Power Systems

Managing the virtualization environment

IBM

Note

Before using this information and the product it supports, read the information in "Notices" on page 107.

Contents

Managing the virtualization environment

You can use the PowerVM® management, Virtual I/O Server management, and partition management functions available with the Hardware Management Console (HMC) Version 8, Release 8.1.0, Service Pack 1, or later to manage the virtualization capabilities of your IBM Power Systems servers.

What's new in Managing the virtualization environment

Read about new or changed information in Managing the virtualization environment since the previous update of this topic collection.

November 2020

The following information is a summary of the updates made to this topic collection:

- Multiple topics have been updated with information about enhancements to the HMC graphical user interface.
- Added information about validating the VIOS for maintenance readiness in the topic "Validating the Virtual I/O Server for maintenance readiness" on page 4.
- Added information about the virtual serial number (VSN) in the topic "Changing partition properties and capabilities" on page 63.
- Added information about the platform keystore capability in the topic "Changing advanced partition settings" on page 68.

April 2020

- Updated the topic "Virtual network bridges" on page 15 with information about the network bridge configuration.

October 2019

- The following topics were added or updated with information about configuration, validation and migration of a logical partition that is configured with the SR-IOV logical ports:
  - "Validating the configuration of a logical partition before the migration operation" on page 71
  - "Migrating a logical partition" on page 72
  - "Changing partition profile properties" on page 82
  - "Adding SR-IOV logical ports" on page 99
- Added information about the persistent memory volume in the topic "Managing persistent memory volume" on page 77
- Updated the following topics with information about the capabilities of a restricted I/O partition:
  - "Changing partition properties and capabilities" on page 63
  - "Changing advanced partition settings" on page 68
- Updated the topic "Viewing virtual Fibre Channel adapters" on page 32 with information about the capabilities of the Fibre Channel adapter.

May 2019

- The following topics were updated with information about enhancements to the HMC graphical user interface:
  - "Managing system properties" on page 3
  - "Managing the properties of a Virtual I/O Server" on page 9

- "Viewing the virtual network configuration" on page 16
- "Activating IBM i partitions" on page 60
- "Activating AIX or Linux partitions" on page 61
- The following topics were added or updated with information about RDMA over Converged Ethernet (RoCE) support:
  - "Managing partition profiles for logical partitions" on page 80
  - "Creating a partition profile" on page 80
  - "Copying a partition profile" on page 81
  - "Changing partition profile properties" on page 82
  - "Deleting a partition profile" on page 84
  - "Adding SR-IOV logical ports" on page 99

August 2018

- The following topics were added or updated with information about enhancements to the HMC graphical user interface:
  - "Changing processor settings" on page 73
  - "Changing memory settings" on page 75
  - "Managing physical I/O adapters" on page 78
  - "Managing virtual SCSI resources for a partition" on page 93
  - "Synchronizing a virtual switch" on page 22
- The following topics were updated with information about the secure boot capability:
  - "Changing advanced partition settings" on page 68
  - "Managing the properties of a Virtual I/O Server" on page 9
- Added information about Universal Serial Bus (USB) flash drive support for VIOS installation in the "Activating Virtual I/O Servers" on page 6 topic.

Managing systems

You can use the PowerVM function on the Hardware Management Console (HMC) Version 8, Release 8.1.0, Service Pack 1, or later to manage the system-level virtualization capabilities of IBM Power Systems, such as managing a Virtual I/O Server (VIOS), managing virtual networks, managing virtual Network Interface Controllers (vNICs), and managing virtual storage.

If you are using an HMC interface, you can perform system management functions, such as configuring a Virtual I/O Server (VIOS), virtual networks, and virtual storage, by accessing the options listed under the PowerVM area of the graphical user interface.

You can manage the system-level virtualization capabilities of IBM Power Servers only when a server is managed by the HMC, or when a server is co-managed by the HMC and PowerVM NovaLink, with the HMC or PowerVM NovaLink in the master mode. The PowerVM NovaLink architecture enables management of highly scalable cloud deployment by using the PowerVM technology and OpenStack solutions. The architecture provides a direct OpenStack connection to a PowerVM server. The NovaLink partition runs the Linux operating system and the partition runs on a server that is virtualized by PowerVM. The server is managed by PowerVC or other OpenStack solutions.

If you want to manage system-level virtualization capabilities by using the HMC, you must set the HMC or the PowerVM NovaLink to the master mode. Run the following command from the command line to switch the HMC to the master mode:

```
chcomgmt -m <managed system> -o setmaster -t norm
```

Managing system properties

You can view and change the properties of the selected managed system. You can view the capabilities that are supported by the managed system.

Before you begin

Stealable processor or memory value indicates the processor and memory resources that are retrieved by the HMC from shutdown or hibernated partitions. You can view information about the estimated available resources including, stealable processor and memory resources, which can be used to perform certain partition management functions. You can also view information about the estimated remaining processor resources for AIX or IBM i partitions that are in the running state.

About this task

To view and change the properties of the selected managed system, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the navigation pane, ensure that **Properties** is expanded.
   a) Click **General Settings** > **General Properties**. You can view and change the general system properties. You can change the system's name, location, and description, assigned service partition (if designated), power-off setting, and group tags. You can view only the reference code, machine type, serial number, managed system firmware, default configuration, and the maximum number of partitions that can be defined on the server.
   b) Click **Save** to apply the changes. Alternatively, click **Cancel** to reject the changes and close the page.
   c) Click **General Settings** > **Migration**. You can view or change the partition mobility properties and change the migration policy for inactive partitions on the managed system.
      - Select the migration policy that you want to use when you migrate inactive partitions. You can select one of the following policies:
         - `Partition configuration`: Configures the management console to use the partition state that is defined for the logical partition when you migrate an inactive partition. If the inactive partition cannot start automatically, the management console uses the configuration data that is defined for the partition in the last activated profile.
         - `Last Activated Profile`: Configures the management console to use the memory and processor configuration data that is defined in the last activated profile for the partition when you migrate an inactive logical partition.
      - Select **Allow Migration with Inactive Source Storage VIOS** to perform Live Partition Mobility (LPM) when the source Virtual I/O Server (VIOS) that is hosting the storage adapters is powered off or shutdown. If you enable this feature, the storage configuration-related data is collected for all client partitions based on the CEC level preference. The collected data is used to perform LPM on the powered off VIOS.
      - View the migration capabilities table to see information about the type of migration that is supported, number of migrations in progress, and number of migrations that are supported by the managed system.
   d) Click **Save** to apply the changes. Alternatively, click **Cancel** to reject the changes and close the page.

e) Click **General Settings** > **Power-On Parameters**.

> You can change the power-on parameters for the next system restart by changing the values in the **Next Value** fields. The **Current Value** field displays the value that was used when the system was last restarted. You can change the value for the partition start policy, power-on side, keylock position, IBM i IPL source, and AIX/Linux boot mode. The changed value takes effect after the next system restart.

f) Click **Save** to apply the changes. Alternatively, click **Cancel** to reject the changes and close the page.

g) Click **General Settings** > **Advanced**.

> You can view or change the settings for Barrier Synchronization Register (BSR), huge page memory, processor performance, memory mirroring, memory optimization, Virtual Trusted Platform Module (VTPM) enabled partitions, and supported hardware accelerator types for the managed system. The Nutanix hardware accelerator has a total of 32 hardware accelerator types. Currently, only the GZIP co-processor type is supported. You can increase the amount of available mirrored memory on the system and perform defragmentation operation, by using the **Memory Optimization Tool**.

h) Click **Save** to apply the changes. Alternatively, click **Cancel** to reject the changes and close the page.

5. In the navigation pane, click **Processor, Memory, I/O** to view the memory, processor, and physical I/O resource settings for the managed system. You can click **I/O Pools** to display all the I/O pools available in the managed system. The maximum number of I/O pools that are allowed is 1000.

6. Click **Save** to apply the changes. Alternatively, click **Cancel** to reject the changes and close the page.

7. In the navigation pane, click **Hardware Virtualized I/O**. The Single Root I/O Virtualization (**SR-IOV**) page for the selected Virtual I/O Server is displayed in the work pane.

a) The **SR-IOV** page lists all of the SR-IOV logical ports that are connected to the VIOS. Right-click a logical port and select **Modify Port** or **Remove Port** to change or remove the selected port. Click **Add Port** to add an SR-IOV logical port to the VIOS partition.

b) The **HEA** page lists all of the Logical Host Ethernet Adapters (LHEAs) connected to the VIOS. Select an LHEA adapter from the list to view the port configuration details. Right-click any port in the table to modify the port configuration and view the partitions that are associated with the selected HEA port.

c) In the **HCA** page, click **Launch Manage Host Channel Adapters** to open the HMC panel with a list of available HCAs. Select an HCA to display the current partition usage for the selected HCA.

Managing Virtual I/O Servers

You can manage a Virtual I/O Server (VIOS) by using the **Virtual I/O Servers** option listed under the PowerVM area of the interface available in the Hardware Management Console (HMC).

The **Virtual I/O Servers** option displays a list of Virtual I/O Servers that are configured in the managed system. It also displays information about each VIOS configuration such as allocated memory, allocated processing units, allocated virtual processors, RMC status property, operating system (OS) version information, and status.

Note:

- The suggested VIOS level is 2.2.3.3, or later. If the VIOS is not at the suggested level, you might not get optimal performance and certain functions such as Shared Storage Pool management are not available.
- If your VIOS license is not accepted, some of these properties are not populated and you are not able to fully manage the VIOS. When your VIOS license is not accepted, the OS version information shows the version as `License not accepted`.

Validating the Virtual I/O Server for maintenance readiness

When the Virtual I/O Server (VIOS) partition is in **Running** state with an active Resource Monitoring and Control (RMC) connection, and you have access to all the resources of the managed system, you can

validate the VIOS for maintenance readiness by using the Hardware Management Console (HMC). You can view the impacted client partitions for storage or network redundancy on the resources provided by VIOS.

About this task

To validate the VIOS for maintenance readiness, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the server name where you want to activate the VIOS and click **Actions** > **View System Properties**.
4. In the **PowerVM** area, click **Virtual I/O Servers**. The Virtual I/O Servers that are available on the system are displayed.
5. In the work pane, select the VIOS and click **Actions** > **Validate Maintenance Readiness**. The **Validate Maintenance Readiness** window is displayed.
6. In the **Validate Maintenance Readiness** window, the following sections are displayed:

   - **All**: Select the **All** option to view both the errors and the warning message information related to storage or network redundancy. By default, the **All** option is selected.
   - **Errors**: Select the **Errors** option to view only the error message information related to storage or network redundancy.
   - **Warnings**: Select the **Warnings** option to view only the warning message information related to storage or network redundancy.

   a) **Virtual SCSI Storage Validation** - Click and expand the **Virtual SCSI Storage Validation** section. The **Virtual SCSI Storage Validation** section displays the following information:
      - **Partition Name (State)**: Displays the name and state of the partition.
      - **Storage Name**: Displays the name of the storage device.
      - **Storage Type**: Displays the type of the storage such as physical volume, logical volume, virtual optical media and logical units.
      - **Remarks**: Displays the errors and the warning message information related to storage redundancy.

   b) **Virtual Fibre Channel Validation** - Click and expand the **Virtual Fibre Channel Validation** section. The **Virtual Fibre Channel Validation** section displays the following information:
      - **Partition Name (State)**: Displays the name and state of the partition.
      - **VFC Host Adapter**: Displays the name of the virtual Fibre Channel host adapter.
      - **Remarks**: Displays the errors and the warning message information related to virtual Fibre Channel host redundancy.

   c) **Virtual NIC Validation** - Click and expand the **Virtual NIC Validation** section. The **Virtual NIC Validation** section displays the following information:
      - **Partition Name (State)**: Displays the name and state of the partition.
      - **VNIC Device**: Displays the virtual NIC adapter value.
      - **Remarks**: Displays the errors and the warning message information related to virtual NIC adapter redundancy.

   d) **Virtual LAN Validation** - Click and expand the **Virtual LAN Validation** section. The **Virtual LAN Validation** section displays the following information:
      - **Partition Name (State)**: Displays the name and state of the partition.
      - **Port VLAN ID**: Displays the Port VLAN ID value.

- **Virtual Switch**: Displays the name of the virtual switch.
- **Virtual Network Name**: Displays the name of the virtual network.
- **Remarks**: Displays the errors and the warning message information related to virtual network redundancy.

7. Click **Re-Validate** in the upper-right corner of the **Validate Maintenance Readiness** window to validate again and view the impacted client partitions for storage or network redundancy.

8. Click **View System VIOS** in the upper-right corner of the **Validate Maintenance Readiness** window to view all the Virtual I/O Server information of the managed system. The **View System Virtual I/O Server Information** window is displayed. The **View System Virtual I/O Server Information** window displays the following information:

- **Name(ID)**: Displays the name of the Virtual I/O Server.
- **State**: Indicates the current state of the Virtual I/O Server.
- **RMC State**: Indicates the status of the Resource Monitoring and Control (RMC) connection.
- **Remarks**: Displays the errors and the warning message information.
- Click **Close** to close the **View System Virtual I/O Server Information** window.

9. Click **Close** to close the **Validate Maintenance Readiness** window.

Activating Virtual I/O Servers

You can activate **Virtual I/O Servers** by using the Hardware Management Console (HMC).

About this task
To activate the Virtual I/O Server (VIOS) and to set the activation options to activate or network boot the (VIOS) by using the activation wizard, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the server name where you want to activate the VIOS and click **Actions** > **View System Properties**.
4. In the **PowerVM** area, click **Virtual I/O Servers**. The Virtual I/O Servers that are available on the system are displayed.
5. In the work pane, select the VIOS and click **Actions** > **Activate**. The **Activate <VIOS partition name>** wizard is displayed.
6. From the **Select VIOS Configuration** list, select the required partition configuration profile.

   You can select only the profile that is associated to the selected partition. When you create a partition a default profile is always associated to the partition. This is indicated with the profile name being followed by **default** in parentheses.

   Note: If you choose **Current Configuration**, the **Advanced Settings** are unavailable.

7. From the **Activation Options** list, select the activation option for the partition.

   - Select **Activate** to activate the partition.

     Note: If you select **Activate**, the **Next** button is not available and you can only click **Finish** to activate and close the wizard after you make all your choices in the wizard.

   - Select **Install** to install the operating system on the partition. The HMC enables the network installation. When you select Install, click **Next** to configure the network settings for the logical partition.

8. Click **Advanced Settings** if you want to view and modify the following options for the selected partition:

   - **Keylock Position** establishes the power-on and power-off modes that are allowed for the system. You can select the following keylock values - Do not override configuration, Manual (attended), and Normal (unattended).

     ⚠️ **Attention:** The **Manual** (attended) value is not preferred value for security reasons.

   - **Boot Mode** indicates the activation type for a partition. This activation type is applicable only for AIX, Linux, or Virtual I/O Server partitions. This option is not displayed for IBM i partitions.

   - **Open vterm** opens a virtual terminal console.

   - **Use VSI Profile** activates the partition with Virtual Station Interface (VSI) profiles.

     Note: If the VSI attributes are not set correctly, the activation fails.

9. If you selected **Activate** from the **Activation Options** list, click **Finish** to activate the VIOS partition and close the activation wizard.

10. If you selected **Install** from the **Activation Options** list, click **Next** to configure the network settings for the VIOS partition and to install the VIOS software. The **VIOS Installation Configuration** page opens.

11. In the **VIOS Installation Configuration** page, select one of the following methods from the **Installation Method** list to install a VIOS software on the VIOS partition:

    - **NIM Server**. You must enter the NIM server IP address to be accessed by the HMC. The NIM server IP address is the HMC IP address from which the VIOS IP address can be accessed. Additionally, you can view the MAC address of the system.

    - **Management Console Image**. You must enter the HMC IP address. You must also select VIOS image from the list.

    - **Management Console Session**. You must specify the boot mode to start the operating system on the logical partition. The valid boot modes are - **Normal**, **System Management Services (SMS)**, and **Open Firmware OK**.

    - **USB Image**. You must enter the HMC IP address to specify which Ethernet adapter must be used for communication with the VIOS. The **VIOS Installation Image** field lists all the Universal Serial Bus (USB) flash drives that are attached to your system. Select the VIOS image that you have saved in the USB flash drive and proceed with the VIOS installation.

12. Click **Advanced Settings** to view and change the following network configuration settings for the selected partition:

    a) From the **Adapter Speed** list, select the speed of the Ethernet adapter for the target partition. By default, **Auto** is selected to enable the system to determine the required speed for the adapter. You can also select the following values - **10**, **100**, or **1000**.

    b) From the **Adapter Duplex** list, select duplex value for the Ethernet adapter. By default, **Auto** is selected to enable the system to determine the required duplex for the adapter. You can also select the **Full** or **Half** values.

13. Click **Next**. The **VIOS Installation Progress** page is displayed.

14. In the **VIOS Installation Progress** page, you can install and activate the VIOS software and activate a VIOS partition on the managed system.

15. Click **Start** to start the VIOS software installation on the VIOS partition and then accept the licenses for each VIOS.

16. Click **Finish** to complete the VIOS software installation and close the activation wizard.

Viewing the configuration details of a Virtual I/O Server

You can view the configuration details of Virtual I/O Server (VIOS) resources on a system that is managed by a Hardware Management Console (HMC).

Procedure

To view resource information for a VIOS, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, click the server name that has the VIOS.
4. In the **PowerVM** area, click **Virtual I/O Servers**. The Virtual I/O Servers that are available on the system are displayed.
5. Select the VIOS and click **Actions** > **View Virtual I/O Server Properties** You can view the details of the VIOS configuration.

Adding a Virtual I/O Server

You can add one or more Virtual I/O Servers and configure virtual resources by using the **Add Virtual I/O Server** wizard in the Hardware Management Console (HMC).

About this task

You can add a Virtual I/O Server (VIOS) to provision system resources virtually to client partitions. Adding more Virtual I/O Servers can increase resource availability.

Procedure

To add a VIOS by using the **Create Virtual I/O Server** wizard, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the server name where you want to add the VIOS.
4. In the **PowerVM** area, click **Virtual I/O Servers**. The Virtual I/O Servers that are available on the system are displayed.
5. In the work pane, click **Create Virtual I/O Server**. The **Add VIOS Wizard** opens and displays the **General** tab.
6. Specify a name and a partition ID for the VIOS partition.
7. Click **Next**.
8. In the **Processor** tab, select the processor mode and change the maximum, allocated, and minimum processor resources that are assigned to the partition.
9. In the **Processor** > **Advanced Settings** section, select the appropriate setting for **Idle Processor Sharing**.
10. Click **Next**.
11. In the **Memory** tab, select the dedicated memory properties for the VIOS. You can change the maximum, allocated, and minimum memory values that are to be assigned to the VIOS.
12. Click **Next**.
13. In the **Physical I/O** page, assign the physical I/O adapters and Host Ethernet Adapters (HEA) to the VIOS.

Note: You must select one or more I/O adapters that can provide network and storage connectivity for the VIOS. Otherwise, the VIOS partition is created, but the VIOS installation and the VIOS deployment process fails.

14. Click **Next**.
15. In the **Configuration Summary** page, review the summary of configuration for the new VIOS. Select one of the following options to add the VIOS to the managed system:

    - **Apply configuration**: Creates the VIOS with the resources that you selected in this wizard. When you select this option, all the VIOS configurations are saved in the hypervisor, and the created VIOS is not powered on.

    - **Create Virtual I/O Server and Install Image**: Creates the VIOS by installing the VIOS image. When you select this option, you are directed to the **Install VIOS Wizard** where additional installation steps must be performed. In the **Install VIOS Wizard**, you can install the VIOS software on the VIOS partition that is created by using different installation methods. You can also provide network settings and accept the VIOS license by using this wizard.

16. Click **Finish** to create the VIOS on the managed system.

Managing the properties of a Virtual I/O Server

You can view, remove, or change the resources that are allocated to a Virtual I/O Server (VIOS) by using the **PowerVM** function in the Hardware Management Console.

About this task

You can change the resources that are configured for a VIOS.

Note: You can change only certain attributes while the VIOS is in active state. You can change all of the VIOS attributes when it is in inactive state.

Procedure

To view and change resources and the configuration for a VIOS, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the server name that has the VIOS that you want to change.
4. In the **PowerVM** area, click **Virtual I/O Servers**. The Virtual I/O Servers that are available on the system are displayed.
5. In the work pane, select the VIOS for which you want to view and change properties.
6. Click **Actions** > **View Virtual I/O Server Properties**.
7. In the navigation pane, ensure that **Properties** is expanded and **General Properties** is selected.

    a) In the **General Properties** page, you can view or change the VIOS name, VIOS version, IP address, boot mode, resource configuration, key lock position, view the machine serial number and machine type, and change the description and group tags.

    Note: If the Resource Monitoring and Control (RMC) connection is active, and if you want to accept the VIOS license, click **License not accepted** in the **VIOS Version** field to accept the VIOS license. The **Accept License for VIOS** window is displayed. Click **Accept** to accept the VIOS license. Alternatively, click **Cancel** to reject the changes and to close the window.

    b) In the **General Properties** page, click **Advanced** to enable or disable automatic start of the managed system, to enable or disable the mover service partition (MSP), to enable connection monitoring, to enable redundant error path reporting, to enable time reference, to enable VTPM, to allow performance information collection, to enable or disable the secure boot feature by selecting a value from the **Secure Boot** list, to specify the GZIP Quality of Service (QoS) credits, or to select the processor compatibility mode for a partition. You can also save the current

configuration of the VIOS to a new partition profile, if you are a super administrator, service representative, operator, or product engineer. Click **Save** to apply the changes. Alternatively, click **Cancel** to reject the changes and close the page.

8. In the navigation pane, click **Processors**.

   a) In the **Processors** page, select the values for virtual processors and values for processing units for the VIOS. You can set the VIOS to be either capped or uncapped. Click **Advanced** to select the processor compatibility mode and choose when to share a processor.

   b) Click **Save** to apply the changes. Alternatively, click **Cancel** to reject the changes and close the page.

9. In the navigation pane, click **Memory**.

   a) In the **Memory** page, you can view the properties of the VIOS that is using dedicated or shared memory. You can also allocate the required amount of dedicated or shared memory to the VIOS. Click **Advanced** to change the Assigned Barrier Synchronization Register (BSR) Array.

      Note: POWER8® or POWER9™processor-based servers do not support BSR.

   b) Click **Save** to apply the changes. Alternatively, click **Cancel** to reject the changes and close the page.

10. In the navigation pane, click **Physical I/O Adapters**.

    a) The **Physical I/O Adapters** page lists the physical I/O adapters that are assigned to the VIOS partition with the adapter physical location code and description. Click **Add Adapter** to open the **Add Physical I/O Adapters** page. In the **Add Physical I/O Adapters** page, select a drawer to list the available adapters or filter the adapters by their physical location. Select an adapter from the table and click **OK**. Right-click an adapter in the **Physical I/O Adapter** page and select **Remove Adapter** to remove an adapter after confirmation.

    b) Click **Save** to apply the changes. Alternatively, click **Cancel** to reject the changes and close the page.

11. In the navigation pane, expand **Virtual I/O** > **Virtual Storage**. The **Virtual Storage** page is displayed with the **Virtual SCSI Adapters** and **Virtual Fibre Channel Adapters** tabs. By default, the **Virtual SCSI Adapters** tab is selected.

    a) **Virtual SCSI Adapters**

       i) In the **Virtual SCSI Adapters** section, click **Create Adapter**. The **Create Virtual SCSI Adapter** window is displayed.

       ii) In the **Server Adapter ID** field, enter the server adapter ID.

          Note: If you do not want to specify the server adapter ID, you can continue the procedure with the server adapter ID that is populated automatically in the **Server Adapter ID** field. The server adapter ID displayed in this field is the next available slot ID for the virtual SCSI server adapter that is being created.

       iii) From the **Remote Partition** list, select the logical partition to which the virtual SCSI adapter connects. The list displays all the logical partitions that are available in the managed system for creating the virtual SCSI adapter.

       iv) From the **Remote Adapter ID** list, select the remote adapter ID. The remote slot number of the selected logical partition is displayed in the **Remote Partition ID** field. This field is populated automatically with the next available slot ID which is based on the logical partition that is selected for creating the virtual SCSI adapter. Alternatively, you can click **Populate existing usable Remote Adapter IDs**. All the client adapters that exist in the selected logical partition, and which are not connected to any Virtual I/O Server are displayed in the **Remote Adapter ID** field.

       v) By default, both the virtual SCSI **server adapter** and the corresponding **client adapter** will be created. If you do not want to create the virtual SCSI **client adapter**, clear the **Create Remote Adapter** check box.

       vi) Click **OK** to apply the changes. Alternatively, you can click **Cancel** to reject the changes and to close the window.

b) **Virtual Fibre Channel Adapters**

  i) In the **Virtual Storage** page, select **Virtual Fibre Channel Adapters** tab.

  ii) In the **Virtual FC Adapters** section, click **Create Adapter**. The **Create Virtual Fibre Channel Adapter** window is displayed.

  iii) In the **Server Adapter ID** field, enter the server adapter ID.

   Note: If you do not want to specify the server adapter ID, you can continue the procedure with the server adapter ID that is populated automatically in the **Server Adapter ID** field. The server adapter ID displayed in this field is the next available slot ID for the virtual Fibre Channel server adapter that is being created.

  iv) From the **Remote Partition** list, select the logical partition to which the virtual Fibre Channel adapter connects. The list displays all the logical partitions that are available in the managed system for creating the virtual Fibre Channel adapter.

  v) From the **Remote Adapter ID** list, select the remote adapter ID. The remote slot number of the selected logical partition is displayed in the **Remote Partition ID** field. This field is populated automatically with the next available slot ID, which is based on the logical partition that is selected for creating the virtual Fibre Channel adapter. Alternatively, you can click **Populate existing usable Remote Adapter IDs**. All the client adapters that exist in the selected logical partition, and which are not connected to any Virtual I/O Server, are displayed in the **Remote Adapter ID** field.

  vi) By default, both the virtual Fibre Channel **server adapter** and the **client adapter** will be created. If you do not want to create the virtual Fibre Channel **client adapter**, clear the **Create Remote Adapter** check box.

  vii) Click **OK** to apply the changes. Alternatively, you can click **Cancel** to reject the changes and to close the window.

12. In the navigation pane, expand **Virtual I/O** > **Hardware Virtualized I/O**. The Single Root I/O Virtualization (**SR-IOV**) page for the selected Virtual I/O Server is displayed in the work pane.

   a) The **SR-IOV** page lists all of the SR-IOV logical ports that are connected to the VIOS. Right-click a logical port and select **Modify Port** or **Remove Port** to change or remove the selected port. Click **Add Port** to add an SR-IOV logical port to the VIOS partition. Click **Select and SR-IOV physical port** to view a list of available physical ports. After you select a physical port, a table is displayed that lists the configuration details of the physical port. You can also configure additional settings for the logical port in the advanced settings section.

   b) The **HEA** page lists all of the Logical Host Ethernet Adapters (LHEAs) connected to the VIOS. Click **Add Adapter** to assign more adapters to the VIOS partition. You can modify the adapter to use dedicated resources by selecting **Yes** in the **Dedicated** column. Click **Advanced Settings** to set the Media Access Control (MAC) address settings and virtual LAN (VLAN) ID settings.

   You can select the following values for operating system-defined MAC address.

   • **Allow all**: Allows any operating-system defined MAC address. This value is the default value that is displayed.

   • **Deny all**: Does not allow any operating-system defined MAC addresses.

   • **Allow specified**: Specifies a maximum of four operating-system defined MAC addresses that are allowed. You can add the MAC addresses to the Allowed MAC Addresses list.

   You can set the adapters to accept packets with any virtual LAN ID (VLAN ID) or to accept only packets with specific VLAN IDs.

   • **Allow all**: Allows the logical port to accept packets with any VLAN ID.

   • **Deny all**: Does not allow the logical port to accept packets with any VLAN ID.

   • **Allow specified**: Allows the logical port to accept packets with only specific VLAN IDs.

   Note:

You must use the following configuration settings when you specify the MAC address and VLAN ID for the configuration to be valid:

- If **MAC Address Settings** is set to **Allow all**, the **VLAN ID Settings** must also be set to **Allow all**. Any other value that is specified for the VLAN ID is not valid.
- If **MAC Address Settings** is set to **Deny all**, the **VLAN ID Settings** can either be set to **Deny all** or **Allow Specified**.
- If **MAC Address Settings** is set to **Allow Specified**, the **VLAN ID Settings** can either be **Deny all** or **Allow Specified**.

c) In the **HCA** page click **Launch Manage Host Channel Adapters** to open the HMC panel with a list of available Host Channel Adapters (HCA). Select an HCA to display the current partition usage for the selected HCA.

Managing Virtual I/O Server operations

You can shut down or restart a Virtual I/O Server (VIOS) by using the Hardware Management Console (HMC).

For instructions, see Shutting down a Virtual I/O Server and Restarting a Virtual I/O Server.

Accessing management operations for a VIOS

You can use the Hardware Management Console (HMC) to manage a Virtual I/O Server (VIOS).

About this task

To access the management operations for a VIOS, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, click the server name that has the VIOS.
4. In the **PowerVM** area click **Virtual I/O Servers**. The Virtual I/O Servers that are available on the system are displayed.
5. Select the VIOS and click **Actions** > **View Virtual I/O Server Properties**
6. In the work pane, select the Virtual I/O Server of your choice and select a management task from the options.

Changing the default profile of a VIOS

You can change the default profile of a Virtual I/O Server (VIOS) by using the Hardware Management Console (HMC).

About this task

To change the default profile of a VIOS by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.

4. In the **PowerVM** area, click **Virtual I/O Servers** to view all the Virtual I/O Servers on the selected system.

5. In the work pane, right-click the Virtual I/O Server of your choice and select **Profiles** > **Change Default Profile**. The **Change Default Profile** page is displayed.

6. From the **New Default Profile** list, select a new default profile.

Managing virtual networks

Learn about IBM PowerVM networking concepts and managing PowerVM virtual networks.

The IBM Power Architecture® defines a set of networking technologies with specific terminology. You can use the Hardware Management Console (HMC) to manage PowerVM virtual networks.

PowerVM networking concepts

PowerVM includes extensive and powerful networking tools and technologies, which you can use to enable more flexibility, better security, and enhanced usage of hardware resources. Some of these terms and concepts are unique to the Power Architecture.

Network connectivity in the PowerVM virtual environment is highly flexible. PowerVM virtual networking includes the following technologies:

Table 1. PowerVM network technologies

PowerVM technology	Definition
Virtual network	Enables interpartition communication without assigning a physical network adapter to each partition. If the virtual network is bridged, partitions can communicate with external networks. A virtual network is identified by its name or VLAN ID and the associated virtual switch.
Virtual Ethernet adapter	Enables a client partition to send and receive network traffic without a physical Ethernet adapter.
Virtual switch	An in-memory, hypervisor implementation of a layer-2 switch.
Virtual network bridge	A software adapter that bridges physical and virtual networks to enable communication. A network bridge can be configured for failover or load sharing.
Link aggregation device	A link aggregation (also known as Etherchannel) device is a network port-aggregation technology that allows several Ethernet adapters to be aggregated.

Virtual networks

The managing PowerVM option includes the **Add Virtual Network** wizard that guides you through the steps to create the virtual network. A PowerVM virtual network allows connectivity between partitions on a server or, if bridged, across servers. You can create multiple virtual networks on a managed system and then connect partitions to those networks.

A virtual local area network (VLAN) allows the physical network to be logically segmented. You can connect partitions to virtual Ethernet adapters, and then connect those adapters to VLANs. Traffic on the VLANs can be routed through virtual switches.

A VLAN is a method to logically segment a physical network so that layer 2 connectivity is restricted to members that belong to the same VLAN. This separation is achieved by tagging Ethernet packets with their VLAN membership information and then restricting delivery to members of that VLAN. VLAN is described by the IEEE 802.1Q standard.

The VLAN tag information is referred to as VLAN ID (VID). Ports on a switch are configured as being members of a VLAN designated by the VID for that port. The default VID for a port is referred to as the Port VID (PVID). The VID can be added to an Ethernet packet either by a VLAN-aware host, or by the

switch in the case of VLAN-unaware hosts. Therefore, ports on an Ethernet switch must be configured with information that indicates whether the host connected is VLAN-aware.

For VLAN-unaware hosts, a port is set up as untagged and the switch tags all packets that enter through that port with the Port VLAN ID (PVID). The switch also untags all packets that exit that port before delivery to the VLAN unaware host. A port that is used to connect VLAN-unaware hosts is called an *untagged port*, and it can be a member of only a single VLAN identified by its PVID. Hosts that are VLAN-aware can insert and remove their own tags and can be members of more than one VLAN. These hosts are typically attached to ports that do not remove the tags before the packets are delivered to the host. However, it inserts the PVID tag when an untagged packet enters the port. A port allows only packets that are untagged or tagged with the tag of one of the VLANs that the port belongs to. These VLAN rules are in addition to the regular media access control (MAC) address-based forwarding rules followed by a switch. Therefore, a packet with a broadcast or multicast destination MAC is also delivered to member ports that belong to the VLAN that is identified by the tags in the packet. This mechanism ensures the logical separation of the physical network that is based on membership in a VLAN.

Virtual Ethernet adapters

A virtual Ethernet adapter allows client partitions to send and receive network traffic without a dedicated physical Ethernet adapter. A virtual Ethernet adapter is created when you connect a partition to a virtual network. You can change and connect the virtual Ethernet adapters to virtual networks. TCP/IP communications over these virtual networks are routed through the server firmware at high speed.

Virtual Ethernet adapters allow logical partitions within the same system to communicate without having to use physical Ethernet adapters. Within the system, virtual Ethernet adapters are connected to an IEEE 802.1Q virtual Ethernet switch. Using this switch function, logical partitions can communicate with each other by using virtual Ethernet adapters and assigning VIDs. With VIDs, virtual Ethernet adapters can share a common logical network. The system transmits packets by copying the packet directly from the memory of the sender logical partition to the receive buffers of the receiver logical partition without any intermediate buffering of the packet.

You can use virtual Ethernet adapters without using the Virtual I/O Server, but the logical partitions cannot communicate with external systems. However, in this situation, you can use another device, called a Host Ethernet Adapter (or Integrated Virtual Ethernet) to facilitate communication between logical partitions on the system and external networks.

Related links
Virtual Ethernet adapters
Virtual Ethernet
Virtual local area networks

Virtual switches
The POWER Hypervisor implements an IEEE 802.1Q virtual LAN style virtual Ethernet switch. When you add a virtual network, you can add a virtual switch. After you add a virtual switch, if necessary, you can change the name and mode of the virtual switch.

Multiple virtual switches are supported. By default, a single virtual switch that is named *ETHERNET0* is configured. You can change the name of the virtual switch and create more virtual switches with different names by using the Hardware Management Console (HMC). You can add more virtual switches to provide an extra layer of security or to increase the flexibility of a virtual Ethernet configuration.

Note: A virtual switch that is associated with a virtual network bridge can be removed only if the following conditions are true:

- All virtual network bridges to which the virtual switch is attached are deleted.

- The virtual switch is not associated with any other virtual network bridge.

Related links
Changing system configuration
Changing the virtual switch mode setting

Configuring the Virtual I/O Server for the VSN capability

Virtual network bridges

A virtual network bridge can be configured for a failover or for load sharing. If the virtual network bridge is configured for a failover, a primary Virtual I/O Server (VIOS) and a backup VIOS must be identified.

A virtual network bridge has one or more load groups. By default, a virtual network bridge has one load group. The number of load groups determines the number of virtual Ethernet adapters (trunk adapters) present on each Shared Ethernet adapter (SEA) that is a part of the virtual network bridge.

The PowerVM virtual network bridge is associated with one or more shared Ethernet adapters (SEAs) that bridge the internal network traffic to a physical network adapter. You can create or change a network bridge for the virtual networks by using the Hardware Management Console (HMC).

A virtual network that is connected through a virtual network bridge can be tagged or untagged. If you are creating a tagged network, you can choose an existing network bridge or create a network bridge for the virtual network that you want to add to the managed system. If you are creating an untagged network, you must create a new network bridge. In an untagged virtual network, PowerVM uses the virtual LAN ID to tag and route the network traffic among partitions.

A virtual network bridge can be associated with one untagged virtual network and up to 20 tagged virtual networks. A bridged virtual network is created by adding a virtual network to an existing or a new virtual network bridge. When a virtual network is added to an existing bridge, a tagged virtual network is created. When a virtual network is added to a new bridge, it can be added as an untagged network or as a tagged network.

A virtual network bridge can be configured for a failover only when two Virtual I/O Servers are present in the network. Also, each VIOS must have only one trunk adapter that is associated with a particular VLAN configuration. The priority of the trunk adapter must be unique for a specific VLAN configuration. You cannot configure a virtual network bridge with more than two trunk adapters by using the HMC Graphical User Interface (GUI) or the HMC REST API. However, if required, you can use the HMC command-line interface (CLI) and VIOS commands to create more than two trunk adapters, with the same VLAN configuration. Additionally, you can set different priorities for trunk adapters across Virtual I/O Servers. After creating trunk adapters, the HMC REST API or the HMC GUI does not support any operation on that virtual network bridge. You must use the HMC CLI and VIOS commands to delete any trunk adapters and continue the operation on that virtual network bridge by using the HMC REST API or the HMC GUI.

Link aggregation devices

A link aggregation, or Etherchannel device, is a network port-aggregation technology that allows several Ethernet adapters to be aggregated. The adapters that are aggregated can then act as a single Ethernet device. Link aggregation helps provide more throughput over a single IP address than would be possible with a single Ethernet adapter.

For example, `ent0` and `ent1` adapters can be aggregated to the `ent3` adapter. The system considers these aggregated adapters as one adapter, and all adapters in the link aggregation device are given the same hardware address. Therefore, they are treated by remote systems as if they were one adapter.

Link aggregation can provide increased redundancy because individual links might fail. The link aggregation device can automatically fail over to another adapter in the device to maintain connectivity. For example, if the `ent0` adapter fails, the packets are automatically sent on the next available adapter, `ent1`, without disruption to existing user connections. The `ent0` adapter automatically returns to service on the link aggregation device when it recovers.

Related information

Network attributes

Viewing the virtual network configuration

On a server that is managed by the Hardware Management Console (HMC), you can view the configuration details of the PowerVM virtual networks.

Procedure

To view and change resources and the network configuration for a Virtual I/O Server (VIOS), complete the following steps:

1. In the navigation pane, click the **Resources** icon
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Networks**. The **Virtual Networks** page opens.
5. In the **Virtual Networks** work pane, you can use the left and right arrow key buttons to switch between **Network(s)** and **Adapter(s)** views. The **Network(s)** view lists all the virtual networks that are configured on the managed system. Each table represents the properties of the Virtual Networks, Virtual Switches, Network Bridges, and Link Aggregation Devices. The **Adapter(s)** view lists all the network adapters that are connected to the logical partition. You can view the Virtual I/O Servers and the associated virtual Ethernet adapter IDs, load group, VLAN ID, and the 802.1Q VLAN ID settings for the adapter in the table.

   a) The **Virtual Networks** section lists all the virtual networks that are configured on the managed system. Virtual network is a system level attribute that helps you to create multiple virtual networks on the managed system. Right-click a virtual network in the table and select **Modify virtual network name** to change the virtual network name. Select **View connected partitions** to view the partitions that are connected to the selected virtual network. Select **Remove virtual network** to remove the virtual network from the partition after confirmation. Click **Add Virtual Network** to add a network to the partition by using the **Add Virtual Network** wizard.

   b) The **Virtual Switches** section lists all the virtual switches that are configured on the managed system. A virtual switch (VSwitch) is used to allow the virtual Ethernet adapters to route through a physical adapter to an external network. Right-click a virtual switch in the table and select **Modify virtual switch** to change the virtual switch name. Select **Remove virtual switch** to remove the virtual switch from the partition after confirmation.

   c) The **Virtual Network Bridges** section lists all the virtual network bridges that are configured on the managed system. A network bridge is used to associate one or more shared Ethernet adapters that bridge internal network traffic to a physical network adapter. Right-click virtual network bridge in the table and select **Modify virtual network bridge**, or **View virtual network bridge** to change the properties of the selected virtual network bridge, or select **Add Virtual Network to Load Group** to add a virtual network bridge to a load group.

   d) The **Link Aggregation Devices** section lists all the link aggregation devices on the VIOS. Right-click a device in the table and select **Modify** or **Remove** to change the properties of the selected device. Click **Add Device** to add a link aggregation device. Select a VIOS and mode for the device.

Results

You can view the configuration details of the virtual networks in the table that is displayed in the **Virtual Networks** tab. The configuration details for each virtual network include the following information:

- Virtual network name
- VLAN ID
- Virtual switch
- Virtual network bridge

- Load group

The Add Virtual Network wizard

You can use the **Add Virtual Network** wizard in the Hardware Management Console (HMC) to add an existing virtual network or to add a new virtual network to the server.

You can complete the following tasks by using the **Add Virtual Network** wizard:

- Create internal or bridged networks.
- Create tagged or untagged virtual networks.
- Create a virtual network on an existing or a new virtual switch.
- Create a load group or select an existing load group.

Note: When you add a virtual network, the wizard prompts you to create a network bridge to support the new virtual network. You can connect the new virtual network to an existing network bridge or create a network bridge. If you select the untagged network, you are prompted to create a new network bridge. If the physical network adapters are unavailable to create a network bridge, you cannot select an untagged network.

Adding a virtual network with an existing virtual network bridge
On a server that is managed by the Hardware Management Console (HMC), you can add a PowerVM virtual network with an existing virtual bridge by using the **Add Virtual Network** wizard.

Procedure

To add a virtual network with an existing virtual bridge on a server by using the **Add Virtual Network** wizard, complete the following steps:

1. In the navigation pane, click the **Resources** icon
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Networks**. The **Virtual Networks** page opens.
5. In the work pane, click **Add Virtual Network**. The **Add Virtual Network** wizard opens to the **Network Name** page.
   a) Enter a name in the **Virtual network name** field.
   b) Select **Bridged Network** or **Internal Network** to specify the type of virtual network.
   c) Select **Yes** from the **IEEE 802.1Q Tagging** list to specify that the network is tagged.
   d) Enter a virtual network ID in the **VLAN ID** field. The valid range for the ID is 1 - 4094.
   e) Click **Advanced Settings** to expand the section.
   f) Select **Use an existing Virtual Switch**.
   g) Choose an existing virtual switch from the table.
   h) Select the **Add new virtual network to all Virtual I/O Servers** to add the new virtual network to all the Virtual I/O Servers.

      A client virtual Ethernet adapter is added to all the Virtual I/O Servers.
   i) Click **Next** and then continue with step 6.
6. To use an existing virtual network bridge, complete the following steps:
   a) If you want to enable failover, select **Yes** for failover from the **Network Bridge Settings** option.
   b) If you want to enable load sharing, select **Yes** for load sharing from the **Network Bridge Settings** option.
   c) Enter a network bridge PVID in the **Bridge PVID** field.

d) Select **Jumbo Frame**, **Large Send**, and **QoS** for the **Network Bridge Settings**.

e) Click **Next** and then continue with step 7.

7. To select the VIOS and adapter, complete the following steps:

   a) Select the Virtual I/O Server and physical adapter location as the primary Virtual I/O Server.

   b) Use the **Advanced VIOS Settings** to configure the address to ping, IP address, netmask, and the gateway details for the selected VIOS.

   c) Click **Next** and then continue with step 8.

8. To use an existing load group, complete the following steps:

   a) Select the **Use an existing Load Group**.

   b) From the table that lists the existing load group, select a load group.

   c) Click **Next** and then continue with step 9.

9. To create a load group, complete the following steps:

   a) Select the **Create a new Load Group** option.

   b) Enter a VLAN ID for the load group in the **Enter Load Group PVID** field.

   c) Enter a name for the load group in the **Load Group Name** field. A load group creates a pair of trunk adapters with the VLAN ID you enter.

   d) Click **Next** and then continue with step 10.

10. To view the summary of the virtual network that is created by using the **Add Virtual Network** wizard, complete the following steps:

    a) Click **Adapter View** or **Network View** to display the summary of the virtual network. You can use the **Adapter View** tab to change the adapter ID.

    b) Click **Finish** to exit the **Add Virtual Network** wizard.

Adding a virtual network by creating a virtual network bridge

On a server that is managed by the Hardware Management Console (HMC), you can use the **Add Virtual Network** wizard to add a PowerVM virtual network.

Procedure

To add a virtual network by creating a virtual network bridge, by using the **Add Virtual Network** wizard, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Systems**. The **All Systems** page is displayed.

3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.

4. In the **PowerVM** area, click **Virtual Networks**. The **Virtual Networks** page opens.

5. In the work pane, click **Add Virtual Network**. The **Add Virtual Network** wizard opens to the **Network Name** page.

   a) Enter a name in the **Virtual network name** field.

   b) Select either **Bridged Network** or **Internal Network** depending on what type of network you want to create.

   c) Select **No** from the **IEEE 802.1Q Tagging** list to specify that the network is untagged.

   d) Enter a virtual network ID in the **VLAN ID** field. The valid range for the ID is 1 - 4094.

   e) Click **Advanced Settings** to expand the section.

   f) Select **Create a new Virtual Switch**.

   g) Enter a virtual switch name and mode for the new switch.

    h) Select **Add new virtual network to all Virtual I/O Servers** to add the new virtual network to all the Virtual I/O Servers.

       A client virtual Ethernet adapter is added to all of the Virtual I/O Servers. The VLAN ID of the virtual Ethernet adapter that is added also provides the name of the Virtual Network ID.

    i) Click **Next** and then continue with step 6.

6. To select a **Virtual Network Bridge**, complete the following steps:

    a) If you want to enable failover, select **Yes** for failover from the **Network Bridge Settings** option.

    b) If you want to enable load sharing, select **Yes** for load sharing from the **Network Bridge Settings** option.

    c) Enter a network bridge PVID in the **Bridge PVID** field.

    d) Select **Jumbo Frame**, **Large Send**, and **QoS** for the **Network Bridge Settings**

    e) Click **Next** and continue with step 7.

7. To select the VIOS and Adapters, complete the following steps:

    a) Select the Virtual I/O Server and the physical adapter location as the primary Virtual I/O Server.

    b) Use the **Advanced VIOS Settings** tab to configure the address to ping, IP address, netmask, and the gateway details for the selected VIOS.

    c) Click **Next** and continue with step 8.

8. To use an existing load group, complete the following steps:

    a) Select **Use an existing Load Group**.

    b) From the table that lists the existing load group, select a load group.

    c) Click **Next** and continue with step 9.

9. To create a load group, complete the following steps:

    a) Select the **Create a new Load Group** option.

    b) Enter a VLAN ID for the load group in the **Enter Load Group PVID** field.

    c) Enter a name for the load group in the **Load Group Name** field. A load group creates a pair of trunk adapters with the VLAN ID you enter.

    d) Click **Next** and continue with step 10.

10. To view a summary of the virtual networks, complete the following steps:

    a) Click **Adapter View** or **Network View** to display a summary of the virtual network. You can use the **Adapter View** tab to change the adapter ID.

    b) Click **Finish** to exit the **Add Virtual Network** wizard.

Changing the name of a virtual network

On a server that is managed by the Hardware Management Console (HMC), you can change the name of a PowerVM virtual network.

About this task

To change the name of a virtual network, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Networks**. The **Virtual Networks** page opens.

5. In the work pane, right-click the virtual network that you want to change and select **Modify Virtual Network Name**. The **Modify Virtual Network Name** page opens.

6. Change the name of the virtual network in the **Virtual network name** field.

7. Click **OK** to apply the changes.

Changing the load group of a virtual network

From the Hardware Management Console (HMC), you can change the load group of a PowerVM virtual network.

About this task

To change the load group of a virtual network, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .

2. Click **All Systems**. The **All Systems** page is displayed.

3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.

4. In the **PowerVM** area, click **Virtual Networks**. The **Virtual Networks** page opens.

5. In the work pane, right-click the virtual network that you want to change and select **Modify Load Group**. The **Modify Load Groups** page is displayed.

6. Select the load sharing group that you want from the **Load Groups** table that is displayed.

7. Click **OK** to apply the changes.

Removing a virtual network

From a server that is managed by the Hardware Management Console (HMC), you can remove a PowerVM virtual network.

About this task

Important: Before you remove a virtual network, update the information of the virtual network in the list of networks if the partitions are connected. Consider the following points when you remove a virtual network:

- If the network is a tagged virtual network, remove the virtual network from the network bridge.
- If the network is either untagged or the last tagged virtual network in the bridge, remove the network bridge along with the virtual network.

To remove a virtual network, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .

2. Click **All Systems**. The **All Systems** page is displayed.

3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.

4. In the **PowerVM** area, click **Virtual Networks**. The **Virtual Networks** page opens.

5. In the work pane, right-click the virtual network that you want to remove and select **Remove Virtual Network**.

⚠️ **Attention:** A virtual network bridge associated with a virtual network can be deleted only if the following conditions are true:

- The virtual network to which the virtual network bridge is attached is deleted.
- The virtual network bridge is not associated with any other virtual network.

6. Click **OK** to remove the selected virtual network.

Changing a virtual switch

From a server that is managed by the Hardware Management Console (HMC), you can change the attributes of a PowerVM virtual switch.

About this task

To change a virtual switch, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Networks**. The **Virtual Networks** page opens.
5. In the work pane, expand **Virtual Switches**.
6. Right-click the virtual switch that you want to change and select **Modify Virtual Switch**. Or, you can select the virtual switch and click **Action** > **Modify Virtual Switch**.
7. Change the name of the virtual switch in the **Virtual Switch Name** field.
8. Change the mode of the virtual switch to virtual Ethernet bridging (VEB) or virtual Ethernet port aggregator (VEPA).

   Note: The VEPA mode option is available on VEPA-capable hardware only.
9. Click **OK** to apply the changes.

Removing a virtual switch

From a server that is managed by the Hardware Management Console (HMC), you can remove a PowerVM virtual switch.

About this task

To remove a virtual switch, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Networks**. The **Virtual Networks** page opens.
5. In the work pane, expand **Virtual Switches**.

6. Right-click the virtual switch that you want to remove and select **Remove Virtual Switch**. Or, you can select the virtual switch and click **Action** > **Remove Virtual Switch**.

7. Click **OK** when you are prompted to confirm the removal.

Synchronizing a virtual switch

From a server that is managed by the Hardware Management Console (HMC), you can synchronize a PowerVM virtual switch.

About this task

To synchronize a virtual switch, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Networks**. The **Virtual Networks** page opens.
5. In the work pane, expand **Virtual Switches**.
6. Right-click the virtual switch that you want to synchronize and select **Sync Virtual Switch**. Or, you can select the virtual switch and click **Action** > **Sync Virtual Switch**.
7. Click **OK** when you are prompted to confirm the synchronization.

Changing a network bridge

From a server that is managed by the Hardware Management Console (HMC), you can change the PowerVM virtual network bridge properties.

Procedure

To change virtual network bridge properties, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Networks**. The **Virtual Networks** page opens.
5. In the work pane, expand **Virtual Network Bridges**.
6. Right-click the virtual network bridge that you want to change and select **Modify Network Bridge**.
7. Enable or disable network failover in the **Failover** field.
8. Enable or disable load sharing in the **Load Sharing** field.
9. Change the physical adapter location for the primary Virtual I/O Server (VIOS) in the table.
10. Enable **Jumbo Frame** on the network bridge for the virtual Ethernet adapter to communicate to an external network.

    Note: Before you enable jumbo frames on a network bridge, check whether other devices in your network are also configured for jumbo frames.
11. Enable **Large Send** on the network bridge to reduce the processor usage of the VIOS.

12. Enable **QoS** on the network bridge to check the priority value of all tagged packets and arrange those packets in the corresponding queue.
13. Click **OK** to apply the changes.

Adding a link aggregation device

On a server that is managed by the Hardware Management Console (HMC), you can add a link aggregation device to the VIOS by using the **Add Link Aggregation device** wizard.

About this task

Note: Ensure that the VIOS is assigned with one or more physical Ethernet adapters and at least one link aggregation interface exists on the VIOS.

Procedure

To add a link aggregation device, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Networks**. The **Virtual Networks** page opens.
5. In the work pane, expand **Link Aggregation Devices** and click **Add device**.
6. Select the Virtual I/O Server.
7. Set the mode as **standard**, **IEEE 802.3 AD**, or **round robin**.
8. Select the port location from the table in the **Port Physical Location** field.
9. Click **OK** to apply the changes.

Changing a link aggregation device

From a server that is managed by the Hardware Management Console (HMC), you can change the properties of a link aggregation device.

Procedure

To change the properties of a link aggregation device, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Networks**. The **Virtual Networks** page opens.
5. In the work pane, expand **Link Aggregation Devices**.
6. Right-click the device that you want to change and select **Modify Link Aggregation Device**.
7. Change the mode of the device in the **Mode** field.
8. Change the port location in the **Port Physical Location** field. You can also select more than one port location or disable selected port locations.
9. Click **OK** to apply the changes.

Removing a link aggregation device

From a server that is managed by the Hardware Management Console (HMC), you can remove a link aggregation device.

Procedure

To remove a link aggregation device, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Networks**. The **Virtual Networks** page opens.
5. In the work pane, expand **Link Aggregation Devices**.
6. Right-click the device that you want to remove and select **Remove**.
7. Click **OK** to remove the device.

Managing virtual Network Interface Controllers

A virtual Network Interface Controller (vNIC) is a type of virtual Ethernet adapter that is configured on client partitions of Power Systems servers. Each vNIC is backed by an SR-IOV logical port that is available in a Virtual I/O Server (VIOS) partition. This type of vNIC is also called dedicated vNIC, as the backing SR-IOV logical port serves the vNIC exclusively. The key advantage of placing the SR-IOV logical port in the VIOS is that it makes the client LPAR eligible for Live Partition Mobility (LPM). Although the backing device esists remotely, through a mature PowerVM technology that is known as Logical Redirected DMA (LRDMA), the vNIC can map its transmit and receive buffers to the remote SR-IOV logical port when a one-to-one relationship exists between the vNIC and the backing logical port. After the buffers are mapped, the SR-IOV logical port directly fetches/stores packet data from/to the memory of the client partition. The LRDMA technology eliminates two data copies incurred in the traditional virtual Ethernet that is backed by Shared Ethernet Adapter, thus lowering CPU and memory consumption on the VIOS. Furthermore, because of the one-to-one relationship, the resources that are provisioned for the SR-IOV logical port are owned by the vNIC. As a result, the vNIC inherits all the capabilities that the SR-IOV adapter offers such as the QoS minimum-bandwidth assurance and the ability of setting PVID, VLAN ACL, and MAC ACL.

The vNIC configuration requires the following firmware and operating system support:

- System firmware level FW840 and HMC 840, or later.
- VIOS 2.2.4.0, or later.
- vNIC driver support from AIX and IBM i systems.

Dedicated vNICs backed up by SR-IOV logical ports

For dedicated vNICs, SR-IOV logical ports are the only ones that can be used as backing devices. To create a vNIC, you need to specify the hosting VIOS, in addition to the backing SR-IOV adapter and the physical port from which the logical port is to be allocated. You can also specify the VLAN settings and the MAC settings. For more information, see "Adding virtual NICs" on page 85. The VLAN settings and MAC settings are applied to both the vNIC and the SR-IOV logical ports. Default settings are applied if you do not specify the required parameters. When you add a vNIC in the client LPAR, the backing devices are provisioned and configured automatically by the HMC (based on your specification or defaults). Similar automation is performed for vNIC removal. This setup implies that you need to deal with only the client vNIC adapter and not be concerned with the management of backing devices, in normal cases.

Note:

- HMC supports the vNIC configuration in GUI, command line, and REST APIs.

- Most of the HMC GUI support for vNIC (vNIC add, delete, or edit) is available in the enhanced HMC mode only (not in the classic mode).
- HMC automated management of the backing devices requires RMC connection to the hosting VIOS.

LPM consideration for vNIC

During Live Partition Mobility (LPM) operations, HMC handles the creation of the vNIC server and backing devices on the target system and cleanup of devices on the source system, when LPM completes successfully. HMC has built-in capability to provide auto-mapping of backing devices and hosting Virtual I/O Servers between the source and target servers. The SR-IOV port label, the available capacity and the VF count, and the adapter and VIOS redundancy are some of the key factors that are used by the HMC for auto-mapping. Optionally, you can also specify your own mapping settings.

Viewing virtual NIC backing devices

You can use the Hardware Management Console (HMC) to view the virtual NIC backing devices.

About this task

To view the virtual NIC backing devices that are assigned to the Virtual I/O Server (VIOS) by using HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual NICs**. The **Virtual NIC Backing Devices** page opens with the virtual Network Interface Controllers (vNICs) listed in a table. The table lists all the devices on the managed system that are configured as backing devices for the virtual NICs. You can also view other information about the devices such as the name of the device, the partition that is associated with the virtual NIC, the location code of the backing device, port switch mode, port label, sub label, and the Virtual I/O Server to which each backing device is assigned.

Managing virtual storage

You can use the Hardware Management Console (HMC) to manage and monitor storage devices in a PowerVM virtual storage environment.

You can change the configuration of the virtual storage devices that are allocated to each Virtual I/O Server (VIOS) on the managed system. You can also add a VIOS to a shared storage pool cluster and manage all the shared storage pool clusters.

The virtual storage page has the adapter view and the storage view. You can toggle between these views by clicking the button in the upper-right corner of the work pane. The default view is the **Storage View**. You can use the storage view to view and manage the storage capability of the managed system.

You can view the adapter configuration of the virtual storage devices that are allocated to the Virtual I/O Servers. The **Adapter View** provides a mapping of the adapters to the physical storage device. By selecting a VIOS, you can manage the virtual storage devices that are configured to a particular partition. You can also select and view all the partitions with storage that is provisioned by the VIOS.

Moving an optical device to another partition

With the support of the Virtual I/O Server (VIOS), you can share a CD or DVD that is assigned to the VIOS among multiple AIX, IBM i, and Linux client partitions.

A shared optical device can be accessed only by one client partition at a time. If another client partition wants to use the shared optical device, you must first deallocate the shared optical device from the client partition that is accessing it.

For more information, see "Loading and unloading media files" on page 98.

Moving a virtual tape device to another partition

With the support of the Virtual I/O Server (VIOS) for the virtual tape devices, you can share the physical tape drive that is assigned to the VIOS partition among multiple AIX, IBM i, and Linux client partitions.

A shared tape device can be accessed only by one VIOS client partition at a time. If another VIOS client partition wants to use the shared tape device, you must first deallocate the shared tape device from the client partition that is accessing it.

For more information, see "Loading and unloading media files" on page 98.

Tracing the virtual storage configuration

You can track which virtual objects correspond to which physical objects. A single virtual server can have multiple virtual disks.

The virtual disks are mapped to physical disks as physical volumes or as logical volumes. The logical volumes are mapped from volume groups or storage pools.

Depending on the type of storage provisioning method you choose, you can track the following information:

- VIOS
  - Server host name
  - Physical disk location
  - Physical adapter device name
  - Physical hdisk device name
  - Cluster name (for shared storage pool backed devices only)
  - Volume group or storage pool name (for logical volume or storage pool backed devices only)
  - Logical volume or storage pool backing device name (for logical volume or storage pool backed devices only)
  - Virtual Small Computer System Interface (SCSI) adapter slot
  - Virtual SCSI adapter device name
  - Virtual target device
- VIOS client partition
  - Client host name
  - Virtual SCSI adapter slot
  - Virtual SCSI adapter device name
  - Virtual disk device name

Managing optical devices

You can use the Hardware Management Console (HMC) to view and to change optical devices.

You can add optical devices or remove optical devices to or from any partition if the partition is in either active or inactive state. If you remove an optical device from an active partition, the HMC prompts you to confirm the removal before you remove the optical device. To assign an optical device to a client partition, ensure that the client partition owns one or more virtual Small Computer System Interface (SCSI) adapters. Also, ensure that the Virtual I/O Server (VIOS) owns the corresponding virtual SCSI adapters that host the client adapter.

Managing physical optical devices

You can virtualize the physical optical devices that are assigned to the Virtual I/O Server (VIOS) by using the Hardware Management Console (HMC). The virtualized devices are shared among the client partitions of the VIOS.

Viewing physical optical devices
You can use the Hardware Management Console (HMC) to view the physical optical devices.

About this task

To view the physical optical devices that are assigned to the Virtual I/O Server (VIOS) by using HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon   .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Storage**. The **Virtual Storage** page opens.
5. In the **Virtual Storage** work pane, click and expand the **Virtual Storage Management** section to view and manage the VIOS partitions that are listed in a table.
6. Right-click the VIOS and select **Manage Virtual Storage**. The **Virtual Storage Management** window is displayed.
7. Click the **Optical Devices** tab to show a list of virtual optical media and physical optical devices on the managed system.
8. Select a physical optical device from the table that you want to view.
9. From the **Select Action** list of the **Physical Optical Devices** table, select **Properties** to view the properties of the selected physical optical device.

Changing the partition assignment for a physical optical device
You can use the Hardware Management Console (HMC) to change the Virtual I/O Server (VIOS) to which the optical device is assigned, or to set the optical device so it is not assigned to any other partition.

About this task

To change the partition assignment for a physical optical device by using HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon   .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Storage**. The **Virtual Storage** page opens.
5. In the **Virtual Storage** work pane, click and expand the **Virtual Storage Management** section to view and manage the VIOS partitions that are listed in a table.
6. Right-click the VIOS and select **Manage Virtual Storage**. The **Virtual Storage Management** window opens.

7. Click the **Optical Devices** tab to show a list of virtual optical media and physical optical devices on the managed system.

8. Select an optical device from the **Physical Optical Devices** table for which you want to change the partition assignment.

9. From the **Select Action** list of the **Physical Optical Devices** table, select **Modify assignment** option. The **Modify Physical Optical Device Assignment** page is displayed.

10. Change the partition to which the optical device is assigned, or set the optical device so it is not assigned to any partition. Click **OK**. The list of optical devices reflects the changes that you made.

Managing virtual optical devices

You can virtualize a DVD or a CD device that is assigned to the Virtual I/O Server (VIOS) by using the Hardware Management Console (HMC). The virtualized devices are shared among the client partitions of the VIOS.

Only one client partition can access the shared optical device at a time. The advantage of a virtual optical device is that you do not have to move the parent Small Computer System Interface (SCSI) adapter between the VIOS client partitions. You cannot share optical devices if the SCSI adapter also controls the internal disk drives on which the VIOS is installed.

Note: You cannot move the virtual drive to another VIOS because client SCSI adapters cannot be created in a VIOS. If you want to virtualize the CD or DVD drive in another VIOS, the virtual device must be unconfigured and the parent SCSI adapter must be unconfigured and must be moved.

To change the virtual optical media, consider the following system requirements:

- The HMC must be Version 7 release 3.4.2, or later.
- The VIOS must be Version 2.1.1.0, or later.
- The resource monitoring and control (RMC) connection is established between the HMC and the VIOS.
- The virtual media library exists before you manage, create, or assign virtual optical devices.

Managing media libraries
A media library is a collection of virtual optical media. You can use the Hardware Management Console (HMC) to manage those libraries and assign resources to client partitions.

Viewing media libraries
You can use the Hardware Management Console (HMC) to view the media libraries.

About this task

To view the media libraries that are assigned to the Virtual I/O Server (VIOS) by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Storage**. The **Virtual Storage** page opens.
5. In the **Virtual Storage** work pane, click and expand the **Virtual Storage Management** section to view and manage the VIOS partitions that are listed in a table.
6. Right-click the VIOS and select **Manage Virtual Storage**. The **Virtual Storage Management** window opens.
7. Click the **Optical Devices** tab to display a list of virtual optical media and physical optical devices on the managed system.

8. Select a media library from the **Virtual Optical Media** table that you want to view.
9. From the **Select Action** list of the **Virtual Optical Media** table, select **Properties** to view the properties of the selected media library.

Adding or removing a media library
You can use the Hardware Management Console (HMC) to add or remove media libraries to and from a selected Virtual I/O Server (VIOS).

About this task

To add or remove media libraries by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Storage**. The **Virtual Storage** page opens.
5. In the **Virtual Storage** work pane, click and expand the **Virtual Storage Management** section to view and manage the VIOS partitions listed in a table.
6. Right-click the VIOS and select **Manage Virtual Storage**. The **Virtual Storage Management** window opens.
7. Select the options to either add or remove a media library.
8. Click **Apply** to apply the changes.

Adding or removing media files from a media library
You can use the Hardware Management Console (HMC) to add or remove media files to and from a media library that is assigned to a Virtual I/O Server (VIOS).

About this task

To add or remove media files from a media library by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Storage**. The **Virtual Storage** page opens.
5. In the **Virtual Storage** work pane, click and expand the **Virtual Storage Management** section to view and manage the VIOS partitions that are listed in a table.
6. Right-click the VIOS and select **Manage Virtual Storage**. The **Virtual Storage Management** window opens.
7. Click the **Optical Devices** tab to display a list of virtual optical media and physical optical devices on the managed system.
8. Select a media library from the **Virtual Optical Media** table to add or remove media files.
9. From the **Select Action** list of the **Virtual Optical Media** table, select one of the following options:

- **Add Media** adds an optical media file to the media library and makes it available for assignment to a partition.
- **Delete** removes the selected media files from the media library.

10. Click **Apply** to apply the changes.

Changing the partition assignment for a media file
You can use the Hardware Management Console (HMC) to change the partition assignment for a media file by changing the virtual optical device to which a media file is assigned. You can assign a read-only media to more than one Virtual I/O Server (VIOS).

About this task

To change the partition assignment for a media file by using HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Storage**. The **Virtual Storage** page opens.
5. In the **Virtual Storage** work pane, click and expand the **Virtual Storage Management** section to view and manage the VIOS partitions that are listed in a table.
6. Right-click the VIOS and select **Manage Virtual Storage**. The **Virtual Storage Management** window opens.
7. Click the **Optical Devices** tab to display a list of virtual optical media and physical optical devices on the managed system.
8. Select a media library from the **Virtual Optical Media** table for which you want to change the partition assignment for a media file.
9. From the **Select Action** list of the **Virtual Optical Media** table, select **Modify partition assignment** option.
10. Change the partition assignment as needed.
11. Click **Apply** to apply the changes.

Managing physical volumes

You can use the Hardware Management Console (HMC) to view and to change the assignment of physical volumes.

Viewing the properties of physical volumes
From a server that is managed by the Hardware Management Console (HMC), you can view the properties of the selected physical volume.

About this task

To view the properties of a physical volume by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.

3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.

4. In the **PowerVM** area, click **Virtual Storage**. The **Virtual Storage** page opens.

5. In the **Virtual Storage** work pane, click and expand the **Virtual Storage Management** section to view and manage the VIOS partitions that are listed in a table.

6. Right-click the VIOS and select **Manage Virtual Storage**. The **Virtual Storage Management** window opens.

7. Click **Physical Volumes** tab to display a list of physical volumes on the managed system.

8. Select the physical volume from the **Physical Volumes** table that you want to view.

9. From the **Select Action** list of the **Physical Volumes** table, select **Properties** to view the properties of the selected physical volume.

Changing physical volume assignments

From a server that is managed by the Hardware Management Console (HMC), you can change the partition to which the selected physical volume is assigned, or you can set the physical volume to ensure that it is not assigned to any other partition.

About this task

To change the physical volume assignment by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .

2. Click **All Systems**. The **All Systems** page is displayed.

3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.

4. In the **PowerVM** area, click **Virtual Storage**. The **Virtual Storage** page opens.

5. In the **Virtual Storage** work pane, click and expand the **Virtual Storage Management** section to view and manage the VIOS partitions that are listed in a table.

6. Right-click the VIOS and select **Manage Virtual Storage**. The **Virtual Storage Management** window opens.

7. Click **Physical Volumes** tab to display a list of physical volumes on the managed system.

8. Select the physical volume from the **Physical Volumes** table that you want to change.

9. From the **Select Action** list of the **Physical Volumes** table, select **Modify partition assignment** to change the partition to which the selected physical volume is assigned, or to set the physical volume of the selected partition.

Viewing virtual SCSI adapters

You can view the properties of a virtual Small Computer Serial Interface (SCSI) adapter for each Virtual I/O Server (VIOS) that is configured on the managed system by using the Hardware Management Console (HMC). The view provides a mapping of the adapters to the physical storage device. By selecting a VIOS, you can manage the virtual storage devices that are configured to a particular partition. The virtual SCSI adapters tab displays the end to end mapping for the virtual SCSI that includes the server adapter, client adapter, and the storage that is used by the virtual SCSI adapter that is configured for a particular partition. You can also remove the client or server adapter that is configured for the particular partition.

To view the list of virtual SCSI adapters, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Storage**.
5. In the **Virtual Storage** work pane, you can use the left and right arrow key buttons to switch between the **Storage(s)** and **Adapter(s)** views.
6. Click the right arrow key button to select **Adapter(s)** view.
7. Click and expand the **Virtual SCSI Adapters** section. The table lists the virtual SCSI adapters that are connected to the partition.

Viewing virtual Fibre Channel adapters

The N_Port ID Virtualization (NPIV) is an industry-standard technology that helps you to configure an NPIV capable Fibre Channel adapter with multiple, virtual worldwide port names (WWPNs). This technology is also called as virtual Fibre Channel. Similar to the virtual Small Computer System Interface (SCSI) function (VSCSI), virtual Fibre Channel is a method to securely share a physical Fibre Channel adapter among multiple Virtual I/O Servers.

Virtual SCSI server provides server-based storage virtualization. Storage resources can be aggregated and pooled on the Virtual I/O Server (VIOS). Two unique, virtual, WWPNs starting with the letter *c* are generated by the Hardware Management Console (HMC) for the virtual Fibre Channel client adapter. After the activation of the client partition, the WWPNs log in to the storage area network (SAN) similar to other WWPNs from a physical port.

From an architectural perspective, the key difference between the virtual Fibre Channel and the virtual SCSI is that the Virtual I/O Server (VIOS) does not act as a SCSI emulator to its client partitions. Instead, it acts as a direct Fibre Channel pass-through for the Fibre Channel protocol I/O traffic through the POWER Hypervisor. The client partitions are presented with full access to the physical SCSI target devices of a SAN disk or tape storage systems. The benefits of the virtual Fibre Channel are that the physical target device characteristics such as vendor or model information remains fully visible to the VIOS. Hence, you need not change the device drivers such as multi-pathing software, middleware such as copy services, or storage management applications that rely on the physical device characteristics.

Consider the following information when you use the virtual Fibre Channel:

- One virtual Fibre Channel client adapter per physical port per client partition. This strategy helps to avoid a single point of failure.
- For Fibre Channel (16GB/s or lesser) adapters, maximum of 64 active virtual Fibre Channel client adapters per physical port. The virtual adapters per physical port can reduce because of other VIOS resource constraints.
- For Fibre Channel (32GB/s) adapters, maximum of 255 virtual Fibre Channel client adapters per physical port. The virtual adapters per physical port can reduce because of other VIOS resource constraints.
- Maximum of 64 targets per virtual Fibre Channel adapter.
- 32,000 unique WWPN pairs per system. Removing a virtual Fibre Channel client adapter does not reclaim worldwide port names (WWPNs). You can manually reclaim WWPNs by using the **mksyscfg** command and **chhwres** command or by using the **virtual_fc_adapters** attribute.

For more information about the capabilities of the Fibre Channel adapter, see PCIe3 x8 2-port Fibre Channel (32 Gb/s).

To enable NPIV on the managed system, create the required virtual Fibre Channel adapters and connections as follows:

- You use the HMC to create virtual Fibre Channel adapters on the VIOS and associate them with virtual Fibre Channel adapters on the client partitions.

- You use the HMC to create virtual Fibre Channel adapters on each client partition and associate them with virtual Fibre Channel adapters on the VIOS. When you create a virtual Fibre Channel adapter on a client partition, the HMC generates a pair of unique WWPNs for the client virtual Fibre Channel adapter.
- You connect the virtual Fibre Channel adapters on the VIOS to the physical ports of the physical Fibre Channel adapter by running the **vfcmap** command on the VIOS CLI.

The HMC generates WWPNs based on the range of names available for use with the prefix in the vital product data on the managed system. You can get the 6-digit prefix when you purchase the managed system. The 6-digit prefix includes 32,000 pairs of WWPNs. When you remove a virtual Fibre Channel adapter from a client partition, the Power hypervisor deletes the WWPNs that are assigned to the virtual Fibre Channel adapter on the client partition. The HMC does not reuse the deleted WWPNs to generate WWPNs for virtual Fibre Channel adapters. If you require more WWPNs, you must obtain an activation code that includes another prefix that has another 32,000 pairs of WWPNs.

To avoid configuring the physical Fibre Channel adapter to be a single point of failure for the connection between the client partition and its physical storage on the SAN, do not connect two virtual Fibre Channel adapters from the same client partition to the same physical Fibre Channel adapter. Instead, connect each virtual Fibre Channel adapter to a different physical Fibre Channel adapter.

On a server that is managed by the HMC, you can dynamically add and remove virtual Fibre Channel adapters to and from the VIOS and from each client partition. You can also view information about the virtual and physical Fibre Channel adapters and the WWPNs by using VIOS commands.

For more information, see NPIV disk validation for Live Partition Migration.

Viewing virtual Fibre Channel ports for each VIOS
On a server that is managed by the Hardware Management Console (HMC), you can view the properties of the virtual Fibre Channel port that is assigned to a Virtual I/O Server (VIOS).

About this task

To view the properties of the virtual Fibre Channel ports for each VIOS, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Storage**. The **Virtual Storage** page opens.
5. In the **Virtual Storage** work pane, click and expand the **Virtual Storage Management** section to view and manage the VIOS partitions that are listed in a table.
6. Right-click the VIOS and select **Manage Virtual Storage**. The **Virtual Storage Management** window is displayed.
7. Click **Virtual Fibre Channel** tab to display a list of virtual Fibre Channel ports on the managed system.
8. Select the virtual Fibre Channel port from the **Virtual Fibre Channel** table that you want to view.
9. From the **Select Action** list of the Virtual Fibre Channel table, select **Properties** to view the properties of the selected virtual Fibre Channel port.

Changing to the virtual Fibre Channel adapter view
You can view the list of virtual resources per adapter that are configured for a Virtual I/O Server (VIOS).

Procedure
To view the list of virtual resources per adapter by using the Hardware Management Console (HMC), complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Storage**.
5. In the **Virtual Storage** work pane, you can use the left and right arrow key buttons to switch between the **Storage(s)** and **Adapter(s)** views.
6. Click the right arrow key button to select **Adapter(s)** view.
7. Click and expand the **Virtual Fibre Channel Adapters** section. The table lists the virtual Fibre Channel adapters in the managed system.

Changing the virtual Fibre Channel port assignment
On a server that is managed by the Hardware Management Console (HMC), you can change the partition to which the selected virtual Fibre Channel port is assigned, or you can set the virtual Fibre Channel port to ensure that it is not assigned to any other partition.

About this task

To change the virtual Fibre Channel port assignment by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Storage**. The **Virtual Storage** page opens.
5. In the **Virtual Storage** work pane, click and expand the **Virtual Storage Management** section to view and manage the VIOS partitions that are listed in a table.
6. Right-click the VIOS and select **Manage Virtual Storage**. The **Virtual Storage Management** window opens.
7. Click **Virtual Fibre Channel** tab to display a list of virtual Fibre Channel ports on the managed system.
8. Select the virtual Fibre Channel port from the Virtual Fibre Channel table that you want to change.
9. From the **Select Action** list of the Virtual Fibre Channel table, select **Modify virtual Fibre Channel port assignment** to change the partition to which the selected virtual Fibre Channel port is assigned, or to set the virtual Fibre Channel port to the selected partition.

Shared storage pool clusters

Shared Storage Pool (SSP) clusters are a feature in PowerVM Editions and were introduced in Virtual I/O Server (VIOS) Version 2.2.0.11 Fix Pack 11 Service Pack 1. It is a server-based storage virtualization method that provides distributed storage access to a VIOS for client partitions.

Note: For HMC to manage Shared Storage Pool clusters, the VIOS level must be at 2.2.3.3, or later.

A shared storage pool is a pool of storage area network (SAN) storage devices that can be used among Virtual I/O Servers. It is based on a cluster of Virtual I/O Servers and a distributed data object repository with a global namespace. Each VIOS that is part of a cluster represents a cluster node.

Shared storage pools provide the following benefits:

- Improve the usage of available storage.
- Simplify administration tasks.
- Simplify the aggregation of large numbers of disks among the Virtual I/O Servers.

Shared storage pools provide better usage of the available storage by using thin provisioning. The thinly provisioned device is not fully backed by physical storage if the data block is not in actual use.

Viewing the SSP cluster configuration

You can view the configuration details of Shared Storage Pool (SSP) clusters, by using the **PowerVM** > **Virtual Storage** area in the Hardware Management Console (HMC).

Procedure

To view the configuration details of shared storage pool clusters in the Virtual I/O Server (VIOS) by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Storage**. The **Virtual Storage** page opens.
5. In the **Virtual Storage** work pane, click and expand the **Shared Storage Pool Cluster** section. The table lists the clusters that are associated with the managed system.

   Note: You can select **Show All Available Clusters** to display all clusters that are associated with the management console, not just the clusters associated with the managed system.
6. Right-click the cluster and select **View Cluster Details** to view the configuration details.
7. Click the arrows next to **Repository Disk**, **Number of cluster nodes**, **Physical Volume**, and **SSP Volume** to view more details.
8. Click **Close** to exit.

What to do next

Note: You can also view the configuration details of shared storage pool clusters in the VIOS by using the **All Shared Storage Pool Clusters** menu in the HMC. For instructions, see "Viewing the SSP cluster configuration by using the All Shared Storage Pool Clusters menu" on page 49.

Changing SSP clusters

You can change a Shared Storage Pool (SSP) cluster by using the Hardware Management Console (HMC).

Adding or removing a VIOS to an SSP cluster
You can add or remove a Virtual I/O Server (VIOS) to a Shared Storage Pool (SSP) cluster by using the **PowerVM** > **Virtual Storage** area in the Hardware Management Console (HMC).

About this task

By adding or removing a Virtual I/O Server (VIOS) to and from the shared storage pool cluster, you can extend the shared storage pool cluster. Shared storage pools extend storage virtualization to multiple Virtual I/O Servers on multiple IBM Power system servers.

Note: If the VIOS is not managed by this HMC, it cannot be removed because it will be disabled.

Procedure

To add or remove a VIOS, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Virtual Storage**. The **Virtual Storage** page opens.
5. In the **Virtual Storage** work pane, click and expand the **Shared Storage Pool Cluster** section. The table lists the clusters that are associated with the managed system.
6. To add a VIOS to the shared storage pool cluster that is a part of the managed system, complete the following steps:
   a) In the work pane, right-click a shared storage pool cluster from the table and select **Add/Remove Node**. The **Add Nodes/Remove Nodes** page displays the table with the list of Virtual I/O Servers.
   b) Select all the Virtual I/O Servers to be added to the shared storage pool cluster.
   c) Click **OK**.
7. To remove a VIOS from the shared storage pool cluster that is not a part of the managed system, complete the following steps:
   a) In the work pane, right-click a shared storage pool cluster from the table and select **Add/Remove Node**. The **Add Nodes/Remove Nodes** page opens.
   b) Clear the check box available near the Virtual I/O Servers to be removed from the shared storage pool cluster.

   Note: You cannot remove the VIOS nodes that are not managed by this HMC as they are disabled.
   c) Click **OK**.

What to do next

Note: You can also can add or remove a VIOS to a shared storage pool cluster, by using the **All Shared Storage Pool Clusters** menu in the HMC. For instructions, see "Adding nodes by using the All Shared Storage Pool Clusters menu" on page 51 and "Removing a node by using the All Shared Storage Pool Clusters menu" on page 53.

Managing shared processor pools

A shared processor pool is a PowerVM technology that you can use to control the amount of processor capacity that partitions can use from the available physical processors in the system.

Multiple shared processor pools is a capability that is supported on POWER6® technology, or later. This capability isolates work loads in a shared processor pool and prevents the work load from exceeding an upper limit. This capability is also useful for software license management, where subcapacity licensing is involved.

Up to 64 shared processor pools can be defined on IBM Power Systems servers that support multiple shared processor pools. A default shared processor pool is automatically defined in the managed system.

Each shared processor pool has a maximum processing units value that is associated with it. The maximum processing units define the upper boundary of the processor capacity that can be used by the set of partitions in the shared processor pool.

The system administrator can optionally allocate a number of reserved processing units to a shared processor pool. The reserved processing units represent the available processor capacity with the processor capacity entitlements of the individual partitions in the shared processor pool. The default value for the reserved processing units is **zero**.

By using the Hardware Management Console (HMC), you can complete the following tasks:

- Allocate a specific amount of the processing capacity from the shared processor pool to each partition that uses the shared processors.
- Configure the shared processor pools with a maximum processing unit value and a reserved processing unit value.
- View information about your shared processor pool and change the properties of that pool.

Note: The default shared processor pool is pre-configured. Hence, you cannot change the properties of the default shared processor pool. The maximum number of processors available to the default shared processor pool is the total number of active, licensed processors on the managed system minus the number of processors that are assigned to dedicated processor partitions that are set to not share their dedicated processors.

Changing a shared processor pool

You can view and change the shared processor pool configuration by using the Hardware Management Console (HMC).

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Shared Processor Pool**. The **Shared Processor Pool** page opens.
5. From the table, select the shared processor pool that you want to change.
6. From the **Select Action** list, select **Modify**.
7. Select one of the following options to change the properties of the selected shared processor pool:
   - **Pool Name** to change the name of the shared processor pool.
   - **Pool ID** to change the ID of the shared processor pool.
   - **Resource Processing Units** to change the value of the reserved processing unit. The reserved processing unit value is the number of processing units that are reserved for the use of uncapped partitions within the shared processor pool.
   - **Maximum Processing Units** to change the maximum value of the processing unit. The maximum processing unit value limits the total number of processing units that can be used by the partitions in the shared processor pool.

What to do next

After this task is complete, assign partitions to the configured shared processor pools. You can assign a partition to a shared processor pool while creating the partition, or you can reassign existing partitions from their current shared processor pools to the shared processor pools that you configured.

When you no longer want to use a shared processor pool, you can unconfigure the shared processor pool by using this task to set the maximum number of processing units and reserved number of processing units to 0. Before you can unconfigure a shared processor pool, you must reassign all partitions, which use the shared processor pool, to other shared processor pools.

Managing shared memory pools

You can manage the shared memory pool that is configured on a server by using the Hardware Management Console (HMC).

By using the HMC, you can complete the following management tasks on shared memory pools:

- Dynamically increase or decrease the size of the shared memory pool.
- Allocate a paging VIOS to the shared memory pool.
- Allocate a paging space device to the shared memory pool.
- Enable or disable the active memory de-duplication function.
- Delete a shared memory pool.

Important: You cannot delete a shared memory pool when shared memory partitions are configured to use the shared memory pool. The partitions must be removed or changed to dedicated memory partitions before you delete the shared memory pool.

If you want to increase the shared memory pool beyond the maximum pool size, first increase the maximum pool size to a value that is greater than or equal to the required new pool size. The maximum pool size can be increased dynamically.

Active memory de-duplication is a feature of the PowerVM Active Memory Sharing technology in which the memory pages with identical contents are de-duplicated in physical memory. Active memory de-duplication feature aggregates the same data in one memory position, and frees other duplicate memory blocks, thus optimizing memory use.

After you enable the Active Memory De-duplication option, all the partitions that are part of the shared memory pool use Active Memory De-duplication.

Changing a shared memory pool

You can view and change the shared memory pool configuration by using the Hardware Management Console (HMC).

Procedure

To change a shared memory pool, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Shared Memory Pool**. The **Create Shared Memory Pool** wizard opens to the **Welcome** page. If the Shared Memory Pool already exists, the **Modify Shared Memory Pool** wizard opens.
5. Click **Next**.
6. In the **General** page, you can view and change the shared memory pool size. Click **Next**.
7. In the **Paging VIOS** page, you can associate one or more paging VIOS partition to the shared memory pool. Click **Next**.
8. In the **Paging Space Device(s)** page, the table lists the paging space devices that are currently assigned to the shared memory pool. Choose one of the following steps:
    a) To allocate more devices to the memory pool, click **Select Devices**.
    b) To remove a device from the memory pool, click **Remove**.
9. Click **Next**. The **Summary** page displays the size of the shared memory pool, the maximum size of the pool, the paging VIOS assigned to the pool, and the paging space devices that are assigned to the pool.

10. Click **Finish** to apply the changes to the shared memory pool.

Managing reserved storage device pools

You can manage the reserved storage device pool that is configured on a server by using the Hardware Management Console (HMC).

Before you begin

The reserved storage pool has storage devices that are assigned to save data for partitions that are suspended, or for active partitions that are configured with shared memory. The required storage device space is approximately 110% of the configured maximum memory size of the partition.

A reserved storage device pool contains reserved storage devices, also known as paging space devices. These devices are similar to shared memory pools with memory size zero. To suspend a partition, a storage device must have a paging space.

One Virtual I/O Server (VIOS) must be associated as the paging service partition to the reserved storage device pool. Additionally, you can associate a second VIOS with the reserved storage device pool to provide a redundant path, and to provide higher availability for the paging space devices.

During a suspend operation, an HMC assigns a storage device from reserved storage device pool. It automatically selects an unused and suitable device from this pool to store partition suspend data. The reserved storage device must be available in the reserved storage device pool while suspending a partition.

Note: You must not suspend a partition when the `alt_disk_install` command is running in the VIOS on which the storage is provisioned for the client.

You can complete the following management tasks on the reserved storage device pool interface:

- Add a VIOS to the reserved storage device pool.
- Remove a VIOS from the reserved storage device pool.
- Add reserved storage devices to the reserved storage device pool.
- Remove reserved storage devices from the reserved storage device pool.

Important: You cannot delete a reserved storage device pool when partitions are configured to use the pool. The partitions must be removed or their configuration must be changed before you delete the reserved storage device pool.

When a shared memory pool is created, a reserved storage device pool is also created. When a shared memory pool is deleted, a reserved storage device pool is not automatically deleted.

A reserved storage device pool is created when a shared memory pool is created. You must create the reserved storage device pool to use the Partition Suspend and Resume capability where a shared memory pool is not configured.

About this task
To change or remove a reserved storage device pool, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Reserved Storage Pool**. The **Reserved Storage Pool Management** page opens. Choose one of the following steps:

- Select one or more Virtual I/O Servers to assign to the reserved storage device pool.
- Select reserved storage devices from the table and click **Select Device(s)** to assign a device.
- Select reserved storage devices from the table and click **Remove** to remove the reserved storage device pool from the VIOS.

5. Click **Apply** to apply the changes.

Managing SR-IOV, HEA and HCA adapters

You can manage Single Root I/O Virtualization (SR-IOV), Host Ethernet Adapter (HEA), and Host Channel Adapter (HCA) settings on a server by using the Hardware Management Console (HMC).

Managing SR-IOV adapters

Single Root I/O Virtualization (SR-IOV) is an I/O virtualization technology that is used for the virtualization of I/O resources for individual servers. It logically divides a physical adapter port into multiple logical ports. This technology improves the scalability, flexibility, throughput, and latency performance of networking operations. SR-IOV is supported on certain combinations of Power Systems servers and adapters.

If an adapter supports SR-IOV, the SR-IOV tab is displayed. SR-IOV is an extension to the Peripheral Component Interconnect (PCI) Express specification to facilitate multiple partitions that are running simultaneously within a single system to share a PCI Express device. An SR-IOV capable adapter can be assigned to a partition to run in dedicated mode. Or, it can be owned by a hypervisor when the SR-IOV adapter is switched to shared mode. When an adapter is assigned to the hypervisor and is operating in shared mode, the adapter can be shared by multiple partitions at the same time.

Modifying SR-IOV adapters
You can change single root I/O virtualization (SR-IOV) adapter settings on a server by using the Hardware Management Console (HMC).

About this task
To change the SR-IOV adapter settings by using an HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Hardware Virtualized I/O**.
5. In the **SR-IOV** tab, select an SR-IOV adapter from the **SR-IOV adapter** list. The properties of the selected SR-IOV adapter such as the mode, owner, configured logical ports, maximum logical ports are displayed.
6. Click **Modify SR-IOV**. The **Modify SR-IOV adapter** page opens with the configuration details of the selected SR-IOV adapter.
7. Change the mode by selecting **Dedicated mode** or **Shared mode** from the mode options.
8. If you choose **Dedicated mode**, remove all logical ports before you switch the SR-IOV adapter to dedicated mode.
9. Click **OK** to save the changes to the SR-IOV adapter settings.

Updating the SR-IOV adapter firmware
I/O adapters that are configured to run in Single Root I/O Virtualization (SR-IOV) shared-mode are managed by adapter driver firmware and adapter firmware. Both adapter driver firmware and adapter

firmware for the SR-IOV adapter are downloaded with the system firmware updates. If you are updating the system firmware concurrently, the adapter driver firmware and the SR-IOV adapter firmware are not automatically activated for the adapters that are running in SR-IOV shared-mode to prevent any unexpected temporary outage of adapters that are running in SR-IOV shared-mode.

Two types of firmware are required to support adapters that are running in SR-IOV shared-mode. One type is the adapter driver firmware, which is used for configuring and managing the adapter. The second type is the I/O adapter firmware, which enables the adapter to interface with the adapter driver firmware. The following options can be used to activate the adapter driver firmware and the adapter firmware for adapters that are running in SR-IOV shared-mode:

- A system boot or reboot activates all the adapters that are in SR-IOV shared-mode to the new firmware level.
- When the adapter is enabled to run in SR-IOV shared-mode, the adapter driver firmware and the adapter firmware are activated to the firmware level that is available with the system firmware. Also, the activation is automatically performed to the SR-IOV adapters during the maintenance operation of an adapter that is in SR-IOV shared-mode. For example, when the SR-IOV adapter is stopped or replaced during a maintenance operation.
- A selective manual firmware activation of a SR-IOV adapter that is in SR-IOV shared-mode can be performed by using the Hardware Management Console (HMC) graphical user interface or the HMC command-line.

Notes:

1. You cannot use this procedure to update the firmware for adapters that can run in SR-IOV shared-mode, but are not running in the SR-IOV shared-mode.
2. The firmware for the adapter that is capable of running in the SR-IOV shared-mode, but currently is running in the dedicated mode and is assigned to a logical partition, can only be updated concurrently either by using the operating system (OS) that owns the adapter or by using the managing HMC (if the OS is AIX operating system or a VIOS, and when the Resource Monitoring and Control (RMC) is in a running state).

The firmware update process for the SR-IOV adapters is similar to the HMC update process of the other system firmware. When you update the system firmware, the system firmware update might also contain adapter driver firmware updates for the SR-IOV adapters, adapter firmware updates, or both. The firmware for the adapters that are configured to run in SR-IOV shared-mode is not activated automatically while they are running because of a temporary I/O outage that occurs when the firmware is activated. By not automatically activating the firmware immediately, you can schedule the most convenient time for this outage. The outage lasts approximately 1 minute for each adapter that is activated when you activate only the adapter driver firmware, and approximately 5 minutes for each adapter that is activated when you activate both the adapter driver firmware and the adapter firmware. The best practice is to activate both the adapter driver firmware and the adapter firmware simultaneous. You cannot activate only the adapter firmware. To activate the SR-IOV firmware on an adapter that is running in SR-IOV shared-mode, the managed system with the SR-IOV adapter must be powered on and in either the *Standby* state or the *Operating* state.

Updating the SR-IOV adapter firmware by using the graphical user interface
You can update the firmware for your adapters that are running in Single Root I/O Virtualization (SR-IOV) mode by using the graphical user interface when you are running system firmware level FW830, or later.

About this task
To update the firmware, complete the following steps, depending on the interface that you are using:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.

3. Select the server that is running the adapters that you want to update.
4. Click **Actions** > **View all actions** > **Updates** > **SR-IOV Firmware Update**.

   The **SR-IOV Firmware Update** panel is displayed.
5. Select one or more adapters that you would like to update.

   Use the **Update available** column to determine whether updates are available for an adapter. A value of **Yes** indicates that updates are available.

   Note: A temporary I/O outage occurs for each SR-IOV adapter while it is updated. The outage lasts approximately 1 minute for each adapter that is updated when you update only the adapter driver firmware, and approximately 5 minutes for each adapter that is updated when you update both the adapter driver firmware and the adapter firmware.
6. Right-click any of the selected adapters and click **Start firmware update**, then either **Update SR-IOV adapter driver firmware** or **Update SR-IOV adapter driver firmware and adapter firmware**

   If you selected multiple adapters, the process will serially update them. By clicking **Update SR-IOV adapter driver firmware and adapter firmware**, the brief outage is longer than when **Update SR-IOV adapter driver firmware**, but it installs all of the required updates at one time. You cannot install only the adapter firmware updates.

   The Status column updates according to the status of the update. The status is one of the following values:

   Pending Adapter Driver
   > There is an adapter driver firmware update that is ready for installation.

   Pending Adapter Driver and Adapter
   > There are both adapter driver firmware and adapter firmware updates that are available.

   Updating
   > The firmware updates for the adapter are in progress.

   Update successful
   > All updates were completed successfully.

   Update failed
   > At least one of the updates for the specified adapter did not complete successfully.
7. Click **OK** to exit the Update SR-IOV firmware table when all of the adapters are updated, or click **Cancel** to stop any pending updates and leave the Update SR-IOV firmware table.

Updating the SR-IOV adapter firmware by using the command line (system level FW830 and later)
You can update the firmware for your adapters that are running in Single Root I/O Virtualization (SR-IOV) mode by using the command line. Select the procedure that applies, based on the version of your system firmware.

About this task
You can activate the available SR-IOV firmware updates by using the Hardware Management Console (HMC) command line. To activate firmware updates when you are running system firmware level FW830, or later, complete the following steps:

Procedure

1. To identify which SR-IOV adapters have available updates, enter the following command:

   ```
   lslic -t sriov -m system_name
   ```

   Where *machine_type_model* is the identifier of the system.

   The following information is displayed in comma-separated value format for each of the adapters that is running in SR-IOV mode:

   ```
   slot=SR-IOV-adapter-physical-location-code,active_adapter_driver_level=
   "current-adapter-driver-firmware-level",active_adapter_level="current-adapter-firmware-
   level",
   ```

```
update_available=0 (false)|1 (true),update_description="description",
install_separate=0 (false)|1 (true)
```

If the `update_available` value is 1, then updates are available for that adapter.

If updates are available, you can update the adapter driver firmware and the adapter firmware, or only the adapter driver firmware. To update the adapter driver firmware only, the adapter must support this operation, which is indicated if the `install_separate` value is 1. You can also update all of the adapters that require updates sequentially with a single command.

Note: A temporary I/O outage occurs for each SR-IOV adapter during its update. The outage lasts approximately 1 minute for each adapter that is updated when you update only the adapter driver firmware, and approximately 5 minutes for each adapter that is updated when you update both the adapter driver firmware and the adapter firmware.

2. Choose one of the following options that corresponds to the firmware that you want to update:

- To update the adapter driver firmware and the adapter firmware for an SR-IOV adapter, enter one of the following commands. Updating the adapter driver firmware and the adapter firmware results in an I/O outage of up to 5 minutes for each adapter that is being updated.

  – This command updates the adapter driver firmware and adapter firmware for the adapter that is specified by the *-s* parameter.

    ```
    updlic -o f -t sriov -m system_name --subtype adapterdriver,adapter -s adapter_id
    ```

  – This command updates the adapter driver firmware and adapter firmware for the adapters that are specified by the *-s* parameter. You can specify multiple adapters by separating them with commas.

    ```
    updlic -o f -t sriov -m system_name --subtype adapterdriver,
    adapter -s adapter_id1,adapter_id2,...
    ```

- To update only the adapter driver firmware for the selected SR-IOV adapter, enter the following command. Updating only the adapter driver firmware results in an I/O outage of up to 1 minute for each adapter during the update.

  – This command updates only the adapter driver firmware for the adapter that is specified by the *-s* parameter. You can specify more than one *adapter* by separating them with commas.

    ```
    updlic -o f -t sriov -m system_name --subtype adapterdriver -s adapter_id
    ```

3. To verify that the updates completed successfully, run the following command:

    ```
    lslic -t sriov -m system_name
    ```

   The output of the command displays the updated information about the SR-IOV adapters. Depending on which firmware you updated, the adapters with the updated firmware satisfy either the criteria of no available updates or the criterion of having only available adapter firmware updates. These criteria are shown in step "1" on page 42.

Updating the SR-IOV adapter firmware by using the command line (system firmware level earlier than FW830)

About this task
You can activate the available SR-IOV firmware updates by using the HMC command line. To activate firmware updates for system firmware level earlier than FW830, complete the following steps:

Procedure

1. To identify which SR-IOV adapters have available updates, enter the following command:

    ```
    startdump -m system_name -t resource -r "sriovdebug -fwinfo"
    ```

The output is sent to a dump file in the /dump directory that is titled RSCDUMP.*<serial_number>*.*<dump_id>*.*<timestamp>*. The contents of the file contains a section of information for each adapter that is running in SR-IOV mode. The section for each adapter is identified by its **Slot location code**. Use the following list to determine the state of the updates for each adapter that is listed.

- No updates are available for an adapter when the following conditions are met:
  - There is text at the end of the command output for that adapter that states there are no adapter driver firmware updates for the adapter in the specified location.
  - The version number that is displayed in the `Current Version running` output for that adapter is the same as the version number that is displayed in the `Adjunct Firmware image` output for that adapter.
- Adapter driver firmware updates are available for an adapter when the text at the end of the command output for the adapter states that there are adapter driver firmware updates for the adapter in the specified location.
- Adapter firmware updates are available for an adapter when the value of the `Current version running` for that adapter is not the same as the value of the `Adjunct Firmware image` for that adapter.

If updates are available, you can update the adapter driver firmware and the adapter firmware or only the adapter driver firmware. You can also update all of the adapters at the same time, or specify a single adapter to update.

Note: A temporary I/O outage occurs for each SR-IOV adapter during its update. The outage lasts approximately 1 minute for each adapter that is updated when you update only the adapter driver firmware, and approximately 5 minutes for each adapter that is updated when you update both the adapter driver firmware and the adapter firmware.

2. Choose one of the following options that corresponds to the firmware that you want to update:

- To update the adapter driver firmware and the adapter firmware for an SR-IOV adapter, enter one of the following commands. Updating the adapter driver firmware and the adapter firmware results in an I/O outage of up to 5 minutes for each adapter that is being updated. Each adapter is updated sequentially, so that the total update time for updating all the adapters is up to 5 minutes per adapter, where each adapter is configured in SR-IOV shared mode.
  - This command updates the adapter driver firmware and adapter firmware for all of the adapters.

    ```
    startdump -m system_name -t resource -r "sriov all updateadapter"
    ```

  - This command updates the adapter driver firmware and adapter firmware only for the adapter that is specified by the *slot_location_code* parameter.

    ```
    startdump -m system_name -t resource -r "sriov slot_location_code updateadapter"
    ```

- To update only the adapter driver firmware for the selected SR-IOV adapter or for all of your SR-IOV adapters, enter one of the following commands. Updating only the adapter driver firmware results in an I/O outage of up to 1 minute for each adapter during the update. Each adapter is updated sequentially, so that the total update time for updating all the adapters is up to 1 minute per adapter, where each adapter is configured in SR-IOV shared mode.
  - This command updates only the adapter driver firmware for the adapter that is specified by the *slot_location_code* parameter.

    ```
    startdump -m system_name -t resource -r "sriov slot_location_code update"
    ```

  - This command updates only the adapter driver firmware for all of the adapters.

    ```
    startdump -m system_name -t resource -r "sriov all update"
    ```

3. To verify that the updates completed successfully, run the following command:

```
startdump -m system_name -t resource -r "sriovdebug -fwinfo"
```

The output is sent to a dump file in the /dump directory that is titled
RSCDUMP.*<serial_number>*.*<dump_id>*.*<timestamp>*. The contents of the file contains a
section of information for each adapter that is running in SR-IOV mode. The section for each adapter
is identified by its **Slot location code**. The output of the command displays the updated information
about the SR-IOV adapters. Depending on which firmware you updated, the adapters with the updated
firmware satisfy either the criteria of no available updates or the criterion of having only available
adapter firmware updates. These criteria are shown in step <u>"1" on page 43</u>.

Viewing SR-IOV logical port settings

You can view the single root I/O virtualization (SR-IOV) logical port settings on a server by using the
Hardware Management Console (HMC).

About this task

To see the SR-IOV logical port adapter settings by using an HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon   .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and
   change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Hardware Virtualized I/O**.
5. In the **SR-IOV** tab, select an SR-IOV adapter from the **SR-IOV adapter** list.
6. Select an SR-IOV adapter from the **SR-IOV adapter** list.
7. Select **Logical Ports** from the View options. A list of configured SR-IOV logical port adapter settings
   are displayed.
8. Right-click a logical port and select **View Logical Port**. The **View SR-IOV Logical Port** page opens. You
   can view all properties of the selected SR-IOV logical port.

Modifying SR-IOV physical port settings

You can change the single root I/O virtualization (SR-IOV) physical ports settings on a server by using the
Hardware Management Console (HMC).

About this task

To change the settings of an SR-IOV physical port by using an HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon   .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and
   change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Hardware Virtualized I/O**.
5. In the **SR-IOV** tab, select an SR-IOV adapter from the **SR-IOV adapter** list. A list of SR-IOV physical
   ports that are configured for the selected SR-IOV adapter is displayed.
6. Right-click an SR-IOV physical port that you want to change and select **Modify Physical Port**. The
   Modify SR-IOV Physical Port page opens.

7. Change the label from the **Label** field.
8. Change the sublabel from the **Sub-Label** field.
9. Change the configured speed settings from the **Configured Speed** list.
10. Select **Advanced settings**.
11. Change the MTU size settings from the **MTU Size** list.
12. Change the port switch mode settings from the **Port Switch Mode** list.
13. Change the flow control settings from the **Flow Control** list.
14. Change the maximum number of logical ports that are supported from the **Maximum** field.
15. Click **OK** to save your changes to the SR-IOV physical port settings.

Host Ethernet Adapters (HEAs)

A *Host Ethernet Adapter (HEA)* is a physical Ethernet adapter that is integrated directly into the GX+ bus on a managed system. HEAs offer high throughput, low latency, and virtualization support for Ethernet connections. HEAs are also known as Integrated Virtual Ethernet adapters (IVE adapters).

Note: HEA is not supported on POWER9 processor-based server.

Unlike most other types of I/O devices, you can never assign the HEA itself to a logical partition. Instead, multiple logical partitions can connect directly to the HEA and use the HEA resources. This allows these logical partitions to access external networks through the HEA without having to go through an Ethernet bridge on another logical partition.

To connect a logical partition to an HEA, you must create a logical Host Ethernet Adapter (LHEA) for the logical partition. A *logical Host Ethernet Adapter (LHEA)* is a representation of a physical HEA on a logical partition. An LHEA appears to the operating system as if it were a physical Ethernet adapter, just as a virtual Ethernet adapter appears as if it were a physical Ethernet adapter. When you create an LHEA for a logical partition, you specify the resources that the logical partition can use on the actual physical HEA. Each logical partition can have one LHEA for each physical HEA on the managed system. Each LHEA can have one or more logical ports, and each logical port can connect to a physical port on the HEA.

After you create an LHEA for a logical partition, a network device is created in the logical partition. This network device is named ent*X* on AIX logical partitions, CMN*XX* on IBM i logical partitions, and eth*X* on Linux logical partitions, where *X* represents sequentially assigned numbers. The user can then set up TCP/IP configuration like a physical Ethernet device to communicate with other logical partitions.

You can configure a partition so that it is the only logical partition that can access a physical port of an HEA by specifying *dedicated mode* for an LHEA that is assigned to the logical partition. When an LHEA is in dedicated mode, no other logical partitions can access the logical ports of the physical port that is associated with the LHEA that is in dedicated mode. You might want to configure a logical partition to dedicated mode in the following situations:

If you want to connect more than 16 logical partitions to each other and to an external network through a physical port on an HEA, you can create a logical port on a Virtual I/O Server and configure an Ethernet bridge between the logical port and a virtual Ethernet adapter on a virtual LAN. This allows all logical partitions with virtual Ethernet adapters on the virtual LAN to communicate with the physical port through the Ethernet bridge. If you configure an Ethernet bridge between a logical port and a virtual Ethernet adapter, the physical port that is connected to the logical port must have the following properties:

- The physical port must be configured so that the Virtual I/O Server is the dedicated mode logical partition for the physical port.
- The physical port can have only one logical port.

A logical port can communicate with all other logical ports that are connected to the same physical port on the HEA. The physical port and its associated logical ports form a logical Ethernet network. Broadcast and multicast packets are distributed on this logical network as though it was a physical Ethernet network. You can connect up to 16 logical ports to a physical port using this logical network. By extension, you can connect up to 16 logical partitions to each other and to an external network through this logical network. The actual number of logical ports that you can connect to a physical port depends

upon the Multi-Core Scaling value of the physical port group. It also depends on the number of logical ports that have been created for other physical ports within the physical port group. By default, the Multi-Core Scaling value of each physical port group is set to 4, which allows four logical ports to be connected to the physical ports in the physical port group. To allow up to 16 logical ports to be connected to the physical ports in the physical port group, you must change the Multi-Core Scaling value of the physical port group to 1 and restart the managed system.

You can set each logical port to restrict or allow packets that are tagged for specific VLANs. You can set a logical port to accept packets with any VLAN ID, or you can set a logical port to accept only the VLAN IDs that you specify. You can specify up to 20 individual VLAN IDs for each logical port.

The physical ports on an HEA are always configured on the managed system level. If you use an HMC to manage a system, you must use the HMC to configure the physical ports on any HEAs belonging to the managed system. Also, the physical port configuration applies to all logical partitions that use the physical port. (Some properties might require setup in the operating system as well. For example, the maximum packet size for a physical port on the HEA must be set on the managed system level using the HMC. However, you must also set the maximum packet size for each logical port within the operating system.) By contrast, if a system is unpartitioned and is not managed by an HMC, you can configure the physical ports on an HEA within the operating system as if the physical ports were ports on a regular physical Ethernet adapter.

HEA hardware does not support half-duplex mode.

Managing Host Ethernet Adapters (HEAs)

You can create or change a Host Ethernet Adapter (HEA) by using the Hardware Management Console (HMC).

About this task

You can complete the following management tasks on an HEA:

- Changing an HEA adapter
- Changing an HEA port
- Viewing the partitions that are associated with an HEA port

To manage HEA tasks, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.
4. In the **PowerVM** area, click **Hardware Virtualized I/O**. The **Hardware Virtualized I/O** page opens.
5. In the work pane, click the **HEA** tab.
6. To change an HEA adapter, complete the following steps:
    a) Select an HEA adapter from the list to display the port configuration.
    b) Click **Modify HEA Adapter**. The **Modify HEA Adapter** page opens. You can change the properties of the selected adapter, such as the Multi-Core Scaling (MCS) value for the port group. You can also view details about the port group ID, maximum logical ports, and configured logical ports.
    c) From the **HEA Port Groups** table, select a **Port Group MCS** from the list to change the MCS value.
    d) Click **OK**.
7. To change an HEA port, complete the following steps:
    a) Select an HEA adapter from the list to display the port configuration.

b) Right click and select **Modify Port**. The **Modify HEA Port** page opens.

c) The properties of the selected adapter port are listed. You can change the port speed, the actual maximum packet size that can be received by each physical port, and the duplex level for each physical port.

d) Click **OK** to apply the changes.

8. To view partitions that are associated with an HEA port, complete the following steps:

a) Select an HEA adapter from the list to display the port configuration.

b) Right click and select **View Partitions**. The **View HEA Port Partition Assignments** page opens, which displays the partitions table that lists the partitions that are assigned to the physical port.

c) Click **OK**.

Managing Host Channel Adapters (HCAs)

Host Channel Adapters (HCAs) provide port connections from a managed system to other devices. You can connect the port to another HCA, a target device, or a switch that redirects the incoming data from one port to a device that is attached to another port.

Before you begin

You can view a list of the HCAs on a server that is managed by the Hardware Management Console (HMC). You can select an HCA from the list to display the current partition usage for the HCA.

About this task

To view the current partition usage, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .

2. Click **All Systems**. The **All Systems** page is displayed.

3. In the work pane, select a system and click **Actions** > **View System Properties**. You can view and change the properties of the system that are listed under the **PowerVM** area.

4. In the navigation pane, click **Hardware Virtualized I/O**. The **Hardware Virtualized I/O** page is displayed.

5. In the work pane, click the **HCA** tab.

6. Click **Launch Manage Host Channel Adapters**. The HMC pane opens with the list of HCA in a table.

7. From the table, select an HCA to display the current partition usage for the selected HCA.

8. Click **OK**.

Managing SSP clusters by using the All Shared Storage Pool Clusters menu

With HMC version 8.40 or later, you can use the **All Shared Storage Pool Clusters** menu in the Hardware Management Console (HMC) to perform management tasks for the Shared Storage Pool (SSP) clusters in the Virtual I/O Server (VIOS).

To view the configuration details of shared storage pool clusters in the Virtual I/O Server (VIOS), by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers that are managed by the HMC), and the information about tiers and nodes assigned to them.

3. In the upper right of the window, click **Display Gallery View** or **Display Table View** to toggle between the table view and the gallery view.

You can manage the clusters that are listed or add additional clusters to your managed system. Select a cluster in the table to view the manage tasks and to remove the cluster from the table.

Viewing the SSP cluster configuration by using the All Shared Storage Pool Clusters menu

With HMC version 8.40 or later, you can view the configuration details of Shared Storage Pool (SSP) clusters by using the **All Shared Storage Pool Clusters** menu in the Hardware Management Console (HMC).

Procedure

To view the configuration details of shared storage pool clusters in the Virtual I/O Server (VIOS), by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers managed by the HMC), and the information about tiers and nodes assigned to them.

3. Select a Shared Storage Pool cluster from the table and click **Actions** > **View Shared Storage Pool cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.

   You can view the details of the tiers, the repository disk, and the nodes assigned to the cluster. From the cluster configuration page, you can replace the assigned repository disk, add or remove nodes, and perform the following actions on the assigned tiers:

   - Add a tier
   - Remove a tier
   - Remove the default tier
   - Rename a tier
   - Set a tier as default
   - Add capacity to the tier
   - Remove capacity from the tier
   - Enable mirroring
   - Disable mirroring
   - Modify threshold percentage
   - Restrict or unrestrict system tier

4. Click **Close**.

Adding an SSP cluster by using the All Shared Storage Pool Clusters menu

With HMC version 8.40 or later, you can add Shared Storage Pool (SSP) clusters by using the **All Shared Storage Pool Clusters** menu in the Hardware Management Console (HMC).

Procedure

To add shared storage pool clusters to a Virtual I/O Server (VIOS), by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers managed by the HMC).
3. Click **Add Shared Storage Pool Cluster**. The **Add Shared Storage Pool Cluster Wizard** opens.
4. Click **General Settings** tab.
   a) Enter a cluster name in the **Cluster Name** field.
   b) Enter a shared storage pool name in the **Shared Storage Pool** field.
   c) Under **Tier Capability**, select **Single tier capable** or **Multiple tier capable** to specify if you want the cluster to be single-tier or multitier capable. Multiple tier support provides a selection of resources, including Virtual I/O Servers that provide this feature. You can create the cluster and the system tier by using this wizard.
   d) Enter a tier name in the **System Tier Name** field.
   e) Enter the free space threshold percentage in the **Freespace Threshold %** field.
   f) Enter the overcommit threshold percentage in the **Overcommit Threshold %** field.
5. Click **Next** or click the **Nodes** tab.
   a) Select a node from the **Virtual I/O Server Cluster Nodes** table.
6. Click **Next** or click the **Repository Disk** tab.
   a) Select a disk from the **Cluster Repository Disks** table.
7. Click **Next** or click the **System Tier** tab.
   a) Select a physical volume from the **Physical Volumes** table.
   b) Select **Mirroring** and enter the names of the **Failure group 1** and **Failure group 2**. Mirroring enables you to assign physical volumes to the failure group 1 and failure group 2 that are contained by the tiers. The same data is replicated in both the failure groups. If you enable mirroring you can retrieve data when the data is lost from one failure group. To enable mirroring, you must assign the physical volumes in the table to the failure groups.

      Note: The system tier that is created in this wizard is unrestricted and it is the default tier.
8. Click **Next** or click the **Summary** tab. Verify that the shared storage pool cluster is added and complete one of the following steps:
   * Click **Back** to change the parameters.
   * Click **Finish** to add the shared storage pool cluster.

Adding tiers by using the All Shared Storage Pool Clusters menu

With HMC version 8.40 or later, you can add a tier to a Shared Storage Pool (SSP) clusters by using the **All Shared Storage Pool Clusters** menu in the Hardware Management Console (HMC).

Procedure

To add a tier to a Shared Storage Pool cluster, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers that are managed by the HMC).
3. Select a Shared Storage Pool cluster from the table and click **Actions** > **Add Tier**. Alternatively, you can add a tier from the cluster configuration page by clicking **Add Tier**. The **Add Tier** page opens.
4. Enter a tier name in the **Tier Name** field.
5. Enter the free threshold percentage and the overcommit threshold percentage in the **Free Threshold % ** field and the **Overcommit Threshold %** field.
6. Select **Mirroring** and enter the names of the **Failure group 1** and **Failure group 2**. Mirroring enables you to assign physical volumes to the failure group 1 and failure group 2 that are contained by the tiers. The same data is replicated in both the failure groups. If you enable mirroring you can retrieve data when the data is lost from one failure group. To enable mirroring, you must assign the physical volumes in the table to the failure groups.
7. In the **Physical Volumes** table, assign **Failure group 1** and **Failure group 2** to the required physical volumes to add storage capacity.
8. Click **OK**. A tier is added to the selected Shared Storage Pool cluster.

Adding nodes by using the All Shared Storage Pool Clusters menu

With HMC version 8.40 or later, you can add a node to a Shared Storage Pool (SSP) cluster by using the **All Shared Storage Pool Clusters** menu in the Hardware Management Console (HMC).

Procedure

To add a node to a Shared Storage Pool cluster, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers that are managed by the HMC).
3. Select a Shared Storage Pool cluster from the table and click **Actions** > **Add Nodes**. Alternatively, you can add a node from the cluster configuration page by clicking **Add Nodes** under the **Nodes** section. The **Add Nodes** page opens.
4. In the **Virtual I/O Server Cluster nodes** table, select the Virtual I/O Server nodes that you want to add to the Shared Storage Pool cluster.
5. Click **OK**. A cluster node is added to the selected Shared Storage Pool cluster.

Removing SSP clusters by using the All Shared Storage Pool Clusters menu

With HMC version 8.40 or later, you can remove a Shared Storage Pool (SSP) cluster by using the **All Shared Storage Pool Clusters** menu in the Hardware Management Console (HMC).

Procedure

To remove a shared storage pool cluster that is assigned to a managed system, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers that are managed by the HMC).
3. Select the cluster to be removed from the table and click **Actions** > **Remove Cluster**.

4. Click **OK** to confirm the removal of the cluster.

Changing SSP clusters by using the All Shared Storage Pool Clusters menu

With HMC version 8.40 or later, you can change a Shared Storage Pool (SSP) cluster by using the **All Shared Storage Pool Clusters** menu in the Hardware Management Console (HMC).

Changing the assignment of physical volumes in an SSP cluster

You can use the Hardware Management Console (HMC) to view and to change the assignment of physical volumes in a Shared Storage Pool (SSP) cluster.

Each Virtual I/O Server (VIOS) in the cluster requires at least one physical volume for the repository that is used by the Cluster Aware AIX (CAA) subsystem and one or more physical volumes for the storage pool.

When a cluster is created, you must specify one physical volume for the repository physical volume and at least one physical volume for the storage pool physical volume. The storage pool physical volumes are used to provide storage to the actual data generated by the client partitions. The repository physical volume is used to communicate with the cluster and store the cluster configuration. The maximum client storage capacity matches the total storage capacity of all storage pool physical volumes. The repository disk must have minimum 1 GB of available storage space. The physical volumes in the storage pool must have minimum 10 GB of available storage space in total.

You can use any method that is available for the storage area network (SAN) to create each physical volume with minimum 10 GB of available storage space. Map the physical volume to the partition Fibre Channel adapter for each VIOS in the cluster. The physical volumes must be mapped only to the VIOS that is connected to the shared storage pool.

After the physical volumes are allocated to a VIOS in the shared storage pool environment, the VIOS manages those physical volumes. You can change the capacity or allocation of physical volumes in a client partition.

Replacing a cluster repository disk by using the All Shared Storage Pool Clusters menu

With HMC version 8.40 or later, you can replace the assigned repository disk in a shared storage pool cluster by using the **All Shared Storage Pool Clusters** menu in the Hardware Management Console (HMC).

Procedure

To replace the cluster repository disk in a shared storage pool cluster by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers that are managed by the HMC).
3. Select a Shared Storage Pool cluster from the table and click **Actions** > **View Shared Storage Pool Cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.
4. Under the **Repository Disk** section click **Replace Disk**. The **Replace Shared Storage Pool Repository Disk** page opens.
5. Select a cluster repository disk, from the list of those disks that are available in the table to replace the repository disk that is currently assigned to the cluster.
6. Click **OK** to apply the changes.

Removing a node by using the All Shared Storage Pool Clusters menu

With HMC version 8.40 or later, you can remove a node from a shared storage pool cluster by using the **All Shared Storage Pool Clusters** menu in the Hardware Management Console (HMC).

Procedure

To remove a node from a shared storage pool cluster by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers that are managed by the HMC).
3. Select a Shared Storage Pool cluster from the table and click **Actions** > **View Shared Storage Pool Cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.
4. Under the **Nodes** section click **Remove Node**.
5. Click **OK** to confirm the removal of the node.
6. Click **OK** to apply the changes.

Managing tier tasks by using the All Shared Storage Pool Clusters menu

With HMC version 8.40 or later, you can manage tier tasks in a Shared Storage Pool (SSP) cluster by using the **All Shared Storage Pool Clusters** menu in the Hardware Management Console (HMC).

Removing a tier

To remove a tier from a shared storage pool cluster, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers that are managed by the HMC), and the information about tiers and nodes assigned to them.
3. Select an SSP cluster from the table and click **Actions** > **View Shared Storage Pool cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.
4. In the SSP cluster table, click the tier name. The tier configuration page opens.
5. Click **Actions** > **Remove Tier**.
6. Click **OK** to confirm the removal of a tier.

Removing the default tier

To remove a default tier from a shared storage pool cluster, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers that are managed by the HMC), with information about the tiers and nodes assigned to them.

3. Select an SSP cluster from the table and click **Actions** > **View Shared Storage Pool cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.

4. In the SSP cluster table, click the tier name that has *Default* as the suffix. The tier configuration page opens.

5. Click **Actions** > **Remove Default**.

6. Select another tier from the table to be the default tier.

7. Click **OK** to confirm the removal of the default tier.

Renaming a tier

To rename a tier in a shared storage pool cluster, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers that are managed by the HMC), with information about the tiers and nodes assigned to them.

3. Select an SSP cluster from the table and click **Actions** > **View Shared Storage Pool cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.

4. In the SSP cluster table, click the tier name. The tier configuration page opens.

5. Click **Actions** > **Rename Tier**. Alternatively, in the cluster configuration page, select **Actions** > **Rename Tier**. The **Rename Tier** page opens.

6. Enter a new name for the selected tier.

7. Click **OK**. The selected tier is renamed.

Setting another tier as default

To set another tier as default in a shared storage pool cluster, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers that are managed by the HMC), with information about the tiers and nodes assigned to them.

3. Select an SSP cluster from the table and click **Actions** > **View Shared Storage Pool cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.

4. In the SSP cluster table, click the tier name. The tier configuration page opens.

5. Click **Actions** > **Set as Default**. Alternatively, in the cluster configuration page, select **Actions** > **Set as Default**. The **Set Default Tier** page opens.

6. Click **OK** to confirm the removal of the default tier.

Adding storage capacity

To add storage capacity to a tier in a shared storage pool cluster, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers that are managed by the HMC), with information about the tiers and nodes assigned to them.

3. Select an SSP cluster from the table and click **Actions** > **View Shared Storage Pool cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.

4. In the SSP cluster table, click the tier name. The tier configuration page opens.

5. Click **Actions** > **Add Capacity**. Alternatively, in the cluster configuration page, select **Actions** > **Add Capacity**. The **Add Capacity** page opens.

6. In the **Physical Volumes** table, assign **Failure group 1** and **Failure group 2** to the required physical volumes to add storage capacity.

   Note: Failure group 1 and Failure group 2 are displayed only if the selected tier is mirrored. If the selected tier is not mirrored, you can see *Assigned* instead of Failure group 1 and Failure group 2.

7. Click **OK**. The storage capacity is added.

Removing storage capacity

To remove storage capacity to a tier in a shared storage pool cluster, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers that are managed by the HMC), with information about the tiers and nodes assigned to them.

3. Select an SSP cluster from the table and click **Actions** > **View Shared Storage Pool cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.

4. In the SSP cluster table, click the tier name. The tier configuration page opens.

5. Click **Actions** > **Remove Capacity**. Alternatively, in the cluster configuration page, select **Actions** > **Remove Capacity**. The **Remove Capacity** page opens.

6. In the **Physical Volumes** table, unassign **Failure group 1** or **Failure group 2** from the required physical volumes to remove storage capacity.

   Note: If the selected tier is mirrored, it displays the **Failure Groups** tab. If the tier is not mirrored you can see the **Physical Volumes** tab, instead of Failure Groups tab.

7. Click **OK**. The storage capacity is removed.

Enabling mirroring

To enable mirroring in a tier in a shared storage pool cluster, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers that are managed by the HMC), and the information about tiers and nodes assigned to them.

3. Select an SSP cluster from the table and click **Actions** > **View Shared Storage Pool cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.

4. In the SSP cluster table, click the tier name. The tier configuration page opens.

5. Click **Actions** > **Enable Mirroring**. Alternatively, in the cluster configuration page, select **Actions** > **Enable Mirroring**. The **Enable Mirroring** page opens.

6. Select the mirroring group and enter the names of **Failure group 1** or **Failure group 2** to be added. Mirroring enables you to assign physical volumes to the failure group 1 and failure group 2 that are contained by the tiers. The same data is replicated in both the failure groups. If you enable mirroring, you can retrieve data when the data is lost from one failure group. To enable mirroring, you must assign the physical volumes in the table to the failure groups.

7. Click **OK**.

Disabling mirroring

To disable mirroring in a tier in a shared storage pool cluster, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers that are managed by the HMC), with information about the tiers and nodes assigned to them.

3. Select an SSP cluster from the table and click **Actions** > **View Shared Storage Pool cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.

4. In the SSP cluster table, click the tier name. The tier configuration page opens.

5. Click **Actions** > **Disable Mirroring**. Alternatively, in the cluster configuration page, select **Actions** > **Disable Mirroring**. The **Disable Mirroring** page opens.

6. Select the mirroring group **Failure group 1** or **Failure group 2** to be removed.

7. Click **OK** to confirm the removal of the selected mirroring failure group.

Modifying thresholds

To modify threshold percentages in a tier in a shared storage pool cluster, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers that are managed by the HMC), with information about the tiers and nodes assigned to them.

3. Select an SSP cluster from the table and click **Actions** > **View Shared Storage Pool cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.

4. In the SSP cluster table, click the tier name. The tier configuration page opens.

5. Click **Actions** > **Modify Threshold**. Alternatively, in the cluster configuration page, select **Actions** > **Modify Threshold**. The **Modify Thresholds** page opens.

6. Enter the free threshold percentage and the overcommit threshold percentage in the **Free Threshold %** field and the **Overcommit Threshold %** field to modify the existing values.

7. Click **OK**. The threshold percentages are modified.

Restricting or unrestricting the system tier

To restrict or unrestrict the system tier in a shared storage pool cluster, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers that are managed by the HMC), with information about the tiers and nodes assigned to them.
3. Select an SSP cluster from the table and click **Actions** > **View Shared Storage Pool cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.
4. In the cluster configuration page, select **Actions** > **(Un)Restrict**. The **Restrict/Unrestrict System Tier** page opens.

   Note: Restricting the system tier removes the ability to store user data on the system tier. Existing data is not affected. While, unrestricting the system tier enables user data to be stored on the system tier.
5. Click **OK** to confirm the restriction or unrestriction of the system tier.

Renaming failure groups by using the All Shared Storage Pool Clusters menu

With HMC version 8.40 or later, you can rename failure groups by using the **All Shared Storage Pool Clusters** menu in the Hardware Management Console (HMC).

To rename a failure group assigned to a tier in a shared storage pool cluster, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers managed by the HMC), and the information about tiers and nodes assigned to them.
3. Select an SSP cluster from the table and click **Actions** > **View Shared Storage Pool cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.
4. In the SSP cluster table, click the tier name. The tier configuration page opens.
5. In the **Failure Groups** tab, click **Rename FG**. The **Rename Failure Group** page opens.
6. Enter a failure group name in the **New Failure Group Name** field.
7. Click **OK**. The failure group is renamed.

Managing SSP physical volumes by using the All Shared Storage Pool Clusters menu

With HMC version 8.40 or later, you can manage physical volumes in a Shared Storage Pool (SSP) cluster by using the **All Shared Storage Pool Clusters** menu in the Hardware Management Console (HMC).

Replacing an SSP physical volume

To replace the existing shared storage pool (SSP) physical volume in a shared storage pool cluster, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers managed by the HMC), and the information about tiers and nodes assigned to them.

3. Select an SSP cluster from the table and click **Actions** > **View Shared Storage Pool cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.

4. In the SSP cluster table, click the tier name. The tier configuration page opens.

5. In the **Failure Groups** tab, click **Replace Disk**. The **Replace Shared Storage Pool Physical Volume** page opens.

6. Select the new physical volume from the table to replace the existing physical volume that is assigned to the SSP cluster. The replaced disk is free to be used for other assignments.

   Note: Ensure that at least one free physical volume, which has more size than the physical volume that is being replaced, is available.

7. Click **OK**. The physical volume is replaced.

Migrating an SSP volume to a different tier

To migrate the shared storage pool (SSP) volume to a different tier in a shared storage pool cluster, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers managed by the HMC), with information about the tiers and nodes assigned to them.

3. Select an SSP cluster from the table and click **Actions** > **View Shared Storage Pool cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.

4. In the SSP cluster table, click the tier name. The tier configuration page opens.

5. In the **Shared Storage Pool Volumes** tab, click **Actions** > **Migrate to Different Tier**. The **Migrate Shared Storage Pool Volume to a different tier** page opens.

6. Select the destination tier where you want the SSP tier to be migrated. The destination tier must have enough storage space to accommodate the new tier. Depending on the size of the SSP volume, the migration might take some time to complete.

   Note: Ensure that at least one data tier or unrestricted system tier that is configured in the SSP is available, before you migrate to a different tier.

7. Click **OK**. The SSP volume is moved to a different tier.

Increasing SSP volume size

To increase the size of a shared storage pool (SSP) physical volume, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers managed by the HMC), with information about the tiers and nodes assigned to them.

3. Select an SSP cluster from the table and click **Actions** > **View Shared Storage Pool cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.

4. In the SSP cluster table, click the tier name. The tier configuration page opens.

5. In the **Shared Storage Pool Volumes** tab, click **Actions** > **Increase size**. The **Increase Shared Storage Pool Volume Size** page opens.

6. Enter a new storage size for the selected physical volume.

7. Click **OK**. The storage size of the selected physical volume is increased.

Removing unassigned SSP volume

To remove an unassigned shared storage pool (SSP) volume a shared storage pool cluster, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers managed by the HMC), with information about the tiers and nodes assigned to them.

3. Select an SSP cluster from the table and click **Actions** > **View Shared Storage Pool cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.

4. In the SSP cluster table, click the tier name. The tier configuration page opens.

5. In the **Shared Storage Pool Volumes** tab, click **Actions** > **Remove**. The **Remove Unassigned Shared Storage Pool Volume** page opens.

6. Click **OK** to confirm the removal of the unassigned SSP volume.

Viewing assigned partitions

To view all assigned partitions to an share storage pool (SSP) volume in a shared storage pool cluster, by using the HMC, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Shared Storage Pool Clusters**. The **All Shared Storage Pool Clusters** table is displayed. The table lists all clusters that can be accessed by the HMC (all servers managed by the HMC), with information about the tiers and nodes assigned to them.

3. Select an SSP cluster from the table and click **Actions** > **View Shared Storage Pool cluster**. Alternatively, you can click the cluster name to view the configuration details for that SSP cluster. The cluster configuration page opens.

4. In the SSP cluster table, click the tier name. The tier configuration page opens.

5. In the **Shared Storage Pool Volumes** tab, select **Show Assignment**. The partitions assigned to the SSP volumes are displayed in the table.

Managing partitions (logical partitioning)

Partitioning is the ability to make a server run as if it were two or more independent servers. When you logically partition a server, you divide the resources on the server into subsets called partitions. You can install software on a partition, and the partition runs as an independent logical server with the resources that you allocated to the partition. You can create a maximum of 1000 partitions on some servers. However, the maximum number of partitions on a server varies depending on the server configuration.

Partitions help you efficiently use system resources and increase configuration possibilities. You can use partitions to reduce the footprint of your data center by consolidating servers and maximize the use of system resources by sharing resources among multiple partitions.

You can manage the configuration of partitions and the hardware resources that are allocated to each partition by using the Manage PowerVM and Manage partition functions in the Hardware Management Console (HMC).

Note: You must activate the partition or apply the partition configuration at least once before you plan to use the Manage partition functions.

You can perform partition management functions, such as assigning processors, memory, and I/O devices to partitions, by accessing the options listed under the Properties area of the HMC graphical user interface.

You can complete most configuration updates while the partition is running.

You can run AIX, IBM i, or Linux operating systems on partitions.

Activating partitions

You can activate an IBM i, AIX, or a Linux partition by using the Hardware Management Console (HMC).

Based on which partition you want to activate, complete the steps in either the "Activating IBM i partitions" on page 60 topic or the "Activating AIX or Linux partitions" on page 61 topic. You can set the activation options to activate or network boot a partition.

Note: The partition that you choose to activate must be in the **Not Activated** state. If you select a partition that is in other states, the **Activate** option is not displayed.

Activating IBM i partitions

You can activate or network boot an IBM i partition by using the Hardware Management Console (HMC).

About this task
To activate or network boot an IBM i partition by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**.

   The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Partitions**. In the **Partitions** page, you can view all the partitions that belong to the system.
4. To view the **Activate <IBM i partition name>** wizard, choose one of the following options:

   - In the work pane, select the partition that you want to activate and click **Actions** > **Activate**. The **Activation** wizard is displayed.
   - In the work pane, click on the partition name that you want to activate. The partition properties page opens. Click **Partition Actions** > **Operations** > **Activate**. The **Activation** wizard is displayed.
5. From the **Partition Configuration** list, select the required partition configuration profile.

   You can select only the profile that is associated to the selected partition. When you create a partition a default profile is always associated to the partition. This is indicated with the profile name being followed by **default** in parentheses.

   Note: If you choose **Current Configuration**, the **Advanced Settings** are unavailable.
6. From the **Activation Options** list, select the activation option for the partition.

   - Select **Activate** to activate the partition.

     Note: If you select **Activate**, the **Next** button is not available and you can only click **Finish** to activate and close the wizard after making all your choices in the wizard.

- Select **Network Boot** to install the operating system on the partition. Alternatively, you can select the logical partition that you want to network boot from the work pane and click **Actions** > **Netboot**. The **Network Boot** wizard is displayed. Click **Next** to configure the network settings for the logical partition.

7. Click **Advanced Settings** if you want to view and modify the following options for the selected partition:

   - **Keylock Position** establishes the power-on and power-off modes for the system. You can select the following keylock values - Do not override configuration, Manual (attended), and Normal (unattended).

     ⚠️ **Attention:** The **Manual** (attended) value is not preferred value for security reasons.

   - **IPL Type** determines the copy of programs that are used by your system during initial program load (IPL).

   - **Open 5250 console** establishes a console session using the HMC 5250 emulator. This option is available only on the HMC local console and is not available on the HMC remote console.

   - **Use VSI Profile** activates the partition with Virtual Station Interface (VSI) profiles.

     Note: If the VSI attributes are not set correctly, the activation fails.

8. If you selected **Activate** from the **Activation Options** list, click **Finish** to activate the IBM i partition and close the activation wizard.

9. If you selected **Network Boot** from the **Activation Options** list, click **Next**. The **Network Settings** page opens.

10. In the **Network Settings** page, configure network adapter settings for the partition by using the following options:

    - **IPv4 or IPv6 address** to use the IPv4 or IPv6 server and client address.

    - **Boot Server IP address** to specify the IP address of the boot server that contains the network installation image for a partition. If you select **IPv4**, you must also specify the other details, such as the subnet mask and the default gateway. If you select **IPv6** you must specify the required **IPv6** settings for your system.

11. Click **Advanced Settings** to view and change the following network configuration settings for the selected partition:

    a) From the **Adapter Speed** list, select the speed of the Ethernet adapter for the target partition. By default, **Auto** is selected to enable the system to determine the required speed for the adapter. You can also select the following values - **10**, **100**, or **1000**.

    b) From the **Adapter Duplex** list, select duplex value for the Ethernet adapter. By default, **Auto** is selected to enable the system to determine the required duplex for the adapter. You can also select the **Full** or **Half** values.

    c) In the **VLAN Tag Identifier** field, specify a valid value for the virtual local area network (VLAN) tag identifier. The valid value is in the range 1 - 4094. This is an optional parameter and it is displayed only if the managed system is capable of the VLAN tagging function for the IBM i partition network boot.

12. Click **Finish** to activate with the selected network boot settings and to close the activation wizard.

Activating AIX or Linux partitions

You can activate or network boot an AIX or a Linux partition by using the Hardware Management Console (HMC).

About this task
To activate and network boot an AIX or a Linux partition by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**.

   The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Partitions**. In the **Partitions** page, you can view all the partitions that belong to the system.
4. To view the **Activate <AIX / Linux partition name>** wizard, choose one of the following options:

   • In the work pane, select the partition that you want to activate and click **Actions** > **Activate**. The **Activation** wizard is displayed.

   • In the work pane, click the partition name that you want to activate. The partition properties page opens. Click **Partition Actions** > **Operations** > **Activate**. The **Activation** wizard is displayed.
5. From the **Partition Configuration** list, select the required partition configuration profile.

   You can select only the profile that is associated to the selected partition. When you create a partition a default profile is always associated to the partition. This is indicated with the profile name being followed by **default** in parentheses.

   Note: If you choose **Current Configuration**, the **Advanced Settings** are unavailable.
6. From the **Activation Options** list, select the activation option for the partition.

   • Select **Activate** to activate the partition.

     Note: If you select **Activate**, the **Next** button is not available. You can only click **Finish** to activate and close the wizard, after making all your choices in the current screen.

   • Select **Network Boot** to install the operating system on the partition. Alternatively, you can select the logical partition that you want to network boot from the work pane and click **Actions** > **Netboot**. The **Network Boot** wizard is displayed. Click **Next** to configure the network settings for the logical partition.
7. Click **Advanced Settings** if you want to view and modify the following options for the selected partition:

   • **Keylock Position** establishes the power-on and power-off modes that are allowed for the system. You can select the following keylock values - Do not override configuration, Manual (attended), and Normal (unattended).

     ⚠ **Attention:** The **Manual** (attended) value is not preferred value for security reasons.

   • **Boot Mode** indicates the activation type for a partition. This activation type is applicable only for AIX, Linux, or Virtual I/O Server partitions. This option is not displayed for IBM i partitions.

   • **Open vterm** opens a virtual terminal console.

   • **Use VSI Profile** activates the partition with Virtual Station Interface (VSI) profiles.

     Note: If the VSI attributes are not set correctly, the activation fails.
8. If you selected **Activate** from the **Activation Options** list, click **Finish** to activate the AIX or the Linux partition and close the activation wizard.
9. If you selected **Network Boot** from the **Activation Options** list, click **Next**. The **Network Settings** page opens.
10. In the **Network Settings** page, configure network adapter settings for the partition by using the following options:

    • **IPv4 or IPv6 address** to use the IPv4 or IPv6 server and client address.

    • **Boot Server IP address** to specify the IP address of the boot server that contains the network install image for a partition. If you select **IPv4**, you must also specify the other details, like the

subnet mask and the default gateway. If you select **IPv6** you must specify the required **IPv6** settings for your system.

11. Click **Advanced Settings** to view and change the following network configuration settings for the selected partition:

   a) From the **Adapter Speed** list, select the speed of the Ethernet adapter for the target partition. By default, **Auto** is selected to enable the system to determine the required speed for the adapter. You can also select the following values - **10**, **100**, or **1000**.

   b) From the **Adapter Duplex** list, select duplex value for the Ethernet adapter. By default, **Auto** is selected to enable the system to determine the required duplex for the adapter. You can also select the **Full** or **Half** values.

12. Click **Finish** to activate with the selected network boot settings and to close the activation wizard.

Managing partitions

You can view and change the properties of partitions by using the Hardware Management Console (HMC).

You can view and change the following properties of a partition:

- General properties and capabilities
- Processor
- Memory
- Persistent Memory
- Physical I/O adapters

Changing partition properties and capabilities

You can view and change the partition name, view general properties of the partition, and change the virtualization capabilities by using the Hardware Management Console (HMC).

Before you begin

You can view the following general properties:

- Type, version, and IP address of the operating system.
- Machine type and serial number of the system.
- Resource configuration of a logical partition. It indicates whether all the resources that are necessary to activate the partition are available. When the **Resource Configuration** field displays **Configured**, the partition can be activated by using the current configuration. When the **Resource Configuration** field displays **Not Configured** and the partition has a last valid configuration profile, that profile is used to activate the partition. Otherwise, the partition can be activated by using a profile.

Note: When a user, who has access to the partition but does not have access to the partition profile tries to view the properties of the partition, the user is prompted to **Apply Partition Configuration**, before proceeding to view and manage the partition.

You can view or change the partition name and keylock position, add a description, and assign group tags. Additionally, if the managed system supports virtual serial number (VSN) and the managed system is not in the Enterprise Pool 2.0, you can view and manage the virtual serial number for the logical partition.

Virtualization capabilities of a partition include the following features:

Live partition mobility
Live Partition Mobility is a component of the PowerVM Enterprise Edition hardware feature that enables moving AIX, IBM i, and Linux partitions from one system to another. The mobility process transfers the system environment, including the processor state, memory, attached virtual devices, and connected users.

With the active partition mobility feature, you can move AIX, IBM i, and Linux partitions that are running, including the operating system and applications, from one system to another. The partition and the applications that run on that migrated partition do not need to be shut down.

With the inactive partition mobility feature, you can move a powered off AIX, IBM i, or Linux partition from one system to another. For more information on live partition mobility, see Partition Mobility.

You cannot migrate an IBM i partition that is configured with SR-IOV logical ports when the IBM i partition is in the **Restricted I/O Partition** mode.

You cannot migrate a logical partition that is configured with virtual Persistent Memory (PMEM) devices.

Simplified Remote Restart

When this capability is enabled, the partition state and partition configuration data is automatically stored on an HMC that manages the server. Any change to the partition configuration or profile is automatically synchronized with the data that is stored on the HMC. You can enable or disable the simplified remote restart capability only when the partition is in an inactive state.

Note: When the HMC is at Version 8.6.0, or later, and the firmware is at level FW860, or later, you can enable or disable the simplified version of the remote restart capability when the logical partition is in the Running state. The logical partition must not be in the Suspended, Resuming, Migrating, or Remote Restarting states.

This option is available only when the server is enabled with PowerVM Enterprise Edition and the level of firmware on your server supports the simplified remote restart capability. If a managed system is **PowerVM Partition Simplified Remote Restart Capable**, the page displays the option to manage a simplified remote restart partition only.

The partition and profile data, referred to as remote restart data, is stored on the HMC hard drive for partitions that are simplified remote restart capable. For more information on the different states of the remote restart operation, see Remote Restart State.

You cannot enable the **Simplified Remote Restart** (SRR) capability if the SR-IOV logical ports are already assigned to an IBM i partition that is in the **Restricted I/O Partition** mode.

You cannot enable the **Simplified Remote Restart** (SRR) capability if the logical partition is configured with virtual Persistent Memory (PMEM) devices.

Note: If the system key for encrypting the platform keystore data is not a user-defined key, then you cannot create a logical partition with both the platform keystore and simplified remote restart (SRR) capabilities enabled.

About this task

To view and change the properties and capabilities of the partition by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** area, click **Properties** > **General Properties** to view and change the properties of the selected partition.
5. Enter a name in the **Partition Name** field to change the name of the partition.
6. Select the **Key Lock Position** to be either **Manual** or **Normal**.
7. Enter an optional description in the **Description** field to further identify the logical partition.

8. In the **Group Tags** field, select from the list of available tag assignments for the groups to which the partition belongs. If the partition does not belong to any group, the group tags list is empty.

9. If the managed system supports virtual serial number (VSN) and the managed system is not in the Enterprise Pool 2.0, you can view and manage the virtual serial number for the logical partition in the **Virtual Serial Number** field as described in the following sections:

   a) When the logical partition is in **Running** state, you can only view the virtual serial number. If the virtual serial number is assigned to the logical partition, the **Virtual Serial Number** field displays the virtual serial number. **No VSN** is displayed in the **Virtual Serial Number** field if the virtual serial number is not assigned to the logical partition.

   b) When the logical partition is in **Not activated** state, you can view and modify the virtual serial number.

      • If the virtual serial number is assigned to the logical partition, the **Virtual Serial Number** field displays the virtual serial number. Click and enable the **No VSN** check box if you do not want to assign the virtual serial number to the logical partition.

      • If the virtual serial number is not assigned to the logical partition, the **Virtual Serial Number** field displays the following options:

         – **No VSN**: Select **No VSN** option if you do not want to assign the virtual serial number to the logical partition.

         – **Auto-assign**: Select **Auto-assign** option if you want the system to automatically assign a virtual serial number to the logical partition.

         – **Select from pool**: Choose the **Select from pool** option if you want to manually assign a virtual serial number to the logical partition. Click **Select VSN** to open the **Virtual Serial Numbers** window. The window lists the virtual serial number groups and the available virtual serial number that can be assigned to the logical partition. Select a virtual serial number from the list. Click **OK** to apply the changes. Alternatively, click **Cancel** to reject the changes and to close the window.

   Note: When the Power® firmware is at level FW950 and if the managed system already have logical partitions to which the virtual serial number is assigned, the logical partition cannot be added to the Enterprise Pool 2.0. Alternatively, if the managed system is already in the Enterprise Pool 2.0, then the managed system cannot assign a virtual serial number to the logical partition.

10. Click **Save** to apply the changes. Alternatively, click **Cancel** to reject the changes and to close the page.

Disabling Live Partition Mobility
You can disable the Live Partition Mobility feature of a logical partition by using the Hardware Management Console (HMC).

About this task
The HMC provides the **Disable Migration** option to disable the Live Partition Mobility feature at a logical partition level. This option can be used by customers to address application licensing requirements of Independent Software Vendors (ISV). To disable the Live Partition Mobility feature for a logical partition by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .

2. Click **All Systems**. The **All Systems** page is displayed.

3. In the work pane, select the partition for which you want to disable the Live Partition Mobility feature and click **Actions** > **View Partition Properties**.

4. In the **Properties** area, click **Properties** > **General Properties**.

5. Click the **Advanced** tab and in the **Advanced settings** area, select the **Disable Migration** check box.
6. Click **Save**.

Some Independent Software Vendors might require you to purchase a license for all systems where their application can be migrated. Rather than disabling the Live Partition Mobility feature at a system level, IBM provides this logical partition level mechanism that can be audited, to disable migration to address ISV licensing requirements while preserving the ability to leverage migration for applications running on other logical partitions on the system.

Note: IBM software does not stipulate such licensing requirements.

The **Disable Migration** option is supported on all firmware versions, and when the system is managed by an HMC that is at version 8.4.0, or later. Also, you can run the **chsyscfg** command with a value 1 for the *migration_disabled* attribute, from the HMC command line. To disable the Live Partition Mobility feature of a logical partition during partition creation, run the **mksyscfg** command with a value 1 for the *migration_disabled* attribute, from the HMC command line. The **Disable Migration** option is also supported by the Representational State Transfer (REST) application programming interfaces (APIs).

Note: PowerVM NovaLink supports the **Disable Migration** option when the system is co-managed by an HMC. However PowerVM NovaLink does not provide an option to disable Live Partition Mobility feature.

Viewing system event logs for the Live Partition Mobility disable operation

Any changes that are made to the **Disable Migration** option provided by the Hardware Management Console (HMC) is logged as a system event, and can be checked for auditing purposes. A system event is also logged when the remote restart or simplified remote restart capability is set. The system event logs are read only and cannot be modified.

A system event is logged when the following actions occur:

- The remote restart, simplified remote restart, or Live Partition Mobility attributes are set during creation of a logical partition.
- The remote restart, simplified remote restart, or Live Partition Mobility attributes are changed.
- When you restore profile data. For more information about restoring profile data, see Restoring profile data.

You can view the system events by running the **lssvcevents** command from the HMC command-line interface. You can also view the system events by using the graphical user interface (GUI). For more information about using the GUI, see Console Events Logs. By running the **chhmc** command from the HMC command-line interface, these system events can also be sent to a remote server that is on the same network as the HMC.

The following system events can be logged:

Table 2. Event ID and the corresponding message string	
Event ID	**Event message String**
2420	User name {0}: Disabled partition migration for partition {1} with ID {2} on managed system {3} with MTMS{4}
2421	User name {0}: Enabled partition migration for partition {1} with ID {2} on managed system {3} with MTMS{4}
2422	User name {0}: Disabled Simplified Remote Restart for partition {1} with ID {2} on managed system {3} with MTMS{4}
2423	User name {0}: Enabled Simplified Remote Restart for partition {1} with ID {2} on managed system {3} with MTMS{4}
2424	User name {0}: Disabled Remote Restart for partition {1} with ID {2} on managed system {3} with MTMS{4}

Table 2. Event ID and the corresponding message string (continued)	
Event ID	**Event message String**
2425	User name {0}: Enabled Remote Restart for partition {1} with ID {2} on managed system {3} with MTMS{4}

The following are examples of System Events:

- Command to check which logical partitions managed by an HMC have the Live Partition Mobility feature disabled or enabled:

```
lssvcevents -t console | grep vclient
```

The following examples show a sample output of the **lssvcevents** command:

```
time=10/30/2015 10:11:32,text=HSCE2521 UserName hscroot: Enabled partition migration for
partition
vclient10 with Id 10 on Managed system ct05 with MTMS 8205-E6D*1234567.
```

```
time=10/30/2015 10:01:35,text=HSCE2520 UserName hscroot: Disabled partition migration for
partition
vclient9 with Id 9 on Managed system ct05 with MTMS 8205-E6D*1234567.
```

- Command to check which logical partitions managed by an HMC have the Live Partition Mobility feature disabled:

```
lssvcevents -t console | grep HSCE2520
```

The following example shows a sample output of the **lssvcevents** command:

```
time=10/30/2015 10:01:35,text=HSCE2520 UserName hscroot: Disabled partition migration for
partition
vclient9 with Id 9 on Managed system ct05 with MTMS 8205-E6D*1234567.
```

- Command to check which logical partitions managed by an HMC have the Live Partition Mobility feature disabled or enabled for a particular system (1234567):

```
lssvcevents -t console | grep  "partition migration for partition" | grep 1234567
```

The following examples show a sample output of the **lssvcevents** command:

```
time=10/30/2015 10:11:32,text=HSCE2521 UserName hscroot:  Enabled partition migration for
partition
vclient10 with Id 10 on Managed system ct05 with MTMS 8205-E6D*1234567.
```

```
time=10/30/2015 10:01:35,text=HSCE2520 UserName hscroot: Disabled partition migration for
partition
vclient9 with Id 9 on Managed system ct05 with MTMS 8205-E6D*1234567.
```

- Command to check whether a specific logical partition (vclient9) in a specific system (1234567) managed by an HMC has the Live Partition Mobility feature disabled or enabled:

```
lssvcevents -t console | grep  "partition migration for partition vclient9" | grep 1234567
```

The following example shows a sample output of the **lssvcevents** command:

```
time=10/30/2015 10:01:35,text=HSCE2520 UserName hscroot: Disabled partition migration for
partition
vclient9 with Id 9 on Managed system ct05 with MTMS 8205-E6D*1234567
```

Changing advanced partition settings

You can view and change advanced settings of a partition by using the Hardware Management Console (HMC).

Before you begin

The advanced settings for a partition include the following options:

Enable connection monitoring
Monitors the connection between the partition and the HMC.

Enable redundant error path information
If you enable the redundant error-path reporting, the partition reports common server hardware errors and partition hardware errors to the HMC. If you disable redundant error-path reporting, the partition reports only partition hardware errors to the HMC. If you want to move a partition, disable the redundant error-path reporting.

Enable time reference
Synchronize the PowerVM Hypervisor and Service Processors time-of-day based on the time-of-day setting of the concerned partition and other Time Reference partitions.

Disable migration
You can disable the Live Partition Mobility feature for an AIX, Linux, or IBM i partition.

Service partition

Indicates whether the partition is the service partition for the managed system. The service partition is the IBM i logical partition on an IBM System i® managed system that you can configure to apply server firmware updates to the service processor or to the Hypervisor and to communicate server common hardware errors to IBM. These abilities are useful if the HMC is undergoing maintenance or is otherwise unable to perform these functions. You must change the service partition on the managed system through the managed system properties.

Enable virtualized trusted platform module (VTPM)
With the HMC Version 7 Release 7.4.0, or later, and IBM POWER7® processor-based servers with firmware at level 7.4, or later, you can enable the virtual trusted platform module (VTPM) on an AIX or Linux partition. A partition that is VTPM enabled supports the Trusted Boot capability. Trusted Boot is a capability that is supported on the Power Security and Compliance (PowerSC) Standard Edition. Up to 60 partitions per server can be configured to have their own unique VTPM by using the HMC. The VTPM is used to record the system boot and, in association with the AIX Trusted Execution technology, provides security and assurance of the boot image on disk, on the entire operating system, and in the application layers.

Tagged I/O Settings

You can view, configure and specify the exact I/O devices that you want to use for a logical partition to perform specific functions.

Note: You cannot activate a logical partition if the SR-IOV logical ports are configured as a primary load source or an alternate load source in the **Tagged I/O Settings**.

Enable performance information collection
Enable the operating system on a partition to collect performance information.

Restricted I/O Mode SR-IOV Logical Port Assignment Capable
When the HMC is at version V9.1.940, or later, when the firmware is at level FW940, or later, and when the partition is running the latest version of IBM i, the HMC supports assignment of SR-IOV logical ports to IBM i partitions that are in the **Restricted I/O Partition** mode. In the **Advanced** settings area, the **Restricted I/O Mode SR-IOV Logical Port Assignment Capable** field is displayed.

The **Restricted I/O Mode SR-IOV Logical Port Assignment Capable** field displays the following values:

- **Supported**: If this value is displayed in the **Restricted I/O Mode SR-IOV Logical Port Assignment Capable** field, it means that the server allows the SR-IOV logical ports to be assigned to the IBM i partitions that are in the **Restricted I/O Partition** mode.

- **Unsupported**: If this value is displayed in the **Restricted I/O Mode SR-IOV Logical Port Assignment Capable** field, it means that the server does not allow the SR-IOV logical port to be assigned to the IBM i partitions that are in the **Restricted I/O Partition** mode.
- **Unavailable**: If this value is displayed in the **Restricted I/O Mode SR-IOV Logical Port Assignment Capable** field, it means that no information is available because the IBM i partition has never been activated.

Note: The **Restricted I/O Mode SR-IOV Logical Port Assignment Capable** field is displayed only for the IBM i partitions. The IBM i partition must be activated at least once to know the exact value in the **Restricted I/O Mode SR-IOV Logical Port Assignment Capable** field.

Restricted I/O partition
Determines whether an IBM i partition can be migrated by using the Live Partition Mobility (LPM) feature. You can migrate the IBM i partition only if you select the **Restricted I/O Partition** option. On servers that do not support the IBM i partitions with native I/O capability, you must always enable this option. The IBM i native I/O capability of the server is available on the **Licensed Capabilities** page. This option can be enabled only when the partition is stopped.

Note: The Restricted I/O partition setting is applicable only to IBM i partitions.

OptiConnect
A feature of the IBM i operating system that allows a user to connect multiple System i systems by using SPD bus, high-speed link (HSL) loop, or virtual interpartition technologies. This option can be enabled only when the partition is stopped.

Enable Electronically report errors that cause partition termination or require attention
Select this option to set the HMC to send an electronic report to service and support whenever this IBM i logical partition terminates abnormally or encounters an error that requires service. (The HMC does not report errors that requires user intervention.) Use this feature to enable automatic service calls for IBM i logical partitions that run mission-critical applications. This field displays only for IBM i logical partitions.

Platform KeyStore
When you are using HMC version 9.2.950, or later, and when the firmware is at level FW950, you can view and manage the platform keystore size that is used to save the partition key data. When the managed system is in **stand-by** or **operating** state, you can view and specify the platform keystore size. You cannot decrease the platform keystore size for a logical partition. If the platform keystore does not contain any data, you can specify the value **0** in the **KeyStore Size** field to disable the platform keystore feature. You can enable or increase the platform keystore size only when the logical partition is in the **Not activated** state.

Note: When the logical partition is enabled with the platform keystore and simplified remote restart (SRR) features, and if you want to change the system key from a user-defined key to a default system key, then you must manually disable either the platform keystore or the SRR feature on the logical partition.

Note: If the system key for encrypting the platform keystore data is not a user-defined key, then you cannot create a logical partition with both the platform keystore and simplified remote restart (SRR) capabilities enabled.

Supported hardware accelerator types
The **Supported Hardware Accelerator Types** table is displayed only if the managed system has user-mode hardware accelerator for PowerVM®. You can specify the GZIP Quality of Service (QoS) credits for a logical partition. The HMC sets the QoS, if sufficient credits are available for the managed system. The logical partition uses these credits to access the shared hardware accelerators. The following are the prerequisites for a logical partition to receive QoS credits.

- The managed system supports hardware accelerator enablement.
- The managed system supports the GZIP hardware accelerator type.
- QoS enablement must be supported at the operating system level.
- The managed system has sufficient hardware accelerator QoS credits to assign to the partition.

- The logical partition must be either an AIX, Linux, or a VIOS partition.

About this task

To view and change the advanced settings of the partition, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** area, click **Properties** > **General Properties** to view and change the properties of the selected partition.
5. Click the **Advanced** tab. The **Advanced Settings** options are displayed.
6. To enable the advanced settings in the selected partition, select the following options:
   a) **Enable Connection Monitoring** to monitor the connection.
   b) **Enable Redundant Error Path Reporting** to report common server hardware errors and partition hardware errors.
   c) **Enable Time Reference**
   d) **Service Partition**
   e) **Disable Migration** to disable the Live Partition Mobility feature for an AIX, Linux, or IBM i partition.
   f) **Restricted I/O Partition**
   g) Specify a value in the **Maximum Virtual Adapters** field.
   h) **Enable Virtualized Trusted Platform Module (VTPM)** to record the system boot and to provide security and assurance of the boot image on disk, on the entire operating system, and in the application layers.
   i) **Tagged I/O Settings** - In the **Advance** settings area, click the **Tagged I/O Settings** tab if you want to view or configure the I/O devices that you want to use for a logical partition. The **Tagged I/O Device Details** window is displayed.
      - Select the load source that must be used by the system to start the logical partition from the **Load Source** list.
      - Select an alternate device from the **Alternative Restart Device** list.
      - Select the console from the **Console** list.
      - Select an alternate console from the **Alternate Console** list.
      - Select the operations console from the **Operations Console** list.
      - Click **OK** to apply the changes. Alternatively, click **Cancel** to reject the changes and to close the window.
   j) **Enable Performance Information Collection**
   k) **Enable electronically report errors that cause partition termination or require attention**
7. From the **Save configuration changes** list, select one of the following options:
   a) **Enabled** to apply and save the settings that you made on the partition.
   b) **Disabled** to cancel the settings that you made on the partition.
   c) **Disabled until next activate or apply** to temporarily disable the settings that you made and to apply the settings later when you activate the partition.
8. In the **Supported Hardware Accelerator Types** table, specify a value in the **QoS** field.

9. From the **Secure Boot** list, select an option. The options are **Disabled**, **Enabled and Log only**, or **Enabled and Enforced**.

10. Specify a value in the **KeyStore Size** field.

11. Click **Save** to apply the changes. Alternatively, click **Cancel** to reject the changes and to close the page.

Validating the configuration of a logical partition before the migration operation

You can use the validation function on the Hardware Management Console (HMC) to validate the configuration of a logical partition before starting the migration operation. If you are using HMC V9.1.940, or later, and when the firmware is at level FW940, or later, you can validate a logical partition that is configured with Single Root I/O Virtualization (SR-IOV) logical ports.

About this task
To validate the configuration of a logical partition before starting the migration operation, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .

2. Click **All Partitions**. Alternatively, click **All Systems**. In the work pane, click the server name that has the logical partition.

3. Click **View System Partitions**. The **All Partitions** page is displayed.

4. In the work pane, select the logical partition and click **Actions** > **Mobility** > **Validate**. The **Partition Migration Validation** window is displayed.

5. Follow the steps in the **Partition Migration Validation** window.

6. You can use the **Only migrate SR-IOV logical ports when possible** option to validate or migrate a logical partition that is configured with SR-IOV logical ports.

   - When the **Only migrate SR-IOV logical ports when possible** check box is enabled, the HMC performs the following task:

     – The HMC fails the validation or migration operation if the HMC cannot find an SR-IOV physical port to re-create any of the source SR-IOV logical ports that are migratable before the client logical partition is moved to the destination system.

     – If the client logical partition is already moved to the destination system and if the re-creation of the migratable SR-IOV logical ports on the destination system fails, the HMC does not move the client logical partition back to the source system. You can dynamically add the migratable SR-IOV logical ports on the client logical partition after the migration operation completes.

   - When the **Only migrate SR-IOV logical ports when possible** check box is disabled, the HMC performs the following task:

     – The HMC does not fail the validation or migration operation even if the HMC cannot find an SR-IOV physical port to re-create any of the migratable SR-IOV logical ports on the source system. Also, the HMC does not attempt to re-create those SR-IOV logical ports. You can dynamically add the migratable SR-IOV logical ports on the client logical partition after the migration operation completes.

   Note: When the HMC is at Version 9.1.940.x, and when the firmware is at level FW940, the Migratable option for the Hybrid Network Virtualization capability is available as a Technology Preview only and is not intended for production deployments. However, when the HMC is at Version 9.1.941.0, or later, and when the firmware is at level FW940.10, or later, the Migratable option for the Hybrid Network Virtualization capability is supported.

7. Complete the steps in the **Partition Migration Validation** window, and click **Validate**.
8. If the validation operation fails, the **Validation Errors/Warnings** window is displayed that helps you to troubleshoot the configuration problems.

   - Click **All Messages** to view the warnings and error messages along with the verbose log information about the validation operation. The log information also includes data about successful and failed steps.

   - Click **Step Results** to view the log information about the validation operation. The log information also includes data about successful and failed steps.

Migrating a logical partition

You can use the migration function on the Hardware Management Console (HMC) to migrate a logical partition. If you are using HMC V9.1.930, or earlier, you cannot migrate a logical partition that is configured with Single Root I/O Virtualization (SR-IOV) logical ports. If you are using HMC V9.1.940, or later, and when the firmware is at level FW940, or later, you can migrate a logical partition that is configured with SR-IOV logical ports.

About this task
To migrate a logical partition from one server to another server by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Partitions**. Alternatively, click **All Systems**. In the work pane, click the server name that has the logical partition.
3. Click **View System Partitions**. The **All Partitions** page is displayed.
4. In the work pane, select the logical partition and click **Actions** > **Mobility** > **Migrate**. The **Partition Migration** window is displayed.
5. Follow the steps in the **Partition Migration** window.
6. In the **Migration Information** section, you can use the **Only migrate SR-IOV logical ports when possible** option to migrate a logical partition that is configured with SR-IOV logical ports.

   - When the **Only migrate SR-IOV logical ports when possible** check box is enabled, the HMC performs the following task:

     – The HMC fails the migration operation if the HMC cannot find an SR-IOV physical port to re-create any of the source SR-IOV logical ports that are migratable before the client logical partition is moved to the destination system.

     – If the client logical partition is already moved to the destination system and if the re-creation of the migratable SR-IOV logical ports on the destination system fails, the HMC does not move the client logical partition back to the source system. You can dynamically add the migratable SR-IOV logical ports on the client logical partition after the migration operation completes.

   - When the **Only migrate SR-IOV logical ports when possible** check box is disabled, the HMC performs the following task:

     – The HMC does not fail the migration operation even if the HMC cannot find an SR-IOV physical port to re-create any of the migratable SR-IOV logical ports on the source system. Also, the HMC does not attempt to re-create those SR-IOV logical ports. You can dynamically add the migratable SR-IOV logical ports on the client logical partition after the migration operation completes.

   Note: When the HMC is at Version 9.1.940.x, and when the firmware is at level FW940, the Migratable option for the Hybrid Network Virtualization capability is available as a Technology Preview only and

is not intended for production deployments. However, when the HMC is at Version 9.1.941.0, or later, and when the firmware is at level FW940.10, or later, the Migratable option for the Hybrid Network Virtualization capability is supported.

7. Complete the steps in the **Partition Migration** window, and click **Finish**.
8. In the **Validation Errors/Warnings** section, you can view the error message information that helps you to troubleshoot the configuration problems.

   - Click **All Messages** to view the warnings and error messages along with the verbose log information about the migration operation. The log information also includes data about successful and failed steps.

   - Click **Step Results** to view the log information about the migration operation. The log information also includes data about successful and failed steps.

Changing processor settings

You can view and change the settings of the shared and dedicated processors that are assigned to a partition by using the Hardware Management Console (HMC).

Before you begin

You can change the number of virtual processors and processing units that are assigned to the partition. The views and controls that are displayed depend on whether the processor is dedicated or shared, or running or stopped.

You can set a partition to use either processors that are dedicated to the partition or processors that are shared with other partitions. If a partition uses dedicated processors, you must allocate processors (in increments of whole numbers) to the partition. A partition that uses dedicated processors cannot use any processing capacity beyond the processors that are assigned to the partition.

By default, all physical processors that are not dedicated to specific partitions are grouped in a shared processor pool. You can allocate a specific amount of the processing capacity in this shared processor pool to each partition that uses shared processors. With some models, you can use the HMC to configure multiple shared processor pools. These models have a default shared processor pool that contains all the processor resources that do not belong to partitions that use dedicated processors or partitions that use other shared processor pools. The other shared processor pools on these models can be configured with a maximum processing unit value and a reserved processing unit value. The maximum processing unit value limits the total number of processors that can be used by the partitions in the shared processor pool. The reserved processing unit value is the number of processing units that are reserved for the use of uncapped partitions within the shared processor pool.

You can set a partition that uses shared processors to use a minimum of 0.10 processing units, which are approximately a 10th of the processing capacity of a single processor. When the firmware is at level 7.6, or later, you can set a partition that uses shared processors to use a minimum of 0.05 processing units, which are approximately a 20th of the processing capacity of a single processor. You can specify the number of processing units to be used by a shared processor partition to the 100th of a processing unit. In addition, you can set a shared processor partition such that, if the partition requires more processing capacity than its assigned number of processing units, the partition can use processor resources that are not assigned to any partition or processor resources that are assigned to another partition but that are not being used by the other partition. Some server models might require you to enter an activation code before you can create partitions that use shared processors.

If the operating system and server model supports, you can allocate up to the entire processing capacity on the managed system to a single partition. You can configure your managed system such that it does not comply with the software license agreement for your managed system. However, if you operate the managed system in such a configuration, you might receive out-of-compliance messages.

Shared processors are physical processors that share processing capacity among multiple partitions. The ability to divide physical processors and share them among multiple partitions is known as the Micro-Partitioning® technology.

Partitions that use shared processors can have a sharing mode of capped or uncapped. An uncapped partition is a partition that can use more processor power than its assigned processing capacity. The amount of processing capacity that an uncapped partition can use is limited only by the number of virtual processors that are assigned to the partition or the maximum processing units that are allowed by the shared processor pool that the partition uses. In contrast, a capped partition is a partition that cannot use more processor power than its assigned processing units.

Dedicated processors are whole processors that are assigned to a single partition. If you choose to allocate dedicated processors to a partition, you must allocate at least one processor to that partition. Likewise, if you choose to remove processor resources from a dedicated partition, you must remove at least one processor from the partition. On systems that are managed by an HMC, dedicated processors are assigned to partitions that use partition profiles.

A virtual processor is a representation of a physical processor core to the operating system of a partition that uses shared processors.

About this task

To view and change the settings of the processor, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** area, click **General Properties** to view and change the properties of the selected partition.
5. In the **Properties** area, click **Processors** to view the shared and dedicated processors.
6. Select a processor mode that is assigned to the selected partition:

   - When the partition is in the running state, and the processor is set to the **Dedicated** mode, complete the following steps:

      a. You can enter a value or adjust the **Processors** tab for the number of processors that is assigned to the partition.

      b. Click **Advanced** to change the advanced processor settings for the partition.

   - When the partition is in the not activated state, and the processor is set to the **Dedicated** mode, complete the following steps:

      a. From the **Processor Mode** list, change the mode of the processor to shared or dedicated.

      b. Enter values or adjust the **Processors** tab for the maximum, assigned, and minimum number of dedicated processors for the partition.

      c. From the **Processor Compatibility Mode** list, select the compatibility mode of the processor.

      d. Select the **Idle Processing Sharing** check box to enable and use the idle processors that belong to the powered-off shared partition.

   - When the partition is in the running state, and the processor is set to the **Shared** mode, complete the following steps:

      a. Enter a value, or adjust the **Virtual Processors** bar and the **Processing Units** bar for the assigned number of virtual processors and processing units for the partitions in the shared processor pool.

      b. Adjust the capped and uncapped setting for the partition in the shared processor pool.

- When the partition is in the not activated state, and the processor is set to the **Shared** mode, complete the following steps:
  a. From the **Processor Mode** list, select an option to change the mode of the processor to shared or dedicated.
  b. From the **Shared Processor Pool** list, select an available pool to change the shared processor pool.
  c. Adjust the capped and uncapped tab setting for the partition in the shared processor pool.
  d. Enter values or adjust the **Virtual Processors** tab for the maximum, assigned, and minimum number of shared processors for the partition.
  e. From the **Processor Compatibility Mode** list, select the compatibility mode of the processor.
7. Optional: Enter a timeout value in the **Timeout** field.
8. Optional: Click the **Force** option to force a particular operation to be performed on the logical partition immediately.
9. Click **Save** to apply the changes. Alternatively, click **Cancel** to reject the changes and close the page.

Changing memory settings

You can view and change the settings of the shared and dedicated memory that is assigned to a partition by using the Hardware Management Console (HMC).

Before you begin

You can change the memory that is allocated to the partition. The views and controls that are presented depend on whether the memory is dedicated or shared, an whether the partition is or running or stopped.

Processors use memory to temporarily hold information. Memory requirements for partitions depend on the partition configuration, I/O resources that are assigned, and applications used.

Memory can be assigned in increments of 16 MB, 32 MB, 64 MB, 128 MB, and 256 MB. The default memory block size varies according to the amount of configurable memory in the system. On systems that are managed by an HMC, memory is assigned to partitions using partition profiles.

Dedicated memory is physical system memory that you allocate to a partition that uses dedicated memory and is reserved for use by the dedicated memory partition until you remove the memory from the dedicated memory partition or delete the dedicated memory partition.

Depending on the overall memory in your system and the maximum memory values you choose for each partition, the server firmware must have enough memory to complete partition tasks. The following factors influence server firmware memory requirements:

- Number of dedicated memory partitions
- Partition environments of the dedicated memory partitions
- Number of physical and virtual I/O devices that are used by the dedicated memory partitions
- Maximum memory values allocated to the dedicated memory partitions

Note: Firmware level updates can also change the server firmware memory requirements. Larger memory block sizes can exaggerate the memory requirement change.

When you select the maximum memory values for each dedicated memory partition, consider the following points:

- Maximum values affect the hardware page table (HPT) size for each dedicated memory partition
- The logical memory map size for each dedicated memory partition

If the server firmware detects that a memory module failed or is about to fail, the server firmware creates a serviceable event. The server firmware can also unconfigure the failing memory module automatically, depending on the type of failure and the deconfiguration policies that you set up by using the Advanced System Management Interface (ASMI). You can also unconfigure a failing memory module manually

by using the ASMI. If a memory module failure causes the entire managed system to shut down, the managed system restarts automatically if the managed system is in normal initial program load (IPL) mode. When the managed system restarts itself, or when you restart the managed system manually, the managed system attempts to start the dedicated memory partitions that were running at the time of the memory module failure with their minimum memory values. If the managed system does not have enough memory to start all of the dedicated memory partitions with their minimum memory values, the managed system starts as many dedicated memory partitions as it can with their minimum memory values. After the managed system starts the maximum possible number of dedicated memory partitions, the managed system distributes the leftover memory resources among the running dedicated memory partitions, in proportion to the required memory values of the dedicated memory partitions.

Using *Huge pages* can improve performance in specific environments that require a high degree of parallelism, such as in the DB2® database. You can specify huge-page memory that can be used for the shared-memory buffer pools in the DB2 database. For logically partitioned systems, you can specify the minimum, wanted, and maximum number of huge pages to allocate to a partition when you create the partition or partition profile.

On managed systems that support huge-page memory, you can use the HMC to set the value for the huge-page memory pool. You can also specify values for the number of huge pages to allocate to partitions.

To use huge-page memory, you must ensure that your system has adequate memory resources to dedicate to the huge-page memory pool. The huge-page memory pool is a region of the system memory that is mapped as 16 GB page segments and is managed separately from the base memory of the system.

About this task
To view and change the settings of the memory, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** area, click the **Memory** tab to view the properties of the running logical partition that is using the dedicated or the shared memory.
5. Select a memory mode that is assigned to the selected partition:

   - When the partition is in the running state, and the memory is set to the **Dedicated** mode, complete the following steps:

     a. You can enter a value or adjust the **Memory Allocation** tab for the assigned memory that is assigned to the partition.

     b. Click **Advanced** to view the advanced memory settings for the partition.

   - When the partition is in the not activated state, and the memory is set to the **Dedicated** mode, complete the following steps:

     a. You can enter a value or adjust the values for **Memory Allocation** tab for the maximum, assigned, and minimum memory that is assigned to the partition.

     b. Click **Advanced** to change the advanced memory settings for the partition.

     c. Select the **Enable Active Memory Expansion** check box to enable the active memory expansion feature for the partition.

     d. Enter a value for the **Active Memory Expansion** field. The value must be in the range 1.0 - 10.0.

     e. Select the **Huge Page Memory** check box to enable the huge-page memory feature for the partition.

  f. Enter values for the **Minimum**, **Assigned**, and **Maximum** fields.

  g. Select the **BSR Array** check box to allocate barrier-synchronization register (BSR) arrays to the partition.

  h. Enter values for the **Total**, **Assigned**, and **Available** fields.

  i. From the **Memory Mode** list select shared to set the mode to shared. You can change the memory mode to shared only when there is a share memory pool is available. Also, you can change the memory mode to shared only when the processor is also set to the shared mode.

 Note: BSR is not supported on POWER8 processor-based servers.

- When the partition is in the running state, and the memory is set to the **Shared** mode, complete the following steps:

  a. You can enter a value or adjust the **Memory Allocation** tab for the assigned memory that is assigned to the partition.

  b. Click **Avanced** to change the advanced memory settings for the partition.

  c. From the **Assigned I/O Entitled Memory** option, select **Auto** or **Manual**.

  d. Enter values for the **Assigned I/O Entitled Memory** and **Memory Weight** fields.

- When the partition is in the not activated state, and the memory is set to the **Shared** mode, complete the following steps:

  a. Change the mode of the memory to shared or dedicated.

  b. Enter a value, or adjust the **Memory Allocation** tab for the maximum, assigned, and minimum dedicated memory that is assigned to the partition.

  c. Click **Avanced** to change the advanced memory settings for the partition.

  d. From the **Assigned I/O Entitled Memory** option, select **Auto** or **Manual**. When you select the manual option, you must also enter values for the **Assigned I/O Entitled Memory** and **Memory Weight** fields.

  e. From the **Memory Mode** list select dedicated to set the mode to dedicated.

6. Optional: Enter a timeout value in the **Timeout** field.

7. Optional: Click the **Force** option to force a particular operation to be performed on the logical partition immediately.

8. Click **Save** to apply the changes. Alternatively, click **Cancel** to reject the changes and close the page.

Managing persistent memory volume

You can view and manage the persistent memory volume that is assigned to a logical partition by using the Hardware Management Console (HMC).

Before you begin

When you are using HMC version 9.1.940, or later, and when the firmware is at level FW940, or later, you can view and manage the persistent memory volume that is assigned to a logical partition by using the Hardware Management Console (HMC). You can manage the persistent memory volume only when the logical partition is in the **Not activated** state. You cannot add virtual Persistent Memory (PMEM) volumes to a logical partition in which the **Simplified Remote Restart** (SRR) capability is enabled.

Note:

If a live partition mobility (LPM) operation fails due to insufficient memory in the destination system, complete the following steps to resolve the issue:

1. Check if any of the logical partitions are in the **Not Activated** state.

2. Check whether you require vPMEMs of the logical partition in the destination system.

3. If the vPMEMs are not required in the destination system, delete all vPMEMs of the logical partition and resume the LPM operation.

About this task

To view and manage the persistent memory volume, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon ![Resources icon].
2. Click **All Partitions**. The **All Partitions** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties, and click **Actions** > **View Partition Properties**.

   The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** area, click the **Persistent Memory** tab to view the properties of the logical partition that is using persistent memory volume.
5. Click **Add** to create the persistent memory volume. The **Add Volume** window is displayed.
   a) Specify a name for the persistent memory volume in the **Volume Name** field.
   b) Specify a value for the size of the persistent memory volume in the **Volume Size** field.
   c) Select the **Affinity** check box if you want the operating system to get information about the amount of memory that is allocated across multiple DIMMs.
   d) Click **OK** to create the persistent memory volume. Alternatively, click **Cancel** to reject the changes and to close the window.
6. In the **Persistent Memory** page, select an existing persistent memory volume. Click **Edit** if you want to change the name of the persistent memory volume.
7. In the **Persistent Memory** page, select an existing persistent memory volume. Click **Remove** if you want to delete the persistent memory volume.

Managing physical I/O adapters

You can view and change physical I/O adapter assignment for a partition by using the Hardware Management Console (HMC).

You can dynamically add, remove, and move physical I/O devices and slots, to and from running partitions, by using an HMC. You can share infrequently used I/O devices, such as optical disk drives among multiple partitions.

You can specify that I/O devices or slots are required for a partition. If you specify that an I/O device or slot is not required, the I/O device or slot can be shared with other partitions, or the I/O device or slot is optional. If you specify that an I/O device or slot is required (or dedicated) and if the I/O device or slot is unavailable, or is in use by another partition, you cannot activate the partition.

Note: If resources are moved dynamically, the configuration change is temporary and is not reflected in the partition profile. All configuration changes are lost when the partition profile is next activated. If you want to save your new partition configuration, either change the partition profile or save the partition configuration to a new partition profile.

You can specify a timeout value in the **Timeout** field. You can also click the **Force** option to force a particular operation to be performed on the logical partition immediately.

Adding a physical I/O adapter to a partition

You can dynamically add a physical I/O slot, the adapter, and devices that are connected to the slot to an active partition by using the Hardware Management Console (HMC). You can add I/O capabilities to an active partition without shutting down the partition.

Before you begin

Consider the following conditions when you add physical I/O slots to a Linux partition:

- A Linux distribution that supports dynamic partitioning is installed on the Linux partition. Distributions that support dynamic partitioning include SUSE Linux Enterprise Server 9, and later.
- The DynamicRM tool package is installed on the Linux partition. To download the DynamicRM tool package, see the Service and productivity tools for Linux on POWER® systems website.

You cannot add physical I/O devices and slots to partitions that use shared memory. You can allocate only virtual adapters to partitions that use shared memory.

About this task

To dynamically add a physical I/O adapter to an active partition by using an HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** area, click **Physical I/O Adapters**. The table lists all the adapters that are available for the partition.
5. Click **Add Adapter**. The **Add Physical I/O Adapter(s)** page opens.
6. Select an I/O adapter from the **Add Physical I/O Adapter(s)** list that you want to add to the partition. You can view the adapters that are available in the other drawers of the server by clicking the **View** list. You can also narrow your search for available adapters, by using the filter to list adapters based on physical location code.
7. Click **Save** after you select the I/O adapter. Alternatively, click **Cancel** to reject the changes and close the page.

Removing a physical I/O adapter from a partition
You can dynamically remove a physical I/O slot, the adapter, and devices that are connected to that slot by using the Hardware Management Console (HMC). You can reassign the physical I/O adapter to other partitions.

Before you begin

Ensure that the devices that are attached to the managed system through the physical I/O slot that you want to remove are not running, by using the operating system commands.

⚠️ **Attention:** The dynamic removal of a physical I/O slot that controls disk drives can cause unpredictable results, such as partition failure or loss of data.

Consider the following conditions when you remove a physical I/O slot from a Linux partition:

- A Linux distribution that supports dynamic partitioning is installed on the Linux partition. Distributions that support dynamic partitioning include SUSE Linux Enterprise Server 9, and later.
- The DynamicRM tool package is installed on the Linux partition. To download the DynamicRM tool package, see the Service and productivity tools for Linux on POWER systems website.

About this task

To dynamically remove a physical I/O adapter from an active partition by using an HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** area, click **Physical I/O Adapters**.
5. From the table that lists the assigned physical adapters, right-click the physical adapter that you want to remove and select **Remove Adapter**.
6. Click **Save** after you select the I/O adapter. Alternatively, click **Cancel** to reject the changes and close the page.

Results

The selected physical I/O adapter is removed from partition.

Managing partition profiles for logical partitions

You can manage the partition profiles for your logical partitions using the Hardware Management Console (HMC). You can change the resource specifications stored in your partition profiles as your needs change.

Creating a partition profile

You can create a new partition profile using the Hardware Management Console (HMC).

About this task

To create a new partition profile using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Partitions**. Alternatively, click **All Systems**. In the work pane, click the server name that has the logical partition. Click **View System Partitions**. The All Partitions page is displayed.
3. In the work pane, select the logical partition and click **Actions** > **Profiles** > **Manage Profiles**.
4. In the **Manage Profiles** wizard, click **Actions** > **New**. The **Create Lpar** wizard is displayed.
5. In the **Partition Profile** page, specify a name for the logical partition profile in the **Profile name** field.
   a) Select the **Use all the resources in the system** check box if you want the logical partition to have all the resources that are available in the system.
   b) Click **Next**. Alternatively, click **Cancel** to reject the changes and to close the window.
6. In the **Processors** page, select **Shared** to assign partial processor units from the shared processor pool or select **Dedicated** to assign the entire processor that can only be used by the logical partition, and click **Next**.
7. In the **Processing Settings** page, specify values for the processor units in the **Minimum processing units**, **Desired processing units**, and **Maximum processing units** fields. Select a shared processor pool from the **Shared processor pool** list.
   a) In the **Virtual Processors** section, specify values for the virtual processor in the **Minimum virtual processors**, **Desired virtual processors**, and **Maximum virtual processors** fields.
   b) If you want to specify uncapped weight value for the virtual processors, select the **Uncapped Weight** check box and specify a value in the **Uncapped Weight** field, and click **Next**.

8. In the **Memory Settings** page, specify values for the logical partition memory in the **Minimum Memory**, **Desired Memory**, and **Maximum Memory** fields, and click **Next**.

9. In the **I/O** page, select the adapters that you want to be included in the partition profile from the adapter list and click **Add as required**, or **Add as desired**. Click **Remove** to remove the selected adapter from the partition profile, and click **Next**.

10. In the **Virtual Adapters** page, select the virtual adapter from the available adapter list and click **Actions** > **Properties** to view the properties of the virtual adapter.

    a) In the **Maximum virtual adapters** field, specify the number of maximum virtual adapters for the logical partition.

    b) To create a virtual adapter, click **Actions** > **Create Virtual Adapter** and select **Ethernet Adapter**, **Fibre Channel Adapter**, **SCSI Adapter**, or **Serial Adapter**.

    c) In the **Virtual Adapters** page, click **Next**.

11. In the **SR-IOV Logical Ports** page, click **Actions** > **Create Logical Port** and select **Ethernet Logical Port**, or **RoCE Logical Port**. The **Add SR-IOV Logical Port** is displayed.

    a) From the **SR-IOV Port** list, select the SR-IOV logical port to create the corresponding logical port, and click **OK**.

    b) In the **SR-IOV Logical Ports** page, click **Next**.

12. In the **OptiConnect Settings** page, select the **Use virtual OptiConnect** check box to set virtual OptiConnect. Select **Use High Speed Link (HSL) OptiConnect** check box to set High Speed Link (HSL) OptiConnect.

13. In the **Tagged I/O** page, specify the load source that you want the logical partition to use as its load source from the **Load source** list. Select an alternate device on which the system restarts from the **Alternate restart device** list. Select the console from the **Console** list. Select an alternate console from the **Alternate console** list. Select the operations console from the **Operations Console** list, and click **Next**.

14. In the **Optional Settings** page, select the **Enable connection monitoring** check box to enable connection monitoring. Select the **Automatically start when the managed system is powered on** check box to start the partition profile automatically when the managed system is powered on. Select the **Enable redundant error path reporting** check box to receive reports about any redundant errors. Select **Enable electronic reporting of errors that cause partition termination or require attention** to receive electronic reports about any errors that cause logical partition termination or that require attention, and click **Next**.

15. The **Profile Summary** page displays the summary information about the logical partition and the partition profile. Click **Details** to view details about the physical I/O devices. Click **Finish** to create the logical partition and the partition profile.

Copying a partition profile

You can create a copy of an existing partition profile using the Hardware Management Console (HMC). After you create a copy of the existing partition profile, you can change the resource allocations within the new partition profile. This allows you to create multiple, nearly identical partition profiles without having to re-enter all of the resource allocations repeatedly.

About this task
To copy a partition profile using the HMC, follow these steps:

Procedure

1. In the navigation pane, click the **Resources** icon .

2. Click **All Partitions**. Alternatively, click **All Systems**. In the work pane, click the server name that has the logical partition. Click **View System Partitions**. The All Partitions page is displayed.

3. In the work pane, select the logical partition and click **Actions** > **Profiles** > **Manage Profiles**.
4. Select the partition profile that you want to copy and click **Actions** > **Copy**.
5. Enter the name of the new partition profile into **New profile name** and click **OK**.

Changing partition profile properties

You can change the properties of a partition profile using the Hardware Management Console (HMC). Changing the properties of a partition profile changes the resource amounts that are assigned to a logical partition when you shut down and restart the logical partition using the changed partition profile.

Before you begin

A partition profile stores the required number of processors, memory, and hardware resources assigned to that profile. Any partition profile property changes are not applied to the logical partition until you activate the partition profile.

If you plan to change a partition profile that specifies dedicated memory to a partition profile that specifies shared memory, the following conditions apply:

- The HMC automatically deletes all of the physical I/O adapters specified in the partition profile. You can assign only virtual adapters to logical partitions that use shared memory.
- You must specify shared processors. Logical partitions that use shared memory must also use shared processors.

About this task
To change partition profile properties using the HMC, follow these steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Partitions**. Alternatively, click **All Systems**. In the work pane, click the server name that has the logical partition. Click **View System Partitions**. The All Partitions page is displayed.
3. In the work pane, select the logical partition and click **Actions** > **Profiles** > **Manage Profiles**.
4. Select the partition profile that you want to change and click **Actions** > **Edit**.

   To add, remove, or change the vNIC adapter settings, you can run the **chsyscfg** command from the HMC command line. To add vNIC backing devices to a partition or to remove vNIC backing devices from a partition, and to change the vNIC auto-failback policy or to change the vNIC backing device failover policy, run the **chhwres** command from the HMC command line.

   When the HMC is at Version 9.1.0, or later, you can use the *max_capacity* field in the vNIC backing device attribute of the **chsyscfg** command to configure vNIC backing devices. You can also use the *max_capacity* attribute of the **chsyscfg** command to configure a single root I/O virtualization (SR-IOV) Ethernet logical port.
5. In the **General** tab, specify a name for the profile in the **Profile name** field, and click **OK**.
6. In the **Processors** tab, select **Shared** to assign partial processor units from the shared processor pool or select **Dedicated** to assign the entire processor that can only be used by the logical partition, and click **OK**.
   a) In the **Dedicated processors** section, specify values for the logical partition in the **Minimum dedicated processors**, **Desired dedicated processors**, and **Maximum dedicated processors** fields.
   b) In the **Processor Sharing** section, select **Allow when partition is inactive** check box to allow processor sharing when the partition is inactive. Select **Allow partition is active** check box to allow processor sharing when the partition is active. Select the processor compatibility mode from the **Processor compatibility mode** list, and click **OK**.

7. In the **Memory** tab, specify values for the logical partition memory in the **Minimum memory**, **Desired memory**, and **Maximum memory** fields, and click **OK**.

8. In the **I/O** tab, select the adapters from the adapter list to be included in the partition profile and click **Add as required**, or **Add as desired**. Click **Remove** to remove the selected adapter from the partition profile, and click **OK**.

9. In the **Virtual Adapters** tab, select the virtual adapter from the available adapter list and click **Actions** > **Properties** to view the properties of the virtual adapter.

   a) In the **Maximum virtual adapters** field, specify the number of maximum virtual adapters for the logical partition.

   b) To create a virtual adapter, click **Actions** > **Create Virtual Adapter** and select **Ethernet Adapter**, **Fibre Channel Adapter**, **SCSI Adapter**, or **Serial Adapter**.

   c) In the **Virtual Adapters** page, click **OK** to apply the changes.

10. In the **Power Controlling** tab, select the power controlling partitions from the **Power controlling partitions to add** list. Click **Add** to add the selected power controlling partition. Click **Remove** to remove the selected power controlling partition, and click **OK**.

11. In the **Settings** tab, select the **Enable connection monitoring** check box to enable connection monitoring. Select the **Automatically start when the managed system is powered on** check box to start the partition profile automatically when the managed system is powered on. Select the **Enable redundant error path reporting** check box to receive reports about any redundant errors. Select **Enable electronic reporting of errors that cause partition termination or require attention** to receive electronic reports about any errors that cause logical partition termination or that require attention.

   a) From the **Workload Management** section, select the partition workload group from the **Partition workload group** list, and click **OK**.

12. In the **SR-IOV Logical Ports** tab, click **SR-IOV Menu** > **Add Logical Port** and select **Ethernet Logical Port**, or **RoCE Logical Port**. The **Add SR-IOV Logical Port** page opens.

   a) From the **SR-IOV Port** list, select the SR-IOV logical port to create the corresponding logical port, and click **OK**.

   b) In the **SR-IOV Logical Ports** tab, click **OK**.

13. In the **SR-IOV Logical Ports** tab, a list of SR-IOV logical ports that are configured for the selected partition is displayed.

14. Select an SR-IOV logical port that you want to change, click **SR-IOV Menu** > **Edit Logical Port**. The **Logical Port Properties** page is displayed.

15. Select the **Diagnostic Mode** check box to enable or disable the setting.

    Note: Diagnostic mode can be set only if other logical ports are not associated with the physical port.

16. Select the **Promiscuous Mode** check box, if you want to enable the settings for the SR-IOV port. These settings are disabled by default.

    Note: You must select the **Promiscuous Mode** check box, if you want to virtualize the logical port even further, such as, if you want to use the logical port as the network adapter for shared Ethernet adapter (SEA).

17. Select the **Migratable** check box to configure SR-IOV logical ports in a client partition and to mark the SR-IOV logical ports as migratable by creating a new backup device, which can either be a virtual Ethernet adapter or a virtual NIC adapter.

   a) Select the **Configure a new back backup device** option to configure a new backup device. By default, this setting is enabled.

      i) Select **Virtual Ethernet Adapter** or **Virtual NIC Adapter** from the **Backup Device Type** option. By default, the **Virtual NIC Adapter** option is enabled.

      ii) Click **Configure backup device**. The **Configure SR-IOV Virtual NIC Migratable Backup** page is displayed.

- Select a physical port that you want as a backup port for the migratable logical port from the list of available physical ports.
- Select a hosting VIOS from the **Hosting Partition** list.
- Select the appropriate capacity from the **Capacity** list.
- Click **OK** to apply the changes. Alternatively, click **Cancel** to reject the changes and to close the window.

iii) Optional: If you have selected **Virtual Ethernet Adapter** from the **Backup Device Type** option, the **Configure SR-IOV Virtual Ethernet Migratable Backup** page is displayed.

- Select a virtual network that you want as a backup network for the migratable logical port from the list of available virtual networks.
- Click **OK** to apply the changes. Alternatively, click **Cancel** to reject the changes and to close the window.

Note: When the HMC is at Version 9.1.940.x, and when the firmware is at level FW940, the Migratable option for the Hybrid Network Virtualization capability is available as a Technology Preview only and is not intended for production deployments. However, when the HMC is at Version 9.1.941.0, or later, and when the firmware is at level FW940.10, or later, the Migratable option for the Hybrid Network Virtualization capability is supported.

18. In the **Tagged I/O** tab, specify the load source that you want the logical partition to use as its load source from the **Load source** list. Select an alternate device on which the system restarts from the **Alternate restart device** list. Select the console from the **Console** list. Select an alternate console from the **Alternate console** list. Select the operations console from the **Operations Console** list, and click **OK**.

19. In the **OptiConnect tab**, select the **Use virtual OptiConnect** check box to set virtual OptiConnect. Select the **Use High Speed Link (HSL) OptiConnect** check box to set High Speed Link (HSL) OptiConnect, and click **OK**.

Deleting a partition profile

You can delete a partition profile using the HMC Hardware Management Console (HMC). This allows you to remove partition profiles that you no longer use.

Before you begin

Note: You cannot delete a partition profile that is the default partition profile for the logical partition. If the partition profile you want to delete is the default partition profile, you must first change the default profile to another partition profile.

About this task

To delete a partition profile using the HMC, follow these steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Partitions**. Alternatively, click **All Systems**. In the work pane, click the server name that has the logical partition. Click **View System Partitions**. The All Partitions page is displayed.
3. In the work pane, select the logical partition and click **Actions** > **Profiles** > **Manage Profiles**.
4. Select the partition profile that you want to delete and click **Actions** > **Delete**.
5. Click **OK** to confirm.

Managing virtual NICs on a logical partition

Learn how to manage virtual Network Interface Controllers (vNICs) on a partition.

You can use the Hardware Management Console (HMC) to complete the following tasks related to the virtual NICs on a partition:

- Adding virtual NICs
- Viewing virtual NICs
- Changing virtual NICs
- Removing virtual NICs

Adding virtual NICs

You can add virtual NICs to a partition by using the Hardware Management Console (HMC).

Before you begin

Before you add a virtual NIC, ensure that your system meets the following prerequisites, if the client partition is running:

- The Virtual I/O Server (VIOS) that hosts the virtual NIC is running with an active Resource Monitoring and Control (RMC) connection.
- The client partition has an active RMC connection.

Ensure that your system meets the following prerequisite, if the client partition is shut down:

- The Virtual I/O Server (VIOS) that hosts the virtual NIC is running with an active RMC connection or is shut down.

About this task

To add virtual NICs by using an HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon ![icon] .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** pane, click **Virtual NICs**. The **Virtual NIC** page opens.
5. Click **Add Virtual NIC**. The **Add Virtual NIC - Dedicated** page opens with the SR-IOV physical ports listed in a table.
6. Click **Add Entry** or **Remove Entry** to add or to remove backing devices for the Virtual NIC.

   Note: The **vNIC Auto Priority Failover** list is displayed when you add the second backing device entry. If you select **Enabled** from the **vNIC Auto Priority Failover** list, the hypervisor automatically fails over to the operational backing device that has the highest failover priority. Alternatively, if you select **Disabled**, the hypervisor does not take any action even if another operational backing device has a higher failover priority.
7. To configure each backing device entry, complete the following actions:
   a) Select the SR-IOV physical port on which you want to create the logical port to support the virtual NIC.

      Note: You must assign a different SR-IOV physical port for each backing device.
   b) Select the hosting partition.

c) Specify the logical port minimum capacity.

   Note: The capacity of the logical port must be a percentage of the capacity of the SR-IOV physical port. If you do not specify a value, the HMC assigns the minimum capacity of the Ethernet logical port. The failover priority for the backing device must be in the range of 1 - 100, where 1 indicates the highest priority and 100 indicates the lowest priority. If you do not specify any value, the default priority value 50 is assigned to the backing device.

d) Specify the failover priority for the backing device.

8. Click **Advanced Virtual NIC Settings** to configure additional settings for the virtual NIC, such as virtual NIC adapter ID, MAC address settings, and the VLAN ID settings.

9. Click **OK**. The virtual NIC is added to the partition.

Viewing virtual NICs

You can view the properties of the virtual NIC backing device by using the Hardware Management Console (HMC).

About this task

To view the properties of the virtual NIC backing device by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon   .

2. Click **All Systems**. The **All Systems** page is displayed.

3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.

4. In the **Properties** pane, click **Virtual NICs**. The **Virtual NICs** page opens with the virtual NIC adapters listed in a table.

5. Select the virtual NIC from the list for which you want to view the properties.

6. Click **Action** > **View**. The **View Virtual NIC** page opens.

7. View the properties of the virtual NIC backing device, the MAC address settings, and VLAN ID settings for the virtual NIC.

8. Click **Close**.

Changing virtual NICs

You can change the properties of the virtual NIC by using the Hardware Management Console (HMC).

About this task

To change the properties of the virtual NIC by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon   .

2. Click **All Systems**. The **All Systems** page is displayed.

3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.

4. In the **Properties** pane, click **Virtual NICs**. The **Virtual NICs** page opens with the virtual NIC adapters listed in a table.
5. Select the virtual NIC from the list for which you want to change the properties.
6. Click **Action** > **Modify**. The **Modify Virtual NIC** page opens.
7. View the properties of the backing device, the MAC address settings, and VLAN ID settings for the virtual NIC.
8. You can change the Port VLAN ID and PVID priority for the selected virtual NIC.
9. Click **Close**.

Removing virtual NICs

You can remove the virtual NIC by using the Hardware Management Console (HMC).

About this task

To remove the virtual NIC by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** pane, click **Virtual NICs**. The **Virtual NICs** page opens with the virtual NIC adapters listed in a table.
5. Select the virtual NIC that you want to remove.
6. Click **Action** > **Remove**. A delete confirmation message appears.
7. Click **OK** to remove the selected virtual NIC.

Managing virtual networks

Learn about managing PowerVM virtual networks on a partition.

You can use the Hardware Management Console (HMC) to complete the following networking tasks on a partition:

- Viewing virtual networks
- Changing virtual networks
- Removing virtual networks

Viewing the virtual network configuration

You can view the configuration details of the PowerVM virtual networks that are assigned to a partition by using the Hardware Management Console (HMC).

About this task

To view the configuration details of the PowerVM virtual networks by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** pane, click **Virtual I/O** > **Virtual Networks**. The **Virtual Networks** page opens.

Results

You can view the configuration details of the virtual networks in the table that is displayed in the **Virtual Networks** tab. The configuration details for each virtual network include the following information:

- Virtual Network Name
- VLAN ID
- Virtual Switch
- Network Bridge

Managing virtual network connections in adapter view

You can manage the PowerVM virtual network connections that are assigned to a partition in the adapter view, by using the Hardware Management Console (HMC).

About this task

To manage the virtual network connections in the adapter view by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** pane, click **Virtual I/O** > **Virtual Networks**. The **Virtual Networks** page opens in the **Network(s)** view. The currently available virtual network connections for the partition are listed in a table.
5. In the **Virtual Networks** work pane, click the right arrow key button to select **Adapter(s)** view. The currently available virtual Ethernet adapters and trunk adapters for the partition that are listed in a table. You can view, modify, or remove an adapter by using the **Action** menu.

   You can also create a trunk adapter for an IBM i logical partition.
6. To change the adapter settings, complete the following steps:
   a) Select the adapter for which you want to change the settings and click **Action** > **Modify Virtual Ethernet Adapter Settings**. Alternatively, you can right-click the adapter and select **Modify Virtual Ethernet Adapter Settings**. The **Modify Virtual Ethernet Adapter Settings** page opens with the virtual Ethernet adapter ID, virtual LAN (VLAN) ID, 802.1Q VLAN ID, and trunk priority of the adapter displayed in a table.
   b) Change the virtual Ethernet adapter settings including the Media Access Control (MAC) address settings, QoS settings, and 802.1Qbg settings, or IEEE settings and click **OK**.

You can choose the following values for operating system-defined the MAC addresses:

- **Allow all**: Allows any operating system-defined MAC addresses. This value is the default that is displayed.
- **Deny all**: Does not allow any operating system-defined MAC addresses.
- **Allow specified**: Specifies a maximum of four operating system-defined MAC addresses. You can add the MAC addresses to the **Allowed MAC Addresses** list.

Notes:

- Under **IEEE settings**, if you select the **IEEE 802.1q Compatibility** check box, additional VLANs can be supported on an Ethernet network. If you do not need additional VLANs for the trunk adapter, clear the **IEEE 802.1q Compatibility** check box.
- The **802.11q VLAN ID** option is supported only for trunk adapters.

7. To view the adapter settings, complete the following steps:

   a) Select the adapter that you want to view and click **Action** > **View Virtual Ethernet Adapter Settings**. Alternatively, you can right-click the adapter and select **View Virtual Ethernet Adapter Settings**. The **View Virtual Ethernet Adapter Settings** page opens.

   b) View the virtual Ethernet adapter settings including the Media Access Control (MAC) address settings, QoS settings, and 802.1Qbg settings, or IEEE settings and click **Close**.

8. To remove the adapter settings, complete the following steps:

   a) Select the adapter that you want to remove and click **Action** > **Remove Virtual Ethernet Adapter Settings**. Alternatively, you can right-click the adapter and select **Remove Virtual Ethernet Adapter Settings**.

   b) When you are prompted to confirm the removal, click **OK**.

Creating trunk adapters

When the Hardware Management Console (HMC is at version 8.7.0, or later, you can create trunk adapters for an IBM i logical partition.

About this task

To create a trunk adapter by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** pane, click **Virtual I/O** > **Virtual Networks**. The **Virtual Networks** page opens. You can use the left and right arrow key buttons to switch between **Network(s)** and **Adapter(s)** views. The **Network(s)** view is the default view.
5. In the **Virtual Networks** work pane, click the right arrow key button to select **Adapter(s)** view. The currently available virtual Ethernet adapters and trunk adapters for the partition are listed in a table.
6. Click **Create Trunk Adapter**. The **Create Trunk Adapter** page is displayed. You can add a trunk adapter to an IBM i logical partition.
7. Optional: Click **View Existing Virtual Networks** to view the list of all existing virtual networks on the managed system.
8. In the **Port VLAN ID** field, enter the VLAN ID on which the trunk adapter must be created.

9. In the **Virtual Switch** field, select a virtual switch that can be assigned to the trunk adapter from the list of virtual switches that are configured on the managed system.
10. In the **Trunk Priority** field, set the trunk priority for the trunk adapters to either 1 or 2.
11. In the **MAC Address** field, enter the MAC address.
12. In the **OS MAC Address Restrictions** field, specify the MAC address restrictions. The available values are **Allow all**, **Deny all**, and **Allow Specified**.
13. In the **QoS Settings** section, select the **Enable QoS Setting** option, if you want to provide different priorities to different applications, users, or data flows to maintain the performance of the network. The value for the priority level ranges in the range 0 - 7.
14. In the **IEEE Settings** section, select **IEEE 802.11q Compatibility** if you need additional VLANs to be supported on an Ethernet network. Alternatively, you can clear the **IEEE 802.1q Compatibility** check box if you do not need additional VLANs for the trunk adapter.

    If you select **IEEE 802.1q Compatibility**, the **802.11q VLAN ID** field is displayed. You can select additional VLAN IDs.
15. Click **OK**.

Managing virtual network connections in network view

You can manage the PowerVM virtual network connections that are assigned to a partition in the network view by using the Hardware Management Console (HMC).

About this task

To manage the virtual network connections in the network view by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** pane, click **Virtual I/O** > **Virtual Networks**. The **Virtual Networks** page is displayed. You can use the left and right arrow key buttons to switch between **Network(s)** and **Adapter(s)** views. The **Network(s)** view is the default view. The currently available virtual network connections for the partition are listed in a table, with the details about the virtual network name, VLAN ID, virtual switch, virtual network bridge, and virtual Ethernet adapter ID that are associated with each virtual network. You can attach new virtual networks by clicking **Attach Virtual Network**. You can also detach an existing virtual network by selecting the virtual network that you want to remove and by using the **Action** menu.
5. To attach a virtual network click **Attach Virtual Network**. All virtual networks that are discovered by the managed system are displayed in a table. The table lists all the assigned virtual networks, the VLAN ID, the virtual switch, the network bridge name to which the virtual network is attached.
6. To attach an existing virtual network to a partition, complete the following steps:
    a) Select **Show and attach new virtual Ethernet adapters**.
    b) Select the check box near the name of the virtual network that you want to connect to the logical partition.
    c) In the **Virtual Ethernet Adapter ID** field, enter the virtual Ethernet adapter ID.
    d) Click **OK**.
7. To remove a virtual network from the partition, complete the following steps:

a) In the **Virtual Networks** table, select the virtual network that you want to remove and click **Action** > **Detach**. Alternatively, you can right-click the virtual network and select **Detach**. The **Detach Virtual Network** page is displayed.

b) In the **Virtual Ethernet Adapters** table, select the check box near the name of the virtual network that you want to remove.

c) Click **OK**.

Managing virtual storage for a partition

Learn about managing virtual storage for a partition.

You can use the Hardware Management Console (HMC) to complete the following storage tasks on a partition:

- Managing virtual storage for a partition in Adapter view.
  - Creating virtual SCSI and virtual Fibre Channel adapters
  - Removing virtual SCSI and virtual Fibre Channel adapters
- Managing virtual storage for a partition in Storage view.
  - Managing virtual SCSI resources for a partition
  - Viewing virtual Fibre Channel assignment
  - Optical device assignment

Managing virtual storage for a partition in adapter view

You can create, view, and manage virtual storage allocated to a partition by using the Hardware Management Console (HMC).

You can add the required virtual storage resources to a partition. In the **Virtual Storage** work pane, you can use the left and right arrow key buttons to switch between **Storage View** and **Adapter View**. Click the right arrow key button to select **Adapter View**. In the **Adapter View**, you can view the adapter configuration of the virtual storage devices that are allocated for the logical partition. The **Adapter View** provides a mapping of the adapters to the physical storage device in a logical partition.

In the **Adapter View**, you can create, view, and manage the properties of virtual Small Computer Serial Interface (SCSI) and Virtual Fibre Channel (VFC) adapters for the partition on the managed system. You can also add different types of storage devices to the logical partition. To launch the **Add Virtual SCSI Device** page, select an adapter from the list available in the table and click **Action** > **Add Client Device**. Alternatively, you can right-click the adapter and select **Add Client Device**. For more information, see "Managing virtual SCSI resources for a partition" on page 93.

Creating IBM i or Virtual I/O Server hosted Virtual SCSI adapters

When the Hardware Management Console (HMC is at version 8.7.0, or later, you can view and manage the IBM i or Virtual I/O Server hosted virtual SCSI adapters for the partition.

To add an IBM i or Virtual I/O Server hosted virtual SCSI adapter, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Partitions**. In the **Partitions** page, you can view all the partitions that belong to the system.
4. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
5. In the **Properties** pane, click **Virtual I/O** > **Virtual Storage**.

6. In the **Virtual Storage** work pane, click the right arrow key button to select **Adapter View**. The **Virtual SCSI Adapters** tab is displayed by default.

7. In the **IBM i / Virtual I/O Server Virtual SCSI Adapters** section, click **Create Adapter**. The **Create Virtual SCSI Adapter** window is displayed.

8. From the **Remote Partition Type** option, select **IBM i** or **Virtual I/O Server**.

9. In the **Adapter ID** field, enter the adapter ID.

   Note: If you do not want to specify an adapter ID, you can continue the procedure with the adapter ID that is populated automatically in the **Adapter ID** field. The adapter ID displayed in this field is the next available slot ID for the virtual SCSI client adapter that is being created.

10. From the **Remote Partition** list, select an IBM i or Virtual I/O Server partition to which the virtual SCSI client adapter connects.

    • If you have selected IBM i from the **Remote Partition Type** option, select an IBM i partition from the **Remote Partition** list. The list displays all the IBM i partitions that are available in the managed system for creating the virtual SCSI adapter.

    • If you have selected **Virtual I/O Server** from the **Remote Partition Type** option, select a virtual I/O server partition from the **Remote Partition** list. The list displays all the VIOS partitions that are available in the managed system for creating the virtual SCSI adapter.

11. By default, the **Remote Adapter** check box is enabled which means both the client and the server adapters are created. If you want to create only the client adapter, clear the **Remote Adapter** check box.

12. If the client partition is an IBM i partition, and you want to create only the server adapter, you can select the adapter type. From the **Adapter Type** option, select **Client** or **Server**. The **Remote Partition Type** is disabled if you select **Server** from the **Adapter Type** option.

13. From the **Remote Adapter ID** list, select the remote adapter ID. The remote slot number of the selected IBM i or Virtual I/O Server partition is displayed in the **Remote Partition ID** field. This field is populated automatically with the next available slot ID, which is based on the IBM i or Virtual I/O Server partition that is selected for creating the virtual SCSI server adapter. Alternatively, you can click **Populate existing usable Remote Adapter IDs**. All server adapters that exist in the selected IBM i or Virtual I/O Server partition, and which are not connected to any logical partition, are displayed in the **Remote Adapter ID** field.

14. Click **OK** to apply the changes. Alternatively, you can click **Cancel** to reject the changes and to close the window.

You can remove the virtual SCSI adapter that is configured for a logical partition. Select the virtual SCSI adapter that you want to remove from the **Virtual SCSI Adapters** list, and click **Action** > **Remove**. Click **OK** when prompted.

Creating Virtual I/O Server hosted Virtual Fibre Channel Adapter

To create a Virtual I/O Server hosted Virtual Fibre Channel (VFC) adapter, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Systems**. The **All Systems** page is displayed.

3. In the work pane, select a system and click **Actions** > **View System Partitions**. In the **Partitions** page, you can view all the partitions that belong to the system.

4. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.

5. In the **Properties** pane, click **Virtual I/O** > **Virtual Storage**.

6. In the **Virtual Storage** work pane, click the right arrow key button to select **Adapter View**. The **Virtual SCSI Adapters** tab is displayed by default.

7. Select **Virtual Fibre Channel Adapters** tab. A list of virtual Fibre Channel assignments to a partition is displayed.

8. In the **Virtual FC Adapters** section, click **Create Adapter**. The **Create Virtual Fibre Channel Adapter** window is displayed.

9. In the **Adapter ID** field, enter the adapter ID.

   Note: If you do not want to specify an adapter ID, you can continue the procedure with the adapter ID that is populated automatically in the **Adapter ID** field. The adapter ID displayed in this field is the next available slot ID for the virtual Fibre Channel adapter that is being created.

10. From the **Remote Partition** list, select a Virtual I/O Server partition to which the virtual Fibre Channel adapter connects. The list displays all the VIOS partitions that are available in the managed system for creating the virtual Fibre Channel adapter.

11. From the **Remote Adapter ID** list, select the remote adapter ID. The remote slot number of the selected Virtual I/O Server partition is displayed in the **Remote Partition ID** field. This field is populated automatically with the next available slot ID, which is based on the Virtual I/O Server partition that is selected for creating the virtual Fibre Channel adapter. Alternatively, you can click **Populate existing usable Remote Adapter IDs**. All server adapters that exist in the selected Virtual I/O Server partition, and which are not connected to any logical partition, are displayed in the **Remote Adapter ID** field.

12. Click **OK** to apply the changes. Alternatively, you can click **Cancel** to reject the changes and to close the window.

You can remove the virtual Fibre Channel adapter that is configured for a logical partition. Select the virtual Fibre Channel adapter that you want to remove from the **Virtual FC Adapters** list, and click **Action** > **Remove**. Click **OK** when prompted.

Managing virtual storage for a partition in storage view

You can create, view, and manage virtual storage allocated to a partition by using the Hardware Management Console (HMC).

You can add the required virtual storage resources to a partition. In the **Virtual Storage** work pane, you can use the left and right arrow key buttons to switch between the **Storage View** and **Adapter View**. Click the left arrow key button to select **Storage View**. In the **Storage View**, you can view and manage the storage capability of the logical partition. The **Storage View** is the default view.

In the **Storage View**, you can view and manage the virtual SCSI adapters, VFC adapters, and the virtual optical devices that are configured to a logical partition.

Managing virtual SCSI resources for a partition
You can assign virtual Small Computer Serial Interface (SCSI) resources to a partition by using the Hardware Management Console (HMC).

Using the virtual SCSI adapter, client partitions can share disk storage and optical devices that are assigned to the Virtual I/O Server (VIOS) partition.

You can add different types of virtual storage to the PowerVM® configuration such as, **Physical Volume**, **Shared Storage Pool Volume**, or **Logical Volume**. By default, the **Physical Volume** table is displayed.

You can view the device mapping details of the storage devices in a logical partition. Right-click on the storage device and select View Device Mapping. The storage device details and the connected Virtual I/O Server details are displayed.

You can also add the Virtual I/O Server to provide an adapter connection. Click Edit Connections and select the Virtual I/O Server and the server adapters to provide the adapter connection.

The Virtual SCSI tab displays the end to end mapping for the virtual SCSI that includes the server adapter, client adapter, and the storage that is used by the virtual SCSI adapter that is configured for a particular logical partition. You can also remove the client or server adapter that is configured for the particular partition.

Adding virtual SCSI devices

You can add different types of virtual storage, such as a physical volume, a shared storage pool volume, or a logical volume from the Virtual SCSI tab in the Storage View. Only the virtual storage devices assigned to the PowerVM configuration are displayed here.

Adding a Physical Volume

To add a physical volume, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Partitions**. In the **Partitions** page, you can view all the partitions that belong to the system.
4. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
5. In the **Properties** page, click **Virtual I/O** > **Virtual Storage**.
6. In the **Virtual SCSI** tab, click **Add Physical Volume**. The **Add Physical Volume** page opens and the physical volumes table is displayed.
7. Select physical volumes from the list available in the table.

   Note: You can select the **Show in use physical volumes** check box to see the assigned physical volumes. You can also click **Run ConfigDevice** to refresh the list of physical volumes

8. Specify the Target Name for the physical volume that you want to add to the partition.
9. Click **Edit Connection** if you want to change the server Adapter ID and client Adapter ID that are assigned to the physical volume. The **Edit Connection** page opens. You can enter a server Adapter ID and client Adapter ID.
10. Select the **Virtual I/O servers** to provide an adapter connection. You can select up to three Virtual I/O Servers.
11. Enter a **Server Adapter ID** and a **Client Adapter ID** that you want to assign for the adapter connection, or click **Use Existing Adapters** to select a server adapter ID from the list.

    Note: If you clicked **Use Existing Adapters**, you cannot modify the client Adapter ID as the client Adapter ID is automatically assigned to the VIOS.
12. Click **OK** to assign the physical volume to the partition.

Adding a Shared Storage Pool Volume

To add a Shared Storage Pool volume, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select a system and click **Actions** > **View System Partitions**. In the **Partitions** page, you can view all the partitions that belong to the system.
4. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
5. In the **Properties** page, click **Virtual I/O** > **Virtual Storage**.
6. In the **Virtual SCSI** tab, click **Shared Storage Pool Volume**. The **Shared Storage Pool Volumes** table is displayed.
7. Click **Add Shared Storage Pool Volume**. The **Add Shared Storage Pool Volume** page is displayed.

8. Select a **Storage Cluster** from the list.

9. Select **Add new Shared Storage Pool Volume** to add a Shared Storage Pool volume or select **Add existing Shared Storage Pool volume**.

   - If you chose to add a new Shared Storage Pool volume, select the tier to which the new SSP volume is associated and enter a device name and size. Select the VIOS connections that are assigned to the PowerVM configuration.

   - If you chose to add an existing Shared Storage Pool (SSP) volume, select an existing SSP volume. Select the VIOS connections that are assigned to the PowerVM configuration.

10. Click **Edit Connection** if you want to change the server Adapter ID and client Adapter ID that are assigned to the shared storage pool volume. The **Edit Connection** page opens. You can enter a server Adapter ID and client Adapter ID.

11. Select the **Virtual I/O servers** to provide an adapter connection. You can select up to three Virtual I/O Servers.

12. Enter a **Server Adapter ID** and a **Client Adapter ID** that you want to assign for the adapter connection, or click **Use Existing Adapters** to select a server adapter ID from the list.

    Note: If you clicked **Use Existing Adapters**, you cannot modify the client Adapter ID as the client Adapter ID is automatically assigned to the VIOS.

13. Select **Shared Storage Pool Volumes** to view the SSP volumes that are already assigned to the existing logical partition

14. Click **OK** to assign the Shared Storage Pool volume to the partition.

Adding a Logical Volume

To add a Logical volume, complete the following steps:

1. In the navigation pane, click the **Resources** icon .

2. Click **All Systems**. The **All Systems** page is displayed.

3. In the work pane, select a system and click **Actions** > **View System Partitions**. In the **Partitions** page, you can view all the partitions that belong to the system.

4. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.

5. In the **Properties** page, click **Virtual I/O** > **Virtual Storage**.

6. In the **Virtual SCSI** tab, click **Logical Volume**. The **Logical Volume** table is displayed.

7. Click **Add Logical Volume** to add logical volumes to a partition. The **Add Logical Volume** page is displayed.

8. Select a volume group from the table.

9. Select **Add new logical volume** to add a logical volume or select **Add an existing logical volume**.

   - If you chose to add a new logical volume, enter a device name and size.

   - If you chose to add an existing logical volume, select an existing device name.

10. Click **Edit Connection** if you want to change the server Adapter ID and client Adapter ID that are assigned to the logical volume. The **Edit Connection** page opens. You can enter a server Adapter ID and client Adapter ID.

11. Select the **Virtual I/O servers** to provide an adapter connection. You can select up to three Virtual I/O Servers.

12. Enter a **Server Adapter ID** and a **Client Adapter ID** that you want to assign for the adapter connection, or click **Use Existing Adapters** to select a server adapter ID from the list.

    Note: If you clicked **Use Existing Adapters**, you cannot modify the client Adapter ID as the client Adapter ID is automatically assigned to the VIOS.

13. Click **OK** to assign the Logical volume to the partition.

Viewing virtual Fibre Channel assignments to a partition
You can view the virtual Fibre Channel resources that are assigned to a partition by using the Hardware Management Console (HMC).

About this task

To view the virtual Fibre Channel resources that are assigned to a partition by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** pane, click **Virtual I/O** > **Virtual Storage**. The **Virtual Storage** page is displayed.
5. Click the **Virtual Fibre Channel** tab. The **Virtual Fibre Channel** page opens. You can use the left and right arrow key buttons to switch between the **Storage View** and **Adapter View**. The **Storage View** view is the default view. The table displays all the virtual Fibre Channel resources assigned to the partition. Only the virtual Fibre Channel resources assigned to the PowerVM configuration are displayed.
6. In the **Virtual Storage** work pane, click the right arrow key button to select **Adapter View**.
7. Select **Virtual Fibre Channel Adapters** tab. A list of virtual Fibre Channel assignments to a partition is displayed.

Assigning virtual Fibre Channel storage to a partition
You can assign virtual Fibre Channel storage to a partition by using the Hardware Management Console (HMC).

About this task

To assign virtual Fibre Channel storage to a partition by using an HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** pane, click **Virtual I/O** > **Virtual Storage**. The **Virtual Storage** page opens.
5. Click the **Virtual Fibre Channel** tab. The **Virtual Fibre Channel** page opens in **Storage View**.
6. Click **Add Virtual Storage**. The **Add Virtual Fibre Channel** page opens.
7. Select a Virtual storage type from the **Virtual I/O Server** list.
8. Select Fibre Channel ports from the **Fibre Channel port** list available in the selected **VIOS**.

    Note: You can click **Edit connection** to manually configure the **Virtual Fibre Channel** adapter settings for the connection. Enter the **WWPN** details and the **Server Adapter ID**.
9. Click **Save**. The Fibre Channel port is assigned to the partition.

Optical device assignment

You can manage the optical devices that are assigned to partitions by using the Hardware Management Console (HMC).

Viewing virtual optical devices
You can view the virtual optical devices that can be assigned to a partition by using the Hardware Management Console (HMC).

About this task
To view the virtual optical devices by using an HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** pane, click **Virtual I/O** > **Virtual Storage**. The **Virtual Storage** page opens.
5. Click the **Virtual Optical Device** tab. A list of virtual optical devices that are assigned to the selected partition is displayed.
6. To view the mapping of a virtual optical device, click a virtual optical device and select **View Device Mapping**.

   In the **Virtual Optical Device** area, you can view details such as the device name, the media file, and the size in GB. In the **Virtual I/O Server** area, you can view the client adapter name and the server adapter name.
7. Click **Close**.

Adding virtual optical devices
You can add virtual optical devices to a partition by using the Hardware Management Console (HMC).

About this task
To add a virtual optical device, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** pane, click **Virtual I/O** > **Virtual Storage**. The **Virtual Storage** page opens.
5. Click the **Virtual Optical Device** tab.
6. Click the **Add Virtual Storage** tab. The **Add Virtual Storage** page opens.
7. In the **Device Name** field, enter the device name and select the Virtual I/O Server from the table.
8. Click **OK**.
9. Optional:

10. You can select the server adapter ID to provide an adapter connection. Otherwise, the next available server adapter ID is used.

   a) To select the server adapter ID, click **Edit Connections**.

   b) From the **Server Adapter ID** list, select the server adapter ID.

11. Click **OK**. The virtual optical device is added to the partition.

12. Click **Close**.

Removing virtual optical devices

You can remove a virtual optical device that is assigned to a partition by using the Hardware Management Console (HMC).

About this task

To remove a virtual optical device by using an HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .

2. Click **All Systems**. The **All Systems** page is displayed.

3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.

4. In the **Properties** pane, click **Virtual I/O** > **Virtual Storage**. The **Virtual Storage** page opens.

5. Click the **Virtual Optical Device** tab.

6. Select a virtual device and click **Remove** When the device to be removed is assigned to a running partition, you are prompted with a message to verify whether you want to continue to remove the device.

7. Click **OK** to remove the device, or click **Cancel** to exit the operation.

8. Click **Close**.

Loading and unloading media files

You can load or unload media files to or from virtual optical devices by using the Hardware Management Console (HMC).

About this task

To load or unload a media file to or from a virtual optical device by using an HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .

2. Click **All Systems**. The **All Systems** page is displayed.

3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.

4. In the **Properties** pane, click **Virtual I/O** > **Virtual Storage**. The **Virtual Storage** page opens.

5. Click the **Virtual Optical Device** tab.

6. Select a virtual device and click **Load**.

7. Select the media file to assign to partition and click **OK**.

Note: If there is a mount error, a message is displayed.

8. Click **Close**.
9. To remove a media file that is assigned to a partition, select the virtual optical device and click **Unload**.

Managing hardware virtualized I/O adapters

You can view and change the settings of hardware virtualized I/O adapters, such as single root I/O virtualization (SR-IOV) port adapters and logical host Ethernet adapters (LHEA) for a partition by using the Hardware Management Console (HMC).

SR-IOV logical port settings

You can add, change, and remove single root I/O virtualization (SR-IOV) logical ports that are configured on a partition by using the Hardware Management Console (HMC).

Adding SR-IOV logical ports
You can add single root I/O virtualization (SR-IOV) logical ports to a partition by using the Hardware Management Console (HMC).

Before you begin

About this task
To add an SR-IOV port to a partition by using an HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** pane, click **Virtual I/O** > **Hardware Virtualized I/O**. The **Hardware Virtualized I/O** page opens.
5. On the **SR-IOV** tab, click **Add Port**. The **Add SR-IOV Logical Port** page opens.
6. In the **Add SR-IOV Logical Port** page, select **Ethernet** or **RoCE** from the **Select Logical Port Type** option button.
7. Click **Select an SR-IOV physical port**. The **Physical Ports** page is displayed.
8. In the **Physical Ports** page, select a physical port from the list of available physical ports, and click **OK**.
9. In the **Logical port capacity** field, enter the capacity value in percentage for the logical port.

   Note: The sum of percentage of capacity values for all the configured logical ports on a physical port must be less than or equal to 100%. To minimize the configuration effort when you add more logical ports, you can reserve some capacity for the additional logical ports.
10. Expand **Advanced settings** to view the advanced setting options for the SR-IOV adapter.
11. Select the **Promiscuous Mode** check box, if you want to enable the settings for the SR-IOV port. These settings are disabled by default.

    Note: You must select the **Promiscuous Mode** checkbox, if you want to virtualize the logical port even further, such as, if you want to use the logical port as the network adapter for shared Ethernet adapter (SEA).

12. Select the **Migratable** check box to configure SR-IOV logical ports in a client partition and to mark the SR-IOV logical port as migratable by creating a new backup device, which can either be a virtual Ethernet adapter or a virtual NIC adapter.

   a) Select the **Configure a new back backup device** option to configure a new backup device. By default, this setting is enabled.

     i) Select **Virtual Ethernet Adapter** or **Virtual NIC Adapter** from the **Backup Device Type** option. By default, the **Virtual NIC Adapter** option is enabled.

     ii) Click **Configure backup device**. The **Configure Virtual NIC Backing Device** page is displayed.

       • In the **Physical Port Location Code** tab, select a physical port that you want as a backup port for the migratable logical port from the list.

       • In the **Hosting Partition** tab, select a hosting VIOS from the hosting partition list.

       • In the **Capacity** tab, select the appropriate capacity from the capacity list.

       • Click **OK** to apply the changes. Alternatively, click **Cancel** to reject the changes and to close the window.

     iii) Optional: If you have selected **Virtual Ethernet Adapter** from the **Backup Device Type** option, the **Attach Virtual Network** page is displayed.

       • Select a virtual network that you want as a backup network for the migratable logical port from the list of available virtual networks.

       • Click **OK** to apply the changes. Alternatively, click **Cancel** to reject the changes and to close the window.

   Note: When the HMC is at Version 9.1.940.x, and when the firmware is at level FW940, the Migratable option for the Hybrid Network Virtualization capability is available as a Technology Preview only and is not intended for production deployments. However, when the HMC is at Version 9.1.941.0, or later, and when the firmware is at level FW940.10, or later, the Migratable option for the Hybrid Network Virtualization capability is supported.

13. From the **OS MAC Address Restrictions** list, select an option for the OS MAC address restrictions.
14. From the **VLAN ID Restrictions** list, select an option for the OS VLAN ID restrictions.
15. In the **Port VLAN ID** field, enter a value. The valid range is 2 - 4094.

   Note: The default value of Port VLAN ID is 0. If you enter a non-zero value in the Port VLAN ID field, the 802.1Q Priority field becomes available.

16. In the **802.1Q Priority** field, enter any value from 0 - 7, where 0 indicates the lowest priority and 7 indicates the highest priority value.
17. Click **OK**. The SR-IOV port is added to the partition.

Changing SR-IOV logical ports

You can change the settings of single root I/O virtualization (SR-IOV) logical ports on a partition by using the Hardware Management Console (HMC).

About this task
To change the settings of an SR-IOV port by using an HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.

4. In the **Properties** pane, click **Virtual I/O** > **Hardware Virtualized I/O**. The **Hardware Virtualized I/O** page opens.

5. Click the **SR-IOV** tab. A list of SR-IOV logical ports that are configured for the selected partition is displayed.

6. Right click an SR-IOV logical port that you want to change and select **Modify Logical Port**. The **Modify SR-IOV Logical Port** page opens.

   Note: Diagnostic mode can be set only if other logical ports are not associated with the physical port.

7. Select the **Diagnostic Mode** check box to enable or disable the setting.

8. If the **OS MAC Address Restrictions** option indicates **Allow Specified**, you can add MAC addresses to the **Specify allowed MAC Addresses** list.

9. If the **VLAN ID Restrictions** option indicates **Allow Specified**, you can add VLAN IDs to the **Specified VLAN IDs or range** list.

10. In the **Port VLAN ID** field, enter a value to change the existing value. The valid range is 2 - 4094.

    Note: The default value of Port VLAN ID is 0. If you enter a non-zero value in the Port VLAN ID field, the 802.1Q Priority field becomes available.

11. In the **802.1Q Priority** field, enter any value from 0 - 7, where 0 indicates the lowest priority and 7 indicates the highest priority value.

12. Click **OK** to save the changes that you made for the SR-IOV logical port settings.

Removing SR-IOV logical ports
You can remove single root I/O virtualization (SR-IOV) logical ports from a partition by using the Hardware Management Console (HMC).

About this task
To remove an SR-IOV port by using an HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .

2. Click **All Systems**. The **All Systems** page is displayed.

3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.

4. In the **Properties** pane, click **Virtual I/O** > **Hardware Virtualized I/O**. The **Hardware Virtualized I/O** page opens.

5. Click the **SR-IOV** tab. A list of SR-IOV logical ports that are configured for the selected partition is displayed.

6. Right-click an SR-IOV logical port that you want to remove and select **Remove Logical Port** > **OK**.

   Note: If the selected partition is powered on, the SR-IOV logical port needs to be deconfigured in the selected partition before being removed.

Results

The selected SR-IOV logical port is removed.

Logical host Ethernet adapter (LHEA) settings

You can view, add, change, and remove logical host Ethernet adapters (LHEAs) that are configured on a partition by using the Hardware Management Console (HMC).

An LHEA is a representation of a physical HEA on a partition. An LHEA appears to the operating system as a physical Ethernet adapter, just as a virtual Ethernet adapter appears as a physical Ethernet adapter. Each partition can have one LHEA for each physical HEA on the managed system. Each LHEA can have one or more logical ports, and each logical port can connect to a physical port on the HEA.

Adding logical host Ethernet adapters
You can add logical host Ethernet adapters (LHEAs) to a partition by using the Hardware Management Console (HMC).

About this task
You can select an LHEA from the list and add it to the partition with the required settings.

Procedure

To add an LHEA adapter to a partition, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** pane, click **Virtual I/O** > **Hardware Virtualized I/O**. The **Hardware Virtualized I/O** page opens.
5. Click the **HEA** tab.
6. Click **Add Adapter**. The **Add LHEA Adapter** page opens.
7. From the list of physical ports, select the physical port to associate with the LHEA adapter. The list of physical ports is not displayed if there are no available ports.
8. Expand **Advanced Settings**.
9. From **MAC Address settings** option, select the MAC address settings.
10. From **VLAN ID Settings** option, select the VLAN ID settings .

    Note: The advanced settings are available only if the partition is QoS capable.
11. Click **OK**.

Results
The LHEA adapter is added to the partition.

Modifying logical host Ethernet adapter ports
You can change the settings of logical host Ethernet adapter (LHEA) ports on a partition by using the Hardware Management Console (HMC).

About this task
You can select an LHEA from the list and change it with the required settings.

Procedure

To change LHEA port settings, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** pane, click **Virtual I/O** > **Hardware Virtualized I/O**. The **Hardware Virtualized I/O** page opens.
5. Click the **HEA** tab. A list of LHEAs configured for the selected partition is displayed.
6. Right-click an LHEA adapter that you want to change and select **Modify Port**. The **Modify Logical Host Ethernet Adapter Port** page opens.
7. Select the **Dedicated Mode** check box if you want to make the LHEA port dedicated to the assigned partition.
8. From the **MAC Address Settings** list, change the MAC address settings.
9. From the **VLAN ID Settings** list, change the VLAN ID settings.
10. Click **OK** to save the changes for the LHEA port.

Results
The LHEA port settings are saved.

Removing logical host Ethernet adapter ports
You can remove logical host Ethernet adapter (LHEA) ports from a partition by using the Hardware Management Console (HMC).

About this task
You can select an LHEA from the list and remove it from the partition.

Procedure

To remove an LHEA port, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** pane, click **Virtual I/O** > **Hardware Virtualized I/O**. The **Hardware Virtualized I/O** page opens.
5. Click the **HEA** tab. A list of LHEA ports that are configured for the selected partition is displayed.
6. Right-click an LHEA port and select **Remove Port**.
7. Click **OK**. The selected LHEA port is removed after confirmation.

Results
The selected LHEA port is removed.

Managing host channel adapters on a partition

Host channel adapters (HCAs) provide port connections from a managed system to other devices. You can connect the port to another HCA, a partition, or a switch that redirects the incoming data from one port to a device that is attached to another port.

About this task

You can view a list of the HCAs on a partition that is managed by the Hardware Management Console (HMC). You can select an HCA from the list to display the current partition usage for the HCA.

Procedure

To manage HCA settings, complete the following steps:

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**. The **All Systems** page is displayed.
3. In the work pane, select the partition for which you want to view or change the properties and capabilities and click **Actions** > **View Partition Properties**. The **Properties** page is displayed. You can view and change the properties that are listed under the **Properties** area.
4. In the **Properties** pane, click **Virtual I/O** > **Hardware Virtualized I/O**. The **Hardware Virtualized I/O** page opens.
5. In the work pane, click the **HCA** tab.
6. Click **Launch Manage Host Channel Adapters**. A window opens with the list of HCAs in a table.
7. From the table, select an HCA to display the current partition usage.
8. Click **OK**.

Viewing topology diagrams of a system

Learn how to view all the topology diagrams of a system.

You can use the Hardware Management Console (HMC) to view the topology diagrams of a system.

Viewing virtual networking diagrams

You can view the end-to-end network configuration for the selected system, by using the HMC. The view of the virtual networks begins with the physical adapter cards and the physical ports that are connected to them. As you scroll down, you can see the defined virtual bridges, link aggregation devices, virtual switches, virtual networks, and partitions in the VIOS.

About this task

You can click a resource and drag to pan across the diagram. You can also double-click a resource to highlight that resource and the relationship between its various virtual and physical components in the network. To remove the highlighting, double-click in an empty area of the network diagram. To view more detailed information about a resource, you can right-click a resource and additional information is displayed in a click card. Alternatively, you can hover over the label of a resource area to display the name of the resource as a tooltip.

To view the end-to-end network configuration for the selected system by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .

2. Click **All Systems**.

   The **All Systems** page is displayed.

3. In the work pane, select the system in which the partition is located and click **Actions** > **View System Partitions**. The configuration page opens. You can view the configuration details of the system you selected.

4. In the navigation pane, click **Topology** > **Virtual Networking Diagram** to view the end-to-end network configuration for the selected system.

5. Right-click a resource for the selected system to view more detailed information in a click card. You can also hover over the label of a resource area to display the name of the resource as a tooltip.

6. In the upper-right corner of the work pane, click the **zoom in** and **zoom out** icons to achieve the required level of magnification.

   Note: You can also zoom in and zoom out by using the scroll wheel on the mouse from within the diagram.

7. In the upper-right corner of the work pane, click the **Legend** icon to view an explanation of the symbols used in the virtual networking diagram.

Viewing virtual storage diagrams

Two types of virtual storage diagrams are available - systems storage and partition storage. You can view the virtual storage configuration for the selected system, including the physical and virtual components of system storage, by using the HMC. You can also view the virtual storage configuration for a single partition in a particular system, including the physical and virtual components of storage assigned to that particular partition, by using the HMC.

About this task

This diagram displays a high-level overview of the contents of the system or a single partition, and not specific component relationships. You can click a resource and drag to pan across the diagram. You can also double-click a resource to highlight that resource and the relationship between its various virtual and physical components in the network. To remove the highlighting, double-click in an empty area of the storage diagram. To view more detailed information about a resource, you can right-click a resource and additional information is displayed in a click card. Alternatively, you can hover over the label of a resource area to display the name of the resource as a tooltip.

To view the virtual storage configuration for the selected system or a single partition by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon   .

2. Click **All Systems**.

   The **All Systems** page is displayed.

3. In the work pane, select the system in which the partition is located and click **Actions** > **View System Partitions**. The configuration page opens. You can view the configuration details of the system you selected.

4. In the navigation pane, click **Topology** > **Virtual Storage Diagram** to view the virtual storage configuration for the selected system.

   Note: To view the virtual storage diagrams of a single partition in a particular system, select the partition of your choice and then click **Topology** > **Partition Virtual Storage Diagram**.

5. Right-click a resource for the selected system to view more detailed information in a click card. You can also hover over the label of a resource area to display the name of the resource as a tooltip.

6. In the upper-right corner of the work pane, click the **zoom in** and **zoom out** icons to achieve the required level of magnification.

   Note: You can also zoom in and zoom out by using the scroll wheel on the mouse from within the diagram.

7. In the upper-right corner of the work pane, click the **Legend** icon to view an explanation of the symbols used in the virtual storage diagram.

Viewing SR-IOV and vNIC diagrams

You can view the SR-IOV and virtual Network Interface Controllers (vNIC) configuration for the selected system, including the physical and virtual components, by using the HMC.

About this task

This diagram displays the relationships between SR-IOV adapters and other virtual components, such as vNIC. You can click a resource and drag to pan across the diagram. You can also double-click a resource to highlight that resource and the relationship between its various virtual and physical components in the network. To remove the highlighting, double-click in an empty area of the SR-IOV and vNIC diagram. To view more detailed information about a resource, you can right-click a resource and additional information is displayed in a click card. Alternatively, you can hover over the label of a resource area to display the name of the resource as a tooltip.

To view the SR-IOV and vNIC configuration for the selected system by using the HMC, complete the following steps:

Procedure

1. In the navigation pane, click the **Resources** icon .
2. Click **All Systems**.

   The **All Systems** page is displayed.
3. In the work pane, select the system in which the partition is located and click **Actions** > **View System Partitions**. The configuration page opens. You can view the configuration details of the system you selected.
4. In the navigation pane, click **Topology** > **SR-IOV and vNIC Diagram** to view the SR-IOV and vNIC configuration for the selected system.
5. Right-click a resource for the selected system to view more detailed information in a click card. You can also hover over the label of a resource area to display the name of the resource as a tooltip.
6. In the upper-right corner of the work pane, click the **zoom in** and **zoom out** icons to achieve the required level of magnification.

   Note: You can also zoom in and zoom out by using the scroll wheel on the mouse from within the diagram.

7. In the upper-right corner of the work pane, click the **legend** icon to view an explanation of the symbols used in the SR-IOV and vNIC diagram.

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Accessibility features assist users who have a disability, such as restricted mobility or limited vision, to use information technology content successfully.

Overview

The IBM Power Systems servers include the following major accessibility features:

- Keyboard-only operation
- Operations that use a screen reader

The IBM Power Systems servers use the latest W3C Standard, WAI-ARIA 1.0 (www.w3.org/TR/wai-aria/), to ensure compliance with US Section 508 (www.access-board.gov/guidelines-and-standards/communications-and-it/about-the-section-508-standards/section-508-standards) and Web Content

Accessibility Guidelines (WCAG) 2.0 (www.w3.org/TR/WCAG20/). To take advantage of accessibility features, use the latest release of your screen reader and the latest web browser that is supported by the IBM Power Systems servers.

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Keyboard navigation

This product uses standard navigation keys.

Interface information

The IBM Power Systems servers user interfaces do not have content that flashes 2 - 55 times per second.

The IBM Power Systems servers web user interface relies on cascading style sheets to render content properly and to provide a usable experience. The application provides an equivalent way for low-vision users to use system display settings, including high-contrast mode. You can control font size by using the device or web browser settings.

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