

# Hardware Information

Partitioning for AIX with an  
HMC

ESCALA POWER5



REFERENCE

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# ESCALA POWER5

## Hardware Information

### Partitioning for AIX with an HMC

#### **Hardware**

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## Partitioning for AIX with an HMC

Partitioning for AIX with an HMC includes information about configuring and managing partitions that run the AIX operating system on server hardware.

- **[What's new in Partitioning for AIX with an HMC](#)**  
Use this information to see a list of the new or updated topics for AIX logical partitions.
  - **[Printable PDF](#)**  
Use this to view and print a PDF of this information.
  - **[Scenarios for AIX logical partitions](#)**  
Use AIX logical partition scenarios to understand how a partitioned server can be configured and used.
  - **[Planning for logical partitions](#)**  
This topic provides you with a checklist of things to consider before creating or changing logical partitions on your system running AIX. See this checklist for information about preparing to partition your server.
  - **[Configuring AIX logical partitions](#)**  
This topic provides information about the Hardware Management Console (HMC) creation wizard that guides you through the process of creating partition profiles on the HMC.
  - **[Configuring resource management for AIX partitions with the Partition Load Manager](#)**  
This topic provides information about using the Partition Load Manager to configure resource management.
  - **[Managing AIX logical partitions](#)**  
This topic provides information about managing your logical partitions. It helps you understand how you can change your logical partition configuration and change processing resources.
  - **[Using AIX installed on a logical partition](#)**  
This topic helps you find information about using AIX when it is installed on a logical partition. It also helps you understand how to shut down AIX, manage security, and manage performance.
  - **[Troubleshooting AIX logical partitions](#)**  
This topic helps you understand how to resolve logical partition errors efficiently.
  - **[Related information for AIX logical partitions](#)**  
This topic provides links to information related to AIX logical partitions.
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## What's new in Partitioning for AIX with an HMC

Use this information to see a list of the new or updated topics for AIX logical partitions.

The title of this topic has changed from Partitioning for AIX to Partitioning for AIX with an HMC.

**Parent topic:** [Partitioning for AIX with an HMC](#)

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## Printable PDF

Use this to view and print a PDF of this information.

To view or download the PDF version of this document, select [Partitioning for AIX with an HMC](#)(about 470 KB).

You can view or download these related topics:

- **[Partitioning for Linux with an HMC](#)** (about 926 KB) contains the following topics:
  - ◆ [What's new for Partitioning for Linux with an HMC](#)
  - ◆ [General concepts for partitioning the server](#)
  - ◆ [Scenarios for Linux logical partitions](#)
  - ◆ [Supported virtual devices for Linux logical partitions](#)
  - ◆ [Configuring Linux logical partitions](#)
  - ◆ [Managing Linux logical partitions](#)
  - ◆ [Using Linux installed on a logical partition](#)
  - ◆ [Troubleshooting Linux logical partitions](#)

- ◆ Related information for Linux logical partitions

#### Other information

You can also view or print any of the following PDFs:

IBM Redbooks:

- [Partitioning Implementations for ESCALA PL Series Servers](#) (about 3.1 MB)
- [Advanced POWER Virtualization on ESCALA PL Series Servers: Introduction and Basic Configuration](#) (about 7.2 MB)

#### Saving PDF files

To save a PDF on your workstation for viewing or printing:

1. Right-click the PDF link in your browser.
2. Click the option that saves the PDF locally.
3. Navigate to the directory in which you want to save the PDF.
4. Click Save.

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**Parent topic:** [Partitioning for AIX with an HMC](#)

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## Scenarios for AIX logical partitions

Use AIX logical partition scenarios to understand how a partitioned server can be configured and used.

One of the best ways to understand logical partitions is to see examples illustrating how many of the applications and functions can be used in a sample business environment. Use the following scenarios and configuration examples to understand more about AIX logical partitions.

- **Scenario: Using partition profiles**  
Use this scenario to learn about changing the configuration of your managed system by using partition profiles.
- **Scenario: Using system profiles**  
Use this scenario to change the configuration of your managed system by using system profiles.
- **Scenario: Creating an AIX logical partition and partition profile**  
Use this scenario to help you become familiar with the details involved with creating an AIX logical partition.
- **Scenario: Using the HMC through a remote PC client**  
Use this scenario to help you become familiar with the details involved with using one personal computer (PC) to manage your server or ESCALA PL Series server 6xx system and your server.

**Parent topic:** [Partitioning for AIX with an HMC](#)

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## Scenario: Creating an AIX logical partition and partition profile

Use this scenario to help you become familiar with the details involved with creating an AIX logical partition.

### Situation

You are the system administrator responsible for configuring and managing the server hardware system. You would like to know how to create an AIX partition profile.

### Objectives

The objective of this scenario is to create an AIX logical partition and [partition profile](#) on a server hardware system.

### Prerequisites and assumptions

This scenario assumes that the following prerequisite steps have been completed and are operational prior to beginning the configuration steps:

1. The [Hardware Management Console](#) was set up.
  - ◆ The Hardware Management Console (HMC) was [cabled](#).
  - ◆ You completed the planning process and you understand how you want to [configure](#) your HMC.
  - ◆ You used the [Guided Setup wizard](#) or the [HMC configuration checklist](#) to set up the HMC.
2. You understand the [concepts](#) for partitioning the server.
3. You completed the tasks recommended for [planning for logical partitions](#).
4. You logged in to the HMC with one of the following [user roles](#):
  - ◆ Super administrator
  - ◆ Operator

### Configuration steps

Ensure that all the prerequisites for this scenario have been completed prior to completing these tasks:

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

1. In the navigation area, open Server and Partition.
2. Click Server Management.
3. In the contents area, open the server on which you want to create the partition profile.
4. Right-click Partitions, and then click Create > Logical Partitions.
5. Follow the steps in the Create Logical Partitions wizard to create a logical partition and a partition profile.

**Parent topic:** [Scenarios for AIX logical partitions](#)

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## Scenario: Using the HMC through a remote PC client

Use this scenario to help you become familiar with the details involved with using one personal computer (PC) to manage your server or ESCALA PL Series server 6xx system and your server.

### Situation

You have a partitioned server 6xx server with an HMC. You have access to and control the logical partitions on the server using a personal computer (PC). You have just received a new ESCALA PL Series system with an HMC. You would like to continue managing the server 6xx and the ESCALA PL Series system from one PC.

### Objectives

The objectives of this scenario are as follows:

- To manage the server 6xx server and ESCALA PL Series system using one PC
- To install and use the remote HMC client

Prerequisites and assumptions

This scenario assumes that the following prerequisite steps have been completed and are operational prior to beginning the configuration steps:

1. The [Hardware Management Console](#) was set up.
  - ◆ The Hardware Management Console (HMC) was [cabled](#).
  - ◆ You completed the planning process and you understand how you want to [configure](#) your HMC.
  - ◆ You used the [Guided Setup wizard](#) or the [HMC configuration checklist](#) to set up the HMC.
2. You understand the [concepts for partitioning the server](#).
3. You completed the tasks recommended for [planning for logical partitions](#).
4. Your PC meets the hardware and software [requirements](#) needed to install the Web-based System Manager client.

Solution

Complete the following tasks to access the HMC remotely:

1. [Install the Web-based System Manager Remote Client for Java Web Start](#) or [Install the Web-based System Manager Remote Client](#)
2. [Configure System Manager Security](#)

After you have installed the remote HMC client on your PC, you are able to access and control the logical partitions on your ESCALA PL Series system using the same PC that you use to control the server 6xx server.

**Parent topic:** [Scenarios for AIX logical partitions](#)

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## Configuring AIX logical partitions

This topic provides information about the Hardware Management Console (HMC) creation wizard that guides you through the process of creating partition profiles on the HMC.

You can use the [Hardware Management Console](#) to create logical partitions on your systems and ESCALA PL Series hardware. Before you start creating logical partitions, it is essential that you understand the [concepts](#) behind this type of system configuration. The purpose of this information is to familiarize you with the following:

- **[Partitioning a new or nonpartitioned server](#)**  
Use these procedures to partition your new or nonpartitioned server using the Hardware Management Console (HMC).
- **[Creating logical partitions and partition profiles](#)**  
This topic provides information about using the Create Logical Partition wizard on the Hardware Management Console (HMC) to create a new logical partition and partition profile on your system.
- **[Creating additional partition profiles](#)**  
This topic provides information about creating partition profiles, which store the required number of processors, memory, and hardware resources assigned to that profile. A partition profile is identified by partition ID and profile name.
- **[Configuring a virtual Ethernet adapter for AIX](#)**  
This topic describes how to configure a virtual Ethernet adapter for AIX.
- **[Copying a partition profile](#)**  
This topic provides information about using the Hardware Management Console to copy the contents of a partition profile that you have already created. For example, you might decide that you need a

partition profile that is similar to one that you have already created, but with a small change in resource allocation.

- **Creating a system profile**

This topic provides information about creating a system profile, which is a collection of partition profiles. A system profile helps you change the managed system from one complete set of partition configurations to another. System profiles are useful to validate your partition profile. If a partition profile has overcommitted resources, you will not be able to add that profile to the system profile.

- **Copying a system profile**

This topic provides information about copying a system profile. You can use the Hardware Management Console (HMC) to copy the contents of a profile that you have already created.

- **Deleting a logical partition**

This topic provides information about using the Hardware Management Console (HMC) to delete a logical partition and all of the partition profiles associated with the logical partition.

- **Resetting the server to a nonpartitioned configuration**

This topic provides information about resetting the server to a nonpartitioned configuration. There might be a time when you want to erase all of your logical partitions and reset the server to a nonpartitioned configuration. When you reset the server, all of the physical hardware resources are assigned to a single partition.

**Parent topic:** [Partitioning for AIX with an HMC](#)

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## Configuring a virtual Ethernet adapter for AIX

This topic describes how to configure a virtual Ethernet adapter for AIX.

Complete the following steps to configure a virtual Ethernet adapter for AIX:

1. In the navigation area, open Server and Partition.
2. Select Server Management.
3. In the contents area, expand the server with the partition that will use the Ethernet adapter.
4. Expand Partitions.
5. Right-click the partition profile of the partition that will use the virtual Ethernet adapter and select Dynamic Logical Partitioning > Virtual Adapter Resources > Add/Remove.
6. Select the Virtual I/O tab.
7. In the Create Adapters area, select Ethernet and click Create. The Virtual Ethernet Adapter Properties window is displayed.
8. Enter the slot number for the virtual Ethernet adapter.
9. Enter the Port Virtual LAN ID (PVID) for the virtual Ethernet Adapter. The PVID allows the virtual Ethernet adapter to communicate other virtual Ethernet adapters that have the same PVID.
10. Select the IEEE 802.1Q-compatible adapter check box if you want to configure the virtual Ethernet adapter to communicate over multiple virtual LANs. If you leave this option unchecked and you want this partition to connect to multiple virtual networks, then you need to create multiple virtual adapters by creating additional virtual LAN IDs.
11. Repeat this procedure as needed for any additional virtual adapters that you require for this partition.

**Parent topic:** [Configuring AIX logical partitions](#)

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## Configuring resource management for AIX partitions with the Partition Load Manager

This topic provides information about using the Partition Load Manager to configure resource management.

The Partition Load Manager for AIX 5L provides automated processor and memory resource management across logical partitions that are capable of dynamic logical partitioning on AIX 5L. The Partition Load Manager allocates resources to partitions on demand within the constraints of a user-defined policy. Partitions with a high demand for resources are given resources from partitions with a lower demand, improving the overall resource utilization of the system. Resources that would otherwise be unused, if left allocated to a

partition that was not using them, can now be used to meet resource demands of other partitions in the same system.

The Partition Load Manager uses a client/server model to report and manage resource utilization. The clients, or *managed partitions*, notify the Partition Load Manager server when resources are either not used enough or are overused. Upon notification of one of these events, the Partition Load Manager server makes resource allocation decisions based on a user-defined resource management policy. This policy determines how much of the available resources are to be allocated to each partition.

The Partition Load Manager works much like any other system management software in that you can use it to view the resources across your partitions, group those resources into manageable segments, and allocate and reallocate those resources within or across the groups. It also locally logs activity on the partitions. The underlying processes of the Partition Load Manager rely on Resource Monitoring and Control (RMC) for network communication with the managed partitions.

Requirements for using the Partition Load Manager server include the following:

- A Hardware Management Console (HMC) must be attached to the managed system.
- The Partition Load Manager system can be running AIX 5L Version 5.2 with the 5200-04 Technology Level or AIX 5L Version 5.3.
- The Partition Load Manager system can be a partition in the managed server, a partition in a different server, or a stand-alone AIX system.
- The Partition Load Manager server system requires network connectivity to the HMC and to every managed partition.
- Multiple Partition Load Manager servers may be run on one AIX system.
- One Partition Load Manager server can manage partitions within only one managed server.

The following topics provide additional information about managing resources on AIX partitions with the Partition Load Manager:

- **[Preparing to install the Partition Load Manager](#)**  
This topic provides information about how to prepare to install the Partition Load Manager.
- **[Installing OpenSSH software tools](#)**  
This topic provides information about how you can download and install OpenSSH software tools and then verify that you have installed OpenSSH correctly.
- **[Installing the Partition Load Manager server](#)**  
This topic provides information about how to install the Partition Load Manager server.
- **[Configuring the policy file](#)**  
This topic provides information about how to configure the policy file.
- **[Querying partition status](#)**  
This topic helps you understand how to use Partition Load Manager to query partition status.
- **[Configuring Resource Monitoring and Control \(RMC\)](#)**  
This topic provides information about how to configure Resource Monitoring and Control and then how to verify that you installed it correctly.
- **[Starting and stopping the Partition Load Manager server](#)**  
This topic provides information about how to start and stop the Partition Load Manager server and how to check the Partition Load Manager statistics.
- **[Commands for the Partition Load Manager](#)**  
This topic links to descriptions of the commands for the Partition Load Manager.

**Parent topic:** [Partitioning for AIX with an HMC](#)

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## Preparing to install the Partition Load Manager

This topic provides information about how to prepare to install the Partition Load Manager.

Before you install the Partition Load Manager, complete the following steps:

Name resolution

Resolve the host name by doing the following steps:

1. Set the host name on each logical partition to the fully qualified host name, such as **lpar1.domain.com**.
2. If you are not using a name server, edit the `/etc/hosts` file on each logical partition to include the Partition Load Manager server host name, similar to the following:

```
172.16.0.30      lpar1.domain.com      lpar1
172.16.0.100    plmserver1.domain.com plmserver1
```

3. If you are not using a name server, edit the `/etc/hosts` file on the Partition Load Manager server to include the logical partitions and HMC host names, similar to the following:

```
172.16.0.100    plmserver1.domain.com plmserver1
172.16.0.30     lpar1.domain.com      lpar1
172.16.0.33     lpar2.domain.com      lpar2
172.16.0.3      p5hmc1.domain.com     p5hmc1
```

## Dynamic partitioning capability on logical partitions

Determine the dynamic partitioning capability of logical partitions by doing the following steps:

1. To determine whether each logical partition is capable of dynamic partitioning, run the following command:

```
lssrc -a | grep rsct
```

If the **Partition Load Manager resource manager** daemon is running, then the logical partition has an active Resource Monitoring and Control (RMC) session with the HMC and is capable of dynamic partitioning.

If the **Partition Load Manager resource manager** daemon is not running, check the name resolution and the network connectivity between the HMC and the LPAR.

2. If you changed the host name without rebooting, recycle the RMC daemons on each logical partition by running the following commands:

```
/usr/sbin/rcst/bin/rmcctrl -z
/usr/sbin/rsct/bin/rmcctrl -s
```

## RSH and RCP access to managed logical partitions from the Partition Load Manager server

Remote shell (rsh) and remote control panel (rcp) access is required to all logical partitions for setting up the Partition Load Manager. If rsh and rcp have been disabled for security reasons, use the following steps to enable these services:

1. Edit the `.rhosts` file on each logical partition to add the following lines:

```
plmserver1 root
plmserver1.domain.com root
```

2. Enable rsh and rcp on each logical partition by running the following commands:

```
chmod 4554 /usr/sbin/rshd
chmod 4554 /usr/bin/rcp
```

3. Edit the `/etc/inetd.conf` file, and uncomment the following line:

```
shell stream tcp6 nowait root /usr/sbin/rshd rshd
```

4. Restart the **inetd** daemon by running the following command.

```
refresh -s inetd
```

5. Test the rsh access from the Partition Load Manager server to each logical partition by running the following commands:

```
rsh root@lpar1 date
rsh root@lpar2 date
```

## Create an AIX user ID for the Partition Load Manager

The Partition Load Manager server is a `setuid` program that runs under the configured user ID. This user must exchange ssh keys with the configured HMC user and be authorized with Resource Monitoring and Control (RMC) before running Partition Load Manager. Use any of the management interfaces to create the `plmuser` ID on the Partition Load Manager server.

**Parent topic:** [Configuring resource management for AIX partitions with the Partition Load Manager](#)

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## Installing OpenSSH software tools

This topic provides information about how you can download and install OpenSSH software tools and then verify that you have installed OpenSSH correctly.

OpenSSH must be set up so that you can facilitate authentication and communication between the Partition Load Manager server and the controlling Hardware Management Console (HMC). Whenever the Partition Load Manager satisfies a resource request, it uses remote HMC commands to gather partition information and initiate **DR** operations. The HMC must be enabled for OpenSSH by activating the Enable/Disable Remote Command Execution task on the HMC.

When you are setting up a user on the HMC for OpenSSH, specify one of the following roles:

- System administrator
- Service representative
- Advanced operator

Before you can use OpenSSH, there must be a user on the HMC that has remote command enabled. This user must exchange ssh keys with the configured HMC user, but does not have to be the same user as the plmuser ID.

OpenSSH software tools support the SSH1 and SSH2 protocols. The tools provide shell functions where network traffic is encrypted and authenticated. OpenSSH is based on client and server architecture. OpenSSH runs the **sshd** daemon process on the AIX host and waits for the connection from clients. It supports public-key and private-key pairs for authentication and encryption of channels to ensure secure network connections and host-based authentication. For more information about OpenSSH, including the man pages, see the following Web site:

<http://www.openssh.org>

The OpenSSH software is included on the AIX 5.3 Expansion Pack. This version of OpenSSH is compiled and packaged as **installp** packages using the **openssh-3.7.1p2** level of source code. The **installp** packages include the man pages and the translated message filesets. The OpenSSH program contained in the Expansion Pack CD-ROM media is licensed under the terms and conditions of the International Program License Agreement (IPLA) for Non-Warranted Programs.

Before installing the OpenSSH **installp** format packages, you must install the Open Secure Sockets Layer (OpenSSL) software that contains the encrypted library.

After you download the OpenSSL package, you can install OpenSSL and OpenSSH.

1. Install the OpenSSL RPM package using the **geninstall** command, as follows:

```
# geninstall -d/directory R:openssl-0.9.6g
```

where *directory* is the name of the directory to which you downloaded the OpenSSL package. Output similar to the following displays:

```
SUCCESES
-----
openssl-0.9.6g-3
```

2. Install the OpenSSH **installp** packages using the **geninstall** command, as follows:

```
# geninstall -Y -d/directory I:openssh.base
```

Use the **-Y** flag to accept the OpenSSH license agreement after you have reviewed the license agreement.

To view the license agreement, type the following command:

```
# geninstall -IapE -ddirectory openssh.base 2>&1 |pg
```

After you accept the license agreement, output similar to the following displays:

```
Installation Summary
-----
```

Name	Level	Part	Event	Result
openssh.base.client	3.6.0.5200	USR	APPLY	SUCCESS
openssh.base.server	3.6.0.5200	USR	APPLY	SUCCESS
openssh.base.client	3.6.0.5200	ROOT	APPLY	SUCCESS
openssh.base.server	3.6.0.5200	ROOT	APPLY	SUCCESS

You can also use the **smitty license\_on\_media** fast path to view the license, and the **smitty install\_software** fast path to install OpenSSL and OpenSSH.

The following OpenSSH binary files are installed as a result of the preceding procedure:

```
scp
    A file copy program similar to rcp
sftp
    A program similar to FTP that works over the SSH1 and SSH2 protocol
sftp-server
    A SFTP server subsystem (started automatically by sshd daemon)
ssh
    Similar to the rlogin and rsh client programs
ssh-add
    A tool that adds keys to ssh-agent
ssh-agent
    An agent that can store private keys
ssh-keygen
    A key-generation tool
ssh-keyscan
    A utility for gathering public host keys from a number of hosts
ssh-keysign
    A utility for host-based authentication
ssh-rand-helper
    A program used by OpenSSH to gather random numbers. It is used only on AIX 5.1 installations.
sshd
    A daemon that permits you to log in
```

SSH access to the HMC from the Partition Load Manager server

After you have installed SSH, you can generate the SSH keys and communicate with the HMC.

If you are going to run the Partition Load Manager server under the plmuser ID, grant SSH access to the HMC from the Partition Load Manager server by using the following steps:

1. Log in under the plmuser ID.
2. Generate SSH keys on the Partition Load Manager server by using the following command:

```
ssh-keygen -t rsa
```

3. Exchange SSH keys with the HMC by using the following commands:

```
scp hscroot@p5hmc1:~/.ssh/authorized_keys2 ~/.ssh/tmp_authorized_keys2
cat ~/.ssh/id_rsa.pub >> ~/.ssh/tmp_authorized_keys2
scp ~/.ssh/tmp_authorized_keys2 hscroot@p5hmc1:~/.ssh/authorized_keys2
```

4. Test the SSH access to the HMC as the plmuser ID without using a password by using the following command:

```
ssh hscroot@p5hmc1 date
```

5. Obtain the name of the managed system from the HMC by using the following command:

```
ssh hscroot@p5hmc1 lssyscfg -r sys
```

Unless the name of the managed system is changed on the HMC using the Properties tab on the managed system, the default managed system name is similar to the following:

server-9117-570-SNxxxxxxx

**Note:** The HMC hostname used in the setup and the managed system name are used in the Partition Load Manager policy. If there is more than one managed system, determine which system contains the partitions to be managed. For each managed system, use the following command:

```
ssh hmcuser@hmchost lssyscfg r lpar m machine
```

**Parent topic:** [Configuring resource management for AIX partitions with the Partition Load Manager](#)

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## Installing the Partition Load Manager server

This topic provides information about how to install the Partition Load Manager server.

To install the Partition Load Manager server, complete the following steps:

1. Mount the *Partition Load Manager* CD to your system.
2. Using either the **installp** command or the smitty `install_latest` fastpath, install the following filesets:
  - ◆ plm.license
  - ◆ plm.server.rte
  - ◆ plm.sysmgt.websm
  - ◆ plm.msg.en\_US.server
  - ◆ plm.msg.en\_US.websm
3. Read and accept the license.

Now that the Partition Load Manager server is installed, you can create a policy file and configure Resource Monitoring and Control (RMC) for the Partition Load Manager. If you create the policy file first and Web-based System Manager is being used, you can use the policy file to input the list of partitions being managed.

**Parent topic:** [Configuring resource management for AIX partitions with the Partition Load Manager](#)

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## Configuring the policy file

This topic provides information about how to configure the policy file.

### Policy file concepts

The system uses the policy file to determine which processor and memory resources may be managed by the Partition Load Manager server. The policy also includes resource shares, group definitions, and tunable parameters. This file defines the partitions that are to be managed, their guaranteed entitlements, and their minimum and maximum entitlements.

The policy file is divided into stanzas, and each of the stanzas has a type field. Every stanza follows the following format:

```
<stanza_label>:
    attribute=<value>
    attribute2=<value>
    type=<value>
```

The policy file has the following rules:

- The policy file consists of a number of stanzas containing attributes.
- Stanza names may not contain any blanks and must be followed immediately by a colon (:). Only white space or a comment can follow the stanza name. It is suggested that stanza names be placed in column 1 on the line. The following are the supported stanza types:
  - ◆ globals:
  - ◆ tunables:
  - ◆ group\_name:
  - ◆ partition\_name:
- Attributes consist of a name and a value separated by an equal sign (=). Attribute names and values may not contain any blanks. Nothing but white space or a comment may follow the value. It is suggested that attributes be indented under the containing stanza name.
- Do not repeat attributes in a stanza. Only the first attribute in a stanza is used.
- Comments begin with a number sign(#). They may be started in any column on the line and continue until end of line.
- Stanzas may be placed in the policy file in any order. The following is a suggested order:
  1. globals stanza
  2. tunables stanza
  3. group stanza for first group
  4. partition stanzas for partitions in first group
  5. repeat group/partition stanza for subsequent groups

The available types of stanzas and their attributes are described as follows:

globals stanza:

This stanza specifies global environment attributes for the Partition Load Manager server. Only one globals stanza can be specified in a Partition Load Manager policy.

The following attributes are required in the globals stanza:

Attribute	Description
hmc_host_name	Host name of the Hardware Management Console (HMC) managing the server containing the managed partitions.  <b>Note:</b> This is the host name that was used for the HMC when exchanging ssh keys.
hmc_cec_name	The HMC managed system name for the server containing the managed partitions.
hmc_user_name	The user name that the Partition Load Manager uses to send OpenSSH commands to the HMC

The following attribute is optional in the globals stanza:

Attribute	Minimum value	Maximum value	Default value	Description
hmc_command_wait	1 minute	60 minutes	5 minutes	The number of minutes that the Partition Load Manager waits before timing out an HMC command. This is the DR Phase Timeout, one of three phases.

tunables stanza:

This optional stanza is used to specify tunable attributes for the managed partitions. There are no required attributes in the tunables stanza. The Partition Load Manager has selected default values for these attributes that should be appropriate for most installations. However, installations with special requirements may customize their installation by specifying the attributes in this stanza. The attributes in the tunables stanza may also be specified in the group and partition stanzas. A tunable attribute for

a partition is obtained in the following order:

1. From the partition stanza.
2. From the group stanza containing the partition if tunable attribute is not specified in the partition stanza.
3. From the tunables stanza if tunable attribute is not specified in the partition or group stanzas.
4. Default value is used if tunable attribute is not specified in the partition, group, or tunables stanzas.

Specify any of the following processor-related attributes:

Attribute	Minimum value	Maximum value	Default value	Description
cpu_intervals	1	100	6	The number of 10 second sample periods that a CPU related sample must cross a threshold before the Partition Load Manager will activate. Setting this value higher causes the Partition Load Manager to react more slowly to system changes. Setting it lower causes the Partition Load Manager to activate more quickly.
cpu_load_low	0.10	1.00	0.5	The CPU load average low threshold value. A partition with a load average below this value is considered to have unneeded CPU capacity.  <b>Note:</b> The minimum delta between cpu_load_low and cpu_load_high is 0.10.
cpu_load_high	0.2	10.0	1.0	The CPU load average high threshold value. A partition with a load average above this value is considered to need more CPU capacity.  <b>Note:</b> The minimum delta between cpu_load_low and cpu_load_high is 0.10.
cpu_free_unused			No	Indicates whether CPU capacity not needed by a partition is removed from the partition. A value of "no" indicates unneeded CPU capacity remains in the partition until another partition has a need for it. A value of "yes" indicates unneeded CPU capacity is removed from the partition when the partition no longer has a need for it.

Specify any of the following shared processor-related attributes:

Attribute	Minimum value	Maximum value	Default value	Description
ec_delta	1	100	10	The amount of CPU entitled capacity to add or remove from a shared processor partition. The value specifies the percentage of the partition's current entitled capacity to add or remove.
ec_per_vp_min	0.1	0.9	0.5	The minimum amount of entitled capacity per virtual processor. This attribute prevents a partition from having degraded performance by having too many virtual processors relative to its entitled capacity. When entitled capacity is removed from a partition, virtual processors will also be removed if the amount of entitled capacity for each virtual processor falls below this number.  <b>Note:</b> The minimum delta between ec_per_vp_min and ec_per_vp_max is 0.10.
ec_per_vp_max	0.2	1.0	0.8	The maximum amount of entitled capacity per virtual processor. This attribute controls the amount of available capacity that may be used by an uncapped shared CPU partition. When entitled capacity is added to a partition, virtual processors will be added if the amount of the entitled capacity for each virtual processor exceeds this number. Increasing the number of virtual processors in an uncapped partition allows the partition to use more of the available CPU capacity.  <b>Note:</b> The minimum delta between ec_per_vp_min and ec_per_vp_max is 0.10.

Specify any of the following memory-related attributes:

Attribute	Minimum value	Maximum value	Default value	Description
mem_intervals	1	100	6	The number of 10 second sample periods that a memory related sample must cross a threshold before the Partition

				Load Manager will activate. Setting this value higher causes the Partition Load Manager to react more slowly to system changes. Setting it lower causes the Partition Load Manager to activate more quickly.
mem_util_low	1	90	50	The memory utilization low threshold value. A partition with a memory utilization below this value is considered to have unneeded memory. Units are in percent.  <b>Note:</b> The minimum delta between mem_util_low and mem_util_high is 10.
mem_util_high	1	100	90	The memory utilization high threshold value. A partition with a memory utilization above this value is considered to need more memory. Units are in percent.  <b>Note:</b> The minimum delta between mem_util_low and mem_util_high is 10.
mem_pgstl_high	0	2147483647	0	The page steal threshold. A partition with a page steal rate, which is the number of page steals per second, greater than or equal to this value is considered to need more memory. Units are in integer value. The result of checking this threshold is logically ANDed with the result of the mem_util_high threshold check when determining if memory is needed.
mem_free_unused			No	Indicates when memory not needed by a partition is removed from the partition. A value of "no" indicates unneeded memory remains in the partition until another partition has a need for it. A Yes value indicates unneeded memory is removed from a partition when the partition no longer has a need for it.
mem_delta	1	256	Specifies one LMB to be removed	The amount of memory to be removed or added to a partition. The units are in megabytes. If the value is less

			or added to a partition at a time	than the system's logical memory block (LMB) size, the value is rounded up to the system's LMB size. If the value is greater than the system's LMB size but not a multiple of LMB size, the value is rounded down to the nearest LMB multiple size.
--	--	--	-----------------------------------	---

group\_name stanza:

This stanza specifies the name and global attributes for a group, and any or all of the tunables stanzas. The name on a group stanza specifies the name of the group. The group stanza allows you to create multiple groups of partitions that are managed independently. At least one group must be defined.

The following attributes are required in the group stanza:

- ◇ type = group
- ◇ cpu\_maximum
- ◇ mem\_maximum

The `cpu_maximum` attribute specifies if processor management is desired for the partitions in the group and if desired the amount of processor capacity to be allocated to the partitions. If processor management is specified, processor management is done for all partitions in the group. Specifying a `cpu_maximum` value of 0 specifies processor management is not done for the partitions in the group.

All partitions in a group must have the same processor type. The `cpu_type` attribute specifies the processor type for all the partitions in the group and is written as follows:

```
cpu_type = dedicated | shared
```

The `mem_maximum` attribute specifies memory management is desired for the partitions in the group and if desired the amount of memory to be allocated to the partitions. If memory management is specified, memory management is done for all partitions in the group. Specifying a `mem_maximum` value of 0 specifies memory management is not done for the partitions in the group.

You can specify `cpu_maximum` and `mem_maximum` values greater than the amount of physical resources in the server. In this situation, all available resources will be used to satisfy resource requests for the managed partitions.

The following attributes are required in this stanza:

Attribute	Description
type=group	An attribute identifying this as a group stanza. The attribute must be specified as <code>type = group</code> .
cpu_maximum	The maximum amount of CPU capacity to be allocated to partitions in the group. The units are in physical CPU units. A value of 0 indicates CPUs are not managed for the partitions in the group.
mem_maximum	The maximum amount of memory to be allocated to partitions in the group. The units are in megabytes (MB). A value of 0 indicates memory is not be managed for the partitions in the group.
cpu_type	The processor type of the partitions in the group. All partitions in the group must be the same type. The attribute value must either be "dedicated" or "shared".

partition\_name stanza:

This stanza specifies the name and attributes for a partition. A partition stanza is required for every managed partition.

The name of the partition stanza is the host name of the managed partition.

The following attributes are required in a partition stanza:

- ◇ type = partition
- ◇ group = group\_name

The following attributes are optional in the partition stanza:

- ◇ cpu\_minimum
- ◇ cpu\_guaranteed
- ◇ cpu\_maximum
- ◇ cpu\_shares
- ◇ mem\_minimum
- ◇ mem\_guaranteed
- ◇ mem\_maximum
- ◇ mem\_shares

If not specified, the `cpu_minimum`, `cpu_guaranteed`, and `cpu_maximum` attribute values are obtained from the CPU minimum, desired, and maximum HMC partition definition values respectively. Similarly, the `mem_minimum`, `mem_guaranteed`, and `mem_maximum` attribute values are obtained from the minimum, desired, and maximum HMC partition memory definition values. The shares values default to 1.

If minimum, guaranteed, and maximum values are specified in the policy, the values must satisfy the following relationship:

`minimum <= guaranteed <= maximum`

If management of CPU or memory resource is not wanted in a specific partition in a group, the values for the resource can all be specified as the same value. If management of CPU or memory resource is not wanted for all partitions in a group, the `cpu_maximum` or `mem_maximum` attributes in the group definition can be set to 0.

Any CPU or memory values specified in the policy must be compatible with the partition's HMC partition definition. You cannot use the Partition Load Manager to decrease a partition's minimum below the HMC minimum. Nor can you use the Partition Load Manager to increase a partition's maximum over the HMC maximum. System administrators are responsible for ensuring that the Partition Load Manager policies and HMC partition definitions are compatible.

The `cpu_shares` and `mem_shares` attributes are optional in the partition stanza, with default values set to 1.

The default value for `cpu_shares` is to have equal shares for all partitions in the group. The default `cpu_shares` value for shared, uncapped processor partitions is not obtained from the variable weight attribute of the partition's HMC definition. If the `cpu_shares` attribute is not specified, the Partition Load Manager does not set the variable weight HMC attribute for the partition. (The variable weight value set by the HMC continues to be used.) If the `cpu_shares` attribute is specified and the partition is shared or uncapped, the Partition Load Manager sets the partition's variable weight HMC attribute to the `cpu_shares` value.

The following tunable attributes are used in the partition stanza:

Attribute	Minimum value	Maximum value	Default value	Description
type				A required attribute identifying this as a partition stanza. The attribute must be specified as <code>type = partition</code> .
group				A required attribute specifying the group containing this partition.
cpu_minimum				The minimum amount of CPU capacity to be allocated to a partition. The units are in physical CPU units.
cpu_guaranteed				The guaranteed amount of CPU capacity to be allocated to a partition. The units are in

				physical CPU units.
cpu_maximum				The maximum amount of CPU capacity to be allocated to partition. The units are in physical CPU units.
cpu_shares	0	255	1	<p>A factor without units that is used to specify how available CPU capacity in excess of the cpu_guaranteed is distributed to partitions in the group. The available excess CPU capacity is allocated to partitions using the following formula:</p> $\frac{\text{cpu\_shares}}{\text{(sum of cpu\_shares from active partitions in the group)}}$ <p><b>Note:</b> Specifying a minimum value of 0 limits a partition to receiving only its cpu_guaranteed amount of CPU capacity.</p>
mem_minimum				The minimum amount of memory to be allocated to the partition. The units are in megabytes (MB).
mem_guaranteed				The guaranteed amount of memory to be allocated to the partition. The units are in megabytes (MB).
mem_maximum				The maximum amount of memory to be allocated to the partition. The units are in megabytes (MB).
mem_shares	0	255	1	<p>A factor with no units that is used to specify how available memory in excess of the mem_guaranteed is distributed to the partitions in the group. The available excess memory is allocated to partitions using the following formula:</p> $\frac{\text{mem\_shares}}{\text{(sum of mem\_shares from competing partitions)}}$ <p><b>Note:</b> Specifying a minimum value of 0 limits a partition to receiving only its mem_guaranteed amount of memory.</p>

## Example of policy file creation and configuration

Using the Web-based System Manager, create a policy file by using the following steps as an example.

**Note:** If you are using a remote X server, set the *DISPLAY* variable, and use the **wsm &** command to start the Web-based System Manager client.

1. Create a policy file.
2. Add the policy file name: /etc/plm/policies/plm1
3. Add the following global values for the following fields:
  - ◆ Hardware Management Console (HMC) name: p5hmc1
  - ◆ HMC user name: hscroot
  - ◆ Central Electronic Complex name: server-9117-570-SNxxxxxxx
4. Obtain the names of the LPARs and settings from the HMC by running the following commands:
  - ◆ `ssh hscroot@p5hmc1 lssyscfg -r lpar -m server-9117-570-SNxxxxxxx`  
(LPAR names and default profile names)
  - ◆ `ssh hscroot@p5hmc1 lshwres -r proc -m server-9117-570-SNxxxxxxx`  
--level lpar (**settings**)
  - ◆ `ssh hscroot@p5hmc1 lshwres -r proc -m server-9117-570-SNxxxxxxx`  
--level sys (**system resources**)

The output includes the following information:

  - ◆ name=lpar1, default\_profile=default
  - ◆ curr\_min\_proc\_units=0.5, curr\_proc\_units=0.75, curr\_max\_proc\_units=1.25
  - ◆ name=lpar2, default\_profile=default
  - ◆ curr\_min\_proc\_units=0.5, curr\_proc\_units=0.75, curr\_max\_proc\_units=1.25
5. Add the following group information to the policy file:
  - ◆ Group name: plm1
  - ◆ Maximum CPU: 1.75
  - ◆ Maximum Memory: N/A
  - ◆ CPU type: shared
  - ◆ Select CPU management
  - ◆ Deselect Memory management
6. Add the following information for partitions for CPU resource management:
  - ◆ Partition name: **lpar1.domain.com** (this is the fully qualified host name for lpar1)
  - ◆ Group name: plm1
  - ◆ Resource Entitlements:
    - ◇ Minimum CPU: 0.5
    - ◇ Guaranteed CPU: 0.75
    - ◇ Maximum CPU: 1.25
    - ◇ CPU variable shares: 1 (default)
  - ◆ Partition name: **lpar2.domain.com**
  - ◆ Group name: plm1
  - ◆ Resource Entitlements:
    - ◇ Minimum CPU: 0.5
    - ◇ Guaranteed CPU: 0.75
    - ◇ Maximum CPU: 1.25
    - ◇ CPU variable shares: 1 (default)
  - ◆ Tunables:
    - ◇ CPU load average high threshold: 0.8
    - ◇ CPU load average low threshold: 0.2

**Parent topic:** [Configuring resource management for AIX partitions with the Partition Load Manager](#)

## Querying partition status

This topic helps you understand how to use Partition Load Manager to query partition status.

Any user can run the `xlplm` command to obtain status information for running instances of Partition Load Manager.

### Query the status of Partition Load Manager

To query the status of all running instances of Partition Load Manager, type the following command:

```
xlplm -Q
```

A list of the instances that are running is displayed. If there are no instances running, no output is displayed.

### Query the attributes of an instance

To query the attributes of a single instance, type the following command, where `test1` is the name of the instance:

```
xlplm -Q test1
```

Output from this command will be similar to the following:

```
PLM Instance: test1

GROUP: group1
      CUR      MAX      AVAIL      RESVD      MNGD
CPU:   6.00     4.00     0.00     0.00       Yes
MEM:   8192     8192      0        0          Yes

thimblelp10.server.company.com

RESOURCES:
      CUR      MIN      GUAR      MAX      SHR
CPU:   3.00     1.00     3.00     3.00      1
MEM:   4096     1024     4096     4096      1

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RESOURCES:
      CUR      MIN      GUAR      MAX      SHR
CPU:   3.00     1.00     3.00     3.00      1
MEM:   4096     1024     4096     4096      1
```

### View additional information from a query

To view additional information from the query of a specific instance, type the following command, where `test1` is the name of the instance:

```
xlplm -v -Q test1
```

The verbose output from this command will be similar to the following:

```
PLM Instance: test1

      CEC Name      Thimble
      Mode          monitor
      Policy        /etc/plm/policies/policy1
      Log           /tmp/log.test
      HMC Host      kbuphsc2.server.company.com
      HMC User      hscroot

GROUP: group1
      CUR      MAX      AVAIL      RESVD      MNGD
CPU:   6.00     4.00     0.00     0.00       Yes
MEM:   8192     8192      0        0          Yes

CPU TYPE: dedicated

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      RESOURCES:
      CUR      MIN      GUAR      MAX      SHR
CPU:   3.00     1.00     3.00     3.00      1
MEM:   4096     1024     4096     4096      1

      TUNABLES:
      INTVL      FRUNSD      LOADLO      LOADHI      DELTA      PGSTL
```

## Partitioning for AIX with an HMC

```
CPU:      6      0      0.40      1.00      1.00      -
MEM:      6      0      50%      90%      256      0\
```

thimblelp11.server.company.com

### RESOURCES:

```
      CUR      MIN      GUAR      MAX      SHR
CPU:    3.00    1.00    3.00    3.00     1
MEM:   4096   1024   4096   4096     1
```

### TUNABLES:

```
      INTVL     FRUNSD     LOADLO     LOADHI     DELTA     PGSTL
CPU:    6         0         0.40       1.00       1.00      -
MEM:    6         0         50%        90%        256       0
```

\*\*\*\*\*

## Allocate resources to partitions

You can allocate resources to specific partitions and even reserve resources for specific partitions regardless of when those partitions will use the resources. You can reserve and allocate resources from a group of managed partitions using the `xplm -R` command. Those resources that are reserved can be used to create a new unmanaged partition, or to make room for a new partition to enter the managed group.

Reserved resources will not be allocated to any existing partition in a group unless they are first released. If a previously offline partition comes online and enters a managed group, any reserved resources within that group automatically are removed from the collection of reserved resources, called the *free pool*, and assigned to the new partition. If the reserved resources are used instead to create a new, unmanaged partition, they can be released to the group after the new partition has booted and can then be automatically reclaimed by the managed group if they later become available and are needed.

The requested reservation amount is absolute, so a reserve command can result in either a reserve or a release, depending on the current reservation amount. The minimum allowed changes in the reservation amounts are the following:

- 1 MB for memory
- 1 processor unit for a dedicated processor group
- 0.01 processor unit for a shared processor group

When you reserve resources, the free pool for the target group is first checked for available resources. If the free pool has enough resources to satisfy the request, the requested amount is removed from the free pool. If the free pool does not have enough resources to satisfy the request, resources will be taken from one or more partitions with the lowest workload, or least need for the resources. A reservation request will fail if the requested amount is more than the minimum allowed for the group.

## Manage memory resource requests

The following is an example of how to use Partition Load Manager to manage memory resource requests. This example shows how Partition Load Manager responds to memory resource requests between two partitions:

The two partitions, LP0 and LP1, are configured as follows:

```
LP0:      Minimum = 1024 MB
          Guaranteed = 1024 MB
          Maximum = 4096 MB
          Weight = 2
          Current Entitlement = 1024 MB

LP1:      Minimum = 1024 MB
          Guaranteed = 1024 MB
          Maximum = 4096 MB
          Current Entitlement = 1024 MB
          Weight = 1
```

The total amount of memory managed by Partition Load Manager is 5120 MB. With each partition's current memory allocation, shown as `Current Entitlement = 1024 MB`, Partition Load Manager assumes that the remaining 3072 MB is unallocated and available.

If both partitions become loaded in terms of memory use, then events demanding more memory resources are generated and sent to the Partition Load Manager server. For each event received, Partition Load

Manager identifies the partition as a *taker*. At the same time, Partition Load Manager checks whether the partition is currently using more than its guaranteed amount. If so, the partition is identified as an *excess user*. Because there are available resources, Partition Load Manager satisfies the request immediately and allocates memory in the amount of `mem_increment` (defined either in the Partition Load Manager policy or by the internal default value) to the partition from the available memory. After the available memory is depleted, the new entitlement allocations are as follows:

```
LP0:      Current Entitlement = 2560 MB
LP1:      Current Entitlement = 2560 MB
```

Even with the current allocations, the partitions continue to generate events demanding more memory resources.

For each event, Partition Load Manager continues to identify the partition as a taker and excess user because the partition has more resources allocated than is shown as its guaranteed entitlement. However, because there are no available resources, the request is queued if there are no other resource *donors* or any other excess users. When the request from the second partition is received, it is also marked as a taker and an excess user. Because there is an excess user already queued, Partition Load Manager can satisfy the resource request.

Because both LP0 and LP1 are takers and excess users, Partition Load Manager uses the weight associated with each as the determining factor of how the extra entitlement (the sum of the current entitlement for each partition minus the sum of each partition's guaranteed allotment) will be distributed between the two partitions.

In this example, of the extra 3072 MB, the LP0 partition is allocated 2048 MB and the LP1 partition is allocated 1024 MB. Partition Load Manager assigns the `mem_increment` MB of memory from the LP1 partition to the LP0 partition.

With constant memory requests from each partition, Partition Load Manager eventually distributes the memory so that current entitlements become the following:

```
LP0:      Current Entitlement = 3072 MB
LP1:      Current Entitlement = 2048 MB
```

### Manage processor resources in a shared partition environment

The following example describes how Partition Load Manager manages processor resources in a shared partition environment. The two partitions are configured as follows:

```
LP0:      Minimum = 0.1
          Guaranteed = 0.5
          Maximum = 2.0
          Max entitlement per virtual processor = 0.8
          Weight = 3
          Current entitlement = 0.1
          Current number of virtual processors = 1

LP1:      Minimum = 0.1
          Guaranteed = 0.5
          Maximum = 2.0
          Max entitlement per virtual processor = 0.8
          Weight = 1
          Current entitlement = 0.1
          Current number of virtual processors = 1
```

The total amount of processor entitlement managed by Partition Load Manager is 2.0. The amount that is currently allocated to each partition, 0.1, leaves 1.8 of unallocated processor entitlement that Partition Load Manager can distribute.

If both partitions begin running processor-intensive jobs, they request more processor entitlement by sending requests to the Partition Load Manager. Partition Load Manager then identifies the demanding partitions as takers and as excess users if the current entitlement is above its guaranteed value.

In addition to managing processor entitlement, Partition Load Manager also manages the number of virtual processors. When either partition's current entitlement exceeds 0.8, a virtual processor is also added.

In this example, Partition Load Manager assigns the available entitlement until the partitions reach the following state:

```
LP0:      Current entitlement = 1.0
```

```

Current number of virtual processors = 2
LP1:    Current entitlement = 1.0
        Current number of virtual processors = 2

```

If the partitions continue to demand more resource, then Partition Load Manager redistributes the assigned entitlement based on the weight and excess entitlement. Here, between the LP0 partition and the LP1 partition, the total excess amount is 1.5. Because LP0 has a weight of 3 and LP1 has a weight of 1, Partition Load Manager removes processor entitlement from the LP1 partition and reassigns it to the LP0 partition. If both partitions remain busy, then the resource allocation becomes the following:

```

LP0:    Current entitlement = 1.25
        Current number of VPs = 2
LP1:    Current entitlement = 0.75
        Current number of VPs = 2

```

**Parent topic:** [Configuring resource management for AIX partitions with the Partition Load Manager](#)

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## Configuring Resource Monitoring and Control (RMC)

This topic provides information about how to configure Resource Monitoring and Control and then how to verify that you installed it correctly.

The Partition Load Manager server uses Resource Monitoring and Control (RMC) to communicate with the managed LPARs.

The RMC setup comprises host authentication and user authorization. The host authentication involves a public key exchange between the Partition Load Manager server and the managed nodes (partitions). This allows the Partition Load Manager server to connect, or create a session, to the managed system. The user authorization involves adding an entry to the RMC ACL (Access Control) file and allows the plmuser (the Partition Load Manager server) access to the required resource class. The plmsetup script automates these tasks using remote shell commands. If the remote shell is unavailable or not configured, the administrator can perform these tasks manually.

Run the following shell script as the root user on the managing machine that will run the Partition Load Manager:

```
/etc/plm/setup/plmsetup
```

After the script runs successfully, the RMC ACL file on the remote machine will have an entry similar to the following:

```
vendor.LPAR          plmuser@plmserver1.domain.com      *          rw
```

The setup procedure takes the following as arguments:

- The user ID under which the Partition Load Manager is to run
- The host name of the partition

This user ID is used to set up the RMC ACL files on the logical partitions. ACL files are used to authenticate authorized users for each resource class when they connect to the RMC subsystem. Only this user will be permitted access to the Partition Load Manager. Only the authorized user can run Partition Load Manager. Any user is able to run commands that only display data.

Resource Monitoring and Control (RMC) configuration for the Partition Load Manager

Configure RMC for the Partition Load Manager by doing the following steps.

1. Select Set up Management of Logical Partitions.
  - ◆ Authenticated user name: plmuser
2. Select Automatically setup with each partition in the policy file.

- ◆ Policy file name: /etc/plm/policies/plm1
3. Click OK.

This configuration can also be done using the command line if you are the root user on the Partition Load Manager server:

```
/etc/plm/setup/plmsetup lpar_hostname plmuser
```

To run this command, you must have rsh and rcp access. After the setup has been run, you can delete the .rhosts file.

- **Verifying the Resource Monitoring and Control (RMC) setup**

This topic provides information about how to verify the Resource Monitoring and Control (RMC) setup.

**Parent topic:** [Configuring resource management for AIX partitions with the Partition Load Manager](#)

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## Verifying the Resource Monitoring and Control (RMC) setup

This topic provides information about how to verify the Resource Monitoring and Control (RMC) setup.

To verify the RMC setup, run the following as the Partition Load Manager user for each of the partitions that were used with the **plmsetup** script. Replace PART\_HOST with the name of the partitions in the following command:

```
CT_CONTACT=PART_HOST@STvendor.LPAR
```

The persistent attributes of the resource class should be displayed.

If the persistent attributes of the resource class are not displayed, then try the following steps:

- This step is for troubleshooting host or connection errors.
  1. Perform host-based authentication. On both the Partition Load Manager server machine and the partition, run the following command:
 

```
/usr/sbin/rsct/bin/ctsvhbal
```
  2. A list of identities are displayed. These are identities as which the known partition host can be identified. On each machine, run the following command:
 

```
/usr/sbin/rsct/bin/ctsth1 -l
```
  3. On the Partition Load Manager server machine, there is an entry for the partition. On the partition, there is an entry for the Partition Load Manager server machine. The HOST\_IDENTITY value should match one of the identities listed in the respective **ctsvhbal** command output. If an entry does not match, remove it by running the following command:
 

```
/usr/sbin/rsct/bin/ctsth1 -d -n HOST_IDENTITY
```
  4. After the entry is removed, add the new entry using the identity listed in the **ctsvhbal** command output by running the following command:
 

```
/usr/sbin/rsct/bin/ctsth1 -a -n IDENTITY -m METHOD \ -p ID_VALUE
```
  5. The value for the **METHOD** parameter can be obtained from the **ctsth1** command. Look for an entry for the machine itself. In that entry, use the value in the Identifier Generation Method field. One example is `rsa512`. For the **ID\_VALUE** parameter value, use the Identifier Value field in the same entry.
- This step is for troubleshooting user or authorization type errors.
  1. On partitions, check the ACL file. In the `/var/ct/cfg/ctrmc.acls` file, there is a stanza for `vendor.LPAR` towards the end of the file that looks similar to the following:
 

```
vendor.LPAR          plmuser@plmserver1.domain.com      *          rw
```
  2. The user should match the name of the user to run the Partition Load Manager. The host name should match what was returned by the **ctsvhbal** command which was run on the Partition Load Manager server machine. If it is not, run the **plmsetup** script again, this time

using the IDENTITY provided by the **ctsvhbal** command.

For additional information about cluster configuration and management, see the [Cluster library](#) Web site.

**Parent topic:** [Configuring Resource Monitoring and Control \(RMC\)](#)

---

## Starting and stopping the Partition Load Manager server

This topic provides information about how to start and stop the Partition Load Manager server and how to check the Partition Load Manager statistics.

### Starting the Partition Load Manager server

- Assume the following environment:
  - ◆ Configuration name: `default`
  - ◆ Policy file name: `/etc/plm/policies/plm1`
  - ◆ Log file name: `/var/opt/plm/plm.log`
  - ◆ Operation mode: `management` or `monitoring`
- Start the Partition Load Manager server by doing one of the following:
  - ◆ From the command line, type the following command for management operation mode:

```
xlplm -S -p /etc/plm/policies/plm1 -l /var/opt/plm/plm.log -o M
```

- ◆ From the command line, type the following command for monitoring operation mode:

```
xlplm -S -p /etc/plm/policies/plm1 -l /var/opt/plm/plm.log -o N
```

Check the log for errors by typing the following command:

```
tail -f /var/opt/plm/plm.log
```

### Checking the Partition Load Manager statistics

The **xlpstat** command is independent from the Partition Load Manager server and therefore can be run whether or not the Partition Load Manager server is running. The **xlpstat** command can be run any time after the RMC setup is complete.

Check the Partition Load Manager statistics by typing the following command, which checks the statistics every five seconds until you cancel the command:

```
xlpstat -p /etc/plm/policies/plm1 5
```

### Stopping the Partition Load Manager server

Stop the Partition Load Manager server by doing one of the following steps:

- Assume that the configuration name is `default`.
- From the command line, type the following:

```
xlplm -K default
```

**Parent topic:** [Configuring resource management for AIX partitions with the Partition Load Manager](#)

---

## Commands for the Partition Load Manager

This topic links to descriptions of the commands for the Partition Load Manager.

A description of each Partition Load Manager command is given in this topic. This information is also available from the command line using the **man** command.

- **xlplm command**  
This topic describes the **xlplm** command, which starts, stops, modifies, reserves, and queries a Partition Load Manager server.
- **xlpstat command**  
This topic describes the **xlpstat** command, which displays logical partition load statistics for a list of host names.

**Parent topic:** [Configuring resource management for AIX partitions with the Partition Load Manager](#)

---

## xlplm command

This topic describes the **xlplm** command, which starts, stops, modifies, reserves, and queries a Partition Load Manager server.

### Purpose

Start, stop, modify, reserve, and query a Partition Load Manager server.

This command is for use with the Partition Load Manager on AIX only.

### Syntax

**xlplm -S -p policy\_file -l log\_file -o operation\_mode configuration**

**xlplm -K configuration**

**xlplm -M -p policy\_file -l log\_file -o operation\_mode configuration**

**xlplm -R -g group\_name -c cpu\_resource\_size -m memory\_resource\_size configuration**

**xlplm -Q -r -f configuration**

**xlplm -C -p policy\_file**

### Description

The Partition Load Manager server **xlplmd** daemon performs the specified resource management operations.

### Flags

-c <code>cpu_resource_size</code>	Specifies the amount of processor resources to reserve.
-C	Verifies the validity of the policy file.
-f	By default, the query operation displays the active configuration values that might have been adjusted at run time due to conflicts with the partition profile. This option changes the output to display the values that were specified in the policy file.
-g <code>group_name</code>	Specifies the name of a group in the policy file. Use this flag when you are reserving or releasing resources. The resources that you want to reserve are removed from the specified group in the policy file. When you are releasing resources, they are placed in the free pool of the specified group in the policy file.
-K	Stop the Partition Load Manager instance. To use this flag, you must either have root authority or be logged in as the authorized <code>plmuser</code> user ID.
-l <b>log_file</b>	Specifies the name of the file you want to contain the Partition Load Manager activity log.
-M	Modify a Partition Load Manager server. To use this flag, you must either have root authority or be logged in as the authorized <code>plmuser</code> user ID.
-m <code>memory_resource_size</code>	Specifies the amount of memory resource to reserve.
-o <code>operation_mode</code>	Specifies whether the Partition Load Manager server is to operate in management mode, with a value of <b>M</b> , or monitoring mode, with a value of <b>N</b> . When the <b>xlplm</b> daemon starts, the default value is management mode, or <b>M</b> .
-p <code>policy_file</code>	Specifies the name of the Partition Load Manager policy file.
-Q	Query the Partition Load Manager server status.
-R	Reserve or release resources from a partition managed by a Partition Load Manager server. To use this flag, you must either have root authority or be logged in as the authorized <code>plmuser</code> user ID.
-r	Use the Partition Load Manager server in raw data mode.
-S	Start a Partition Load Manager instance. To use this flag, you must either have root authority or be logged in as the authorized <code>plmuser</code> user ID.

## Parameters

<b>configuration</b>	Identifies an instance of the Partition Load Manager management. This parameter must be specified if there are multiple instances of the Partition Load Manager server on your system. If the parameter is not specified, a default value is used.
----------------------	--

## Exit status

This command returns the following exit values:

0	Command completed successfully.
1	The program encountered a nonrecoverable internal error, such as a memory allocation or system call failure.
2	The specified log file could not be opened or created.
3	The specified policy file could not be opened or created.
4	A required temporary file could not be created in the <b>/tmp</b> directory.
5	The specified policy is invalid.
6	

The daemon failed to start. This could be the result of an internal error or an inability to communicate with the Hardware Management Console (HMC).

7

Command line usage error.

8

An invalid number was specified for the reservation amount.

9

The current user does not match the authorized user in the `/etc/plm/auth/plmuser` file, or the file could not be read.

10

An instance with the requested name already exists.

11

An instance with the requested name does not exist.

12

The requested mode is the same as the current mode.

13

A remote command to the HMC failed.

14

A reservation request failed due to one of the following reasons:

- ◇ unknown group
- ◇ reservation amount is already set to requested amount
- ◇ could not reserve the requested amount
- ◇ the requested resource is not managed

## Examples

1. Start the Partition Load Manager server in management mode with a configuration name of `cec1` by typing one of the following commands on the Partition Load Manager server system:

```
cd /etc/xlplm/cec1
xlplm -S -p policy -l log cec1
```

or

```
xlplm -S -p /etc/xlplm/cec1 -l /etc/xlplm/cec1/log -o M cec1
```

2. Start the Partition Load Manager server in monitoring mode by typing the following:

```
xlplm -S -p policy -l log -o N cec1
```

3. Stop the Partition Load Manager server by typing the following:

```
xlplm -K cec1
```

4. Load a new policy into the Partition Load Manager server by typing the following:

```
xlplm -M -p evening_policy cec1
```

5. Start using a new log file, called **newlog**, for the Partition Load Manager server by typing the following:

```
xlplm -M -l newlog cec1
```

6. Display configuration names for the active Partition Load Manager server by typing the following:

```
xlplm -Q
```

**Parent topic:** [Commands for the Partition Load Manager](#)

---

## xlpstat command

This topic describes the **xlpstat** command, which displays logical partition load statistics for a list of host names.

## Purpose

Displays logical partition load statistics for a list of host names.

This command is for use with the Partition Load Manager on AIX only.

## Syntax

```
xlprstat -r {-p policy_file | -f host_list} interval count
```

## Description

Display load statistics for one or more remote logical partitions. The command will contact the remote systems every number of seconds specified by the **interval** parameter for each number of intervals specified by the **count** parameter. If the **interval** parameter and the **count** parameter are omitted, the remote systems are queried once. If only the **count** parameter is omitted, the remote systems are queried every number of seconds specified by the **interval** parameter until the command is terminated by the user.

The caller of this command must be the root user or the Partition Load Manager authorized user.

For the formatted output, the output is displayed as follows, for each host listed in the input file:

STAT	TYP	CPU			MEM			HOST
		CUR	PCT	LOAD	CUR	PCT	PGSTL	
up	D	4.00	50.15	0.65	1024	43.10	0	testlp1
up	D	2.00	95.72	0.90	2048	97.48	250	testlp2
up	D	10.00	98.31	1.03	5120	72.25	0	testlp3

STAT Partition status. May be "up" or "down".  
 TYP Partition type. May be "D" (dedicated) "S" (shared) or "U" (unknown).  
 If the type is "U", the command was unable to query the partition type and there may be a connectivity or authentication problem.  
 CUR The current amount of resource allocated to the partition.  
 PCT Percent utilization for the resource  
 LOAD CPU load average  
 PGSTL Page steals per second  
 HOST Managed host name

The raw output is displayed as a header containing column descriptions followed by one line of data for each host:

```
#host_name:group_name:status:cpu_type:cpu_ent:cpu_util:cpu_load:mem_ent:mem_util:mem_pgstl
testlp1.mydomain.com:group1:up:dedicated:4.00:45.05:0.38:1024:75.00:0
testlp2.mydomain.com:group1:up:dedicated:2.00:87.23:0.92:2048:92.21:123
testlp3.mydomain.com:group1:up:dedicated:10.00:95.17:1.01:5120:70.30:0
```

## Flags

-r	Raw output mode. Data is printed in colon separated format, with one line per host.
-p policy_file	Retrieves the host list from the given policy file.
-f host_list	Retrieves the host list from the given plain text file. This file has one host name per line.

**Exit status**

This command returns the following exit values:

1	Internal error.
3	Could not open input file.
5	Invalid policy file.
7	Usage error.
9	Not authorized.

**Parent topic:** [Commands for the Partition Load Manager](#)

---

**Managing AIX logical partitions**

This topic provides information about managing your logical partitions. It helps you understand how you can change your logical partition configuration and change processing resources.

When you create one or more logical partitions on the server, you are creating logical partitions that are independent of each other. Each logical partition has its own independent configuration of processor, memory, input/output (I/O) devices, Licensed Internal Code, operating system (AIX), and optional software applications.

You can use the HMC to manage your logical partitions. Most tasks you perform are independent of the other logical partitions on the system. Consider each logical partition as an independent system.

- **[Managing partition profiles for logical partitions](#)**  
This topic provides an overview and procedures for functions that can help you manage your partition profiles. The partition profile functions are available through the Hardware Management Console (HMC).
- **[Managing system profiles for logical partitions](#)**  
This topic provides an overview and procedures for functions that can help you manage your system profiles.
- **[Dynamically managing AIX logical partition resources](#)**  
This topic helps you understand how you can dynamically add, remove, and move resources between partitions.
- **[Managing partitions remotely](#)**  
This topic tells you how to access your Hardware Management Console (HMC) remotely by installing the remote client on your personal computer (PC).
- **[Backing up and recovering AIX logical partitions](#)**  
This topic helps you understand how to back up and recover your AIX logical partition.
- **[Getting fixes for your servers](#)**  
This topic helps you understand the basic steps to installing a fix, also known as program temporary fix (PTF), on your servers and AIX logical partition.

**Parent topic:** [Partitioning for AIX with an HMC](#)

---

**Dynamically managing AIX logical partition resources**

This topic helps you understand how you can dynamically add, remove, and move resources between partitions.

You can add, remove, or move resources between partitions. When moving resources in AIX partitions, the Resource Monitoring and Control (RMC) infrastructure is used to provide a secure and reliable connection channel between the HMC and the partitions. This connection channel is automatically configured by the HMC, and each AIX partition when the AIX partition is started. The HMC uses the open network LAN connection for this connection channel.

To add, remove, or move specific logical partition resources, refer to the following information:

- [Dynamically managing physical I/O devices and slots](#)
- [Dynamically managing memory](#)
- [Dynamically managing processing power](#)
- [Scheduling the movement of resources to and from logical partitions](#)

**Parent topic:** [Managing AIX logical partitions](#)

---

## Backing up and recovering AIX logical partitions

This topic helps you understand how to back up and recover your AIX logical partition.

It is crucial that you back up your data because you never know when you might need to do a server recovery. You should save everything in your system as often as possible. You might not be prepared to recover from a site loss or certain types of disk failures if you do not regularly save everything.

This information explains how to back up and recover AIX system backups, the Hardware Management Console, and profile data.

- [Creating and installing system backups](#)
- [Backing up and restoring the Hardware Management Console](#)
- [Reinstalling the HMC machine code](#)
- [Backing up partition profile data](#)
- [Restoring profile data](#)

**Parent topic:** [Managing AIX logical partitions](#)

---

## Getting fixes for your servers

This topic helps you understand the basic steps to installing a fix, also known as program temporary fix (PTF), on your servers and AIX logical partition.

Servers are equipped with tools to help you determine when you need to perform service or call for help.

The following information helps you to understand the types of fixes available for your servers:

- [Getting fixes](#)

**Parent topic:** [Managing AIX logical partitions](#)

---

## Using AIX installed on a logical partition

This topic helps you find information about using AIX when it is installed on a logical partition. It also helps you understand how to shut down AIX, manage security, and manage performance.

- [Restarting and shutting down AIX in a logical partition](#)  
This topic helps you find information about how to restart and shut down AIX in a logical partition.

Parent topic: [Partitioning for AIX with an HMC](#)

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## Restarting and shutting down AIX in a logical partition

This topic helps you find information about how to restart and shut down AIX in a logical partition.

You can shut down and restart AIX using the Hardware Management Console (HMC). To find out how to shut down and restart AIX, refer to the following information:

- [Using the Hardware Management Console to shut down AIX logical partitions](#)  
This topic provides information about how to use the Hardware Management Console (HMC) to shut down AIX logical partitions.
- [Using the Hardware Management Console to restart AIX logical partitions](#)  
This topic provides information about how to use the Hardware Management Console (HMC) to restart AIX logical partitions.

Parent topic: [Using AIX installed on a logical partition](#)

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## Using the Hardware Management Console to shut down AIX logical partitions

This topic provides information about how to use the Hardware Management Console (HMC) to shut down AIX logical partitions.

You can shut down AIX logical partitions by performing either a delayed shutdown or an immediate shutdown of a logical partition or the operating system only.

### Delayed shutdown of a logical partition

When you use the delayed shutdown option, the logical partition waits a predetermined amount of time to shut down. This allows the logical partition time to end jobs and write data to disks. To perform a delayed shutdown of an AIX logical partition, complete the following:

1. In the navigation area, open Server and Partition.
2. Click Server Management.
3. In the contents area, open the server that has the logical partition.
4. Open Partitions.
5. Right-click the logical partition that you want to shut down and click Shut Down Partition.
6. Click Delayed and click OK.

### Immediate shutdown of a logical partition

When you use the immediate shutdown option, the system shuts down without any preset delay. To perform an immediate shutdown of an AIX logical partition, complete the following:

1. In the navigation area, open Server and Partition.
2. Click Server Management.
3. In the contents area, open the server that has the logical partition.
4. Open Partitions.
5. Right-click the logical partition that you want to shut down and Click Shut Down Partition.
6. Click Immediate and click OK.

### Delayed shutdown of the operating system

When you use the delayed shutdown option, the HMC issues the AIX **shutdown** command to shut down the logical partition normally. To perform a delayed shutdown of the operating system, complete the following:

1. In the navigation area, open Server and Partition.
2. Click Server Management.

3. In the contents area, open the server that has the logical partition.
4. Open Partitions.
5. Right-click the logical partition that you want to shut down and click Shut Down Operating System.
6. Click Delayed and click OK.

#### Immediate shutdown of the operating system

When you use the immediate shutdown option, the HMC issues the AIX **shutdown -F** command to shut down the logical partition as quickly as possible, bypassing messages to other users. To perform an immediate shutdown of the operating system, complete the following:

1. In the navigation area, open Server and Partition.
2. Click Server Management.
3. In the contents area, open the server that has the logical partition.
4. Open Partitions.
5. Right-click the logical partition that you want to shut down and click Shut Down Operating System.
6. Click Immediate and click OK.

**Parent topic:** [Restarting and shutting down AIX in a logical partition](#)

---

## Using the Hardware Management Console to restart AIX logical partitions

This topic provides information about how to use the Hardware Management Console (HMC) to restart AIX logical partitions.

You can use the HMC to restart an AIX logical partition. Restarting a logical partition shuts the partition down and then starts it again. You can restart a logical partition or the operating system only in the following ways.

#### Immediate restart of a logical partition

When you use the immediate restart option, the logical partition is restarted as quickly as possible, without notifying the logical partition. To perform an immediate restart of an AIX logical partition, complete the following:

1. In the navigation area, open Server and Partition.
2. Click Server Management.
3. In the contents area, open the server that has the logical partition.
4. Open Partitions.
5. Right-click the logical partition that you want to shut down and click Restart Partition.
6. Click Immediate and click OK.

#### Restart of a logical partition with main storage or system memory dump

When you use this option, the HMC initiates a main storage or system memory dump on the logical partition and restarts the logical partition after the dump. To restart an AIX logical partition with a main storage or system memory dump, complete the following:

1. In the navigation area, open Server and Partition.
2. Click Server Management.
3. In the contents area, open the server that has the logical partition.
4. Open Partitions.
5. Right-click the logical partition that you want to shut down and click Restart Partition.
6. Click Dump and click OK.

#### Normal restart of the operating system

When you use the normal restart option, the HMC issues the AIX **shutdown -r** command to shut down and restart the logical partition normally. To perform a normal restart of the operating system, complete the following:

1. In the navigation area, open Server and Partition.
2. Click Server Management.
3. In the contents area, open the server that has the logical partition.
4. Open Partitions.
5. Right-click the logical partition that you want to shut down and click Restart Operating System.
6. Click OK.

Immediate restart of the operating system

When you use the immediate restart option, the HMC issues the AIX **shutdown -F -r** command to shut down and restart the logical partition as quickly as possible, bypassing messages to other users. To perform an immediate restart of the operating system, complete the following:

1. In the navigation area, open Server and Partition.
2. Click Server Management.
3. In the contents area, open the server that has the logical partition.
4. Open Partitions.
5. Right-click the logical partition that you want to shut down and click Restart Operating System.
6. Click Immediate and click OK.

**Parent topic:** [Restarting and shutting down AIX in a logical partition](#)

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## Troubleshooting AIX logical partitions

This topic helps you understand how to resolve logical partition errors efficiently.

If you have problems with a partitioned system, determine if the problem is specific to logical partitions or a system problem. Refer to [Troubleshooting](#) to determine whether or not your problem is a general system problem. If your problem is specific to logical partitions, understand how you use the reference codes to resolve the error. However, specific recovery actions and tasks might require the assistance of the next level of support.

- [Reference codes for logical partitions](#)

This topic provides information about logical partition reference codes, which are diagnostic aids that help you determine the source of a hardware or operating system problem. Using reference codes enables you to find the correct solution to fix the problem. To use reference codes effectively, you must use them in conjunction with other service and support procedures.

**Parent topic:** [Partitioning for AIX with an HMC](#)

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## Related information for AIX logical partitions

This topic provides links to information related to AIX logical partitions.

Listed below are information center topics that relate to the Partitioning for AIX with an HMC topic. You can view or print any of the PDF files.

Other information

- [Logical partition functional differences between new hardware and previous hardware models](#)
- [Upgrades](#)
- [Partitioning for Linux with an HMC](#)
- [Managing your server](#)
- [Working with Power On Demand \(POD\)](#)
- [Overview of service and support](#)

**Parent topic:** [Partitioning for AIX with an HMC](#)

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