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Hitachi Freedom Storage™
Lightning 9900™ V Series

Hitachi Parallel Access Volume (HPAV)
User and Reference Guide

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Document Revision Level

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- No technical changes. Updated revision level to –0 initial release.

Referenced Documents

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

- 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)

For further information on defining HPAV devices to the S/390® host, please refer to the
following IBM® documentation:

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

Hitachi Lightning 9900™ V Series documentation referenced in this document:

- *Hitachi Lightning 9900™ V Series User and Reference Guide*, MK-92RD100
- *Hitachi Lightning 9900™ V Series Hitachi Remote Console – Storage Navigator User's
  Guide*, MK-92RD101
- *Hitachi Lightning 9900™ V Series Hitachi TrueCopy–S/390® User and Reference Guide*,
  MK-92RD107

Preface

The *Hitachi Lightning 9900™ V Series Hitachi Parallel Access Volume (HPAV) User and Reference Guide* describes and provides instructions for using the HPAV Remote Console software to configure and perform Hitachi Parallel Access Volume operations on the Hitachi Lightning 9900™ V Series RAID storage subsystem. This document assumes that:

- the user has a background in data processing and understands direct-access storage device (DASD) subsystems and their basic functions,

- the user has read and understands both the *Hitachi Lightning 9900™ V Series User and Reference Guide* (MK-92RD100) and the *Hitachi Lightning 9900™ V Series Hitachi Remote Console – Storage Navigator User's Guide* (MK-92RD101), and

- the user is familiar with the Microsoft® Windows NT® and/or Windows® 2000 operating systems (e.g., opening, closing, minimizing, and restoring windows; using the keyboard and mouse to navigate on screen and select objects).

Note: The term "9900V" refers to the entire Lightning 9900™ V Series subsystem family, unless otherwise noted. Please refer to the *Hitachi Lightning 9900™ V Series User and Reference Guide* (MK-92RD100) for further information on the 9900V disk array subsystems.

Note: The use of Hitachi Parallel Access Volume, the HPAV software, and all other Hitachi Data Systems products is governed by the terms of your license agreement(s) with Hitachi Data Systems.

Microcode Level

This document revision applies to 9900V microcode versions 21-01-*xx* and higher.

COMMENTS

Please send us your comments on this document: doc.comments@hds.com.

Make sure to include the document title, number, and revision.
Please refer to specific page(s) and paragraph(s) whenever possible.

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

Thank you!

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Chapter 1   Overview of Hitachi Parallel Access Volume (HPAV)

1.1   Hitachi Parallel Access Volume

Hitachi Parallel Access Volume (HPAV) enables a single S/390® host system to issue multiple I/O requests in parallel to individual logical devices (LDEVs) in the Hitachi Lightning 9900™ V Series subsystem. When HPAV is not used, the host system can start only one I/O request to a device at a time, and must wait for the I/O to complete before starting another I/O request to the same device. HPAV enables the host system to start multiple I/O requests to the same device at the same time via alias addresses assigned to a device. When HPAV is used, the S/390® host computer has substantially faster access to the data stored in the 9900V subsystem.

The two types of devices used in HPAV operations are base devices and alias devices. The base devices are the installed devices which contain user data. The alias devices are installed but unused devices whose addresses can be used as aliases for the base devices. The Lightning 9900™ V Series subsystem supports up to 256 devices per logical control unit (CU), including base and alias devices, for a maximum of 8192 device addresses per subsystem.

The licensed 9900V Hitachi Remote Console – Storage Navigator software allows you to configure HPAV devices on the 9900V subsystem (i.e., assign aliases to base devices, cancel aliases). The 9900V Remote Console software communicates directly with the 9900V subsystem via a LAN. For further information on the 9900V Remote Console software, please refer to the *Hitachi Lightning 9900™ V Series Hitachi Remote Console – Storage Navigator User's Guide* (MK-92RD101).

The Workload Manager (WLM) host software function enables the S/390® host to utilize the HPAV functionality of the Lightning 9900™ V Series subsystem. WLM compatibility mode provides static HPAV functionality, and WLM goal mode provides dynamic HPAV functionality. The 9900V subsystem supports both static and dynamic HPAV. When static HPAV is used, the number of aliases assigned to each base device does not change. For dynamic HPAV, the number of aliases assigned to a base device can change depending on the number of host I/O requests to that device. See section 2.2 for further information on static and dynamic HPAV.

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

■ DFSMS/MVS® Software Support for IBM Enterprise Storage Server (SC26-7318)

■ IBM® Enterprise Storage Server Performance Monitoring and Tuning (SG24-5656)

■ System/390® Command Reference 2105 Models E10, E20, F10, F20 (SC26-7298)

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

Chapter 2   Overview of HPAV Operations

2.1   Components

The components which are involved in HPAV operations are:

- Base devices and alias devices on the 9900V subsystem (see section 2.1.1),

- Controller emulation type for the 9900V subsystem (see section 2.1.2),

- HPAV Remote Console software (see section 2.1.3),

- HCD definitions for the 9900V subsystem (see section 2.1.4), and

- WLM host software definitions for dynamic alias management (see section 2.1.5).

2.1.1   Base Devices and Alias Devices

The 9900V subsystem supports a maximum of 8192 logical devices (LDEVs), up to 256 LDEVs per logical control unit (CU) image and up to 32 CU images. The number of LDEVs per parity group depends on the hard disk drive (HDD) type, RAID level, and device emulation type (e.g., 3390-3R, OPEN-9) of the parity group. Each LDEV is uniquely identified by its LDEV ID, which consists of the logical CU image number (00, 01, 02...1F) and device number (00-FF hexadecimal) (e.g., x00:0F = device 0F in CU image 00).

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

The two device types for HPAV operations are:

- **Base device – 3390B:** A base device is a formatted LVI which contains user data and to which one or more alias devices can be assigned. A base device must be defined to the host as a 3390B device type (e.g., 3390B-3, 3390B-9).

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

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

2.1.2 Controller Emulation Type

The IBM **2105** controller emulation type is required for HPAV operations. Each logical CU image on the 9900V subsystem which contains HPAV base and alias devices must be set for 2105 controller emulation.

Note: If you want to configure copy devices and HPAV devices under the same logical CU image, please see Table 2.2 for important information and instructions. Copy devices include Hitachi TrueCopy, PPRC, XRC, and Concurrent Copy (CC) devices.

2.1.3 HPAV Remote Console Software

The HPAV Remote Console software enables you to configure HPAV base and alias devices on the 9900V subsystem. The HPAV software displays the LDEVs in use as aliases as well as the unassigned LDEV IDs which are available for use, and allows you to assign aliases to base devices and cancel aliases. This document provides instructions for using the 9900V HPAV Remote Console software.

Note: The HPAV option must be enabled on each 9900V subsystem. If the HPAV option is not enabled, the HPAV Remote Console software will not be accessible (see section 3.2.2).

2.1.4 HCD Definitions for the 9900V HPAV Devices

The HPAV base and alias devices on the 9900V subsystem must be defined to the host system using HCD. The 9900V base devices must be 3390B devices (e.g., 3390B-3), and the 9900V alias devices must be 3390A devices (e.g., 3390A-3). The required controller emulation for each 9900V CU image which contains HPAV devices is 2105 emulation. Appendix A provides sample instructions on using HCD to define an HPAV device.

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

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

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

Note: HPAV operations require that one SSID be set for each set of 256 LDEVs.

2.1.5 WLM Host Software Definitions for Dynamic Alias Management

The Workload Manager (WLM) software component of the MVS/ESA® or OS/390® operating system enables the host to interface with the HPAV functionality of the Lightning 9900™ V Series subsystem. WLM compatibility mode provides static HPAV functionality, and WLM goal mode provides dynamic HPAV functionality. WLM must be in "**GOAL**" mode to support "**Dynamic Alias Management**" HPAV functionality.

Support for Dynamic Alias Management by the Workload Manager (WLM) is dependent on the following three parameter settings:

- WLM Goal Mode setting,

- WLM "Dynamic alias management" setting in the Service Coefficients/Service Definitions panel (see Figure B.4 in Appendix B), and

- WLMPAV setting of each base device as defined in the "Define Device Parameters / Features" HCD definition panel (see Figure A.15 in Appendix A).

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

- DFSMS/MVS® Software Support for IBM Enterprise Storage Server (SC26-7318)

- IBM® Enterprise Storage Server Performance Monitoring and Tuning (SG24-5656)

- System/390® Command Reference 2105 Models E10, E20, F10, F20 (SC26-7298)

- OS/390® MVS Planning: Workload Management (GC28-1761)

2.2 Static and Dynamic HPAV Operations

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

■ The 'WLMPAV=xxx' parameter setting for each device defined to the OS/390® host via HCD. The default setting of this parameter is 'WLMPAV=YES' for 3390B or 3390A devices defined via HCD.

■ The 'Dynamic Alias Support' parameter setting for WLM.

■ Static HPAV is implemented when the WLM feature for 'Dynamic Alias Support' is set to NO and the appropriate aliases are assigned to the base devices using the HPAV Remote Console software. The setting of the 'WLMPAV=xxx' parameter defined for each 3390B or 3390A device is ignored. In addition, the 'I/O Priority Management' setting for WLM is ignored (see Table 2.1).

■ Dynamic HPAV is implemented when 'Dynamic Alias Support' is set to YES and the appropriate aliases are assigned to the base devices using the HPAV Remote Console software. The setting of the 'WLMPAV=xxx' parameter defined for each 3390B or 3390A device must be set to 'YES' if WLM is to manage the alias device address assignments. In addition, the 'I/O Priority Management' setting for WLM determines the dynamic alias algorithm to be used for meeting the Performance Index of the workloads under the control of WLM using the HPAV feature (see Table 2.1).

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

Table 2.1   HCD Settings for Static and Dynamic HPAV

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

2.2.1 Static HPAV

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

Figure 2.1 shows an example of static HPAV operations. Each of the three base devices (x10, x11, x12) has two aliases assigned. If I/O requests converge on base device x10 (shown by the large arrow), the number of aliases for each base device remains unchanged.

Note: If you will be using static HPAV, you need to determine on which devices I/O requests are likely to converge, and then assign more aliases to those base devices. If not, HPAV might not be able to provide much improvement in host access to data in the 9900V subsystem.
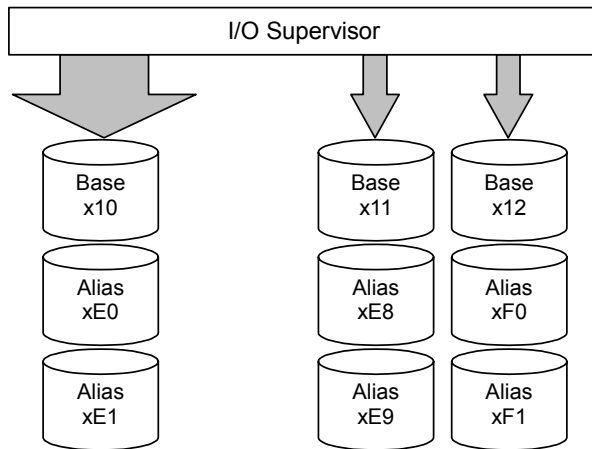
Figure 2.1   Static HPAV

2.2.2   Dynamic HPAV

When dynamic HPAV is used, the number of aliases for a base device may change as the number of I/O requests to the device changes. If I/O requests converge on several base devices, the number of aliases for these devices may increase, while the number of aliases for other base devices may decrease. Dynamic HPAV operations can balance workloads on base devices and optimize the speed for accessing data in the 9900V subsystem.

Figure 2.2 shows an example of dynamic HPAV operations. Each of the three base devices (x10, x11, x12) was originally assigned two aliases. In this example, as I/O requests converge on base device x10 (shown by the large arrow), the number of aliases for device x10 increases to four, while the number of aliases for base device x11 and x12 decreases to one.

Dynamic HPAV operations require the Workload Manager (WLM) software function provided by the host computer. For further information on WLM operations, see sections 2.1.5 and 3.1.
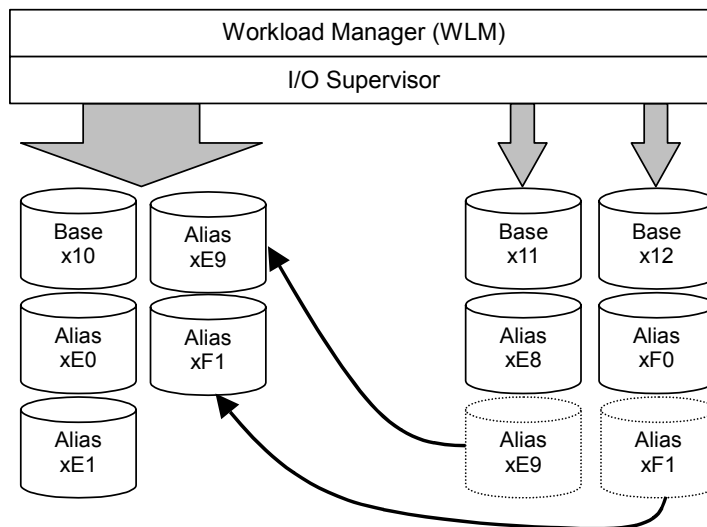
Figure 2.2   Dynamic HPAV

2.3   Requirements and Restrictions

Table 2.2 lists the requirements and restrictions for HPAV operations on the 9900V subsystem.

Table 2.2   Requirements and Restrictions for HPAV

Item	Requirement and/or Restriction
Controller emulation type	I-2105
Device emulation type for base device	3390-3, 3390-3R*, 3390-9 *Note:* Hitachi RapidXchange (HRX) devices (3390-3A, 3390-3B, 3390-3C) are not supported.
Storage subsystem ID (SSID) setting	One SSID must be set for each set of 256 LDEVs.
Maximum number of aliases that can be assigned to a base device	15
Alias device	Alias device and its base device must belong to the same logical CU image.
Functions that cannot be used concurrently with HPAV	Hitachi Multiplatform Backup/Restore (HMBR) Hitachi RapidXchange (HRX) Virtual LUN FlashAccess SANtinel ShadowImage Hitachi TrueCopy
Functions that can be used concurrently with HPAV *Note on GDPS:* Please refer to the *Hitachi Lightning 9900™ V Series Hitachi TrueCopy-S/390® User and Reference Guide* (MK-92RD107) for important information on GDPS support for 2105 emulation.	Virtual LVI FlashAccess-S/390® SANtinel-S/390® Hitachi CruiseControl ShadowImage-S/390® Hitachi TrueCopy-S/390® PPRC Concurrent Copy(CC) with restrictions (see *Caution* below) Extended Remote Copy (XRC) with restrictions (see *Caution* below)

* Early versions of 9900V HPAV do not support 3390-3R devices. Please check with your Hitachi Data Systems representative.

Caution: The following restrictions apply if CC and/or XRC will be used with HPAV:

- Ensure that the emulation type of all LCUs is 2105. For CC and XRC, 2105 emulation cannot be intermixed with other emulation types within the same subsystem.

- If CC and/or XRC volumes already exist, you must change to 2105 emulation as follows:

  a) Stop all Concurrent Copy jobs, and delete all XRC pairs.

  b) Change the DKC emulation type of all CHA packages in the 9900V to 2105 (I-2105).

  c) Restart Concurrent Copy jobs, and re-establish XRC pairs.

2.4   Maximizing Your HPAV Results

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

- The best results can be obtained if the number of aliases per CU image is equal to the number of available channel paths minus one. If the number of aliases is specified this way, I/O operations can use all channel paths, thus providing the best results.

- HPAV may not produce good results when many channel paths are used. If all channel paths are used, good HPAV results cannot be expected.

- The unused device addresses in the 9900V subsystem are used as alias devices. If you use most of the unused device addresses for aliases, you will only have a small amount of free devices available. If you determine that a large number of aliases will be required, please consider adding more disks to ensure that storage will be available when needed.

- HPAV may not provide good results for devices that are always shared and used by multiple host systems. For access by multiple hosts, you should use the Multiple Allegiance (MA) host software function supported by the Lightning 9900™ V Series subsystem.

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

- The recommended ratio of base devices to alias devices is 1:3. Table 2.3 shows examples of calculating the number of base and alias devices for a CU image with 256 devices. If you know the types of jobs and/or the expected host access rates for the base devices, you should determine the number of aliases for each base device to meet your requirements for each base device.

- Up to 15 alias devices can be assigned to one base device.

Table 2.3   Ratio of Base Devices to Alias Devices

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

Chapter 3   Preparing for HPAV Operations

3.1   System Requirements

Hitachi Parallel Access Volume (HPAV) operations involve the volumes on the 9900V subsystem(s), the licensed HPAV Remote Console software, and the WLM host software function. The system requirements for HPAV are:

- **Hitachi Lightning 9900™ V Series subsystem(s):** The emulation type for a CU image which controls HPAV devices must be 2105 (see section 3.2.1).

- **HPAV Remote Console Software:**
  - The **9900V Hitachi Remote Console – Storage Navigator** software is required for 9900V HPAV operations (see section 3.2.2). The HPAV Remote Console software is a component of the 9900V Hitachi Remote Console – Storage Navigator.
  - The **HPAV license key code** is required to enable the HPAV option on the 9900V subsystem (see section 3.2.2). A separate license code is required for each 9900V.

  Note: Administrator access to the 9900V Remote Console software is required to perform HPAV operations. Users without administrator access can only view HPAV information.

- **Host software:**
  - **For static HPAV:**
    OS/390® V1R3 or later, and DFSMS/MVS 1.3 or later
    VM/ESA 2.4.0 or later

  - **For dynamic HPAV:**
    OS/390® V2R7 with APAR OW39854, and DFSMS/MVS 1.5 or later

  - **APARs and PTFs:** All customers planning the installation of HPAV on a 9900V subsystem are encouraged to obtain the Preventive Service Planning (PSP Bucket) document from IBM® for the 2105 device. The title of this PSP document is *2105MVSESA*, and this IBM® document can be obtained via IBMLINK.

    The PSP document identifies all current IBM® APAR/PTF items applicable for OS/390® support of the 2105 device type. The 9900V does not have any specific APAR/PTF requirements beyond what is required by the OS/390® operating system to provide minimum support for the 2105 device type.

  For further information on the OS/390® PAV host software function, please refer to the following and other IBM® documents:
  - DFSMS/MVS® Software Support for IBM Enterprise Storage Server (SC26-7318)
  - IBM® Enterprise Storage Server Performance Monitoring and Tuning (SG24-5656)
  - System/390® Command Reference 2105 Models E10, E20, F10, F20 (SC26-7298)
  - OS/390® MVS Planning: Workload Management (GC28-1761)

- **IOCP definition considerations:** If you maintain separate IOCP definitions files and create your SCDS or IOCDS manually by running the IZP IOCP program, the following definition rules apply:

  - Each LCU on a 9900V subsystem is defined using one CNTLUNIT statement in IOCP. The unit type is 2105. Up to 16 LCUs can be defined on a 9900V. An LCU is identified by its 'Control Unit Address' ('CUADDR=x' parameter) and is specified as a hexadecimal number in the range of '0' to 'F'. An LCU is the same as an IBM Logical Sub-System or LSS. While it is possible to have an LCU on a 9960 subsystem defined using multiple CNTLUNIT statements in IOCP, the resulting input deck cannot be migrated to HCD due to an IBM restriction to allow only one CNTLUNIT definition.

  - Up to 256 devices may be defined on each LCU. Base device addresses are identified as unit type 3390B. Alias device addresses are identified as 3390A.

- **HCD definition considerations:** If you use HCD exclusively to define I/O definitions to OS/390® and to automatically run the IOCP program to create SCDS or IOCDS, the following definition rules apply:

  - Each LCU on a 9900V subsystem is defined as a 2105 control unit.

  - Base devices are defined as 3390B device types. HCD will only allow you to connect base devices to one control unit. Base device optional parameter definitions in HCD include the 'WLMPAV=xxx' parameter. The default setting is 'YES'.

  - Alias devices are defined as 3390A device types. HCD will only allow you to connect alias devices to one control unit. Alias devices have only one optional parameter definition in HCD. The 'WLMPAV=xxx' parameter defaults to 'YES'.

3.2   Preparing the 9900V Subsystem for HPAV Operations

Before starting HPAV operations, you must perform the following tasks:

- Change the controller emulation type (see section 3.2.1), and then

- Enable the HPAV option on the 9900V subsystem (see section 3.2.2).

3.2.1   Changing the Controller Emulation Type

For HPAV operations the 9900V subsystem must have channel adapter (CHA) packages for which the 2105 emulation type is specified. Please ask your Hitachi Data Systems representative to verify that the correct CHA packages are installed.

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

- Add CHA packages, and set the emulation type of these packages to 2105 (I-2105-F20).

- Use the System Tuning function on the SVP to change the emulation type to 2105, and power off and then power on the 9900V subsystem.

Caution: For CC and XRC operations, the 2105 emulation type cannot be intermixed with other emulation types within the same subsystem. If your 9900V subsystem is already performing CC and/or XRC operations, please see Table 2.2 for instructions on implementing HPAV with these functions on the same subsystem.

3.2.2   Enabling the HPAV Option

After setting the controller emulation to 2105 (see section 3.2.1), you must enable the HPAV option on the 9900V subsystem using the 9900V Remote Console software. For instructions on using the 9900V Remote Console software and enabling the HPAV option, please refer to the *Hitachi Lightning 9900™ V Series Hitachi Remote Console – Storage Navigator User's Guide* (MK-92RD101).

Disabling HPAV
For information on disabling the HPAV option, please refer to the *Hitachi Lightning 9900™ V Series Hitachi Remote Console – Storage Navigator User's Guide*.

Caution: Before disabling the HPAV option, you must cancel all aliases (see section 4.2.2).

3.2.3   Using the HPAV Remote Console Software

You can start using the 9900V HPAV Remote Console software as soon as the controller emulation is set (see section 3.2.1) and the HPAV option is enabled (see section 3.2.2).

To use the HPAV software:

1. Log on to the 9900V Hitachi Remote Console – Storage Navigator with administrator access or custom HPAV access. If you do not have administrator access or custom HPAV access, you will only be able to view the HPAV information for the connected subsystem.

   Note: Remember that the HPAV option must be enabled for each 9900V subsystem on which you want to perform HPAV operations.

2. Select the Mainframe Connection icon (along left side of panel), and then select the **HPAV** tab to display the Hitachi Parallel Access Volume panel (see section 4.1). The HPAV panel displays the HPAV information for the connected subsystem and provides access to all HPAV operations.

3.3   Preparing the Host System for HPAV Operations

This section provides a brief description of the required preparations at the host system for HPAV operations on the Hitachi Lightning 9900™ V Series subsystem. For more detailed information, please refer to the documentation for MVS. Before performing HPAV operations, you must:

- Set the desired WLM operation mode on the host system (see section 3.3.1), and

- Set the MIH timer value on the host system (see section 3.3.2).

3.3.1   Setting the WLM Operation Mode

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

- **Goal mode:** If you want to use dynamic HPAV, you must set the WLM operation mode to *goal mode*. In goal mode, WLM can assign more or fewer aliases to a base device depending on the host I/O activity to that device, thereby managing the system to meet the performance goal specified before system operations began.

- **Compatibility mode:** If you want to use static HPAV, you must set the WLM operation mode to *compatibility mode*. In compatibility mode, the number of aliases assigned to each base device does not change as a result of changes in host I/O activity. WLM manages the system according to the parameters in the IPS and ICS (IEAIPSxx, IEAICSxx).

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

3.3.2   Setting the MIH Timer Value

The recommended MIH timer value for 9900V HPAV operations is **30 seconds**. The MIH timer values can be set in MVS/ESA® or OS/390® either at IPL or after IPL.

To set the MIH timer value:

1. **At IPL –** Use the MIH parameter in the IECIOSxx parmlib member to set the MIH timer value at IPL time. For the complete syntax of this parameter, please refer to IBM document SC28-1752, *OS/390® MVS Initialization and Tuning Reference*.

2. **After IPL –** Use the "SETIOS" System Command after IPL to change or set the MIH timer value. For the complete syntax of this command, please refer to IBM document GC28-1781, *OS/390® MVS System Commands*.

Chapter 4   Performing HPAV Operations

After you have prepared for HPAV operations as described in Chapter 3, you are ready to start performing HPAV operations on the Hitachi Lightning 9900™ V Series subsystem. HPAV operations include:

- Using the HPAV panel on the Hitachi Remote Console – Storage Navigator (see section 4.1),

- Assigning and canceling aliases (see section 4.2), and

- Defining the 9900V devices to the host system (see section 4.3).

Chapter 5 provides information on monitoring HPAV activities on the 9900V subsystem.

Chapter 6 provides troubleshooting information for 9900V HPAV operations.

Appendix B provides sample instructions for using HCD to define 9900V logical control units and HPAV devices and view WLMPAV parameters.

Appendix C provides instructions for viewing and changing the WLM PAV settings.

4.1   Using the HPAV Panel

The HPAV panel (see Figure 4.1) displays the HPAV information for the connected 9900V subsystem and provides access to all HPAV operations. To open the HPAV panel, select the Mainframe Connection icon ▉ (along the left side), and then select the **HPAV** tab.
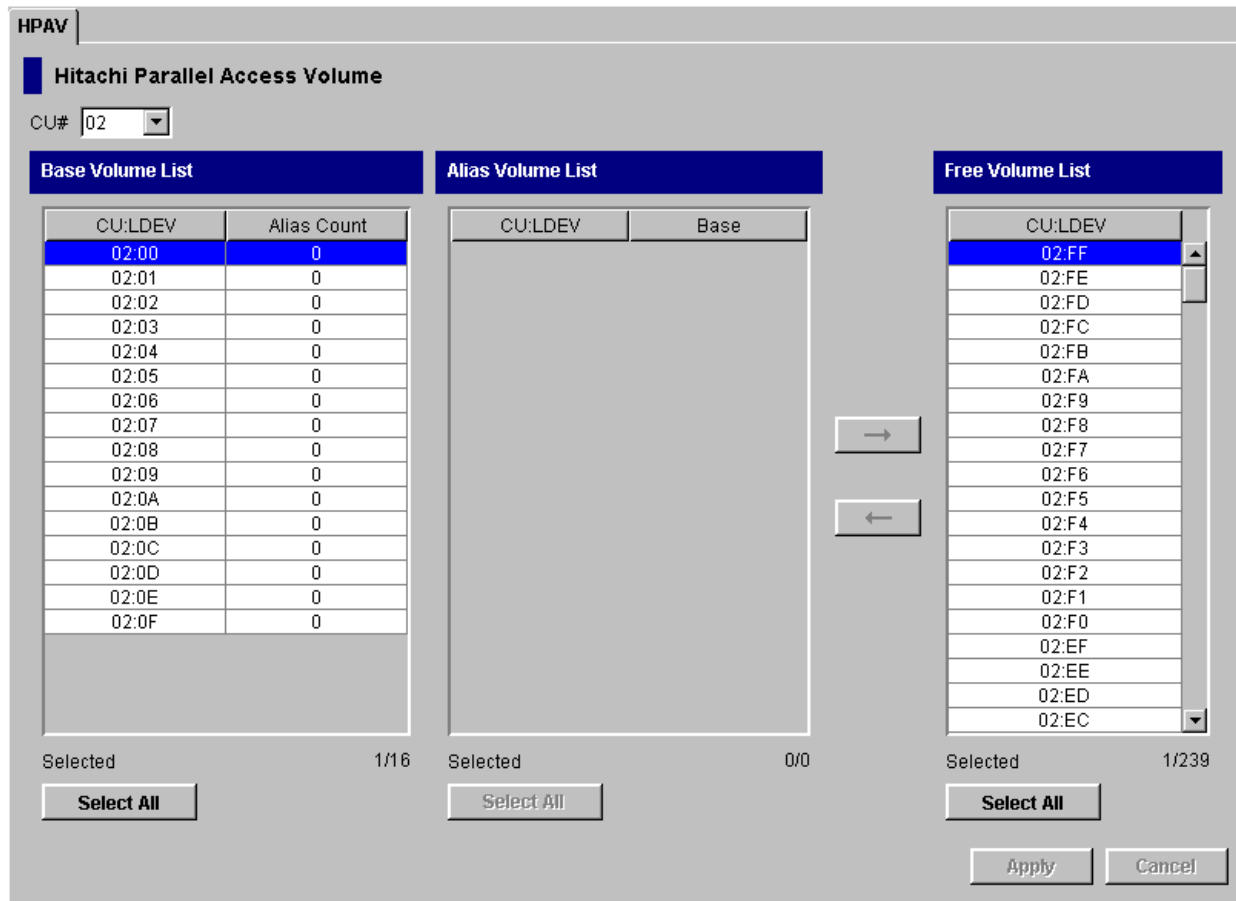
Figure 4.1   HPAV Panel

The **CU#** drop-down list box allows you to select the desired logical CU image in the connected 9900V subsystem. The HPAV panel displays the LDEVs (3390 LVIs only) for the selected CU image.

The **Base Volume List** box displays the 3390 LVIs that are currently in use in the selected CU image. Each of these LDEVs can be an HPAV base device. When you assign and cancel aliases for base devices, you select the base devices from this list box.

- **Alias Count:** This column indicates the number of aliases for each base volume.

- The **Selected** field displays the number of selected base volumes and the total number of base volumes in the selected CU image. For example, 2/73 indicates that two base volumes are selected out of a total of 73 base volumes in the select CU image.

- The **Select All** button allows you to select all volumes in the **Base Volume List** box.

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 **Base** column displays the LDEV ID of the base device for each alias device.

- The **Selected** field 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.

- The **Select All** button allows you to select all volumes in the **Alias Volume List** box.

The **Free Volume List** box displays the LDEV IDs of the unused volumes in the selected CU. Each of these free volumes can be used as an HPAV alias device. When you assign aliases to base volumes, you select the alias devices from this list.

- The **Selected** field displays the number of selected free devices and the total number of free devices in the selected CU image. For example, 8/47 indicates that eight free devices are selected out of a total of 47 free devices in the selected CU image.

- The **Select All** button allows you to select all volumes in the **Free Volume List** box.

The ← button allows you to assign aliases to base devices (see section 4.2.1). When you select the ← button, the selected free LDEV IDs are assigned to the selected base devices, and the new alias devices are displayed the **Alias Volume List** box. To complete your request to assign the new aliases as specified, you must select the **Apply** button.

The → button allows you to cancel aliases for base devices (see section 4.2.2). When you select the → button, the selected alias devices are canceled, and their LDEV IDs are displayed the **Free Volume List** box. To complete your request to cancel the aliases as specified, you must select the **Apply** button.

The **Apply** button applies the settings made on this panel to the 9900V subsystem. When you select the **Apply** button, a message appears to ask you whether you want to apply your request to the disk subsystem. The **Cancel** button discards changes in this panel to restore the initial settings.

4.2   Assigning and Canceling Aliases

4.2.1   Assigning Aliases

Before you assign HPAV aliases, you should have determined the required number of aliases for each base device to meet your operational requirements (see section 2.4). If you assign additional aliases after starting I/O operations to the 9900V HPAV devices, you will need to redefine the 9900V HPAV devices to the host operating system.

You can assign up to 15 aliases to one base device. The HPAV assign alias function pairs each selected base volume with one or more of the selected free volumes. If the number of selected free volumes is larger than the number of selected base volumes, this function attempts to allocate the free volumes equally to the base volumes. For example, if six free volumes and two base volumes are selected, three free volumes (aliases) are allocated to each base volume.

To assign aliases to volumes in the connected 9900V subsystem:

1. On the HPAV panel, select the CU image which contains the desired base volumes. The total number of available free volumes is displayed under the **Free Volume List** box.

2. Select the desired base volumes in the **Base Volume List** box, select the desired free volumes in the **Free Volume List** box, and then select the ← button to add the new aliases to the **Alias Volume List** box.

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

3. Select **Apply** on the HPAV panel. When the set HPAV confirmation panel appears, select **Yes** to assign the new aliases as specified. To cancel your request, select **No**.
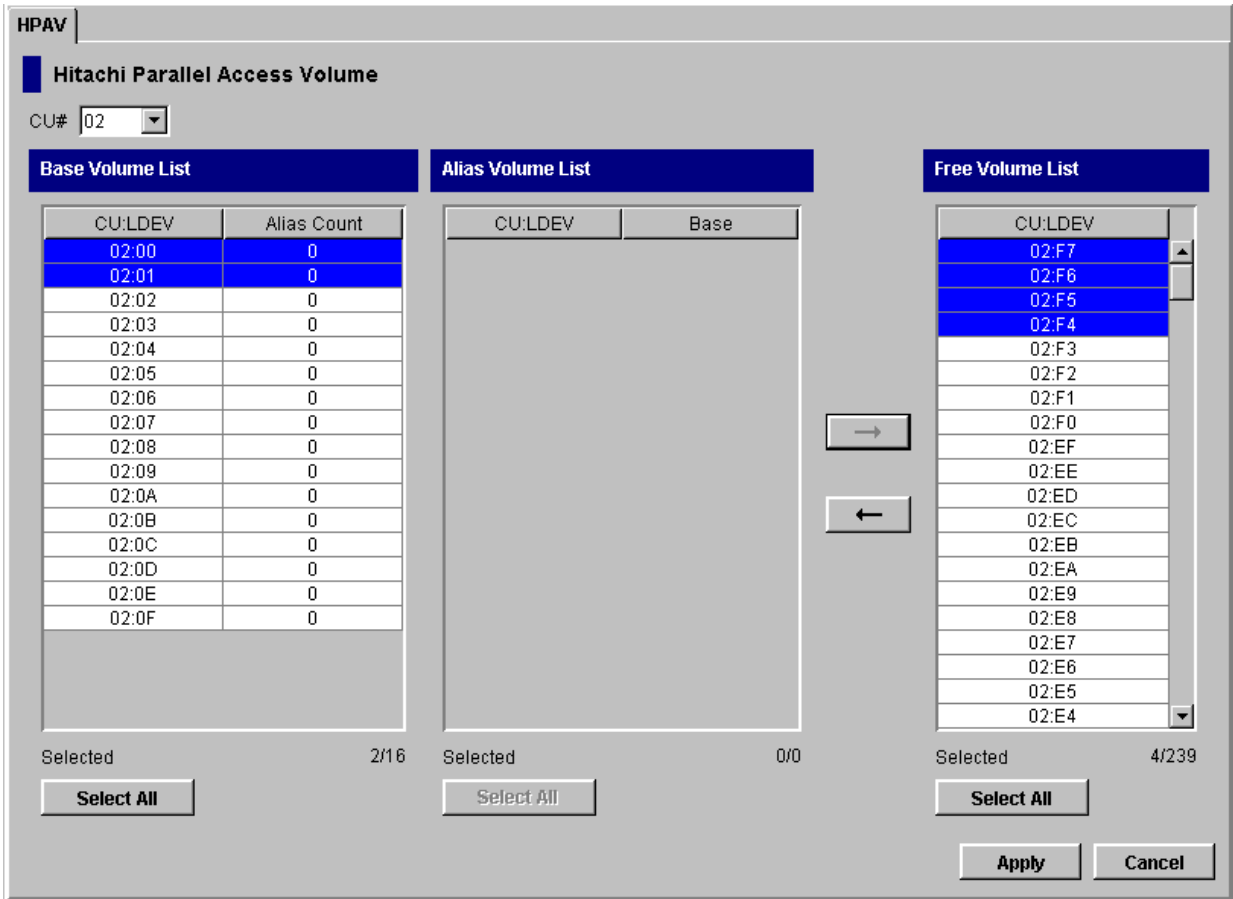
Figure 4.2   Assigning Aliases
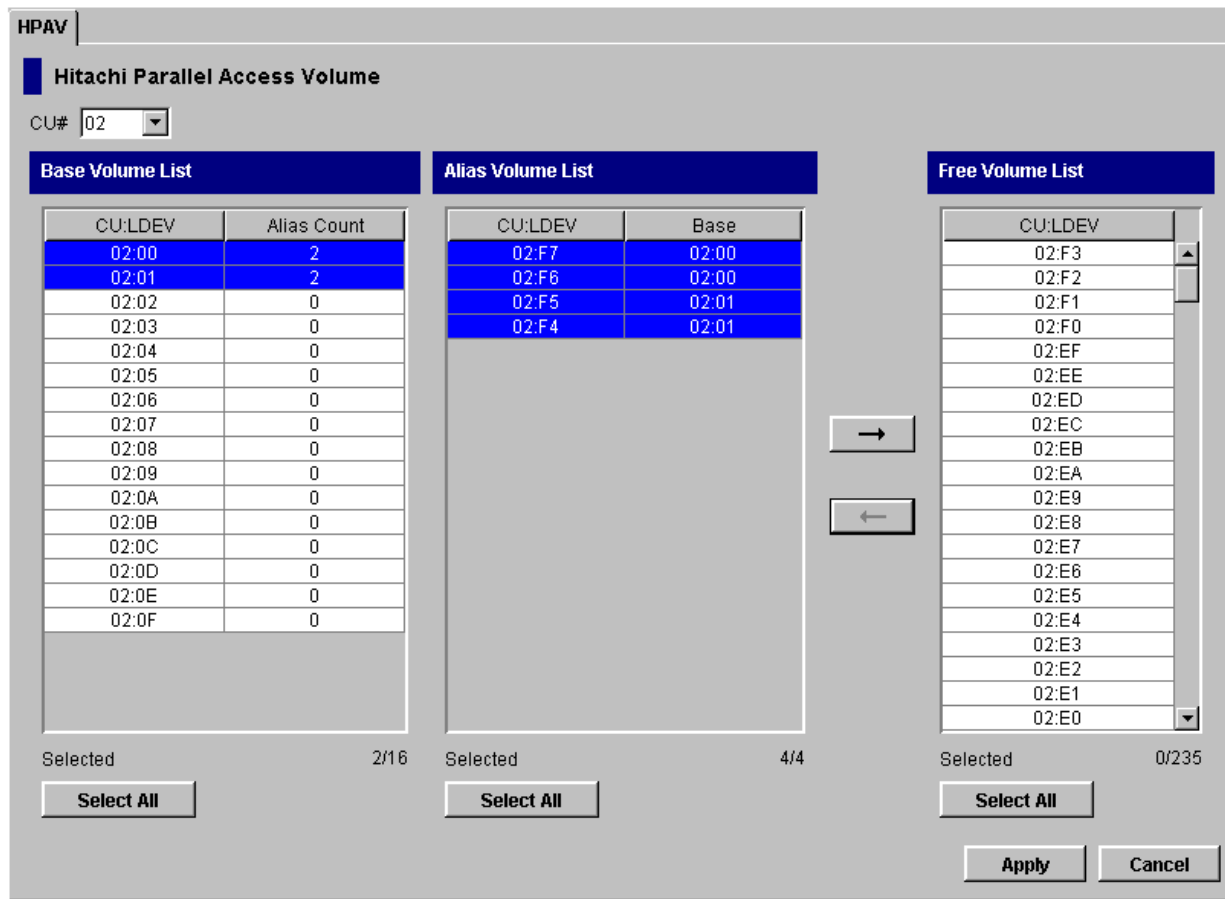
Figure 4.3   Confirming the New Aliases

4.2.2   Canceling Aliases

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

To cancel aliases for volumes in the connected 9900V subsystem:

1. On the HPAV panel, select the CU image which contains the aliases that you want to cancel.

2. In the **Base Volume List** box, select the base device(s) for the aliases that you want to cancel.

3. In the **Alias Volume List** box, select the alias devices that you want to cancel (see Figure 4.4), and then select the ➔ button to remove the aliases from the **Alias Volume List** box and add their LDEV IDs to the **Free Volume List** box.

4. Select **Apply** on the HPAV panel. When the set HPAV confirmation panel appears, select **Yes** to cancel the aliases as specified. To cancel your request, select **No**.

Figure 4.4   Canceling Aliases

4.3   Considerations for Defining the 9900V Devices to the Host System

Important: For CC and XRC, the 2105 controller emulation type cannot be intermixed with other emulation types within the 9900V subsystem. If the 9900V has existing CC and/or XRC volumes and you want to implement HPAV, you must change to 2105 emulation as follows:

1. Stop all Concurrent Copy jobs, and delete all XRC pairs.

2. Change the DKC emulation type of all CHA packages in the 9900V to I-2105.

3. Restart Concurrent Copy jobs, and re-establish XRC pairs.

Note: HPAV operations require that one SSID be set for each set of 256 LDEVs.

4.3.1   Definition of 9900V 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 using the HPAV Remote Console software. If the mappings do not match, serious failures can occur during data processing. Figure 4.5 shows examples of mappings between base devices and alias devices.

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

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

Figure 4.5   Mapping Between Base Devices and Alias Devices

4.3.2 Verifying Base and Alias Device Definition

After you have defined the mapping between base devices and alias devices to the host operating system (see section 4.3.1), you need to verify that the host recognizes the 9900V devices as specified.

To verify that the host system recognizes the settings for the 9900V base and alias devices:

1. At the MVS console display information about the base devices and the corresponding alias addresses using the **DEVSERV** (**DS**) command (see sample output in Figure 4.6):

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

2. Make sure that the information displayed by the **DS** command matches your definitions of base devices and alias addresses.

   Note: The information displayed by the **DS** command should match the HPAV settings for base devices and alias addresses that you specified using the HPAV Remote Console software. If it does not match, redefinition is required. After dynamic HPAV has been used, the information may not match, but the mismatch will not cause any problems. For dynamic HPAV, the mismatch occurs because the host system can change the number of aliases assigned to each base device.

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

Figure 4.6   Verifying the Base Devices and Alias Addresses

4.3.3　Verifying the Status of the Devices

After verifying the generation definition for the 9900V devices, you need to verify the status of the devices for each channel path (CHP).

To verify the status of the 9900V devices by CHP ID:

1. At the MVS console display the status of the 9900V devices by issuing the **Display Matrix** command for each CHPID connected to the 9900V (see sample output in Figure 4.7):

   D M=CHP(XX)　　　(XX = CHP ID)

2. Make sure that the displayed information matches the device status that was defined when the generation definition was made.

   If the information is correct, the Lightning 9900™ V Series subsystem is now ready for HPAV activities. Please see Chapter 5 for information on monitoring HPAV activities.

   If the information is not correct, you need to redefine the 9900V devices to the host as described in sections 4.3.1 and 4.3.2.

```
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   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   UL
68F   UL   UL   UL   UL   UL   UL   UL   UL   UL   UL   UL   UL   UL   UL   UL   UL
************************************SYMBOL
EXPLANATIONS*************************************
+ ONLINE  @ PATH NOT VALIDATED  - OFFLINE  .DOES NOT EXIST
* PHYSICALLY ONLINE  $ PATH NOT OPERATIONAL
BX DEVICE IS BOXED  SN SUBCHANNEL NOT AVAILABLE
DN DEVICE NOT AVAILABLE  PE SUBCHANNEL IN PERMANENT ERROR
AL DEVICE IS AN ALIAS  UL DEVICE IS AN UNBOUND ALIAS
```

Figure 4.7　Verifying the Status of Devices Defined by CHP ID

Chapter 5   Monitoring HPAV Activities

The following methods can be used to monitor Hitachi Parallel Access Volume (HPAV) activities on the Hitachi Lightning 9900™ V Series subsystem:

- Additional MVS commands
- GTF I/O tracing

5.1   Additional MVS Commands

In addition to the "DS QPAV" and "D M=CHP" commands (refer to Figure 4.6 and Figure 4.7), the following commands will provide additional information:

- **DISPLAY M=DEV**. Figure 5.1 shows an example of the Display M=DEV(xxxx) command for a base device.

- **DEVSERV PATHS**. Figure 5.2 shows an example of a DEVSERV PATHS command

- **DEVSERV QPAV**. Figure 5.3 through Figure 5.5 show sample outputs of the DEVSERV QPAV commands having the following command formats:
  - DS QP,8300,4   Display status of four base devices starting at device 8300
  - DS QP,SSID=8300   Display status of entire Subsystem-ID
  - DS QP,8300,VOLUME   Display status of host/subsystem configuration for volume

For the complete syntax of the DISPLAY and DESVSERV commands, please refer to IBM document GC28-1781, *OS/390® MVS System Commands*.

5.2   GTF I/O Tracing

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

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

Figure 5.1   Sample Output of Display Command – HPAV Base Device with 5 Aliases

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

Figure 5.2   Sample Output of DEVSERV DISPLAY PATHS Command

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

Figure 5.3   Sample DEVSERV QPAV Command

```
DS QP,SSID=8300
 IEE459I 15.56.03 DEVSERV QPAVS 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
```

Figure 5.4   Sample Output of DSESERV QPAV,SSID=xxxx Command

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

Figure 5.5   Sample Output of DS QP,8300,VOLUME Command

Chapter 6   Troubleshooting

6.1   Troubleshooting

- For troubleshooting information on the 9900V subsystem, please refer to the *Hitachi Lightning 9900™ V Series User and Reference Guide* (MK-92RD100).

- For troubleshooting information on the 9900V Remote Console software, please refer to the *Hitachi Lightning 9900™ V Series Hitachi Remote Console – Storage Navigator User's Guide* (MK-92RD101).

- For information on the 9900V Remote Console software error codes, please refer to the *Hitachi Lightning 9900™ V Series Remote Console Error Codes* (MK-92RD132).

- For troubleshooting information on host operations, please refer to the IBM® MVS documentation.

The user is responsible for the operation and normal maintenance of the PC(s) which host the 9900V Remote Console software. Here are some guidelines for troubleshooting 9900V Remote Console software operations:

- **Check the cabling and the LAN.** Verify that both the computer and LAN cabling are firmly attached, and that the LAN is operating properly.

- **Reboot the PC.** Close any programs that are not responding. If necessary, reboot the PC and restart the 9900V Remote Console – Storage Navigator Java applet program.

- **Check for any General Error Conditions.** Check the troubleshooting information in the *Hitachi Lightning 9900™ V Series Hitachi Remote Console – Storage Navigator User's Guide*. The document lists general error conditions and provides recommended resolution for each condition. If you are still unable to resolve an error condition, please call the Hitachi Data Systems Support Center for assistance (see section 6.2 for contact information).

- **Check the status lamp on the Hitachi Remote Console – Storage Navigator.** If the lamp becomes yellow (🟡) or red (🔴), confirm the severity level of the error on the Status panel (refer to the *Hitachi Lightning 9900™ V Series Hitachi Remote Console – Storage Navigator User's Guide*). If you are unable to resolve an error condition, please contact the Hitachi Data Systems Support Center (see section 6.2).

- **Download the Remote Console trace files using the FD Dump Tool.** If you are unable to resolve an error condition, copy the 9900V Remote Console configuration information onto diskette using the FD Dump Tool (see the *Hitachi Lightning 9900™ V Series Hitachi Remote Console – Storage Navigator User's Guide* for instructions). Contact the Hitachi Data Systems Support Center (see section 6.2), and give this information on the floppy disk(s) to the Hitachi Data Systems service personnel.

6.2   Calling the Support Center

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

- The 9900V Remote Console configuration information saved on diskette using the FD Dump Tool (see the *Hitachi Lightning 9900™ V Series Hitachi Remote Console – Storage Navigator User's Guide* for instructions),

- The circumstances surrounding the error or failure,

- The exact content of any error messages displayed on the host system(s),

- The HPAV (or other) error code(s) displayed by the 9900V Remote Console software, and

- The reference codes and severity levels of the recent service information messages (SIMs).

The worldwide Hitachi Data Systems Support Centers are:

- Hitachi Data Systems North America/Latin America
  San Diego, California, USA
  1-800-348-4357

- Hitachi Data Systems Europe
  Contact Hitachi Data Systems Local Support

- Hitachi Data Systems Asia Pacific
  North Ryde, Australia
  011-61-2-9325-3300

Appendix A   Using HCD to Define and View 9900V Logical Control Units and HPAV Devices

The 9900V logical control units (LCUs) and PAV base and alias devices are defined to MVS/ESA® and OS/390® systems using the configuration dialog panels of the Hardware Configuration Definition (HCD) Program. The WLMPAV device parameter for existing HPAV devices can also be displayed using the HCD Program.

This appendix provides sample instructions for:

- Defining a 9960 LCU and base and alias HPAV devices (see section A.1), and

- Displaying the WLMPAV device parameters (see section A.2).

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

A.1   Using HCD to Define a 9960 LCU and the Base and Alias Devices

The following example shows the sequence of HCD panels used in defining a 9960 LCU and a range of base and alias devices. Before you can define the LCU, the channel paths must already be defined.

To define a 9960 LCU and the base and alias address range that it will support, please use the following example for HCD:

1. From an ISPF/PDF primary options menu, select the HCD option to display the basic HCD panel (see Figure A.1). On this panel you must verify the name of the IODF or IODF.WORK I/O definition file to be used.

2. On the basic HCD panel, select option 1 to display the Define, Modify, or View Configuration Data panel (see Figure A.1).

3. On the Define, Modify, or View Configuration Data panel (see Figure A.2), select option 4 to display the Add Control Unit panel.

4. On the Add Control Unit panel (see Figure A.3), enter the following information:
   Control unit number
   Control unit type – 2105
   Switch connection information

5. After defining the control unit, select the processor complex that the control unit is to be attached to (see Figure A.4), and then select option 1, SELECT (see Figure B5).

6. Enter chpids that attach to the control unit, the logical control unit address, the device starting address, and the number of devices supported (see Figure A.6).

7. Return to the Define, Modify, or View Configuration Data panel, and select option 5 to display the I/O Device List panel (see Figure A.7).

8. On the I/O Device List panel, press PF11 to start the Add Device dialog (see Figure A.8).

9. On the Add Device panel, enter the following (see Figure A.9):
    Device number
    Number of devices
    Device type: 3390B for an HPAV base device, or 3390A for an HPAV alias device.

10. Once the device is defined using the Add Device panel, you must direct HCD to add this device to a specific Processor/System-ID combination. Figures A.10-A.13 show the HCD panels used to select the Processor and System-ID to which this device will be added.

11. After you select the OS configuration on the Define Device to Operating System Configuration panel (refer to Figure A.13), you are prompted to select the device or disconnect the device from the selected OS (see Figure A.14). Select option 1 (Select).

12. The Define Device Parameters / Features panel (see Figure A.15) displays the default device parameters. *Note:* The WLMPAV parameter defaults to "YES".

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

                         Hardware Configuration

 Select one of the following.

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

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

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

Figure A.1   Basic HCD Panel

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

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

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

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

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

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

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

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

Figure A.3   Add Control Unit Panel

```
   Goto  Filter  Backup  Query  Help
.-------------------- Select Processor / Control Unit ---------------------.
|                                                 Row 1 of 1 More:       >  |
| Command ===> _____ Scroll ===> CSR      |
|                                                                          |
| Select processors to change CU/processor parameters, then press Enter.   |
|                                                                          |
| Control unit number . . : 2000    Control unit type . . . : 2105         |
|                                                                          |
|              Log. Addr. -------Channel Path ID . Link Address + -------   |
| / Proc. ID Att. (CUADD) +  1---- 2---- 3---- 4---- 5---- 6---- 7---- 8----  |
| _ SYSTEMS         __       _____ _____ _____ _____ _____ _____ _____ _____  |
| **************************** Bottom of data **************************** |
|                                                                       |  |
|  F1=Help       F2=Split     F3=Exit      F4=Prompt      F5=Reset          |
|  F6=Previous   F7=Backward  F8=Forward   F9=Swap        F12=Cancel        |
| F20=Right      F22=Command                                               |
`--------------------------------------------------------------------------'
_ 3007 SCTC          1         _____ _____
_ 3008 SCTC          1         _____ _____
_ 3009 SCTC          1         _____ _____
_ 300A SCTC          1         _____ _____
_ 3101 SCTC          1         _____ _____
_ 3102 SCTC          1         _____ _____
_ 3103 SCTC          1         _____ _____
_ 3104 SCTC          1         _____ _____
_ 3105 SCTC          1         _____ _____
_ 3106 SCTC          1         _____ _____
_ 3107 SCTC          1         _____ _____
_ 3108 SCTC          1         _____ _____
_ 3109 SCTC          1         _____ _____
_ 310A SCTC          1         _____ _____
_ 4000 2105          1         _____ _____
_ 4100 2105          1         _____ _____
 F1=Help      F2=Split     F3=Exit      F4=Prompt     F5=Reset     F7=Backward
 F8=Forward   F9=Swap     F10=Actions  F11=Add       F12=Cancel   F13=Instruct
 F22=Command
```

Figure A.4   Selecting the Operating System

```
   Goto  Filter  Backup  Query  Help
.-------------------- Select Processor / Control Unit --------------------.
|                                                                         |
|  Command ===>  .-------------- Actions on selected processors --------------.
|               |                                                          |
|  Select proces |                                                         |
|               |   Select by number or action code and press Enter.      |
|  Control unit |                                                          |
|               |  __  1.  Select (connect, change)  . . . . . (s)         |
|               |      2.  Group connect . . . . . . . . . . . (g)         |
| / Proc. ID At |      3.  Disconnect  . . . . . . . . . . . . (n)         |
| / SYSTEMS     |                                                          |
| ************* |                                                          |
|               |    F1=Help     F2=Split     F3=Exit     F9=Swap     F12=Cancel |
|               '-----------------------------------------------------------'
|                                                                         |
|                                                                         |
|                                                                         |
|                                                                         |
|                                                                         |
|   F1=Help        F2=Split       F3=Exit       F4=Prompt      F5=Reset    |
|   F6=Previous    F7=Backward    F8=Forward     F9=Swap       F12=Cancel  |
|  F20=Right      F22=Command                                             |
'-------------------------------------------------------------------------'
 _ 3007 SCTC          1        _____ _____
 _ 3008 SCTC          1        _____ _____
 _ 3009 SCTC          1        _____ _____
 _ 3109 SCTC          1        _____ _____
 _ 310A SCTC          1        _____ _____
 _ 4000 2105          1        _____ _____
 _ 4100 2105          1        _____ _____
 F1=Help      F2=Split     F3=Exit      F4=Prompt     F5=Reset      F7=Backward
 F8=Forward   F9=Swap      F10=Actions  F11=Add       F12=Cancel    F13=Instruct
F22=Command
```

Figure A.5   Select, Change Option

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

Figure A.6   Control Unit Chpid, CUADD, and Device Address Range Addressing

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

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

     _5  1. Operating system configurations              ← Select option 5.
              consoles
              system-defined generics
              EDTs
                esoterics
              user-modified generics
          2. Switches
                ports
              switch configurations
                port matrix
          3. Processors
              partitions
              channel paths
          4. Control units
          5. I/O devices

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

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

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

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

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

Figure A.8   I/O Device List

```
                          Add Device


   Specify or revise the following values.

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

   Serial number  . . . . . . . . _____
   Description  . . . . . . . . . HDS 9960 PAV_____ ← Enter description.

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

   Connected to CUs . . 8100  ____  ____  ____  ____  ____  ____  ____  ← Enter CU.


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

Figure A.9   Add Device

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

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

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


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



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

Figure A.10   Device / Processor Definition Panel – Selecting the Processor ID

```
                  Define Device / Processor


 Specify or revise the following values.

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

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

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

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

Figure A.11   Define Device / Processor Panel

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

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

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


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






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

Figure A.12   Device / Processor Definition Panel

```
        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
   / LABSYSTM     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
```

Figure A.13   Define Device to OS Configuration Panel – Selecting the OS Configuration

```
             Actions on selected operating systems


   Select by number or action code and press Enter.

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



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

Figure A.14   Select / Disconnect Option

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


   Specify or revise the values below.

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


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



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

Figure A.15   HCD Device Parameters

A.2 Displaying HPAV Device Parameters

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

1. Starting from the I/O Device List panel (see Figure A.16), select the desired device by entering a "/" by the device number. In our example, we have selected device 8101.

2. After you select the desired device, you are prompted to select the desired action (see Figure A.17). Select option 8 to open the View Device Definition panel.

3. Review the information on the View Device Definition panel (see Figure A.18), and press Enter to continue.

4. Select the processor definition on the View Device / Processor Definition panel (see Figure A.19).

5. Review the candidate list for this device (see Figure A.20), and press Enter to continue.

6. On the View Device / OS Configuration Definitions panel (see Figure A.21), select the OS configuration.

7. The View Device Parameter / Feature Definition panel (see Figure A.22) displays the WLMPAV device parameters.

```
  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 ____ ____ ____ ____ ____ ____ ____
```

Figure A.16   Device Selection Display

```
                 Actions on selected devices


   Select by number or action code and press Enter.

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


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

Figure A.17   Actions on Selected Devices

```
                    View Device Definition


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

    Serial number  . . . . . . . :
    Description  . . . . . . . . : HDS 9960 PAV – 8101 (B)

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

    Connected to CUs : 8100

    ENTER to continue.                                  ← Press Enter to continue.



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

Figure A.18   View Device Definition

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

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

  Device number  . : 8101    Device type  . : 3390B


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



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

Figure A.19   Selecting the Processor Definition

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

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

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

  ENTER to continue.                                    ← Press Enter to continue.

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



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

Figure A.20   View Device Candidate List

```
                  View Device / OS Configuration Definitions
                                                          Row 1 of 1
 Command ===> _____ Scroll ===> CSR

 Select OSs to view more details, then press Enter.

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

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




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

Figure A.21   Selecting the OS Configuration

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

 Configuration ID . : LABSYSTM       OS Configuration List (EDT's)
 Device number  . . : 8100           Device type  . . . : 3390B
 Generic / VM device type  . . . . : 3390


 ENTER to continue.

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



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

Figure A.22   View Device Parameters

Appendix B Checking the WLM PAV Settings

To view or change the Workload Manager PAV settings:

1. On the WLM initial panel (see Figure B.1), press Enter to continue.

2. The Service Definition panel (see Figure B.2) allows you to define where the service coefficient information can be found. Select option 1 (Read saved definition).

3. On the Primary Options panel (see Figure B.3), select option 8 (Service Coefficients/Options) to display the WLM PAV settings.

4. The Service Coefficient/Service Definition Options panel (see Figure B.4) is used to set PAV Dynamic Alias Management.

```
 Command ===> _____



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


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                        ENTER to continue

```

Figure B.1   WLM Initial Panel

```
   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

```

Figure B.2   WLM Choose Service Definition Panel

```
   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
```

Figure B.3   WLM Primary Options Panel

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

Enter or change the Service Coefficients:

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

Enter or change the service definition options:

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

Figure B.4   WLM Service Coefficient/Service Definition Options Panel

Acronyms and Abbreviations

ADDR	address
APAR	Authorized Problem Analysis Report
CC	Concurrent Copy
CCW	channel command word
CH	channel
CHA	channel adapter
CHP	channel path
CU	control unit
DASD	direct-access storage device
DB2	DATABASE 2
DFSMS	Data Facility Storage Management Subsystem
DS	DEVSERV
DSF	Device Support Facilities
ERP	error recovery procedure
ESA	Enterprise Systems Architecture
HCD	hardware configuration definition
HDD	hard disk drive
HMBR	Hitachi Multiplatform Backup/Restore
HPAV	Hitachi Parallel Access Volume
HRX	Hitachi RapidXchange
I/O	input/output
IBM	International Business Machines Corporation
ICS	Installation Control Specification
ID	identification
IOCP	input/output configuration program
IODF	input/output definition file
IPL	initial program load
IPS	Installation Performance Specification
ISPF/PDF	Interactive System Productivity Facility/package definition file
JCL	job control language
kB	kilobytes
LAN	local-area network
LCU	logical control unit
LDEV	logical device
LU	logical unit
LVI	logical volume image (e.g., 3390-3R)
max	maximum
MIH	missing interrupt handler

min	minimum, minutes
MVS	Multiple Virtual Storage
NUM	number
PC	personal computer system
PPRC	Peer-to-Peer Remote Copy
PTF	program temporary fix
R	release
R-SIM	remote service information message
RAID	redundant array of independent disks
rnd	random
S/390®	System/390®
SCI	state-change-interrupt
SCP	state-change-pending
sec	seconds
seq	sequential
SIM	service information message
SI390	ShadowImage - S/390®
SMS	Storage Management Subsystem
S/N	serial number (also abbreviated as s#)
SSB	sense byte
SSCH	start subchannel
SSID	storage subsystem identification
SVP	service processor
TC390	Hitachi TrueCopy - S/390®
TC390A	Hitachi TrueCopy - S/390® Asynchronous
UA	unit address
UCB	unit control block
V	version
VM	Virtual Machine
vol	volume
VOLSER	volume serial number
VSE	Virtual Storage Extended
VTOC	volume table of contents
WLM	Workload Manager
XRC	Extended Remote Copy