System i and System p

Partitioning for Linux with an HMC

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Note

Before using this information and the product it supports, read the information in "Notices" on page 221 and the *IBM Systems Safety Information* manual, G229-9054.

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Contents

About this topic

This topic describes how to use a Hardware Management Console (HMC) to create and maintain Linux® logical partitions on IBM® System i5®, System p5®, eServer™ i5, and eServer p5 hardware.

For information about the accessibility features of this product, for users who have a physical disability, see "Accessibility features," on page 219.

Partitioning for Linux with an HMC

Learn how to configure and manage partitions that run the Linux operating system.

The process of getting Linux partitions up and running on IBM Systems and eServer hardware begins with Planning for logical partitions. If you already have Linux for POWER™ installed on IBM Systems and eServer hardware, you may want to proceed to Migrating a Linux installation.

To use logical partitions on an IBM eServer OpenPower® system, you need the appropriate Advanced POWER® Virtualization technologies activated in your system's Hardware Management Console.

Related concepts

"Planning for logical partitions" on page 43
IBM hardware architectures allow you to create logical partitions to distribute resources within a single server and make it function as if it were two or more independent servers. Before creating logical partitions (LPARs), you need to plan for several variables that are specific to your solution. You need to understand how you can reconfigure partitions to respond to future needs.

"Migrating a Linux installation" on page 166
Learn about the options and requirements for upgrading or migrating a Linux installation from an System i® system or a System p® system to an IBM eServer hardware system.

Related information

Advanced POWER Virtualization

What's new for Partitioning the server

Enhancements relating to partitioning in general have been made with this release.

Partitioning using version 7 or later of the HMC

New articles give instructions for using the latest, browser-based version of the Hardware Management Console (HMC).

Barrier-synchronization register

This new article gives a brief description of the barier-synchronization register (BSR) that is located on certain POWER technology-based processors, and how you can assign this resource to logical partitions using version 7 or later of the HMC.

Host Ethernet Adapter

This new article contains information on Host Ethernet Adapter (HEAs), which are physical Ethernet adapters that are integrated directly into the GX+ bus on a managed system. HEAs offer high throughput, low latency, and virtualization support for Ethernet connections.

Related concepts

"Partitioning with version 7 or later of the HMC" on page 47
The *Hardware Management Console (HMC)* is a system that controls managed systems, including the management of logical partitions and use of Capacity Upgrade on Demand. Using service applications, the HMC communicates with managed systems to detect, consolidate, and forward information to IBM for analysis.

"Barrier-synchronization register" on page 36
The barrier-synchronization register (BSR) is a memory register that is located on certain POWER technology-based processors. You can write a parallel-processing application running on AIX® so that the application uses a BSR to perform barrier synchronization, which is a method for synchronizing the threads in the parallel-processing application. If you use version 7 or later of the Hardware Management Console (HMC) to create logical partitions, you can divide BSRs into arrays and assign BSR arrays to partition profiles.

"Host Ethernet Adapter" on page 37
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).

Concepts for partitioning the server

There are many different ways in which you can partition a server. You can assign some resources directly to logical partitions, and you can share other resources among your logical partitions to make your server more flexible and reduce the amount of maintenance that you must perform. A thorough understanding of the ways in which you can partition a server will allow you to take the fullest advantage of the capabilities of your server.

Logical partition overview

Logical 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 *logical partitions*. You can install software on a logical partition, and the logical partition runs as an independent logical server with the resources that you have allocated to the logical partition.

Processors, memory, and input/output devices are examples of resources that you can assign to logical partitions. Examples of the kinds of software that you can install and run on logical partitions include the AIX, i5/OS®, and Linux operating systems and Virtual I/O Server software.

Logical partitions share a few system attributes, such as the system serial number, system model, and processor feature code. All other system attributes can vary from one logical partition to another.

You must use tools to partition your servers. The tool that you use to partition each server depends upon the server model and the operating systems and features that you want to use on the server.

Benefits of partitioning

The following scenarios illustrate the benefits of partitioning your server:

Consolidating servers
A logically partitioned server can reduce the number of servers that are needed within an enterprise. You can consolidate several servers into a single logically partitioned system. This eliminates the need for, and expense of, additional equipment.

Sharing resources
You can quickly and easily move hardware resources from one logical partition to another as needs change. Features such as Micro-Partitioning™ allow for processor resources to be shared automatically among logical partitions that use the shared processor pool. Other features, such as

dynamic logical partitioning, allow for resources to be moved to, from, and between running logical partitions manually without shutting down or restarting the logical partitions.

Maintaining independent servers
Dedicating a portion of the resources (disk storage unit, processors, memory, and I/O devices) to a partition achieves logical isolation of software. If configured correctly, logical partitions also have some hardware fault tolerance. Batch and 5250 on-line transaction processing (OLTP) workloads, which might not run well together on a single machine, can be isolated and run efficiently in separate partitions.

Creating a mixed production and test environment
You can create a combined production and test environment on the same server. The production partition can run your main business applications, and the test partition is used to test software. A failure in a test partition, while not necessarily planned, will not disrupt normal business operations.

Merging production and test environments
Partitioning enables separate partitions to be allocated for production and test servers, eliminating the need to purchase additional hardware and software. When testing has been completed, the resources allocated to the test partition can be returned to the production partition or elsewhere as required. As new projects are developed, they can be built and tested on the same hardware on which they will eventually be deployed.

Running integrated clusters
Using high-availability application software, your partitioned server can run as an integrated cluster. You can use an integrated cluster to protect your server from most unscheduled failures within a partition.

Although there are many benefits to using logical partitioning, consider the following points before choosing to partition.

- Processor and memory failures might result in the failure of the entire server with all of its logical partitions. (The failure of a single I/O device affects only the logical partition to which the I/O device belongs.) To reduce the possibility of system failure, you can use the Advanced System Management Interface (ASMI) to set the server so that the server can deconfigure failing processors or memory modules automatically. After the server deconfigures the failing processor or memory module, the server continues running without using the deconfigured processor or memory module.
- There are many concepts that you must understand to implement logical partitions successfully on your server.
- Administering a consolidated system might be more difficult in some ways than administering multiple smaller systems, particularly if the resources in the consolidated system are used at a level close to their capacity. If you anticipate that you will use your server at a level close to its capacity, consider ordering a server model that is capable of Capacity on Demand (CoD).

Sharing resources

Although each logical partition acts as an independent server, the logical partitions on a server can share some kinds of resources with each other. The ability to share resources among many logical partitions allows you to increase resource utilization on the server and to move the server resources to where they are needed. The following list illustrates some of the ways in which logical partitions can share resources. For some server models, the features mentioned in this list are options for which you must obtain and enter an activation code.

- Micro-Partitioning (or shared processing) allows logical partitions to share the processors in the shared processor pool. The shared processor pool includes all processors on the server that are not dedicated to specific logical partitions. Each logical partition that uses the shared processor pool is assigned a specific amount of processor power from the shared processor pool. If the logical partition needs more processor power than its assigned amount, the logical partition is set by default to use the unused processor power in the shared processor pool. The amount of processor power that the logical partition

can use is limited only by the virtual processor settings of the logical partition and the amount of unused processor power available in the shared processor pool. For more information about Micro-Partitioning, see Shared Processors.

- Dynamic logical partitioning allows you to move resources to, from, and between running logical partitions manually without shutting down or restarting the logical partitions. This allows you to share devices that logical partitions use occasionally. For example, if the logical partitions on your server use an optical drive occasionally, you can assign a single optical drive to multiple logical partitions as a desired device. The optical drive would belong to only one logical partition at a time, but you can use dynamic logical partitioning to move the optical drive between logical partitions as needed. On servers that are managed using the Integrated Virtualization Manager, dynamic logical partitioning is supported only for the management partition. Dynamic logical partitioning is not supported on servers that are managed using the Virtual Partition Manager.
- Virtual I/O allows logical partitions to access and use I/O resources on other logical partitions. For example, virtual Ethernet allows you to create a virtual LAN that connects the logical partitions on your server to each other. If one of the logical partitions on the server has a physical Ethernet adapter that is connected to an external network, you can configure the operating system of that logical partition to connect the virtual LAN with the physical Ethernet adapter. This allows the logical partitions on the server to share a physical Ethernet connection to an external network.
- A Host Ethernet Adapter (HEA) allows multiple logical partitions to share a single physical Ethernet adapter. 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.

Supported operating systems and software

The operating systems and software that are supported on IBM eServer hardware varies by server line.

The following table details the operating systems and software that is supported on each server line.

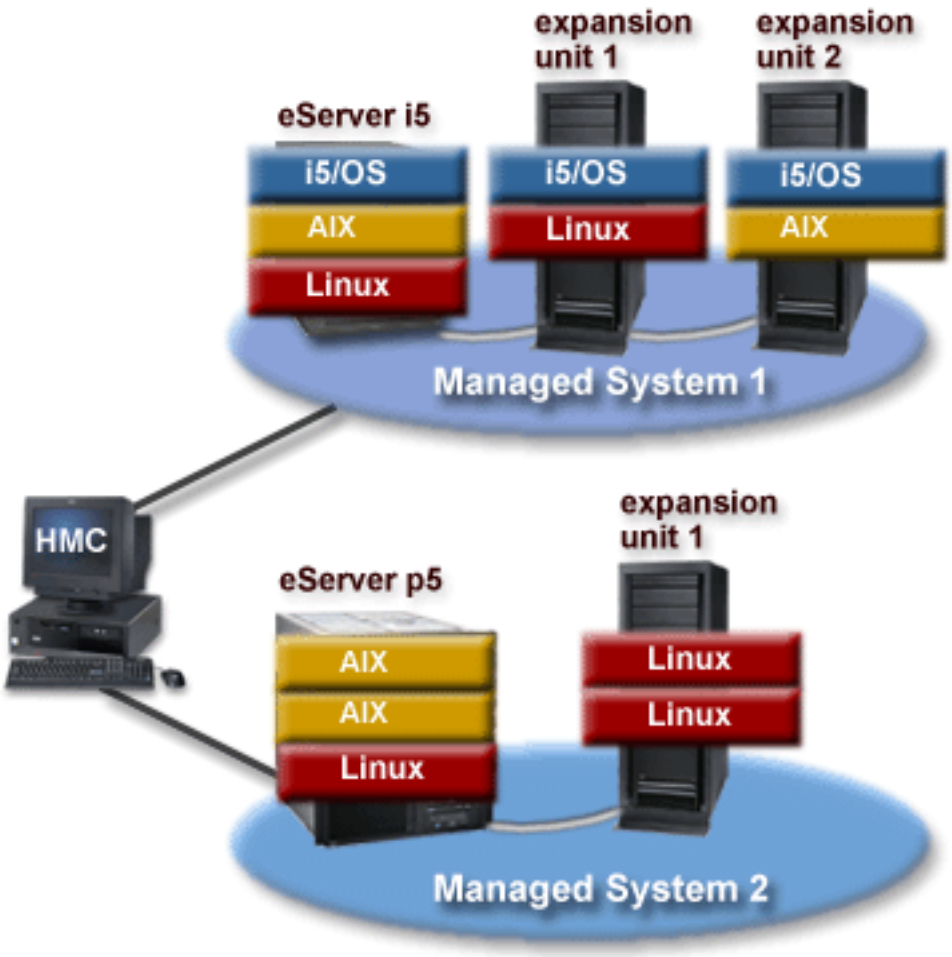
Table 1. Supported operating systems and software for logical partitions on IBM Systems and eServer environments

	IBM eServer i5	**IBM System p5 and eServer p5**	**IBM eServer OpenPower**
AIX	Yes	Yes	No
i5/OS	Yes	Yes	No
Linux	Yes	Yes	Yes
Virtual I/O Server	Yes	Yes	Yes
Windows® environment integrated on iSeries®	Yes	Yes	No
Linux environment integrated on iSeries	Yes	Yes	No

Managed Systems

A *managed system* is a single physical server and the resources that are connected to the physical server and managed by the physical server as a single unit. Connected resources can include expansion units, towers, and drawers, and storage area network (SAN) resources that are assigned to the server.

You can install a single operating system on a managed system and use the managed system as a single server. Alternately, you can use a partitioning tool, such as the Hardware Management Console (HMC), to create multiple logical partitions on the managed system. The partitioning tool manages the logical partitions on the managed system.



In this figure, you can see the logical partitions on each managed system, with the operating systems installed on the disk drives of the physical server and the connected expansion units. The HMC is connected to both managed systems simultaneously and allows you to manage both managed systems from a single location.

Related concepts

"Shared processors" on page 29
Shared processors are physical processors whose processing capacity is shared among multiple logical partitions. The ability to divide physical processors and share them among multiple logical partitions is known as *Micro-Partitioning*.

Partitioning tools

You must use tools to partition your servers. The tool that you use to partition each server depends upon the server model and the operating systems and features that you want to use on the server.

Related concepts

"Dedicated processors" on page 29
Dedicated processors are whole processors that are assigned to a single partition.

"Memory" on page 32
Processors use memory to temporarily hold information. Memory requirements for partitions depend on partition configuration, I/O resources assigned, and applications used.

"Shared processors" on page 29
Shared processors are physical processors whose processing capacity is shared among multiple logical partitions. The ability to divide physical processors and share them among multiple logical partitions is known as *Micro-Partitioning.*

"Virtual processors in the shared processor pool" on page 31
A *virtual processor* is a representation of a physical processor to the operating system of a logical partition that uses the shared processor pool.

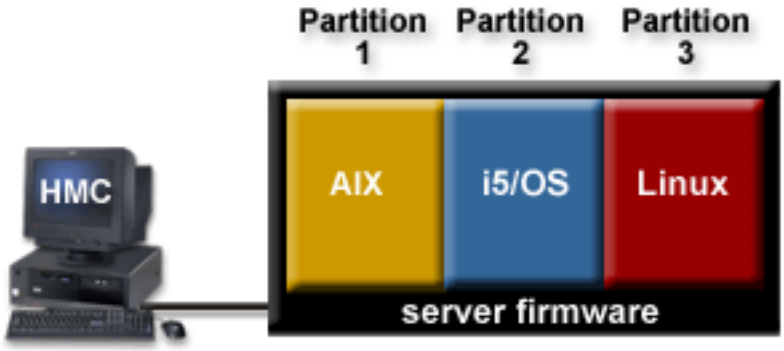
"Virtual SCSI adapters" on page 23
Virtual SCSI (Small Computer Systems Interface) adapters provide one partition with the ability to use storage I/O (disk, CD, and tape) that is owned by another partition.

"Virtual serial adapters" on page 24
Virtual serial adapters provide a point-to-point connection from one logical partition to another, or from the Hardware Management Console (HMC) to each logical partition on the managed system. Virtual serial adapters are used primarily to establish terminal or console connections to logical partitions.

Hardware Management Console

The *Hardware Management Console (HMC)* is a hardware appliance that you can use to configure and control one or more managed systems. You can use the HMC to create and manage logical partitions and activate Capacity Upgrade on Demand. Using service applications, the HMC communicates with managed systems to detect, consolidate, and send information to service and support for analysis.

The HMC also provides terminal and 5250 console emulation for the logical partitions on your managed system. You can connect to logical partitions from the HMC itself, or you can set up the HMC so that you can connect to logical partitions remotely through the HMC. HMC terminal and 5250 console emulation provides a dependable connection that you can use if no other terminal or console device is connected or operational. HMC terminal and 5250 console emulation is particularly useful during initial system setup, before you have configured your terminal or console of choice.



This figure illustrates the logical partitions and the server firmware on the IBM Systems and eServer hardware. The *server firmware* is code that is stored in system flash memory on the server. The server firmware directly controls the resource allocations on the server and the communications between logical partitions on the server. The HMC connects with the server firmware and specifies how the server firmware allocates resources on the server.

If you use a single HMC to manage a server, and the HMC malfunctions or becomes disconnected from the server firmware, then the server continues to run, but you will not be able to change the logical partition configuration of the server or manage the server. If desired, you can attach an additional HMC to act as a backup and to provide a redundant path between the server and IBM service and support.

Partitioning using the HMC is supported on all IBM System i5 and eServer i5, IBM System p5 and eServer p5, and IBM eServer OpenPower server models, although some models require you to enter an Advanced POWER Virtualization activation code before you can partition the server.

There are two different HMC user interfaces.

- Version 7 and later of the HMC uses a web-based user interface. You can configure the HMC to allow remote connections using a supported web browser.
- Version 6 and earlier of the HMC uses a window-based user interface. You can configure the HMC to allow remote connections using the Web-based System Manager.

Partition profile:

A partition profile is a record on the Hardware Management Console (HMC) that specifies a possible configuration for a logical partition. When you activate a logical partition using a partition profile, the managed system attempts to start the logical partition using the configuration information in the partition profile.

A partition profile specifies the desired system resources for the logical partition and the minimum and maximum amounts of system resources that the logical partition can have. The system resources specified within a partition profile includes processors, memory, and I/O resources. The partition profile can also specify certain operating settings for the logical partition. For example, you can set a partition profile so that, when the partition profile is activated, the logical partition is set to start automatically the next time that you power on the managed system.

Each logical partition on a managed system that is managed by an HMC has at least one partition profile. If desired, you can create additional partition profiles with different resource specifications for your logical partition. If you create multiple partition profiles, you can designate any partition profile on the logical partition to be the default partition profile. The HMC activates the default profile if you do not select a specific partition profile to be activated. Only one partition profile can be active at one time. To activate another partition profile for a logical partition, you must shut down the logical partition before you activate the other partition profile.

A partition profile is identified by partition ID and profile name. Partition IDs are whole numbers used to identify each logical partition that you create on a managed system, and profile names identify the partition profiles that you create for each logical partition. Each partition profile on a logical partition must have a unique profile name, but you can use a profile name for different logical partitions on a single managed system. For example, logical partition 1 cannot have more than one partition profile with a profile name of `normal`, but you can create a `normal` partition profile for each logical partition on the managed system.

When you create a partition profile, the HMC shows you all of the resources available on your system. The HMC does not verify if another partition profile is currently using a portion of these resources. Therefore, it is possible for you to overcommit resources. When you activate a logical partition using a partition profile, the system attempts to start the logical partition using the resources that are specified in the partition profile. If the minimum resources specified in the partition profile are not available on the managed system, the logical partition cannot be started using the partition profile.

For example, you have four processors on your managed system. Partition 1 profile A has three processors, and partition 2 profile B has two processors. If you attempt to activate both of these partition profiles at the same time, partition 2 profile B will fail to activate because you have overcommitted processor resources.

When you shut down a logical partition and reactivate the logical partition using a partition profile, the partition profile overlays the resource specifications of the logical partition with the resource specifications in the partition profile. Any resource changes that you made to the logical partition using dynamic logical partitioning are lost when you reactivate the logical partition using a partition profile. This is desirable when you want to undo dynamic logical partitioning changes to the logical partition. However, this is not desirable if you want to reactivate the logical partition using the resource specifications that the logical partition had when you shut down the managed system. It is therefore best to keep your partition profiles up to date with the latest resource specifications. You can save the current configuration of the logical partition as a partition profile. This allows you to avoid having to change partition profiles manually. For more information about this procedure, see Saving the partition configuration to a partition profile.

If you shut down a logical partition whose partition profiles are not up to date, and the logical partition is set to start automatically when the managed system starts, you can preserve the resource specifications on that logical partition by restarting the entire managed system using the partition autostart power-on mode. When the logical partitions start automatically, the logical partitions have the resource specifications that the logical partitions had when you shut down the managed system.

Memory and processor resource assignment

When you create a partition profile for a logical partition, you set up the desired, minimum, and maximum amounts of memory and processor resources that you want for the logical partition. (Where applicable, this also applies to 5250 CPW.) The desired value is the resource amount that the logical partition gets if you do not overcommit the resource on the managed system. If the desired amount of resources is available when you activate the partition profile, then the logical partition starts with the desired amount of resources. However, if the desired amount of resources is not available when you activate the partition profile, then the resources on your managed system are overcommitted. In that case, if the amount of resources that are available on the managed system is equal to or greater than the minimum amount of resources in the partition profile, then the logical partition starts with the available amount of resources. If the minimum amount of resources is not met, then the logical partition does not start.

Virtual processor assignment

If you create a partition profile that is set to use shared processors, the HMC calculates a minimum, maximum, and desired number of virtual processors for the partition profile. The calculation is based upon the minimum, maximum, and desired number of processing units that you specify for the partition profile. By default, the virtual processor settings are calculated as follows:

- The default minimum number of virtual processors is the minimum number of processing units (rounded up to the next whole number). For example, if the minimum number of processing units is 0.8, the default minimum number of virtual processors is 1.
- The default desired number of virtual processors is the desired number of processing units (rounded up to the next whole number). For example, if the desired number of processing units is 2.8, the default desired number of virtual processors is 3.
- The default maximum number of virtual processors is the maximum number of processing units rounded up to the next whole number and multiplied by two. For example, if the maximum number of processing units is 3.2, the default maximum number of virtual processors is 8 (4 times 2).

When you activate the logical partition using the partition profile on the HMC, the logical partition is assigned the desired number of virtual processors. You can then use dynamic logical partitioning to change the number of virtual processors to any number between the minimum and maximum values, so long as the number of virtual processors is greater than the number of processing units that are assigned to the logical partition. Before changing the default settings, performance modeling should be performed.

For example, you create a partition profile on the HMC with the following processor unit settings.

Minimum processing units 1.25

Desired processing units 3.80

Maximum processing units 5.00

The default virtual processor settings for this partition profile on the HMC are as follows.

Minimum virtual processors 2

Desired virtual processors 4

Maximum virtual processors 10

When you activate the logical partition using this partition profile on the HMC, the operating system sees four processors, because the logical partition is activated with the desired value of four virtual processors. Each of these virtual processors has 0.95 processing units supporting the work assigned to the processor. After the logical partition is activated, you can use dynamic logical partitioning to change the number of virtual processors on the logical partition to any number between 2 and 10, so long as the number of virtual processors is greater than the number of processing units that are assigned to the logical partition. If you increase the number of virtual processors, bear in mind that you will have less processing power supporting the work assigned to each processor.

I/O device assignment

I/O devices are assigned to partition profiles on a slot-by-slot basis. Most I/O devices can be assigned to a partition profile on the HMC as required or as desired.

- If an I/O device is assigned to a partition profile as required, then the partition profile cannot be successfully activated if the I/O device is unavailable or is in use by another logical partition. Also, after the logical partition starts, you cannot use dynamic logical partitioning to remove the required I/O device from the running logical partition or move the required I/O device to another logical partition. This setting is suitable for devices that are required for the continuous operation of the logical partition (such as disk drives).
- If an I/O device is assigned to a partition profile as desired, then the partition profile can be successfully activated if the I/O device is unavailable or is in use by another logical partition. The desired I/O device can also be deconfigured in the operating system or system software and removed from the running logical partition or moved to another logical partition using dynamic logical partitioning. This setting is suitable for devices that you want to share among multiple logical partitions (such as optical drives or tape drives).

The exception to this rule is host channel adapters (HCAs), which are added to partition profiles on the HMC as required. Each physical HCA contains a set of 64 globally unique IDs (GUIDs) that can be assigned to partition profiles. You can assign multiple GUIDs to each partition profile, but you can assign only one GUID from each physical HCA to each partition profile. Also, each GUID can be used by only one logical partition at a time. You can create multiple partition profiles with the same GUID, but only one of those partition profiles can be activated at a time.

You can change the required or desired setting within any partition profile for any I/O device at any time. Changes to the required or desired setting for an I/O device take effect immediately, even if the logical partition is running. For example, you want to move a tape device from one running logical partition to another, and the I/O device is required in the active partition profile for the source logical partition. You can access the active partition profile for the source logical partition, set the tape device to be desired, and then deconfigure and move the tape device to the other logical partition without having to restart either logical partition.

If you create an i5/OS logical partition using the HMC, you must tag I/O devices to perform certain functions for that i5/OS logical partition. For more information on these types of devices, see Tagged resources for i5/OS logical partitions.

Related concepts

"Linux logical partition functional differences between IBM eServer hardware and previous hardware models" on page 13
Use this information to see the new or significantly changed enhancements to Linux partitioning.

"Scenario: Creating a Linux logical partition and partition profile" on page 209
See an example of creating a Linux logical partition.

Partition profiles that use all of the system resources:

You can create partition profiles on your Hardware Management Console (HMC) that specify all of the resources on the managed system. If you activate a logical partition using such a partition profile, then the managed system assigns all of its resources to the logical partition.

If you add additional resources to the managed system, the managed system automatically assigns the added resources to the logical partition when the profile is activated. The profile must be activated while the server is in 'partition standby' state, because automatic restart of the partition will not assign newly added processor and memory resources. You do not need to change the partition profile for the managed system to assign the additional resources to the logical partition.

You cannot activate a logical partition using a partition profile that specifies all of the system resources if any other logical partition is running. However, after the logical partition is activated with all of the system resources, you can remove most processor and memory resources and all I/O resources from the logical partition using dynamic logical partitioning. This allows you to start other logical partitions using the resources that you remove from the logical partition. There is an implicit minimum amount of processor and memory resources that is reserved for the logical partition that uses all of the system resources, so you cannot remove all processor and memory resources from such a logical partition.

System profile:

A *system profile* is an ordered list of partition profiles that is used by the Hardware Management Console (HMC) to start the logical partitions on a managed system in a specific configuration.

When you activate the system profile, the managed system attempts to activate each partition profile in the system profile in the order specified. A system profile helps you activate or change the managed system from one complete set of logical partition configurations to another.

It is possible for you to create a system profile whose partition profiles specify more resources than are available on the managed system. You can use the HMC to validate the system profile against the currently available system resources and against the total system resources. Validating your system profile ensures that your I/O devices and processing resources are not overcommitted, and it increases the likelihood that the system profile can be activated. The validation process estimates the amount of memory needed to activate all of the partition profiles in the system profile. It is possible that a system profile can pass validation and yet not have enough memory to be activated.

Related concepts

"Linux logical partition functional differences between IBM eServer hardware and previous hardware models" on page 13
Use this information to see the new or significantly changed enhancements to Linux partitioning.

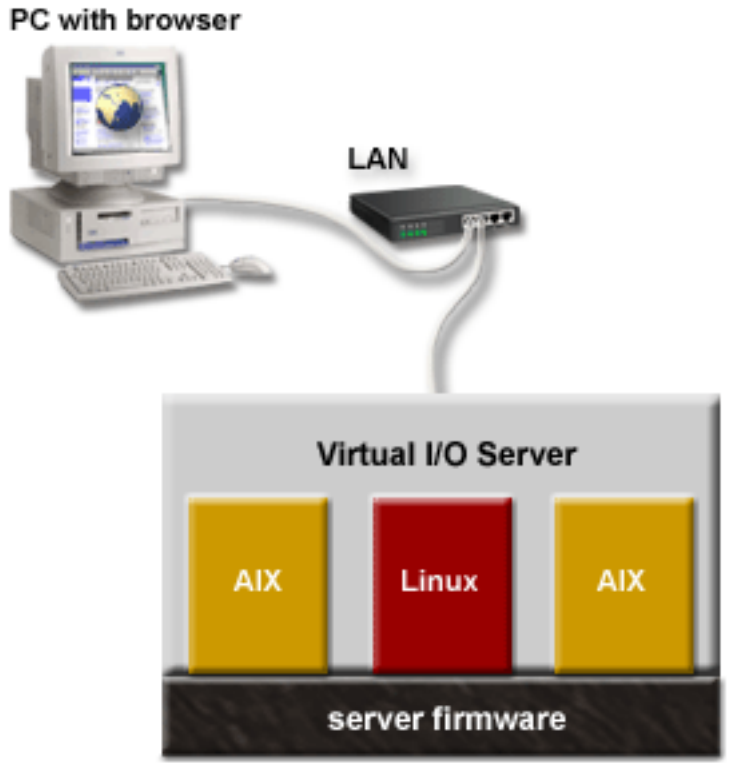
Integrated Virtualization Manager

The *Integrated Virtualization Manager* is a browser-based system management interface for the Virtual I/O Server. The Integrated Virtualization Manager allows you to create and manage AIX and Linux logical partitions on a single IBM System p server. On OpenPower servers, the Integrated Virtualization Manager supports only Linux logical partitions.

The Integrated Virtualization Manager is supported only on specific server models.

Virtual I/O Server is software that provides virtual storage and shared Ethernet resources to the other logical partitions on the managed system. Virtual I/O Server is not a general purpose operating system that can run applications. Virtual I/O Server is installed on a logical partition in the place of a general purpose operating system, and is used solely to provide virtual I/O resources to other logical partitions with general purpose operating systems. You use the Integrated Virtualization Manager to specify how these resources are assigned to the other logical partitions.

To use the Integrated Virtualization Manager, you must first install Virtual I/O Server on an unpartitioned server. Virtual I/O Server automatically creates a logical partition for itself, which is called the *management partition* for the managed system. The management partition is the Virtual I/O Server logical partition that controls all of the physical I/O resources on the managed system. After you install Virtual I/O Server, you can configure a physical Ethernet adapter on the server so that you can connect to the Integrated Virtualization Manager from a computer with a Web browser.



This figure illustrates Virtual I/O Server in its own logical partition, and the AIX and Linux logical partitions that are managed by the Virtual I/O Server logical partition. The browser on the PC connects to the Integrated Virtualization Manager interface over a network, and you can use the Integrated Virtualization Manager to create and manage the logical partitions on the server.

Resource assignment

When you use the Integrated Virtualization Manager to create a logical partition, then you assign memory and processor resources directly to logical partitions. If you use dedicated processors, then you specify the exact number of dedicated processors. If you use shared processors, then you specify the number of virtual processors for the logical partition, and the Integrated Virtualization Manager calculates the number of processing units it assigns to the logical partition based on the number of virtual processors. In all cases, the amount of resources that you assign is committed to the logical partition from

the time that you create the logical partition until the time that you change this amount or delete the logical partition. You therefore cannot overcommit processor resources to logical partitions using the Integrated Virtualization Manager.

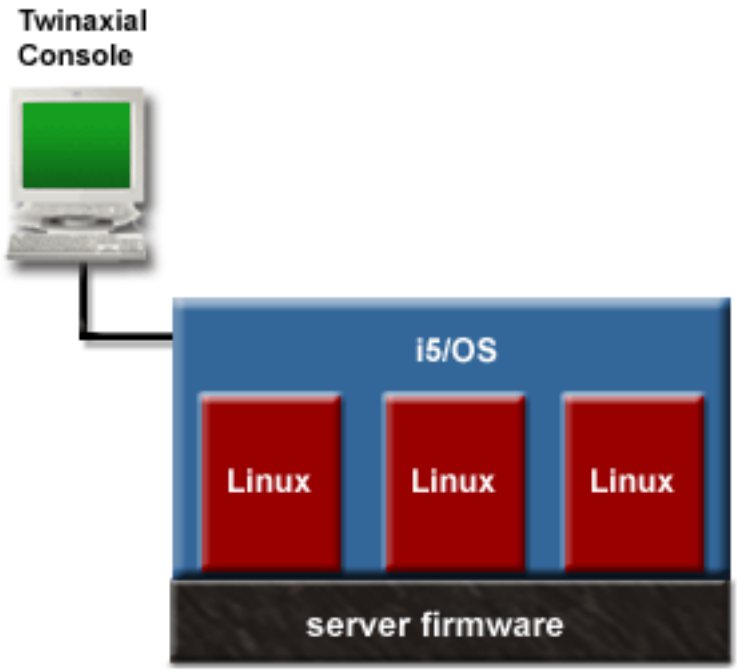
A logical partition that is created using the Integrated Virtualization Manager has minimum and maximum memory and processor values. The minimum and maximum values are used when you use a workload management application on the managed system, when you restart the managed system after a processor failure, or when you dynamically move resources to or from the Virtual I/O Server management partition. By default, the minimum and maximum values are set to the same value as the actual amount of committed resources. You can change the minimum and maximum processor values at any time, but you can change the minimum and maximum memory values only while the logical partition is not running.

When you use the Integrated Virtualization Manager to partition your managed system, a fraction of the memory and a fraction of the processors on the managed system are assigned to the Virtual I/O Server management partition. If desired, you can change the memory and processor resources that are assigned to the management partition to match your Virtual I/O Server workload. Physical disks can be assigned directly to logical partitions, or they can be assigned to storage pools, and virtual disks (or logical volumes) can be created from these storage pools and assigned to logical partitions. Physical Ethernet connections are generally shared by configuring the physical Ethernet adapter as a virtual Ethernet bridge between the virtual LAN on the server and an external, physical LAN. Host Ethernet Adapter Other types of I/O devices

Virtual Partition Manager

The *Virtual Partition Manager* is a feature of i5/OS that allows you to create and manage one i5/OS logical partition and up to four Linux logical partitions on a single IBM System i5 or eServer i5 server. You can use the Virtual Partition Manager to partition any IBM System i5 or eServer i5 model that does not require a Hardware Management Console (HMC), such as a model 595.

To use the Virtual Partition Manager, you must first install i5/OS on an nonpartitioned server. After you install i5/OS, you can initiate a console session on i5/OS and use System Service Tools (SST) to create and configure Linux logical partitions. i5/OS controls the resource allocations of the logical partitions on the server.



This figure illustrates the i5/OS logical partition and the Linux logical partitions that are managed by the i5/OS logical partition. The user creates and configures the Linux logical partitions on the server by accessing SST over the twinaxial console.

When you use the Virtual Partition Manager to partition an IBM System i5 or eServer i5 server, SST is the only tool that you can use to create and manage the logical partitions. You cannot use iSeries Navigator to create or manage logical partitions on an IBM System i5 or eServer i5 server. However, the console session that you use to access SST can be initiated using either iSeries Operations Console (LAN or direct attach) or a twinaxial console.

Linux logical partition functional differences between IBM eServer hardware and previous hardware models

Use this information to see the new or significantly changed enhancements to Linux partitioning.

Linux logical partition functions have new and changed technical enhancements for new IBM eServer hardware.

To identify Linux logical partition technical enhancements running on IBM eServer hardware compared to previous hardware models, see the following tables.

On System i systems, Linux logical partitions support these enhancements.

Function	Linux on IBM iSeries	Linux on IBM System i5 and IBM eServer i5
LPAR (Logical Partitioning) user interface	• iSeries Navigator • Dedicated Service Tools (DST) or System Service Tools (SST)	• Hardware Management Console (HMC) required to partition the server. • HMC remote command • Virtual Partition Manager

Function	Linux on IBM iSeries	Linux on IBM System i5 and IBM eServer i5
LPAR authority	Service Tools User IDs created using DST or SST. • System partitions-administration authority • System partitions-operations authority	User roles created using the HMC: • Super administrator • Operator • Viewer • Product engineer • Service representative
Maximum number of partitions	31 for 270, 8xx, and 890 models The maximum number of partitions supported depends on the number of processors in the server model.	The maximum number of logical partitions supported equals 10 times the number of processors in the server model. The maximum number of logical partitions on Virtual Partition Manager-managed systems is four Linux partitions and one i5/OS partition.
Types of partitions	Primary partition is i5/OS Secondary partitions are i5/OS or Linux	• No primary or secondary partitions • i5/OS service partition • Partition profiles • System profiles Profiles are HMC-specific. On Virtual Partition Manager-managed systems, you can have one primary partition (with i5/OS) and up to four secondary partitions (with Linux).
Partition management	iSeries Navigator GUI or SST/DST	• The Hardware Management Console (HMC) enablement utilities provide base infrastructure for communicating between the partition and the HMC. • The ppc64utils and lsvpd packages enable basic serviceability actions. • The Service Resource Manager, Platform Error Log Analysis, and I/O Error Log Analysis work with the Service Focal Point on the HMC to service hardware errors in a partition. • Inventory Scout reports system configuration information and facilitates update of system firmware. • Service Agent provides additional capability to monitor a system and report problems. • The Dynamic LPAR Resource Manager (DRM) must be used with Linux distributions Red Hat Enterprise Linux version 4 or SUSE Linux Enterprise Server 9 to perform Dynamic LPAR (DLPAR) processor and I/O capabilities. See the Service and productivity tools Web site for more information. Dynamic LPAR is not available on Virtual Partition Manager-managed systems.

Function	Linux on IBM iSeries	Linux on IBM System i5 and IBM eServer i5
Processors	• Processors can be changed dynamically. • Can be shared among multiple partitions.	• Processors can be changed without restarting the partition with Linux distributions Red Hat Enterprise Linux version 4 and SUSE Linux Enterprise Server 9 and using the DLPAR Resource Manager (DRM). See the Service and productivity tools Web site for more information. • Can be shared among multiple partitions. • Sharing mode of capped and uncapped. • Powered-off partition using dedicated processors can have its processors available to shared processing pool. Dynamic LPAR is not available on Virtual Partition Manager-managed systems.
Memory	Assigned in 1 MB increments.	Dynamic: can be changed without restarting the logical partition. Memory can be assigned in increments of 16 MB, 32 MB, 64 MB, 128 MB, and 256 MB. Increment value is determined by the logical memory block size set in the ASMI. Dynamic LPAR is not available on Virtual Partition Manager-managed systems.
Virtual Ethernet	Up to 16 networks.	Up to 4094 networks. On Virtual Partition Manager-managed systems, there's a maximum of four virtual Ethernet adapters per LPAR.
Fixes also known as program temporary fix (PTF)	Primary partition	• HMC • Service partition

On System p systems, Linux logical partitions support these enhancements.

Function	Linux on IBM pSeries®	Linux on IBM System p5 and IBM eServer p5
LPAR user interface	• Hardware Management Console (HMC) required to partition the server. • HMC remote command	• Hardware Management Console (HMC) required to partition the server. • HMC remote command • Integrated Virtualization Manager
LPAR authority	User roles created using the HMC: • Super administrator • Operator • Viewer • Product engineer • Service representative	User roles created using the HMC: • Super administrator • Operator • Viewer • Product engineer • Service representative
Maximum number of partitions	The maximum number of partitions supported depends on the number of processors in the server model.	The maximum number of logical partitions supported equals 10 times the number of processors in the server model. The maximum number of logical partitions on Integrated Virtualization Manager-managed systems is ten times the number of processors.

Function	Linux on IBM pSeries®	Linux on IBM System p5 and IBM eServer p5
Types of partitions	• AIX service partition • Partition profiles • Full system profiles • System profiles Profiles are HMC-specific.	• Partition profiles • System profiles Profiles are HMC-specific. On Integrated Virtualization Manager-managed systems, the Virtual I/O Server logical partition is called the ″management partition.″
Partition management	• The Hardware Management Console (HMC) enablement utilities provide base infrastructure for communicating between the partition and the HMC. • The ppc64utils and lsvpd packages enable basic serviceability actions. • The Service Resource Manager, Platform Error Log Analysis, and I/O Error Log Analysis work with the Service Focal Point on the HMC to service hardware errors in a partition. • Inventory Scout reports system configuration information and facilitates update of system firmware. • Service Agent provides additional capability to monitor a system and report problems. See the Service and productivity tools Web site for more information.	• The Hardware Management Console (HMC) enablement utilities provide base infrastructure for communicating between the partition and the HMC. • The ppc64utils and lsvpd packages enable basic serviceability actions. • The Service Resource Manager, Platform Error Log Analysis, and I/O Error Log Analysis work with the Service Focal Point on the HMC to service hardware errors in a partition. • Inventory Scout reports system configuration information and facilitates update of system firmware. • Service Agent provides additional capability to monitor a system and report problems. • The Dynamic LPAR Resource Manager (DRM) must be used with Linux distributions Red Hat Enterprise Linux version 4 or SUSE Linux Enterprise Server 9 to perform DLPAR processor and I/O capabilities. See the Service and productivity tools Web site for more information.
Processors	• Processors cannot be changed dynamically. • Processors cannot be shared among multiple partitions.	• Processors can be changed without restarting the partition with Linux distributions Red Hat Enterprise Linux version 4 and SUSE Linux Enterprise Server 9 and using the DLPAR Resource Manager (DRM). See the Service and productivity tools Web site for more information. • Can be shared among multiple partitions. • Sharing mode of capped and uncapped. • Powered-off partition using dedicated processors can have its processors available to shared processing pool.

Function	Linux on IBM pSeries®	Linux on IBM System p5 and IBM eServer p5
Memory	Assigned in 256 MB increments.	The xx value is set through Logical Memory Block Size in ASMI.
Virtual Ethernet		Each Linux logical partition can belong to up to 4094 networks on HMC-managed systems. On Integrated Virtualization Manager-managed systems, there's a maximum of four virtual LANs, with up to two virtual Ethernet adapters per LPAR. (The management partition manages and belongs to all virtual LANs.) On Virtual Partition Manager-managed systems, there's a maximum of four virtual Ethernet adapters per LPAR.
Virtual I/O		Supports virtual SCSI disk, CD, and tape attached to a dedicated Virtual I/O Server partition (VIOS) or i5OS partition on the same system.
DLPAR	Supports DLPAR processors and I/O when running Linux distributions Red Hat Enterprise Linux version 4 or SUSE Linux Enterprise Server 9 and the DLPAR Resource Manager (DRM).	Supports DLPAR processors and I/O when running Linux distributions Red Hat Enterprise Linux version 4 or SUSE Linux Enterprise Server 9 and the DLPAR Resource Manager (DRM). See the Service and productivity tools Web site for more information.
Micro-partitioning		Supports capped and uncapped sharing of all processors in the partition.
Fixes also known as program temporary fix (PTF)	Primary partition	

Related concepts

"Partition profile" on page 7
A partition profile is a record on the Hardware Management Console (HMC) that specifies a possible configuration for a logical partition. When you activate a logical partition using a partition profile, the managed system attempts to start the logical partition using the configuration information in the partition profile.

"System profile" on page 10
A *system profile* is an ordered list of partition profiles that is used by the Hardware Management Console (HMC) to start the logical partitions on a managed system in a specific configuration.

"Shared processors" on page 29
Shared processors are physical processors whose processing capacity is shared among multiple logical partitions. The ability to divide physical processors and share them among multiple logical partitions is known as *Micro-Partitioning.*

"Dedicated processors" on page 29
Dedicated processors are whole processors that are assigned to a single partition.

"Service partition" on page 19
If you are using the Hardware Management Console (HMC) to manage systems and the HMC becomes unavailable, then you can use the service partition to perform service-related tasks on systems.

Related information

Managing your server using the Hardware Management Console

Tasks and roles

Service and productivity tools Web site

Types of logical partition configurations

There are many different types of logical partition configurations on IBM Systems and eServer hardware.

Manufacturing default configuration

The manufacturing default configuration is the initial partition setup of the managed system as received from your service provider.

When your system is in the manufacturing default configuration, you can install an operating system on the managed system and use the managed system as a nonpartitioned server. In this state, you do not need to manage the system using a Hardware Management Console (HMC).

If you choose to attach an HMC to the managed system for reasons other than partitioning (such as to activate Capacity on Demand), then the HMC displays the managed system as having one logical partition with one partition profile. All of the physical hardware resources on the system are automatically assigned to this logical partition, and any new physical hardware resources that are added to the managed system are added automatically to this logical partition. The name of the logical partition is the serial number of the managed system, and the name of the partition profile is `default`. If the server is an IBM System i5 and eServer i5 server, then the i5/OS logical partition automatically has service authority. You do not need to make any partitioning changes on the server if you do not want to do so.

However, if you use the HMC to create, delete, change, copy, or activate any logical partitions or partition profiles on the managed system, the system will then be in partition mode. You must then use the HMC to manage the managed system. If the server is an IBM System i5 and eServer i5 server, then you must also change the managed system properties on the HMC so that one of the i5/OS logical partitions on the managed system is the service partition for the managed system. If a managed system is managed using an HMC, and you want to return the managed system to an nonpartitioned state or if you want to partition the managed system with the Integrated Virtualization Manager or the Virtual Partition Manager, then you must follow a special procedure to reset the server.

Managed systems that are partitioned using the Integrated Virtualization Manager are not managed with an HMC. If a managed system is managed using the Integrated Virtualization Manager, then you do not need to reset the server to return the managed system to a nonpartitioned state. Also, you do not need to reset the server if you want to switch from using the Integrated Virtualization Manager to using an HMC. To switch to using an HMC, back up the data on each logical partition, attach the HMC to the server, create the logical partitions, and restore the data to the storage assigned to each logical partition.

Managed systems that are partitioned using the Virtual Partition Manager are not managed with an HMC. If a managed system is managed using the Virtual Partition Manager, then you do not need to reset the server to return the managed system to a nonpartitioned state. Also, you do not need to reset the server if you want to switch from using the Virtual Partition Manager to using an HMC. To switch to using an HMC, back up the data on each logical partition, attach the HMC to the server, create the logical partitions, and restore the data to the storage assigned to each logical partition.

Related concepts

"Partitioning a new or nonpartitioned server" on page 130
Use these procedures partition your new or nonpartitioned server using the Hardware Management Console (HMC).

Related tasks

"Resetting the managed system to a nonpartitioned configuration using version 6 or earlier of the HMC" on page 173
You can erase all of your logical partitions and reset the managed system to a nonpartitioned configuration. When you reset the managed system, all of the physical hardware resources are assigned to a single logical partition. This allows you to use the managed system as if it were a single, nonpartitioned server.

Service partition

If you are using the Hardware Management Console (HMC) to manage systems and the HMC becomes unavailable, then you can use the service partition to perform service-related tasks on systems.

The *service partition* is the i5/OS logical partition on an IBM eServer i5 server that you can configure to apply server firmware updates to the service processor or to the POWER 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. The preferred method for applying server firmware updates and communicating server common hardware errors to IBM is by using the HMC.

Server common hardware errors include errors in processors, memory, power subsystems, the service processor, the system unit vital product data (VPD), non-volatile random access memory (NVRAM), I/O unit bus transport (RIO and PCI), clustering hardware, and switch hardware. Server common hardware errors do not include errors in I/O processors (IOPs), I/O adapters (IOAs), or I/O device hardware. These I/O hardware errors are handled by i5/OS on the logical partition to which the I/O hardware belongs.

IBM System p5, eServer p5, and IBM eServer OpenPower servers do not have a service partition. If an IBM System p5, eServer p5, and IBM eServer OpenPower server is managed by an HMC, then you must use the HMC to update the server firmware, and the server can contact service and support only through the HMC. If you use an HMC to manage IBM System p5, eServer p5, and IBM eServer OpenPower servers, then use a backup HMC to ensure that the servers have redundant methods for contacting service and support and for applying fixes.

Servers that are managed using the Integrated Virtualization Manager do not have a service partition designation. The Virtual I/O Server logical partition automatically has service authority on servers that are managed using the Integrated Virtualization Manager.

Servers that are managed using the Virtual Partition Manager do not have a service partition designation. The i5/OS logical partition automatically has service authority on servers that are managed using the Virtual Partition Manager.

You can designate only one logical partition at a time as the service partition for your managed system. The service partition for your IBM eServer i5 server must be an i5/OS logical partition.

You must designate a service partition on a server only after you use the HMC to create, change, delete, copy, or activate any logical partitions on the managed system. You can set up the operating system on an unpartitioned server to contact service and support, and you can use the operating system on an unpartitioned server to apply server firmware updates.

If you want to configure your service partition to communicate errors to IBM, then the service partition should have a physical network connection that can reach IBM if the HMC is unavailable. Otherwise, there are no special hardware requirements for your service partition (apart from the hardware requirements for the operating system and for the normal workload of the service partition). The performance of the service partition is not affected when the service partition reports errors or performs service-related functions on the managed system.

The best candidate for a service partition is a logical partition that is running a set of applications that are not likely to cause the logical partition to fail. This increases the chances that the service partition will be available if there is a problem.

For more information about how to designate a logical partition as the service partition, see Designating the service partition for your managed system.

For more information about how your server helps you and service and support to quickly and accurately manage problems, see Overview of service and support.

Related concepts

"Linux logical partition functional differences between IBM eServer hardware and previous hardware models" on page 13
Use this information to see the new or significantly changed enhancements to Linux partitioning.

Virtual I/O Server partition

The Virtual I/O Server provides virtual SCSI and shared Ethernet capability to client logical partitions on IBM eServer p5, IBM System p5, and IBM eServer OpenPower systems.

The Virtual I/O Server is installed in its own partition. It allows a physical adapter with attached disks on the Virtual I/O Server partition to be shared by one or more partitions, enabling client logical partitions to consolidate, and potentially minimize, the number of physical adapters required. It also facilitates the sharing of physical Ethernet adapters, allowing multiple client logical partitions to share a single Ethernet adapter.

For more information about the Virtual I/O Server, see Using the Virtual I/O Server.

Related information

Using the Virtual I/O Server

Partition workload groups

Partition workload groups identify sets of logical partitions that workload management tools can manage. For example, Enterprise Workload Manager (EWLM) can automatically distribute processing capacity within a partition workload group in response to workload performance goals.

A *partition workload group* identifies a set of logical partitions that reside on the same physical system. Workload management tools use partition workload groups to identify which logical partitions they can manage. For example, Enterprise Workload Manager (EWLM) can dynamically and automatically

distribute processing capacity within a partition workload group to satisfy workload performance goals. EWLM adjusts processing capacity based on calculations that compare the actual performance of work processed by the partition workload group to the business goals that are defined for the work.

Systems managed by the Hardware Management Console (HMC) or the Integrated Virtualization Manager can assign logical partitions to partition workload groups. For HMC-managed systems, the maximum number of partition workload groups allowed per physical server is equal to the maximum number of logical partitions allowed on the physical server. You cannot assign a logical partition to more than one partition workload group at a time. Systems managed by the Integrated Virtualization Manager can have only one partition workload group per physical server.

It is not required that all logical partitions on a system participate in a partition workload group. Workload management tools manage the resources of only those logical partitions assigned to a partition workload group. Workload management tools can monitor the work of a logical partition that is not assigned to a partition workload group, but they cannot manage the logical partition's resources.

Some workload management tools require that additional software be installed on the logical partitions to monitor its workload, manage its resources, or both. For example, EWLM requires that an EWLM managed server be installed on each logical partition that EWLM is to monitor and manage, and that partition management be enabled within EWLM.

Minimum configuration requirements for a Linux partition

Learn about configuration requirements for Linux on IBM Systems and eServer hardware.

To use features that require logical partitions on an IBM eServer OpenPower system, you need the appropriate Advanced POWER Virtualization technologies activated in your system's HMC.

Each Linux logical partition on a IBM Systems or eServer model requires the following minimum hardware resources.

Minimum processor requirements

1 dedicated processor or 0.1 processing unit

Minimum memory requirements

128 MB

Minimum I/O requirements

- Storage adapter (physical or virtual)
- Network adapter (physical or virtual)
- Approximately 1 GB storage

Physical and virtual hardware resources

When you partition a managed system, you can assign the physical resources on the managed system directly to logical partitions. You can also share hardware resources among logical partitions by virtualizing those hardware resources. The methods used to virtualize and share hardware resources depend on the type of resource that you are sharing.

Virtual adapters

Virtual adapters allow you to connect logical partitions with each other without using physical hardware. Operating systems can display, configure, and use virtual adapters just like they can display, configure,

and use physical adapters. Depending on the operating environment used by the logical partition, you can create virtual Ethernet adapters, virtual Small Computer Serial Interface (SCSI) adapters, and virtual serial adapters for a logical partition.

The system administrator uses the following tools to create virtual adapters:

- Hardware Management Console (HMC)
- Integrated Virtualization Manager
- Virtual Partition Manager

Adapters can be added while the system is running using dynamic logical partitioning. The virtual adapters are recorded in system inventory and management utilities. Converged location codes can be used to correlate operating-system level or partition-level software entities to adapters, such as eth0, CMN21, and en0. Similarly, the Ethernet adapters are visible in the same way as physical Ethernet adapters.

By default, Virtual Ethernet Media Access Control (MAC) addresses are created from the locally administered range. Using the default MAC addresses, it is possible that different servers will have virtual Ethernet adapters with the same addresses. This situation can present a problem if multiple, virtual networks are bridged to the same physical network.

If a server partition providing I/O for a client partition fails, the client partition might continue to function, depending on the significance of the hardware it is using. For example, if one partition is providing the paging volume for another partition, a failure of the partition providing that particular resource will be significant to the other partition. However, if the shared resource is a tape drive, a failure of the server partition providing the resource will have only minimal effects on the client partition.

Virtual I/O client support

The following table summarizes operating system support for using virtual I/O devices.

Table 2. Virtual I/O client support by operating system

	Virtual console	**Virtual Ethernet**	**Virtual disk**	**Virtual CD**	**Virtual tape**
AIX	Yes	Yes	Yes	Yes when Integrated Virtualization Manager managed No when HMC managed	No
i5/OS	Yes	Yes	No	No	No
Linux	Yes	Yes	Yes	Yes	Yes

AIX partitions support booting from virtual devices, including disk boot from virtual disk or network boot from virtual Ethernet.

The firmware running in AIX and Linux logical partitions recognizes virtual I/O and can start the partition from virtual I/O. IPL can be either from the network over virtual Ethernet, or from a device such as virtual disk or virtual CD.

Virtual I/O server support

The following table summarizes operating system support for providing virtual I/O to partitions.

Table 3. Virtual I/O server support by operating system

	Virtual CD	Virtual console	Virtual disk	Virtual tape
i5/OS	Yes	Yes	Yes	Yes
Linux	Yes	Yes	No	No
Virtual I/O Server	Yes	Yes	Yes	No

Version 1.1 of the Virtual I/O Server (08/2004) provides SCSI disk and shared Ethernet adapter functions to logical partitions that use Virtual I/O Server resources.

i5/OS provides disk, CD, tape, and console functions to logical partitions that use i5/OS resources. i5/OS uses standard i5/OS network server storage and network server descriptions to provide disk, CD, and tape resources to other logical partitions.

To configure virtual I/O for the logical partitions on your managed system, you must create virtual I/O adapters on the HMC or Integrated Virtualization Manager. Virtual I/O adapters are usually created when you create your logical partitions. Alternately, you can add virtual I/O adapters to running logical partitions using dynamic logical partitioning. After you create a virtual I/O adapter, you can then access the operating system used by the logical partition and complete the configuration of the virtual I/O adapter in the operating system software. For Linux partitions, virtual adapters are listed in the device tree. The device tree contains Virtual SCSI adapters, not the devices under the adapter.

Logical Host Ethernet Adapter

A Logical Host Ethernet Adapter (LHEA) is a special type of virtual adapter. Even though an LHEA is a virtual resource, an LHEA can exist only if a physical Host Ethernet Adapter (HEA) provides its resources to the LHEA. For more information about how LHEAs work, see Host Ethernet Adapter.

Virtual SCSI adapters:

Virtual SCSI (Small Computer Systems Interface) adapters provide one partition with the ability to use storage I/O (disk, CD, and tape) that is owned by another partition.

A Virtual SCSI client adapter in one logical partition can communicate with a Virtual SCSI server adapter in another partition. The Virtual SCSI client adapter allows a logical partition to access a storage device being made available by the other logical partition. The partition owning the hardware is the *server partition*, and the partition that uses the virtualized hardware is the *client partition*. With this arrangement, the system can have many server partitions.

For example, partition A provides disk space to partitions B, C, and D. A partition can simultaneously use virtual I/O from more than one partition. Therefore, using the example, while partition A provides disk space to partitions B, C, and D, partitions A and B can use a tape drive connected to partition D. In this case, A is serving D for disk space, while D is serving A for the tape device.

Virtual SCSI allows you to simplify the backup and maintenance operations on your managed system. When you back up the data on the server partition, you also back up the data on each client partition.

Virtual SCSI server adapters can be created only in partitions of type i5/OS and Virtual I/O Server.

Disk unit, CD/DVD, and tape on an IBM System i model are based on the SCSI protocol using the ANSI SCSI Remote DMA (Direct Memory Access) protocol. Therefore, Linux partitions can access data among each other or by an adapter that is directly attached to the memory of other partitions.

The virtual SCSI client device driver is not capable of storage protection using Redundant Arrays of Independent Disks (RAID). While the Linux operating system allows software RAID protection of virtual disks, the recommended technique for protecting disk storage is to configure the virtual I/O storage server to perform the disk protection.

Different partitioning tools assign virtual SCSI adapters to logical partitions in different ways. For more information about virtual SCSI adapter assignment by a specific partitioning tool, see Partitioning tools.

Related concepts

"Partitioning tools" on page 5
You must use tools to partition your servers. The tool that you use to partition each server depends upon the server model and the operating systems and features that you want to use on the server.

Virtual serial adapters:

Virtual serial adapters provide a point-to-point connection from one logical partition to another, or from the Hardware Management Console (HMC) to each logical partition on the managed system. Virtual serial adapters are used primarily to establish terminal or console connections to logical partitions.

When you create a logical partition, the HMC automatically creates two virtual server serial adapters on the logical partition. These virtual server serial adapters allow you to establish a terminal or console connection to the logical partition through the HMC.

You can also create pairs of virtual serial adapters on logical partitions so that you can access and control one logical partition directly from another logical partition. For example, one logical partition uses the disk resources of another logical partition using virtual SCSI adapters. You can create a server serial adapter on the logical partition that uses the disk resources and a client serial adapter on the logical partition that owns the disk resources. This connection allows the logical partition that owns the disk resources to shut down the logical partition that uses the disk resources before you back up data on the logical partition that owns the disk resources.

Different partitioning tools assign virtual serial adapters to logical partitions in different ways. For more information about virtual serial adapter assignment by a specific partitioning tool, see Partitioning tools.

Related concepts

"Partitioning tools" on page 5
You must use tools to partition your servers. The tool that you use to partition each server depends upon the server model and the operating systems and features that you want to use on the server.

Supported virtual devices for Linux logical partitions:

Learn what device drivers for virtual devices and adapters are supported for Linux on IBM Systems and eServer hardware.

For the most current information about supported hardware devices for Linux, refer to the Facts and features report Web site (http://www.ibm.com/servers/eserver/pseries/hardware/factsfeatures.html).

Virtual devices

IBM Systems and eServer hardware support the following virtual devices.

Note: This list might not include all of the currently supported virtual devices.

Device	Driver	Functions supported by Linux
Virtual console	hvc	client/server
Virtual tape	st and ibmvscsic	client
Virtual CD	sr and ibmvscsic	client
Virtual disk unit	sd and ibmvscsic	client
Virtual SCSI	ibmvscsic	client
Virtual serial	HVSI	client
Virtual Ethernet	ibmveth	client/server

To use Virtual SCSI on an IBM eServer OpenPower system, you need Advanced POWER Virtualization activated in your system's Hardware Management Console and the Virtual I/O Server installed on your OpenPower system.

Related information

Facts and features report Web site

Advanced POWER Virtualization

How each OS implements virtual resources

The manner in which virtual resources are implemented on a logical partition depends upon the operating system used on the logical partition.

How Linux implements virtual resources:

Linux logical partitions can use virtual storage and networking devices that are made available by the Virtual I/O Server or by i5/OS.

Devices and adapters are assigned to the Virtual I/O Server or i5/OS partition, which can then make those devices available for multiple Linux logical partitions to share.

For more information about virtual Ethernet, see Virtual Ethernet. For more information about virtual storage, see Concepts for Virtual SCSI.

Related concepts

"Virtual Ethernet" on page 39
Virtual Ethernet allows logical partitions to communicate with each other without having to assign physical hardware to the logical partitions.

Related information

Concepts for virtual SCSI

Processors

This information describes how you can set the managed system to distribute its processing capacity among the logical partitions on the managed system.

A *processor* is a device that processes programmed instructions. The more processors that you assign to a logical partition, the greater the number of concurrent operations that the logical partition can run at any given time.

You can set up a logical partition to use either shared processors from a shared processor pool or processors that are dedicated to that logical partition. If a logical partition uses dedicated processors, then you must assign processors (in increments of whole numbers) to the logical partition. A logical partition

that uses dedicated processors cannot use any processing capacity beyond the processors that are assigned to the logical partition, and no other logical partition can use the dedicated processors that are assigned to that logical partition.

All processors that are not dedicated to specific logical partitions are placed in the shared processor pool. The shared processor pool can be used by logical partitions that are set to use shared processors. You can set a logical partition that uses shared processors to use as little as 0.10 processing units, which is approximately one tenth of the processing capacity of a single processor. You can specify the number of processing units to be used by a shared processor logical partition down to the hundredth of a processing unit. Also, you can set a shared processor logical partition so that, if the logical partition requires more processing capacity than its assigned number of processing units, the logical partition can use unused processing units from the shared processor pool. (Some IBM eServer p5, IBM System p5, and IBM eServer OpenPower server models might require you to enter an activation code before you can create logical partitions that use shared processors.)

You can assign up to the entire processing capacity on the managed system to a single logical partition, provided that the operating system and server model supports doing so. You can configure your managed system so that it does not comply with the software license agreement for your managed system, but you will receive out-of-compliance messages if you operate the managed system in such a configuration. For more information about calculating the number of software licenses that you need for any given configuration, see Software licensing for IBM licensed programs on logical partitions.

For example, an i5/OS logical partition can use a maximum of 32 processors at a time. However, IBM eServer p5 servers limit the total number of processors that can be used by all i5/OS logical partitions on the managed system. The number of processors that can be used by i5/OS logical partitions on IBM eServer p5 servers varies by server model. In turn, this limits the number of i5/OS logical partitions that you can create on these IBM eServer p5 servers and the possible configurations of those i5/OS logical partitions.

On IBM eServer p5 servers that support one processor for i5/OS logical partitions, you can create the following i5/OS logical partitions:

- One logical partition that uses one dedicated processor.
- One logical partition that uses uncapped shared processing units, with a maximum of one virtual processor for the logical partition.
- Up to ten logical partitions that use capped shared processing units, with a minimum of 0.10 processing units for each logical partition.

On IBM eServer p5 servers that support two processors for i5/OS logical partitions, you can create the following i5/OS logical partitions:

- One logical partition that uses one or two dedicated processors.
- Two logical partitions that use one dedicated processor each.
- One logical partition that uses uncapped shared processing units, with a maximum of two virtual processors for the logical partition.
- Two logical partitions that use uncapped shared processing units, with a maximum of one virtual processor for each logical partition.
- One logical partition that uses one dedicated processor and one logical partition that uses uncapped shared processing units, with a maximum of one virtual processor for the logical partition that uses uncapped shared processing units.
- One logical partition that uses one dedicated processor and from one to ten logical partitions that use capped shared processing units, with a minimum of 0.10 processing units for each logical partition that uses capped shared processing units.
- One logical partition that uses uncapped shared processors, with a maximum of one virtual processor for each logical partition that uses uncapped shared processing units, and from one to ten logical

partitions that use capped shared processing units, with a minimum of 0.10 processing units for each logical partition that uses capped shared processing units.
- From one to twenty logical partitions that use capped shared processors, with a minimum of 0.10 processing units for each logical partition.

Automatic redistribution of work when a processor fails

If the server firmware detects that a processor is about to fail, or if a processor fails when the processor is not in use, then the server firmware creates a serviceable event. The server firmware can also deconfigure the failing processor automatically, depending upon the type of failure and the deconfiguration policies that you set up using the Advanced System Management Interface (ASMI). You can also deconfigure a failing processor manually using the ASMI. For more information, see Setting deconfiguration policies and Deconfiguring hardware.

When the server firmware deconfigures a failing processor, and there are no unassigned processors available on the managed system, the processor deconfiguration can cause the logical partition to which the processor is assigned to shut down. To avoid shutting down mission-critical workloads when your server firmware deconfigures a failing processor, you can use the Hardware Management Console (HMC) to set partition-availablity priorities for the logical partitions on your managed system. A logical partition with a failing processor can acquire a replacement processor from logical partitions with a lower partition-availability priority. The acquisition of a replacement processor allows the logical partition with the higher partition-availability priority to continue running after a processor failure.

When a processor fails on a high-priority logical partition, the managed system follows these steps to acquire a replacement processor for the high-priority logical partition.

1. If there are unassigned processors on the managed system, the managed system replaces the failed processor with an unassigned processor.
2. If there are no unassigned processors on the managed system, the managed system checks the logical partitions with lower partition-availability priorities, starting with the lowest partition-availability priority.
   - If a lower-priority logical partition uses dedicated processors, the managed system shuts down the logical partition and replaces the failed processor with one of the processors from the dedicated-processor partition.
   - If a lower-priority logical partition uses shared processors, and removing a whole processor from the logical partition would not cause the logical partition to go below its minimum value, the managed system removes a whole processor from the shared-processor partition using dynamic logical partitioning and replaces the failed processor with the processor that the managed system removed from the shared-processor partition.
   - If a lower-priority logical partition uses shared processors, but removing a whole processor from the logical partition would cause the logical partition to go below its minimum value, the managed system skips that logical partition and continues to the logical partition with the next higher partition availability.
3. If the managed system still cannot find a replacement processor, the managed system shuts down as many of the shared-processor partitions as it needs to acquire the replacement processor. The managed system shuts down the shared-processor partitions in partition-availability priority order, starting with the lowest partition-availability priority.

A logical partition can take processors only from logical partitions with lower partition-availability priorities. If all of the logical partitions on your managed system have the same partition-availability priority, then a logical partition can replace a failed processor only if the managed system has unassigned processors.

By default, the partition-availability priority of Virtual I/O Server logical partitions with virtual SCSI adapters is set to 191. The partition-availablity priority of all other logical partitions is set to 127 by default.

Do not set the priority of Virtual I/O Server logical partitions to be lower than the priority of the logical partitions that use the resources on the Virtual I/O Server logical partition. Do not set the priority of i5/OS logical partitions with virtual SCSI adapters to be lower than the priority of the logical partitions that use the resources on the i5/OS logical partition. If the managed system shuts down a logical partition because of its partition-availability priority, all logical partitions that use the resources on that logical partition are also shut down.

If a processor fails when the processor is in use, then the entire managed system shuts down. When a processor failure causes the entire managed system to shut down, the system deconfigures the processor and restarts. The managed system attempts to start the logical partitions that were running at the time of the processor failure with their minimum processor values. If the managed system does not have enough processor resources to start all of the logical partitions with their minimum processor values, then the managed system starts as many logical partitions as it can with their minimum processor values. If there are any processor resources remaining after the managed system has started the logical partitions, then the managed system distributes any remaining processor resources to the running logical partitions in proportion to their desired processor values.

POWER6® processor compatibility modes

POWER6 processors can be set to any of the following processor compatibility modes.

- The POWER6 architected mode allows supported operating-system versions to use all of the standard features of the POWER6 processor.
- The POWER6 enhanced mode provides additional floating-point instructions to applications using the processor.
- The POWER5™ compatibility mode allows you to use operating-system versions that support only POWER5 processors.

The processor compatibility mode used by a logical partition depends upon the following:

- The partition compatibility mode setting on the partition profile that you use to activate the logical partition
- The partition compatibility modes that are supported by the operating system or system software that is installed on the logical partition

Each partition profile has a partition compatibility mode setting. By default, partition profiles for POWER6 systems are set to the POWER6 architected processor mode. You can set the processor compatibility mode of a partition profile to the POWER6 enhanced mode by using the HMC command `chsyscfg -r prof` to set the `lpar_proc_compat_mode` attribute to `enhanced`. If you want to set the processor compatibility mode of a partition profile back to the POWER6 architected mode, use the HMC command `chsyscfg -r prof` to set the `lpar_proc_compat_mode` attribute back to `default`. (You cannot set a partition profile to the POWER5 compatibility mode.)

When you activate a logical partition, the managed system checks the partition compatibility mode setting on the partition profile, and determines whether the installed operating system or system software supports the specified mode. If so, the logical partition uses the partition compatibility mode from the partition profile. If not, the logical partition uses the most fully featured mode that is supported by the installed operating system or system software. (The logical partition therefore cannot use a more fully featured mode than the mode specified on the partition profile, but the operating system or system software can negotiate a lesser mode if it does not support the mode specified on the partition profile.)

You cannot dynamically change the partition compatibility mode used on a logical partition. To change the partition compatibility mode, you must shut down the logical partition and restart the logical partition with a partition profile that is set to the desired partition compatibility mode.

A POWER6 processor cannot emulate all features of a POWER5 processor. For example, certain types of performance monitoring might not be available for a logical partition if the logical partition is set to the POWER5 compatibility mode.

Related information

Setting deconfiguration policies

Deconfiguring hardware

Dedicated processors:

Dedicated processors are whole processors that are assigned to a single partition.

If you choose to assign dedicated processors to a logical partition, you must assign 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.

Different partitioning tools assign dedicated processors to logical partitions in different ways. For more information about dedicated processor assignment by a specific partitioning tool, see Partitioning tools.

By default, a powered-off logical partition using dedicated processors will have its processors available to the shared processor pool. When the processors are in the shared processor pool, an uncapped partition that needs more processing power can use the idle processing resources. However, when you power on the dedicated partition while the uncapped partition is using the processors, the activated partition will regain all of its processing resources. If you use the Hardware Management Console, you can prevent dedicated processors from being used in the shared processor pool by disabling this function in the partition properties panels.

You can also set the properties of a logical partition using dedicated processors so that unused processing cycles on those dedicated processors can be made available to the shared processor pool while the dedicated processor logical partition is running. This effectively allows the dedicated processor partition to act as if it were a capped processor partition. You can change the processor sharing mode of the dedicated processor partition at any time, without having to shut down and restart the logical partition.

Related concepts

"Partitioning tools" on page 5
You must use tools to partition your servers. The tool that you use to partition each server depends upon the server model and the operating systems and features that you want to use on the server.

"Linux logical partition functional differences between IBM eServer hardware and previous hardware models" on page 13
Use this information to see the new or significantly changed enhancements to Linux partitioning.

Shared processors:

Shared processors are physical processors whose processing capacity is shared among multiple logical partitions. The ability to divide physical processors and share them among multiple logical partitions is known as *Micro-Partitioning*.

Note: For some models, Micro-Partitioning is an option for which you must obtain and enter an Advanced POWER Virtualization activation code. If you have not yet entered this activation code for these server models, see Entering the activation code for Virtualization Engine technologies.

All physical processors that are not dedicated to specific logical partitions are grouped together in the *shared processor pool*. You can assign a specific amount of the processing capacity in the shared processor pool to each logical partition using the shared processor pool.

The shared processor pool allows you to assign partial processors to a logical partition. A minimum of 0.10 processing units can be configured for any partition using shared processors. Processing units are a unit of measure for shared processing power across one or more virtual processors. One shared processing unit on one virtual processor accomplishes approximately the same work as one dedicated processor.

Some server models allow only a portion of the shared processor pool for use by logical partitions, so you are not always able to assign the full capacity of the shared processor pool to logical partitions. The System Planning Tool (SPT) shows how much of the shared processor pool is available for partitioning use on each server model, so use the SPT to validate your partition plan. For more information about the SPT, see System Planning Tool.

Different partitioning tools assign shared processors to logical partitions in different ways. For more information about shared processor assignment by a specific partitioning tool, see Partitioning tools.

Partitions in the shared processor pool can have a sharing mode of capped or uncapped. An *uncapped logical partition* is a logical partition that can use more processor power than its assigned processing capacity. The amount of processing capacity that an uncapped logical partition can use is limited only by the number of virtual processors assigned to the logical partition and the amount of unused processing capacity that is available in the shared processor pool. In contrast, a *capped logical partition* is a logical partition that cannot use more processor power than its assigned processing capacity.

For example, logical partitions 2 and 3 are uncapped logical partitions, and logical partition 4 is a capped logical partition. Logical partitions 2 and 3 are each assigned 3.00 processing units and four virtual processors. Logical partition 2 currently uses only 1.00 of its 3.00 processing units, but logical partition 3 currently has a workload demand that requires 4.00 processing units. Because logical partition 3 is uncapped and has four virtual processors, the server firmware automatically allows logical partition 3 to use 1.00 processing units from logical partition 2. This increases the processing power for logical partition 3 to 4.00 processing units. Soon afterwards, logical partition 2 increases its workload demand to 3.00 processing units. The server firmware therefore automatically returns 1.00 processing units to logical partition 2 so that logical partition 2 can use its full, assigned processing capacity once more. Logical partition 4 is assigned 2.00 processing units and three virtual processors, but currently has a workload demand that requires 3.00 processing units. Because logical partition 4 is capped, logical partition 4 cannot use any unused processing units from logical partitions 2 or 3. However, if the workload demand of logical partition 4 decreases below 2.00 processing units, logical partitions 2 and 3 could use any unused processing units from logical partition 4.

By default, logical partitions that use the shared processor pool are capped logical partitions. You can set a logical partition to be an uncapped logical partition if you want the logical partition to use more processing power than its assigned amount.

Although an uncapped logical partition can use more processor power than its assigned processing capacity, the uncapped logical partition can never use more processing units than its assigned number of virtual processors.

If multiple uncapped logical partitions need additional processor capacity at the same time, the server can distribute the unused processing capacity to all uncapped logical partitions. This distribution process is determined by the uncapped weight of each of the logical partitions.

Uncapped weight is a number in the range of 0 through 255 that you set for each uncapped partition in the shared processor pool. On the HMC, you can choose from any of the 256 possible uncapped weight values. The Integrated Virtualization Manager and the Virtual Partition Manager limit you to only one of

several different uncapped weight values. By setting the uncapped weight (255 being the highest weight), any available unused capacity is distributed to contending logical partitions in proportion to the established value of the uncapped weight. The default uncapped weight value is 128.

For example, logical partition 2 has an uncapped weight of 100, and logical partition 3 has an uncapped weight of 200. If logical partitions 2 and 3 both require additional processing capacity, logical partition 3 would receive two additional processing units for every additional processing unit that logical partition 2 receives.

Related concepts

"Logical partition overview" on page 2
Logical 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 *logical partitions*. You can install software on a logical partition, and the logical partition runs as an independent logical server with the resources that you have allocated to the logical partition.

"System Planning Tool" on page 41
The System Planning Tool (SPT) helps you design a managed system that can support a specified set of workloads. You can design a managed system based upon workload data from your current systems, based upon new workloads that you want the managed system to support, based upon sample systems that are provided with the utility, or based upon your own custom specifications.

"Partitioning tools" on page 5
You must use tools to partition your servers. The tool that you use to partition each server depends upon the server model and the operating systems and features that you want to use on the server.

"Linux logical partition functional differences between IBM eServer hardware and previous hardware models" on page 13
Use this information to see the new or significantly changed enhancements to Linux partitioning.

Related information

Entering the activation code for Virtualization Engine technologies

Virtual processors in the shared processor pool:

A *virtual processor* is a representation of a physical processor to the operating system of a logical partition that uses the shared processor pool.

When you install and run an operating system on a server that is not partitioned, the operating system calculates the number of operations that it can perform concurrently by counting the number of processors on the server. For example, if you install an operating system on a server that has eight processors, and each processor can perform two operations at a time, the operating system can perform 16 operations at a time. In the same way, when you install and run an operating system on a logical partition that uses dedicated processors, the operating system calculates the number of operations that it can perform concurrently by counting the number of dedicated processors that are assigned to the logical partition. In both cases, the operating system can easily calculate how many operations it can perform at a time by counting the whole number of processors that are available to it.

However, when you install and run an operating system on a logical partition that uses the shared processor pool, the operating system cannot calculate a whole number of operations from the fractional number of processing units that are assigned to the logical partition. The server firmware must therefore represent the processing power available to the operating system as a whole number of processors. This allows the operating system to calculate the number of concurrent operations that it can perform. A *virtual processor* is a representation of a physical processor to the operating system of a logical partition that uses the shared processor pool.

The server firmware distributes processing units evenly among the virtual processors assigned to a logical partition. For example, if a logical partition has 1.80 processing units and two virtual processors, each virtual processor has 0.90 processing units supporting its workload.

There are limits to the number of processing units that you can have for each virtual processor. The minimum number of processing units that you can have for each virtual processor depends on the server model. The maximum number of processing units that you can have for each virtual processor is always 1.00. This means that a logical partition cannot use more processing units than the number of virtual processors that it is assigned, even if the logical partition is uncapped.

A logical partition generally performs best if the number of virtual processors is close to the number of processing units available to the logical partition. This lets the operating system manage the workload on the logical partition effectively. In certain situations, you might be able to increase system performance slightly by increasing the number of virtual processors. If you increase the number of virtual processors, you increase the number of operations that can run concurrently. However, if you increase the number of virtual processors without increasing the number of processing units, the speed at which each operation runs will decrease. The operating system also cannot shift processing power between processes if the processing power is split between many virtual processors.

Different partitioning tools assign virtual processors to logical partitions in different ways. For more information on virtual processor assignment by a specific partitioning tool, see Partitioning tools.

Operating systems display virtual processors in system utilities and performance-monitoring programs in the same way that the operating systems would display physical processors. However, operating systems may differ in how they display processor information. For example, each physical POWER5 processor has two processor cores, and each processor core can run two threads simultaneously, so a physical POWER5 processor can run four threads simultaneously. When a logical partition uses the shared processor pool on a server that uses the POWER5 processor, each virtual processor can also run four threads simultaneously. System utilities in AIX take processor cores and threads into account, so if an AIX system utility says that you have four processors, then you have four threads on one virtual processor. In contrast, system utilities in i5/OS do not take processor cores or threads into account, so if an i5/OS system utility says that you have four processors, you have four virtual processors.

Related concepts

"Partitioning tools" on page 5
You must use tools to partition your servers. The tool that you use to partition each server depends upon the server model and the operating systems and features that you want to use on the server.

Memory

Processors use memory to temporarily hold information. Memory requirements for partitions depend on partition configuration, I/O resources assigned, and applications used.

Different partitioning tools assign memory to logical partitions in different ways. For more information about memory assignment by a specific partitioning tool, see Partitioning tools.

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.

Table 4. Default memory block size used for varying amounts of configurable memory

Amount of configurable memory	Default memory block size
Less than 4 GB	16 MB
Greater than 4 GB up to 8 GB	32 MB
Greater than 8 GB up to 16 GB	64 MB
Greater than 16 GB up to 32 GB	128 MB
Greater than 32 GB	256 MB

The memory block size can be changed by using the Logical Memory Block Size option in the Advanced System Management Interface (ASMI). The machine default value should only be changed under

direction from your service provider. To change the memory block size, you must be a user with administrator authority, and you must shut down and restart the managed system for the change to take effect. If the minimum memory amount in any partition profile on the managed system is less than the new memory block size, you must also change the minimum memory amount in the partition profile.

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 perform logical partition tasks. Each partition has a Hardware Page Table (HPT). The size of the HPT is based on an HPT ratio of 1/64 and is determined by the maximum memory values you establish for each partition.

Server firmware requires memory to support the logical partitions on the server. The amount of memory required by the server firmware varies according to several factors. Factors influencing server firmware memory requirements include the following:

- Number of logical partitions
- Partition environments of the logical partitions
- Number of physical and virtual I/O devices used by the logical partitions
- Maximum memory values given to the logical partitions

Note: Firmware level updates can also change the server firmware memory requirements. Larger memory block sizes can exaggerate the memory requirement change.

Generally, you can estimate the amount of memory required by server firmware to be approximately 8% of the system installed memory. The actual amount required will generally be less than 8%. However, there are some server models that require an absolute minimum amount of memory for server firmware, regardless of the previously mentioned considerations.

When selecting the maximum memory values for each partition, consider the following:

- Maximum values affect the HPT size for each partition
- The logical memory map size for each partition

If the server firmware detects that a memory module has failed or is about to fail, then the server firmware creates a serviceable event. The server firmware can also deconfigure the failing memory module automatically, depending upon the type of failure and the deconfiguration policies that you set up using the ASMI. You can also deconfigure a failing memory module manually 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 IPL mode. When the managed system restarts itself, or when you restart the managed system manually, the managed system attempts to start the logical 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 logical partitions with their minimum memory values, then the managed system starts as many logical partitions as it can with their minimum memory values. If there is any memory left over after the managed system has started as many logical partitions as it can, then the managed system distributes any remaining memory resources to the running logical partitions in proportion to their desired memory values.

Related concepts

"Partitioning tools" on page 5
You must use tools to partition your servers. The tool that you use to partition each server depends upon the server model and the operating systems and features that you want to use on the server.

Memory requirements for Linux logical partitions:

Linux logical partitions require a minimum of 128 MB of memory.

Expansion unit

You can add expansion units to many of the models to support additional features and devices. If you want to create logical partitions on your server, you might need to add an expansion unit that contains the additional hardware that you need for each logical partition.

Some expansion units can support only disk units (storage expansion unit), while others can support a variety of hardware (system expansion unit). Expansion units generally contain one or more system I/O buses with various I/O devices.

Terminal and console options for logical partitions

You can initiate a terminal or console session to the logical partitions on your managed system using a variety of methods. Your choice of terminal or console depends on your operating system and business needs.

The following choices of terminal or console are available for each operating system.

Table 5. Terminal and console options for logical partitions

Operating system	Terminal or console options
AIX	• Hardware Management Console (HMC) • Telnet • OpenSSH with OpenSSL (included in the AIX expansion pack) • Direct serial connection (ASCII terminal or PC connected with null modem cable) • i5/OS virtual console (for AIX logical partitions that use i5/OS resources) • When on a system with a Virtual I/O Server (VIOS) partition, the console can be provided by the VIOS partition when using VIOS 1.2.0 or later.
i5/OS	• HMC • Operations Console – Operations Console LAN – Operations Console Directly attached • Twinaxial console
Linux	• HMC • Telnet • OpenSSH with OpenSSL (included in the Linux distribution) • Direct serial connection (ASCII terminal or PC connected with null modem cable) • i5/OS virtual console (for Linux logical partitions that use i5/OS resources) • When on a system with a Virtual I/O Server (VIOS) partition, the console can be provided by the VIOS partition when using VIOS 1.2.0 or later.
Virtual I/O Server	• Hardware Management Console (HMC) • Telnet • OpenSSH with OpenSSL (included in the AIX expansion pack) • Direct serial connection (ASCII terminal or PC connected with null modem cable) • i5/OS virtual console (for AIX logical partitions that use i5/OS resources) • When on a system with a Virtual I/O Server (VIOS) partition, the console can be provided by the VIOS partition when using VIOS 1.2.0 or later.

Hardware Management Console terminal and console options:

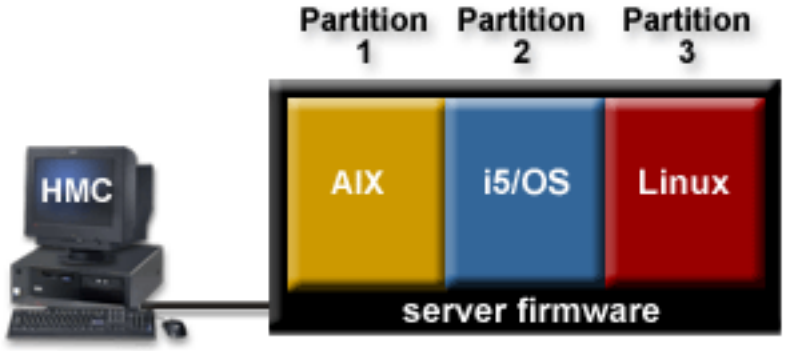
The HMC provides virtual terminal emulation for AIX and Linux logical partitions and virtual 5250 console emulation for i5/OS logical partitions.

The HMC connects to the server firmware. You use the HMC to specify to the server firmware how you want resources to be allocated among the logical partitions on the managed system. You also use the HMC to start and stop the logical partitions, update the server firmware code, manage Capacity on Demand, and transmit service information to service and support if there are any hardware problems with your managed system.

You can create virtual terminal and virtual 5250 console sessions locally on the HMC by using the Server Management commands on the HMC. If you configure the HMC to allow remote access, you can also create virtual terminal and virtual 5250 console sessions remotely through the HMC. You can create remote virtual terminal sessions on AIX and Linux logical partitions by using the Server Management commands on Web-based System Manager. You can also create virtual 5250 console sessions on i5/OS logical partitions. You must configure the HMC to allow remote access, and you must configure encryption on the logical partitions for the session to be secure.

The HMC communicates with servers using service applications to detect, consolidate, and send information to IBM for analysis.

The following figure shows a partitioned server being managed by an HMC.

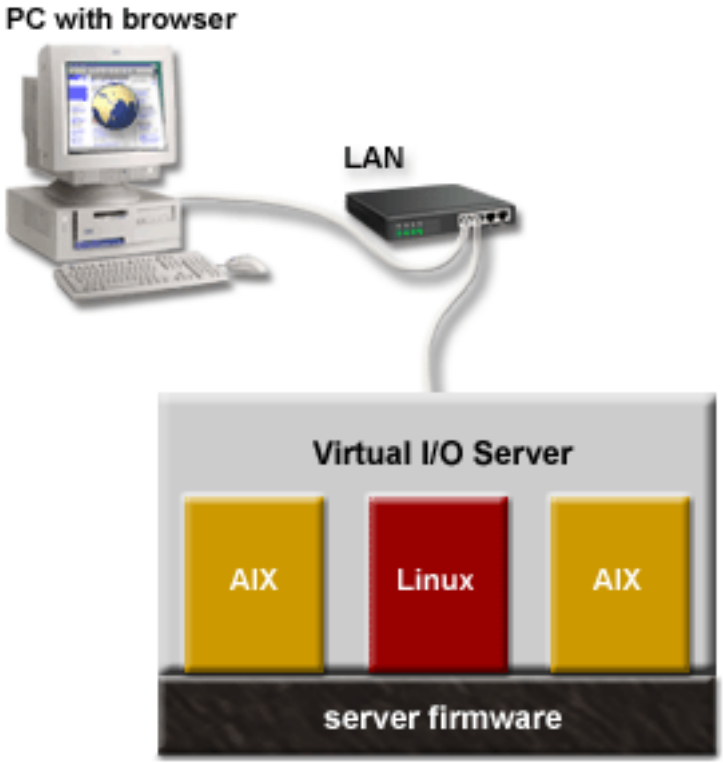


Integrated Virtualization Manager terminal and console options:

The *Integrated Virtualization Manager* is a browser-based system management interface for Virtual I/O Server that allows you to create and manage AIX and Linux logical partitions on a single IBM eServer p5 or IBM System p5 server or Linux logical partitions on a single IBM eServer OpenPower server. The Integrated Virtualization Manager is supported only on certain IBM eServer p5, IBM System p5, and IBM eServer OpenPower server models.

Virtual I/O Server is software that provides virtual storage and shared Ethernet resources to the other logical partitions on the managed system. Virtual I/O Server is not a general purpose operating system that can run applications. Virtual I/O Server is installed on a logical partition in the place of a general purpose operating system, and is used solely to provide virtual I/O resources to other logical partitions with general purpose operating systems. You use the Integrated Virtualization Manager to specify to Virtual I/O Server how these resources are assigned to the other logical partitions.

To use the Integrated Virtualization Manager, you must first install Virtual I/O Server on an unpartitioned server. Virtual I/O Server automatically creates a logical partition for itself, which is called the *management partition* for the managed system. The management partition is the Virtual I/O Server logical partition that controls all of the physical I/O resources on the managed system. After you install Virtual I/O Server, you can configure a physical Ethernet adapter on the server so that you can connect to the Integrated Virtualization Manager from a computer with a web browser.



In this figure, you can see Virtual I/O Server in its own logical partition, and the AIX and Linux logical partitions that are managed by the Virtual I/O Server logical partition. The browser on the PC connects to the Integrated Virtualization Manager interface over a network, and you can use the Integrated Virtualization Manager to create and manage the logical partitions on the server.

The Integrated Virtualization Manager does not have a command line interface that you can launch from the GUI. Instead, you can start a terminal session on the Virtual I/O Server logical partition from your PC. You can start the terminal session using either *ssh* (if you have installed OpenSSL and Portable OpenSSH software on the management partition) or *telnet*. You can then use the *mkvt* command on the Virtual I/O Server command line interface. The *mkvt* command starts a virtual terminal session on any of the logical partitions on the managed system.

For more information about partitioning using the Integrated Virtualization Manager, see Partitioning with the Integrated Virtualization Manager.

Related information

Partitioning with the Integrated Virtualization Manager

I/O devices

I/O devices allow your managed system to gather, store, and transmit data. I/O devices are found in the server unit itself and in expansion units and towers that are attached to the server. I/O devices can be embedded into the unit, or they can be installed into physical slots.

Not all types of I/O devices are supported for all operating systems or on all server models. For example, Switch Network Interface (SNI) adapters are supported only on certain server models, and are not supported for i5/OS logical partitions. Also, I/O processors (IOPs) are supported only on i5/OS logical partitions.

Barrier-synchronization register

The barrier-synchronization register (BSR) is a memory register that is located on certain POWER technology-based processors. You can write a parallel-processing application running on AIX so that the

application uses a BSR to perform barrier synchronization, which is a method for synchronizing the threads in the parallel-processing application. If you use version 7 or later of the Hardware Management Console (HMC) to create logical partitions, you can divide BSRs into arrays and assign BSR arrays to partition profiles.

Each BSR array is 8 bytes long. The number of BSR arrays that are available on a managed system depends on the type of processors used on the server model. You can see the number of BSR arrays that are available on a managed system by viewing managed system properties on the HMC.

Using an HMC, you can assign a whole number of BSR arrays to one or more partition profiles. When you activate a logical partition using a partition profile that specifies a number of BSR arrays, the managed system assigns the BSR arrays to the logical partition if the specified number of BSR arrays are available. If the number of BSR arrays specified in the partition profile are not available, you cannot activate the logical partition using that partition profile.

The Integrated Virtualization Manager does not allow you to assign BSR arrays to logical partitions.

The HMC allows you to assign BSR arrays to any logical partition. However, AIX is the only operating system that currently supports the use of BSRs and BSR arrays. Also, you might not realize a performance advantage if you use barrier synchronization on a logical partition that uses shared processors.

You cannot add BSR arrays to or remove BSR arrays from logical partitions using dynamic logical partitioning. To add or remove BSR arrays, you must change the partition profile or create a new partition profile with the revised number of BSR arrays, shut down the logical partition, and restart the logical partition using the partition profile with the new number of BSR arrays.

To take advantage of barrier synchronization, a parallel-processing application must be written specifically to access and write to the BSR or a BSR array. For more information on how to do this, see the information about the bsr_alloc, bsr_free, and bsr_query kernel services under ″Technical Reference: Kernel and Subsystems, Volume 1″ in the IBM System p and AIX Information Center.

Communications options for logical partitions

The types of communications options that you use depend on your business needs and the operating system you are running. You can establish interpartition communication using virtual Ethernet. For IBM System i5 and eServer i5 server models, you can also use the HSL OptiConnect for high-speed system-to-system communication or the virtual OptiConnect to emulate external OptiConnect hardware providing a virtual bus between logical partitions.

Host Ethernet Adapter

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).

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.

You can create an LHEA for a logical partition using either of the following methods:

- You can add the LHEA to a partition profile, shut down the logical partition, and reactivate the logical partition using the partition profile with the LHEA.
- You can add the LHEA to a running logical partition using dynamic logical partitioning. (This method can be used for Linux logical partitions only if you install Red Hat Enterprise Linux version 5.1, Red Hat Enterprise Linux version 4.6, or a later version of Red Hat Enterprise Linux on the logical partition.)

When you activate a logical partition, the LHEAs in the partition profile are considered to be required resources. If the physical HEA resources required by the LHEAs are not available, then the logical partition cannot be activated. However, when the logical partition is active, you can remove any LHEAs you want from the logical partition.

After you create an LHEA for a logical partition, a network device is created in the logical partition. This network device is named `entX` on AIX logical partitions, `CMNXX` on i5/OS logical partitions, and `ethX` on Linux logical partitions, where *X* represents sequentially assigned numbers. The user can then set up TCP/IP configuration similar to a physical Ethernet device to communicate with other logical partitions.

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 and 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 4 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.

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 logical partition 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. Because you are bridging the Ethernet connection through the Virtual I/O Server, the connection might not perform as well as a logical network. 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 logical partition is the promiscuous mode partition for the physical port. For more information on how to configure a physical port, see Configuring physical ports on a Host Ethernet Adapter using version 7 or later of the HMC.
- The physical port can have only one logical port.

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 just as if the physical ports were ports on a regular physical Ethernet adapter.

HEA hardware does not support Half Duplex mode.

You can change the properties of a logical port on an LHEA by using dynamic logical partitioning to remove the logical port from the logical partition and add the logical port back to the logical partition using the changed properties. If the operating system of the logical partition does not support dynamic logical partitioning for LHEAs, and you want to change any logical port property other than the VLANs on which the logical port participates, you must set a partition profile for the logical partition so that the partition profile contains the desired logical port properties, shut down the logical partition, and activate the logical partition using the new or changed partition profile. If the operating system of the logical partition does not support dynamic logical partitioning for LHEAs, and you want to change the VLANs on which the logical port participates, you must remove the logical port from a partition profile belonging to the logical partition, shut down and activate the logical partition using the changed partition profile, add the logical port back to the partition profile using the changed VLAN configuration, and shut down and activate the logical partition again using the changed partition profile.

Virtual Ethernet

Virtual Ethernet allows logical partitions to communicate with each other without having to assign physical hardware to the logical partitions.

You can create virtual Ethernet adapters on each logical partition and connect these virtual Ethernet adapters to virtual LANs. TCP/IP communications over these virtual LANs is routed through the server firmware.

A virtual Ethernet adapter provides similar function as a 1 Gb Ethernet adapter. A logical partition can use virtual Ethernet adapters to establish multiple high-speed interpartition connections within a single managed system. AIX, i5/OS, Linux, and Virtual I/O Server logical partitions and Windows environments integrated on iSeries can communicate with each other using TCP/IP over the virtual Ethernet communications ports.

Virtual Ethernet adapters are connected to an IEEE 802.1q (VLAN)-style virtual Ethernet switch. Using this switch function, logical partitions can communicate with each other by using virtual Ethernet adapters and assigning VIDs (VLAN ID) that enable them to share a common logical network. The virtual Ethernet adapters are created and the VID assignments are done using the Hardware Management Console (HMC). The system transmits packets by copying the packet directly from the memory of the sender partition to the receive buffers of the receiver partition without any intermediate buffering of the packet.

You can configure an Ethernet bridge between the virtual LAN and a physical Ethernet adapter that is owned by a Virtual I/O Server or i5/OS logical partition. The logical partitions on the virtual LAN can communicate with an external Ethernet network through the Ethernet bridge. You can reduce the number of physical Ethernet adapters required for a managed system by routing external communications through the Ethernet bridge.

The number of virtual Ethernet adapters allowed for each logical partition varies by operating system.

- AIX 5.3 supports up to 256 virtual Ethernet adapters for each logical partition.
- i5/OS supports up to 32 767 virtual Ethernet adapters for each logical partition. Each i5/OS logical partition can belong to a maximum of 4094 virtual LANs.

- Version 2.4 of the Linux kernel supports up to 100 virtual Ethernet adapters for each logical partition. Each Linux logical partition can belong to a maximum of 4094 virtual LANs.
- Version 2.6 of the Linux kernel supports up to 32 768 virtual Ethernet adapters for each logical partition. Each Linux logical partition can belong to a maximum of 4094 virtual LANs.

Besides a PVID, the number of additional VID values that can be assigned for each virtual Ethernet adapter is 19, which indicates that each virtual Ethernet adapter can be used to access 20 networks. The HMC generates a locally administered Ethernet MAC address for the virtual Ethernet adapters so that these addresses do not conflict with physical Ethernet adapter MAC addresses. To ensure uniqueness among the virtual Ethernet adapters, the address generation is based on the system serial number, LPAR ID, and adapter ID.

After a specific virtual Ethernet is enabled for a logical partition, a network device is created in the logical partition. This network device is named `entX` on AIX logical partitions, `CMNXX` on i5/OS logical partitions, and `ethX` on Linux logical partitions, where *X* represents sequentially assigned numbers. The user can then set up TCP/IP configuration similar to a physical Ethernet device to communicate with other partitions.

Some managed systems contain a Host Ethernet Adapter (HEA). A *Host Ethernet Adapter (HEA)* is a physical Ethernet adapter that is integrated directly into the GX+ bus on a managed system. 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. For more information on HEAs and their benefits, see Host Ethernet Adapter.

Related concepts

"How Linux implements virtual resources" on page 25
Linux logical partitions can use virtual storage and networking devices that are made available by the Virtual I/O Server or by i5/OS.

Virtual Ethernet for Linux logical partitions: Virtual Ethernet technology is supported on versions 2.4 and 2.6 of the Linux kernel on POWER5 hardware. Virtual Ethernet enables IP-based communication between logical partitions on the same system using a VLAN-capable software switch in POWER5 systems. The bridge module of the Linux kernel, along with the bridge-utils package, enables the logical partitions to communicate with other systems without assigning physical Ethernet slots to the logical partitions.

Virtual networking along with other POWER5 virtualization technologies offers greater flexibility in configuration scenarios. Workloads can be easily consolidated with more control over resource allocation. Network availability can also be improved for more systems with fewer resources using a combination of Virtual Ethernet, the bridge kernel module, and the bonding kernel module. When there are not enough physical slots to allocate a physical network adapter to each LPAR, network access using Virtual Ethernet and the bridge kernel module is preferable to IP forwarding because it does not complicate the IP network topology.

IBM System p5 and eServer p5 hardware supports inter-LPAR communication using virtual networking. Virtual Ethernet adapters are connected to an IEEE 802.1q (VLAN)-style virtual Ethernet switch. Using this switch function, logical partitions can communicate with each other by using virtual Ethernet adapters and assigning VLAN IDs (VID) that enable them to share a common logical network. The Virtual Ethernet adapters are created and the VID assignments are done using the Hardware Management Console. The system transmits packets by copying the packet directly from the memory of the sender partition to the receive buffers of the receiver partition without any intermediate buffering of the packet.

The number of Virtual Ethernet adapters for each LPAR varies by operating system. Version 2.4 of the Linux kernel supports up to 100 Virtual Ethernet adapters while version 2.6 of the Linux kernel can

support up to 32 768 Virtual Ethernet adapters. Besides a Primary VID (PVID), the number of additional VID values that can be assigned for each Virtual Ethernet adapter is 19, which indicates that each Virtual Ethernet adapter can be used to access 20 networks. The HMC generates a locally administered Ethernet MAC address for the Virtual Ethernet adapters so that these addresses do not conflict with physical Ethernet adapter MAC addresses. To ensure uniqueness among the Virtual Ethernet adapters, the address generation is based on the system serial number, LPAR ID, and adapter ID.

When using the Integrated Virtualization Manager, only PVID is allowed (no additional VLANs), and only the PVID may only be 1-4.

When using Virtual Partition Manager, each partition can have at most one Virtual Ethernet adapter for each PVID from 1-4.

For VLAN-unaware operating systems, each Virtual Ethernet adapter is created with only a PVID (no additional VID values) and the POWER hypervisor will ensure that packets have their VLAN tags removed before delivering to that LPAR. In the case of VLAN aware systems, such as Linux with the vlan module, you can assign additional VID values besides the PVID and the POWER hypervisor removes the tags of any packets that arrive with the PVID tag. Because the number of Virtual Ethernet adapters supported for each LPAR is large, you can have multiple Virtual Ethernet adapters with each adapter being used to access a single network and therefore assigning only PVID and avoiding the additional VID assignments. This also has the advantage that no additional VLAN configuration is required for the operating system using these Virtual Ethernet adapters.

After a specific virtual Ethernet is enabled for a partition, a network device named `ethX` is created in the partition. The user can then set up TCP/IP configuration similar to a physical Ethernet device to communicate with other partitions.

Logical partition utilities

There are utilities in addition to the main partition management tools that you can use to manage your system. These utilities allow you to monitor and manage resources more closely than you could if you use the partition management tools alone. These utilities are installed on logical partitions on your managed system.

System Planning Tool

The System Planning Tool (SPT) helps you design a managed system that can support a specified set of workloads. You can design a managed system based upon workload data from your current systems, based upon new workloads that you want the managed system to support, based upon sample systems that are provided with the utility, or based upon your own custom specifications.

If you make any changes to the hardware assignments or placement in the system, the SPT validates the changes to ensure that the resulting system fulfills the minimum hardware requirements and hardware placement requirements for the logical partitions.

When you are done making changes to the system, you can save your work as a system plan. You can import this file into your Hardware Management Console (HMC) or the management partition for the Integrated Virtualization Manager and deploy the system plan to a managed system that is managed by the HMC or the Integrated Virtualization Manager. When you deploy the system plan, the HMC or the Integrated Virtualization Manager creates the logical partitions from the system plan on the managed system. For more information on system plans, see Creating partitions from a system plan.

To download the SPT, see the IBM System Planning Tool Web site.

Related concepts

"Shared processors" on page 29
Shared processors are physical processors whose processing capacity is shared among multiple logical partitions. The ability to divide physical processors and share them among multiple logical partitions is known as *Micro-Partitioning*.

Related tasks

"Creating additional partition profiles using version 6 or earlier of the HMC" on page 163
You can create more than one partition profile for a logical partition using the Hardware Management Console (HMC). Each partition profile can specify a different amount of system resources and different partition startup attributes. You can change the attributes used by a logical partition by shutting down the logical partition and restarting the logical partition using a different partition profile.

"Creating additional partition profiles using version 7 or later of the HMC" on page 76
You can create more than one partition profile for a logical partition using the Hardware Management Console (HMC). Each partition profile can specify a different amount of system resources and different partition startup attributes. You can change the attributes used by a logical partition by shutting down the logical partition and restarting the logical partition using a different partition profile.

Enterprise Workload Manager

Enterprise Workload Manager (EWLM) is a performance-management tool that monitors workloads on your managed system. With EWLM, you can establish performance goals for workloads. If your workloads require more system resources to meet the performance goals that you have established, EWLM automatically adjusts the resources on your managed system so that those performance goals can be met.

EWLM uses dynamic logical partitioning to adjust the resources on your managed system. To use this feature of EWLM, you must have a model that supports Advanced POWER Virtualization, or you must obtain and enter an Advanced POWER Virtualization enablement code for your managed system.

If you want EWLM to manage workloads on a logical partition, you must set up the logical partition so that it can be managed by a workload-management application. The workload-management setting is located in logical partition properties on the Hardware Management Console (HMC) and in the Integrated Virtualization Manager.

EWLM manages logical partitions in partition-workload groups. EWLM allows you to define the amount of resources that the workloads in each partition-workload group can use.

The HMC allows you to define from 0 to 4095 partition-workload groups on a single managed system. You can set the partition-workload group for each logical partition by changing the properties of the logical partition. Each logical partition can belong to one partition-workload group at a time, or to no partition-workload groups at all.

The Integrated Virtualization Manager allows only for a single partition-workload group on each managed system. Each logical partition can belong to the single partition-workload group, or to no partition-workload groups at all.

Examples of logically partitioned systems

You can use the logical partitioning examples in this section to consolidate servers, use computing resources more efficiently, and increase the flexibility of your enterprise.

Creating multiple client environments

You provide high-availability e-commerce services to a number of clients. You provide computing resources, applications, and technical support to each client, and each client can independently configure and use the applications running on the computing resources that you provide. In such an environment, it is essential to isolate the clients so that the clients have access only to their resources. However,

dedicating a physical server to each client is cost prohibitive, and does not allow you to easily increase or decrease the amount of computing resources used by each client.

You therefore decide to create a logical partition for each client. You install an operating system and applications on each logical partition. You can then use dynamic logical partitioning to add resources to logical partitions or remove resources from logical partitions as needed. If a client stops using your service, you can delete the logical partition for that client and reassign the resources to other logical partitions.

Testing new applications

You are a furniture manufacturer that uses an application to track inventory at your plant. A new version of the application is now available. You want to test this new version before using it on your production server, but you do not have any money to buy separate test hardware.

You therefore decide to create a separate test environment on your managed system. You remove resources from the existing production environment, and you create a new logical partition that contains the resources that you removed from the production environment. You install an operating system and the new version of the inventory application on the logical partition. You can then use dynamic logical partitioning to move resources from the test logical partition to the production logical partition during peak production demand, and then return the resources to the test logical partition during testing. When you have finished testing, you can delete the test logical partition, add the resources back to the production logical partition, and install the new version of the inventory application on the production system.

Integrating new acquisitions

You have just acquired a new company. Your new acquisition does not use the same applications for payroll, inventory, and billing that you do. You plan to consolidate your two companies onto a single set of applications, but it will take time to implement this consolidation. In the meantime, you are under pressure to reduce data center costs quickly.

You therefore decide to create logical partitions for the applications used by your new acquisition. You install an operating system and the applications used by the new company on the logical partition. If the combined workloads require more resources, you can use Capacity Upgrade on Demand (CUoD) to add processors and memory to the managed system, and then use dynamic logical partitioning to add these resources to the logical partitions. This solution allows you to save hardware costs immediately while you determine the best way to consolidate onto a single set of applications.

Planning for logical partitions

IBM hardware architectures allow you to create logical partitions to distribute resources within a single server and make it function as if it were two or more independent servers. Before creating logical partitions (LPARs), you need to plan for several variables that are specific to your solution. You need to understand how you can reconfigure partitions to respond to future needs.

You can create logical partitions on your server to integrate multiple operating systems and consolidate several servers into one. Consolidation helps you reduce maintenance and administration costs while improving performance. Planning for logical partitions is a multistep process. Here are the recommended tasks for LPAR planning for AIX, i5/OS, and Linux logical partitions.

Before you begin your planning tasks, complete these items:

Before you begin

__ **Determine what you want to do**

For example, you can:

- Plan a new system
- Reconfigure an existing system
- Upgrade an existing system
- Physically set up a new system
- Partition a new system
- Virtualize systems resources
- Install operating systems on new partitions
- Migrate a partition between physical systems

To help you determine what you want to do, see Logical partition overview and Concepts for partitioning the server in the IBM Systems Hardware Information Center.

This information familiarizes you with the hardware and software that is required for logical partitions and prepares you to plan for and create logical partitions on your server.

Before you begin

__ **Learn about available tools**

The available tools include:

IBM Prerequisite site
IBM Prerequisite site

The IBM Prerequisite site provides you with compatibility information for hardware features. This site helps you plan a successful system upgrade by providing you with the prerequisite information for features that you currently have or plan to add to your system.

Workload Estimator
IBM Systems Workload Estimator

The Workload Estimator estimates the computer resources that are required for Domino®, WebSphere® Commerce, WebSphere, Web Serving and traditional workloads. The Workload Estimator projects the most current System i and System p models that meet the capacity requirements that are within the CPU percent utilization objectives.

System Planning Tool
System Planning Tool

The System Planning Tool (SPT) emulates an LPAR configuration and validates that the planned partitions are valid. In addition, the SPT allows you to test the placement of AIX, i5/OS and Linux hardware within the system to ensure that the placement is valid.

Hardware Management Console
Managing your server using the Hardware Management Console

The Hardware Management Console (HMC) is a system that controls managed systems, including server hardware, logical partitions, and Capacity on Demand (CoD).

Performance toolbox
AIX Performance Toolbox and Performance AIDE for POWER Version 3.0

The AIX Performance Toolbox (PTX) for POWER Version 3.0 is a licensed program product that provides a comprehensive tool for monitoring and tuning system performance in distributed environments.

Integrated Virtualization Manager
Partitioning with Integrated Virtualization Manager

Integrated Virtualization Manager is a browser-based system management interface that you can use to manage a single managed system that uses Virtual I/O Server on a managed partition.

Virtual I/O Server
Using the Virtual I/O Server

The Virtual I/O Server is an appliance that resides in a logical partition that facilitates the sharing of physical I/O resources between AIX and Linux client logical partitions within the server.

__ **Check prerequisites**

Use these resources to check prerequisites:

- Hardware resources
- IBM Prerequisite Web site at http://www-912.ibm.com/e_dir/eServerPrereq.nsf

Logical partition planning tasks

__ **Take inventory of your current environment, and what is available through CoD**

See Working with Capacity on Demand.

Logical partition planning tasks

__ **Perform capacity planning**

Use the Workload Estimator (WLE) for each logical system, new or consolidated, to determine the number of partitions that are needed and the size of each. Use your existing Performance Monitor (PM) information as input for the WLE. See the IBM Systems Workload Estimator Web site at

http://www.ibm.com/systems/support/tools/estimator/index.html .

__ **Design and validate your partition configuration**

Use the SPT to help you design a partitioned system and develop a system plan. See the System Planning Tool for more information about this tool. If you are using an HMC to partition, you can use the system plan file to automate the task of creating partitions on your system. See System plan overview to learn how to deploy a system plan.

__ **Use the WLE and SPT output to identify the console that interacts with the server and its operating systems**

See Console options for logical partitions to help you determine which console helps you to connect and communicate with the server and your operating systems.

__ **Use the WLE and SPT output to determine how the partitions communicate with other partitions, servers, or workstations**

See Communications options for logical partitions to help you select the communication option for your logical partition. Determine which communication option allows you to communicate with other partitions, servers, and workstations.

__ **Use the WLE and SPT output to identify how the partitions communicate with the HMC**

See Hardware Management Console (HMC) to help you determine how to implement a network connection on the HMC.

__ **Determine a service and support strategy**

See Service, support, and troubleshooting to understand how your server communicates to your service provider if you have hardware or software errors. Determine how to apply fixes to your server and how you identify problems that need to be reported to your service provider.

__ **Decide if you want your operating systems to share I/O resources with each other**

See Using the Virtual I/O Server to understand how your OS can provide I/O resources to other logical partitions.

__ **Plan for software licensing in a partitioned environment**

You need to decide how many software licenses you might need depending on your logical partition configuration.

Software licensing for IBM licensed programs on logical partitions

Software licensing considerations for Capacity BackUp.

Related concepts

"Scenario: Using partition profiles" on page 210
As you will see, partition profiles allow you to change the hardware configuration of a logical partition quickly and easily.

"Scenario: Using system profiles" on page 212
As you will see, system profiles allow you to change the hardware configuration of an entire managed system quickly and easily.

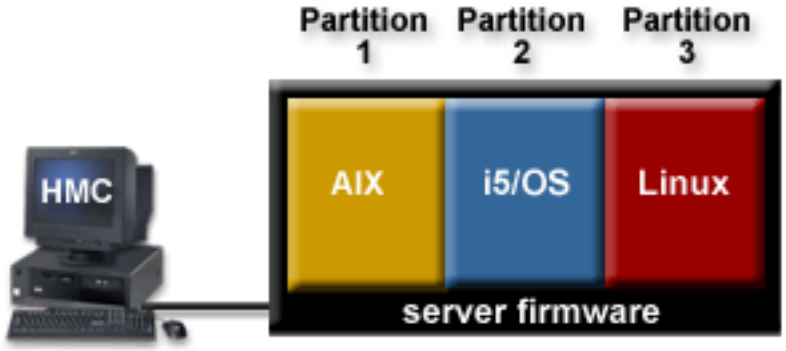
"Partitioning for Linux with an HMC" on page 1
Learn how to configure and manage partitions that run the Linux operating system.

"Scenario: Creating a Linux logical partition and partition profile" on page 209
See an example of creating a Linux logical partition.

Partitioning with version 7 or later of the HMC

The *Hardware Management Console (HMC)* is a system that controls managed systems, including the management of logical partitions and use of Capacity Upgrade on Demand. Using service applications, the HMC communicates with managed systems to detect, consolidate, and forward information to IBM for analysis.

Version 7 or later of the HMC features a browser-based user interface. You can use the HMC locally by connecting a keyboard and mouse to the HMC. You can also configure the HMC so that you can connect to the HMC remotely using a supported browser.



In this figure, you can see the logical partitions and the server firmware on the managed system. The *server firmware* is code that is stored in flash memory on the managed system. The server firmware directly controls the resource allocations on the managed system and the communications between logical partitions on the managed system. The HMC connects with the server firmware and specifies how the server firmware allocates resources on the managed system.

If you use a single HMC to manage a managed system, and the HMC malfunctions or becomes disconnected from the server firmware, then the managed system continues to run, but you will not be able to change the logical partition configuration of the managed system. If desired, you can attach an additional HMC to act as a backup and to provide a redundant path between the managed system and service and support.

When you configure logical partitions using the HMC, you must create at least one partition profile for each logical partition. A *partition profile* is a record on the HMC that specifies a resource configuration and activation state for the logical partition. Each logical partition has a default partition profile. If desired, you can create additional partition profiles with different resource configurations. When you activate a

logical partition using the HMC, you choose a partition profile, and the server firmware starts the logical partition according to the specifications contained in the selected partition profile. For more information on partition profiles, see Partition profile.

To simplify the process of starting an entire system configuration, you can create system profiles. A *system profile* is a record on the HMC that contains an ordered list of partition profiles. When you activate a system profile from the HMC, the server firmware activates the partition profiles in the system profile in the order in which the partition profiles are listed. For more information on system profiles, see System profile.

The HMC also provides terminal and 5250 console emulation for the logical partitions on your managed system. You can connect to logical partitions from the HMC itself, or you can set up the HMC so that you can connect to logical partitions remotely through the HMC. HMC terminal and 5250 console emulation provides a dependable connection that you can use if no other terminal or console device is connected or operational. HMC terminal and 5250 console emulation is particularly useful during initial system setup, before you have configured your terminal or console of choice.

Partitioning using the HMC is supported on all IBM System i5 and eServer i5 and IBM System p5 and eServer p5 models, although some models require you to enter an Advanced POWER Virtualization Technologies enablement code before partitioning the managed system.

Partitioning a new or nonpartitioned server

Use these procedures to partition your new or nonpartitioned server using the Hardware Management Console (HMC).

When you receive your server, the server is in what is known as the manufacturing default configuration. You can install an operating system on the server and use the server in a nonpartitioned configuration. However, if you want to create logical partitions on the managed system, you must develop a partition plan for the server, add hardware to the server or move the hardware within the server according to your partition plan, and validate the hardware on the server. When the server is ready, you can then create the logical partitions using the HMC.

The procedure used to partition a new or nonpartitioned server varies by server type.

Partitioning a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 7 or later of the HMC

Use this procedure to partition a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 7 or later of the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system, create the logical partitions on the managed system, and designate the service partition for the managed system.

Use this procedure in the following cases:

- You have just received your managed system and want to partition the managed system immediately.
- You have used the managed system as a nonpartitioned server, and now want to partition the managed system.

If you want to create a new logical partition on a managed system that has already been partitioned, then you do not need to perform all of the steps in this procedure. For more information on creating a new logical partition on a managed system that has already been partitioned, see Creating logical partitions using version 7 or later of the HMC.

Before you begin, complete the following tasks:

- Use the System Planning Tool (SPT) to ensure that your hardware configuration supports your desired logical partition configuration.

- If necessary, install additional hardware resources on your managed system to support the partition plan specified by the SPT.
- Set up the HMC to manage your logical partition and the managed system. For information on how to set up the HMC, see Setting up the HMC.
- If you have used the managed system prior to partitioning, back up all data on the managed system.

To partition a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 7 or later of the HMC, you must be a super administrator or operator on the HMC. For more information about user roles, refer to Tasks and roles.

To partition a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 7 or later of the HMC, complete the following steps:

1. Ensure that the managed system is in a state of Standby or Operating. Complete the following:
   a. In the navigation pane, open **Systems Management** and click **Servers**.
   b. In the contents pane, find the state of the managed system as displayed in the contents pane under the **Status** heading.
   c. If the managed system is in a **Power off** state, select the managed system in the contents pane, click the **Tasks** button, choose **Operations → Power On**, select the power-on mode of **Partition Standby**, click **OK**, and wait until the contents area displays a Standby state for the managed system.

   If the managed system does not display in the contents pane, or if the managed system is in any state other than Standby or Operating, you must fix the problem before continuing. For more information about correcting the operating state of the managed system, see Correcting the managed system operating state.
2. Verify that a single logical partition exists on the managed system. When you connect a new or nonpartitioned managed system to an HMC, a single logical partition displays in the HMC user interface. All system resources belong to this logical partition. In this procedure, you will use this logical partition to validate the hardware on the managed system. After you validate the hardware on the managed system, you will delete this logical partition and create the logical partitions according to your logical partition plan.
   a. In the navigation pane of the HMC, open **Servers** and click on the managed system.
   b. In the contents pane, verify that there is only one logical partition in the list of partitions. The name of this logical partition will be the serial number of the managed system, and the logical partition will have one partition profile called `default_profile`.

   If the logical partition that is described in this step exists, continue to step 4 on page 50. Otherwise, continue to step 3 to reset the managed system.
3. Reset the managed system so that a single logical partition exists on the managed system. Complete the following *at your HMC* (not remotely) to create this logical partition:
   a. Ensure that the hardware placement in the managed system supports the manufacturing default configuration. If the hardware placement in the managed system does not support the manufacturing default configuration, you must move the hardware so that the hardware placement supports the manufacturing default configuration. For more information on placing the hardware in your managed system to support the manufacturing default configuration, contact your marketing representative or business partner.
   b. In the navigation pane, click **Servers**.
   c. In the contents pane, select the managed system in the contents area, click the **Tasks** button, choose **Configuration → Manage Partition Data → Initialize** and click **Yes**.
   d. In the navigation pane, click **HMC Management**.
   e. In the contents pane, click **Open Restricted Shell Terminal**. The Restricted shell command-line interface displays.

f. Type: `lpcfgop -m managed_system_name -o clear`. *managed_system_name* is the name of managed system as it displays in the content area.

g. Enter 1 to confirm. This step will take several seconds to complete.

4. Ensure that the logical partition is in a Not Activated state. In the navigation pane of the HMC, select the managed system if it is not already selected, and review the state of the logical partition on the managed system. If the logical partition is in a Running state, shut down the logical partition by completing the following steps:

   a. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Properties**.

   b. Ensure that **Power off the system after all the logical partitions are powered off** is cleared, and click **OK**.

   c. Shut down the logical partition using operating system procedures. For more information on shutting down logical partitions using operating system procedures, see Shutting down i5/OS logical partitions.

   If the logical partition is in an Error state, complete the following:

   a. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Serviceability → Reference Code History**.

   b. Click the **Reference Code** tab and use the reference codes displayed on the **Reference Code** tab to diagnose and fix the problem. For more information about using reference codes to diagnose and fix problems, see Reference codes list for customers.

5. Identify (or tag) the load source device, alternate restart device, and console device to use for system setup. Identify the HMC as the console device for system setup, regardless of the types of console device that you ultimately plan to use for the logical partitions on your system. The HMC provides the easiest, most reliable method to access a console session during system setup. When you create your logical partitions, you can specify the console of your choice for each logical partition. Also, when you select the load source device and alternate restart device, select the devices that will be used by the first i5/OS logical partition in your SPT plan. To identify the devices to use for system setup, complete the following:

   a. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Configuration → Manage Profiles**.

   b. Select the partition profile, click **Actions**, and choose **Edit**.

   c. Click the **Tagged I/O** tab.

   d. Under **Load source**, click **Select**.

   e. Select the slot in which the load source I/O Adapter (IOA) or the load source I/O Processor (IOP) is installed and click **OK**.

   f. Under **Alternate restart device**, click **Select**.

   g. Sselect the slot in which the alternate restart device IOA or IOP is installed and click **OK**.

   h. Select **Use HMC console** and click **OK**.

   i. Click **Close**.

6. If Licensed Internal Code was not preinstalled on the server, or if you want to install Licensed Internal Code yourself, then install Licensed Internal Code at this time. For more information on installing Licensed Internal code, see Installing Licensed Internal Code on the new logical partition. When the Licensed Internal Code installation is complete, continue to step 8 on page 51.

7. Activate the logical partition:

   a. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Operations → Activate**.

   b. Click **Advanced**.

   c. Select `Manual` in the **Keylock position** field, select `B: IPL from the second side of the load source` in the **IPL type** field, and click **OK**.

   d. If you are performing this procedure from the HMC, select **Open a terminal window or console session** and click **OK**. If you are performing this procedure remotely, click **OK** and then open an

HMC 5250 console session remotely on the logical partition. For more information about opening an HMC 5250 console session remotely, see Connecting to a 5250 console remotely.

e. Type 1 and press Enter to start a dedicated HMC 5250 console session.

8. Verify that the physical adapters are connected and reporting to the managed system using the Failed and non-reporting hardware resources option in the Hardware Service Manager. Use the Failed and non-reporting hardware resource option to display a list of the logical hardware resources that either failed or did not report to the system at the last IPL.

   Attention: Incorrect use of the Failed and non-reporting hardware resource option can cause damage to data in your system.

   a. In the HMC 5250 console session, type 3 and press Enter to select option 3 [Use Dedicated Service Tools (DST)].
   b. Sign onto DST with a valid user ID and password.
   c. Type 7 and press Enter to select option 7 [Start a service tool].
   d. Type 4 and press Enter to select option 4 [Hardware service manager].
   e. Type 4 and press Enter to select option 4 [Failed and non-reporting hardware resources].
   f. Verify that there are no failed or non-reporting resources. If no failed resources or non-reporting resources exist, the informational message No failed or non-reporting logical hardware resources were found will appear. If there are failed resources, contact your service provider.

      Note: You can verify only the adapters that are supported by i5/OS. Any adapter that is not supported by i5/OS might have an error of unknown or failed hardware.

   g. Press F3 until the Use Dedicated Service Tools (DST) display appears.
   h. Type 7 and press Enter to select option 7 [Start a service tool].
   i. Type 7 and press Enter to select option 7 [Operator panel functions].
   j. Press F10 to power off, press Enter to confirm, close the 5250 console session window, and wait until the logical partition shuts down.

9. If the hardware in the managed system is already in the configuration specified in your SPT configuration plan, then continue to step 15 on page 52.
10. Power off the managed system using your HMC.
    a. In the navigation pane, open **Systems Management** and click **Servers**.
    b. In the contents pane, select the managed system in the contents area, click the **Tasks** button, and choose **Operations** → **Power Off**.
    c. Select the **Normal power off** option and click **OK**.
11. Move the hardware in the managed system according to your SPT configuration plan.
12. Power on the managed system to the Standby state using your HMC.
    a. In the navigation pane, open **Systems Management** and click **Servers**.
    b. In the contents pane, select the managed system in the contents area, click the **Tasks** button, and choose **Operations** → **Power On**.
    c. Select **Partition standby** as the power-on mode and click **OK**.
13. Activate the logical partition:
    a. In the navigation pane, open **Systems Management**, open **Servers**, and click the managed system.
    b. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Operations** → **Activate**.
    c. Click **Advanced**.
    d. Select Manual in the **Keylock position** field, select B: IPL from the second side of the load source in the **IPL type** field, and click **OK**.
    e. If you are performing this procedure from the HMC, select **Open a terminal window or console session** and click **OK**. If you are performing this procedure remotely, click **OK** and then open an

HMC 5250 console session remotely on the logical partition. For more information on opening an HMC 5250 console session remotely, see Connecting to a 5250 console remotely.

f. Type 1 and press Enter to start a dedicated HMC 5250 console session.

14. Verify that the physical adapters are connected and reporting to the managed system using the Failed and non-reporting hardware resources option in the Hardware Service Manager.

    Attention: Incorrect use of the Failed and non-reporting hardware resource option can cause damage to data in your system.

    a. Type 3 and press Enter to select option 3 [Use Dedicated Service Tools (DST)].
    b. Sign onto DST with a valid user ID and password.
    c. Type 7 and press Enter to select option 7 [Start a service tool].
    d. Type 4 and press Enter to select option 4 [Hardware service manager].
    e. Type 4 and press Enter to select option 4 [Failed and non-reporting hardware resources].
    f. Verify that there are no failed or non-reporting hardware resources. If no failed or non-reporting hardware resources exist, the informational message No failed or non-reporting logical hardware resources were found will appear. If there are failed resources, contact your service provider.

       Note: You can verify only the adapters that are supported by i5/OS. Any adapter that is not supported by i5/OS might have an error of unknown or failed hardware.

    g. Press F3 until the **Use Dedicated Service Tools (DST)** display appears.
    h. Type 7and press Enter to select option 7 [Start a service tool].
    i. Type 7 and press Enter to select option 7 [Operator panel functions].
    j. Press F10 to power off, press Enter to confirm, close the 5250 console session window, and wait until the logical partition shuts down.

15. Delete the logical partition that owns all of the system resources.

    Attention: This procedure erases the logical partition and the logical partition configuration data stored on the partition profiles. This procedure does not affect any of the data stored on the managed system.

    a. In the navigation pane, open **Systems Management**, open **Servers**, and click the managed system.
    b. In the contents pane, ensure that the logical partition is powered off.
    c. Select the logical partition, click the **Tasks** button, and choose **Operations** → **Delete**.
    d. Click **Yes** to confirm.

16. Create each logical partition on your managed system according to your logical partition plan. You can do this by importing a system plan file into your HMC and deploying the system plan to the managed system. For more information on creating logical partitions using a system plan, see Managing system plans using version 7 or later of the HMC. You can alternately create the logical partitions by performing the following procedure for each logical partition that you want to create.

    a. In the navigation pane, open **Systems Management** and click **Servers**.
    b. In the contents pane, select the managed system, click the **Tasks** button, and choose **Configuration** → **Create Logical Partition**.
    c. Follow the steps in the Create Logical Partition wizard to create a logical partition and a partition profile.

17. Designate one of the i5/OS logical partitions on your managed system as the service partition for the managed system.

    a. In the navigation pane, open **Systems Management** and click **Servers**.
    b. In the contents pane, select the managed system, click the **Tasks** button, and choose **Configuration** → **Properties**.

c. In the **Service partition** field, select the logical partition that you want to designate as the service partition.
d. Click **OK**.

18. Ensure that there is at least one LAN adapter on the HMC that is configured to connect with the logical partitions on your managed system.
    a. In the navigation pane, open **HMC Management**.
    b. Select **HMC Configuration**.
    c. In the contents pane, click **Change Network Settings**.
    d. Click the **LAN Adapters** tab.
    e. Select any LAN adapter other than the `eth0` adapter that connects the HMC with the service processor and click **Details**.
    f. On the **LAN Adapter** tab, under **Local area network information**, select **Open**, and select **Partition communication**.
    g. Click the **Firewall Settings** tab.
    h. Ensure that the RMC application is one of the applications displayed in **Allowed Hosts**. If it is not displayed in **Allowed Hosts**, select the RMC application under **Available Applications** and click **Allow Incoming**. The RMC application displays in **Allowed Hosts** to signify that it has been selected.
    i. Click **OK**.

After you have created the logical partitions on your managed system, you must then complete the following tasks:

1. Install operating systems on the logical partitions. For installation procedures for the AIX, i5/OS, and Linux operating systems, refer to Installing operating systems.
2. Change the console device on each i5/OS logical partition to the console device of your choice. For procedures to change the console i5/OS logical partitions, see Changing the i5/OS console from the HMC to Operations Console or twinaxial console.
3. Connect the logical partitions on your managed system to the LAN adapter that you have just configured on the HMC. You can create a virtual LAN to connect the logical partitions on your managed system with each other, bridge the virtual LAN to a physical Ethernet adapter on an external network, and connect the LAN adapter on the HMC to the same external network. Alternately, you can configure a physical Ethernet adapter on each logical partition, connect the physical Ethernet adapters on the logical partitions to an external network, and connect the LAN adapter on the HMC to the same external network. For information on how to create and configure virtual Ethernet adapters for your logical partitions, see Configuring a virtual Ethernet adapter using version 7 or later of the HMC.

Related concepts

"System plan overview for the HMC" on page 146
Learn about system plan concepts and operations, as well as understand the high-level tasks that you can perform with system plans when using the Hardware Management Console (HMC).

Related tasks

"Creating logical partitions using version 7 or later of the HMC" on page 75
You can use the Create Logical Partition wizard on the Hardware Management Console (HMC) to create a new logical partition. When you create a logical partition, you also create a partition profile that contains the resource allocations and settings for the logical partition.

"Configuring a virtual Ethernet adapter using version 7 or later of the HMC" on page 78
You can configure a virtual Ethernet adapter dynamically for a running logical partition. Doing so will connect the logical partition to a virtual LAN.

Related information

Tasks and roles

Setting up the HMC

Correcting the managed system operating state

Shutting down i5/OS logical partitions

Connecting to a 5250 console remotely

Installing Licensed Internal Code on the new logical partition

Reference codes list for customers

Reference codes list for customers

Installing operating systems

Changing consoles, interfaces, and terminals

Partitioning a new or nonpartitioned IBM System p5, eServer p5 or IntelliStation POWER 285 managed system using version 7 or later of the HMC

Use this procedure to partition a new or nonpartitioned IBM System p5, eServer p5 or IntelliStation® POWER 285 managed system using version 7 or later of the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system and create the logical partitions on the managed system.

Use this procedure in the following cases:

- You have just received your managed system and want to partition the managed system immediately.
- You have used the managed system as a nonpartitioned server, and now want to partition the managed system.

If you want to create a new logical partition on a managed system that has already been partitioned, then you do not need to perform all of the steps in this procedure. For more information about creating a new logical partition on a managed system that has already been partitioned, see Creating logical partitions using version 7 or later of the HMC.

Before you begin, complete the following:

- Use the System Planning Tool (SPT) to ensure that your hardware configuration supports your desired logical partition configuration.
- If necessary, install additional hardware resources on your managed system to support the partition plan specified by the SPT .
- Set up the HMC to manage your logical partition and the managed system. For information on how to set up the HMC, see Setting up the HMC.
- If you have used the managed system prior to partitioning, back up all data on the managed system.

To partition a new or nonpartitioned IBM System p5, eServer p5 or IntelliStation POWER 285 managed system using version 7 or later of the HMC, you must be a super administrator or operator on the HMC. For more information about user roles, refer to Tasks and roles.

To partition a new or nonpartitioned IBM System p5, eServer p5 or IntelliStation POWER 285 managed system using version 7 or later of the HMC, complete the following steps:

1. Ensure that the managed system is in a state of Standby or Operating. Complete the following:
   a. In the navigation pane, open **Systems Management** and click **Servers**.
   b. In the contents pane, find the state of the managed system as displayed in the contents pane under the **Status** heading.
   c. If the managed system is in a Power off state, select the managed system in the contents pane, click the **Tasks** button, choose **Operations → Power on**, select the power-on mode of **Partition Standby**, click **OK**, and wait until the contents area displays a Standby state for the managed system.

   If the managed system does not display in the contents pane, or if the managed system is in any state other than Standby or Operating, you must fix the problem before continuing. For more information about correcting the operating state of the managed system, see Correcting the managed system operating state.
2. Verify that a single logical partition exists on the managed system. When you connect a new or nonpartitioned managed system to an HMC, a single logical partition displays in the HMC user interface. All system resources belong to this logical partition. In this procedure, you will use this logical partition to validate the hardware on the managed system. After you validate the hardware on the managed system, you will delete this logical partition and create the logical partitions according to your logical partition plan.
   a. In the navigation pane of the HMC, open **Servers** and click on the managed system.
   b. In the contents pane, verify that there is only one logical partition in the list of partitions. The name of this logical partition will be the serial number of the managed system, and the logical partition will have one partition profile named `default_profile`.

   If the logical partition that is described in this step exists, continue to step 4. Otherwise, continue to step 3 to reset the managed system.
3. Reset the managed system so that a single logical partition exists on the managed system. Complete the following *at your HMC* (not remotely) to create this logical partition:
   a. Ensure that the hardware placement in the managed system supports the manufacturing default configuration. If the hardware placement in the managed system does not support the manufacturing default configuration, you must move the hardware so that the hardware placement supports the manufacturing default configuration. For more information about placing the hardware in your managed system to support the manufacturing default configuration, contact your marketing representative or business partner.
   b. In the navigation pane, click **Servers**.
   c. In the contents pane, select the managed system in the contents area, click the **Tasks** button, choose **Configuration → Manage Partition Data → Initialize** and click **Yes**.
   d. In the navigation pane, click **HMC Management**.
   e. In the contents pane, click **Open Restricted Shell Terminal**. The Restricted shell command-line interface displays.
   f. Type: `lpcfgop -m` *`managed_system_name`* `-o clear`. *`managed_system_name`* is the name of managed system as it displays in the content area.
   g. Enter 1 to confirm. This step will take several seconds to complete.
4. Ensure that the logical partition is in a Not Activated state. In the navigation pane of the HMC, select the managed system if it is not already selected, and review the state of the logical partition on the managed system. If the logical partition is in a Running state, shut down the logical partition by completing the following steps:

a. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Properties**.
b. Ensure that **Power off the system after all the logical partitions are powered off** is cleared, and click **OK**.
c. Shut down the logical partition using operating system procedures. For more information about shutting down logical partitions using operating system procedures, see the following information:
   - For managed systems running AIX, see Shutting down AIX logical partitions using version 7 or later of the HMC.
   - For managed systems running Linux, see Shutting down Linux logical partitions using version 7 or later of the HMC..

If the logical partition is in an Error state, complete the following:

a. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Serviceability** → **Reference Code History**.
b. Click the **Reference Code** tab and use the reference codes displayed on the **Reference Code** tab to diagnose and fix the problem. For more information about using reference codes to diagnose and fix problems, see Reference codes list for customers.

5. Activate the logical partition and verify that the physical adapters on the managed system are connected and reporting to the managed system using the configuration manager. If AIX is not installed on your managed system, continue with step 6. You can use the configuration manager in AIX to view all of the available devices. When AIX boots and the configuration manager runs, the configuration manager displays all the working adapters. The recognized adapters will be in the Available state if they are configured correctly.
   a. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Operations** → **Activate**.
   b. Click **Advanced**.
   c. In the **Boot mode** field, select `Normal` and click **OK**.
   d. Select **Open a terminal window or console session** and click **OK**. A virtual terminal (vterm) window opens for the logical partition.
   e. Ensure that all the resources are attached and powered on.
   f. Log in to AIX using a valid user name and password.
   g. Enter the following command at the command prompt to list all of the adapters on AIX: `# lsdev -Cc adapter`. If there are any adapters that do not display as `Available`, contact service and support.

      Note: You can verify only the adapters that are recognized by AIX. Any adapter that is not recognized by AIX might have an error of unknown or failed hardware.
   h. Shut down the logical partition using operating system procedures and close the terminal session window. For information on how to shut down AIX, see Shutting down AIX logical partitions using version 7 or later of the HMC.
6. Activate the logical partition and verify that the physical adapters on the managed system are connected and reporting to the managed system using the System Management Services (SMS) interface. If Linux is installed on the managed system, or if there is no operating system on the managed system, you can use the SMS interface to view the available devices. When the logical partition is activated, the bus is scanned to determine what device adapters are attached. The recognized adapters are listed.
   a. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Operations** → **Activate**.
   b. Click **Advanced**.
   c. In the **Boot mode** field, select `SMS` and click **OK**.

d. Select **Open a terminal window or console session** and click **OK**. A virtual terminal (vterm) window opens for the logical partition.
e. When the SMS interface is displayed, type 5 and press Enter to select option 5 [`Select Boot Options`].
f. Type 1 and press Enter to select option 1 [`Select Install or Boot a Device`]
g. Type 7 and press Enter to select option 7 [`List all Devices`]. All of the recognized devices in the partition are listed. If there are any devices that do not display, contact service and support.

   Note: You can verify only the adapters that are recognized by SMS. Any adapter that is not recognized by SMS might have an error of unknown or failed hardware.
h. Close the terminal session window, click the **Tasks** button, and choose **Operations** → **Shut down**, and click **OK**.

7. If the hardware in the managed system is already in the configuration specified in your SPT configuration plan, then continue to step 13 on page 58.
8. Power off the managed system using your HMC.
   a. In the navigation pane, open **Systems Management** and click **Servers**.
   b. In the contents pane, select the managed system in the contents area, click the **Tasks** button, and choose **Operations** → **Power Off**.
   c. Select the **Normal power off** option and click **OK**.
9. Move the hardware in the managed system according to your SPT configuration plan.
10. Power on the managed system to the Standby state using your HMC.
    a. In the navigation pane, open **Systems Management** and click **Servers**.
    b. In the contents pane, select the managed system in the contents area, click the **Tasks** button, and choose **Operations** → **Power On**.
    c. Select **Partition standby** as the power-on mode and click **OK**.
11. Activate the logical partition and verify that the physical adapters on the managed system are connected and reporting to the managed system using the configuration manager. If AIX is not installed on the managed system, continue with step 12 on page 58. You can use the configuration manager in AIX to view all of the available devices. When AIX boots and the configuration manager runs, the configuration manager displays all the working adapters. The recognized adapters will be in the Available state if they are configured correctly.
    a. In the navigation pane, open **Systems Management**, open **Servers**, and click the managed system.
    b. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Operations** → **Activate**.
    c. Click **Advanced**.
    d. In the **Boot mode** field, select `Normal` and click **OK**.
    e. Select **Open a terminal window or console session** and click **OK**. A virtual terminal (vterm) window opens for the logical partition.
    f. Ensure that all the resources are attached and powered on.
    g. Log in to AIX using a valid user name and password.
    h. Enter the following command at the command prompt to list all of the adapters on AIX: `# lsdev -Cc adapter`. If there are any adapters that do not display as `Available`, contact service and support.

       Note: You can verify only the adapters that are recognized by AIX. Any adapter that is not recognized by AIX might have an error of unknown or failed hardware.
    i. Shut down the logical partition using operating system procedures and close the terminal session window. For information on how to shut down AIX, see Shutting down AIX logical partitions using version 7 or later of the HMC.

12. Activate the logical partition and verify that the physical adapters on the managed system are connected and reporting to the managed system using the System Management Services (SMS) interface. If Linux is installed on the managed system, or if there is no operating system on the managed system, you can use the SMS interface to view the available devices. When the logical partition is activated, the bus is scanned to determine what device adapters are attached. The recognized adapters are listed.
    a. In the navigation pane, open **Systems Management**, open **Servers**, and click the managed system.
    b. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Operations** → **Activate**.
    c. Click **Advanced**.
    d. In the **Boot mode** field, select `SMS` and click **OK**.
    e. Select **Open a terminal window or console session** and click **OK**. A virtual terminal (vterm) window opens for the logical partition.
    f. When the SMS interface is displayed, type `5` and press Enter to select option 5 [`Select Boot Options`].
    g. Type `1` and press Enter to select option 1 [`Select Install or Boot a Device`]
    h. Type `7` and press Enter to select option 7 [`List all Devices`]. All of the recognized devices in the partition are listed. If there are any devices that do not display, contact service and support.

       Note: You can verify only the adapters that are recognized by SMS. Any adapter that is not recognized by SMS might have an error of unknown or failed hardware.
    i. Close the terminal session window, click the **Tasks** button, and choose **Operations** → **Shut down**, and click **OK**.
13. Delete the logical partition that owns all of the system resources.

    Attention: This procedure erases the logical partition and the logical partition configuration data stored on the partition profiles. This procedure does not affect any of the data stored on the managed system.
    a. In the navigation pane, open **Systems Management**, open **Servers**, and click the managed system.
    b. In the contents pane, ensure that the logical partition is powered off.
    c. Select the logical partition, click the **Tasks** button, and choose **Operations** → **Delete**.
    d. Click **Yes** to confirm.
14. Create each logical partition on your managed system according to your logical partition plan. You can do this by importing a system plan file into your HMC and deploying the system plan to the managed system. For more information about creating logical partitions using a system plan, see Working with system plans using version 7 or later of the HMC. Alternately, you can create the logical partitions by performing the following procedure for each logical partition that you want to create.
    a. In the navigation pane, open **Systems Management** and click **Servers**.
    b. In the contents pane, select the managed system, click the **Tasks** button, and choose **Configuration** → **Create Logical Partition**.
    c. Follow the steps in the Create Logical Partition wizard to create a logical partition and a partition profile.
15. Ensure that there is at least one LAN adapter on the HMC that is configured to connect with the logical partitions on your managed system.
    a. In the navigation pane, open **HMC Management**.
    b. Select **HMC Configuration**.
    c. In the contents pane, click **Change Network Settings**.
    d. Click the **LAN Adapters** tab.

e. Select any LAN adapter other than the `eth0` adapter that connects the HMC with the service processor and click **Details**.
f. On the **LAN Adapter** tab, under **Local area network information**, select **Open**, and select **Partition communication**.
g. Click the **Firewall Settings** tab.
h. Ensure that the RMC application is one of the applications displayed in **Allowed Hosts**. If it is not displayed in **Allowed Hosts**, select the RMC application under **Available Applications** and click **Allow Incoming**. The RMC application displays in **Allowed Hosts** to signify that it has been selected.
i. Click **OK**.

After you have created the logical partitions on your managed system, you must then complete the following tasks:

1. Install operating systems on the logical partitions. For installation procedures for the AIX, i5/OS, and Linux operating systems, refer to Installing operating systems.
2. Connect the logical partitions on your managed system to the LAN adapter that you have just configured on the HMC. You can create a virtual LAN to connect the logical partitions on your managed system with each other, bridge the virtual LAN to a physical Ethernet adapter on an external network, and connect the LAN adapter on the HMC to the same external network. Alternately, you can configure a physical Ethernet adapter on each logical partition, connect the physical Ethernet adapters on the logical partitions to an external network, and connect the LAN adapter on the HMC to the same external network. For information on how to create and configure virtual Ethernet adapters, see Configuring a virtual Ethernet adapter using version 7 or later of the HMC.

Related concepts

"System plan overview for the HMC" on page 146
Learn about system plan concepts and operations, as well as understand the high-level tasks that you can perform with system plans when using the Hardware Management Console (HMC).

Related tasks

"Creating logical partitions using version 7 or later of the HMC" on page 75
You can use the Create Logical Partition wizard on the Hardware Management Console (HMC) to create a new logical partition. When you create a logical partition, you also create a partition profile that contains the resource allocations and settings for the logical partition.

Related information

Tasks and roles

Setting up the HMC

Correcting the managed system operating state

Shutting down AIX in a logical partition

Using the HMC to shut down Linux logical partitions

Reference codes list for customers

Installing operating systems

Partitioning a new or nonpartitioned IBM eServer OpenPower managed system using version 7 or later of the HMC

Use this procedure to partition a new or nonpartitioned IBM eServer OpenPower managed system using version 7 or later of the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system and create the logical partitions on the managed system.

Use this procedure in the following cases:

- You have just received your managed system and want to partition the managed system immediately.

- You have used the managed system as a nonpartitioned server, and now want to partition the managed system.

If you want to create a new logical partition on a managed system that has already been partitioned, then you do not need to perform all of the steps in this procedure. For more information about creating a new logical partition on a managed system that has already been partitioned, see Creating logical partitions using version 7 or later of the HMC.

Before you begin, complete the following:

- Use the System Planning Tool (SPT) to ensure that your hardware configuration supports your desired logical partition configuration.
- If necessary, install additional hardware resources on your managed system to support the partition plan specified by the SPT.
- Set up the HMC to manage your logical partition and the managed system. For information on how to set up the HMC, see Setting up the HMC.
- If you have used the managed system prior to partitioning, back up all data on the managed system.

To partition a new or nonpartitioned IBM eServer OpenPower managed system using version 7 or later of the HMC, you must be a super administrator or operator on the HMC. For more information about user roles, refer to Tasks and roles.

To partition a new or nonpartitioned IBM eServer OpenPower managed system using version 7 or later of the HMC, complete the following steps:

1. Ensure that the managed system is in a state of Standby or Operating. Complete the following:
   a. In the navigation pane, open **Systems Management** and click **Servers**.
   b. In the contents pane, find the state of the managed system as displayed in the contents pane under the **Status** heading.
   c. If the managed system is in a Power off state, select the managed system in the contents pane, click the **Tasks** button, choose **Operations → Power on**, select the power-on mode of **Partition Standby**, click **OK**, and wait until the contents area displays a Standby state for the managed system.

   If the managed system does not display in the contents pane, or if the managed system is in any state other than Standby or Operating, you must fix the problem before continuing. For more information about correcting the operating state of the managed system, see Correcting the managed system operating state.
2. Verify that a single logical partition exists on the managed system. When you connect a new or nonpartitioned managed system to an HMC, a single logical partition displays in the HMC user interface. All system resources belong to this logical partition. In this procedure, you will use this logical partition to validate the hardware on the managed system. After you validate the hardware on the managed system, you will delete this logical partition and create the logical partitions according to your logical partition plan.
   a. In the navigation pane of the HMC, open **Servers** and click on the managed system.
   b. In the contents pane, verify that there is only one logical partition in the list of partitions. The name of this logical partition will be the serial number of the managed system, and the logical partition will have one partition profile named `default_profile`.

   If the logical partition that is described in this step exists, continue to step 4 on page 61. Otherwise, continue to step 3 to reset the managed system.
3. Reset the managed system so that a single logical partition exists on the managed system. Complete the following *at your HMC* (not remotely) to create this logical partition:
   a. Ensure that the hardware placement in the managed system supports the manufacturing default configuration. If the hardware placement in the managed system does not support the manufacturing default configuration, you must move the hardware so that the hardware

placement supports the manufacturing default configuration. For more information about placing the hardware in your managed system to support the manufacturing default configuration, contact your marketing representative or business partner.

b. In the navigation pane, click **Servers**.

c. In the contents pane, select the managed system in the contents area, click the **Tasks** button, choose **Configuration** → **Manage Partition Data** → **Initialize** and click **Yes**.

d. In the navigation pane, click **HMC Management**.

e. In the contents pane, click **Open Restricted Shell Terminal**. The Restricted shell command-line interface displays.

f. Type: `lpcfgop -m` *managed_system_name* `-o clear`. *managed_system_name* is the name of managed system as it displays in the content area.

g. Enter 1 to confirm. This step will take several seconds to complete.

4. Ensure that the logical partition is in a Not Activated state. In the navigation pane of the HMC, select the managed system if it is not already selected, and review the state of the logical partition on the managed system. If the logical partition is in a Running state, shut down the logical partition by completing the following steps:

   a. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Properties**.

   b. Ensure that **Power off the system after all the logical partitions are powered off** is cleared, and click **OK**.

   c. Shut down the logical partition using operating system procedures. For more information about shutting down logical partitions using operating system procedures, see Shutting down Linux logical partitions using version 7 or later of the HMC.

   If the logical partition is in an Error state, complete the following:

   a. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Serviceability** → **Reference Code History**.

   b. Click the **Reference Code** tab and use the reference codes displayed on the **Reference Code** tab to diagnose and fix the problem. For more information about using reference codes to diagnose and fix problems, see Reference codes list for customers.

5. Activate the logical partition and verify that the physical adapters on the managed system are connected and reporting to the managed system using the System Management Services (SMS) interface. If Linux is installed on the managed system, or if there is no operating system on the managed system, you can use the SMS interface to view the available devices. When the logical partition is activated, the bus is scanned to determine what device adapters are attached. The recognized adapters are listed.

   a. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Operations** → **Activate**.

   b. Click **Advanced**.

   c. In the **Boot mode** field, select `SMS` and click **OK**.

   d. Select **Open a terminal window or console session** and click **OK**. A virtual terminal (vterm) window opens for the logical partition.

   e. When the SMS interface is displayed, type 5 and press Enter to select option 5 [`Select Boot Options`].

   f. Type 1 and press Enter to select option 1 [`Select Install or Boot a Device`]

   g. Type 7 and press Enter to select option 7 [`List all Devices`]. All of the recognized devices in the partition are listed. If there are any devices that do not display, contact service and support.

      Note: You can verify only the adapters that are recognized by SMS. Any adapter that is not recognized by SMS might have an error of unknown or failed hardware.

   h. When you are done, close the terminal session window, click the **Tasks** button, and choose **Operations** → **Shut down**, and click **OK**.

6. If the hardware in the managed system is already in the configuration specified in your SPT configuration plan, then continue to step 11.
7. Power off the managed system using your HMC.
   a. In the navigation pane, open **Systems Management** and click **Servers**.
   b. In the contents pane, select the managed system in the contents area, click the **Tasks** button, and choose **Operations** → **Power Off**.
   c. Select the **Normal power off** option and click **OK**.
8. Move the hardware in the managed system according to your SPT configuration plan.
9. Power on the managed system to the Standby state using your HMC.
   a. In the navigation pane, open **Systems Management** and click **Servers**.
   b. In the contents pane, select the managed system in the contents area, click the **Tasks** button, and choose **Operations** → **Power On**.
   c. Select **Partition standby** as the power-on mode and click **OK**.
10. Activate the logical partition and verify that the physical adapters on the managed system are connected and reporting to the managed system using the System Management Services (SMS) interface. If Linux is installed on the managed system, or if there is no operating system on the managed system, you can use the SMS interface to view the available devices. When the logical partition is activated, the bus is scanned to determine what device adapters are attached. The recognized adapters are listed.
    a. In the navigation pane, open **Systems Management**, open **Servers**, and click the managed system.
    b. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Operations** → **Activate**.
    c. Click **Advanced**.
    d. In the **Boot mode** field, select `SMS` and click **OK**.
    e. Select **Open a terminal window or console session** and click **OK**. A virtual terminal (vterm) window opens for the logical partition.
    f. When the SMS interface is displayed, type `5` and press Enter to select option 5 [`Select Boot Options`].
    g. Type `1` and press Enter to select option 1 [`Select Install or Boot a Device`]
    h. Type `7` and press Enter to select option 7 [`List all Devices`]. All of the recognized devices in the partition are listed. If there are any devices that do not display, contact service and support.

       Note: You can verify only the adapters that are recognized by SMS. Any adapter that is not recognized by SMS might have an error of unknown or failed hardware.
    i. When you are done, close the terminal session window,click the **Tasks** button, and choose **Operations** → **Shut down**, and click **OK**.
11. Delete the logical partition that owns all of the system resources.

    Attention: This procedure erases the logical partition and the logical partition configuration data stored on the partition profiles. This procedure does not affect any of the data stored on the managed system.
    a. In the navigation pane, open **Systems Management**, open **Servers**, and click the managed system.
    b. In the contents pane, ensure that the logical partition is powered off.
    c. Select the logical partition, click the **Tasks** button, and choose **Operations** → **Delete**.
    d. Click **Yes** to confirm.
12. Create each logical partition on your managed system according to your logical partition plan. You can do this by importing a system plan file into your HMC and deploying the system plan to the managed system. For more information about creating logical partitions using a system plan, see

Working with system plans using version 7 or later of the HMC. Alternately, you can create the logical partitions by performing the following procedure for each logical partition that you want to create.

a. In the navigation pane, open **Systems Management** and click **Servers**.
b. In the contents pane, select the managed system, click the **Tasks** button, and choose **Configuration** → **Create Logical Partition**.
c. Follow the steps in the Create Logical Partition wizard to create a logical partition and a partition profile.

13. Ensure that there is at least one LAN adapter on the HMC that is configured to connect with the logical partitions on your managed system.
    a. In the navigation pane, open **HMC Management**.
    b. Select **HMC Configuration**.
    c. In the contents pane, click **Customize Network Settings**.
    d. Click the **LAN Adapters** tab.
    e. Select any LAN adapter other than the `eth0` adapter that connects the HMC with the service processor and click **Details**.
    f. On the **LAN Adapter** tab, under **Local area network information**, select **Open**, and select **Partition communication**.
    g. Click the **Firewall Settings** tab.
    h. Ensure that the RMC application is one of the applications displayed in **Allowed Hosts**. If it is not displayed in **Allowed Hosts**, select the RMC application under **Available Applications** and click **Allow Incoming**. The RMC application displays in **Allowed Hosts** to signify that it has been selected.
    i. Click **OK**.

After you have created the logical partitions on your managed system, you must then complete the following tasks:

1. Install operating systems on the logical partitions. For installation procedures for the Linux operating system, refer to Installing operating systems.
2. Connect the logical partitions on your managed system to the LAN adapter that you have just configured on the HMC. You can create a virtual LAN to connect the logical partitions on your managed system with each other, bridge the virtual LAN to a physical Ethernet adapter on an external network, and connect the LAN adapter on the HMC to the same external network. Alternately, you can configure a physical Ethernet adapter on each logical partition, connect the physical Ethernet adapters on the logical partitions to an external network, and connect the LAN adapter on the HMC to the same external network. For information on how to create and configure virtual Ethernet adapters, see Configuring a virtual Ethernet adapter using version 7 or later of the HMC.

Related concepts

"System plan overview for the HMC" on page 146
Learn about system plan concepts and operations, as well as understand the high-level tasks that you can perform with system plans when using the Hardware Management Console (HMC).

Related tasks

"Creating logical partitions using version 7 or later of the HMC" on page 75
You can use the Create Logical Partition wizard on the Hardware Management Console (HMC) to create a new logical partition. When you create a logical partition, you also create a partition profile that contains the resource allocations and settings for the logical partition.

Related information

Tasks and roles

Setting up the HMC

Correcting the managed system operating state

Using the HMC to shut down Linux logical partitions

Reference codes list for customers

Installing operating systems

Working with system plans using version 7 or later of the HMC

A *system plan* is a specification of the hardware and the logical partitions contained in one or more systems.

You can create a logical partition configuration on a managed system by using your Hardware Management Console (HMC) to deploy a system plan. You can also use your HMC to create a system plan based upon an existing logical partition configuration. This allows you to keep a permanent record of the logical partition configuration at a specific time.

Importing a system plan by using HMC Version 7

You can import a system-plan file into a Hardware Management Console (HMC) from various types of media, a remote FTP site, or the computer from which you remotely access the HMC. You can then deploy the imported system plan to a system that the HMC manages.

You can import a system-plan file into the HMC from any of the following locations:

- From the computer on which you remotely access the HMC.
- From various media, such as optical discs or USB drivers, that is mounted on the HMC.
- From a remote site by using FTP. To use this option, you must fulfill the following requirements:
  - The HMC must have a network connection to the remote site.
  - An FTP server must be active on the remote site.
  - Port 21 must be open on the remote site.

Note: You cannot import a system plan that has an identical name to any system plan that is available on the HMC.

To import a system-plan file, you must be a super administrator. For more information about user roles, refer to Tasks and roles.

To import a system-plan file into Version 7 of the HMC, complete the following steps:

1. In the navigation area of the HMC, select **System Plans**.
2. In the tasks area, select **Import System Plan**. The Import System Plan window opens.
3. Select the source of the system-plan file that you want to import. Use the following table to complete the appropriate steps for importing the system plan from the selected source location of the file:

Source of the system plan to import	Complete the following steps:
This computer	1. Select **Import from this computer to the HMC** 2. Click **Import** to display the Upload File window 3. Click **Browse**. 4. Select the system-plan file that you want to import and click **Open**. 5. Click **OK** to upload the file.
Media	1. Select **Import from media**. 2. In the **System plan file name** field, enter the name of the system-plan file. **Note:** The name of the system-plan file must end with the .sysplan file name suffix and can use alphanumeric characters only. 3. In the **Sub-directory on media** field, enter the path in which the system-plan file is located on the media. **Note:** Specify the subdirectory location only, rather than the fully qualified path and file name. 4. Click **Import** to display the Select Media Device window. 5. Select the media that contains the system-plan file you want to import. 6. Click **OK**.
Remote FTP site	1. Select **Import from a remote FTP site**. 2. In the **System plan file name** field, enter the name of the system-plan file. **Note:** The name of the system-plan file must end with the .sysplan file name suffix and can use alphanumeric characters only. 3. In the **Remote site hostname** field, enter the host name or IP address of the remote FTP site. 4. In the **User ID** field, enter the user ID to use to access the remote FTP site. 5. In the **Password** field, enter the password to use to access the remote FTP site. 6. In the **Remote directory** field, enter the path in which the system-plan file is located on the remote FTP site. If you do not enter a path, the HMC uses the default path specified on the remote FTP site.

4. Click **Import**. If the HMC returns an error, return to the **Import System Plan** window and verify that the information you entered is correct. If necessary, click **Cancel**, return to step 2, and redo the procedure, ensuring that the information you specify at each step is correct.

When you complete the process of importing the system-plan file, you can deploy the system plan in the system-plan file to a system that the HMC manages. For instructions, see Deploying a system plan using HMC version 7. If you imported the system-plan file from media, you can unmount the media by using the umount command in the HMC command line interface.

Note: As an alternative to the HMC Web user interface, you can use the `cpysysplan` command from the HMC command line interface to import a system plan.

Related tasks

"Creating a system plan by using HMC Version 7" on page 68
You can use the Hardware Management Console (HMC) Version 7 to create a new system plan based on an existing system configuration, and then deploy that system plan to other managed systems.

"Deleting a system plan by using HMC version 7" on page 74
You can remove a system plan from your Hardware Management Console (HMC) Version 7.

"Deploying a system plan by using HMC Version 7"
You can use the Hardware Management Console (HMC) to deploy all or part of a system plan to a managed system.

"Exporting a system plan by using HMC Version 7" on page 71
You can export a system-plan file from a Hardware Management Console (HMC) to various types of media, a remote FTP site, or the computer from which you remotely access the HMC.

"Viewing a system plan by using HMC version 7" on page 73
You can use the System Plan Viewer on the Hardware Management Console (HMC) to view a system plan.

Related information

Tasks and roles

Deploying a system plan by using HMC Version 7

You can use the Hardware Management Console (HMC) to deploy all or part of a system plan to a managed system.

When you deploy a system plan, the HMC creates logical partitions on the managed system according to the specifications in the system plan. Depending on the contents of the system plan, you can also install operating environments on the partitions in the plan and, if the plan contains Virtual I/O Server provisioning information for a partition, such as storage assignments, the HMC can make these resource assignments for the partition.

Before you deploy a system plan, complete the following tasks:

- Ensure that the system-plan file exists on the HMC. If the system-plan file does not exist on the HMC, you must import the system-plan file into the HMC. For instructions, see Importing a system plan using HMC version 7.
- Verify that the physical hardware and any expansion units are connected and reporting to the server. Each server comes with one logical partition and one partition profile. All of the physical hardware resources on the system are assigned automatically to this logical partition so that you can power on the server and verify that the physical hardware is connected and reporting to the server.
- Delete the logical partition that was provided with your server, and delete any other logical partition that is not in the system plan. For instructions, see Deleting a logical partition. The name of the logical partition that was provided with the server is the serial number of the managed system, and the name of the partition profile is *default_profile*.
- If the system plan includes a Storage Area Network (SAN) or Fibre Channel adapters, ensure that the adapters are cabled and the SAN is configured.
- If you plan to deploy the Virtual I/O Server, then ensure that its installation image is on the HMC. To see the installation images on the HMC, enter this command `OS_install -l` on the HMC command line. If the Virtual I/O Server installation image is not listed, then complete the following steps to copy an installation image to the HMC:
  1. Obtain a copy of the Virtual I/O Server on DVD. You can use the original installation media or you can contact your sales representative to obtain another copy. If you cannot obtain a copy of the Virtual I/O Server, you can deploy the remainder of the system plan and install the Virtual I/O Server at a later time.
  2. Insert the DVD into the DVD drive on the HMC.

3. From the HMC command line, use the OS_install command to copy the Virtual I/O Server installation image from the DVD to the HMC. For example, you can enter the following command: `OS_install -o define_resource -a type=AIX -a version=1.4.0.0 -a location=/export/resources/vios -a source=/dev/cdrom vios1_install_res`.

- Excluding the Virtual I/O Server logical partitions, shut down any logical partitions that you have already deployed to the managed system from the system plan. For Virtual I/O Server partitions previously deployed, ensure that they are active, and that there is an Resource Monitoring and Control (RMC) connection between the HMC and each Virtual I/O Server partition.
- Ensure that you are not using this HMC or any other HMC that is attached to the managed system to perform any other operations on the managed system.
- Ensure that you are a super administrator. For information about user roles, refer to Tasks and roles.

To use the HMC to deploy a system plan on a managed system, complete the following steps:

1. In the navigation area of the HMC, select **System Plans**.
2. In the contents area, select the system plan that you want to deploy.
3. Click **Tasks** and select **Deploy system plan**. The Deploy System Plan wizard starts.
4. On the Welcome page, complete the following steps:
   a. Select the system-plan file that contains the system plan that you want to deploy.
   b. Choose the managed system to which you want to deploy the system plan and click **Next**. If the system plan does not match the managed system to which you want to deploy the plan, the wizard displays a window that informs you of this. Click **OK** to continue or **Cancel** to select a different system plan.

      Note: If the system-plan file contains multiple system plans, the wizard provides a step so that you can select a specific system plan from the file. This step does not occur unless there is more than one system plan in the specified file.
5. On the Validation page, complete the following steps:
   a. Wait for the wizard to validate the managed system and its hardware against the system plan. The validation process can take several minutes.
   b. If the validation process completes successfully, click **Next**.
   c. If the validation process does not complete successfully, correct the issues that the error messages describe, click **Cancel** to exit the wizard, and restart this procedure from the beginning.
   d. If the validation process fails, you might want to create a system plan that is based on the current configuration of the managed system. Such a system plan would allow you to compare the system plan that you want to deploy with the current configuration of the managed system. You can do this by using the Create System Plan task in the HMC, or you can run the following command from the HMC command line: mksysplan *-m* `name_of_managed_system` *-f* `name_of_new_system_plan.sysplan`. This action creates a new system plan that you can view and compare to the old system plan to help diagnose any problems.
6. Optional: On the Partition Deployment page, if you do not want to create all of the logical partitions, partition profiles, virtual adapter types, or virtual adapters in the system plan, clear the boxes in the **Deploy** column beside the logical partitions, partition profiles, virtual adapter types, or virtual adapters that you do not want to create. Virtual serial adapters are required in virtual slots 0 and 1 for each logical partition. You cannot create the logical partition unless you create these virtual serial adapters.
7. Optional: On the Operating Environment Install page, if there are operating environments specified in the system plan, complete the following steps:
   a. Select the operating environments that you want to deploy to the managed system for each partition. At this time, you can select to deploy the Virtual I/O Server operating environment only.
   b. Enter the location of the Virtual I/O Server installation image.

c. Enter or change late-binding installation settings for the Virtual I/O Server. Late-binding installation settings are settings that are specific to the installation instance and must be supplied during the installation step to ensure that the settings are accurate for the installation instance. For example, you can enter the IP address of the target partition on which you are installing the operating environment.
d. Save any changes that you make to late-binding installation settings. You can save them to the current system-plan file or to a new system-plan file.

8. On the Summary page, review the system deployment step order and click **Finish**. The HMC uses the system plan to create the specified logical partitions and to install any specified operating environments. This process can take several minutes.

After you finish the deployment of the system plan, complete the following tasks:

1. Locate the physical disk I/O adapters that belong to each logical partition and verify that the disk drives that are attached to these physical I/O adapters will support your desired configuration for each logical partition. The Deploy System Plan wizard validates only that the physical disk I/O adapters match the system plan. It does not validate that the disk drives are configured for the physical disk I/O adapters.
2. Install operating systems and software on the logical partitions.
3. Configure the virtual I/O adapters that are assigned to each logical partition within the operating systems so that virtual storage resources can be shared among logical partitions.

Related tasks

"Creating a system plan by using HMC Version 7"
You can use the Hardware Management Console (HMC) Version 7 to create a new system plan based on an existing system configuration, and then deploy that system plan to other managed systems.

"Deleting a system plan by using HMC version 7" on page 74
You can remove a system plan from your Hardware Management Console (HMC) Version 7.

"Exporting a system plan by using HMC Version 7" on page 71
You can export a system-plan file from a Hardware Management Console (HMC) to various types of media, a remote FTP site, or the computer from which you remotely access the HMC.

"Importing a system plan by using HMC Version 7" on page 64
You can import a system-plan file into a Hardware Management Console (HMC) from various types of media, a remote FTP site, or the computer from which you remotely access the HMC. You can then deploy the imported system plan to a system that the HMC manages.

"Viewing a system plan by using HMC version 7" on page 73
You can use the System Plan Viewer on the Hardware Management Console (HMC) to view a system plan.

Related information

Deleting a logical partition

Installing operating systems

Installing the Virtual I/O Server

Tasks and roles

Creating a system plan by using HMC Version 7

You can use the Hardware Management Console (HMC) Version 7 to create a new system plan based on an existing system configuration, and then deploy that system plan to other managed systems.

You can use the newly-created system plan to create identical logical partition configurations on managed systems with identical hardware. The new system plan contains specifications for the logical partitions and partition profiles of the managed system that you used to create the plan. The new system plan also can contain hardware information that the HMC is able to obtain from the selected managed system. However, the amount of hardware information that the HMC can capture for the new system plan varies based on the method that the HMC uses to gather the hardware information. There are two methods that

the HMC potentially can use: inventory gathering and hardware discovery. For example, using inventory gathering, the HMC can detect virtual device configuration information for the Virtual I/O Server. Additionally, the HMC can use one or both of these methods to detect disk and tape information for i5/OS.

Inventory gathering prerequisites

The HMC always performs inventory gathering to capture detailed information for hardware that has an assignment to an active partition. To maximize the amount of data that the inventory gathering process of the HMC is able to collect from the managed system, ensure that you complete the following tasks:

- Ensure that the managed system in the 'Standby' state or that the managed system is powered on.

  Note: You cannot create a system plan if the managed server is in either the power off state or the recovery state.
- Ensure that all the logical partitions on the managed system from which you plan to base the new system plan are activated.
- To ensure that Linux systems and partitions can perform inventory gathering, you must load the IBM Installation Toolkit for Linux on POWER, which is available at the IBM Service and productivity tools Web site (http://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/installtools/home.html).
- Ensure that there is an Resource Monitoring and Control (RMC) connection between the HMC and each logical partition. An RMC connection is required for the inventory-gathering process. An RMC connection also is required to configure Virtual I/O Server and to collect data for Virtual I/O Server device mappings.

  Note: It is possible for an i5/OS partition to have more than one HMC set up to manage it. In this situation, if you want to use RMC to create a new system plan, you must ensure that you create the system plan from the primary HMC for the partition because secondary HMCs cannot use RMC.

To ensure that the HMC can use RMC, complete the following steps:

1. In the HMC navigation pane, select **HMC Management**.
2. In the contents pane, select **Change Network Settings** to display the Customize Network Settings window.
3. Click **LAN Adapters**, select the appropriate adapter from the list, and click **Details**.
4. On the LAN Adapter page of the LAN Adapters Details window, ensure that **Partition communication** is selected.
5. On the Firewall page, in the Firewall Settings list, select all instances of RMC, and click **Allow Incoming**, if necessary.
6. Click **OK** to close the LAN Adapter Details window.
7. Click **OK** to close the Customize Network Settings window.
8. Restart the HMC if you made any changes to these configuration settings.

For some operating systems, you might need to perform additional steps to ensure that RMC is configured and running correctly. To learn more about configuring and using RMC, review the appropriate operating system documentation.

Hardware discovery prerequisites

If the managed system supports hardware discovery, the HMC can use it, in addition to the inventory-gathering process, to capture hardware information for a new system plan. The hardware discovery process allows you to capture hardware configuration information, regardless of the state of the hardware. Using hardware discovery, you can capture information about hardware that does not have a partition assignment, as well as hardware with assignments to inactive partitions.

To use the hardware discovery process, ensure that you complete the following tasks:

- Ensure that there is a minimum of .5 processor available.
- Ensure that there is a minimum of 256 MB of free memory available.
- Ensure that all partitions on the managed server for which you want to use the hardware discovery process are inactive. If a partition is active, the hardware discovery process cannot capture fresh information from the partition and retrieves information about the hardware assigned to the inactive partition from the hardware inventory cache on the managed system instead.

  Note: Hardware discovery does not require the use of RMC.

To create a system plan from Version 7 of the Hardware Management Console, complete the following steps:

1. From the navigation area, select **System Plans**. The System Plans page opens.
2. From the Tasks area, select **Create System Plan**. The Create System Plan window opens.
3. Select the managed system that you want to use as the basis for the new system plan.
4. Enter a name and description for the new system plan.
5. Optional: Select whether you want to retrieve inactive and unallocated hardware resources. This option appears only if the managed system is capable of hardware discovery and the option is selected by default.

   Note: If you do not select the **Retrieve inactive and unallocated hardware resources** option, the HMC does not perform hardware discovery. The HMC still performs inventory gathering and retrieves hardware information for any active partitions on the managed server. The resulting new system plan contains hardware information from the inventory-gathering process, as well as hardware information from the hardware inventory cache on the system.
6. Optional: Select whether you want to view the system plan immediately after the HMC creates it.
7. Click **Create**.

Now that you have a new system plan, you can export the system plan, import it onto another managed system, and deploy the system plan to the managed system.

Note: As an alternative to the HMC Web user interface, you can use the mksysplan command on the HMC to create a system plan based upon the configuration of an existing managed system.

Related tasks

"Deleting a system plan by using HMC version 7" on page 74
You can remove a system plan from your Hardware Management Console (HMC) Version 7.

"Deploying a system plan by using HMC Version 7" on page 66
You can use the Hardware Management Console (HMC) to deploy all or part of a system plan to a managed system.

"Exporting a system plan by using HMC Version 7"
You can export a system-plan file from a Hardware Management Console (HMC) to various types of media, a remote FTP site, or the computer from which you remotely access the HMC.

"Importing a system plan by using HMC Version 7" on page 64
You can import a system-plan file into a Hardware Management Console (HMC) from various types of media, a remote FTP site, or the computer from which you remotely access the HMC. You can then deploy the imported system plan to a system that the HMC manages.

"Viewing a system plan by using HMC version 7" on page 73
You can use the System Plan Viewer on the Hardware Management Console (HMC) to view a system plan.

Related information

mksysplan Command

Exporting a system plan by using HMC Version 7

You can export a system-plan file from a Hardware Management Console (HMC) to various types of media, a remote FTP site, or the computer from which you remotely access the HMC.

You can export a system-plan file from the HMC to any of the following locations:

- To the computer on which you remotely access the HMC.
- To media that is mounted on the HMC (such as optical discs or USB drives).
- To a remote site by using FTP. This allows you to import the system-plan file into a different HMC and deploy the system plan to a managed system with identical hardware. To use this option, you must fulfill the following requirements:
  - The HMC must have a network connection to the remote site.
  - An FTP server must be active on the remote site.
  - Port 21 must be open on the remote site.

To export a system-plan file, you must be a super administrator. For more information about user roles, refer to Tasks and roles.

To export a system-plan file that is stored on Version 7 of the HMC, complete the following steps:

1. In the navigation area of your HMC, select **System Plans**.
2. In the contents area, select the system-plan file that you want to export.
3. Click **Tasks** and select **Export System Plan**. The Export System Plan window opens.
4. Select the export destination for the system plan. Use the following table to complete the appropriate steps for exporting the system plan to the selected destination location of the file:

Export destination for the system plan	Complete the following steps:
This computer	1. Select **Export to this computer from the HMC**. 2. Click **Export** to display the Save File window. 3. Click the file name link and use the save file function of your browser to save the file to a location on your local file system. 4. Click **OK** to close the window after you have saved the file.

Export destination for the system plan	Complete the following steps:
Media	1. Select **Export to media**. 2. In the **Sub-directory on media** field, enter the path on the media to which to export the system-plan file. **Note:** Specify the subdirectory location only, rather than the fully qualified path and file name. 3. Click **Export** to display the Select Media Device window. 4. Select the media to which you want to export the system plan file. 5. Click **OK**.
Remote FTP site	1. Select **Export to a remote site**. 2. Enter the host name or IP address of the remote FTP site into the **Remote site hostname** field. 3. Enter the user ID to use to access the remote FTP site into the **User ID** field. 4. Enter the password to use to access the remote FTP site into the **Password** field. 5. Enter the path to which you want to export the system-plan file into the **Remote directory** field. If you do not enter a path, the HMC exports the system-plan file to the default path specified on the remote FTP site.

5. Click **Export**. If the HMC returns an error, verify that the information you entered on this window is correct. If necessary, click **Cancel**, return to step 4, and redo the procedure, ensuring that the information you specify at each step is correct.

If you exported the system-plan file to media, you can unmount the media by using the `umount` command in the HMC command-line interface. You can then import the system-plan file into a different HMC so that you can deploy the system plan to systems that the other HMC manages. For more information about importing the system-plan file into a different HMC, see Importing a system plan.

Note: As an alternative to the HMC Web user interface, you can use the `cpysysplan` command from the HMC command line interface to export a system plan.

Related tasks

"Creating a system plan by using HMC Version 7" on page 68
You can use the Hardware Management Console (HMC) Version 7 to create a new system plan based on an existing system configuration, and then deploy that system plan to other managed systems.

"Deleting a system plan by using HMC version 7" on page 74
You can remove a system plan from your Hardware Management Console (HMC) Version 7.

"Deploying a system plan by using HMC Version 7" on page 66
You can use the Hardware Management Console (HMC) to deploy all or part of a system plan to a managed system.

"Importing a system plan by using HMC Version 7" on page 64
You can import a system-plan file into a Hardware Management Console (HMC) from various types of media, a remote FTP site, or the computer from which you remotely access the HMC. You can then deploy the imported system plan to a system that the HMC manages.

"Viewing a system plan by using HMC version 7"
You can use the System Plan Viewer on the Hardware Management Console (HMC) to view a system plan.

Related information

Tasks and roles

Viewing a system plan by using HMC version 7

You can use the System Plan Viewer on the Hardware Management Console (HMC) to view a system plan.

The System Plan Viewer uses a navigation tree and tables to display the information in the system-plan file. It includes features such as dynamic table-column sorting and the ability to display EADS boundary lines. The System Plan Viewer is included with the HMC so that it can be accessed from the HMC. However, you must re-enter your user ID and password before you can view the system plan.

To view a system plan from version 7 of the HMC, complete the following steps:

1. From the navigation area, select **System Plans**.
2. In the contents area, select the system plan that you want to view.
3. Click **Tasks** and select **View System Plan**. The System Plan Viewer opens in a separate browser window.

   Note: You can also open the system plan in the System Plan Viewer by clicking on the name of the system plan.
4. Enter your HMC **Username** and **Password** to log in to the System Plan Viewer.

Related tasks

"Creating a system plan by using HMC Version 7" on page 68
You can use the Hardware Management Console (HMC) Version 7 to create a new system plan based on an existing system configuration, and then deploy that system plan to other managed systems.

"Deleting a system plan by using HMC version 7"
You can remove a system plan from your Hardware Management Console (HMC) Version 7.

"Deploying a system plan by using HMC Version 7" on page 66
You can use the Hardware Management Console (HMC) to deploy all or part of a system plan to a managed system.

"Exporting a system plan by using HMC Version 7" on page 71
You can export a system-plan file from a Hardware Management Console (HMC) to various types of media, a remote FTP site, or the computer from which you remotely access the HMC.

"Importing a system plan by using HMC Version 7" on page 64
You can import a system-plan file into a Hardware Management Console (HMC) from various types of media, a remote FTP site, or the computer from which you remotely access the HMC. You can then deploy the imported system plan to a system that the HMC manages.

Related information

System Planning Tool Web site

Deleting a system plan by using HMC version 7

You can remove a system plan from your Hardware Management Console (HMC) Version 7.

Removing a system plan from the Hardware Management Console (HMC) does not undo any partition or hardware configuration changes that occurred if the specified system plan was deployed on a managed system.

To remove a system plan from Version 7 of the HMC, complete the following steps:

1. From the navigation area, select **System Plans**.
2. In the contents area, select the system plan that you want to delete.
3. Click **Tasks** and select **Remove System Plan**. The Remove System Plans window opens.
4. Confirm that the system plan is the one that you want to remove and click **Remove System Plan** to delete the system plan.

Related tasks

"Creating a system plan by using HMC Version 7" on page 68
You can use the Hardware Management Console (HMC) Version 7 to create a new system plan based on an existing system configuration, and then deploy that system plan to other managed systems.

"Deploying a system plan by using HMC Version 7" on page 66
You can use the Hardware Management Console (HMC) to deploy all or part of a system plan to a managed system.

"Exporting a system plan by using HMC Version 7" on page 71
You can export a system-plan file from a Hardware Management Console (HMC) to various types of media, a remote FTP site, or the computer from which you remotely access the HMC.

"Importing a system plan by using HMC Version 7" on page 64
You can import a system-plan file into a Hardware Management Console (HMC) from various types of media, a remote FTP site, or the computer from which you remotely access the HMC. You can then deploy the imported system plan to a system that the HMC manages.

"Viewing a system plan by using HMC version 7" on page 73
You can use the System Plan Viewer on the Hardware Management Console (HMC) to view a system plan.

Configuring logical partitions using version 7 or later of the HMC

The Create Logical Partition wizard on the Hardware Management Console (HMC) guides you through the procedure of creating logical partitions and partition profiles on your server.

Creating logical partitions using version 7 or later of the HMC

You can use the Create Logical Partition wizard on the Hardware Management Console (HMC) to create a new logical partition. When you create a logical partition, you also create a partition profile that contains the resource allocations and settings for the logical partition.

Use this procedure only if you are creating logical partitions on a managed system that has already been partitioned. If you are creating logical partitions on a new or nonpartitioned managed system, you must test the hardware on your managed system to ensure that the hardware is in working order. Testing the hardware helps you detect potential problems with your managed system and makes such problems easier to correct. After you test the hardware, you can create logical partitions on a new or nonpartitioned managed system by deploying a system plan to the managed system. For more information about how to create logical partitions on new and nonpartitioned managed systems, see Partitioning a new or nonpartitioned IBM System p5, eServer p5 or IntelliStation POWER 285 managed system using version 7 or later of the HMC or Partitioning a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 7 or later of the HMC.

You can also create logical partitions on a managed system by deploying a system plan to the managed system. A system plan automates the process of creating logical partitions and ensures that each logical partition gets the resources that are specified within the system plan. For more information about system plans, see System plan overview.

Before you create a logical partition, have the System Planning Tool (SPT) output available. Use the output from this tool as a guide as you start to create partition profiles on your server.

To create a partition profile, you must be a super administrator or an operator. For more information about the role of a super administrator and operator, refer to Tasks and roles.

To create a logical partition and a partition profile on your server using the HMC, follow these steps:

1. In the navigation pane, open **Systems Management** and click **Servers**.
2. In the contents pane, select the managed system, click the **Tasks** button, and choose **Configuration** → **Create Logical Partitions**.

3. Follow the steps in the Create Logical Partition wizard to create a logical partition and a partition profile.

After creating your logical partition and partition profile, you must install an operating system. For installation procedures for the AIX, i5/OS, and Linux operating systems, refer to Installing operating systems.

Related concepts

"System plan overview for the HMC" on page 146
Learn about system plan concepts and operations, as well as understand the high-level tasks that you can perform with system plans when using the Hardware Management Console (HMC).

Related tasks

"Partitioning a new or nonpartitioned IBM eServer OpenPower managed system using version 7 or later of the HMC" on page 59
Use this procedure to partition a new or nonpartitioned IBM eServer OpenPower managed system using version 7 or later of the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system and create the logical partitions on the managed system.

"Partitioning a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 7 or later of the HMC" on page 48
Use this procedure to partition a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 7 or later of the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system, create the logical partitions on the managed system, and designate the service partition for the managed system.

"Partitioning a new or nonpartitioned IBM System p5, eServer p5 or IntelliStation POWER 285 managed system using version 7 or later of the HMC" on page 54
Use this procedure to partition a new or nonpartitioned IBM System p5, eServer p5 or IntelliStation POWER 285 managed system using version 7 or later of the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system and create the logical partitions on the managed system.

Related information

Tasks and roles

Installing operating systems

Configuring partition profiles for logical partitions using version 7 or later of the HMC

You can configure the partition profiles for your logical partitions using the Hardware Management Console (HMC). This allows you to change the resource specifications stored in your partition profiles as your needs change.

Creating additional partition profiles using version 7 or later of the HMC:

You can create more than one partition profile for a logical partition using the Hardware Management Console (HMC). Each partition profile can specify a different amount of system resources and different partition startup attributes. You can change the attributes used by a logical partition by shutting down the logical partition and restarting the logical partition using a different partition profile.

Before you create a partition profile, ensure that you have the System Planning Tool (SPT) output available. Use the output from this tool as a guide as you start to create partition profiles on your server. For more information about the SPT, see System Planning Tool.

To create a partition profile using version 7 or later of the HMC, you must be a super administrator or an operator. For more information about the role of a super administrator and operator, refer to Tasks and roles.

To create a partition profile using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management**, open **Servers**, and click the name of the managed system.
2. In the contents pane, select the logical partition for which you want to create the partition profile, click the **Tasks** button, and select **Configuration** → **Manage Profiles**.
3. Click **Actions** → **New**.
4. Follow the steps in the Create Partition Profile wizard to create the partition profile.

Related concepts

"System Planning Tool" on page 41
The System Planning Tool (SPT) helps you design a managed system that can support a specified set of workloads. You can design a managed system based upon workload data from your current systems, based upon new workloads that you want the managed system to support, based upon sample systems that are provided with the utility, or based upon your own custom specifications.

Related information

Tasks and roles

Copying a partition profile using version 7 or later of the HMC:

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.

To copy a partition profile using version 7 or later of the HMC, you must be a super administrator, operator, or product engineer. For more information about user roles, refer to Tasks and roles.

To copy a partition profile using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management**, open **Servers**, and click the name of the managed system.
2. In the contents pane, select the logical partition whose partition profile you want to copy, click the **Tasks** button, and select **Configuration** → **Manage Profiles**.
3. Select the partition profile that you want to copy and click **Actions** → **Copy**.
4. Enter the name of the new partition profile into **New profile name** and click **OK**.

Related information

Tasks and roles

Changing partition profile properties using version 7 or later of the HMC:

You can change the properties of a partition profile using version 7 or later of the Hardware Management Console (HMC). Changing the properties of a partition profile will change the resource amounts that are assigned to a logical partition when you shut down and restart the logical partition using the changed partition profile.

To change partition profile properties using version 7 or later of the HMC, you must be a super administrator, service representative, operator, or product engineer. For more information about user roles, refer to Tasks and roles.

A partition profile stores the required number of processors, memory, and hardware resources assigned to that profile. Any partition profile property changes will not be applied to the logical partition until the partition profile has been activated.

To change partition profile properties using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management**, open **Servers**, and click the name of the managed system.

2. In the contents pane, select the logical partition whose partition profile you want to change, click the **Tasks** button, and select **Configuration** → **Manage Profiles**.
3. Select the partition profile that you want to change and click **Actions** → **Edit**.
4. Make the appropriate changes and click **OK**.

Related tasks

"Saving the partition configuration to a partition profile using version 7 or later of the HMC" on page 107
Use this procedure to save the current configuration of a logical partition to a new partition profile using a Hardware Management Console (HMC). Use this procedure if you change the configuration of a logical partition using dynamic logical partitioning and you do not want to lose the changes when you reactivate the logical partition. This procedure allows you to save the changed configuration to a new partition profile instead of having to enter the changed resource allocations manually.

Related information

Tasks and roles

Deleting a partition profile using version 7 or later of the HMC:

You can delete a partition profile using version 7 or later of the HMC Hardware Management Console (HMC). This allows you to remove partition profiles that you no longer use.

To delete a partition profile using version 7 or later of the HMC, you must be a super administrator or an operator. For more information about the role of a super administrator and operator, refer to Tasks and roles.

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.

To delete a partition profile using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management**, open **Servers**, and click the managed system on which the partition profile is located.
2. In the contents pane, select the logical partition on which the partition profile is located, click the **Tasks** button, and choose **Configuration** → **Manage Profiles**.
3. Select the partition profile that you want to delete and click **Actions** → **Delete**.
4. Click **OK** to confirm.

Related information

Tasks and roles

Configuring a virtual Ethernet adapter using version 7 or later of the HMC

You can configure a virtual Ethernet adapter dynamically for a running logical partition. Doing so will connect the logical partition to a virtual LAN.

You can dynamically configure a virtual Ethernet adapter for a Linux logical partition only if the following conditions are met:

- A Linux distribution that supports dynamic logical partitioning is installed on the Linux logical partition. Distributions that support dynamic logical partitioning include Red Hat Enterprise Linux version 4, SUSE Linux Enterprise Server 9, and later versions of these distributions.
- The DynamicRM tool package is installed on the Linux logical partition. For more information about the DynamicRM tool package, see the Service and productivity tools Web site.

To configure a virtual Ethernet adapter dynamically for a running logical partition using version 7 or later of the HMC, you must be a super administrator, service representative, product engineer, or operator. For more information about user roles, refer to Tasks and roles.

To configure a virtual Ethernet adapter dynamically for a running logical partition using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management**, open **Servers**, and click the system on which the logical partition is located.
2. In the contents pane, select the logical partition on which you want to configure the virtual Ethernet adapter, click the **Tasks** button, and choose **Dynamic Logical Partitioning** → **Virtual Adapters**.
3. Click **Actions** and choose **Create** → **Ethernet Adapter**.
4. Enter the slot number for the virtual Ethernet adapter into **Adapter ID**.
5. Enter the Port Virtual LAN ID (PVID) for the virtual Ethernet adapter into **VLAN ID**. The PVID allows the virtual Ethernet adapter to communicate with other virtual Ethernet adapters that have the same PVID.
6. If the logical partition is an AIX, Linux, or Virtual I/O Server logical partition, select **IEEE 802.1 compatible adapter** if you want to configure the virtual Ethernet adapter to communicate over multiple virtual LANs. If you leave this option unchecked and you want this partition to connect to multiple virtual networks, then you must create multiple virtual adapters by creating additional virtual LAN IDs.
7. Click **OK**.

After you have finished, access any existing partition profiles for the logical partition and add the virtual Ethernet adapters to those partition profiles. The virtual Ethernet adapter will be lost if you shut down the logical partition and activate that logical partition using a partition profile that does not have the virtual Ethernet adapter in it.

Related tasks

"Partitioning a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 7 or later of the HMC" on page 48
Use this procedure to partition a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 7 or later of the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system, create the logical partitions on the managed system, and designate the service partition for the managed system.

Creating a Logical Host Ethernet Adapter for a running logical partition using version 7 or later of the HMC

If your managed system has a Host Ethernet Adapter (HEA), you can set up a logical partition to use HEA resources by creating 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 allows the logical partition to connect to external networks directly through the HEA. HEAs are also known as Integrated Virtual Ethernet adapters (IVE adapters).

You can add an LHEA dynamically to a running Linux logical partition only if you install Red Hat Enterprise Linux version 5.1, Red Hat Enterprise Linux version 4.6, or a later version of Red Hat Enterprise Linux on the logical partition. To add an LHEA to a Linux logical partition with a distribution other than these distributions, you must shut down the logical partition and reactivate the logical partition using a partition profile that specifies the LHEA.

If a logical partition is not currently running, you can create an LHEA for the logical partition by changing the partition profiles for the logical partition. For more information on how to change partition profiles, see Changing partition profile properties using version 7 or later of the HMC.

To create an LHEA for a running logical partition using version 7 or later of the HMC, you must be a super administrator, a service representative, a product engineer, or an operator. For more information about user roles, refer to Tasks and roles.

To create an LHEA for a running logical partition using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management**, open **Servers**, and click the managed system on which the logical partition is located.
2. In the contents pane, select the logical partition for which you want to create the LHEA, click the **Tasks** button, and select **Dynamic Logical Partitioning → Host Ethernet → Add**.
3. Select the HEA whose resources you want the logical partition to use in **Choose an HEA to select Logical Ports from**.
4. In the table that lists HEA physical ports, select a physical port whose resources you want the logical partition to use, and click **Configure**.
5. In the **Choose Logical Ports** table, select the logical port (LHEA port) that you want the logical partition to use.
6. Set the logical port to accept packets with any virtual LAN ID (VLAN ID) or to accept only packets with specific VLAN IDs.
   - If you want the logical port to accept packets with any VLAN ID, select **Allow all VLAN IDs**.
   - If you want the logical port to accept only packets with specific VLAN IDs, enter each VLAN ID into **VLAN to add** and click **Add**. You can repeat this step to allow up to 20 VLAN IDs to be accepted on the logical port.
7. Click **OK**.
8. Repeat steps 4 through 7 for each additional physical port whose resources you want the logical partition to use.
9. Adjust the values in **Timeout (minutes)** and **Detail level** if necessary and click **OK**.

When you are done, one or more new Ethernet adapters will be visible to the operating system of the logical partition.

Configuring physical ports on a Host Ethernet Adapter using version 7 or later of the HMC

You can configure the properties of each physical port on a Host Ethernet Adapter (HEA). These properties include port speed, duplex mode, maximum packet size, flow control setting, and the promiscuous logical partition for unicast packets. The physical port properties are also used by the logical ports that are associated with each physical port. HEAs are also known as Integrated Virtual Ethernet adapters (IVE adapters).

To configure physical ports on an HEA using version 7 or later of the HMC, you must be a super administrator, a service representative, a product engineer, or an operator. For more information about the role of a super administrator, service representative, product engineer, and operator, refer to Tasks and roles.

To configure physical ports on an HEA using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management** and click **Servers**.
2. In the contents pane, select the managed system whose HEAs you want to configure, click the **Tasks** button, and select **Hardware (Information) → Adapters → Host Ethernet**.
3. Select the HEA in **Choose a Physical Location Code to view / modify that Host Ethernet Adapter's information**.
4. In the **Current Status** table, select a physical port that you want to configure and click **Configure**.
5. Change the HEA physical port configuration settings as necessary and click **OK**.
6. Repeat steps 4 and 5 for any other physical ports that you want to configure.
7. When you are done configuring physical ports, click **OK**.

After this procedure is complete, you might need to reconfigure any logical ports that are associated with the changed physical ports. For example, if you change the maximum packet size on the physical port, you might also need to access the operating systems that use the resources on that physical port and change the maximum packet size for the corresponding logical ports.

Configuring system profiles using version 7 or later of the HMC

You can configure the system profiles on your managed system using the Hardware Management Console (HMC). This allows you to change the logical partitions and partition profiles specified within the system profiles as the logical partitions change on your managed system.

Creating a system profile using version 7 or later of the HMC:

You can create a system profile using version 7 or later of the Hardware Management Console (HMC). A *system profile* is an ordered list of partition profiles. When you activate a system profile, the managed system attempts to activate the partition profiles in the system profile in the order in which the partition profiles are listed.

System profiles are also useful for validating your partition profiles to ensure that you have not overcommitted the resources on your managed system.

To create a system profile using version 7 or later of the HMC, you must be a super administrator or an operator. For more information about the role of a super administrator and operator, refer to Tasks and roles.

To create a system profile using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management** and click **Servers**.
2. In the contents pane, select the managed system, click the **Tasks** button, and choose **Configuration** → **Manage System Profiles**.
3. Click **Actions** → **New**.
4. Enter the name of the new system profile into **System profile name**.
5. For each partition profile that you want to add to the system profile, open the logical partition to which the partition profile belongs, select the partition profile, and click **Add**.
6. When you are done adding partition profiles to the system profile, click **OK**.

Related information

Tasks and roles

Copying a system profile using version 7 or later of the HMC:

You can use the Hardware Management Console (HMC) to create a copy of an existing system profile. After you create a copy of the existing system profile, you can change the partition profiles that are contained within the new system profile. This allows you to create multiple, nearly identical system profiles quickly and easily.

To copy a system profile using version 7 or later of the HMC, you must be a super administrator, operator, or product engineer. For more information about user roles, refer to Tasks and roles.

To copy a system profile using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management** and click **Servers**.
2. In the contents pane, select the managed system, click the **Tasks** button, and choose **Configuration** → **Manage System Profiles**.
3. Select the system profile and click **Actions** → **Copy**.
4. Enter the name that you want to use for the copy into **New profile name** and click **OK**.

Related information

Tasks and roles

Changing a system profile using version 7 or later of the HMC:

You can change which partition profiles are included in a system profile using the Hardware Management Console (HMC).

To change a system profile using version 7 or later of the Hardware Management Console (HMC), you must be a super administrator, operator, or product engineer. For more information about user roles, refer to Tasks and roles.

To change a system profile using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management** and click **Servers**.
2. In the contents pane, select the managed system, click the **Tasks** button, and choose **Configuration** → **Manage System Profiles**.
3. Select the system profile that you want to change and click **Actions** → **Edit**.
4. In the **System Profile** area, select each partition profile that you want to remove from the system profile and click **Remove**.
5. For each partition profile that you want to add to the system profile, open the logical partition to which the partition profile belongs, select the partition profile, and click **Add**.
6. When you are done changing the system profile, click **OK**.

Related information

Tasks and roles

Validating a system profile using version 7 or later of the HMC:

When you validate a system profile, the Hardware Management Console (HMC) compares the resources defined in the system profile with the resources available on the managed system. If the system profile requires more resources than are available on the managed system, a message is displayed on the HMC.

To validate a system profile using version 7 or later of the Hardware Management Console (HMC), you must be a super administrator, operator, or product engineer. For more information about user roles, refer to Tasks and roles.

To validate a system profile using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management** and click **Servers**.
2. In the contents pane, select the managed system, click the **Tasks** button, and choose **Configuration** → **Manage System Profiles**.
3. Select the system profile and click **Validate**.
4. When validation is complete, click **OK**.

Related information

Tasks and roles

Deleting a system profile using version 7 or later of the HMC:

You can delete a system profile using the Hardware Management Console (HMC). This allows you to remove system profiles that you no longer use.

To delete a system profile using version 7 or later of the HMC, you must be a super administrator or an operator. For more information about the role of a super administrator and operator, refer to Tasks and roles.

A system profile helps you activate or change the managed system from one complete set of logical partition configurations to another.

To delete a system profile using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management** and click **Servers**.
2. In the contents pane, select the managed system, click the **Tasks** button, and choose **Configuration** → **Manage System Profiles**.
3. Select the system profile and click **Actions** → **Delete**.
4. Click **Yes** to confirm.

Related information

Tasks and roles

Creating a Linux logical partition that uses i5/OS virtual I/O resources using version 7 or later of the HMC

You can create a Linux logical partition that uses i5/OS virtual I/O resources on IBM System i models. This allows you to maximize utilization of the physical hardware and simplify the backup procedure for your managed system.

To set this up, you must create virtual SCSI adapters that connect the Linux logical partition with the i5/OS. You can then set up i5/OS to provide disk resources to the Linux logical partition through the virtual SCSI connection. You can also create a virtual serial connection between the i5/OS logical partition and the Linux logical partition. A virtual serial connection allows you to connect to the Linux logical partition from the i5/OS logical partition.

You cannot create a Linux logical partition that uses i5/OS virtual I/O resources on IBM System por OpenPower servers. On IBM System por OpenPower servers, you can create a Virtual I/O Server logical partition and configure the Linux logical partition to use the virtual SCSI and virtual Ethernet resources of the Virtual I/O Server logical partition. You might need to enter an Advanced POWER Virtualization activation code to create a Virtual I/O Server logical partition on your IBM System p or OpenPower server. For more information about the Virtual I/O Server, see Using the Virtual I/O Server.

To create a Linux logical partition that uses i5/OS virtual I/O resources using version 7 or later of the HMC, you must be a super administrator or operator. For more information about the role of a super administrator and an operator, refer to Tasks and roles.

To create a Linux logical partition that uses i5/OS virtual I/O resources using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management** and click **Servers**.
2. In the contents pane, select the managed system, click the **Tasks** button, and choose **Configuration** → **Create Logical Partition**.
3. Follow the steps in the Create Logical Partition wizard to create a logical partition and a partition profile.
4. Create a network server description (NWSD) and network-server storage space. For more information, see Creating an NWSD and a network-server storage space for a Linux logical partition.
5. Set up the console for your Linux partition. For more information, see Connecting to the virtual console for a Linux logical partition.
6. Start the NWSD. For more information, see Starting the network-server description for a Linux logical partition.
7. Install the Linux operating system on your new logical partition. For installation procedures, see Installing operating systems.

Creating an NWSD and a network-server storage space for a Linux logical partition:

A *network-server description (NWSD)* is an i5/OS object that describes the storage resources that are used by an integrated operating environment. An NWSD can be linked to one or more network-server storage spaces. Create an NWSD to assign storage to a Linux logical partition that uses i5/OS resources.

To create an NWSD and a network-server storage space for a Linux logical partition that uses i5/OS resources, follow these steps:

1. Determine the correct SCSI server resource name.
   - If there is only one SCSI server adapter corresponding to a given client partition, and that adapter has its remote partition and remote slot configured correctly, you can specify *AUTO as the RSRCNAME in your NWSD.
   - Otherwise, you must determine the actual resource name. At an i5/OS command line, type `WRKHDWRSC *CMN`, and find a controller resource with type 290B and a converged location code that corresponds to the SCSI server adapter at the Hardware Management Console (HMC). This resource name will be used later to specify the SCSI server resource.
2. At an i5/OS command line on the partition that shares resources, type `CRTNWSD` and press F4 for prompts.
3. Specify the following information. The default or suggested parameter values are provided within the parentheses. These settings are relevant only to a logical partition. After the installation, if your root file system (/) is not installed on the first partition of the first disk, you must set a root parameter.
   - `NWSD (Provide a name for the NWSD)`
   - `RSRCNAME (*AUTO or the resource name of the SCSI server resource`
   - `TYPE(*GUEST)`
   - `ONLINE (*NO or *YES)`
   - `PARTITION ('Provide the name of your Linux logical partition')`

     As an alternative to the Partition parameter, you can also specify a partition number by typing `PTNNBR(`*`integer`*`)` where *integer* is the number of the partition you are specifying.
   - `CODEPAGE (437)`
   - `TCPPORTCFG (*NONE)`
   - `RSTDDEVRSC (for virtual CD and tape devices) (*NONE)`
   - `SYNCTIME (*TYPE)`
   - `IPLSRC (*NWSSTG)`
     - You can store a kernel in a disk partition of a virtual disk (a network-server storage space (NWSSTG)). By specifying the `IPLSRC (*NWSSTG)` parameter, you are specifying that the Linux logical partition will start from a disk partition on that virtual disk. The disk partition on the virtual disk must be formatted as type `PReP Boot` (type 0x41) and marked as a device that starts. You can format a disk partition as type `PReP Boot` by using the Linux **fdisk** command with the -t option. You can specify that the disk partition starts by using the **fdisk** command with the -a option.
     - To start an NWSD with a kernel from a stream file, set the `IPLSRC` parameter to `*STMF` and set the `IPLSTMF` parameter to point to the kernel. You must have read access to the file and the path leading to the file to use the vary on command. This value only loads the kernel. After the kernel is running, it must find a root file system. In an initial installation, the root file system might be a RAM disk that is physically attached to the kernel.
   - `IPLSTMF (*NONE)`
   - `IPLPARM (*NONE)`
   - `PWRCTL (*YES)`
     - If you specify `PWRCTL (*YES)`, perform the following steps:
       a. Ensure that the server adapter in the i5/OS partition specifies the remote partition and remote slot in its configuration.
       b. Ensure that the client partition has the i5/OS partition as the power-controlling partition in the profile.
       c. Ensure before you activate the NWSD that the client partition's profile has been saved to the server by activating the partition from the HMC, even if the client operating system does not activate correctly because of the absence of virtual devices.

– If you specify `PWRCTL(*NO)`, virtual devices will be available to the partition. You must shut down and restart the partition using the HMC.

4. If you use iSeries Navigator, create the network-server storage space using iSeries Navigator.
   a. Expand **My Connections** → **your server** → **Network** → **Windows Administration** .
   b. Right-click the **Disk Drives** and select **New Disk**.
   c. In the **Disk drive name** field, specify the name that you want to give to the disk drive.
   d. In the **Description** field, specify a meaningful description for the disk drive.
   e. In the **Capacity** field, specify the size of the new disk drive in megabytes. Refer to your preferred Linux distributor installation documentation to determine the size you want to use.
   f. Click **OK**.
   g. Continue with step 6.
5. If you use a character-based interface, create the network-server storage space using the character-based interface:
   a. At an i5/OS command line, type the command CRTNWSSTG and press F4. The Create NWS Storage Space (CRTNWSSTG) display appears.
   b. In the Network-server storage space field, specify the name you want to give to the storage space.
   c. In the Size field, specify the size in megabytes for the new storage space. Refer to your preferred Linux distributor installation documentation to determine the size you want to use.
   d. In the Text description field, specify a meaningful description for the storage space.
   e. Press Enter.
   f. Continue with step 7.
6. If you use iSeries Navigator, link the network-server storage space using iSeries Navigator:
   a. Expand **My Connections** → **your server** → **Network** → **Windows Administration** .
   b. Click **Disk Drives**, right-click an available network-server storage space, and select **Add Link**.
   c. Select the server to which you want to link the network-server storage space.
   d. Select the link sequence position you want to use.
   e. Select one of the available data access types.
   f. Click **OK**.

   The procedure is complete. Do not complete step 7.
7. If you use a character-based interface, link the network-server storage space using the character-based interface:
   a. At an i5/OS command line, type the command ADDNWSSTGL and press F4. The Add Network-Server Storage Link (ADDNWSSTGL) display appears.
   b. In the Network server description field, specify the name of the network server description (NWSD).
   c. In the Dynamic storage link field, specify *YES to make the network-server storage space dynamically available to the partition (that is, available without rebooting the Linux partition).
   d. In the Drive sequence number field, specify the link sequence position you want to use. If you want the system to find the next available position for you, specify *CALC.
   e. Press Enter.

Related tasks

“Creating a Linux logical partition using i5/OS virtual I/O resources” on page 168
IBM System i5 and eServer i5 models allow you to create a Linux logical partition that uses i5/OS virtual I/O resources. This allows you to maximize utilization of the physical hardware and simplify the backup procedure for your managed system.

Connecting to the virtual console for a Linux logical partition:

You can connect to the virtual console for a Linux logical partition so that you can install the operating system or access the command line interface for the Linux logical partition.

You must have one of the following privileges to use the Linux virtual console.

- Remote Panel
- System Partitions - Administration

The virtual console provides the console function for a Linux server. It is used primarily during the initial installation of the operating system. The virtual console can also be used to view server errors or to restore communication to the LAN. This console connection is used prior to configuring TCP/IP.

Any Telnet client can be used as the Linux console. Multiple Telnet clients can share access to the same virtual console. To connect to a console, use Telnet to connect to port 2301 of the partition that is sharing its resources. TCP/IP must be configured and running on at least one i5/OS logical partition. Perform one of the following procedures:

- If you use IBM Personal Communications, connect to a virtual console using IBM Personal Communications.
  1. Click **Start** → **IBM Personal Communications** → **Start or Configure Session**.
  2. From the Customize Communication window, select **ASCII** as your type of host and select **Link Parameters**.
  3. From the Telnet ASCII window, enter the host name or the IP address of the partition that is sharing its resources, and enter port number 2301 of the partition sharing its resources. Click **OK**.
  4. If you are not using an Integrated xSeries® Server, go to the next step. If you are using both Linux partitions and Integrated xSeries Server consoles, select **i5/OS Guest Partition Consoles** from the i5/OS Virtual Consoles window.
  5. From the i5/OS Guest Partition Consoles window, select the logical partition to which you want to connect as the console.
  6. Enter the i5/OS service tools ID and password to connect to the Linux logical partition.
- If you use Telnet, connect to the virtual console using Telnet from an MS-DOS command prompt.
  1. From an MS-DOS command prompt, use the Telnet command to connect to your server and port 2301 (`telnet` *`xxxxxx`* `2301`).
  2. If you are not using an Integrated xSeries Server, go to the next step. If you are using both Linux partitions and Integrated xSeries Server consoles, select **i5/OS Guest Partition Consoles** from the i5/OS Virtual Consoles window.
  3. From the i5/OS Guest Partition Consoles window, select the logical partition to which you want to connect as the console.
  4. Enter the i5/OS service tools ID and password to connect to the Linux logical partition.

Related tasks

"Creating a Linux logical partition using i5/OS virtual I/O resources" on page 168
IBM System i5 and eServer i5 models allow you to create a Linux logical partition that uses i5/OS virtual I/O resources. This allows you to maximize utilization of the physical hardware and simplify the backup procedure for your managed system.

Starting the network-server description for a Linux logical partition:

You can start the network-server description (NWSD) for a Linux logical partition that uses i5/OS resources to make the resources defined in the NWSD available to the Linux logical partition.

To start (vary on) the NWSD for a Linux logical partition, complete the following tasks:

1. If you use iSeries Navigator, start the NWSD using iSeries Navigator.
   a. Click **Network** → **Windows Administration** → **Integrated xSeries Servers**

b. Right-click the name of the NWSD that you want to start.
c. Click **Start**.

2. If you use the character-based interface, start the NWSD using a character-based interface:
   a. Type `WRKCFGSTS *NWS` and press Enter.
   b. Type **1** next to the NWSD that you want to start and press Enter.

Related tasks

"Creating a Linux logical partition using i5/OS virtual I/O resources" on page 168
IBM System i5 and eServer i5 models allow you to create a Linux logical partition that uses i5/OS virtual I/O resources. This allows you to maximize utilization of the physical hardware and simplify the backup procedure for your managed system.

"Unlinking virtual disk drives from a Linux logical partition" on page 92
By unlinking virtual disk drives (network-server storage spaces) from a Linux logical partition that uses i5/OS resources, you disconnect the virtual disk drives from the logical partition, making the virtual disk drives inaccessible to users. If you delete a Linux logical partition that uses i5/OS resources, you must unlink all virtual disk drives from the logical partition before you delete the logical partition.

Adding virtual disk units to a Linux logical partition:

You can add virtual disk units dynamically to a Linux logical partition that uses i5/OS resources. This allows you to increase the storage capacity of your AIX logical partition when needed.

Virtual disks simplify hardware configuration on the server because they do not require you to add additional physical devices to the server in order to run Linux. You can allocate up to 64 virtual disks to a Linux logical partition. Each virtual disk supports up to 1000 GB of storage. Each virtual disk appears to Linux as one actual disk unit. However, the associated space in the i5/OS integrated file system is distributed across the disks that belong to the i5/OS logical partition. Distributing storage across the disks provides the benefits of device parity protection through i5/OS. Therefore, you do not have to use additional processing resources and memory resources by setting up device parity protection through Linux.

i5/OS provides the ability to dynamically add virtual disks to a Linux logical partition. You can allocate disk space in the integrated file system and make it available to Linux without restarting the server or logical partition. The Linux administrator can also configure the newly allocated disk space and make it available without restarting the server.

To add virtual disks dynamically to a Linux logical partition, do the following:

1. If you use iSeries Navigator, create a network-server storage space using iSeries Navigator.
   a. Expand **My Connections** → **your server** → **Network** → **Windows Administration** .
   b. Right-click the **Disk Drives** and select **New Disk**.
   c. In the **Disk drive name** field, specify the name that you want to give to the network-server storage space.
   d. In the **Description** field, specify a meaningful description for the network-server storage space.
   e. In the **Capacity** field, specify the size of the new network-server storage space in megabytes. Refer to the installation documentation of your preferred Linux distributor to determine the size you want to use.
   f. Click **OK**.
   g. Continue with step 4 on page 88.
2. If you use a character-based interface, create a network-server storage space using the character-based interface:
   a. At an i5/OS command line, type the command CRTNWSSTG and press F4. The Create NWS Storage Space (CRTNWSSTG) display appears.

b. In the Network-server storage space field, specify the name you want to give to the network-server storage space.
c. In the Size field, specify the size in megabytes for the new network-server storage space. Refer to the installation documentation of your preferred Linux distributor to determine the size you want to use.
d. In the Text description field, specify a meaningful description for the network-server storage space.
e. Press Enter.

3. If you use iSeries Navigator, link the network-server storage space using iSeries Navigator.
   a. Expand **My Connections → your server → Network → Windows Administration** .
   b. Click **Disk Drives**, right-click an available network-server storage space, and select **Add Link**.
   c. Select the server to which you want to link the network-server storage space.
   d. Select one of the available data access types.
   e. Click **OK**.
   f. Continue with step 5.
4. If you use a character-based interface, link the network-server storage space using a character-based interface:
   a. At an i5/OS command line, type the command ADDNWSSTGL and press F4. The Add Network-Server Storage Link (ADDNWSSTGL) display appears.
   b. In the Network server description field, specify the name of the network server description (NWSD).
   c. In the Dynamic storage link field, specify *YES to make the network-server storage space dynamically available to the partition (that is, available without rebooting the Linux partition).
   d. In the Drive sequence number field, specify the link sequence position you want to use.
   e. Press Enter.
5. If the Linux logical partition is not running, activate the Linux logical partition. Do not continue until the partition is running.
6. Log in to Linux using a user name with superuser (root) privileges.
7. Determine the host ID, SCSI bus, and logical unit number (LUN) for your new virtual disk drive. You can list the existing devices by typing the following command at the Linux command prompt: `cat /proc/scsi/scsi`. The following example shows sample output of the command:

   ```
   Attached devices:
   Host: scsi0 Channel: 00 Id: 00 Lun: 00
     Vendor: IBM      Model: VDASD NETSPACE   Rev: 0001
     Type:   Direct-Access                    ANSI SCSI revision: 04
   ```

   In this example, `NETSPACE` is the name of the network storage space for the displayed device. Look for the name of an existing network storage space on your Linux logical partition. Note the numeric part of the `Host:` value (host ID) and the `Channel:` (SCSI bus) and `Lun:` (logical unit number (LUN)) values for the existing network storage space. The new virtual disk drive will have the same host ID, SCSI bus, and LUN as the existing network storage space. For example, if the existing network storage space is as displayed in the preceding example output, then the new virtual disk drive will have a host ID of `0`, a SCSI bus of `0`, and a LUN of `0`.
8. Determine the SCSI ID for your new virtual disk drive. You can list the existing devices in table form by typing the following commands at the Linux command prompt:

   ```
   cd /proc/scsi/sg
   cat device_hdr; cat devices
   ```

   The following example shows sample output of the commands:

```
host    chan    id      lun     type    opens   qdepth  busy    online
0       0       0       0       0       2       30      0       1
0       1       0       0       0       0       30      0       1
```

Note the `host` (host ID), `chan` (SCSI bus), `id` (SCSI ID), and `lun` (logical unit number (LUN)) values for the existing devices. Find the devices that have the same host ID, SCSI bus, and LUN as the new virtual disk drive (as you determined in the previous step). Of those devices, find the device with the greatest SCSI ID. The new virtual disk drive will have a SCSI ID that is one greater than the greatest existing SCSI ID. For example, if the new virtual disk drive has a host ID of `0`, a SCSI bus of `0`, and a LUN of `0`, and the devices on your Linux logical partition are as listed in the example output above, then the new virtual disk drive will have a SCSI ID of 1.

9. Type the following command at the Linux command prompt to add the virtual disk drive manually: `echo "scsi add-single-device host chan id lun" > /proc/scsi/scsi`. Use the following information to help you understand the arguments of the command:
   - `host` is the host ID.
   - `chan` is the SCSI bus.
   - `id` is the SCSI ID.
   - `lun` is the LUN.

   For example, if the new virtual disk drive is to have a host ID of `0`, a SCSI bus of `0`, a SCSI ID of `1`, and a LUN of `0`, you would type the command `echo "scsi add-single-device 0 0 1 0" > /proc/scsi/scsi` at the Linux command prompt.
10. At the Linux command prompt, type the following command to create a disk partition on the virtual disk drive: `fdisk /dev/sdb`. You must have superuser (root) privileges to run this command. The `Command (m for help):` prompt appears.
11. Type `p` at the prompt to see the current partition table for the virtual disk drive. By default, the new virtual disk drive shows a single disk partition on the virtual disk. For example,

```
Disk /dev/sdb: 64 heads, 32 sectors, 200 cylinders
Units = cylinders of 2048 * 512 bytes

Device Boot    Start       End    Blocks   Id   System
/dev/sdb1          1       199    203760    6   FAT16
```

12. Type `d` at the command prompt to delete the current partition and then create a new one. The default format for the disk partition is FAT16. Do not use a disk partition that is formatted as FAT16 on your virtual disk drive. The `Partition number (1-4):` prompt appears.
13. Type the disk partition number you want to delete and press Enter. In this example, you type a 1. The `fdisk` command indicates that the deletion is successful by displaying the command prompt.
14. Type `n` to create a new disk partition. The `Command action E extended P primary partition (1-4)` prompt appears.
15. Type `p` to create a primary disk partition on the virtual disk and press Enter. The `Partition number (1-4):` prompt appears.
16. Type 1 because this is the first partition on the virtual disk, and press Enter. The `First cylinder (1-200, default 1):` prompt appears.
17. Press Enter to use the default of 1 for the first disk cylinder. This uses the entire disk for this disk partition. The `Last cylinder or +size or +sizeM or +sizeK (1-200, default 200):` prompt appears.
18. Press Enter to use the default of 200 for the last disk cylinder. This uses the entire virtual disk for this partition.

    Note: The type of the partition defaults to Linux. If you need a different disk type (like Logical Volume Manager (LVM), or Linux Extended), type `t` to change the type of the partition.
    The `fdisk` command indicates that the partition creation is successful by returning the command prompt.

19. Type `w` to commit the changes to the disk structure and press Enter. The `fdisk` command writes the changes to the virtual disk drive. The `fdisk` command displays the following diagnostic message:

```
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
```

    After the operation is completed, the fdisk command returns the command prompt.

20. Format the disk partition using the Linux **mkfs** command . There are a number of optional parameters for the mkfs command, but typically the defaults satisfy most disk uses. To format the disk partition created in the previous steps, ensure that you are logged in with superuser (root) privileges and type the following command at a Linux command prompt:

```
mkfs /dev/sdb1
```

    Since a single disk partition exists on the second virtual disk, the name of the disk is /dev/sdb1 (the sdb indicates that it is the second disk, and the 1 indicates that it is partition 1). The mkfs command displays the following diagnostic messages:

```
mke2fs 1.28 (31-Aug-2002)
Fileserver label=
OS type: Linux Block size=1024 (log=0)
Fragment size=1024 (log=0)
51200 inodes, 204784 blocks
10239 blocks (5.00%) reserved for the super user
First data block=1
25 block groups
8192 blocks per group, 8192 fragments per group
2048 inodes per group
Superblock backups stored on blocks:
      8193, 24577, 40961, 57345, 73729

Writing inode tables: done
Writing superblocks and fileserver accounting information: done

This fileserver will be automatically checked every 29 mounts or
180 days, whichever comes first.  Use tune2fs -c or -i to override.
```

21. Type the following command to create a directory that you can use to access the new file: `mkdir /mnt/data`
22. Type the following command to mount the virtual disk drive in the new directory: `mount /dev/sdb1 /mnt/data`
23. Add an entry to the /etc/fstab file using a Linux text editor, such as vi. For example, `/dev/sdb1 /mnt/data ext2 defaults 1 1`. This entry mounts the virtual disk every time you restart Linux.

Linking a network-server storage space to a network-server description:

You can link a network-server storage space (NWSSTG) to one or more network-server descriptions (NWSDs). This allows the NWSDs and their associated logical partitions to use the data stored on the NWSSTG.

You can link an NWSSTG to an unlimited number of NWSDs. This is beneficial when multiple logical partitions need access to a single application.

When you link an NWSSTG to an NWSD, you can set up the NWSD to have read-only access to the NWSSTG, or you can set up the NWSD to read or write to the NWSSTG.

Attention: If more than one NWSD can write to the NWSSTG, ensure that only one NWSD can update the data at a time. Otherwise, changes made by one NWSD can be overwritten by another NWSD.

To link an NWSSTG to an NWSD, follow these steps:

1. At an i5/OS command line, type the command ADDNWSSTGL and press F4.
2. From the Add Server Storage Link display, provide the following information:

   ```
   NWSSTG (Name)
   NWSD (Name)
   DYNAMIC (*YES)
   DRVSEQNBR (*CALC)
   ```

3. Press F10 (Additional Parameters).
4. Enter the type of access the storage space will have.

Deleting network-server descriptions for a Linux logical partition:

You can delete the i5/OS network-server description (NWSD) for a Linux logical partition that uses i5/OS resources. When you delete the NWSD, all the configuration information for the Linux logical partition is deleted from i5/OS.

To delete the network-server description (NWSD) for a Linux logical partition, follow these steps:

1. On an i5/OS control language (CL) command line, type the command WRKNWSD and press Enter.
2. Type 8 in the Opt field to the left of the Network Server and press Enter.
3. In the Work with Configuration Status display, if the status of the NWSD is not varied off, type 2 in the Opt field to the left of the Network Server and press Enter. Otherwise, go to the next step.
4. Press F3 to return to the previous display
5. Enter a 4 in the Opt field to the left of the Network Server and press Enter.
6. On the Confirm Delete of Network Server Descriptions display, press Enter.

Deleting virtual disk drives for a Linux logical partition:

You can delete a virtual disk drive from a Linux logical partition that uses i5/OS resources to make the space available to the i5/OS logical partition once more. When you delete a virtual disk drive, all of the information on the virtual disk drive is erased.

Before you can delete a disk drive, you must unlink it from the network-server description. For more information on how to unlink a virtual disk drive from an NWSD, see Unlinking virtual disk drives from a Linux logical partition.

To delete a virtual disk drive, follow these steps:

Delete the disk drive using the interface that you prefer.

Interface	Actions
iSeries Navigator	Complete the following steps: 1. Click **Network** → **Windows Administration** → **Disk Drives**. 2. Right-click the disk drive that you want to delete. 3. Click **Delete**. 4. Click **Delete** in the confirmation window.
i5/OS character-based interface	Complete the following steps: 1. At an i5/OS control language (CL) command line, type DLTNWSSTG and press F4. 2. Type the name of the disk drive in the Network-server storage space field and press Enter.

Related tasks

"Unlinking virtual disk drives from a Linux logical partition"
By unlinking virtual disk drives (network-server storage spaces) from a Linux logical partition that uses i5/OS resources, you disconnect the virtual disk drives from the logical partition, making the virtual disk drives inaccessible to users. If you delete a Linux logical partition that uses i5/OS resources, you must unlink all virtual disk drives from the logical partition before you delete the logical partition.

Using IPL types when running Linux:

The IPL source (IPLSRC) parameter on the network-server description (NWSD) determines the initial program that is loaded when the NWSD is varied on. For a Linux logical partition that uses i5/OS resources, the initial program is the kernel. Ensure that the IPLSRC parameter specifies the kernel location of the kernel for the Linux logical partition that uses i5/OS resources.

You can set the IPLSRC parameter when you use the Create Network Server Description (CRTNWSD) command, and you can change the IPLSRC parameter when you use the Change Network Server Description (CHGNWSD) command.

Note: IPLSRC parameter also has the values A, B, and D, which are not valid for IBM System i hardware.

The IPLSRC parameter has the following valid values.

IPLSRC values	Description
*Panel	The partition is started from the source indicated on the control panel.
*NWSSTG (network-server storage space)	This IPL type is used to start a partition from a virtual disk. The open firmware will find the kernel in the virtual disk. The open firmware searches the first virtual disk connected to the server for a partition marked bootable, and of type 0x41 (PReP start). If a partition of this type does not exist, the partition IPL will fail.
*STMF (stream file)	This IPL type is used to start a partition from a kernel loaded in the i5/OS integrated file system. Note that the integrated file system includes files on the optical (CD) drive on i5/OS .

Unlinking virtual disk drives from a Linux logical partition:

By unlinking virtual disk drives (network-server storage spaces) from a Linux logical partition that uses i5/OS resources, you disconnect the virtual disk drives from the logical partition, making the virtual disk drives inaccessible to users. If you delete a Linux logical partition that uses i5/OS resources, you must unlink all virtual disk drives from the logical partition before you delete the logical partition.

To unlink a virtual disk drive from a Linux logical partition that uses i5/OS resources, follow these steps:

1. Unlink disk drives from a logical partition using iSeries Navigator. If you prefer to use a character-based interface, go to step 2 on page 93.
   a. Vary off the NWSD for your logical partition. For more information, see Starting and stopping the NWSD.
   b. Click **Network → Windows Administration → Disk Drives**.
   c. Right-click the name of the disk drive that you want to unlink.
   d. Click **Remove Link**.
   e. Select a server from the list of linked servers.

f. If you are unlinking a disk drive that you plan to relink later, uncheck **Compress link sequence**. You must relink the disk drive as the same link sequence number before you vary on the server. By preventing compression of the link sequence values, you avoid having to unlink and relink all the disk drives to get them in the correct sequence.

g. Click **Remove**.

h. You have completed this procedure. Do not complete step 2.

2. Unlink disk drives from a logical partition using a character-based interface:

a. Vary off the NWSD for your logical partition. For more information, see Starting and stopping the NWSD.

b. Type `RMVNWSSTGL` and press F4.

c. In the Network-server storage space field, type the name of the storage space that you want to unlink and press Enter.

d. In the Network server description field, type the name of the server from which you want to unlink the storage space and press Enter.

e. If you are unlinking a linked disk drive that you plan to relink later, specify *NO in the Renumber field.

Note: You must relink the disk drive as the same sequence number before you vary on the server. By preventing automatic renumbering, you avoid having to unlink and relink all the disk drives to get them in the correct sequence.

f. Press Enter.

Note: If you are uninstalling a logical partition, your next step is to delete the disk drive. For more information on deleting disk drives, see Deleting virtual disk drives for a logical partition. Otherwise, vary on the NWSD for your logical partition. For more information about starting the NWSD, see Starting and stopping the NWSD.

For more information about saving i5/OS server objects, see Saving server objects in i5/OS.

Related concepts

"Saving Linux server objects in i5/OS"
When a Linux logical partition uses i5/OS resources, i5/OS stores Linux information in i5/OS objects.i5/OS can restore the objects correctly only if you save all objects for a Linux logical partition.

Related tasks

"Deleting virtual disk drives for a Linux logical partition" on page 91
You can delete a virtual disk drive from a Linux logical partition that uses i5/OS resources to make the space available to the i5/OS logical partition once more. When you delete a virtual disk drive, all of the information on the virtual disk drive is erased.

"Starting the network-server description for a Linux logical partition" on page 86
You can start the network-server description (NWSD) for a Linux logical partition that uses i5/OS resources to make the resources defined in the NWSD available to the Linux logical partition.

Saving Linux server objects in i5/OS:

When a Linux logical partition uses i5/OS resources, i5/OS stores Linux information in i5/OS objects.i5/OS can restore the objects correctly only if you save all objects for a Linux logical partition.

You can save these objects by using options of the i5/OS GO SAVE command in the server.

- Option 21 saves the entire server.
- Option 22 saves server data, which includes objects in the QUSRSYS library.
- Option 23 saves all user data, which includes objects in the QFPNWSSTG library.

If you want to save a particular object, use the following table to see the location of that object on i5/OS and the command to use. For more information about using the save commands, see the i5/OS Backup and recovery topic collection.

Table 6. Objects to save for logical partitions with virtual disk

Object content	Object name	Object location	Object type	Save command
Guest partition and virtual disk drive	stgspc	/QFPNWSSTG	User-defined network-server storage spaces in system auxiliary storage pool (ASP)	GO SAV, option 21 or 23
				SAV OBJ('/QFPNWSSTG/stgspc') DEV('/QSYS.LIB/TAP01.DEVD')
			User-defined network-server storage spaces in user ASP	SAV OBJ(('/QFPNWSSTG/stgspc') ('/dev/QASPnn /stgspc.UDFS')) DEV('/QSYS.LIB/TAP01.DEVD')

Table 7. Objects to save for all logical partitions with a server

Object content	Object name	Object location	Object type	Save command
Messages from the logical partition	Various	Various	Server message queue	GO SAVE, option 21 or 23
				SAVOBJ OBJ(msg) LIB(qlibrary) DEV(TAP01) OBJTYPE(*MSGQ)
i5/OS configuration objects for logical partitions	Various	QSYS	Device configuration objects	GO SAVE, option 21, 22, or 23
				SAVOBJ DEV (TAPO1)
Various	Various	QUSRSYS	Various	GO SAVE, option 21 or 23
				SAVLIB LIB(*NONSYS) or LIB(*ALLUSR)

Related tasks

"Unlinking virtual disk drives from a Linux logical partition" on page 92
By unlinking virtual disk drives (network-server storage spaces) from a Linux logical partition that uses i5/OS resources, you disconnect the virtual disk drives from the logical partition, making the virtual disk drives inaccessible to users. If you delete a Linux logical partition that uses i5/OS resources, you must unlink all virtual disk drives from the logical partition before you delete the logical partition.

Related information

Backup and recovery

Setting partition-availability priorities for your managed system using version 7 or later of the HMC

To avoid shutting down mission-critical workloads when your server firmware deconfigures a failing processor, you can set partition-availablity priorities for the logical partitions on your managed system. A logical partition with a failing processor can acquire a replacement processor from logical partitions with a lower partition-availability priority. The acquisition of a replacement processor allows the logical partition with the higher partition-availability priority to continue running after a processor failure.

To set partition-availability priorities for your managed system using version 7 or later of the Hardware Management Console (HMC), you must be a super administrator, product engineer, or an operator. For more information about the role of a super administrator, product engineer, and operator, refer to Tasks and roles.

To set partition-availability priorities for your managed system using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management** and click **Servers**.
2. In the contents pane, select the managed system whose partition-availability priorities you want to set, click the **Tasks** button, and select **Configuration → Partition Availability Priority**.
3. Select the logical partitions whose partition-availability priority you want to set, set **Availability priority** to the partition-availability priority value that you want to use for all selected logical partitions, and click **OK**. You can enter any value from 0 to 255 into **Availability priority**, or you can select one of the preset choices. All selected logical partitions are set to the same partition-availability priority value.
4. Repeat this procedure for other logical partitions to set the partition-availability priority for those logical partitions.

Designating the service partition for your managed system using version 7 or later of the HMC

The *service partition* is the i5/OS logical partition on an IBM System i server 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 Hardware Management Console (HMC) is undergoing maintenance or is otherwise unable to perform these functions.

The preferred method for applying server firmware updates and communicating server common hardware errors to IBM is by using the HMC.

IBM System p and OpenPower servers do not have a service partition. If an IBM System p and OpenPower server is managed by an HMC, then you must use the HMC to update the server firmware, and the server can contact service and support only through the HMC. If you use an HMC to manage IBM System p and OpenPower servers, then use a backup HMC to ensure that the servers have redundant methods for contacting service and support and for applying fixes.

You can designate only one logical partition at a time as the service partition for your managed system. The service partition for your IBM System i server must be an i5/OS logical partition.

Before you can designate a logical partition as the service partition for your managed system, you must shut down the logical partition. You must also shut down the logical partition before you remove the service partition designation from the logical partition. If you want to change the service partition from one logical partition to another logical partition, you must shut down both logical partitions before using this procedure. Refer to the operating system shutdown procedures for information on shutting down your logical partitions normally.

Note: You must designate a service partition on a server only after you use the HMC to create, change, delete, copy, or activate any logical partitions on the managed system. You can set up the operating system on an unpartitioned server to contact service and support, and you can use the operating system on an unpartitioned server to apply server firmware updates.

To designate a service partition for your managed system using version 7 or later of the HMC, you must be a member of the super administrator role. For more information about user roles, refer to Tasks and roles.

To designate one of your logical partitions as the service partition for your managed system using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management** and click **Servers**.
2. In the contents pane, select the managed system whose service partition you want to designate, click the **Tasks** button, and select **Properties**.

3. In the **Service partition** field, select the logical partition that you want to designate as the service partition. If you do not want to designate another logical partition as the service partition, select None.
4. Click **OK**.

Related tasks

"Deleting a logical partition using version 7 or later of the HMC"
You can use the Hardware Management Console (HMC) to delete a logical partition and all of the partition profiles associated with the logical partition.

Deleting a logical partition using version 7 or later of the HMC

You can use the Hardware Management Console (HMC) to delete a logical partition and all of the partition profiles associated with the logical partition.

To delete a logical partition using version 7 or later of the HMC, you must be a super administrator or operator. For more information about user roles, refer to Tasks and roles.

You cannot delete a logical partition if it is the service partition of your managed system. Before you can delete such a logical partition, you must designate another logical partition as the service partition of your managed system or remove the service partition designation from the logical partition. For more information, see Designating the service partition for your managed system.

Attention: This procedure erases the logical partition and the logical partition configuration data stored on the partition profiles.

To delete a logical partition using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management**, open **Servers**, and click the managed system on which the partition profile is located.
2. In the contents pane, select the logical partition on which the partition profile is located, click the **Tasks** button, and choose **Operations** → **Delete**.
3. Click **OK** to confirm.

Related tasks

"Designating the service partition for your managed system using version 7 or later of the HMC" on page 95
The *service partition* is the i5/OS logical partition on an IBM System i server 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 Hardware Management Console (HMC) is undergoing maintenance or is otherwise unable to perform these functions.

Related information

Tasks and roles

Resetting the managed system to a nonpartitioned configuration using version 7 or later of the HMC and the ASMI

Use this procedure to erase all of your logical partitions and reset the managed system to a nonpartitioned configuration. When you reset the managed system, all of the physical hardware resources are assigned to a single logical partition. This allows you to use the managed system as if it were a single, nonpartitioned server.

Attention: By resetting a partitioned managed system to a nonpartitioned configuration, you will lose all of your logical partition configuration data. However, resetting the managed system does not erase the operating systems and data from disk units on that managed system.

Before you reset the managed system, ensure that the hardware placement in the managed system supports a nonpartitioned configuration. If the hardware placement in the managed system does not support a nonpartitioned configuration, you must move the hardware so that the hardware placement

supports a nonpartitioned configuration. For more information about how to place the hardware in your managed system to support a nonpartitioned configuration, contact your marketing representative or business partner.

Also, if you plan to use an operating system that is already installed on one of the logical partitions on the managed system (instead of reinstalling the operating system after you reset the managed system), consider how the console used by that operating system will change when you reset the managed system.

- If the operating system that you want to use is AIX, log into AIX and enable the login prompt for the virtual serial port vty0 using either SMIT or the chdev command. You can then reset the managed system, use a physical serial console to log into AIX, and use SMIT or chcons to change the console device to the console device you want to use.
- If the operating system that you want to use is i5/OS, the device tagging that you set up on the HMC no longer applies after you disconnect the HMC. Before you reset the managed system, switch the console setting to the device that you want to use.

To reset a partitioned managed system to a nonpartitioned configuration using version 7 or later of the HMC, you must be a super administrator or operator. For more information about user roles, refer to Tasks and roles. You must also have an Advanced System Management Interface (ASMI) login profile with an administrator authority level.

Also, parts of this procedure must be performed *at your HMC* (not connected remotely). Ensure that you have physical access to the HMC before you begin.

To reset a partitioned managed system to a nonpartitioned configuration using version 7 or later of the HMC, follow these steps:

1. Shut down all logical partitions on your managed system using operating system procedures. For more information about shutting down logical partitions using operating system procedures, see the following information:
   - For logical partitions running AIX, see Shutting down AIX logical partitions using version 7 or later of the HMC.
   - For logical partitions running i5/OS, see Shutting down i5/OS logical partitions.
   - For logical partitions running Linux, see Shutting down Linux logical partitions using version 7 or later of the HMC..
2. If the managed system powered off automatically when you shut down the last logical partition, power on the managed system to the Standby state. Complete the following:
   a. In the navigation pane of your HMC, open **Systems Management** and click **Servers**.
   b. In the contents pane, select the managed system, click the **Tasks** button, and choose **Operations** → **Power On**.
   c. Select the power-on mode of **Partition Standby** and click **OK**.
   d. Wait until the contents pane displays a Standby state for the managed system.
3. Initialize the profile data on the HMC. Complete the following:
   a. In the contents pane, select the managed system, click the **Tasks** button, and choose **Configuration** → **Manage Partition Data** → **Initialize**.
   b. Click **Yes** to confirm.
4. Clear the partition configuration data on the managed system. Complete the following *at your HMC* (not connected remotely):
   a. In the navigation pane, click **HMC Management**.
   b. In the contents pane, click **Open Restricted Shell Terminal**.
   c. Type the command: `lpcfgop -m managed_system_name -o clear`. In this command, *managed_system_name* is the name of the managed system as it displays in the content area.

d. Enter **1** to confirm. This step will take several seconds to complete.

5. Optional: If you no longer intend to manage the system using the HMC, remove the connection between the HMC and the managed system. To remove the connection between the HMC and the managed system, complete the following:
   a. In the contents pane, select the managed system, click the **Tasks** button, and choose **Connections → Reset or Remove Connection**.
   b. Select **Remove connection** and click **OK**.
6. Access the Advanced System Management Interface (ASMI) using a Web browser on a PC. If you do not already have a PC that is set up to access the ASMI on the managed system, you will need to set up the PC at this point. For more information about accessing ASMI, see Accessing the ASMI using a Web browser.
7. On the ASMI Welcome pane, log in using the admin user ID (enter `admin` into **User ID**, enter the admin password into **Password**, and click **Log In**).
8. In the navigation pane, expand **Power/Restart Control** and click **Power On/Off System**.
9. Set **Boot to server firmware** to `Running`.
10. Click **Save settings and power off**.
11. Click **Power On/Off System** periodically to refresh the window. Repeat this step until **Current system power state: Off** is displayed in the navigation pane.
12. Click **Save settings and power on**.
13. Wait for the managed system to restart. It can take several minutes for the managed system and operating system to restart completely.

Related tasks

"Shutting down Linux logical partitions using version 7 or later of the HMC" on page 109
You can shut down Linux logical partitions and the Linux operating system using the Hardware Management Console (HMC).

Related information

Tasks and roles

Accessing the ASMI using a Web browser

Shutting down AIX in a logical partition

Managing logical partitions using version 7 or later of the HMC

You can manage the configuration of your logical partitions using the Hardware Management Console (HMC). The HMC allows you to adjust the hardware resources that are used by each logical partition.

Activating a logical partition using version 7 or later of the HMC

You must activate a logical partition before you can use the logical partition. When you activate a logical partition, the system commits resources to the logical partition and starts the operating system or software that is installed on the logical partition.

To activate a logical partition using version 7 or later of the HMC, you must be a super administrator, operator, or product engineer. For more information about user roles, refer to Tasks and roles.

When you activate a logical partition, you must select a partition profile. A *partition profile* is a record on the Hardware Management Console (HMC) that specifies a possible configuration for a logical partition.

To activate a logical partition using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management**, open **Servers**, and click the system on which the logical partition is located.
2. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Operations → Activate**.
3. Select the partition profile that you want to use to activate the logical partition.

4. If you want the HMC to open a terminal window or console session for the logical partition when the logical partition is activated, select **Open a terminal window or console session**.
5. If you want to use a keylock position or boot mode that is different from the keylock position or boot mode specified in the partition profile, click **Advanced**, select the desired keylock position and boot mode, and click **OK**.
6. Click **OK**.

Related information

Tasks and roles

Activating a system profile using version 7 or later of the HMC

You can activate many logical partitions at a time by activating a system profile. A *system profile* is an ordered list of partition profiles. When you activate a system profile, the managed system attempts to activate the partition profiles in the system profile in the order in which the partition profiles are listed.

To activate a system profile using version 7 or later of the Hardware Management Console (HMC), you must be a super administrator, operator, or product engineer. For more information about user roles, refer to Tasks and roles.

To activate a system profile using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management** and click **Servers**.
2. In the contents pane, select the managed system, click the **Tasks** button, and choose **Configuration** → **Manage System Profiles**.
3. Select the system profile and click **Activate**.
4. Select the desired activation settings for the system profile and click **Continue**.

Related information

Tasks and roles

Managing logical partition resources dynamically using version 7 or later of the HMC

You can add, remove, or move processor, memory, and I/O resources between running logical partitions without restarting the logical partitions or the managed system.

Dynamic resource management is used only for running logical partitions. If a logical partition is not running, you cannot add resources to that logical partition dynamically or remove resources from that logical partition dynamically. Also, if you shut down a logical partition, you cannot move resources dynamically to or from that logical partition. (However, the resources that were used by that logical partition can be added dynamically to running logical partitions.) You can change the resource allocations for an idle logical partition by changing the properties of the partition profiles used by that logical partition. When you start the logical partition using one of the changed partition profiles, the managed system applies the changes to the logical partition.

Managing memory dynamically using version 7 or later of the HMC:

You can add, remove, and move memory dynamically to and from running logical partitions using the Hardware Management Console (HMC). This allows you to adjust the memory allocated to each logical partition without having to shut down the logical partitions.

Dynamic memory changes on i5/OS logical partitions affect the base memory pool of the logical partitions (*BASE pool). Private memory pools or shared memory pools are not affected. Dynamic memory changes cannot cause the amount of memory in the base pool to fall below the minimum amount of memory required in the base pool (as determined by the base storage minimum size (QBASPOOL) system value). If a dynamic memory change would cause the base pool to fall below this amount, the system releases excess memory pages only after keeping the minimum amount of memory required in the base pool.

To prevent any data loss during dynamic memory movement, the system first writes any data from memory pages to the disks before making the memory pages available to another partition. Depending on the amount of memory you have requested to move, this might take some time.

Memory in each logical partition operates within its assigned minimum and maximum values. The full amount of memory that you assign to a logical partition might not be available for the logical partition to use. Static memory overhead that is required to support the assigned maximum memory affects the reserved or hidden memory amount. This static memory overhead also influences the minimum memory size of a partition.

Note: If resources are moved dynamically, the configuration change is temporary and is not reflected in the partition profile. This means that all configuration changes will be lost the next time the partition profile is 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.

Adding memory dynamically using version 7 or later of the HMC:

You can add memory dynamically to a running logical partition using the Hardware Management Console (HMC). This allows you to increase the memory available to a logical partition without having to shut down the logical partition.

A Linux logical partition supports the dynamic addition of memory resources only if the following conditions are met:

- A Linux distribution that supports the dynamic addition of memory resources is installed on the Linux logical partition. Distributions that support the dynamic addition of memory resources include Novell SUSE Linux Enterprise Server 10, Red Hat Enterprise Linux version 5, and later versions of these distributions.
- The DynamicRM tool package is installed on the Linux logical partition. For more information on the DynamicRM tool package, see the Service and productivity tools Web site.

To add memory to a Linux logical partition that uses an earlier version of these distributions, you must shut down the Linux logical partition and reactivate the logical partition using a partition profile that specifies a greater amount of memory.

To add memory dynamically to a running logical partition using version 7 or later of the HMC, you must be a super administrator, service representative, product engineer, or operator. For more information about user roles, refer to Tasks and roles.

To add memory dynamically to a running logical partition using version 7 or later of the HMC, follow these steps:

1. In the navigation pane of your HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partition is located.
2. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Dynamic Logical Partitioning** → **Memory** → **Add or Remove**.
3. Enter the amount of memory that you want the logical partition to have into the fields in the **Pending memory** row.
4. Adjust the settings in the **Options** area if necessary. You might need to increase the value in the **Timeout (minutes)** field to allow enough time for the HMC to complete the operation. (These settings relate to how the managed system adds memory dynamically. These settings are not retained after the addition completes.)
5. Click **OK**.

Moving memory dynamically using version 7 or later of the HMC:

You can move memory dynamically from one running logical partition to another using version 7 or later of the Hardware Management Console (HMC). This allows you to reassign memory directly to a logical partition that needs additional memory.

You cannot move memory dynamically from a running Linux logical partition. To remove memory from a Linux logical partition, you must shut down the Linux logical partition and reactivate the logical partition using a partition profile that specifies a lesser amount of memory.

You can move memory to a running Linux dynamically only if the following conditions are met:

- A Linux distribution that supports the dynamic addition of memory resources is installed on the Linux logical partition. Distributions that support the dynamic movement of memory resources include Novell SUSE Linux Enterprise Server 10 and later versions.Distributions that support the dynamic movement of memory resources include Novell SUSE Linux Enterprise Server 10, Red Hat Enterprise Linux version 5, and later versions of these distributions.
- The DynamicRM tool package is installed on the Linux logical partition. For more information on the DynamicRM tool package, see the Service and productivity tools Web site.

To move memory to a Linux logical partition that uses an earlier version of these distributions, you must shut down the Linux logical partition and reactivate the logical partition using a partition profile that specifies a greater amount of memory.

To move memory dynamically from one running logical partition to another using version 7 or later of the HMC, you must be a super administrator, service representative, product engineer, or operator. For more information about user roles, refer to Tasks and roles.

To move memory dynamically from one running logical partition to another using version 7 or later of the HMC, follow these steps:

1. In the navigation pane of your HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partitions are located.
2. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Dynamic Logical Partitioning** → **Memory** → **Move**.
3. Select the logical partition to which you want to move the memory in **Select Destination Partition**.
4. Enter the amount of memory that you want to move into the fields in the **Memory to move** row.
5. Adjust the settings in the **Options** area if necessary. You might need to increase the value in the **Timeout (minutes)** field to allow enough time for the HMC to complete the operation. (These settings relate to how the managed system moves memory dynamically. These settings are not retained after the move completes.)
6. Click **OK**.

Removing memory dynamically using version 7 or later of the HMC:

You can remove memory dynamically from a running AIX, i5/OS, or Virtual I/O Server logical partition using the Hardware Management Console (HMC). This allows you to reassign the memory to other logical partitions.

You cannot remove memory dynamically from a running Linux logical partition. To remove memory from a Linux logical partition, you must shut down the logical partition and reactivate the logical partition using a partition profile that specifies a lesser amount of memory.

To remove memory dynamically from a running logical partition using version 7 or later of the HMC, you must be a super administrator, service representative, product engineer, or operator. For more information about user roles, refer to Tasks and roles.

To remove memory dynamically from a running logical partition using version 7 or later of the HMC, follow these steps:

1. In the navigation pane of your HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partition is located.
2. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Dynamic Logical Partitioning → Memory → Add or Remove**.
3. Enter the amount of memory that you want the logical partition to have into the fields in the **Pending memory** row.
4. Adjust the settings in the **Options** area if necessary. You might need to increase the value in the **Timeout (minutes)** field to allow enough time for the HMC to complete the operation. (These settings relate to how the managed system removes memory dynamically. These settings are not retained after the removal completes.)
5. Click **OK**.

Managing processor resources dynamically using version 7 or later of the HMC:

You can add, remove, and move processor resources dynamically to and from running logical partitions using the Hardware Management Console (HMC). This allows you to adjust the processor resources allocated to each logical partition without having to shut down the logical partitions.

The ability to move processor resources dynamically becomes important when you need to adjust to changing workloads. Processor resources can be moved based on the minimum and maximum values that you created for the partition profile. You can move processor resources as long as the processor resources for each logical partition remains within the range specified by the minimum and maximum values for the logical partition. If the managed system uses more than one shared processor pool, you must also ensure that the number of processors used in each shared processor pool is less than or equal to the maximum number of processing units specified for each shared processor pool.

Note: If resources are moved dynamically, the configuration change is temporary and is not reflected in the partition profile. This means that all configuration changes will be lost the next time the partition profile is 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.

Adding processor resources dynamically using version 7 or later of the HMC:

You can add processor resources dynamically to a running logical partition using the Hardware Management Console (HMC). This allows you to increase the processing capacity of a running logical partition without having to shut down the logical partition.

A Linux logical partition supports the dynamic addition of processor resources only if the following conditions are met:

- A Linux distribution that supports dynamic logical partitioning is installed on the Linux logical partition. Distributions that support dynamic logical partitioning include Red Hat Enterprise Linux version 4, SUSE Linux Enterprise Server 9, and later versions of these distributions.
- The DynamicRM tool package is installed on the Linux logical partition. For more information on the DynamicRM tool package, see the Service and productivity tools Web site.

To add processor resources dynamically to a running logical partition using version 7 or later of the HMC, you must be a super administrator, service representative, product engineer, or operator. For more information about user roles, refer to Tasks and roles.

To add processor resources dynamically to a running logical partition using version 7 or later of the HMC, follow these steps:

1. In the navigation pane of your HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partition is located.
2. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Dynamic Logical Partitioning** → **Processor** → **Add or Remove**.
3. Enter the amounts of processor resources that you want the logical partition to have into the fields in the **Current** column. If the logical partition uses shared processors, you might need to adjust the number of virtual processors so that it is greater than the number of processing units.
4. Adjust the settings in the **Options** area if necessary. You might need to increase the value in the **Timeout (minutes)** field to allow enough time for the HMC to complete the operation. (These settings relate to how the managed system adds processor resources dynamically. These settings are not retained after the addition completes.)
5. Click **OK**.

Moving processor resources dynamically using version 7 or later of the HMC:

You can move processor resources from one running logical partition to another using the Hardware Management Console (HMC). This allows you to reassign processor resources directly to a logical partition that needs additional processor resources.

A Linux logical partition supports the dynamic movement of processor resources only if the following conditions are met:

- A Linux distribution that supports dynamic logical partitioning is installed on the Linux logical partition. Distributions that support dynamic logical partitioning include Red Hat Enterprise Linux version 4, SUSE Linux Enterprise Server 9, and later versions of these distributions.
- The DynamicRM tool package is installed on the Linux logical partition. For more information on the DynamicRM tool package, see the Service and productivity tools Web site.

To move processor resources dynamically from one running logical partition to another using version 7 or later of the HMC, you must be a super administrator, service representative, product engineer, or operator. For more information about user roles, refer to Tasks and roles.

To move processor resources dynamically from one running logical partition to another using version 7 or later of the HMC, follow these steps:

1. In the navigation pane of your HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partitions are located.
2. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Dynamic Logical Partitioning** → **Processor** → **Move**.
3. Enter the amounts of processor resources that you want to move into the fields in the **To move** column.
4. Select the logical partition to which you want to move the processor resources in **Select Destination Partition**.
5. Adjust the settings in the **Options** area if necessary. You might need to increase the value in the **Timeout (minutes)** field to allow enough time for the HMC to complete the operation. (These settings relate to how the managed system moves processor resources dynamically. These settings are not retained after the move completes.)
6. Click **OK**.

Removing processor resources dynamically using version 7 or later of the HMC:

You can remove processor resources dynamically from a running logical partition using the Hardware Management Console (HMC). This allows you to reassign the processor resources to other logical partitions.

A Linux logical partition supports the dynamic removal of processor resources only if the following conditions are met:

- A Linux distribution that supports dynamic logical partitioning is installed on the Linux logical partition. Distributions that support dynamic logical partitioning include Red Hat Enterprise Linux version 4, SUSE Linux Enterprise Server 9, and later versions of these distributions.
- The DynamicRM tool package is installed on the Linux logical partition. For more information on the DynamicRM tool package, see the Service and productivity tools Web site.

To remove processor resources dynamically from a running logical partition using version 7 or later of the HMC, you must be a super administrator, service representative, product engineer, or operator. For more information about user roles, refer to Tasks and roles.

To remove processor resources dynamically from a running logical partition using version 7 or later of the HMC, follow these steps:

1. In the navigation pane of your HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partition is located.
2. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Dynamic Logical Partitioning → Processor → Add or Remove**.
3. Enter the amounts of processor resources that you want to the logical partition to have into the fields in the **Current** column. If the logical partition uses shared processors, you might need to adjust the number of virtual processors so that it is greater than the number of processing units.
4. Adjust the settings in the **Options** area if necessary. You might need to increase the value in the **Timeout (minutes)** field to allow enough time for the HMC to complete the operation. (These settings relate to how the managed system removes processor resources dynamically. These settings are not retained after the removal completes.)
5. Click **OK**.

Managing physical I/O devices and slots dynamically using version 7 or later of the HMC:

You can add, remove, and move physical I/O devices and slots dynamically to and from running logical partitions using the Hardware Management Console (HMC). This allows logical partitions to share infrequently used I/O devices (such as optical disc drives).

Logical partitions can have desired or required I/O devices or slots. When you specify that an I/O device or slot is desired (or shared), this means either that the I/O device or slot is meant to be shared with other logical partitions, or that the I/O device or slot is optional. When you specify that an I/O device or slot is required (or dedicated), then you cannot activate the logical partition if the I/O device or slot is unavailable or in use by another logical partition.

Note: If resources are moved dynamically, the configuration change is temporary and is not reflected in the partition profile. This means that all configuration changes will be lost the next time the partition profile is 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.

Adding physical I/O devices and slots dynamically using version 7 or later of the HMC:

You can add a physical I/O slot (and the adapter and devices that are connected to that slot) to a running logical partition using the Hardware Management Console (HMC). This allows you to add I/O capabilities to a running logical partition without having to shut down the logical partition.

A Linux logical partition supports the dynamic addition of physical I/O slots only if the following conditions are met:

- A Linux distribution that supports dynamic logical partitioning is installed on the Linux logical partition. Distributions that support dynamic logical partitioning include Red Hat Enterprise Linux version 4, SUSE Linux Enterprise Server 9, and later versions of these distributions.
- The DynamicRM tool package is installed on the Linux logical partition. For more information on the DynamicRM tool package, see the Service and productivity tools Web site.

To add a physical I/O slot dynamically to a running logical partition using version 7 or later of the HMC, you must be a super administrator, service representative, product engineer, or operator. For more information about user roles, refer to Tasks and roles.

To add a physical I/O slot dynamically to a running logical partition using version 7 or later of the HMC, follow these steps:

1. In the navigation pane of your HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partition is located.
2. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Dynamic Logical Partitioning** → **Physical Adapters** → **Add**.
3. Select the physical I/O slot that you want to add to the logical partition.
4. If you want to assign the physical I/O slot to an I/O pool, select the I/O pool for the physical I/O slot in **I/O Pool ID**.
5. Click **OK**.

Moving physical I/O devices and slots dynamically using version 7 or later of the HMC:

You can move a physical I/O slot (and the adapter and devices that are connected to that slot) from one running logical partition to another using the Hardware Management Console (HMC). This allows you to share a physical I/O device such as a DVD drive among many logical partitions.

Before you begin, vary off any devices that are attached to the managed system through the physical I/O slot that you want to move. You can vary off devices using operating system commands.

Attention: The dynamic movement of a physical I/O slot that controls disk drives can cause unpredictable results, such as partition failure or loss of data.

A Linux logical partition supports the dynamic movement of physical I/O slots only if the following conditions are met:

- A Linux distribution that supports dynamic logical partitioning is installed on the Linux logical partition. Distributions that support dynamic logical partitioning include Red Hat Enterprise Linux version 4, SUSE Linux Enterprise Server 9, and later versions of these distributions.
- The DynamicRM tool package is installed on the Linux logical partition. For more information on the DynamicRM tool package, see the Service and productivity tools Web site.

To move a physical I/O slot dynamically from one running logical partition to another using version 7 or later of the HMC, you must be a super administrator, service representative, product engineer, or operator. For more information about user roles, refer to Tasks and roles.

To move a physical I/O slot dynamically from one running logical partition to another using version 7 or later of the HMC, follow these steps:

1. In the navigation pane of your HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partitions are located.
2. In the contents pane, select the logical partition that currently owns the physical I/O slot, click the **Tasks** button, and choose **Dynamic Logical Partitioning** → **Physical Adapters** → **Move or Remove**.
3. Select the physical I/O slot that you want to move from the list.

4. Select the running logical partition to which you want to move the selected physical I/O slot in **Move to partition**.
5. If you want to assign the physical I/O slot to an I/O pool on the logical partition to which the physical I/O slot will be moved, select the I/O pool for the physical I/O slot in **I/O Pool ID**.
6. Ensure that any devices that are attached to the managed system through the physical I/O slot are not busy. The devices should be varied off.
7. Click **OK**.

Removing physical I/O devices and slots dynamically using version 7 or later of the HMC:

You can remove a physical I/O slot and the adapter and devices that are connected to that slot dynamically from a running logical partition using the Hardware Management Console (HMC). This allows you to reassign the physical I/O slot to other logical partitions.

Before you begin, vary off any devices that are attached to the managed system through the physical I/O slot that you want to remove. You can vary off devices using 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.

A Linux logical partition supports the dynamic removal of physical I/O slots only if the following conditions are met:

- A Linux distribution that supports dynamic logical partitioning is installed on the Linux logical partition. Distributions that support dynamic logical partitioning include Red Hat Enterprise Linux version 4, SUSE Linux Enterprise Server 9, and later versions of these distributions.
- The DynamicRM tool package is installed on the Linux logical partition. For more information on the DynamicRM tool package, see the Service and productivity tools Web site.

To remove a physical I/O slot dynamically from a running logical partition using version 7 or later of the HMC, you must be a super administrator, service representative, product engineer, or operator. For more information about user roles, refer to Tasks and roles.

To remove a physical I/O slot dynamically from a running logical partition using version 7 or later of the HMC, follow these steps:

1. In the navigation pane of your HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partition is located.
2. In the contents pane, select the logical partition, click the **Tasks** button, and choose **Dynamic Logical Partitioning** → **Physical Adapters** → **Move or Remove**.
3. Select the physical I/O slot that you want to remove from the list.
4. Ensure that any devices that are attached to the managed system through the physical I/O slot are not busy. The devices should be varied off.
5. Click **OK**.

Scheduling the movement of resources to and from logical partitions using version 7 or later of the HMC:

You can schedule the movement of memory, dedicated processors, shared processors, and I/O devices between running logical partitions on a managed system. This allows you to move resources between running logical partitions without user intervention.

To schedule the movement of resources to and from running logical partitions using version 7 or later of the HMC, you must be a member of the super administrator role or the operator role. For more information about user roles, refer to Tasks and roles.

To schedule the movement of resources to or from a running logical partition using version 7 or later of the HMC, follow these steps:

1. In the navigation pane, open **Systems Management**, open **Servers**, and click the system on which the logical partition is located.
2. In the contents pane, select the logical partition for which you want to schedule the movement of resources, click the **Tasks** button, and choose **Operations → Schedule Operations**. (If you want to schedule the movement of resources from one logical partition to another, select the logical partition from which you are moving resources.)
3. Click **Options** and choose **New**.
4. Select **Dynamic Reconfiguration**, and click **OK**.
5. Select the date and time on which you want the movement to occur.
6. Select the **Options** tab and select the resource type (I/O, memory, or processor), the type of movement (**Add**, **Remove**, or **Move to**), the destination logical partition (if you are moving resources to another logical partition), and the quantity (in processors or in megabytes) or the I/O slot that you want to move.
7. If you want the operation to be repeated, select the **Repeat** tab and specify how you want the operation to be repeated.
8. Click **Save**.
9. When the message dialog displays, click **OK** to continue.

When this procedure is completed, the managed system is set to perform the dynamic logical partitioning task at the date and time that you specify.

Related information

Tasks and roles

Saving the partition configuration to a partition profile using version 7 or later of the HMC:

Use this procedure to save the current configuration of a logical partition to a new partition profile using a Hardware Management Console (HMC). Use this procedure if you change the configuration of a logical partition using dynamic logical partitioning and you do not want to lose the changes when you reactivate the logical partition. This procedure allows you to save the changed configuration to a new partition profile instead of having to enter the changed resource allocations manually.

You can perform this procedure at any time after you initially activate a logical partition.

To save the current configuration of a logical partition to a new partition profile using version 7 or later of the HMC, you must be a super administrator, service representative, operator, or product engineer. For more information about user roles, refer to Tasks and roles.

You can perform this procedure on active logical partitions and on logical partitions that are shut down. In either of these cases, the HMC reads the partition configuration that is stored for the logical partition in the server firmware and saves this partition configuration to the specified partition profile. For active logical partitions, the partition configuration that is stored in the server firmware is the current partition configuration of the logical partition. For logical partitions that are shut down, the partition configuration that is stored in the server firmware is the partition configuration at the time that you shut down the logical partition. Regardless of the state of the logical partition at the time that you perform this procedure, the procedure allows you to save the dynamic logical partitioning changes to a partition profile and use the partition profile to reactivate the logical partition without losing those changes.

After you shut down a logical partition, other logical partitions can use the resources that were used by that logical partition when the logical partition was active. Therefore, the resources available on the managed system might not support the logical partition configuration that is stored in the server firmware for the inactive logical partition. After you save the partition configuration of a logical partition

that is shut down, verify that the resources available on the managed system can support the logical partition configuration that you saved to a partition profile.

When you save the partition configuration to a new partition profile, the desired amounts of memory, processors, processing units, and virtual processors in the new partition profile are set to the current amounts from the partition configuration. The minimum and maximum amounts of memory, processors, processing units, and virtual processors in the new partition profile are set to the minimum and maximum amounts from the partition configuration. For example, you start a logical partition using a partition profile that specifies a minimum of 512 MB of memory, a maximum of 2 GB of memory, and 1 GB as the desired amount of memory. The managed system has over 1 GB of memory available, so the logical partition has 1 GB of memory when it starts. You then add 1 GB of memory to the logical partition for a total of 2 GB of memory. If you shut down the logical partition, and then save the partition configuration, the resulting partition profile specifies a minimum of 512 MB of memory, a maximum of 2 GB of memory, and 2 GB as the desired amount of memory. Likewise, if the model and edition feature of the managed system allow you to assign percentages of the 5250 CPW capability of the managed system to i5/OS logical partitions, the minimum, desired, and maximum percentage of 5250 CPW in the new partition profile are the minimum, current, and maximum percentages of 5250 CPW from the partition configuration.

The physical and virtual I/O devices that are set as required in the active partition profile are saved as required devices in the new partition profile. The physical and virtual I/O devices that are set as desired in the active partition profile or that were added to the logical partition through dynamic logical partitioning are saved as desired devices in the new partition profile. The partition workload group on the logical partition (if any) is saved as the partition workload group on the new partition profile.

To save the current configuration of a logical partition to a new partition profile using version 7 or later of the HMC, complete the following:

1. In the navigation pane of the HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partition is located.
2. In the contents pane, select the logical partition, click the **Tasks** button, and select **Configuration** → **Save Current Configuration**.
3. Enter the name of the new partition profile into **New profile** and click **OK**.

After you save the partition configuration to a new partition profile, verify that the new partition profile is set the way that you want. In particular, verify that the required and desired settings are set correctly for your I/O devices. By default, physical and virtual I/O devices that are added to the logical partition using dynamic logical partitioning are saved as desired devices in the new partition profile. If you want any of these I/O devices to be required, you must change the partition profile so that the I/O device is required. For more information on changing partition profiles, see Changing partition profile properties using version 7 or later of the HMC.

Related tasks

“Changing partition profile properties using version 7 or later of the HMC” on page 77
You can change the properties of a partition profile using version 7 or later of the Hardware Management Console (HMC). Changing the properties of a partition profile will change the resource amounts that are assigned to a logical partition when you shut down and restart the logical partition using the changed partition profile.

Related information

Tasks and roles

Using Linux installed on a logical partition

Learn how to shut down and restart Linux when it is installed on a logical partition and how you can integrate Linux with i5/OS applications and data.

To use logical partitions on an IBM eServer OpenPower system, you need the appropriate Advanced POWER Virtualization technologies activated in your system's Hardware Management Console.

RPM packages are available at the Service and productivity tools Web site at

https://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/home.html .

Related information

Advanced POWER Virtualization

Shutting down and restarting Linux in a logical partition using version 7 or later of the HMC

You can shut down and restart Linux using the Hardware Management Console (HMC).

To use features that require logical partitions on an IBM eServer OpenPower system, you need the appropriate Advanced POWER Virtualization technologies activated in your system's HMC.

Shutting down Linux logical partitions using version 7 or later of the HMC:

You can shut down Linux logical partitions and the Linux operating system using the Hardware Management Console (HMC).

Related tasks

"Resetting the managed system to a nonpartitioned configuration using version 7 or later of the HMC and the ASMI" on page 96

Use this procedure to erase all of your logical partitions and reset the managed system to a nonpartitioned configuration. When you reset the managed system, all of the physical hardware resources are assigned to a single logical partition. This allows you to use the managed system as if it were a single, nonpartitioned server.

Delayed shutdown of the operating system:

When you use the delayed shutdown option, the Hardware Management Console (HMC) issues the Linux **shutdown -h +1** command to shut down the logical partition normally. This option is available only when the operating system is running, and not when the logical partition is in an **Open Firmware** state.

To perform a delayed shutdown of the operating system using version 7 or later of the HMC, complete the following:

1. In the navigation area of your HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partition resides.
2. In the contents area, select the logical partition, click the **Tasks** button, and choose **Operations → Shut Down**.
3. Select **Operating System** and click **OK**.

Immediate shutdown of the operating system:

When you use the immediate shutdown option, the Hardware Management Console (HMC) issues the Linux **shutdown -h now** command to shut down the logical partition as quickly as possible, bypassing messages to other users. This option is available only when the operating system is running, and not when the logical partition is in an **Open Firmware** state.

To perform an immediate shutdown of the operating system using version 7 or later of the HMC, complete the following:

1. In the navigation area of your HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partition resides.

2. In the contents area, select the logical partition, click the **Tasks** button, and choose **Operations** → **Shut Down**.
3. Select **Operating System Immediate** and click **OK**.

Delayed shutdown of a logical partition:

When you use the delayed shutdown option, the logical partition waits a predetermined amount of time to shut down. This allows the logical partition time to end jobs and write data to disks.

To perform a delayed shutdown of a Linux logical partition using version 7 or later of the HMC, complete the following:

1. In the navigation area of your HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partition resides.
2. In the contents area, select the logical partition, click the **Tasks** button, and choose **Operations** → **Shut Down**.
3. Select **Delayed** and click **OK**.

Immediate shutdown of a logical partition:

When you use the immediate shutdown option, the system shuts down without any preset delay.

To perform an immediate shutdown of a Linux logical partition using version 7 or later of the HMC, complete the following:

1. In the navigation area of your HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partition resides.
2. In the contents area, select the logical partition, click the **Tasks** button, and choose **Operations** → **Shut Down**.
3. Select **Immediate** and click **OK**.

Restarting Linux logical partitions using version 7 or later of the HMC:

You can restart Linux logical partitions or the Linux operating system using the Hardware Management Console (HMC). Restarting a logical partition shuts the partition down and then starts it again.

Normal restart of the operating system:

When you use the normal restart option, the HMC issues the Linux **shutdown -r +1** command to shut down and restart the logical partition normally. This option is available only when the operating system is running, and not when the logical partition is in an **Open Firmware** state.

To perform a normal restart of the operating system using version 7 or later of the HMC, complete the following:

1. In the navigation area of your HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partition resides.
2. In the contents area, select the logical partition, click the **Tasks** button, and choose **Operations** → **Restart**.
3. Select **Operating System** and click **OK**.

Immediate restart of the operating system:

When you use the immediate restart option, the Hardware Management Console (HMC) issues the Linux **shutdown -r now** command to shut down and restart the logical partition as quickly as possible, bypassing messages to other users.

To perform an immediate restart of the operating system using version 7 or later of the HMC, complete the following:

1. In the navigation area of your HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partition resides.
2. In the contents area, select the logical partition, click the **Tasks** button, and choose **Operations** → **Restart**.
3. Select **Operating System Immediate** and click **OK**.

Immediate restart of a logical partition:

When you use the immediate restart option, the logical partition is restarted as quickly as possible, without notifying the logical partition.

To perform an immediate restart of a Linux logical partition using version 7 or later of the HMC, complete the following:

1. In the navigation area of your HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partition resides.
2. In the contents area, select the logical partition, click the **Tasks** button, and choose **Operations** → **Restart**.
3. Select **Immediate** and click **OK**.

Restart of a logical partition with main storage or system memory dump:

When you use this option, the HMC allows the operating system on the logical partition to run a diagnostic procedure. After the diagnostic procedure is complete, the logical partition restarts.

The exact diagnostic procedure depends upon which operating system is installed on the logical partition and how the operating system is set to do. The operating system might run an OS debugger, the operating system might perform a main storage or system memory dump on the logical partition, or the operating system might not be set to run any diagnostic procedure at all.

To restart a Linux logical partition with a main storage or system memory dump using version 7 or later of the HMC, complete the following:

1. In the navigation area of your HMC, open **Systems Management**, open **Servers**, and click the managed system on which the logical partition resides.
2. In the contents area, select the logical partition, click the **Tasks** button, and choose **Operations** → **Restart**.
3. Select **Dump** and click **OK**.

Backing up and recovering Linux logical partitions that use i5/OS virtual I/O resources:

When you create a Linux logical partition that uses resources from an i5/OS logical partition, you can manage backup and recovery using i5/OS control language (CL) commands, Linux commands, or a combination of the two.

For more information on planning your backup strategy, see the i5/OS Backup and recovery topic.

To save Linux data in a logical partition that uses i5/OS resources to a shared tape drive and restore the data from the tape drive, you can use either the Linux **tar** command or the i5/OS Save (SAV) and Restore (RST) commands. You can also use the **tar** command to save your data to a file. If you use the **tar** command to save data, the only way you can restore that data is by using the **tar** command again. Similarly, if you use the SAV command to save data, the only way you can restore that data is by using the RST command. The two methods of backing up and restoring data are not compatible.

The following restrictions apply:

- To use the tape device from Linux, you must vary the tape off under i5/OS .
- To use the i5/OS SAV or RST command to save or restore the NWSD, Linux must be inactive (that is, the NWSD must be varied off).
- Saving the storage space is typically faster than saving by using the **tar** command, but it does not provide file-level backup and recovery.
- Linux does not support switching tapes in a library device. You can only use the tape that is currently in the device.
- You cannot save i5/OS data and **tar** data on the same tape volume.

Backing up and recovering Linux files using the tar command:

The most common data backup utility in Linux is the **tar** (tape archive) utility. Use the Linux **tar** command if you have Linux installed on a dedicated disk or if you cannot vary off a Linux partition while you are backing up data.

Backups using the Linux **tar** command are at the file level. They save only the files and directories that the **tar** command specifies. Therefore, you cannot use the **tar** command to save Linux data that is not in the file server. For example, you cannot save a kernel in the PowerPC Reference Platform (PReP) start partition by using the **tar** command.

One advantage of the **tar** command is that it supports incremental backups and backup of special devices, which is not common for tar implementations. Also, the **tar** command backs up files without regard to the underlying file system type.

Saving to and restoring from a tape device:

Use these procedures to save and restore Linux files between a Linux logical partition that uses i5/OS resources and a shared tape drive.

Ensure that your Linux data is in the file server.

Linux typically treats tape as a *character device* that it can quickly read from or write to in long streams of data, but cannot quickly access to find specific data. By contrast, Linux treats a disk or CD as a *block device* that it can read from or write to quickly at any point on the device, making it suitable for the **mount** command.

Complete the following steps to save and restore Linux files between a partition that uses i5/OS resources and a shared tape drive:

1. Type the following command: `tar -b 40 -c -f /dev/st0 files` Use the following descriptions to help you understand the arguments of this command:
   - `tar` is the command name (the contraction of “tape archive”).
   - `-b 40` is the block size in sectors. This argument specifies that Linux is to write the archive stream in blocks of 40 sectors (20 KB). If you do not specify a value for this argument, the default value is 20 sectors (10 KB), which does not perform as well over virtual tape as does a value of 40.
   - `-c` is the command action to create. This argument specifies that the **tar** command creates a new archive or overwrites an old one (as opposed to restoring files from an archive or adding individual files to an existing archive).
   - `-f /dev/st0` is the virtual tape device and number. This argument specifies that the command uses virtual tape 0 on the IBM System i server. After the **tar** command runs, the tape device is closed and the tape is rewound. To save more than one archive on the tape, you must keep the tape from rewinding after each use, and you must position the tape to the next file marker. To do this, specify the *nst0* (nonrewinding virtual tape) device instead of *st0*.

- *files* are the names of the files and directories that you plan to save.

You have now saved Linux data from a partition that uses i5/OS resources to the shared tape drive.

2. Type the following command: `tar -b 40 -x -f /dev/st0 files` The **-x** (extract) argument replaces the **-c** (create) argument in the **tar** command used in step 1 on page 112. You have now restored Linux data from the shared tape drive to a partition that is sharing resources.

Saving to and restoring from a file:

You can save and restore Linux files between a Linux logical partition that uses i5/OS resources and a tar file.

Saving to a file

The following is an example of using the **tar** command to save to a file.

```
tar -cvf /tmp/etc.tar /etc
```

Use the following descriptions to help you understand the arguments of this command:

tar The command name.

c Create a tar file.

v Verbose. This argument shows the files that are being added to the tar file.

f The data immediately following `f` is the name of the tar file.

/tmp/etc.tar
The name of the tar file.

/etc An object to be added to the tar file. Because /etc is a directory, the utility adds all the contents of the directory and its subdirectories to the tar file.

After you create the tar file, you can save it to an offline medium in several ways. For example, you can save the tar file to a virtual tape device or a directly attached tape device. You can also copy the tar file to the integrated file system and save it at a later time.

You can save the data on a Linux partition to a tar file during normal server usage. You can automate and start the **tar** utility by using the **cron** (chronology) daemon on the logical partition. The **cron** daemon is a scheduling mechanism for Linux. You can also use the **tar** utility to schedule a single backup request. For example, if you want to use the tar utility to back up the /etc directory at 10 p.m. on 19 September, you can type the following command:`at 10pm Sep 19 -f tar.command`.

Restoring from a file

The following is an example of using the tar command to restore from file:`tar -xvf /tmp/etc.tar /etc`. The **-x** (extract) argument replaces the **-c** (create) argument in the tar command used to save the files.

Backing up and recovering Linux partitions using i5/OS commands:

If you have a Linux logical partition that uses i5/OS resources, tools are available in i5/OS for backup and recovery. You can use the Save (SAV) and Restore (RST) control language (CL) commands to save and restore entire virtual disks in their current state.

The SAV command saves the directory that has the same name as the virtual disk under the QFPNWSSTG directory in the integrated file system. This method of backup and recovery is most effective if the Linux kernel is saved in a PowerPC Reference Platform (PReP) start partition on the virtual disk. On most Linux distributions, this usually occurs as part of a default installation.

Backups using i5/OS commands are at drive level. This means that i5/OS backs up the entire contents of a virtual disk, or network storage space, rather than individual files. Thus, the correct SAV command backs up any information on the drive, including a kernel in the PReP start partition.

If you save the Linux kernel in a PReP partition, you can restore and start the partition after a total system reinstallation. You can also transport and restore saved virtual disks to other IBM System i servers using File Transfer Protocol (FTP) and tape.

Save Linux data by using i5/OS SAV:

You can save data for a Linux logical partition that uses i5/OS resources by using the Save (SAV) i5/OS CL command.

On i5/OS, your data is in a network-server storage space.

To save data for a Linux logical partition that uses i5/OS resources by using the Save (SAV) i5/OS CL command, follow these steps:

1. At the i5/OS command line, enter the Save (SAV) command.
2. On the Save display, enter the following parameter values:
   a. In the **Device** field, enter the associated i5/OS device description. To save to a save file in a library like QGPL, enter `/qsys.lib/qgpl.lib/myfile.file`. For example, if your tape device is named TAP01, enter `/qsys.lib/tap01.devd`.
   b. In the **Objects: Name** field, enter the integrated-file-system location of the network-server storage space. For example, if your network-server storage space is named TEST1, enter `/qfpnwsstg/test1`.
3. At the i5/OS command line, enter the Display Save File (DSPSAVF) command to verify that the changed save file exists.
4. In the Option field by the new save file name, enter 5 (Display) to display a list of the stream files in the save file.

Restore Linux data using i5/OS RST:

You can restore data for a Linux logical partition that uses i5/OS resources by using the Restore (RST) i5/OS CL command.

Restore (RST) is the i5/OS command to restore Linux files from the shared tape drive of the partition that shares resources. On the Restore Object display, enter the following parameter values:

1. To restore from a tape device, enter the associated i5/OS device description in the **Device** field. For example, if your tape device is named TAP01, enter `/qsys.lib/tap01.devd`.
2. To restore from a save file in library QGPL, enter the associated file name. For example, `/qsys.lib/qgpl.lib/myfile.file`.
3. In the **Objects: Name** field, enter the integrated-file-system location of the network-server storage space. For example, `/qfpnwsstg/test1`.

Backing up the network server description and virtual disk drives associated with a Linux partition:

Learn about how to back up the data for a Linux logical partition that uses i5/OS resources.

Backing up the data for a Linux logical partition that uses i5/OS resources is different from backing up the data for a Linux logical partition that uses its own resources. When you install the logical partitions with virtual disk, the i5/OS logical partition that shares resources creates a network server description and creates disk drives for your Linux logical partition that you need to back up. Some of the disk drives are server-related (the installation and server drives), while others are user-related. Because your Linux logical partition might consider the disk drives to be a unified server, you must save all the disk drives and the network server description so they restore correctly.

The implementation of a logical partition for IBM System i servers allows you to save and restore virtual disks as i5/OS network-server storage space objects. These objects are saved as part of the i5/OS server when you perform a full i5/OS server backup. You can also specifically save the network server description and storage spaces that are associated with a logical partition on an IBM System i server. Daily backup of the server drive is a good practice.

Building a rescue image on a network storage space:

You can build a rescue image on a network storage space (NWSSTG) to assist you in checking and repairing a faulty Linux installation.

A *rescue image* is a disk image that contains the Linux kernel, a shell, and the diagnostic tools, drivers, and other utilities that would be useful for checking and repairing a faulty Linux installation. Many Linux distributors include a rescue image on their installation disks. One rescue solution for a logical partition is to create a small NWSSTG that can remain on the integrated file system solely for the purpose of rescuing logical partitions. You can install a rescue image to the NWSSTG when you create your logical partition.

Before creating a rescue image on network storage, it is important to document the configuration information for each of your logical partitions.

1. Document the drive configuration information, which is located in the /etc/fstab file.
2. Capture the networking information that is reported when you run the **ifconfig** command.
3. Create a list of the modules that are needed by each logical partition. You can see which modules are in use by using the **lsmod** command from within Linux. Use the information obtained from the commands and files listed above to determine which files to store on your rescue network storage space.

To build a rescue image on an NWSSTG, follow these steps:

1. Determine how much network storage space you need to build the rescue image. Consult your Linux documentation to see how much space is required for a minimum installation of your distribution, and add enough space to create a swap partition (a PowerPC Reference Platform (PReP) start partition) and to install any extra software that you would like to have available in your rescue image. For example, if the documentation states that a minimum server installation is 291 MB, create a storage space of 425 MB.
2. Create a network storage space (CRTNWSSTG) of the size you determined for the rescue image. You might want to make a note in the storage space description field that indicates which distribution was used to make the rescue image and warns that it should be saved.
3. Link this storage space to a network server description (NWSD). You do not need to create a new NWSD for this step. You could unlink an existing storage space and temporarily link your rescue storage space to any of your existing NWSDs.
4. Start the installation server for your distribution as described in the documentation and follow the prompts. To partition your installation manually, ensure that you create a PReP start partition. At the point where you select the packages to install, select the minimum number of packages supported. The name for the package group varies by distribution.
5. Allow the installer to complete its package installation and configuration. After installation has finished, the installer starts the rescue image for you.
6. Verify that the rescue image has all the utilities that you need. For a logical partition, at a Linux command prompt, type `rpm -qa | grep ibmsis` to make sure that the utilities that work with the integrated disk are available.
7. Ensure that the device drivers that your logical partitions require are installed. For example, verify that pcnet32 is installed for Ethernet devices, or that olympic is installed for token-ring devices. The kernel modules that have been compiled can be found in the /lib/modules/kernel version/kernel/drivers directory or in directories under that directory.

8. Install any other special drivers or software packages that your logical partitions require.
9. Use File Transfer Protocol (FTP) to send the files with the configuration information for your other logical partitions to the rescue server network storage space.
10. Install the kernel manually (if you are required to do so by your Linux distribution). For details regarding installing the kernel, consult the appropriate installation documentation for your distribution.
11. Make note of the path to the root partition on the rescue-storage space. You must use this information to start the rescue network storage space from the network. To determine the root partition, type the command `cat /etc/fstab`. The partition that has a forward slash (/) in the second column is your root partition. For further assistance in determining the root partition, see the documentation for your distribution.

You can shut down your logical partition by typing `shutdown -h now` and varying off the partition after the shutdown has completed. After the partition has varied off, you can unlink the rescue storage space and relink the normal storage space for the NWSD.

Using a rescue image from a network-server storage space:

You can use a Linux rescue image on a network-server storage space (NWSSTG) to repair a Linux logical partition that uses i5/OS resources. A *rescue image* is a disk image that contains the Linux kernel, a shell, and the diagnostic tools, drivers, and other utilities that would be useful for checking and repairing a faulty Linux installation.

To use the rescue image that you built on the NWSSTG, use the following steps:

1. Disconnect the virtual storage space for the failed logical partition (if applicable) by using the Work with NWS Storage Spaces (WRKNWSSTG) command.
2. Connect your rescue storage space as the first drive to the network server description (NWSD), and reconnect the original storage space (where applicable) as the second drive.
3. Edit the NWSD for the failed partition so that it starts from IPL source *NWSSTG. Also, edit the IPL Parameters field to reflect the root partition on the rescue storage space. For most distributions, this is a parameter such as `root=/dev/sda3` or `root=/dev/vda1`. For assistance, see the documentation for your Linux distribution.
4. Restart the partition.
5. If the existing root partition is on a dedicated disk, you might need to insert the `ibmsis` driver using the `insmod ibmsis` command.
6. Create a mount point to which you will mount the root partition of the network storage space that you are trying to rescue. You can use a command such as `mkdir /mnt/rescue`.
7. Mount the root partition of the network storage space that you are trying to rescue. Mount a drive using the command `mount -t` *`partition-type partition-location mount-point`*, where the partition type is the format of the partition such as ext2 or reiserfs, the partition location is similar to /dev/sdb3 (for non-devfs disk partitions), /dev/sd/disc1/part3 (for devfs disk partitions), or /dev/sda2 (for a partition on a dedicated disk).
8. The drive that you are trying to rescue, when using virtual disk, will be the second drive rather than the first drive. (That is, if the drive was /dev/sda3 when the partition was running normally, it will be /dev/sdb3 in the rescue server.)
9. Use the documentation or the configuration files you created when you created the rescue NWSSTG to help you determine the device for the root of the partition you are trying to rescue. Your mount point will be similar to /mnt/rescue if you use the previous example.

You can either use the rescue tools provided in your rescue storage space against the mount point you have created or you can work on the partition that you are rescuing from within its own storage space. If rescuing the image from its own storage space, change the root directory for that partition using the `chroot` *`mount-point`* command.

Backing up network server descriptions for a Linux partition:

When you save the storage space objects that are associated with a logical partition that uses virtual disks, you must also save the network server description (NWSD). Otherwise, a logical partition might not be able to re-establish items such as the file-system permissions for the partition.

Use the Save Configuration (SAVCFG) command to save the network server description:

1. On the i5/OS command line, type `SAVCFG`.
2. Press Enter to save the NWSD configuration.

The Save Configuration command (SAVCFG) saves the objects associated with an NWSD and the current static network-server storage spaces. This command does not save the links associated with the dynamically added storage spaces. You must add these links manually after the configuration and the dynamically linked storage spaces have been restored.

Restoring network-server descriptions for a Linux partition:

In a disaster-recovery situation, you would restore all the configuration objects, which include the network-server description (NWSD) for your logical partition. In some situations, you must specifically restore the NWSD. For example, you must restore the NWSD when you migrate to new hardware.

To have i5/OS automatically relink disk drives within the integrated file system to the restored NWSD, restore those disk drives first.

To restore the NWSD, use the Restore Configuration (RSTCFG) command:

1. On an i5/OS command line, type `RSTCFG` and press F4 (Prompt).
2. In the **Objects** field, specify the name of the NWSD.
3. In the **Device** field, specify which device you are using to restore the NWSD. If you are restoring from media, specify the device name. If you are restoring from a save file, specify *SAVF and identify the name and library for the save file in the appropriate fields.
4. Press Enter to restore the NWSD.
5. When you have restored the NWSD and all of its associated storage spaces, start (vary on) the logical partition.

Troubleshooting errors for Linux partitions using i5/OS virtual I/O resources:

In many cases, you can troubleshoot and resolve errors specific to Linux logical partitions using i5/OS virtual I/O resources without having to call service and support.

Debugging network server description error messages:

This topic provides a list of network server description (NWSD) error codes and explanations to help you debug NWSD error messages for Linux logical partitions.

You could encounter error messages when you try to vary on a Linux logical partition. These error messages will appear if you provide information when you create your network server description (NWSD) that does not apply to a logical partition running on the server. All error messages related to the NWSD should appear in QSYSOPR indicating a description of the problem and a resolution to the problem.

Table 8. NWSD error messages

Reason codes	Code explanations
00000001	*NWSSTG was specified as the IPL source, but no storage space was found.

Table 8. NWSD error messages (continued)

Reason codes	Code explanations
00000002	The partition specified in the PARTITION parameter was not found. Use the CHGNWSD i5/OS Control Language (CL) command to compare the partition name in the NWSD with the partition name created on the Hardware Management Console (HMC), and change the partition name as necessary.
00000003	The partition specified in the PARTITION parameter is not a GUEST partition (that is, the TYPE parameter for the partition specified in the PARTITION parameter does not have a value of *GUEST).
00000004	There is already an NWSD in the i5/OS partition that is active and using the partition specified in the PARTITION parameter of the NWSD.
00000005	The partition specified in the PARTITION parameter of the NWSD is powered on (perhaps through the LPAR configuration interface or from another i5/OS partition.)
00000006	The partition is set to start from a stream file (stmf) and that did not work. You should note that the user performing the vary on operation needs read access to the IPL STMF parameter.
00000007	The NWSD is set to start from a network-storage space (NWSSTG), but the kernel could not found the NWSSTG. Some common reasons are that the storage space does not have a disk partition that is formatted as type 0x41 or is marked as startable.
00000008	The partition would not start. There are a variety of reasons why the partition will not start. You should look at the information for this partition and start reviewing the SRCs.
00000009	The partition identified as the logical partition is not configured. You should specify who has power controlling access to the partition.
00000010	A network server storage space linked to this network server is damaged. Contact your next level of support.
00000011	Contact your next level of support to find a proper solution to the problem.
00000012	The resource name you selected in the RSRCNAME parameter is not valid. Use the Work with Hardware Resources (WRKHDWRSC) command with the TYPE(*CMN) parameter to help determine the resource name.
00000013	The resource you selected in the RSRCNAME command exists, but is not in the partition you specified. Use the WRKHDWRSC command with the TYPE(*CMN) parameter to help determine a resource name in the partition you specified.
00000014	Unable to determine partition for resource name. Either specify a partition directly or update the resource definition at the HMC to indicate the client partition.
00000015	Unknown error occurred. Contact your next level of support.

Troubleshooting Linux virtual tape errors:

You can troubleshoot and recover from many common Linux virtual tape errors without having to call service and support.

If errors occur while you access Linux virtual tape, examine the file /proc/iSeries/viotape. It describes the mapping between i5/OS device names and Linux device names and records the last error for each tape device.

Table 9. Common errors and recovery scenarios for troubleshooting Linux virtual tape

Error	Recovery scenario
Device unavailable	Make sure the device is varied off in the i5/OS logical partition.
Not ready	Retry the operation. If the operation still fails with the same description in /proc/iSeries/viotape, verify that the correct medium is in the tape drive.
Load failure or cleaning cartridge found	Verify that the correct medium is in the tape drive.
Data check or Equipment check	Verify that you are using a supported block size to read or write the tape. All known IBM -supported tape devices can use a block size of 20 KB (supplied by the -b 40 argument to tar).
Internal error	Contact your service representative.

Application support

Learn how to integrate Linux with i5/OS applications and data.

Samba support with i5/OS Netserver:

Learn about Linux integration with i5/OS applications.

Server Message Block (SMB) is a file-sharing protocol that is commonly used by Windows PCs. Whenever a network drive is mapped from a Windows PC to another Windows PC, the SMB TCP/IP protocol is being used.

Samba implements the SMB/CIFS standard on UNIX® operating systems. This protocol enables file sharing among SMB-enabled operating systems, including i5/OS with NetServer.

Samba allows Linux PCs and servers to interact with existing Windows PCs and file servers without requiring any additional software. i5/OS Netserver supports Linux Samba clients.

You can use a Samba server to run printers and authenticate users, share files, and directories, just like Microsoft® Windows. Samba can also act as a Primary Domain Controller (PDC) or as a Backup Domain Controller (BDC) in your Windows network. You can use it to run OpenLDAP and add LDAP function to your Windows Network without the expense. You can use Samba and NetServer to share printers and files on IBM Systems or eServer Linux partitions.

Accessing i5/OS data using Linux ODBC driver:

The IBM eServer i5 Open Database Connectivity (ODBC) Driver for Linux allows you to access the IBM eServer i5 database data from Linux applications written to the ODBC API. It is based on the ODBC driver in the IBM eServer i5 Access Express for Windows product.

Refer to Linux for iSeries for more information on using the Linux ODBC driver.

Related information

Linux for iSeries Web site

Scenarios: Logical partitions

One of the best ways to learn about logical partitions is to see examples illustrating how many of the applications and functions can be used in a sample business environment. Use these scenarios to learn about how you can use logical partitions in your business.

Scenario: Creating a logical partition using version 7 or later of the HMC

You can create a logical partition that acts as a virtual server on your managed system using version 7 or later of the HMC. When you create the logical partition, you specify the resources that the logical partition uses in a partition profile.

Situation

As the system administrator of a medium-sized technology company, you are responsible for configuring and managing the server that your company just purchased. Your server has arrived and you are ready to start partitioning your model.

Objectives

The objective of this scenario is to create a logical partition and partition profile on a new server.

Prerequisites and assumptions

This scenario assumes that the following prerequisite steps have been completed and are operational prior to beginning the configuration steps:

1. The Hardware Management Console (HMC) was set up and version 7 or later of the HMC software was installed.
   - The HMC was cabled. For more information about cabling the HMC, see Cabling the HMC.
   - You completed the planning process and you understood how you wanted to configure your HMC. For more information about configuring your HMC, see Gathering required configuration settings.
   - You used the Guided Setup wizard or the HMC configuration checklist to set up the HMC. For more information about the Guided Setup wizard, see Configuring the HMC using the Guided Setup wizard. For more information about the HMC configuration checklist, see Configuring the HMC using the HMC configuration checklist.
2. You read and understand the HMC concepts. For more information about HMC concepts, see Concepts for partitioning the server.
3. You completed the tasks recommended for logical partition planning. For more information about logical partition planning, see Planning for logical partitions.
4. You removed the system from the manufacturing default configuration and moved the physical hardware to support a partitioned configuration. For more information about how to prepare your system for partitioning, see Partitioning a new or nonpartitioned managed system using version 7 or later of the HMC.
5. You logged into the HMC with one of the following user roles:
   - Super administrator
   - Operator

   For more information about user roles, see Tasks and roles in the *Operations Guide for the Hardware Management Console and its Managed Systems*.

Configuration steps

Ensure that all the prerequisites for this scenario have been completed prior to completing these tasks.

To create a new logical partition on your server using the HMC, follow these steps:

1. In the navigation pane, open **Systems Management** and click **Servers**.
2. In the contents pane, select the managed system, click the **Tasks** button, and choose **Configuration** → **Create Logical Partitions**.
3. Follow the steps in the Create Logical Partition wizard to create a logical partition and a partition profile.

Scenario: Using partition profiles with version 7 or later of the HMC

As you will see, partition profiles allow you to change the hardware configuration of a logical partition.

Situation

You are the system administrator for a business recovery service center. You use your server primarily to test disaster-recovery strategies for your clients. Each of your clients has a different system configuration. This means that, each time a client comes into the office, you must change the system configuration of your managed system.

On each logical partition on your server, you create one profile for each client that uses the logical partition. When a client returns to the business recovery service center, you can reconfigure the managed system for that client simply by activating the partition profiles for that client.

You have just finished testing for Client 1. You must now reconfigure the server for Client 2, who comes into the office tomorrow.

Note: This is one example of how to change your system configuration. Depending on your operating system, business needs, and resource allocation, you could resolve this situation by dynamically moving resources.

Objectives

The objective of this scenario is to change the configuration of your managed system by using partition profiles.

Details

Your managed system has three logical partitions. The managed system has eight processors and 12 GB of memory. Each logical partition has one or two partition profiles. The following table illustrates how the logical partitions and partition profiles are set up.

Logical partition ID	Name of logical partition	Name of partition profile	Processor resources	Memory resources
Partition 1	Test 1	Profile 1: Client 1	5 dedicated processors	8 GB
		Profile 2: Client 2	7 dedicated processors	10 GB
Partition 2	Test 2	Profile 1: Client 1	2 dedicated processors	3 GB
		Profile 2: Client 2	1 dedicated processor	2 GB
Partition 3	Test 3	Profile 1: Client 1	1 dedicated processor	1 GB

Prerequisites and assumptions

This scenario assumes that the following prerequisite steps have been completed prior to beginning the configuration steps:

1. The Hardware Management Console (HMC) was set up and version 7 or later of the HMC software was installed.
   - The HMC was cabled. For more information about cabling the HMC, see Cabling the HMC.
   - You completed the planning process and you understood how you wanted to configure your HMC. For more information about configuring your HMC, see Gathering required configuration settings.

- You used the Guided Setup wizard or the HMC configuration checklist to set up the HMC. For more information about the Guided Setup wizard, see Configuring the HMC using the Guided Setup wizard. For more information about the HMC configuration checklist, see Configuring the HMC using the HMC configuration checklist.

2. You read and understand the HMC concepts. For more information about HMC concepts, see Concepts for partitioning the server.
3. You completed the tasks recommended for logical partition planning.
4. You moved and assigned the physical hardware according to the System Planning Tool (SPT) output. For more information about the SPT, see System Planning Tool.
5. You logged in to the HMC with one of the following user roles:
   - Super administrator
   - Service representative
   - Product engineer
6. You created the logical partitions and partition profiles.
7. You activated the partition profiles for Client 1.

The following table lists the partition profiles that are currently active for each logical partition on the managed system.

Logical partition ID	Name of logical partition	Name of partition profile	Processor resources	Memory resources
Partition 1	Test 1	Profile 1: Client 1	5 dedicated processors	8 GB
Partition 2	Test 2	Profile 1: Client 1	2 dedicated processors	3 GB
Partition 3	Test 3	Profile 1: Client 1	1 dedicated processor	1 GB

Configuration steps

To change the configuration of your managed system so that it is ready for Client 2, you must first shut down the logical partitions by using usual operating system procedures.

After shutting down the logical partitions, you can activate the partition profiles for Client 2. To do this, complete the following steps on your HMC:

1. In the navigation pane, open **Systems Management**, open **Servers**, and click the system on which the Test 1 logical partition is located.
2. In the contents pane, select the Test 1 logical partition, click the **Tasks** button, and choose **Operations** → **Activate**.
3. Select the Profile 2 partition profile and click **OK**.
4. In the contents pane, select the Test 2 logical partition, click the **Tasks** button, and choose **Operations** → **Activate**.
5. Select the Profile 2 partition profile and click **OK**.

After activating the partition profile, the managed system is configured according to the needs of Client 2. The following table lists the partition profiles that are currently active for each logical partition on the managed system.

Logical partition ID	Name of logical partition	Name of partition profile	Processor resources	Memory resources
Partition 1	Test 1	Profile 2: Client 2	7 dedicated processors	10 GB

Logical partition ID	Name of logical partition	Name of partition profile	Processor resources	Memory resources
Partition 2	Test 2	Profile 2: Client 2	1 dedicated processor	2 GB

Scenario: Using system profiles with version 7 or later of the HMC

As you will see, system profiles allow you to change the hardware configuration of an entire managed system quickly and easily.

Situation

You are the system administrator for a business recovery service center. You use your server primarily to test disaster-recovery strategies for your clients. Each of your clients has a different system configuration. This means that, each time a client comes in, you must change the system configuration of your managed system.

You decide to create and use system profiles to change the system configuration of your managed system. First, on each logical partition on your server, you create a partition profile for each client that uses the logical partition. Then, you create a system profile for each client. Each system profile contains the partition profiles that you want to activate for the client. When a client returns to the business recovery service center, you can reconfigure the managed system for that client simply by activating the system profile for that client.

You have just finished testing for Client 1. You must now reconfigure the managed system for Client 2, who comes in tomorrow.

Note: This is one example of how to change your system configuration. Depending on your operating system, business needs, and resource allocation, you could resolve this situation by dynamically moving resources.

Objectives

The objective of this scenario is to change the configuration of your managed system by using system profiles.

Details

Your managed system has eight processors and 12 GB of memory. You have created two system profiles on this managed system. Each system profile divides the resources of the managed system between two or three logical partitions.

The following table shows how the system profiles are set up:

System Profile	Logical partition ID	Name of logical partition	Name of partition profile	Processor resources	Memory resources
Client 1	Partition 1	Test 1	Profile 1: Client 1	5 dedicated processors	8 GB
	Partition 2	Test 2	Profile 1: Client 1	2 dedicated processors	3 GB
	Partition 3	Test 3	Profile 1: Client 1	1 dedicated processor	1 GB

System Profile	Logical partition ID	Name of logical partition	Name of partition profile	Processor resources	Memory resources
Client 2	Partition 1	Test 1	Profile 2: Client 2	7 dedicated processors	10 GB
	Partition 2	Test 2	Profile 2: Client 2	1 dedicated processor	2 GB

Prerequisites and assumptions

This scenario assumes that the following prerequisite steps have been completed prior to beginning the configuration steps:

1. The Hardware Management Console (HMC) was set up.
   - The HMC was cabled.
   - You completed the planning process and you understand how you want to configure your HMC.
   - You used the Guided Setup wizard or the HMC configuration checklist to set up the HMC.
2. You understand the concepts for partitioning the server.
3. You completed the tasks recommended for logical partition planning.
4. You moved and assigned the physical hardware according to the System Planning Tool (SPT) output. For more information about the SPT, see System Planning Tool.
5. You logged in to the HMC with one of the following user roles:
   - Super administrator
   - Service representative
   - Product engineer
6. You created the logical partitions, partition profiles, and system profiles described.
7. You activated the system profile for Client 1.

The following table lists the system profile that is currently active on the managed system.

System Profile	Logical partition ID	Name of logical partition	Name of partition profile	Processor resources	Memory resources
Client 1	Partition 1	Test 1	Profile 1: Client 1	5 dedicated processors	8 GB
	Partition 2	Test 2	Profile 1: Client 1	2 dedicated processors	3 GB
	Partition 3	Test 3	Profile 1: Client 1	1 dedicated processor	1 GB

Configuration steps

To change the configuration of your managed system so that it is ready for Client 2, you must first shut down the logical partitions by using usual operating system procedures.

After shutting down the logical partitions, you can activate the system profile for Client 2. To do this, complete the following steps on your HMC:

1. In the navigation pane, open **Systems Management** and click **Servers**.
2. In the contents pane, select the managed system, click the **Tasks** button, and choose **Configuration** → **Manage System Profiles**.
3. Select the Client 2 system profile and click **Activate**.
4. Select the desired activation settings for the system profile and click **Continue**.

After activating the system profile, the managed system is configured according to the needs of Client 2. The following table lists the system profile that is currently active on the managed system.

System Profile	Logical partition ID	Name logical partition	Name of partition profile	Processor resources	Memory resources
Client 2	Partition 1	Test 1	Profile 2: Client 2	7 dedicated processors	10 GB
	Partition 2	Test 2	Profile 2: Client 2	1 dedicated processor	2 GB

Scenario: Dynamically moving processors and memory resources using version 7 or later of the HMC

You can use dynamic logical partitioning to move processor and memory resources between logical partitions. This allows you to maximize resource utilization on your managed system by moving resources to wherever the resources are needed.

Situation

You are the system administrator for a business recovery service center with IBM Systems hardware. You use IBM Systems hardware primarily to test disaster recovery strategies for your clients. Each of your clients has a different system configuration. This means that, each time a client comes in, you must change the system configuration of your managed system.

To change the system configuration of your managed system, you decide to use dynamic logical partitioning. Whenever you need to move resources from one logical partition to another, you move the resources directly between the logical partitions without shutting down the logical partitions.

You have just finished testing for Client 1. You must now reconfigure the logical partitions for Client 2, who comes in tomorrow.

Note: This is one example of how to change your system configuration. Depending on your operating system, business needs, and resource allocation, you could resolve this situation using partition profiles or system profiles.

Objectives

The objective of this scenario is to change the configuration of the logical partitions by dynamically moving resources.

Details

Your managed system has two logical partitions. It has eight processors and 12 GB of memory. The following table shows the system configuration required for client 1.

Client	Logical partition ID	Name of logical partition	Processor resources	Memory resources
Client 1	Partition 1	Test 1	5 dedicated processors	8 GB
	Partition 2	Test 2	3 dedicated processors	4 GB

The following table shows the system configuration required for client 2.

Client	Logical partition ID	Name of logical partition	Processor resources	Memory resources
Client 2	Partition 1	Test 1	7 dedicated processors	10 GB
	Partition 2	Test 2	1 dedicated processor	2 GB

Prerequisites and assumptions

This scenario assumes that the following prerequisite steps have been completed and are operational prior to beginning the configuration steps:

1. The Hardware Management Console (HMC) was set up.
   - The HMC was cabled. For more information about cabling the HMC, see Cabling the HMC.
   - You completed the planning process and you understood how you wanted to configure your HMC. For more information about configuring your HMC, see Gathering required configuration settings.
   - You used the Guided Setup wizard or the HMC configuration checklist to set up the HMC. For more information about the Guided Setup wizard, see Configuring the HMC using the Guided Setup wizard. For more information about the HMC configuration checklist, see Configuring the HMC using the HMC configuration checklist.
2. You read and understand the HMC concepts. For more information about HMC concepts, see Concepts for partitioning the server.
3. You completed the tasks recommended for logical partition planning.
4. You removed the system from the manufacturing default configuration and moved the physical hardware to support a partitioned configuration. For more information about how to prepare your system for partitioning, see Partitioning a new or nonpartitioned managed system using the HMC.
5. You logged in to the HMC with one of the following user roles:
   - Super administrator
   - Service representative
   - Product engineer

   For more information about user roles, see Tasks and roles in the *Operations Guide for the Hardware Management Console and its Managed Systems*.
6. You created the logical partitions and partition profiles.
7. The managed system is configured for Client 1.

The following table displays the current configuration of each logical partition on the managed system.

Logical partition ID	Name of logical partition	Name of partition profile	Processor resources	Memory resources
Partition 1	Test 1	Profile 1	5 dedicated processors	8 GB
Partition 2	Test 2	Profile 1	2 dedicated processors	4 GB

Configuration steps

To change the configuration of your managed system so that it is ready for Client 2, you must complete the following:

- Move two dedicated processors from the logical partition Test 2 to the logical partition Test 1.
- Move 2 GB of memory from the logical partition Test 2 to the logical partition Test 1.

To move two dedicated processors from one logical partition to another, complete the following steps on your HMC.

1. In the navigation pane of the HMC, open **Systems Management**, open **Servers**, and click the managed system on which the Test2 logical partition is located.
2. In the contents pane, select the Test2 logical partition, click the **Tasks** button, and select **Dynamic Logical Partitioning → Processor → Move**.
3. Specify two processors in the **To move** column, select the Test 1 logical partition in **Select Destination Partition**, and click **OK**.

To move two memory units from one logical partition to another, complete the following steps on your HMC:

1. In the contents pane, select the Test2 logical partition, click the **Tasks** button, and select **Dynamic Logical Partitioning → Memory → Move**.
2. Specify 2 GB in the **Memory To Move** row, select the Test 1 logical partition in **Select Destination Partition**, and click **OK**.

When this is completed, the managed system is configured according to the needs of Client 2. The following table displays the current configuration of each logical partition on the managed system.

Logical partition ID	Name of logical partition	Name of partition profile	Processor resources	Memory resources
Partition 1	Test 1	Profile 1	7 dedicated processors	10 GB
Partition 2	Test 2	Profile 1	1 dedicated processor	2 GB

Scenario: Dynamically moving desired I/O devices using version 7 or later of the HMC

You can move infrequently used I/O devices such as optical disc drives dynamically from one logical partition to another using version 7 or later of the HMC. This allows you to share the single I/O device among many logical partitions.

Situation

You are the system administrator for a business recovery service center. You use your managed system to test disaster recovery strategies for your clients. The managed system has only one CD drive and one tape drive, which are to be shared among all the logical partitions in the managed system.

The CD drive and tape drive can be used by only one logical partition at a time. When you are recovering a managed system with two logical partitions, you must move the CD drive and tape drive between the two logical partitions.

You have just finished using the CD drive and tape drive to recover logical partition Test 1. You now need to move the CD drive and tape drive to logical partition Test 2 so that you can begin recovery procedures for that logical partition.

Note: This is one example of how to change your system configuration. Depending on your operating system, business needs, and resource allocation, you could resolve this situation using partition profiles.

Objectives

The objective of this scenario is to move I/O devices from one logical partition to another by dynamically moving desired I/O devices.

Prerequisites and assumptions

This scenario assumes that the following prerequisite steps have been completed and are operational prior to beginning the configuration steps:

1. The Hardware Management Console (HMC) was set up.
   - The HMC was cabled. For more information about cabling the HMC, see Cabling the HMC.
   - You completed the planning process and you understood how you wanted to configure your HMC. For more information about configuring your HMC, see Gathering required configuration settings.
   - You used the Guided Setup wizard or the HMC configuration checklist to set up the HMC. For more information about the Guided Setup wizard, see Configuring the HMC using the Guided Setup wizard. For more information about the HMC configuration checklist, see Configuring the HMC using the HMC configuration checklist.
2. You read and understand the HMC concepts. For more information about HMC concepts, see Concepts for partitioning the server.
3. You completed the tasks recommended for logical partition planning. For more information about logical partition planning, see Planning for logical partitions.
4. You removed the system from the manufacturing default configuration and moved the physical hardware to support a partitioned configuration. For more information about how to prepare your system for partitioning, see Partitioning a new or nonpartitioned managed system using the HMC.
5. You logged in to the HMC with one of the following user roles:
   - Super administrator
   - Service representative
   - Product engineer

   For more information about user roles, see Tasks and roles in the *Operations Guide for the Hardware Management Console and its Managed Systems*.
6. You created the logical partitions and partition profiles.
7. The CD drive and tape drive are currently selected as desired I/O resources for both logical partition Test 1 and logical partition Test 2.
8. The CD drive and tape drive are varied off.

Configuration steps

To move the CD drive and tape drive from one logical partition to another, complete the following steps on your HMC.

1. In the navigation pane of the HMC, open **Systems Management**, open **Servers**, and click the managed system on which the Test 1 logical partition is located.
2. In the contents pane, select the Test 1 logical partition, click the **Tasks** button, and select **Dynamic Logical Partitioning** → **Physical Adapter** → **Move**.
3. Select the CD drive and the tape drive, select the Test 2 logical partition in the **Move To** area, and click **OK**.

When this is completed, the CD drive and tape drive belong to the Test 2 logical partition. You can now begin recovery procedures for the Test 2 logical partition using the CD drive and tape drive.

Scenario: Capacity on Demand for Linux

Learn the steps of planning, ordering, and using Capacity on Demand for Linux logical partitions on IBM Systems and eServer hardware.

Note: Capacity on Demand is not available on all hardware models.

Capacity on Demand allows customers to activate inactive processors as their workload requires. The following scenario walks through the steps of planning for, ordering, and using this feature.

Situation

A server is operating with eight active processors and four inactive processors. As the server workload grows, the available processor resource utilization consistently approaches or exceeds 70% of the available capacity. Anticipating the need for additional resources, the system administrator decides to consider activating some of the inactive processors.

Objectives

The objectives of this scenario are as follows:

- To test the effectiveness of increasing the number of available processors
- To increase the number of processors (if that change will improve performance)

Capacity on Demand preparation and activation

The system administrator completes the following steps to prepare and configure the server for Capacity on Demand:

1. Before activating any processors, the system administrator prepares the server for Capacity on Demand. This task involves performing a trend analysis to learn how many additional processors will be required, preparing the server to activate additional processors, and preparing to order the new capacity.
2. To investigate the benefits of activating the additional processors, the system administrator decides to activate the processors for a trial period. The trial period lasts 14 days.
3. After deciding that the performance improvement gained by activating the additional processors warrants purchasing the processors permanently, the system administrator contacts the IBM marketing representative or IBM Business Partner, or visits http://www.ibm.com to place an order for four processor activation features.
4. The IBM marketing representative places the order in the IBM configurator and receives a reminder to send the vital product data (VPD) from the server with the order. The VPD can be faxed to IBM or sent electronically with the Electronic Service Agent™. (The Electronic Service Agent is located on your HMC and is designed to monitor events and to transmit server inventory information to IBM on a periodic, customer-definable timetable.)
5. The system administrator retrieves the activation codes from the Web and activates the permanent capacity. This task involves entering the activation code on the target server and assigning the processors to a logical partition.

The server now has all eight processors available for use.

For more information, refer to Working with Capacity on Demand.

Related information

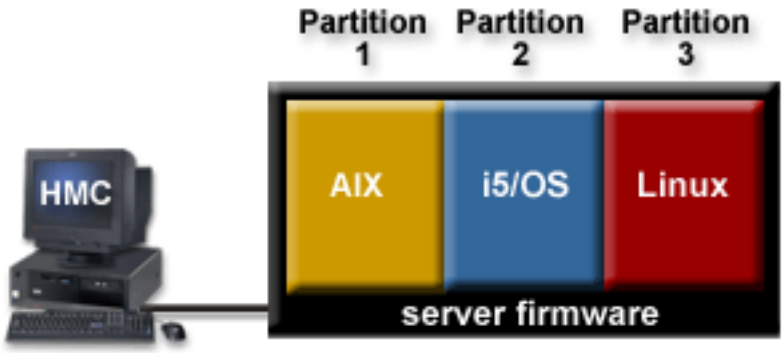
Preparing for Capacity on Demand

Activating Capacity Upgrade on Demand

Working with Capacity Upgrade on Demand

Partitioning with version 6 or earlier of the HMC

The *Hardware Management Console (HMC)* is a system that controls managed systems, including the management of logical partitions and use of Capacity Upgrade on Demand. Using service applications, the HMC communicates with managed systems to detect, consolidate, and send information to IBM for analysis.



In this figure, you can see the logical partitions and the server firmware on the IBM Systems and eServer hardware. The *server firmware* is code that is stored in flash memory on the server. The server firmware directly controls the resource allocations on the server and the communications between logical partitions on the server. The HMC connects with the server firmware and specifies how the server firmware allocates resources on the server.

If you use a single HMC to manage a server, and the HMC malfunctions or becomes disconnected from the server firmware, then the server continues to run, but you will not be able to change the logical partition configuration of the server. If desired, you can attach an additional HMC to act as a backup and to provide a redundant path between the server and IBM service and support.

When you configure logical partitions using the HMC, you must create at least one partition profile for each logical partition. A *partition profile* is a record on the HMC that specifies a resource configuration and activation state for the logical partition. Each logical partition has a default partition profile. If desired, you can create additional partition profiles with different resource configurations. When you activate a logical partition using the HMC, you choose a partition profile, and the server firmware starts the logical partition according to the specifications contained in the selected partition profile. For more information on partition profiles, see Partition profiles.

To simplify the process of starting an entire system configuration, you can create system profiles. A *system profile* is a record on the HMC that contains an ordered list of partition profiles. When you activate a system profile from the HMC, the server firmware activates the partition profiles in the system profile in the order in which the partition profiles are listed. For more information on system profiles, see System profiles.

The HMC also provides terminal and 5250 console emulation for the logical partitions on your managed system. You can connect to logical partitions from the HMC itself, or you can set up the HMC so that you can connect to logical partitions remotely through the HMC. HMC terminal and 5250 console emulation provides a dependable connection that you can use if no other terminal or console device is connected or operational. HMC terminal and 5250 console emulation is particularly useful during initial system setup, before you have configured your terminal or console of choice.

Partitioning using the HMC is supported on all IBM System i5 and eServer i5 and IBM System p5 and eServer p5 server models, although some models require you to enter an Advanced POWER Virtualization Technologies enablement code before partitioning the server.

Partitioning a new or nonpartitioned server

Use these procedures partition your new or nonpartitioned server using the Hardware Management Console (HMC).

When you receive your managed system from your service provider, the managed system is in what is known as the manufacturing default configuration. You can install an operating system on the managed system and use the managed system in a nonpartitioned configuration. However, if you want to create logical partitions on the managed system, you must develop a partition plan for the managed system, validate the hardware on the managed system, move the hardware according to your partition plan, and create the logical partitions using the HMC.

The procedure used to create logical partitions from the manufacturing default configuration or the nonpartitioned configuration varies by server type.

Related concepts

"Manufacturing default configuration" on page 18
The manufacturing default configuration is the initial partition setup of the managed system as received from your service provider.

Partitioning a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 6 or earlier of the HMC

Use this procedure to partition a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 6 or earlier of the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system, create the logical partitions on the managed system, and designate the service partition for the managed system.

Use this procedure in the following cases:

- You have just received your managed system and want to partition the managed system immediately.
- You have used the managed system as a nonpartitioned server, and now want to partition the managed system.

If you want to create a new logical partition on a managed system that has already been partitioned, then you do not need to perform all of the steps in this procedure. For more information on creating a new logical partition on a managed system that has already been partitioned, see Creating logical partitions using version 6 or earlier of the HMC.

Before you begin, complete the following tasks:

- Use the System Planning Tool (SPT) to ensure that your hardware configuration supports your desired logical partition configuration.
- If necessary, install additional hardware resources on your managed system to support the partition plan specified by the SPT.
- Set up the HMC to manage your logical partition and the managed system. For information on how to set up the HMC, see Setting up the HMC.
- If you have used the managed system prior to partitioning, back up all data on the managed system.

To partition a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 6 or earlier of the HMC, you must be a super administrator or operator on the HMC. For more information about user roles, refer to Tasks and roles.

To partition a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 6 or earlier of the HMC, complete the following steps:

1. Ensure that the managed system is in a state of **Standby** or **Operating**. Complete the following:
   a. In the navigation area of the HMC, open the object with the same name as your HMC, open **Server and Partition**, and select **Server Management**.
   b. Find the state of the managed system as displayed in the contents area under the **State** heading.
   c. If the managed system is in a **Power off** state, right-click the managed system, choose **Power On**, select the power-on mode of **Partition Standby**, click **OK**, and wait until the contents area displays a **Standby** state for the managed system.

If the managed system does not display in the contents area, or if the managed system is in any state other than **Standby** or **Operating**, you must fix the problem before continuing. For more information on correcting the operating state of the managed system, see Correcting the managed system operating state.

2. Verify that a single logical partition exists on the managed system. When you connect a new or nonpartitioned managed system to an HMC, a single logical partition displays in the HMC user interface. All system resources belong to this logical partition. In this procedure, you will use this logical partition to validate the hardware on the managed system. After you validate the hardware on the managed system, you will delete this logical partition and create the logical partitions according to your logical partition plan.
   a. In the contents area of the HMC, open the managed system.
   b. Open **Partitions**. The logical partition displays as an object under **Partitions**. The name of this logical partition will be the serial number of the managed system, and the logical partition will have one partition profile called `default`.

   If the logical partition that is described in this step exists, continue to step 4. Otherwise, continue to step 3 to reset the managed system.
3. Reset the managed system so that a single logical partition exists on the managed system. Complete the following *at your HMC* (not using a remote client such as Web-based System Manager) to create this logical partition on your managed system:
   a. Ensure that the hardware placement in the managed system supports the manufacturing default configuration. If the hardware placement in the managed system does not support the manufacturing default configuration, you must move the hardware so that the hardware placement supports the manufacturing default configuration. For more information on placing the hardware in your managed system to support the manufacturing default configuration, contact your marketing representative or business partner.
   b. If necessary, move the hardware in the managed system to support the manufacturing default configuration, according to instructions from service and support.
   c. In the contents area, right-click the managed system.
   d. From the menu, click **Profile Data** → **Initialize** and click **Yes**.
   e. Right-click your HMC desktop (outside of any of the displayed windows) and click **Terminal** → **rshterm**. The Restricted shell command-line interface displays.
   f. Type: `lpcfgop -m` *`managed_system_name`* `-o clear`. *managed_system_name* is the name of managed system as it displays in the content area.
   g. Enter 1 to confirm. This step will take several seconds to complete.
4. Ensure that the contents area displays a state of **Not Activated** for the logical partition. If the logical partition is in a **Running** state, shut down the logical partition by completing the following:
   a. Right-click the managed system in the contents area.
   b. Click **Properties**.
   c. Ensure that **Power off the system after all the logical partitions are powered off** is cleared.
   d. Click **OK**.
   e. Shut down the logical partition using operating system procedures. For more information on shutting down logical partitions using operating system procedures, see Shutting down i5/OS logical partitions.

   If the logical partition is in an **Error** state, complete the following:
   a. Right-click the logical partition and choose **Properties**.
   b. Click the **Reference Code** tab and use the reference codes displayed on the **Reference Code** tab to diagnose and fix the problem. For more information on using reference codes to diagnose and fix problems, see Reference codes list for customers.
5. Identify (or tag) the load source device, alternate restart device, and console device to use for system setup. Identify the HMC as the console device for system setup, regardless of the types of console

device that you ultimately plan to use for the logical partitions on your system. The HMC provides the easiest, most reliable method to access a console session during system setup. When you create your logical partitions, you can specify the console of your choice for each logical partition. Also, when you select the load source device and alternate restart device, select the devices that will be used by the first i5/OS logical partition in your SPT plan. To identify the devices to use for system setup, complete the following:

a. Open the logical partition, right-click on the `default` partition profile, and choose **Properties**.
b. Click the **Tagged I/O** tab.
c. Under **Load source**, click **Select**.
d. Open the unit and bus in which the load source I/O Adapter (IOA) or the load source I/O Processor (IOP) is installed, select the slot in which the load source IOA or IOP is installed, and click **Select**.
e. Click **OK**.
f. Under **Alternate restart device**, click **Select**.
g. Open the unit and bus in which the alternate restart device IOA or IOP is installed, select the slot in which the alternate restart device IOA or IOP is installed, and click **Select**.
h. Click **OK**.
i. Select **Use HMC console** and click **OK**.

6. If Licensed Internal Code was not preinstalled on the server, or if you want to install Licensed Internal Code yourself, then install Licensed Internal Code at this time. For more information on installing Licensed Internal code, see Installing Licensed Internal Code on the new logical partition. When the Licensed Internal Code installation is complete, continue to step 8.
7. Activate the logical partition:
   a. Right-click the logical partition and click **Activate**.
   b. Click **Advanced**.
   c. Select `Manual` in the **Keylock position** field, select `B: IPL from the second side of the load source` in the **IPL type** field, and click **OK**.
   d. If you are performing this procedure from the HMC, select **Open a terminal window or console session** and click **OK**. If you are performing this procedure remotely, click **OK** and then open an HMC 5250 console session remotely on the logical partition. For more information about opening an HMC 5250 console session remotely, see Connecting to a 5250 console remotely.
   e. Type 1 and press Enter to start a dedicated HMC 5250 console session.
8. Verify that the physical adapters are connected and reporting to the managed system using the Failed and non-reporting hardware resources option in the Hardware Service Manager. Use the Failed and non-reporting hardware resource option to display a list of the logical hardware resources that either failed or did not report to the system at the last IPL.

   Attention: Incorrect use of the Failed and non-reporting hardware resource option can cause damage to data in your system.

   a. In the HMC 5250 console session, type 3 and press Enter to select option 3 [`Use Dedicated Service Tools (DST)`].
   b. Sign onto DST with a valid user ID and password.
   c. Type 7 and press Enter to select option 7 [`Start a service tool`].
   d. Type 4 and press Enter to select option 4 [`Hardware service manager`].
   e. Type 4 and press Enter to select option 4 [`Failed and non-reporting hardware resources`].
   f. Verify that there are no failed or non-reporting resources. If no failed resources or non-reporting resources exist, the informational message `No failed or non-reporting logical hardware resources were found` will appear. If there are failed resources, contact your service provider.

      Note: You can verify only the adapters that are supported by i5/OS. Any adapter that is not supported by i5/OS might have an error of unknown or failed hardware.

g. Press F3 until the Use Dedicated Service Tools (DST) display appears.
h. Type 7 and press Enter to select option 7 [Start a service tool].
i. Type 7 and press Enter to select option 7 [Operator panel functions].
j. Press F10 to power off, press Enter to confirm, close the 5250 console session window, and wait until the logical partition shuts down.

9. If the hardware in the managed system is already in the configuration specified in your SPT configuration plan, then continue to step 15 on page 135.
10. Power off the managed system using your HMC.
    a. In the navigation area of your HMC, open **Server and Partition**.
    b. Select **Server Management**.
    c. In the contents area, right-click the managed system that you are partitioning and choose **Power Off**.
    d. Select the **Normal power off** option and click **OK**.
11. Move the hardware in the managed system according to your SPT configuration plan.
12. Power on the managed system to the **Standby** state using your HMC.
    a. In the navigation area of your HMC, open **Server and Partition**.
    b. Select **Server Management**.
    c. In the contents area, right-click the managed system that you are partitioning and choose **Power On**.
    d. Select **Partition standby** as the power-on mode and click **OK**.
13. Activate the logical partition:
    a. Right-click the logical partition and click **Activate**.
    b. Click **Advanced**.
    c. Select Manual in the **Keylock position** field, select B: IPL from the second side of the load source in the **IPL type** field, and click **OK**.
    d. If you are performing this procedure from the HMC, select **Open a terminal window or console session** and click **OK**. If you are performing this procedure remotely, click **OK** and then open an HMC 5250 console session remotely on the logical partition. For more information on opening an HMC 5250 console session remotely, see Connecting to a 5250 console remotely.
    e. Type 1 and press Enter to start a dedicated HMC 5250 console session.
14. Verify that the physical adapters are connected and reporting to the managed system using the Failed and non-reporting hardware resources option in the Hardware Service Manager.

    Attention: Incorrect use of the Failed and non-reporting hardware resource option can cause damage to data in your system.
    a. Type 3 and press Enter to select option 3 [Use Dedicated Service Tools (DST)].
    b. Sign onto DST with a valid user ID and password.
    c. Type 7 and press Enter to select option 7 [Start a service tool].
    d. Type 4 and press Enter to select option 4 [Hardware service manager].
    e. Type 4 and press Enter to select option 4 [Failed and non-reporting hardware resources].
    f. Verify that there are no failed or non-reporting hardware resources. If no failed or non-reporting hardware resources exist, the informational message No failed or non-reporting logical hardware resources were found will appear. If there are failed resources, contact your service provider.

       Note: You can verify only the adapters that are supported by i5/OS. Any adapter that is not supported by i5/OS might have an error of unknown or failed hardware.
    g. Press F3 until the **Use Dedicated Service Tools (DST)** display appears.
    h. Type 7and press Enter to select option 7 [Start a service tool].

i. Type 7 and press Enter to select option 7 [Operator panel functions].

j. Press F10 to power off, press Enter to confirm, close the 5250 console session window, and wait until the logical partition shuts down.

15. Delete the logical partition that owns all of the system resources.

    Attention: This procedure erases the logical partition and the logical partition configuration data stored on the partition profiles. This procedure does not affect any of the data stored on the managed system.

    a. In the navigation area of your HMC, open **Server and Partition**.

    b. Select **Server Management**.

    c. In the contents area, open the managed system that you are partitioning.

    d. Open **Partitions**.

    e. Ensure that the logical partition is powered off.

    f. Right-click the logical partition and choose **Delete**.

    g. Click **Yes** to confirm.

16. Create each logical partition on your managed system according to your logical partition plan. You can do this by importing a system plan file into your HMC and deploying the system plan to the managed system. For more information on creating logical partitions using a system plan, see Working with system plans using version 6 or earlier of the HMC. You can alternately create the logical partitions by performing the following procedure for each logical partition that you want to create.

    a. In the navigation area of your HMC, open **Server and Partition**.

    b. Select **Server Management**.

    c. In the contents area, right-click **Partitions** under the managed system that you are partitioning, and choose **Create → Logical Partition**.

    d. Follow the steps in the Create Logical Partition wizard to create a logical partition and a partition profile.

17. Designate one of the i5/OS logical partitions on your managed system as the service partition for the managed system.

    a. In the navigation area of your HMC, open **Server and Partition**.

    b. Select **Server Management**.

    c. In the contents area, right-click the managed system that you are partitioning and choose **Properties**.

    d. In the **Service partition** field, select the logical partition that you want to designate as the service partition.

    e. Click **OK**.

18. Ensure that there is at least one LAN adapter on the HMC that is configured to connect with the logical partitions on your managed system.

    a. In the navigation area of your HMC, open **HMC Management**.

    b. Select **HMC Configuration**.

    c. In the contents pane, click **Customize Network Settings**.

    d. Click the **LAN Adapters** tab.

    e. Select any LAN adapter other than the eth0 adapter that connects the HMC with the service processor and click **Details**.

    f. On the **LAN Adapter** tab, under **Local area network information**, select **Open**, and select **Partition communication**.

    g. Click the **Firewall Settings** tab.

h. Ensure that the RMC application is one of the applications displayed in **Allowed Hosts**. If it is not displayed in **Allowed Hosts**, select the RMC application under **Available Applications** and click **Allow Incoming**. The RMC application displays in **Allowed Hosts** to signify that it has been selected.

i. Click **OK**.

After you have created the logical partitions on your managed system, you must then complete the following tasks:

1. Install operating systems on the logical partitions. For installation procedures for the AIX, i5/OS, and Linux operating systems, refer to Installing operating systems.
2. Change the console device on each i5/OS logical partition to the console device of your choice. For procedures to change the console i5/OS logical partitions, see Changing the i5/OS console from the HMC to Operations Console or twinaxial console.
3. Connect the logical partitions on your managed system to the LAN adapter that you have just configured on the HMC. You can create a virtual LAN to connect the logical partitions on your managed system with each other, bridge the virtual LAN to a physical Ethernet adapter on an external network, and connect the LAN adapter on the HMC to the same external network. Alternately, you can configure a physical Ethernet adapter on each logical partition, connect the physical Ethernet adapters on the logical partitions to an external network, and connect the LAN adapter on the HMC to the same external network. For information on how to create and configure virtual Ethernet adapters for your AIX logical partitions, see Configuring a virtual Ethernet adapter for AIX. For information on how to create and configure virtual Ethernet adapters for your logical partitions, see Configuring a virtual Ethernet adapter using version 6 or earlier of the HMC.

Related concepts

"System plan overview for the HMC" on page 146
Learn about system plan concepts and operations, as well as understand the high-level tasks that you can perform with system plans when using the Hardware Management Console (HMC).

Related tasks

"Creating logical partitions using version 6 or earlier of the HMC" on page 162
You can use the Create Logical Partition wizard on the Hardware Management Console (HMC) to create a new logical partition. When you create a logical partition, you also create a partition profile that contains the resource allocations and settings for the new logical partition.

"Configuring a virtual Ethernet adapter using version 6 or earlier of the HMC" on page 164
You can configure a virtual Ethernet adapter dynamically for a running logical partition. Doing so will connect the logical partition to a virtual LAN.

Related information

Tasks and roles

Setting up the HMC

Correcting the managed system operating state

Shutting down i5/OS logical partitions

Connecting to a 5250 console remotely

Shutting down AIX in a logical partition

Using the HMC to shut down Linux logical partitions

Reference codes list for customers

Installing operating systems

Changing consoles, interfaces, and terminals

Partitioning a new or nonpartitioned IBM System p5, eServer p5, or IntelliStation POWER 285 managed system using version 6 or earlier of the HMC

Use this procedure to partition a new or nonpartitioned IBM System p5, eServer p5, or IntelliStation POWER 285 managed system using the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system and create the logical partitions on the managed system.

Use this procedure in the following cases:

- You have just received your managed system and want to partition the managed system immediately.
- You have used the managed system as a nonpartitioned server, and now want to partition the managed system.

If you want to create a new logical partition on a managed system that has already been partitioned, then you do not need to perform all of the steps in this procedure. For more information on creating a new logical partition on a managed system that has already been partitioned, see Creating logical partitions using version 6 or earlier of the HMC.

Before you begin, complete the following:

- Use the System Planning Tool (SPT) to ensure that your hardware configuration supports your desired logical partition configuration.
- If necessary, install additional hardware resources on your managed system to support the partition plan specified by the SPT .
- Set up the HMC to manage your logical partition and the managed system. For information on how to set up the HMC, see Setting up the HMC.
- If you have used the managed system prior to partitioning, back up all data on the managed system.

To partition a new or nonpartitioned IBM System p5, eServer p5, or IntelliStation POWER 285 managed system using version 6 or earlier of the HMC, you must be a super administrator or operator on the HMC. For more information about user roles, refer to Tasks and roles.

To partition a new or nonpartitioned IBM System p5, eServer p5, or IntelliStation POWER 285 managed system using version 6 or earlier of the HMC, complete the following steps:

1. Ensure that the managed system is in a state of **Standby** or **Operating**. Complete the following:
   a. In the navigation area of the HMC, open the object with the same name as your HMC, open **Server and Partition**, and choose **Server Management**.
   b. Find the state of the managed system as displayed in the contents area under the **State** heading.
   c. If the managed system is in a **Power off** state, right-click the managed system, choose **Power On**, select the power-on mode of **Partition Standby**, click **OK**, and wait until the contents area displays a **Standby** state for the managed system.

   If the managed system does not display in the contents area, or if the managed system is in any state other than **Standby** or **Operating**, you must fix the problem before continuing. For more information on correcting the operating state of the managed system, see Correcting the managed system operating state.
2. Verify that a single logical partition exists on the managed system. When you connect a new or nonpartitioned managed system to an HMC, a single logical partition displays in the HMC user interface. All system resources belong to this logical partition. In this procedure, you will use this logical partition to validate the hardware on the managed system. After you validate the hardware on the managed system, you will delete this logical partition and create the logical partitions according to your logical partition plan.
   a. In the contents area of the HMC, open the managed system.
   b. Open **Partitions**. The logical partition displays as an object under **Partitions**. The name of this logical partition will be the serial number of the managed system, and the logical partition will have one partition profile called `default`.

   If the logical partition that is described in this step exists, continue to step 4. Otherwise, continue to step 3 to reset the managed system.
3. Reset the managed system so that a single logical partition exists on the managed system. Complete the following *at your HMC* (not using a remote client such as Web-based System Manager) to create this logical partition on your managed system:
   a. Ensure that the hardware placement in the managed system supports the manufacturing default configuration. If the hardware placement in the managed system does not support the manufacturing default configuration, you must move the hardware so that the hardware placement supports the manufacturing default configuration. For more information on placing the hardware in your managed system to support the manufacturing default configuration, contact your marketing representative or business partner.
   b. In the contents area, right-click the managed system.
   c. From the menu, click **Profile Data** → **Initialize** and click **Yes**.
   d. Right-click your HMC desktop (outside of any of the displayed windows) and click **Terminal** → **rshterm**. The Restricted shell command-line interface displays.
   e. Type: `lpcfgop -m` *`managed_system_name`* `-o clear`. *managed_system_name* is the name of managed system as it displays in the content area.
   f. Enter `1` to confirm. This step will take several seconds to complete.
4. Ensure that the contents area displays a state of **Not Activated** for the logical partition. If the logical partition is in a **Running** state, shut down the logical partition by completing the following:
   a. Right-click the managed system in the contents area.
   b. Click **Properties**.
   c. Ensure that **Power off the system after all the logical partitions are powered off** is cleared.

d. Click **OK**.
e. Shut down the logical partition using operating system procedures. For more information on shutting down logical partitions using operating system procedures, see the following information:
   - For managed systems running AIX, see Shutting down AIX in a logical partition.
   - For managed systems running Linux, see Using the Hardware Management Console to shut down Linux logical partitions.

If the logical partition is in an **Error** state, complete the following:

a. Right-click the logical partition and choose **Properties**.
b. Click the **Reference Code** tab and use the reference codes displayed on the **Reference Code** tab to diagnose and fix the problem. For more information on using reference codes to diagnose and fix problems, see Reference codes list for customers.

5. Activate the logical partition and verify that the physical adapters on the managed system are connected and reporting to the managed system using the configuration manager. If AIX is not installed on your managed system, continue with step 6. You can use the configuration manager in AIX to view all of the available devices. When AIX boots and the configuration manager runs, the configuration manager displays all the working adapters. The recognized adapters will be in the **Available** state if they are configured correctly.
   a. In the contents area, right-click the partition and click **Activate**.
   b. Click **Advanced** .
   c. In the **Boot mode** field, select `Normal` and click **OK**.
   d. Select **Open a terminal window or console session** and click **OK**. A virtual terminal (vterm) window opens for the logical partition.
   e. Ensure that all the resources are attached and powered on.
   f. Log in to AIX using a valid user name and password.
   g. Enter the following command at the command prompt to list all of the adapters on AIX: `# lsdev -Cc adapter`. If there are any adapters that do not display as `Available`, contact service and support.

      Note: You can verify only the adapters that are recognized by AIX. Any adapter that is not recognized by AIX might have an error of unknown or failed hardware.
   h. When you are done, shut down the logical partition using operating system procedures and close the terminal session window. For information on how to shut down AIX, see Restarting and shutting down AIX in a logical partition.
6. Activate the logical partition and verify that the physical adapters on the managed system are connected and reporting to the managed system using the System Management Services (SMS) interface. If Linux is installed on the managed system, or if there is no operating system on the managed system, you can use the SMS interface to view the available devices. When the logical partition is activated, the bus is scanned to determine what device adapters are attached. The recognized adapters are listed.
   a. In the contents area, right-click the partition and click **Activate**.
   b. Click **Advanced** .
   c. In the **Boot mode** field, select `SMS` and click **OK**.
   d. Select **Open a terminal window or console session** and click **OK**. A virtual terminal (vterm) window opens for the logical partition.
   e. When the SMS interface is displayed, type `5` and press Enter to select option 5 [`Select Boot Options`].
   f. Type `1` and press Enter to select option 1 [`Select Install or Boot a Device`]
   g. Type `7` and press Enter to select option 7 [`List all Devices`]. All of the recognized devices in the partition are listed. If there are any devices that do not display, contact service and support.

Note: You can verify only the adapters that are recognized by SMS. Any adapter that is not recognized by SMS might have an error of unknown or failed hardware.

h. When you are done, close the terminal session window, right-click the partition in the contents area, click **Shut down partition**, and click **OK**.

7. If the hardware in the managed system is already in the configuration specified in your SPT configuration plan, then continue to step 13 on page 141.
8. Power off the managed system using your HMC.
   a. In the navigation area of your HMC, open **Server and Partition**.
   b. Select **Server Management**.
   c. In the contents area, right-click the managed system that you are partitioning and choose **Power Off**.
   d. Select the **Normal power off** option and click **OK**.
9. Move the hardware in the managed system according to your SPT configuration plan.
10. Power on the managed system to the **Standby** state using your HMC.
    a. In the navigation area of your HMC, open **Server and Partition**.
    b. Select **Server Management**.
    c. In the contents area, right-click the managed system that you are partitioning and choose **Power On**.
    d. Select **Partition standby** as the power-on mode and click **OK**.
11. Activate the logical partition and verify that the physical adapters on the managed system are connected and reporting to the managed system using the configuration manager. If AIX is not installed on the managed system, continue with step 12. You can use the configuration manager in AIX to view all of the available devices. When AIX boots and the configuration manager runs, the configuration manager displays all the working adapters. The recognized adapters will be in the `Available` state if they are configured correctly.
    a. In the contents area, right-click the partition and click **Activate**.
    b. Click **Advanced**.
    c. In the **Boot mode** field, select `Normal` and click **OK**.
    d. Select **Open a terminal window or console session** and click **OK**. A virtual terminal (vterm) window opens for the logical partition.
    e. Ensure that all the resources are attached and powered on.
    f. Log in to AIX using a valid user name and password.
    g. Enter the following command at the command prompt to list all of the adapters on AIX: `# lsdev -Cc adapter`. If there are any adapters that do not display as `Available`, contact service and support.

       Note: You can verify only the adapters that are recognized by AIX. Any adapter that is not recognized by AIX might have an error of unknown or failed hardware.

    h. When you are done, shut down the logical partition using operating system procedures and close the terminal session window. For information on how to shut down AIX, see Restarting and shutting down AIX in a logical partition.
12. Activate the logical partition and verify that the physical adapters on the managed system are connected and reporting to the managed system using the System Management Services (SMS) interface. If Linux is installed on the managed system, or if there is no operating system on the managed system, you can use the SMS interface to view the available devices. When the logical partition is activated, the bus is scanned to determine what device adapters are attached. The recognized adapters are listed.
    a. In the contents area, right-click the partition and choose **Activate**.
    b. Click **Advanced**.

c. In the **Boot mode** field, select `SMS` and click **OK**.
d. Select **Open a terminal window or console session** and click **OK**. A virtual terminal (vterm) window opens for the logical partition.
e. When the SMS interface is displayed, type `5` and press Enter to select option 5 [`Select Boot Options`].
f. Type `1` and press Enter to select option 1 [`Select Install or Boot a Device`]
g. Type `7` and press Enter to select option 7 [`List all Devices`]. All of the recognized devices in the partition are listed. If there are any devices that do not display, contact service and support.

   Note: You can verify only the adapters that are recognized by SMS. Any adapter that is not recognized by SMS might have an error of unknown or failed hardware.
h. When you are done, close the terminal session window, right-click the partition in the contents area, click **Shut down partition**, and click **OK**.

13. Delete the logical partition that owns all of the system resources.

    Attention: This procedure erases the logical partition and the logical partition configuration data stored on the partition profiles. This procedure does not affect any of the data stored on the managed system.
    a. In the navigation area of your HMC, open **Server and Partition**.
    b. Select **Server Management**.
    c. In the contents area, open the managed system that you are partitioning.
    d. Open **Partitions**.
    e. Ensure that the logical partition is powered off.
    f. Right-click the logical partition and choose **Delete**.
    g. Click **Yes** to confirm.
14. Create each logical partition on your managed system according to your logical partition plan. You can do this by importing a system plan file into your HMC and deploying the system plan to the managed system. For more information on creating logical partitions using a system plan, see Working with system plans using version 6 or earlier of the HMC. You can alternately create the logical partitions by performing the following procedure for each logical partition that you want to create.
    a. In the navigation area of your HMC, open **Server and Partition**.
    b. Select **Server Management**.
    c. In the contents area, right-click **Partitions** under the managed system that you are partitioning, and choose **Create → Logical Partition**.
    d. Follow the steps in the Create Logical Partition wizard to create a logical partition and a partition profile.
15. Ensure that there is at least one LAN adapter on the HMC that is configured to connect with the logical partitions on your managed system.
    a. In the navigation area of your HMC, open **HMC Management**.
    b. Select **HMC Configuration**.
    c. In the contents pane, click **Customize Network Settings**.
    d. Click the **LAN Adapters** tab.
    e. Select any LAN adapter other than the `eth0` adapter that connects the HMC with the service processor and click **Details**.
    f. On the **LAN Adapter** tab, under **Local area network information**, select **Open**, and select **Partition communication**.
    g. Click the **Firewall Settings** tab.

h. Ensure that the RMC application is one of the applications displayed in **Allowed Hosts**. If it is not displayed in **Allowed Hosts**, select the RMC application under **Available Applications** and click **Allow Incoming**. The RMC application displays in **Allowed Hosts** to signify that it has been selected.

i. Click **OK**.

After you have created the logical partitions on your managed system, you must then complete the following tasks:

1. Install operating systems on the logical partitions. For installation procedures for the AIX, i5/OS, and Linux operating systems, refer to Installing operating systems.
2. Connect the logical partitions on your managed system to the LAN adapter that you have just configured on the HMC. You can create a virtual LAN to connect the logical partitions on your managed system with each other, bridge the virtual LAN to a physical Ethernet adapter on an external network, and connect the LAN adapter on the HMC to the same external network. Alternately, you can configure a physical Ethernet adapter on each logical partition, connect the physical Ethernet adapters on the logical partitions to an external network, and connect the LAN adapter on the HMC to the same external network. For information on how to create and configure virtual Ethernet adapters for your logical partitions, see Configuring a virtual Ethernet adapter using version 6 or earlier of the HMC..

Related concepts

"System plan overview for the HMC" on page 146
Learn about system plan concepts and operations, as well as understand the high-level tasks that you can perform with system plans when using the Hardware Management Console (HMC).

Related tasks

"Creating logical partitions using version 6 or earlier of the HMC" on page 162
You can use the Create Logical Partition wizard on the Hardware Management Console (HMC) to create a new logical partition. When you create a logical partition, you also create a partition profile that contains the resource allocations and settings for the new logical partition.

Related information

Tasks and roles

Setting up the HMC

Correcting the managed system operating state

Shutting down AIX in a logical partition

Using the HMC to shut down Linux logical partitions

Reference codes list for customers

Installing operating systems

Partitioning a new or nonpartitioned IBM eServer OpenPower managed system using version 6 or earlier of the HMC

Use this procedure to partition a new or nonpartitioned IBM eServer OpenPower managed system using version 6 or earlier of the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system and create the logical partitions on the managed system.

Use this procedure in the following cases:

- You have just received your managed system and want to partition the managed system immediately.
- You have used the managed system as a nonpartitioned server, and now want to partition the managed system.

If you want to create a new logical partition on a managed system that has already been partitioned, then you do not need to perform all of the steps in this procedure. For more information on creating a new logical partition on a managed system that has already been partitioned, see Creating logical partitions using version 6 or earlier of the HMC.

Before you begin, complete the following:

- Use the System Planning Tool (SPT) to ensure that your hardware configuration supports your desired logical partition configuration.
- If necessary, install additional hardware resources on your managed system to support the partition plan specified by the SPT.
- Set up the HMC to manage your logical partition and the managed system. For information on how to set up the HMC, see Setting up the HMC.
- If you have used the managed system prior to partitioning, back up all data on the managed system.

To partition a new or nonpartitioned IBM eServer OpenPower managed system using version 6 or earlier of the HMC, you must be a super administrator or operator on the HMC. For more information about user roles, refer to Tasks and roles.

To partition a new or nonpartitioned IBM eServer OpenPower managed system using version 6 or earlier of the HMC, complete the following steps:

1. Ensure that the managed system is in a state of **Standby** or **Operating**. Complete the following:
   a. In the navigation area of the HMC, open the object with the same name as your HMC, open **Server and Partition**, and choose **Server Management**.
   b. Find the state of the managed system as displayed in the contents area under the **State** heading.
   c. If the managed system is in a **Power off** state, right-click the managed system, choose **Power On**, select the power-on mode of **Partition Standby**, click **OK**, and wait until the contents area displays a **Standby** state for the managed system.

   If the managed system does not display in the contents area, or if the managed system is in any state other than **Standby** or **Operating**, you must fix the problem before continuing. For more information on correcting the operating state of the managed system, see Correcting the managed system operating state.
2. Verify that a single logical partition exists on the managed system. When you connect a new or nonpartitioned managed system to an HMC, a single logical partition displays in the HMC user interface. All system resources belong to this logical partition. In this procedure, you will use this logical partition to validate the hardware on the managed system. After you validate the hardware on the managed system, you will delete this logical partition and create the logical partitions according to your logical partition plan.
   a. In the contents area of the HMC, open the managed system.
   b. Open **Partitions**. The logical partition displays as an object under **Partitions**. The name of this logical partition will be the serial number of the managed system, and the logical partition will have one partition profile called `default`.

   If the logical partition that is described in this step exists, continue to step 4 on page 144. Otherwise, continue to step 3 to reset the managed system.
3. Reset the managed system so that a single logical partition exists on the managed system. Complete the following *at your HMC* (not using a remote client such as Web-based System Manager) to create this logical partition on your managed system:
   a. Ensure that the hardware placement in the managed system supports the manufacturing default configuration. If the hardware placement in the managed system does not support the manufacturing default configuration, you must move the hardware so that the hardware placement supports the manufacturing default configuration. For more information on placing the hardware in your managed system to support the manufacturing default configuration, contact your marketing representative or business partner.
   b. In the contents area, right-click the managed system.
   c. From the menu, click **Profile Data** → **Initialize** and click **Yes**.
   d. Right-click your HMC desktop (outside of any of the displayed windows) and click **Terminal** → **rshterm**. The Restricted shell command-line interface displays.

e. Type: `lpcfgop -m managed_system_name -o clear`. *managed_system_name* is the name of managed system as it displays in the content area.

f. Enter 1 to confirm. This step will take several seconds to complete.

4. Ensure that the contents area displays a state of **Not Activated** for the logical partition. If the logical partition is in a **Running** state, shut down the logical partition by completing the following:
   a. Right-click the managed system in the contents area.
   b. Click **Properties**.
   c. Ensure that **Power off the system after all the logical partitions are powered off** is cleared.
   d. Click **OK**.
   e. Shut down the logical partition using operating system procedures. For managed systems running Linux, see Using the Hardware Management Console to shut down Linux logical partitions.

   If the logical partition is in an **Error** state, complete the following:
   a. Right-click the logical partition and choose **Properties**.
   b. Click the **Reference Code** tab and use the reference codes displayed on the **Reference Code** tab to diagnose and fix the problem. For more information on using reference codes to diagnose and fix problems, see Reference codes list for customers.
5. Activate the logical partition and verify that the physical adapters on the managed system are connected and reporting to the managed system using the System Management Services (SMS) interface. You can use the SMS interface to view the available devices. When the logical partition is activated, the bus is scanned to determine what device adapters are attached. The recognized adapters are listed.
   a. In the contents area, right-click the partition and click **Activate**.
   b. Click **Advanced** .
   c. In the **Boot mode** field, select `SMS` and click **OK**.
   d. Select **Open a terminal window or console session** and click **OK**. A virtual terminal (vterm) window opens for the logical partition.
   e. When the SMS interface is displayed, type 5 and press Enter to select option 5 [`Select Boot Options`].
   f. Type 1 and press Enter to select option 1 [`Select Install or Boot a Device`]
   g. Type 7 and press Enter to select option 7 [`List all Devices`]. All of the recognized devices in the partition are listed. If there are any devices that do not display, contact service and support.

      Note: You can verify only the adapters that are recognized by SMS. Any adapter that is not recognized by SMS might have an error of unknown or failed hardware.
   h. When you are done, close the terminal session window, right-click the partition in the contents area, click **Shut down partition**, and click **OK**.
6. If the hardware in the managed system is already in the configuration specified in your SPT configuration plan, then continue to step 11 on page 145.
7. Power off the managed system using your HMC.
   a. In the navigation area of your HMC, open **Server and Partition**.
   b. Select **Server Management**.
   c. In the contents area, right-click the managed system that you are partitioning and choose **Power Off**.
   d. Select the **Normal power off** option and click **OK**.
8. Move the hardware in the managed system according to your SPT configuration plan.
9. Power on the managed system to the **Standby** state using your HMC.
   a. In the navigation area of your HMC, open **Server and Partition**.

b. Select **Server Management**.
c. In the contents area, right-click the managed system that you are partitioning and choose **Power On**.
d. Select **Partition standby** as the power-on mode and click **OK**.

10. Activate the logical partition and verify that the physical adapters on the managed system are connected and reporting to the managed system using the System Management Services (SMS) interface. You can use the SMS interface to view the available devices. When the logical partition is activated, the bus is scanned to determine what device adapters are attached. The recognized adapters are listed.
    a. In the contents area, right-click the partition and choose **Activate**.
    b. Click **Advanced**.
    c. In the **Boot mode** field, select `SMS` and click **OK**.
    d. Select **Open a terminal window or console session** and click **OK**. A virtual terminal (vterm) window opens for the logical partition.
    e. When the SMS interface is displayed, type `5` and press Enter to select option 5 [`Select Boot Options`].
    f. Type `1` and press Enter to select option 1 [`Select Install or Boot a Device`]
    g. Type `7` and press Enter to select option 7 [`List all Devices`]. All of the recognized devices in the partition are listed. If there are any devices that do not display, contact service and support.

       Note: You can verify only the adapters that are recognized by SMS. Any adapter that is not recognized by SMS might have an error of unknown or failed hardware.
    h. When you are done, close the terminal session window, right-click the partition in the contents area, click **Shut down partition**, and click **OK**.
11. Delete the logical partition that owns all of the system resources.

    Attention: This procedure erases the logical partition and the logical partition configuration data stored on the partition profiles. This procedure does not affect any of the data stored on the managed system.
    a. In the navigation area of your HMC, open **Server and Partition**.
    b. Select **Server Management**.
    c. In the contents area, open the managed system that you are partitioning.
    d. Open **Partitions**.
    e. Ensure that the logical partition is powered off.
    f. Right-click the logical partition and choose **Delete**.
    g. Click **Yes** to confirm.
12. Create each logical partition on your managed system according to your logical partition plan. You can do this by importing a system plan file into your HMC and deploying the system plan to the managed system. For more information on creating logical partitions using a system plan, see Working with system plans using version 6 or earlier of the HMC. You can alternately create the logical partitions by performing the following procedure for each logical partition that you want to create.
    a. In the navigation area of your HMC, open **Server and Partition**.
    b. Select **Server Management**.
    c. In the contents area, right-click **Partitions** under the managed system that you are partitioning, and choose **Create → Logical Partition**.
    d. Follow the steps in the Create Logical Partition wizard to create a logical partition and a partition profile.
13. Ensure that there is at least one LAN adapter on the HMC that is configured to connect with the logical partitions on your managed system.

a. In the navigation area of your HMC, open **HMC Management**.
b. Select **HMC Configuration**.
c. In the contents pane, click **Customize Network Settings**.
d. Click the **LAN Adapters** tab.
e. Select any LAN adapter other than the `eth0` adapter that connects the HMC with the service processor and click **Details**.
f. On the **LAN Adapter** tab, under **Local area network information**, select **Open**, and select **Partition communication**.
g. Click the **Firewall Settings** tab.
h. Ensure that the RMC application is one of the applications displayed in **Allowed Hosts**. If it is not displayed in **Allowed Hosts**, select the RMC application under **Available Applications** and click **Allow Incoming**. The RMC application displays in **Allowed Hosts** to signify that it has been selected.
i. Click **OK**.

After you have created the logical partitions on your managed system, you must then complete the following tasks:

1. Install operating systems on the logical partitions. For installation procedures for the Linux operating system, refer to Installing operating systems.
2. Connect the logical partitions on your managed system to the LAN adapter that you have just configured on the HMC. You can create a virtual LAN to connect the logical partitions on your managed system with each other, bridge the virtual LAN to a physical Ethernet adapter on an external network, and connect the LAN adapter on the HMC to the same external network. Alternately, you can configure a physical Ethernet adapter on each logical partition, connect the physical Ethernet adapters on the logical partitions to an external network, and connect the LAN adapter on the HMC to the same external network. For information on how to create and configure virtual Ethernet adapters for your logical partitions, see Configuring a virtual Ethernet adapter using version 6 or earlier of the HMC..

Related concepts

"System plan overview for the HMC"
Learn about system plan concepts and operations, as well as understand the high-level tasks that you can perform with system plans when using the Hardware Management Console (HMC).

Related tasks

"Creating logical partitions using version 6 or earlier of the HMC" on page 162
You can use the Create Logical Partition wizard on the Hardware Management Console (HMC) to create a new logical partition. When you create a logical partition, you also create a partition profile that contains the resource allocations and settings for the new logical partition.

Related information

Tasks and roles

Setting up the HMC

Correcting the managed system operating state

Shutting down AIX in a logical partition

Using the HMC to shut down Linux logical partitions

Reference codes list for customers

Installing operating systems

System plan overview for the HMC

Learn about system plan concepts and operations, as well as understand the high-level tasks that you can perform with system plans when using the Hardware Management Console (HMC).

A *system plan* is a specification of the hardware and the logical partitions contained in one or more systems. A system plan is stored in a *system-plan file*, which has a file suffix of .sysplan. A system-plan file can contain more than one system plan, although multiple plans in a single file are not common. After you create a system plan, you also can also view, delete, and export the system plan.

System plans have a number of valuable uses. For example, you can use system plans to accomplish the following goals:

- You can create a system plan as a means of capturing up-to-date system documentation. The system plan provides a record of the hardware and partition configuration of the managed system at a given time.
- You can use a system plan that you create for system documentation as part of your disaster recovery planning. You can export the system-plan file to an offsite location or to removable media for offsite storage so that you have the system documentation that you need available to you if you must recover a managed system.
- You can use system plans as audit records to track system resources for accounting and accountability purposes by exporting them to a spreadsheet.
- You can use system plans to help you plan new workloads that require additional system and hardware resources. You can use a system plan, along with appropriate capacity planning information, to make decisions about whether your current system can handle a new workload.
- You can deploy this system plan to other systems that this HMC manages that have hardware that is identical to the hardware in the system plan. In this way, you can rapidly configure and use other, similar systems in your business.
- You can export the system plan to another HMC and use it to deploy the system plan to other systems that the target HMC manages that have hardware that is identical to the hardware in the system plan. In this case and the previous case, you can use the system plan to create logical partitions on new managed systems that do not already have logical partitions created on them.

To create logical partitions from a system plan, you must first complete the following tasks:

1. Create the system plan.
2. Import the system plan (when necessary).
3. Deploy the system plan.

After you create a system plan, you also can also view, delete, and export the system plan. The following table provides a complete overview of system plan tasks.

Table 10. Overview of the tasks for system plans

Task	Overview
Create a system plan	You can create system plans by using any of the following methods: • System Planning Tool (SPT) *SPT* helps you design a system to fit your needs, whether you want to design a logically partitioned system or to design an unpartitioned system. SPT incorporates the function from Workload Estimator (WLE) to help you create an overall system plan. The SPT opens the WLE to help you gather and integrate workload data, and provides advanced users with the option of creating a system plan without the help of additional tools. To help you get started, SPT provides the following options: – You can use the sample system plans that SPT provides as a starting point for planning your system – You can create a system plan based on existing performance data – You can create a system plan based on new or anticipated workloads – You can export a system plan as a .cfr file and import it into the marketing configurator (eConfig) tool to use for ordering a system. When you import the .cfr file into the eConfig tool, the tool populates your order with the information from the .cfr file. However, the .cfr file does not contain all the information that the eConfig tool requires and you will need to enter all required information before you can submit your order. • Hardware Management Console (HMC) Web user interface You can use the HMC to create a system plan based on the configuration of one managed system and can use the HMC to deploy that plan to another managed system. Based on the logical partition configuration in the system plan, the HMC creates logical partitions on the managed system to which it deploys the system plan. Depending on the contents of the system plan, the HMC can install operating environments on the partitions in the plan and, if the plan contains Virtual I/O Server provisioning information for a partition, such as storage assignments, the HMC can make these resource assignments for the partition. • HMC command-line interface You also can use the **mksysplan** command to create a system plan. After the system plan is created, you can also use the command-line interface to deploy that plan to a managed system. Based on the logical partition configuration in the system plan, the HMC creates logical partitions on the managed system to which it deploys the system plan.
Import the system plan	Before you can use a system plan to create logical partitions, the system-plan file must exist on the HMC that manages the managed system to which you want to deploy the system plan. If the system-plan file does not already exist on the HMC, you must import the file into the HMC. You can use the HMC Web user interface to import the file into the HMC from one of the following sources: • Upload the system-plan file from the remote console (the computer from which you remotely access the HMC) • Copy the system-plan file to media (optical disc or USB drive), insert the media into the HMC, and import the file from the media. • Download the system-plan file from a remote FTP site. **Note:** You can also use the HMC command-line interface to import a system plan. After you import the system-plan file into an HMC, you can deploy the system plan within that file to other systems that the HMC manages.

Table 10. Overview of the tasks for system plans (continued)

Task	Overview
Deploy the system plan	You can choose to deploy a system plan in stages, with some logical partitions being created in one stage, and other logical partitions being created in later stages. You cannot, however, deploy a system plan to a managed system if the managed system already has logical partitions. The managed system must be in the manufacturing default configuration. Also, if you want to deploy a system plan in stages, you need to create a new system plan if you change the resource allocations on the logical partitions on the managed system between stages to avoid validation problems in later stages. When you deploy a system plan by using the HMC Web user interface, the HMC validates the system plan. The managed system on which you deploy a system plan must have hardware that is identical to the hardware in the system plan. The HMC deploys a system plan to a managed system only if the system plan level is supported by the HMC, the format of the system plan is valid, and the hardware and each existing logical partition on the managed system passes validation. If the system plan contains installation information about the Virtual I/O Server, you can use the Deploy System Plan wizard to install the Virtual I/O Server and assign virtual networking and storage resources for the client logical partitions.
Export the system plan	You can use the HMC Web user interface to export a system-plan file from the HMC to one of the following locations: • Save the system-plan file to the remote console (the computer from which you remotely access the HMC). • Export the system-plan file to media that is mounted to the HMC (such as optical discs or USB drives). • Download the system-plan file to a remote FTP site. **Note:** You can also use the HMC command-line interface to export a system plan.
View the system plan	You can look at the contents of a system-plan file in the HMC by using the System Plan Viewer that is integrated with the HMC. The System Plan Viewer uses a navigation tree and tables to display the information in the system-plan file. It includes features such as dynamic table-column sorting and displaying EADS boundary lines. You can open a system plan in the System Plan Viewer, either by using the View System Plan task or by clicking the name of a system plan. When you start the System Plan Viewer, you must enter your HMC user ID and password before you can view the system plan.
Print the system plan	You can use the System Plan Viewer to print a system plan that you have open in the Viewer. You can print all of the system plan or a portion of the system plan, depending on the current view of the system plan. To print the current view of the system plan, click **Print** in the Actions pane of the System Plan Viewer.
Delete the system plan	You can delete unnecessary system plans from your HMC.

Optimizing system plan hardware information

The amount of hardware information that the HMC can capture in a new system plan varies based on the method that the HMC uses to gather the hardware information. Setting up your environment to maximize inventory gathering allows the HMC to capture more complete information about the hardware allocated to the partitions on the managed system. For example, the HMC can capture disk drive and tape drive configuration information for an active partition in the new system plan. However, doing so can cause system plan creation to take several more minutes to complete.

There are two methods that the HMC potentially can use:

- Inventory gathering, which is available for HMC Version 7 Release 3.1.0 and later
- Hardware discovery, which is available for some systems with HMC Version 7 Release 3.2.0 and later

System plan inventory gathering

The HMC always performs inventory gathering to capture detailed information for hardware that has an assignment to an active partition.

Note: Beginning with HMC Version 7.3.2, you can use the hardware discovery process to gather information about hardware assignments for an inactive partition or hardware on a managed system that does not have a partition assignment.

To optimize the amount of and type of hardware information that the inventory-gathering process is able to capture, ensure that you meet the following prerequisites and conditions:

- You must set up Resource Monitoring and Control (RMC) prior to creating a system plan. Using RMC ensures that the inventory-gathering process can capture more detailed hardware information. Without RMC, the inventory-gathering process is not able to detect the types of disk drives installed on a managed system.

  Note: i5/OS partitions respond to RMC requests from the HMC by means of the Management Server.
- To ensure that Linux systems and partitions can perform inventory gathering, you must load the IBM Installation Toolkit for Linux on POWER, which is available at the IBM Service and productivity tools Web site (http://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/installtools/home.html).
- You must have the managed system in the 'Standby' state or you must power on the managed system and activate the logical partitions on the managed system before creating the system plan.

Note: It is possible for a partition to have more than one HMC set up to manage it. In this situation, if the partition is an i5/OS partition and you want to use RMC to create a new system plan, ensure that you create the system plan from the primary HMC for the partition because redundant HMCs cannot use RMC.

System plan hardware discovery

In some cases, the HMC Version 7.3.2 can use hardware discovery, in addition to the inventory-gathering process, to capture hardware information for a new system plan. Using hardware discovery, you can capture information about hardware that does not have a partition assignment, as well as hardware with assignments to inactive partitions.

On a system that can use hardware discovery, the hardware discovery process runs whenever the system is powered on in *hardware discovery* mode. The hardware discovery process writes hardware inventory information to a cache on the system. The hardware inventory cache ensures that a certain amount of hardware information is available on the system when you create a system plan. The HMC can capture the information in the cache for a system plan when partitions are active and the HMC cannot perform fresh hardware discovery on the partition.

Note: It is recommended that you power on the system in hardware discovery mode whenever you add or change hardware on the system.

If the managed system is capable of hardware discovery, the Create System Plan page provides an additional option that you can select to capture a broader range of hardware information for the new system plan. This option, called **Retrieve inactive and unallocated hardware resources**, allows you to capture hardware configuration information for the managed system, regardless of the state of the hardware.

When you create a system plan and do not select the **Retrieve inactive and unallocated hardware resources** option, the HMC does not perform hardware discovery. The HMC still performs inventory gathering and retrieves hardware information for any active partitions on the managed server. The

resulting new system plan contains hardware information from the inventory-gathering process, as well as hardware information from the hardware inventory cache on the system.

To use the hardware discovery process, ensure that you meet the following prerequisites and conditions:

Available processing capability:
The hardware discovery process requires a minimum .5 processor be available for it to use.

Memory capability:
The hardware discovery process requires a minimum of 256 MB of free memory for it to use.

Partition state:
To maximize the information that the hardware discovery process can capture, partitions on the managed server must be inactive. If a partition is active, the hardware discovery process cannot capture fresh information from the partition and instead retrieves information about the hardware assigned to the inactive partition from the hardware inventory cache on the managed system.

By setting up your system to optimize the hardware information that you capture in a system plan that you create by using the HMC, you ensure that your system plan provides you with the most valuable information possible. It also ensures that you have the most usable configuration information possible when you convert the system plan for use in the System Planning Tool (SPT). The following table describes the type of hardware information that you can expect to see in a system plan that you convert, based on the system management product that you use to create the plan.

Table 11. Type of hardware information available in a system plan that you create in the HMC and convert to use in the SPT

Expected Conversion Results			
Partition	**HMC version 7 release 3.1.0 and earlier**	**HMC version 7 release 3.2.0 and later**	**Integrated Virtualization Manager**
i5/OS	Most cards. No disk, tape, CD, SCSI.	More cards. Some disk. No tape, CD, SCSI.	Not applicable.
All other operating systems	Very few cards. No disk, tape, CD, SCSI.	Most cards. Some disk. No tape, CD, SCSI.	Few, if any, cards. No disk, tape, CD, SCSI.

System plan validation

When validating the hardware on the managed system, the HMC compares the following information from the system plan with the hardware available on the managed system:

- Processor and memory amounts, including 5250 commercial processing workload (5250 CPW) where applicable
- Physical I/O adapter placement

The hardware described in the system plan passes validation if it matches the hardware specified by the managed system. The hardware on the managed system can contain resources in addition to those specified in the system plan and still pass validation, but the hardware on the managed system must at least match the hardware specified in the system plan.

For example, a system plan specifies a server with two processors, 8 GB of memory, and a specific placement of physical I/O adapters within the system unit. A server that contains two processors, 16 GB of memory, a matching placement of physical I/O adapters within the system unit, and an expansion unit with additional physical I/O adapters would allow the system to pass validation. A server that contains 4 GB of memory can cause the system to fail validation. A system plan can also fail validation if the system plan specifies one type of physical I/O adapter in a slot but the actual system unit has a different type of physical I/O adapter in that slot. However, if the system plan specifies an empty slot, validation allows any type of physical I/O adapter to be in that slot on the actual system.

The HMC does not validate the disk drives that are attached to physical I/O adapters against the disk drives specified in the system plan. You must ensure that the disk drives installed in the managed system support your desired logical partition configuration. Embedded devices automatically pass hardware validation because they are embedded into the system and cannot be removed.

If any step fails, validation fails for the existing logical partition. Any existing partition found on the managed system must appear in the system plan and must match the system plan as it appears in the managed system. For example, hardware on the managed system must at least match the hardware specified in the system plan. When validating an existing logical partition, the HMC validates the following items for that logical partition:

1. Is there a logical partition in the system plan that has the same partition ID as the existing logical partition specified in the machine default configuration?
2. Does the existing logical partition have partition profiles that match each partition profile specified for the logical partition in the system plan?
3. Do the partition profiles for the existing logical partitions contain the resources specified in the corresponding partition profiles in the system plan?

For example, if the server has an existing logical partition with a partition ID of 1, the HMC examines the logical partition in the system plan that has a partition ID of 1. If this logical partition exists and has a partition profile that is named SUPPORT, the HMC looks at the existing logical partition to see if it also has a partition profile that is named SUPPORT. If so, the HMC verifies that the resources specified in the SUPPORT partition profile in the system plan are contained in the SUPPORT partition profile in the existing logical partition.

When the HMC validates partition profiles, it compares the following resources in the partition profiles:

- Processor and memory amounts, including 5250 commercial processing workload (5250 CPW) where applicable
- Physical I/O slot assignments

The following examples illustrate how the HMC compares resources in the partition profiles during the validation process to determine whether the system plan is valid for a managed system:

- If the SUPPORT partition profile in the system plan specifies 2 GB of memory and the SUPPORT partition profile for the existing logical partition specifies 3 GB of memory, the amount of memory is valid.
- If the SUPPORT partition profile in the system plan specifies 4 GB of memory and the SUPPORT partition profile for the existing logical partition specifies 3 GB of memory, the amount of memory is not valid.
- If physical I/O slot P1 is assigned to the SUPPORT partition profile in the system plan but not to the SUPPORT partition profile for the existing logical partition, the physical slot assignment is not valid.
- If physical I/O slot P2 is not assigned to the SUPPORT partition profile in the system plan, it does not matter whether slot P2 is assigned to the SUPPORT partition profile for the existing logical partition.

If the system plan contains installation information for the Virtual I/O Server, you can use the Deploy System Plan wizard to install the Virtual I/O Server and to set up virtual networking and storage resources for the client logical partitions of the Virtual I/O Server.

Note: The HMC cannot install AIX or Linux or i5/OS operating environments on logical partitions.

Related tasks

"Partitioning a new or nonpartitioned IBM eServer OpenPower managed system using version 6 or earlier of the HMC" on page 142
Use this procedure to partition a new or nonpartitioned IBM eServer OpenPower managed system using version 6 or earlier of the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system and create the logical partitions on the managed system.

"Partitioning a new or nonpartitioned IBM eServer OpenPower managed system using version 7 or later of the HMC" on page 59
Use this procedure to partition a new or nonpartitioned IBM eServer OpenPower managed system using version 7 or later of the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system and create the logical partitions on the managed system.

"Creating logical partitions using version 6 or earlier of the HMC" on page 162
You can use the Create Logical Partition wizard on the Hardware Management Console (HMC) to create a new logical partition. When you create a logical partition, you also create a partition profile that contains the resource allocations and settings for the new logical partition.

"Creating logical partitions using version 7 or later of the HMC" on page 75
You can use the Create Logical Partition wizard on the Hardware Management Console (HMC) to create a new logical partition. When you create a logical partition, you also create a partition profile that contains the resource allocations and settings for the logical partition.

"Partitioning a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 6 or earlier of the HMC" on page 131
Use this procedure to partition a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 6 or earlier of the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system, create the logical partitions on the managed system, and designate the service partition for the managed system.

"Partitioning a new or nonpartitioned IBM System p5, eServer p5, or IntelliStation POWER 285 managed system using version 6 or earlier of the HMC" on page 137
Use this procedure to partition a new or nonpartitioned IBM System p5, eServer p5, or IntelliStation POWER 285 managed system using the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system and create the logical partitions on the managed system.

"Partitioning a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 7 or later of the HMC" on page 48
Use this procedure to partition a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 7 or later of the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system, create the logical partitions on the managed system, and designate the service partition for the managed system.

"Partitioning a new or nonpartitioned IBM System p5, eServer p5 or IntelliStation POWER 285 managed system using version 7 or later of the HMC" on page 54
Use this procedure to partition a new or nonpartitioned IBM System p5, eServer p5 or IntelliStation POWER 285 managed system using version 7 or later of the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system and create the logical partitions on the managed system.

"Creating a system plan by using the HMC Version 6" on page 159
You can use the Hardware Management Console (HMC) to create a new system plan based on an existing system configuration, and then deploy that system plan to other managed systems.

"Deleting a system plan by using the HMC Version 6" on page 161
You can remove a system plan from your Hardware Management Console (HMC).

"Deploying a system plan by using the HMC Version 6" on page 155
You can use the Hardware Management Console (HMC) to deploy all or part of a system plan to a managed system.

"Exporting a system-plan file by using the HMC Version 6" on page 157
You can export a system-plan file from an Hardware Management Console (HMC) to various types of

media or to a remote site for use on another HMC.

"Importing a system-plan file by using the HMC Version 6"
You can import a system-plan file into a Hardware Management Console (HMC) from various types of media, a remote FTP site, or the computer from which you remotely access the HMC. You can then deploy the imported system plan to a system that the HMC manages.

"Viewing a system plan by using the HMC Version 6" on page 160
You can view a system plan from the System Plan Viewer on the Hardware Management Console (HMC).

Importing a system-plan file by using the HMC Version 6

You can import a system-plan file into a Hardware Management Console (HMC) from various types of media, a remote FTP site, or the computer from which you remotely access the HMC. You can then deploy the imported system plan to a system that the HMC manages.

You can import a system-plan file into the HMC from any of the following locations:

- From various media, such as optical discs or USB drivers, that is mounted on the HMC.
- From a system-plan file from a remote site by using FTP. To use this option, you must fulfill the following requirements:
  - The HMC must have a network connection to the remote site.
  - An FTP server must be active on the remote site.
  - Port 21 must be open on the remote site.

Note: You cannot import a system plan that has an identical name to any system plan that is available on the HMC.

To import a system-plan file, you must be a super administrator. For more information about user roles, refer to Tasks and roles.

To import a system-plan file into Version 6 or earlier of the HMC, complete the following steps:

1. If you are importing the system-plan file from media, complete these steps to mount the media on the HMC:
   a. Insert the media into the HMC or connect the media to the HMC.
   b. On your HMC desktop (outside of any of the open windows), right-click **Terminal** → **rshterm**. The Restricted shell command line interface opens.
   c. Enter the `mount` *`mountpoint`* command, where *mountpoint* is the location of the media. You can typically use `mount /mnt/cdrom` to mount an optical drive or `mount /media/sda1` to mount a USB drive.
   d. Enter the `lsmediadev` command to list the mounted drives on the HMC and verify that the media is mounted and ready to use.
2. In the navigation area of the HMC, select **System Plans**.
3. In the tasks area, select **Import System Plan**. The Import System Plan window opens.
4. Enter the name of the system-plan file into the **System plan file name** field. The name of the system-plan file must end with the .sysplan file name suffix and can use alphanumeric characters only.
5. Specify whether you are importing the system-plan file from locally mounted media or from a remote FTP site. Use the following table to complete the appropriate steps for importing the system plan from the selected source location of the file:

Source of the system-plan file to import	Complete the following steps:
Locally mounted media	1. Select **Import from media**. 2. Enter the path of the system-plan file location into the **Directory** field.

Source of the system-plan file to import	Complete the following steps:
Remote FTP site	1. Select **Import from a remote site**. 2. Enter the host name or IP address of the remote FTP site into the **Remote site hostname** field. 3. Enter the user ID to use to access the remote FTP site into the **User id** field. 4. Enter the password to use to access the remote FTP site into the **Password** field. 5. Enter the path of the system-plan file location on the remote FTP site into the **Remote directory** field. If you do not enter a path, the HMC uses the default path specified on the remote FTP site.

6. Click **Import**. If the HMC returns an error, return to step 4 on page 154 and verify that the information you entered on this window is correct.

When you complete the process of importing the system-plan file, you can deploy the system plan in the system-plan file to a system that HMC manages. For more information about how to deploy the system plan, see Deploying a system plan. If you imported the system-plan file from media, you can unmount the media by using the umount command in the HMC command line interface.

Note: As an alternative to the HMC Web user interface, you can use the `cpysysplan` command from the HMC command line interface to import a system plan.

Related concepts

"System plan overview for the HMC" on page 146
Learn about system plan concepts and operations, as well as understand the high-level tasks that you can perform with system plans when using the Hardware Management Console (HMC).

Related tasks

"Creating a system plan by using the HMC Version 6" on page 159
You can use the Hardware Management Console (HMC) to create a new system plan based on an existing system configuration, and then deploy that system plan to other managed systems.

"Deleting a system plan by using the HMC Version 6" on page 161
You can remove a system plan from your Hardware Management Console (HMC).

"Deploying a system plan by using the HMC Version 6"
You can use the Hardware Management Console (HMC) to deploy all or part of a system plan to a managed system.

"Exporting a system-plan file by using the HMC Version 6" on page 157
You can export a system-plan file from an Hardware Management Console (HMC) to various types of media or to a remote site for use on another HMC.

"Viewing a system plan by using the HMC Version 6" on page 160
You can view a system plan from the System Plan Viewer on the Hardware Management Console (HMC).

Related information

Tasks and roles

Deploying a system plan by using the HMC Version 6

You can use the Hardware Management Console (HMC) to deploy all or part of a system plan to a managed system.

When you deploy a system plan, the HMC creates logical partitions on the managed system according to the specifications in the system plan.

Before you deploy a system plan, complete the following tasks:

- Ensure that the system-plan file exists on the HMC. If the system-plan file does not exist on the HMC, you must import the system-plan file into the HMC. For more information about importing a system-plan file, see Importing a system-plan file.
- Verify that the physical hardware is connected and reporting to the server. Every server comes with one logical partition with one partition profile. All of the physical hardware resources on the system are automatically assigned to this logical partition so that you can power on the server and verify that the physical hardware is connected and reporting to the server.
- Delete the logical partition that was provided with your server, and delete any other logical partition that is not in the system plan. For instructions, see Deleting a logical partition. The name of the logical partition that was provided with the server is the serial number of the managed system, and the name of the partition profile is *default*.
- Shut down any logical partitions that you have already deployed to the managed system from the system plan.
- Ensure that you are not performing any other operations on the managed system using this HMC or any other HMC that is attached to the managed system.
- Ensure that you are a super administrator. For more information about user roles, refer to Tasks and roles.

To use the HMC to deploy a system plan on a managed system, complete the following steps:

1. In the navigation area of your HMC, select **System Plans**.
2. In the contents area, select **Manage System Plans**.
3. Select the system-plan file that contains the system plan that you want to deploy and click **Deploy** to start the Deploy System Plan wizard. If you are not certain which system-plan file to choose, you can select a system-plan file and click **View** to list the contents of a system-plan file in a browser window.
4. Verify that the system-plan file that you want to deploy is displayed and click **Next**.
5. Optional: If there are multiple system plans within the system-plan file, the wizard prompts you to select the system plan that you want to deploy from that system-plan file. Select the system plan that you want to deploy in the **System plan to deploy** field and click **Next**.
6. Select the managed system to which you want to deploy the system plan in **Managed system** field and click **Next**. If the system plan does not match the managed system to which you want to deploy the plan, the wizard displays a window that informs you of this. Click **OK** to continue or **Cancel** to select a different system plan.
7. Wait for the wizard to validate the managed system and its hardware against the system plan. The validation process can take several minutes.
8. If the validation process completes successfully, click **Next**. If the validation process does not complete successfully, correct the issues that the error messages describe, click **Cancel** to exit the wizard, and restart this procedure from the beginning. To help you to correct validation issues, you might want to create a system plan that is based on the current configuration of the managed system. Such a system plan would allow you to compare the system plan that you want to deploy with the current configuration of the managed system. For more information about creating a system plan, see Creating a system plan.
9. Optional: If you do not want to create all of the logical partitions, partition profiles, virtual adapter types, or virtual adapters in the system plan, clear the boxes in the **Deploy** column beside the logical partitions, partition profiles, virtual adapter types, or virtual adapters that you do not want to create. Virtual serial adapters are required in virtual slots 0 and 1 for each logical partition. You cannot create the logical partition unless you create these virtual serial adapters.
10. Click **Next** to continue.
11. Review the system deployment step order and click **Finish**. The HMC creates the specified logical partitions. This process can take several minutes.

After you finish the deployment of the system plan, complete the following tasks:

- Locate the physical disk I/O adapters that belong to each logical partition and verify that the disk drives that are attached to these physical I/O adapters will support your desired configuration for each logical partition.
- Install operating systems and software on the logical partitions. For installation procedures for AIX, i5/OS, and Linux, refer to Installing operating systems. For installation procedures for the Virtual I/O Server, refer to Installing the Virtual I/O Server manually using the HMC version 6.
- Configure the virtual I/O adapters that are assigned to each logical partition within the operating systems so that virtual storage resources can be shared among logical partitions.

Related concepts

"System plan overview for the HMC" on page 146
Learn about system plan concepts and operations, as well as understand the high-level tasks that you can perform with system plans when using the Hardware Management Console (HMC).

Related tasks

"Creating a system plan by using the HMC Version 6" on page 159
You can use the Hardware Management Console (HMC) to create a new system plan based on an existing system configuration, and then deploy that system plan to other managed systems.

"Deleting a system plan by using the HMC Version 6" on page 161
You can remove a system plan from your Hardware Management Console (HMC).

"Exporting a system-plan file by using the HMC Version 6"
You can export a system-plan file from an Hardware Management Console (HMC) to various types of media or to a remote site for use on another HMC.

"Importing a system-plan file by using the HMC Version 6" on page 154
You can import a system-plan file into a Hardware Management Console (HMC) from various types of media, a remote FTP site, or the computer from which you remotely access the HMC. You can then deploy the imported system plan to a system that the HMC manages.

"Viewing a system plan by using the HMC Version 6" on page 160
You can view a system plan from the System Plan Viewer on the Hardware Management Console (HMC).

Related information

Deleting a logical partition

Installing operating systems

Installing the Virtual I/O Server

Tasks and roles

Exporting a system-plan file by using the HMC Version 6

You can export a system-plan file from an Hardware Management Console (HMC) to various types of media or to a remote site for use on another HMC.

You can export a system-plan file from the HMC to any of the following locations:

- To media that is mounted on the HMC (such as optical discs or USB drives).
- To a remote site by using FTP. This allows you to import the system-plan file into a different HMC and deploy the system plan to a managed system with identical hardware. To use this option, you must fulfill the following requirements:
  - The HMC must have a network connection to the remote site.
  - An FTP server must be active on the remote site.
  - Port 21 must be open on the remote site.

To export a system-plan file, you must be a super administrator. For more information about user roles, refer to Tasks and roles.

To export a system-plan file that is stored on an HMC, complete the following steps:

1. If you are exporting the system-plan file to media, complete these steps to mount the media on the HMC:
   a. Insert the media into the HMC or connect the media to the HMC.
   b. On your HMC desktop (outside of any of the open windows), right-click **Terminal → rshterm**. The Restricted shell command-line interface opens.
   c. Enter the `mount` *`mountpoint`* command, where *mountpoint* is the location at which the media is located. You can typically use `mount /mnt/cdrom` to mount an optical drive or `mount /media/sda1` to mount a USB drive.
   d. Enter the `lsmediadev` command to list the mounted drives on the HMC and verify that the media is mounted and ready to use.
2. In the navigation area of the HMC, select **System Plans**.
3. In the contents area, select **Manage System Plans**.
4. Select the system-plan file that you want to export and click **Export**.
5. Select the export destination for the system plan. Use the following table to complete the appropriate steps for exporting the system plan to the selected destination location of the file:

Export destination for the system plan	Complete the following steps:
Locally mounted media	1. Select **Export to media**. 2. Enter the path to which you want to export the system-plan file into the **Directory** field.
Remote FTP site	1. Select **Export to a remote site**. 2. Enter the host name or IP address of the remote FTP site into the **Remote site hostname** field. 3. Enter the user ID to use to access the remote FTP site into the **User id** field. 4. Enter the password to use to access the remote FTP site into the **Password** field. 5. Enter the path to which you want to export the system-plan file into the **Remote directory** field. If you do not enter a path, the HMC exports the system-plan file to the default path specified on the remote FTP site.

6. Click **Export**. If the HMC returns an error, verify that the information you entered on this window is correct. If necessary, click **Cancel**, return to step 4, and redo the procedure, ensuring that the information you specify at each step is correct.

If you exported the system-plan file to media, you can unmount the media by using the umount command in the HMC command-line interface. You can then import the system-plan file into a different HMC so that you can deploy the system plan to systems that the other HMC manages. For more information about importing the system-plan file into a different HMC, see Importing a system-plan file.

Note: As an alternative to the HMC Web user interface, you can use the `cpysysplan` command from the HMC command line interface to export a system plan.

Related concepts

"System plan overview for the HMC" on page 146
Learn about system plan concepts and operations, as well as understand the high-level tasks that you can perform with system plans when using the Hardware Management Console (HMC).

Related tasks

"Creating a system plan by using the HMC Version 6"
You can use the Hardware Management Console (HMC) to create a new system plan based on an existing system configuration, and then deploy that system plan to other managed systems.

"Deleting a system plan by using the HMC Version 6" on page 161
You can remove a system plan from your Hardware Management Console (HMC).

"Deploying a system plan by using the HMC Version 6" on page 155
You can use the Hardware Management Console (HMC) to deploy all or part of a system plan to a managed system.

"Importing a system-plan file by using the HMC Version 6" on page 154
You can import a system-plan file into a Hardware Management Console (HMC) from various types of media, a remote FTP site, or the computer from which you remotely access the HMC. You can then deploy the imported system plan to a system that the HMC manages.

"Viewing a system plan by using the HMC Version 6" on page 160
You can view a system plan from the System Plan Viewer on the Hardware Management Console (HMC).

Related information

Tasks and roles

Creating a system plan by using the HMC Version 6

You can use the Hardware Management Console (HMC) to create a new system plan based on an existing system configuration, and then deploy that system plan to other managed systems.

The HMC can deploy that plan to the managed system. The HMC creates logical partitions based on the logical partition configuration information in the system plan.

To maximize the amount of data that the HMC is able to collect from the system, ensure that you complete the following tasks:

- Ensure that the managed system from which you plan to base the new system plan is powered on.

  Note: You cannot create a system plan if the managed server is in either the power off state or the recovery state.
- Ensure that all the logical partitions on the managed system from which you plan to base the new system plan are activated.

To create a system plan based on an existing system configuration by using the HMC, complete the following steps:

1. From the navigation area, select **System Plans**.
2. In the contents area, select **Manage System Plans**. The Manage System Plans window opens.
3. Select the system plan you want to create, and click **Create**. The Create System Plan window opens.
4. Select the managed system on which you want to base the new system plan.
5. Enter a name and description for the new system plan.
6. Click **Create**.

Now that you have a new system plan, you can export the system plan, import it onto another managed system, and deploy the system plan to the managed system.

When you deploy the system plan, the HMC creates logical partitions on the target managed system based on the logical partition configuration information in the system plan.

Note: As an alternative to the HMC Web user interface, you can use the mksysplan command on the HMC to create a system plan based upon the configuration of an existing managed system.

Related concepts

"System plan overview for the HMC" on page 146
Learn about system plan concepts and operations, as well as understand the high-level tasks that you can perform with system plans when using the Hardware Management Console (HMC).

Related tasks

"Deleting a system plan by using the HMC Version 6" on page 161
You can remove a system plan from your Hardware Management Console (HMC).

"Deploying a system plan by using the HMC Version 6" on page 155
You can use the Hardware Management Console (HMC) to deploy all or part of a system plan to a managed system.

"Exporting a system-plan file by using the HMC Version 6" on page 157
You can export a system-plan file from an Hardware Management Console (HMC) to various types of media or to a remote site for use on another HMC.

"Importing a system-plan file by using the HMC Version 6" on page 154
You can import a system-plan file into a Hardware Management Console (HMC) from various types of media, a remote FTP site, or the computer from which you remotely access the HMC. You can then deploy the imported system plan to a system that the HMC manages.

"Viewing a system plan by using the HMC Version 6"
You can view a system plan from the System Plan Viewer on the Hardware Management Console (HMC).

Related information

mksysplan Command

Viewing a system plan by using the HMC Version 6

You can view a system plan from the System Plan Viewer on the Hardware Management Console (HMC).

The System Plan Viewer uses a navigation tree and tables to display the information in the system-plan file. The System Plan Viewer is included with the HMC so that it can be accessed from the HMC. However, to access the System Plan Viewer, you must re-enter your user ID and password before you can view the system plan.

To view a system plan from the HMC, complete the following steps:

1. From the navigation area, select **System Plans**.
2. In the contents area, select **Manage System Plans**. The Manage System Plans window is displayed.
3. Select the system plan you want to view, and click **View**. The System Plan Viewer opens in a separate browser window.

   Note: You can also open the system plan in the System Plan Viewer by clicking on the name of the system plan.
4. Enter your HMC **Username** and **Password** to log in to the System Plan Viewer.

Related concepts

"System plan overview for the HMC" on page 146
Learn about system plan concepts and operations, as well as understand the high-level tasks that you can perform with system plans when using the Hardware Management Console (HMC).

Related tasks

"Creating a system plan by using the HMC Version 6" on page 159
You can use the Hardware Management Console (HMC) to create a new system plan based on an existing system configuration, and then deploy that system plan to other managed systems.

"Deleting a system plan by using the HMC Version 6"
You can remove a system plan from your Hardware Management Console (HMC).

"Deploying a system plan by using the HMC Version 6" on page 155
You can use the Hardware Management Console (HMC) to deploy all or part of a system plan to a managed system.

"Exporting a system-plan file by using the HMC Version 6" on page 157
You can export a system-plan file from an Hardware Management Console (HMC) to various types of media or to a remote site for use on another HMC.

"Importing a system-plan file by using the HMC Version 6" on page 154
You can import a system-plan file into a Hardware Management Console (HMC) from various types of media, a remote FTP site, or the computer from which you remotely access the HMC. You can then deploy the imported system plan to a system that the HMC manages.

Related information

System Planning Tool Web site

Deleting a system plan by using the HMC Version 6

You can remove a system plan from your Hardware Management Console (HMC).

Removing a system plan from the HMC does not undo any partition or hardware configuration changes that occurred if the specified system plan was deployed on a managed system.

To remove a system plan from the HMC, complete the following steps:

1. From the navigation area, select **System Plans**.
2. In the contents area, select **Manage System Plans**. The Manage System Plans window opens.
3. Select the system plan that you want to delete, and click **Remove**.
4. Confirm that the system plan is the one that you want to remove and click **Remove System Plan** to delete the system plan.

Related concepts

"System plan overview for the HMC" on page 146
Learn about system plan concepts and operations, as well as understand the high-level tasks that you can perform with system plans when using the Hardware Management Console (HMC).

Related tasks

"Creating a system plan by using the HMC Version 6" on page 159
You can use the Hardware Management Console (HMC) to create a new system plan based on an existing system configuration, and then deploy that system plan to other managed systems.

"Deploying a system plan by using the HMC Version 6" on page 155
You can use the Hardware Management Console (HMC) to deploy all or part of a system plan to a managed system.

"Exporting a system-plan file by using the HMC Version 6" on page 157
You can export a system-plan file from an Hardware Management Console (HMC) to various types of media or to a remote site for use on another HMC.

"Importing a system-plan file by using the HMC Version 6" on page 154
You can import a system-plan file into a Hardware Management Console (HMC) from various types of media, a remote FTP site, or the computer from which you remotely access the HMC. You can then deploy the imported system plan to a system that the HMC manages.

"Viewing a system plan by using the HMC Version 6" on page 160
You can view a system plan from the System Plan Viewer on the Hardware Management Console (HMC).

Configuring Linux logical partitions

Learn about logical partition configuration and resource requirements for a Linux installation.

To use features that require logical partitions on an IBM eServer OpenPower system, you need the appropriate Advanced POWER Virtualization technologies activated in your system's Hardware Management Console.

You can use the Hardware Management Console to create logical partitions on your IBM eServer hardware system. Before you start creating logical partitions, it is essential that you understand the concepts behind this type of system configuration.

Related information

Advanced POWER Virtualization

Managing your server using the Hardware Management Console

Creating logical partitions using version 6 or earlier of the HMC

You can use the Create Logical Partition wizard on the Hardware Management Console (HMC) to create a new logical partition. When you create a logical partition, you also create a partition profile that contains the resource allocations and settings for the new logical partition.

Use this procedure only if you are creating logical partitions on a managed system that has already been partitioned. If you are creating logical partitions on a new or nonpartitioned managed system, you must test the hardware on your managed system to ensure that the hardware is in working order. Testing the hardware helps you detect potential problems with your managed system and makes such problems easier to correct. After you test the hardware, you can create logical partitions on a new or nonpartitioned managed system by deploying a system plan to the managed system. For more information on how to create logical partitions on new and nonpartitioned managed systems, see the Partitioning a new or nonpartitioned server topics.

You can also create logical partitions on a managed system by deploying a system plan to the managed system. A system plan automates the process of creating logical partitions and ensures that each logical partition gets the resources that are specified within the system plan. For more information on system plans, see System plan overview.

Before you create a logical partition, have the System Planning Tool (SPT) output available. Use the output from this tool as a guide as you start to create partition profiles on your server.

To create a logical partition using version 6 or earlier of the HMC, you must be a super administrator or an operator. For more information about the role of a super administrator and operator, refer to Tasks and roles.

To create a logical partition on your server using version 6 or earlier of the HMC, follow these steps:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the managed system on which you want to create the partition profile.
4. Right-click **Partitions**, and select **Create → Logical Partition**.
5. Follow the steps in the Create Logical Partition wizard to create a logical partition and a partition profile.

After creating your logical partition and partition profile, you must install an operating system. For installation procedures for the AIX, i5/OS, and Linux operating systems, refer to Installing operating systems.

Related concepts

"System plan overview for the HMC" on page 146
Learn about system plan concepts and operations, as well as understand the high-level tasks that you can perform with system plans when using the Hardware Management Console (HMC).

Related tasks

"Partitioning a new or nonpartitioned IBM eServer OpenPower managed system using version 6 or earlier of the HMC" on page 142
Use this procedure to partition a new or nonpartitioned IBM eServer OpenPower managed system using version 6 or earlier of the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system and create the logical partitions on the managed system.

"Partitioning a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 6 or earlier of the HMC" on page 131
Use this procedure to partition a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 6 or earlier of the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system, create the logical partitions on the managed system, and designate the service partition for the managed system.

"Partitioning a new or nonpartitioned IBM System p5, eServer p5, or IntelliStation POWER 285 managed system using version 6 or earlier of the HMC" on page 137
Use this procedure to partition a new or nonpartitioned IBM System p5, eServer p5, or IntelliStation POWER 285 managed system using the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system and create the logical partitions on the managed system.

Related information

Tasks and roles

Installing operating systems

Creating additional partition profiles using version 6 or earlier of the HMC

You can create more than one partition profile for a logical partition using the Hardware Management Console (HMC). Each partition profile can specify a different amount of system resources and different partition startup attributes. You can change the attributes used by a logical partition by shutting down the logical partition and restarting the logical partition using a different partition profile.

Before you create a partition profile using version 6 or earlier of the HMC, it is recommended that you have the System Planning Tool (SPT) output available. You should use the output from this tool as a guide as you start to create partition profiles on your server. For more information on the SPT, see System Planning Tool.

To create a partition profile, you must be a super administrator or an operator. For more information about the role of a super administrator and operator, refer to Tasks and roles.

To create a partition profile using version 6 or earlier of the HMC, follow these steps:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the managed system on which you want to create the partition profile.
4. Open **Partitions**.
5. Right-click the logical partition for which you want to create the partition profile and select **Create → Profile**.
6. Follow the steps in the Create Partition Profile wizard to create the partition profile.

Related concepts

"System Planning Tool" on page 41
The System Planning Tool (SPT) helps you design a managed system that can support a specified set of workloads. You can design a managed system based upon workload data from your current systems, based upon new workloads that you want the managed system to support, based upon sample systems that are provided with the utility, or based upon your own custom specifications.

Related information

Tasks and roles

Configuring a virtual Ethernet adapter using version 6 or earlier of the HMC

You can configure a virtual Ethernet adapter dynamically for a running logical partition. Doing so will connect the logical partition to a virtual LAN.

You can dynamically configure a virtual Ethernet adapter for a Linux logical partition only if the following conditions are met:

- A Linux distribution that supports dynamic logical partitioning is installed on the Linux logical partition. Distributions that support dynamic logical partitioning include Red Hat Enterprise Linux version 4, SUSE Linux Enterprise Server 9, and later versions of these distributions.
- The DynamicRM tool package is installed on the Linux logical partition. For more information on the DynamicRM tool package, see the Service and productivity tools Web site.

To configure a virtual Ethernet adapter dynamically on a running logical partition using version 6 or earlier of the HMC, follow these steps:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, expand the managed system on which the logical partition that will use the Ethernet adapter resides.
4. Expand **Partitions**.
5. Right-click the logical partition that will use the virtual Ethernet adapter and select **Dynamic Logical Partitioning → Virtual Adapter Resources → Add/Remove**.
6. Select the **Virtual I/O** tab.
7. In the **Create Adapters** area, select **Ethernet** and click **Create**. The Virtual Ethernet Adapter Properties window appears.
8. Enter the slot number for the virtual Ethernet adapter.

9. Enter the Port Virtual LAN ID (PVID) for the virtual Ethernet adapter. The PVID allows the virtual Ethernet adapter to communicate other virtual Ethernet adapters that have the same PVID.
10. If the logical partition is an AIX, Linux, or Virtual I/O Server logical partition, select the IEEE 802.1Q-compatible adapter check box if you want to configure the virtual Ethernet adapter to communicate over multiple virtual LANs. If you leave this option unchecked and you want this partition to connect to multiple virtual networks, then you need to create multiple virtual adapters by creating additional virtual LAN IDs.
11. Click **OK** .

After you have finished, access any existing partition profiles for the logical partition and add the virtual Ethernet adapters to those partition profiles. The virtual Ethernet adapter will be lost if you shut down the logical partition and activate the logical partition using a partition profile that does not have the virtual Ethernet adapter in it.

Related tasks

"Partitioning a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 6 or earlier of the HMC" on page 131
Use this procedure to partition a new or nonpartitioned IBM System i5 or eServer i5 managed system using version 6 or earlier of the Hardware Management Console (HMC). In this procedure, you will validate the hardware on the managed system, create the logical partitions on the managed system, and designate the service partition for the managed system.

Designating the service partition for your managed system using version 6 or earlier of the HMC

The *service partition* is the i5/OS logical partition on an IBM System i5 or eServer i5 server 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 Hardware Management Console (HMC) is undergoing maintenance or is otherwise unable to perform these functions.

The preferred method for applying server firmware updates and communicating server common hardware errors to IBM is by using the HMC.

IBM System p5, eServer p5, and OpenPower servers do not have a service partition. If an IBM System p5, eServer p5, or OpenPower server is managed by an HMC, then you must use the HMC to update the server firmware, and the server can contact service and support only through the HMC. If you use an HMC to manage IBM System p5, eServer p5, and OpenPower servers, then use a backup HMC to ensure that the servers have redundant methods for contacting service and support and for applying fixes.

You can designate only one logical partition at a time as the service partition for your managed system. The service partition for your IBM System i5 or eServer i5 server must be an i5/OS logical partition.

Before you can designate a logical partition as the service partition for your managed system, you must shut down the logical partition. You must also shut down the logical partition before you remove the service partition designation from the logical partition. If you want to change the service partition from one logical partition to another logical partition, you must shut down both logical partitions before using this procedure. Refer to the operating system shutdown procedures for information on shutting down your logical partitions normally.

Note: You must designate a service partition on a server only after you use the HMC to create, change, delete, copy, or activate any logical partitions on the managed system. You can set up the operating system on an unpartitioned server to contact service and support, and you can use the operating system on an unpartitioned server to apply server firmware updates.

To designate a service partition for your managed system using version 6 or earlier of the HMC, you must be a member of the super administrator role. For more information about user roles, refer to Tasks and roles.

To designate one of your logical partitions as the service partition for your managed system using version 6 or earlier of the HMC, follow these steps:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, right-click the managed system and select **Properties**.
4. In the **Service partition** field, select the logical partition that you want to designate as the service partition. If you do not want to designate another logical partition as the service partition, select `None`.
5. Click **OK**.

Related tasks

"Deleting a logical partition using version 6 or earlier of the HMC" on page 173
You can use the Hardware Management Console to delete a logical partition and all of the partition profiles associated with the logical partition.

Migrating a Linux installation

Learn about the options and requirements for upgrading or migrating a Linux installation from an System i system or a System p system to an IBM eServer hardware system.

Related concepts

"Partitioning for Linux with an HMC" on page 1
Learn how to configure and manage partitions that run the Linux operating system.

Migrating a Linux installation from an existing System i server to an IBM System i5 or eServer i5 server:

Learn about the options and requirements for updating and migrating a Linux installation from an System i server to a IBM System i5 or eServer i5 server.

Migrating Linux when performing a data migration

A data migration is the process of moving data from an IBM System i server to a IBM System i5 or eServer i5 server when the serial number changes. The following topics contain more information:

Preparing for data migration from a Linux logical partition
See this topic to learn how to prepare your Linux partition for the data migration.

Completing the data migration from a Linux logical partition
See this topic to learn how to perform to complete your Linux migration.

Migrating Linux when performing an upgrade

During a server model upgrade when moving from an IBM System i server to a IBM System i5 or eServer i5 server and the serial number does not change, use the following topics to perform your Linux migration.

Preparing for data migration from a Linux logical partition
Use this information to prepare your Linux partition for your server upgrade.

Finalizing server configuration
Use the information in this topic to complete your upgrade and Linux migration.

Related information

Preparing for data migration from a Linux logical partition

Completing the data migration from a Linux logical partition

Preparing for data migration from a Linux logical partition

Finalizing server configuration

Migrating a Linux installation from a System p server to an IBM System p5 or eServer p5:

Learn about the options and requirements for updating and migrating a Linux installation from a System p system to an IBM System p5 or eServer p5 system.

Learn about the process for updating and migrating a Linux installation to a IBM System p5 or eServer p5 managed system. The first step in migrating a Linux installation to a IBM System p5 or eServer p5 is to upgrade to a Linux version that supports IBM System p5 or eServer p5 hardware.

For general information about migration and upgrading, or for information on migrating logical partitions with operating systems other than Linux, refer to Migrating your server.

1. On the existing System p server, upgrade the partition to be migrated to a Linux version that supports the IBM System p5 or eServer p5. For detailed migration instructions, refer to your Linux distribution documentation.
2. Back up all data on the existing partition.
3. On the existing System p system, install and configure the same Linux version to which the IBM System p5 or eServer p5 partition was upgraded in step 1.
4. Load the data that was backed up in step 3 onto the newly configured Linux logical partition on IBM System p5 or eServer p5.

Related information

Upgrades

Copying a partition profile using version 6 or earlier of the HMC

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 easily.

To copy a partition profile using version 6 or earlier of the HMC, you must be a super administrator, operator, or product engineer. For more information about user roles, refer to Tasks and roles.

To copy a partition profile using version 6 or earlier of the HMC, follow these steps:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the managed system on which the partition profile that you want to copy is located.
4. Open **Partitions**.
5. Open the logical partition for the partition profile that you want to copy.
6. Right-click the partition profile that you want to copy and select **Copy**.
7. Enter the name of the new partition profile and click **OK**.

Related information

Tasks and roles

Creating a system profile using version 6 or earlier of the HMC

You can create a system profile using the Hardware Management Console (HMC). A *system profile* is an ordered list of partition profiles. When you activate a system profile, the managed system attempts to activate the partition profiles in the system profile in the order in which the partition profiles are listed.

System profiles are useful to validate your partition profile. If a partition profile has overcommitted resources, you will not be able to add that partition profile to the system profile.

To create a system profile using version 6 or earlier of the HMC, you must be a super administrator or an operator. For more information about the role of a super administrator and operator, refer to Tasks and roles.

To create a system profile using version 6 or earlier of the HMC, follow these steps:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, right-click the managed system on which you want to create the system profile and select **Create** → **System Profile**.

Related information

Tasks and roles

Copying a system profile using version 6 or earlier of the HMC

You can use the Hardware Management Console (HMC) to create a copy of an existing system profile. After you create a copy of the existing system profile, you can change the partition profiles that are contained within the new system profile. This allows you to create multiple, nearly identical system profiles quickly and easily.

To copy a system profile using version 6 or earlier of the HMC, you must be a super administrator, operator, or product engineer. For more information about user roles, refer to Tasks and roles.

To copy a system profile using version 6 or earlier of the HMC, follow these steps:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the managed system on which the system profile that you want to copy is located.
4. Open **System Profiles**.
5. Right-click the system profile that you want to copy and select **Copy**.
6. Enter the name of the new system profile and click **OK**.

Related information

Tasks and roles

Creating a Linux logical partition using i5/OS virtual I/O resources

IBM System i5 and eServer i5 models allow you to create a Linux logical partition that uses i5/OS virtual I/O resources. This allows you to maximize utilization of the physical hardware and simplify the backup procedure for your managed system.

To set this up, you must create virtual SCSI adapters that connect the Linux logical partition with the i5/OS. You can then set up i5/OS to provide disk resources to the Linux logical partition through the virtual SCSI connection. You can also create a virtual serial connection between the i5/OS logical partition and the Linux logical partition. A virtual serial connection would allow the i5/OS logical partition to control the Linux logical partition.

You cannot create a Linux logical partition that uses i5/OS virtual I/O resources on IBM System p5, eServer p5, or OpenPower servers. On IBM System p5, eServer p5, and OpenPower servers, you can create a Virtual I/O Server logical partition and configure the Linux logical partition to use the virtual SCSI and virtual Ethernet resources of the Virtual I/O Server logical partition. You might need to enter an Advanced POWER Virtualization activation code to create a Virtual I/O Server logical partition on your IBM System p5, eServer p5, or OpenPower server. For more information about the Virtual I/O Server, see Using the Virtual I/O Server.

To create a Linux logical partition using i5/OS virtual I/O resources, you must be a super administrator or operator. For more information about the role of a super administrator and an operator, refer to Tasks and roles.

To create a Linux logical partition using i5/OS virtual I/O resources, follow these steps on your HMC:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server on which you want to create the partition profile.
4. Right-click **Partitions** and select **Create → Logical Partitions**.
5. Follow the steps in the Create Logical Partition wizard to create a logical partition and a partition profile.
6. Create a network server description (NWSD) and network-server storage space. See Creating an NWSD and a network-server storage space for a Linux logical partition for details.
7. Set up the console for your Linux partition. See Connecting to the virtual console for a Linux logical partition.
8. Start the NWSD. See Starting the network-server description for a Linux logical partition.
9. Install the Linux operating system on your new logical partition. For installation procedures, see Installing operating systems.

Related tasks

"Creating an NWSD and a network-server storage space for a Linux logical partition" on page 83
A *network-server description (NWSD)* is an i5/OS object that describes the storage resources that are used by an integrated operating environment. An NWSD can be linked to one or more network-server storage spaces. Create an NWSD to assign storage to a Linux logical partition that uses i5/OS resources.

"Connecting to the virtual console for a Linux logical partition" on page 85
You can connect to the virtual console for a Linux logical partition so that you can install the operating system or access the command line interface for the Linux logical partition.

"Starting the network-server description for a Linux logical partition" on page 86
You can start the network-server description (NWSD) for a Linux logical partition that uses i5/OS resources to make the resources defined in the NWSD available to the Linux logical partition.

Related information

Using the Virtual I/O Server

Tasks and roles

Installing operating systems

Creating an NWSD and a network-server storage space for a Linux logical partition:

A *network-server description (NWSD)* is an i5/OS object that describes the storage resources that are used by an integrated operating environment. An NWSD can be linked to one or more network-server storage spaces. Create an NWSD to assign storage to a Linux logical partition that uses i5/OS resources.

To create an NWSD and a network-server storage space for a Linux logical partition that uses i5/OS resources, follow these steps:

1. Determine the correct SCSI server resource name.

- If there is only one SCSI server adapter corresponding to a given client partition, and that adapter has its remote partition and remote slot configured correctly, you can specify *AUTO as the RSRCNAME in your NWSD.
- Otherwise, you must determine the actual resource name. At an i5/OS command line, type `WRKHDWRSC *CMN`, and find a controller resource with type 290B and a converged location code that corresponds to the SCSI server adapter at the Hardware Management Console (HMC). This resource name will be used later to specify the SCSI server resource.

2. At an i5/OS command line on the partition that shares resources, type `CRTNWSD` and press F4 for prompts.
3. Specify the following information. The default or suggested parameter values are provided within the parentheses. These settings are relevant only to a logical partition. After the installation, if your root file system (/) is not installed on the first partition of the first disk, you must set a root parameter.
   - `NWSD (Provide a name for the NWSD)`
   - `RSRCNAME (*AUTO or the resource name of the SCSI server resource`
   - `TYPE(*GUEST)`
   - `ONLINE (*NO or *YES)`
   - `PARTITION ('Provide the name of your Linux logical partition')`

     As an alternative to the Partition parameter, you can also specify a partition number by typing `PTNNBR(`*`integer`*`)` where *integer* is the number of the partition you are specifying.
   - `CODEPAGE (437)`
   - `TCPPORTCFG (*NONE)`
   - `RSTDDEVRSC (for virtual CD and tape devices) (*NONE)`
   - `SYNCTIME (*TYPE)`
   - `IPLSRC (*NWSSTG)`
     - You can store a kernel in a disk partition of a virtual disk (a network-server storage space (NWSSTG)). By specifying the `IPLSRC (*NWSSTG)` parameter, you are specifying that the Linux logical partition will start from a disk partition on that virtual disk. The disk partition on the virtual disk must be formatted as type `PReP Boot` (type 0x41) and marked as a device that starts. You can format a disk partition as type `PReP Boot` by using the Linux **fdisk** command with the -t option. You can specify that the disk partition starts by using the **fdisk** command with the -a option.
     - To start an NWSD with a kernel from a stream file, set the `IPLSRC` parameter to `*STMF` and set the `IPLSTMF` parameter to point to the kernel. You must have read access to the file and the path leading to the file to use the vary on command. This value only loads the kernel. After the kernel is running, it must find a root file system. In an initial installation, the root file system might be a RAM disk that is physically attached to the kernel.
   - `IPLSTMF (*NONE)`
   - `IPLPARM (*NONE)`
   - `PWRCTL (*YES)`
     - If you specify `PWRCTL (*YES)`, perform the following steps:
       a. Ensure that the server adapter in the i5/OS partition specifies the remote partition and remote slot in its configuration.
       b. Ensure that the client partition has the i5/OS partition as the power-controlling partition in the profile.
       c. Ensure before you activate the NWSD that the client partition's profile has been saved to the server by activating the partition from the HMC, even if the client operating system does not activate correctly because of the absence of virtual devices.
     - If you specify `PWRCTL(*NO)`, virtual devices will be available to the partition. You must shut down and restart the partition using the HMC.
4. If you use iSeries Navigator, create the network-server storage space using iSeries Navigator.

a. Expand **My Connections** → **your server** → **Network** → **Windows Administration** .
b. Right-click the **Disk Drives** and select **New Disk**.
c. In the **Disk drive name** field, specify the name that you want to give to the disk drive.
d. In the **Description** field, specify a meaningful description for the disk drive.
e. In the **Capacity** field, specify the size of the new disk drive in megabytes. Refer to your preferred Linux distributor installation documentation to determine the size you want to use.
f. Click **OK**.
g. Continue with step 6 on page 85.

5. If you use a character-based interface, create the network-server storage space using the character-based interface:
   a. At an i5/OS command line, type the command CRTNWSSTG and press F4. The Create NWS Storage Space (CRTNWSSTG) display appears.
   b. In the Network-server storage space field, specify the name you want to give to the storage space.
   c. In the Size field, specify the size in megabytes for the new storage space. Refer to your preferred Linux distributor installation documentation to determine the size you want to use.
   d. In the Text description field, specify a meaningful description for the storage space.
   e. Press Enter.
   f. Continue with step 7 on page 85.
6. If you use iSeries Navigator, link the network-server storage space using iSeries Navigator:
   a. Expand **My Connections** → **your server** → **Network** → **Windows Administration** .
   b. Click **Disk Drives**, right-click an available network-server storage space, and select **Add Link**.
   c. Select the server to which you want to link the network-server storage space.
   d. Select the link sequence position you want to use.
   e. Select one of the available data access types.
   f. Click **OK**.

   The procedure is complete. Do not complete step 7 on page 85.
7. If you use a character-based interface, link the network-server storage space using the character-based interface:
   a. At an i5/OS command line, type the command ADDNWSSTGL and press F4. The Add Network-Server Storage Link (ADDNWSSTGL) display appears.
   b. In the Network server description field, specify the name of the network server description (NWSD).
   c. In the Dynamic storage link field, specify *YES to make the network-server storage space dynamically available to the partition (that is, available without rebooting the Linux partition).
   d. In the Drive sequence number field, specify the link sequence position you want to use. If you want the system to find the next available position for you, specify *CALC.
   e. Press Enter.

Related tasks

"Creating a Linux logical partition using i5/OS virtual I/O resources" on page 168
IBM System i5 and eServer i5 models allow you to create a Linux logical partition that uses i5/OS virtual I/O resources. This allows you to maximize utilization of the physical hardware and simplify the backup procedure for your managed system.

Connecting to the virtual console for a Linux logical partition:

You can connect to the virtual console for a Linux logical partition so that you can install the operating system or access the command line interface for the Linux logical partition.

You must have one of the following privileges to use the Linux virtual console.

- Remote Panel
- System Partitions - Administration

The virtual console provides the console function for a Linux server. It is used primarily during the initial installation of the operating system. The virtual console can also be used to view server errors or to restore communication to the LAN. This console connection is used prior to configuring TCP/IP.

Any Telnet client can be used as the Linux console. Multiple Telnet clients can share access to the same virtual console. To connect to a console, use Telnet to connect to port 2301 of the partition that is sharing its resources. TCP/IP must be configured and running on at least one i5/OS logical partition. Perform one of the following procedures:

- If you use IBM Personal Communications, connect to a virtual console using IBM Personal Communications.
  1. Click **Start** → **IBM Personal Communications** → **Start or Configure Session**.
  2. From the Customize Communication window, select **ASCII** as your type of host and select **Link Parameters**.
  3. From the Telnet ASCII window, enter the host name or the IP address of the partition that is sharing its resources, and enter port number 2301 of the partition sharing its resources. Click **OK**.
  4. If you are not using an Integrated xSeries Server, go to the next step. If you are using both Linux partitions and Integrated xSeries Server consoles, select **i5/OS Guest Partition Consoles** from the i5/OS Virtual Consoles window.
  5. From the i5/OS Guest Partition Consoles window, select the logical partition to which you want to connect as the console.
  6. Enter the i5/OS service tools ID and password to connect to the Linux logical partition.
- If you use Telnet, connect to the virtual console using Telnet from an MS-DOS command prompt.
  1. From an MS-DOS command prompt, use the Telnet command to connect to your server and port 2301 (`telnet` *`xxxxxx`* `2301`).
  2. If you are not using an Integrated xSeries Server, go to the next step. If you are using both Linux partitions and Integrated xSeries Server consoles, select **i5/OS Guest Partition Consoles** from the i5/OS Virtual Consoles window.
  3. From the i5/OS Guest Partition Consoles window, select the logical partition to which you want to connect as the console.
  4. Enter the i5/OS service tools ID and password to connect to the Linux logical partition.

Related tasks

"Creating a Linux logical partition using i5/OS virtual I/O resources" on page 168
IBM System i5 and eServer i5 models allow you to create a Linux logical partition that uses i5/OS virtual I/O resources. This allows you to maximize utilization of the physical hardware and simplify the backup procedure for your managed system.

Starting the network-server description for a Linux logical partition:

You can start the network-server description (NWSD) for a Linux logical partition that uses i5/OS resources to make the resources defined in the NWSD available to the Linux logical partition.

To start (vary on) the NWSD for a Linux logical partition, complete the following tasks:

1. If you use iSeries Navigator, start the NWSD using iSeries Navigator.
   a. Click **Network** → **Windows Administration** → **Integrated xSeries Servers**
   b. Right-click the name of the NWSD that you want to start.
   c. Click **Start**.
2. If you use the character-based interface, start the NWSD using a character-based interface:
   a. Type `WRKCFGSTS *NWS` and press Enter.

b. Type **1** next to the NWSD that you want to start and press Enter.

Related tasks

"Creating a Linux logical partition using i5/OS virtual I/O resources" on page 168
IBM System i5 and eServer i5 models allow you to create a Linux logical partition that uses i5/OS virtual I/O resources. This allows you to maximize utilization of the physical hardware and simplify the backup procedure for your managed system.

"Unlinking virtual disk drives from a Linux logical partition" on page 92
By unlinking virtual disk drives (network-server storage spaces) from a Linux logical partition that uses i5/OS resources, you disconnect the virtual disk drives from the logical partition, making the virtual disk drives inaccessible to users. If you delete a Linux logical partition that uses i5/OS resources, you must unlink all virtual disk drives from the logical partition before you delete the logical partition.

Deleting a logical partition using version 6 or earlier of the HMC

You can use the Hardware Management Console to delete a logical partition and all of the partition profiles associated with the logical partition.

To delete a logical partition, you must be a super administrator or operator. For more information about user roles, refer to Tasks and roles.

You cannot delete a logical partition if it is the service partition of your managed system. Before you can delete such a logical partition, you must designate another logical partition as the service partition of your managed system or remove the service partition designation from the logical partition. For more information, see Designating the service partition for your managed system.

Attention: This procedure erases the logical partition and the logical partition configuration data stored on the partition profiles.

To delete a logical partition using version 6 or earlier of the HMC, follow these steps:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server on which the logical partition that you want to delete is located.
4. Open **Partitions**.
5. Ensure the logical partition you want to delete is powered off.
6. Right-click the logical partition and select **Delete**.
7. Click **Yes** to confirm.

Related tasks

"Designating the service partition for your managed system using version 6 or earlier of the HMC" on page 165
The *service partition* is the i5/OS logical partition on an IBM System i5 or eServer i5 server 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 Hardware Management Console (HMC) is undergoing maintenance or is otherwise unable to perform these functions.

Related information

Tasks and roles

Resetting the managed system to a nonpartitioned configuration using version 6 or earlier of the HMC

You can erase all of your logical partitions and reset the managed system to a nonpartitioned configuration. When you reset the managed system, all of the physical hardware resources are assigned to a single logical partition. This allows you to use the managed system as if it were a single, nonpartitioned server.

Attention: By resetting a partitioned managed system to a nonpartitioned configuration, you will lose all of your logical partition configuration data. However, resetting the managed system does not erase the operating systems and data from disk units on that managed system.

Before you reset the managed system, ensure that the hardware placement in the managed system supports a nonpartitioned configuration. If the hardware placement in the managed system does not support a nonpartitioned configuration, you must move the hardware so that the hardware placement supports a nonpartitioned configuration. For more information about how to place the hardware in your managed system to support a nonpartitioned configuration, contact your marketing representative or business partner.

Also, if you plan to use an operating system that is already installed on one of the logical partitions on the managed system (instead of reinstalling the operating system after you reset the managed system), consider how the console used by that operating system will change when you reset the managed system.

- If the operating system that you want to use is AIX, log into AIX and enable the login prompt for the virtual serial port vty0 using either SMIT or the chdev command. You can then reset the managed system, use a physical serial console to log into AIX, and use SMIT or chcons to change the console device to the console device you want to use.
- If the operating system that you want to use is i5/OS, the device tagging that you set up on the HMC no longer applies after you disconnect the HMC. Before you reset the managed system, switch the console setting to the device that you want to use.

To reset a partitioned managed system to a nonpartitioned configuration using version 6 or earlier of the HMC, you must be a super administrator or operator. For more information about user roles, refer to Tasks and roles. You must also have an Advanced System Management Interface (ASMI) login profile with an administrator authority level.

To reset a partitioned managed system to a nonpartitioned configuration using version 6 or earlier of the HMC, follow these steps:

1. Shut down all logical partitions on your managed system using operating system procedures. For more information about shutting down logical partitions using operating system procedures, see the following information:
   - For logical partitions running AIX, see Shutting down AIX in a logical partition.
   - For logical partitions running i5/OS, see Shutting down i5/OS logical partitions.
   - For logical partitions running Linux, see Using the Hardware Management Console to shut down Linux logical partitions.
2. If the managed system powered off automatically when you shut down the last logical partition, power on the managed system to the **Standby** state. Complete the following:
   a. In the contents area of your HMC, right-click the managed system and choose **Power On**.
   b. Select the power-on mode of **Partition Standby** and click **OK**.
   c. Wait until the contents area displays a **Standby** state for the managed system.
3. Initialize the profile data on the HMC. Complete the following:
   a. In the contents area, right-click on the managed system, choose **Profile Data** → **Initialize**.
   b. Click **Yes** to confirm.
4. Clear the partition configuration data on the managed system. Complete the following:
   a. On your HMC desktop (outside of any of the displayed windows), right-click **Terminal** → **rshterm**. The Restricted shell command line interface displays.
   b. Type the command: `lpcfgop -m` *`managed_system_name`* `-o clear`. In this command, *managed_system_name* is the name of the managed system as it displays in the content area.
   c. Enter **1** to confirm. This step will take several seconds to complete.

5. Optional: If you no longer intend to manage the system using the HMC, remove the connection between the HMC and the managed system. To remove the connection between the HMC and the managed system, complete the following:
   a. In the contents area, right-click on the managed system.
   b. From the menu, click **Reset or Remove Connection**.
   c. Select **Remove connection** and click **OK**.
6. Access the Advanced System Management Interface (ASMI) using a Web browser on a PC. If you do not already have a PC that is set up to access the ASMI on the managed system, you will need to set up the PC at this point. For more information on accessing ASMI, see Accessing the ASMI using a Web browser.
7. On the ASMI Welcome pane, log in using the admin user ID (enter `admin` into **User ID**, enter the admin password into **Password**, and click **Log In**).
8. In the navigation area, expand **Power/Restart Control** and click **Power On/Off System**.
9. Set **Boot to server firmware** to `Running`.
10. Click **Save settings and power off**.
11. Click **Power On/Off System** periodically to refresh the window. Repeat this step until **Current system power state: Off** is displayed in the navigation area.
12. Click **Save settings and power on**.
13. Wait for the managed system to restart. It can take several minutes for the managed system and operating system to restart completely.

Related concepts

"Manufacturing default configuration" on page 18
The manufacturing default configuration is the initial partition setup of the managed system as received from your service provider.

Related tasks

"Shutting down Linux logical partitions using version 6 or earlier of the HMC" on page 193
You can shut down Linux logical partitions and the Linux operating system using the Hardware Management Console (HMC).

Related information

Tasks and roles

Accessing the ASMI using a Web browser

Shutting down AIX in a logical partition

Managing Linux logical partitions

When you create one or more logical partitions on IBM Systems and eServer hardware, you are creating partitions that are independent of each other. Each logical partition has its own independent configuration of processor, memory, input/output (I/O) devices, Licensed Internal Code (also known as server firmware), operating system (Linux), and optional software applications. Learn about procedures for managing Linux logical partitions.

To use features that require logical partitions on an IBM eServer OpenPower system, you need the appropriate Advanced POWER Virtualization technologies activated in your system's Hardware Management Console.

You can use the Hardware Management Console to manage your logical partitions. Most tasks that you perform are independent of the other logical partitions on the system. Consider each logical partition as an independent system.

Related information

Advanced POWER Virtualization

Managing your server using the Hardware Management Console

Managing partition profiles for logical partitions

You can manage the partition profiles for your logical partitions using the Hardware Management Console (HMC). This allows you to change the resource specifications stored in your partition profiles as your needs change.

Activating a logical partition using the HMC:

You must activate a logical partition before you can use the logical partition. When you activate a logical partition, the system commits resources to the logical partition and starts the operating system or software that is installed on the logical partition.

To activate a logical partition, you must be a super administrator, operator, or product engineer. For more information about user roles, refer to Tasks and roles.

When you activate a logical partition, you must select a partition profile. A *partition profile* is a record on the HMC that specifies a possible configuration for a logical partition.

To activate a logical partition using the HMC, follow these steps:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the system on which the logical partition is located.
4. Open **Partitions**.
5. Right-click the logical partition and select **Activate**.
6. Select the partition profile that you want to use when activating the logical partition.
7. If you want the HMC to open a terminal window or console session for the logical partition when the logical partition is activated, select **Open a terminal window or console session**.
8. If you want to use a keylock position or boot mode that is different from the keylock position or boot mode specified in the partition profile, click **Advanced**, select the desired keylock position and boot mode, and click **OK**.
9. Click **OK**.

Related information

Tasks and roles

Changing partition profile properties using version 6 or earlier of the HMC:

You can change the properties of a partition profile using the Hardware Management Console (HMC). Changing the properties of a partition profile will change the resource amounts that are assigned to a logical partition when you shut down and restart the logical partition using the changed partition profile.

To change partition profile properties using version 6 or earlier of the HMC, you must be a super administrator, service representative, operator, or product engineer. For more information about user roles, refer to Tasks and roles.

A partition profile stores the required number of processors, memory, and hardware resources assigned to that profile. Any partition profile property changes will not be applied to the logical partition until the partition profile has been activated.

To change partition profile properties using version 6 or earlier of the HMC, follow these steps:

1. In the navigation area, open **Server and Partition**.

2. Select **Server Management**.
3. In the contents area, open the managed system on which the partition profile is located.
4. Open **Partitions**.
5. Open the logical partition for the partition profile.
6. Right-click the partition profile and select **Properties**.
7. Make the appropriate changes and click **OK**.

Related tasks

"Dynamically managing physical I/O devices and slots on Linux" on page 179
Learn how to dynamically add, remove, and move physical I/O devices and slots from one running logical partition to another using the Hardware Management Console (HMC). Learn how to make Linux recognize the changes in the available resources.

"Dynamically managing processing power on Linux" on page 181
Learn how to dynamically move processors from one running logical partition to another using the HMC. Processing power can be moved based on the desired, minimum, and maximum values that you created for the profile.

"Saving the partition configuration to a partition profile" on page 182
Use this procedure to save the current configuration of a logical partition to a new partition profile using a Hardware Management Console (HMC). Use this procedure if you change the configuration of a logical partition using dynamic logical partitioning and you do not want to lose the changes when you reactivate the logical partition. This procedure allows you to save the changed configuration to a new partition profile instead of having to enter the changed resource allocations manually.

Related information

Tasks and roles

Deleting a partition profile using version 6 or earlier of the HMC:

You can delete a partition profile using the Hardware Management Console (HMC). This allows you to remove partition profiles that you no longer use.

To delete a partition profile using version 6 or earlier of the HMC, you must be a super administrator or an operator. For more information about the role of a super administrator and operator, refer to Tasks and roles.

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.

To delete a partition profile using version 6 or earlier of the HMC, follow these steps:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the managed system on which the partition profile is located.
4. Open **Partitions**.
5. Open the logical partition for the partition profile.
6. Right-click the partition profile and select **Delete**.
7. Click **OK** to confirm.

Related information

Tasks and roles

Managing system profiles

You can managed the system profiles on your managed system using the Hardware Management Console (HMC). This allows you to change the logical partitions and partition profiles specified within the system profiles as the logical partitions change on your managed system.

Activating a system profile using version 6 or earlier of the HMC:

You can activate many logical partitions at a time by activating a system profile using the HMC.

To activate a system profile using version 6 or earlier of the HMC, you must be a super administrator, operator, or product engineer. For more information about user roles, refer to Tasks and roles.

A *system profile* is an ordered list of partition profiles. When you activate a system profile, the managed system attempts to activate the partition profiles in order. A system profile helps you activate or change the managed system from one complete set of logical partition configurations to another.

To activate a system profile using version 6 or earlier of the HMC, follow these steps:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server on which the system profile is located.
4. Open **System Profiles**.
5. Right-click the system profile and select **Activate**. Optionally, you may set the activation settings for your system profile.
6. Click **Continue**.

Related information

Tasks and roles

Deleting a system profile using version 6 or earlier of the HMC:

You can delete a system profile using the Hardware Management Console (HMC). This allows you to remove system profiles that you no longer use.

To delete a system profile using version 6 or earlier of the HMC, you must be a super administrator or an operator. For more information about the role of a super administrator and operator, refer to Tasks and roles.

A system profile helps you activate or change the managed system from one complete set of logical partition configurations to another.

To delete a system profile using version 6 or earlier of the HMC, follow these steps:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the managed system on which the system profile is located.
4. Right-click the system profile and select **Delete**.
5. Click **Yes** to confirm.

Related information

Tasks and roles

Managing partitions remotely

You can access your Hardware Management Console (HMC) remotely by installing the remote client on your personal computer (PC).

For more information about the remote client and how to install it, refer to Installing and uninstalling the remote client.

Related information

Installing and uninstalling the remote client

Dynamically managing Linux logical partition resources

Learn how you can dynamically add, remove, and move resources between partitions.

If you are using Linux distributions Red Hat Enterprise Linux version 4 or SUSE Linux Enterprise Server 9 or later, you can add, remove, or move resources between partitions without restarting a partition or system.

To dynamically add or remove Linux logical partitions, you need to install additional software.

These RPM packages are available at the Service and productivity tools Web site at

https://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/home.html .

Related information

Installing required additional software for the Linux operating system

Dynamically managing physical I/O devices and slots on Linux:

Learn how to dynamically add, remove, and move physical I/O devices and slots from one running logical partition to another using the Hardware Management Console (HMC). Learn how to make Linux recognize the changes in the available resources.

This topic describes how to manage physical I/O devices and slots on Linux, limitations to this capability, and ways to work around those limitations.

Linux distributions Red Hat Enterprise Linux version 4 or SUSE Linux Enterprise Server 9 or later are required to dynamically move I/O devices and slots to or from a Linux logical partition.

If you add slots with adapters, the devices are automatically configured by Linux kernel modules (rpaphp and PCI Hotplug Core). However, after the devices have been added with the HMC, you must log in to the running Linux logical partition as root so you can set up those devices that have been added using the appropriate user space tools, such as the mount command or the ifup command.

If you remove adapters for storage devices, you must unmount the file systems on those devices before you remove the slots and adapters. Also, if you remove network adapters, you should shut down the network interfaces for those devices before removing the slots and adapters.

Logical partitions can have desired or required I/O devices or slots. When you specify that an I/O device or slot is desired (or shared), this means that the I/O device or slot is optional. When you specify that an I/O device or slot is required (or dedicated), then you cannot activate the logical partition if the I/O device or slot is unavailable or in use by another logical partition.

Note: If resources are moved dynamically, the configuration change is temporary and is not reflected in the partition profile. This means that all configuration changes will be lost the next time the partition

profile is activated. To save your new partition configuration, modify the partition profile. For more information on changing the partition profile properties, see Changing partition profile properties using version 6 or earlier of the HMC.

To **add** physical I/O devices or slots to a running logical partition, follow these steps on the HMC:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server on which the logical partitions are located.
4. Open **Partitions**.
5. Right-click the logical partition and select **Dynamic Logical Partitioning** → **Adapter Resources** → **Add**.
6. In the **Current** area, open the unit with the physical I/O device or slot, open the planar with the physical I/O device or slot, and select the line corresponding to the physical I/O device or slot.
7. Select the I/O pool for the physical I/O device or slot (if any).
8. Click **Advanced** and adjust the settings there. You might need to increase the value in the **Timeout setting** field to allow enough time for the HMC to complete the operation. These settings relate to how the managed system adds the physical I/O device or slot dynamically. These settings are not retained after the change is completed.
9. Click **OK**.

Related tasks

"Changing partition profile properties using version 6 or earlier of the HMC" on page 176
You can change the properties of a partition profile using the Hardware Management Console (HMC). Changing the properties of a partition profile will change the resource amounts that are assigned to a logical partition when you shut down and restart the logical partition using the changed partition profile.

Remove physical I/O devices or slots from a running logical partition:

To **remove** physical I/O devices or slots from a running logical partition, follow these steps on the HMC:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server on which the logical partitions are located.
4. Open **Partitions**.
5. Right-click the logical partition and select **Dynamic Logical Partitioning** → **Adapter Resources** → **Remove**.
6. In the **Current** area, open the unit with the physical I/O device or slot, open the planar with the physical I/O device or slot, and select the line corresponding to the physical I/O device or slot.
7. Click **Advanced** and adjust the settings there. You might need to increase the value in the **Timeout setting** field to allow enough time for the HMC to complete the operation. These settings relate to how the managed system removes the physical I/O device or slot dynamically. These settings are not retained after the removal is completed.
8. Ensure that any devices attached to the I/O processor you want to remove are not busy. Unmount the file systems on any storage devices you are removing, and shut down any network interfaces on network devices you are removing.
9. Click **OK**.

Move physical I/O devices or slots:

To **move** physical I/O devices or slots from one a running logical partition to another using the HMC, follow these steps:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.

3. In the contents area, open the server on which the logical partitions are located.
4. Open **Partitions**.
5. Right-click the logical partition and select **Dynamic Logical Partitioning → Adapter Resources → Move**.
6. In the **Current** area, open the unit with the physical I/O device or slot, open the planar with the physical I/O device or slot, and select the line corresponding to the physical I/O device or slot.
7. In **Logical Partition**, select the logical partition to which you want to move the physical I/O device or slot.
8. Click **Advanced** and adjust the settings there. You might need to increase the value in the **Timeout setting** field to allow enough time for the HMC to complete the operation. These settings relate to how the managed system moves the physical I/O device or slot dynamically. These settings are not retained after the move is completed.
9. Ensure that any devices attached to the I/O processor you want to remove are not busy. Unmount the file systems on any storage devices you are removing, and shut down any network interfaces on network devices you are removing.
10. Click **OK**.

Dynamically managing processing power on Linux:

Learn how to dynamically move processors from one running logical partition to another using the HMC. Processing power can be moved based on the desired, minimum, and maximum values that you created for the profile.

Linux distributions Red Hat Enterprise Linux version 4 or SUSE Linux Enterprise Server 9 or later are required in order to dynamically move processing power to or from a Linux logical partition.

The ability to move processor power dynamically becomes important when you need to adjust to changing workloads. The desired processing value you establish is the amount of processing resources that you get if you do not overcommit the processing power. The minimum and maximum values enable you to establish a range within which you can dynamically move the processors.

Note: If resources are moved dynamically, the configuration change is temporary and is not reflected in the partition profile. This means that all configuration changes will be lost the next time the partition profile is activated. If you wish to save your new partition configuration, you should modify the partition profile. For more information on changing the partition profile properties, see Changing partition profile properties using version 6 or earlier of the HMC.

To **add** processor resources dynamically to a running logical partition, follow these steps:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server on which the logical partitions are located.
4. Open **Partitions**.
5. Right-click the logical partition that is currently using the processor resources that you want to add, and select **Dynamic Logical Partitioning → Processor Resources → Add**.
6. Specify the amount of processor resources you want to add. If the logical partition uses processors from the shared processor pool, you can change the logical partition's sharing mode, uncapped weight, and number of virtual processors.
7. Click **Advanced** and adjust the settings there. You might need to increase the value in the **Timeout setting** field to allow enough time for the HMC to complete the operation. (These settings relate to how the managed system adds the processor resources dynamically. These settings are not retained after the addition is completed.)
8. Click **OK**.

Related tasks

"Changing partition profile properties using version 6 or earlier of the HMC" on page 176
You can change the properties of a partition profile using the Hardware Management Console (HMC). Changing the properties of a partition profile will change the resource amounts that are assigned to a logical partition when you shut down and restart the logical partition using the changed partition profile.

Remove processor resources dynamically:

To **remove** processor resources dynamically from a running logical partition, follow these steps:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server on which the logical partitions are located.
4. Open **Partitions**.
5. Right-click the logical partition that is currently using the processor resources that you want to move, and select **Dynamic Logical Partitioning** → **Processor Resources** → **Remove**.
6. Specify the amount of processor resources you want to remove. If the logical partition uses processors from the shared processing pool, you can change the logical partition's sharing mode, uncapped weight, and number of virtual processors.
7. Click **Advanced** and adjust the settings there. You might need to increase the value in the **Timeout setting** field to allow enough time for the HMC to complete the operation. (These settings relate to how the managed system removes the processor resources dynamically. These settings are not retained after the removal is completed.)
8. Click **OK**.

Move processors from one running logical partition to another:

To **move** processors from one running logical partition to another using the HMC, follow these steps:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server on which the logical partitions are located.
4. Open **Partitions**.
5. Right-click the logical partition that is currently using the processor resources that you want to move, and select **Dynamic Logical Partitioning** → **Processor Resources** → **Move**.
6. Specify the amount of processor resources that you want to move and the logical partition to which you want to move the processor resources. If either logical partition uses processing resources from the shared processor pool, you can change the sharing mode, uncapped weight, and number of virtual processors for the logical partition.
7. Click **Advanced** and adjust the settings there. You might need to increase the value in the **Timeout setting** field to allow enough time for the HMC to complete the operation. (These settings relate to how the managed system moves the processor resources dynamically. These settings are not retained after the move is completed.)
8. Click **OK**.

Saving the partition configuration to a partition profile:

Use this procedure to save the current configuration of a logical partition to a new partition profile using a Hardware Management Console (HMC). Use this procedure if you change the configuration of a logical partition using dynamic logical partitioning and you do not want to lose the changes when you reactivate the logical partition. This procedure allows you to save the changed configuration to a new partition profile instead of having to enter the changed resource allocations manually.

You can perform this procedure at any time after you initially activate a logical partition.

To save the current configuration of a logical partition to a new partition profile, you must be a super administrator, service representative, operator, or product engineer. For more information about user roles, refer to Tasks and roles.

You can perform this procedure on active logical partitions and on logical partitions that are shut down. In either of these cases, the HMC reads the partition configuration that is stored for the logical partition in the server firmware and saves this partition configuration to the specified partition profile. For active logical partitions, the partition configuration that is stored in the server firmware is the current partition configuration of the logical partition. For logical partitions that are shut down, the partition configuration that is stored in the server firmware is the partition configuration at the time that you shut down the logical partition. Regardless of the state of the logical partition at the time that you perform this procedure, the procedure allows you to save the dynamic logical partitioning changes to a partition profile and use the partition profile to reactivate the logical partition without losing those changes.

After you shut down a logical partition, other logical partitions can use the resources that were used by that logical partition when the logical partition was active. Therefore, the resources available on the managed system might not support the logical partition configuration that is stored in the server firmware for the inactive logical partition. After you save the partition configuration of a logical partition that is shut down, verify that the resources available on the managed system can support the logical partition configuration that you saved to a partition profile.

When you save the partition configuration to a new partition profile, the desired amounts of memory, processors, processing units, and virtual processors in the new partition profile are set to the current amounts from the partition configuration. The minimum and maximum amounts of memory, processors, processing units, and virtual processors in the new partition profile are set to the minimum and maximum amounts from the partition configuration. For example, you start a logical partition using a partition profile that specifies a minimum of 512 MB of memory, a maximum of 2 GB of memory, and 1 GB as the desired amount of memory. The managed system has over 1 GB of memory available, so the logical partition has 1 GB of memory when it starts. You then add 1 GB of memory to the logical partition for a total of 2 GB of memory. If you shut down the logical partition, and then save the partition configuration, the resulting partition profile specifies a minimum of 512 MB of memory, a maximum of 2 GB of memory, and 2 GB as the desired amount of memory. Likewise, if the model and edition feature of the managed system allow you to assign percentages of the 5250 CPW capability of the managed system to i5/OS logical partitions, the minimum, desired, and maximum percentage of 5250 CPW in the new partition profile are the minimum, current, and maximum percentages of 5250 CPW from the partition configuration.

The physical and virtual I/O devices that are set as required in the active partition profile are saved as required devices in the new partition profile. The physical and virtual I/O devices that are set as desired in the active partition profile or that were added to the logical partition through dynamic logical partitioning are saved as desired devices in the new partition profile. The partition workload group on the logical partition (if any) is saved as the partition workload group on the new partition profile.

To save the current configuration of a logical partition to a new partition profile, complete the following:

1. In the navigation area of the HMC, open the object with the same name as your HMC, open **Server and Partition**, and select **Server Management**.
2. In the contents area of the HMC, open the managed system, open **Partitions**, and right-click the logical partition whose configuration you want to save and select **Save**.
3. Enter the name of the new partition profile into **New profile** and click **OK**.

After you save the partition configuration to a new partition profile, verify that the new partition profile is set the way that you want. In particular, verify that the required and desired settings are set correctly for your I/O devices. By default, physical and virtual I/O devices that are added to the logical partition using dynamic logical partitioning are saved as desired devices in the new partition profile. If you want

any of these I/O devices to be required, you must change the partition profile so that the I/O device is required. For more information on changing partition profiles, see Changing partition profile properties using version 6 or earlier of the HMC.

Related tasks

"Changing partition profile properties using version 6 or earlier of the HMC" on page 176
You can change the properties of a partition profile using the Hardware Management Console (HMC). Changing the properties of a partition profile will change the resource amounts that are assigned to a logical partition when you shut down and restart the logical partition using the changed partition profile.

Related information

Tasks and roles

Managing logical-partition and operating-system security

When all logical partitions are managed by the Hardware Management Console, you can control who has access to the HMC and the system. You can also use the IBM eServer Security Planner to help you plan a basic security policy for each of the operating systems on your system.

When all logical partitions are managed by the Hardware Management Console (HMC), the system administrator for the HMC can control who has access to the HMC and the managed systems by creating HMC user roles. The user roles control who can access different parts of the HMC and what tasks they can perform on the managed system.

For more information about securing the HMC and protecting your server, refer to Working with users, roles, and passwords, System Manager Security, or Tasks and roles.

You can use the IBM eServer Security Planner to help you plan a basic security policy for each of the operating systems on your IBM Systems or eServer hardware. The planner provides you with a list of recommendations for setting password rules, resource-access rules, logging and auditing rules, and other security settings that are specific to the operating system.

For more information about protecting your operating system, refer to the IBM eServer Security Planner.

Backing up and recovering Linux installations

It is crucial that you back up your data because you never know when you may need to do a server recovery. You may not be prepared to recover from certain types of disk failures if you do not regularly perform backups. Learn how to back up and restore Linux installations on IBM Systems and eServer hardware.

Backing up and recovering Linux:

It is crucial that you back up your data because you never know when you may need to do a server recovery. You may not be prepared to recover from certain types of disk failures if you do not regularly perform backups. Learn about backing up and recovering a Linux installation on IBM System p or eServer System p hardware .

Backing up and recovering partitioned data

Linux on managed systems supports numerous file systems, but those files systems do not share a universal backup-and-restore function. The most commonly used journaling file systems are ext3, Reiser FS, SGI XFS, and IBM JFS. Backup of the ext3 file system is supported by the dump and restore programs. SGI XFS has its own pair of backup utilities: xfsdump and xfsrestore. The Reiser FS and IBM JFS do not have backup programs; the only method currently available for backing up Reiser FS and JFS on Linux is the GNU tar program.

Note: The GNU tar program supports file-system-level backups. It does not operate on the i-node level. It is slower than the dump utility, but it does not care about the underlying file system type. It supports incremental backups and backup of special devices, which is not common for tar implementations.

Backing up and restoring partition profile data

On servers, the HMC is used to back up and restore partition profiles.

Back up profile data

To back up profile data, do the following.

1. In the Contents area, select the managed system.
2. From the menu bar, choose **Selected** → **Profile Data** → **Backup** to open the **Profile Data Backup** window.
3. Type the file name in the **Backup** filename field, then click **OK**. The backup file is saved in the `/var/hsc/profiles/MT-MDL*S/N` directory on the HMC, as shown in the following example.

```
[user1@remote_host]$ ssh -l hscroot itsohmc.itsc.austin.ibm.com

hscroot@itsohmcs password: XXXXXX

[hscroot@itsohmc]$ cd /var/hsc/profiles/7040-681*021768A

[hscroot@itsohmc 7040-681*021768A]$ ls -l

total 40

-rw-r--r-- 1 root root 20464 Nov 27 12:00 backupFile

-rw-r--r-- 1 root root 20464 Nov 27 12:18 ITSO_p690
```

MT, MDL, and S/N are the system machine type, model, and serial number.

Restore profile data

To restore profile data, do the following:

1. In the **Contents** area, select the managed system.
2. From the menu bar, choose **Selected** → **Profile Data** → **Restore** to open the **Profile Data Restore** window.
3. Select the backup file name that you want to restore from the list.
4. Select one of the following options.
   - **Full restore from the selected backup file:** Restores all profile data using only your backup file. Profile modifications performed after the selected backup file was created will be lost.
   - **Backup priority – merge current profile and backup:** Merges the stored backup with recent profile activity. If information conflicts, the stored backup data is restored over the recent profile activity. Note: Select this option for a managed system in the Recovery state.
   - **Managed system priority – merge current profile and backup:** Merges recent profile activity with the stored backup. If information conflicts, the recent profile activity is restored over the stored backup data.
5. Click **OK**.

Backing up and recovering Linux logical partitions that use i5/OS virtual I/O resources:

When you create a Linux logical partition that uses resources from an i5/OS logical partition, you can manage backup and recovery using i5/OS control language (CL) commands, Linux commands, or a combination of the two.

For more information on planning your backup strategy, see the i5/OS Backup and recovery topic.

To save Linux data in a logical partition that uses i5/OS resources to a shared tape drive and restore the data from the tape drive, you can use either the Linux **tar** command or the i5/OS Save (SAV) and Restore (RST) commands. You can also use the **tar** command to save your data to a file. If you use the **tar** command to save data, the only way you can restore that data is by using the **tar** command again. Similarly, if you use the SAV command to save data, the only way you can restore that data is by using the RST command. The two methods of backing up and restoring data are not compatible.

The following restrictions apply:

- To use the tape device from Linux, you must vary the tape off under i5/OS .
- To use the i5/OS SAV or RST command to save or restore the NWSD, Linux must be inactive (that is, the NWSD must be varied off).
- Saving the storage space is typically faster than saving by using the **tar** command, but it does not provide file-level backup and recovery.
- Linux does not support switching tapes in a library device. You can only use the tape that is currently in the device.
- You cannot save i5/OS data and **tar** data on the same tape volume.

Backing up and recovering Linux files using the tar command:

The most common data backup utility in Linux is the **tar** (tape archive) utility. Use the Linux **tar** command if you have Linux installed on a dedicated disk or if you cannot vary off a Linux partition while you are backing up data.

Backups using the Linux **tar** command are at the file level. They save only the files and directories that the **tar** command specifies. Therefore, you cannot use the **tar** command to save Linux data that is not in the file server. For example, you cannot save a kernel in the PowerPC Reference Platform (PReP) start partition by using the **tar** command.

One advantage of the **tar** command is that it supports incremental backups and backup of special devices, which is not common for tar implementations. Also, the **tar** command backs up files without regard to the underlying file system type.

Backing up and recovering Linux partitions using i5/OS commands:

If you have a Linux logical partition that uses i5/OS resources, tools are available in i5/OS for backup and recovery. You can use the Save (SAV) and Restore (RST) control language (CL) commands to save and restore entire virtual disks in their current state.

The SAV command saves the directory that has the same name as the virtual disk under the QFPNWSSTG directory in the integrated file system. This method of backup and recovery is most effective if the Linux kernel is saved in a PowerPC Reference Platform (PReP) start partition on the virtual disk. On most Linux distributions, this usually occurs as part of a default installation.

Backups using i5/OS commands are at drive level. This means that i5/OS backs up the entire contents of a virtual disk, or network storage space, rather than individual files. Thus, the correct SAV command backs up any information on the drive, including a kernel in the PReP start partition.

If you save the Linux kernel in a PReP partition, you can restore and start the partition after a total system reinstallation. You can also transport and restore saved virtual disks to other IBM System i servers using File Transfer Protocol (FTP) and tape.

Backing up the network server description and virtual disk drives associated with a Linux partition:

Learn about how to back up the data for a Linux logical partition that uses i5/OS resources.

Backing up the data for a Linux logical partition that uses i5/OS resources is different from backing up the data for a Linux logical partition that uses its own resources. When you install the logical partitions with virtual disk, the i5/OS logical partition that shares resources creates a network server description and creates disk drives for your Linux logical partition that you need to back up. Some of the disk drives are server-related (the installation and server drives), while others are user-related. Because your Linux logical partition might consider the disk drives to be a unified server, you must save all the disk drives and the network server description so they restore correctly.

The implementation of a logical partition for IBM System i servers allows you to save and restore virtual disks as i5/OS network-server storage space objects. These objects are saved as part of the i5/OS server when you perform a full i5/OS server backup. You can also specifically save the network server description and storage spaces that are associated with a logical partition on an IBM System i server. Daily backup of the server drive is a good practice.

Building a rescue image on a network storage space:

You can build a rescue image on a network storage space (NWSSTG) to assist you in checking and repairing a faulty Linux installation.

A *rescue image* is a disk image that contains the Linux kernel, a shell, and the diagnostic tools, drivers, and other utilities that would be useful for checking and repairing a faulty Linux installation. Many Linux distributors include a rescue image on their installation disks. One rescue solution for a logical partition is to create a small NWSSTG that can remain on the integrated file system solely for the purpose of rescuing logical partitions. You can install a rescue image to the NWSSTG when you create your logical partition.

Before creating a rescue image on network storage, it is important to document the configuration information for each of your logical partitions.

1. Document the drive configuration information, which is located in the /etc/fstab file.
2. Capture the networking information that is reported when you run the **ifconfig** command.
3. Create a list of the modules that are needed by each logical partition. You can see which modules are in use by using the **lsmod** command from within Linux. Use the information obtained from the commands and files listed above to determine which files to store on your rescue network storage space.

To build a rescue image on an NWSSTG, follow these steps:

1. Determine how much network storage space you need to build the rescue image. Consult your Linux documentation to see how much space is required for a minimum installation of your distribution, and add enough space to create a swap partition (a PowerPC Reference Platform (PReP) start partition) and to install any extra software that you would like to have available in your rescue image. For example, if the documentation states that a minimum server installation is 291 MB, create a storage space of 425 MB.
2. Create a network storage space (CRTNWSSTG) of the size you determined for the rescue image. You might want to make a note in the storage space description field that indicates which distribution was used to make the rescue image and warns that it should be saved.

3. Link this storage space to a network server description (NWSD). You do not need to create a new NWSD for this step. You could unlink an existing storage space and temporarily link your rescue storage space to any of your existing NWSDs.
4. Start the installation server for your distribution as described in the documentation and follow the prompts. To partition your installation manually, ensure that you create a PReP start partition. At the point where you select the packages to install, select the minimum number of packages supported. The name for the package group varies by distribution.
5. Allow the installer to complete its package installation and configuration. After installation has finished, the installer starts the rescue image for you.
6. Verify that the rescue image has all the utilities that you need. For a logical partition, at a Linux command prompt, type `rpm -qa | grep ibmsis` to make sure that the utilities that work with the integrated disk are available.
7. Ensure that the device drivers that your logical partitions require are installed. For example, verify that pcnet32 is installed for Ethernet devices, or that olympic is installed for token-ring devices. The kernel modules that have been compiled can be found in the /lib/modules/kernel version/kernel/drivers directory or in directories under that directory.
8. Install any other special drivers or software packages that your logical partitions require.
9. Use File Transfer Protocol (FTP) to send the files with the configuration information for your other logical partitions to the rescue server network storage space.
10. Install the kernel manually (if you are required to do so by your Linux distribution). For details regarding installing the kernel, consult the appropriate installation documentation for your distribution.
11. Make note of the path to the root partition on the rescue-storage space. You must use this information to start the rescue network storage space from the network. To determine the root partition, type the command `cat /etc/fstab`. The partition that has a forward slash (/) in the second column is your root partition. For further assistance in determining the root partition, see the documentation for your distribution.

You can shut down your logical partition by typing `shutdown -h now` and varying off the partition after the shutdown has completed. After the partition has varied off, you can unlink the rescue storage space and relink the normal storage space for the NWSD.

Using a rescue image from a network-server storage space:

You can use a Linux rescue image on a network-server storage space (NWSSTG) to repair a Linux logical partition that uses i5/OS resources. A *rescue image* is a disk image that contains the Linux kernel, a shell, and the diagnostic tools, drivers, and other utilities that would be useful for checking and repairing a faulty Linux installation.

To use the rescue image that you built on the NWSSTG, use the following steps:

1. Disconnect the virtual storage space for the failed logical partition (if applicable) by using the Work with NWS Storage Spaces (WRKNWSSTG) command.
2. Connect your rescue storage space as the first drive to the network server description (NWSD), and reconnect the original storage space (where applicable) as the second drive.
3. Edit the NWSD for the failed partition so that it starts from IPL source *NWSSTG. Also, edit the IPL Parameters field to reflect the root partition on the rescue storage space. For most distributions, this is a parameter such as `root=/dev/sda3` or `root=/dev/vda1`. For assistance, see the documentation for your Linux distribution.
4. Restart the partition.
5. If the existing root partition is on a dedicated disk, you might need to insert the `ibmsis` driver using the `insmod ibmsis` command.
6. Create a mount point to which you will mount the root partition of the network storage space that you are trying to rescue. You can use a command such as `mkdir /mnt/rescue`.

7. Mount the root partition of the network storage space that you are trying to rescue. Mount a drive using the command `mount -t partition-type partition-location mount-point`, where the partition type is the format of the partition such as ext2 or reiserfs, the partition location is similar to /dev/sdb3 (for non-devfs disk partitions), /dev/sd/disc1/part3 (for devfs disk partitions), or /dev/sda2 (for a partition on a dedicated disk).
8. The drive that you are trying to rescue, when using virtual disk, will be the second drive rather than the first drive. (That is, if the drive was /dev/sda3 when the partition was running normally, it will be /dev/sdb3 in the rescue server.)
9. Use the documentation or the configuration files you created when you created the rescue NWSSTG to help you determine the device for the root of the partition you are trying to rescue. Your mount point will be similar to /mnt/rescue if you use the previous example.

You can either use the rescue tools provided in your rescue storage space against the mount point you have created or you can work on the partition that you are rescuing from within its own storage space. If rescuing the image from its own storage space, change the root directory for that partition using the `chroot mount-point` command.

Backing up network server descriptions for a Linux partition:

When you save the storage space objects that are associated with a logical partition that uses virtual disks, you must also save the network server description (NWSD). Otherwise, a logical partition might not be able to re-establish items such as the file-system permissions for the partition.

Use the Save Configuration (SAVCFG) command to save the network server description:

1. On the i5/OS command line, type `SAVCFG`.
2. Press Enter to save the NWSD configuration.

The Save Configuration command (SAVCFG) saves the objects associated with an NWSD and the current static network-server storage spaces. This command does not save the links associated with the dynamically added storage spaces. You must add these links manually after the configuration and the dynamically linked storage spaces have been restored.

Restoring network-server descriptions for a Linux partition:

In a disaster-recovery situation, you would restore all the configuration objects, which include the network-server description (NWSD) for your logical partition. In some situations, you must specifically restore the NWSD. For example, you must restore the NWSD when you migrate to new hardware.

To have i5/OS automatically relink disk drives within the integrated file system to the restored NWSD, restore those disk drives first.

To restore the NWSD, use the Restore Configuration (RSTCFG) command:

1. On an i5/OS command line, type `RSTCFG` and press F4 (Prompt).
2. In the **Objects** field, specify the name of the NWSD.
3. In the **Device** field, specify which device you are using to restore the NWSD. If you are restoring from media, specify the device name. If you are restoring from a save file, specify *SAVF and identify the name and library for the save file in the appropriate fields.
4. Press Enter to restore the NWSD.
5. When you have restored the NWSD and all of its associated storage spaces, start (vary on) the logical partition.

Unlinking virtual disk drives from a Linux logical partition:

By unlinking virtual disk drives (network-server storage spaces) from a Linux logical partition that uses i5/OS resources, you disconnect the virtual disk drives from the logical partition, making the virtual disk drives inaccessible to users. If you delete a Linux logical partition that uses i5/OS resources, you must unlink all virtual disk drives from the logical partition before you delete the logical partition.

To unlink a virtual disk drive from a Linux logical partition that uses i5/OS resources, follow these steps:

1. Unlink disk drives from a logical partition using iSeries Navigator. If you prefer to use a character-based interface, go to step 2 on page 93.
   a. Vary off the NWSD for your logical partition. For more information, see Starting and stopping the NWSD.
   b. Click **Network** → **Windows Administration** → **Disk Drives**.
   c. Right-click the name of the disk drive that you want to unlink.
   d. Click **Remove Link**.
   e. Select a server from the list of linked servers.
   f. If you are unlinking a disk drive that you plan to relink later, uncheck **Compress link sequence**. You must relink the disk drive as the same link sequence number before you vary on the server. By preventing compression of the link sequence values, you avoid having to unlink and relink all the disk drives to get them in the correct sequence.
   g. Click **Remove**.
   h. You have completed this procedure. Do not complete step 2 on page 93.
2. Unlink disk drives from a logical partition using a character-based interface:
   a. Vary off the NWSD for your logical partition. For more information, see Starting and stopping the NWSD.
   b. Type `RMVNWSSTGL` and press F4.
   c. In the Network-server storage space field, type the name of the storage space that you want to unlink and press Enter.
   d. In the Network server description field, type the name of the server from which you want to unlink the storage space and press Enter.
   e. If you are unlinking a linked disk drive that you plan to relink later, specify *NO in the Renumber field.

      Note: You must relink the disk drive as the same sequence number before you vary on the server. By preventing automatic renumbering, you avoid having to unlink and relink all the disk drives to get them in the correct sequence.
   f. Press Enter.

      Note: If you are uninstalling a logical partition, your next step is to delete the disk drive. For more information on deleting disk drives, see Deleting virtual disk drives for a logical partition. Otherwise, vary on the NWSD for your logical partition. For more information about starting the NWSD, see Starting and stopping the NWSD.

For more information about saving i5/OS server objects, see Saving server objects in i5/OS.

Related concepts

"Saving Linux server objects in i5/OS" on page 93
When a Linux logical partition uses i5/OS resources, i5/OS stores Linux information in i5/OS objects.i5/OS can restore the objects correctly only if you save all objects for a Linux logical partition.

Related tasks

"Deleting virtual disk drives for a Linux logical partition" on page 91
You can delete a virtual disk drive from a Linux logical partition that uses i5/OS resources to make the space available to the i5/OS logical partition once more. When you delete a virtual disk drive, all of the information on the virtual disk drive is erased.

"Starting the network-server description for a Linux logical partition" on page 86
You can start the network-server description (NWSD) for a Linux logical partition that uses i5/OS resources to make the resources defined in the NWSD available to the Linux logical partition.

Deleting virtual disk drives for a Linux logical partition:

You can delete a virtual disk drive from a Linux logical partition that uses i5/OS resources to make the space available to the i5/OS logical partition once more. When you delete a virtual disk drive, all of the information on the virtual disk drive is erased.

Before you can delete a disk drive, you must unlink it from the network-server description. For more information on how to unlink a virtual disk drive from an NWSD, see Unlinking virtual disk drives from a Linux logical partition.

To delete a virtual disk drive, follow these steps:

Delete the disk drive using the interface that you prefer.

Interface	Actions
iSeries Navigator	Complete the following steps: 1. Click **Network → Windows Administration → Disk Drives**. 2. Right-click the disk drive that you want to delete. 3. Click **Delete**. 4. Click **Delete** in the confirmation window.
i5/OS character-based interface	Complete the following steps: 1. At an i5/OS control language (CL) command line, type `DLTNWSSTG` and press F4. 2. Type the name of the disk drive in the Network-server storage space field and press Enter.

Related tasks

"Unlinking virtual disk drives from a Linux logical partition" on page 92
By unlinking virtual disk drives (network-server storage spaces) from a Linux logical partition that uses i5/OS resources, you disconnect the virtual disk drives from the logical partition, making the virtual disk drives inaccessible to users. If you delete a Linux logical partition that uses i5/OS resources, you must unlink all virtual disk drives from the logical partition before you delete the logical partition.

Saving Linux server objects in i5/OS:

When a Linux logical partition uses i5/OS resources, i5/OS stores Linux information in i5/OS objects.i5/OS can restore the objects correctly only if you save all objects for a Linux logical partition.

You can save these objects by using options of the i5/OS GO SAVE command in the server.

- Option 21 saves the entire server.
- Option 22 saves server data, which includes objects in the QUSRSYS library.
- Option 23 saves all user data, which includes objects in the QFPNWSSTG library.

If you want to save a particular object, use the following table to see the location of that object on i5/OS and the command to use. For more information about using the save commands, see the i5/OS Backup and recovery topic collection.

Table 12. Objects to save for logical partitions with virtual disk

Object content	Object name	Object location	Object type	Save command
Guest partition and virtual disk drive	stgspc	/QFPNWSSTG	User-defined network-server storage spaces in system auxiliary storage pool (ASP)	GO SAV, option 21 or 23
				SAV OBJ('/QFPNWSSTG/stgspc') DEV('/QSYS.LIB/TAP01.DEVD')
			User-defined network-server storage spaces in user ASP	SAV OBJ(('/QFPNWSSTG/stgspc') ('/dev/QASPnn /stgspc.UDFS')) DEV('/QSYS.LIB/TAP01.DEVD')

Table 13. Objects to save for all logical partitions with a server

Object content	Object name	Object location	Object type	Save command
Messages from the logical partition	Various	Various	Server message queue	GO SAVE, option 21 or 23
				SAVOBJ OBJ(msg) LIB(qlibrary) DEV(TAP01) OBJTYPE(*MSGQ)
i5/OS configuration objects for logical partitions	Various	QSYS	Device configuration objects	GO SAVE, option 21, 22, or 23
				SAVOBJ DEV (TAPO1)
Various	Various	QUSRSYS	Various	GO SAVE, option 21 or 23
				SAVLIB LIB(*NONSYS) or LIB(*ALLUSR)

Related tasks

"Unlinking virtual disk drives from a Linux logical partition" on page 92
By unlinking virtual disk drives (network-server storage spaces) from a Linux logical partition that uses i5/OS resources, you disconnect the virtual disk drives from the logical partition, making the virtual disk drives inaccessible to users. If you delete a Linux logical partition that uses i5/OS resources, you must unlink all virtual disk drives from the logical partition before you delete the logical partition.

Related information

Backup and recovery

Using Linux installed on a logical partition

Learn how to shut down and restart Linux when it is installed on a logical partition and how you can integrate Linux with i5/OS applications and data.

To use logical partitions on an IBM eServer OpenPower system, you need the appropriate Advanced POWER Virtualization technologies activated in your system's Hardware Management Console.

RPM packages are available at the Service and productivity tools Web site at

https://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/home.html .

Related information

Advanced POWER Virtualization

Shutting down and restarting Linux in a logical partition using version 6 or earlier of the HMC

You can shut down and restart Linux using the HMC.

To use features that require logical partitions on an IBM eServer OpenPower system, you need the appropriate Advanced POWER Virtualization technologies activated in your system's Hardware Management Console (HMC).

Shutting down Linux logical partitions using version 6 or earlier of the HMC:

You can shut down Linux logical partitions and the Linux operating system using the Hardware Management Console (HMC).

Related tasks

"Resetting the managed system to a nonpartitioned configuration using version 6 or earlier of the HMC" on page 173

You can erase all of your logical partitions and reset the managed system to a nonpartitioned configuration. When you reset the managed system, all of the physical hardware resources are assigned to a single logical partition. This allows you to use the managed system as if it were a single, nonpartitioned server.

Delayed shutdown of the operating system:

When you use the delayed shutdown option, the Hardware Management Console (HMC) issues the Linux **shutdown -h +1** command to shut down the logical partition normally. To perform a delayed shutdown of the operating system using version 6 or earlier of the HMC, complete the following:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server on which the logical partition resides.
4. Open **Partitions**.
5. Right-click the logical partition that you want to shut down and select **Shut Down Operating System**.
6. Select **Delayed** and click **OK**.

Immediate shutdown of the operating system:

When you use the immediate shutdown option, the Hardware Management Console (HMC) issues the Linux **shutdown -h now** command to shut down the logical partition as quickly as possible, bypassing messages to other users. To perform an immediate shutdown of the operating system using version 6 or earlier of the HMC, complete the following:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server on which the logical partition resides.
4. Open **Partitions**.
5. Right-click the logical partition that you want to shut down and select **Shut Down Operating System**.
6. Select **Immediate** and click **OK**.

Delayed shutdown of a logical partition:

When you use the delayed shutdown option, the logical partition waits a predetermined amount of time to shut down. This allows the logical partition time to end jobs and write data to disks. To perform a delayed shutdown of a Linux logical partition using version 6 or earlier of the HMC, complete the following:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server on which the logical partition resides.
4. Open **Partitions**.
5. Right-click the logical partition that you want to shut down and select **Shut Down Partition**.
6. Select **Delayed** and click **OK**.

Immediate shutdown of a logical partition:

When you use the immediate shutdown option, the system shuts down without any preset delay. To perform an immediate shutdown of a Linux logical partition using version 6 or earlier of the HMC, complete the following:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server on which the logical partition resides.
4. Open **Partitions**.
5. Right-click the logical partition that you want to shut down and select **Shut Down Partition**.
6. Select **Immediate** and click **OK**.

Restarting Linux logical partitions using version 6 or earlier of the HMC:

You can restart Linux logical partitions or the Linux operating system using the Hardware Management Console (HMC). Restarting a logical partition shuts the partition down and then starts it again.

Immediate restart of a logical partition:

When you use the immediate restart option, the logical partition is restarted as quickly as possible, without notifying the logical partition. To perform an immediate restart of a Linux logical partition using version 6 or earlier of the HMC, complete the following:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server on which the logical partition resides.
4. Open **Partitions**.
5. Right-click the logical partition that you wish to shut down and select **Restart Partition**.
6. Select **Immediate** and click **OK**.

Restart of a logical partition with main storage or system memory dump:

When you use this option, the HMC initiates a main storage or system memory dump on the logical partition and restarts the logical partition after the dump. To restart a Linux logical partition with a main storage or system memory dump using version 6 or earlier of the HMC, complete the following:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server on which the logical partition resides.
4. Open **Partitions**.
5. Right-click the logical partition that you wish to shut down and select **Restart Partition**.

6. Select **Dump** and click **OK**

Normal restart of the operating system:

When you use the normal restart option, the HMC issues the Linux **shutdown -r +1** command to shut down and restart the logical partition normally. To perform a normal restart of the operating system using version 6 or earlier of the HMC, complete the following:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server on which the logical partition resides.
4. Open **Partitions**.
5. Right-click the logical partition that you wish to shut down and select **Restart Operating System**.
6. Click **OK**.

Immediate restart of the operating system:

When you use the immediate restart option, the Hardware Management Console (HMC) issues the Linux **shutdown -r now** command to shut down and restart the logical partition as quickly as possible, bypassing messages to other users. To perform an immediate restart of the operating system using version 6 or earlier of the HMC, complete the following:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server on which the logical partition resides.
4. Open **Partitions**.
5. Right-click the logical partition that you wish to shut down and select **Restart Operating System**.
6. Select **Immediate** and click **OK**.

Application support

Learn how to integrate Linux with i5/OS applications and data.

Samba support with i5/OS Netserver:

Learn about Linux integration with i5/OS applications.

Server Message Block (SMB) is a file-sharing protocol that is commonly used by Windows PCs. Whenever a network drive is mapped from a Windows PC to another Windows PC, the SMB TCP/IP protocol is being used.

Samba implements the SMB/CIFS standard on UNIX operating systems. This protocol enables file sharing among SMB-enabled operating systems, including i5/OS with NetServer.

Samba allows Linux PCs and servers to interact with existing Windows PCs and file servers without requiring any additional software. i5/OS Netserver supports Linux Samba clients.

You can use a Samba server to run printers and authenticate users, share files, and directories, just like Microsoft Windows. Samba can also act as a Primary Domain Controller (PDC) or as a Backup Domain Controller (BDC) in your Windows network. You can use it to run OpenLDAP and add LDAP function to your Windows Network without the expense. You can use Samba and NetServer to share printers and files on IBM Systems or eServer Linux partitions.

Accessing i5/OS data using Linux ODBC driver:

The IBM eServer i5 Open Database Connectivity (ODBC) Driver for Linux allows you to access the IBM eServer i5 database data from Linux applications written to the ODBC API. It is based on the ODBC driver in the IBM eServer i5 Access Express for Windows product.

Refer to Linux for iSeries for more information on using the Linux ODBC driver.

Related information

Linux for iSeries Web site

Troubleshooting Linux logical partitions

Learn how to resolve Linux logical partition errors.

Troubleshooting

If you have problems with a partitioned system, determine if the problem is specific to logical partitions or if it is a system problem. To determine whether the problem is a general system problem, refer to Troubleshooting. If your problem is specific to logical partitions, reference codes might resolve the error. However, specific recovery actions and tasks might require the assistance of service support.

Linux on IBM Web site at

http://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/info/LinuxAlerts.html

Learn about the latest information, fixes, and procedures that might help you avoid problems during the installation of Linux on IBM systems.

Reference codes for logical partitions

Find a detailed description of reference codes that relate to logical partitions.

Virtual I/O Server

Find a detailed description of concepts related to Virtual I/O Server.

Related concepts

"Reference codes for logical partitions"
Logical partition reference codes are diagnostic aids that help you determine the source of a hardware or operating system problem. Using reference codes enables you to find the correct solution to fix the problem. To use reference codes effectively, you must use them in conjunction with other service and support procedures.

Related information

Troubleshooting

Troubleshooting the Virtual I/O Server

Reference codes for logical partitions

Logical partition reference codes are diagnostic aids that help you determine the source of a hardware or operating system problem. Using reference codes enables you to find the correct solution to fix the problem. To use reference codes effectively, you must use them in conjunction with other service and support procedures.

For additional information about reference codes, including how to use reference code information, refer to the following topics:

Table 14. Information about reference codes for logical partitions

Topic	Description
Reference codes overview	This topic contains information about the four categories of status indicators that can appear in the control panel or console of the system or operating system.

Table 14. Information about reference codes for logical partitions (continued)

Topic	Description
Using system reference codes	This topic shows you how you can use reference code information to identify a list of possible failing items. The information in this topic is intended for authorized service providers.
Logical partition reference codes	This topic contains a list of common system reference codes. The information in this topic is intended for authorized service providers.
Partition firmware reference codes	This topic contains a list of common partition firmware reference codes. The information in this topic is intended for authorized service providers.
Hardware Management Console error messages	This topic contains a list of common HMC error messages.
Troubleshooting	This topic collection contains information to help you understand, isolate, and resolve problems that you are having with your server.

Related concepts

"Troubleshooting Linux logical partitions" on page 196
Learn how to resolve Linux logical partition errors.

Related information

Reference codes overview

Using system reference codes

Logical partition reference codes

Partition firmware reference codes

Hardware Management Console error messages

Troubleshooting

Scenarios for Linux logical partitions

One of the best ways to understand logical partitions is to see examples illustrating how many of the applications and functions can be used in a sample business environment. Review the following scenarios to see common configurations of Linux logical partitions on IBM Systems and eServer hardware.

To use features that require logical partitions on an IBM eServer OpenPower system, you need the appropriate Advanced POWER Virtualization technologies activated in your system's Hardware Management Console.

Related information

Linux at IBM Web site

Scenario: Configuring the model 710 server with Linux on two logical partitions using virtual I/O

See an example of how you can configure a model 710 without a graphics adapter and install the Linux operating system from CD on multiple logical partitions.

Situation

You are a system administrator responsible for consolidating workloads running on Linux from two IBM eServer System p servers onto a single model 710 server.

Objective

The objective in this scenario is to configure the model 710 server with two logical partitions for Linux, using Virtual SCSI adapters and shared Ethernet adapters provided by the Virtual I/O Server that will run in a third logical partition. The logical partitions will share most of the CPU capacity, so the workload with the highest CPU demands can use CPU capacity that is not being used by the other logical partitions. See how your system's resources will be allocated at Resource allocation for the scenario.

Prerequisites and assumptions

These prerequisites describe the system that was used in this scenario.

- Model 710 server with hardware installed and cables attached, but not plugged in to a power source
- 8 GB memory
- Four 73 GB, 15K rpm disk drives
- One SCSI RAID controller
- Two 1 Gbit Ethernet adapters
- Hardware Management Console (HMC) configured for your environment with the model 710 server

  Note:

  1. For information on cabling the model 710, refer to Cabling the OpenPower 710 and a Hardware Management Console.
  2. To complete the remaining configuration for the HMC, refer to Configuring the HMC.
- Linux for POWER installation CD
- POWER Hypervisor
- Virtual I/O Server CD
- Linux or Windows PC or mobile computer with a serial port
- Null modem cable

  Note: You will need this null modem cable to connect the model 710 server to the Linux or Windows PC or mobile computer when you are preparing your system.
- IP addresses and host names for the Linux installations you will perform, as well as the other network information for your environment, such as name server and routing information (gateway IP address).

For the latest information, fixes, and procedures that might help you avoid problems during the installation of Linux on IBM systems, see the Linux on IBM Web site at

http://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/info/LinuxAlerts.html  .

Configuration details

Continue this scenario by completing the steps for using the Hardware Management Console to set up and configure the server for the scenario, installing Linux for the scenario, and viewing the resource allocation for the scenario.

Related reference

"Resource allocation for the scenario" on page 207
See how your system's resources will be allocated when the example configuration is complete.

Related information

Cabling the OpenPower 710 and a Hardware Management Console

Configuring the HMC

Using the Hardware Management Console to set up and configure the server for the scenario:

See an example of how to configure your server using the Hardware Management Console (HMC).

1. Make sure that the HMC is connected to the model 710. When the HMC for the model 710 has been fully configured and is finished rebooting, connect the model 710 to a power source.
   a. Progress indicators, also referred to as checkpoints, display on the control panel display while the system is being started. The display might look blank for a few moments during this sequence.
   b. When the service processor has completed its power-on sequence, the green power-on light blinks slowly and the output on the control panel is similar to the following: `01 N V=F T`. After the service processor is powered on, proceed to the next step.

   Note: This process will take 3-5 minutes.
2. Click **Server and Partitions > Server management** to view the status of your OpenPower server. It may take a few minutes for the status to display. If the status shows **Pending Authentication**, then proceed to the next step. If you receive the message **Authentication Failed**, or if you do not receive a message, see Troubleshooting HMC setup.
3. You may be prompted to update the system passwords. If not, complete the following steps:
   a. Right-click the server you are configuring. Select **Update Managed System Password**.
   b. When the **Update Password - Authentication Pending** dialog opens, enter your password.
   c. Click the **ASM General** tab and enter your password. Select **OK**.
4. Power on the model 710 server.
   a. In the Navigation area of the HMC, expand the **Server and Partition** folder.
   b. Click the **Server Management** icon.
   c. In the Contents area, select the OpenPower server.
   d. From the menu, click **Selected > Power On**.
   e. Select the desired power-on mode and click **OK**.
5. Right-click the server you are configuring. Select **Properties**. Under the **General** tab, in the **Name** text field type: `IBMOP_SERVER`. In the Policy section, clear the **Power off the system after all the logical partitions are powered off** checkbox.
6. Determine whether `IBMOP_SERVER` already has an existing logical partition and if it does, delete that partition.
   a. In the contents area of the HMC, expand `IBMOP_SERVER`.
   b. Expand **Partitions**. If the logical partition exists, it will be displayed as an object under **Partitions**.

      Note: The name of this logical partition will be the serial number of the OpenPower server, and the logical partition will have one partition profile called `default`.
   c. If a logical partition exists, make sure that the state of the partition is **Not Activated** (powered off). You can power off the partition by right-clicking on the logical partition and selecting **Shut down partition**. In the **Shutdown Options** area, select **Delayed** (this is the default) and select **OK**. Wait until the state of the logical partition is **Not Activated**.
   d. Right-click the logical partition and select **Delete**, then select **OK** to confirm.
   e. Do not proceed until the deleted partition is no longer displayed.

7. Right-click the server you are configuring and select **Properties**. Under the **General** tab, in the **Capabilities** section, make sure that **Micropartitioning Capable** and **Virtual I/O Server** both display **True** in the **Value** column. If **True** is displayed, proceed to step 8. If **False** is displayed, this indicates that the POWER hypervisor is not activated and you need to complete the following steps:
   a. To receive your activation code, follow the directions in the POWER hypervisor activation code entitlement letter that you received with your system.
   b. Select the server `IBMOP_SERVER`, and in the **Selected** menu, choose **Manage On Demand Activations > Virtual Engine Technologies > Enter Activation Code**.
   c. Enter your activation code in the dialog.
8. Set up the Virtual I/O server partition.
   a. Right-click the server `IBMOP_SERVER`, select **Create**, then select **Logical Partition**.
   b. The **Create Logical Partition Wizard** dialog will open. Enter 1 for the **Partition ID** and `IBMOP_VIO` for the **Partition Name**. Make sure that **Virtual I/O server** is selected, and select **Next**.
   c. In the **Create Logical Partition – Workload Management Groups** window, skip the definition of the workload management group by selecting the **No**. Select **Next**.
   d. At the Create Logical Partition Profile window, use `IBMOP_VIO_default` as the **Profile name**.

      Clear **Use all the resources in the system** if it is selected. Select **Next**.
   e. At the Create Logical Partition Profile – Memory window, assign the following memory requirement values:
      - **Minimum** is 0 GB and 512 MB
      - **Desired** is 0 GB and 512 MB
      - **Maximum** is 0 GB and 512 MB

      Select **Next**.
   f. At the Create Logical Partition Profile – Processors window, select **Shared** for processor allocation. Select **Next**.
   g. At the Create Logical Partition Profile - Processing Settings window, assign the following processor values:
      - **Desired** is 0.1
      - **Minimum** is 0.1
      - **Maximum** is 2.0

      Select **(Advanced)**. Under **Sharing modes**, make sure that **Uncapped** is selected, and change **Weight** to 160.
   h. Under **Virtual processors**, change **Maximum number of virtual processors** to 2. Select **OK**. Select **Next**.
   i. At the Create Logical Partition Profile – I/O window, double click the unit to expand the buses. Expand **Bus 2** for the following selections:
      1) Highlight **PCI 10/100/1000Mbps Ethernet UTP 2-port** (this provides a 2 port network adapter). Then, select **Add as required**.
      2) Highlight **Storage Controller** (this is a SCSI adapter). Then, select **Add as required**.
      3) Highlight **Other Mass Storage Controller** (this is the CD-ROM). Then, select **Add as desired**.

      Expand **Bus 3** for the following selection: Highlight **Ethernet controller** (this is another network adapter). Then, select **Add as required**.

      Select **Next**.
   j. At the Create Logical Partition Profile - I/O Pools window, select **Next**.
   k. At the Create Logical Partition Profile - Virtual I/O Adapters window, select **Yes, I want to specify virtual I/O adapters.** Select **Next**.

l. The Create Logical Partition Profile - Create Virtual I/O Adapters window will open. Under **Virtual Adapters**, change **Number of virtual adapter slots** to 64. To create two virtual Ethernet adapters for the Virtual I/O Server, complete the following steps twice:
   1) Add a virtual Ethernet adapter by choosing the **Ethernet** in the **Create adapters** area. Select **(Create)**.
   2) At the Virtual Ethernet Adapter Properties window, set the **Slot number** to 2 the first time you complete these steps and to 3 the second time.
   3) Set **Port virtual LAN ID** to 1 the first time you complete these steps and to 2 the second time.
   4) Select **Access external network** and set priority to **Trunk** to use this adapter as a gateway between VLANs and an external network. This Ethernet adapter will be configured as a shared Ethernet adapter.
   5) Select the **IEEE 802.1Q compatible adapter** checkbox.
   6) Select **OK**. You will return to the **Create Logical Partition Profile - Create Virtual I/O adapters** window. Under **Virtual Adapters**, select **Required** for the adapter you just created.

m. From the Create Logical partition Profile - Create Virtual I/O Adapters window, create the virtual SCSI server adapters. You will create a total of five virtual SCSI server adapters. You will perform these steps for each adapter you create. The slot numbers must be assigned in the order shown.
   1)
      a) Add a virtual SCSI adapter by choosing **SCSI** in the **Create adapters** area. Select **Create server adapter**.
      b) At the Virtual SCSI Adapter Properties window, set the **Slot number** for the adapters as follows:

	First	Second	Third	Fourth	Fifth
Slot number	21	22	31	32	33

      c) Under **Connection Information**, select **Any remote partition and slot can connect**.
      d) Select **OK**. You will return to the Create Logical Partition Profile - Create Virtual I/O adapters window.
   2) Under **Virtual Adapters**, check the **Required** checkbox for the five virtual SCSI adapters you just created.
   3) Select **Next**.

n. At the Create Logical Partition Profile – Power Controlling Partitions window, accept the defaults for Power Controlling. Select **Next**.

o. At the Create Logical Partition Profile - Optional Settings window, select **Normal** (this is the default) for the **Boot modes** setting. Select **Next**.

p. At the Create Logical Partition Profile - Profile Summary window, you will see a summary of what you have selected. Select **Finish**. Wait until the `IBMOP_VIO` partition is displayed under `IBMOP_SERVER` in the HMC console.

   Note: To view the partitions you are creating, expand the view of **Partitions** under `IBMOP_SERVER`.

9. Create two logical partitions that will use virtual I/O for the Linux installations.
   a. Create the logical partition for the first Linux installation.
      1) Right-click the server `IBMOP_SERVER`, select **Create**, then select **Logical Partition**.
      2) The **Create Logical Partition Wizard** dialog will open. Enter 2 for the **Partition ID** and `IBMOP_LINUX1` for the **Partition Name**. Make sure that **AIX or Linux** is selected, and select **Next**.

3) In the Create Logical Partition – Workload Management Groups window, skip the definition of the workload management group by selecting the **No** checkbox. Select **Next**.
4) At the Create Logical Partition Profile window, use `IBMOP_LINUX1_default` as the **Profile name**.

   Clear **Use all the resources in the system** if it is selected. Select **Next**.
5) At the Create Logical Partition Profile – Memory window, assign the following memory requirement values:
   - **Minimum** is 2 GB and 0 MB
   - **Desired** is o 2 GB and 0 MB
   - **Maximum** is 2 GB and 0 MB

   Select **Next**.
6) At the Create Logical Partition Profile – Processors window, select **Shared** for processor allocation. Select **Next**.
7) At the Create Logical Partition Profile - Processing Settings window, assign the following processor values:
   - **Desired** is 0.1
   - **Minimum** is 0.1
   - **Maximum** is 2.0

   Select **(Advanced)**. Under **Sharing modes**, make sure that **Uncapped** is selected, and change **Weight** to 140.
8) Under **Virtual processors**, change **Maximum number of virtual processors** to 2. Select **OK**. Select **Next**.
9) At the Create Logical Partition Profile – I/O window, double-click the unit to expand the buses. Expand **Bus 2** and highlight **Other Mass Storage Controller** (this is the CD-ROM). Then, select **Add as desired**. Select **Next**.
10) At the Create Logical Partition Profile - I/O Pools window, select **Next**.
11) At the Create Logical Partition Profile - Virtual I/O Adapters window, Select **Yes, I want to specify virtual I/O adapters.** Select **Next**.
12) Create a virtual Ethernet adapter.
    a) Add a virtual Ethernet adapter by choosing **Ethernet** in the **Create adapters** area. Select **(Create)**.
    b) At the Virtual Ethernet Adapter Properties window, accept the default for the **Slot number**.
    c) Set **Port virtual LAN ID** to 1.
    d) Select the **IEEE 802.1Q compatible adapter** checkbox.
    e) Select **OK**. You will return to the Create Logical Partition Profile - Create Virtual I/O adapters window. Under **Virtual Adapters**, check the **Required** checkbox for the adapter you just created.
13) You will create a total of two virtual SCSI client adapters for this partition. You will perform these steps for each adapter you create.

    Note: The remote partition virtual slot numbers must be assigned in the order shown.
    a) Add a virtual SCSI adapter by choosing **SCSI** in the **Create adapters** area. Select **Create client adapter**.
    b) At the Virtual SCSI Adapter Properties window, accept the default **Slot number**.
    c) Under **Connection Information**, select `IBMOP_VIO (1)` for the **Remote partition** and set the **Remote partition virtual slot number** for the adapters as follows:

	First	Second
Remote partition virtual slot number	21	22

d) Select **OK**. You will return to the Create Logical Partition Profile - Create Virtual I/O adapters window. Under **Virtual Adapters**, check the **Required** checkbox for the adapter you just created.

14) Select **Next**.

15) At the Create Logical Partition Profile – Power Controlling Partitions window, accept the defaults for Power Controlling. Select **Next**.

16) At the Create Logical Partition Profile - Optional Settings window, select **Normal** (this is the default) for the **Boot modes** setting. Select **Next**.

17) At the Create Logical Partition Profile - Profile Summary window, you will see a summary of what you have selected. Select **Finish**. Wait until the `IBMOP_LINUX1` partition is displayed under `IBMOP_SERVER` in the HMC console.

b. Create the logical partition for the second Linux installation.

1) Right-click the server `IBMOP_SERVER`, select **Create**, then select **Logical Partition**.

2) The Create Logical Partition Wizard dialog will open. Enter 3 for the **Partition ID** and `IBMOP_LINUX2` for the **Partition name**. Make sure that **AIX or Linux** is selected, and select **Next**.

3) In the Create Logical Partition – Workload Management Groups window, select the **No** checkbox. Select **Next**.

4) At the Create Logical Partition Profile window, use `IBMOP_LINUX2_default` as the **Profile name**.

   Clear **Use all the resources in the system** if it is selected. Select **Next**.

5) At the Create Logical Partition Profile – Memory window, assign the following memory requirement values:

   - **Minimum** is 2 GB and 0 MB
   - **Desired** is 2 GB and 0 MB
   - **Maximum** is 2 GB and 0 MB

   Select **Next**.

6) At the Create Logical Partition Profile – Processors window, select **Shared** for processor allocation. Select **Next**.

7) At the Create Logical Partition Profile - Processing Settings window, assign the following processor values:

   - **Desired** is 0.1
   - **Minimum** is 0.1
   - **Maximum** is 2.0

   Select **(Advanced)**. Under **Sharing modes**, make sure that **Uncapped** is selected, and change **Weight** to 140.

8) Under **Virtual processors**, change **Maximum number of virtual processors** to 2. Select **OK**. Select **Next**.

9) At the Create Logical Partition Profile – I/O window, double click the unit to expand the buses. Expand **Bus 2** and highlight **Other Mass Storage Controller** (this is the CD-ROM). Then, select **Add as desired**.

   Select **Next**.

10) At the Create Logical Partition Profile - I/O Pools window, select **Next**.

11) At the Create Logical Partition Profile - Virtual I/O Adapters window, Select **Yes, I want to specify virtual I/O adapters.** Select **Next**.

12) Create a virtual Ethernet adapter.
    a) Add a virtual Ethernet adapter by choosing **Ethernet** in the **Create adapters** area. Select **(Create)**.
    b) At the Virtual Ethernet Adapter Properties window, accept the default for the **Slot number**.
    c) Set **Port virtual LAN ID** to 2.
    d) Select the **IEEE 802.1Q compatible adapter** checkbox.
    e) Select **OK**. Return to the **Create Logical Partition Profile - Create Virtual I/O adapters** window. Under **Virtual Adapters**, check the **Required** checkbox for the adapter you just created.
13) Create a total of three virtual SCSI client adapters for this partition. Perform these steps for each adapter you create.

    Note: The remote partition virtual slot numbers must be assigned in the order shown.
    a) Add a virtual SCSI adapter by choosing **SCSI** in the **Create adapters** area. Select **Create client adapter**.
    b) At the Virtual SCSI Adapter Properties window, accept the default **Slot number**.
    c) Under **Connection Information**, select `IBMOP_VIO (1)` for the **Remote partition** and set the **Remote partition virtual slot number** for the adapters as follows:

	First	Second	Third
Remote partition virtual slot number	31	32	33

    d) Select **OK**. You will return to the Create Logical Partition Profile - Create Virtual I/O adapters window. Under **Virtual Adapters**, check the **Required** checkbox for the adapter you just created.
14) Select **Next**.
15) At the Create Logical Partition Profile – Power Controlling Partitions window, accept the defaults for Power Controlling. Select **Next**.
16) At the Create Logical Partition Profile - Optional Settings window, select **Normal** (this is the default) for the **Boot modes** setting. Select **Next**.
17) At the Create Logical Partition Profile - Profile Summary window, you will see a summary of what you have selected. Select **Finish**. Wait until the `IBMOP_LINUX2` partition is displayed under `IBMOP_SERVER` in the HMC console.

10. Right-click the server `IBMOP_SERVER`, select **Properties**.
11. In the property dialog, under the **General** tab, in the **Policy** section, uncheck **Power off the system after all the logical partitions are powered off**. Select **OK**.
12. Make sure that all of the partitions are shown as `Not Activated` under state; if not, click the reload icon below the menu bar.
13. To install and configure the Virtual I/O Server software:
    a. Insert the Virtual I/O Server CD into the OpenPower server CD-ROM drive.
    b. Activate the Virtual I/O Server partition. Right-click the partition name, `IBMOP_VIO`. Select **Activate**.
    c. Select the profile `IBMOP_VIO_default`. Select the **Open a terminal window or console session** checkbox. Select **(Advanced)**.
    d. Under **Boot mode**, select **SMS**. Select **OK** to return to the previous window.
    e. Select **OK** to activate the partition and launch a terminal window.
    f. A vterm window will open. Press 0 to select this console as the active console, if prompted.
    g. At the SMS Main Menu, select **Select Boot Options**. Press Enter.

h. Select **Select Install/Boot Device**. Press Enter.

i. At the Select Device Type menu, select **CD/DVD**. Press Enter.

j. At the Select Media Type menu, select **IDE**. Press Enter.

k. Press `x` to exit **System Management Services**. Select **Yes** when prompted. Press Enter and the**STARTING SOFTWARE** window will open.

l. Select 1 (the 1 will not display on your window) and press Enter to select this terminal as the system console.

m. Select your language and press Enter.

n. Select **Change/Show Installation Settings and Install**, so you can verify the installation location for the Virtual I/O server. Press Enter.

   1) If **Disk(s) where you want to install** is set to `hdisk0`, skip to step 13o. However, if this is set to `hdisk0...` (hdisk0 followed by "...") rather than `hdisk0`, the installation will use more disk drives than it should, so you must complete the following steps.

   2) Select **Disk(s) where you want to install**. Press Enter.

   3) The current choice is indicated by **>>>**. If `hdisk0` is not the current choice, select the number for `hdisk0`, and press Enter.

   4) If any disks other than `hdisk0` are identified as current choices, by **>>>**, cancel those choices by selecting the number for each and pressing Enter, until `hdisk0` is the only choice indicated.

   5) Select **Continue with choices indicated above**. Press Enter.

o. Select **Install with the settings listed above** and press Enter.

p. When the installation is complete, use `padmin` for the username at the login prompt. Set a new password.

q. After you log in as `padmin`, you can view the license by using the **license** command on the command line, as follows:

```
license -view
```

   You can use the Space key to page through the license agreement.

r. Accept the license by entering the following command:

```
license -accept
```

s. Configure the shared Ethernet adapters.

   1) To configure the first shared Ethernet adapter, enter the following command:

```
mkvdev -sea ent0 -vadapter ent3 -default ent3 -defaultid 1
```

   2) To configure the second shared Ethernet adapter, enter the following command:

```
mkvdev -sea ent2 -vadapter ent4 -default ent4 -defaultid 2
```

t. Enter the following commands to create your logical volumes:

   1) `mklv -lv lv_linux1 rootvg 4G`

   2) `mklv -lv lv_linux2 rootvg 6G`

   3) `mklv -lv lv_linux2_data1 rootvg 8G`

u. Enter the following commands to configure the virtual SCSI adapters for the Linux partitions:

   1) `mkvdev -vdev lv_linux1 -vadapter vhost0 -dev dev_linux1`

   2) `mkvdev -vdev hdisk1 -vadapter vhost1 -dev dev_linux1_dat1`

   3) `mkvdev -vdev lv_linux2 -vadapter vhost2 -dev dev_linux2`

   4) `mkvdev -vdev lv_linux2_data1 -vadapter vhost3 -dev dev_linux2_dat1`

   5) `mkvdev -vdev hdisk2 -vadapter vhost4 -dev dev_linux2_dat2`

   6) Optional: To back up the operating systems by shadowing hdisk0 on hdisk3, skip to the next step. Otherwise, you can add hdisk3 as another data device by entering the following command:

```
mkvdev -vdev hdisk3 -vadapter vhost3 -dev dev_linux2_dat3
```

Note: The *vhost* entries in these commands correspond to the numeric order of the virtual SCSI adapter's slot numbers when the Virtual I/O Server is first activated. The virtual SCSI adapter that you created on slot 21 corresponds to `vhost0`. Because you created a virtual SCSI client adapter at slot 21 in logical partition `IBMOP_FIREWALL1`, the 4 GB logical volume that you just created with the **mklv** command, `lv_firewall1`, will be associated with logical partition `IBMOP_FIREWALL1`. The virtual SCSI adapter that you created on slot 31 corresponds with `vhost1`, and so on. The following table shows how the virtual SCSI devices you have created are allocated:

vhost	Slot	Logical Partition	Devices
`vhost0`	21	`IBMOP_LINUX1`	`lv_linux1`
`vhost1`	22	`IBMOP_LINUX1`	`hdisk1`
`vhost2`	31	`IBMOP_LINUX2`	`lv_linux2`
`vhost3`	32	`IBMOP_LINUX2`	`lv_linux2_data1`
`vhost4`	33	`IBMOP_LINUX2`	`hdisk2` and optionally `hdisk3`

v. Optional: If you want to back up your operating systems, shadowing hdisk0 on hdisk3 is recommended. To shadow your main disk, enter the commands below. If you do not want to back up your operating systems, you can skip to step 14.

1) `extendvg -f rootvg hdisk3`
2) `mirrorios -f hdisk3`

Note: This command may take up to 30 minutes to complete. The mirrorios command produces an error message when it completes. However, the shadowing of the main disk was completed successfully, so you can safely proceed.

14. From the HMC window, right-click `IBMOP_VIO` and select **Shut Down Partition**.
15. In the **Shutdown Options** area, select **Delayed** (this is the default) and select **OK.**
16. Wait until the state of `IBMOP_VIO` is `Not Activated`. Right-click `IBMOP_VIO` and select **Close Terminal Connection**. Select **Yes** at warning prompt.
17. Expand the `IBMOP_VIO` partition view. Right-click `IBMOP_VIO_default` and select **Properties**.
18. Select the Physical I/O tab.
19. In the Profile I/O devices area, click the unit to display the buses.
20. Click `Bus 2` and select `Other Mass Storage Controller`.
21. Select **Remove**. Select **OK**
22. Right-click `IBMOP_VIO` and select **Activate**.
23. At the Activate Logical Partition window, select **OK**.
24. Wait until the state of `IBMOP_VIO` is `Running` and no more messages display in the operator panel value before you proceed with the next section.

Related information

Troubleshooting HMC setup

Installing Linux for the scenario:

After your system is configured, use the steps in this section of the scenario to install the Linux operating system.

1. Install Linux for POWER on the partition `IBMOP_LINUX1`. For installation documentation, refer to Linux operating system distribution installation documentation.
   a. Insert your Linux for POWER installation CD into the OpenPower server CD-ROM drive.

b. Right-click on the partition IBMOP_LINUX1 under the server IBMOP_SERVER. Select **Activate**. A VTERM window will open. Select the **Open a terminal window or console session** checkbox. Select **OK**. The partition will begin to boot.
c. Enter the SMS menu by pressing 1 after the ″keyboard″ checkpoint, and before the ″speaker″ checkpoint is reached.
d. At the SMS Main Menu, select **5. Select Boot Options**.
e. Select **1. Select Install/Boot Device**.
f. Select **7. List all Devices**.
g. Select the CD-ROM device.
h. Select **2. Normal Mode Boot**.
i. Select **1. Yes** to exit SMS.
j. At the boot prompt (**boot:**), press Enter to begin the installation. Follow the on-screen prompts to complete the installation.
k. After the installation is completed, a login prompt opens. Log in as root, then enter halt.
l. When system messages stop printing and the **Power down** message opens in the terminal window, right-click on the IBMOP_LINUX1 partition, select **Close Terminal Connection** and **Yes** at warning prompt. Wait until the terminal window closes and Not Activated displays for the state of the IBMOP_LINUX1 partition.

2. Install Linux for POWER on the partition IBMOP_LINUX2. For installation documentation, refer to Linux operating system distribution installation documentation.
a. Insert your Linux for POWER installation CD-ROM into the OpenPower server CD-ROM drive.
b. From the navigation area of your HMC, right-click on the partition IBMOP_LINUX2. Select **Activate**. A VTERM window will open. Check the box **Open a terminal window or console session**. Select **OK**.
c. Press 0 to select this console as the active console, if prompted. The partition will begin to boot.
d. Enter the SMS menu by pressing 1 after the ″keyboard″ checkpoint, and before the ″speaker″ checkpoint is reached.
e. At the SMS Main Menu, select **5. Select Boot Options**.
f. Select **1. Select Install/Boot Device**.
g. Select **7. List all Devices**.
h. Select the CD-ROM device.
i. Select **2. Normal Mode Boot**.
j. Select **1. Yes** to exit System Management Services.
k. At the boot prompt (**boot:**), press Enter to begin the installation. Follow the on-screen prompts to complete the installation.

Related information

Linux operating system distribution installation documentation

Resource allocation for the scenario:

See how your system's resources will be allocated when the example configuration is complete.

This information describes the allocation of the system's resources after you follow the configuration procedures described in this scenario.

Resource allocation for 3 logical partitions

Logical partition 1: IBMOP_VIO

VIO disk

Table 15. Logical partition 1: IBMOP_VIO

VIO disk name	VIO logical/physical volume names	VIO Server and client slot	VIO vhost	Logical/physical volume sizes
hdisk0	lv_linux1, lv_linux2, lv_linux2_data1			73 GB
(optionally) hdisk3	pv_vio_mirror			73 GB

Shared processor allocation: Minimum/Desired/Maximum
0.1/0.1/2.0

Virtual processors: Minimum/Desired/ Maximum
1/1/2

Uncapped/Weight
Yes/160

LPAR memory requirements: Minimum/Desired/Maximum
512MB/512MB/512MB

VIO Ethernet PVID/ Client LAN ID

Logical partition 2: IBMOP_LINUX1

VIO disk

Table 16. Logical partition 2: IBMOP_LINUX1

VIO disk name	VIO logical/physical volume names	VIO Server and client slot	VIO vhost	Logical/physical volume sizes
hdisk0	lv_linux1	21	vhost0	6 GB
hdisk1	lv_linux1_data1	22	vhost1	73 GB

Shared processor allocation: Minimum/Desired/Maximum
0.1/0.1/2.0

Virtual processors: Minimum/Desired/ Maximum
1/1/2

Uncapped/Weight
Yes/140

LPAR memory requirements: Minimum/Desired/Maximum
2GB/2GB/2GB

VIO Ethernet PVID/ Client LAN ID
1

Logical partition 3: IBMOP_LINUX2

VIO disk

Table 17. Logical partition 3: IBMOP_LINUX2

VIO disk name	VIO logical/physical volume names	VIO Server and client slot	VIO vhost	Logical/physical volume sizes
hdisk0	lv_linux2	31	vhost1	6 GB
hdisk0	lv_linux2_data1	32	vhost2	6 GB
hdisk2	pv_linux2_data2	33	vhost3	73 GB
(optionally) hdisk3	pv_linux2_data3	33	vhost3	73 GB

Shared processor allocation: Minimum/Desired/Maximum
0.1/0.1/2.0

Virtual processors: Minimum/Desired/ Maximum
1/1/2

Uncapped/Weight
Yes/140

LPAR memory requirements: Minimum/Desired/Maximum
2GB/2GB/2GB

VIO Ethernet PVID/ Client LAN ID
2

Related concepts

"Scenario: Configuring the model 710 server with Linux on two logical partitions using virtual I/O" on page 197
See an example of how you can configure a model 710 without a graphics adapter and install the Linux operating system from CD on multiple logical partitions.

Scenario: Creating a Linux logical partition and partition profile

See an example of creating a Linux logical partition.

Situation

You are the system administrator responsible for configuring and managing an IBM Systems or eServer system. You would like to know how to create a Linux partition profile.

Objectives

The objective of this scenario is to create a Linux logical partition and partition profile on an IBM Systems or eServer hardware.

Prerequisites and assumptions

This scenario assumes that the following prerequisite steps have been completed and are operational prior to beginning the configuration steps:

1. The Hardware Management Console for eServer was set up.
   - The Hardware Management Console (HMC) was cabled.
   - You completed the planning process and you understand how you want to configure your HMC.
   - You used the Guided Setup wizard or the HMC configuration checklist to set up the HMC.
2. You understand the concepts for partitioning the server.
3. You completed the tasks recommended for planning for logical partitions.
4. You logged onto the HMC with one of the following user roles:
   - Super administrator
   - Operator
5. You used the Facts and features report to see hardware-support information for Linux on POWER.

Configuration steps

Ensure that all the prerequisites for this scenario have been completed prior to completing these tasks:

To create a new logical partition on your server using the HMC, follow these steps:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server on which you want to create the partition profile.
4. Right-click **Partitions**, and click **Create → Logical Partitions**.
5. Follow the steps in the Create Logical Partitions wizard to create a logical partition and a partition profile.

Related concepts

"Partition profile" on page 7
A partition profile is a record on the Hardware Management Console (HMC) that specifies a possible configuration for a logical partition. When you activate a logical partition using a partition profile, the managed system attempts to start the logical partition using the configuration information in the partition profile.

"Planning for logical partitions" on page 43
IBM hardware architectures allow you to create logical partitions to distribute resources within a single server and make it function as if it were two or more independent servers. Before creating logical partitions (LPARs), you need to plan for several variables that are specific to your solution. You need to understand how you can reconfigure partitions to respond to future needs.

Related information

Managing your server using the Hardware Management Console

Cabling the HMC

Gathering required configuration settings

Configuring the HMC using the Guided Setup wizard

Configuring the HMC using the HMC configuration checklist

System Planning Tool Web site

Tasks and roles

Facts and features report Web site

Scenario: Using partition profiles

As you will see, partition profiles allow you to change the hardware configuration of a logical partition quickly and easily.

Situation

You are the system administrator for a business recovery service center running IBM eServer hardware. You use IBM eServer hardware primarily to test disaster recovery strategies for your clients. Each of your clients has a different system configuration. This means that, each time a client comes into the office, you must change the system configuration of your managed system.

On each logical partition on your server, you create one profile for each client that uses the logical partition. When a client returns to the business recovery service center, you can reconfigure the managed system for that client simply by activating the partition profiles for that client.

You have just finished testing for Client 1. You must now reconfigure the server for Client 2, who comes into the office tomorrow.

Note: This is one example of how to change your system configuration. Depending on your operating system, business needs, and resource allocation, you could resolve this situation by dynamically moving resources.

Objectives

The objective of this scenario is to change the configuration of your managed system by using partition profiles.

Details

Your managed system has three logical partitions. The managed system has eight processors and 12 GB of memory. Each logical partition has one or two partition profiles. The following table illustrates how the logical partitions and partition profiles are set up.

Logical partition ID	Name of logical partition	Name of partition profile	Processor resources	Memory resources
Partition 1	Test 1	Profile 1: Client 1	5 dedicated processors	8 GB
		Profile 2: Client 2	7 dedicated processors	10 GB
Partition 2	Test 2	Profile 1: Client 1	2 dedicated processors	3 GB
		Profile 2: Client 2	1 dedicated processor	2 GB
Partition 3	Test 3	Profile 1: Client 1	1 dedicated processor	1 GB

Prerequisites and assumptions

This scenario assumes that the following prerequisite steps have been completed prior to beginning the configuration steps:

1. The Hardware Management Console (HMC) was set up.
   - The HMC was cabled.
   - You completed the planning process and you understand how you want to configure your HMC.
   - You used the Guided Setup wizard or the HMC configuration checklist to set up the HMC.
2. You understand the concepts for partitioning the server.
3. You completed the tasks recommended for logical partition planning.
4. You moved and assigned the physical hardware according to the LPAR Validation Tool (LVT) output.
5. You logged in to the HMC with one of the following user roles:
   - Super administrator
   - Service representative
   - Product engineer
6. You created the logical partitions and partition profiles.
7. You activated the partition profiles for Client 1.

The following table lists the partition profiles that are currently active for each logical partition on the managed system.

Logical partition ID	Name of logical partition	Name of partition profile	Processor resources	Memory resources
Partition 1	Test 1	Profile 1: Client 1	5 dedicated processors	8 GB
Partition 2	Test 2	Profile 1: Client 1	2 dedicated processors	3 GB
Partition 3	Test 3	Profile 1: Client 1	1 dedicated processor	1 GB

Configuration steps

To change the configuration of your managed system so that it is ready for Client 2, you must first shut down the logical partitions by using usual operating system procedures.

After shutting down the logical partitions, you can activate the partition profiles for Client 2. To do this, complete the following steps on your HMC:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server.
4. Open **Partitions**.
5. In the contents area, right-click the Test 1 logical partition and select **Activate**.
6. Select the Profile 2 partition profile and click **OK**.
7. Right-click the Test 2 logical partition and select **Activate**.
8. Select the Profile 2 partition profile and click **OK**.

After activating the partition profile, the managed system is configured according to the needs of Client 2. The following table lists the partition profiles that are currently active for each logical partition on the managed system.

Logical partition ID	Name of logical partition	Name of partition profile	Processor resources	Memory resources
Partition 1	Test 1	Profile 2: Client 2	7 dedicated processors	10 GB
Partition 2	Test 2	Profile 2: Client 2	1 dedicated processor	2 GB

Related concepts

"Planning for logical partitions" on page 43
IBM hardware architectures allow you to create logical partitions to distribute resources within a single server and make it function as if it were two or more independent servers. Before creating logical partitions (LPARs), you need to plan for several variables that are specific to your solution. You need to understand how you can reconfigure partitions to respond to future needs.

Related information

Cabling the HMC

Gathering required configuration settings

Configuring the HMC using the Guided Setup wizard

Configuring the HMC using the HMC configuration checklist

System Planning Tool Web site

Tasks and roles

Scenario: Using system profiles

As you will see, system profiles allow you to change the hardware configuration of an entire managed system quickly and easily.

Situation

You are the system administrator for a business recovery service center with IBM eServer hardware. You use IBM eServer hardware primarily to test disaster-recovery strategies for your clients. Each of your

clients has a different system configuration. This means that, each time a client comes in, you must change the system configuration of your managed system.

You decide to create and use system profiles to change the system configuration of your managed system. First, on each logical partition on your server, you create a partition profile for each client that uses the logical partition. Then, you create a system profile for each client. Each system profile contains the partition profiles that you want to activate for the client. When a client returns to the business recovery service center, you can reconfigure the managed system for that client simply by activating the system profile for that client.

You have just finished testing for Client 1. You must now reconfigure the managed system for Client 2, who comes in tomorrow.

Note: This is one example of how to change your system configuration. Depending on your operating system, business needs, and resource allocation, you could resolve this situation by dynamically moving resources.

Objectives

The objective of this scenario is to change the configuration of your managed system by using system profiles.

Details

Your managed system has eight processors and 12 GB of memory. You have created two system profiles on this managed system. Each system profile divides the resources of the managed system between two or three logical partitions.

The following table shows how the system profiles are set up:

System Profile	Logical partition ID	Name of logical partition	Name of partition profile	Processor resources	Memory resources
Client 1	Partition 1	Test 1	Profile 1: Client 1	5 dedicated processors	8 GB
	Partition 2	Test 2	Profile 1: Client 1	2 dedicated processors	3 GB
	Partition 3	Test 3	Profile 1: Client 1	1 dedicated processor	1 GB
Client 2	Partition 1	Test 1	Profile 2: Client 2	7 dedicated processors	10 GB
	Partition 2	Test 2	Profile 2: Client 2	1 dedicated processor	2 GB

Prerequisites and assumptions

This scenario assumes that the following prerequisite steps have been completed prior to beginning the configuration steps:

1. The Hardware Management Console (HMC) was set up.
   - The HMC was cabled.
   - You completed the planning process and you understand how you want to configure your HMC.
   - You used the Guided Setup wizard or the HMC configuration checklist to set up the HMC.
2. You understand the concepts for partitioning the server.
3. You completed the tasks recommended for logical partition planning.

4. You moved and assigned the physical hardware according to the LPAR Validation Tool (LVT) output.
5. You logged in to the HMC with one of the following user roles:
   - Super administrator
   - Service representative
   - Product engineer
6. You created the logical partitions, partition profiles, and system profiles described.
7. You activated the system profile for Client 1.

The following table lists the system profile that is currently active on the managed system.

System Profile	Logical partition ID	Name of logical partition	Name of partition profile	Processor resources	Memory resources
Client 1	Partition 1	Test 1	Profile 1: Client 1	5 dedicated processors	8 GB
	Partition 2	Test 2	Profile 1: Client 1	2 dedicated processors	3 GB
	Partition 3	Test 3	Profile 1: Client 1	1 dedicated processor	1 GB

Configuration steps

To change the configuration of your managed system so that it is ready for Client 2, you must first shut down the logical partitions by using usual operating system procedures.

After shutting down the logical partitions, you can activate the system profile for Client 2. To do this, complete the following steps on your HMC:

1. In the navigation area, open **Server and Partition**.
2. Select **Server Management**.
3. In the contents area, open the server.
4. Open **System Profiles**.
5. Right-click the Client 2 system profile and select **Activate**.
6. Select the activation settings you want to use and click **Continue**.

After activating the system profile, the managed system is configured according to the needs of Client 2. The following table lists the system profile that is currently active on the managed system.

System Profile	Logical partition ID	Name logical partition	Name of partition profile	Processor resources	Memory resources
Client 2	Partition 1	Test 1	Profile 2: Client 2	7 dedicated processors	10 GB
	Partition 2	Test 2	Profile 2: Client 2	1 dedicated processor	2 GB

Related concepts

"Planning for logical partitions" on page 43
IBM hardware architectures allow you to create logical partitions to distribute resources within a single server and make it function as if it were two or more independent servers. Before creating logical partitions (LPARs), you need to plan for several variables that are specific to your solution. You need to understand how you can reconfigure partitions to respond to future needs.

Related information

Cabling the HMC

Gathering required configuration settings

Configuring the HMC using the Guided Setup wizard

Configuring the HMC using the HMC configuration checklist

System Planning Tool Web site

Tasks and roles

Scenario: Capacity on Demand for Linux

Learn the steps of planning, ordering, and using Capacity on Demand for Linux logical partitions on IBM Systems and eServer hardware.

Note: Capacity on Demand is not available on all hardware models.

Capacity on Demand allows customers to activate inactive processors as their workload requires. The following scenario walks through the steps of planning for, ordering, and using this feature.

Situation

A server is operating with eight active processors and four inactive processors. As the server workload grows, the available processor resource utilization consistently approaches or exceeds 70% of the available capacity. Anticipating the need for additional resources, the system administrator decides to consider activating some of the inactive processors.

Objectives

The objectives of this scenario are as follows:

- To test the effectiveness of increasing the number of available processors
- To increase the number of processors (if that change will improve performance)

Capacity on Demand preparation and activation

The system administrator completes the following steps to prepare and configure the server for Capacity on Demand:

1. Before activating any processors, the system administrator prepares the server for Capacity on Demand. This task involves performing a trend analysis to learn how many additional processors will be required, preparing the server to activate additional processors, and preparing to order the new capacity.
2. To investigate the benefits of activating the additional processors, the system administrator decides to activate the processors for a trial period. The trial period lasts 14 days.
3. After deciding that the performance improvement gained by activating the additional processors warrants purchasing the processors permanently, the system administrator contacts the IBM marketing representative or IBM Business Partner, or visits http://www.ibm.com to place an order for four processor activation features.
4. The IBM marketing representative places the order in the IBM configurator and receives a reminder to send the vital product data (VPD) from the server with the order. The VPD can be faxed to IBM or

sent electronically with the Electronic Service Agent. (The Electronic Service Agent is located on your HMC and is designed to monitor events and to transmit server inventory information to IBM on a periodic, customer-definable timetable.)

5. The system administrator retrieves the activation codes from the Web and activates the permanent capacity. This task involves entering the activation code on the target server and assigning the processors to a logical partition.

The server now has all eight processors available for use.

For more information, refer to Working with Capacity on Demand.

Related information

Preparing for Capacity on Demand

Activating Capacity Upgrade on Demand

Working with Capacity Upgrade on Demand

Related information for Linux logical partitions

IBM Redbooks® (in PDF format), Web sites, and information center topics contain information related to the Partitioning for Linux with an HMC topic. You can view or print any of the PDF files.

IBM Redbooks

- Partitioning Implementations for IBM eServer p5 Servers (4.6 MB)
- Linux Handbook: A Guide to IBM Linux Solutions and Resources, SG24–7000–00 (5.0 MB)
- AIX and Linux Interoperability, SG24–6622–00 (4.3 MB)
- Linux on the IBM System i Server: An Implementation Guide, SG24–6232–00 (4.6 MB)

Web sites

- For information and side-by-side comparison of the various systems available and many of their key specifications, see the Facts and features reports Web site at

  http://www.ibm.com/servers/eserver/pseries/hardware/factsfeatures.html .
- For the latest information, fixes, and procedures that might help you avoid problems during the installation of Linux on IBM systems, see the Linux on IBM Web site at

  http://www14.software.ibm.com/webapp/set2/sas/f/lopdiags/info/LinuxAlerts.html .
- For detailed information about installing Red Hat Enterprise Linux version 4 on POWER hardware, see Red Hat Enterprise Linux 4 Installation Guide for the IBM POWER Architecture Web site at

  http://www.redhat.com/docs/manuals/enterprise/RHEL-4-Manual/ppc-multi-install-guide/
- For detailed information about installing SUSE Linux Enterprise Server 9, see SUSE LINUX Enterprise Server Web site at http://www.novell.com/documentation/sles9/index.html
- For tools that enable POWER features for Linux (such as Reliability, Availability, and Serviceability (RAS) features, dynamic logical partitioning, and Virtual I/O Server), see the Service and productivity tools For Linux on POWER systems Web site
- Linux at IBM Web site (http://www.ibm.com/linux/)
- IBM Redbooks Web site (http://www.redbooks.ibm.com)
- Linux servers Web site at http://www.ibm.com/servers/eserver/linux/home.html

- IBM System p Servers (http://www.ibm.com/systems/p/) 

Information center topics

- Installing Linux
- Using the Virtual I/O Server
- Partitioning for AIX
- Partitioning for i5/OS
- Migrating or upgrading your iSeries system
- Managing your server
- Working with Capacity on Demand
- Customer service and support

Saving PDF files

To save a PDF on your workstation for viewing or printing:

1. Right-click the PDF link.
2. Click the option that saves the PDF locally.
3. Navigate to the directory in which you would like to save the PDF.
4. Click **Save**.

Downloading Adobe Reader

You need Adobe Reader installed on your system to view or print these PDFs. You can download a free copy from the Adobe Web site  .

Appendix. Accessibility features

Accessibility features help users who have a physical disability, such as restricted mobility or limited vision, to use information technology products successfully.

The following list includes the major accessibility features:

- Keyboard-only operation
- Interfaces that are commonly used by screen readers
- Keys that are tactilely discernible and do not activate just by touching them
- Industry-standard devices for ports and connectors
- The attachment of alternative input and output devices

IBM and accessibility

See the IBM Accessibility Center at http://www.ibm.com/able/ for more information about the commitment that IBM has to accessibility.

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