

# Hitachi Virtual Storage Platform Hitachi Compatible PAV User Guide

## **FASTFIND LINKS**

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# Preface

This document describes and provides instructions for performing Hitachi Compatible PAV operations on the Hitachi Virtual Storage Platform (VSP) storage system.

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

This preface includes the following information:

- [Intended audience](#)
- [Product version](#)
- [Document revision level](#)
- [Changes in this revision](#)
- [Referenced documents](#)
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- [Convention for storage capacity values](#)
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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 Virtual Storage Platform storage system.

Readers of this document should meet the following requirements:

- You should have a background in data processing and understand RAID storage systems and their basic functions.
- You should be familiar with the Hitachi Virtual Storage Platform storage system, and you should have read the *Hitachi Virtual Storage Platform User and Reference Guide*.
- You should be familiar with the Storage Navigator software for the Hitachi Virtual Storage Platform, and you should have read the *Storage Navigator User Guide*.
- You should be familiar with the IBM Parallel Access Volume (PAV) software on the mainframe host.

## Product version

This document revision applies to Hitachi VSP microcode 70-02-5x or later.

## Document revision level

Revision	Date	Description
MK-90RD7012-00	October 2010	Initial release.
MK-90RD7012-01	April 2011	Supersedes and replaces MK-90RD7012-00.
MK-90RD7012-02	August 2011	Supersedes and replaces MK-90RD7012-01.

## Changes in this revision

Changes in this revision include:

- Updating the microcode version in the Preface.
- Updating the procedure [To assign aliases to base volumes in the VSP: on page 5-2](#) in [Performing Hitachi Compatible PAV operations on page 5-1](#).

## Referenced documents

Hitachi Virtual Storage Platform documentation:

- *Hitachi Command Control Interface User and Reference Guide*, MK-90RD7010
- *Provisioning Guide for Open Systems*, MK-90RD7022
- *Hitachi Virtual Storage Platform User and Reference Guide*, MK-90RD7042



- *Hitachi Storage Navigator User Guide, MK-90RD7027*
- *Hitachi Virtual Storage Platform Storage Navigator Messages, MK-90RD7028*

IBM documentation:

- *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 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
<a href="#">Chapter 1, Overview</a>	Provides an overview of Hitachi Compatible PAV and Hyper PAV.
<a href="#">Chapter 2, Requirements and specifications</a>	Describes the requirements and specifications for Hitachi Compatible PAV.
<a href="#">Chapter 3, Defining devices</a>	Provides information about selecting base and alias device ratios, and provides instructions for defining logical control units (LCUs) and devices using Hardware Configuration Definition (HCD).
<a href="#">Chapter 4, Preparing for Compatible PAV operations</a>	Provides instructions for preparing to use Hitachi Compatible PAV.
<a href="#">Chapter 5, Performing Hitachi Compatible PAV operations</a>	Provides instructions for performing PAV operations using Hitachi Compatible PAV on Storage Navigator.
<a href="#">Chapter 6, Verifying and monitoring devices</a>	Provides instructions for verifying base and alias devices, and describes the commands used to monitor PAV and Hyper PAV activities from the host computer.
<a href="#">Chapter 7, Troubleshooting</a>	Provides troubleshooting information for Hitachi Compatible PAV.
<a href="#">Appendix A, Disabling Compatible Hyper PAV</a>	Provides instructions for disabling Hitachi Compatible PAV on the storage system.
<a href="#">Appendix B, Hitachi Compatible PAV GUI reference</a>	Describes the Storage Navigator windows and dialog boxes for Hitachi Compatible PAV.

## Document conventions

This document uses the following typographic conventions:

Convention	Description
<b>Bold</b>	Indicates text on a window or dialog box, including window and dialog box names, menus, menu options, buttons, fields, and labels. Example: Click <b>OK</b> .
<i>Italic</i>	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: copy <i>source-file</i> <i>target-file</i> <b>Note:</b> Angled brackets (< >) are also used to indicate variables.
screen/code	Indicates text that is displayed on screen or entered by the user. Example: # pairdisplay -g oradb
< > angled brackets	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: # pairdisplay -g <group> <b>Note:</b> 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.

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

Icon	Meaning	Description
	Tip	Provides helpful information, guidelines, or suggestions for performing tasks more effectively.
	Note	Calls attention to important and/or additional information.
	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:

Physical capacity unit	Value
1 KB	1,000 bytes
1 MB	1,000 <sup>2</sup> bytes

Physical capacity unit	Value
1 GB	1,000 <sup>3</sup> bytes
1 TB	1,000 <sup>4</sup> bytes
1 PB	1,000 <sup>5</sup> bytes
1 EB	1,000 <sup>6</sup> bytes

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

Logical capacity unit	Value
1 KB	1,024 bytes
1 MB	1,024 KB or 1,024 <sup>2</sup> bytes
1 GB	1,024 MB or 1,024 <sup>3</sup> bytes
1 TB	1,024 GB or 1,024 <sup>4</sup> bytes
1 PB	1,024 TB or 1,024 <sup>5</sup> bytes
1 EB	1,024 PB or 1,024 <sup>6</sup> bytes
1 block	512 bytes

## Accessing product documentation

The Hitachi Virtual Storage Platform user documentation is available on the Hitachi Data Systems Support Portal: <https://hdssupport.hds.com>. Please check this site for the most current documentation, including important updates that may have been made after the release of the product.

## Getting help

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

## Comments

Please send us your comments on this document: [doc.comments@hds.com](mailto:doc.comments@hds.com). Include the document title, number, and revision. Please refer to specific sections and paragraphs whenever possible.

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



# Overview

This topic provides an overview of Hitachi Compatible PAV.

- [Hitachi Compatible PAV](#)
- [Base and alias devices](#)
- [Hitachi Compatible PAV modes](#)
- [Workload Manager](#)
- [Compatible Hyper PAV](#)
- [Flow of I/O requests using Hitachi Compatible PAV](#)
- [Flow of I/O requests using Compatible Hyper PAV](#)

## Hitachi Compatible PAV

Compatible PAV runs on the VSP storage system. Compatible PAV enables a single IBM zSeries® or S/390® host computer to issue multiple I/O requests in parallel to a single logical device (LDEV).

For more information on the zSeries and S/390 PAV host software feature, see the following IBM documents:

- *DFSMS/MVS Software Support for IBM Enterprise Storage Server*, (SC26-7318)
- *DS8000 Performance Monitoring and Tuning*, (SG24-7146)
- *System/390 Command Reference 2105 Models E10, E20, F10, F20*, (SC26-7298)

## Base and alias devices

The two types of devices used in Compatible PAV operations are base devices and alias devices. The VSP storage system supports up to 256 devices per control unit (CU).

A base device is an LDEV that has a formatted mainframe emulated volume assigned which contains user data.



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**Caution:** A device that has been used as a journal volume in the Universal Replicator, as a volume used for Cross-OS File Exchange, or as a system disk or migration volume may not be defined as a base device.

---

An alias device is an unassigned LDEV whose unit address can be used as an alias for a base device. Each alias device must be within the same logical CU image as the base device to which it is assigned. Base and alias devices are defined to the host OS using a combination of HCD/IODF/IOCDS. Base devices are defined to the storage system when the mainframe emulated volumes are defined and installed.

Alias devices are created and installed with the Storage Navigator panels.

## Hitachi Compatible PAV modes

Compatible PAV operations may be performed in one of two standard operational modes. When the VSP is operating in IBM 2105 control unit emulation, Dynamic or Static PAV mode can be used. When the VSP is operating in IBM 2107 control unit emulation, Dynamic, Static Compatible PAV, or Compatible Hyper PAV modes can be used.

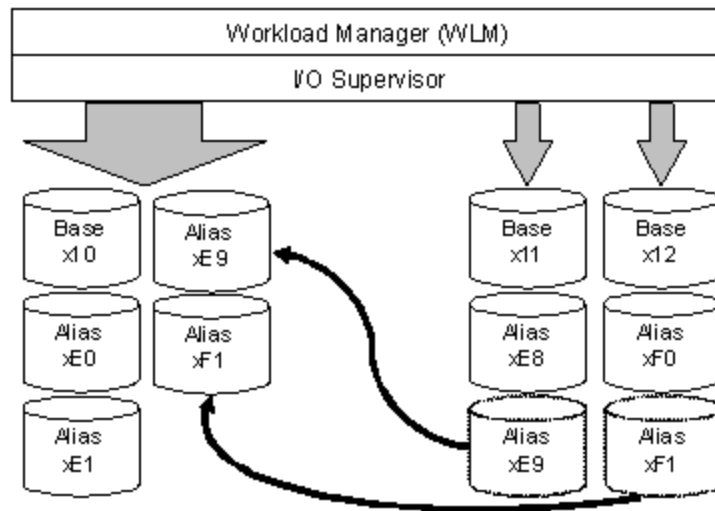
The Compatible PAV mode is controlled by the Dynamic alias management parameter setting for the IBM Workload Manager® (WLM) and the WLM PAV parameter setting in the HCD file.

## Hitachi Compatible PAV in dynamic mode

When Compatible PAV is in dynamic mode, the number of alias devices assigned to each base device may dynamically increase or decrease based on the number of I/O requests to each device. Dynamic mode assists in

balancing workloads on base devices and can optimize the speed of accessing data in the VSP. A dynamic Compatible PAV operation is implemented when the WLM feature for Dynamic alias management setting and the WLMPAV parameter setting in the HCD file are both set to *YES*.

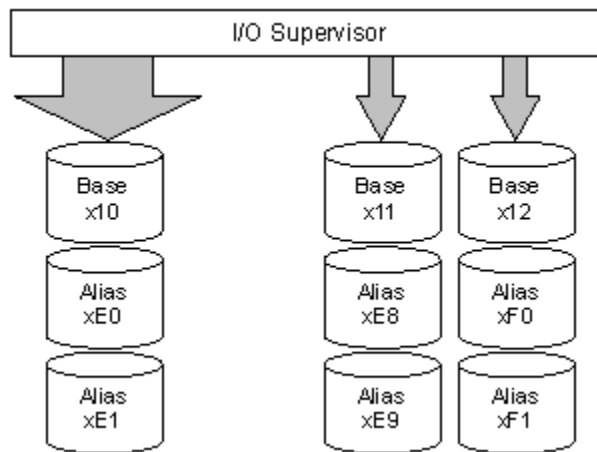
In the following figure, the x10, x11, and x12 base devices were originally assigned two alias devices each. In this example, as I/O requests converge on the base device x10 (indicated by the large arrow), the number of alias devices for base device x10 increases to four, while the number of alias devices assigned to the base devices x11 and x12 decreases to one each.



## Hitachi Compatible PAV in static mode

When Compatible PAV is in static mode, the number of alias devices assigned to each base device does not change, even when the number of I/O requests to each device changes. A static Compatible PAV operation is implemented when the WLM feature for Dynamic alias management setting and the WLMPAV parameter setting in the HCD file are both set to *NO*.

In the following figure, the x10, x11 and x12 base devices were originally assigned two alias devices each. In this example, as I/O requests converge on the base device x10 (indicated by the large arrow), the number of alias devices for each base device does not change.



## Workload Manager

The Workload Manager (WLM) is a software component of the MVS/ESA<sup>®</sup>, z/OS<sup>®</sup>, and OS/390<sup>®</sup> operating systems that enables the host computer to utilize Compatible PAV.

The WLM manages workloads on MVS systems and has two operation modes to support dynamic and static Compatible PAV operations.

### WLM in goal mode

The WLM must be in goal mode to support dynamic Compatible PAV operations. The WLM is in goal mode when the Dynamic alias management setting in the WLM Service Coefficient/Service Definition Options dialog box is set to *YES*. While in goal mode, the WLM manages the system to meet a performance goal.

### WLM in Compatibility mode

The WLM must be in compatibility mode to support static Compatible PAV operations. The WLM is in compatibility mode when the Dynamic alias management setting in the WLM Service Coefficient/Service Definition Options dialog box is set to *NO*. While in compatibility mode, WLM manages the system according to parameters in IPS and ICS (IEAIPSxx and IEAICSxx parmlib members).

## Compatible Hyper PAV

The Compatible Hyper PAV feature allows you to assign alias devices to one base device, but have all other base devices in the same CU share these aliases.

When using the Compatible Hyper PAV feature, the number of alias devices assigned to each base device does not need to change, as is required when using Compatible PAV in dynamic mode. With the Compatible Hyper PAV feature, a whole collection of alias devices can be mapped to one single base device in a CU.

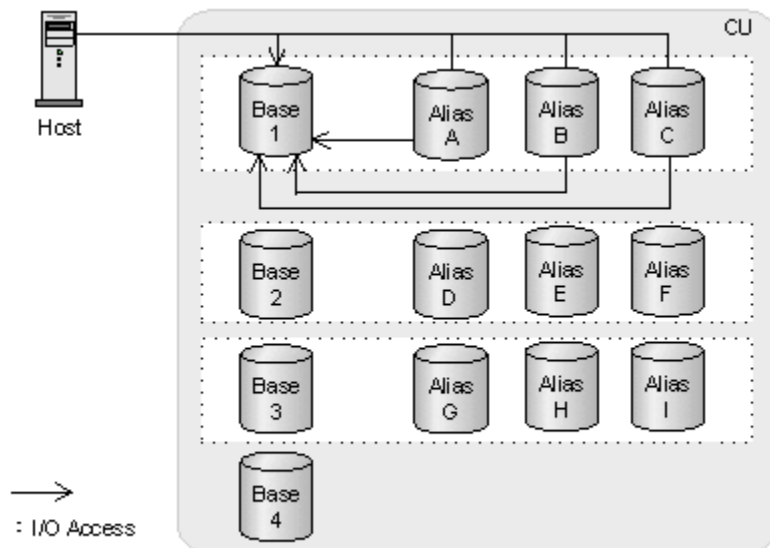


You can specify the PAV feature (Compatible PAV or Compatible Hyper PAV) to use for each host computer. Therefore, an alias device may accept I/O requests issued through Compatible PAV or Compatible Hyper PAV.

## Flow of I/O requests using Hitachi Compatible PAV

Multiple alias devices are assigned to a base device in a CU to enable the base device to handle multiple I/O requests.

In the following figure, three alias devices are each assigned to base devices 1, 2 and 3. As illustrated with the arrows in the figure, I/O requests converge on base device 1 when a host computer accesses the device using Compatible PAV. Since alias devices A, B, and C were assigned to base device 1 in advance of the operation, I/O requests are automatically issued to these alias devices. Similarly, if a host computer accesses base devices 2 and 3, the I/O requests are automatically issued to the alias devices assigned to those two base devices. Base device 4 is not able to process multiple I/O requests since no alias devices are assigned to the device.

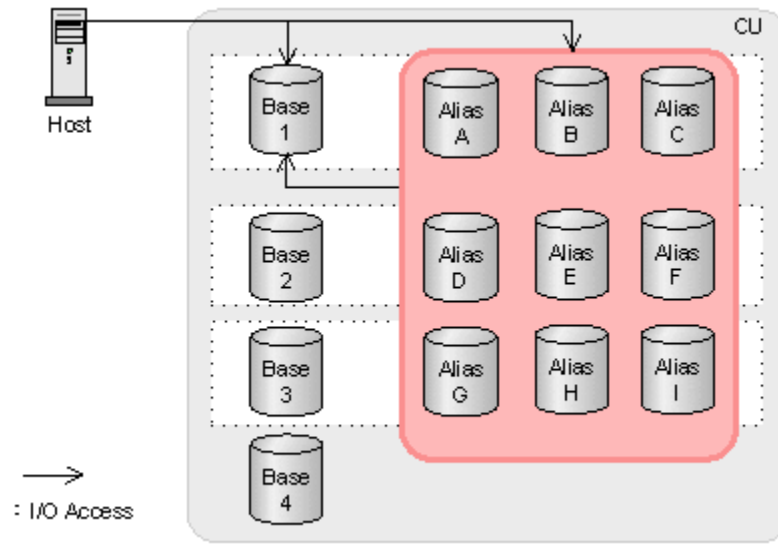


## Flow of I/O requests using Compatible Hyper PAV

Multiple alias devices are assigned to a base device in a CU to enable the base device to handle multiple I/O requests. In Compatible Hyper PAV, alias devices are *pooled* together in a single CU, meaning that all base devices in the CU share alias devices.

In the following figure, three alias devices each are assigned to base devices 1, 2, and 3. As illustrated with the arrows in the figure, I/O requests converge on base device 1 when a host computer accesses the device using Compatible PAV. I/O requests are automatically issued to unused alias devices among the nine alias devices in the CU. Similarly, if a host computer accesses base devices 2, 3, and 4, the I/O requests are automatically issued

to unused alias devices among the nine alias devices. Base device 4 is able to process multiple I/O requests even though no alias devices are specifically assigned to the device.



## Requirements and specifications

This topic contains requirements and specifications.

- [Requirements](#)
- [Notes](#)
- [Functions incompatible with Hitachi Compatible PAV](#)
- [IBM CC and Extended Remote Copy \(XRC\) for Mainframe restrictions](#)
- [Sharing Hitachi Compatible PAV across multiple sysplexes](#)
- [Preventive Service Planning](#)

## Requirements

The following table lists the requirements for Hitachi Compatible PAV and Compatible Hyper PAV operations.

Item	Requirements	
	Compatible PAV	Compatible Hyper PAV
Software License Keys	Compatible PAV Workload Manager (WLM)	Compatible PAV Compatible Hyper PAV Workload Manager (WLM)
Host OS	Dynamic mode <ul style="list-style-type: none"> <li>OS/390 V2R7 (DFSMS/DSF 1.5) with PTF or later</li> <li>OS/390 V2R7 (DFSMS/DSF 1.5) with PTF or later</li> </ul> Static mode <ul style="list-style-type: none"> <li>OS/390 V1R3 (DFSMS/DSF 1.3) with PTF or later</li> <li>VM/ESA 2.4.0 or later</li> </ul>	z/OS 1.8 or later z/OS 1.6 with PTF or later z/VM 5.3 or later When you use z/VM, you must use z/OS as a guest OS on z/VM.
Microcode	N/A	60-02-4x or later 60-03-2x or later for z/VM host
Controller emulation type	I-2105, I-2107	I-2107
Device emulation type for base device	3380-3, 3390-1, 3390-2, 3390-3, 3390-3R*, 3390-9, 3390-L, 3390-M, 3390-A 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 * 3390-3R devices are not supported in Compatible Hyper PAV	
Channel interface	FICON	
Storage system ID setting	One storage system ID for each set of 256 LDEVs	
Maximum number of aliases for one base device	255	
Alias device management	Alias device and its base device must belong to the same logical CU image	
Compatible Storage Navigator functions	Virtual LVI Cache Residency Manager for Mainframe Volume Migration TrueCopy for Mainframe ShadowImage for Mainframe Hitachi Universal Replicator software for Mainframe IBM Concurrent Copy (CC) with restrictions Extended Remote Copy (XRC) for Mainframe with restrictions PPRC	

## Notes

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

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### Functions incompatible with Hitachi Compatible PAV

Devices using Compatible PAV can coexist in the same storage system but cannot be used concurrently with the following functions:

- Open Volume Management
- Cache Residency Manager
- LUN Manager
- ShadowImage
- Hitachi TrueCopy® Remote Replication software
- Universal Replicator

Devices using Cross-OS File Exchange cannot coexist in the same CU with devices using Compatible PAV.

### IBM CC and Extended Remote Copy (XRC) for Mainframe restrictions

For Concurrent Copy (CC) and Extended Remote Copy (XRC) for Mainframe, the 2105 and 2107 controller emulation types cannot be intermixed with other emulation types within the same storage system.

### Sharing Hitachi Compatible PAV across multiple sysplexes

Compatible PAV functionality can be shared across multiple sysplexes that are on a single storage system.

When sharing static Compatible PAV, all connected systems must be in static mode. When sharing dynamic Compatible PAV, the following requirements and restrictions apply:

- Only one sysplex should be running in Dynamic Alias Management mode. This *master* sysplex is the only sysplex in the storage system that assigns aliases.
- For all other connected sysplexes, the WLMPAV (HCD) and Dynamic Alias Management (WLM) settings should be set to *No*.



**Note:** If more than one sysplex has the Dynamic Alias Management enabled, unsynchronized alias transition and unpredictable response times may occur.

---

## Preventive Service Planning

If you are using the Compatible PAV feature on 2105 or 2107 device types, you are encouraged to obtain the Preventive Service Planning (PSP) document from IBM to use as a program temporary fix (PTF) source. The title of the document is *2105MVSESA*, and it can be downloaded 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 types. The VSP storage system 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 types.

## Defining devices

This topic contains information on selecting base and alias device ratios, and procedures for defining LCUs and devices using HCD (hardware configuration definition).

Hitachi Compatible PAV users use the HCD program to define logical control units (LCUs) and Hitachi Compatible PAV devices to the host system.

- [Selecting optimum base/alias device ratio](#)
- [Defining an LCU](#)
- [Defining a base or alias device](#)
- [Finding a device eligible for dynamic Hitachi Compatible PAV management](#)
- [Address mapping between base and alias devices](#)

## Selecting optimum base/alias device ratio

Any unused device address in a CU may be used as an alias for a base device. An optimum base-to-alias device ratio will ensure maximum efficiency in processing I/O requests.

### Optimum base/alias device ratio for Hitachi Compatible PAV

A base-to-alias device ratio of 1:3 is recommended. This means, if all 256 devices of a CU were defined to the host system, there would be 64 base devices and 192 alias devices. Three alias devices would be assigned to each base device. The optimum base-to-alias device ratio can vary based on how often a base device is accessed by the host system.

For dynamic Compatible PAV operations, eight to 16 alias devices in each CU generally produces good results.

Poor results may occur for devices that are accessed by multiple host systems. For this type of use case, the Multiple Allegiance (MA) host software may be a better option.

### Optimum base/alias device ratio for Compatible Hyper PAV

For Compatible Hyper PAV, eight to 16 alias devices in each CU generally produces good results. No more than three alias devices should be assigned to a single base device.

The number of alias devices assigned to each base device in a CU should be kept as equal as possible. For example, a CU with 10 alias devices could have three aliases each assigned to the first, second and third base device, one alias assigned to the fourth base device, and no alias assignments to the remaining base devices. Alternatively, one alias could be assigned to each of the 10 addresses.

## Defining an LCU

Use the Hardware Configuration Definition (HCD) program to define an LCU on a storage system.

### Prerequisite

Channel paths must be defined.

#### To define an LCU on a storage system:

1. From the ISPF/PDF primary options menu, select the **HCD** option to display the HCD main screen.



```

z/OS V1.11 HCD
Command ==> _____

Hardware Configuration

Select one of the following.

1_ 0. Edit profile options
   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.WORK'          +

```

2. Verify the name of the Work IODF to be used, and then select option 1 to display the Define, Modify or View Configuration Data screen.

```

z/OS V1.11 HCD
C _____ Define, Modify, or View Configuration Data _____
S
1
F
I
Select type of objects to define, modify, or view data.

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

```

3. Select option 4 to display the Control Unit List screen.

```

Goto Filter Backup Query Help
-----
Control Unit List                               Row xxx of yyy
Command ==> _____ Scroll ==> CSR

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

      ---#---
/ CU  Type +      CUADD CSS MC Serial-# + Description
/ 1600 2107        0   2  _____
_ 1700 2107        1   2  _____
_ 1800 2107        2   2  _____
_ 1900 2107        3   2  _____
_ 1A00 2107        4   2  _____
_ 1B00 2107        5   2  _____
_ 1C00 2107        6   2  _____
_ 1D00 2107        7   2  _____
_ 1E00 2107        0   2  _____
_ 1E40 2107        1   2  _____
_ 1E80 2107        2   2  _____
_ 1EC0 2107       3F   2  _____
_ 1EE0 2107       40   2  _____
_ 1F00 2107       FE   2  _____
_ 2000 3990        1   1  _____
_ 2400 2105       14   2  _____
_ 2480 2105       15   2  _____

```

4. Press **F11** on the keyboard to display the Add Control Unit screen.

```

Goto Filter Backup Query Help
-----
Control Unit List                               Scroll ==> CSR

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

      ---#---
/ CU _____ Add Control Unit _____
_ 000
_ 00A
_ 010 Specify or revise the following values.
_ 011
_ 012 Control unit number . . . . . ____ +
_ 013 Control unit type . . . . . _____ +
_ 014
_ 015 Serial number . . . . . _____
_ 016 Description . . . . . _____
_ 017
_ 020 Connected to switches . . . _ _ _ _ _ _ _ _ _ _ _ _ +
# 030 Ports . . . . . _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ +
# 034
_ 038 If connected to a switch:
_ 03E
_ 040 Define more than eight ports . . 2 1. Yes
_ 041
_ 042 Propose CHPID/link addresses and
_ 043 unit addresses . . . . . 2 1. Yes
_ 044
_ 045
_ 046
_ 047

```

5. Enter the following information:

- o Control unit number
- o Control unit type - 2105 or 2107
- o Switch connection information

Press **Enter** to display the Select Processor / Control Unit screen.

```

                                Select Processor / CU      Row xxx of yyy More:  >
Command ==> _____ Scroll ==> CSR

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

Control unit number . . : 0000      Control unit type . . . : 2107

-----Channel Path ID . Link Address + -----
/ Proc.CSSID 1----- 2----- 3----- 4----- 5----- 6----- 7----- 8-----
_ SYSTEM 0
***** Bottom of data *****

```

6. Select the processor complex that the control unit attaches to, and then press **Enter** to display the next Select Processor / Control Unit screen.

```

                                Select Processor / CU
                                Actions on selected processors
Command ==> _____
Select proces
Control unit
/ Proc.CSSID
/ SYSTEM 0
***** Bottom of data *****

Select by number or action code and press Enter.

1. Select (connect, change) . . . . . (s)
2. Group connect . . . . . (g)
3. Disconnect . . . . . (n)

```

7. Select option 2 and then press **Enter** to display the next Select Processor / Control Unit screen.

```

                                Select Processor / CU
                                Change Control Unit Definition
Specify or revise the following values.

Control unit number . . : 0000      Type . . . . . : 2107
Processor ID . . . . . : SYSTEM
Channel Subsystem ID . . : 0

Channel path IDs . . . . 2E  2F  34  35  _  _  _  _  +
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)

```

8. Enter the following information:
  - o chpids that attach to the control unit
  - o the logical control unit address
  - o the device starting address
  - o the number of devices supported

## Defining a base or alias device

Use the Hardware Configuration Definition (HCD) program to define a base or alias device on an LCU.

### To define a base or alias device on an LCU:

1. From the ISPF/PDF primary options menu, select the **HCD** option to display the HCD main screen.

```

                                z/OS V1.11 HCD
Command ===> _____

                                Hardware Configuration

Select one of the following.

1_ 0. Edit profile options
    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.WORK'          +
  
```

2. Verify the name of the IODF or IODF.WORK I/O definition file to be used, and then select option 1 to display the Define, Modify, or View Configuration Data screen.

```

----- 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
   esoter ics
   user-modified gener ics
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

```

3. Select option 5 to display the I/O Device List screen.

```

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

```

4. Press **PF11** to display the Add Device screen.

```

                                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 . . . . .                               <- Enter description.
Description . . . . . 9980V PAV
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 -

```

5. Enter the following information:

- o Device Number
- o Number of devices
- o Hitachi Compatible PAV device type. Supported base device types are 3380B and 3390B and supported alias device types are 3380A and 3390A.
- o Description of storage system
- o CUs to which the device is connected



**Note:** The 3380A and 3380B devices are not related to the 3380-3A/B/C multiplatform devices. Similarly, the 3390A and 3390B devices are not related to the 3390-3A/B/C multiplatform devices.

6. Press **Enter** to display the Device / Processor Definition screen.

```

                                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
***** Bottom of data ***** <- Select processor.

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

```

7. Select a Processor/System ID combination and then press **Enter** to display the Define Device / Processor screen.

```

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 -

```

- Specify or revise any values and then press **Enter** to display the Define Device to Operating System Configuration screen.

```

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)  <- Select OS.
***** 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

```

- Select the OS to connect or disconnect devices and press **Enter** to display the select / disconnect screen.

```

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 -

```

- Select option 1 and press **Enter** to display the Define Device Parameters / Features screen.

```

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

Specify or revise the values below.

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

Parameter/
Feature  Value  P Req.  Description
OFFLINE  No     P Req.  Device considered online or offline at IPL
DYNAMIC  Yes
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 -

```

- Specify or revise any values. The *DYNAMIC* parameter controls whether Hitachi Compatible PAV is in dynamic or static mode. The *WLMPAV* parameter controls whether or not the device is supported by Workload Manager (WLM). These parameters are set to Yes by default.

## Finding a device eligible for dynamic Hitachi Compatible PAV management

The Hardware Configuration Definition (HCD) program is used to view configuration parameters. This information is useful for determining if a specific device is eligible for dynamic Compatible PAV management by WLM.

### To display configuration parameters for a device:

- From the ISPF/PDF primary options menu, select the **HCD** option to display the HCD main screen.



```

z/OS V1.11 HCD
Command ==> _____

Hardware Configuration

Select one of the following.

1_ 0. Edit profile options
   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.WORK'          +

```

2. Verify the name of the IODF or IODF.WORK I/O definition file to be used, and then select option 1 to display the Define, Modify, or View Configuration Data screen.

```

----- 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 gener ics
   EDTs
   esoter ics
   user-modified gener ics
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

```

3. Select option 5 to display the I/O Device List screen.

```

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.

-----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

```

4. Select the desired device by entering a slash (/) by the device number (in the preceding figure, *device 8101* is selected), and press **Enter** to display the Actions on selected devices screen.

```

              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

```

5. Select option 8 and press **Enter** to display the View Device Definition screen.

```

View Device Definition

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

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

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

Connected to CUs : 8100

ENTER to continue.                               <- Press Enter.

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

```

- Review the information for accuracy and then press **Enter** to display the View Device / Processor Definition screen.

```

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

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

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

```

- Select a Processor/System ID combination to display the View Device Candidate List screen.

```

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.

Partition Name  Description                               Reachable
AS04            System A / LPAR 4                                       Yes
DASDPERF       DASD Performance & Testing                             Yes
MVS LAB        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 -

```

- Review the candidate list for this device and then press **Enter** to display the View Device / OS Configuration Definitions screen.

```

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
/ LABSYSTEM  MVS   OS Configuration List (EDT's)
***** Bottom of data *****
<- Select OS.

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

```

- Select an OS to view more details and press **Enter** to display the View Device Parameter / Feature Definition screen.

```

View Device Parameter / Feature Definition
Row 1 of 6
Command ==> Scroll ==> CSR

Configuration ID . . : LABSYSTEM      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     Req.  Device considered online or offline at IPL
DYNAMIC  Yes    Req.  Device supports dynamic configuration
LOCANY   Yes    Req.  UCB can reside in 31 bit storage
WLMPAV   Yes    Req.  Device supports work load manager      <- WLMPAV parameter.
SHARED   Yes    Req.  Device shared with other systems
SHAREDUP No     Req.  Shared when system physically partitioned
***** Bottom of data *****

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

```

10. Verify that the *WLMPAV* parameter is set to Yes.

## Address mapping between 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 on the Storage Navigator client machine. If the mappings do not match, serious failures can occur during data processing. The following figure shows examples of mappings between base devices and alias devices.

```

(A) x 00-x3F:Base   (B) x 00-x3F:Base   (C) x 00-x7F:Alias  (D) x 00-x3F:Alias
   x 40-xFF:Alias   x 40-x7F:Alias     x 80-xFF:Base     x 40-x7F:Base
                   x 80-xBF:Base     x 80-xBF:Alias    x 80-xBF:Alias
                   x C0-xFF:Alias     x C0-xFF:Base     x C0-xFF:Base

```



# Preparing for Compatible PAV operations

This topic describes the necessary preparations to use Compatible PAV with your system.

- [Setting the WLM mode](#)
- [Enabling Compatible Hyper PAV on z/OS](#)
- [Enabling Compatible Hyper PAV from z/OS on z/VM](#)
- [Setting the MIH timer value](#)

## Setting the WLM mode

To use dynamic Compatible PAV, the WLM must be set to goal mode. In goal mode, WLM can assign more or fewer aliases to a base device based on the host I/O activity to that device.

To use static Compatible PAV, the WLM must be set to compatibility mode. In compatibility mode, the number of aliases assigned to each base device remains the same regardless of host I/O activity to that device.

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

### To view/modify WLM mode:

1. On the WLM startup screen, press **Enter** to display the Choose Service Definition screen.

```
File Help
-----
Command ==>

      ~
      |          Choose Service Definition          |
      | Select one of the following options.        |
      | 1 1. Read saved definition                  |   <- Select option 1.
      | 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                 |
```

2. Select option 1 and press **Enter** to display the WLM primary options screen.

```
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                <- Select option 8.
                             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
```



3. Select option 8 to display the Service Coefficient/Service Definition Options screen.

```

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

Enter or change the Service Coefficients:

CPU . . . . . 1.0      (0.0-99.9)
I/O . . . . . 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)

```

4. Set the *Dynamic alias management* field to *Yes* and WLM is in goal mode. Set the field to *No* and WLM is in compatibility mode. The default setting is *Yes*.
5. Set the *I/O priority management* field. The effect of this field setting depends on the *Dynamic alias management* setting. As shown in the following table, the setting of both of these fields controls whether the Dynamic Alias Algorithm is in effect.

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

6. If dynamic is the desired mode, verify that the *DYNAMIC* and *WLMPAV* fields are both set to *Yes* in the WLM View Device Parameter / Feature Definition screen.

## Enabling Compatible Hyper PAV on z/OS

To enable Compatible Hyper PAV on the z/OS, issue the following command from the host system console:

```
SETIOS HYPERPAV=YES
```

An example of the command is shown below.

```

SETIOS HYPERPAV=YES
IOS1801 HYPERPAV MODE CHANGE INITIATED - CONTROL UNIT CONVERSION WILL
COMPLETE ASYNCHRONOUSLY

```



**Note:** The SETIOS command can be set for each logical partition (LPAR).

---

## Enabling Compatible Hyper PAV from z/OS on z/VM

To enable Compatible Hyper PAV from the z/OS on z/VM, Compatible Hyper PAV must be enabled on the z/VM and on the z/OS.

### To enable Compatible Hyper PAV from z/OS on z/VM:

1. Issue the following command from z/OS system console to all base devices in the corresponding CU to take those base devices offline.

```
V base_device_number1 base_device_number2,OFFLINE
```

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

3. Enable Compatible Hyper PAV on the z/OS with the following command from the host system console:

```
SETIOS HYPERPAV=YES
```

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
```

## Setting the MIH timer value

The recommended MIH timer value for Compatible PAV operations is 30 seconds. The MIH timer values are set in MVS/ESA<sup>®</sup>, z/OS<sup>®</sup>, or OS/390<sup>®</sup> at IPL (initial program load) or after IPL.

At IPL, use the MIH parameter in the IECIOSxx parmlib member to set or modify the MIH timer value. For the complete syntax of this parameter, see the IBM document *MVS Initialization and Tuning Reference (SC28-1752)*.

After IPL, use the "SETIOS" system command to set or modify the MIH timer value. For the complete syntax of this command, see the IBM document *MVS System Commands (GC28-1781)*.

# Performing Hitachi Compatible PAV operations

This topic describes performing Hitachi Compatible PAV operations on the storage system using the GUI.

- [Assigning aliases to base volumes](#)
- [Removing aliases from base volumes](#)
- [Reassigning aliases](#)
- [Calculating Hitachi Compatible PAV used capacity](#)
- [Refreshing Hitachi Compatible PAV data](#)

## Assigning aliases to base volumes

Up to 255 aliases can be assigned to one base device. If the number of selected free volumes is larger than the number of selected base volumes, the Hitachi Compatible PAV 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.


If you only use 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.

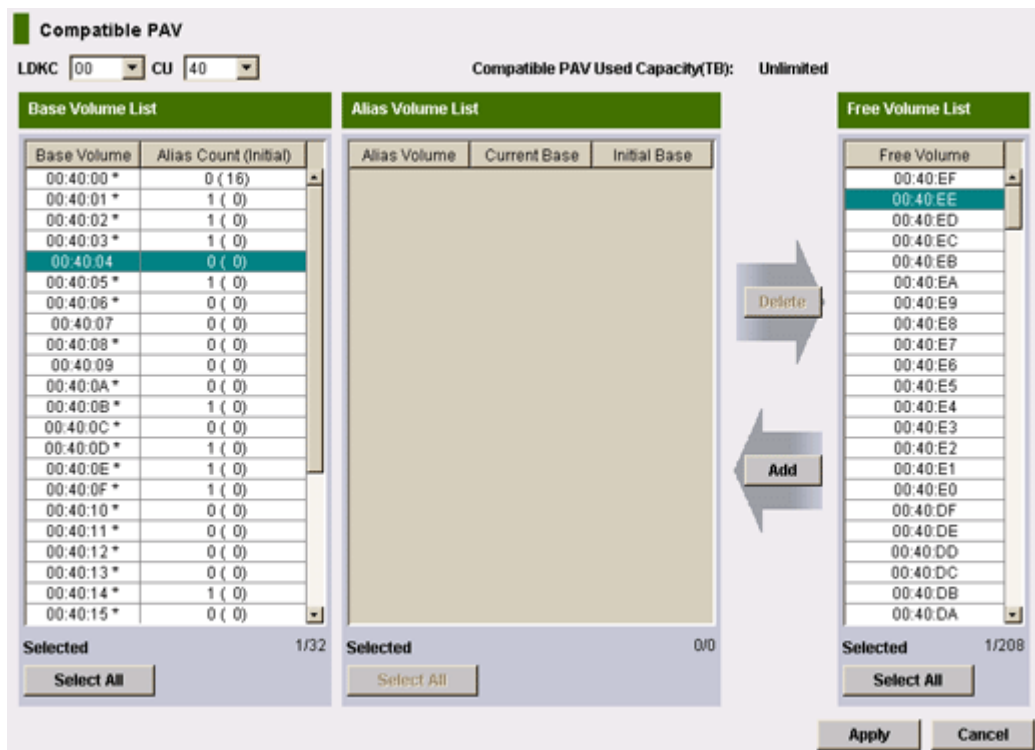
Click **Apply** to assign aliases to more than one CU that is used by the host. The host performance may be degraded if you click **Apply** to assign aliases simultaneously to more than one CU.

### Prerequisites

- Compatible PAV option or Compatible Hyper PAV option is enabled in Storage Navigator
- You must have Storage Administrator (Provisioning) role to perform this task.
- Base devices are defined in the storage system

### To assign aliases to base volumes in the VSP:

1. In the Storage Navigator main window, select **Actions > Mainframe Connection > Compatible PAV**.
2. Click  to change to Modify mode.
3. In the Compatible PAV window (shown in the following figure), select the LDKC which includes the CU image to be modified from the **LDKC** list.

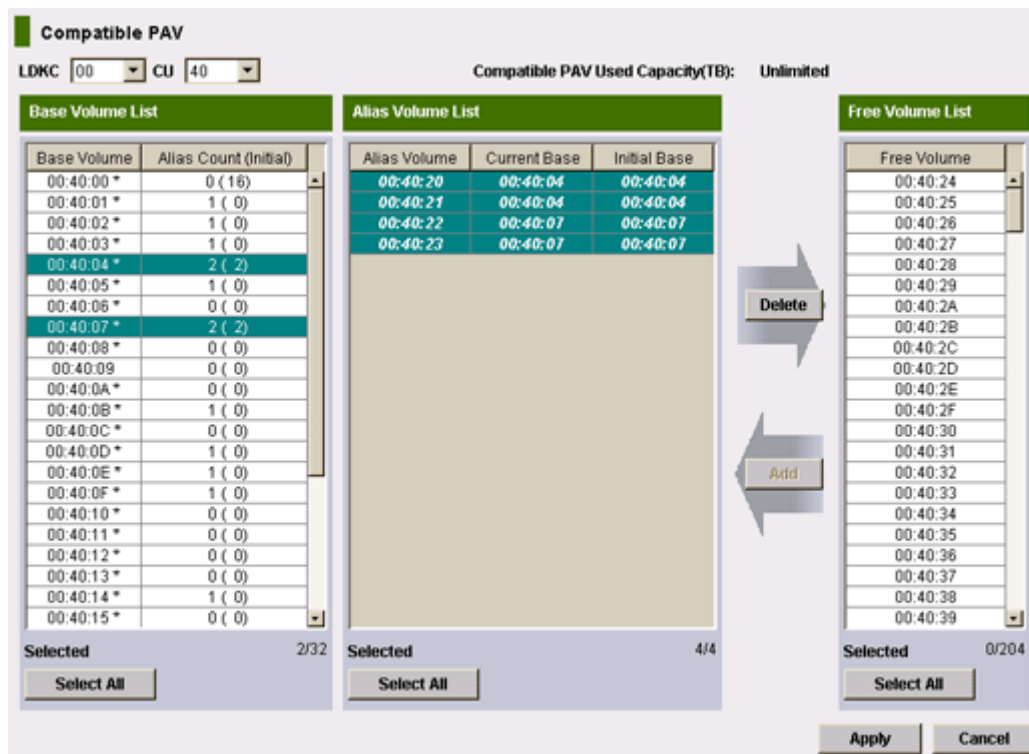


- From the **CU** list, select the CU image which contains the desired base volumes.

Base volumes are displayed in **Base Volume List**.

No volumes are displayed if the selected CU image only contains devices to which aliases cannot be assigned, such as 3390-V type devices or journal volumes. In these cases, select another CU image.

- Select one or more base volumes in the **Base Volume List**. Press **Ctrl** and click to select multiple base volumes, press **Shift** + click to select a series of base volumes, or click **Select All** to select all base volumes in the CU image.
- Select one or more free volumes in the **Free Volume List**. Press **Ctrl** and click to select multiple free volumes, press **Shift** + click to select a series of free volumes, or click **Select All** to select all free volumes in the CU image.
- Click **Add** to assign the selected free volume(s) to the selected base volume(s). The assignments appear in the **Alias Volume List** shown in the following figure.



8. Confirm the alias volume(s) assigned to the selected base volume(s) in the **Alias Volume List**.
9. Click **Apply** to apply the current alias assignments in the **Alias Volume List**.


## Removing aliases from base volumes

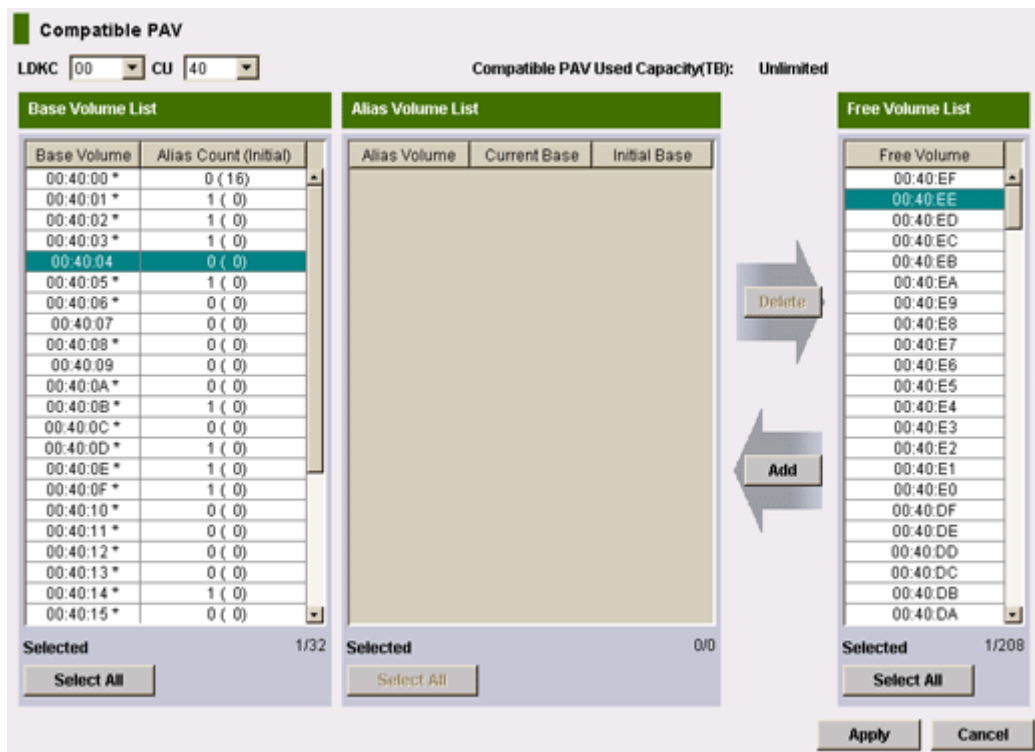
Alias volumes may be removed from base volumes using the Compatible PAV window.

### Prerequisite

- No I/O operations are currently being performed on base devices. Removing alias devices while I/O operations are occurring can cause a serious failure.
- You must have Storage Administrator (Provisioning) role to perform this task.

### To remove aliases from base volumes:

1. In the Storage Navigator main window, select **Actions > Mainframe Connection > Compatible PAV**.
2. Click  to change to Modify mode.
3. In the **Compatible PAV** window (shown in the following figure), select the LDKC which includes the CU image to be modified from the **LDKC** list.

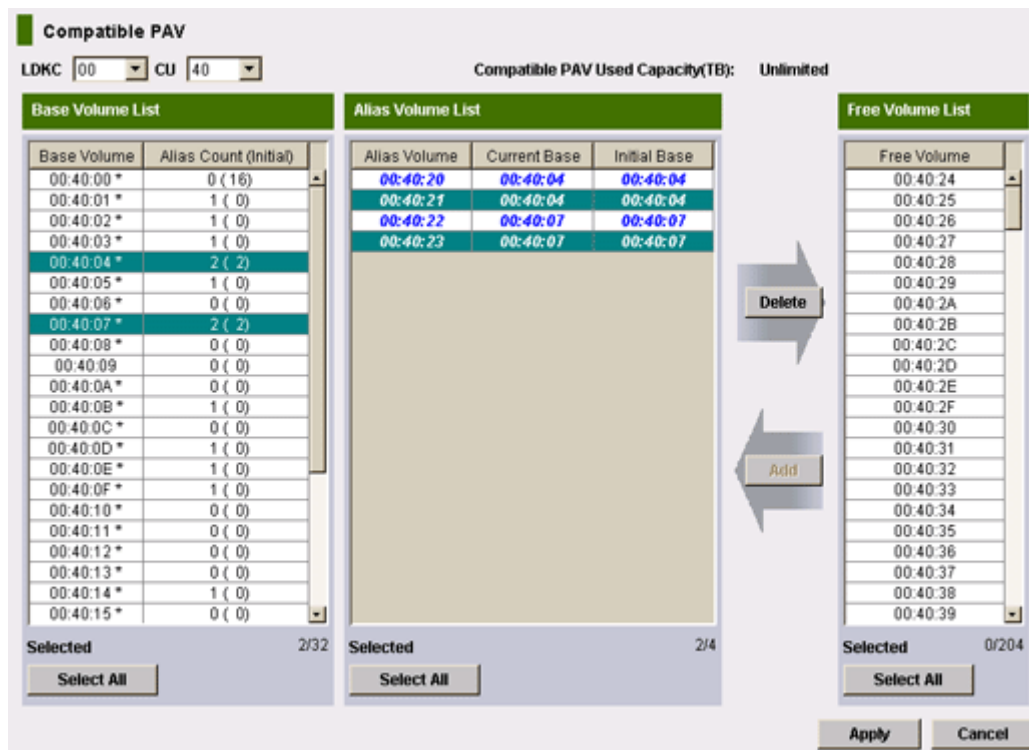


- From the **CU** list, select the CU image which contains the aliases to be removed.

Base volumes are displayed in the **Base Volume List**.

No volumes are displayed if the selected CU image only contains devices to which aliases cannot be assigned, such as 3390-V type devices or journal volumes. In these cases, select another CU image.

- Select one or more base volumes in the **Base Volume List**. Press **Ctrl** and click to select multiple base volumes, press **Shift** and click to select a series of base volumes, or click **Select All** to select all base volumes in the CU image. Alias volumes for each selected base volume(s) appear in the **Alias Volume List** as shown in the following figure.



6. Select one or more alias volumes to remove in the **Alias Volume List**. Press **Ctrl** and click to select multiple alias volumes, Press **Shift** and click to select a series of alias volumes, or click **Select All** to select all alias volumes in the CU image.
7. Once one or more alias volumes are selected, click **Delete** to remove the selected alias volume(s) from the selected base volume(s) and move these alias volumes back to the **Free Volume List**.
8. Click **Apply** to apply the changes.

## Reassigning aliases

Alias volumes may be reassigned to a different base volume in the same or different CU image using the Compatible PAV window.


### Prerequisites

- Before an alias is reassigned, the user must confirm that the number of requests to the base device that the alias is moved from is less than 50 IOPS. This performance information is acquired using RMF (Resource Measurement Facility Report Analysis) or other available tools. If the alias is reassigned when there are more than 50 IOPS to the base device, the process performance may decline in the worst cases.
- You must have Storage Administrator (Provisioning) role to perform this task.

### To reassign aliases to a different base volume:

1. In the Storage Navigator main window, select **Actions > Mainframe Connection > Compatible PAV**.



2. Click  to change to Modify mode.
3. In the Compatible PAV window, select the LDKC that includes the CU image to be modified from the **LDKC** list.
4. From the **CU** list, select the CU image that contains the aliases to be reassigned.
5. Select the base volume(s) in the **Base Volume List**. Press **Ctrl** and click to select multiple base volumes, press **Shift** and click to select a series of base volumes, or click **Select All** to select all base volumes in the CU image. Alias volumes for each selected base volume(s) appear in the **Alias Volume List**.
6. Select one or more alias volumes to remove in the **Alias Volume List**. Press **Ctrl** and click to select multiple alias volumes, press **Shift** and click to select a series of alias volumes, or click **Select All** to select all alias volumes in the CU image.
7. When one or more alias volumes are selected, click **Delete** to remove the selected alias volume(s) from the selected base volume(s) and move these alias volumes back to the **Free Volume List**.
8. Select different base volume(s). These base volumes can be in the same CU image. Or the CU image can be changed by using the **LDKC** and **CU** lists.
9. When one or more new base volumes are selected in the **Base Volume List** and one or more free volumes are selected in the **Free Volume List**, click **Add** to assign the selected free volume(s) to the selected base volume(s). The assignments appear in the **Alias Volume List**.
10. Confirm the alias volume(s) assigned to the selected base volume(s) in the **Alias Volume List**.
11. Click **Apply** to apply the changes.

## Calculating Hitachi Compatible PAV used capacity

After each Compatible PAV operation, the Compatible PAV Used Capacity value is recalculated. These operations include:

- Assigning aliases to a new base volume and clicking Apply
- Canceling all aliases in the corresponding CU and clicking Apply



**Note:** A base volume with no assigned aliases does not contribute the total used capacity value.

- 
- Uninstalling base volumes using the LVI/LUN (VLL) or Universal Volume Manager software
  - Assigning aliases to a new base volume by Dynamic Compatible PAV or Compatible Hyper PAV function

The used capacity is the sum of the capacities of base volumes which meet at least one of the following conditions:

- Base volumes to which alias volumes are or were assigned through Storage Navigator

- Base volumes which are accessed by alias volumes using Dynamic Compatible PAV or Compatible Hyper PAV

The calculation of the used capacity can be time-consuming as it takes three minutes for each CU to calculate this value. 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. All volumes defined to storage system are calculated. After the calculation has finished, the brackets disappear and the latest value of the used capacity is displayed.

## Refreshing Hitachi Compatible PAV data

To access the latest data following Compatible PAV calculations or operations, open the Compatible PAV window and select **File > Refresh**.

## Verifying and monitoring devices

This topic describes the procedures for verifying base and alias devices on the system, and the syntax and description of the commands used to monitor Hitachi Compatible PAV activities from the host computer.

- [Verifying base and alias device definition](#)
- [Verifying status of devices per channel path](#)
- [Verifying Compatible Hyper PAV aliases from z/OS](#)
- [Verifying Compatible Hyper PAV aliases from z/OS on z/VM](#)
- [Monitoring with MVS commands](#)
- [DISPLAY command](#)
- [DEVSERV PATHS command](#)
- [DEVSERV QPAV commands](#)
- [DISPLAY IOS HYPERPAV command](#)
- [GTF I/O tracing](#)
- [VM CP commands for z/VM](#)
- [QUERY CU command](#)
- [QUERY DASD DETAILS command](#)
- [QUERY PAV command](#)

- [QUERY VIRTUAL DASD DETAILS command](#)
- [QUERY VIRTUAL PAV command](#)

## Verifying base and alias device definition

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

### To verify that the host system recognizes the settings for the base and alias devices:

1. Run the MVS DEVSERV QPAV command to display information about the base device and corresponding alias addresses. Use the following syntax for this command.

```
DS QPAV, device_unit_ID, VOLUME
```

The following figures show sample outputs of this command. First on a Compatible PAV device, and then on a Compatible Hyper PAV device.

```
DS QPAV, D222, VOLUME
IEE459I 08:20:32 DEVSERV QPAVS 591
HOST CONFIGURATION SUBSYSTEM CONFIGURATION
-----
UNIT UNIT UA
NUM ADDR 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
```

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



**Note:** The relationship between base and alias devices is not fixed for the OS using Compatible Hyper PAV. Therefore, only the information about base devices is displayed.

2. Verify that the information displayed by the DEVSERV QPAV command matches the base and alias device definitions specified on the Storage Navigator client machine.



**Note:** After dynamic Compatible PAV operations are performed, mismatches occur because the host system can change the number of aliases assigned to each base device. This type of mismatch will not cause any problems.

## Verifying status of devices per channel path

After verifying the definition of devices, the status of these devices must be verified for each channel path (CHP).

## To verify the status of the devices by CHP ID:

1. Run the MVS Display Matrix command for each CHP ID connected to the storage system. Use the following syntax for this command.

```
D M=CHP(CHP_ID)
```

The following figure shows a sample output of this command.

```
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 AL
685 AL 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 AL
687 AL 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 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
```

2. Verify that the information displayed by the Display Matrix command matches the device status that was defined when the generation definition was made. If the information is incorrect, the devices must be redefined to the host.

## Verifying Compatible Hyper PAV aliases from z/OS

When you restart a VSP storage system while using Compatible Hyper PAV, you must verify that the correct aliases are assisted to a CU.

### To verify Compatible Hyper PAV aliases on a z/OS host:

1. On the host computer, enable the **Compatible Hyper PAV** option.
2. Issue the DEVSERV QPAV command from the host to verify that the displayed aliases are those assigned for Compatible Hyper PAV. See [DEVSERV QPAV commands on page 6-8](#) for proper syntax and an example of this command.

If the correct aliases for Compatible Hyper PAV do not appear after running the DEVSERV QPAV command, and if the host only accesses the corresponding VSP, disable the **Compatible Hyper PAV** option on the host computer, and then enable the option again. Proceed to step 3.

If the host accesses other storage systems that use Compatible 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_path1-channel_path2),OFFLINE
CF CHP(channel_path1-channel_path2),ONLINE
V base_device_number1-base_device_number2,ONLINE
```

If Cross-OS File Exchange is being used on the host computer, issue the following commands.

```
V Cross_OS_File_Exchange_Volume_1-
Cross_OS_File_Exchange_Volume_2,OFFLINE
V Cross_OS_File_Exchange_Volume_1-
Cross_OS_File_Exchange_Volume_2,ONLINE
```

3. After performing one of the preceding actions, reissue the DEVSERV QPAV command and check for the alias devices in the returned results.

## Verifying Compatible Hyper PAV aliases from z/OS on z/VM

When you restart a VSP storage system while using Compatible Hyper PAV, you must verify that the correct aliases are sustained to a CU.

To verify Compatible Hyper PAV aliases on a z/OS system (which is a guest OS on z/VM):

1. Enable the **Compatible Hyper PAV** option on the z/VM and on the z/OS.
2. Issue the QUERY PAV command from z/VM to verify that the displayed aliases are those assigned for Compatible Hyper PAV. See [QUERY PAV command on page 6-12](#) for proper syntax and an example of this command.
3. Issue the DEVSERV QPAV command from z/OS to verify that the displayed aliases are those assigned for Compatible Hyper PAV. See [DEVSERV QPAV commands on page 6-8](#) for proper syntax and an example of this command.
4. If the correct aliases for Compatible Hyper PAV do not appear after running the QUERY PAV and DEVSERV QPAV commands, and if the host only accesses the corresponding VSP, disable the **Compatible Hyper PAV** option on the host computer, and then enable the option again. Skip to step 5.

If the host accesses other storage systems that use Compatible Hyper PAV, perform 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_path1
VARY OFFLINE CHPID channel_path2
:
VARY ONLINE CHPID channel_path1
VARY ONLINE CHPID channel_path2
:
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_path), ONLINE
```

5. Reissue the DEVSERV QPAV command and check for the alias devices in the returned results.

## Monitoring with MVS commands

MVS commands can be used to monitor the Compatible PAV activities on the VSP from z/OS. For the complete syntax of MVS commands, see the IBM document *OS/390 MVS System Commands (GC28-1781)*.

## DISPLAY command

The MVS DISPLAY command displays path information and alias count for the specified base device. Use the following syntax for this command.

```
D M=DEV(device_unit_ID)
```

The following figure shows a sample output of this command for a Compatible PAV base device with five aliases.



```

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

```

The following figure shows a sample output of this command for a Compatible Hyper PAV base device with 16 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

```

## DEVSERV PATHS command

The MVS DEVSERV PATHS command displays the status of the specified base device. Use the following syntax for this command.

```
DS P, device_unit_ID
```

The following figure shows a sample output of this command.

```

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*****
0 = ONLINE + = PATH AVAILABLE
< = PHYSICALLY UNAVAILABLE

```

## DEVSERV QPAV commands

The MVS DEVSERV QPAV commands can be used for the following functions.

- Display the status of Compatible PAV base devices. Use the following syntax for this command.

```
DS QP, device_unit_ID, 4
```

The following figure shows a sample output of this 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
  
```

- Display the status of a Compatible Hyper PAV base device and its alias devices. Use the following syntax for this command.

```
DS QP, device_unit_ID, HPAV
```

The following figure shows a sample output of this command.

```

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
  
```

- Display the status of an entire SSID. Use the following syntax for this command.

```
DS QP, SSID=device_unit_ID
```

The following figure shows a sample output of this command.

```

DS QP,SSID=8300
IEE4591 15.56.03 DEVSERV QPAYS 026
      HOST                                SUBSYSTEM
      CONFIGURATION                      CONFIGURATION
-----
UNIT                                     UNIT   UA
NUM. UA  TYPE                          STATUS SSID  ADDR. TYPE
-----
8300 00  BASE                               8300  00  BASE
8301 01  BASE                               8300  01  BASE
8302 02  BASE                               8300  02  BASE
8303 03  BASE                               8300  03  BASE
8304 04  BASE                               8300  04  BASE
8306 06  BASE                               8300  06  BASE
8307 07  BASE                               8300  07  BASE
8308 08  BASE                               8300  08  BASE
8309 09  BASE                               8300  09  BASE
830A 0A  BASE                               8300  0A  BASE
830C 0C  BASE                               8300  0C  BASE
830D 0D  BASE                               8300  0D  BASE
830E 0E  BASE                               8300  0E  BASE
830F 0F  BASE                               8300  0F  BASE
8310 10  BASE                               8300  10  BASE
8311 11  BASE                               8300  11  BASE
8312 12  BASE                               8300  12  BASE
8313 13  BASE                               8300  13  BASE
8314 14  BASE                               8300  14  BASE
8315 15  BASE                               8300  15  BASE
8316 16  BASE                               8300  16  BASE
8317 17  BASE                               8300  17  BASE
8318 18  BASE                               8300  18  BASE
8319 19  BASE                               8300  19  BASE
831A 1A  BASE                               8300  1A  BASE
831B 1B  BASE                               8300  1B  BASE
831D 1D  BASE                               8300  1D  BASE
831F 1F  BASE                               8300  1F  BASE
8320 20  BASE                               8300  20  BASE
8321 21  BASE                               8300  21  BASE
8322 22  BASE                               8300  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

```

- Display the status of the host and subsystem configuration. Use the following syntax for this command.

```
DS QP, device_unit_ID, VOLUME
```

The following figure shows a sample output of this command.

```

DS QP, 8300, VOLUME
IEE459I 16.00.15 DEVSERV QPAVS 041
      HOST                                SUBSYSTEM
      CONFIGURATION                       CONFIGURATION
-----
UNIT                                UNIT   UA
NUML 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

```

## DISPLAY IOS HYPERPAV command

The MVS DISPLAY IOS HYPERPAV command displays the current *HYPERPAV* enablement status. Use the following syntax for this command.

**D IOS, HYPERPAV**

The following figure shows a sample output of this command.

```

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

```

## GTF I/O tracing

Compatible PAV is compatible with GTF I/O tracing. When a device number is specified for a GTF I/O tracing operation, GTF determines if the device is a Compatible PAV base device and automatically includes the alias addresses currently assigned to the base device. For more information on GTF I/O tracing, see the IBM document *OS/390 MVS Diagnosis: Tools and Service Aids (SY28-1085)*.

## VM CP commands for z/VM

VM CP commands can be used to monitor the Compatible PAV activities on the VSP from z/VM.

The following syntax conventions are used for VM CP commands.

- **BOLD AND CAPITALIZED** characters—indicate characters that must be entered.
- lowercase characters—indicate characters that can be omitted.
- *italic* characters—indicate a type of operand. An arbitrary value can be entered.
- brackets ([ ])—indicate an operand that can be omitted.

- braces ({ })—indicate that one operand must be selected from the list of operands enclosed by the braces. Operands enclosed within the braces are delimited by vertical bars (|).

## QUERY CU command

The **QUERY CU** command displays information about DASD CU. Use the following syntax for this command.

```
Q CU [DASD] {ssid | ssid1 | ssid2} {ALiases | DEViCES | PAVMode}
```

The following figure shows a sample output of this command.

```

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

```



**Note:** The **QUERY CU** command may only be executed on the OS that is used directly by the host computer. Any attempt to execute the **QUERY CU** command on the z/VM that is operated as a guest OS on the other z/VM is rejected.

## QUERY DASD DETAILS command

The **QUERY DASD DETAILS** command displays information about DASD (RDEV). Use the following syntax for this command.

```
Query DASd DETAILS {rdev | rdev1 | rdev2}
```

The following figure shows a sample output of this command.

```
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 = --
DUPLICATE DETAILS: --
HYPERPAV DETAILS: BASE VOLUME IN POOL 0
CU DETAILS:  SSID = B600, CUNUM = A000
```



**Caution:** The QUERY DASD DETAILS command cannot be used for a 3380 DASD.

## QUERY PAV command

The QUERY PAV command displays the list of Hitachi Compatible PAV or Compatible Hyper PAV devices (including information on those devices) that are managed by the corresponding storage system. Use the following syntax for this command.

```
Query PAV {rdev | rdev1 | rdev2 | ALL}
```

The following figure shows a sample output of this command.

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

## QUERY VIRTUAL DASD DETAILS command

The QUERY VIRTUAL DASD DETAILS command displays information about all DASDs that can be accessed by z/VM. Use the following syntax for this command.

```
Query Virtual DASd [DETAILS]
```

The following figure shows a sample output of this command.

```
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  A000 SUBCHANNEL = 005F
HYPERPAVALIAS(A000,0)
DASD A001 ON DASD  A001 R/W CMA001 SUBCHANNEL = 005E
DEVCTL HYPERPAVBASE(0)
```



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

## QUERY VIRTUAL PAV command

The QUERY VIRTUAL PAV command displays the status of all Hitachi Compatible PAV and Compatible Hyper PAV devices that can be accessed by z/VM. Use the following syntax for this command.

Query **Virtual PAV** {*vdev* | *vdev1* | *vdev2* | **ALL**}

The following figure shows a sample output of this command.

```
<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
```





# Troubleshooting

This topic provides troubleshooting information.

- [Troubleshooting](#)

## Troubleshooting

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

## Disabling Compatible Hyper PAV

This topic describes the procedures for disabling Compatible Hyper PAV on the storage system.

- [Disabling Compatible Hyper PAV from z/OS](#)
- [Disabling Compatible Hyper PAV from z/OS when multiple storage systems are used](#)
- [Disabling Compatible Hyper PAV from z/OS on z/VM](#)

# Disabling Compatible Hyper PAV from z/OS

## Prerequisites

- All alias devices must be removed
- You must have Storage Administrator (Provisioning) role to perform this task

## To disable Compatible Hyper PAV from z/OS:

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

```
V base_device_number1-base_device_number2,OFFLINE  
CF CHP(channel_path1-channel_path2),OFFLINE
```

2. Issue the following command from the host system console to disable the **Compatible Hyper PAV** option on the host computer.

```
SETIOS HYPERPAV=NO
```

3. Uninstall Compatible Hyper PAV on Storage Navigator.
4. Issue the following DEVSERV command from the z/OS to an arbitrary device per CU:

```
DS QD,device_ID,VALIDATE
```

5. Issue the DEVSERV QPAV command from the host to verify that the aliases assigned for Compatible Hyper PAV are released. See [DEVSERV QPAV commands on page 6-8](#) for proper syntax and an example of this command.

## Disabling Compatible Hyper PAV from z/OS when multiple storage systems are used

This procedure is used when Compatible Hyper PAV and Cross-OS File Exchange are still used on other storage systems which are accessed from the corresponding host.

## To disable Compatible Hyper PAV from the target storage system only:

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

```
V base_device_number1-base_device_number2,OFFLINE  
CF CHP(channel_path1-channel_path2),OFFLINE
```

2. Uninstall Compatible Hyper PAV on Storage Navigator.
3. Issue the following commands to all base devices in the corresponding CU.

```
CF CHP(channel_path1-channel_path2),ONLINE  
V base_device_number1-base_device_number2,ONLINE
```

4. Issue the DEVSERV QPAV command from the host to verify that the aliases assigned for Compatible Hyper PAV are released. See [DEVSERV QPAV commands on page 6-8](#) for proper syntax and an example of this command.

## Disabling Compatible Hyper PAV from z/OS on z/VM

### Prerequisites

- All alias devices must be removed
- You must have permission to modify the storage system

### To disable Compatible Hyper PAV from z/OS on z/VM:

1. From z/OS on z/VM, issue the following commands to all base devices in the corresponding CU.

```
V base_device_number1-base_device_number2,OFFLINE
CF CHP(channel_path1-channel_path2),OFFLINE
```

2. Issue the following command from the host system console to disable the **Compatible Hyper PAV** option on the host computer.

```
SETIOS HYPERPAV=NO
```

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

```
DET alias_device_number1-alias_device_number2
VARY OFFLINE alias_device_number1-alias_device_number2
SET CU PAV 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.

4. Uninstall Compatible Hyper PAV on Storage Navigator.
5. Issue the following DEVSERV command from the z/OS to an arbitrary device per CU:

```
DS QD,device_ID,VALIDATE
```

6. Issue the QUERY PAV command from z/VM to verify that the aliases assigned for Compatible Hyper PAV are released. See [QUERY PAV command on page 6-12](#) for proper syntax and an example of this command.
7. Issue the DEVSERV QPAV command from the z/OS to verify that the aliases assigned for Compatible Hyper PAV are released. See [DEVSERV QPAV commands on page 6-8](#) for proper syntax and an example of this command.





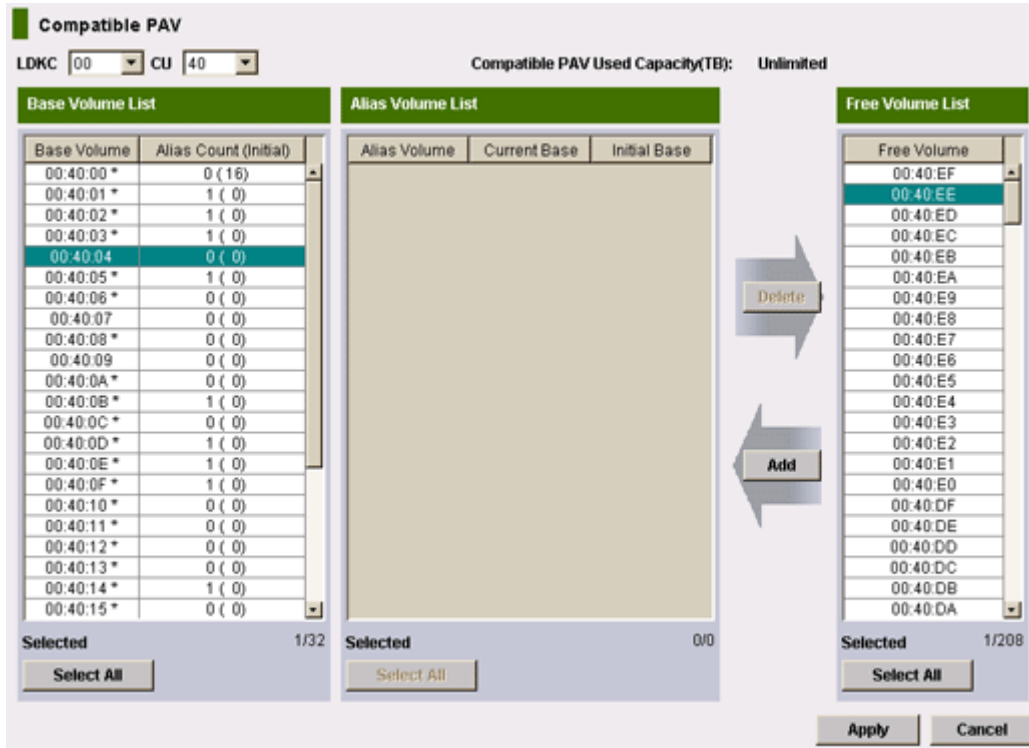
# Hitachi Compatible PAV GUI reference

This topic describes the fields and options available in the Hitachi Compatible PAV window.

- [Hitachi Compatible PAV window](#)

# Hitachi Compatible PAV window

Use the Hitachi Compatible PAV window to assign alias devices to base devices.



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 list.
Compatible PAV Used Capacity	Indicates the capacity currently being used by base volumes. The value in the parentheses indicates the total available capacity (in terabytes) in the storage system for Compatible PAV. <b>Unlimited</b> indicates that the available capacity is unlimited. 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.
Base Volume List	Displays the LDEVs that are currently in use in the selected CU image. See <a href="#">Base Volume List on page B-3</a> for a description of all fields.
Alias Volume List	Displays the alias device(s) assigned to the selected base device(s). See <a href="#">Alias Volume List on page B-3</a> for a description of all fields.
Free Volume List	Displays the LDEVs of unused volumes in the selected CU. See <a href="#">Free Volume List on page B-4</a> for a description of all fields.



Item	Description
Add	Assigns aliases to selected base devices. When you click Add, the selected free LDEVs are assigned to the selected base devices, and the new alias devices are displayed in the Alias Volume List box. To complete your request to assign the new aliases as specified, you must click Apply.
Delete	Cancels aliases for a selected base device. When you click Delete, the selected alias devices are canceled, and their LDEVs are displayed the Free Volume List box. To complete canceling the aliases as specified, you must click Apply.
Apply	Applies the settings to the storage system.
Cancel	Discards any changes and restores the initial settings.

## Base Volume List

The Base Volume List box 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. The following table describes the items in the Base Volume List box.

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 storage system. 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 selected CU image.
Select All	Selects all volumes in the Base Volume List box.

## Alias Volume List

The Alias Volume List box 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. The following table describes the items in the Base Volume List box.

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 storage system.
Initial Base	Displays the LDKC, CU, and LDEV numbers of the base volume set by the user for the alias volume.

Item	Description
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 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. The following table describes the items in the Free Volume List box.

Item	Description
Free Volume	Displays the complete list of volumes available for assignment.
Selected	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.



# Glossary

This glossary defines the special terms used in this document. Click the desired letter below to display the glossary entries that start with that letter.

## A

### APAR

Authorized Problem Analysis Report

### alias device

A formatted but unused mainframe logical device (LDEV) whose address can be used as an alias for a Parallel Access Volume (PAV) base device. See also *base device*

## B

### base device

A formatted mainframe logical device (LDEV) that contains user data and can be accessed via alias devices using IBM Parallel Access Volume (PAV) host software. A base device must be defined to the host as a "B" device type (e.g., 3390B-9). See also *alias device*

## C

### ca

cache

### capacity

The amount of data storage space available on a physical storage device, usually measured in bytes (MB, GB, TB, etc.).

#	<a href="#">A</a>	<a href="#">B</a>	<a href="#">C</a>	<a href="#">D</a>	<a href="#">E</a>	<a href="#">F</a>	<a href="#">G</a>	<a href="#">H</a>	<a href="#">I</a>	<a href="#">J</a>	<a href="#">K</a>	<a href="#">L</a>	<a href="#">M</a>	<a href="#">N</a>	<a href="#">O</a>	<a href="#">P</a>	<a href="#">Q</a>	<a href="#">R</a>	<a href="#">S</a>	<a href="#">T</a>	<a href="#">U</a>	<a href="#">V</a>	<a href="#">W</a>	<a href="#">X</a>	<a href="#">Y</a>	<a href="#">Z</a>
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**CH**

Channel

**CHA**

channel adapter

**channel path**

The communication path between a channel and a control unit. A channel path consists of the physical channel path and the logical path.

**CHP**

channel path

**CU**

control unit

**D****DASD**

direct-access storage device

**device**

A physical or logical unit with a specific function.

**device emulation**

Indicates the type of logical volume. Mainframe device emulation types provide logical volumes of fixed size, called logical volume images (LVIs), which contain EBCDIC data in CKD format. Typical mainframe device emulation types include 3390-9 and 3390-M. Open-systems device emulation types provide logical volumes of variable size, called logical units (LUs), that contain ASCII data in FBA format. The typical open-systems device emulation type is OPEN-V.

**I****IPL**

initial program load

**IPS**

Installation Performance Specification

**ISPF/PDF**

Interactive System Productivity Facility/package definition file

#	<a href="#">A</a>	<a href="#">B</a>	<a href="#">C</a>	<a href="#">D</a>	<a href="#">E</a>	<a href="#">F</a>	<a href="#">G</a>	<a href="#">H</a>	<a href="#">I</a>	<a href="#">J</a>	<a href="#">K</a>	<a href="#">L</a>	<a href="#">M</a>	<a href="#">N</a>	<a href="#">O</a>	<a href="#">P</a>	<a href="#">Q</a>	<a href="#">R</a>	<a href="#">S</a>	<a href="#">T</a>	<a href="#">U</a>	<a href="#">V</a>	<a href="#">W</a>	<a href="#">X</a>	<a href="#">Y</a>	<a href="#">Z</a>
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## **J**

### **JCL**

job control language

## **L**

### **LCU**

logical control unit

### **LDEV**

logical device

### **LU**

logical unit

### **LVI**

logical volume image (e.g., 3390-3R)

## **M**

### **MIH**

missing interrupt handler

### **MVS**

Multiple Virtual Storage

## **N**

### **NUM**

Number

## **P**

### **PAV**

Parallel Access Volume

### **PPRC**

Peer-to-Peer Remote Copy

#	<a href="#">A</a>	<a href="#">B</a>	<a href="#">C</a>	<a href="#">D</a>	<a href="#">E</a>	<a href="#">F</a>	<a href="#">G</a>	<a href="#">H</a>	<a href="#">I</a>	<a href="#">J</a>	<a href="#">K</a>	<a href="#">L</a>	<a href="#">M</a>	<a href="#">N</a>	<a href="#">O</a>	<a href="#">P</a>	<a href="#">Q</a>	<a href="#">R</a>	<a href="#">S</a>	<a href="#">T</a>	<a href="#">U</a>	<a href="#">V</a>	<a href="#">W</a>	<a href="#">X</a>	<a href="#">Y</a>	<a href="#">Z</a>
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## **R**

### **R-SIM**

remote service information message

### **RAID**

redundant array of independent disks

## **S**

### **SIM**

service information message

### **SIz**

ShadowImage for z/OS

### **SMS**

Storage Management Subsystem

### **SSCH**

start subchannel

### **SSID**

storage subsystem identification

## **V**

### **VM**

Virtual Machine

### **vol**

Volume

### **VSE**

Virtual Storage Extended

### **VTOC**

volume table of contents

## **W**

### **WLM**

Workload Manager

#	<a href="#">A</a>	<a href="#">B</a>	<a href="#">C</a>	<a href="#">D</a>	<a href="#">E</a>	<a href="#">F</a>	<a href="#">G</a>	<a href="#">H</a>	<a href="#">I</a>	<a href="#">J</a>	<a href="#">K</a>	<a href="#">L</a>	<a href="#">M</a>	<a href="#">N</a>	<a href="#">O</a>	<a href="#">P</a>	<a href="#">Q</a>	<a href="#">R</a>	<a href="#">S</a>	<a href="#">T</a>	<a href="#">U</a>	<a href="#">V</a>	<a href="#">W</a>	<a href="#">X</a>	<a href="#">Y</a>	<a href="#">Z</a>
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## **X**

### **XRC**

Extended Remote Copy

## **Z**

### **zvm**

z/Virtual Machine

#	<a href="#">A</a>	<a href="#">B</a>	<a href="#">C</a>	<a href="#">D</a>	E	F	G	H	<a href="#">I</a>	<a href="#">J</a>	K	<a href="#">L</a>	<a href="#">M</a>	<a href="#">N</a>	O	<a href="#">P</a>	Q	<a href="#">R</a>	<a href="#">S</a>	T	U	<a href="#">V</a>	<a href="#">W</a>	<a href="#">X</a>	Y	<a href="#">Z</a>
---	-------------------	-------------------	-------------------	-------------------	---	---	---	---	-------------------	-------------------	---	-------------------	-------------------	-------------------	---	-------------------	---	-------------------	-------------------	---	---	-------------------	-------------------	-------------------	---	-------------------

#	<a href="#">A</a>	<a href="#">B</a>	<a href="#">C</a>	<a href="#">D</a>	E	F	G	H	<a href="#">I</a>	<a href="#">J</a>	K	<a href="#">L</a>	<a href="#">M</a>	<a href="#">N</a>	O	<a href="#">P</a>	Q	<a href="#">R</a>	<a href="#">S</a>	T	U	<a href="#">V</a>	<a href="#">W</a>	<a href="#">X</a>	Y	<a href="#">Z</a>
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## Glossary-6





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Hitachi Data Systems

**Corporate Headquarters**

750 Central Expressway  
Santa Clara, California 95050-2627  
U.S.A.  
Phone: 1 408 970 1000  
[www.hds.com](http://www.hds.com)  
[info@hds.com](mailto: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](mailto:info@hds.com)

**Europe Headquarters**

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



**MK-90RD7012-02**