators:

- Manual migration with Volume Migration (For more information on Volume Migration, contact the Hitachi Data Systems Support Center (see Calling the Hitachi Data Systems Support Center).

- ShadowImage Quick Restore (see the *ShadowImage User Guide* and the *ShadowImage for IBM z/OS User Guide*).

- LU path settings and High Speed settings (see the *LUN Manager User's Guide*).

- LUSE settings (see the *LUN Expansion User's Guide*).

If you are using Universal Replicator, Universal Replicator data volumes and journal volumes can belong to different CLPRs. All journal volumes in the same journal group must belong to the same CLPR. For more information on Universal Replicator, see the *Universal Replicator User and Reference Guide*.

Figure 3-2 shows an example involving manual volume migration. In this example, volume "LDKC00:CU01:LDEV05" is manually migrated from SLPR1 to SLPR2, and volume "LDKC00:CU02:LDEV10" is manually migrated from SLPR2 to SLPR1. CU 01 is allocated to SLPR1. Because volume "LDKC00:CU01:LDEV05" belonged to CU01 before the manual migration, there is no conflict. However, volume "LDKC00:CU02:LDEV10" will be allocated to CU01 after manual migration, and that CU number conflicts with the volume number.

If the CU number does not correspond with the volume number in the SLPR, an error does not occur, but this can make storage system administration more difficult, particularly when you need to perform a forced manual migration between the different SLPRs. For further information on the customized volume, please refer to the (see the *LUN Manager User's Guide*). For more information on Volume Migration, contact the Hitachi Data Systems Support Center (see Calling the Hitachi Data Systems Support Center).

<An example of forcibly performing Manual Migration of Volume Migration between SLPR1 and SLPR2>
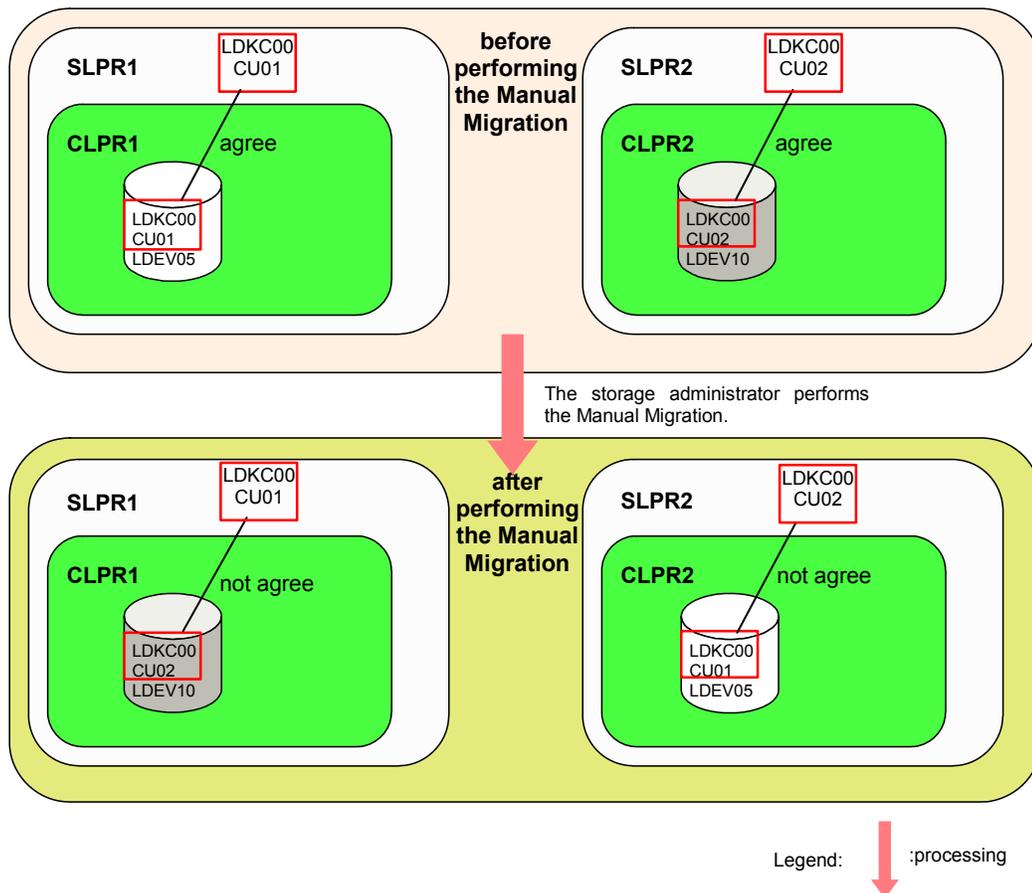
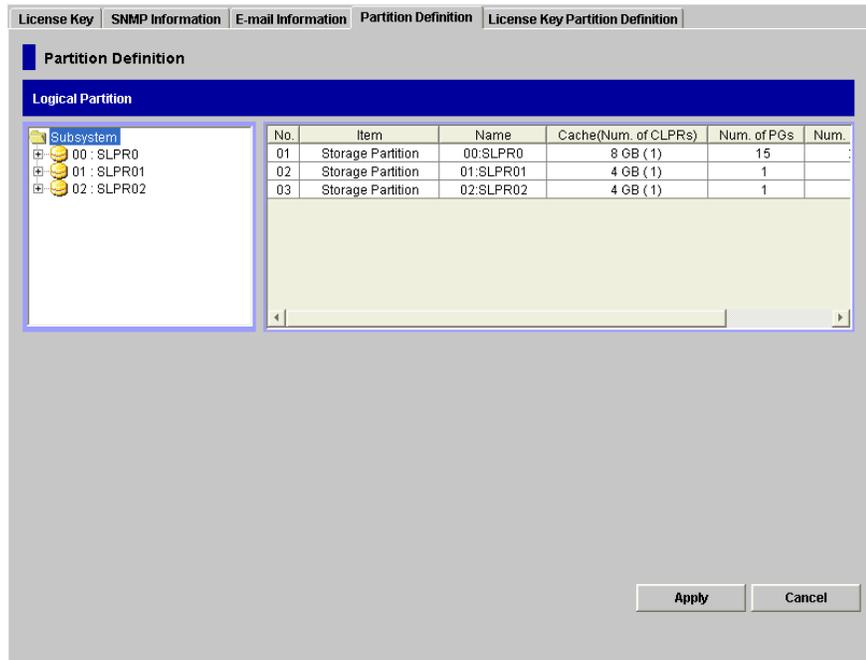**Figure 3-2   Manual Migration Between SLPRs**

4

Using the Virtual Partition Manager GUI

This chapter describes the windows that comprise the Virtual Partition Manager GUI.

☐ Logical Partition Window

☐ Storage Management Logical Partition Window

☐ Cache Logical Partition Window

☐ Select CU Dialog Box

☐ License Key Partition Definition Window

Logical Partition Window

To open the Partition Definition window, from the Storage Navigator main window click **Go**, then **Environmental Settings**. Select the **Partition Definition** tab, and then select a storage system in the Logical Partition tree. If you are logged on as a storage partition administrator, this window shows only the resources in that storage partition.
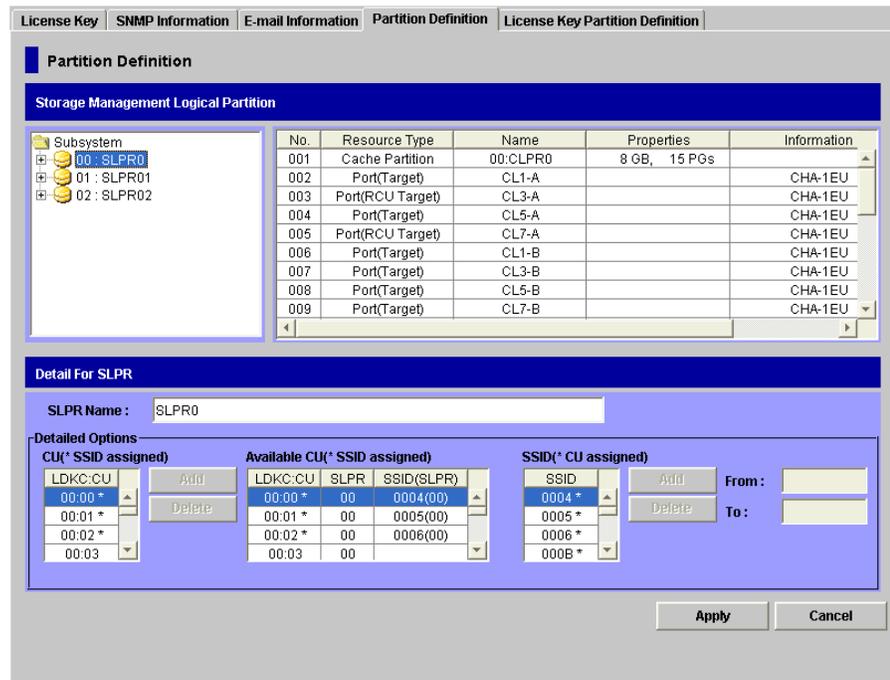

Figure 4-1   Logical Partition Window (Storage System Selected)

Item	Description
Partition Definition tree	The subsystem and all of its logical partitions. The name and number of the storage logical partition appear to the right of each SLPR icon.
Storage System resource list	Provides information about all of the logical partitions in the storage system that is selected in the Partition Definition tree. The list provides the following information. ▪ **No.:** The storage system resource list number. ▪ **Item:** The resource type (Storage Partition). ▪ **Name:** The storage logical partition numbers and names. ▪ **Cache (Num. of CLPRs):** The cache capacity and number of cache logical partitions. ▪ **Num. of PGs:** Number of parity groups. For SLPR 0, the amount is calculated by subtracting the number of parity groups of all other SLPRs from those of SLPR 0. ▪ **Num. of ports:** Number of ports. For SLPR 0, the amount is calculated by subtracting the number of ports of all other SLPRs from those of SLPR 0. ▪ The right-most column shows the status of the SLPR. When the SLPR is added, **Create** appears. When the SLPR is deleted, **Delete** appears.
Apply	Implements the settings that were made in this window.
Cancel	Cancels any settings that were made in this window.

Storage Management Logical Partition Window

The Storage Management Logical Partition window opens if you select a SLPR in the Partition Definition tree of the **Partition Definition** tab. If you are logged on as a storage partition administrator, this window shows only the resources in that storage partition.

Figure 4-2   Storage Management Logical Partition Window (SLPR Selected)

Item	Description
Partition Definition tree	The storage system and all of its logical partitions. The name and number of the storage logical partition number and name appear to the right of each SLPR icon. The cache logical partition number and name appear to the right of each CLPR icon.
Storage Logical Partition resource list	When a storage logical partition is selected in the Partition Definition tree, the Storage Logical Partition resource list shows resource information of the selected storage logical partition, that is, cache logical partitions and ports. If **SLPR 0** is selected in the Storage Logical Partition tree, this list shows all resources not specifically assigned to another SLPR. The list provides the following information: **No.:** The line number. **Resource Type:** The resource type, including Cache Partition or Port (type). **Name:** The resource name: If the resource type is **Cache Partition**, the CLPR number and name appear. If the resource type is **Port**, the port name appears. **Properties:** The capacity and number of parity groups allocated to the selected cache logical partition.

Item	Description
	▪ **Information:** If the resource is a port, this is the channel adapter name.
	▪ The right-most column shows the status of the SLPR resource (CLPR and port). When the CLPR is created or migrated from another SLPR, **Create** appears. When the CLPR is deleted or migrated to another SLPR, **Delete** appears. Nothing appears when the SLPR resource is a port.
Detail for SLPR	The settings of the selected storage logical partition. See Creating a Storage Logical Partition for more information on Storage Logical Partition operations.
	If the storage partition administrator wants to use the Virtual LVI/LUN function, the CU numbers and SSIDs must have previously been specified for each storage logical partition, so that newly allocated CU number(s) and SSID(s) do not overlap those in another storage logical partition. For more information on Virtual LVI/LUN, see the *Virtual LVI/LUN and Volume Shredder User's Guide*.
	▪ **SLPR Name:** The name of the storage logical partition, up to 32 alphanumeric characters. This field allows you to set or change the name of the storage logical partition, provided that it is within the selected CU.
	▪ **CU (* SSID assigned):** The LDKC and CU number of the specified SLPR (00 to FE). An asterisk (*) indicates that the SSIDs are assigned to the CU. To delete a CU from the specified SLPR, select that CU from this list and select **Delete** to return the CU to the Available CU list.
	▪ **Available CU (* SSID assigned):**
	LDKC:CU: the LDKC and CU numbers. An asterisk (*) indicates that the SSIDs are assigned to the CU.
	SLPR: The SLPR for that CU.
	SSID (SLPR): If the SSID is assigned to the CU, it appears here. The SLPR for that SSID appears to the right.
	▪ **SSID (* CU assigned):** The SSIDs in the selected storage logical partition (0004 to FFFE). An asterisk (*) indicates that the SSID is assigned to a CU. You can select up to 510 CUs that do not have SSIDs assigned and/or CUs that have SSIDs assigned.
	If a customized volume (CV) is set by using Virtual LVI/LUN, and the CU No. and SSID are registered to different storage logical partition, a dash (-) appears to the right of the SSID number. For more information on the VLL function, see *Virtual LVI/LUN User's Guide*.
	▪ **From:** The starting number of the SSID that is added (0004 to FFFE). This number must be smaller than the number that is input into the **To** field.
	▪ **To:** The ending number of the SSID that is added (0004 to FFFE). You may input up to 2040 SSIDs from SLPR 0.
	To add one or more SSID(s) to the SLPR, enter the starting number in **From** and the last number in **To**, then click **Add**. To delete an SSID from the SSID box, select that SSID and click **Delete**.
Apply	Implements the settings that were made in this window.
Cancel	Cancels any settings that were made in this window.

Cache Logical Partition Window

The Cache Management Logical Partition window (see Figure 4-3) opens if you select a CLPR in the Partition Definition tree of the **Partition Definition** tab. If you are logged on as a storage partition administrator, this window shows only the resources in that storage partition.

Figure 4-3   Cache Logical Partition Window (CLPR Selected)

> ⚠ **WARNING:** Before changing cache size or cache residency size, please verify that CLPR 0 has at least 4 GB remaining *after* subtracting cache residency size from the cache Size.

Item	Description
CU	Indicates either **All CUs** or the selected CU number.
Select CU	Opens the Select CU dialog box (see Figure 4-4).
Partition Definition tree	All of the storage logical partitions and cache logical partitions in the storage system. The storage logical partition number and name appear to the right of the each SLPR icon (🍯). The cache logical partition number and name appear to the right of the CLPR icon (🔲).
Cache Logical Partition resource list	When a CLPR is selected in the Partition Definition tree, the Cache Logical Partition resource list show the resource information for the selected CU and CLPR. If **CLPR 0** is selected in the Cache Logical Partition tree, this list shows all resources not already assigned to other partitions. The list provides the following information: ▪ **No.:** The row number. ▪ **Resource Type:** Type of resources of CLPR. Parity Group appears in this column. ▪ **Address:** Parity group address. An address beginning with E (e.g., E1-1) indicates that the parity group contains external volumes. An address beginning with M (e.g., M1-1) indicates that the parity group contains migration volumes. An address beginning with V (e.g., V1-1) indicates that the parity group contains Copy-on-Write Snapshot virtual volumes. An address beginning with X (e.g., X1-1) indicates that the parity group contains Dynamic Provisioning virtual volumes. ▪ **Properties:** If a parity group contains internal volumes, the parity group and RAID configuration are shown. If a parity group contains external volumes, the volume capacity is shown, but the RAID configuration is not shown. If a parity group contains virtual volumes (e.g., Copy-on-Write Snapshot or Dynamic Provisioning), the volume capacity is shown, but the RAID configuration is not shown. ▪ **Emulation:** Emulation type of the parity group.
Detail for CLPR in Subsystem	Allows you to set or change the settings of the specified cache logical partition. See Cache Logical Partition Operations for more information. You cannot directly change the capacity value of CLPR 0. Any changes in the capacity of the other CLPRs are reflected as an opposite change in the capacity of CLPR 0. The maximum available cache capacity (installed cache capacity less the cache assigned to other cache logical partitions) is shown for the upper limit of **Cache Size**, **Cache Residency Size**, and **Num. of Cache Residency Areas**. For more information on cache residency, see the *Cache Residency Manager User's Guide*. ▪ **CLPR Name:** Allows you to set or change the name of the cache logical partition, provided that it is within the selected CU. You can use up to 16 alphanumeric characters. ▪ **Cache Size:** As illustrated in Figure 4-3, allows you to set or change the cache capacity of each cache logical partition. You may select 4 GB or more up to a maximum size of 508 GB, which is 4 GB smaller than the cache size of the whole storage system. From a default value of 4 GB you may increase the size in 2 GB increments.**Cache Residency Size:** As illustrated in Figure 4-3, allows you to set or change the capacity of the Cache Residency cache. You may select nothing (0 GB) to a maximum size of 504 GB, which is the Cache Residency size of the entire storage system. The default value is 0 GB to which you may add capacity in 0.5 GB increments. If you have previously defined cache residency size for this cache logical partition using Cache Residency Manager, the cache residency size selected for this cache logical partition must be greater than that which was previously defined. Please use Cache Residency Manager to verify the size *before* you set the value for this field). ▪ **Num. of Cache Residency Areas:** Allows you to set or change the number of cache

Item	Description
	residency areas, from 0 to 16,384. The default value is zero (0).
	If you have previously defined cache residency areas for this cache logical partition using Cache Residency Manager, the number of cache residency areas selected for this cache logical partition must be more than that which was previously defined. Please use Cache Residency Manager to verify the number of areas *before* you set the value for this field.
Apply	Implements settings made in this window.
Cancel	Cancels any settings made in this window

Select CU Dialog Box

Open the Select CU Dialog box by clicking **Select CU** on the Cache Logical Partition Window ([Figure 4-3](#)).
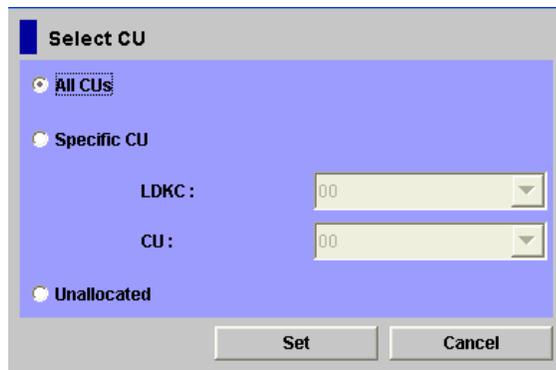
Figure 4-4   Select CU Dialog Box

Item	Description
All CUs	When selected, information about all CUs appears on the CLPR resource list.
Specific CU	When selected, information about only the specified CU appears on the CLPR resource list. ▪ Use the **LDKC** list to specify LDKC. ▪ Use the **CU** list to specify CU.
Unallocated	When selected, only the information about CUs unallocated to CLPR appears on the CLPR resource list.
Set	Implements settings made in this window.
Cancel	Cancels any settings made in this window.

License Key Partition Definition Window

The License Key Partition Definition window (see [Figure 4-5](#)) lists options that are available to storage logical partitions. From here, a storage administrator with the storage administrator role enabled can allocate license key capacity among various storage logical partitions. Each option must first be installed from the License Key window before its license capacity can be partitioned. For more information on installing options, see the *Storage Navigator User's Guide*.

To open the License Key Partition Definition window, from the Storage Navigator main window click **Go**, then **Environmental Settings**. Select the **License Key Partition Definition** tab.

Figure 4-5   License Key Partition Definition Window

The Product Name list, on the upper part of the window (see [Figure 4-6](#)), lists the program products for which the licensed capacity can be allocated to SLPRs.

Figure 4-6   Product Name List

Item	Description

Product Name	Name of the product, including:
	▪ Option name
	▪ Installed/Not Installed icon:
	
	   indicates Installed
	
	   indicates Not Installed

Key Type	The license type: **Permanent**, **Temporary**, **Emergency**, or **Not Installed**. Because all the SLPRs are available when the key type of the program product is Temporary or Emergency, you do not need to separate each SLPR. Therefore, no partition status information of the program product whose key type is Temporary or Emergency appears in the License Key Partition Definition window, so that you cannot partition the SLPR for that program product.
Permitted Volumes	Capacity information: ▪ Available capacity (licensed capacity). 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. ▪ Capacity that is already being used. For example, if this column shows **10.0 TB (2.50 TB)**, the licensed capacity is 10.0 TB and the capacity already being used is 2.50 TB. ▪ **Unlimited** appears if the size is unlimited.
Term (days)	The number of days that remain before temporary or emergency key expiration. After the temporary key has expired, this column shows the number of days that remain before you can re-install the temporary key.
Status	The option's current status: ▪ **Installed** indicates that the option is available. The **Product Name** column shows the **Installed** icon ( ). ▪ **Not Installed** indicates that the option is not available. The **Product Name** column shows the **Not Installed** icon ( ). ▪ **Not Enough** indicates that the volume capacity is insufficient. The **Product Name** column shows **Not Installed** icon ( ). ▪ **Capacity Insufficient** indicates that the licensed capacity is insufficient because disk drives have been added. The **Product Name** column shows the **Installed** icon ( ), but you must purchase additional licensed capacity before the License Key expires. ▪ **Expired** indicates that the license key of an option that had been in the Capacity Insufficient status has expired. The **Product Name** column shows the **Not Installed** icon( ). ▪ **Time Out** indicates that the term has already expired for the temporary key. The **Product Name** column shows the **Not Installed** icon ( ).

When you select an option, the capacity list, directly under the Product Name list, is updated (see Figure 4-7).

| Total Capacity | 60000 GB |
| Remaining Capacity | 60000 GB |

Figure 4-7   Capacity List

Item	Description
Total Capacity	Total licensed capacity for the selected option.
Remaining Capacity	The remaining licensed capacity (in GB) that is not yet allocated to any SLPR among the entire licensed capacity for the selected option.

After selecting an option, the **Partition Status List** and **Setting Box** appear underneath the information about the licensed capacity (see Figure 4-8, Figure 4-9, and Figure 4-10). This allows you to select and display information regarding a storage logical partition.

Partition Status	SLPR Name	Used Volumes	Status	Permitted Volumes
	SLPR0	106882 GB	Install	104400 GB
	SLPR01	0 GB	Install	99895600 GB

Figure 4-8   Partition Status List

The **Partition Status List** provides the following information for the selected option:

Item	Description
SLPR Name	Storage logical partition name.
Used Volume	Amount of licensed capacity currently being used.

Item	Description
Status	Volume status, which is determined by comparing allocated licensed capacity (**Permitted Volumes**) and used licensed capacity (**Used Volumes**):
	▪ **Installed:** License capacity for this option has been allocated to the SLPR. If the license capacity is limited, this indicates that the partitioned licensed capacity is allocated to the SLPR and the allocated licensed capacity is more than the capacity of **Used Volumes**. A storage partition administrator can use the option in the allocated SLPR.
	▪ **Not Installed:** No license and licensed capacity for the selected option are allocated to the SLPR.
	▪ **Capacity Insufficient:** Licensed capacity that is allocated to the SLPR (**Permitted Volumes**) is less than the currently used licensed capacity (**Used Volumes**). When a trial period still remains, the remaining number of days appears in parentheses.
Permitted Volumes	Allocated licensed capacity to SLPR in GB when the option without unlimited licensed capacity is selected. Blank when the option with unlimited licensed capacity is selected.

After selecting an option and a SLPR, if you select an option with an unlimited license capacity, or where the licensed capacity is not relevant, the **Setting** box looks like Figure 4-9:

Figure 4-9   Setting Box (Licensed Capacity Unlimited or Not Relevant)

Item	Description
Enable	Enables the license key for selected option.
Disable	Disables the license key for the selected option.

If you select an option with a limited license capacity, the **Setting** box looks like Figure 4-10. You may enter the licensed capacity to be allocated to the SLPR.

However, you cannot set the licensed capacity of SLPR0. If you select SLPR0, **Set** will be inactive.

Figure 4-10   Setting Box (License Capacity Limited)

Item	Description
Set	Selects the setting. The selected row of the option list and the **Partition Status** list change to blue bold italics, and the capacity shown in the **Remaining Capacity** field changes to the new capacity.
	Important: The setting is not implemented until you click **Apply**.
Apply	Implements the setting in the storage system.
Cancel	Cancels the setting.

5

Virtual Partition Manager Operations

This chapter provides detailed instructions for Virtual Partition Manager operations.

□ Storage Logical Partition Operations

□ Cache Logical Partition Operations

Storage Logical Partition Operations

Storage Logical Partition operations have the following requirements:

- You must have storage administrator access for all storage logical partition actions described in this section.

- If you have not yet created any storage logical partitions, all resources belong to SLPR 0.

- Mainframe volumes must be allocated to SLPR 0, and cannot be migrated. Mainframe operations must be performed by storage administrators.

- If you want to allocate a port to a SLPR other than SLPR 0, it must be a Target port.

- Before you create a customized volume (CV) in a storage logical partition using the Virtual LVI/LUN (VLL) function, you must allocate the CU numbers to that SLPR. This is necessary so that the storage partition administrator can allocate LDEVs to those CU numbers when creating a customized volume. For more information on the VLL function, see the *Virtual LVI/LUN and Volume Shredder User's Guide*.

- For instructions on creating storage partition administrators and granting write access to one or more products, see the *Storage Navigator User's Guide*.

Creating a Storage Logical Partition

To create storage logical partition:

4. From the Partition Definition window, right-click a storage system in the Partition Definition tree, then select **Create SLPR**. This adds a storage logical partition to the Partition Definition tree. In addition to the default SLPR 0, you can create up to 31 storage logical partitions, either at this point in the process or at a later time.

5. Select the SLPR that you want to define from the Partition Definition tree. This opens the Storage Management Logical Partition window.

6. In the **SLPR Name** field, type the name of the selected SLPR. You can use up to 32 alphanumeric characters.

7. In the **CU** field, type the CU number(s) for the selected SLPR (00-FE). An asterisk (*) indicates that the SSID is assigned to the CU:

   - To add a CU to the SLPR, select the CU from the **Available CU** list, then click **Add** to move that CU to the **CU** list. You can select up to 64 CUs, whether or not those CUs are defined as LDEVs.

   - To delete CU from the specified SLPR, select the CU from the **CU** list and click **Delete** to return that CU to the **Available CU** list.

8. Available SSIDs are in SLPR 0. In the **SSID** field, select an available SSID as follows:

   – In the **From:** field, input the starting number of the SSID (0004 to FFFE).

   – In the **To:** field, input the ending number of the SSID.

9. Click **Apply** to apply the settings, or select **Cancel** to cancel the settings.

At this point in the process, the newly created storage logical partition has no resources (e.g., cache logical partitions and ports). See Migrating Resources To and From Storage Logical Partitions for instructions on migrating resources. See Partitioning and Allocating Licensed Capacity to Storage Logical Partitions for instructions on adding and deleting resources.

Partitioning and Allocating Licensed Capacity to Storage Logical Partitions

You must already have created at least one SLPR in order to perform this operation.

> ⚠️ *Caution:* You will not be charged for using external volumes. To perform operations on external volumes, however, you need to set 0.1 TB or more license capacity and enable program products on SLPRs to which the external volumes are allocated.

To partition and allocate licensed capacity to storage logical partitions:

1. Log on as a storage administrator with write authority for Virtual Partition Manager and open the **Storage Navigator** main window. Change to **Modify** mode

2. On the menu bar, Click **Go**, **Environmental Settings,** and then **License Key Partition Definition** to open the License Key Partition window (refer to Figure 4-5).

3. Select an option in the **Product Name** list. The **Partition Status** and **Setting** boxes appear at the bottom of the window. In the **Partition Status** box, select a storage logical partition.

4. If license capacity for that option is limited, type in the desired license capacity for this option (see Figure 5-1).

   However, you cannot set the licensed capacity of SLPR0.

5. If the licensed capacity for that option is unlimited, select **Enable** in the **Setting** box (see Figure 5-2).

6. Select **Set**. The new setting appears in the **Remaining Capacity** and **Partition Status** boxes

7. Make additional settings, if desired, using above instructions.

8. Click **Apply** to implement the settings, or select **Cancel**.

Setting	0 GB >>	00 GB	Set
		Apply	Cancel
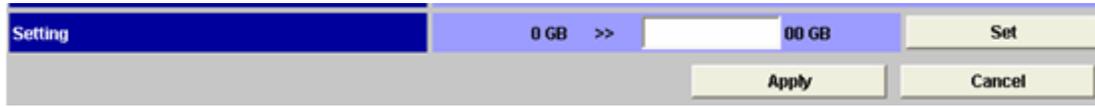
Figure 5-1   Selecting the License Capacity (License Capacity Limited)

Setting	⦿ Enable ○ Disable	Set

Figure 5-2   Selecting Enable (License Capacity Unlimited)

Migrating Resources To and From Storage Logical Partitions

The resources of a storage logical partition include cache logical partitions and ports, which can be migrated to another storage logical partition as needed. This process has the following restrictions:

- You can migrate resources only within the same LDKC.

- The only ports that can be migrated are Target ports. Initiator ports, RCU Target ports and External ports cannot be migrated, and must remain in SLPR 0.

- Mainframe parity groups cannot be migrated out of SLPR 0.

To migrate one or more resources:

1. Open the Partition Definition window, and select a SLPR in the Partition Definition tree to open the Storage Management Logical Partition window.

2. From the Storage Logical Partition Resource List, select one or more cache logical partition(s) and/or target port(s) to be migrated. Right-click, then select **Cut**. SLPRs from other CUs are unavailable.

3. On the Partition Definition tree, select the SLPR to which you want to migrate resources. SLPRs from other CUs are unavailable.

4. Right-click to display, then select **Paste CLPRs, Ports**. You can select up to 31 CLPRs (not including CLPR 0) and 256 ports. A colored icon (😄) and black characters indicate available destination SLPRs.

5. Cache logical partitions are added to both the Partition Definition tree and the Storage Management Logical Partition resource list. Ports are added only to the SLPR resource list.

6. Click **Apply** to apply the settings.

Deleting a Storage Logical Partition

If you delete a storage logical partition, any resources in that storage logical partition are automatically returned to SLPR 0. SLPR 0 cannot be deleted.

Before deleting a storage logical partition, you must do the following:

- Delete all user accounts for that SLPR. For more information, see the *Storage Navigator User's Guide*.

- Either set the license capacity for that SLPR to 0 GB, or disable the license for all program products that are assigned to the SLPR. For more information, see Partitioning and Allocating Licensed Capacity to Storage Logical Partitions.

To delete a storage logical partition

1. Open the Partition Definition window, and select a SLPR in the Partition Definition tree to open the Storage Management Logical Partition window.

2. In the logical partition tree, right-click the storage logical partition that you want to delete and select **Delete SLPR**.

3. Click **Apply** to apply the settings.

Cache Logical Partition Operations

⚠️ **WARNINGS:**
- Before reconfiguring a partition, make sure that you have enough cache memory assigned to a partition to support the disk storage assigned to that same partition. See Cache Logical Partition (CLPR) for more information on the amount of cache required to support disk storage.
- As a general rule, you should perform cache logical partition operations either during the initial installation and setup or during a maintenance window, because cache logical partition operations can significantly degrade host performance. If you must perform such operations on a production machine, you should use Performance Monitor to verify that the write pending rate, including spikes, is well below 30%. For more information on Performance Monitor, see the *Performance Manager User's Guide*.
- Changes to CLPR/SLPR configurations may take hours to implement and can not be aborted or modified until all changes have completed. For assistance or for more information, contact your Hitachi Data Systems account team.

You can have up to four CLPRs, including the default CLPR 0, without a separate license key. If you want to have more than four CLPRs, you will need a license key.

Cache logical partition operations have the following restrictions:

- You must have storage administrator access for all cache logical partition actions.

- If you have not yet created any cache logical partitions, all cache belongs to CLPR 0.

- Adding or changing CLPR definitions can require several hours or more.

- If you are using Universal Replicator, data and journal volumes can belong to different CLPRs, but the journal volumes in the same journal group must belong to the same CLPR. For more information on Universal Replicator, see the *Universal Replicator User's Guide* and the *Universal Replicator for IBM z/OS User's Guide*.

The following operations are not recommended with cache logical partition:

- Creating LUSE volumes across multiple CLPRs. If you forcibly perform this operation and create a LUSE across multiple CLPRs, the LUSE volumes cannot be used for TrueCopy or the TrueCopy for IBM z/OS pair volumes.

- ShadowImage Quick Restore operations that affect multiple CLPRs.
- Volume Migration manual migration operations that affect multiple CLPRs.
- TrueCopy Asynchronous or TrueCopy for IBM z/OS Asynchronous operations across CLPR boundaries. If these are allocated to the same consistency group, you cannot create a TrueCopy Asynchronous pair, and you cannot migrate a TrueCopy Asynchronous parity group to another CLPR.
- A parity group that contains LDEVs assigned to Cache Residency cache extents cannot be migrated to another CLPR.

Creating a Cache Logical Partition

When creating a CLPR, the remaining cache size, which is calculated by subtracting cache residency size from the cache size of CLPR 0, needs to be 8 GB or more.

To create a cache logical partition:

1. Open the Partition Definition window, and select a SLPR in the Partition Definition tree to open the Storage Logical Partition window.

2. Right-click a SLPR from the Partition Definition tree and select **Create CLPR**. This adds a cache logical partition to the Partition Definition tree. The maximum number of CLPRs that can be manually created is 31 (not including CLPR 0).

3. Select the newly created CLPR to open the Cache Logical Partition window.

4. In the Detail for CLPR section, do the following:

   – In **CLPR Name**, type the name of the cache logical partition, in up to 16 alphanumeric characters.

   – In **Cache Size**, select the cache capacity. You may select from 4 to 508 GB, in 2 GB increments. The default value is 4 GB. The size of the cache is allocated from CLPR 0, but you must leave at least 8 GB remaining in CLPR 0.

   – In **Cache Residency Area**, type the desired capacity for the cache residency area. The range of values is 0 to 16384 and the default value is 0.

5. Click **Apply** to apply the settings. The change in cache capacity is reflected in this cache logical partition and in CLPR 0.

6. If you want to change the settings of an existing CLPR, repeat steps 3 through 5.

At this point, the cache logical partition has no parity groups. See Migrating Resources To and From Cache Logical Partitions for more information on migrating resources to and from cache logical partitions.

Migrating Resources To and From Cache Logical Partitions

When migrating resources to and from cache logical partitions, the following rules apply:

- You can migrate resources only within the same CU.

- All concatenated parity groups must be in the same CLPR.

- LUSE volumes cannot be set across more than one CLPR.

- If a parity group contains one or more LDEVs that have defined cache residency extents, you cannot migrate that parity group to another CLPR.

To migrate one or more parity groups to another cache logical partition:

1. Access the Storage Management Logical Partition window, then select a CLPR from the Partition Definition tree. This opens the Cache Logical Partition window.

2. If you want to choose a CU, click **Select CU** to open the Select CU dialog box (see Figure 5-3). Within that dialog box, do one of the following:
   - Select **All CU** to show the information about all CUs on the CLPR resource list.
   - Select **Specific CU**, then specify the LDKC and the CU. This shows only CLPRs from the selected CU.
   - Select **Unallocated** to show the information about only the CUs unallocated to CLPR on the CLPR resource list.

3. Click **Set** to close the dialog box.

4. From the Cache Logical Partition Resource List, select one or more parity groups to be migrated, then select **Cut**.

5. On the Partition Definition tree, select the CLPR to which you want to migrate resources, then right-click and select **Paste**.

6. Click **Apply** to apply the settings.
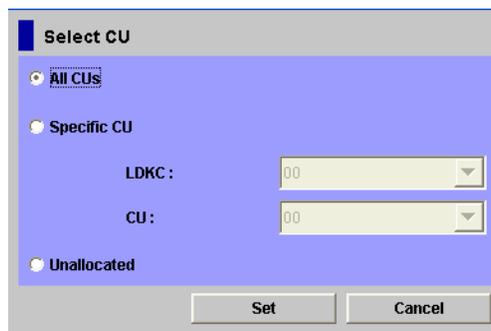
Figure 5-3   Selecting the CU

Item	Description
All CUs	Displays the information of all CUs in the CLPR resource list.
Specific CU	Displays the information of specified CU in the CLPR resource list. ▪ The LDKC dropdown list allows you to select the LDKC. ▪ The CU dropdown list allows you to select the CU.
Unallocated	Displays the information of the unallocated CUs in the CLPR list.
Set	Implements the setting in the storage system.
Cancel	Cancels the setting.

Deleting Cache Logical Partitions

Before you delete a cache logical partition, be sure to migrate any resources (e.g., parity groups) to another CLPR. The CLPRs which are not necessary may be deleted, but CLPR 0 cannot be deleted. To delete a cache logical partition:

1. Select a CLPR in the Partition Definition tree to open the Cache Logical Partition window.

2. Right-click the CLPR that you want to delete and select **Delete CLPR**.

3. Click **Apply** to apply the settings.

6

Troubleshooting

This chapter describes some troubleshooting methods if you have problems with Virtual Partition Manager.

□ General Troubleshooting

□ Displaying an Error Message

□ Troubleshooting Virtual Partition Manager

□ Calling the Hitachi Data Systems Support Center

General Troubleshooting

- For troubleshooting information on the USP V/VM storage system, see the *Hitachi USP V/VM User and Reference Guide*.

- For troubleshooting information on the Storage Navigator software, see the *Storage Navigator User's Guide*.

- For information on the Storage Navigator software error codes, see the *Storage Navigator Messages*.

Displaying an Error Message

To display an error message:

1. Right-click an SLPR on the Partition Definition tree, then select **Error Detail** to open the Message dialog box.

2. Click **OK** to close the message window.

Troubleshooting Virtual Partition Manager

Table 6-1 provides general troubleshooting instructions for Virtual Partition Manager operations.

Table 6-1   General Troubleshooting for Virtual Partition Manager Operations

Error	Cause
All Virtual Partition Manager functions are not available.	Only Storage administrators have access to Virtual Partition Manager functions.
The specified port cannot be migrated to another storage logical partition.	▪ Only Target ports on the same channel adapter can be migrated to another storage logical partition. Initiator ports, RCU Target ports and External ports cannot be migrated. ▪ Resources can only be migrated within the same CU.
A parity group cannot be migrated.	▪ Only open-system parity groups can be migrated. ▪ Resources can only be migrated within the same CU.
When you attempt to migrate a parity group to a CLPR in another SLPR, an LU warning message appears.	▪ LUs in parity groups must remain within the same SLPR.
When you attempt to migrate a CLPR to another SLPR or deleted that CLPR, an LU warning message appears.	▪ LUs in parity groups must remain within the same SLPR.
When you attempt to migrate a port to another SLPR, an LU warning message appears.	LUs that are associated with a port in a particular SLPR must stay within that SLPR.

Error	Cause
When you attempt to migrate a parity group to another CLPR, an LU warning message appears.	LUSE volumes cannot be set across more than one CLPR.
When the port in an SLPR migrates to another SLPR, a warning message appears.	You are trying to allocate ports in a port block in High Speed mode to more than one SLPR. Check the port settings and make sure that all ports in the port block belong to the same SLPR.
The SLPR name cannot be changed.	You cannot assign the same name to more than one SLPR. The name you entered is already being used. Enter another name.
The CLPR name cannot be changed.	You cannot assign the same name to more than one CLPR. The name you entered is already being used or is reserved by a system. Enter another name.
The parity group in a CLPR cannot migrate to another CLPR.	▪ Make sure that all concatenated parity groups belong to the same CLPR. ▪ Make sure to click **Apply** when creating a new CLPR.

Calling the Hitachi Data Systems Support Center

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

- The circumstances surrounding the error or failure.
- The exact content of any error messages displayed on the host system(s).
- The exact content of any error messages displayed by Storage Navigator.
- The Storage Navigator configuration information (use the FD Dump Tool).
- The service information messages (SIMs), including reference codes and severity levels, displayed by Storage Navigator.

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

CCI	Command Control Interface
CLPR	cache logical partition
CU	control unit
CV	customized volume
GB	gigabyte (see Convention for Storage Capacity Values)
host group	Used to segregate hosts by operating system platform. Also known as a host storage domain.
KB	kilobyte (see Convention for Storage Capacity Values)
LAN	local-area network
LDEV	logical device
LDKC	logical disk controller
LCP	local control port
LU	logical unit
LUN	logical unit number
LUSE	LUN Expansion
LVI	logical volume image
MB/s	megabytes per second
MB	megabyte (see Convention for Storage Capacity Values)
NAS	network-attached storage
NVS	non-volatile storage
PB	petabyte (see Convention for Storage Capacity Values)
PCB	printed circuit board
RAID	redundant array of independent disks
RCU	remote control unit
SAN	storage-area network
SIM	service information message
SLPR	storage logical partition
SOM	system option mode
SSID	storage system ID
SVP	service processor

TB	terabyte (see Convention for Storage Capacity Values)
USP V	Universal Storage Platform V
USP VM	Universal Storage Platform VM
VLL	Virtual LVI/LUN
VPM	Virtual Partition Manager
V-VOL	virtual volume
WWN	world wide name
z/OS	IBM z/OS operating system

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MK-96RD629-11