

Capacity on Demand User's Guide

ESCALA Power7



REFERENCE
86 A1 20FK 01

Capacity on Demand User's Guide

The ESCALA Power7 publications concern the following models:

- Bull Escala E1-700 (Power 710 / 8231-E2B)
- Bull Escala E1-705 (Power 710 / 8231-E1C)
- Bull Escala E2-700 / E2-700T (Power 720 / 8202-E4B)
- Bull Escala E2-705 / E2-705T (Power 720 / 8202-E4C)
- Bull Escala E3-700 (Power 730 / 8231-E2B)
- Bull Escala E3-705 (Power 730 / 8231-E2C)
- Bull Escala E4-700 / E4-700T (Power 740 / 8205-E6B)
- Bull Escala E4-705 (Power 740 / 8205-E6C)
- Bull Escala E5-700 (Power 750 / 8233-E8B)
- Bull Escala M6-700 (Power 770 / 9117-MMB)
- Bull Escala M6-705 (Power 770 / 9117-MMC)
- Bull Escala M6-715 (Power 770 / 9117-MMD)
- Bull Escala M7-700 (Power 780 / 9179-MHB)
- Bull Escala M7-705 (Power 780 / 9179-MHC)
- Bull Escala M7-715 (Power 780 / 9179-MHD)

References to Power 755 / 8236-E8C models are irrelevant.

Hardware

November 2012

BULL CEDOC
357 AVENUE PATTON
B.P.20845
49008 ANGERS CEDEX 01
FRANCE

REFERENCE
86 A1 20FK 01

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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.

This topic collection contains information about how to use CoD offerings with the Hardware Management Console (HMC) Version 7 Release 7 Maintenance Level 1, and later.

Capacity on Demand offerings

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

Table 1. Capacity on Demand offerings

Offering	Description
"Capacity Upgrade on Demand" on page 3	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 6	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.
"On/Off 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.
"Utility Capacity on Demand" on page 26	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.
"Capacity BackUp" on page 30	You can use Capacity BackUp to provide an off-site, disaster recovery server using On/Off CoD capabilities. The Capacity BackUp offering has a minimum set of active processor cores that can be used for any workload and a large number of inactive processor cores that can be activated using On/Off CoD in the event of a disaster. A specified number of no-charge On/Off CoD processor days is provided with Capacity BackUp.

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.

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.

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.

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 sales representative for more information.

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 1.

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 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.

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 6.
- 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.
2. Contact your 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 6

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.

About this task

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

Procedure

1. Retrieve the activation code.
2. Enter your activation code on your server using the HMC. To enter your code:
 - a. Click **Systems Management**.
 - b. Select **Servers**.
 - c. Select the server on which you want enter your activation code.
 - d. Select **Tasks > Capacity on demand (CoD) > Enter CoD Code**.
 - e. Type your activation code in the **Code** field.
 - f. Click **OK**.

Results

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.

About this task

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 On/Off CoD processor cores and memory units, Trial CoD processor cores and memory units, and your Utility CoD processor cores.

To view the capacity settings for processor cores or memory, do the following:

Procedure

1. In the navigation area of the HMC window, expand **Systems Management**.
2. Select **Servers**.
3. In the contents area, select the server on which you want to view capacity settings.
4. Select **Capacity on demand**.
5. Select either **Processor** or **Memory**.
6. Select the CoD offering that you want to view.
7. Select **View Capacity Settings**.

Viewing and saving Capacity on Demand code-generation information

You can view and save Capacity on Demand (CoD) code-generation information using the Hardware Management Console (HMC). You might need to do this if the CoD code that was provided for your server does not work.

About this task

You can view CoD code-generation information and save it to a file on a remote system or to a file on removable media. The information that is used to generate your CoD codes must exactly match the information that is shown on the HMC CoD Code Information window. To collect the information that is used to generate your CoD codes, use the CoD Code Information window to save the CoD code information to a file on a remote system or to a file on removable media. Then, you can either attach the file to an email, or print the file and fax it to your CoD administrator.

To view and save CoD code-generation information:

Procedure

1. In the navigation area of the HMC window, expand **Systems Management**.
2. Select **Servers**.
3. In the contents area, select the server on which you want to view and save the CoD code information.
4. Select **Tasks**.
5. Select **Capacity on Demand (CoD)**.
6. Select **Processors (or Memory)**.
7. Select the CoD offering you want to view or save.

8. Select **View Code Information**.
9. In the CoD Code Information window, click **Save** to save the CoD code information to a file on a remote system or to a file on removable media.
10. In the Save CoD Code Information panel, select one of these options, and then perform the tasks associated with that option.

Option	Description
Save to a file on a remote system	<ol style="list-style-type: none"> 1. Enter the remote system name, file name, user ID, and password. 2. Click OK to save the CoD code information or click Cancel to exit the panel without saving the CoD code information.
Save to media	<ol style="list-style-type: none"> 1. Click OK. 2. Select the required device. These options might be included in the list (the list includes only those removable media devices that are available for use on the HMC): <ul style="list-style-type: none"> • Diskette drive • Flash memory • USB diskette drive 3. Click OK to save the CoD code-generation information, or click Cancel to exit the panel without saving the CoD code information.

Results

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 3

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).

Before you begin

An HMC is required to use Trial Capacity on Demand.

About this task

To order Trial CoD, do the following:

Procedure

1. Click the Trial Capacity on Demand website.
2. Select a request based on your situation.

Results

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.

About this task

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

Results

1. Request a trial code, which is good for 30 days. To copy the code, select the code and right-click on it; then click **Copy** on the pop-up menu.
2. Enter the trial code on your server using the HMC.
 - a. In the navigation area of the HMC window, expand **Systems Management**.
 - b. Select **Servers**.
 - c. In the contents area, select the server on which you want to enter your activation code.
 - d. Select **Tasks > Capacity on Demand > Enter CoD Code**.
 - e. Type your activation code in the **Code** field.
 - f. Select **Enter CoD Code**.
 - g. Click **OK**.

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 4 or “Returning Capacity on Demand resources” on page 9.

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.

About this task

For more information about returning Capacity on Demand (CoD) resources, see “Returning Capacity on Demand resources” on page 9. 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. For more information, see “Recovery actions.”

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 4. For more information about Capacity Upgrade on Demand, see “Capacity Upgrade on Demand” on page 3.

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:

Procedure

1. Return the trial resources. See “Returning Capacity on Demand resources” on page 9 for more information.
2. In the navigation area of the HMC window, expand **Systems Management**.
3. Select **Servers**.
4. In the contents area, select the server on which you want to stop Trial Capacity on Demand.
5. Select **Tasks**.
6. Select **Capacity on Demand (CoD)**.
7. Select either **Processor** or **Memory**.
8. Select **Trial CoD**.
9. Select **Stop**.
10. In the confirmation window, click **Yes** to stop the trial. Click **No** to cancel the request to stop the trial (the trial will remain active).

Results

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

Recovery actions:

Before you begin

Perform these recovery actions in the event the server is powered off or loses power when there are unreturned Trial CoD or On/Off 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 On/Off CoD resources result when the On/Off CoD request expires before the On/Off CoD resources have been removed from your logical partition. These recovery actions need to be used to ensure that logical partitions that were running prior to the power off or loss of power are successfully powered on.

About this task

When a server is powered off or loses power, all unreturned Trial CoD or On/Off 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.

Note: The server can power on to standby mode only if you have specified that option prior to powering on your server.

To successfully power on those logical partitions, perform either step 1 or 2, or a combination of the 2 steps.

Procedure

1. Reduce logical partition resources so that the total of logical partition resources across all logical partitions to be powered on does not exceed the total number of activated resources.
2. Enter new Capacity on Demand activation codes to satisfy these requirements. Additionally, start an On/Off CoD request (if On/Off CoD is still enabled) or enter a new Trial CoD activation code. If the On/Off CoD enablement is exhausted, a new On/Off CoD enablement code would need to be entered before doing a new On/Off CoD request.

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 On/Off CoD request or Trial CoD. You can remove the processor cores or memory from any of your logical partitions.

It is best to remove processor cores or memory from a logical partition when the logical partition is running.

Logical partitions that are not activated might still have processor cores and memory assigned to them. To remove processor cores or memory from a logical partition that is not activated, you have these options:

- Modify a partition profile for the logical partition to reduce the number of processor cores or memory, and then activate the logical partition by using the modified partition profile.
- Delete the logical partition.

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.

About this task

The following describes each option:

Procedure

- 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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.

About this task

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 On/Off CoD processor cores and memory units, Trial CoD processor cores and memory units, and your Utility CoD processor cores.

To view the capacity settings for processor cores or memory, do the following:

Procedure

1. In the navigation area of the HMC window, expand **Systems Management**.
2. Select **Servers**.
3. In the contents area, select the server on which you want to view capacity settings.
4. Select **Capacity on demand**.
5. Select either **Processor** or **Memory**.
6. Select the CoD offering that you want to view.
7. Select **View Capacity Settings**.

Viewing and saving Trial Capacity on Demand code-generation information

You can view and save Trial Capacity on demand (CoD) code-generation information using the Hardware Management Console (HMC). You might need to do this if the CoD code that was provided for your server does not work.

About this task

You can view CoD code-generation information and save it to a file on a remote system or to a file on removable media. The information that is used to generate your CoD codes must exactly match the information that is shown on the HMC CoD Code Information window. To collect the information that is used to generate your CoD codes, use the CoD Code Information window to save the CoD code information to a file on a remote system or to a file on removable media. Then, you can either attach the file to an email, or print the file and fax it to your CoD administrator.

To view and save CoD code-generation information:

Procedure

1. In the navigation area of the HMC window, expand **Systems Management**.
2. Select **Servers**.
3. In the contents area, select the server on which you want to view and save the CoD code information.
4. Select **Tasks**.
5. Select **Capacity on Demand (CoD)**.
6. Select **Processors (or Memory)**.
7. Select the CoD offering you want to view or save.
8. Select **View Code Information**.
9. In the CoD Code Information window, click **Save** to save the CoD code information to a file on a remote system or to a file on removable media.
10. In the Save CoD Code Information panel, select one of these options, and then perform the tasks associated with that option.

Option	Description
Save to a file on a remote system	<ol style="list-style-type: none"> 1. Enter the remote system name, file name, user ID, and password. 2. Click OK to save the CoD code information or click Cancel to exit the panel without saving the CoD code information.
Save to media	<ol style="list-style-type: none"> 1. Click OK. 2. Select the required device. These options might be included in the list (the list includes only those removable media devices that are available for use on the HMC): <ul style="list-style-type: none"> • Diskette drive • Flash memory • USB diskette drive 3. Click OK to save the CoD code-generation information, or click Cancel to exit the panel without saving the CoD code information.

Results

On/Off Capacity on Demand

On/Off Capacity on Demand (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 On/Off 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 On/Off 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 On/Off Capacity on Demand request” on page 15 or “Changing a running On/Off Capacity on Demand request” on page 21.

Make sure that you have prepared your server before continuing. For more information, see “Preparing for Capacity on Demand” on page 1.

On/Off Capacity on Demand concepts

You can activate inactive processor cores or memory units on a temporary basis with On/Off 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.

On/Off Capacity on Demand processor days or memory days

Temporary capacity provided by On/Off 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 On/Off 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 On/Off Capacity on Demand” on page 14

The customer contract that must be signed prior to receiving your On/Off 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 On/Off CoD during the period.

On/Off Capacity on Demand enablement code

After you have decided to take advantage of On/Off Capacity on Demand (CoD), you must order an On/Off CoD enablement feature. The enablement feature provides the On/Off 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 On/Off 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 On/Off 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 On/Off 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 2. On/Off CoD processor enablement features

Machine type and model	On/Off CoD processor enablement feature
9117-MMB	7951
9117-MMC	7951
9117-MMD	7951
9117-MMD	EP9T (Requires minimum firmware level eFW 7.6)
9119-FHB	7971
9119-FHB	EP9T (Requires minimum firmware level eFW 7.6)

Table 2. On/Off CoD processor enablement features (continued)

Machine type and model	On/Off CoD processor enablement feature
9179-MHB	7951
9179-MHC	7951
9179-MHD	7951
9179-MHD	EP9T (Requires minimum firmware level eFW 7.6)

Table 3. On/Off CoD memory enablement features

Machine type and model	On/Off CoD memory enablement feature
9117-MMB	7954
9117-MMC	7954
9117-MMD	7954
9117-MMD	EM9T (Requires minimum firmware level eFW 7.6)
9119-FHB	7973
9119-FHB	EM9T (Requires minimum firmware level eFW 7.6)
9179-MHB	7954
9179-MHC	7954
9179-MHD	7954
9179-MHD	EM9T (Requires minimum firmware level eFW 7.6)

Billing for On/Off Capacity on Demand

The customer contract that must be signed prior to receiving your On/Off 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 On/Off CoD during the period.

Billing data is used to calculate billing amounts at the end of each billing period (calendar quarter).

Ensure that you report billing data if your server has been enabled for On/Off CoD. Failure to report the billing data results in an estimated bill for 90 processor days or memory days of temporary capacity.

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 On/Off CoD. This credit happens automatically until all of the days of credit are used. On/Off 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 On/Off 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 On/Off 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 On/Off Capacity on Demand resources" on page 23.

Related concepts:

“On/Off Capacity on Demand processor days or memory days” on page 12

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

Billing when changing a running On/Off Capacity on Demand request:

Ensure that you understand the implications to billing before you decide to change a running On/Off 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 On/Off 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 On/Off 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 On/Off CoD enablement is calculated separately from the number of resource days that are billed. When an On/Off 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 On/Off 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 On/Off CoD processors, such as during a test period, the implications to billing are slightly different. The 24-hour test period starts when the first On/Off 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 On/Off CoD processors or memory requested when you make On/Off CoD activation or change requests. Therefore, as the testing reactivation occurs, you can start and stop, or change, On/Off 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 On/Off CoD activations, see Testing your On/Off Capacity on demand activations.

Examples: Changing a running On/Off 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 On/Off Capacity on Demand activations”

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

Billing when testing your On/Off Capacity on Demand activations:

You can test your On/Off 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 On/Off 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 On/Off CoD activations.

Examples: On/Off CoD processor activations and billing results

Table 4. Billing example for testing On/Off CoD activations

Time	Processor activations and billing results
8:00 a.m.	<ul style="list-style-type: none"> • 5 processors activated • 5 processor days charged • 5 processor maximum
11:00 a.m. (3 hours later)	<ul style="list-style-type: none"> • 3 processors added • 3 processor days charged • 8 processor maximum
3:00 p.m. (4 hours later)	<ul style="list-style-type: none"> • 3 processors canceled (no credit) • 8 processor maximum
5:00 p.m. (2 hours later)	<ul style="list-style-type: none"> • 3 processors added (no charge) • 8 processor maximum
8:00 p.m. (3 hours later)	<ul style="list-style-type: none"> • 3 processors canceled (no credit) • 8 processor maximum
11:00 p.m. (3 hours later)	<ul style="list-style-type: none"> • 3 processors added (no charge) • 8 processor maximum
4:00 a.m. (5 hours later; 20 hours since 8:00 a.m. initial activation)	<ul style="list-style-type: none"> • 3 processors canceled (no credit) • 8 processor maximum
Total charge	8 processor days total

This is billing example when starting and stopping On/Off CoD requests during a test.

Table 5. Billing example for starting and stopping On/Off CoD requests when testing

Time	Processor activations and billing results
8:00 a.m.	<ul style="list-style-type: none"> • 3 processors activated • 3 processor days charged • 3 processor maximum
9:00 a.m. (1 hour later)	<ul style="list-style-type: none"> • 1 processor canceled (no credit) • 3 processor maximum
10:00 a.m. (1 hour later)	<ul style="list-style-type: none"> • 1 processor added • No charge • 3 processor maximum
11:00 a.m. (1 hour later)	<ul style="list-style-type: none"> • 3 processors stopped (no credit) • 3 processor maximum
12:00 p.m. (1 hour later)	<ul style="list-style-type: none"> • 4 processors activated • 1 processor day charged (1 multiplied by 20 hours < 24 hours) • 4 processor maximum
1:00 p.m. (1 hour later)	<ul style="list-style-type: none"> • 4 processors stopped (no credit) • 4 processor maximum
2:00 p.m. (1 hour later)	<ul style="list-style-type: none"> • 1 processor activated • No charge • 4 processor maximum
4:00 p.m. (2 hours later)	<ul style="list-style-type: none"> • 1 processor stopped (no credit) • 4 processor maximum
Total charge	4 processor days total

Related concepts:

“Billing when changing a running On/Off Capacity on Demand request” on page 15
 Ensure that you understand the implications to billing before you decide to change a running On/Off Capacity on Demand (CoD) request.

Ordering On/Off Capacity on Demand

To order On/Off Capacity on Demand (CoD), contact your Business Partner or sales representative.

Results

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

Before using On/Off CoD, you must enable On/Off CoD. See “Enabling On/Off Capacity on Demand” on page 19 for more information.

Using On/Off Capacity on Demand

You must use the Hardware Management Console (HMC) to use and manage On/Off 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 On/Off CoD, minimal day-to-day management of your temporary capacity is required.

Enabling On/Off Capacity on Demand

Enable your server for On/Off Capacity on Demand (CoD), before requesting temporary capacity on your server. To enable your server for On/Off CoD, you must use the Hardware Management Console (HMC).

About this task

Most CoD tasks on the HMC require the HMC super administrator user role.

Perform the following steps to enable your server for On/Off CoD:

Procedure

1. Retrieve the On/Off CoD enablement code.
2. Enter your activation code on your server using the HMC. To enter your code:
 - a. Click **Systems Management**.
 - b. Select **Servers**.
 - c. Select the server on which you want enter your activation code.
 - d. Select **Tasks > Capacity on demand (CoD) > Enter CoD Code**.
 - e. Type your activation code in the **Code** field.
 - f. Click **OK**.

Results

Your server is now enabled for On/Off CoD. To use your processors or memory, see “Activating On/Off Capacity on Demand.”

Activating On/Off Capacity on Demand

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

About this task

For information about entering On/Off CoD enablement codes, see “Ordering On/Off Capacity on Demand” on page 18 and “Enabling On/Off Capacity on Demand.”

To request activation of On/Off CoD resources:

Procedure

1. In the navigation area of the Hardware Management Console window, expand **Systems Management**.
2. Select **Servers**.
3. In the contents area, select the server on which you want to activate processor cores or memory temporarily.
4. Select **Tasks**.
5. Select **Capacity on Demand**.
6. Select either **Processor** or **Memory**.
7. Select **On/Off CoD**.
8. Select **Manage**.

9. Type the number of On/Off CoD resources you want and the number of days you want them for, and then click **OK**.

Results

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 On/Off CoD resources regardless of whether they have been assigned to a logical partition or are being used. You can stop an active request for On/Off Capacity on Demand before it expires. For more information, see “Stopping an On/Off Capacity on Demand request.”

You can change a running On/Off CoD request. For more information, see “Changing a running On/Off Capacity on Demand request” on page 21. If you stopped the previous On/Off CoD request that was running on your server, and you start a new On/Off 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 On/Off CoD request will be handled like a change request for billing purposes. For more information, see “Billing when changing a running On/Off Capacity on Demand request” on page 15.

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

Establishing monthly reporting

You can establish monthly reporting.

About this task

The customer contract that is required prior to receiving your On/Off 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.

Stopping an On/Off Capacity on Demand request

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

About this task

On/Off 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:

Procedure

1. Return the On/Off CoD resources. See “Returning On/Off Capacity on Demand resources” on page 23 for information about how to return On/Off CoD resources.

2. In the navigation area of the Hardware Management Console window, expand **Systems Management**.
3. Select **Servers**.
4. In the contents area, select the server on which you want to stop your On/off CoD request.
5. Select **Tasks**.
6. Select **Capacity on Demand**.
7. Select either **Processor** or **Memory**.
8. Select **On/Off CoD**.
9. Select **Manage**.
10. Type **0** for the number of On/Off CoD processors and type **0** for the number of days, then click **OK**.

Changing a running On/Off Capacity on Demand request

In a running On/Off Capacity 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.

About this task

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

To successfully change a running On/Off CoD request:

Procedure

1. If you are decreasing the amount of resources in the running request, return the On/Off CoD resources to be deactivated. See “Returning On/Off Capacity on Demand resources” on page 23 for details about how to return On/Off CoD resources.
2. In the navigation area of the Hardware Management Console window, expand **Systems Management**.
3. Select **Servers**.
4. In the contents area, select the server on which you want to change your request.
5. Select **Tasks**.
6. Select **Capacity on Demand**.
7. Select either **Processor** or **Memory**.
8. Select **On/Off CoD**.
9. Select **Manage**.
10. Type the new number of On/Off CoD resources that you want and how many days you want them for and then click **OK**.

Results

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 On/Off Capacity on Demand activations

You can test your On/Off 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 On/Off 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 On/Off CoD activations, see Table 4 on page 17.

Discontinuing On/Off Capacity on Demand

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

About this task

To obtain this termination code, send a request for an On/Off CoD termination code to the appropriate CoD administrator.

A single On/Off CoD termination code disables On/Off CoD for both processor cores and memory units. The termination code cannot be entered if an active On/Off CoD request exists on the system, or if unreturned On/Off CoD resources are in use on the system. The active request must be stopped and any unreturned resources must be returned before On/Off CoD can be discontinued. For information about how to stop the active On/Off CoD request, see “Stopping an On/Off Capacity on Demand request” on page 20. For information about how to return On/Off CoD resources, see “Returning On/Off Capacity on Demand resources” on page 23.

If your server unexpectedly loses power after you have stopped an On/Off CoD request, you might need to perform “Recovery actions” to successfully power on your server.

To disable future use of On/Off CoD on your server after you have obtained a termination code:

Procedure

1. In the navigation area of the HMC window, expand **Systems Management**.
2. Select **Servers**.
3. In the contents area, select the server on which you want enter your termination code.
4. Select **Tasks > Capacity on Demand > Enter CoD Code**.
5. Type your termination code in the **Code** field.
6. Click **OK**.

Recovery actions: Before you begin

Perform these recovery actions in the event the server is powered off or loses power when there are unreturned Trial CoD or On/Off 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 On/Off CoD resources result when the On/Off CoD request expires before the On/Off CoD resources have been removed from your logical partition. These recovery actions need to be used to ensure that logical partitions that were running prior to the power off or loss of power are successfully powered on.

About this task

When a server is powered off or loses power, all unreturned Trial CoD or On/Off 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.

Note: The server can power on to standby mode only if you have specified that option prior to powering on your server.

To successfully power on those logical partitions, perform either step 1 or 2, or a combination of the 2 steps.

Procedure

1. Reduce logical partition resources so that the total of logical partition resources across all logical partitions to be powered on does not exceed the total number of activated resources.
2. Enter new Capacity on Demand activation codes to satisfy these requirements. Additionally, start an On/Off CoD request (if On/Off CoD is still enabled) or enter a new Trial CoD activation code. If the On/Off CoD enablement is exhausted, a new On/Off CoD enablement code would need to be entered before doing a new On/Off CoD request.

Returning On/Off Capacity on Demand resources

To return On/Off 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 On/Off CoD request or Trial CoD. You can remove the processor cores or memory from any of your logical partitions.

It is best to remove processor cores or memory from a logical partition when the logical partition is running.

Logical partitions that are not activated might still have processor cores and memory assigned to them. To remove processor cores or memory from a logical partition that is not activated, you have these options:

- Modify a partition profile for the logical partition to reduce the number of processor cores or memory, and then activate the logical partition by using the modified partition profile.
- Delete the logical partition.

Viewing settings for On/Off Capacity on Demand resources

You can use the Hardware Management Console (HMC) to view On/Off 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 On/Off CoD processor cores and memory units.

About this task

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 On/Off CoD processor cores and memory units, Trial CoD processor cores and memory units, and your Utility CoD processor cores.

To view the capacity settings for processor cores or memory, do the following:

Procedure

1. In the navigation area of the HMC window, expand **Systems Management**.
2. Select **Servers**.
3. In the contents area, select the server on which you want to view capacity settings.
4. Select **Capacity on demand**.
5. Select either **Processor** or **Memory**.
6. Select the CoD offering that you want to view.
7. Select **View Capacity Settings**.

Viewing and saving On/Off Capacity on Demand information

You can use the Hardware Management Console (HMC) to view and save On/Off Capacity on Demand (CoD) code-generation and billing information. You might need to do this if the CoD code that was provided for your server does not work.

About this task

You can view CoD code-generation information and save it to a file on a remote system or to a file on removable media. The information that is used to generate your CoD codes must exactly match the information that is shown on the HMC CoD Code Information window. To collect the information that is used to generate your CoD codes, use the CoD Code Information window to save the CoD code information to a file on a remote system or to a file on removable media. Then, you can either attach the file to an email, or print the file and fax it to your CoD administrator.

To view and save CoD code-generation information:

Procedure

1. In the navigation area of the HMC window, expand **Systems Management**.
2. Select **Servers**.
3. In the contents area, select the server on which you want to view and save the CoD code information.
4. Select **Tasks**.
5. Select **Capacity on Demand (CoD)**.
6. Select **Processors (or Memory)**.
7. Select the CoD offering you want to view or save.
8. Select **View Code Information**.
9. In the CoD Code Information window, click **Save** to save the CoD code information to a file on a remote system or to a file on removable media.
10. In the Save CoD Code Information panel, select one of these options, and then perform the tasks associated with that option.

Option	Description
Save to a file on a remote system	<ol style="list-style-type: none"> 1. Enter the remote system name, file name, user ID, and password. 2. Click OK to save the CoD code information or click Cancel to exit the panel without saving the CoD code information.
Save to media	<ol style="list-style-type: none"> 1. Click OK. 2. Select the required device. These options might be included in the list (the list includes only those removable media devices that are available for use on the HMC): <ul style="list-style-type: none"> • Diskette drive • Flash memory • USB diskette drive 3. Click OK to save the CoD code-generation information, or click Cancel to exit the panel without saving the CoD code information.

Viewing and saving Capacity on demand billing information: Before you begin

You can view CoD billing information and save it to a file on a remote system or to a file on removable media. If you choose to manually report the billing information, use the CoD Billing Information window on the HMC to save the billing information. Then, you can either attach the file to an email or print the file and fax it to your CoD administrator.

To view and save CoD billing information, do the following:

Procedure

1. In the navigation area of the HMC window, expand **Systems Management**.
2. Select **Servers**.
3. In the contents area, select the server on which you want to view and save your billing information.
4. Select **Tasks**.
5. Select **Capacity on Demand**.
6. Select **Processor** or **Memory**.
7. Select **On/Off CoD**.
8. Select **View Billing Information**.
9. In the CoD Billing Information window, click **Save** to save the CoD billing information to a file on a remote system or to media.
10. In the Save Billing Information panel, select one of these options, and then perform the tasks associated with that option.

Option	Description
Save to a file on a remote system	<ol style="list-style-type: none"> 1. Enter the remote system name, file name, user ID, and password 2. Click OK to save the CoD billing information or click Cancel to exit the panel without saving the CoD billing information.

Option	Description
Save to media	<ol style="list-style-type: none"> 1. Click OK. 2. Select the required device. The following options might be displayed (the list will include only those removable media devices that are available for use on your HMC): <ul style="list-style-type: none"> • Diskette drive • Flash memory • USB diskette drive 3. Click OK to save the CoD billing information, or click Cancel to exit the panel without saving the CoD billing information.

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 Hardware Management Console (HMC) 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 sent 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 6. Utility CoD features

Machine type-model	Orderable processor feature	Utility CoD processor billing feature
9117-MMB	4980	7642
9117-MMB	4980	7643 (IBM® i)
9117-MMB	4981	7646
9117-MMB	4981	7647 (IBM i)
9117-MMC	4983	5330
9117-MMC	4983	5331 (IBM i)
9117-MMC	4984	5335
9117-MMC	4984	5336 (IBM i)
9117-MMD	EPM0	EPMW
9117-MMD	EPM0	EPMX (IBM i)
9117-MMD	EPM1	EPMY
9117-MMD	EPM1	EPMZ (IBM i)
9119-FHB	4700	4706
9119-FHB	4700	4719 (IBM i)
9119-FHB	4702	4707
9119-FHB	4702	4722 (IBM i)
9179-MHB	4982	7633
9179-MHB	4982	7634 (IBM i)
9179-MHC	5003	5340
9179-MHC	5003	5341 (IBM i)
9179-MHC	EP24	EP 26
9179-MHC	EP24	EP 27 (IBM i)

Table 6. Utility CoD features (continued)

Machine type-model	Orderable processor feature	Utility CoD processor billing feature
9179-MHD	EPH0	EPHU
9179-MHD	EPH0	EPHV (IBM i)
9179-MHD	EPH2	EPHY
9179-MHD	EPH2	EPHZ (IBM i)

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."

Discontinuing Utility Capacity on Demand

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

Before you begin

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.

About this task

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.

About this task

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

Learn more about how to use the HMC to enter enablement and reporting codes.

Before you begin

To enter the Utility Capacity on Demand (CoD) enablement and reporting codes, do the following:

Procedure

1. In the navigation area of the HMC window, expand **Systems Management**.
2. Select **Servers**.
3. In the contents area, select the server on which you want to enter your Utility CoD enablement or reporting code.
4. Select **Tasks > Capacity on Demand > Enter CoD Code**.
5. Type your enablement or reporting code in the **Code** field.
6. Click **OK**.

Reviewing used or reported processor minutes

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

Before you begin

To review used or reported processor minutes, do the following:

Procedure

1. In the Navigation area, click **Systems Management > Servers**.
2. Select the server for which you want to view Utility CoD processor minute information.
3. Click **Tasks > Capacity on Demand (CoD) > Processor > Utility CoD > View Capacity Settings**.

Setting a usage limit on processor minutes

Learn more about setting a limit on the processor minutes that you use.

Before you begin

To set a usage limit on processor minutes, do the following:

Procedure

1. In the Navigation area, click **Systems Management > Servers**.
2. Select the server for which you want to set a Utility CoD processor minute usage limit.
3. Click **Tasks > Capacity on Demand (CoD) > Processor > Utility CoD > Manage**.
4. Select **Enable processor minute usage limit**.
5. In the **New limit** field, type the number of processor minutes you want to set as the limit.
6. Click **OK**.

Obtaining the information needed to report processor minutes

Read more about how to view the information you need to report Utility Capacity on Demand (CoD) processor minutes.

About this task

To view the information you need to report Utility CoD processor minutes for billing, do the following:

Procedure

1. In the Navigation area, click **Systems Management > Servers**.
2. Select the server for which you want to report Utility CoD processor minutes.
3. Click **Tasks > Capacity on Demand > Processor > Utility CoD > View Code Information**.

Capacity BackUp

Capacity BackUp uses On/Off Capacity on Demand (CoD) capabilities to provide an off-site, disaster-recovery server.

The Capacity BackUp offering has a minimum set of active processor cores that can be used for any workload and a large number of inactive processor cores that can be activated using On/Off CoD in the event of a disaster. A specified number of no-charge On/Off CoD processor days is provided with Capacity BackUp.

For more information about On/Off CoD, see “On/Off Capacity on Demand” on page 12.

Make sure that you have prepared your server before continuing. For more information, see “Preparing for Capacity on Demand” on page 1.

You can test your Capacity BackUp activations while not incurring duplicate charges. For more information, see Testing your On/Off activations.

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).

The following table describes the Enterprise Enablement features. Full-system Enterprise Enablement means that 100% of the processor cores are enabled.

Table 7. Enterprise Enablement features

Machine type and model	Single-processor enterprise enablement	Full-system enterprise enablement
8205-E6B	4970, 4973	4974
8205-E6C	4970, 4973	4974
8231-E2B	4970	4974
8231-E1C and 8231-E2C	4970	4974
8233-E8B	4988	4989
8236-E8C	4988	4989
9117-MMB	4992	4997
9117-MMC	4992	4997
9117-MMD	4992	4997
9119-FHB	4995	4996
9179-MHB	4992	4997
9179-MHC	4992	4997
9179-MHD	4992	4997

Active Memory Expansion

Active Memory Expansion (AME) is a POWER7[®] 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 POWER7 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

Table 8. Active Memory Expansion features

Machine type and model	Active Memory Expansion feature
8202-E4B	4793
8202-E4C	4793
8205-E6B	4794
8205-E6C	4794
8231-E2B	4795
8231-E1C and 8231-E2C	4795
8233-E8B	4792
8236-E8C	4792
9117-MMB	4791
9117-MMC	4791
9119-FHB	4790
9179-MHB	4791
9179-MHC	4791

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.

Table 9. Trial PowerVM feature

Machine	Trial PowerVM feature
POWER7	ELPM

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 on the 9119-FHB POWER7 servers. 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.

Table 10. Activation for 256-core LPAR

Machine	Activation for 256-core LPAR
9119-FHB	1256

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 on the 9179-MHC POWER7 servers. 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.

Table 11. Active Memory Mirroring for Hypervisor

Machine	Active Memory Mirroring feature
9117-MMC	4797

Dynamic Platform Optimizer

Dynamic Platform Optimizer (DPO) is a hypervisor function that is available for firmware level eFW 7.6, or later. DPO analyzes, and presents processor and memory affinity states to improve system performance. You have the option to reduce system latency and to improve ongoing system performance by moving selected workloads to alternative processor cores and memory spaces. System performance improvement varies based on the number of workloads, workload size, system configuration, amount of system resource available, virtualized environments, and system activity. DPO monitors the metrics by performing demand analysis and optimizing workload placement. All IBM-supported operating systems support DPO.

You can temporarily activate and evaluate the use of DPO, free of cost, with Trial Capacity on Demand (CoD).

Note: The trial version of CoD can be used only once on a server.

To order the trial version of Capacity on Demand, complete the following steps:

1. Go to the Trial Capacity on Demand website:
Trial Capacity on Demand
2. Select the Request for Dynamic Platform Optimizer.
3. Retrieve the activation code.

The following table shows the DPO features available for different machine types.

Table 12. Dynamic Platform Optimizer features

Machine	Dynamic Platform Optimizer features
9117-MMD	EB33
9179-MHD	EB33
9119-FHB	EB33

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