



IBM Systems

IBM PowerExecutive
Installation and User's Guide

Version 1.10





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Note

Before using this information and the product it supports, read the information in "Notices" on page 33.

Second Edition (July 2006)

This edition applies to version 1.10 of IBM PowerExecutive and to all subsequent releases and modifications until otherwise indicated in new editions.

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Contents

Tables	v	Monitoring power-consumption data	15
About this user's guide	vii	Displaying details and summary information about a group of BladeCenter chassis or rack-mounted servers	15
Who should read this user's guide	vii	Displaying details and summary information about an individual BladeCenter chassis	16
Conventions and terminology	vii	Displaying details and summary information about individual power domains	17
Related information	vii	Displaying details about individual power objects	19
How to send your comments	viii	Displaying details about power-managed rack-mounted servers	21
Accessibility	viii	Displaying details about unmanaged rack-mounted servers	21
Chapter 1. Getting started	1	Setting the derating power factor	22
Introducing PowerExecutive	1	Collecting power consumption data	22
PowerExecutive task overview	1	Suspending data collection	22
PowerExecutive terminology	2	Resuming data collection	23
PowerExecutive components	2	Managing trend data	23
PowerExecutive Server	3	Managing collection of trend data	23
PowerExecutive Console	3	Creating a custom time interval for the trend pane.	24
PowerExecutive database	3	Exporting data from PowerExecutive	24
PowerExecutive task.	4	Exporting summary data	24
Starting PowerExecutive for all chassis objects	5	Exporting the power meter data	25
Starting PowerExecutive for some chassis objects	5	Exporting a trend graph	25
PowerExecutive Console window	5	Exporting a trend table	25
Navigation pane	6	Understanding events that affect PowerExecutive.	25
Detail pane	6	External events	26
Trend pane	7	Internal events	27
Customizing the PowerExecutive Console	8	Chapter 4. Troubleshooting	29
Refreshing the PowerExecutive Console	9	Contacting customer support	29
Invoking PowerExecutive functions.	9	Before you call	29
Chapter 2. Installing PowerExecutive	11	Using the documentation.	29
Requirements.	11	Getting help and information from the World Wide Web	30
Hardware requirements	11	Software service and support	30
Supported operating systems	11	Appendix. Notices	31
Preparing to install PowerExecutive	12	Trademarks	33
Checking all prerequisites	12	Glossary	35
Downloading PowerExecutive	12	Terms	35
Installing PowerExecutive on systems running Windows	12	Index	39
Installing PowerExecutive on systems running Linux	13		
Uninstalling PowerExecutive on systems running Windows	14		
Uninstalling PowerExecutive on systems running Linux	14		

Tables

1. Colors and meanings that are used in trend graph 8
2. Toolbar icons and their actions 10
3. PowerExecutive files that can be downloaded 12
4. Detail information about a group of BladeCenter chassis or rack-mounted servers . 16
5. Detail and summary information about an individual BladeCenter chassis 17
6. Detail information about power objects in a power domain 18
7. Detail information about an individual power object 19
8. Detailed information about a power-managed rack-mounted server 21
9. Detailed information about an unmanaged rack-mounted server 21
10. Event severities and their meanings 26
11. Events that affect the information in PowerExecutive 26

About this user's guide

This user's guide provides instructions for using IBM® PowerExecutive™ software to manage the power and thermal needs of BladeCenter® systems and rack-mounted servers in the data center. PowerExecutive is part of a larger power-management implementation that includes hardware and firmware components. PowerExecutive 1.10 is an extension to IBM Director 5.10 software.

Who should read this user's guide

This user's guide is for system administrators and operators using PowerExecutive from IBM Director Console to manage the power and thermal needs of systems and servers in the data center.

Conventions and terminology

These notices are designed to highlight key information:

Note: These notices provide important tips, guidance or advice.

Important: These notices provide information or advice that might help you avoid inconvenient or difficult situations.

Attention: These notices indicate possible damage to programs, devices or data. An attention notice appears before the instruction or situation in which damage can occur.

Related information

This topic provides links to additional information related to PowerExecutive.

PowerExecutive resources on the World Wide Web

The following Web pages provide resources for understanding, using and troubleshooting PowerExecutive and other systems-management tools.

PowerExecutive Web site

http://www.ibm.com/servers/eserver/xseries/systems_management/ibm_director/extensions/powerexec.html

Obtain an overview of PowerExecutive and links to download the product, release notes and user's guide.

IBM personal computing support page

www.ibm.com/pc/support/

Locate support for IBM hardware and systems-management software.

IBM Systems Management Software: Download/Electronic Support page

www.ibm.com/servers/eserver/xseries/systems_management/ibm_director/

Download IBM systems-management software, including PowerExecutive. Check this Web page regularly for new PowerExecutive releases and updates.

IBM System x[®] Systems Management page

www.ibm.com/systems/x/

Obtain an overview of IBM systems management.

IBM ServerProven[®] page

www.ibm.com/pc/us/compat/index.html

Obtain information about IBM System x, IBM eServer and IBM BladeCenter.

How to send your comments

Your feedback is important in helping to provide the most accurate and highest quality information. If you have any comments about this book or any other IBM publication, use the form for reader's comments that is provided at the back of this publication. If the form has been removed, address your comments to:

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Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use information technology products successfully.

Features

PowerExecutive meets the accessibility standards for Section 508 of the US Rehabilitation Act.

These are the major accessibility features in PowerExecutive:

- You can use screen-reader software and a digital speech synthesizer to hear what is displayed on the screen.
- You can operate all features using the keyboard instead of the mouse.
- You can choose from a variety of high-contrast color schemes and large font sizes in the IBM Director Console.

PowerExecutive supports all accessibility features provided by IBM Director.

Keyboard navigation

This product uses standard Microsoft[®] Windows[®] and Java[™] navigation keys.

Chapter 1. Getting started

Use this topic to gain general and conceptual information about PowerExecutive.

Introducing PowerExecutive

Use this topic as an overview of PowerExecutive.

PowerExecutive is an IBM Director extension that provides the PowerExecutive task in an IBM Director environment. The PowerExecutive task displays the PowerExecutive Console in IBM Director Console. PowerExecutive enables you to monitor and collect power-consumption data from BladeCenter chassis and rack-mounted servers, manage trend data, and export data.

Additionally, the information in PowerExecutive is affected by certain events. For more information, see “Understanding events that affect PowerExecutive” on page 25.

PowerExecutive task overview

Use PowerExecutive to monitor and collect power consumption data from supported BladeCenter chassis and rack-mounted servers, manage trend data and export data from PowerExecutive.

See the following table for information availability.

Icon	
Supported IBM Director objects	Level-0 managed systems
Supported operating systems	<ul style="list-style-type: none">• Linux[®]• Windows For detailed operating-system support information, see the PowerExecutive documentation.
Availability	Extension to the IBM Director product. You can download the extension from the IBM Support Web site at www.ibm.com/servers/eserver/xseries/systems_management/ibm_director .
Required hardware or hardware limitations	For installation, none. For monitoring, this task only supports specific BladeCenter chassis and specific rack-mounted server systems. For details, see the PowerExecutive documentation.
Required software	BladeCenter Management extension to IBM Director 5.10 must be installed.
Required protocols	None
Required device drivers	None
Mass configuration support	No
Scheduler support	No
Files associated with this task	None

Events associated with this task	None, but the information displayed by PowerExecutive is affected by certain events. For more information, see the PowerExecutive documentation.
----------------------------------	--

PowerExecutive terminology

PowerExecutive uses terminology that is specific to power management in IBM Director Console.

The hardware in a PowerExecutive environment is referred to in the following ways:

- A *management server* is a server on which both IBM Director Server and PowerExecutive Server are installed.
- A *rack-mounted server* is a stand alone system with a Baseboard Management Controller (BMC)
- A *management console* is a system on which both IBM Director Console and PowerExecutive Console are installed.
- A *managed system* is a BladeCenter server that is a level-0 system (agentless) in an IBM Director environment.
- A *module* is a BladeCenter component that is inserted in a bay in a BladeCenter chassis.
- A *management module (MM)* is the BladeCenter component that handles system-management functions. It configures the BladeCenter chassis and switch modules, communicates with the blade servers and all I/O modules, multiplexes the keyboard/video/mouse (KVM), and monitors critical information about the chassis and blade servers.

The software and its components in a PowerExecutive environment are referred to in the following ways:

- A *chassis object* is an IBM Director managed object that represents a BladeCenter chassis whose power information can be displayed in Power Executive.
- A *power object* is an IBM Director managed object that represents a module in a BladeCenter chassis. Power objects can include the following BladeCenter components:
 - Power modules
 - Processor blades
 - I/O modules
 - Management modules
 - Blower modules
 - Media trays
 - Midplanes

PowerExecutive components

This topic provides information about the PowerExecutive components.

PowerExecutive comprises the following three components:

- PowerExecutive Server
- PowerExecutive Console
- PowerExecutive database

PowerExecutive Server

PowerExecutive Server maintains the PowerExecutive environment and manages all PowerExecutive operations.

PowerExecutive Server communicates out-of-band with each managed system and each PowerExecutive Console to display status and perform operations. It communicates with IBM Director Server to provide event filtering and event actions that support IBM Director event action plans. PowerExecutive Server must be installed on the management server. When you install PowerExecutive Server, PowerExecutive Console is installed automatically.

In normal cases, PowerExecutive Server communicates indirectly with management modules by querying IBM Director Server for information that IBM Director has already collected from the management modules. When IBM Director does not have the requested information, PowerExecutive Server can communicate directly with management modules through an internal communication path.

Power data is collected only while the PowerExecutive Server is running. When you install PowerExecutive, the server starts running. It runs whenever the IBM Director Service is running. It collects data on BladeCenter chassis and rack-mounted servers every minute, or as configured on the Manage Trend Data window.

PowerExecutive Console

PowerExecutive Console provides the graphical user interface (GUI) to PowerExecutive in IBM Director Console.

PowerExecutive Console displays rack-mounted servers at the same level in the navigation tree as the BladeCenter chassis, but rack-mounted servers will be a leaf node. The Object Info panel for a rack-mounted server has the same basic layout as the corresponding panel for the BladeCenter chassis.

Install PowerExecutive Console on all management consoles from which a system administrator remotely accesses the management server and performs PowerExecutive tasks.

PowerExecutive database

The PowerExecutive database stores information collected by PowerExecutive Server.

PowerExecutive creates or updates its database when it obtains information that IBM Director cannot provide. The PowerExecutive database can contain information about BladeCenter chassis objects, power objects and historical data such as temperature and power data over time.

The PowerExecutive database is created in the PowerExecutive subdirectory of the IBM Director installation directory.

When you uninstall IBM Director Server, it does not remove the PowerExecutive database unless you request that customizations be deleted during the uninstallation of IBM Director Server.

The size of the PowerExecutive database directly correlates to the short-term data-collection interval, the long-term data-collection interval, and the number of

days that short-term and long-term trend data is kept. All of these values are configurable. You can control them and the size of the PowerExecutive database by using the Manage Trend Data window. For information about doing so, see “Managing collection of trend data” on page 23.

Further, the PowerExecutive database can grow very large when you are retaining data about blade servers that have enabled the power meter.

As an example, you could have one BladeCenter chassis fully populated with 14 blade servers, each that have the power meter enabled. Assuming that the short-term data collection cycle is the default value of 1 minute and the long-term polling cycle is the default value of 10 minutes, then a day’s worth of short-term data consumes approximately 1-1/4 MB of database storage. In this scenario, one day’s worth of long-term data collection consumes approximately 126 KB of database storage.

When the PowerExecutive database cannot expand, it deletes the oldest historical data from the database to free up room for the new data that it is collecting.

PowerExecutive task

The PowerExecutive task runs the PowerExecutive GUI from an IBM Director Console. You can use the PowerExecutive task to view and monitor power consumption on various rack-mounted servers, BladeCenter chassis and power objects in the IBM Director environment.

When you add PowerExecutive Console to your IBM Director environment, the PowerExecutive task is added to IBM Director Console.

You can start the PowerExecutive task by dragging and dropping the task icon onto the following targets:

- If the target is a blade, the display will consist of chassis containing the blade with the targeted blade preselected.
- If the target is a BladeCenter chassis, the display will consist of the chassis with the chassis itself preselected.
- If the target is a rack-mounted server, the display will consist of the server with the server itself preselected.
- If the target is a group of rack-mounted servers or BladeCenter chassis, or both, the display will consist of all chassis or rack-mounted servers in the group with the first chassis or server in the group preselected.

If there is no target (you start the PowerExecutive task by double clicking rather than dragging and dropping it onto a target), then the display will consist of all BladeCenter chassis and rack-mounted servers known to Director.

You can perform the following tasks for rack-mounted servers, BladeCenter chassis and components:

- Monitor power consumption data
- Collect power consumption data
- Manage trend data
- Export data

More information about these tasks is provided in Chapter 3, “Using PowerExecutive,” on page 15.

Starting PowerExecutive for all chassis objects

When you start PowerExecutive for all chassis objects in the IBM Director group called All Systems, the PowerExecutive window opens and displays a tree of all chassis objects on IBM Director Server.

When there are numerous chassis objects on the management server, this method can take several minutes for PowerExecutive to start. However, the advantage of starting PowerExecutive in this manner you can manage all chassis objects from one window.

Starting PowerExecutive for some chassis objects

When you start PowerExecutive for only a chassis object or a group of chassis, the PowerExecutive window opens and displays a tree of only the selected objects.

The left pane in PowerExecutive contains only the selected chassis objects, only those chassis that contain the blade servers that have also been selected, and only the chassis objects in a selected group. When you select a blade server, PowerExecutive determines the containing chassis object and displays the entire tree structure for that chassis object, not just the one that you selected.

The advantage of starting PowerExecutive in this manner is that it must obtain information about only a subset of chassis objects instead of obtaining information about all chassis objects on IBM Director Server. PowerExecutive starts quickly when you use this method. The disadvantage is that you can manage only those chassis objects that were selected when you started PowerExecutive. If you need to manage power objects in other chassis objects or at a later time, you must start another PowerExecutive task for those additional chassis objects.

PowerExecutive Console window

After you start the PowerExecutive task, the PowerExecutive Console opens and provides a GUI for managing selected rack-mounted servers, BladeCenter chassis components and power objects on the management server.

The PowerExecutive Console window contains a menu bar, a tool bar and a graphical representation of the BladeCenter chassis component selected and power consumption data on various power objects in these chassis objects. The PowerExecutive window displays only those power objects in the chassis objects for which it was started, which might not be all power objects on the management server.

The PowerExecutive Console contains these major areas:

- Navigation pane
- Detail pane
- Trend pane

You can customize which of these panes are displayed in the PowerExecutive Console. To do so, see “Customizing the PowerExecutive Console” on page 8.

Regardless of the panes that are displayed in the PowerExecutive window, you can use the breadcrumb at the upper right of the window to determine the tree structure of the component that is currently selected. You can also navigate back up the tree structure to see information about higher-level objects. This is

equivalent to collapsing the tree structure in the navigation pane or selecting a higher-level tree element. To expand the tree structure, you must use the navigation pane.

You can force the window to refresh in different ways, as explained in “Refreshing the PowerExecutive Console” on page 9.

Navigation pane

Use the navigation pane to select the power object for which the PowerExecutive Console displays information.

The left side of the PowerExecutive Console contains the navigation pane, which displays the systems currently targeted by PowerExecutive in a tree structure. Each node in the structure represents an object that is managed by PowerExecutive. There is always a root node with two child nodes:

- The root node is labeled *All Systems* if you launch the Console by double-clicking the PowerExecutive task, or *Selected Systems* if you launch the Console by targeting a specific group or system.
- One child node labeled *Power-Managed Systems* represents the group consisting of all currently-targeted rack-mounted servers or BladeCenter chassis that support power metering.
- The other child node labeled *Other Systems* represents the group consisting of all currently-targeted rack-mounted servers that don't support power metering.

Note: If the node labeled *Other Systems* is selected in the navigation tree, the Summary table, Power Meter and Trend Data graph or table displays a message that no information is available for that system.

When you expand an individual BladeCenter chassis within the navigation pane, the tree structure shows folders that identify the power domains in the BladeCenter chassis. Under each power domain folder are various components within that power domain, such as the following objects:

- Power modules
- Blade servers
- I/O modules
- Management modules
- Blower modules
- Media trays
- Midplanes

When you select one of these components, PowerExecutive updates the object information pane and the trend pane to display information about the one that you selected.

Detail pane

Use the detail pane to view information about a selected power object.

The upper right side of the window contains the detail pane, which use a table to display information about the power object that is currently selected in the tree structure.

The rows and columns in the table change with the power object that is selected.

- If you select the root of the tree in the navigation pane and it represents an IBM Director group, the detail pane displays rows about the BladeCenter chassis in that group and columns with information about that chassis.
- If you select a BladeCenter chassis in the navigation pane, the detail pane displays rows about the power domains in the chassis and columns with information about those power domains.
- If you select a power domain in the navigation pane, the detail pane displays rows about the power objects in that power domain and columns with information about those power objects.
- If you select a power object within a power domain in the navigation pane, the detail pane displays information about the fields and field values for that power object.

For information about the columns and fields in the tables of the details pane, see “Monitoring power-consumption data” on page 15.

PowerExecutive updates the information in the detail pane when new information becomes available, which is generally once per data collection interval. The default is every minute, but this data-collection interval can be customized. For more information, see “Managing collection of trend data” on page 23.

You can use PowerExecutive to export the information in the detail pane. For more information, see either “Exporting a trend table” on page 25 or “Exporting a trend graph” on page 25.

When the detail pane is displaying group, BladeCenter chassis, or power domain information, the last row of the table provides a summary of the other information in the table. Just the summary information in the detail pane can be exported by PowerExecutive. For more information, see “Exporting summary data” on page 24.

Trend pane

Use the trend pane to view information about current and historical power consumption for a selected power object.

The lower right side of the window contains the trend pane, which provides a power meter and either a tabular or a graphical view of power data over time about the power object that is currently selected in the tree structure.

The watts shown in the power meter can represent alternating current (ac) or direct current (dc) watts as follows:

- When the power meter is displayed for a power object, the watts in the power meter represent dc watts.
- When the power meter is displayed for a group of chassis, a rack-mounted server, an individual chassis, or a group, the watts in the power meter represent ac watts.

The title for the power meter changes to represent the type of watts being measured.

The time range for the displayed trend data is indicated by the trend data interval list box. You can select one of the predefined data ranges or create a custom trend data interval. For more information, see “Creating a custom time interval for the trend pane” on page 24.

The predefined data ranges are as follows:

- Last hour
- Last 12 hours
- Last 24 hours
- Last 48 hours
- Last week
- Last 2 weeks
- Last month
- Last 6 months
- Last year

The check boxes above the trend data table or trend data graph enable you to control the display of power in use, minimum and maximum power in use, and event information. The values for each of these graphs is displayed in the trend data graph in a different color. For the trend data table, this information is put into cells of the table (see Table 1).

Table 1. Colors and meanings that are used in trend graph

Graph check boxes	Displayed in trend graph as	Description
Power in Use	Green line	Shows the power in use as reported by the BladeCenter management module (MM).
Min and Max Power in Use	Minimum power is shown as a blue line while maximum power is shown as a red line	Shows the minimum power that the object has consumed and the maximum power that the object has consumed.
Events	Green triangles and yellow diamonds	Shows the PowerExecutive events that have occurred. Each event has a severity. For more information, see "Internal events" on page 27

If the Power in Use and Min and Max Power check boxes are selected for display and all three power values are the same, the combined line is red.

On the trend data graph, you can also select a time range graphically by using the mouse to zoom in or out on the current view.

Customizing the PowerExecutive Console

You can customize the contents of the PowerExecutive Console.

You can control the display of these panes on the PowerExecutive Console:

- Navigation pane
- Detail pane
- Trend pane

To show or hide one of these panes, use the View menu to check or uncheck the name of each pane.

When the trend pane is displayed, you can control its display as follows:

- Show or hide the power meter
- Show the trend data as a graph

- Show the trend data as a table

To control these aspects of the trend pane, use the View menu to check or uncheck each aspect you wish to control.

Refreshing the PowerExecutive Console

You can use the Refresh function to request an update of the information that is shown in the PowerExecutive Console.

PowerExecutive obtains its information from persistent storage in IBM Director Server and then caches the information on the console for subsequent display. See “Monitoring power-consumption data” on page 15 for the types of information that is displayed by PowerExecutive.

By default, the Console view is refreshed automatically once per short-term data-collection interval. The default is every minute, but you can this data collection interval. To configure the short-term data collection interval, see “Managing collection of trend data” on page 23.

Additionally, certain events from Server Configuration Manager also cause refreshes. For more information, see “External events” on page 26.

The Configuration Manager Editor allows you to create and edit profiles that include configuration settings for the components of chassis and servers, such as switches and management modules.

However, with the Refresh function, you can force a refresh request rather than waiting for the data collection interval or an event to occur.

To refresh the PowerExecutive Console, click the **Refresh** icon in the toolbar. If the management server contains several power objects that are being displayed, the refresh operation can take several minutes. Alternatively, you can use the **View** → **Refresh** menu option.

During the refresh operation, the status line of the PowerExecutive Console displays the word Refreshing to indicate that the operation is active. After the refresh operation is complete, the status line displays the word Ready.

Invoking PowerExecutive functions

Operations are invoked in PowerExecutive primarily through the toolbar, the menu bar or popup menus in the PowerExecutive Console.

You can use the menu bar to suspend and resume data collection, manage trend data, export power information, derate power for individual power objects, customize the contents of the PowerExecutive Console, access the PowerExecutive help system, and close the PowerExecutive Console. Menu bar operations are explained in Chapter 3, “Using PowerExecutive,” on page 15.

The PowerExecutive toolbar contains the functions that are described in Table 2 on page 10.

Table 2. Toolbar icons and their actions

Icon	Action
	Hides the power meter in the trend pane. This icon is available only when the power meter is displayed in the trend pane.
	Displays the power meter in the trend pane. This icon is available only when the power meter is not displayed in the trend pane.
	Displays trend data in graphical format. This toolbar icon is available only when the trend data is displayed in tabular format.
	Displays trend data in tabular format. This toolbar icon is available only when the trend data is displayed in graphical format.
	Refreshes the entire tree structure in the navigation pane and updates the power information in the detail and trend panes.
	Suspends data collections. This toolbar icon is available only for BladeCenter chassis objects whose data is actively collected by PowerExecutive.
	Resumes data collections. This toolbar icon is available only for BladeCenter chassis objects whose data collection has suspended by PowerExecutive.

Chapter 2. Installing PowerExecutive

This chapter provides information about requirements, planning and preparation, as well as instructions for installing and uninstalling PowerExecutive.

Requirements

This topic provides information about PowerExecutive product requirements.

In addition to the requirements that are applicable to IBM Director 5.10, PowerExecutive has further restrictions regarding the hardware and software with which it can be used. For information about IBM Director 5.10 requirements, see the *IBM Director Installation and Configuration Guide*.

Hardware requirements

This section describes the minimum hardware requirements that must be met when you install or use PowerExecutive.

Management servers and management consoles

PowerExecutive can be installed on any management server or management console that supports IBM Director 5.10.

Managed systems

PowerExecutive can monitor the power objects in certain rack-mounted servers and that are IBM Director level-0 managed systems:

PowerExecutive can monitor these BladeCenter chassis:

- BladeCenter machine type 8877
- BladeCenter 2 machine type 8852

Within a supported BladeCenter chassis, PowerExecutive can provide actual power consumption information for the following blades:

- BladeCenter HS20, machine type 8843
- BladeCenter JS21, machine type 8844
- BladeCenter LS20, machine type 8850
- BladeCenter T, machine type 8720 and 8730

Note: PowerExecutive does not support any blade servers that do not have power-metering support.

In a supported rack-mounted server, PowerExecutive can provide estimates of power consumption for these servers:

- 1U rack server ----> x3550
- 2U rack server ----> x3650

Supported operating systems

PowerExecutive is supported for use with IBM Director 5.10 management servers and management consoles that are running supported 32-bit operating systems.

PowerExecutive supports a subset of the operating systems supported by IBM Director. Specifically, these operating systems are supported for Power Executive:

- Red Hat Enterprise Linux AS and ES, version 4.0, for Intel® x86
- SUSE LINUX Enterprise Server 9 for x86
- Windows Server 2003, Enterprise, Standard, and Web Editions

Preparing to install PowerExecutive

Use this section to ensure that your environment is set up properly for the installation and use of PowerExecutive.

Checking all prerequisites

Ensure that all prerequisites have been met before you install and use PowerExecutive.

The following prerequisites are specific to PowerExecutive v1.10:

- IBM Director 5.1 is installed
- BladeCenter Management extension of IBM Director is installed

Downloading PowerExecutive

Use this section to ensure that your environment is set up properly for the installation and use of PowerExecutive.

Complete the following steps to download PowerExecutive from the IBM Web site:

1. Go to the overview page for PowerExecutive at www.ibm.com/servers/eserver/xseries/systems_management/ibm_director/extensions/powerexec.html
2. On the right side of the overview page, click the link for the download page.
3. From the download page, click the file link for the executable file that you want to download.

Table 3 lists the executable files that you can download.

Table 3. PowerExecutive files that can be downloaded

Operating system	PowerExecutive component	File to download
Windows	Server or console	40k1484.exe
Linux	Server	PowerExecutive-server-1.1-1.noarch.rpm
Linux	Console	PowerExecutive-console-1.1-1.noarch.rpm

You should also download the *IBM PowerExecutive 1.10 Release Notes* and the *IBM PowerExecutive Installation and User's Guide* from this Web page.

4. Copy the downloaded file to a local drive on each management server and management console on which you want to install PowerExecutive. Be sure that you copy the correct file based on the operating system that the management server or management console is using.

Installing PowerExecutive on systems running Windows

Use this section for installing PowerExecutive on systems that are running Windows.

If you are installing PowerExecutive on systems that are running Linux, see “Installing PowerExecutive on systems running Linux.”

Complete the following steps to install PowerExecutive on a system that is running Windows:

1. If IBM Director Server or IBM Director Console, or both, are running, close them.
2. From the system on which you want to install PowerExecutive, run the executable file that you downloaded.

Note: The operating-system account that is used to install PowerExecutive must have at least local Administrator authority.

The PowerExecutive Setup program starts. After several seconds, the welcome window opens.

3. Click **Next**. The License Agreement window opens.
4. Read the license agreement, click **I accept the terms in the license agreement**, and click **Next**. The Ready to Install the Program window opens.
5. Click **Install**.

Note: If you are installing PowerExecutive Console or PowerExecutive Server when IBM Director Server is not running, the Installing IBM PowerExecutive window opens. The progress of the installation is displayed.

Note: If this is an upgrade, and the existing PowerExecutive database is from a prior release, then a warning prompt will occur that indicates that the previous version of PowerExecutive will no longer be able to access the database once version 1.10 has been started.

6. Click **Finish**.

Installing PowerExecutive on systems running Linux

This section provides instructions for installing PowerExecutive on systems that are running Linux.

If you are installing PowerExecutive on systems that are running Windows, see “Installing PowerExecutive on systems running Windows” on page 12.

To install PowerExecutive on a Linux system:

- On systems where you are installing PowerExecutive Server, enter the following command at the command prompt:

```
rpm -Uv PowerExecutive-server-1.1-1.10noarch.rpm
```

- On systems where you are installing PowerExecutive Console, enter the following command at the command prompt:

```
rpm -Uv PowerExecutive-console-1.1-1.10noarch.rpm
```

Note: If you are installing PowerExecutive Server and IBM Director Server is running, then this installation stops the IBM Director service before the PowerExecutive installation begins. After the PowerExecutive installation is completed, the IBM Director service is restarted.

Uninstalling PowerExecutive on systems running Windows

Use these instructions for uninstalling PowerExecutive on systems that are running Windows.

If you are uninstalling PowerExecutive on systems that are running Windows, see “Uninstalling PowerExecutive on systems running Windows.”

Complete the following steps to uninstall PowerExecutive on systems that are running Windows:

1. Click **Start > Settings > Control Panel**. The Control Panel window opens.
2. Double-click **Add/Remove Programs**. The Add/Remove Programs window opens.
3. Click the currently installed program IBM PowerExecutive; then click **Change/Remove**.
4. Follow any further instructions on the screen.

Uninstalling PowerExecutive on systems running Linux

Use these instructions for uninstalling PowerExecutive on systems that are running Linux.

If you are uninstalling PowerExecutive from systems that are running Windows, see “Uninstalling PowerExecutive on systems running Windows.”

To uninstall PowerExecutive from a Linux system:

- On systems where you are uninstalling PowerExecutive Server, enter the following command at the command prompt:
`rpm -ev PowerExecutive-server`
- On systems where you are uninstalling PowerExecutive Console, enter the following command at the command prompt:
`rpm -ev PowerExecutive-console`

Chapter 3. Using PowerExecutive

This chapter provides information about using PowerExecutive to monitor and collect power consumption data, manage trend data, and export data.

Monitoring power-consumption data

Use PowerExecutive to display details and summaries about both power-managed systems and unmanaged systems.

Each node in the navigation tree of PowerExecutive represents an object that is being managed. There is one top-level node with two children:

- *Power-Managed Systems* consist of all currently targeted rack-mounted servers or BladeCenter chassis that support power metering.
- *Other Systems* consist of all currently targeted rack-mounted servers that don't support power metering.

Note: All BladeCenter chassis are considered to be power-managed, so chassis cannot appear in this group.

You can display the following details and summaries about power-managed systems:

- For a group of BladeCenter chassis or rack-mounted servers, you can display details and summary information.
- For an individual BladeCenter chassis, you can display details and summary information.
- For an individual rack-mounted server, you can display details.
- For an individual power domain, you can display details and summary information.
- For an individual power object, you can display details.

Displaying details and summary information about a group of BladeCenter chassis or rack-mounted servers

Use this section to display the details and summary information that PowerExecutive provides about a group of BladeCenter chassis or rack-mounted servers.

Complete the following steps to display details and summary information about a group of BladeCenter chassis or rack-mounted servers:

1. From IBM Director Console, drag the PowerExecutive task onto a group of chassis or rack-mounted servers.
2. In the navigation pane of the PowerExecutive Console, look at the information in the detail pane.

Each row in the table corresponds to one BladeCenter chassis or rack-mounted server in the group. All power numbers in the table represent alternating current (ac) power.

The last row of the table summarizes information about the chassis or server in the group.

Table 4 describes the information that is displayed for each chassis or server in the group.

Table 4. Detail information about a group of BladeCenter chassis or rack-mounted servers

Column title	Description
Name	The name of the BladeCenter chassis or rack-mounted server.
Data Collection	The status of data collection. Values are Enabled, Disabled and Offline. The offline status is used when data collection is enabled, but the management module is not responsive. The offline status reflects only whether the management module is responsive to PowerExecutive. It is not an indicator of system health.
Watts in Use	The sum of the power in use by all power domains in the BladeCenter chassis or rack-mounted server. This value is measured in watts. If no value is displayed, then data to determine this value is unavailable.
Nameplate Watts	The sum of the static maximum power of all power domains. This value is measured in watts. The static maximum power is the nameplate power as reported by VPD.
°C Ambient	The current ambient (inlet) temperature of the chassis. This value is measured in Celsius degrees.
°C Exhaust	The current temperature of the air exiting the box. This value is measured in Celsius degrees.
Acoustic Mode	Indicates whether acoustic mode is in use for the BladeCenter chassis. Values are Enabled or Disabled. For information about acoustic mode, see the documentation that comes with the management module that is in the affected chassis.
BTUs/hr	An estimate, based on the power in use, of the thermal load in British thermal units (Btu) placed on the surrounding environment by this BladeCenter chassis or rack-mounted server. The following formula is used to determine the estimate that is displayed: 1 watt = 3412 Btu/hour
Summary Row	Totals for the following columns: <ul style="list-style-type: none"> • Watts in Use • Nameplate Watts • BTU/hr

Displaying details and summary information about an individual BladeCenter chassis

Use this action to describe the details and summary information that PowerExecutive provides about an individual BladeCenter chassis.

Complete the following steps to display details and summary information about an individual BladeCenter chassis:

1. From IBM Director Console, drag the PowerExecutive task onto a chassis.
2. In the navigation pane of the PowerExecutive Console, look at the information in the detail pane.

Each row in the table corresponds to one power domain in the BladeCenter chassis. All power numbers in the table represent ac power.

The last row of the table summarizes information about the power objects in the BladeCenter chassis.

Table 5 describes the information that is displayed for each power object in a BladeCenter chassis.

Table 5. Detail and summary information about an individual BladeCenter chassis

Column title	Description
Name	The name of the power object.
Watts in Use	The sum of the power in use by all power objects in the power domain. This value is measured in watts. If no value is displayed, then data to determine this value is unavailable.
Nameplate Watts	The sum of the static maximum power of all power domains in the chassis. This value is measured in watts. The static maximum power is the nameplate power as reported by VPD.
Redundancy Status	The redundancy in the power domain. The following values are available: <ul style="list-style-type: none"> • Redundant Power Available • Non-Redundant Power Available • No Power Available For information about power-management policy settings, including redundancy in the power domain, see the documentation that comes with the MM that is in the affected BladeCenter chassis.
Oversubscription Policy	The oversubscription policy that the BladeCenter chassis is using. Values are one of the following: <ul style="list-style-type: none"> • Redundant without Performance Impact • Redundant with Performance Impact • Non-Redundant For information about oversubscription policies, see the documentation that comes with the MM that is in the affected BladeCenter chassis.
Summary Row	Totals for the following columns: <ul style="list-style-type: none"> • Watts in Use • Nameplate Watts

Displaying details and summary information about individual power domains

Use this action to display the details and summary information that PowerExecutive provides about an individual power domain within a BladeCenter chassis.

Complete the following steps to display details and summary information about an individual power domain:

1. From IBM Director Console, drag the PowerExecutive task onto the BladeCenter chassis that contains the power domain.

2. In the navigation pane of the PowerExecutive Console, expand the tree structure until you see the power domain.
3. Click the name of the power domain and look at the information in the detail pane.

Each row in the table corresponds to one bay, which is generally one power object, within the power domain. The power numbers for modules in the table represent dc power.

The last row of the table summarizes information about the power objects in the power domain. The power numbers in the summary row represent ac power.

Table 6 describes the information that is displayed for each power object in a power domain.

Table 6. Detail information about power objects in a power domain

Column title	Description
Name	The name of the power object.
Type	The type of power object. The following values are available: <ul style="list-style-type: none"> • Power Module <p>Note: The power consumption listed for the power module represents the amount of power lost in the power module.</p> <ul style="list-style-type: none"> • Blade Server • I/O Module • Management Module • Blower Module • Media Tray • Midplane
Bay	The number of the bays that this power object occupies.
Power Meter Supported	(Blade servers only) Indicates whether a power meter is enabled on this processor. Values are Yes and No.
Watts in Use	The power in use of the power object. <ul style="list-style-type: none"> • For a blade server that has the power meter enabled, this column displays the actual watts being consumed as reported by the power meter. <p>If no value is displayed, then data to determine this value is unavailable.</p> <ul style="list-style-type: none"> • For all other blade servers and all power objects, this column displays the same value as that displayed by the Static Max Power as Configured column, reduced by the derating percentage. For more information, see “Setting the derating power factor” on page 22. <p>In both cases, this value is measured in watts.</p>
Nameplate Watts	The nameplate power as reported by VPD.

Table 6. Detail information about power objects in a power domain (continued)

Column title	Description
Max Watts	<p>The maximum watts consumed during the current measurement interval.</p> <ul style="list-style-type: none"> For a blade that has the power meter enabled, this column displays the value as reported by the power meter. <p>If no value is displayed, then data to determine this value is unavailable.</p> <ul style="list-style-type: none"> For all other blades and all power objects, this column displays the same value as that displayed by the Static Max Power as Configured column. <p>In both cases, this value is measured in watts.</p>
Max Time	<p>(Blade servers that have the power meter enabled only) The time at which the maximum power value was recorded.</p> <p>If no value is displayed, then data to determine this value is unavailable.</p>
Summary Row	<p>The totals of the following columns:</p> <ul style="list-style-type: none"> Watts in Use Nameplate Watts

Displaying details about individual power objects

Use this action to describe the details that PowerExecutive provides about individual power objects.

Complete the following steps to display details about an individual power object:

1. From IBM Director Console, drag the PowerExecutive task onto the BladeCenter chassis that contains the power object.
2. In the navigation pane of the PowerExecutive Console window, expand the tree structure until you see the power object.
3. Click the name of the power object and look at the information in the detail pane.

Each row in the table corresponds to one power object in the BladeCenter chassis.

Table 7 describes the information that is displayed for an individual power object. The power numbers in the table represent dc power.

Table 7. Detail information about an individual power object

Field name	Description
Name	The name of the power object. No value is displayed when the bay is not populated.
Type	<p>The type of power object. The following values are available:</p> <ul style="list-style-type: none"> Power Module <p>Note: The power consumption listed for the power module represents the amount of power lost in the power module.</p> <ul style="list-style-type: none"> Blade Server I/O Module Management Module Blower Module Media Tray Midplane

Table 7. Detail information about an individual power object (continued)

Field name	Description
Bay	The number of the bay that this power object occupies.
Power Meter Supported	Indicates whether a power meter is enabled on this processor. For a blade server, values are Yes and No. For any other power object, the value is always No. No value is displayed when the bay is not populated.
Watts in Use	<p>The power in use of the power object.</p> <ul style="list-style-type: none"> For a blade server that has the power meter enabled, this column displays the actual watts being consumed as reported by the power meter. If no value is displayed, then data to determine this value is unavailable. For all other blade servers and all power objects, this column displays the same value as that displayed by the Label Power column, reduced by the derating percentage. <p>In both cases, this value is measured in watts.</p>
Nameplate Watts	The nameplate power as reported by VPD.
Derate Nameplate Watts to (%)	The percentage of the static maximum power to use when estimating the power in use for blade servers that have not enabled the power meter and for all other power objects. The default value is 100%, which means that the static maximum power is not reduced when used as an estimate for the power in use.
Max Watts	<p>The maximum watts consumed during the current measurement interval.</p> <ul style="list-style-type: none"> For a blade server that has the power meter enabled, this column displays the value as reported by the power meter. If no value is displayed, then data to determine this value is unavailable. For all other blade servers and all power objects, this column displays the same value as that displayed by the Label Power column. <p>In both cases, this value is measured in watts.</p>
Max Time	<p>(Blade servers that have the power meter enabled only) The time at which the maximum power value was recorded.</p> <p>If no value is displayed, then data to determine this value is unavailable.</p>
Current CPU Throttle Values (%)	(Blade server only) A comma-separated list of the current throttle values of each processor in the blade server. A value of 100% indicates that a processor is running at maximum performance (full throttle). For information about throttle levels, see the documentation that comes with the BladeCenter management module that is in the affected chassis.
Preset Blade Throttle Value (W)	(Blade server only) The preset throttle level of the BladeCenter chassis that contains this power object. For information about throttle levels, see the documentation that comes with the BladeCenter MM that is in the affected chassis.

Displaying details about power-managed rack-mounted servers

Use this action to describe the details that PowerExecutive provides about power-managed rack-mounted servers.

Complete the following steps to display details about a power-managed rack-mounted server:

1. From IBM Director Console, drag the PowerExecutive task onto the object that contains the server.
2. In the navigation pane of the PowerExecutive Console window, expand the tree structure until you see the server.
3. Click the name of the rack-mounted server, and look at the information in the detail pane.

Each row in the table corresponds to one power object in the power-managed server.

Table 8. Detailed information about a power-managed rack-mounted server

Field name	Description
Name	The name of the server.
Power Meter Supported	Indicates whether a power meter is enabled on this processor. Values are Yes and No.
Watts in Use	The sum of the power in use by all power objects in the power domain. This value is measured in watts.
Nameplate Watts	The nameplate power as reported by VPD.
Max Watts	The maximum watts consumed during the current measurement interval, as reported by the power meter, or "-" if maximum-power data is not available.
Max Time	The time at which the Max Watts value was recorded, or "-" if maximum-power data is not available.

Displaying details about unmanaged rack-mounted servers

Use this action to display the details that PowerExecutive provides about unmanaged rack-mounted servers.

Complete the following steps to display details about an unmanaged rack-mounted server:

1. From IBM Director Console, drag the PowerExecutive task onto the object that contains the server.
2. In the navigation pane of the PowerExecutive Console window, click **Other Systems** to expand the tree structure until you see the server.
3. Click the name of the rack-mounted server and look at the information in the detail pane.

Each row in the table corresponds to an unmanaged server.

Table 9. Detailed information about an unmanaged rack-mounted server

Field name	Description
Name	The name of the rack-mounted server

Table 9. Detailed information about an unmanaged rack-mounted server (continued)

Field name	Description
Upgradeable	"Yes" if the server could become power-managed with a firmware upgrade; "No" if not.

Setting the derating power factor

You can set the derating power factor for an individual power object. By default, the derating power factor is 100%, which means that the reported power is not derated at all.

The derating factor is the percentage of the static maximum power that is used when estimating the power in use for blade servers that are not power meter enabled and for all other power objects. The derating factor does not apply to power objects when information about the actual power consumed is available from the BladeCenter management module.

Complete these steps to set the derating factor:

1. From IBM Director Console, start PowerExecutive.
2. In the navigation pane, select the power object that you want to derate. You cannot derate power for a chassis or a power domain, you must select a lower-level power object.
3. From the PowerExecutive window, click **Edit → Derate Power**. The PowerExecutive Derate Power Factor window opens.
4. From the PowerExecutive Derate Power Factor window, enter a number that represents the percent of the static maximum power that you want to use when estimating the power consumption of the power object.
5. Click **OK**.

Collecting power consumption data

This section provides information about using PowerExecutive to collect power consumption data.

By default, power information is collected for all BladeCenter chassis objects or rack-mounted servers or both that are displayed in PowerExecutive.

Suspending data collection

You can suspend data collection on any chassis displayed in PowerExecutive.

You might decide to suspend data collection to decrease the amount of disk space required in the PowerExecutive database. Another reason might be to reduce the network load from polling for new information about power objects within a chassis.

Data collection cannot be suspended for individual power objects within a chassis.

Complete these steps to suspend data collection for a chassis or a server:

1. From IBM Director Console, start PowerExecutive.
2. In the navigation pane of the Power Executive Console, select the chassis for which you want to suspend data collection.
3. From the PowerExecutive Console, click **Edit → Suspend Data Collection**.

Resuming data collection

You can resume data collection for a chassis displayed in PowerExecutive in which data collection was previously suspended.

Resuming data collection increases the amount of disk space required in the PowerExecutive database. It also increases the network load as it polls for new information about the power objects within the chassis.

Complete these steps to resume data collection for a chassis:

1. From IBM Director Console, start PowerExecutive.
2. In the navigation pane of the PowerExecutive Console, select the chassis for which you want to resume data collection.
3. From the PowerExecutive Console, click **Edit → Resume Data Collection**.

Managing trend data

This section provides information about using PowerExecutive to manage trend data.

Trend data is displayed in the trend pane of the PowerExecutive console. For more information, see “Trend pane” on page 7.

Managing collection of trend data

You can manage trend data using the Edit menu of PowerExecutive.

Historical trend data is written to the PowerExecutive database. You can control how often and how much historical trend data is written to the database and when trend data is deleted .

However, when the PowerExecutive database cannot expand, it deletes the oldest historical data from the database to free up room for new data that it is collecting.

Complete these steps to affect the trend data written to the PowerExecutive database:

1. From IBM Director Console, start PowerExecutive.
2. From the Power Executive Console, click **Edit → Manage Trend Data**. The Manage Trend Data window opens.
3. Complete the fields on the Manage Trend Data window as follows:
 - In the **Short-term data collection interval in minutes** field, enter the number of minutes in the short-term data-collection cycle. The default value is one day.

Once every short-term data-collection interval, PowerExecutive collects temperature and power data from the systems under its control. Each short-term data collection interval, PowerExecutive checks each bay to see if it is populated, and if it is occupied by a power object that is different from the last data collection. The data collected during these cycles is considered to be short-term data collection. Lower values in this field could have an impact on the network performance of the systems involved.
 - In the **Long-term data collection interval in minutes** field, enter the number of minutes in the long-term data collection cycle. The default value is ten days. PowerExecutive uses the long-term data collection cycle to determine which data is considered to be long-term data. Long-term data is the trend data that you can be display on the trend pane.

- In the **Number of days to keep short-term trend data** field, enter the number of days that PowerExecutive identifies data as short-term data before considering it to be long-term data. The default value is 31 days.
 - In the **Number of days to keep long-term trend data** field, enter the number of days that PowerExecutive keeps long-term data before deleting it. The default value is 365 days.
4. Click **OK**.

Creating a custom time interval for the trend pane

You can create a custom time interval for use by the trend pane instead of using one of the predefined time intervals.

Complete the following steps to create a custom time interval for the trend pane:

- From IBM Director Console, start PowerExecutive.
- From the trend pane in the PowerExecutive window, click **Custom** as the trend data interval. The PowerExecutive Custom window opens.
- Complete the fields on the PowerExecutive Custom window as follows:
 - In the first row of fields, enter the day and time from which the trend data should start. You need to define the month, day, year, hour and minute from which to start displaying trend data.
 - In the second row of fields, enter the day and time at which the trend data should stop. You need to define the month, day, year, hour and minute at which to stop displaying trend data.
- Click **OK**.

Exporting data from PowerExecutive

Use this section to get information about exporting data from PowerExecutive.

You can export the following types of data:

- Summary data from the details pane
- Power metering data from the trend pane
- Trend graph from the trend pane
- Trend table from the trend pane

Exporting summary data

Use the File menu in PowerExecutive to export summary data from the detail pane.

PowerExecutive can save the exported summary data in comma-separated value (CSV), XML or HTML format.

Complete the following steps to export the summary data in the detail pane:

1. From IBM Director Console, start PowerExecutive.
2. From the PowerExecutive Console, click **File** → **Export** → **Summary Table**. The Export Summary Table window opens.
3. Select the directory where you want to export the data.
4. In the **File Name** field, type a name for the file.
5. In the **Files of Type** field, select the type of file that you want to create.
6. Click **OK**.

Exporting the power meter data

Use the File menu in PowerExecutive to export the power meter data from the trend pane.

PowerExecutive saves the exported power meter data in JPEG format.

Complete the following steps to export the power meter data:

1. From IBM Director Console, start PowerExecutive.
2. From the PowerExecutive console, click **File** → **Export** → **Power Meter**. The Export Power Meter window opens.
3. Select the directory where you want to export the data.
4. In the **File Name** field, type a name for the file.
5. Click **OK**.

Exporting a trend graph

Use the File menu in PowerExecutive to export a trend graph from the trend pane.

PowerExecutive saves the exported trend graph in JPEG format.

Complete the following steps to export the trend graph:

1. From IBM Director Console, start PowerExecutive.
2. From the PowerExecutive Console, click **File** → **Export** → **Trend Graph**. The Export Trend Graph window opens.
3. Select the directory where you want to export the data.
4. In the **File Name** field, type a name for the file.
5. Click **OK**.

Exporting a trend table

Use the File menu in PowerExecutive to export a trend table from the trend pane.

Power Executive can save the exported trend table in CSV, XML or HTML format.

Complete the following steps to export the data in a trend table:

1. From IBM Director Console, start PowerExecutive.
2. From the PowerExecutive Console, click **File** → **Export** → **Trend Table**. The Export Trend Table window opens.
3. Select the directory where you want to export the data.
4. In the **File Name** field, type a name for the file.
5. In the **Files of Type** field, select the type of file that you want to create.
6. Click **OK**.

Understanding events that affect PowerExecutive

This section provides information about the IBM Director events and PowerExecutive events that affect the information that is displayed in PowerExecutive.

Before using PowerExecutive, you should use the Management Processor Configuration subtask of the Server Configuration Manager task (formerly Management Processor Assistant [MPA]) to configure an alert-forwarding profile for

the chassis that contain the power objects that you plan to monitor. In the alert-forwarding profile, the connection type must be set to **IBM Director Comprehensive** and the IP address must be set to the IP address of the management server that is being used to monitor power consumption with PowerExecutive. Further, this management server must be the only server that is configured and enabled to receive alerts from the chassis that you plan to target.

If an alert-forwarding profile is not created for a chassis, PowerExecutive cannot receive any events for that chassis.

Note: The IBM Director event log might not contain all events that are reported in PowerExecutive. Further, the timestamp on events is different between the IBM Director event log and the trend pane in Power Executive. The IBM Director event log records the time that the defect occurred. The PowerExecutive events reflect the time that PowerExecutive detected the event.

External events

Some events from Server Configuration Manager cause PowerExecutive to poll for new information and refresh the PowerExecutive Console as needed. Server Configuration Manager is an IBM Director task that is used to create or update server configuration profiles, which include management of service processors in System x and IBM Netfinity[®] servers.

Table 10 describes the severities that can be assigned to each event.

Table 10. Event severities and their meanings

Event severity	Description
Critical	Severe events that signal that the system might not be functioning.
Warning	Serious events that could progress to critical severity.
Harmless	Any event that is not severe or serious. These events are not necessarily errors.

Table 11 describes the events that can cause refreshes of the information in the PowerExecutive Console.

Table 11. Events that affect the information in PowerExecutive

Severity	Category	Description
Critical	Multiple Blower Failure	Both blowers in the system failed.
Critical	Power Failure	A system power supply failed.
Critical	Temperature	A monitored temperature exceeded its critical threshold value. (If a critical temperature condition is detected on a blade server, the blade server is automatically shut down.)
Critical	Multiple I/O Module Failure	Multiple I/O modules failed or were removed.
Warning	Single Blower Failure	One blower failed.
Warning	Temperature	A monitored temperature exceeded its warning threshold value. (This event does not initiate an automatic system shutdown.)

Table 11. Events that affect the information in PowerExecutive (continued)

Severity	Category	Description
Warning	Redundant Module Failure	A redundant module failed or was removed.
Warning	Blade Throttle	A BladeCenter is throttled in order to maintain a power consumption within certain bounds. A recovery event is also sent.
Warning	Power Management	A power-management event was detected, such as mismatched power modules in a power domain, demand exceeding capacity in a domain, or components not being allowed to turn on due to insufficient power.
Warning	Change In Power-management State	The BMC goes from not supporting power metering to supporting power metering or vice versa.
Warning	Restart MM	The Management Module (MM) will reset.
Harmless	Power-On	A blade server or I/O module was turned on.
Harmless	Power-Off	A module in the system was turned off.

Internal events

PowerExecutive displays information about events that it generates in the trend pane.

Specifically, PowerExecutive generates and displays event information with the following severities:

- These events have a warning severity:
 - Stopping PowerExecutive Server
 - Suspending data collection for a BladeCenter chassis
 - Offline status of a BladeCenter chassis
 - Removal of a module from a BladeCenter chassis
 - Long-term data deleted from PowerExecutive database
- These events have a harmless severity:
 - Start of PowerExecutive Server
 - Resume status of data collection for a BladeCenter chassis
 - Online status of a BladeCenter chassis
 - Insertion of a module from a BladeCenter chassis
 - Addition of a BladeCenter chassis
 - Enable or disablement of acoustic mode
 - Changes to the oversubscription policy
 - Short-term data coalesced

Events that PowerExecutive generates are collected with other trend data and stored in the PowerExecutive database. These events let you know why historical data might be missing for one or more chassis.

In the trend graph, these events are displayed as follows:

- Events with a critical severity are shown as red squares.
- Events with a warning severity are shown as yellow diamonds.
- Events with a harmless severity are shown as green triangles.

You can place your mouse over each event in the trend graph to obtain a description of the event that occurred.

In the trend table, these events are displayed in the Event column.

Chapter 4. Troubleshooting

Use this section to troubleshoot and resolve problems with PowerExecutive.

Contacting customer support

If you need help, service or technical assistance or just want more information about IBM products, you can find a wide variety of sources available from IBM to assist you. This section contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your System x system, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system is turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM *System x Documentation* or at the IBM Support Web site.
- Go to the IBM Support Web site at www.ibm.com/pc/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the publications that are provided with your system and software. The information that comes with your system also describes the diagnostic tests that you can perform. Most System x systems, operating systems, and programs come with information that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the information for the operating system or program.

Using the documentation

Information about your IBM System x system and preinstalled software, if any, is available in the documentation that is included with your system. That documentation includes printed books, online books, readme files and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to www.ibm.com/pc/support/ and follow the instructions. Also, you can order publications through the IBM Publications Ordering System at www.elink.ibm.com/public/applications/publications/cgibin/pbi.cgi.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM System x products, services and support. The address for IBM System x information is www.ibm.com/systems/x.

You can find service information for your IBM products, including supported options, at www.ibm.com/pc/support/.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with System x servers, workstations and appliances. For information about which products are supported by Support Line in your country or region, go to www.ibm.com/services/sl/products/.

For more information about Support Line and other IBM services, go to www.ibm.com/services/, or go to www.ibm.com/planetwide/ for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

Appendix. Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

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Glossary

Terms

This topic provides definitions of terms that are used in the PowerExecutive product.

A

ac See *alternating current*.

alternating current

An electric current that reverses its direction at regularly recurring intervals.

B

Baseboard Management Controller

A controller that monitors system platform management events such as fan failure and temperature or voltage increases, and logs their occurrence.

blade server

An IBM BladeCenter server. A high-throughput server on a card that supports symmetric multiprocessors (SMP).

BladeCenter chassis

A BladeCenter unit that acts as an enclosure. It enables the individual blade servers to share resources such as the management, switch, power and blower modules.

BMC See *Baseboard Management Controller*.

British thermal unit

An English unit of measure for heat produced in one hour.

BTU See *British thermal unit*.

C

chassis

The metal frame in which various electronic components are mounted.

D

dc See *direct current*.

direct current

An electric current that flows in a single direction and at a constant voltage.

discovery

The process of finding resources within an enterprise, including finding the new location of monitored resources that were moved.

E

event An occurrence of significance to a task or system, such as the completion or failure of an operation. There are two types of events: alert and resolution.

event action

The action that IBM Director takes in response to a specific event or events

event-action plan

A user-defined plan that determines how IBM Director manages certain events. An event action plan comprises one or more event filters and one or more customized event actions.

Event Action Plan wizard

An IBM Director Console wizard that can be used to create simple event action plans.

event filter

A filter that specifies the event criteria for an event action plan. Events must meet the criteria specified in the event filter in order to be processed by the event action plan to which the filter is assigned to.

extension

See *IBM Director extension*.

G

group A logical set of managed objects. Groups can be dynamic, static, or task-based.

I

IBM Director Console

A component of IBM Director software. When installed on a system, it provides a graphical user interface (GUI) for accessing IBM Director Server. IBM Director Console transfers data to and from the management server using TCP/IP.

IBM Director environment

The complex, heterogeneous environment managed by IBM Director. It includes systems, BladeCenter chassis, software, Simple Network Management Protocol (SNMP) devices.

IBM Director extension

A tool that extends the functionality of IBM Director. Some of the IBM Director extensions are BladeCenter Management, Capacity Manager, ServeRAID Manager, Remote Deployment Manager, and PowerExecutive.

IBM Director Server

The main component of IBM Director software. When installed on the management server, it provides basic functions such as discovery of managed systems, persistent storage of configuration and management data, an inventory database, event listening, security and authentication, management console support, and administrative tasks.

L**Level-0 managed system**

An IBM or non-IBM server, desktop computer, workstation, or mobile computer that can be managed by IBM Director but does not have any IBM Director software installed on it.

M**managed group**

A group of systems or objects managed by IBM Director.

managed object

An item managed by IBM Director. In IBM Director Console, a managed object is represented by an icon that shows its type (such as chassis, cluster, system, or scalable system).

managed object ID

A unique identifier for each managed object. It is the key value used by IBM Director database tables.

managed system

A system that is being controlled by a given system management application, for example, a system managed by IBM Director.

management console

A system (server, desktop computer, workstation, or mobile computer) on which IBM Director Console is installed.

management module

The BladeCenter component that handles system-management functions. It configures the chassis and switch modules, communicates with the blade servers and all I/O modules, multiplexes the keyboard/video/mouse (KVM), and monitors critical information about the chassis and blade servers.

management server

The server on which IBM Director Server is installed.

module

A BladeCenter component that is inserted in a bay in a chassis and whose power consumption data can be monitored by PowerExecutive. Modules include power modules (power supplies), blade servers, I/O modules, BladeCenter management modules, blower modules, and media trays.

O**out-of-band communication**

Communication that occurs through a modem or other asynchronous connection, for example, service processor alerts sent through a modem or over a LAN. In an IBM Director environment, such communication is independent of the operating system and interprocess communication (IPC).

P**power object**

An IBM Director managed object that can be managed by PowerExecutive. A power object can be a group, a BladeCenter chassis, a power domain, or a module.

R**rack-mounted server**

A standalone system with a Baseboard Management Controller (BMC).

S**switch module**

The BladeCenter component that provides

network connectivity for the BladeCenter chassis and blade servers. It also provides interconnectivity between the management module and blade servers.

system

The computer and its associated devices and programs.

T

target system

A managed system on which an IBM Director task is performed.

V

vital product data (VPD)

Information that uniquely defines the system, hardware, software, and microcode elements of a processing system.

VPD See *vital product data*.

Index

A

- accessibility viii
 - keyboard viii
 - shortcut keys viii
- alert-forwarding profile 25

B

- bay 6
- breadcrumb 5

C

- chassis
 - displaying details 16
- collect
 - data 22
 - trend 23
- components 2
- critical events 26
- custom time interval 24

D

- data
 - collection 22
 - resuming 9, 23
 - suspending 9, 22
 - trend data 23
 - exporting 24
- derating power factor 22
- detail pane 6
 - displaying 8
- details, displaying 15
 - chassis 16
 - group of chassis 15
 - power domains 17
 - power objects 19
- disability viii
- downloading PowerExecutive 12

E

- estimating
 - power consumption 22
- events
 - refresh operations 26
 - trend pane 27
- export
 - data 24
 - power meter 25
 - summary data 24
 - trend graph 25
 - trend table 25

G

- glossary 35

- group of chassis
 - displaying details 15

H

- hardware
 - requirements 11

I

- IBM Web sites vii
- installation 11, 13
 - downloading PowerExecutive 12
 - prerequisites 12

K

- keyboard viii

L

- legal notices 31

M

- Manage Trend Data window 23
- Management Processor Assistant 26
- module 6
- monitoring power consumption 15

N

- navigation pane 6
 - displaying 8

O

- operating system
 - supported 12

P

- polling interval 23
- power domains
 - displaying details 17
- Power Executive
 - components of 1
 - concepts 1
 - documentation vii
 - getting started 1
 - overview 1
- Power Executive Console 3
- Power Executive Custom window 24
- Power Executive Derate Power Factor window 22
- Power Executive window
 - customizing 8

- Power Executive window (*continued*)

- navigation pane 6
- refreshing 9
- trend pane 7
- power meter 7
 - displaying 8, 9
 - exporting 25
- power objects
 - derating 22
 - displaying details 19
- PowerExecutive
 - database 3
 - prerequisites 12
 - uninstalling
 - Linux 14
 - Windows 14
- PowerExecutive Console
 - events 26
- PowerExecutive Server 3
- PowerExecutive window 5
 - detail pane 6
- problem solving 29

R

- refresh 9
- requirements 11
 - hardware 11
- resume
 - data collection 9, 23

S

- Server Configuration Manager events 26
- shortcut keys viii
- solving problems 29
- summary data
 - exporting 24
- summary, displaying 15
- suspend
 - data collection 9, 22
- system events 26

T

- toolbar 9
- trademarks 33
- trend graph 7
 - displaying 8, 9
 - exporting 25
- trend pane 7
 - custom time interval 24
 - displaying 8
 - events 27
 - predefined time intervals 7
- trend table 7
 - displaying 8, 9
 - exporting 25
- troubleshooting 29

U

uninstalling Power Executive
Linux 14
uninstalling PowerExecutive
Windows 14

W

warning events 26

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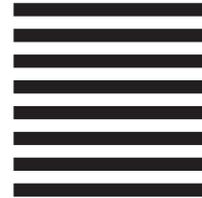
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