Power Systems

Capacity on Demand

IBM

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This edition applies to IBM Hardware Management Console Version 8 Release 8.7.0 Maintenance Level 0 and to all subsequent releases and modifications until otherwise indicated in new editions.

Contents

Capacity on Demand

With Capacity on Demand (CoD) offerings you can dynamically activate one or more resources on your server as your business peaks dictate. You can activate inactive processor cores or memory units that are already installed on your server on a temporary and permanent basis.

Capacity on demand offerings are available on select IBM® servers. For ordering information, see the POWER8® machine type/model tables within each CoD offering section of this document. Some servers include a number of active and inactive resources. Active processor cores and active memory units are resources that are available for use on your server. Inactive processor cores and inactive memory units are resources that are included with your server, but are not available for use until you activate them.

This topic collection contains information about how to use CoD offerings with the Hardware Management Console (HMC) Version 8 Release 8.2.0 Maintenance Level 0 and later. This topic collection is also meant for users who are managing systems based on the POWER8 processor.

Note:

The procedures and functions of the HMC Enhanced + Tech Preview (Pre-GA) interface, which was an option that was provided with HMC version 8.20, are the same as the HMC Enhanced+ interface that is provided with HMC version 8.30. Only the HMC Enhanced+ is referred to in the documentation, but that content also applies to the HMC Enhanced + Tech Preview (Pre-GA) interface.

What's new in Capacity on Demand

Read about new or significantly changed information in Capacity on Demand (CoD) since the previous update of this topic collection.

April 2017
- Added machine type and model information for Power Enterprise Pools.

October 2016
- Added additional information about managing HMC requirements for Power Enterprise Pools.

May 2016
- Added information about multiple HMC support for Power Enterprise Pools.
- Added information about master and managing Hardware Management Consoles.
- Removed references to backup master HMCs (every managing HMC is now considered a backup HMC).
- Added information about how to add a managing HMC to a Power enterprise pool.
- Added information about removing a managing HMC from a Power enterprise pool.

October 2015
- Added information about converting permanent CoD entitlement to a Power Enterprise Pool.

June 2015
- Added task information for different HMC interfaces. Added information about new IBM Power System E850 (8408-E8E) feature codes. Changed references of On/Off CoD to Elastic CoD.

October 2014

- Added information about new POWER8 systems and feature codes.

Capacity on Demand offerings

Learn the differences between the Capacity on Demand (CoD) offerings and learn basic information about each offering.

The following table provides a brief description of each CoD offering. Consult your IBM Business Partner or IBM sales representative to select the CoD offering most appropriate for your environment.

Table 1. Capacity on Demand offerings

Offering	Description
"Capacity Upgrade on Demand" on page 6	You can permanently activate inactive processor cores and memory units by purchasing an activation feature and entering the provided activation code. You can do this without restarting your server or interrupting your business.
"Trial Capacity on Demand" on page 9	You can evaluate the use of inactive processor cores, memory, or both, at no charge using Trial CoD. After it is started, the trial period is available for 30 power-on days.
"Elastic Capacity on Demand" on page 12	You can activate processor cores or memory units for a number of days by using the HMC to activate resources on a temporary basis. Formerly referred to as *On/Off* CoD.
"Utility Capacity on Demand" on page 23	Utility CoD is used when you have unpredictable, short workload spikes. Utility CoD automatically provides additional processor capacity on a temporary basis within the shared processor pool. Use is measured in processor minute increments and is reported at the Utility CoD website.
"Power Enterprise Pool" on page 27	A Power Enterprise Pool is a group of systems that can share Mobile Capacity on Demand (CoD) processor resources and memory resources.
"PowerVM Editions (PowerVM)" on page 38	PowerVM® Editions (PowerVM Editions) deliver advanced virtualization functions for AIX®, Linux and IBM i clients. PowerVM Editions (PowerVM Editions) include the following offerings: • Micro-Partitioning™ • Virtual I/O Server • Integrated Virtualization Manager • Live Partition Mobility • The ability to run x86 Linux applications on Power Systems™ PowerVM Editions (Express, Standard , and Enterprise) offer different capabilities. For more information about each editions' capabilities, see "PowerVM Editions (PowerVM)" on page 38.

Preparing for Capacity on Demand

Capacity on Demand (CoD) allows you to activate processor cores and memory units on your server when your workload requires the additional resources. To prepare your server for CoD, consider how you would like to license your software and determine when you need to activate your resources. You also must plan for and set up your environment in preparation for CoD.

Capacity on Demand software licensing considerations

As you select the software to install on activated Capacity on Demand (CoD) resources, consider how you would like to license your software. Many methods are used to license software, such as per user, software tier, or Processor Value Unit.

The following is the list of IBM Power Systems software for which incremental licensing is included in Elastic CoD, Utility CoD or Trial CoD. Note that CoD does not ship any software or provide the base licensing entitlement. The software has to be initially installed and licensed on the server before temporary CoD provides the incremental licensing to cover the additional processor cores which have been temporarily activated. Payment for the temporary use of this software is through the hardware billing features associated with Elastic or Utility CoD. Only these IBM software products' temporary incremental processor core licensing is included.

- AIX
- IBM i
- PowerVM
- PowerVC
- PowerVP
- Systems Director
- SmartCloud Entry
- VMcontrol
- PowerHA®
- PowerSC
- Cluster Systems Management (CSM)
- General Parallel File System (GPFS™)

Additional licensing for other IBM software products or for non-IBM products licensed on a per-core basis is not covered for temporarily activated cores.

Typically a tool, such as a license manager, is used to manage the licenses. A license manager detects use of the software, compares it to the entitlement, and then takes action based on the results. A license manager can be provided by IBM or can be made available by the software provider.

This table shows Capacity on Demand software licensing considerations.

Table 2. Capacity on Demand software licensing considerations

Licensing type[1]	Software type	Capacity Upgrade on Demand (permanent activations)	Elastic, Utility, and Trial CoD (temporary activations)
Per user licensing	- IBM and non-IBM middleware - Independent software vendor (ISV) software	No Charge - User entitlement does not change when inactive processor cores are permanently activated	No Charge - User entitlement does not change when inactive processor cores are temporarily activated
Software tier licensing	- IBM and non-IBM middleware - ISV software	No Charge - Tier entitlement does not change when inactive processor cores are permanently activated	No Charge - Tier entitlement does not change when inactive processor cores are temporarily activated
Processor Value Unit licensing	IBM i, AIX, Linux	Per activation charge - One processor entitlement must be purchased for each permanently activated processor assigned to a partition that uses the software.	No Charge - Processor entitlement does not change when inactive processor cores are temporarily activated. **Note:** This rule might not apply to Linux, see your Linux distributor for details.

Table 2. Capacity on Demand software licensing considerations (continued)

Licensing type[1]	Software type	Capacity Upgrade on Demand (permanent activations)	Elastic, Utility, and Trial CoD (temporary activations)
Processor Value Unit licensing	IBM middleware	Per activation charge - One processor entitlement must be purchased for each permanently activated processor assigned to a partition that uses the software.	Daily user charge - One processor day of entitlement must be purchased each time that any number of inactive processor cores are temporarily activated.
[1] It is possible that you use a combination of these licensing types. For details, consult the license agreement associated with your product.			

Determining when to activate resources

Capacity on Demand (CoD) provides the ability to activate processor cores and memory units on your server when your workload requires the additional resources. To determine when to activate additional processor cores or memory units and how many new resources you require, monitor your trends in CPU and memory utilization by using a performance tool. Several performance tools are available to report CPU utilization information.

To identify trends in your resource utilization, click the following links:
* Performance Management for IBM i
* Performance Management for Power Systems
* IBM Performance Management for Power Systems

When computing average usage of all available processor cores, the system functions that report CPU utilization do not include the inactive processor cores in the total amount of CPU capacity. The inactive processor cores are not considered active within the various system functions that report CPU utilization percentages. The percentage of used CPU capacity is a calculated metric based on the amount of time that the processor was active within an elapsed time. This capacity is typically reported as a percentage, where 100% indicates that the processor was busy for the entire elapsed time. When multiple processor cores are present, CPU time must be adjusted to represent the average usage of all processor cores, so utilization is always reported as the percentage of total available capacity.

Processor sparing and memory sparing

Dynamic *processor sparing* is a feature that allows inactive processor cores to act as dynamic spares in environments with the Capacity on Demand (CoD) offering. *Memory sparing* occurs when on-demand inactive memory is automatically activated by the system to temporarily replace failed memory until a service action can be performed.

Processor sparing helps minimize the impact to server performance caused by a failed processor. An inactive processor is activated if a failing processor reaches a predetermined error threshold, thus helping to maintain performance and improve system availability. Dynamic processor sparing happens dynamically and automatically when using dynamic logical partitioning (DLPAR) and the failing processor is detected prior to failure. If not detected prior to failure or when not using DLPAR, a reboot of the system or partition activates an alternate processor from the inactive spares. You can then re-establish required performance levels without waiting for parts to arrive on-site. Dynamic processor sparing does not require the purchase of an activation code; it requires only that the system have inactive CUoD processor cores available.

Memory sparing occurs only when inactive Capacity on Demand (CoD) memory is present in a system and when an entire memory feature becomes unusable. During an initial program load (IPL), failed memory parts are taken out of use and inactive CoD memory is activated in place of the failed part without operational intervention.

Moving activations

You might want to move parts (processor cores or memory) between compatible systems in an attempt to rebalance your capacity.

Sometimes the movement of the resource requires both the movement of the physical component and the movement of the Capacity on Demand (CoD) activation. Under these circumstances, a deactivation of the capacity on the source server is required as the processor or memory activation is being migrated.

It is not usual practice, but if the need arises to move activations, contact your Capacity on Demand administrator at:
- Power Systems: pcod@us.ibm.com

Planning for Capacity on Demand

Capacity planning for servers with inactive processor cores and memory units uses essentially the same procedures and resources that are used for sizing other servers. The set of tools, resources, and offerings available to help determine the required server capacity supports servers with inactive processor cores and memory units.

For information about pricing and to determine how much a particular Capacity on Demand (CoD) activation costs, contact your IBM Business Partner or IBM sales representative for more information.

For help with capacity planning, refer to these resources:
- IBM Benchmark Center

  Use this website for help with benchmarking application environments.
- Systems solution center, Bangalore

  Systems solution center, Bangalore can help find the right solution to run your business and can link you with solution developers. Connect to IBM eServer™ solution options for your business needs across technologies and solution areas such as business intelligence, client relationship management, and enterprise software.
- IBM Systems Workload Estimator

  IBM Systems Workload Estimator to help you predict a possible server model processor, interactive feature, memory, and disk storage to purchase for a given workload.

Setting up your environment for Capacity on Demand

Before you order any activation features, prepare your environment for integrating the additional capacity to ensure that your server is able to fully use the activated processor cores or memory.

To set up your environment for Capacity on Demand (CoD), you should:
- Prepare any logical partitions (LPARs)
- Perform any I/O conditioning
- Perform any disk upgrades

Newly activated processor cores are immediately available for use by uncapped logical partitions. You can choose to assign these processor cores to one or more logical partitions, except for processor cores that are activated by using Utility CoD. The processor cores that are activated by using Utility CoD are assigned to a default shared processor pool and are then used from the pool. You must assign these

processor cores to one or more logical partitions to begin using them. You must also assign newly
activated memory to one or more logical partitions to begin using the memory.

Capacity Upgrade on Demand

Capacity Upgrade on Demand (CUoD) allows you to permanently activate one or more inactive
processor cores or memory units without requiring you to restart your server or interrupt your business.

Capacity Upgrade on Demand concepts

With Capacity Upgrade on Demand (CUoD), you can activate additional processor cores and memory
units on selected servers by purchasing a permanent processor or memory unit activation feature. CUoD
adds capacity for new workloads, which enables your server to adapt to unexpected performance
demands.

Make sure that you have prepared your server before continuing. For more information, see "Preparing
for Capacity on Demand" on page 2.

With appropriate planning, you can determine exactly when to activate CUoD based on your current and
future workloads. Without appropriate planning and preparation, you might not obtain the maximum
potential that is available through CUoD.

Capacity Upgrade on Demand processor cores and memory units

This information lists the number of active and inactive processor cores and memory units available for
each server model.

Your managed systems include a number of active processor cores and memory units. They can also
include inactive processor cores and memory units. *Active* processor cores or memory units are processor
cores or memory units that are already available for use on your server when it comes from the
manufacturer. *Inactive* processor cores or memory units are processor cores or memory units that are
included with your server, but not available for use until you activate them. Inactive processor cores and
memory units can be permanently activated by purchasing an activation feature and entering the
provided activation code on your server. For information about ordering, see "Ordering Capacity
Upgrade on Demand activation features" on page 7.

The activation code is unique to your server and is posted at the website IBM Capacity on Demand:
Activation code.

Allow several days for order processing and activation code posting to take place.

These tables list the number of active and inactive processor cores and memory units that are available
for each server model.

Table 3. Power Systems Capacity Upgrade on Demand processor features and processor activation features.

Machine type and model	Processor feature n-core	Processor feature	CUoD processor core activation feature (priced/zero priced)
9119-MME	0/32	EPBA (4.00 GHz Processor Card)	EPBJ
9119-MME	0/40	EPBC (4.21 GHz Processor Card)	EPBL
9119-MHE	0/32	EPBB (4.46 GHz Processor Card)	EPBK
8408-E8E	0/8	EPV2 (3.72 GHz Processor Card)	EPV2
8408-E8E	0/10	EPV6 (3.35 GHz Processor Card)	EPV6
8408-E8E	0/12	EPV4 (3.02 GHz Processor Card)	EPV4

Table 4. Power Systems Capacity Upgrade on Demand memory activation features.

Machine type and model	Orderable memory feature code	Description
9119-MME, 9119-MHE	EMA5	Activation of 1 GB DDR3 POWER8 memory
9119-MME, 9119-MHE	EMA6	Activation of 100 GB DDR3 POWER8 memory
8408-E8E	EMAA	Activation of 1 GB DDR3 POWER8 memory
8408-E8E	EMAB	Activation of 100 GB DDR3 POWER8 memory
Note: Memory must be 50% activated.		

Capacity Upgrade on Demand activation codes

After you decide to permanently activate some or all of your resources, you must order and purchase one or more activation features. When you order and purchase activation features, you are provided with one or more activation codes that you use to activate resources on your server.

When the order is placed, the order record is combined with vital product data (VPD) from your server. This information generates one or more activation codes that are specific to your server.

The activation codes are posted on an IBM website for quick access, usually within one business day (24 hours) after the order reaches the IBM manufacturing system. After your activation codes have been generated, you can access them by using your system type and serial number at the following Capacity on Demand (CoD) website http://www-912.ibm.com/pod/pod.

To order activation features and receive activation codes, see "Ordering Capacity Upgrade on Demand activation features."

Ordering Capacity Upgrade on Demand activation features

You can order activation features for a new server, a server model upgrade, or an installed server. After you place your order, you will receive a code that activates inactive processor cores or memory units.

For a new server or a server model upgrade, your order can contain one or more activation features for processor cores or memory units, which results in one or more activation codes. In this case, the activation codes are entered before the server is sent to you.

When you order Capacity Upgrade on Demand (CUoD) activation features for an installed server, you must determine whether you want to permanently activate some or all of your inactive processor cores or memory units. You must order one or more activation features and then use the resulting one or more activation codes to activate your inactive processor cores or memory units.

Notes:
- It can take several days to process an order. You can use a one-time no-charge Trial Capacity on Demand for 30 days to satisfy workload requirements while your order for permanent activation of additional capacity is being fulfilled. For more information, see "Ordering Trial Capacity on Demand" on page 9.
- An order for activation features will process more quickly if you do not include any miscellaneous features with the order.

To order one or more CUoD activation features:
1. Determine the number of inactive processor cores or memory units that you want to activate. For more information, see "Capacity Upgrade on Demand processor cores and memory units" on page 6.
2. Contact your IBM Business Partner or IBM sales representative to place your order for one or more activation features.

After ordering, see "Activating Capacity Upgrade on Demand" to activate inactive resources permanently.

Related concepts:

"Trial Capacity on Demand" on page 9

Trial Capacity on Demand (CoD) provides no-charge temporary capacity to enable you to test new function on your server.

Using Capacity Upgrade on Demand from ASMI

You can use the Hardware Management Console (HMC) or the Advanced System Management Interface (ASMI) to manage Capacity Upgrade on Demand (CUoD).

Most Capacity on Demand (CoD) tasks on the HMC require the HMC Super Administrator user role.

If you are not using the HMC, you can use the ASMI.

For more information on using On-demand Utilities from ASMI, see On Demand Utilities.

Activating Capacity Upgrade on Demand

When you purchase one or more activation features, you will receive corresponding activation codes to permanently activate your inactive processor cores or memory units.

To permanently activate your inactive resources by retrieving and entering your activation code:

1. Retrieve the activation code by going to Capacity on Demand: Activation code.
2. Enter the system type and serial number of your server.
3. Record the activation code that is displayed on the website.
4. To enter your activation code on your server by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:
   - If you are using an HMC Classic or HMC Enhanced interface, use the **HMC Capacity On Demand > Enter CoD Code** task.
   - If you are using an HMC Enhanced+ interface, use the **Capacity on Demand > CoD functions > Enter CoD Code** task.

Any newly activated processor cores are now available for use by uncapped logical partitions. If there are no uncapped logical partitions, you must assign the processor cores to one or more logical partitions in order to begin using the processor cores. Any newly activated memory must be assigned to one or more logical partitions to begin using the newly activated memory.

You can dynamically assign the newly activated processor cores or memory to the default partition. Alternatively, if your server is in the manufacturing default configuration, the server can start to use the newly activated processor cores or memory immediately after restarting your server operating system

You can now begin using the new resources.

Viewing settings for Capacity on Demand resources

You can use the Hardware Management Console (HMC) to view Capacity on Demand (CoD) settings.

You can see how many processor cores or memory units you have, how many are active, and how many are available for activation using CoD with these settings. You can also view information about your Elastic CoD processor cores and memory units, Trial CoD processor cores and memory units, Utility CoD processor cores, and Mobile CoD processor cores and memory units.

To view the capacity settings for processor cores or memory by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:

- If you are using the HMC Classic or HMC Enhanced interface, use the **HMC Capacity On Demand** > **Processor** or **Memory** > **View Capacity Settings** task.
- If you are using the HMC Enhanced+ interface, use the **Capacity on Demand** > **CoD functions** > **View Processor Settings** or **View Memory settings** task.

Trial Capacity on Demand

Trial Capacity on Demand (CoD) provides no-charge temporary capacity to enable you to test new function on your server.

Related concepts:

"Ordering Capacity Upgrade on Demand activation features" on page 7
You can order activation features for a new server, a server model upgrade, or an installed server. After you place your order, you will receive a code that activates inactive processor cores or memory units.

Trial Capacity on Demand concepts

You can evaluate the use of inactive processor cores, memory, or both, at no charge with Trial Capacity on Demand (CoD).

After you start the CoD trial, the trial period is available for 30 power-on days. The trial period only advances while the server is powered on.

When action on your part is required after you implement this CoD offering, the HMC displays messages on the HMC desktop.

You can use the Hardware Management Console to stop a current CoD trial for processor cores or memory units before the trial automatically expires. If you choose to stop the trial before it expires, you cannot restart it and you forfeit any remaining days.

Ordering Trial Capacity on Demand

If you need to test new functions or evaluate inactive processor cores, memory, or both processor cores and memory, order Trial Capacity on Demand (CoD).

An HMC is required to use Trial Capacity on Demand.

To order Trial CoD, do the following:
1. Click the Trial Capacity on Demand website.
2. Select a request based on your situation.

Before using Trial CoD, you must activate Trial Capacity on Demand. See "Activating Trial Capacity on Demand" to activate your inactive processor cores or memory.

Using Trial Capacity on Demand

You must use the Hardware Management Console (HMC) to manage your Trial Capacity on Demand (CoD) activations.

Most Capacity on Demand (CoD) tasks on the HMC require the HMC Super Administrator user role.

Activating Trial Capacity on Demand

You can activate your inactive processor cores or memory for a trial period by obtaining and entering a trial processor code or a trial memory code.

To activate Trial Capacity on Demand (CoD), do the following:

1. Retrieve the activation code by going to the following web address: http://www-912.ibm.com/pod/pod.
2. To enter your activation code on your server by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:
   - If you are using an HMC Classic or HMC Enhanced interface, use the **HMC Capacity On Demand > Enter CoD Code** task.
   - If you are using an HMC Enhanced+ interface, use the **Capacity on Demand > CoD functions > Enter CoD Code** task.

Any newly activated processor cores are now available for use by uncapped logical partitions. If there are no uncapped logical partitions, you must assign the processor cores to one or more logical partitions in order to begin using the processor cores. Any newly activated memory must be assigned to one or more logical partitions to begin using the newly activated memory.

You can dynamically assign the newly activated processor cores or memory to the default partition. Alternatively, if your server is in the manufacturing default configuration, the server can start to use the newly activated processor cores or memory immediately after restarting your server operating system

Before the trial period expires, you must either enter a Capacity Upgrade on Demand activation code to permanently activate the Trial CoD resources, or you must return the Trial CoD resources. For more information, see "Activating Capacity Upgrade on Demand" on page 8 or "Returning Capacity on Demand resources" on page 11.

Stopping Trial Capacity on Demand

Trial Capacity on Demand (CoD) ends when the trial period is over and the resources have been reclaimed by the server. You must return the resources before the trial period has ended.

For more information about returning Capacity on Demand (CoD) resources, see "Returning Capacity on Demand resources" on page 11. If your server is powered off or loses power before the resources are removed from the logical partitions, you might need to perform recovery actions to successfully power on your server.

Trial Capacity on Demand can also end when you enter a Capacity Upgrade on Demand activation code to permanently activate the processor cores or memory. For more information about permanently activating resources, see "Activating Capacity Upgrade on Demand" on page 8. For more information about Capacity Upgrade on Demand, see "Capacity Upgrade on Demand" on page 6.

Stopping a current trial

You can use the HMC to stop a current Capacity on Demand trial for processor cores or memory units before the trial automatically expires. If you choose to stop the trial before it expires, you cannot restart it and you forfeit any remaining days.

Additional requests for Trial Capacity on Demand might be available from your Capacity on Demand administrator.

To stop a current Trial Capacity on Demand, follow these steps:
1. Return the trial resources. See "Returning Capacity on Demand resources" on page 11 for more information.
2. To stop a current Trial Capacity on Demand by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:
   - If you are using the HMC Classic or HMC Enhanced interface, use the **HMC Capacity On Demand > Processor** or **Memory > Trial CoD > Stop** task.

- If you are using the HMC Enhanced+ interface, use the **Capacity on Demand > CoD functions > Stop Trial** task.

Trial Capacity on Demand is now stopped and cannot be restarted.

Unreturned Capacity on Demand resources

In the event the server is powered off or loses power, there may be unreturned Trial CoD, Elastic CoD, or Mobile CoD resources. Unreturned Trial CoD resources result when the trial period ends before the Trial CoD resources have been removed from your logical partition. Unreturned Elastic CoD resources result when the Elastic CoD request expires before the Elastic CoD resources have been removed from your logical partition. Unreturned Mobile CoD resources result when you remove Mobile CoD resources from your server before you have removed them from your logical partition.

When a server is powered off or loses power, all unreturned Trial CoD, Elastic CoD, or Mobile CoD resources are reclaimed by the server. As a result, when the server is powered back on, all logical partitions that were running prior to the power off or loss of power might not be able to be restarted since only licensed resources are available for use. Furthermore, when a logical partition is powered on, if there are not enough licensed resources to satisfy the logical partition's memory or processor requirements, the power on of that logical partition will fail. The failure might result in an HMC message of HSCL03F4 (not enough processing resources to meet the allocation setting), or a system reference code of B2xx1150 or B2xx1230.

Returning Capacity on Demand resources

To return Trial Capacity on Demand (CoD) processor cores or memory, you must remove the processor cores or memory from the logical partitions to which they are assigned, thus making them available to be reclaimed by the server.

You do not need to remove the processor cores or memory from the same logical partitions to which they were assigned when you started your Elastic CoD request or Trial CoD. You can remove the processor cores or memory from any of your logical partitions.

Entering a Capacity Upgrade on Demand activation while running Trial Capacity on Demand

To manage the permanent activation of resources while running under a Trial Capacity on Demand (CoD) activation, you select your option based on the number of resources that you would like to activate.

The following describes each option:
- When the number of resources to be permanently activated is equal to the number of resources that are activated by Trial CoD, these options are presented to convert the trial resource activations into permanent resource activations when the permanent activation code is entered on the Hardware Management Console (HMC):

Option	Description
Yes	The conversion occurs immediately (dynamic conversion from trial resources to permanent resources).
No	- If there are enough inactive resources (not trial or permanent), the permanent activation will be accomplished using the inactive resources that are currently installed on the system. - If there are not enough inactive resources to satisfy the request, the permanent activation will not be accepted.

- When the number of resources to be permanently activated is greater than the number of resources activated through Trial CoD and there are enough inactive resources plus the trial resources to satisfy

the permanent activation, these options are presented to convert the trial resource activations into permanent resource activations when the permanent activation code is entered on the HMC:

Option	Description
Yes	The conversion occurs immediately (dynamic conversion from trial resources to permanent resources using as many inactive resources as necessary).
No	• If there are enough inactive resources (not trial or permanent), the permanent activation will be accomplished using the inactive resources that are currently installed on the system. • If there are not enough inactive resources to satisfy the request, then the permanent activation will not be accepted. You should stop the Trial CoD request before attempting to permanently activate resources.

- When the number of resources to be permanently activated is less than the number of resources activated through Trial CoD, these are the results that occur:
  - If there are enough inactive resources (not trial or permanent), then the permanent activation will be accomplished using the inactive resources that are currently installed on the system.
  - If there are not enough inactive resources to satisfy the request, then the permanent activation code will not be accepted. Stop the Trial CoD request before attempting to permanently activate resources.

Viewing settings for Trial Capacity on Demand resources

You can use the Hardware Management Console (HMC) to view Trial Capacity on Demand (CoD) settings.

You can see how many Trial CoD processor cores or memory units you have and how much time is left in the current Trial CoD period.

To view the settings by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:

- If you are using the HMC Classic or HMC Enhanced interface, use the **HMC Capacity On Demand** > **Processor** or **Memory** > **Trial CoD** > **View Capacity Settings** task.
- If you are using the HMC Enhanced+ interface, use the **Capacity on Demand > CoD functions > View Capacity Settings** task.

Elastic Capacity on Demand

Elastic Capacity on Demand (CoD) (formerly referred to as *On/Off CoD*) allows you to temporarily activate and deactivate processor cores and memory units to help meet the demands of business peaks. After you request that a number of processor cores or memory units are to be made temporarily available for a specified number of days, those processor cores and memory units are available immediately. You can start and stop requests for Elastic CoD, and you are billed for usage at the end of each quarter.

You can change the number of resources and number of days in a running Elastic CoD request. Instead of having to stop the current request and start a new request, or wait until the current request expires, you can change the number of resources and number of days in the current request. For more information about how billing works when changing a current request, or how to change a current request, see "Billing when changing a running Elastic Capacity on Demand request" on page 15 or "Changing a running Elastic Capacity on Demand request" on page 22.

Make sure that you have prepared your server before continuing. For more information, see "Preparing for Capacity on Demand" on page 2.

Elastic Capacity on Demand concepts

You can activate inactive processor cores or memory units on a temporary basis with Elastic Capacity on Demand (CoD).

You can turn on inactive processor cores or memory units for a number of days as your business peaks demand and pay only for the days that the processor cores or memory units remain activated.

When action on your part is required after you implement this CoD offering, the HMC displays messages on the HMC desktop.

Elastic Capacity on Demand processor days or memory days

Temporary capacity provided by Elastic Capacity on Demand (CoD) is measured and billed in units called processor days or memory days.

Requested processor or memory days

> Requested processor days or memory days equal the number of temporarily activated processor cores or memory units multiplied by the number of days that are specified on a request for temporary capacity using Elastic CoD. After a request for temporary capacity is made on the server, the server records one processor day for each requested processor or one memory day for each requested memory unit at the beginning of each 24-hour period that the request is running. One memory unit is one GB of memory.

> [number of processor cores or memory units] * [number of requested days]

Unreturned processor or memory days

> Unreturned processor days or memory days equal the number of days (24-hour periods) that the temporarily activated processor cores or memory units were used beyond the expiration of the request for temporary capacity, multiplied by the number of requested processor cores or memory units that are still in use.

> [number of days processor cores or memory units were used beyond expiration of temporary capacity request] * [number of requested processor cores or memory units still in use]

> **Tip:** Unreturned processor or memory days are charged at the beginning of each 24-hour period that the temporarily activated processor cores or memory units are still being used after the expiration of the request for temporary capacity.

Related concepts:

"Billing for Elastic Capacity on Demand" on page 14
The customer contract that must be signed prior to receiving your Elastic Capacity on Demand (CoD) enablement code requires you to report billing data, at least once per month, regardless of whether you have used the temporary capacity provided by Elastic CoD during the period.

Elastic Capacity on Demand enablement code

After you have decided to take advantage of Elastic Capacity on Demand (CoD), you must order an Elastic CoD enablement feature. The enablement feature provides the Elastic CoD enablement code that allows you to request temporary activation of inactive processor cores or memory units by entering the code on your server.

Notes:

- An HMC is required to use Elastic Capacity on Demand.
- You must have an assigned contract for the enablement code before you can obtain the enablement code.
- The enablement code is available only through an MES upgrade order.
- An Elastic CoD enablement code enables you to request temporary capacity on the server. You can make requests for temporary capacity over the life of the machine as long as your total days do not exceed the predefined limit. When the limit is reached, a new Elastic CoD enablement feature must be

ordered and a new enablement code entered on your server. Each time a new enablement code is entered, it will reset the limit of processor days or memory days that can be requested as temporary capacity.

Table 5. Elastic CoD processor enablement features

Machine type and model	Elastic CoD processor enablement feature
9080-MME and 9119-MME and 9080-MME	EP9T
9080-MHE and 9119-MHE and 9080-MHE	EP9T
8408-E8E and 8408-44E	EP9T

Table 6. Elastic CoD memory enablement features

Machine type and model	Elastic CoD memory enablement feature
9080-MME and 9119-MME and 9080-MME	EM9T
9080-MHE and 9119-MHE and 9080-MHE	EM9T
8408-E8E and 8408-44E	EM9T

After your Elastic CoD enablement code has been generated, you can access it by using your system type and serial number at theCapacity on Demand website. (http://www-912.ibm.com/pod/pod)

Billing for Elastic Capacity on Demand

The customer contract that must be signed prior to receiving your Elastic Capacity on Demand (CoD) enablement code requires you to report billing data, at least once per month, regardless of whether you have used the temporary capacity provided by Elastic CoD during the period.

Billing data is used to calculate billing amounts at the end of each billing period (calendar quarter). For instructions about setting up a method of reporting, see "Establishing monthly reporting to IBM" on page 20.

Processor days or memory days of credit are applied against any requested or unreturned processor days or memory days of temporary capacity that are provided by Elastic CoD. This credit happens automatically until all of the days of credit are used. Elastic CoD credits cannot be transferred to another system serial number and there is no feature conversion offered for remaining credits on a model upgrade.

If the temporary resources that are provided by Elastic CoD are still assigned to partitions after your request has expired, the processor days or memory days continue to be recorded at the beginning of each 24-hour period, and you continue to be billed for these days at the end of the Elastic CoD billing cycle. You are charged for these unreturned processor days or memory days at the same rate as requested processor days or memory days.

You must return the resources before your request expires, so you are not billed for any unreturned processor cores or memory units. If your request has already expired and you do not want to be billed for any more unreturned processor cores or memory units, return the expired processor cores or memory units immediately. For more information about returning CoD resources, see "Returning Elastic Capacity on Demand resources" on page 23.

The following table lists the models, processor features, and billing features for Elastic CoD.

Table 7. Elastic CoD processor features and billing features

Machine type and model	Orderable processor feature	Elastic CoD processor day billing feature
9119-MME	EPBA	EPJ6 (EPJ8 = Bundle of 100 x EPJ6)

Machine type and model	Orderable processor feature	Elastic CoD processor day billing feature
9119-MME	EPBA	EPJ7 (IBM i) (EPJ9 = Bundle of 100 x EPJ7)
9119-MME	EPBC	EPJJ (EPJL = Bundle of 100 x EPJJ)
9119-MME	EPBC	EPJK (IBM i) (EPJM = Bundle of 100 x EPJK)
9119-MHE	EPBB	EPJC (EPJE = Bundle of 100 x EPJC)
9119-MHE	EPBB	EPJD (IBM i) (EPJF = Bundle of 100 x EPJD)
8408-E8E	EPV2	EPJW (EPJX = Bundle of 100 x EPJW)
8408-E8E	EPV4	EPK0 (EPK1 = Bundle of 100 x EPK0)
8408-E8E	EPV6	EPK3 (EPK4 = Bundle of 100 x EPK3)

The following table lists the models, memory features, and billing features for Elastic CoD.

Table 8. Elastic CoD memory features and billing features

Machine type and model	Elastic CoD memory billing feature
9119-MME	EMJ4 (EMJ5 = Bundle of 100 and EMJ6 = Bundle of 999 of FC EMJ4)
9119-MHE	EMJ4 (EMJ5 = Bundle of 100 and EMJ6 = Bundle of 999 of FC EMJ4)
8408-E8E	EMJA (EMJB = Bundle of 100 and EMJC = Bundle of 999 of FC EMJA)

Related concepts:
"Elastic Capacity on Demand processor days or memory days" on page 13
Temporary capacity provided by Elastic Capacity on Demand (CoD) is measured and billed in units called processor days or memory days.

Billing when changing a running Elastic Capacity on Demand request:

Ensure that you understand the implications to billing before you decide to change a running Elastic Capacity on Demand (CoD) request.

When you issue a change request, the days in the running request are not preserved; however, the time in the current resource day is carried forward from the running request. It is important to understand that the resource days that remain in a request are decremented at the start of each day. Therefore, the number of resource days billed is incremented at the start of each day.

The change request expires in the number of days that are requested in the change request plus the time that remains in the current resource day of the running request since you have already been charged for that entire resource day. For example, if there are 23 hours and 12 minutes in the current Elastic CoD request, and the request is changed to 5 days, the new request will expire in 5 days, 23 hours, and 12 minutes (the 5 days that are specified by the change request plus the time in the current resource day).

Note: In the confirmation message, the time is rounded up to the nearest hour, so it will show 6 days and 0 hours.

Another example, if there are 3 hours and 45 minutes that remain in the current Elastic CoD request, and the request is changed to 5 days, the new request will expire in 5 days, 3 hours, and 45 minutes (the 5 days that are specified by the change request plus the time that remains in the current resource day).

Note: The time displayed by the confirmation message is rounded up to the nearest hour and will be 5 days and 4 hours.

If the change request decreases the amount of resources in the running request, the remainder of the current resource day is forfeited for each of the resources that are being canceled. No credit is given for any partial resource days that are forfeited. If the change request increases the amount of resources in the running request, a charge for the additional resources for the time that remains in the current resource day is immediately applied. That charge is calculated as additional resources multiplied by the quantity (time that remains in the current resource day rounded up to the whole hour and divided by 24). The result is rounded up to whole resource days. The usual charge for any requested days in the change request applies.

The number of resource days in the Elastic CoD enablement is calculated separately from the number of resource days that are billed. When an Elastic CoD request is started, the number of enabled resource days is reduced by the number of requested resource days (number of requested resources multiplied by the number of requested days). When a running Elastic CoD request is changed, the number of enabled resource days is increased by the number of remaining resource days in the running request, then reduced by the number of requested resource days in the change request. If the change request increases the number of resources, the number of enabled resource days is also reduced by the number of resource days that are charged for the additional resources for the time in the current resource day.

If you decide, within the same day, to again activate the Elastic CoD processors, such as during a test period, the implications to billing are slightly different. The 24-hour test period starts when the first Elastic CoD request is made. During the 24-hour test period that your server is powered on, a record is kept of the maximum number of Elastic CoD processors or memory requested when you make Elastic CoD activation or change requests. Therefore, as the testing reactivation occurs, you can start and stop, or change, Elastic CoD requests repeatedly. Any subsequent requests during the same 24-hour period for the same or fewer resources are not charged. Requests that are made for more resources result in a pro-rated charge for the excess resources. This new, higher level of resources becomes the maximum resource amount for the 24-hour period, and subsequent requests during the same 24-hour period are not charged for resources up to this new maximum amount. For information about testing your Elastic CoD activations, see Testing your Elastic Capacity on demand activations.

Examples: Changing a running Elastic CoD request

At 9:00 a.m. on Monday, you start a new request for 5 processors for 1 day. The result is:
- 24 hours remain in current processor day
- 1 day plus 0 hours until request expires
- Charge for 5 processor days (5 processors multiplied by 1 day)
- Enablement reduced by 5 processor days

At 11:00 a.m. on Monday, you change the request to 5 processors for 2 days. The result is:
- 22 hours remain in current processor day
- 2 days plus 22 hours until request expires
- No additional charge
- Enablement reduced by 10 processor days (5 processors multiplied by 2 days)

At 3:00 p.m. on Monday, you change the request to 10 processors for 2 days. The result is:
- 18 hours remain in current processor day
- 2 days + 18 hours until request expires
- Charge for 4 processor days (5 additional processors multiplied by 18 hours in current processor day divided by 24 equals 3.75, which is then rounded up to 4)

- Enablement increase by the 10 processor days in the running request, then reduced by 24 processor days (10 processors multiplied by 2 days plus 4 processor days charged for the hours in the current processor day)

At 5:00 p.m. on Monday, you change the request to 2 processors for 2 days. The result is:
- 16 hours remain in current processor day
- 2 days plus 16 hours until request expires
- No charge and no credit for the 8 canceled processors
- Enablement increased by the 20 processor days in the running request, then reduced by 4 processor days (2 processors multiplied by 2 days)

At 7:00 p.m. on Monday, you change the request to 2 processors for 1 day. The result is:
- 14 hours remain in current processor day
- 1 day plus 14 hours until request expires
- No charge and no credit
- Enablement increased by the 4 processor days in the running request, then reduced by 2 processor days (2 processors multiplied by 1 day)

At 9:00 a.m. on Tuesday, the request is still active. The result is:
- Start of new processor day
- 24 hours remain in current processor day
- 1 day plus 0 hours until request expires
- Charge for 2 processor days
- No change to enablement

At 9:00 a.m. on Wednesday, the request expires. The result is:
- No charge or credit
- No change to enablement

At 10:00 a.m. on Wednesday, you start a new request for 5 processors for 2 days. The result is:
- 24 hours remain in current processor day
- Charge for 5 processor days
- Enablement reduced by 10 processor days

Related concepts:
"Billing when testing your Elastic Capacity on Demand activations"
You can test your Elastic Capacity on Demand (CoD) and Capacity BackUp activations several times within a 24-hour period without incurring duplicate billing charges.

Billing when testing your Elastic Capacity on Demand activations:

You can test your Elastic Capacity on Demand (CoD) and Capacity BackUp activations several times within a 24-hour period without incurring duplicate billing charges.

With this capability, you can test your activations several times over a 24-hour period while the server is powered on. When performing this test, you are only charged for the maximum number of Elastic CoD processors or memory that you request during that 24-hour period. The 24-hour period only accounts for when your server is powered on, which eliminates the possibility that the period would expire if you power off your system for an extended period of time.

The following is an example of how billing works if you decide to test your Elastic CoD activations.

Examples: Elastic CoD processor activations and billing results

Table 9. Billing example for testing Elastic CoD activations

Time	Processor activations and billing results
8:00 a.m.	• 5 processors activated • 5 processor days charged • 5 processor maximum
11:00 a.m. (3 hours later)	• 3 processors added • 3 processor days charged • 8 processor maximum
3:00 p.m. (4 hours later)	• 3 processors canceled (no credit) • 8 processor maximum
5:00 p.m. (2 hours later)	• 3 processors added (no charge) • 8 processor maximum
8:00 p.m. (3 hours later)	• 3 processors canceled (no credit) • 8 processor maximum
11:00 p.m. (3 hours later)	• 3 processors added (no charge) • 8 processor maximum
4:00 a.m. (5 hours later; 20 hours since 8:00 a.m. initial activation)	• 3 processors canceled (no credit) • 8 processor maximum
Total charge	8 processor days total

This is billing example when starting and stopping Elastic CoD requests during a test.

Table 10. Billing example for starting and stopping Elastic CoD requests when testing

Time	Processor activations and billing results
8:00 a.m.	• 3 processors activated • 3 processor days charged • 3 processor maximum
9:00 a.m. (1 hour later)	• 1 processor canceled (no credit) • 3 processor maximum
10:00 a.m. (1 hour later)	• 1 processor added • No charge • 3 processor maximum
11:00 a.m. (1 hour later)	• 3 processors stopped (no credit) • 3 processor maximum
12:00 p.m. (1 hour later)	• 4 processors activated • 1 processor day charged (1 multiplied by 20 hours < 24 hours) • 4 processor maximum
1:00 p.m. (1 hour later)	• 4 processors stopped (no credit) • 4 processor maximum

Table 10. Billing example for starting and stopping Elastic CoD requests when testing (continued)

Time	Processor activations and billing results
2:00 p.m. (1 hour later)	• 1 processor activated • No charge • 4 processor maximum
4:00 p.m. (2 hours later)	• 1 processor stopped (no credit) • 4 processor maximum
Total charge	4 processor days total

Related concepts:

"Billing when changing a running Elastic Capacity on Demand request" on page 15
Ensure that you understand the implications to billing before you decide to change a running Elastic Capacity on Demand (CoD) request.

Ordering Elastic Capacity on Demand

To order Elastic Capacity on Demand (CoD), contact your IBM Business Partner or IBM sales representative.

Your IBM Business Partner or IBM sales representative guides you through the completion of the required Elastic CoD contracts with IBM. Then, your IBM Business Partner or IBM sales representative places a customer order for an Elastic CoD enablement feature. For more information about the enablement feature, see"Elastic Capacity on Demand enablement code" on page 13.

Before using Elastic CoD, you must enable Elastic CoD. See "Enabling Elastic Capacity on Demand" for more information.

Using Elastic Capacity on Demand

You must use the Hardware Management Console (HMC) to manage Elastic Capacity on Demand (CoD).

Most Capacity on Demand (CoD) tasks on the HMC require the HMC Super Administrator user role.

After you have enabled and activated Elastic CoD, minimal day-to-day management of your temporary capacity is required.

Enabling Elastic Capacity on Demand

Enable your server for Elastic Capacity on Demand (CoD), before requesting temporary capacity on your server.

Perform the following steps to enable your server for Elastic CoD:

1. Retrieve the Elastic CoD enablement code by accessing http://www-912.ibm.com/pod/pod.
2. To enter your activation code on your server by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:
   - If you are using an HMC Classic or HMC Enhanced interface, use the **HMC Capacity On Demand > Enter CoD Code** task.
   - If you are using an HMC Enhanced+ interface, use the **Capacity on Demand > CoD functions > Enter CoD Code** task.

Your server is now enabled for Elastic CoD. To use your processors or memory, see "Activating Elastic Capacity on Demand" on page 20.

Activating Elastic Capacity on Demand

After you have ordered Elastic Capacity on Demand (CoD) and enabled Elastic CoD, you can request temporary activation of Elastic CoD resources.

For information about entering Elastic CoD enablement codes, see "Ordering Elastic Capacity on Demand" on page 19 and "Enabling Elastic Capacity on Demand" on page 19.

To request activation of Elastic CoD resources by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:

* If you are using the HMC Classic or HMC Enhanced interface, use the **HMC Capacity on Demand** > **Processor** or **Memory** > **On/Off CoD** > **Manage** task.
* If you are using the HMC Enhanced+ interface, use the **Capacity on Demand > CoD functions > Manage** task.

Any newly activated processor cores are now available for use by uncapped logical partitions. If there are no uncapped logical partitions, you must assign the processor cores to one or more logical partitions in order to begin using the processor cores. Any newly activated memory must be assigned to one or more logical partitions to begin using the newly activated memory.

You can dynamically assign the newly activated processor cores or memory to the default partition. Alternatively, if your server is in the manufacturing default configuration, the server can start to use the newly activated processor cores or memory immediately after restarting your server operating system

You will be billed for the activated Elastic CoD resources regardless of whether they have been assigned to a logical partition or are being used. You can stop an active request for Elastic Capacity on Demand before it expires. For more information, see "Stopping an Elastic Capacity on Demand request" on page 21.

You can change a running Elastic CoD request. For more information, see "Changing a running Elastic Capacity on Demand request" on page 22. If you stopped the previous Elastic CoD request that was running on your server, and you start a new Elastic CoD request before the current resource day from the previous request expires (the hours remaining in the current resource day is a non-zero number), the new Elastic CoD request will be handled like a change request for billing purposes. For more information, see "Billing when changing a running Elastic Capacity on Demand request" on page 15.

To avoid being billed for unreturned processor or memory days, you must return the Elastic CoD resources before your Elastic CoD request expires. For more information, see "Returning Elastic Capacity on Demand resources" on page 23.

Establishing monthly reporting to IBM

You can establish monthly reporting to IBM by using the IBM Electronic Service Agent™ or email.

The customer contract that is required prior to receiving your Elastic Capacity on Demand (CoD) enablement code requires you to report billing data, at least once per month, regardless of whether you have used temporary capacity during the period.

You can use several methods to report information about your requests for temporary capacity provided by Elastic CoD to IBM. The preferred method of reporting is to send information electronically using the Electronic Service Agent. Reporting can also be done using email.

Establish monthly reporting using the Electronic Service Agent

Monthly reporting of your temporary capacity billing information can be sent to IBM electronically by using the Electronic Service Agent, which is part of the Hardware Management Console. The Electronic Service Agent is designed to monitor events and to transmit server inventory information to IBM on a periodic, customer-definable timetable.

Establish monthly reporting using email

To send an email containing your billing information for Elastic CoD, do the following:

1. Save your billing information.

   To view and save CoD billing information by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:

   - If you are using the HMC Classic or HMC Enhanced interface, use the **HMC Capacity On Demand > Processor** or **Memory** > **On/Off CoD** >**View Billing information** task.
   - If you are using the HMC Enhanced+ interface, use the use the **Capacity on Demand > CoD functions > View Billing information** task.

2. Alternately, you can sent the output of the following HMC command:

   For processors
   > `lscod -t bill -m managed system -r proc`

   For memory
   > `lscod -t bill -m managed system -r mem`

   -m (The name of the managed system for which CoD information is to be listed.)

   The name may either be the user-defined name for the managed system, or be in the form *tttt-mmm*sssssss*, where *tttt* is the machine type, *mmm* is the model, and *sssssss* is the serial number of the managed system. The *tttt-mmm*sssssss* form must be used if there are multiple managed systems with the same user-defined name.

   The following is an example of an **lscod** command that you can use to report billing information:

   `lscod -t bill -m 9117-570*658BD1C -r proc`

3. Send the electronic image of the billing information in an email to tcod@us.ibm.com.

Stopping an Elastic Capacity on Demand request

You can stop a request for temporary capacity before it expires.

Elastic Capacity on Demand (CoD) remains enabled on your server, but an issued request for temporary capacity will be stopped. For example, consider this scenario: you have requested the temporary activation of one inactive processor for 14 days. After seven days of this request, you determine that you do not need the temporarily activated processor for the remaining seven days of the request. You can stop the request and avoid being billed for any unused processor or memory days of your request. Stopping a request does not preclude making any further requests at a later time.

To stop a request for temporary capacity at any time during the period of requested temporary capacity:

1. Return the Elastic CoD resources. See "Returning Elastic Capacity on Demand resources" on page 23 for information about how to return Elastic CoD resources.

2. To stop an Elastic CoD request by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:

   - If you are using the HMC Classic or HMC Enhanced interface, use the **HMC Capacity on Demand > Processor** or **Memory** > **On/Off CoD** > **Manage** task.
   - If you are using the HMC Enhanced+ interface, use the **Capacity on Demand > CoD functions > Manage** task.

Changing a running Elastic Capacity on Demand request

In a running ElasticCapacity on Demand (CoD) request, you can change the number of resources, number of days, or both the number of resources and number of days. You do not need to stop the current request to start a new request or wait until the current request expires.

Before you change a running Elastic CoD request, ensure that you understand the implications to billing. For more information, see "Billing when changing a running Elastic Capacity on Demand request" on page 15.

To successfully change a running Elastic CoD request:

1. If you are decreasing the amount of resources in the running request, return the Elastic CoD resources to be deactivated. See "Returning Elastic Capacity on Demand resources" on page 23 for details about how to return Elastic CoD resources.
2. by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:
   - If you are using the HMC Classic or HMC Enhanced interface, use the **HMC Capacity on Demand > Processor** or **Memory** > **Elastic CoD** > **Manage** task.
   - If you are using the HMC Enhanced+ interface, use the **Capacity on Demand > CoD functions > Manage** task.

Any newly activated processor cores are now available for use by uncapped logical partitions. If there are no uncapped logical partitions, you must assign the processor cores to one or more logical partitions in order to begin using the processor cores. Any newly activated memory must be assigned to one or more logical partitions to begin using the newly activated memory.

You can dynamically assign the newly activated processor cores or memory to the default partition. Alternatively, if your server is in the manufacturing default configuration, the server can start to use the newly activated processor cores or memory immediately after restarting your server operating system

Testing your Elastic Capacity on Demand activations

You can test your Elastic Capacity on Demand (CoD) and Capacity BackUp activations several times within a 24-hour period without incurring duplicate billing charges.

You can test your activations several times over a 24-hour period while the server is powered on. When performing this test, you are only charged for the maximum number of Elastic CoD processor cores or memory that you request during that 24-hour period. The 24-hour period only accounts for when your server is powered on, which eliminates the possibility that the period would expire if you power off your system for an extended period of time.

For an example of how billing works when testing your Elastic CoD activations, see Table 9 on page 18.

Discontinuing Elastic Capacity on Demand

To discontinue the Elastic Capacity on Demand (CoD) function on your server, disabling the capability for future use, you must obtain and enter an Elastic CoD termination code on your server.

To obtain this termination code, send a request for an Elastic CoD termination code to the CoD administrator at the following email address:

- Power Systems: pcod@us.ibm.com

A single Elastic CoD termination code disables Elastic CoD for both processor cores and memory units. The termination code cannot be entered if an active Elastic CoD request exists on the system, or if unreturned Elastic CoD resources are in use on the system. The active request must be stopped and any unreturned resources must be returned before Elastic CoD can be discontinued. For information about

how to stop the active Elastic CoD request, see "Stopping an Elastic Capacity on Demand request" on page 21. For information about how to return Elastic CoD resources, see "Returning Elastic Capacity on Demand resources."

To disable future use of Elastic CoD on your server after you have obtained a termination code by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:

- If you are using the HMC Classic or HMC Enhanced interface, use the **HMC Capacity On Demand > Enter CoD Code** task.
- If you are using the HMC Enhanced+ interface, use the **Capacity on Demand > CoD functions > Enter CoD Code** task.

Returning Elastic Capacity on Demand resources

To return Elastic Capacity on Demand (CoD) processor cores or memory, you must remove the processor cores or memory from the logical partitions to which they are assigned, thus making them available to be reclaimed by the server.

You do not need to remove the processor cores or memory from the same logical partitions to which they were assigned when you started your Elastic CoD request or Trial CoD. You can remove the processor cores or memory from any of your logical partitions.

Viewing settings for Elastic Capacity on Demand resources

You can use the Hardware Management Console (HMC) to view Elastic Capacity on Demand (CoD) settings.

You can see how many Elastic CoD processor cores or memory units you have, how many are active, and how many are available for activation.

To view the settings by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:

- If you are using the HMC Classic or HMC Enhanced interface, use the **HMC Capacity On Demand** > **Processor** or **Memory** > **On/Off CoD** > **View Capacity Settings** task.
- If you are using the HMC Enhanced+ interface, use the **Capacity on Demand > CoD functions > View Capacity Settings** task.

Utility Capacity on Demand

Utility Capacity on Demand (CoD) automatically delivers additional processor capacity on a temporary basis within the system's default Shared Processor Pool.

Utility Capacity on Demand concepts

The Utility Capacity on demand (CoD) offering is for customers with unpredictable, short workload increases who need an automated and affordable way to help assure that adequate server resource is available as needed.

When you add utility CoD processor cores, they are automatically placed in the default shared processor pool. These processor cores are available to any uncapped partition in any shared processor pool.

The processor cores become available to the pool's resource manager. When the system recognizes that the combined processor utilization within the shared pool exceeds 100% of the level of base (purchased or active) processor cores assigned across uncapped partitions, a Utility CoD Processor Minute is charged, and this level of performance is available for the next minute of use. If additional workload requires a higher level of performance, the system will automatically allow the additional Utility CoD processor cores to be used. The system automatically and continuously monitors and charges for the performance needed above the base (permanent) level.

When action on your part is required after you implement this CoD offering, the HMC displays messages on the HMC desktop.

Utility Capacity on Demand enablement code

Learn more about enabling your system so that it can use Utility Capacity on Demand (CoD). An HMC is required to use Utility CoD.

You must enable your system to use Utility Capacity on Demand. The Utility CoD website can provide a Utility CoD Enablement Code. To start using the inactive capacity on your system as utility capacity, you must enter the enablement code. The Utility CoD enablement code is valid for 365 server powered-on days.

The HMC displays messages on the HMC desktop. Console messages are displayed during the last 30 days of the enablement period. This allows you time to return to the CoD website, accept the terms and conditions for another year and receive a new enablement code.

After you have enabled your machine to use Utility Capacity on Demand, you can move the inactive processor cores into the shared processor pool. Then you can use them as utility processor cores for uncapped partitions.

Utility Capacity on Demand processor minutes

You can use Capacity on Demand (CoD) to add processor minutes to your managed system.

Utility CoD automatically delivers additional processor capacity on a temporary basis within the system's shared processor pool. You can place any number of inactive processor cores into the shared processor pool. After you have placed the processor cores in the shared processor pool, the processor cores become available to the pool's resource manager. When the system recognizes that all the used processor cores within the shared pool exceeds 100% of the level of base (purchased or active) processor cores assigned across uncapped partitions, a Utility CoD Processor Minute is charged. This level of performance is available for the next minute of use. If additional workload requires a higher level of capacity, the system automatically allows the additional Utility CoD processor cores to be used. The system automatically and continuously monitors and charges for the capacity needed above the base (permanent) level.

When the system recognizes that the base processor cores assigned across uncapped partitions is 100% used and at least 10% of one processor is needed, the additional processor resource is automatically applied and chargeable processor minutes start accruing. Processor minutes stop accruing when the utilization level drops and the base processor cores assigned can handle the workload.

Utility Capacity on Demand billing features

Learn more about the Utility Capacity on Demand (CoD) billing features associated with your machine type and model.

The following table describes the processor and billing features for Utility CoD.

Table 11. Utility CoD features

Machine type-model	Orderable processor feature	Utility CoD processor billing feature
9119-MME	EPBA	EPJA
9119-MME	EPBA	EPJB (IBM i)
9119-MME	EPBC	EPJN
9119-MME	EPBC	EPJP (IBM i)
9119-MHE	EPBB	EPJG
9119-MHE	EPBB	EPJH (IBM i)
8408-E8E	EPV2	EPJY

Table 11. Utility CoD features (continued)

Machine type-model	Orderable processor feature	Utility CoD processor billing feature
8408-E8E	EPV4	EPK2
8408-E8E	EPV6	EPK5

Note: Each billing feature is purchased to pay for 100 Utility CoD processor minutes.

Using Utility Capacity on Demand

Utility Capacity on Demand (CoD) automatically provides additional processor capacity on a temporary basis within the shared processor pool.

Utility CoD use is measured in processor minute increments and is reported at the Utility CoD website. Payment is required based on the reported use of processor minutes. You must purchase and pay for an order that includes a quantity of Utility CoD billing features.

Each managed system has a *reporting limit* and a *reporting threshold*. These values are set by the Utility CoD Enablement Code. On managed systems with 1 - 4 inactive processor cores, the reporting threshold is 500 minutes, and the reporting limit is 1000 minutes. On managed systems with 5 - 16 inactive processor cores, the reporting threshold is 1000 minutes, and the reporting limit is 2000 minutes. If the number of inactive processor cores is more than 16, then the reporting threshold is 2500 minutes, and the reporting limit is 5000 minutes.

The HMC displays a message on the desktop when the number of unreported minutes reaches 90% of the reporting threshold. To ensure that you can continue to use your Utility CoD processor cores, you should report when your reporting threshold reaches 90%. For more information about reporting Utility Capacity on Demand processor minutes, see "Reporting Utility Capacity on Demand processor minutes" on page 26.

Enabling Utility Capacity on Demand
Learn more about how to enable your managed system to use Utility Capacity on Demand (CoD).

Utility CoD allows you to report your use based on how your business uses utility processor minutes. There is no fixed reporting schedule, and there are no electronic or screen captures required to report use of utility processor minutes. The managed system notifies you when the reporting threshold has been reached. You can also choose to report at any time before the threshold has been reached. The enablement code sets the reporting threshold and reporting limit for the system.

Perform the following steps to enable your managed system to use Utility Capacity on Demand:
1. Go to the Utility Capacity on Demand website.
2. Click **Utility CoD** to accept the Terms and Conditions associated with Utility CoD. A Utility CoD Enablement Code will be provided for your system after you agree to the Terms and Conditions.
3. To enter your activation code on your server by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:
   - If you are using an HMC Classic or HMC Enhanced interface, use the **HMC Capacity On Demand > Enter CoD Code** task.
   - If you are using an HMC Enhanced+ interface, use the **Capacity on Demand > CoD functions > Enter CoD Code** task.
4. Assign a quantity of inactive processor cores (any number you choose) to the shared processor pool using the HMC.

You can then configure Utility CoD so that you can use the new utility processor cores based on your business priorities and performance requirements. For example, you can set an upper limit on the

maximum amount of usage that Utility CoD consumes. For example, if you want to limit the total usage at 500 minutes, you can use the HMC to set this limit.

Discontinuing Utility Capacity on Demand

You can stop Utility Capacity on Demand (CoD) by removing all utility processor cores from the shared processor pool.

To disable and end active Utility CoD, you must request for a termination code from the Utility CoD website. When you enter the termination code on the HMC, Utility CoD functions will be disabled. The termination code will not be accepted by the HMC if more than 100 minutes of use remain unreported.

Reporting Utility Capacity on Demand processor minutes

Learn more about how to report the number of Utility Capacity on Demand (CoD) processor minutes your managed system has used.

To report utility processor minutes, go to the CoD website and enter the number of processor minutes you would like to report. You can enter the value currently displayed on your system's HMC Utility CoD screen, or some amount less than what is displayed. You can also report some amount greater than what is displayed, if you would like to purchase minutes before they have been used.

You must report in increments of 100 processor minutes. The website ensures you report only 100, 200, 300, or any multiple of 100 processor minutes.

After you report a quantity of processor minutes, a Utility CoD reporting code will be provided to you. This code acts like a receipt, showing that you reported processor minutes. You must enter this code on your HMC for the processor minutes you reported to be recorded.

To ensure that you can continue to use your Utility CoD processor cores, you should report when the HMC notifies you that the number of unreported minutes has reached 90% of the reporting threshold. The HMC displays a message on the desktop when the number of unreported minutes reaches 90% of the reporting threshold. At that point, you have 30 powered-on days to report or you have until the reporting limit is reached, whichever comes first. At this time, if the Utility CoD reporting code has not yet been entered at the HMC, Utility CoD will be disabled and all utility processor cores will be removed from the shared pool.

Paying for Utility Capacity on Demand processor minutes

Learn more about how to pay for the Utility Capacity on Demand (CoD) processor minutes you have used and what will happen if you do not pay for processor minutes.

The marketing team that you specify at the time you enable your system for Utility CoD is notified of the processor minutes you report. The marketing team works with you to process a standard miscellaneous equipment specification (MES) order for a quantity of 100 processor minute billing features (for example, feature code 7642 for the 9117-MMB) so that you can pay for what you used. If you do not pay for the utility processor minutes you report, the CoD website does not accept future reported minutes. As a result, you are not be provided with another Utility CoD reporting code to enter at your system to continue using Utility CoD.

Entering Utility CoD enablement codes and reporting codes

Use the HMC to enter Utility CoD enablement and reporting codes.

To enter the Utility Capacity on Demand (CoD) enablement and reporting codes by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:

- If you are using the HMC Classic or HMC Enhanced interface, use the **HMC Capacity On Demand > Enter CoD Code** task.

- If you are using the HMC Enhanced+ interface, use the **Capacity on Demand > CoD functions > Enter CoD Code** task.

Reviewing used or reported processor minutes

You can review the used or reported processor minutes using the Hardware Management Console (HMC) interface.

To review used or reported processor minutes by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:

- If you are using the HMC Classic or HMC Enhanced interface, use the **HMC Capacity on Demand > Processor > Utility CoD > View Capacity Settings** task.
- If you are using the HMC Enhanced+ interface, use the **Capacity on Demand > CoD functions > View Capacity Settings** task.

Setting a usage limit on processor minutes

Set a limit on the processor minutes that you use.

To set a usage limit on processor minutes by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:

- If you are using the HMC Classic or HMC Enhanced interface, use the **HMC Capacity on Demand** > **Processor** > **Utility CoD** > **Manage** task.
- If you are using the HMC Enhanced+ interface, use the **Capacity on Demand > CoD functions > Manage** task.

Obtaining the information needed to report processor minutes

View the information you need to report Utility Capacity on Demand (CoD) processor minutes.

To view the information you need to report Utility CoD processor minutes for billing by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:

- If you are using the HMC Classic or HMC Enhanced interface, use the **HMC Capacity On Demand** > **Processor** > **Utility CoD** >**View Code information** task.
- If you are using the HMC Enhanced+ interface, use the **Capacity on Demand > CoD functions > View Code information** task.

Power Enterprise Pool

Power Enterprise Pool provides flexibility and value for Power Systems. A Power enterprise pool is a group of systems that can share Mobile Capacity on Demand (CoD) processor resources and memory resources.

You can move Mobile CoD resource activations among the systems in a pool with Hardware Management Console (HMC) commands. These operations provide flexibility when you manage large workloads in a pool of systems and helps to rebalance the resources to respond to business needs. This feature is useful for providing continuous application availability during maintenance. Not only can the workloads be easily moved to alternate systems but the processor activations and memory activations can be moved. Disaster recovery planning also is more manageable with the ability to move activations where and when they are needed.

Power Enterprise Pool configuration requirements

Two different types of Power Enterprise Pools are available:
- The IBM Power System 770, IBM Power System E870, IBM Power System E870C, and IBM Power System E880C Power Enterprise Pools

- The IBM Power System 780, IBM Power System 795, IBM Power System E880, IBM Power System E870C, and IBM Power System E880C Power Enterprise Pools

The Power 770 and 780 systems require a minimum of four static processor activations. The 9119-MHE and 9119-MME servers require a minimum of eight static processor activations. The Power 795 requires a minimum of 24 static processor activations. 50% of memory must be active for all systems, and a minimum of 25% of the active memory must be static memory. The Power 9119-MHE and 9119-MME servers have same minimum activations as the 9119-MHE and 9119-MME servers. However, the resources in these systems can go in any pool.

An HMC can manage multiple Power Enterprise Pools and can also manage systems that are not part of a Power Enterprise Pool. Systems can belong to only one Power enterprise pool at a time.

Master HMC and managing Hardware Management Consoles

The *master* HMC authorizes all Power enterprise pool change operations. It also performs all pool change operations for the servers that it manages. A managing HMC is an HMC that you designate to the master HMC of a pool as a managing HMC for the pool. A *managing* HMC can be directed by the master HMC to perform pool change operations for the servers that are not managed by the master HMC.

All managing HMCs must have an active network connection to the master HMC. The HMCs can communicate on either a public or a private network. The HMCs communicate by using the standard Resource Monitoring and Control (RMC) port 657. The master HMC communicates with all managing HMCs and all managing HMCs communicate with the master HMC. Managing HMCs do not communicate with each other, except when you are setting a managing HMC after the new master HMC when the current master HMC goes down.

Use static IP addresses for HMC-to-HMC communication.

You can perform the following tasks by using any managing HMC, including the master HMC:
- View pool information
- Add Mobile CoD resources to a server
- Remove Mobile CoD resources from a server
- Set a new master HMC for the pool
- Synchronize pool information

The following tasks must be performed on the HMC designated as the master HMC:
- Create pool
- Update pool (including updating the pool name)
- Recover pool
- Update the managing HMC list for the pool

Ordering Power Enterprise Pools

To order a Power Enterprise Pool, contact your IBM Business Partner or IBM sales representative.

Your IBM Business Partner or IBM sales representative helps you complete the following steps:
1. Complete and submit the Power Enterprise Pool contract and addendum specifying all system serial numbers to be included in the pool. A copy must be sent to the Power Systems CoD Project Office (pcod@us.ibm.com) to generate a pool ID number.
2. Order mobile enablement and processor and memory activation features for participating systems. Every system in the pool must have feature code EB35 as an identifier.

When the order is fulfilled, a configuration file is generated which contains a Power Enterprise Pool membership activation code for each of the systems in the pool along with the Mobile processor activation code and Mobile memory activation code for the pool. The file might also contain codes to convert permanently activated resources on servers in the pool to Mobile CoD resources. This file is made available on the Capacity on Demand (CoD) website (http://www-912.ibm.com/pod/pod). The file is required by the Hardware Management Console (HMC) to create the pool.

Power Enterprise Pools feature codes

Table 12. Machine type 9119 Power Enterprise Pools feature codes

Machine type and model	Feature code	Description
9119-MME	EP2S	1-Core Mobile activation
9119-MHE	EP2T	1-Core Mobile activation
9119-MME, 9119 MHE	EMA7	100 GB Mobile memory activation
9119-MME, 9119 MHE	EB35	Mobile enablement

All Mobile CoD feature codes are MES only.

The amount of permanent and Mobile CoD activations ordered for any system cannot exceed the total physical capacity of the system.

Power Enterprise Pool codes

The configuration file is a signed XML file that contains the required information to configure a Power Enterprise Pool.

Pool ID
The unique ID that IBM assigns to the Power Enterprise Pool.

Sequence number
A numeric value that increments higher whenever IBM updates the configuration file.

Power Enterprise Pool configuration file membership codes
An activation code or a termination code for each system that is a member of the pool.

Mobile CoD processor code
The activation code that sets the total number of Mobile CoD processors that you can use in the pool.

Mobile CoD memory code
The activation code that sets the total amount of Mobile CoD memory that you can use in the pool.

Permanent to Mobile CoD processor conversion codes
The CoD codes for servers in the pool to convert permanently activated processors to Mobile CoD processors. These CoD codes are optional.

Permanent to Mobile CoD memory conversion codes
The CoD codes for servers in the pool to convert permanently activated memory to Mobile CoD memory. These CoD codes are optional.

You must contact IBM to get a new configuration file to do the following operations:
* Create a Power Enterprise Pool
* Add systems to a pool or remove systems from a pool
* Add Mobile CoD resources to a pool or remove Mobile CoD resources from a pool
* Convert permanently activated resources on a server to Mobile CoD resources.

You must have the latest configuration file for a pool to do the following operations:

- Recover the master Hardware Management Console (HMC) for a pool after a clean installation of the master HMC.

The latest configuration file for a Power enterprise pool is available on the Capacity on Demand (CoD) website (http://www-912.ibm.com/pod/pod)

Add or remove systems from Power Enterprise Pools

Adding or removing a system from an established Power Enterprise Pool requires notification to IBM.

An updated addendum must be submitted to the Power Systems CoD project office (pcod@us.ibm.com) to add or remove systems from Power Enterprise Pool. When the update is processed, a new pool configuration file is posted on the CoD website.

Before you remove the systems from a pool, all assets (including Mobile CoD resources) that were originally purchased with the system must be returned to that same system serial number. Mobile assets that belong to a system might qualify for transfer to another system serial number depending on normal qualifying guidelines and, if possible, require more administrative action.

Systems that are removed from a pool can join another pool and contribute Mobile CoD resources to the new pool and use Mobile CoD resources of other systems. Mobile CoD resources require a pool ID to be recognized.

Eligible program authorizations

As a result of authorized participation in a Power Enterprise Pools offering, you are authorized to temporarily transfer entitlements for authorized use of each Eligible Program from a Power Systems server that is participating in the pool to another Power Systems server that is also participating in the pool. You must not exceed the maximum number of software licenses within the pool for any specific software agreement.

Required maintenance service and support

Within each Power Enterprise Pool, all participating systems must either be serviced by IBM under warranty or an IBM maintenance service agreement, or not be serviced by IBM. In addition, each eligible program that is entitled for IBM software maintenance (SWMA) on one or more systems that are participating in the pool must also have a valid SWMA agreement on every participating system in the pool that eligible program will execute on.

Additional Power Enterprise Pool requirements

The following are the additional Power Enterprise Pool requirements:

- Any licenses for Power® software like AIX, IBM i, and other Power software, that exist on any system in a pool must also be licensed for at least one core on each of the additional systems in the pool.
- All systems in a pool must be owned by the same customer enterprise number.
- Activations cannot be transferred, moved, or otherwise reassigned across country boundaries.
- Integrated Facility for Linux activations are not supported as mobile activations within Power Enterprise Pools but can reside separately on systems within a pool. AIX, IBM i, and Linux operating systems and their workloads are all supported by Power Enterprise Pools.

Power Enterprise Pool and the master HMC

A single Hardware Management Console (HMC) must be selected as the master HMC for a Power Enterprise Pool. The HMC that is used to create a Power Enterprise Pool is initially set as the master HMC of that pool. You can set a new master HMC for a pool at any time.

When you power on or restart a server, ensure that the server is connected to a managing HMC. When both the server and its managing Hardware Management Consoles are powered off, restart a managing HMC first, then restart the server.

Note: If a restarted server is not able to contact any managing HMC, it restarts with no Mobile CoD resources. However, when a managing HMC connects to the server, the Mobile CoD resources are automatically assigned back to the server.

Upgrading the master HMC
> You cannot perform any Power Enterprise Pool change operations when you are upgrading the master HMC. After the upgrade is complete, you can resume performing pool change operations. If you plan to perform any pool change operations when you are upgrading the master HMC, you must set a new master HMC before you start the upgrade.

Installing the master HMC
> Performing a clean installation of the master HMC deletes all Power enterprise pool data from the HMC. After installation, the HMC cannot resume master HMC functions for the pool until you perform a recovery operation. To avoid this situation, you can set a new master HMC for the pool before you start the clean installation of the current master HMC.

To perform a recovery operation after a clean installation of the HMC, run the following HMC command in a restricted shell terminal:

```
chcodpool -o recover -p <pool name> -f<configuration file name>[-a"attributes"] [-v]
```

For more information, run the `man chcodpool` command in a restricted shell terminal on the HMC to view the online help.

Using Power Enterprise Pools

After you obtain your Power Enterprise Pool configuration file from IBM, you can create and update the Power Enterprise Pool by using the Hardware Management Console (HMC). As a user you have two choices. If you are accessing the HMC interface locally (by using a local browser session), you must have the configuration file in your home directory on your HMC. If you are accessing the HMC interface remotely, then the configuration file must be on the remote machine.

Create a Power Enterprise Pool

You can create a Power Enterprise Pool by using the HMC.

Ensure that you meet the following prerequisites for creating a Power enterprise pool:
- Ensure that the configuration file is in the appropriate location. If you are remotely accessing the HMC, you must place the file on the local system that you are using. If you are using a local browser session, the file must be in your home directory on the HMC. This HMC is the master HMC for the new pool.
- Ensure that all servers that are to participate in the pool are in the standby or the operating state.
- If you have a 9119-FHB (IBM Power 795), ensure that it uses firmware version 7.8 or later.
- Ensure that any POWER7 server to have permanently activated resources converted to Mobile CoD resources uses firmware that is version 7.8 SP5 or later.

- Ensure that any POWER8 server to have permanently activated resources converted to Mobile CoD resources uses firmware that is version 820.50, 830.40, 8.4 or later. For more information about automatic feature conversions, see http://m.ibm.com/http/www-912.ibm.com/PowerEntPool/poolDownload.jsp.
- Collect HMC information (host names, IP addresses, a user ID and password) for each of the HMCs that manage servers that will participate in the pool. Ensure that the HMCs are running and that you can access them through the network.

To create a Power Enterprise Pool, choose one of the following navigation options depending on the interface type of the HMC:

- If you are using the HMC Classic interface, from the master HMC select **Systems Management > Power Enterprise Pools**, then click **Create Pool**.
- If you are using the HMC Enhanced+ interface, from the master HMC select **Resources > All Power Enterprise Pools > Create Pool**.

Update the configuration of a Power Enterprise Pool

After the Power Enterprise Pool is created, you can update the configuration of your pool. You must contact IBM and get a new configuration file for your pool to make the following types of configuration changes:

- You can add Mobile Capacity on Demand (CoD) resources to your pool or you can remove Mobile CoD resources from your pool.
- You can convert permanently activated resources on any server in the pool to Mobile CoD resources.
- You can add servers to your pool or you can remove servers from your pool.
    Attention: The HMC deletes the pool automatically if you remove the last server from a pool.

Ensure that you meet the following prerequisites for updating the configuration of a Power Enterprise Pool:

- Ensure that you obtained the required configuration file from IBM.
- Ensure that the configuration file is in the appropriate location. If you are remotely accessing the HMC, you must place the file on the local system that you are using. If you are using a local browser session, the file must be in your home directory on the HMC.
- Ensure that any new server that is to participate in the pool is in the standby state or the operating state.
- If you have a 9119-FHB (IBM Power 795), ensure that it uses firmware version 7.8 or later.
- Ensure that there is at least one HMC managing the server that has been added as a managing HMC for the pool.
- Ensure that the HMC is running and the master HMC can communicate with it through the network.
- Ensure that any server to be removed from the pool is in the standby state or the operating state.
- Ensure that any server to be removed from the pool does not have any Mobile CoD resource assignments or any unreturned Mobile CoD resources.
- On POWER7 processor-based servers, ensure that permanently activated resources that are converted to Mobile CoD resources uses firmware version 7.8 SP5, or later.
- On POWER8 processor-based servers, ensure that permanently activated resources that are converted to Mobile CoD resources uses firmware version 8.4, or later.

When you update the configuration of a pool, the HMC validates the sequence number in the current configuration file. This sequence number must be greater than, or equal to, the sequence number in the last file that was used to create or update the pool. If the current sequence number does not meet this requirement, the update fails. You must obtain the latest configuration file for the pool and update the pool again.

The latest configuration file for a Power enterprise pool is available on the Capacity on Demand (CoD) website (http://www-912.ibm.com/pod/pod).

To update the configuration of a Power Enterprise Pool by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:

- If you are using the HMC Classic interface, from the master HMC for the pool select **Systems Management > Power Enterprise Pools**. In the Power Enterprise Pool table, right-click on the pool and then select **Update Pool**.
- If you are using the HMC Enhanced+ interface, from the master HMC for the pool select **Resources > All Power Enterprise Pools**. In the Power Enterprise Pool table, right-click on the pool and then select **Update Pool**.

Allocate Mobile CoD resources to servers in a Power enterprise pool

After you create your Power Enterprise Pool, all Mobile CoD processor resources and Mobile CoD memory resources are allocated to the pool. You must use the HMC to allocate Mobile CoD resources to the servers in the pool. You do not have to notify IBM when you allocate resources.

You can assign Mobile CoD resources to partitions in the same manner as you assign permanent resources to partitions. Mobile CoD resources remain on a server until you remove them from that server. Mobile CoD resources do not expire in the same manner as Elastic CoD resources or Trial CoD resources do.

It is easy to move Mobile CoD resources from one server to another when migrating partitions. You can remove Mobile CoD resources from a server and add them to another server, even if the resources are still being used on the server from which they were removed. This action allows the processor and memory resources of the migrating partition to exist both on the source and destination servers, and be used by both the servers at the same time, until the migration is complete.

The following are Mobile CoD resource allocation guidelines:

- You can add Mobile CoD resources only to servers with unlicensed resources.
- If you remove Mobile CoD resources from a server that the server cannot reclaim because they are still in use, these resources become unreturned resources. A grace period timer then starts for the unreturned Mobile CoD resources on that server. If you do not free the unreturned Mobile CoD resources so that the server can reclaim them before the grace period expires, the pool becomes out of compliance.
- If the pool is out of compliance and the grace period timer for the pool is expired, you can add Mobile CoD resources only to servers that have unreturned resources. And, you cannot add more resources than the number of unreturned Mobile CoD resources on that server.
- When you add Mobile CoD resources to a server, they are used first to satisfy any unreturned CoD resources on that server.

Mobile CoD resource allocation guidelines for a server that is in **No Connection**, **Pending Authentication**, or **Failed Authentication** state:

- You can add Mobile CoD resources only to a server with unreturned Mobile CoD resources. The number of resources that you add cannot exceed the number of unreturned Mobile CoD resources on that server.
- You can remove Mobile CoD resources from a server. The Mobile CoD resources that you remove from the server become unreturned and a grace period timer starts for these resources. If the master HMC is not able to reach the server before the grace period expires, the pool becomes out of compliance.

Mobile CoD resource allocation guidelines for a server that is in **Power Off**, **Power Off In Progress**, **Error**, or **Initializing** state:

- You cannot add Mobile CoD resources to the server.

- You can remove Mobile CoD resources from a server and the resources are reclaimed immediately.

Mobile CoD resource allocation guidelines for a server that is in **Incomplete** or **Recovery** state, and the server is powered on:

- You can add or remove Mobile CoD resources from the server.

To allocate Mobile CoD processors to servers in a Power enterprise pool, choose one of the following navigation options depending on the interface type of the HMC:

- If you are using the HMC Classic interface, from any managing HMC for the pool, select **Systems Management > Power Enterprise Pools**. In the navigation pane, select the pool name and then select **Processor Resources**.
- If you are using the HMC Enhanced+ interface, from any managing HMC for the pool, select **Resources > All Power Enterprise Pools**. Select the pool name and then select **Processor Resources**.

To allocate Mobile CoD memory to servers in a Power enterprise pool, choose one of the following navigation options depending on the interface type of the HMC:

- If you are using the HMC Classic interface, from any managing HMC for the pool, select **Systems Management > Power Enterprise Pools**. In the navigation pane, select the pool name and then select **Memory Resources**.
- If you are using the HMC Enhanced+ interface, from any managing HMC for the pool, select **Resources > All Power Enterprise Pools**. Select the pool name and then select **Memory Resources**.

Set the master HMC for a Power enterprise pool

Each Power Enterprise Pool has one master HMC.

Initially, the HMC that you use to create the pool is set as the master HMC of the pool.

Use the following guidelines for designating a new HMC to be the master HMC for a pool:

- Whenever possible, set a new master for the pool when the current master HMC is running.
- Set a new master HMC before you perform a clean installation of the current master HMC.

To set a new master HMC for a pool by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:

Note: If the current master HMC is not functioning correctly or is disconnected from the network, you must perform this operation on the HMC that you want to designate as the new master HMC.

- If you are using the HMC Classic interface, from the any managing HMC for the pool, select **Systems Management > Power Enterprise Pools**. In the navigation pane, select the pool name and then select **Managing HMCs**.
- If you are using the HMC Enhanced+ interface, from any managing HMC for the pool, select **Resources > All Power Enterprise Pools**. Select the pool name and then select **Managing HMCs**.

Adding a managing HMC to a Power enterprise pool

Every server in the pool must have at least one managing HMC in the pool. Every managing HMC must be at version 8.5.0 or later. Both managing Hardware Management Consoles must be added to the pool. This redundancy will allow each HMC to connect to a server to perform pool operations.

To add a managing HMC for a pool by using the master HMC, choose one of the following navigation options depending on the interface type of the HMC:

- If you are using the HMC Classic interface, from the master HMC for the pool, select **Systems Management > Power Enterprise Pools**. In the navigation pane, select the pool name and then select **Managing HMCs**. Click **Add HMC**.
- If you are using the HMC Enhanced+ interface, from the master HMC for the pool, select **Resources > All Power Enterprise Pools**. Click **Add HMC**.

Removing a managing HMC from a Power enterprise pool

To remove a managing HMC for a pool, choose one of the following navigation options depending on the interface type of the HMC:

- If you are using the HMC Classic interface, from the master HMC for the pool, select **Systems Management > Power Enterprise Pools**. In the navigation pane, select the pool name and then select **Managing HMCs**. Select **Action** > **Remove HMC**.
- If you are using the HMC Enhanced+ interface, from the master HMC for the pool, select the HMC that you want to remove, then select **Resources > All Power Enterprise Pools**. In the navigation pane, select the pool name and then click **Managing HMCs**. Select the HMC that you want to remove, then select **Action** > **Remove HMC**.

Re-authenticating the HMC

When the machine type and model of the HMC changes, the HMC must be re-authenticated. When you add an HMC to the pool, the HMC's ID and password are used when the connection is being established to the HMC. This connection is only made once and is not needed again, even if that user's password has changed.

To re-authenticate the HMC, from the master HMC click the **Reauthentication Required** connection state. Enter the HMC user ID and password.

Viewing history logs

The master HMC for a Power enterprise pool maintains a history log of the Mobile CoD resource usage in the pool. Other Power Enterprise Pool related events that have occurred are also recorded in this history log.

To view the history log for a pool by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:

- If you are using the HMC Classic interface, from any managing HMC for the pool, select **Systems Management > Power Enterprise Pools**. In the navigation pane, select the pool name and then select **View Pool History Log**.
- If you are using the HMC Enhanced+ interface, from any managing HMC for the pool, select **Resources > All Power Enterprise Pools**. Select the pool name and then select **View Pool History Log**.

Each server maintains a history log of the CoD events that have occurred on the server. Mobile CoD resource usage and other Power Enterprise Pool related events are recorded in this history log.

Note: You can only view the history log for a server on an HMC that is managing the server.

To view the history log for a server by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:

1. If you are using the HMC Classic interface, from an HMC managing the server, select **Systems Management > Power Enterprise Pools**.
2. In the navigation pane, select the pool name and then select **Processor Resources**.
3. In the **Server Processor Information** table, right-click on the server and select **View Server History Log**.

1. If you are using the HMC Enhanced+ interface, from an HMC managing the server, select **Resources > All Power Enterprise Pools**.
2. Select the pool name and then select **Processor Resources**.
3. In the **Server Processor Information** table, right-click on the server and select **View Server History Log**.

The history log for a server can also be accessed from the Memory Resources screen.

Power Enterprise Pool compliance

When you share Mobile Capacity on Demand (CoD) resources among servers in a Power Enterprise Pool, the pool must be in compliance with your CoD licensing agreements.

The resource entitlements for the pool are procured through your CoD licenses, which include a grace period for overuse of these resources. The resource entitlements for the pool must synchronize with the actual usage of those resources. You can temporarily overuse the Mobile CoD pool resources. However, the grace period in your licenses restricts this overuse. When resources are in use beyond the grace period, those resources are overdue and the server is out of compliance with the CoD license. Compliance policies for the Power enterprise pool are based on your CoD licenses and these policies enforce resource availability and usage restrictions for the pool.

The Mobile CoD resource compliance of the servers in the pool determines the compliance state of the pool itself. A server is in compliance if the server does not have any unreturned Mobile CoD resources.

A Power Enterprise Pool can have one of the following four compliance states:

In compliance
> None of the servers in the pool have any unreturned Mobile CoD resources.

Approaching out of compliance (within server grace period)
> At least one server in the pool has Mobile CoD resources that are unreturned, and the server grace period for those resources is unexpired. None of the servers in the pool have Mobile CoD resources that are unreturned and overdue.

Out of compliance (within pool grace period)
> At least one server in the pool has overdue, unreturned Mobile CoD resources and the pool grace period is unexpired.

Out of compliance
> At least one server in the pool has overdue, unreturned Mobile CoD resources and the pool grace period is expired.

A Mobile CoD resource becomes an unreturned resource under the following conditions:

- You remove the Mobile CoD resource from a server, but the server cannot reclaim the resource because that resource is still in use. For example, the resource is assigned to one or more partitions. You must remove the partition assignments to enable the server to reclaim the resource.
- You remove a Mobile CoD resource from a server that is not reachable from the master HMC for the pool. Either the server is not connected to the master HMC, or the HMCs managing the server are not reachable from the master HMC.

When Mobile CoD resources that are removed from a server become unreturned, a grace period timer starts for the unreturned resources on that server. There is a separate grace period timer for unreturned Mobile CoD processors and for unreturned Mobile CoD memory on each server.

Before a server grace period expires, you must release the unreturned Mobile CoD resources and make them available for the server to reclaim. If a resource remains unreturned after the end of the grace period, the pool is out of compliance. When the pool moves to the out of compliance state, a new grace

period timer starts for the pool itself. There is only one grace period timer for the pool. If any servers have overdue Mobile CoD resources when the pool grace period expires, add operations for Mobile CoD resources are restricted to servers with unreturned Mobile CoD resources. This restriction is enforced until there are no servers in the pool with overdue unreturned Mobile CoD resources.

When a server in a pool is out of compliance, or the pool is out of compliance, console messages are displayed on all HMCs that manage the pool.

To view compliance information for a Power Enterprise Pool by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:

- If you are using the HMC Classic interface, from any managing HMC for the pool, select **Systems Management > Power Enterprise Pools**. In the navigation pane, select the pool name and then select **Compliance Information**.
- If you are using the HMC Enhanced+ interface, from any managing HMC for the pool, select **Resources > All Power Enterprise Pools**. Select the pool name and then select **Compliance Information**.

Resolving compliance issues

To avoid compliance issues, ensure that Mobile CoD resources are released on a server before you remove the resources from that server. Also, do not remove Mobile CoD resources from a server that is not reachable by the master HMC for the pool. The master HMC must be able to connect to a server through its managing HMC.

If you want to overuse your Mobile CoD resources when migrating partitions, ensure that all Mobile CoD resources removed from the source server are released and reclaimed by the source server as soon as the migration completes. If the migration fails, immediately remove the Mobile CoD resources added to the destination system and add them back to the source system.

You can resolve unreturned Mobile CoD resources in any of the following ways:

- Migrate a partition to another server. After the partition migrates successfully, any resources that are assigned to the partition on the source server are reclaimed automatically.
- Remove resources from a running partition by using the appropriate dynamic logical partition (DLPAR) task.
- Remove resources from a shutdown partition.
- Delete a partition to release resources that are assigned to that partition.
- Activate Capacity Upgrade on Demand (CUoD), Elastic CoD, or Trial CoD resources.
- Add Mobile CoD resources to the server.

Note: When a server is powered off, any unreturned Mobile CoD resources are reclaimed automatically by the master HMC for the pool.

If the server is not connected to the master HMC for the pool, you must do one of the following:

- Establish a connection from the master HMC to that server directly
- Establish a connection from the master HMC to an HMC that manages that server and is currently connected to it

After you reestablish the connection, if any unreturned Mobile CoD resources remain on the server, take one of the previously stated actions to release them. If you cannot reestablish this connection, you can add Mobile CoD resources to the server to resolve the unreturned resources.

PowerVM Editions (PowerVM)

PowerVM Editions (also referred to as *PowerVM*) is activated with a code, similar to the way that capacity is activated on IBM Systems.

When you purchase a PowerVM Editions feature, a code is provided that can be entered on the Hardware Management Console (HMC) to activate the technology. You can enter PowerVM activation codes by using the Integrated Virtualization Manager (IVM).

PowerVM Editions concepts

This information describes the virtualization technologies that are available.

The following virtualization technologies are available:

- PowerVM is a Virtualization Engine technology that enables the system for the following features:
    - Micro-Partitioning®
    - Virtual I/O Server
    - Integrated Virtualization Manager
    - Live Partition Mobility
    - Single root I/O virtualization (SR-IOV)
    - The ability to run x86 Linux applications on Power Systems

The following table describes the features each PowerVM Edition offers:

Table 13. PowerVM Editions offerings

Offering	Standard Edition	Enterprise Edition
Maximum number of logical partitions offered	1000 per server	1000 per server
Management offering	VMControl, IVM, HMC, PowerVC, FSM	VMControl, IVM, HMC, PowerVC, FSM
Virtual I/O server	Offered (Dual)	Offered (Dual)
Suspend/Resume	Offered	Offered
N_Port Virtualization (NPIV)	Offered	Offered
Multiple shared processor pools	Offered	Offered
Multiple shared storage pools	Offered	Offered
Thin provisioning	Offered	Offered
Active Memory Sharing	Not offered	Offered
Live Partition Mobility	Not offered	Offered
PowerVP Performance Monitor	Not offered	Offered
SR-IOV	Offered	Offered

Note: IVM only supports a single Virtual I/O Server.

Ordering PowerVM Editions features

You can order PowerVM Editions features for a new server, a server model upgrade, or an installed server.

For a new server or a server model upgrade, your order can contain one or more PowerVM Editions features, resulting in a single PowerVM Editions code. In this case, the PowerVM Editions code is entered before the server is sent to you.

When you order PowerVM Editions features for an installed server, determine which PowerVM Editions technology you want to enable and then order the associated features. A single PowerVM Editions code will be generated for you to enter that enables all of the technologies that you ordered.

Perform the following steps to order one or more PowerVM Editions features:

1. Determine which PowerVM Editions features you want to enable. For more information, see "PowerVM Editions concepts" on page 38.
2. Contact your IBM Business Partner or IBM sales representative to place your order for one or more PowerVM Editions features.
3. Enter the resulting code on your server to enable PowerVM Editions. See "Activating PowerVM Editions" for more information.

Using PowerVM Editions

You can activate Virtualization Engine technologies after you order the features. Learn about how to view a history log of your past PowerVM Editions activations and code-generation information.

Activating PowerVM Editions

To activate PowerVM Editions, you must enter an activation code from the Hardware Management Console (HMC) or the Advanced System Management Interface (ASMI) menu interface. You can also use the Integrated Virtualization Manager (IVM) interface.

To activate PowerVM Editions on the HMC, you must have an HMC super administrator user role.

To enter a PowerVM Editions code, do the following:

1. Retrieve the enablement code by going to http://www-912.ibm.com/pod/pod
2. To enter your activation code on your server by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:
   - If you are using an HMC Classic or HMC Enhanced interface, use the **HMC Capacity On Demand > PowerVM > Enter Activation Code** task.
   - If you are using an HMC Enhanced+ interface, use the **Capacity on Demand > PowerVM Licenses > PowerVM Enter Activation Code** task.

You can now begin using PowerVM Editions.

Viewing history log for PowerVM Editions activations

You can see what PowerVM Editions technologies activations are entered and what capabilities have been enabled on your server by using the history log.

To view the PowerVM Editions technologies activations that have been entered and the capabilities that have been enabled by using the Hardware Management Console (HMC), choose one of the following navigation options depending on the interface type of the HMC:

- If you are using the HMC Classic or HMC Enhanced interface, use the **HMC Capacity on Demand > PowerVM > View History Log** task.
- If you are using the HMC Enhanced+ interface, use the **Capacity on Demand > PowerVM Licenses > PowerVM View History Log** task.

Other Capacity on Demand Advanced Functions

This topic explains other Capacity on Demand (CoD) Advanced Functions such as Enterprise Enablement, Active Memory™ Expansion, worldwide port name renewal, Live Partition Mobility Trial, activation for 256-core LPAR and Active Memory Mirroring for Hypervisor.

Enterprise Enablement features

Enterprise Enablement is a Capacity on Demand Advanced Function technology that enables the system for 5250 online transaction processing (OLTP).

Active Memory Expansion

Active Memory Expansion (AME) is a function available for use in AIX partitions (AIX 6.1 or later with Technology Level 4).

With AME, memory can be expanded beyond the physical limits of the server or of the true physical memory assigned to the AIX partition by using compression and decompression of memory content.

Depending on your data's characteristics and the available processor resource, you might see expansion up to 100% of the true memory that can allow your partition to do more work, or allow your server to run more partitions and do more work, or both. After Active Memory Expansion is enabled on the server, you control which AIX partitions use Active Memory Expansion and control the degree of expansion.

You can evaluate the use of Active Memory Expansion at no charge with Trial Capacity on Demand (Trial CoD). With Trial CoD, the Active Memory Expansion function can be temporarily activated for up to 60 days at no charge. Trial Active Memory Expansion is available once per server and it allows you to validate the benefits your server can realize.

Complete the following steps to order Trial Active Memory Expansion:
1. Go to the Trial Capacity on Demand website:

    Trial Capacity on Demand
2.   Select the request for Active Memory Expansion.
3. Retrieve the activation code by going to

    Active Memory Expansion request

Worldwide port name renewal code

A worldwide port name (WWPN) is a unique 64-bit identifier that is assigned to a fibre channel node port, called an N_port. The storage area network (SAN) administrator assigns storage to a WWPN. This scheme provides security that limits access to storage on the SAN. The fibre channel standards allow N_Port virtualization, called NPIV, so that one N_port can be shared and require the generation of a unique worldwide port name for each NPIV. Each IBM server that supports NPIV provides up to 64,000 unique WWPNs. When a server indicates that there are no WWPNs remaining, customers must request a WWPN renewal code on the website. The code enables a WWPN prefix, which provides the first 48 bits of each WWPN and makes 64,000 more WWPNs available on the server.

Live Partition Mobility Trial

The Live Partition Mobility feature enables live partitions in servers with no application downtime, resulting in better system utilization, improved application availability, and energy savings. You can use the Live Partition Mobility Trial version to evaluate Live Partition Mobility free of charge for a period of 60 days. After the trial period of 60 days, if you want to continue to use Live Partition Mobility, you can order the PowerVM Enterprise Edition. If you do not upgrade to PowerVM Enterprise Edition, at the end of the trial period, your system automatically returns to PowerVM Standard Edition.

Activation for 256 core LPAR

The activation for 256 core LPAR feature permanently enables greater than 128 cores and up to 256 cores per dedicated processor partition. Without this feature, the largest partition that can be created is up to 128 cores. Micropartitions, which are not affected by this feature, can only be created with a maximum of 128 virtual processors.

Note: The System Partition Processor Limit (SPPL) setting must be set to the maximum value to allow a partition to be created with more than 32 cores. If the system is running in TurboCore mode, a partition cannot be created with more than 128 cores.

Active Memory Mirroring for hypervisor

Active Memory Mirroring for hypervisor is designed to ensure that system operation continues even in the unlikely event of an uncorrectable error occurring in main memory used by the system hypervisor. The feature permanently activates the Active Memory Mirroring for hypervisor capability. When this feature is activated, two identical copies of the system hypervisor are maintained in memory at all times. Both copies are simultaneously updated with any changes. In the event of a memory failure on the primary copy, the second copy is automatically called, eliminating platform outages due to uncorrectable errors in system hypervisor memory.

Related information for Capacity on Demand

Websites contain information related to the Capacity on demand topic collection.

Websites
- Hardware Information website at http://www.ibm.com/support/knowledgecenter/POWER8/p8hdx/POWER8welcome.htm
- Capacity on Demand for IBM i

  describes the various Capacity on Demand offerings.
- Capacity Upgrade on Demand for System p servers

  describes Capacity Upgrade on Demand for processors (CoD) and memory.
- WWPN details on the support page. provides information on World wide port name.
- Virtualization editions provides information on server virtualization with IBM PowerVM.

Unlocking the activation code interface

Read this topic, to understand how to unlock the activation code interface.

Keying errors during the entry of the 34-character activation code are simply flagged and the interface remains functional for as many times as it takes for the activation code to be keyed correctly. However, if the activation code is keyed correctly but is invalid (Invalid means that the activation code is properly formed and entered correctly but is not for a valid CoD function or is not for the server on which it is being entered), the firmware permits only five entry attempts. On the first four attempts, if the activation code is refused as invalid, the HMC provides a warning message. On the fifth entry attempt, the HMC warns of the last entry attempt before the activation code entry interface is locked, and confirms whether you want to proceed. On the fifth entry of an invalid activation code, the HMC locks the code interface.

Refer to the table below for recovery options. Contact the CoD Admin for a valid CoD activation code for the invalid code.

Note:

- Server reboot clears the five invalid activation code attempts and unlocks the activation code interface; therefore, the five invalid activation code attempts accumulate since the last server reboot.
- If Advance System Management Interface (ASMI) is used to enter the activation code, note that ASMI does not provide the invalid activation code warnings that the HMC does. After using ASMI to enter an invalid activation code five times, the activation code entry interface will be locked without warning.

Table 14. Recovery options

System	Procedure
POWER8	Both the CoD and CoD advanced functions activation code entry interfaces remain locked for approximately one hour. Wait for one hour. You do not need to reboot the server or enter a reset code to unlock the activation code entry interface.

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Accessibility features for IBM Power Systems servers

Accessibility features assist users who have a disability, such as restricted mobility or limited vision, to use information technology content successfully.

Overview

The IBM Power Systems servers include the following major accessibility features:
- Keyboard-only operation
- Operations that use a screen reader

The IBM Power Systems servers use the latest W3C Standard, WAI-ARIA 1.0 (www.w3.org/TR/wai-aria/), to ensure compliance with US Section 508 (www.access-board.gov/guidelines-and-standards/communications-and-it/about-the-section-508-standards/section-508-standards) and Web Content Accessibility Guidelines (WCAG) 2.0 (www.w3.org/TR/WCAG20/). To take advantage of accessibility features, use the latest release of your screen reader and the latest web browser that is supported by the IBM Power Systems servers.

The IBM Power Systems servers online product documentation in IBM Knowledge Center is enabled for accessibility. The accessibility features of IBM Knowledge Center are described in the Accessibility section of the IBM Knowledge Center help (www.ibm.com/support/knowledgecenter/doc/kc_help.html#accessibility).

Keyboard navigation

This product uses standard navigation keys.

Interface information

The IBM Power Systems servers user interfaces do not have content that flashes 2 - 55 times per second.

The IBM Power Systems servers web user interface relies on cascading style sheets to render content properly and to provide a usable experience. The application provides an equivalent way for low-vision users to use system display settings, including high-contrast mode. You can control font size by using the device or web browser settings.

The IBM Power Systems servers web user interface includes WAI-ARIA navigational landmarks that you can use to quickly navigate to functional areas in the application.

Vendor software

The IBM Power Systems servers include certain vendor software that is not covered under the IBM license agreement. IBM makes no representation about the accessibility features of these products. Contact the vendor for accessibility information about its products.

Related accessibility information

In addition to standard IBM help desk and support websites, IBM has a TTY telephone service for use by deaf or hard of hearing customers to access sales and support services:

TTY service
800-IBM-3383 (800-426-3383)
(within North America)

For more information about the commitment that IBM has to accessibility, see IBM Accessibility (www.ibm.com/able).

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Programming interface information

This Managing the Hardware Management Console publication documents intended Programming Interfaces that allow the customer to write programs to obtain the services of IBM Hardware Management Console Version 8 Release 8.7.0 Maintenance Level 0.

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