Sharing Processor and Memory Activations Dynamically Among IBM Power Systems Enterprise Class Servers

IBM Redbooks Solution Guide

This IBM® Redbooks® Solution Guide describes IBM Power Enterprise Pools, a technology for dynamically sharing processor and memory activations among a group (or pool) of IBM Power Systems™ enterprise class servers. Using mobile Capacity on Demand (CoD) activation codes, your systems administrator can perform tasks without contacting IBM. You need only to upgrade to Hardware Management Console (HMC) V7.7.8.

This Solution Guide is directed at experienced IBM Power Systems users and financial decision-makers who want to know how Power Enterprise Pools can improve IT efficiencies. The process uses an easy-to-follow HMC GUI, as shown in the following figure.

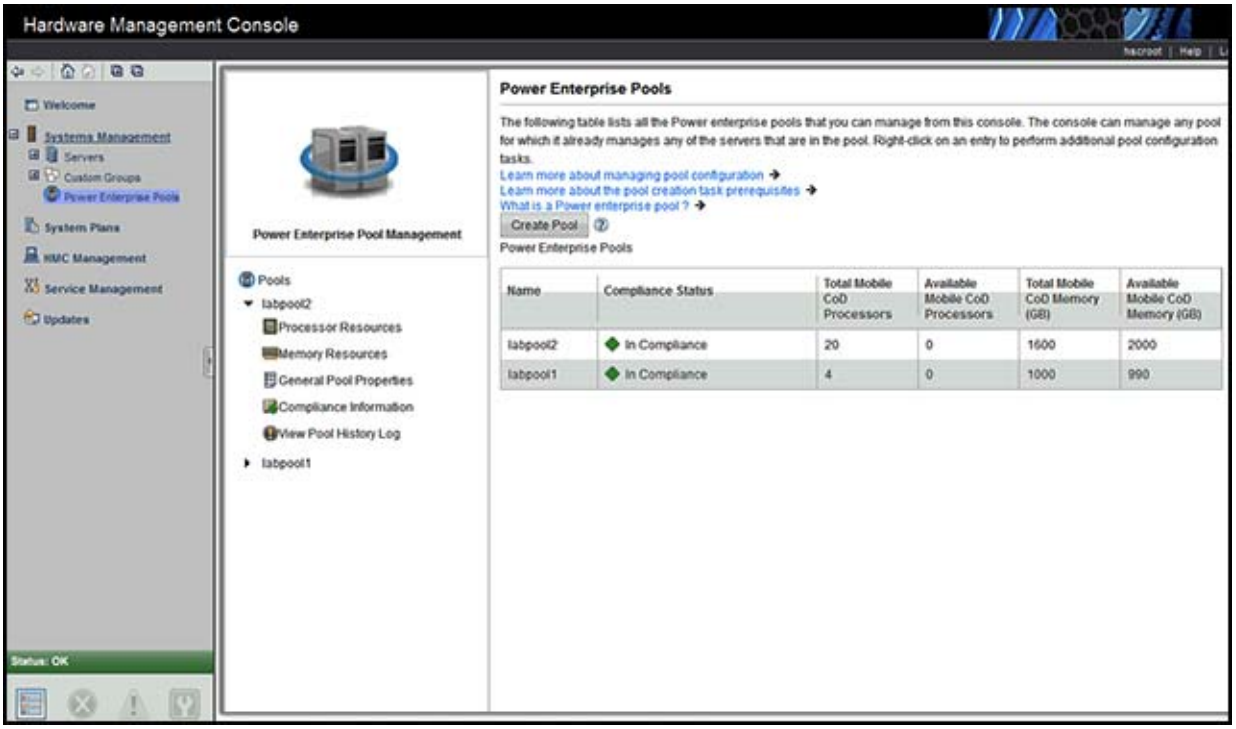

Figure 1. The IBM Hardware Management Console (HMC) main window

Did you know?

IBM delivers industrial-strength virtualization in IBM AIX®, IBM i, and Linux environments on IBM POWER® processor-based systems. Technical benefits of implementing Power Enterprise Pools include improved flexibility and load balancing of Power Systems, and a number of new HMC V7.7.8 functions that support Power Enterprise Pool management and IBM Power Virtualization Center (PowerVC) Standard Edition enablement.

Business value

From a business perspective, using Power Enterprise Pools can provide your organization with a dynamic infrastructure, reduced cost of performance management, improved service levels, and controlled risk management. The Power Enterprise Pools technology is ideal for further improving the flexibility, load balancing, and disaster recovery planning and operations of your Power Systems.

The reliability, availability, and serviceability (RAS) of your Power Systems environment can be increased significantly by using Power Enterprise Pools.

Here are some of the technical benefits that can improve your business efficiencies:

- Redundant HMCs that, although not required, are highly recommended, to ensure the reliability that your organizational needs.
- Improved flexibility and load balancing of Power Systems.
- HMC V7.7.8 provides the following new functions:
  - Support for Power Enterprise Pool management.
  - IBM Power Virtualization Center (PowerVC) Standard Edition enablement.
  - User-defined thresholds enable monitoring and alerting for workloads that can benefit from Dynamic Workload Optimizer (DWO) and optional automation for starting DWO when the threshold is exceeded. This function also indicates when a virtual machine can benefit from DWO.
  - Additional tracking of dynamic logical partition activity in the current profile enables reactivation of a virtual machine with all configuration changes intact since the last shutdown.
  - Improved group-based access control for Lightweight Directory Access Protocol (LDAP) users, which limits your users to a subset of HMCs.
- The master HMC (see "Master and non-master HMCs" in this Solution Guide) can be used to perform the following functions:
  - Mobile CoD processor and memory resources can be assigned to systems with inactive resources. Mobile CoD resources remain on the system to which they are assigned until they are removed from the system.
  - New systems can be added to the pool and existing systems can be removed from the pool.
  - New resources can be added to the pool and existing resources can be removed from the pool.
  - Pool information can be viewed, including pool resource assignments, compliance, and history logs. This function can also be performed from the non-master HMC.

Solution overview

This section describes how Power Enterprise Pools work and some of the benefits that can be realized with Power Enterprise Pools that are implemented in your organization.

Power Enterprise Pool types

Two types of Power Enterprise Pools are available:

- One pool type enables IBM Power 770 class systems. It is restricted to valid configurations of 9117-MMD systems. This is designated as a *770 pool* and can support systems with different clock speeds.
- Another pool type enables IBM Power 780 (9179-MHD) and IBM Power 795 (9119-FHB) class systems. This pool type is designated as a *high-end pool* and can support different clock speeds and different machine types.

Note: Power Enterprise Pools are not available on the IBM Flex System® Manager®.

Mobile and static activations

All of the previously announced processor and memory activation features are static and do not move from one server to another one. However, mobile activation features are introduced to reference a CoD activation that can be moved between systems that belong to a Power Enterprise Pool.

The remaining processor core activations, aside from the required static activations, optionally can be mobile activations, static activations, or a mixture of both. Static and mobile core activations can coexist in the same system and in the same partition. Of the static and mobile active processor activations, a minimum of four must be static processor activations on a Power 770 and Power 780. A minimum of 25% of the active processors on a Power 795 must be static processor activations.

A maximum of 75% of all physically installed memory can have mobile activations. Capacity granularity when adding memory activations to a Power Enterprise Pool is 100 GB.

Note: At the time of writing, IBM intends to support the conversion of existing static activation features into mobile activations at a charge.

See the "Ordering information" section for details about mobile-enabled processor activations for the Power 770 (9117-MMD), Power 780 (9179-MHD), and Power 795 (9119-FHB), and for mobile activations that are not available on initial orders. The following table shows the new mobile activation features and their sales manual descriptions. Links to full sales manuals are included in the "Related information" section of this Solution Guide.

Table 1. Mobile and static activation features per system type model (part 1 of 2)

System type model	Feature number	Description

9117-MMD	EPMC	**1-Core mobile activation**
		● Attributes provided: Activation Code Number
		● Attributes required: None
		● For 9117-MMD:
		  ● Minimum required: 0
		  ● Maximum allowed: 60 (Initial order maximum: 0)
		  ● Operating system (OS) level required: None
		  ● Initial Order/MES/Both/Supported: MES
		  ● CSU: Yes
		  ● Return parts MES: No

9179-MHD
9119-FHB
	EPMD	**1-Core mobile activation**
		● Attributes provided: Activation Code Number
		● For 9179-MHD:
		  ● Minimum required: 0
		  ● Maximum allowed: 120 (Initial order maximum: 0)
		  ● OS level required: None
		  ● Initial Order/MES/Both/Supported: MES
		  ● CSU: Yes
		  ● Return parts MES: No
		● For 9119-FHB:
		  ● Minimum required: 0
		  ● Maximum allowed: 192 (Initial order maximum: 0)
		  ● OS level required: None
		  ● Initial Order/MES/Both/Supported: MES
		  ● CSU: Yes
		  ● Return parts MES: No

9117-MMD
9179-MHD
9119-FHB
	EMA4	**100 GB mobile memory activation**
		● Attributes provided: 100 GB Activation Code Number
		● Attributes required: Memory feature codes
		● For 9117-MMD: (#EMA4)
		  ● Minimum required: 0
		  ● Maximum allowed: 30 (Initial order maximum: 0)
		  ● OS level required: None
		  ● Initial Order/MES/Both/Supported: MES
		  ● CSU: Yes
		  ● Return parts MES: No
		● For 9179-MHD: (#EMA4)
		  ● Minimum required: 0
		  ● Maximum allowed: 30 (Initial order maximum: 0)
		  ● OS level required: None
		  ● Initial Order/MES/Both/Supported: MES
		  ● CSU: Yes
		  ● Return parts MES: No
		● For 9119-FHB: (#EMA4)
		  ● Minimum required: 0
		  ● Maximum allowed: 120 (Initial order maximum: 0)
		  ● OS level required: None
		  ● Initial Order/MES/Both/Supported: MES
		  ● CSU: Yes
		  ● Return parts MES: No

Table 1. Mobile and static activation features per system type model (part 2 of 2)

System type model	Feature number	Description

9117-MMD	EP22	**1-core mobile activation**
		● Attributes provided: None
		● Activation Code Number: None
		● Attributes required: None
		● For 9117-MMD: (#EP22):
		  ● Minimum required: 0
		  ● Maximum allowed: 60 (Initial order maximum: 0)
		  ● OS level required: None
		  ● Initial Order/MES/Both/Supported: MES
		  ● CSU: Yes
		  ● Return parts MES: No

9179-MHD
9119-FHB
	EP23	**1-core mobile activation**
		● Attributes provided: None
		● Activation Code Number: None
		● For 9179-MHD: (#EP23):
		  ● Minimum required: 0
		  ● Maximum allowed: 120 (Initial order maximum: 0)
		  ● OS level required: None
		  ● Initial Order/MES/Both/Supported: MES
		  ● CSU: Yes
		  ● Return parts MES: No
		● For 9119-FHB: (#EP23):
		  ● Minimum required: 0
		  ● Maximum allowed: 192 (Initial order maximum: 0)
		  ● OS level required: None
		  ● Initial Order/MES/Both/Supported: MES
		  ● CSU: Yes
		  ● Return parts MES: No

9117-MMD
9179-MHD
9119-FHB
	EB35	**Mobile enablement (Power Enterprise Pool enablement)**
		● Attributes provided: None
		● Attributes required: None
		● For 9117-MMD: (#EB35)
		  ● Minimum required: 0
		  ● Maximum allowed: 1 (Initial order maximum: 0)
		  ● OS level required: None
		  ● Initial Order/MES/Both/Supported: MES
		  ● CSU: Yes
		  ● Return parts MES: No
		● For 9179-MHD: (#EB35)
		  ● Minimum required: 0
		  ● Maximum allowed: 1 (Initial order maximum: 0)
		  ● OS level required: None
		  ● Initial Order/MES/Both/Supported: MES
		  ● CSU: Yes
		  ● Return parts MES: No
		● For 9119-FHB: (#EB35)
		  ● Minimum required: 0
		  ● Maximum allowed: 1(Initial order maximum: 0)
		  ● OS level required: None
		  ● Initial Order/MES/Both/Supported: MES
		  ● CSU: Yes
		  ● Return parts MES: No

Master and non-master HMCs

Each Power Enterprise Pool has a single master HMC. There can be only one master HMC and one non-master HMC managing a pool. All of the servers in the pool must be connected to both HMCs.

The HMC that is used to create a Power Enterprise Pool is set as the master HMC of that pool. After the Power Enterprise Pool is created, you should configure a redundant HMC as a non-master HMC for the pool. Redundant HMCs are not required, but are a preferred practice.

Each time a pool configuration change is made, the master HMC pushes the pool data to the non-master HMC. This allows the non-master HMC to take over the master function for the pool seamlessly, if needed, because the pool data on the non-master HMC is always up to date.

All Power Enterprise Pool resource assignments must be performed by the master HMC. When powering on or restarting a server, ensure that the server is connected to the master HMC. This ensures that the required Mobile CoD resources are assigned to the server.

When both the server and the master HMC are powered off, restart the master HMC first, and then restart the server. This ensures that the server can connect to the HMC to obtain its Mobile CoD resource assignments.

Note: If a restarted server cannot contact the master HMC, it restarts with no Mobile CoD resources. However, when the master HMC connects to the server, the Mobile CoD resources are automatically assigned to the server.

Solution architecture

This section describes the primary requirements and specifications for implementing Power Enterprise Pools.

Considerations and prerequisites for HMC

Here are the minimum requirements and prerequisites to update the HMC and use the new enhancements in HMC V7.7.8:

- Power Enterprise Pools and DWO enhancements for HMC require HMC V7.7.8 or later.
- To manage Power Enterprise Pools, or to use with IBM PowerVC, the HMC requires at least 2 GB of physical memory. Here are the HMC models that cannot be upgraded to support this function (where HMC V7.7.8 is the last supported firmware level):
    - 7042-CR4
    - 7310-CR4
    - 7310-C05
    - 7310-C06
    - 7042-C06
    - 7042-C07
    - 7315-CR3
    - 7310-CR3

For these HMC models, the new GUI function is automatically disabled. The HMC operation then continues in legacy mode for HMC models with less than 2 GB of memory.

Power Enterprise Pool configuration file

The configuration file is a signed XML file that contains the required information to configure a Power Enterprise Pool. Contact IBM for a new configuration file, which enables you to do the following tasks:

- Create a Power Enterprise Pool.
- Add systems to, or remove systems from, a Power Enterprise Pool.
- Add or remove Mobile CoD resources on a Power Enterprise Pool.

You must have the latest configuration file for a Power Enterprise Pool to perform the following operations:

- Recover the master HMC for a Power Enterprise Pool after a clean installation completes, without previously setting a backup master HMC as the master HMC.
- Set a new master HMC for a Power Enterprise Pool if you have not previously set a backup master HMC as the master HMC.

The latest configuration file for a Power Enterprise Pool is available on the IBM CoD website: http://www-03.ibm.com/systems/power/hardware/cod/offerings.html

Requirements and specifications

In the first release of Power Enterprise Pools, all of the servers in a pool must be managed by the same HMC, or pair of redundant HMCs. Redundant HMCs are highly preferred for Power Enterprise Pools.

The following table shows the requirements and specifications for Power Enterprise Pools.

Table 2. Requirements and specifications for HMC and Power Enterprise Pools

Item	Requirement and specification
HMC	● The HMCs must be at V7R7.8 or later. ● The HMCs require at least 2 GB of memory. ● A Power Enterprise Pool can be managed by at most two HMCs. ● If a pair of redundant HMCs is used to manage a Power Enterprise Pool, they must be able to communicate with each other through a network connection. ● The HMC can manage multiple Power Enterprise Pools, but is limited to 1000 total partitions and 32 high-end servers.

Power Systems	● All systems in a pool must be owned by the same customer enterprise number.
	● All participating systems must either be serviced by IBM under warranty or an IBM maintenance service agreement, or not be serviced by IBM.
	● Systems can belong to only one Power Enterprise Pool at a time.
	● Systems on the pool must be one of the following models:
	  ● IBM Power 795 with POWER7® processors (9119-FHB)
	  ● IBM Power 780 with POWER7+™ processors (9179-MHD)
	  ● IBM Power 770 with POWER7+ processors (9117-MMD)
	● The systems in the pool must be at firmware level FW780 (also known as AH780).
	● Power 770 and Power 780 must have at least 4 static core activations.
	● The Power 795 must have at least 24 static core activations or 25% of the installed cores, whichever is higher, that are activated in static capability.
	● A minimum of 25% of all memory activations on a server must have static activations.
	● There are no partition or operating system impacts.

IBM Power Systems Software™	● Eligible programs can temporarily transfer entitlements from a Power Systems server that is participating in the pool to another Power Systems server that is also participating in the pool. ● The maximum number of software licenses within the pool for any specific software agreement cannot be exceeded. ● Any licenses for AIX, IBM i, and other Power Systems 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. ● Each Eligible Program that is entitled for IBM Software Maintenance (SWMA) on an Authorized Machine in an Power Enterprise Pool must also have a valid IBM Software Maintenance agreement on every Authorized Machine in the same Power Enterprise Pool.
Power Enterprise Pools	● The maximum number of systems in a Power Enterprise Pool is 32 high-end or 48 mid-range systems. ● 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. ● There must be inactive processors and memory on the member systems of a Power Enterprise Pool. ● Activations cannot be transferred, moved, or otherwise reassigned across country boundaries. ● Memory activations within a Power Enterprise Pool are independent of physical memory DIMM sizes and are supported in blocks of 100 GB.

Eligible Power Systems Software

The Power Systems Software in the following table is eligible for use with Power Enterprise Pools.

Table 3. Power Systems Software that can be used with Power Enterprise Pools

IBM Program Number	Description
5765-G62	AIX V6.1 Standard Edition
5765-AEZ	AIX V6.1 Enterprise Edition
5765-G98	AIX V7.1 Standard Edition
5765-G99	AIX V7.1 Enterprise Edition
5761-SS1	IBM i V6.1
5770-SS1	IBM i V7.1
5765-SEP	Systems Director Standard Edition
5765-EMP	VMControl Enterprise Edition
5765-SKC	SmartCloud Entry
5765-PSE	IBM PowerSC™ Standard
5765-PVS	IBM PowerVM® V2 Standard
5765-PVE	IBM PowerVM V2 Enterprise
5761-HAS	IBM PowerHA® for i V6.1
5770-HAS	PowerHA IBM SystemMirror® for i V7.1
5765-H23	PowerHA for AIX V6 Standard
5765-H24	PowerHA for AIX V6 Enterprise
5765-H39	PowerHA for AIX V7 Standard
5765-SLE	IBM PowerVP™ Standard Edition
5765-VCX	PowerVC Express Edition
5765-VCS	PowerVC Standard Edition

Usage scenarios

The scenario that follows is an example of the easy-to-follow HMC GUI, in this case for creating a Power Enterprise Pool.

Scenario 1: Creating a Power Enterprise Pool

To create a Power Enterprise Pool, complete the following steps:

1. Open a session on the HMC that manages your hosts.
2. Expand the **Systems Management** section and click **Power Enterprise Pools** to show the Power Enterprise Pools GUI.
3. Click **Create Pool**, and the main Power Enterprise Pools main window opens, as shown in the following figure.

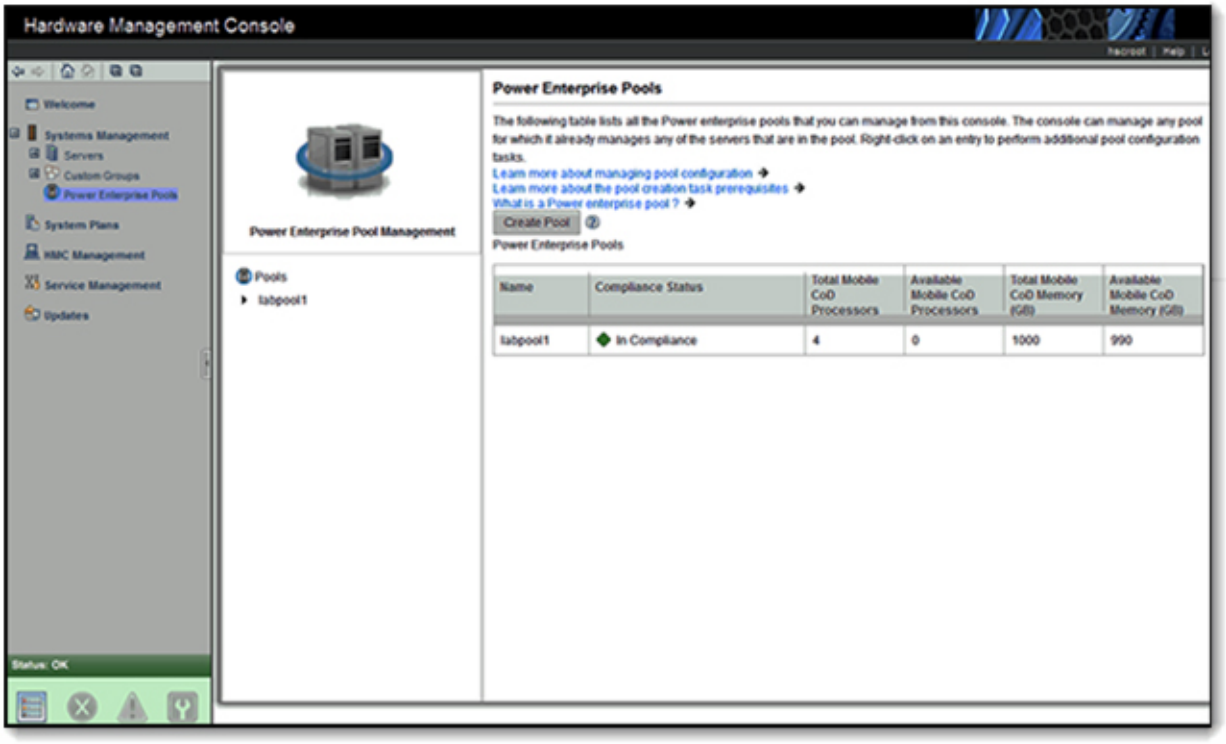

Figure 2. Power Enterprise Pools main window

4. Click **Create Pool**, and the Create Power Enterprise Pool wizard starts.
5. Enter a name for the storage pool, as shown in the following figure.

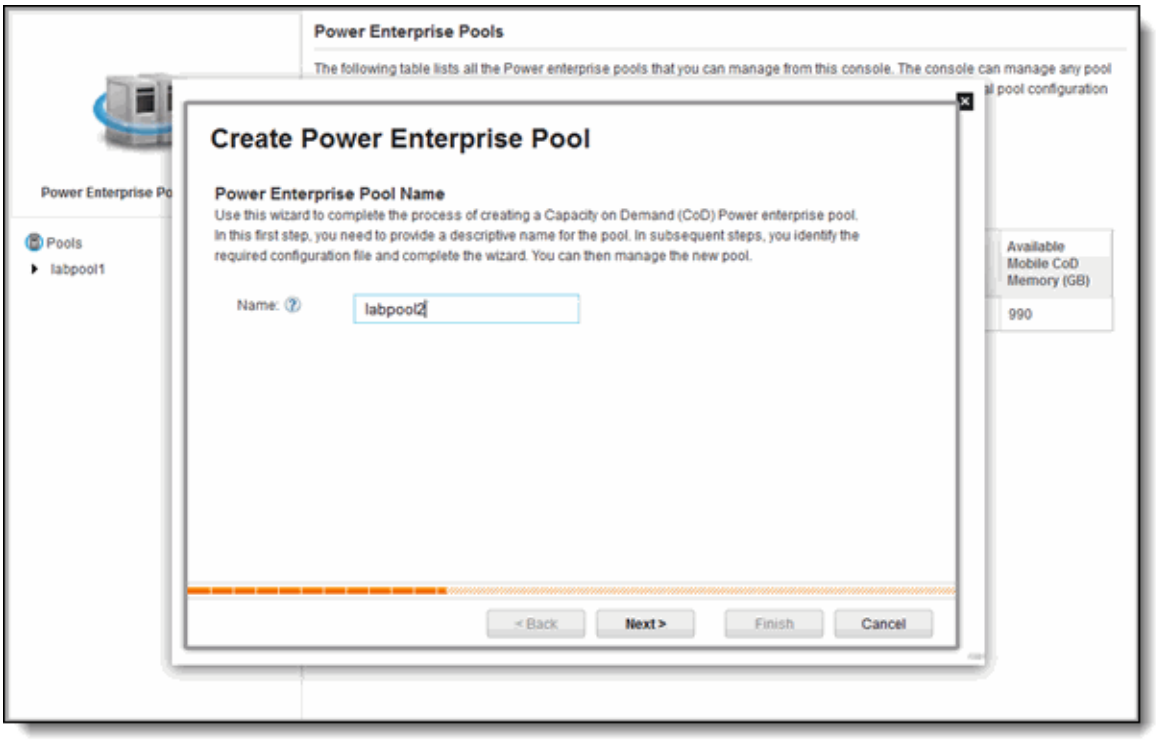

Figure 3. Naming the pool in the Create Power Enterprise Pool wizard

6. Click **Next**.
7. Click **Browse** to find the configuration file, and click **Upload**, as shown in the following figure.

   For more information about the configuration file, see the following resources:

   - The "Power Enterprise Pool configuration file" section in this Solution Guide
   - *IBM PowerVM 2013 Enterprise Enhancements,* SG24-8198

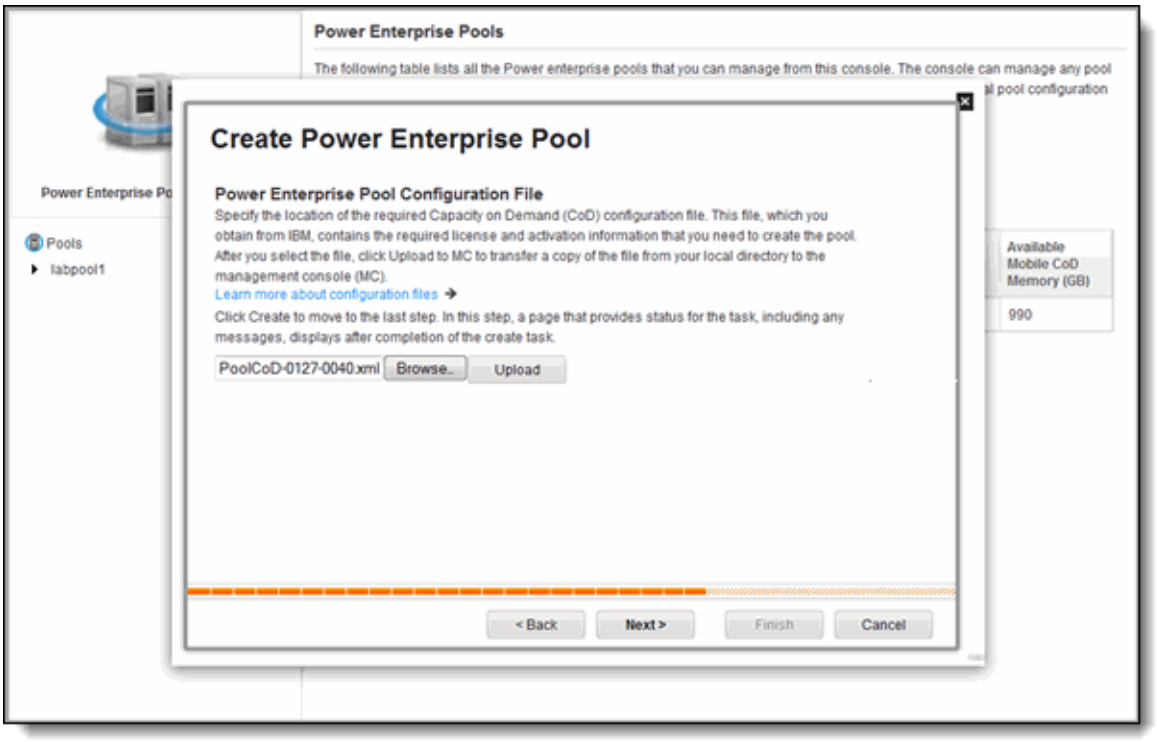

Figure 4. Uploading the configuration file

8. When the upload completes, click **Next**, and the HMC creates the pool.

   After the pool is created, the HMC shows information about the memory and activation codes for the new pool, as shown in the following figure.

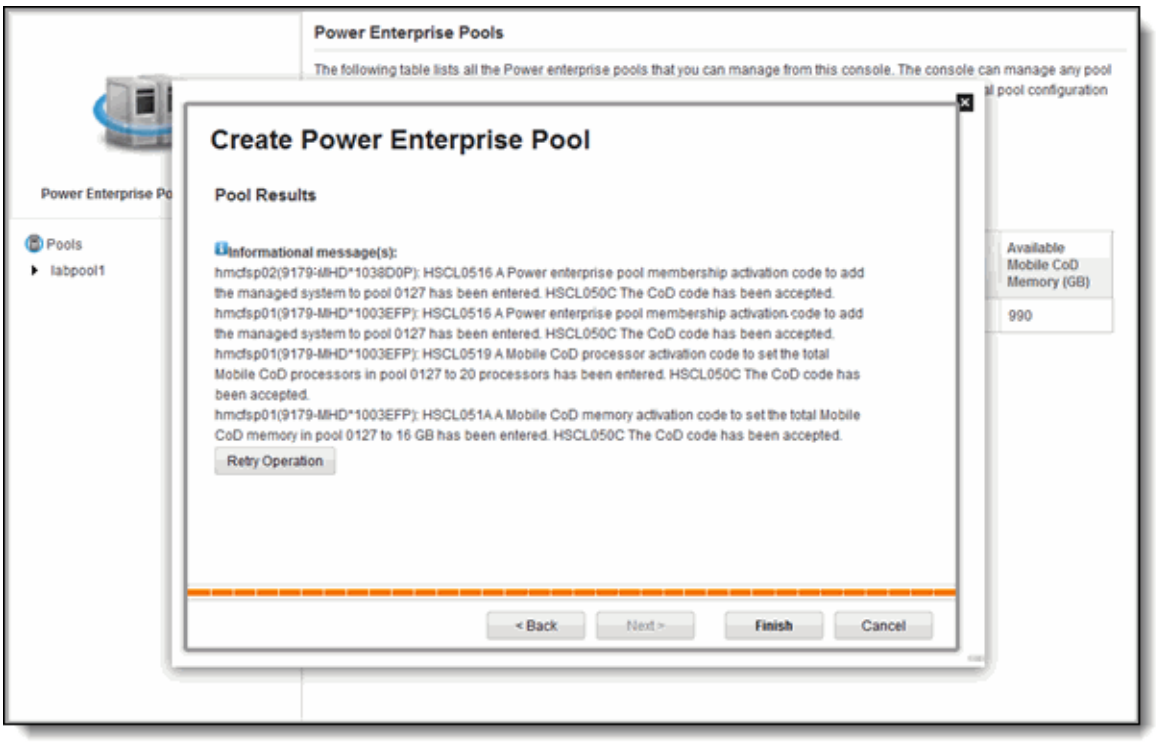

Figure 5. Confirmation of memory and activation codes

9. Click **Finish**, and then refresh the Power Enterprise Pool view.

   The new pool shows in the list of existing pools, as shown in the following figure.

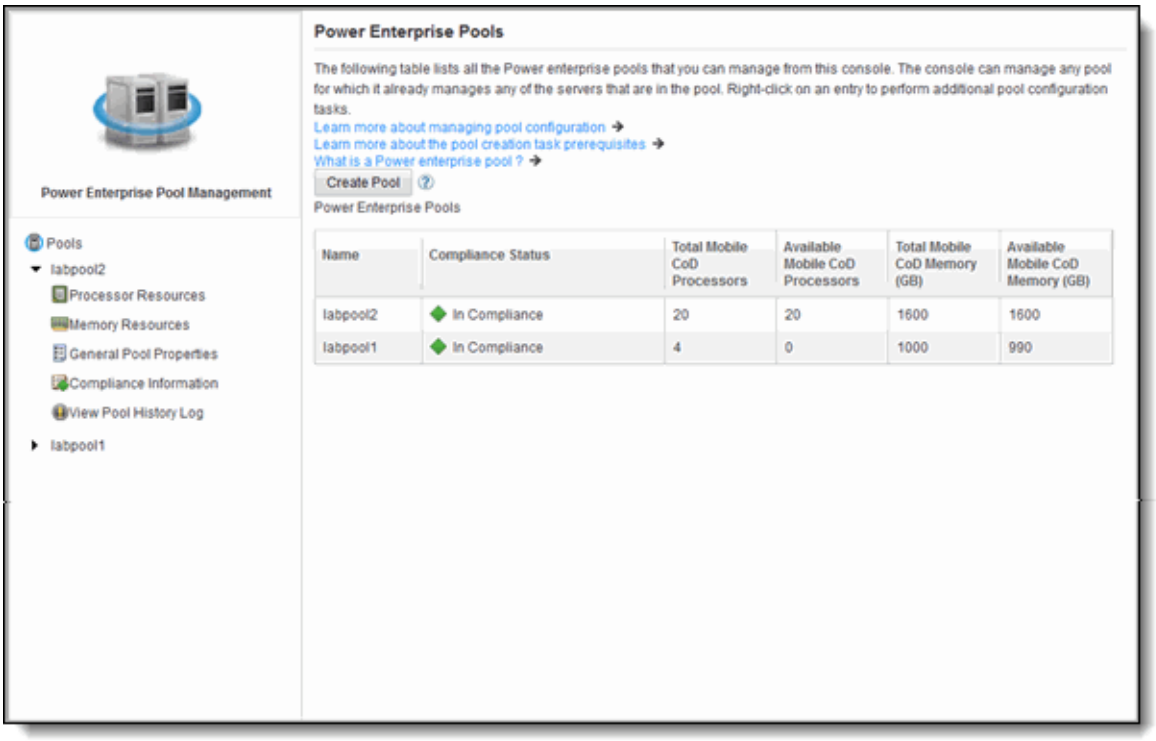

Figure 6. A new Power Enterprise Pool is created

Scenario 2: Resetting a master HMC

Setting a new master HMC for a Power Enterprise Pool can happen under the following scenarios:

- The master HMC for a Power Enterprise Pool is up and running, and there is a backup master HMC defined for the pool.

  To perform the operation, at least one server in the pool must be in standby mode or an operating state and connected to both the master HMC and the backup master HMC. The current master HMC must be able to communicate with the backup master HMC. To begin the process, click **Set as Master** from the master HMC. During this process, the master HMC transfers the current HMC CoD history log for the pool to the backup master HMC.

- The master HMC for a Power Enterprise Pool is not up and running and there is a backup master HMC that is defined for the pool. The user can set a new master HMC from the backup master HMC.

  To perform the operation, at least one server in the pool must be in standby mode or an operating state and connected to the backup master HMC. If the backup master HMC has maintained an active network connection to the master HMC, the pool data is expected to be up to date, and the backup master HMC can be set as the master HMC. Otherwise, the backup master HMC can be set as the master HMC only if the user enters the latest pool configuration file. This is the only way that the backup master HMC is ensured to be able to re-create the latest pool configuration.

- The master HMC CoD history log will not be transferred. A new HMC CoD history log is started for the pool on the backup master HMC after it becomes the master HMC.

  When no backup master HMC is defined for the pool and the master HMC is not available, use the latest configuration file for the pool to set a new master HMC. Click **Create Pool** to import the configuration file.

All of the operations that are related to controlling the Power Enterprise Pool HMCs are carried out from the Power Enterprise Pools management window by completing the following steps:

1. From a master HMC for a pool, click **Systems Management Power Enterprise Pools** . The HMC interface opens, showing the Power Enterprise Pools selection in the left navigation pane, and the main Power Enterprise Pools management window on the right.
2. In the left navigation pane, select a pool name to manage. The management options and General Pool Properties for the selected pool open.

Scenario 3: Ordering mobile activations using IBM Configurator for e -business (e-Config)

This section presents a scenario for ordering mobile activations using IBM Configurator for e-business (e-Config). Here are the main points of interest for this scenario:

- Client XYZ owns three IBM Power Systems: one Power 795, one Power 795A, and one Power 795B.
- Client XYZ wants to share a Power Enterprise Pool made up of 16 mobile processor core activations and 200 mobile GB of memory activations for workload ERP-XYZ that is running on Power 795B.
- Every month, workload ERP-XYZ uses 100% more than its 8-core processing requirement.
- When Power 795C is undergoing maintenance, Client XYZ also wants to keep workload ERP-XYZ running on either of the other two Power Systems that will be configured for the Power Enterprise Pool.
- The client has selected the Power 795A as the donor system for resources that will be added to the pool.

The following tables show the initial and final configuration scenarios that generate the fulfillment orders, which contain the feature codes that are shown in Examples 1, 2, and 3 on the following pages.

Table 4. Initial hardware and software configuration scenario

Power 795A	Power 795B	Power 795C
64 installed cores	64 installed cores	64 installed cores
24 static processor core activations	24 static processor core activations	48 static processor core activations
768 GB of memory installed	768 GB of memory installed	768 GB of memory installed
384 static GB of memory activations	384 static GB of memory activations	576 static GB of memory activations
24 AIX V7.1 Enterprise Edition licenses	24 AIX V7.1 Enterprise Edition licenses	48 AIX V7.1 Enterprise Edition licenses
24 PowerVM Enterprise Edition licenses	24 PowerVM Enterprise Edition licenses	48 PowerVM Enterprise Edition licenses

Table 5. Final hardware and configuration scenario

Power 795A	Power 795B	Power 795C
64 installed cores	64 installed cores	64 installed cores
24 static processor core activations	24 static processor core activations	48 static processor core activations
16 mobile processor core activations	0 mobile processor core activations	0 mobile processor core activations
768 GB of memory installed	768 GB of memory installed	768 GB of memory installed
384 static GB of memory activations	384 static GB of memory activations	576 static GB of memory activations
200 mobile GB of memory activations	0 mobile GB of memory activations	0 mobile GB of memory activations
48 AIX V7.1 Enterprise Edition licenses	24 AIX V7.1 Enterprise Edition licenses	48 AIX V7.1 Enterprise Edition licenses
48 PowerVM Enterprise Edition licenses	24 PowerVM Enterprise Edition licenses	48 PowerVM Enterprise Edition licenses

Example 1. Hardware and software fulfillment orders for Power 795A

```
System 1 - Hardware Orders - ( Power 795A )
Product                     Description                           Qty
_________  _____________________________________________________  _____
Hardware MESs
9119-FHB   9119 Model FHB                                            1
Additions
    2146   Primary OS - AIX                                          1
    8002   PowerVM (Enterprise Edition)                             16
    9742   Customer Install MES                                      1
    EB35   Mobile Enablement                                         1
    EMA4   100 GB Mobile Memory Activation                           2
    EP23   1-Core Mobile Activation                                 16

System 1 - Software Orders - ( Power 795A )
Product                     Description                           Qty
_________  _____________________________________________________  _____
Software New Orders
5765-G99   IBM AIX Enterprise Edition Version 7.1                    1
    0017   Per Processor - Large POWER 7                            16

5765-PVE   PowerVM Enterprise Edition                                1
    0006   Per Processor large system                               16

5771-AEZ   Software Maintenance for AIX Enterprise Edition, 1 Year         1
    1484   Per Proc Large 1 Year Reg Pwr 7                          16

5771-PVE   PowerVM Enterprise Edition SW Maintenance:                1
           1 Yr
    1199   Per processor large system 1yr reg                       16
```

Example 2. Hardware and software fulfillment orders for Power 795B

```
System 2 - Hardware Orders - ( Power 795B )
Product                     Description                           Qty
_________  _____________________________________________________  _____
Hardware MESs
9119-FHB   9119 Model FHB                                            1
Additions
    2146   Primary OS - AIX                                          1
    9742   Customer Install MES                                      1
    EB35   Mobile Enablement                                         1
```

Example 3. Hardware and software fulfillment orders for Power 795C

```
System 3 - Hardware Orders - ( Power 795C )
Product                     Description                           Qty
_________  _____________________________________________________  _____
Hardware MESs
9119-FHB   9119 Model FHB                                            1
Additions
    2146   Primary OS - AIX                                          1
    9742   Customer Install MES                                      1
    EB35   Mobile Enablement                                         1
```

For more information about e-Config, see the following websites:

- IBM Business Partners
  http://www.ibm.com/services/econfig/announce/index.htm
- IBM internal website
  http://w3-03.ibm.com/transform/worksmart/docs/e-config.html

Integration

Power Enterprise Pools can be configured on the following products:

- IBM Power Virtualization Center (PowerVC)

  IBM PowerVC is designed to simplify the management of virtual resources in your Power Systems environment. After the product code is loaded, the IBM PowerVC no-menus interface guides you through three simple configuration steps to register physical hosts, storage providers, and network resources, and to start capturing and intelligently deploying your virtual machines and other tasks.

  IBM PowerVC manages PowerVM virtualization environments by using a set of application programming interfaces (APIs) that interact with the HMC. These APIs provide the HMC with the necessary instructions to manage the Power Systems hardware, the Power Hypervisor, and the Virtual I/O Server (VIOS).

- IBM Power Virtualization Performance (PowerVP)

  IBM PowerVP for Power Systems offers a performance view into an IBM PowerVM virtualized environment that is running the latest firmware of IBM Power Systems. It can show which virtual workloads are using specific physical resources on an IBM Power Systems server.

- Power Integrated Facility for Linux (Power IFL)

  With Power IFL, IBM introduces an enterprise Power Systems offering to consolidate or integrate Linux with AIX and IBM i applications and data in large enterprise servers.

- VIOS 2.2.3

  The VIOS is enhanced with flexibility, scalability, and resiliency features in the areas of shared storage pools, simplified shared Ethernet adapters, and enhanced performance on Live Partition Mobility.

- Virtual I/O Server Performance Advisor

  The Virtual I/O Server Performance Advisor tool provides advisory reports that are based on key performance metrics from various partition resources in the VIOS environment. This tool provides health reports that include proposals for making configuration changes to the VIOS environment and to identify areas to investigate further.

- PowerVM Live Partition Mobility

  PowerVM Live Partition Mobility enhancements include system evacuation and a set of recommended settings to further improve performance. Server evacuation is a feature that helps systems administrators to move all of the capable logical partitions from one system to another when performing maintenance tasks and without disrupting business operations. Supported platforms are AIX, IBM i, and IBM PowerLinux™ virtual machines.

  Note: The server evacuation and Live Partition Mobility features are included in the HMC V7.8.8 upgrade.

Supported platforms

All AIX, IBM i, and Linux operating systems that run on POWER7+ or POWER8 are supported by Power Enterprise Pools.

Ordering information

This section explains the ordering process for activations.

Mobile-enabled processor activations for the Power 770 (9117-MMD) and Power 780 (9179-MHD)

IBM announced new mobile-enabled processor activation feature codes that are orderable with the initial shipment of Power 770 (9117-MMD) and Power 780 (9179-MHD) servers. These new feature codes allow you to purchase static processor activations, which can be converted to mobile processor activations at no charge when you are ready to implement Power Enterprise Pools. These new mobile-enabled feature codes allow you to purchase mobile-enabled processor activations and avoid the additional cost that is associated with the conversion of static to mobile processor activations. These new feature codes initially deliver the same capability as a static processor activation until you take the necessary steps to convert them to mobile processor activations.

Mobile-enabled processor activations for the Power 770 (9117-MMD), Power 780 (9179-MHD), and Power 795 (9119-FHB)

Mobile-enabled processor static activation feature codes can be ordered with the initial shipment of Power 770 (9117-MMD), Power 780 (9179-MHD), and Power 795 (9119-FHB) servers. These feature codes allow you to purchase static processor activations, which can be converted to mobile processor activations at no charge when you are ready to implement Power Enterprise Pools. This provides a cost savings compared to the previously announced structure of purchasing the existing regular static activations and then purchasing conversions to mobile activations. It also allows you to receive a single-priced invoice instead of two invoices for processor activations (an initial invoice plus an MES conversion invoice).

Mobile activations not available for initial orders

Mobile activations cannot be purchased with an initial server order because the association with a pool and its HMC has not been established at that point in time. Conversions of mobile-enabled static to mobile activations are ordered exactly like the current conversions of static conversions to mobile activations. This new ordering option is for processor cores. No similar announcement for mobile-enabled static memory activations is made because there is no price advantage for purchasing the conversion with the initial shipment.

The new mobile-enabled processor core activations are:

- Feature EPMC for the Power 770 (9117-MMD) 4.22 GHz (#EPM0)
- Feature EPMD for the Power 770 (9117-MMD) 3.8 GHz (#EPM1)
- Feature EPHL for the Power 780 (9179-MHD) 4.42 GHz (#EPHO)
- Feature EPHM for the Power 780 (9179-MHD) 3.72 GHz (#EPH2)
- Feature 4715 for the Power 795 (9119-FHB) 4.0 GHz (#4700)
- Feature 4725 for the Power 795 (9119-FHB) 3.7 GHz (#4702)

There is one processor core activation per feature code. The following tables describe the feature conversions for models 9117-MMD, 9119-FHB, and 9179-MHD. For pricing information, see the IBM Power Systems product page at http://www.ibm.com/systems/power/.

Table 6. Feature conversions for 9117-MMD processor features

From Feature Code	To Feature Code	Parts returned
EPMC - #EPM0 processor activation, mobile-enabled	EP22 - 1-Core mobile activation	No
EPMD - #EPM1 processor activation, mobile-enabled	EP22 - 1-Core mobile activation	No

Table 7. Feature conversions for 9119-FHB processor features

From Feature Code	To Feature Code	Parts returned
4715 - #4700 processor activation, mobile-enabled	EP23 - 1-Core mobile activation	No
4725 - #4702 processor activation, mobile-enabled	EP23 - 1-Core mobile activation	No

Table 8. Feature conversions for 9179-MHD processor features

From Feature Code	To Feature Code	Parts returned
EPHL - #EPH0 processor activation, mobile-enabled	EP23 - 1-Core mobile activation	No
EPHM - #EPH2 processor activation, mobile-enabled	EP23 - 1-Core mobile activation	No

Ordering and enabling mobile activations

Before you create a Power Enterprise Pool, you must have systems with available processors and memory resources that can be activated by using mobile enablement codes. To order and enable these mobile activations for enterprise class systems, complete the following steps:

1. Complete and submit the Power Enterprise Pools contract and addendum (Z126-6228 and Z126-6229), specifying all system serial numbers to be included in the pool. Send a copy to the Power Systems CoD Project Office at pcod@us.ibm.com to generate a pool ID number. The IBM License Supplement for Power Enterprise Pools (Z126-6228) is required before ordering mobile resources, but is only required one time per client. The IBM License Supplement for Power Enterprise Pools Addendum (Z126-6229) is used to assign or remove systems to or from a pool.
2. Order mobile enablement, processor, and memory activation features for participating systems. Every system in the pool must have feature #EB35 as an identifier.
3. Ensure all participating systems and controlling HMCs have the proper levels of supporting software. For more information, see the “Requirements and specifications” section.

4. When the order is fulfilled, a configuration file is generated that contains a Power Enterprise Pool membership activation code for each of the systems in the pool, along with the mobile processor and memory activations. This file is made available on the IBM Capacity on Demand website at http://www-03.ibm.com/systems/power/hardware/cod/activations.html.

   Download the client-specific configuration file with mobile activations to the master HMC for the pool. The file works only for the specified system serial numbers. A new file is generated when systems or mobile resources are added or removed from the pool.

Power Enterprise Pool configuration file

The configuration file is a signed XML file that contains the required information to configure a Power Enterprise Pool. The following table defines the primary fields that are needed to complete this procedure.

Contact IBM for a new configuration file, which enables you to do the following task:

- Create a Power Enterprise Pool.
- Add systems to, or remove systems from, a Power Enterprise Pool.
- Add or remove Mobile CoD resources on a Power Enterprise Pool.

You must have the latest configuration file for a Power Enterprise Pool to perform the following operations:

- Recover the master HMC for a Power Enterprise Pool after a clean installation is completed, without previously setting a backup master HMC as the master HMC.
- Set a new master HMC for a Power Enterprise Pool if you have not previously set a backup master HMC as the master HMC.

The following table describes the fields in the configuration file.

Table 6. Fields in the configuration file

Field	Description
Pool ID	A unique ID that IBM assigns to the Power enterprise pool.
Sequence number	A numeric value that increments to a higher value when IBM updates the configuration file.
Power enterprise pool 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.

For more information about setting and recovering HMCs, see the "Related information" section for a link to *IBM PowerVM 2013 Enterprise Enhancements,* SG24-8198.

The latest configuration file for a Power Enterprise Pool is available on the IBM Capacity on Demand website at:
http://www-03.ibm.com/systems/power/hardware/cod/offerings.html

Related information

For more information, see the following resources:

- *IBM PowerVM Virtualization Managing and Monitoring*, SG24-7590
  http://www.redbooks.ibm.com/abstracts/sg247590.html
- *IBM PowerVM Virtualization Introduction and Configuration*, SG24-7940
  http://www.redbooks.ibm.com/abstracts/sg247940.html
- *IBM PowerVM 2013 Enterprise Enhancements*, SG24-8198
  http://www.redbooks.ibm.com/abstracts/sg248198.html?Open
- *IBM PowerVC Introduction and Configuration*, SG24-8199
  http://www.redbooks.ibm.com/abstracts/sg248199.html?Open
- *IBM PowerVM for Growing Businesses: Managing and Monitoring a Virtual Environment*, TIPS1091
  http://www.redbooks.ibm.com/abstracts/tips1091.html
- *IBM PowerVM for Growing Businesses: Reduce Total Cost of Computing, and More, in a Virtual Environment*, TIPS1099
  http://www.redbooks.ibm.com/abstracts/tips1099.html
- *Implementing IBM PowerVC in Your Organization*, TIPS1136
  http://www.redbooks.ibm.com/abstracts/tips1136.html
- IBM Power System Pools
  http://www.ibm.com/systems/power/hardware/systempools/
- IBM Power Systems feature new enterprise and HMC enhancements
  http://www.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/rep_ca/2/877/ENUSZG13-0302/index.html&lang=en&request_locale=en
- Power Enterprise Pools
  http://www-01.ibm.com/support/knowledgecenter/api/redirect/powersys/v3r1m5/index.jsp?topic=%2Fp7ha2%2Fsystempool_cod.htm
- *New Power Enterprise Pools Add Mobility to Core and Memory Activations*
  http://www.ibmsystemsmag.com/aix/administrator/systemsmanagement/power_enterprise_pools/
- IBM Power Systems (product page)
  http://www.ibm.com/systems/power/
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- *5765-VCS IBM PowerVC Standard Edition V1.2* (sales manual; also includes descriptions of IBM PowerVC Express Edition)
  http://www.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/rep_sm/s/897/ENUS5765-VCS/index.html&lang=en&request_locale=en

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