



Hitachi Universal Storage Platform V Hitachi Universal Storage Platform VM

Hitachi Compatible PAV for IBM[®] z/OS[®] User's Guide
(Including Hyper PAV)

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Acronyms and Abbreviations



Preface

This user's guide describes and provides instructions for using the Compatible PAV Storage Navigator software to configure and perform Compatible PAV operations on the Hitachi Universal Storage Platform V and Hitachi Universal Storage Platform VM.

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](#)
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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 system and has read the *Hitachi Universal Storage Platform V and Hitachi Universal Storage Platform VM User and Reference Guide*.
- The user is familiar with the Storage Navigator software for the Hitachi Universal Storage Platform V and Hitachi Universal Storage Platform VM and has read the *Storage Navigator User's Guide*.
- The user 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 USP V/VM microcode 60-07-5x or later.

Document Revision Level

Revision	Date	Description
MK-96RD608-P	February 2007	Preliminary Release
MK-96RD608-00	April 2007	Initial Release, supersedes and replaces MK-96RD608-P
MK-96RD608-01	May 2007	MK-96RD608-01 supersedes and replaces MK-96RD608-00
MK-96RD608-02	September 2007	MK-96RD608-02 supersedes and replaces MK-96RD608-01
MK-96RD608-03	November 2007	MK-96RD608-03 supersedes and replaces MK-96RD608-02
MK-96RD608-04	January 2008	MK-96RD608-04 supersedes and replaces MK-96RD608-03
MK-96RD608-05	March 2008	MK-96RD608-05 supersedes and replaces MK-96RD608-04
MK-96RD608-06	March 2008	MK-96RD608-06 supersedes and replaces MK-96RD608-05
MK-96RD608-07	May 2008	MK-96RD608-07 supersedes and replaces MK-96RD608-06
MK-96RD608-08	August 2008	MK-96RD608-08 supersedes and replaces MK-96RD608-07
MK-96RD608-09	November 2008	MK-96RD608-09 supersedes and replaces MK-96RD608-08
MK-96RD608-10	November 2009	MK-96RD608-10 supersedes and replaces MK-96RD608-09
MK-96RD608-11	July 2010	MK-96RD608-11 supersedes and replaces MK-96RD608-10
MK-96RD608-12	December 2010	MK-96RD608-12 supersedes and replaces MK-96RD608-11

Source Documents for this Revision

- MK-96RD608-12a

Changes in this Revision

- Added a warning about possible degradation in host performance associated with assigning aliases to more than one CU at the same time ([Assigning Aliases](#)).

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 Compatible PAV	This chapter provides an overview of how Compatible PAV operates and interacts with other Hitachi software.
About Compatible PAV Operations	This chapter describes how to operate and use Compatible PAV.
Preparing for Compatible PAV Operations	This chapter describes the necessary preparations to use Compatible PAV with your system.
Performing Compatible PAV Operations	This chapter describes Compatible PAV operations.
Monitoring Compatible PAV Activities	This chapter describes the methods for monitoring Compatible PAV activities on the USP V/VM
Troubleshooting	This chapter provides troubleshooting information and customer support contact information.
Appendix A - Using HCD to Define and View Logical Control Unit and Compatible PAV Devices	This appendix describes how to use HCD to define and view Logical Control Units and compatible PAV devices.
Appendix B - Checking the WLM PAV Settings	This appendix provides information how to check the WLM PAV Settings on your system.
Appendix C – Using Compatible Hyper PAV	This appendix provides information and instruction on using Compatible Hyper PAV.
Acronyms and Abbreviations	Defines the acronyms and abbreviations used in this document.

Referenced Documents

Hitachi Universal Storage Platform V/VM:

- *Command Control Interface (CCI) User and Reference Guide*, MK-90RD011
- *LUN Manager User's Guide*, MK-96RD615
- *User and Reference Guide*, MK-96RD635
- *Storage Navigator User's Guide*, MK-96RD621

IBM publications:

- *DFSMS/MVS® Software Support for IBM Enterprise Storage Server*, SC26-7318
- *Enterprise Storage Server Performance Monitoring and Tuning*, SG24-5656
- *System/390® Command Reference 2105 Models E10, E20, F10, F20*, SC26-7298
- *OS/390® MVS Planning: Workload Management*, GC28-1761
- *IBM HCD Planning*, GC28-1750
- *IBM HCD Users Guide*, SC28-1848





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 .
<i>Italic</i>	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: <i>copy 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 ora d b
< > 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 (for example, logical device capacity) are calculated based on the following values:

- 1 KB = 1,024 (2¹⁰) bytes
- 1 MB = 1,024 KB or 1,024² bytes
- 1 GB = 1,024 MB or 1,024³ bytes
- 1 TB = 1,024 GB or 1,024⁴ bytes
- 1 PB = 1,024 TB or 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 content of any error message(s) displayed on the host system(s).
- The content of any error message(s) displayed on the Storage Navigator.
- Any 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

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.)

Overview of Compatible PAV

This chapter provides an overview of how Compatible PAV operates and the interactions it has with other Hitachi software.

Compatible PAV has the following two capabilities:

- Compatible PAV feature
- Compatible Hyper PAV feature

The Compatible PAV feature itself has two unique capabilities as shown next:

- Static Compatible PAV
- Dynamic Compatible PAV

In this manual, Compatible PAV and Compatible Hyper PAV are collectively referred to as "Compatible PAV", unless otherwise noted.

- [About Compatible PAV Feature](#)
- [About Compatible Hyper PAV Feature](#)

About Compatible PAV Feature

The Compatible PAV feature enables a single zSeries® and S/390® host system to issue multiple I/O requests in parallel to individual logical devices (LDEVs) in the Hitachi Universal Storage Platform V and Hitachi Universal Storage Platform VM (hereinafter referred to as USP V/VM) subsystem. When Compatible PAV is not used, the host system can start only one I/O request to a device at a time, and must wait for the I/O to complete before starting another I/O request to the same device. Compatible PAV enables the host system to start multiple I/O requests to the same device at the same time via alias addresses assigned to a device. When Compatible PAV is used, the zSeries and S/390 host computer has substantially faster access to the data stored in the USP V/VM.

The two types of devices used in Compatible PAV operations are base devices and alias devices. The base devices are the installed devices which contain user data. The alias devices are installed but unused devices whose addresses can be used as aliases for the base devices. The USP V/VM supports up to 256 devices per logical control unit (CU), including base and alias devices, for a maximum of 130,560 device addresses per subsystem.

The licensed Compatible PAV software on the Storage Navigator computer allows you to configure Compatible PAV devices on the USP V/VM (i.e., assign aliases to base devices, cancel aliases). The Storage Navigator computer is attached to and communicates directly with the USP V/VM(s) via the USP V/VM internal local area network (LAN). For further information on the Storage Navigator computer, see the *Storage Navigator User's Guide*.

The Workload Manager (WLM) host software function enables the zSeries and S/390 host to utilize the Compatible PAV feature of the USP V/VM. The WLM compatibility mode provides static Compatible PAV feature, and WLM goal mode provides dynamic Compatible PAV feature. The USP V/VM supports both static and dynamic Compatible PAV. When static Compatible PAV is used, the number of aliases assigned to each base device does not change. For dynamic Compatible PAV, the number of aliases assigned to a base device can change depending on the number of host I/O requests to that device. See section Static and Dynamic Compatible PAV Operations for further information on static and dynamic Compatible PAV.

For further information on the zSeries and S/390 PAV host software feature, please refer to the following IBM® documents:

- *DFSMS/MVS Software Support for IBM Enterprise Storage Server* (SC26-7318)
- *IBM Enterprise Storage Server Performance Monitoring and Tuning* (SG24-5656)
- *System/390 Command Reference 2105 Models E10, E20, F10, F20* (SC26-7298)

The use of Compatible PAV, the Compatible PAV software, and all Hitachi products is governed by the terms of your license agreement(s) with Hitachi, Ltd.

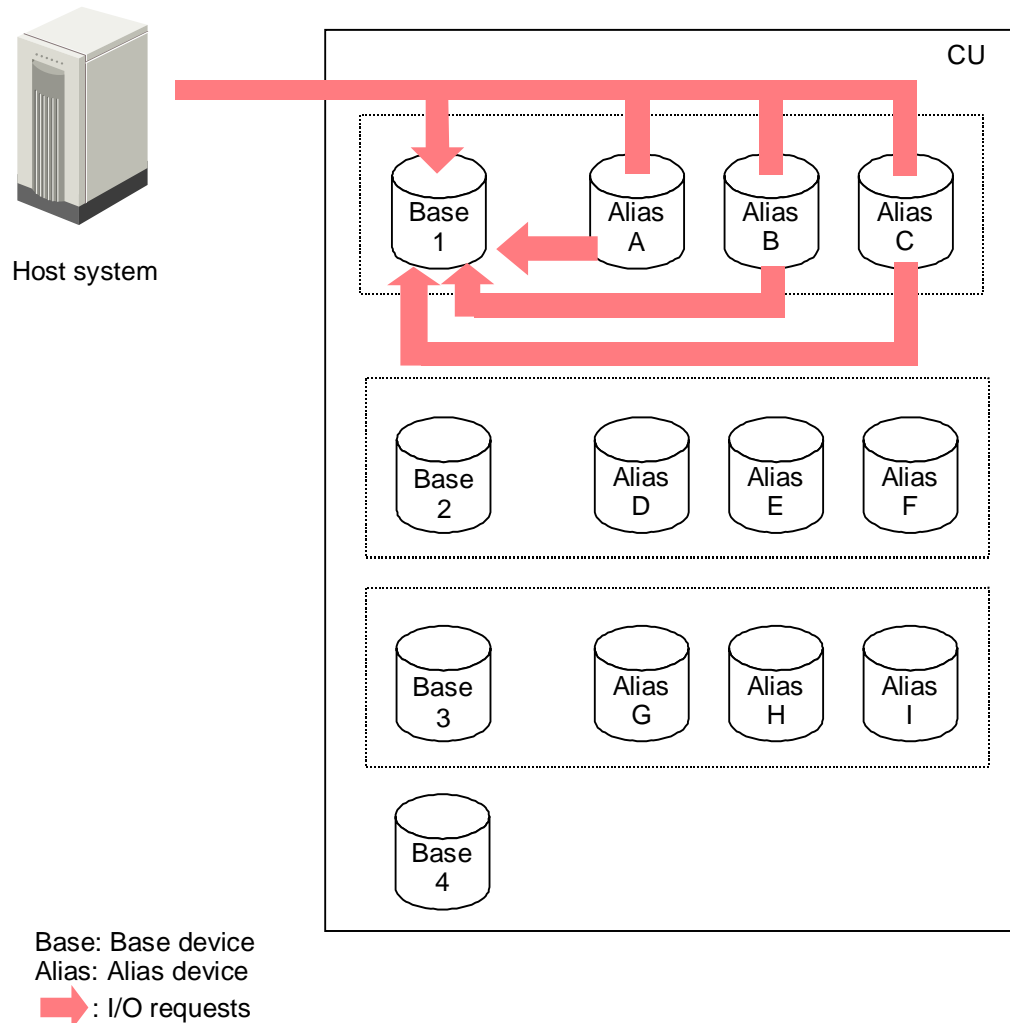


Figure 1-1 Flow of I/O Requests Using Compatible PAV

When using Compatible PAV, alias devices must be assigned in advance to each base device before they can be used. In Figure 1-1, the alias devices A, B and C are assigned to the base device 1, the alias devices D, E and F are assigned to the base device 2, and the alias devices G, H and I are assigned to the base device 3 within a CU.

In Figure 1-1, I/O requests converge on base device 1 when a host computer accesses it using Compatible PAV. Because alias devices were assigned to device 1 in advance, I/O requests are automatically issued to alias devices A, B or C. Similarly, if a host computer accesses base devices 2 or 3, those I/O requests will also automatically be issued to alias devices assigned in advance.

In Figure 1-1, when I/O requests are issued using Compatible PAV, base device 4 cannot use any alias devices because no devices were assigned to it.

About the Compatible Hyper PAV Feature

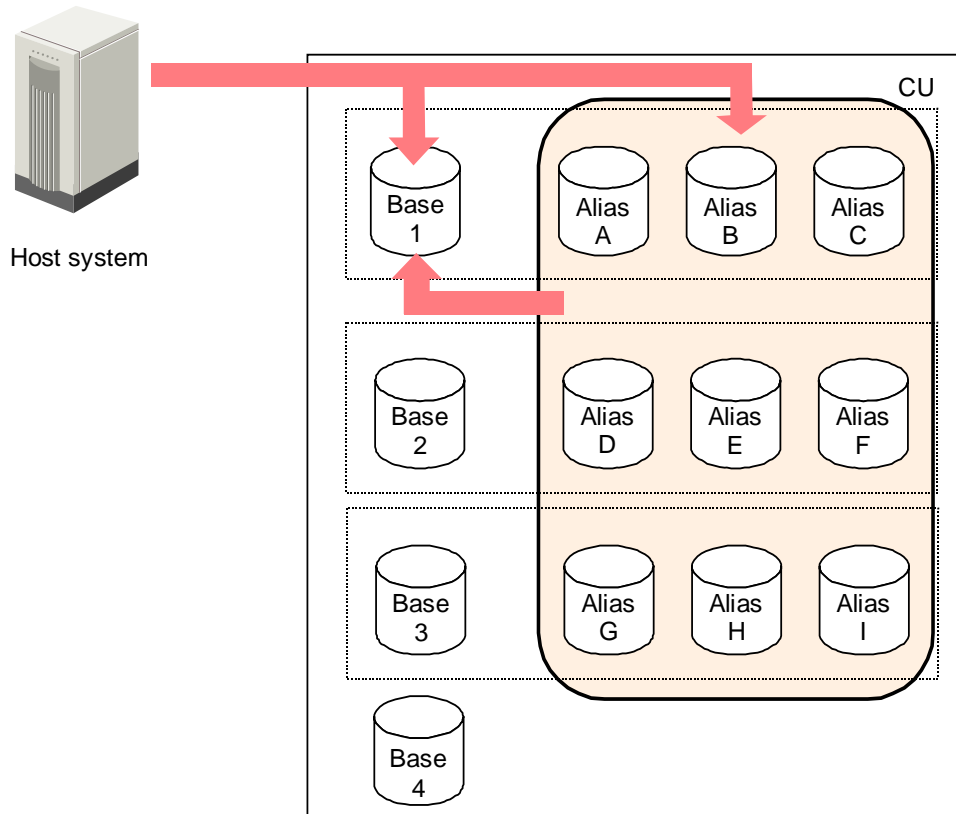
The Compatible Hyper PAV feature evolved from the static Compatible PAV and the dynamic Compatible PAV features.

If you use Compatible Hyper PAV, alias devices that are assigned to any base device are shared with all base devices in the same CU. Thus, the number of alias devices assigned to each base device by Compatible Hyper PAV does not need to change, as it does if you use Dynamic Compatible PAV. This feature allows more devices to be assigned to a base device than possible when using Compatible PAV because you can reduce the quantity of devices that are assigned to an alias device.

You can specify the type of PAV (Compatible PAV or Compatible Hyper PAV) to use for each host computer. Therefore, an alias device may accept both I/O requests that are issued when you use the Compatible PAV and Compatible Hyper PAV.

The Compatible Hyper PAV feature using the z/OS host computer is supported by microcode version 60-02-4x or later, and the feature using the z/VM host computer is supported by microcode version 60-03-2x or later.

When you use z/VM, you must use z/OS as a guest OS on z/VM.



Base: Base device
 Alias: Alias device
 → : I/O requests
 □ : Alias devices can be used by any base devices in the CU

Figure 1-2 Flow of I/O Requests Using Compatible Hyper PAV

Figure 1-2 illustrates that alias devices A, B and C are assigned to base device 1. Alias devices D, E and F are shown assigned to base device 2 and alias devices G, H and I are shown assigned to base device 3 within a CU. When using Compatible Hyper PAV, all alias devices assigned in advance to base devices 1, 2 or 3 perform as alias devices for all base devices in the same CU.

For example, If I/O requests come from a host computer to base device 1 using Compatible Hyper PAV, they are automatically issued to the alias devices in the same CU. For Compatible Hyper PAV, the rule is that all alias devices assigned to any base devices in this CU are used as alias devices for any base device in the CU. If a host computer accesses similarly to the base device 2 or 3, I/O requests will be also issued to all alias devices in this CU automatically.

Unlike the example illustrated in Figure 1-1, base device 4 in this CU is also able to use all alias devices in this CU, even though no alias devices were assigned to it in advance.

About Compatible PAV Operations

This chapter describes how to operate and use Compatible PAV:

- [Components](#)
- [Static and Dynamic Compatible PAV Operations](#)
- [Considerations for Storage Subsystem Sharing Across Multiple Systems](#)
- [Maximizing Your Results Using Compatible PAV](#)

Components

The components involved in Compatible PAV operations are:

- Base devices and alias devices on the USP V/VM
- Controller emulation type for the USP V/VM
- Compatible PAV software enabled on the USP V/VM and on the Storage Navigator computer
- HCD definitions for the USP V/VM
- WLM host software definitions
- Enabling Compatible Hyper PAV

Base Devices and Alias Devices

The USP V/VM supports a maximum of 65,280 logical devices (LDEVs), up to 256 LDEVs per logical control unit (CU) image and up to 255 CU images. The number of LDEVs per parity group depends on the hard disk drive (HDD) type, RAID level, and device emulation type (e.g., 3390-3R, OPEN-9) of the parity group. Each LDEV is uniquely identified by its LDEV ID, which consists of the Logical Disk Control Unit (LDKC) number (00, 01), logical CU image number (00, 01, 02...FE) and device number (00-FF hexadecimal) (e.g., x01:00:0F = device 0F on CU image 00 in LDKC).

The host recognizes that one LDKC is one device having up to 65,280 LDEVs. The disk subsystem provides the LDKC serial number for the host recognizing the device per LDKC. The USP V/VM supports only LDKC number 00 currently.

LDEVs which are formatted as zSeries and S/390 devices (e.g., 3390, 3380) are called logical volume images (LVIs) or volumes. LDEVs formatted as open-system devices (e.g., OPEN-3, OPEN-9) are called logical units (LUs). Compatible PAV operations can only be performed on 3390 or 3380 LVIs.

The two device types for Compatible PAV operations are:

- **Base device – 3390B or 3380B:** A base device is an LDEV that is currently used within a formatted LVI which contains user data. A base device must be defined to the host as a 3390B or 3380B device type (e.g., 3390B-3, 3390B-9).



Caution: You cannot use as a base device any device that has been used: as a journal volume of Universal Replicator for z/OS, as a system disk, or as a migration volume .

- **Alias device – 3390A or 3380A:** An alias device is a formatted but unused logical device whose LDEV ID (address) can be used as an alias for a base device. Alias devices cannot be varied online. Each alias must be within the same logical CU image as the base device to which it is assigned. An alias device must be defined to the host as a 3390A or 3380A device type (e.g., 3390A-3, 3390A-9).

The 3390A and 3390B devices are not related to the 3390-3A/B/C multiplatform devices. Also, the 3380A and 3380B devices are not related to the 3380-3A/B/C multiplatform devices.

Controller Emulation Type

You must use either the IBM **2105** or **2107** controller emulation type for Compatible PAV operations. Each logical CU image on the USP V/VM which contains Compatible PAV base and alias devices must be set for 2105 or 2107 controller emulation. If you use Compatible Hyper PAV, only the 2107 controller emulation type is available.

If you want to configure copy devices and Compatible PAV devices under the same logical CU image, please see Table 3-1 for important information and instructions. Copy devices include TrueCopy™ for z/OS, Universal Replicator for z/OS, PPRC, XRC, and Concurrent Copy (CC) devices.

Compatible PAV Software and License Key

The Compatible PAV software enables you to configure the devices on USP V/VM storage systems attached to the Storage Navigator computer.

Before you can use Compatible Hyper PAV, you must acquire licenses for both Compatible PAV and Compatible Hyper PAV.

The Compatible PAV software displays the LDEVs in use as well as the unassigned LDEV IDs which are available for use as aliases. You can then use the Compatible PAV and Compatible Hyper PAV software to assign aliases to base devices and cancel aliases.

The Storage Navigator computer is attached to and communicates directly with the USP V/VM(s) via the USP V/VM internal LAN. For further information on the Storage Navigator computer, see the *Storage Navigator User's Guide*.

The Compatible PAV software will not function in a USP V/VM storage system which does not have the Compatible PAV option enabled on the subsystem. When enabling the Compatible PAV option, you must have the license key.

HCD Definitions for the Compatible PAV Devices

The Compatible PAV base and alias devices on the USP V/VM must be defined to the host system using hardware configuration definitions (HCD). The USP V/VM base devices must be either 3390B or 3380B devices (for example, 3390B-3), and the USP V/VM alias devices must be either 3390A or 3380A devices (for example, 3390A-3). The required controller emulation for each CU image which contains any Compatible PAV devices is 2105 or 2107. However, only 2107 controller emulation is available when using Compatible Hyper PAV. Appendix A provides sample instructions on using HCD to define a Compatible PAV device.

The 3390A and 3390B devices are not related to the 3390-3A/B/C multiplatform devices. Also, the 3380A and 3380B devices are not related to the 3380-3A/B/C multiplatform devices.

For further information on defining Compatible PAV devices to the zSeries and S/390 host, please refer to the following and other IBM documents:

- *IBM HCD Planning* (GC28-1750)
- *IBM HCD Users Guide* (SC28-1848)

Compatible PAV operations require that one SSID be set for each set of 256 LDEVs.

WLM Host Software Definitions

The Workload Manager (WLM) software component of the MVS/ESA[®], z/OS[®], or OS/390 operating systems enable the host to interface with the Compatible PAV of the USP V/VM. The WLM compatibility mode provides static Compatible PAV, and WLM goal mode provides dynamic Compatible PAV. The WLM feature must be in GOAL mode to support the Dynamic Alias Management functionality of the Compatible PAV software.

Support for Dynamic Alias Management by the WLM depends on the following three parameter settings:

- The WLM Goal Mode setting
- The WLM Dynamic Alias Management setting in the Service Coefficients/Service Definitions window (see Figure B-4 in Appendix B)
- The WLMPAV setting of each base device as defined in the "Define Device Parameters / Features" HCD definition window (see Figure A-15 in Appendix A).

For further information on configuring RAID storage subsystems and disk devices for zSeries and S/390 PAV operations, please refer to the following and other IBM documents:

- *DFSMS/MVS Software Support for IBM Enterprise Storage Server* (SC26-7318)
- *IBM Enterprise Storage Server Performance Monitoring and Tuning* (SG24-5656)
- *System/390 Command Reference 2105 Models E10, E20, F10, F20* (SC26-7298)
- *OS/390 MVS Planning: Workload Management* (GC28-1761)

Enabling Compatible Hyper PAV

Enable Compatible Hyper PAV using the system console of your host computer.

Static and Dynamic Compatible PAV Operations

Static or dynamic Compatible PAV operation is determined by the combination of the following parameter settings:

- The 'WLMPAV=xxx' parameter setting for each device defined to the z/OS and OS/390 host via HCD. The default setting of this parameter is 'WLMPAV=YES' for 3390B or 3390A, 3380B or 3380A devices defined via HCD.
- The 'Dynamic Alias Support' parameter setting for WLM.
- Static Compatible PAV operation is implemented when the WLM feature for 'Dynamic Alias Support' is set to NO and the appropriate aliases are assigned to the base devices using the Compatible PAV software. The setting of the 'WLMPAV=xxx' parameter defined for each 3390B or 3390A, 3380B or 3380A device is ignored. In addition, the 'I/O Priority Management' setting for WLM is ignored (see Table 2-1).
- Dynamic Compatible PAV is implemented when 'Dynamic Alias Support' is set to 'YES' and the appropriate aliases are assigned to the base devices using the Compatible PAV software. The setting of the 'WLMPAV=xxx' parameter defined for each 3390B or 3390A, 3380B or 3380A device must be set to 'YES' if WLM is to manage the alias device address assignments. In addition, the 'I/O Priority Management' setting for WLM determines the dynamic alias algorithm to be used for meeting the Performance Index of the workloads under the control of WLM using the Compatible PAV feature (see Table 2-1).

When 'Dynamic Alias Support' is enabled, the alias-to-base assignments are managed by the WLM component of the z/OS and OS/390 system as needed in response to changes in I/O activity.

Table 2-1 HCD Settings for Static and Dynamic Compatible PAV

Dynamic Alias Support	I/O Priority Management	Dynamic Alias Algorithm in Effect
NO	NO	None (i.e., static Compatible PAV only)
NO	YES	None (i.e., static Compatible PAV only)
YES	NO	Efficiency only
YES	YES	Both efficiency and goal

Static Compatible PAV

When static Compatible PAV is used, the number of aliases specified for each base device does not change, even when the number of I/O requests to each device changes. When dynamic Compatible PAV is used, the number of aliases for each base device is likely to change as the number of I/O requests changes.

Figure 2-1 shows an example of static Compatible PAV operations. Each of the three base devices (x10, x11, x12) has two aliases assigned. If I/O requests converge on base device x10 (shown by the large arrow), the number of aliases for each base device remains unchanged.

If you will be using static Compatible PAV, you need to determine on which devices I/O requests are likely to converge, and then assign more aliases to those base devices. If not, Compatible PAV might not be able to provide much improvement in host access to data in the USP V/VM.

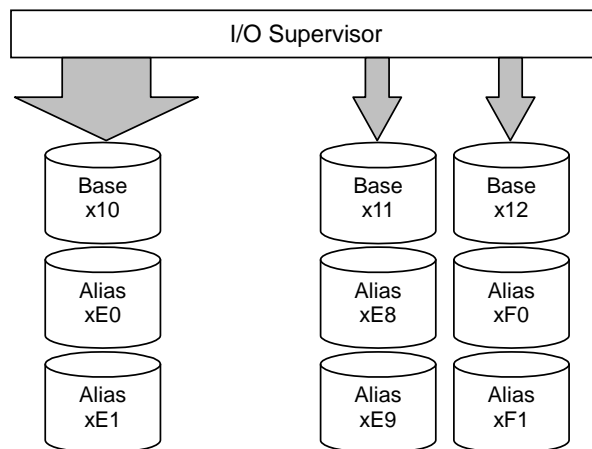


Figure 2-1 Static Compatible PAV

Dynamic Compatible PAV

When dynamic Compatible PAV is used, the number of aliases for a base device may change as the number of I/O requests to the device changes. If I/O requests converge on several base devices, the number of aliases for these devices may increase, while the number of aliases for other base devices may decrease. Dynamic Compatible PAV operations can balance workloads on base devices and optimize the speed for accessing data in the USP V/VM.

Figure 2-2 shows an example of dynamic Compatible PAV operations. Each of the three base devices (x10, x11, x12) was originally assigned two aliases. In this example, as I/O requests converge on base device x10 (indicated by the large arrow), the number of aliases for device x10 increases to four, while the number of aliases for base device x11 and x12 decreases to one.

Dynamic Compatible PAV operations require the WLM software function provided by the host computer.

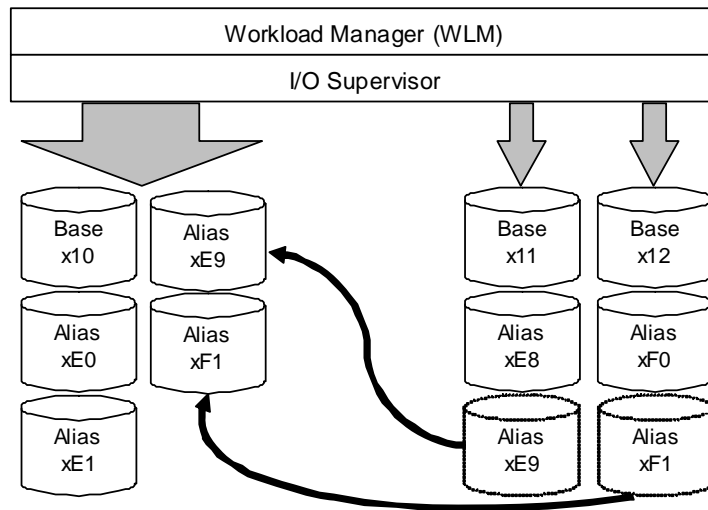


Figure 2-2 Dynamic Compatible PAV

Considerations for Storage Subsystem Sharing Across Multiple Systems

A USP V/VM that is installed with Compatible PAV can be shared across multiple sharing systems, subject to the following considerations:

- When Compatible PAV is used in static mode, any number of sharing systems can be connected.
- Each system will use Compatible PAV in static mode. All alias assignments to base addresses will remain static and not change. Each sharing system can be a different sysplex or monoplex configuration.
- When Compatible PAV is used in a Dynamic Alias Management mode, the following considerations apply:
 - Only one sysplex should be running in Dynamic Alias Management mode. This sysplex will control the alias movement across the storage subsystem.
 - Other connected systems (or sysplexes) must be run with 'Dynamic Alias Management' set to NO or with 'WLMPAV=NO' defined for all base and alias addresses on the shared storage subsystem.
 - Avoid sharing a USP V/VM with Compatible PAV across multiple sysplexes when each sysplex is running with 'Dynamic Alias Management' set to 'YES'. Doing so causes increased unsynchronized alias transition movement in the USP V/VM and may lead to unpredictable response-time issues.

For further information, please refer to *IBM APAR OW39854 - Enterprise Storage Server with Parallel Access Volume Feature*.

Maximizing Your Results Using Compatible PAV

To maximize your results from Compatible PAV operations, please be aware of the following:

- For Compatible PAV
 - The best results can be obtained if the number of aliases per CU image is equal to the number of available channel paths minus one. If the number of aliases is specified this way, I/O operations can use all channel paths, thus providing the best results.
 - Compatible PAV may not produce good results when many channel paths are used. If all channel paths are used, good Compatible PAV results cannot be expected.
 - The unused device addresses in the USP V/VM are used as alias devices. If you use most of the unused device addresses for aliases, you will only have a small amount of free devices available. If you determine that a large number of aliases will be required, please consider adding more disks to ensure that storage will be available when needed.
 - Compatible PAV may not provide good results for devices that are always shared and used by multiple host systems. For access by multiple hosts, you should use the Multiple Allegiance (MA) host software function supported by the USP V/VM.
 - Up to 255 alias devices can be assigned to one base device. In this case, however, the desired effect will not be achieved because I/O conflict can occur with the base device and the alias devices, therefore the devices may be unable to receive the I/Os.

For dynamic Compatible PAV

- If dynamic Compatible PAV can be used in all systems, good results can be expected if you assign eight to sixteen (8-16) aliases to each CU image.

For static Compatible PAV

- The recommended ratio of base devices to alias devices is 1:3. Table 2-2 shows examples of calculating the number of base and alias devices for a CU image with 256 devices. If you know the types of jobs and/or the expected host access rates for the base devices, you should determine the number of aliases for each base device to meet your requirements for each base device.

Table 2-2 Ratio of Base Devices to Alias Devices

Ratio (base devices : alias devices)	Number of Base Devices	Number of Alias Devices	Total Devices
1:3 (recommended)	64	192	256 (64+192)
1:2	85	171 (85+86)	256 (85+171)
1:1	128	128	256 (128+128)

- For Compatible Hyper PAV
 - When using Compatible Hyper PAV, assign eight to sixteen (8-16) aliases to each CU image for best performance. Based on your system, determine the quantity of aliases required for best performance: not too many so that I/O is impacted or so few that their usefulness is limited.
 - During assignment of aliases to base devices in Storage Navigator, do not assign more than three aliases to a single base device address.
 - The number of alias devices assigned to each base device should be kept as equal as possible. For example, a CU with 10 aliases could have three aliases each assigned to the first to third base addresses, one alias to the fourth base address, and no alias assignments to the remaining base addresses or you could assign one alias to each of the 10 addresses, as needed.

Preparing for Compatible PAV Operations

This chapter describes the necessary preparations to use Compatible PAV with your system. If you use Compatible Hyper PAV, please refer to [Using Compatible Hyper PAV](#).

- [System Requirements](#)
- [Preparing the USP V/VM for Compatible PAV Operations](#)
- [Preparing the Host System for Compatible PAV Operations](#)

System Requirements

Compatible PAV operations involve the volumes on the USP V/VM(s) and require the following licensed versions:

- Compatible PAV
- Workload Manager (WLM)
- Compatible Hyper PAV. (This license is not required if only Compatible PAV operations are needed.)

The system requirements for Compatible PAV are as follows:

- Host software:
 - **For static Compatible PAV:**
 - OS/390 V1R3 (DFSMS/DSF 1.3) with Program Temporary Fix (PTF) or later
 - VM/ESA 2.4.0 or later
 - **For dynamic Compatible PAV:**
 - OS/390 V2R7 (DFSMS/DSF 1.5) with PTF or later
 - z/VM5.2 with PTF or later
 - **For Compatible Hyper PAV:**
 - z/OS 1.8 or later
 - z/OS 1.6 with PTF or later
 - z/VM5.3 or later
 - **PTFs:** All customers planning the installation of the Compatible PAV feature on a USP V/VM are encouraged to obtain the Preventive Service Planning (PSP Bucket) document from IBM for the 2105 or 2107 device. The title of this PSP document is *2105MVSESA*, and this IBM document can be obtained via IBMLINK.

The PSP document identifies all current IBM PTF items applicable for z/OS and OS/390 support of the 2105 or 2107 device type. The USP V/VM does not have any specific PTF requirements beyond what is required by the z/OS and OS/390 operating system to provide minimum support for the 2105 or 2107 device type.

When you use z/VM, you must use z/OS as a guest OS on z/VM.

For further information on the z/OS and OS/390 PAV host software function, please refer to the following and other IBM documents:

- *DFSMS/MVS Software Support for IBM Enterprise Storage Server* (SC26-7318)
- *IBM Enterprise Storage Server Performance Monitoring and Tuning* (SG24-5656)
- *System/390 Command Reference 2105 Models E10, E20, F10, F20* (SC26-7298)
- *OS/390 MVS Planning: Workload Management* (GC28-1761)

- USP V/VM(s): The emulation type for a CU image which controls Compatible PAV devices must be 2105 or 2107.
If you use Compatible Hyper PAV, only 2107 controller emulation type is available.
- IOCP definition considerations: If you maintain separate IOCP definitions files and create your SCDS or IOCDS manually by running the IZP IOCP program, the following definition rules apply:
 - Each LCU on a USP V/VM is defined using one CNTLUNIT statement in IOCP. The unit type can be 2105 or 2107 (only 2107 is available if you use Compatible Hyper PAV). Up to 16 LCUs can be defined on a USP V/VM. An LCU is identified by its 'Control Unit Address' ('CUADDR=x' parameter) and is specified as a hexadecimal number in the range of '0' to 'F'. An LCU is the same as an IBM Logical Sub-System or LSS. While it is possible to have an LCU on a USP V/VM defined using multiple CNTLUNIT statements in IOCP, the resulting input deck cannot be migrated to HCD due to an IBM restriction to allow only one CNTLUNIT definition.
 - Up to 256 devices may be defined on each LCU. Base device addresses are identified as unit type 3390B or 3380B. Alias device addresses are identified as 3390A or 3380A.
- HCD definition considerations: If you use HCD exclusively to define I/O definitions to z/OS and OS/390 and to automatically run the IOCP program to create SCDS or IOCDS, the following definition rules apply:
 - Each LCU on a USP V/VM is defined as a 2105 or 2107 control unit (only 2107 is available if you use Compatible Hyper PAV).
 - Base devices are defined as 3390B or 3380B device types. HCD will only allow you to connect base devices to one control unit. Base device optional parameter definitions in HCD include the 'WLMPAV=xxx' parameter. The default setting is 'YES'.
 - Alias devices are defined as 3390A or 3380A device types. HCD will only allow you to connect alias devices to one control unit. Alias devices have only one optional parameter definition in HCD. The 'WLMPAV=xxx' parameter defaults to 'YES'.

Administrator access to the Storage Navigator computer is required to perform Compatible PAV operations. Users lacking administrator access can only view Compatible PAV information.

The WLMPAV parameter value is not relevant when using Compatible Hyper PAV.

- Storage Navigator computer:

The Storage Navigator computer must be installed and attached to the USP V/VM(s) via the USP V/VM internal LAN.

The Compatible PAV options must be enabled on the Storage Navigator computer. To use Compatible Hyper PAV, both the Compatible PAV software and the Compatible Hyper PAV software must be enabled on the Storage Navigator computer. For information on how to install the Compatible PAV and Compatible Hyper PAV software, please refer to the *Storage Navigator User's Guide*.

Use the Compatible PAV window to can check the used and available capacity for the Compatible PAV base volume. The used capacity is the sum of capacity of the volumes which meet either or both of the following conditions:

- The base volume to which alias volumes are or were assigned by using Storage Navigator.
- The base volume which alias volumes access or accessed by using dynamic Compatible PAV or Compatible Hyper PAV.

The base volume that is recognized as the object for calculation of used capacity is not be calculated as used capacity if all the assigned aliases in the corresponding CU are cancelled, or the volumes are uninstalled by using LVI/LUN (VLL) or Universal Volume Manager.

Table 3-1 lists the requirements and restrictions for Compatible PAV operations on the USP V/VM. The requirements and restrictions vary depending on Storage Navigator whether you use Compatible PAV or Compatible Hyper PAV. If you use both Compatible PAV and Compatible Hyper PAV, the requirements and restrictions for using Compatible Hyper PAV apply.

Table 3-1 Requirements and Restrictions for Compatible PAV

Item	Requirement and/or Restriction	
	Compatible PAV	Compatible Hyper PAV
Controller emulation type	I-2105, I-2107	I-2107
Device emulation type for base device	3380-3 3390-3, 3390-3R, 3390-9, 3390-L, 3390-M Cross-OS File Exchange devices listed below are not supported. 3380-3A, 3380-3B, 3380-3C 3390-3A, 3390-3B, 3390-3C 3390-9A, 3390-9B, 3390-9C 3390-LA, 3390-LB, 3390-LC 3390-MA, 3390-MB, 3390-MC	3380-3 3390-3, 3390-9, 3390-L, 3390-M
Channel interface	ESCON, FICON	FICON
Storage subsystem ID (SSID) setting	One SSID must be set for each set of 256 LDEVs.	

Item	Requirement and/or Restriction	
	Compatible PAV	Compatible Hyper PAV
Maximum number of aliases that can be assigned to a base device	255	
Alias device	Alias device and its base device must belong to same logical CU image.	
Functions that can be used concurrently	Virtual LVI Cache Residency Manager z/OS® Volume Security Volume Migration TrueCopy for z/OS® ShadowImage for z/OS® Universal Replicator for z/OS® Concurrent Copy (CC) with restrictions (see Caution below this table) Extended Remote Copy (XRC) with restrictions (see Caution below) PPRC Control Unit Initiated Reconfiguration (CUIR) Cautions: <ul style="list-style-type: none"> ▪ For information about Volume Migration, contact the Hitachi Data Systems Support Center. See Calling the Support Center. ▪ You cannot use as a base device any device that has been used: as a journal volume of Universal Replicator for z/OS, as a system disk, or as a migration volume . ▪ Please refer to the <i>TrueCopy for z/OS® User and Reference Guide</i> for important information on GDPS support for 2105 or 2107 emulation. 	
Functions that cannot be used concurrently	Cross-OS File Exchange Open Volume Management Cache Residency Manager LUN Manager ShadowImage TrueCopy Universal Replicator Caution: The devices used by the functions above can coexist in the same storage system with the devices used by the Compatible PAV or Compatible Hyper PAV. However, the devices used by Cross-OS File Exchange cannot coexist in the same CU with the devices used by the Compatible PAV or Compatible Hyper PAV. Use the devices in the different CUs for each function.	



Caution: The following restrictions apply if CC and/or XRC is used with Compatible PAV:

- Ensure that the emulation type of all LCUs is either 2105 or 2107. For CC and XRC, 2105 or 2107 emulation cannot be intermixed with other emulation types within the same subsystem. Only 2107 controller emulation is available when you use Compatible Hyper PAV.
- If CC and/or XRC volumes already exist, you must change to 2105 or 2107 emulation as follows. You must change to 2107 controller emulation when you use Compatible Hyper PAV:
 - Stop all Concurrent Copy jobs, and delete all XRC pairs.
 - Change the CU emulation type of all CHA packages to 2105 or 2107.
 - Restart Concurrent Copy jobs, and re-establish XRC pairs.

Preparing the USP V/VM for Compatible PAV Operations

Configuring your Storage Navigator Computer

To be able to perform Compatible PAV operations, a WWW client computer must be connected via a LAN to the USP V/VM. The WWW client computer requires a Storage Navigator program downloaded to the computer. The WWW client computer also requires appropriate browser settings. For more detailed instructions, see the *Storage Navigator User's Guide*.

Changing the Controller Emulation Type

For Compatible PAV operations the USP V/VM must have channel adapter (CHA) packages for which the 2105 or 2107 emulation type is specified. If you use Compatible Hyper PAV, only 2107 emulation type is available. Please ask your Hitachi representative to verify that the correct CHA packages are installed.

The Hitachi representative can check and change the controller emulation type in any one of the following ways:

- Add CHA packages, and set the emulation type of these packages to 2105 (I-2105) or 2107 (I-2107).
- Use the System Tuning function on the SVP to change the emulation type to 2105 or 2107, and power off and then power on the USP V/VM.



Caution: For CC and XRC operations, the 2105 or 2107 emulation type cannot be intermixed with other emulation types within the same subsystem. If your USP V/VM is already performing CC and/or XRC operations, see Table 3-1 for instructions on implementing Compatible PAV with these functions on the same subsystem.

Enabling the Compatible PAV Option

You must set the controller emulation to 2105 or 2107 before you can enable the Compatible PAV options (only 2107 is available if you use Compatible Hyper PAV). You need to enable Compatible PAV option to perform Compatible PAV operations. If you want to use Compatible Hyper PAV, you need to enable both the Compatible PAV and Compatible Hyper PAV program options.

To enable the Compatible PAV options:

1. Log on as administrator to the USP V/VM SVP. The Storage Navigator Java application will be downloaded to your WWW client computer. For more detailed instructions, see the *Storage Navigator User's Guide*.

2. Use Storage Navigator to enable the Compatible PAV option (and Compatible Hyper PAV option). License key(s) are required when enabling these options. For more detailed instructions, see the *Storage Navigator User's Guide*.
3. Repeat step (1) to (2) for each USP V/VM on which you will perform Compatible PAV operations.

Disabling Compatible PAV

For information on disabling the Compatible PAV options, see the *Storage Navigator User's Guide*.



Caution: Before disabling the Compatible PAV options, you must cancel all aliases.

Starting the Compatible PAV Software

This section describes how to start the Compatible PAV software:

To start the Compatible PAV software:

1. Log on to the SVP to open the Storage Navigator main window. For details, see *Storage Navigator User's Guide*.
To be able to assign or cancel alias devices, 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 will be able to view device settings but will neither be able to assign new aliases nor change alias settings.
2. Click **Go** and then **Mainframe Connection** on the menu bar of the Storage Navigator *main window*.
3. Ensure that the Compatible PAV menu is displayed (refer to Figure 4-2).

Discontinuing Compatible PAV Operations

For information on discontinuing the Compatible PAV option, see the *Storage Navigator User's Guide*.



Caution: Before discontinuing the Compatible PAV option, you must cancel all aliases.

Preparing the Host System for Compatible PAV Operations

This section provides a brief description of the required preparations at the host system for Compatible PAV operations on the USP V/VM. For more detailed information, please refer to the documentation for MVS. Before performing Compatible PAV operations, you must:

- Set the desired WLM operation mode on the host system
- Change the Hyper PAV setting on the host system
- Set the MIH timer value on the host system.

Setting the WLM Operation Mode

WLM manages workloads on MVS systems and has two operation modes for static and dynamic Compatible PAV:

- **Goal mode:** If you want to use dynamic Compatible PAV, you must set the WLM operation mode to goal mode. In goal mode, WLM can assign more or fewer aliases to a base device depending on the host I/O activity to that device, thereby managing the system to meet the performance goal specified before system operations began.
- **Compatibility mode:** If you want to use static Compatible PAV, you must set the WLM operation mode to compatibility mode. In compatibility mode, the number of aliases assigned to each base device does not change as a result of changes in host I/O activity. WLM manages the system according to the parameters in the IPS and ICS (IEAIPSxx, IEAICSxx).

For further information on WLM operation modes, please refer to IBM document *OS/390 MVS Planning: Workload Management (GC28-1761)*.

When you use Compatible Hyper PAV, you do not need to set the WLM operation modes.

Changing the Hyper PAV Setting

To use Compatible Hyper PAV, you must enable Hyper PAV on the host computer. The procedure for enabling Hyper PAV depends on whether Compatible Hyper PAV is used from z/OS or from z/OS used as a guest OS on z/VM. This section describes each procedure.

This section uses the following symbols and typefaces to explain each command operation:

- *Italics*: Indicates a type of an input value. Arbitrary values can be used.
- - (hyphen): Specifies a range of settings (for example, 8101-81FF).

For details about the OS commands, refer to IBM document *OS/390 MVS System Commands* (GC28-1781). If you intend to specify a mini-disk DASD on z/VM, consult your Hitachi representative before doing so.

- Using Compatible Hyper PAV from z/OS

To enable Hyper PAV, issue this command from the host system console:
SETIOS HYPERPAV=YES

You can define SETIOS command for each LPAR (Logical Partitioning).
Figure 3-1 shows the setting result of enabling Compatible Hyper PAV.

```
SETIOS HYPERPAV=YES
IOS189I HYPERPAV MODE CHANGE INITIATED - CONTROL UNIT CONVERSION WILL
COMPLETE ASYNCHRONOUSLY
```

Figure 3-1 Setting Result (Enabling Hyper PAV on z/OS)

To disable Hyper PAV, enter "SETIOS HYPERPAV=NO".

- Using Compatible Hyper PAV from z/OS used as the guest OS on z/VM
You have to enable Hyper PAV on z/VM first, and then also on z/OS.

To enable Hyper PAV:

1. Issue the following command from the system console of z/OS which is used as a guest OS on z/VM to all base devices in the corresponding CU to make those base devices offline:

```
V base-device-number1 - base-device-number2,OFFLINE
```

2. Issue the following commands from the system console of z/VM to all alias devices that are used for Compatible Hyper PAV in the corresponding CU to enable Hyper PAV.

```
DET alias-device-number1 - alias-device-number2
VARY OFFLINE alias-device-number1 - alias-device-number2
SET CU HYPERPAV ssid1 - ssid2
VARY ONLINE alias-device-number1 - alias-device-number2
ATT alias-device-number1 - alias-device-number2*
```

An asterisk (*) is required at the end of the ATT command.

3. Enable Hyper PAV on z/OS (see information about using Compatible Hyper PAV from z/OS)
4. Issue the following command from the system console of z/OS to all base devices in the corresponding CU to make those base devices online:

```
V base-device-number1 - base-device-number2,ONLINE
```

The following figures show the setting results of enabling Compatible Hyper PAV.

```
V base-device-number1 - base-device-number2,OFFLINE
UNIT TYPE STATUS
```

Figure 3-2 Setting Result (Setting base devices in z/OS offline)

```
DET alias-device-number1 - alias-device-number2
alias-device-number1 - alias-device-number2 DETACHED

VARY OFFLINE alias-device-number1 - alias-device-number2
VARIED OFFLINE

SET CU HYPERPAV ssid1 - ssid2
Command Complete

VARY ONLINE alias-device-number1 - alias-device-number2
VARIED ONLINE
ATT alias-device-number1 - alias-device-number2*
alias-device-number1 - alias-device-number2 ATTACHED
```

Figure 3-3 Setting Result (Enabling Hyper PAV on z/VM)

```
SETIOS HYPERPAV=YES
IOS189I HYPERPAV MODE CHANGE INITIATED - CONTROL UNIT CONVERSION WILL
COMPLETE ASYNCHRONOUSLY
```

Figure 3-4 Setting Result (Enabling Hyper PAV on z/OS)

```
V base-device-number1 - base-device-number2,ONLINE
UNIT TYPE STATUS
```

Figure 3-5 Setting Result (Setting base devices in z/OS online)

To disable Hyper PAV, you must disable Hyper PAV on z/VM first, and then on z/OS used as the guest OS on z/VM.

To disable Hyper PAV on z/VM, enter "SET CU PAV *ssid1* - *ssid2*" instead of "SET CU HYPERPAV *ssid1* - *ssid2*".

Setting the MIH Timer Value

The recommended MIH timer value for Compatible PAV operations is **30 seconds**. The MIH timer values can be set in MVS/ESA, z/OS, or OS/390 either at IPL or after IPL.

To set the MIH timer value:

1. **At IPL** – Use the MIH parameter in the IECIOSxx parmlib member to set the MIH timer value at IPL time. For the complete syntax of this parameter, please refer to IBM document SC28-1752, *OS/390 MVS Initialization and Tuning Reference*.
2. **After IPL** – Use the “SETIOS” System Command after IPL to change or set the MIH timer value. For the complete syntax of this command, please refer to IBM document OS/390 *MVS System Commands* (GC28-1781).

Performing Compatible PAV Operations

This chapter describes Compatible PAV operations. After you have prepared for Compatible PAV operations, you are ready to start performing Compatible PAV operations on the USP V/VM.

Compatible PAV operations include:

- [Using the Compatible PAV Window](#)
- [Assigning, Canceling, and Migrating Aliases](#)
- [Considerations for Defining the Devices to the Host System](#)

Using the Compatible PAV Window

This section describes the various components of the Compatible PAV window, which is accessed through Storage Navigator. For general information on Storage Navigator, see the *Storage Navigator User's Guide*.

The Compatible PAV window (see Figure 4-1) displays the Compatible PAV information for the connected USP V/VM and provides access to all Compatible PAV operations. To access the Compatible PAV window, connect to a USP V/VM, select the **Mainframe Connection** menu in the Storage Navigator main window, and then select the **Compatible PAV** tab.

To access the most recently updated information following any calculations or operations, click **File** and then **Refresh** on the menu bar of the Storage Navigator main window.

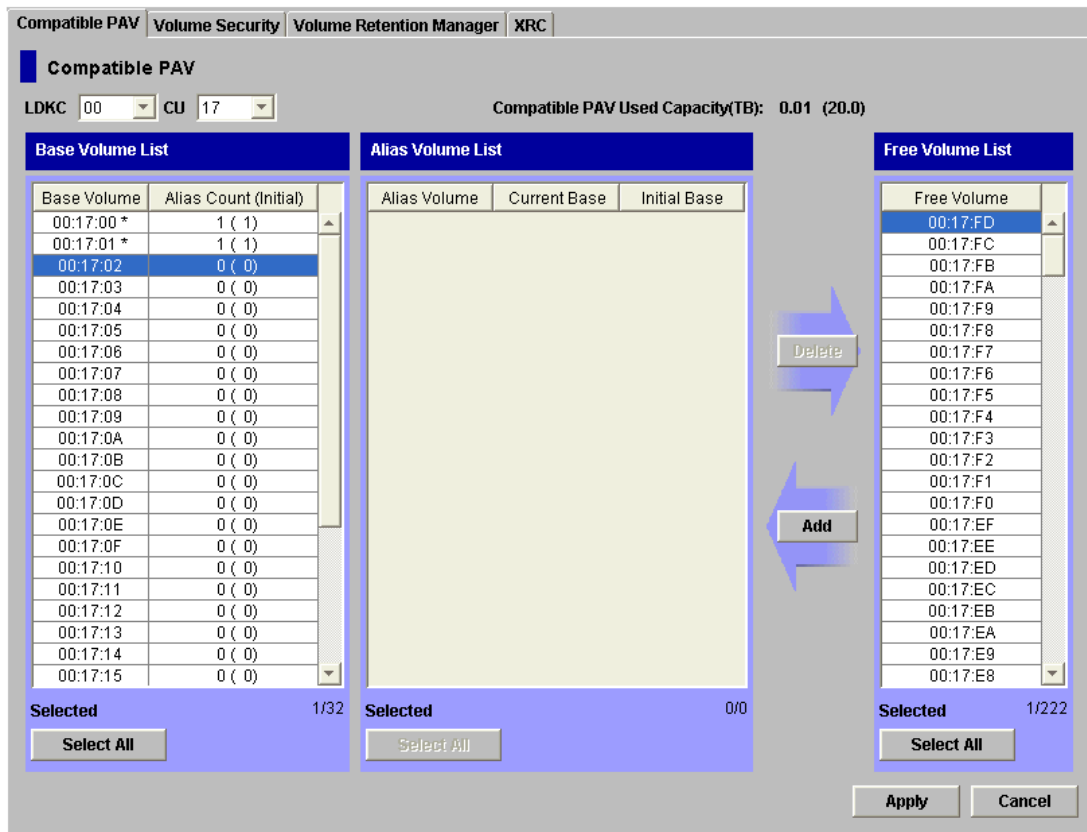


Figure 4-1 Compatible PAV Window

An LDEV that displays with a pound or gate symbol as a suffix (for example, 00:00:00 #), indicates that the LDEV is an external volume.

Item	Description
LDKC and CU dropdown lists	Select the LDKC and CU that contain the desired volume(s)
Compatible PAV Used Capacity	Shows the Compatible PAV capacity values.
Base Volume List	Displays the LDEVs that are currently in use in the selected CU image.
Alias Volume List	Displays the alias device(s) assigned to the selected base device(s).
Free Volume List	Displays the LDEV IDs of unused volumes in the selected CU.
Delete and Add buttons	Allows you to delete or cancel existing alias devices that are assigned to base devices and add or assign new alias devices to base devices.
Apply and Cancel buttons	Allows you to apply or cancel the requested Compatible PAV operations for the USP V/VM storage system.

LDKC/CU Selection Line

Figure 4-2 shows the **LDKC/CU** selection line, which is located in the upper left corner of the Compatible PAV window. The **LDKC/CU** selection line allows you to select the LDKC and CU that contain the desired volume(s).

Table 4-1 describes the LDKC/CU selection line on the Compatible PAV window.

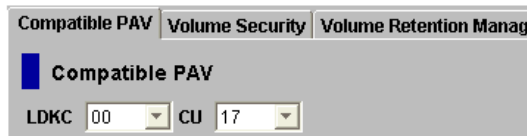


Figure 4-2 LDKC/CU Selection Line

Table 4-1 Items in the LDKC/CU Selection Line

Item	Description
LDKC	Selects the LDKC that contains the desired CU(s) and LDEV(s).
CU	Selects the logical CU image that contains the desired LDEV(s). The volume lists on the Compatible PAV window display only the LDEVs for the selected CU image. CU numbers are included in the currently selected LDKC. To indicate the CU numbers included in another LDKC, select the LDKC that includes the chosen CU number in the LDKC drop-down list.

Compatible PAV Capacity Values

Figure 4-3 shows the Compatible PAV capacity values that are displayed in the upper right corner of the Compatible PAV window. The **Compatible PAV Used Capacity(TB)** is the capacity (in TB) that is already used by the base volumes in the USP V/VM. The total available capacity for Compatible PAV in the USP V/VM is displayed in parentheses to the right of the used capacity value, also in TB.



Figure 4-3 Compatible PAV Capacity Values

- If the available capacity is unlimited, **Unlimited** is displayed.
- If you are using a temporary key or the emergency key, "---" is displayed.
- If the used capacity is enclosed in brackets (" $< >$ "), the calculation has not been completed.

The calculation may be delayed by any of the following operations:

- Assigning aliases to a new base volume and reflect the settings to USP V/USP VM by clicking **Apply** on the Compatible PAV window.
- Canceling all aliases in the corresponding CU and reflect the settings to USP V/USP VM by clicking **Apply** on the Compatible PAV window.
- Assigning Dynamic Compatible PAV or Compatible Hyper PAV aliases to a new base volume.
- Uninstalling volumes that are used as base volumes by using LVI/LUN (VLL) or Universal Volume Manager.

The base volume that is recognized as the object for calculation of used capacity will not be calculated as the used capacity if you cancel the assignment of all aliases in the corresponding CU.

The calculation of the used capacity can be time-consuming as it is almost proportional to the number of CUs that have volumes. It takes three minutes for each CU to calculate the used capacity. If all 255 CUs have volumes, it can take up to 13 hours to calculate and display the updated used capacity. During calculation, the latest value for the used capacity is unavailable.

Even if the calculation of the used capacity has not been completed, the changes had been enabled already. All volumes defined to USP V/VM are calculated. The value displayed during calculation and enclosed in brackets is temporary. After the calculation has finished, the brackets disappear and the latest value of the used capacity is displayed.

Base Volume List

The **Base Volume List** box (see Figure 4-4) displays the LDEVs that are currently in use in the selected CU image. Each of these LDEVs can be a Compatible PAV base device. When you assign and cancel aliases for base devices, you select the base devices from this list box.

Table 4-2 describes the items in the **Base Volume List** box.

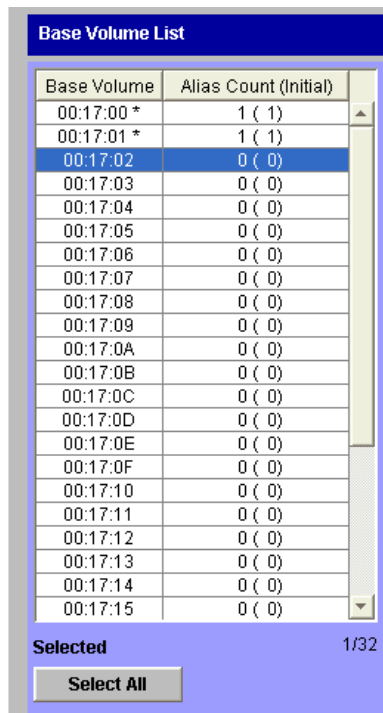


Figure 4-4 Base Volume List

Table 4-2 Items in the Base Volume List

Item	Description
Base Volume	Displays the LDKC number, CU number, and LDEV number of the base volume. For the volume used for Compatible PAV, an asterisk (*) is attached next to the LDEV number (for example, 00:00:00 *). The capacity of the volumes attached asterisks (*) is an object for calculation of used capacity.
Alias Count (Initial)	Displays the number of aliases currently assigned to the base volume in the disk subsystem. The number of aliases set in the base volume by the user is also displayed in the parentheses.
Selected	Displays the number of selected base volumes and the total number of base volumes in the selected CU image. For example, 2/73 indicates that two base volumes are selected out of a total of 73 base volumes in the select CU image.
Select All	Select all volumes in the Base Volume List box.

Alias Volume List

The **Alias Volume List** box (see Figure 4-5) displays the alias device(s) assigned to the selected base device(s). To view all alias devices for the selected CU image, you must select all of the base devices. When you cancel aliases for base devices, you select the alias devices from this list.

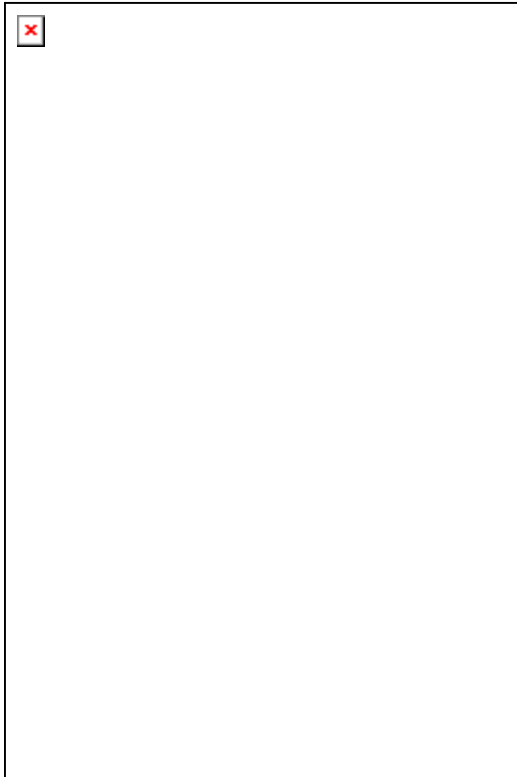


Figure 4-5 Alias Volume List

Table 4-3 Items in the Alias Volume List

Item	Description
Alias Volume	Displays the LDKC, CU, and LDEV numbers of the alias volume.
Current Base	Displays the LDKC, CU, and LDEV numbers of the base volume currently assigned to the alias volume in the disk subsystem.
Initial Base	Displays the LDKC, CU, and LDEV numbers of the base volume set by the user for the alias volume.
Selected	Displays the number of selected alias devices and the total number of alias devices in the selected CU image. For example, 2/4 indicates that two aliases are selected out of a total of four alias devices in the selected CU image.
Select All	Selects all volumes in the Alias Volume List box.

Free Volume List

The **Free Volume List** box (see Figure 4-6) displays the LDEV IDs of unused volumes in the selected CU. Any free volume can be used as a Compatible PAV alias device. Use this list to select aliases to assign to base volumes. Table 4-4 describes the items in the **Free Volume List** box.

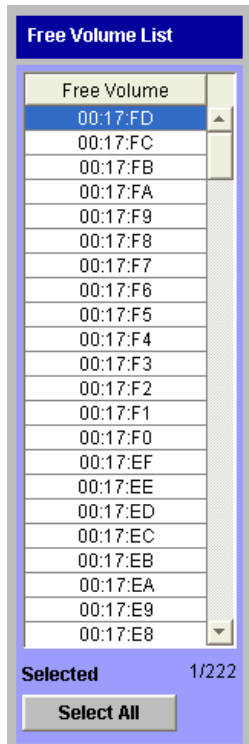


Figure 4-6 Free Volume List

Table 4-4 Items in the Free Volume List

Item	Description
Free Volume	Displays the complete list of volumes available for assignment.
Selected field	Displays the number of selected free devices and the total number of free devices in the selected CU image. For example, "8/47" indicates that eight free devices are selected out of a total of 47 free devices in the selected CU image.
Select All	Selects all volumes in the Free Volume List box.

Delete and Add Buttons

The **Delete** and **Add** buttons (see Figure 4-7), which are located between the **Alias Volume List** and **Free Volume List**, allow you to delete/cancel existing alias devices that are assigned to base devices and add/assign new alias devices to base devices.



Figure 4-7 Delete and Add Buttons

Table 4-5 Delete and Add Buttons

Button	Description
Delete	Cancels aliases for a selected base device. When you click Delete , the selected alias devices are canceled, and their LDEV IDs are displayed the Free Volume List box. To complete canceling the aliases as specified, you must click Apply .
Add	Assigns aliases to selected base devices. When you click Add , the selected free LDEV IDs are assigned to the selected base devices, and the new alias devices are displayed the Alias Volume List box. To complete your request to assign the new aliases as specified, you must click Apply .

Apply and Cancel Buttons

The **Apply** and **Cancel** buttons (see Figure 4-8), which are located in the lower right corner of the Compatible PAV window, allow you to apply or cancel the requested Compatible PAV operations for the USP V/VM storage system. Table 4-6 describes the **Apply** and **Cancel** buttons.



Figure 4-8 Apply and Cancel Buttons

Table 4-6 Apply and Cancel Buttons

Button	Description
Apply	Applies the settings made on this window to the USP V/VM. When you select this button, a message appears to ask you whether you want to apply your request to the disk subsystem. Note: When switching LDKCs to set multiple LDKCs, click Apply for each LDKC to reflect the operation for LDKC setting to the subsystem. The setting will be invalid if the LDKC is switched to another LDKC before clicking Apply .
Cancel	Discards any changes and restores the initial settings.

Assigning, Canceling, and Migrating Aliases

Before you assign Compatible PAV aliases, you should have determined the required number of aliases for each base device to meet your operational requirements. If you assign additional aliases after starting I/O operations to the Compatible PAV devices, you will need to redefine the Compatible PAV devices to the host operating system.

Assigning Aliases

You can assign up to 255 aliases to one base device. The Compatible PAV assign alias function pairs each selected base volume with one or more of the selected free volumes. If the number of selected free volumes is larger than the number of selected base volumes, this function attempts to allocate the free volumes equally to the base volumes. For example, if six free volumes and two base volumes are selected, three free volumes (aliases) are allocated to each base volume.



WARNING:

- If you want to assign aliases to more than one CU that is used by the host, you should click **Apply** whenever you assign aliases to one CU. If you click **Apply** only once to assign aliases simultaneously to more than one CU, the host performance may degrade.
- Before using dynamic Compatible PAV, use a host command to check the number of aliases assigned to the desired base volume. If this number has been reached 255, the following procedure cannot give accurate results because you cannot assign more than 255 aliases for each base volume.
- If you use only Compatible Hyper PAV to issue I/O requests to a CU, first decide the number of aliases that are necessary for the CU, and then assign the aliases to arbitrary base volumes. The assigned aliases function as aliases for all base volumes in that CU. In this case, assign three or less alias devices for each base device.

To assign aliases to volumes in the connected USP V/VM:

1. Select the LDKC which includes the CU number to be set, in the LDKC drop-down list to select LDKCs located in the upper left part of the Compatible PAV window.
2. On the Compatible PAV window, select the CU image which contains the desired base volumes. The total number of available free volumes is displayed under the **Free Volume List** box.

3. Select the desired base volumes in the **Base Volume List** box, select the desired free volumes in the **Free Volume List** box, and then click **Add** to add the new aliases to the **Alias Volume List** box.

To assign one alias to each base volume, select the same number of free volumes as base volumes. To assign three aliases to each base volume, select three times as many free volumes as base volumes (e.g., 3 base volumes and 9 free volumes).

4. Click **Apply** on the Compatible PAV window. When the set Compatible PAV confirmation dialog box appears, click **OK** to assign the new aliases as specified. To cancel your request, click **Cancel**.

To set the CU numbers included in another LDKC, switch the LDKC by step 1 and then follow steps 2 through 4.

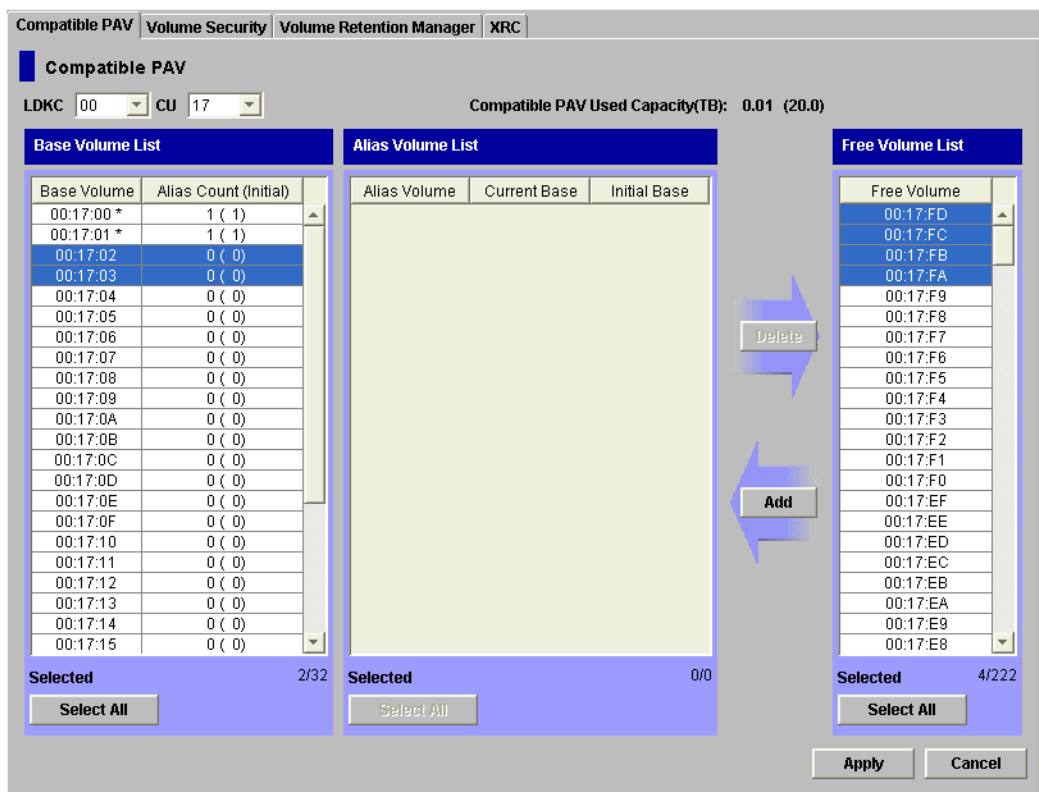


Figure 4-9 Assigning Aliases

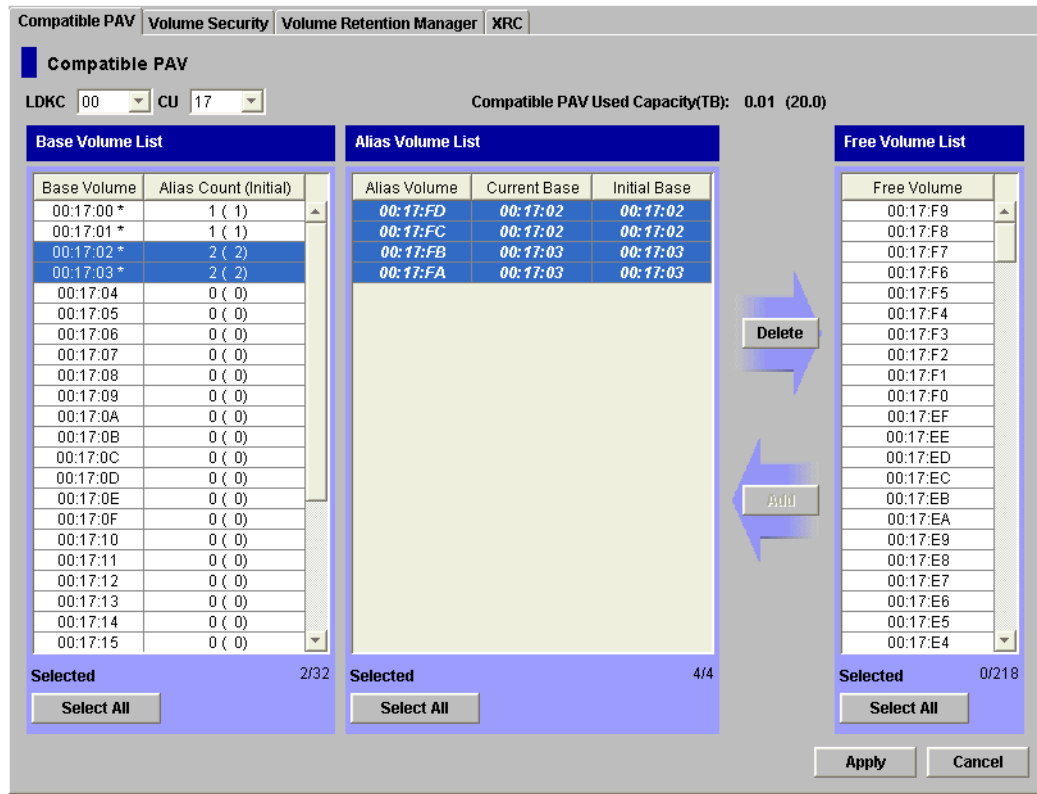


Figure 4-10 Confirming the New Aliases

Canceling Aliases



WARNING: Do not cancel aliases while I/O operations are being performed on the Compatible PAV devices. This can cause a serious failure.

To cancel aliases for volumes in the connected USP V/VM:

1. Select the LDKC which includes the CU number to be canceled, in the LDKC drop-down list to select LDKCs located in the upper left part of the Compatible PAV window.
2. On the Compatible PAV window, select the CU image which contains the aliases that you want to cancel.
3. In the **Base Volume List** box, select the base device(s) for the aliases that you want to cancel.
4. In the **Alias Volume List** box, select the alias devices that you want to cancel (see Figure 4-11), and then select the **Delete** button to remove the aliases from the **Alias Volume List** box and add their LDEV IDs to the **Free Volume List** box.
5. Select **Apply** on the Compatible PAV window. When the set Compatible PAV confirmation dialog box appears, click **OK** to cancel the aliases as specified. To cancel your request, click **Cancel**.

To cancel the alias included in another LDKC, switch the LDKC by step 1 and the follow step 2 to step 5.

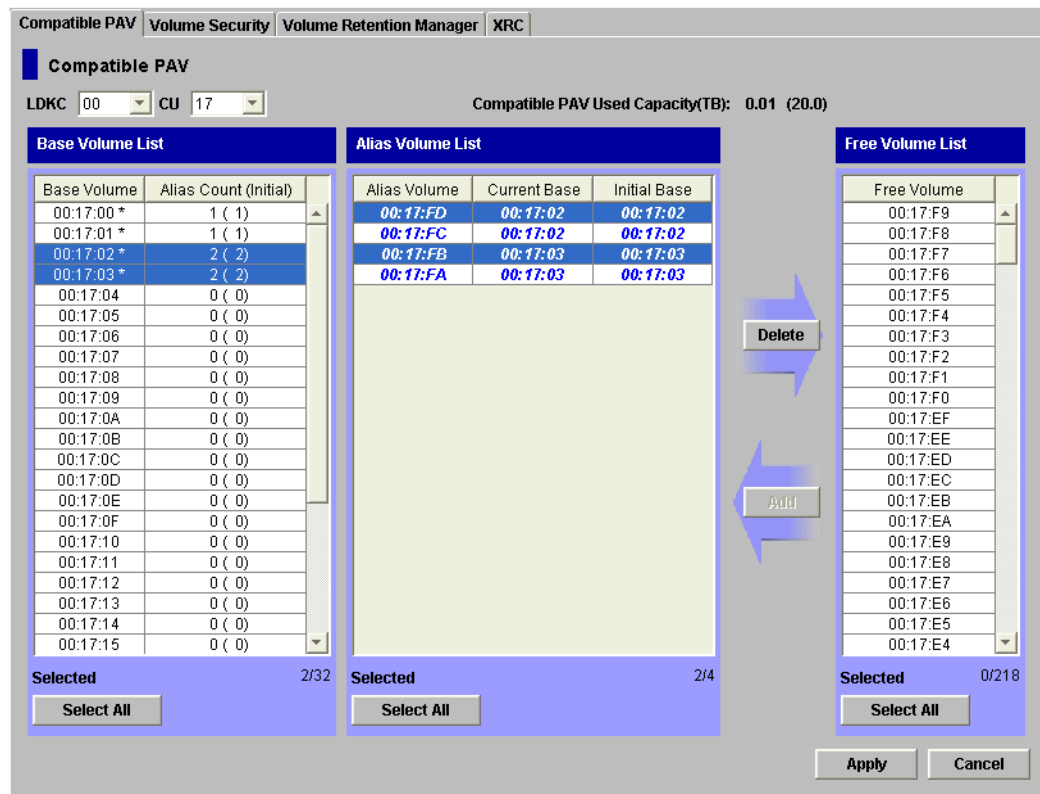


Figure 4-11 Canceling Aliases

Migrating Aliases

To migrate aliases assigned to base devices, cancel the aliases assigned to the base devices and then reassign them to other base devices.



WARNING: When migrating aliases, you must confirm that the number of requests to the base device that the alias is moved from is less than 50 IOPS before migrating the alias. This performance information can be acquired using RMF (Resource Measurement Efacility Report Analysis) or other tools you may have available. If the alias is migrated when there are many requests to the base device, the process performance may decline in the worst cases.

To migrate aliases to volumes in the connected USP V/VM:

1. Execute step 1 to 4 of Canceling Aliases.
2. Execute step 3 of Assigning Aliases.
3. Select **Apply** on the Compatible PAV window. When the set Compatible PAV confirmation dialog box appears, click **OK** to migrate the aliases as specified. To cancel your request, click **Cancel**.

When migrating aliases included in another LDKC, change the LDKC by step 1 of Canceling Aliases, and then execute step 1 to 3.

Considerations for Defining the Devices to the Host System

This section provides a simple description of the considerations and procedure used when you define the device from the host system.

The serial number of the disk subsystem differs from the LDKC serial number which the host recognizes per LDKC. The device address which is specified from the host differs from the LDEV number (CU:LDEV) of the subsystem.

Important: For CC and XRC, the 2105 or 2107 controller emulation type cannot be intermixed with other emulation types within the USP V/VM. If the USP V/VM has existing CC and/or XRC volumes and you want to implement Compatible PAV, you must change to 2105 or 2107 emulation as follows:

1. Stop all Concurrent Copy jobs, and delete all XRC pairs.
2. Change the DKC emulation type of all CHA packages in the USP V/VM to I-2105 or I-2107.
3. Restart Concurrent Copy jobs, and re-establish XRC pairs.

Compatible PAV operations require that one SSID be set for each set of 256 LDEVs.

Defining Base and Alias Devices

The unit address mapping for base and alias devices must be defined to the host operating system and must match the address mapping defined at the Storage Navigator computer. If the mappings do not match, serious failures can occur during data processing. Figure 4-12 shows examples of mappings between base devices and alias devices.

(A)	x00-x3F:Base x40-xFF:Alias	(B)	x00-x3F:Base x40-x7F:Alias x80-xBF:Base xC0-xFF:Alias	(C)	x00-x7F:Alias x80-xFF:Base	(D)	x00-x3F:Alias x40-x7F:Base x80-xBF:Alias xC0-xFF:Base
-----	-------------------------------	-----	--	-----	-------------------------------	-----	--

Note: When each base device is assumed to be assigned the same number of aliases, the recommended ratio of base devices to aliases is **1:3**.

Figure 4-12 Mapping Between Base Devices and Alias Devices

Verifying Base and Alias Device Definition

After you have defined the mapping between base devices and alias devices to the host operating system, you need to verify that the host recognizes the devices as specified.

To verify that the host system recognizes the settings for the USP V/VM base and alias devices:

1. At the MVS console display information about the base devices and the corresponding alias addresses using the **DEVSERV (DS)** command (see output sample in Figure 4-13):

DS QPAV, XXXX,VOLUME (XXXX = address of the base device)

2. The relationship between base and alias devices is not fixed for the OS using Compatible Hyper PAV. Therefore, only the information about the base devices is displayed (see output in Figure 4-14).
3. Make sure that the information displayed by the **DS** command matches your definitions of base devices and alias addresses.

If the information displayed by the **DS** command does not match the Compatible PAV settings that you specified at the Storage Navigator computer for base devices and alias addresses, redefinition is required. After dynamic Compatible PAV has been used, the information may not match, but the mismatch will not cause any problems. For dynamic Compatible PAV, the mismatch occurs because the host system can change the number of aliases assigned to each base device.

```

DS QPAV, D222,VOLUME
IEE459I 08:20:32 DEVSERV QPATHS 591
HOST                                SUBSYSTEM
CONFIGURATION                       CONFIGURATION
-----
UNIT UNIT  UA                        UNIT
NUM  UA   TYPE        STATUS  SSID  ADDR  TYPE
---- --  -
D222 22   BASE              0102  22   BASE
D2FE FE   ALIAS-D222        0102  FE   ALIAS-22
D2FF FF   ALIAS-D222        0102  FF   ALIAS-22
***3 DEVICE(S) MET THE SELECTION CRITERIA
  
```

Figure 4-13 Verifying the Base Devices and Alias Addresses (Compatible PAV)

```

DS QP,5000,VOL
IEE459I 22.28.19 DEVSERV QPAVS 726
HOST                                SUBSYSTEM
CONFIGURATION                       CONFIGURATION
-----
UNIT                                UNIT  UA
NUM. UA  TYPE        STATUS  SSID  ADDR.  TYPE
----- --  -
05000 00  BASE-H              5150  00   BASE
****
1 DEVICE(S) MET THE SELECTION CRITERIA
  
```

Figure 4-14 Verifying the Base Devices (Compatible Hyper PAV)

Verifying the Status of the Devices

After verifying the generation definition for the devices, you need to verify the status of the devices for each channel path (CHP).

To verify the status of the devices by CHP ID:

1. At the MVS console display the status of the devices by issuing the **Display Matrix** command for each CHPID connected to the USP V/VM (see output sample in Figure 4-15, Figure 4-16):
D M=CHP(XX) (XX = CHP ID)
2. Make sure that the displayed information matches the device status that was defined when the generation definition was made.

If the information is correct, the USP V/VM is now ready for Compatible PAV activities. If the information is not correct, you need to redefine the devices to the host.

```

D M=CHP(80)
IEE174I 10.05.24 DISPLAY M 779
CHPID 80:TYPE=05, DESC=ESCON SWITCHED POINT TO POINT
DEVICE STATUS FOR CHANNEL PATH 80
   0   1   2   3   4   5   6   7   8   9   A   B   C   D   E   F
680 +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
681 +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
682 +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
683 +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
684 AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL
685 AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL
686 AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL
687 AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL  AL
688 +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
689 +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
68A +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
68B +   +   +   +   +   +   +   +   +   +   +   +   +   +   +
68C UL  UL  UL  UL  UL  UL  UL  UL  UL  UL  UL  UL  UL  UL  UL
68D UL  UL  UL  UL  UL  UL  AL  AL  AL  AL  AL  AL  AL  AL  AL
68E UL  UL  UL  UL  UL  UL  UL  UL  UL  UL  UL  UL  UL  UL  UL
68F UL  UL  UL  UL  UL  UL  UL  UL  UL  UL  UL  UL  UL  UL  UL
*****SYMBOL
EXPLANATIONS*****
+ ONLINE @ PATH NOT VALIDATED - OFFLINE .DOES NOT EXIST
* PHYSICALLY ONLINE $ PATH NOT OPERATIONAL
BX DEVICE IS BOXED SN SUBCHANNEL NOT AVAILABLE
DN DEVICE NOT AVAILABLE PE SUBCHANNEL IN PERMANENT ERROR
AL DEVICE IS AN ALIAS UL DEVICE IS AN UNBOUND ALIAS

```

Figure 4-15 Verifying the Status of Devices Defined by CHP ID (Compatible PAV)

```

D M=CHP(48)
IEE174I 22.29.16 DISPLAY M 737
CHPID 48: TYPE=1B, DESC=FICON SWITCHED, ONLINE
DEVICE STATUS FOR CHANNEL PATH 48
      0      1      2      3      4      5      6      7      8      9      A      B      C      D      E      F
0500 +      +      +      +      +      +      +      +      +      +      +      +      +      +      +
0501 +      +      +      +      +      +      +      +      +      +      +      +      +      +      +
0502 HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA
0503 HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA
0504 HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA
0505 HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA
0506 HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA
0507 HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA     HA
0508 +      +      +      +      +      +      +      +      +      +      +      +      +      +      +
0509 +      +      +      +      +      +      +      +      +      +      +      +      +      +      +
050A UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL
050B UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL
050C UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL
050D UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL
050E UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL
050F UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL     UL
SWITCH DEVICE NUMBER = NONE
ATTACHED ND = 010000.001.MCD.01.00000XK00540
PHYSICAL CHANNEL ID = 0322
***** SYMBOL EXPLANATIONS *****
+ ONLINE      @ PATH NOT VALIDATED  - OFFLINE      . DOES NOT EXIST
* PHYSICALLY ONLINE  $ PATH NOT OPERATIONAL
BX DEVICE IS BOXED          SN SUBCHANNEL NOT AVAILABLE
DN DEVICE NOT AVAILABLE     PE SUBCHANNEL IN PERMANENT ERROR
AL DEVICE IS AN ALIAS       UL DEVICE IS AN UNBOUND ALIAS
HA DEVICE IS A HYPERPAV ALIAS  HU HYPERPAV ALIAS UNUSABLE

```

Figure 4-16 Verifying the Status of Devices Defined by CHP ID (Compatible Hyper PAV)

Monitoring Compatible PAV Activities

This chapter describes the commands used to monitor Compatible PAV activities on the USP V/VM from the host computer.

The commands differ according to the OS of the host computer. For z/OS, see the following section:

- [MVS Commands \(for z/OS\)](#)
- [GTF I/O Tracing](#)

For z/VM, see the following section:

- [VM CP Commands \(for z/VM\)](#)

MVS Commands (for z/OS)

If you want to monitor the Compatible PAV activities on the USP V/VM from z/OS, use these MVS commands. In addition to the "DS QPAV" and "D M=CHP" commands (refer to Figure 4-13 to Figure 4-16), the following commands will provide additional information:

- DISPLAY M=DEV. Figure 5-1 and Figure 5-2 show an example of the Display M=DEV(xxxx) command for a base device.
- DEVSERV PATHS. Figure 5-3 shows an example of a DEVSERV PATHS command.
- DEVSERV QPAV. Figure 5-4 through Figure 5-9 show output samples of the DEVSERV QPAV commands having the following command formats:
 - DS QP,xxxx,4 displays the status of Compatible PAV base devices.
 - DS QP,xxxx,HPAV displays the status of Compatible Hyper PAV base devices and alias devices.
 - DS QP,SSID=xxxx displays the status of entire Subsystem-ID.
 - DS QP,xxxx,VOLUME displays the status of host/subsystem configuration for volume.
- D IOS,HYPERPAV. Figure 5-10 shows an example of a D IOS, HYPERPAV command.

The following pages contain sample output of these commands.

For the complete syntax of these commands, please refer to IBM document OS/390 *MVS System Commands* (GC28-1781).


```

D M=DEV(8300)
IEE174I 15.33.58 DISPLAY M 739
DEVICE 8300 STATUS=ONLINE
CHP                63 40 64 65
DEST LINK ADDRESS  DD EA E9 E8
DEST LOGICAL ADDRESS 02 02 02 02
PATH ONLINE         N Y Y Y
CHP PHYSICALLY ONLINE Y Y Y Y
PATH OPERATIONAL    N Y Y Y
MANAGED             N N N N
MAXIMUM MANAGED CHPID(S) ALLOWED: 0
ND                  = 002105. .HTC.02.000000012345
DEVICE NED =        2105. .HTC.02.000000012345
PAV BASE AND ALIASES 6

```

Figure 5-1 Output Sample of Display Command – Compatible PAV Base Device with 5 Aliases

```

D M=DEV(5000)
IEA494I 261F,SBF61F,PPRC PAIR FULL DUPLEX,SSID=C9F6,CCA=1F
IEE174I 22.30.30 DISPLAY M 746
DEVICE 5000 STATUS=ONLINE
CHP                48 4C
ENTRY LINK ADDRESS 31 34
DEST LINK ADDRESS  16 15
PATH ONLINE        Y Y
CHP PHYSICALLY ONLINE Y Y
PATH OPERATIONAL   Y Y
MANAGED            N N
CU NUMBER          5000 5000
MAXIMUM MANAGED CHPID(S) ALLOWED: 0
DESTINATION CU LOGICAL ADDRESS = 00
SCP CU ND          = 002107.900.HTC.55.000000063503.0008
SCP TOKEN NED      = 002107.900.HTC.55.000000063503.0000
SCP DEVICE NED     = 002107.900.HTC.55.000000063503.0000
HYPERPAV ALIASES CONFIGURED = 16
FUNCTIONS ENABLED = MIDAW

```

Figure 5-2 Output Sample of Display Command – Compatible Hyper PAV with 16 Aliases

```

DS P,8300
IEE459I 15.43.32 DEVSERV PATHS 755
UNIT DTYPE M CNT VOLSER CHPID=PATH STATUS
RTYPE SSID CFW TC DFW PIN DC-STATE CCA DDC ALT CU-TYP
8300,33903 ,0,000,PA8300,63=< 40=+ 64=+ 65=+
2105 8300 Y YY. YY. N SIMPLEX 00 00 2105
***** SYMBOL DEFINITIONS *****
O = ONLINE + = PATH AVAILABLE
< = PHYSICALLY UNAVAILABLE

```

Figure 5-3 Output Sample of DEVSERV DISPLAY PATHS Command

```

DS QP,8300,4
IEE459I 15.50.16 DEVSERV QPAVS 013
      HOST                      SUBSYSTEM
      CONFIGURATION              CONFIGURATION
-----
UNIT                                UNIT  UA
NUM. UA  TYPE      STATUS      SSID ADDR.  TYPE
-----
8300 00  BASE
8301 01  BASE
8302 02  BASE
8303 03  BASE
**** 4 DEVICE(S) MET THE SELECTION CRITERIA

```

Figure 5-4 Sample DEVSERV QPAV Command (Compatible PAV)

```

DS QP,5000,HPAV
IEE459I 22.38.45 DEVSERV QPAVS 844
      HOST                      SUBSYSTEM
      CONFIGURATION              CONFIGURATION
-----
UNIT                                UNIT  UA
NUM. UA  TYPE      STATUS      SSID ADDR.  TYPE
-----
05000 00  BASE-H
05040 40  ALIAS-H
05041 41  ALIAS-H
05042 42  ALIAS-H
05043 43  ALIAS-H
05044 44  ALIAS-H
05045 45  ALIAS-H
05046 46  ALIAS-H
05047 47  ALIAS-H
05048 48  ALIAS-H
05049 49  ALIAS-H
0504A 4A  ALIAS-H
0504B 4B  ALIAS-H
0504C 4C  ALIAS-H
0504D 4D  ALIAS-H
0504E 4E  ALIAS-H
0504F 4F  ALIAS-H
**** 16 DEVICE(S) IN HYPERPAV ALIAS POOL

```

Figure 5-5 Sample DEVSERV QPAV Command (Compatible Hyper PAV)

```

DS QP,SSID=8300
IEE459I 15.56.03 DEVSERV QPAVS 026
      HOST                SUBSYSTEM
      CONFIGURATION      CONFIGURATION
-----
UNIT
NUM. UA  TYPE          STATUS          SSID  ADDR.  UA
-----
8300 00  BASE
8301 01  BASE
8302 02  BASE
8303 03  BASE
8304 04  BASE
8306 06  BASE
8307 07  BASE
8308 08  BASE
8309 09  BASE
830A 0A  BASE
830C 0C  BASE
830D 0D  BASE
830E 0E  BASE
830F 0F  BASE
8310 10  BASE
8311 11  BASE
8312 12  BASE
8313 13  BASE
8314 14  BASE
8315 15  BASE
8316 16  BASE
8317 17  BASE
8318 18  BASE
8319 19  BASE
831A 1A  BASE
831B 1B  BASE
831D 1D  BASE
831F 1F  BASE
8320 20  BASE
8321 21  BASE
8322 22  BASE
83F6 F6  ALIAS-8301      8300  F6  ALIAS-01
83F7 F7  ALIAS-8301      8300  F7  ALIAS-01
83F8 F8  ALIAS-8301      8300  F8  ALIAS-01
83F9 F9  ALIAS-8301      8300  F9  ALIAS-01
83FA FA  ALIAS-8301      8300  FA  ALIAS-01
83FB FB  ALIAS-8300      8300  FB  ALIAS-00
83FC FC  ALIAS-8300      8300  FC  ALIAS-00
83FD FD  ALIAS-8300      8300  FD  ALIAS-00
83FE FE  ALIAS-8300      8300  FE  ALIAS-00
83FF FF  ALIAS-8300      8300  FF  ALIAS-00
**** 41 DEVICE(S) MET THE SELECTION CRITERIA

```

Figure 5-6 Output Sample of DEVSERV QPAV, SSID=xxxx Command (Compatible PAV)

```

DS QP,SSID=5150
IEE459I 22.32.40 DEVSERV QPAVS 824
      HOST                SUBSYSTEM
      CONFIGURATION      CONFIGURATION
-----
UNIT
NUM. UA  TYPE          STATUS          SSID  ADDR.  TYPE
-----
05000 00  BASE-H
05001 01  BASE
05002 02  BASE
05003 03  BASE
05004 04  BASE
05005 05  BASE
05006 06  BASE
05007 07  BASE
05008 08  BASE
05009 09  BASE
0500A 0A  BASE
0500B 0B  BASE
0500C 0C  BASE
0500D 0D  BASE
0500E 0E  BASE
0500F 0F  BASE
05010 10  BASE
05011 11  BASE
05012 12  BASE
05013 13  BASE
05014 14  BASE
05015 15  BASE
05016 16  BASE
05017 17  BASE
05018 18  BASE
05019 19  BASE
0501A 1A  BASE
0501B 1B  BASE
0501C 1C  BASE
0501D 1D  BASE
0501E 1E  BASE
0501F 1F  BASE
05040 40  ALIAS-H
05041 41  ALIAS-H
05042 42  ALIAS-H
05043 43  ALIAS-H
05044 44  ALIAS-H
05045 45  ALIAS-H
05046 46  ALIAS-H
05047 47  ALIAS-H
05048 48  ALIAS-H
05049 49  ALIAS-H
0504A 4A  ALIAS-H
0504B 4B  ALIAS-H
0504C 4C  ALIAS-H
0504D 4D  ALIAS-H
0504E 4E  ALIAS-H
0504F 4F  ALIAS-H
****
48 DEVICE(S) MET THE SELECTION CRITERIA

```

Figure 5-7 Output Sample of DEVSERV QPAV, SSID=xxxx Command (Compatible Hyper PAV)

```

DS QP,8300,VOLUME
IEE459I 16.00.15 DEVSERV QPAVS 041
      HOST                                SUBSYSTEM
      CONFIGURATION                       CONFIGURATION
-----
UNIT                                     UNIT   UA
NUM. UA  TYPE          STATUS          SSID  ADDR.  TYPE
-----
8300 00  BASE
83FB FB  ALIAS-8300
83FC FC  ALIAS-8300
83FD FD  ALIAS-8300
83FE FE  ALIAS-8300
83FF FF  ALIAS-8300
****          6 DEVICE(S) MET THE SELECTION CRITERIA

```

Figure 5-8 Output Sample of DS QP, xxxx, VOLUME Command (Compatible PAV)

```

DS QP,5000,VOLUME
IEE459I 22.28.19 DEVSERV QPAVS 726
      HOST                                SUBSYSTEM
      CONFIGURATION                       CONFIGURATION
-----
UNIT                                     UNIT   UA
NUM. UA  TYPE          STATUS          SSID  ADDR.  TYPE
-----
05000 00  BASE-H
****          1 DEVICE(S) MET THE SELECTION CRITERIA

```

Figure 5-9 Output Sample of DS QP, xxxx, VOLUME Command (Compatible Hyper PAV)

```

D IOS,HYPERPAV
IOS098I 22.31.34 HYPERPAV DATA 776
HYPERPAV MODE IS SET TO YES

```

Figure 5-10 Output Sample of D IOS, HYPERPAV Command

GTF I/O Tracing

GTF is PAV aware. When a device number is specified for GTF I/O tracing operations, GTF determines if the device is a base PAV device and will automatically include the Alias addresses currently bound to the base device. For further details on GTF I/O tracing, please refer to IBM document SY28-1085, *OS/390 MVS Diagnosis: Tools and Service Aids*.

VM CP Commands for z/VM

Use the following VM CP commands to monitor the Compatible PAV activities on the USP V/VM from z/VM:

- QUERY CU
- QUERY DASD DETAILS
- QUERY PAV
- QUERY VIRTUAL DASD DETAILS
- QUERY VIRTUAL PAV

This section describes provides a descriptive summary, the command syntax, and an output sample of each command. For the complete syntax of the commands, please refer to the z/VM document.

- **Conventions used in this section**

This section uses the following symbols and typefaces to explain syntax:

Capitalized and bold

Indicates characters you must enter.

Lowercase letters

Indicates characters you can omit.

italics

Indicates a type of an operand. You can enter an arbitrary value.

[]

Indicates an operand which can be omitted.

{ }

Indicates that you must select one operand from the operands enclosed by the braces. Two or more operands are enclosed by the braces and are delimited by vertical bars (|).

QUERY CU

- Summary

This command displays the information about DASD CU.

- Syntax

```
q cu [DASD] {ssid | ssid1- ssid2} {ALiases | DEvices | PAVMMode}
```

- Output sample

```
q cu dasd b600 ali
DASD CU B600 ALIASES:
A0C0 A0C1 A0C2 A0C3 A0C4 A0C5 A0C6 A0C7
A0C8 A0C9 A0CA A0CB A0CC A0CD A0CE A0CF
A0D0 A0D1 A0D2 A0D3 A0D4 A0D5 A0D6 A0D7
A0D8 A0D9 A0DA A0DB A0DC A0DD A0DE A0DF
A0E0 A0E1 A0E2 A0E3 A0E4 A0E5 A0E6 A0E7
A0E8 A0E9 A0EA A0EB A0EC A0ED A0EE A0EF
A0F0 A0F1 A0F2 A0F3 A0F4 A0F5 A0F6 A0F7
A0F8 A0F9 A0FA A0FB A0FC A0FD A0FE A0FF

q cu dasd b600 dev
DASD CU B600 DEVICES:
A000 A001 A002 A003 A004 A005 A006 A007
A008 A009 A00A A00B A00C A00D A00E A00F
A040 A041 A042 A043 A044 A045 A046 A047
A048 A049 A04A A04B A04C A04D A04E A04F
A050 A051 A052 A053 A054 A055 A056 A057
A058 A059 A05A A05B A05C A05D A05E A05F
A060 A061 A062 A063 A064 A065 A066 A067
A068 A069 A06A A06B A06C A06D A06E A06F
A070 A071 A072 A073 A074 A075 A076 A077
A078 A079 A07A A07B A07C A07D A07E A07F
A080 A081 A082 A083 A084 A085 A086 A087
A088 A089 A08A A08B A08C A08D A08E A08F
A090 A091 A092 A093 A094 A095 A096 A097
A098 A099 A09A A09B A09C A09D A09E A09F
A0C0 A0C1 A0C2 A0C3 A0C4 A0C5 A0C6 A0C7
A0C8 A0C9 A0CA A0CB A0CC A0CD A0CE A0CF
A0D0 A0D1 A0D2 A0D3 A0D4 A0D5 A0D6 A0D7
A0D8 A0D9 A0DA A0DB A0DC A0DD A0DE A0DF
A0E0 A0E1 A0E2 A0E3 A0E4 A0E5 A0E6 A0E7
A0E8 A0E9 A0EA A0EB A0EC A0ED A0EE A0EF
A0F0 A0F1 A0F2 A0F3 A0F4 A0F5 A0F6 A0F7
A0F8 A0F9 A0FA A0FB A0FC A0FD A0FE A0FF
```

Figure 5-11 Output Sample of QUERY CU Command



Caution: You may execute the QUERY CU command only on the OS that is used directly by the host computer. You may not execute the QUERY CU command on z/VM that is operated as a guest OS on the other z/VM. If you issue the QUERY CU command to z/VM that is operated as a guest OS, the command is rejected.

QUERY DASD DETAILS

- Summary
This command displays the information about DASD (RDEV).
- Syntax
`Query DASD DETAILS {rdev | rdev1-rdev2}`
- Output sample

```
q dasd details a000
A000 CUTYPE = 2107-E8, DEVTYPE = 3390-0A, VOLSER = CMA000, CYLS = 3339
    CACHE DETAILS:  CACHE NVS CFW DFW PINNED CONCOPY
                   -SUBSYSTEM  Y  Y  Y  -  N      N
                   -DEVICE     Y  -  -  Y  N      N
    DEVICE DETAILS: CCA = 00, DDC = --
    DUPLEX DETAILS:  --
    HYPERPAV DETAILS: BASE VOLUME IN POOL 0
    CU DETAILS:     SSID = B600, CUNUM = A000
```

Figure 5-12 Output Sample of QUERY DASD DETAILS Command



Caution: You cannot use QUERY DASD DETAILS command for 3380 DASD.

QUERY PAV

- Summary
This command displays the list of the Compatible PAV or Compatible Hyper PAV devices that are managed by the corresponding USP V/VM.
This command also displays the information about all base devices and alias devices.
- Syntax
`Query PAV {rdev | rdev1-rdev2 | ALL}`
- Output sample

```
q pav a000
Device A000 is a base HyperParallel Access Volume device in Pool 0
```

Figure 5-13 Output Sample of QUERY PAV Command

QUERY VIRTUAL DASD DETAILS

- Summary
This command displays the status of all DASD that can be accessed by z/VM.
- Syntax
Query Virtual DASd [DETAILS]
- Output sample

```
Q V DASD details
.
.
.
DASD 1000 3390 CMA000 R/W          3339 CYL ON DASD  A000 SUBCHANNEL = 005D
      HYPERPAVBASE(0)
DASD 3000 3390          R/W          1 CYL ON DASD  A0C0 SUBCHANNEL = 005F
      HYPERPAVALIAS(A0C0,0)
DASD A001 ON DASD  A001 R/W CMA001 SUBCHANNEL = 005E
      DEVCTL HYPERPAVBASE(0)
```

Figure 5-14 Output Sample QUERY VIRTUAL DASD DETAILS Command



Caution: The DETAILS operand is valid only for dedicated DASD or mini-disk DASD.

QUERY VIRTUAL PAV

- Summary
This command displays the status of all Compatible PAV devices and Compatible Hyper PAV that can be accessed by z/VM.
- Syntax
Query Virtual PAV {vdev | vdev1-vdev2 | ALL}
- Output sample

```
<BASE>
q v pav 1000
HYPERPAV BASE 1000 ON A000 CMA000 ASSIGNED A000 POOL 0

<ALIAS>
q v pav 3000
HYPERPAV ALIAS 3000 ASSIGNED A0C0 POOL 0
```

Figure 5-15 Output Sample QUERY VIRTUAL PAV Command

Troubleshooting

This chapter provides troubleshooting information and customer support contact information.

- [Troubleshooting](#)
- [Calling the Support Center](#)

Troubleshooting

For troubleshooting information on the USP V/VM, refer to the *User and Reference Guide*.

For troubleshooting information on Storage Navigator, refer to the *Storage Navigator User's Guide*. For a complete list of Storage Navigator error codes, see the *Storage Navigator Messages*.

Calling the Support Center

If you need to call the Hitachi Data Systems Support Center, make sure to provide as much information about the problem as possible. Include the circumstances surrounding the error or failure, the Storage Navigator configuration information saved by the **FD Dump Tool**, the exact content of any messages displayed on the Storage Navigator, and the severity levels and reference codes of service information messages (SIMs) displayed on the **Status** tab of the Storage Navigator main window.

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

Using HCD to Define and View Logical CUs and Compatible PAV Devices

This appendix describes how to use Hardware Configuration Definition (HCD) program to define and view Logical Control Units and compatible PAV devices.

- [Using HCD to Define LCUs and Base and Alias Devices](#)
- [Displaying Compatible PAV Device Parameters](#)

The logical control units (LCUs) and PAV base and alias devices are defined to MVS/ESA, z/OS, and OS/390 systems using the configuration dialog boxes of the HCD program. The WLMPAV device parameter for existing Compatible PAV devices can also be displayed using HCD.

This appendix provides sample instructions for:

- Defining a 9980V LCU and base and alias Compatible PAV devices (see section Using HCD to Define LCUs and Base and Alias Devices and
- Displaying the WLMPAV device parameters (see section Displaying Compatible PAV Device Parameters).

For further information on defining Compatible PAV devices to the z/OS and S/390 host, please refer to the S/390 documentation (*OS/390 HCD User's Guide*).

Using HCD to Define LCUs and Base and Alias Devices

The following example shows the sequence of HCD dialog boxes used in defining a LCU and a range of base and alias devices. Before you can define the LCU, the channel paths must already be defined.

To define a LCU and the base and alias address range that it will support, please use the following example for HCD:

1. From an ISPF/PDF primary options menu, select the HCD option to display the basic HCD dialog box (see Figure A-1). On this dialog box you must verify the name of the IODF or IODF.WORK I/O definition file to be used.
2. On the basic HCD dialog box, select option 1 to display the Define, Modify, or View Configuration Data dialog box (see Figure A-1).
3. On the Define, Modify, or View Configuration Data dialog box (see Figure A-2), select option 4 to display the Add Control Unit dialog box.
4. On the Add Control Unit dialog box (see Figure A-3), enter the following information:
 - Control unit number
 - Control unit type – 2105 or 2107
 - Switch connection information
5. After defining the control unit, select the processor complex that the control unit is to be attached to (see Figure A-4), and then select option 1, SELECT (see Figure A-5).
6. Enter chpids that attach to the control unit, the logical control unit address, the device starting address, and the number of devices supported (see Figure A-6).
7. Return to the Define, Modify, or View Configuration Data dialog box, and select option 5 to display the I/O Device List dialog box (see Figure A-7).
8. On the I/O Device List dialog box, press PF11 to start the Add Device dialog (see Figure A-8).
9. On the Add Device dialog box, enter the following (see Figure A-9):
 - Device number
 - Number of devices
 - Device type: 3390B or 3380B for a Compatible PAV base device, or 3390A or 3380A for a Compatible PAV alias device.
10. Once the device is defined using the Add Device dialog box, you must direct HCD to add this device to a specific Processor/System-ID combination. Figures A-10-A-13 show the HCD dialog boxes used to select the Processor and System-ID to which this device will be added.
11. After you select the OS configuration on the Define Device to Operating System Configuration dialog box (refer to Figure A-13), you are prompted to select the device or disconnect the device from the selected OS (see Figure A-14). Select option 1 (Select).
12. The Define Device Parameters / Features dialog box (see Figure A-15) displays the default device parameters.

The WLMPAV parameter defaults to "YES".

```
OS/390 Release 9 HCD
Command ==> _____

                          Hardware Configuration

Select one of the following.

_1 1. Define, modify, or view configuration data           ← Select option 1.
   2. Activate or process configuration data
   3. Print or compare configuration data
   4. Create or view graphical configuration report
   5. Migrate configuration data
   6. Maintain I/O definition files
   7. Query supported hardware and installed UIMs
   8. Getting started with this dialog
   9. What's new in this release

For options 1 to 5, specify the name of the IODF to be used.

I/O definition file . . . 'SYS1.IODF00'
```

Figure A-1 Basic HCD Dialog Box

```
----- Define, Modify, or View Configuration Data -----

Select type of objects to define, modify, or view data.

_4 1. Operating system configurations                       ← Select option 4.
   consoles
   system-defined generics
   EDTs
   esoterics
   user-modified generics
   2. Switches
   ports
   switch configurations
   port matrix
   3. Processors
   partitions
   channel paths
   4. Control units
   5. I/O devices

F1=Help   F2=Split   F3=Exit   F9=Swap   F12=Cancel
```

Figure A-2 Define, Modify, Or View Configuration Data

```

Go to Filter Backup Query Help
-----
Control Unit List
Command ==>> _____ Scroll ==>> CSR
Select one or more control units, then press Enter. To add, use F11.

/ CU  Type +      #PR #MC Serial-# + Description
_ 002 ----- Add Control Unit -----
_ 004 |
_ 006 |
_ 008 | Specify or revise the following values.
_ 03E |
_ 074 | Control unit number . . . . . 2000 +
_ 082 | Control unit type . . . . . 2105_____ +
_ 0E2 |
_ 240 | Serial number . . . . . _____
_ 240 | Description . . . . . _____
_ 300 |
_ 300 | Connected to switches . . . _ _ _ _ _ _ _ _ _ _ _ _ +
_ 300 | Ports . . . . . _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ +
_ 300 |
_ 300 | If connected to a switch:
_ 300 |
_ 300 | Define more than eight ports . . 2 1. Yes
_ 300 |                                     2. No
_ 300 | Propose CHPID/link addresses and
_ 300 | unit addresses . . . . . 2 1. Yes
_ 310 |                                     2. No
_ 310 | F1=Help   F2=Split   F3=Exit   F4=Prompt   F5=Reset   F9=Swap
_ 310 | F12=Cancel
_ 310 |-----|-----|-----|-----|-----|-----|
_ 310 | New IODF SDIODF.IODF07.WORK defined. |-----|-----|-----|
_ 310 |-----|-----|-----|-----|-----|-----|
_ 3108 SCTC          1      _____
_ 3109 SCTC          1      _____
_ 310A SCTC          1      _____
_ 4000 2105         1      _____
_ 4100 2105         1      _____
F1=Help   F2=Split   F3=Exit   F4=Prompt   F5=Reset   F7=Backward
F8=Forward F9=Swap   F10=Actions F11=Add    F12=Cancel  F13=Instruct
F22=Command

```

Figure A-3 Add Control Unit Dialog Box


```

Go to Filter Backup Query Help
----- Select Processor / Control Unit -----
Row 1 of 1 More: >
Command ==> _____ Scroll ==> CSR

Select processors to change CU/processor parameters, then press Enter.

Control unit number . . : 2000      Control unit type . . . : 2105

          Log. Addr. -----Channel Path ID . Link Address + -----
/ Proc. ID Att. (CUADD) + 1----- 2----- 3----- 4----- 5----- 6----- 7----- 8-----
_ SYSTEMS _____
***** Bottom of data *****

| F1=Help      F2=Split      F3=Exit      F4=Prompt      F5=Reset
| F6=Previous  F7=Backward   F8=Forward   F9=Swap        F12=Cancel
| F20=Right    F22=Command
|-----|-----|-----|-----|-----|
_ 3007 SCTC      1      _____
_ 3008 SCTC      1      _____
_ 3009 SCTC      1      _____
_ 300A SCTC      1      _____
_ 3101 SCTC      1      _____
_ 3102 SCTC      1      _____
_ 3103 SCTC      1      _____
_ 3104 SCTC      1      _____
_ 3105 SCTC      1      _____
_ 3106 SCTC      1      _____
_ 3107 SCTC      1      _____
_ 3108 SCTC      1      _____
_ 3109 SCTC      1      _____
_ 310A SCTC      1      _____
_ 4000 2105      1      _____
_ 4100 2105      1      _____
F1=Help      F2=Split      F3=Exit      F4=Prompt      F5=Reset      F7=Backward
F8=Forward   F9=Swap      F10=Actions  F11=Add       F12=Cancel   F13=Instruct
F22=Command

```

Figure A-4 **Selecting Figure the Operating System**

```

Go to Filter Backup Query Help
----- Select Processor / Control Unit -----
Command ==> ----- Actions on selected processors -----
Select proces
Control unit
/ Proc. ID At
/ SYSTEMS
*****
          1. Select (connect, change) . . . . . (s)
          2. Group connect . . . . . (g)
          3. Disconnect . . . . . (n)
          F1=Help    F2=Split    F3=Exit    F9=Swap    F12=Cancel

F1=Help    F2=Split    F3=Exit    F4=Prompt    F5=Reset
F6=Previous F7=Backward F8=Forward F9=Swap      F12=Cancel
F20=Right  F22=Command

_ 3007 SCTC      1
_ 3008 SCTC      1
_ 3009 SCTC      1
_ 3109 SCTC      1
_ 310A SCTC      1
_ 4000 2105      1
_ 4100 2105      1
F1=Help    F2=Split    F3=Exit    F4=Prompt    F5=Reset    F7=Backward
F8=Forward F9=Swap     F10=Actions F11=Add      F12=Cancel  F13=Instruct
F22=Command

```

Figure A-5 **Select, Change Option**

```

Go to Filter Backup Query Help
----- Select Processor / Control Unit -----
C ----- Add Control Unit -----
S
C Specify or revise the following values.
Control unit number . : 2000          Type . . . . . : 2105
Processor ID . . . . . : SYSTEMS
/
/ Channel path IDs . . . . 31  32  33  34  54  55  56  57  +
* Link address . . . . . _  _  _  _  _  _  _  _  +
Unit address . . . . . 00  _  _  _  _  _  _  _  +
Number of units . . . . 256  _  _  _  _  _  _  _
Logical address . . . . 0_  + (same as CUADD)
Protocol . . . . . _  + (D,S or S4)
I/O concurrency level . 2  + (1, 2 or 3)
F
-- F1=Help      F2=Split    F3=Exit      F4=Prompt    F5=Reset    F9=Swap
_3 F12=Cancel
_3
_ 3009 SCTC      1
_ 4000 2105     1
_ 4100 2105     1
F1=Help      F2=Split    F3=Exit      F4=Prompt    F5=Reset    F7=Backward
F8=Forward   F9=Swap     F10=Actions  F11=Add      F12=Cancel  F13=Instruct
F22=Command

```

Figure A-6 Control Unit chpid, CUADD, and Device Address Range Addressing

```

----- Define, Modify, or View Configuration Data -----
Select type of objects to define, modify, or view data.
_5 1. Operating system configurations                               ← Select option 5.
   consoles
   system-defined generics
   EDTs
   esoterics
   user-modified generics
2. Switches
   ports
   switch configurations
   port matrix
3. Processors
   partitions
   channel paths
4. Control units
5. I/O devices
F1=Help      F2=Split    F3=Exit      F9=Swap     F12=Cancel

```

Figure A-7 Define, Modify, Or View Configuration Data

```

Goto Filter Backup Query Help
-----
I/O Device List      Row 4854 of 9653 More:  >
Command ==>> _____ Scroll ==>> CSR

Select one or more devices, then press Enter. To add, use F11.          ← Press PF11.

-----Device-----  --#--  -----Control Unit Numbers + -----
/ Number Type +      PR OS 1--- 2--- 3--- 4--- 5--- 6--- 7--- 8--- Base
_ 8100 3390B          1 1 8100 _____ _____ _____ _____ _____
_ 8102 3390B          1 1 8100 _____ _____ _____ _____ _____
_ 8103 3390B          1 1 8100 _____ _____ _____ _____ _____
_ 8104 3390B          1 1 8100 _____ _____ _____ _____ _____
_ 8105 3390B          1 1 8100 _____ _____ _____ _____ _____
_ 8106 3390B          1 1 8100 _____ _____ _____ _____ _____
_ 8107 3390B          1 1 8100 _____ _____ _____ _____ _____
_ 8108 3390B          1 1 8100 _____ _____ _____ _____ _____
_ 8109 3390B          1 1 8100 _____ _____ _____ _____ _____
_ 810A 3390B          1 1 8100 _____ _____ _____ _____ _____
_ 810B 3390B          1 1 8100 _____ _____ _____ _____ _____
_ 810C 3390B          1 1 8100 _____ _____ _____ _____ _____

```

Figure A-8 I/O Device List

```

                          Add Device

Specify or revise the following values.

Device number . . . . . 8101 (0000 - FFFF)          ← Enter device number.
Number of devices . . . . . 1                      ← Enter # of devices.
Device type . . . . . 3390B                        ← Enter device type.

Serial number . . . . . _____
Description . . . . . HDS 9980V PAV                ← Enter
description.

Volume serial number . . . . . _____ (for DASD)

Connected to CUs . . 8100 _____              ← Enter CU.

F1=Help   F2=Split   F3=Exit   F4=Prompt   F5=Reset   F9=Swap
F12=Cancel -

```

Figure A-9 Add Device

```

Device / Processor Definition
Row 1 of 1
Command ==> _____ Scroll ==> CSR

Select processors to change device/processor definitions, then press
Enter.

Device number . . : 8101          Number of devices . : 1
Device type . . . : 3390B

Preferred Explicit Device
/ Processor ID  UA + Time-Out STADET CHPID + Candidate List
/ SYSTEM#S     _  No         Yes   _   No         ← Select processor.
***** Bottom of data *****

F1=Help      F2=Split    F3=Exit     F4=Prompt   F5=Reset
F6=Previous  F7=Backward F8=Forward  F9=Swap     F12=Cancel
F22=Command

```

Figure A-10 Device / Processor Definition Dialog Box – Selecting the Processor ID

```

Define Device / Processor

Specify or revise the following values.

Device number . : 8101          Number of devices . . . . : 1
Device type . . : 3390B
Processor ID . . : SYSTEM#S     Lab System - F9 - Skyline

Unit address . . . . . 01 + (Only necessary when different from
                           the last 2 digits of device number)
Time-Out . . . . . No (Yes or No)
STADET . . . . . Yes (Yes or No)

Preferred CHPID . . . . . _ +
Explicit device candidate list . No (Yes or No)

F1=Help      F2=Split    F3=Exit     F4=Prompt   F5=Reset   F9=Swap
F12=Cancel -

```

Figure A-11 Define Device / Processor Dialog Box

```

Device / Processor Definition
Row 1 of 1
Command ==> _____ Scroll ==> CSR

Select processors to change device/processor definitions, then press
Enter.

Device number . . : 8101          Number of devices . : 1
Device type . . . : 3390B

Preferred Explicit Device
/ Processor ID  UA + Time-Out  STADET  CHPID +  Candidate List
/ SYSTEM#S     01   No         Yes     ___     No         ← Select processor.
***** Bottom of data *****

F1=Help      F2=Split    F3=Exit     F4=Prompt   F5=Reset
F6=Previous  F7=Backward F8=Forward  F9=Swap     F12=Cancel
F22=Command

```

Figure A-12 Device / Processor Definition Dialog Box

```

Define Device to Operating System Configuration
Row 1 of 1
Command ==> _____ Scroll ==> CSR

Select OSs to connect or disconnect devices, then press Enter.

Device number . . : 8101          Number of devices : 1
Device type . . . : 3390B

/ Config. ID  Type      Description          Defined
/ LABSYSTEM  MVS        OS Configuration List (EDT's)
***** Bottom of data *****
← Select OS.

F1=Help      F2=Split    F3=Exit     F4=Prompt   F5=Reset
F6=Previous  F7=Backward F8=Forward  F9=Swap     F12=Cancel
F22=Command

```

Figure A-13 Define Device to OS Configuration Dialog Box – Selecting the OS Configuration

```

                Actions on selected operating systems

Select by number or action code and press Enter.

_1 1. Select (connect, change) . . . . . (s)           ← Select option 1.
   2. Disconnect from OS . . . . . (n)

F1=Help   F2=Split   F3=Exit   F9=Swap   F12=Cancel -

```

Figure A-14 Select / Disconnect Option

```

                Define Device Parameters / Features
                                                    Row 1 of 6
Command ==> _____ Scroll ==> CSR

Specify or revise the values below.

Configuration ID . : LABSYSTM      OS Configuration List (EDT's)
Device number . . : 8101          Number of devices : 1
Device type . . . : 3390B

Parameter/
Feature   Value   P Req.  Description
OFFLINE   No                Device considered online or offline at IPL
DYNAMIC   Yes                Device supports dynamic configuration
LOCANY    No                UCB can reside in 31 bit storage
WLMPAV    Yes                Device supports work load manager ← WLMPAV parameter.
SHARED    Yes                Device shared with other systems
SHAREDUP  No                Shared when system physically partitioned
***** Bottom of data *****

F1=Help   F2=Split   F3=Exit   F4=Prompt   F5=Reset
F7=Backward F8=Forward F9=Swap   F12=Cancel  F22=Command -

```

Figure A-15 HCD Device Parameters

Displaying Compatible PAV Device Parameters

You can display the device parameters using HCD to determine if a specific device is eligible for Dynamic Compatible PAV management by WLM. To display the device parameters:

1. Starting from the I/O Device List dialog box (see Figure A-16), select the desired device by entering a "/" by the device number. In our example, we have selected device 8101.
2. After you select the desired device, you are prompted to select the desired action (see Figure A-17). Select option 8 to open the View Device Definition dialog box.
3. Review the information on the View Device Definition dialog box (see Figure A-18), and press Enter to continue.
4. Select the processor definition on the View Device / Processor Definition dialog box (see Figure A-19).
5. Review the candidate list for this device (see Figure A-20), and press Enter to continue.
6. On the View Device / OS Configuration Definitions dialog box (see Figure A-21), select the OS configuration.
7. The View Device Parameter / Feature Definition dialog box (see Figure A-22) displays the WLMPAV device parameters.

```

Go to Filter Backup Query Help
-----
I/O Device List      Row 4854 of 9653 More:      >
Command ===> _____ Scroll ===> CSR

Select one or more devices, then press Enter. To add, use F11.

-----Device----- --#-- -----Control Unit Numbers + -----
/ Number Type +      PR OS 1--- 2--- 3--- 4--- 5--- 6--- 7--- 8--- Base
_ 8100 3390B          1  1 8100 _____
/ 8101 3390B          1  1 8100 _____      ← Select
device.
_ 8102 3390B          1  1 8100 _____
_ 8103 3390B          1  1 8100 _____
_ 8104 3390B          1  1 8100 _____
_ 8105 3390B          1  1 8100 _____
_ 8106 3390B          1  1 8100 _____
_ 8107 3390B          1  1 8100 _____
_ 8108 3390B          1  1 8100 _____
_ 8109 3390B          1  1 8100 _____
_ 810A 3390B          1  1 8100 _____
_ 810B 3390B          1  1 8100 _____
_ 810C 3390B          1  1 8100 _____

```

Figure A-16 Device Selection Display


```

                Actions on selected devices

Select by number or action code and press Enter.

_8  1. Add like . . . . . (a)           ← Select option 8.
    2. Change . . . . . (c)
    3. CSS group change . . . . . (g)
    4. OS group change . . . . . (o)
    5. Device type group change . . . . . (t)
    6. Prime serial number and VOLSER . . (i)
    7. Delete . . . . . (d)
    8. View device definition . . . . . (v)
    9. View logical CU information . . . . (l)
   10. View related CTC connections . . . (k)
   11. View graphically . . . . . (h)

F1=Help   F2=Split   F3=Exit   F9=Swap   F12=Cancel

```

Figure A-17 **Actions on Selected Devices**

```

                View Device Definition

Device number . . . . . : 8101
Device type . . . . . : 3390B

Serial number . . . . . :
Description . . . . . : HDS 9980V PAV - 8101 (B)

Volume serial number . . . . :          (for DASD)

Connected to CUs : 8100

ENTER to continue.           ← Press Enter to continue.

F1=Help   F2=Split   F3=Exit   F9=Swap   F12=Cancel -

```

Figure A-18 **View Device Definition**

```

View Device / Processor Definition
Row 1 of 1
Command ==> _____ Scroll ==> CSR

Select one or more processors to view the device candidate list, or
ENTER to continue without selection.

Device number . : 8101      Device type . : 3390B

Preferred Explicit Device
/ Processor ID UA  Time-Out STADET CHPID      Candidate List
_ SYSTEM#S     00  No       Yes         Yes         ← Select processor.
***** Bottom of data *****

F1=Help      F2=Split    F3=Exit     F6=Previous  F7=Backward
F8=Forward   F9=Swap     F12=Cancel  F22=Command

```

Figure A-19 Selecting the Processor Definition

```

View Device Candidate List
Row 1 of 5
Command ==> _____ Scroll ==> CSR

The following partitions are allowed to have access to the
device.

Device number . : 8101      Device type . . . : 3390B
Processor ID . . : SYSTEM#S  Lab System - F9 - Skyline

ENTER to continue.                                     ← Press Enter to continue.

Partition Name  Description                      Reachable
AS04            System A / LPAR 4                     Yes
DASDPERF       DASD Performance & Testing            Yes
MVSLAB         MVS Lab System - OS/390 2.9           Yes
OS390          OS/390 Testing (ie. SYSPLEX)          Yes
VMLAB          VM Lab System - VM/ESA 1.2.0          Yes
***** Bottom of data *****

F1=Help      F2=Split    F3=Exit     F7=Backward  F8=Forward
F9=Swap     F12=Cancel  F22=Command -

```

Figure A-20 View Device Candidate List

```

View Device / OS Configuration Definitions
Row 1 of 1
Command ==> _____ Scroll ==> CSR
Select OSs to view more details, then press Enter.
Device number . : 8101 Device type . . : 3390B
/ Config. ID Type Description
/ LABSYSTM MVS OS Configuration List (EDT's) ← Select OS.
***** Bottom of data *****

F1=Help F2=Split F3=Exit F6=Previous F7=Backward
F8=Forward F9=Swap F12=Cancel F22=Command -

```

Figure A-21 Selecting the OS Configuration

```

~ View Device Parameter / Feature Definition
Row 1 of 6
Command ==> _____ Scroll ==> CSR
Configuration ID . : LABSYSTM OS Configuration List (EDT's)
Device number . . : 8100 Device type . . . : 3390B
Generic / VM device type . . . . : 3390
ENTER to continue.
Parameter/
Feature Value Req. Description
OFFLINE No Device considered online or offline at IPL
DYNAMIC Yes Device supports dynamic configuration
LOCANY Yes UCB can reside in 31 bit storage
WLMPAV Yes Device supports work load manager ← WLMPAV parameter.
SHARED Yes Device shared with other systems
SHAREDUP No Shared when system physically partitioned
***** Bottom of data *****

F1=Help F2=Split F3=Exit F7=Backward F8=Forward
F9=Swap F12=Cancel F22=Command -

```

Figure A-22 View Device Parameters

Checking the WLM PAV Settings

This appendix describes how to check the WLM PAV settings on your system.

To view or change the Workload Manager PAV settings:

1. On the WLM initial dialog box (see Figure B-1), press Enter to continue.
2. The Service Definition dialog box (see Figure B-2) allows you to define where the service coefficient information can be found. Select option 1 (Read saved definition).
3. On the Primary Options dialog box (see Figure B-3), select option 8 (Service Coefficients/Options) to display the WLM PAV settings.
4. The Service Coefficient/Service Definition Options dialog box (see Figure B-4) is used to set PAV Dynamic Alias Management.

```
Command ==> _____

                W  W  L      M  M
                W  W  L      MM MM
                W W W  L      M M M
                WW WW  L      M  M
                W   W  LLLLL  M   M

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                ENTER to continue
```

Figure B-1 **WLM Initial Dialog Box**

```

File Help
-----
Command ===> _____

~
  Choose Service Definition
  Select one of the following options.
  _1 1. Read saved definition
     2. Extract definition from WLM
       couple data set
     3. Create new definition

  F1=Help      F2=Split      F5=KeysHelp
  F9=Swap      F12=Cancel

  ENTER to continue
  
```

← *Select option 1.*

Figure B-2 WLM Choose Service Definition Dialog Box

```

File Utilities Notes Options Help
-----
Functionality LEVEL008      Definition Menu      WLM Appl LEVEL011
Command ===> _____

Definition data set . . . : none

Definition name . . . . . STANDARD (Required)
Description . . . . . Standard Definition

Select one of the
following options. . . . . _8 1. Policies
                               2. Workloads
                               3. Resource Groups
                               4. Service Classes
                               5. Classification Groups
                               6. Classification Rules
                               7. Report Classes
                               8. Service Coefficients/Options
                               9. Application Environments
                               10. Scheduling Environments
  
```

← *Select option 8.*

Figure B-3 WLM Primary Options Dialog Box

```

Coefficients/Options  Notes  Options  Help
-----
                Service Coefficient/Service Definition Options
Command ==> _____

Enter or change the Service Coefficients:

CPU . . . . . 1.0      (0.0-99.9)
IOC . . . . . 0.1      (0.0-99.9)
MSO . . . . . 0.0000   (0.0000-99.9999)
SRB . . . . . 1.0      (0.0-99.9)

Enter or change the service definition options:

I/O priority management . . . . . YES (Yes or No)
Dynamic alias management . . . . . YES (Yes or No)

```

Figure B-4 WLM Service Coefficient/Service Definition Options Dialog Box



Using Compatible Hyper PAV

This appendix describes the procedures for installing and uninstalling Compatible Hyper PAV. There are separate procedures for installations where the Compatible Hyper PAV is used from z/OS as well as the situation where z/OS is used as a guest OS on z/VM.

This appendix also describes the point to be checked when you change the setting to enable or disable Hyper PAV on the host computer and when you restart a USP V/VM storage system while using Compatible Hyper PAV.

When you use Compatible Hyper PAV on z/VM, USP V/VM must be defined as a support device of z/VM.

- **Conventions used in this section**

This section uses the following symbols and typefaces to explain each command operation:

italics

Indicates a type of an input value.

- (hyphen)

Use it to specify a range to enable settings (for example, 8101-81FF).

Installing Compatible Hyper PAV

Using Compatible Hyper PAV from z/OS

To install Compatible Hyper PAV on a z/OS host:

1. Upgrade the host software to support Hyper PAV (z/OS 1.8 or later or z/OS 1.6 with PTF or later).
2. If you have already installed USP V/VM, upgrade USP V/VM to the microcode version supporting Compatible Hyper PAV (60-02-4x or later). To upgrade USP V/VM, contact the Hitachi Technical Support Center.
3. Install the Compatible PAV software.
4. Install the Compatible Hyper PAV software.
5. Assign aliases.

If your installation is a new USP V/VM, and you have already assigned aliases to the base volumes for Compatible Hyper PAV, skip this step.

6. On the host computer, enable Hyper PAV.
7. Issue the DEVSERV QPAV command from the host to verify that the displayed aliases are those assigned for Compatible Hyper PAV.

There are two conditions:

If the aliases for Compatible Hyper PAV do not appear even if the DEVSERV QPAV command has been issued: Execute either of the following operations, and then issue the DEVSERV QPAV command and check the display again.

- If the host accesses only the corresponding USP V/VM, disable Hyper PAV on the host computer, and then enable Hyper PAV again.
- If the host accesses other storage systems that use Hyper PAV, issue the following commands from the host to all base devices in the corresponding CU.

```
V base-device-number1 - base-device-number2,OFFLINE
CF CHP(channel-pass1 - channel-pass2),OFFLINE
CF CHP(channel-pass1 - channel-pass2),ONLINE
V base-device-number1 - base-device-number2,ONLINE
```

If Cross-OS File Exchange is being used on the host computer: After installing Compatible Hyper PAV, issue the following commands:

```
V Cross-OS-File-Exchange-volume-number1 - Cross-OS-File-Exchange-volume-number2, OFFLINE
V Cross-OS-File-Exchange-volume-number1 - Cross-OS-File-Exchange-volume-number2, ONLINE
```

Using Compatible Hyper PAV from a Guest OS z/OS on z/VM

To install Compatible Hyper PAV on a z/OS system which is a guest OS on z/VM:

1. Upgrade the host software to support Hyper PAV.
 - a. z/VM: z/VM 5.3 or later
 - b. z/OS (guest OS): 1.8 or later, or z/OS 1.6 with PTF or later
2. If you have already installed USP V/VM, upgrade USP V/VM to the microcode version supporting Compatible Hyper PAV (60-03-2x or later). If you want to upgrade USP V/VM, contact the Hitachi Technical Support Center.
3. Install the Compatible PAV software.
4. Install the Compatible Hyper PAV software.
5. Assign aliases.

If your installation is a new USP V/VM, and you have already assigned aliases to the base volumes for Compatible Hyper PAV, skip this step.
6. On z/VM, enable Hyper PAV.
7. On the z/OS which is used as a guest OS on z/VM, enable Hyper PAV.
8. Issue the QUERY PAV command from z/VM, and make sure that the displayed aliases are those assigned for Compatible Hyper PAV.
9. Issue the DEVSERV QPAV command from z/OS, and make sure that the displayed aliases are those assigned for Compatible Hyper PAV.

When the aliases for Compatible Hyper PAV are not displayed after DEVSERV QPAV command is issued from z/OS or QUERY PAV command issued from z/VM, execute either of the following operations, and then issue the command and check the display again.

- If the host accesses only the corresponding USP V/VM, disable Hyper PAV on the host computer, and then enable Hyper PAV again.
- If the host accesses other storage systems that use Hyper PAV, execute the following procedure.
 - a) Issue the following command from z/OS which is used as a guest OS on z/VM to all base devices in the corresponding CU.

```
V base-device-number1 - base-device-number2,OFFLINE
```

b) Issue the following commands from z/VM to all base devices and alias devices used for Compatible Hyper PAV in the corresponding CU.

```
DET alias-device-number1 - alias-device-number2
DET base-device-number1 - base-device-number2
VARY OFFLINE alias-device-number1 - alias-device-number2
VARY OFFLINE base-device-number1 - base-device-number2
VARY OFFLINE CHPID channel-pass1
VARY OFFLINE CHPID channel-pass2
:
VARY ONLINE CHPID channel-pass1
VARY ONLINE CHPID channel-pass2
:
VARY ONLINE base-device-number1 - base-device-number2
VARY ONLINE alias-device-number1 - alias-device-number2
ATT base-device-number1 - base-device-number2*
ATT alias-device-number1 - alias-device-number2*
```

c) Issue the following command from z/OS to all base devices in the corresponding CU.

```
V base-device-number1 - base-device-number2,ONLINE
```

d) Issue the following command from z/OS to all channel paths configured on the corresponding CU. This command must be issued for each channel path.

```
V PATH(base-device-number1 - base-device-number2, channel-pass),ONLINE
```

Restarting USP V/VM While Using Compatible Hyper PAV

Using Compatible Hyper PAV from z/OS

When you restart a USP V/VM storage system while using Compatible Hyper PAV, issue the DEVSERV QPAV command from the host after restarting the USP V/VM. Verify that the aliases displayed as the ones assigned for Compatible Hyper PAV.

If these aliases cannot be displayed as for Compatible Hyper PAV, issue the following commands to all base devices in the corresponding CU, and then check them again.

```
V base-device-number1 - base-device-number2,OFFLINE
CF CHP(channel-pass1 - channel-pass2),OFFLINE
CF CHP(channel-pass1 - channel-pass2),ONLINE
V base-device-number1 - base-device-number2,ONLINE
```

Using Compatible Hyper PAV from z/OS When Used as a Guest OS on z/VM

When you restart a USP V/VM storage system while using Compatible Hyper PAV, issue the DEVSERV QPAV command from z/OS, and the QUERY PAV command from z/VM (after restarting the USP V/VM). Verify that the aliases displayed as the ones assigned for Compatible Hyper PAV. If these aliases cannot be displayed as for Compatible Hyper PAV, execute this procedure and then check the results again.

1. Issue this command from z/OS which is used as a guest OS on z/VM to all base devices in the corresponding CU.

```
V base-device-number1 - base-device-number2,OFFLINE
```

2. Issue these commands from z/VM to all base devices and alias devices used for Compatible Hyper PAV in the corresponding CU.

```
DET alias-device-number1 - alias-device-number2
DET base-device-number1 - base-device-number2
VARY OFFLINE alias-device-number1 - alias-device-number2
VARY OFFLINE base-device-number1 - base-device-number2
VARY OFFLINE CHPID channel-pass1
VARY OFFLINE CHPID channel-pass2
:
VARY ONLINE CHPID channel-pass1
VARY ONLINE CHPID channel-pass2
:
VARY ONLINE base-device-number1 - base-device-number2
VARY ONLINE alias-device-number1 - alias-device-number2
ATT base-device-number1 - base-device-number2*
ATT alias-device-number1 - alias-device-number2*
```

3. Issue this command from z/OS to all base devices in the corresponding CU.
`V base-device-number1 - base-device-number2,ONLINE`
4. Issue the following command from z/OS to all channel paths set on the corresponding CU. The command has to be issued to each channel path.
`V PATH(base-device-number1 - base-device-number2, channel-pass),ONLINE`

Enabling/Disabling Hyper PAV with Cross-OS File Exchange

If you change the setting to enable or disable Hyper PAV on z/OS while using Compatible Hyper PAV, and if you use Cross-OS File Exchange on z/OS computer, issue the following commands to all Cross-OS File Exchange volumes after you enable or disable Hyper PAV on the host computer.

```
V Cross-OS-File-Exchange-volume-number1 - Cross-OS-File-Exchange-volume-number2, OFFLINE
```

```
V Cross-OS-File-Exchange-volume-number1 - Cross-OS-File-Exchange-volume-number2, ONLINE
```

Uninstalling Compatible Hyper PAV

Using Compatible Hyper PAV from z/OS

To uninstall Compatible Hyper PAV when you use Compatible Hyper PAV from z/OS:

1. On the host computer, disable Hyper PAV.
2. Uninstall the Compatible Hyper PAV software.
For information on uninstall of Storage Navigator software, please refer to the *Storage Navigator User's Guide*.
3. Execute the **DEVSERV (DS)** command as shown below from the host to a device per CU:
DS QD,xxx,VALIDATE (XXX = device number)
4. Issue the DEVSERV QPAV command and make sure that the displayed aliases are those assigned for Compatible PAV.

Hyper PAV and Cross-OS File Exchange are still used on the other storage systems which are accessed from the corresponding host:

Execute the following procedure to uninstall Compatible Hyper PAV only from the target USP V/VM.

1. Issue the following commands to all base devices in the corresponding CU.

```
V base-device-number1 - base-device-number2,OFFLINE  
CF CHP(channel-pass1 - channel-pass2),OFFLINE
```
2. Uninstall the Compatible Hyper PAV software.
For information on uninstall of Storage Navigator software, please refer to the *Storage Navigator User's Guide*.
3. Issue the following commands to all base devices in the corresponding CU.

```
CF CHP(channel-pass1 - channel-pass2),ONLINE  
V base-device-number1 - base-device-number2,ONLINE
```
4. Issue the DEVSERV QPAV command and make sure that the displayed aliases are those assigned for Compatible PAV.

The aliases for Compatible PAV cannot be displayed after DEVSERV QPAV command has been issued from the host.

Execute either of the following operations, and then issue the command and check the display again.

- If the host accesses only the corresponding USP V/VM, enable Hyper PAV on the host computer, and then disable Hyper PAV again.
- If the host accesses other storage systems that use Hyper PAV, execute the following commands to all base devices in the corresponding CU.

```
V base-device-number1 - base-device-number2,OFFLINE
CF CHP(channel-pass1 - channel-pass2),OFFLINE
CF CHP(channel-pass1 - channel-pass2),ONLINE
V base-device-number1 - base-device-number2,ONLINE
```

Uninstalling Compatible Hyper PAV: Guest OS on z/VM

To uninstall Compatible Hyper PAV when you use Compatible Hyper PAV from z/OS that is used as a guest OS on z/VM:

1. On the host computer, disable Hyper PAV.

2. Uninstall the Compatible Hyper PAV software.

For information on uninstall of Storage Navigator software, please refer to the *Storage Navigator User's Guide*.

3. Execute the **DEVSERV (DS)** command as shown below from z/OS which is used as a guest OS on z/VM to an arbitrary device per CU:

```
DS QD,xxx,VALIDATE (XXX = device number)
```

4. Issue the QUERY PAV command from z/VM to make sure that the displayed aliases are those assigned for Compatible PAV.

5. Issue the DEVSERV QPAV command from z/OS to make sure that the displayed aliases are those assigned for Compatible PAV.

When the aliases for Compatible PAV are not displayed after the DEVSERV QPAV command is issued from z/OS or the QUERY PAV command is issued from z/VM, execute either of the following operations, and then issue the command and check the display again.

- If the host accesses only the corresponding USP V/VM, enable Hyper PAV on the host computer, and then disable Hyper PAV again.
- If the host accesses other storage systems that use Hyper PAV, execute the following procedure:

a) Issue the following command from z/OS which is guest OS on z/VM to all base devices in the corresponding CU.

```
V base-device-number1 - base-device-number2,OFFLINE
```

b) Issue the following commands from z/VM to all base devices and alias devices used for Compatible Hyper PAV in the corresponding CU.

```
DET alias-device-number1 - alias-device-number2
DET base-device-number1 - base-device-number2
VARY OFFLINE alias-device-number1 - alias-device-number2
VARY OFFLINE base-device-number1 - base-device-number2
VARY OFFLINE CHPID channel-pass1
VARY OFFLINE CHPID channel-pass2
      :
VARY ONLINE CHPID channel-pass1
VARY ONLINE CHPID channel-pass2
      :
VARY ONLINE base-device-number1 - base-device-number2
VARY ONLINE alias-device-number1 - alias-device-number2
ATT base-device-number1 - base-device-number2*
ATT alias-device-number1 - alias-device-number2*
```

c) Issue the following command from z/OS to all base devices in the corresponding CU.

```
V base-device-number1 - base-device-number2,ONLINE
```

d) Issue the following command from z/OS to all channel paths configured on the corresponding CU. The command has to be issued to each channel path.

```
V PATH(base-device-number1 - base-device-number2, channel-pass),ONLINE
```



Acronyms and Abbreviations

APAR	Authorized Problem Analysis Report
CC	Concurrent Copy
CCW	channel command word
CH	Channel
CHA	channel adapter
CHP	channel path
CU	control unit
CUIR	Control Unit Initiated Reconfiguration
DASD	direct-access storage device
DB2	DATABASE 2
DFSMS	Data Facility Storage Management Subsystem
DS	DEVSERV
DSF	Device Support Facilities
ERP	error recovery procedure
ESA	Enterprise Systems Architecture
GB	gigabytes (see Convention for Storage Capacity Values)
HCD	hardware configuration definition
HDD	hard disk drive
I/O	input/output
IBM	International Business Machines Corporation
ICS	Installation Control Specification
ID	Identification
IOCP	input/output configuration program
IODF	input/output definition file
IPL	initial program load
IPS	Installation Performance Specification
ISPF/PDF	Interactive System Productivity Facility/package definition file
JCL	job control language
KB	kilobytes (see Convention for Storage Capacity Values)
LAN	local-area network
LCU	logical control unit

LDEV	logical device
LU	logical unit
LVI	logical volume image (e.g., 3390-3R)
max	Maximum
MB	megabytes (see Convention for Storage Capacity Values)
MIH	missing interrupt handler
min	minimum, minutes
MVS	Multiple Virtual Storage
NUM	Number
PAV	Parallel Access Volume
PB	petabytes (see Convention for Storage Capacity Values)
PC	personal computer system
PPRC	Peer-to-Peer Remote Copy
PTF	program temporary fix
R	Release
R-SIM	remote service information message
RAID	redundant array of independent disks
rnd	Random
S/390	System/390
SCI	state-change-interrupt
SCP	state-change-pending
sec	Seconds
seq	Sequential
SIM	service information message
Siz	ShadowImage for z/OS
SMS	Storage Management Subsystem
S/N	serial number (also abbreviated as s#)
SSB	sense byte
SSCH	start subchannel
SSID	storage subsystem identification
SVP	service processor
TB	terabyte (see Convention for Storage Capacity Values)
TCz	TrueCopy for z/OS
TCzA	TrueCopy for z/OS Asynchronous
UA	unit address
UCB	unit control block
V	Version
VM	Virtual Machine
vol	Volume
VOLSER	volume serial number
VSE	Virtual Storage Extended
VTOC	volume table of contents
WLM	Workload Manager
XRC	Extended Remote Copy

Hitachi Data Systems

Corporate Headquarters

750 Central Expressway
Santa Clara, California 95050-2627
U.S.A.
Phone: 1 408 970 1000
www.hds.com
info@hds.com

Asia Pacific and Americas

750 Central Expressway
Santa Clara, California 95050-2627
U.S.A.
Phone: 1 408 970 1000
info@hds.com

Europe Headquarters

Sefton Park
Stoke Poges
Buckinghamshire SL2 4HD
United Kingdom
Phone: + 44 (0)1753 618000
info.eu@hds.com



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