Hitachi HPAV for z/OS

for the XP128/XP1024/XP10000/XP12000

hp
invent

HPAV for z/OS for the XP128/XP1024/XP10000/XP12000

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About this guide

This guide provides information about:

Intended audience

This guide is intended for customers and HP authorized service providers experienced with the following:

- Disk array hardware and software
- Storage systems

Prerequisites

Prerequisites for using this product include:

- XP12000 firmware version
  - Minimum: 50-01-40
  - Recommended: 50-03-96 or later
- XP10000 firmware version
  - Minimum: First release version
  - Recommended: 50-03-96 or later
- XP1024/XP128 firmware version
  - Minimum: 21-10-10
  - Recommended: 21-14-02 or later
- Set up the HP StorageWorks XP disk arrays
- See the `readme.txt` file on the product CD for last-minute announcements

Related documentation

In addition to this guide, please refer to other documents for this product:

- *HP StorageWorks Command View XP User Guide for XP Disk Arrays*
- *HP StorageWorks XP Remote Web Console User Guide for XP12000/XP10000*
- *HP StorageWorks XP Remote Web Console User Guide for XP1024/XP128*

These and other HP documents can be found on an HP web site: http://www.hp.com/support/.

Document conventions and symbols

Table 1 Document conventions

Convention	Element
Medium blue text: Figure 1	Cross-reference links and e-mail addresses
Medium blue, underlined text (http://www.hp.com)	Web site addresses
Bold font	• Key names • Text typed into a GUI element, such as into a box • GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes
Italics font	Text emphasis
`Monospace font`	• File and directory names • System output • Code • Text typed at the command-line
`Monospace, italic font`	• Code variables • Command-line variables
`Monospace, bold font`	Emphasis of file and directory names, system output, code, and text typed at the command-line

△ **CAUTION:**   Indicates that failure to follow directions could result in damage to equipment or data.

☞ **IMPORTANT:**   Provides clarifying information or specific instructions.

☞ **NOTE:**   Provides additional information.

☼ **TIP:**   Provides helpful hints and shortcuts.

HP technical support

Telephone numbers for worldwide technical support are listed on the HP web site: http://www.hp.com/support/.

Collect the following information before calling:

• Technical support registration number (if applicable)
• Product serial numbers
• Product model names and numbers
• Applicable error messages
• Operating system type and revision level
• Detailed, specific questions

For continuous quality improvement, calls may be recorded or monitored.

HP strongly recommends that customers sign-up online using the Subscriber's choice web site at http://www.hp.com/go/e-updates.

- Subscribing to this service provides you with email updates on the latest product enhancements, newest versions of drivers, and firmware documentation updates as well as instant access to numerous other product resources.
- After signing-up, you can quickly locate your products by selecting **Business support** and then **Storage** under Product Category.

HP-authorized reseller

For the name of your nearest HP-authorized reseller:

- In the United States, call 1-800-345-1518
- Elsewhere, visit http://www.hp.com and click **Contact HP** to find locations and telephone numbers

Helpful web sites

For third-party product information, see the following vendor web sites:

- http://www.hp.com
- http://www.hp.com/go/storage
- http://www.hp.com/support

1 HPAV for the XP128/XP1024/XP10000/XP12000

HPAV (Hitachi Parallel Access Volume) enables a zSeries® and S/390® host system to issue multiple I/O requests in parallel to logical devices (LDEVs) on an XP128/XP1024/XP10000/XP12000. 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 allows the host system to start multiple I/O requests to the same device at the same time through the alias addresses assigned to a device. When HPAV is used, the zSeries and S/390 host computer has substantially faster access to the data stored in the XP128/XP1024/XP10000/XP12000.

The two types of devices used in HPAV operations are base devices and alias devices. The base devices are the installed devices that contain user data. The alias devices are installed but are unused devices whose addresses can be used as aliases for the base devices. The XP128/XP1024/XP10000/XP12000 supports up to 256 devices per logical control unit (CU), including base and alias devices, for a maximum of 8,192 device addresses per disk array.

HPAV on the Command View XP management station or XP Remote Web Console configures HPAV devices on the XP128/XP1024/XP10000/XP12000, such as assigning aliases to base devices, canceling aliases, and so forth. The Command View XP management station or XP Remote Web Console is attached to and communicates directly with the XP128/XP1024/XP10000/XP12000 through the LAN.

The Workload Manager (WLM) host software function enables the zSeries and S/390 host to use the HPAV functionality of the XP128/XP1024/XP10000/XP12000. WLM compatibility mode provides static HPAV functionality and WLM goal mode provides dynamic HPAV functionality. The XP128/XP1024/XP10000/XP12000 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. For more information on static and dynamic HPAV, see "Static and Dynamic HPAV Operations" on page 11.

Overview of HPAV Operations

Components

The components that are involved in HPAV operations are:

- Base devices and alias devices on the disk array (see page 9)
- Controller emulation type for the disk array (see page 10)
- HPAV software enabled on the disk array through the Command View XP management station or XP Remote Web Console (see Managing license keys and/or Command View-based HPAV in the *HP StorageWorks Command View XP User Guide for XP Disk Arrays* or the *HP StorageWorks XP Remote Web Console User Guide* for the specific disk array)
- Hardware Configuration Definition (HCD) definitions for the disk array (see page 10)
- WLM host software definitions for dynamic alias management (see page 10)

Base Devices and Alias Devices

The XP128/XP1024/XP10000/XP12000 supports a maximum of 8,192 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 (for example, 3390-3R) of the parity group. Each LDEV is uniquely identified by its LDEV ID, which consists of the logical CU image number (0, 1, 2...F) and device number (00-FF hexadecimal) (for example, x0:0F = device 0F in CU image 0).

LDEVs that are formatted as zSeries and OS/390® devices (for example, 3390 or 3380) are called logical volume images (LVIs) or volumes. LDEVs formatted as open system devices (for example, OPEN-3 or OPEN-9) are called logical units (LUs). HPAV operations can be performed only on 3390 LVIs.

The two device types for HPAV operations are:

- **Base device – 3390B**: A base device is a formatted LVI that 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 (for example, 3390B-3 or 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 modified 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 (for example, 3390A-3 or 3390A-9).

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

Controller Emulation Type

The IBM® 2105 controller emulation type is required for HPAV operations. Each logical CU image on the XP128/XP1024/XP10000/XP12000 that contains HPAV base and alias devices must be set for 2105 controller emulation.

📝 **NOTE:** To configure copy devices and HPAV devices under the same logical CU image, refer to Table 3 on page 13 for important information and instructions. Copy devices include TrueCopy (TC390), Universal Replicator for z/OS®, PPRC, and XRC devices.

Command View XP or XP Remote Web Console based HPAV

HPAV running under Command View XP or XP Remote Web Console configures the HPAV devices on XP128/XP1024/XP10000/XP12000 that have been registered with Command View XP or XP Remote Web Console. HPAV displays the LDEVs in use and the unassigned LDEV IDs that are available for use as aliases. You can use HPAV to assign aliases to base devices and cancel aliases.

📝 **NOTE:** HPAV will not function for an XP128/XP1024/XP10000/XP12000 that does not have the HPAV option enabled on it (see "Enabling the HPAV Options" on page 16).

HCD Definitions for the XP128/XP1024/XP10000/XP12000 HPAV Devices

The HPAV base and alias devices on the XP128/XP1024/XP10000/XP12000 must be defined to the host system using HCD. The XP128/XP1024/XP10000/XP12000 base devices must be 3390B devices (for example, 3390B-3) and the XP128/XP1024/XP10000/XP12000 alias devices must be 3390A devices (for example, 3390A-3). The required controller emulation for each XP128/XP1024/XP10000/XP12000 CU image that contains HPAV devices is 2105 emulation. "Using HCD to Define and View XP128/XP1024/XP10000/XP12000 LCUs and HPAV Devices" on page 25 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. HPAV operations require that one SSID be set for each set of 256 LDEVs.

WLM Host Software Definitions for Dynamic Alias Management

The Workload Manager (WLM) software component of the MVS/ESA, z/OS, or OS/390 operating system enables the host to interface with the HPAV functionality of the XP128/XP1024/XP10000/XP12000. 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 window (see page 39)
- WLMPAV setting of each base device as defined in the "Define Device Parameters / Features" HCD definition window (see page 34)

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 z/OS and OS/390 host through the HCD. The default setting of this parameter is 'WLMPAV=YES' for 3390B or 3390A devices defined through the 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 Command View XP or XP Remote Web Console. 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).
- Dynamic HPAV is implemented when 'Dynamic Alias Support' is set to YES and the appropriate aliases are assigned to the base devices using Command View XP or XP Remote Web Console. 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).

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

Table 2 HCD settings for static and dynamic HPAV

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

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.

The following figure shows an example of static HPAV operations. Each of the three base devices (x10, x11, and 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.
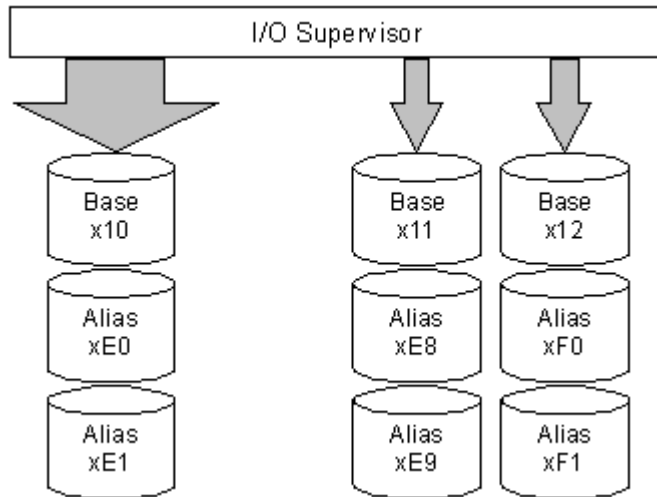
Figure 1 Static HPAV

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 XP128/XP1024/XP10000/XP12000.

The following figure shows an example of dynamic HPAV operations. Each of the three base devices (x10, x11, and 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 more information on WLM operations, see "WLM Host Software Definitions for Dynamic Alias Management" on page 10 and "System Requirements" on page 14.
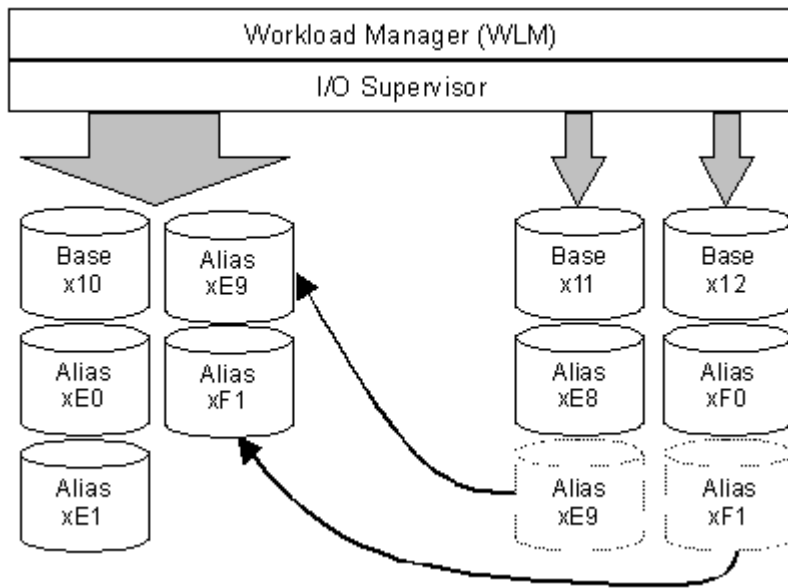
Figure 2 Dynamic HPAV

Requirements and Restrictions

The following table lists the requirements and restrictions for HPAV operations on the XP128/XP1024/XP10000/XP12000.

Table 3 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, 3390-L, 3390-M
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) • Virtual LUN • Cache LUN XP • Business Copy (BC) XP • Continuous Access (CA) XP
Functions that can be used concurrently with HPAV	• Virtual LVI • Hitachi FlashAccess for S/390 • SANtinel - S/390 • TrueCopy (TC390) • ShadowImage (SI390) • Universal Replicator for z/OS • PPRC • Extended Remote Copy (XRC) with restrictions (see *Caution* below)

△ **CAUTION:** The following restrictions apply if XRC will be used with HPAV:

- Ensure that the emulation type of all LCUs is 2105. Do not intermix 2105 emulation with other emulation types within the same disk array.
- If XRC volumes already exist, complete the following steps to change to 2105 emulation:
    a. Stop all jobs and delete all XRC pairs.
    b. Change the DKC emulation type of all CHA packages in the disk array to 2105.
    c. Restart jobs and re-establish XRC pairs.

Maximizing Your HPAV Results

To maximize your results from HPAV operations, 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 XP128/XP1024/XP10000/XP12000 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, 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, use the Multiple Allegiance (MA) host software function supported by the XP128/XP1024/XP10000/XP12000.
- If dynamic HPAV can be used in all systems, expect good results 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 4 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, determine the number of aliases for each base device to meet your requirements for each base device.
- Up to 255 alias devices can be assigned to one base device. In this case, however, the desired effect will not be achieved because I/O conflicts can occur with the base device and the alias devices. Therefore, the devices may be unable to receive the I/Os.

Table 4 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)

Preparing for HPAV Operations

System Requirements

HPAV operations involve the volumes on the XP128/XP1024/XP10000/XP12000, the licensed Command View XP or XP Remote Web Console software, and the WLM host software function. The system requirements for HPAV are:

- 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**: The XP128/XP1024/XP10000/XP12000 does not have any specific APAR/PTF requirements beyond what is required by the z/OS and OS/390 operating system to provide minimum support for the 2105 device type.
- **XP128/XP1024/XP10000/XP12000**: The emulation type for a CU image that controls HPAV devices must be 2105 (see "Changing the Controller Emulation Type" on page 15).
- **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 an XP128/XP1024/XP10000/XP12000 is defined using one CNTLUNIT statement in IOCP. The unit type is 2105. Up to 16 LCUs can be defined on an XP128/XP1024/XP10000/XP12000. 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 an XP1024/XP10000/XP12000 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 z/OS and OS/390 and to automatically run the IOCP program to create SCDS or IOCDS, the following definition rules apply:
  - Each LCU on an XP128/XP1024/XP10000/XP12000 is defined as a 2105 control unit.
  - Base devices are defined as 3390B device types. HCD will only 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 connect alias devices to one control unit. Alias devices have only one optional parameter definition in HCD. The 'WLMPAV=xxx' parameter defaults to 'YES'.
- **Command View XP or XP Remote Web Console**: See the *HP StorageWorks Command View XP User Guide for XP Disk Arrays* or the *HP StorageWorks XP Remote Web Console User Guide* for the specific disk array.

📝 **NOTE:** Administrator access to the Command View XP management station or XP Remote Web Console is required to perform HPAV operations. Users without administrator access can only view HPAV information.

Preparing the XP128/XP1024/XP10000/XP12000 for HPAV Operations

Changing the Controller Emulation Type

For HPAV operations, the XP128/XP1024/XP10000/XP12000 must have channel adapter (CHA) packages for which the 2105 emulation type is specified. Ask your HP representative to verify that the correct CHA packages are installed. The HP 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).
- Use the System Tuning function on the SVP to change the emulation type to 2105, and then power off and power on the XP128/XP1024/XP10000/XP12000.

△ **CAUTION:** For XRC operations, do not intermix the 2105 emulation type with other emulation types within the same disk array. If the XP128/XP1024/XP10000/XP12000 is already performing XRC operations, refer to Table 3 on page 13 for instructions on implementing HPAV with these functions on the same disk array.

Enabling the HPAV Options

Set the controller emulation to 2105 (see "Changing the Controller Emulation Type" on page 15) before enabling the HPAV options. You need to install the HPAV license key through Command View XP or XP Remote Web Console and the HPAV option on each XP128/XP1024/XP10000/XP12000 that will perform HPAV operations (see Managing license keys in the *HP StorageWorks Command View XP User Guide for XP Disk Arrays* or the *HP StorageWorks XP Remote Web Console User Guide* for the specific disk array).

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 XP128/XP1024/XP10000/XP12000. Before performing HPAV operations, you must:

- Set the WLM operation mode on the host system (see page 16)
- Set the MIH timer value on the host system (see page 16)

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 and IEAICSxx).

Setting the MIH Timer Value

The recommended MIH timer value for XP128/XP1024/XP10000/XP12000 HPAV operations is **30 seconds**. The MIH timer values can be set in MVS/ESA, z/OS, or OS/390 either at IPL or after IPL.

To set the MIH timer value:

- **At IPL** – Use the MIH parameter in the IECIOSxx parmlib member to set the MIH timer value at IPL time.
- **After IPL** – Use the "SETIOS" System Command after IPL to change or set the MIH timer value.

Starting HPAV

To access HPAV:

1. Click the **Mainframe** tab, click the **Mainframe Connection** button (▉), and then click the **HPAV** tab. The HPAV window is displayed.
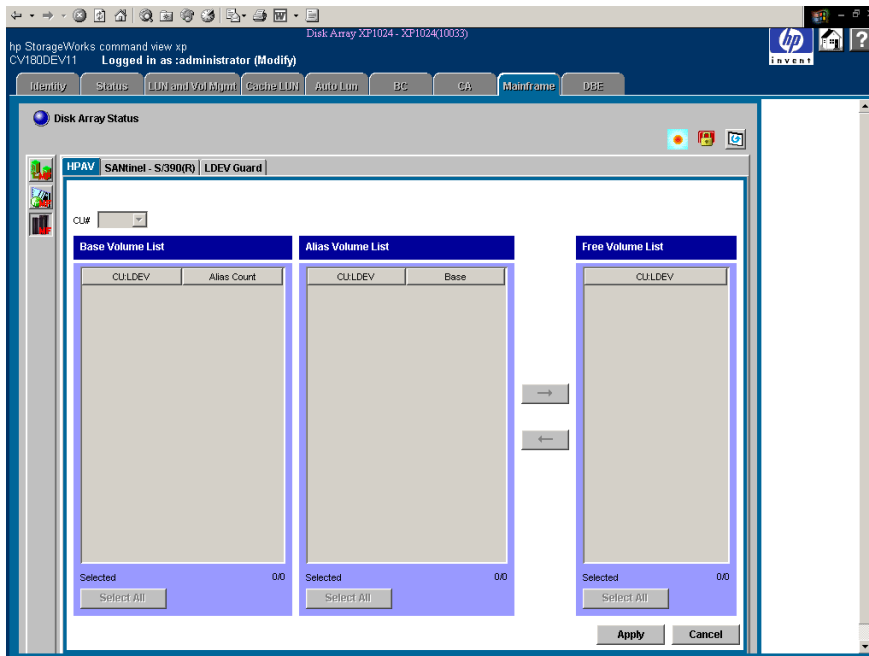
Figure 3 HPAV window

HPAV Window

Use the **CU#** list to select a logical CU image in the connected XP128/XP1024/XP10000/XP12000. The HPAV window 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 assigning and canceling aliases for base devices, select the base devices from this list box.

- **Alias Count**: This column indicates the number of aliases for each base volume.
- The **Selected** box 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.
- Click **Select All** 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, select all of the base devices. When canceling aliases for base devices, select the alias devices from this list.

- The **Base** column displays the LDEV ID of the base device for each alias device.
- The **Selected** box 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.
- Click **Select All** 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 assigning aliases to base volumes, select the alias devices from this list.

- The **Selected** box 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.

- Click **Select All** to select all volumes in the Free Volume List box.

Clicking the → button cancels aliases for base devices (see "Canceling Aliases" on page 20). After clicking the → button, the Free Volume List box then displays their LDEV IDs. To complete your request to cancel the aliases as specified, click **Apply**.

Clicking the ← button assigns aliases to base devices (see "Assigning Aliases" on page 18). After clicking the ← button, the Alias Volume List box displays the new alias devices. To complete your request to assign the new aliases as specified, click **Apply**.

The **Apply** button applies the settings made on this window to the XP128/XP1024/XP10000/XP12000. Clicking this button displays a message confirming that you want to apply your request to the disk array.

The **Cancel** button discards changes in this window to restore the initial settings.

Performing HPAV Operations

After you have prepared for HPAV operations as described in "Preparing for HPAV Operations" on page 14, you are ready to start performing HPAV operations on the XP128/XP1024/XP10000/XP12000. HPAV operations include:

- Assigning and canceling aliases (see page 18)
- Defining the XP128/XP1024/XP10000/XP12000 devices to the host system (see page 20)

Assigning and Canceling Aliases

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 "Maximizing Your HPAV Results" on page 14). If you assign additional aliases after starting I/O operations to the XP128/XP1024/XP10000/XP12000 HPAV devices, you will need to redefine the XP128/XP1024/XP10000/XP12000 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 XP128/XP1024/XP10000/XP12000:

1. From the HPAV window, click the CU image that contains the base volumes. The Free Volume List box displays the total number of available free volumes.
2. To add the new aliases to the Alias Volume List box, click the base volumes in the Base Volume List box, click the free volumes in the Free Volume List box, and then click the ← button.

   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 (for example, 3 base volumes and 9 free volumes).
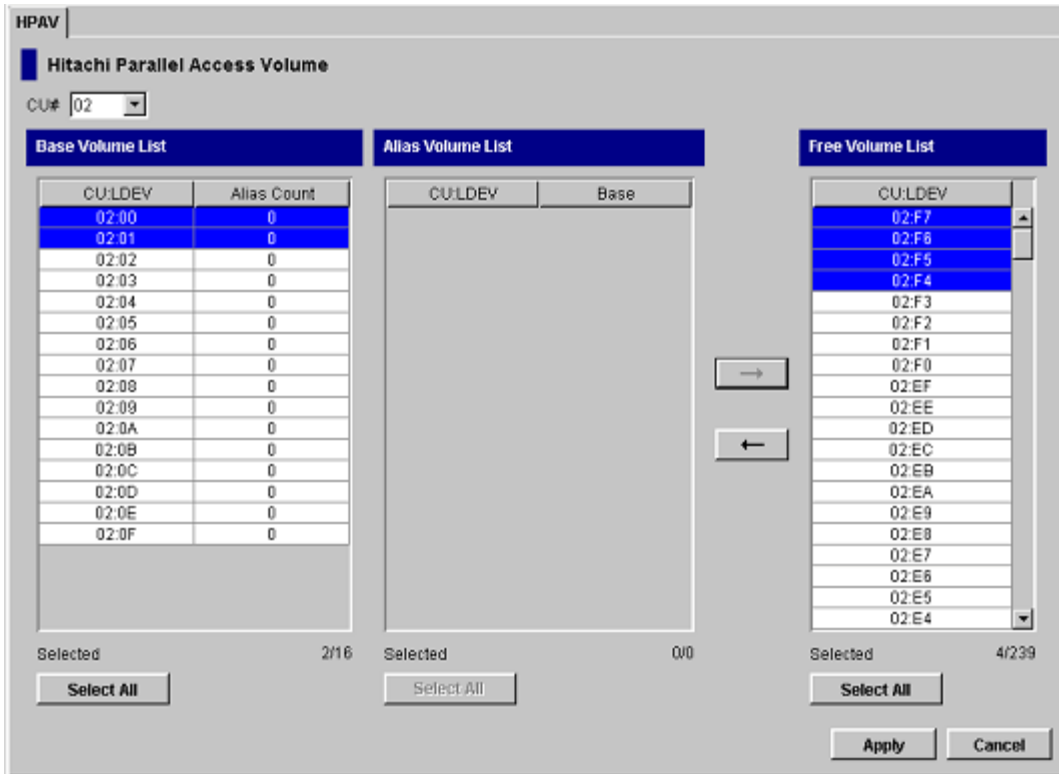
Figure 4 Assigning aliases

3. Click **Apply** on the HPAV window. When the Set HPAV confirmation dialog box is displayed, click **OK** to assign the new aliases as specified. To cancel your request, click **Cancel**.
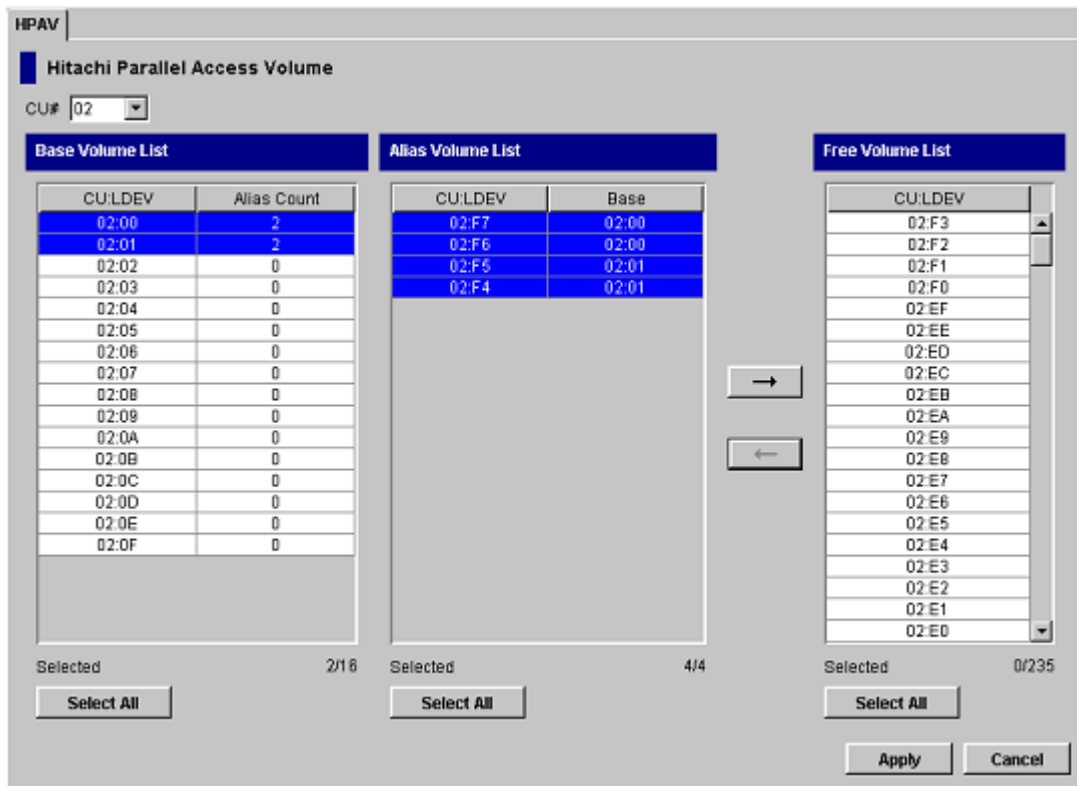
Figure 5 Confirming new aliases

Canceling Aliases

> ⚠ **CAUTION:** 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 XP128/XP1024/XP10000/XP12000:

1. From the HPAV window, click the CU image that contains the aliases that you want to cancel.
2. In the Base Volume List box, click the base device(s) for the aliases that you want to cancel.
3. In the Alias Volume List box, click the alias devices that you want to cancel and then click the ➔ button to remove the aliases from the Alias Volume List box and add their LDEV IDs to the Free Volume List box.
4. Click **Apply** on the HPAV window. When the Set HPAV confirmation dialog box is displayed, click **Yes** to cancel the aliases as specified. To cancel your request, click **No**.
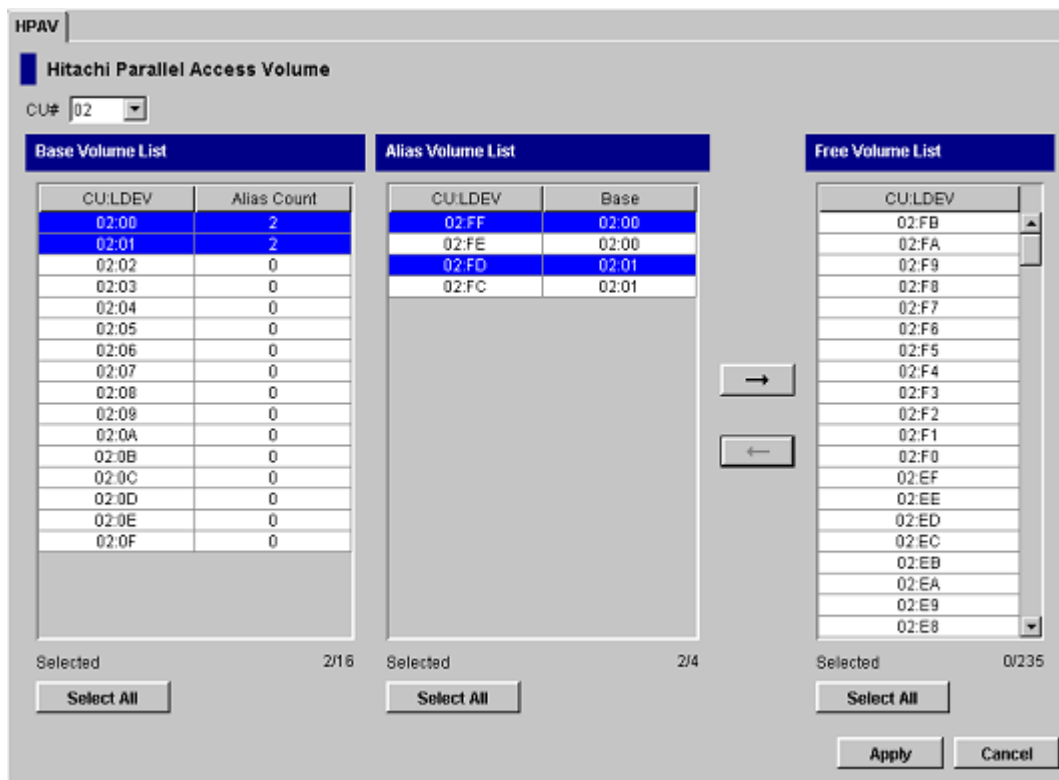
Figure 6 Canceling aliases

Considerations for Defining the XP128/XP1024/XP10000/XP12000 Devices to the Host System

For XRC, do not intermix the 2105 controller emulation type with other emulation types within the XP128/XP1024/XP10000/XP12000. If the XP128/XP1024/XP10000/XP12000 has existing XRC volumes and you want to implement HPAV, complete the following steps to change to 2105 emulation:

1. Stop all jobs and delete all XRC pairs.
2. Change the DKC emulation type of all CHA packages in the XP128/XP1024/XP10000/XP12000 to I-2105.
3. Restart jobs and re-establish XRC pairs.

> 📝 **NOTE:** HPAV operations require that one SSID be set for each set of 256 LDEVs.

Definition of XP128/XP1024/XP10000/XP12000 Base and Alias Devices

The unit address mapping for base and alias devices must be defined to the host operating system and must match the address mapping defined at the Command View management station or XP Remote Web Console. If the mappings do not match, serious failures can occur during data processing. The following 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.

Verifying Base and Alias Device Definition

After defining the mapping between base devices and alias devices to the host operating system (see "Definition of XP128/XP1024/XP10000/XP12000 Base and Alias Devices" on page 21), verify that the host recognizes the XP128/XP1024/XP10000/XP12000 devices as specified.

To verify that the host system recognizes the settings for the XP128/XP1024/XP10000/XP12000 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 "Example: Verifying the Base Devices and Alias Addresses" on page 21.

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

2. Verify 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 that you specified at the Command View management station or XP Remote Web Console for base devices and alias addresses. 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.

Example: Verifying the Base Devices and Alias Addresses

```
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
```

Verifying the Status of the Devices

After verifying the generation definition for the XP128/XP1024/XP10000/XP12000 devices, verify the status of the devices for each channel path (CHP).

1. At the MVS console display the status of the XP128/XP1024/XP10000/XP12000 devices by issuing the Display Matrix command for each CHPID connected to the XP128/XP1024/XP10000/XP12000. See "Example: Verifying the Status of Devices Defined by CHP ID" on page 22.

   D M=CHP(XX)   (XX = CHP ID)

2. Verify that the displayed information matches the device status that was defined when the generation definition was made:

   - If the information is correct, the XP128/XP1024/XP10000/XP12000 is now ready for HPAV activities. For information on monitoring HPAV activities, see "Monitoring HPAV Activities" on page 22.

   - If the information is not correct, redefine the XP128/XP1024/XP10000/XP12000 devices to the host as described in "Definition of XP128/XP1024/XP10000/XP12000 Base and Alias Devices" on page 21 and "Verifying Base and Alias Device Definition" on page 21.

Example: Verifying the Status of Devices Defined by CHP ID

```
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
```

Monitoring HPAV Activities

The following methods can be used to monitor HPAV activities on the XP128/XP1024/XP10000/XP12000:

- Additional MVS commands
- GTF I/O tracing

Additional MVS Commands

In addition to the "DS QPAV" and "D M=CHP" commands (see the examples on page 21 and page 22), the following commands will provide additional information:

- **DISPLAY M=DEV**. "Example: Display Command – HPAV Base Device with 5 Aliases" on page 23 shows an example of the Display M=DEV(xxxx) command for a base device.
- **DEVSERV PATHS**. "Example: DEVSERV DISPLAY PATHS Command" on page 23 shows an example of a DEVSERV PATHS command.
- **DEVSERV QPAV**. "Example: DEVSERV QPAV Command" on page 24, "Example: DSESERV QPAV,SSID=xxxx Command" on page 24, and "Example: DS QP,8300,VOLUME Command" on page 25 show examples 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.

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.

Example: Display Command – HPAV Base Device with 5 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
```

Example: DEVSERV DISPLAY PATHS 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 ,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
```

Example: DEVSERV QPAV 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
```

Example: DSESERV QPAV,SSID=xxxx 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
```

Example: DS QP,8300,VOLUME 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
```

Using HCD to Define and View XP128/XP1024/XP10000/XP12000 LCUs and HPAV Devices

The XP128/XP1024/XP10000/XP12000 logical control units (LCUs) and PAV base and alias devices are defined to MVS/ESA and OS/390 systems using the configuration dialog windows of the Hardware Configuration Definition (HCD) Program. The HCD Program can also display the WLMPAV device parameter for existing HPAV devices.

This section provides sample instructions for:

- Defining an XP1024/XP10000/XP12000 LCU and base and alias HPAV devices (see page 25)
- Displaying the WLMPAV device parameters (see page 34)

Using HCD to Define an XP1024/XP10000/XP12000 LCU and the Base and Alias Devices

The following example shows the sequence of HCD windows used in defining an XP1024/XP10000/XP12000 LCU and a range of base and alias devices. Before you can define the LCU, the channel paths must already be defined.

To define an XP1024/XP10000/XP12000 LCU and the base and alias address range that it will support, use the following example for HCD:

1. From an ISPF/PDF primary options menu, select the HCD option to display the Basic HCD window. On this window, verify the name of the IODF or IODF.WORK I/O definition file to be used.
2. From the Basic HCD window, select option 1 to display the Define, Modify, or View Configuration Data window (see the following example).

Example: Basic HCD Window

```
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'
```

3. From the Define, Modify, or View Configuration Data window, select option 4 to display the Add
Control Unit window (see the following example).

Example: Define, Modify, Or View Configuration Data

```
------------- 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
```

4. From the Add Control Unit window, enter the following information: Control unit number, Control unit type – 2105, and Switch connection information (see the following example).

Example: Add Control Unit window

```
   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
```

5. After defining the control unit, select the processor complex that the control unit is to be attached to (see the following example), and then select option 1 (see "Example: Select, Change Option" on page 29).

Example: Selecting the Operating System

```
  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
```

Example: Select, Change Option

```
  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
```

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 the following example).

Example: Control Unit Chpid, CUADD, and Device Address Range Addressing

```
  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
```

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

Example: Define, Modify, Or View Configuration Data

```
------------- 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
```

8. From the I/O Device List window, press F11 to start the Add Device dialog (see the following example).

Example: I/O Device List

```
   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 F11.


   -------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 ____ ____ ____ ____ ____ ____ ____
```

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

Example: Add Device

```
                          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  . . . . . . . . . HP XP1024/XP12000   _____← 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 ─
```

10. After the device is defined using the Add Device window, add this device to a specific Processor/System-ID combination. "Example: Device / Processor Definition Window – Selecting the Processor ID" on page 32, "Example: Define Device / Processor Window" on page 32, "Example: Device / Processor Definition Window" on page 33, and "Example: Define Device to OS Configuration Window – Selecting the OS Configuration" on page 33 show the HCD windows used to select the Processor and System-ID to which this device will be added.

Example: Device / Processor Definition Window – Selecting the Processor ID

```
                    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
```

Example: Define Device / Processor Window

```
                     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 —
```

Example: Device / Processor Definition Window

```
                  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
```

Example: Define Device to OS Configuration Window – Selecting the OS Configuration

```
        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
```

11. After selecting the OS configuration on the Define Device to Operating System Configuration window (see the previous example), select option 1 to select the device or disconnect the device from the selected OS (see the following example).

Example: Select / Disconnect Option

```
         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 —
```

12. The Define Device Parameters / Features window displays the default device parameters (see the following example).

📝 **NOTE:** The WLMPAV parameter defaults to Yes.

Example: Define Device Parameters / Features

```
         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 —
```

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 window, select the device by entering a "/" by the device number. The example shows device 8101 selected (see the following example).

Example: Device Selection Display

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

2. After selecting the device, select option 8 to open the View Device Definition window (see the following example).

Example: Actions on Selected Devices

```
              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
```

3. Review the information on the View Device Definition window and press Enter to continue (see the following example).

Example: View Device Definition

```
                    View Device Definition

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

  Serial number  . . . . . . . :
  Description  . . . . . . . . : HP XP1024/XP12000 – 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 —
```

4. Select the processor definition on the View Device / Processor Definition window (see the following example).

Example: Selecting the Processor 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
```

5. Review the candidate list for this device and press Enter to continue (see the following example).

Example: View Device Candidate List

```
              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 —
```

6. From the View Device / OS Configuration Definitions window, select the OS configuration (see the following example).

Example: Selecting the OS Configuration

```
         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 —
```

7. The View Device Parameter / Feature Definition window displays the WLMPAV device parameters (see the following example).

Example: View Device Parameters

```
~                    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 —
```

Checking the WLM PAV Settings

To view or change the Workload Manager PAV settings:

1. From the WLM Initial window, press Enter to continue (see the following example).

Example: WLM Initial Window

```
 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
```

2. Use the Service Definition window to define where the service coefficient information can be found. Select option 1 to read the saved definition (see the following example).

Example: WLM Choose Service Definition Window

```
   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
```

3. From the Primary Options window, select option 8 to display the WLM PAV settings (see the following example).

Example: WLM Primary Options Window

```
   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
```

4. Use the Service Coefficient/Service Definition Options window to set PAV Dynamic Alias Management (see the following example).

Example: WLM Service Coefficient/Service Definition Options Window

```
   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)
```

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