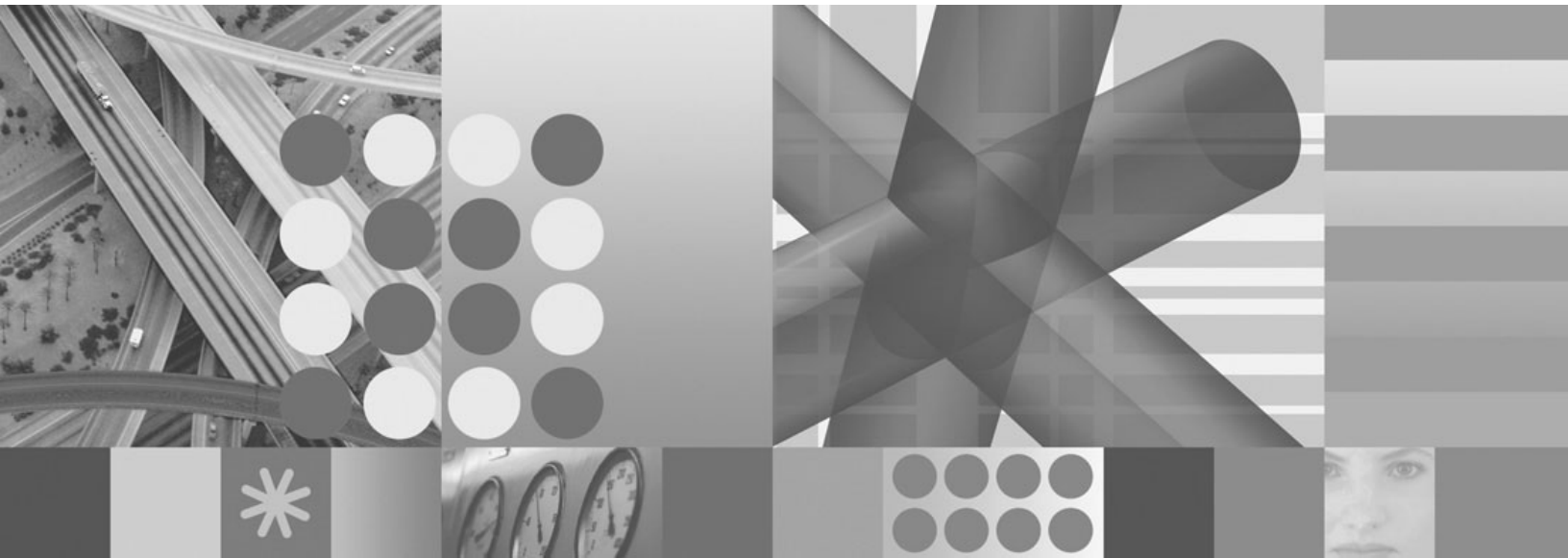




**Offering Guide**





## Offering Guide

**Note**

Before using this information and the product it supports, read the information in Appendix B, "Notices," on page 59.

This edition applies to version 6, release 2 of IBM Tivoli Monitoring for Energy Management (product number 5724-V08) and to all subsequent releases and modifications until otherwise indicated in new editions.

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## Chapter 1. Introduction

The IBM® Tivoli® Monitoring for Energy Management package that you have purchased is made up of several separate component products. This publication guides you through the process of installing and configuring the component products so that they can work together successfully.

This offering is compatible with IBM Tivoli Monitoring V6.2 Fix Pack 1 or higher fix pack version of V6.2 or V6.2.1; IBM Director Version 5.20.2, or higher service update of 5.20; Hardware Management Console extension for IBM Director Version 5.20.2, or higher service update of 5.20; IBM® Systems Director Active Energy Manager™ Version 3.1.1, or higher fix pack of Version 3.1.1; Eaton Power Xpert Gateway interface cards PXGX 1000 Firmware Version 1.1.0-PDU, or higher, and PXGX 2000 Firmware Version 1.1.0-UPS, or higher; and Eaton Power Xpert 4000, 6000, and 8000 Meters.

If you have not downloaded the Tivoli Monitoring for Energy Management package, do so now. See the download document at [http://publib.boulder.ibm.com/infocenter/tivihelp/v24r1/topic/com.ibm.itmem.doc/DownloadDocument\\_itmforenergymgt62001.htm](http://publib.boulder.ibm.com/infocenter/tivihelp/v24r1/topic/com.ibm.itmem.doc/DownloadDocument_itmforenergymgt62001.htm) for instructions.

---

### Contents of the package

The package that you have purchased contains the following components:

- IBM Tivoli Monitoring V6.2 Fix Pack 1

IBM Tivoli Monitoring monitors and manages system and network applications on a variety of operating systems, tracks the availability and performance of your enterprise system, and provides reports to track trends and troubleshoot problems. The following Tivoli Monitoring shared-base components consolidate, distribute, store, and display data for the monitoring agents that are shared by all component products in this offering:

- Tivoli Enterprise Portal browser and desktop clients (TEP or portal browser and portal clients)
- Tivoli Enterprise Portal Server (TEPS or portal server)
- Tivoli Enterprise Monitoring Server (TEMS or monitoring server)
- Tivoli Data Warehouse (data warehouse)

- Tivoli Monitoring for Energy Management V6.20.01

This collection of Tivoli Monitoring agents track power and energy usage, and monitor ambient and exhaust temperatures in individual systems and groups of systems within a data center. Using workspaces provided in this package, this data can be integrated with existing performance monitoring capabilities provided by the Tivoli Enterprise Portal (TEP or portal), thereby providing system administrators with an unprecedented integrated view of power, temperature, and application performance in their data centers. The agent also stores power and thermal data in the Tivoli Data Warehouse, making this data available to other Tivoli management products such as IBM Tivoli Usage and Accounting Manager, IBM Tivoli Service Level Advisor, and IBM Tivoli Business Systems Manager. This collection of Tivoli Monitoring agents can serve as key building blocks for more comprehensive Tivoli-based power management solutions. The following agents are included as part of the Tivoli Monitoring for Energy Management product:

- Active Energy Manager Agent for IBM server hardware and PDU+ devices
- Eaton Power Xpert Agent for PXGX 1000 and PXGX 2000 interface cards and 4000, 6000, and 8000 meters.
- In addition to the agents, Tivoli Data Center Optimization for Energy Management, the reporting and optimization feature of IBM Tivoli Monitoring for Energy Management, reports on the usage and estimated cost of energy used in the data center. The feature also provides recommendations for optimizing usage and estimated costs of energy associated with the resources in the data center.

- IBM Director V5.20.2 (Director)

IBM Director is an integrated suite of tools that provide you with comprehensive system-management capabilities to maximize system availability and lower IT costs. The open, industry-standard design supports the management of a variety of hardware and operating systems, including most Intel® microprocessor-based systems and certain IBM System i®, System p®, System x™, and System z® servers.

- Hardware Management Console extension for IBM Director V5.20.2 (HMC)

Hardware Management Console is an extension of IBM Director that you can use to manage System i and System p physical platforms that are managed by an HMC, an Integrated Virtualization Manager (IVM), or a Flexible Service Processor (FSP).

- Active Energy Manager Agent V3.1.1 (AEM)

This agent is an extension of IBM Director that you can use to monitor and manage the energy and thermal needs of IBM servers and BladeCenter® systems. Non-IBM systems can also be monitored using metering devices, such as PDU+es and sensors.

---

## Architecture

Figure 1 on page 3 shows the architecture of the Tivoli Monitoring for Energy Management product environment.

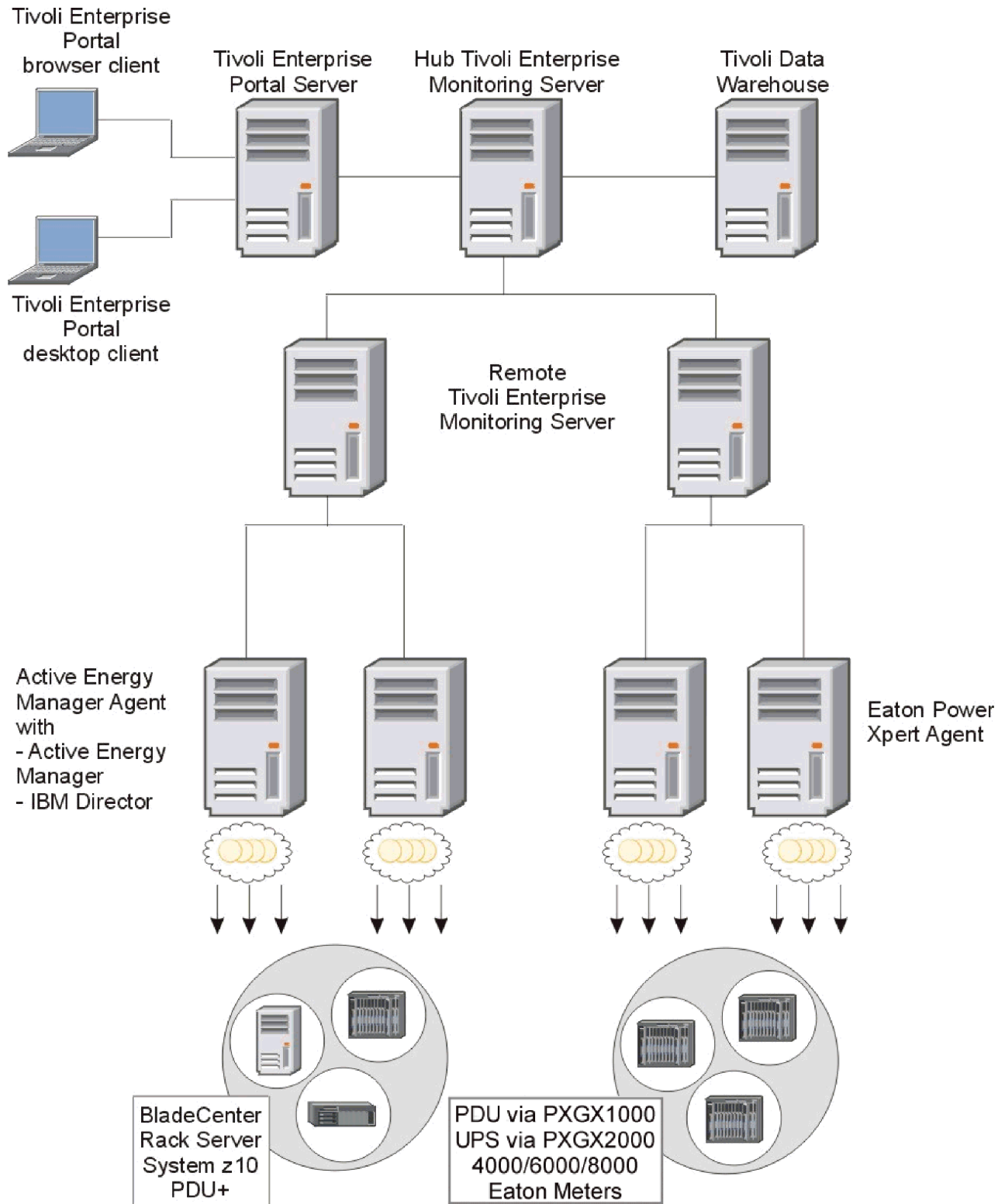


Figure 1. Architecture of the IBM Tivoli Monitoring for Energy Management environment

If you are familiar with Tivoli Monitoring products, you will see that Tivoli Monitoring for Energy Management uses the traditional Tivoli Monitoring architecture, which includes the following components:

- Tivoli Enterprise Portal browser and desktop clients (TEP or portal browser and portal clients)
- Tivoli Enterprise Portal Server (TEPS or portal server)

- Hub Tivoli Enterprise Monitoring Server (hub TEMS or monitoring server)
- Tivoli Data Warehouse (data warehouse)
- Remote Tivoli Enterprise Monitoring Servers (TEMS)
- Monitoring agents

Although the architecture diagram shows each component installed on a separate server, you can also install and run a Tivoli Monitoring for Energy Management test system on a single server.

If you have an existing Tivoli Monitoring environment that meets the prerequisites of Tivoli Monitoring for Energy Management, you can avoid installing all the prerequisite products and simply install one or both of the agents, and their related support files for the portal, portal server, and monitoring server in your existing environment.

Many configurations of servers are possible with Tivoli Monitoring and Tivoli Monitoring for Energy Management. Choose the number and configuration of servers that fits your needs and environment.

---

## Information available to help you

This publication provides basic information in summary form. For detailed information, you can rely on the publications in the product information centers.

### Information centers for this offering

The Tivoli Monitoring for Energy Management information center is at <http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/topic/com.ibm.itmfem.doc/welcome.htm>

The IBM Tivoli Monitoring information center is at <http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/index.jsp?toc=/com.ibm.itm.doc/toc.xml>.

Information about IBM Director, Hardware Management Console, and Active Energy Manager is at <http://www.ibm.com/systems/management/director/resources>.

### IBM Software Support overview

Customers who are entitled to IBM Software Support can use the IBM Software Support Handbook to address all questions related to IBM Software Support.

In general, customers in the United States can open a Service Request or a Problem Management Record (PMR) electronically using IBM online Service Request Tools or by calling 1-800-IBM-SERV for voice support. Customers outside the United States can also use IBM online Service Request Tools or call the IBM phone number in their country for voice support. The IBM Software Support Handbook contains contact information, phone numbers, information about IBM online Service Request Tools, and other IBM Software Support information.

When submitting PMRs for IBM Tivoli Monitoring for Energy Management Version 6.20.01 (product number 5724-V08), use component ID (compid) 5724V08EM. The component ID, or compid, is associated with the problem area or failing component.

Review the IBM product support pages to find solutions to known problems. This method is a quick way to obtain answers to your questions.

Before you contact IBM Software Support, be sure to review the following information:

*IBM Tivoli Monitoring V6.2 Fix Pack 1 Problem Determination Guide* at [http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/topic/com.ibm.itm.doc\\_6.2.fp1/pdg\\_itm62.htm](http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/topic/com.ibm.itm.doc_6.2.fp1/pdg_itm62.htm).

Search the online support pages, especially the Tivoli Monitoring Version 6 Support page at <http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliMonitoringV6.html>.

Review the MustGather documents for different components to determine the information you need to help resolve your problem, especially the IBM Tivoli Monitoring Version 6 MustGather document for all Tivoli Monitoring Version 6 components at <http://www.ibm.com/support/docview.wss?rs=2366&uid=swg21266383>.

See Appendix A, “Support for problem solving,” on page 55.



---

## Chapter 2. Planning your installation

Before you install the component products, take some time for planning.

---

### Required component products to install

The two agents of Tivoli Monitoring for Energy Management, the Active Energy Management Agent and the Eaton Power Xpert Agent, both require IBM Tivoli Monitoring Version 6.2 Fix Pack 1, so you must install that product first.

The Active Energy Management Agent is installed on the same server as IBM Director 5.20.2, Hardware Management Console, and Active Energy Manager 3.1.1. If you want to use the Active Energy Manager Agent to monitor BladeCenters, Rack Servers, System z10s, or PDU+es, you will need to install those prerequisites.

The Eaton Power Xpert Agent has no prerequisites beyond IBM Tivoli Monitoring Version 6.2 Fix Pack 1. If you want to monitor Power Distribution Units (PDUs) through the PXGX 1000 interface, monitor Uninterruptible Power Supplies (UPSes) through the PXGX 2000 interface, or monitor 4000, 6000, or 8000 meters, you may install the agent on any supported server with SNMP network access to the PDUs, UPSes, and meters.

The Data Center Optimization for Energy Management feature requires Tivoli Common Reporting V1.1.1. Install the Data Center Optimization for Energy Management feature on the same server as Tivoli Common Reporting. The Tivoli Data Warehouse must also be installed.

### Restrictions on use of the component products

Tivoli Monitoring for Energy Management contains several products that can be installed separately and used for purposes other than enabling the capabilities of Tivoli Monitoring for Energy Management. Unless you have purchased a separate license authorizing other uses of these products, you may not install or use these products outside their use with Tivoli Monitoring for Energy Management. These restricted products include:

- IBM Tivoli Monitoring V6.2 Fix Pack 1
- IBM DB2<sup>®</sup> Enterprise Server V9.1
- IBM Director V5.20.2
- Hardware Management Console extension of IBM Director V5.20.2
- Active Energy Manager V3.1.1
- Tivoli Common Reporting V1.1.1

Refer to the text of the licensing agreement to determine if any intended use of the restricted products in this package complies with the licensing agreement.

---

### Where to install the component products

For information on where to install the component products, see the product-specific installation information in the Tivoli Monitoring for Energy Management information center at <http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/topic/com.ibm.itmfem.doc/welcome.htm>.

### Platform support matrix

See the following Web page for information about platform support for the most recent version of each product: [http://www.ibm.com/software/sysmgmt/products/support/Tivoli\\_Supported\\_Platforms.html](http://www.ibm.com/software/sysmgmt/products/support/Tivoli_Supported_Platforms.html).

Refer to the hardware and software requirements section in this document for additional information about the supported platforms for the Active Energy Manager Agent and the Eaton Power Xpert Agent of Tivoli Monitoring for Energy Management.

## Installation limitations

Although Tivoli Monitoring is quite flexible in the placement of components on different server configurations, the Active Energy Manager Agent of Tivoli Monitoring for Energy Management can be installed only on the server that also hosts IBM Director server and the Active Energy Manager software. No other location will work.

---

## Hardware and software requirements

Tivoli Monitoring for Energy Management requires Tivoli Monitoring V6.2 Fix Pack 1.

The Active Energy Manager Agent requires IBM Director Version 5.20.2 and Active Energy Manager Version 3.1.1. Monitoring System i and System p servers with the Active Energy Manager Agent additionally require the Hardware Management Console extension of IBM Director Version 5.20.2.

No Tivoli Monitoring for Energy Management code needs to be installed on the IBM servers being monitored by IBM Director and Active Energy Manager. IBM Director monitors the IBM servers and forwards the monitoring data to Tivoli Monitoring for Energy Management through Active Energy Manager and the Active Energy Manager Agent.

The Active Energy Manager Agent includes support for the following operating systems:

- Windows® Server 2003 EE with SP2, for x86-32
- Windows Server 2003 EE R2 with SP2, for x86-32
- Windows Server 2003 EE with SP2, for x86-64
- Windows Server 2003 EE R2 with SP2, for x86-64
- Red Hat Enterprise Linux®, V4.0, for x86-64
- Red Hat Enterprise Linux, V4.0, for x86-32
- Red Hat Enterprise Linux, V4.0, for POWER™
- Red Hat Enterprise Linux, V4.0, for System z
- Red Hat Enterprise Linux, V5.0, for x86-64
- Red Hat Enterprise Linux, V5.0, for x86-32
- Red Hat Enterprise Linux, V5.0, for System z
- Red Hat Enterprise Linux, V5.0 and V5.1, for POWER
- SUSE Linux Enterprise Server 9 for x86-64
- SUSE Linux Enterprise Server 9 for x86-32
- SUSE Linux Enterprise Server 9 for POWER
- SUSE Linux Enterprise Server 9 for System z
- SUSE Linux Enterprise Server 10 for x86-64
- SUSE Linux Enterprise Server 10 for x86-32
- SUSE Linux Enterprise Server 10 for POWER
- SUSE Linux Enterprise Server 10 for System z

The Eaton Power Xpert Agent includes support for the following operating systems:

- AIX® 5.3 (32/64 bit)
- AIX 6.1 (64 bit)
- Solaris V9 (SPARC) (32/64 bit)
- Solaris V10 (SPARC) (32/64 bit)



- HP-UX 11i V2 (B.11.23) (64-bit) for PA-RISC
- HP-UX 11i V3 (11.31) (64-bit) for PA-RISC.
- HP-UX 11.23 and 11.31 on Itanium2
- Windows Server 2003 SE with Service Pack 2 for x86 32-bit
- Windows Server 2003 SE R2 with Service Pack 2 for x86 32-bit
- Windows Server 2003 SE with Service Pack 2 for x86 64-bit
- Windows Server 2003 SE R2 with Service Pack 2 for x86 64-bit
- Windows Server 2003 EE with Service Pack 2 for x86 32-bit
- Windows Server 2003 EE R2 with Service Pack 2 for x86 32-bit
- Windows Server 2003 EE with Service Pack 2 for x86 64-bit
- Windows Server 2003 EE R2 with Service Pack 2 for x86 64-bit
- Red Hat Enterprise Desktop Linux 4 for Intel
- Red Hat Enterprise Linux 4.0 for x86 (32/64 bit)
- Red Hat Enterprise Linux 4.0 for POWER
- Red Hat Enterprise Linux 4.0 for System z
- Red Hat Enterprise Desktop Linux 5 for Intel
- Red Hat Enterprise Linux 5.0 for x86 (32/64 bit)
- Red Hat Enterprise Linux 5.0 for POWER
- Red Hat Enterprise Linux 5.0 for System z
- SUSE Linux Enterprise Server 9 for x86 (32/64 bit)
- SUSE Linux Enterprise Server 9 for POWER
- SUSE Linux Enterprise Server 9 for System z
- SUSE Linux Enterprise Server 10 for x86 (32/64 bit)
- SUSE Linux Enterprise Server 10 for POWER
- SUSE Linux Enterprise Server 10 for System z
- SUSE Linux Enterprise Desktop 9 and 10 for x86 32-bit

The Data Center Optimization for Energy Management feature includes support for the operating systems based on the platform support for the Tivoli Common Reporting V1.1.1.

---

## Sizing the installation

If you are installing Tivoli Monitoring for Energy Management onto an existing Tivoli Monitoring environment, the additional computing resources needed to support the new Tivoli Monitoring for Energy Management functions might be negligible.

The following resources can help you size a new installation:

- *IBM Tivoli Monitoring: Deployment Guide* and *IBM Tivoli Monitoring: Installation and Setup Guide* in the Tivoli Monitoring for Energy Management information center at <http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/topic/com.ibm.itmfem.doc/welcome.htm>
- Tivoli Data Warehouse load projections spreadsheet in the IBM Tivoli Open Process Automation Library (OPAL) at <http://www.ibm.com/software/tivoli/opal>.

---

## Order of installation

If you do not already have IBM Tivoli Monitoring installed in your environment, use IBM Tivoli Monitoring Version 6.2 with Fix Pack 1, which is included with this offering.

Before installing agents in the IBM Tivoli Monitoring environment, refer to the IBM Tivoli Monitoring documentation for information about remote agents and using the deployment depot.

Install or upgrade the components in the following order:

1. Install the database application software (such as IBM DB2 Version 9.1, which is provided with IBM Tivoli Monitoring Version 6.2 Fix Pack 1)
2. Install the shared base components of IBM Tivoli Monitoring to the minimum supported Version 6.2 with Fix Pack 1 or later:
  - Tivoli Enterprise Monitoring Server
  - Tivoli Enterprise Portal Server
  - Tivoli Enterprise Portal Client
  - Tivoli Data Warehouse database
3. The Tivoli Monitoring Warehouse Proxy Agent and the Tivoli Monitoring Summarization and Pruning Agent are required to run the Tivoli Common Reporting reports of Tivoli Monitoring for Energy Management, which are discussed in the Data Center Optimization for Energy Management User's Guide.
4. If you plan to monitor power, energy, and thermal characteristics of BladeCenters, Rack Servers, System z10s, and PDU+es, install IBM Director Version 5.20.2 , Hardware Management Console extension for IBM Director, and Active Energy Manager Version 3.1.1. Install the Tivoli Monitoring for Energy Management Active Energy Manager Agent, along with the plug-in portion of the Active Energy Manager Agent.
5. If you plan to monitor power, energy, and thermal characteristics of PDUs through the Eaton PXGX 1000 interface card, UPSes through the Eaton PXGX 2000 interface card, or 4000, 6000, or 8000 meters, install the Tivoli Monitoring for Energy Management Eaton Power Xpert Agent.
6. Install the Tivoli Data Center Optimization for Energy Management feature to run the reports of IBM Tivoli Monitoring for Energy Management.
7. Install any language packs provided with each product as required.

---

## Pre-installation checklist

As you plan your installation, you may find the following checklist helpful.

- Schedule and attend any required IBM Tivoli Monitoring Administrator Training or other education sessions prior to installing the offering.
- Determine the desired platforms for IBM Tivoli Monitoring infrastructure components (Hub Tivoli Enterprise Monitoring Server, Remote Tivoli Enterprise Monitoring Server, Tivoli Enterprise Portal Server, Warehouse Proxy Agent, Summarization and Pruning Agent, and database server).
- Check the operating system versions and architecture (32-bit or 64-bit) for each system running the Tivoli Monitoring components:
  - Tivoli Enterprise Portal Server
  - Hub Tivoli Enterprise Monitoring Server
  - Remote Tivoli Enterprise Monitoring Server
  - Warehouse Proxy Agent
  - Summarization and Pruning agent
  - Database
  - Agents
- Check the hardware specifications for each Tivoli Monitoring component.
- Review the *IBM Tivoli Monitoring: Deployment Guide*.
- Identify the number of IBM Tivoli Monitoring agents required.
- Determine the appropriate size of your installation (see the general guidelines for small, medium, and large environments).
- Estimate the size of the Tivoli Enterprise Data Warehouse using the Warehouse Load Projection Spreadsheet at <http://catalog.lotus.com/tm?NavCode=1TW10TM1X>.

- Determine the locations of your remote monitoring servers.
- Determine the number of agents assigned to each Remote Tivoli Enterprise Monitoring Server.
- Determine the number of Warehouse Proxy Agents needed.
- Ensure the DB2 or Oracle databases will use UTF-8 for Warehousing.
- Determine the following information:
  - Locations of firewalls
  - If Network Address Translation (NAT) is used
  - Network bandwidth between wide area network (WAN) links
  - Number of agents that are located across WAN links
- Ensure that the protocol settings among the IBM Tivoli Monitoring components meet your security standards.
- Verify whether a firewall gateway is required.
- Determine high availability or disaster recovery requirements. Map those requirements to your IBM Tivoli Monitoring deployment.
- Determine the following failover scenarios for agents:
  - Will there be a process in place to make regular backups of Tivoli Enterprise Portal Server and Tivoli Enterprise Monitoring Server?
  - What are the plans for High Availability for Tivoli Enterprise Portal Server and Tivoli Enterprise Monitoring Server (Hub and Remote)?
  - Check plans for disaster recovery for Tivoli Enterprise Portal Server and Tivoli Enterprise Monitoring Server (Hub and Remote).



---

## Chapter 3. Installing the software

This chapter provides an overview of the installation steps required to install the software provided in this offering. Before you install the component products, take some time and read the following sections to plan your installation.

---

### Initial installation

If you are installing Tivoli Monitoring for Energy Management into an environment where Tivoli Monitoring and monitoring agents are already installed, go to Chapter 4, “Installation into an existing environment,” on page 17. Otherwise, continue here.

During the initial installation, a phased approach is best. These steps should be performed in development and test environments before applying them in the production environment.

### Install the database software

Install the database application software before installing the shared base components of Tivoli Monitoring, using the installation procedures that are provided with your database software. If you use the version of IBM DB2 that is provided with this offering, see the *IBM Tivoli Monitoring: Installation and Setup Guide*, GC32-9407 for additional information and specific instructions.

If you have not already created the Tivoli Data Warehouse database, you can create it using your supported database application software. Here is a summary example procedure if you are using IBM DB2:

1. Open a DB2 command prompt (for example, on Windows, click **Start > Run > db2cmd**).
2. Run this command:  

```
db2 create database Warehous CODESET UTF-8 TERRITORY <Preferred_Territory>
```
3. Close the DB2 command window after the command completes.

---

### Install the shared base components

Install the IBM Tivoli Monitoring shared base components on distributed computers in your environment. Refer to the *IBM Tivoli Monitoring: Installation and Setup Guide* for instructions on installing the following components:

- Tivoli Enterprise Monitoring Server (hub and remote)
- Tivoli Enterprise Portal Server
- Tivoli Enterprise Portal Client

---

### Install data warehousing

Install the Warehouse Proxy Agent and the Summarization and Pruning Agent.

---

### Install IBM Director and related components

You must install the IBM Director and related components if you plan to monitor the power, energy, and thermal characteristics of BladeCenters, Rack Servers, System z10s, and PDU+es.

When installing the IBM Director, be sure to choose the **Full** IBM Systems Director installation option. Do not choose the **Express** installation option.

Install the IBM Director Server V5.20.2 on the system that will serve as the focal point for monitoring your BladeCenters, Rack Servers, System z10s, and PDU+es. Refer to the *IBM Director Planning, Installation,*

and Configuration Guide available from the IBM Director documentation and resource Web site at <http://www-03.ibm.com/systems/management/director/resources/>.

If you also plan to monitor System i and System p servers, you might also need to install the Hardware Management Console (HMC) extension for IBM Director Version 5.20.2 *before* you install Active Energy Manager Version 3.1.1. If you installed IBM Director for Linux on POWER, then HMC was installed along with IBM Director. For all the other platform versions of IBM Director, you must install HMC as a separate step. You can download the HMC extension at <http://www.ibm.com/systems/management/director/downloads.html>. The Installation and User's Guide is available from the same documentation and resource Web site as IBM Director.

Install the Active Energy Manager Version 3.1.1 on the same system as IBM Director. The Installation and User's Guide is available from the same documentation and resource web site as IBM Director.

---

## Install the Active Energy Manager agent

The Active Energy Manager Agent is composed of two parts: the agent and the Director plug-in. Both are installed on the same computer as IBM Director Server and Active Energy Manager, but each requires a separate installation step.

The Tivoli Monitoring for Energy Management Active Energy Manager Agent is installed in the same way as any other standard IBM Tivoli Monitoring agent. Refer to the *IBM Tivoli Monitoring: Installation and Setup Guide*, GC32-9407, which contains installation instructions for both a single-system and a distributed monitoring environment.

Install the Active Energy Manager Agent plug-in portion of the Active Energy Manager Agent. This component is a plug-in to the IBM Director product. The plug-in is installed after agent installation as an additional setup step using one of the instructions included in the following sections. The plug-in can be installed using an installation program, found on the IBM Tivoli Monitoring for Energy Management installation media, or installed using the command line.

Use the following steps to install the Active Energy Manager Agent Plug-in using the installation program:

1. Navigate to the AEMPluginInstaller directory of the installation media.
2. Run the setup program appropriate for your platform.
3. During the installation, you are prompted for the IBM Director installation location.
4. The Director service is stopped and restarted automatically.

Use the following procedure to install the Active Energy Manager Agent plug-in using the command line:

On Windows systems:

1. Open a Windows command prompt.
2. Change directory to <ITM\_HOME>\TMAITM6. On Windows, the default location is C:\IBM\ITM\TMAITM6
3. Run the following command:  
`KE9ManageAEMPlugin.cmd install <IBM_Director_base_directory>`

If the IBM Director base directory contains spaces, enclose the directory name in double quotation marks. For example, `KE9ManageAEMPlugin.cmd install "C:\Program Files\IBM\Director."`

4. Stop and restart the IBM Director Server service.

On Linux and UNIX® systems:

1. Open a Linux or a UNIX command shell.
2. Change directory to <ITM\_HOME>/<platform>/e9/bin. For Linux Intel architecture, the default directory is /opt/IBM/ITM/li6263/e9/bin.

3. Run the following command:

```
./KE9ManageAEMPlugin.sh install <IBM_Director_base_directory>
```

For example, `./KE9ManageAEMPlugin.sh install /opt/ibm/director`.

4. Stop and restart the IBM Director Server service.

---

## Install the Eaton Power Xpert Agent

The Tivoli Monitoring for Energy Management Eaton Power Xpert Agent is installed in the same way as any other standard IBM Tivoli Monitoring agent. Refer to the *IBM Tivoli Monitoring: Installation and Setup Guide*, GC32-9407, which contains installation instructions for both a single-system and a distributed monitoring environment.

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### baroc file installation

The monitoring server generates Tivoli Enterprise Console® events with classes that are unique to each monitoring agent. Each monitoring agent provides a `.baroc` file with the Tivoli Enterprise Console classes that are generated by Tivoli Monitoring. To view this event data in the event console, you must install these monitoring agent `.baroc` files on the event server, which are available for both the Eaton Power Xpert Agent and the Active Energy Manager Agent after installation in the following locations:

On Windows systems:

- C:\IBM\ITM\CMS\teclib\ke8.baroc
- C:\IBM\ITM\CMS\teclib\ke9.baroc

On Linux and UNIX systems:

- /opt/IBM/ITM/tables/<tems\_name>/TECLIB

---

## Install the Data Center Optimization for Energy Management

The Data Center Optimization for Energy Management feature is installed as a plugin or console module on top of the Tivoli Common Reporting Version 1.1.1, which is included with the IBM Tivoli Monitoring Version 6.2 Fixpack 1.

Run the following files to install the feature:

- For Windows, start `Tivoli_Data_Center_Optimization_for_Energy_Management_Windows.exe`.
- For Linux, start `Tivoli_Data_Center_Optimization_for_Energy_Management_Linux.bin`.
- For Solaris, start `Tivoli_Data_Center_Optimization_for_Energy_Management_Solaris.bin`.
- For AIX, start `Tivoli_Data_Center_Optimization_for_Energy_Management_AIX.bin`.
- For HP-UX, start `Tivoli_Data_Center_Optimization_for_Energy_Management_HPUX.bin`.

In the installation wizard, enter the configuration parameters and complete the installation. For detailed instructions, refer to the *Tivoli Data Center Optimization for Energy Management User's Guide*.

---

## Install the language packs

Refer to the installation instructions of the individual products for guidance on installing language packs.

---

## Customize your situations

Customize the product-provided situations to ensure that this first set of agents does not generate a large number of alerts as soon as they are started. See the procedures and guidelines provided with each product's publication library for details.





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## Chapter 4. Installation into an existing environment

You might already have IBM Tivoli Monitoring and one or more of the IBM Tivoli products that are included in this offering installed in your environment. If so, perform the following general steps:

1. If you do not already have a supported database application, install your preferred application software or upgrade to the minimum supported version. Follow the procedures in your database software documentation to create a Tivoli Data Warehouse database. Refer to the *IBM Tivoli Monitoring: Installation and Setup Guide* for details.
2. Verify that your IBM Tivoli Monitoring installation is at a supported version. The minimum supported version is IBM Tivoli Monitoring V6.2 Fix Pack 1 or higher fix pack version of V6.2 or V6.2.1. If you need to upgrade your installation, ensure that it is at this minimum version or later. You might choose to use IBM Tivoli Monitoring Version 6.2 with Fix Pack 1, included with this offering, and follow the upgrade procedures that are provided in the *IBM Tivoli Monitoring: Installation and Setup Guide*.
3. If you plan to monitor power, energy, and thermal characteristics of BladeCenters, Rack Servers, System z10s, and PDU+es, verify that your IBM Director, Active Energy Manager, and optional Hardware Management Console are at a supported version. The minimum supported version for IBM Director and the optional Hardware Management Console extension is Version 5.20.2. The minimum supported version of Active Energy Manger is Version 3.1.1. Refer to the instructions to upgrade to your current software level to the supported level at the IBM Systems Software Information Center at <http://publib.boulder.ibm.com/infocenter/eserver/v1r2/index.jsp?topic=/einfo/icmain.htm>.



---

## Chapter 5. Configuration

As part of the installation procedures for each product in this offering, there might be additional configuration steps that you need to complete before using the product to monitor your environment. Be sure to consult the documentation for each product and verify that you have completed all required steps.

Also verify that online help information for each product is displayed in the help system. From the Manage Tivoli Enterprise Monitoring Services console, verify that the Eclipse Help Server is started.

You might also need to install language support, set up user authentication roles and permissions, configure and enable historical data collection, and configure remote monitoring agents. Refer to the product documentation libraries for details on these and other configuration tasks as needed. The sections that follow include some examples of the kinds of configuration tasks you might need to perform for your environment.

---

### Configuring IBM Tivoli Monitoring

After creating the Tivoli Data Warehouse database, you might need to reconfigure the Warehouse Proxy. See the documentation provided with IBM Tivoli Monitoring for additional information and configuration procedures. Here is an example procedure if you are using the IBM DB2 product:

1. Open the Manage Tivoli Enterprise Monitoring Services utility and right-click the Warehouse Proxy. Then select **Reconfigure**.
2. In response to the pop-up reminder to connect to a Hub Tivoli Enterprise Monitoring Server, click **OK**.
3. Accept the default **Agent Advanced Configuration** settings.
4. In response to the prompt to configure the ITM Warehouse ODBC data source, answer **Yes**.
5. Specify the Database Type by selecting the **DB2** radio button.
6. Verify that the Data Source Name is ITM Warehouse, the Database Name is WAREHOUS, and the Admin user ID is an authorized user name, such as the default, db2admin.
7. On the same page, type a valid administrator password (such as the default, db2admin).
8. When prompted, click **Yes** to complete the configuration process.
9. After receiving a confirmation message that the configuration was successful, click **OK** to complete the process.
10. Restart the Warehouse Proxy from the Manage Tivoli Enterprise Monitoring Services console.

---

### Configuring IBM Director and optional Hardware Management Console

If you have just installed a new IBM Director environment, instead of upgrading an existing installation, you must configure the IBM Director installation. If you installed the optional Hardware Management Console, you must configure it. There is no configuration required for Active Energy Management.

Refer to the configuration instructions for IBM Director and Hardware Management Console on the IBM Systems Software Information Center at <http://publib.boulder.ibm.com/infocenter/eserver/v1r2/index.jsp?topic=/einfo/icmain.htm>.

---

### Configuring the Active Energy Manager Agent plug-in

The Tivoli Monitoring Active Energy Manager Agent plug-in is configured from the IBM Director console. After installing the plug-in, start the IBM Director console.

A new entry for the Tivoli Monitoring Active Energy Manager Data Provider is displayed in the IBM Director Tasks menu. Open the ITM Active Energy Manager Data Provider dialog box from the **Tasks** menu by selecting **ITM Active Energy Manager Data Provider > ITM Active Energy Manager Data Provider**:

**Open.** The dialog box as shown in Figure 2 is displayed.

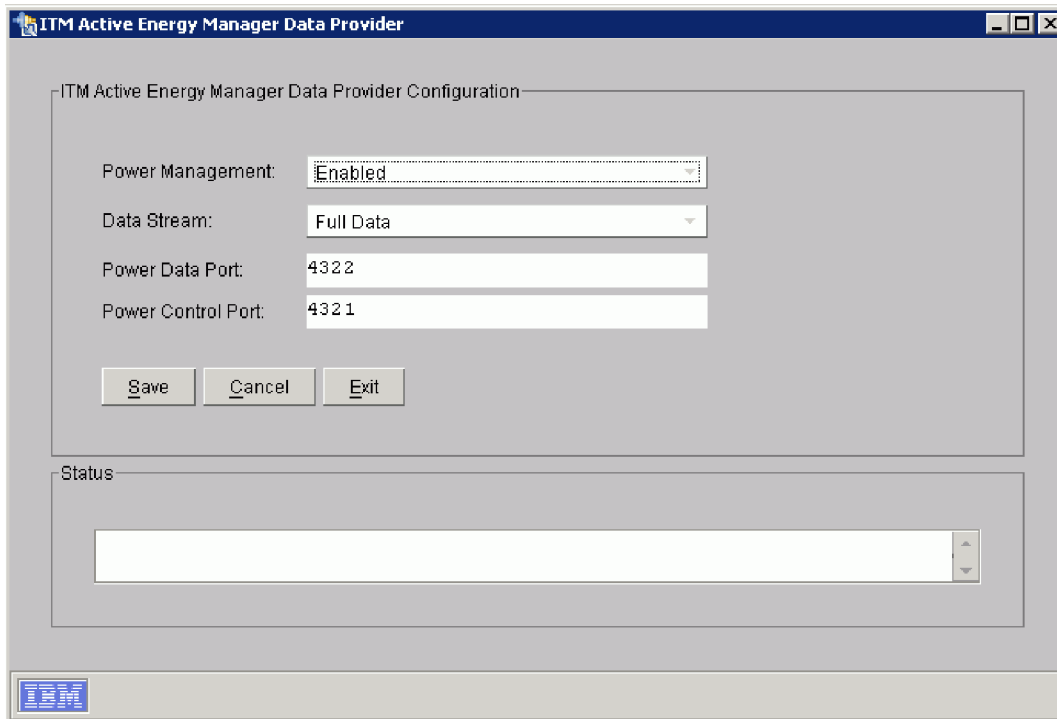


Figure 2. Configuration options for the Active Energy Manager Agent

The following configuration options are available:

- **Power Management:** Enable or disable the ability to set power capping and power saver modes remotely. This setting must be enabled in order to use the Power Control GUI to remotely set power cap and power saver modes on managed systems.
- **Data Stream:** Collect full data or only power and temperature data. Full data includes additional information such as power saver mode, power capping information, and metering levels.
- **Power Data Port:** The TCP/IP port, which the Tivoli Monitoring Active Energy Manager Agent uses to communicate with the plug-in.
- **Power Control Port:** The TCP/IP port, which the Tivoli Monitoring Active Energy Manager Agent uses to control power settings if power management is enabled.

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## Configuring the Eaton Power Xpert Agent

The Tivoli Monitoring for Energy Management: Eaton Power Xpert Agent uses the Simple Network Management Protocol (SNMP) to remotely collect metrics from Eaton Power Xpert uninterruptible power supplies (UPS); power distribution units, remote power panels, rack power modules (generically referred to here as PDU devices), and meters.

The Tivoli Monitoring for Energy Management: Eaton Power Xpert Agent supports UPS devices with a PXGX 2000 gateway card installed and PDU devices with a PXGX 1000 gateway card installed. Refer to the Eaton PXGX 1000 and PXGX 2000 documentation for the steps required to enable SNMP management functions on these cards. The Tivoli Monitoring for Energy Management: Eaton Power Xpert Agent also support the Eaton Power Xpert 4000, 6000, and 8000 Meters. Refer to the documentation for your meter for the steps required to enable SNMP management functions.

After enabling SNMP on the Eaton UPSes, PDUs, or meters, configure the SNMP connection to the device by configuring the agent in the Manage Tivoli Enterprise Monitoring Services utility.

Complete the following three-step procedure to configure the SNMP connection:

1. Select the SNMP version to be used.

**Note:** All devices that are managed must use the same SNMP version. You may use SNMP Version 1, SNMP Version 2c, or SNMP Version 3, depending on the configuration of the Eaton device. The SNMP Version 1 is selected in Figure 3:

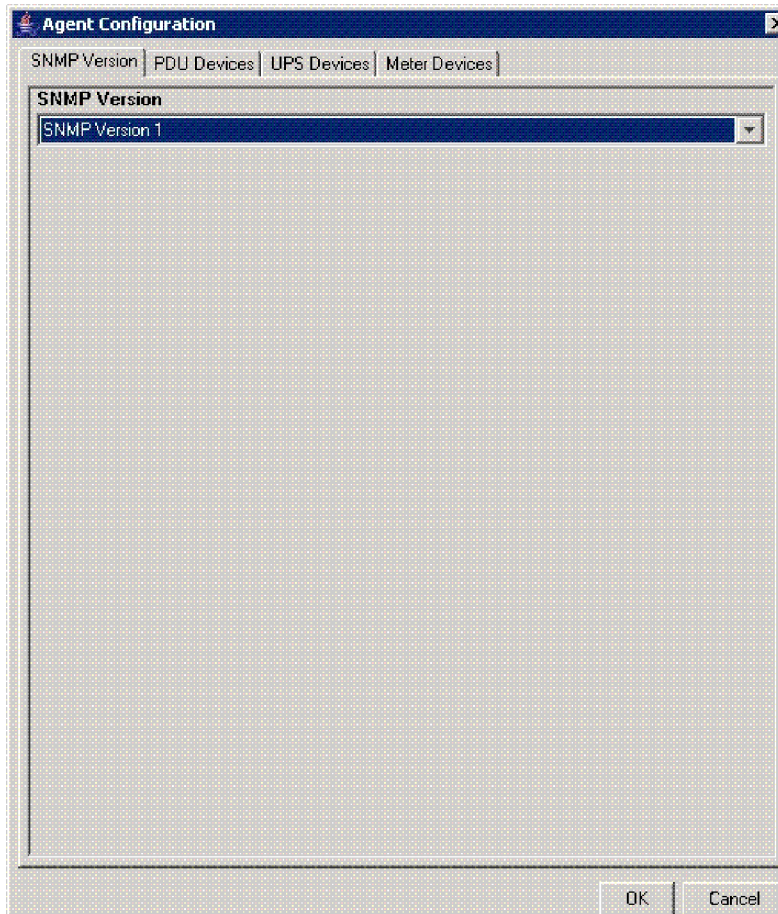


Figure 3. Selecting the SNMP version for the Eaton Power Xpert Agent

2. Provide default values for the SNMP version-specific connection information.
3. Configure new PDUs, UPSes, and meters. Provide unique labels, host name or IP addresses, and device-specific connection information. Figure 4 on page 22, Figure 5 on page 23, and Figure 6 on page 24 show the PDU, UPS, and meter configuration windows:

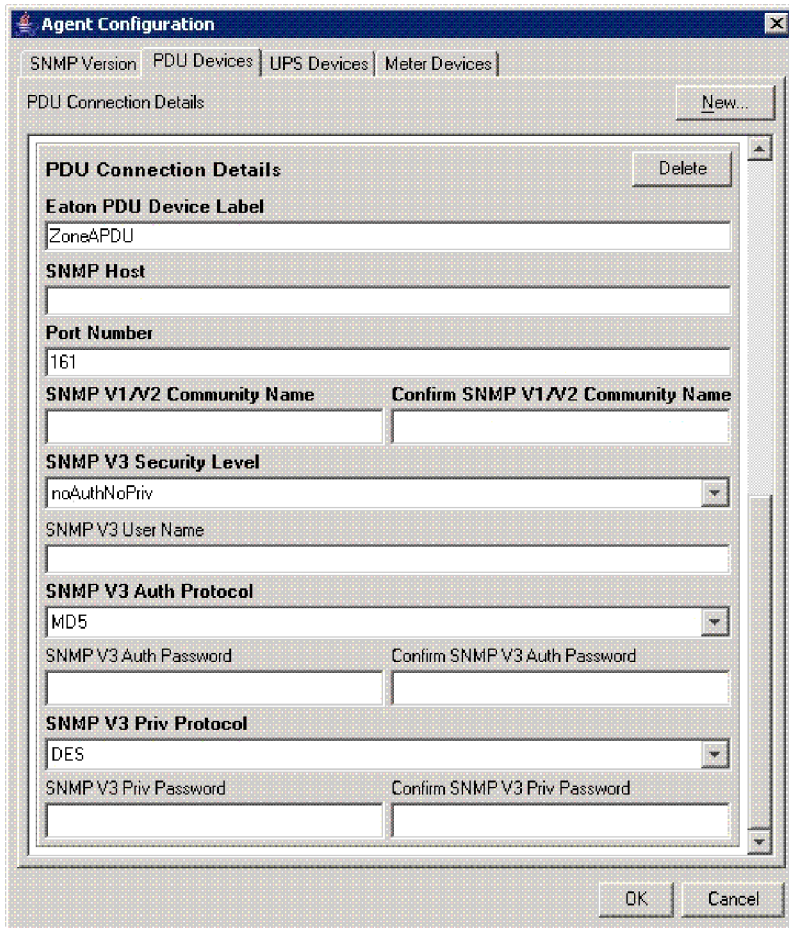


Figure 4. Configuring a PDU for the Eaton Power Xpert Agent

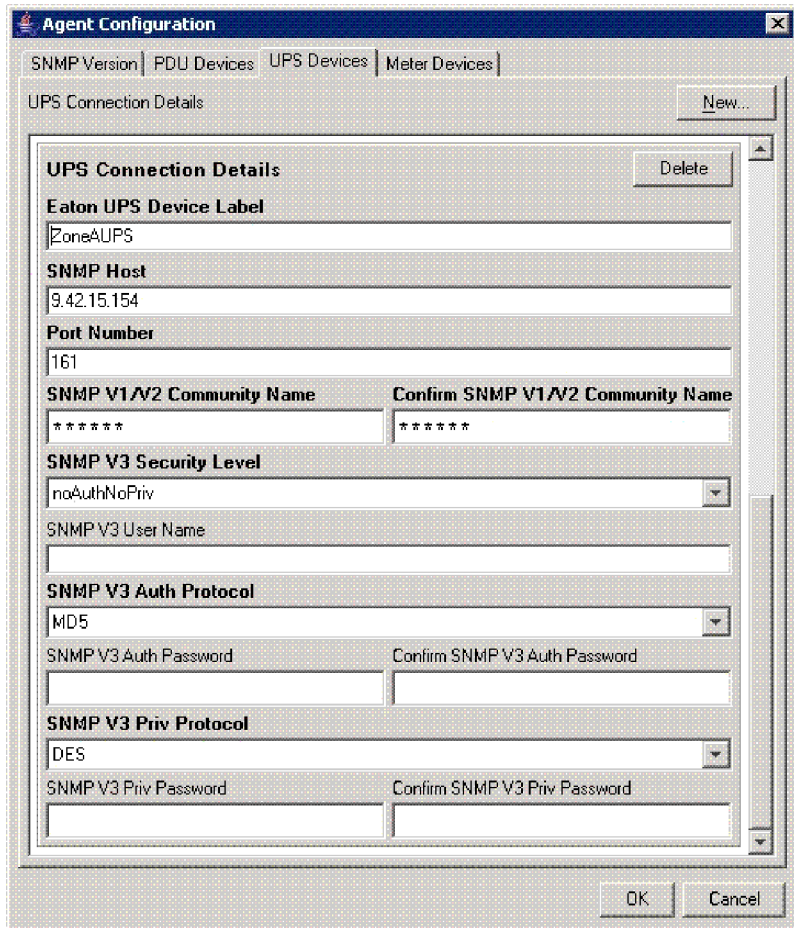


Figure 5. Configuring a UPS for the Eaton Power Xpert Agent

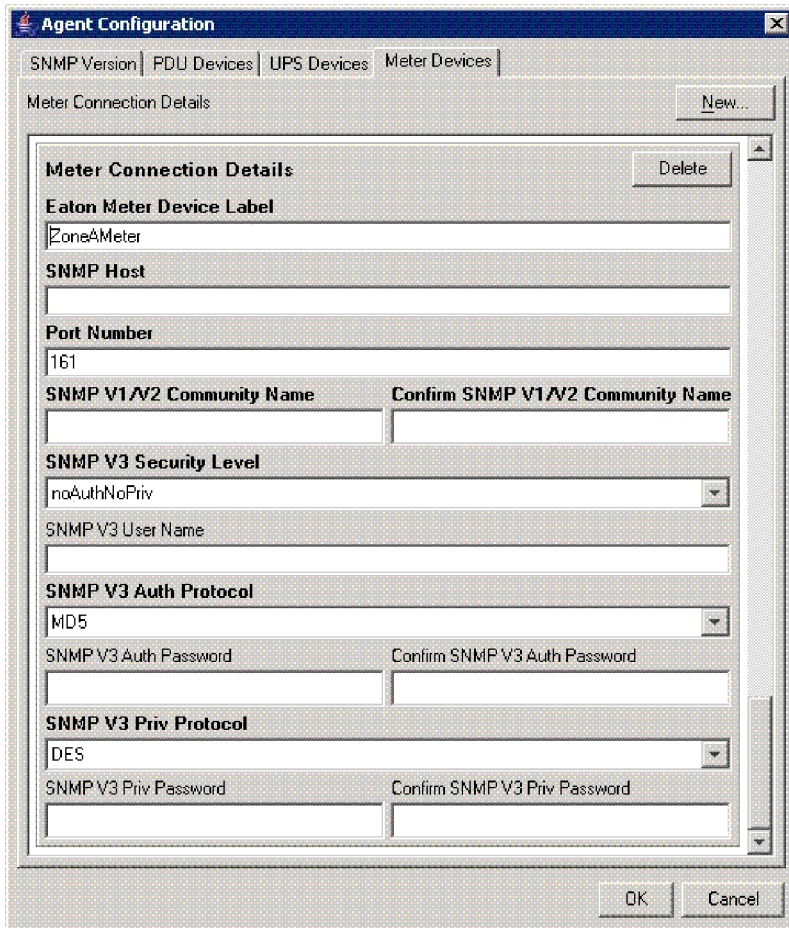


Figure 6. Configuring a Meter for the Eaton Power Xpert Agent

When configuration is complete, start the Eaton Agent.

---

## Configuring Data Center Optimization for Energy Management

If you have just installed the Data Center Optimization for Energy Management feature, you need to enter configuration information to customize the reports generated for your environment. This is done through Tivoli Common Reporting. When Data Center Optimization for Energy Management is installed, an Energy entry is made in the navigation tree which appears in the navigation pane of the Tivoli Common Reporting console.

To run reports, you must provide database settings to connect to the Tivoli Data Warehouse. Select Database Settings under the Configuration selection. The Database Settings page opens, as shown in Figure 7 on page 25.



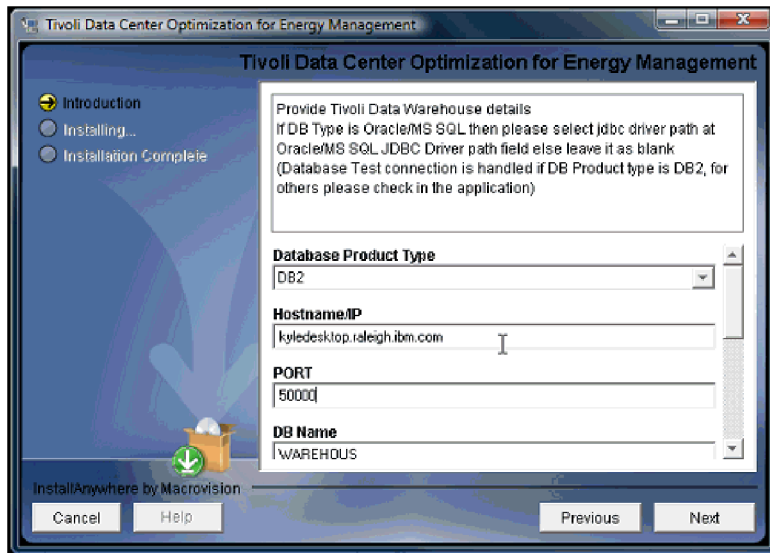


Figure 7. Configuring Data Center Optimization for Energy Management

Information used to customize reports is entered by choosing the options under the **Preferences** selection. You can customize the following:

### Server Settings

You can import servers and groups from the Tivoli Data Warehouse for use in reports. Additionally, you can:

- Classify servers as critical to your business.
- Create server groups that are displayed as a group in the reports, allowing drill down to individual servers.
- Associate servers with IPDUs and energy meters.

### Energy Rate Plans

In order to calculate estimated power costs, you must enter the power rates for your data center.

### Energy Mixes

You have to supply carbon unit energy mix for your area from the power company in order for reports to accurately reflect carbon emissions information. To look up carbon information for your ZIP code in the continental United States, you can access the U.S. Environmental Protection Agency's Power Profiler at <http://www.epa.gov/cleanenergy/energy-and-you/how-clean.html>.

### Data Analyzer Settings

Use the Data Analyzer settings to specify how often to analyze your energy data for patterns to be used in the recommendations reports provided by Data Center Optimization for Energy Management.

For complete information about configuring Data Center Optimization for Energy Management, refer to the Data Center Optimization for Energy Management User's Guide.



## Chapter 6. Use cases

The following use cases are provided to help you perform a few of the more common functions of Tivoli Monitoring for Energy Management. It is unlikely you will need to use all the procedures listed here, and it is also unlikely these procedures will satisfy all of your needs for managing your data center. Take a moment to look through these procedures and find the ones that are most relevant to your situation. You can use them as a basis for your own management techniques.

### Monitoring power and thermal data on an IBM server

The following sections include information for adding a server, turning on warehousing, and viewing the server workspace.

#### Adding a server to IBM Director

To add a Rack Server to IBM Director, complete the following steps while reviewing Figure 8 and Figure 9:

1. Start the IBM Director Console.
2. Using the action bar, navigate to **Console > New > Managed Objects > Physical Platforms**.
3. A pop-up window to Add Physical Platforms is displayed. Enter an optional name and the IP address of the Baseboard Management Controller of the system you are adding. Press the **OK** button. (You can find out more about the Baseboard Management Controller at [http://publib.boulder.ibm.com/infocenter/eserver/v1r2/index.jsp?topic=/dirinfo\\_all/dirinfoparent.html](http://publib.boulder.ibm.com/infocenter/eserver/v1r2/index.jsp?topic=/dirinfo_all/dirinfoparent.html).)
4. A pop-up window is displayed indicating that adding the server is complete. Press the **OK** button.
5. Your new server is displayed in the IBM Director Console **All Managed Objects : System Membership** list.

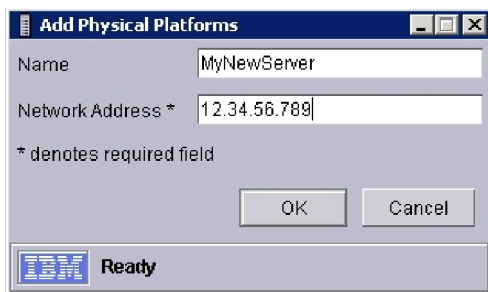


Figure 8. Adding a server to IBM Director

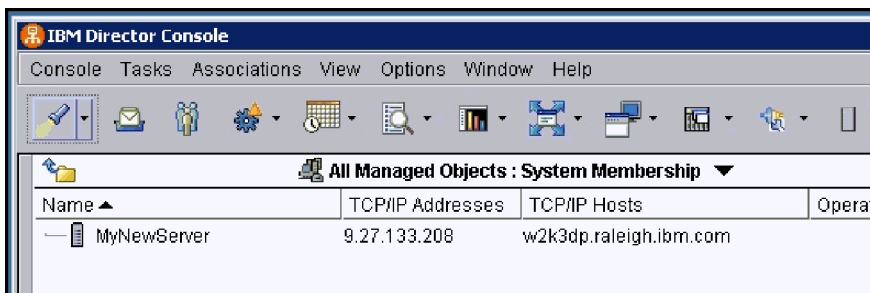


Figure 9. The new server is added

## Turning on warehousing

This procedure guides you through turning on warehousing, which instructs Tivoli Monitoring to capture the power and thermal measurements for later analysis. For warehousing to work, you must have installed the Warehouse Proxy Agent. If you have not installed the agent, you can still do so now.

If you want to use the Tivoli Common Reporting reports of Tivoli Monitoring for Energy Management, you also need to turn on warehouse summary and pruning. If you have not installed the Summarization and Pruning Agent, it is not too late to do so.

To enable historical data collection, complete the following steps and review Figure 10 on page 29:

1. Log on to the portal GUI.
2. Click **Edit > History Configuration**.
3. Select **Active Energy Manager** from the **Select a product** drop-down list.
4. You can enable historical data collection for any of the following attribute groups that are appropriate to your environment:
  - Rack Servers
  - System z
  - BladeCenters
  - PDU+s and UPSes
5. Select a **Collection Interval** of 5 minutes, a **Warehouse Interval** of 1 hour, and a **Collection Location** of TEMA.
6. Multi-select the appropriate attributes groups from the previous list.
7. If you will be using the Tivoli Common Reporting reports, check the Hourly and Daily Summarization boxes.
8. Click **Configure Groups**.
9. Re-select the attribute groups that were configured in Step 4.
10. Click **Start Collection**.

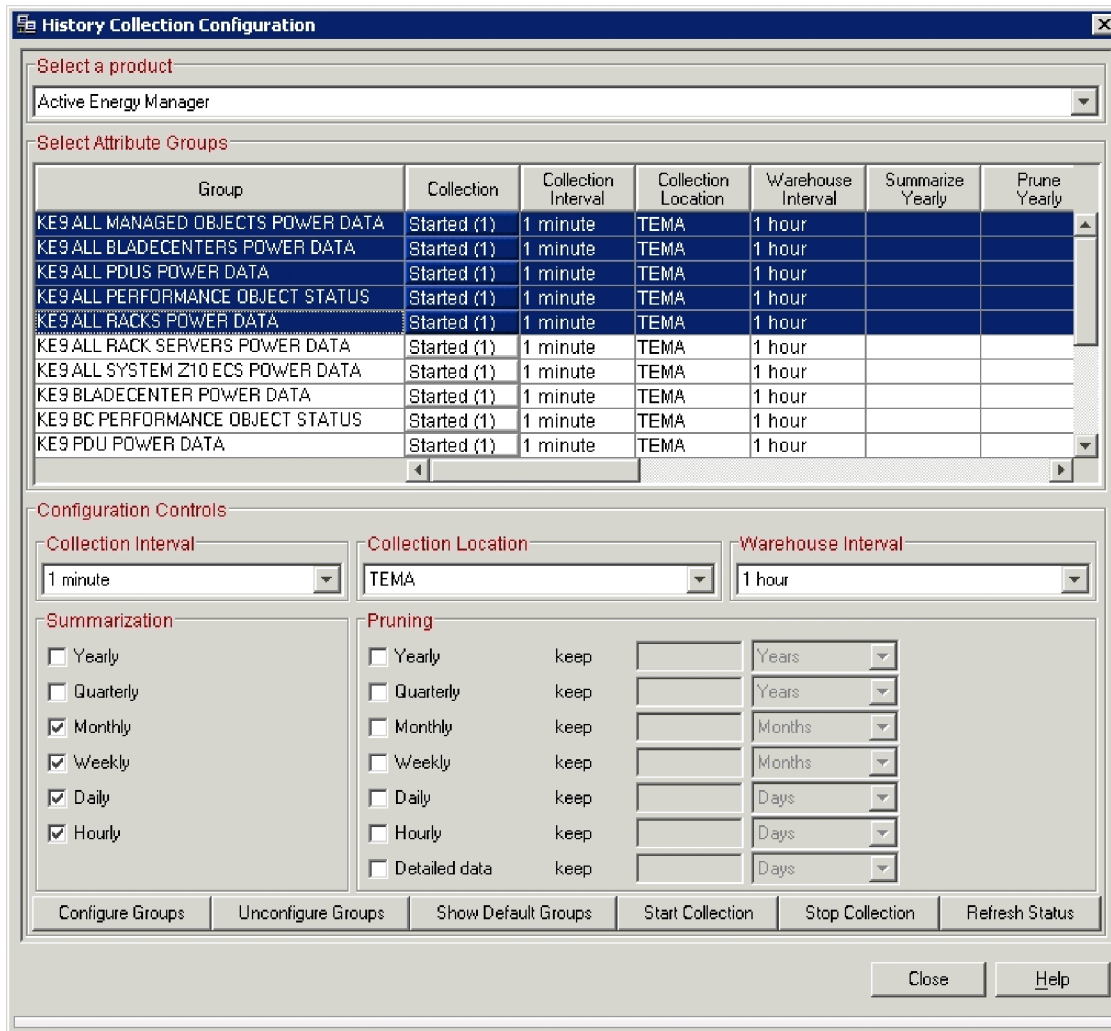


Figure 10. Configuring historical data collection

## Viewing the server workspace

There are many interesting views and workspaces for Tivoli Monitoring for Energy Management within the portal GUI. Here is how to find some of the most interesting ones. All these procedures take place within the portal GUI, so you must be logged in to perform these operations.

### Verifying the status of the Active Energy Manager Agent

To verify the status of the Active Energy Manager Agent, follow these steps and review Figure 11 on page 30 and Figure 12 on page 30:

1. In the Physical View, expand the tree under the **Active Energy Manager** node to view the **Agent Status** node.
2. Click the **Agent Status** node to view the **Power Managed Object Agent Status**.

## Select Agent Status under Active Energy Manager Agent

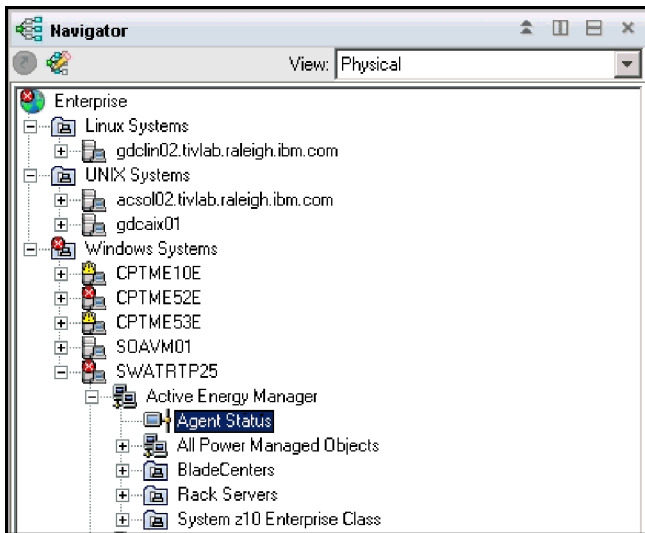


Figure 11. Select Agent Status under Active Energy Manager Agent

Power Managed Object Agent Status				
Timestamp	Query Name	Object Name	Object Status	Error Code
07/10/08 17:42:26	Rack_Servers	Rack_Servers	ACTIVE	NO ERROR
07/10/08 17:42:26	Racks	Racks	INACTIVE	NO INSTANCES AVAILABLE
07/10/08 17:42:26	System_z10_ECcs	System_z10_ECcs	INACTIVE	NO INSTANCES AVAILABLE
07/10/08 17:42:26	BladeCenters	BladeCenters	ACTIVE	NO ERROR
07/10/08 17:42:26	PDUcs	PDUcs	INACTIVE	NO INSTANCES AVAILABLE
07/10/08 17:42:26	All_Power_Managed_Objects	All_Power_Managed_Objects	ACTIVE	NO ERROR

Figure 12. The Power Managed Object Agent Status

## Viewing the status of rack servers and other managed objects

Under the **Active Energy Manager** node in the Physical View, at the same level in the tree as **Agent Status**, there is a tree entry for each of the following managed objects of the Active Energy Manager Agent:

- All Power Managed Objects
- BladeCenters
- PDU+es
- Racks
- Rack Servers
- IBM System z

The following procedure applies to monitoring Rack Servers, but the procedures and workspaces for the other object types are very similar. Follow these steps and review Figure 13 on page 31:

1. Click the **Rack Servers** node, which changes the screen layout and shows you several workspaces that display the operational measurements being collected by the agent for your Rack Servers.
2. Expand the tree under the Rack Servers node to view all of the monitored Rack Servers.
3. Click one of the Rack Servers in the exposed tree to view operating measurement workspaces.
4. Expand the tree under the Rack Server to view the Rack Server Power data.
5. Click the Rack Server Power Data to view power usage workspaces.

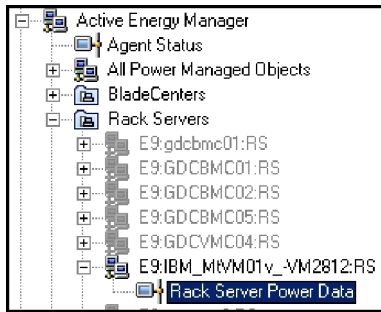


Figure 13. Selecting Rack Server Data

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## Managing the power caps on an IBM Server

One of the most sophisticated functions you can perform using Tivoli Monitoring for Energy Management is controlling the power consumption of your IBM servers. The discussion that follows is a related set of procedures for setting and adjusting power consumption, or the *power cap*, of your IBM servers.

Note that not all IBM servers can be power capped. Refer to the IBM Director information Web site at <http://www.ibm.com/systems/management/director/resources>.

### Invoking the application

The Active Energy Manager Power Control GUI is launched in a portal environment by clicking the icon shown in Figure 14 on page 32 and then double-clicking the workspace view where you want to view the Active Energy Manager Power Control GUI.

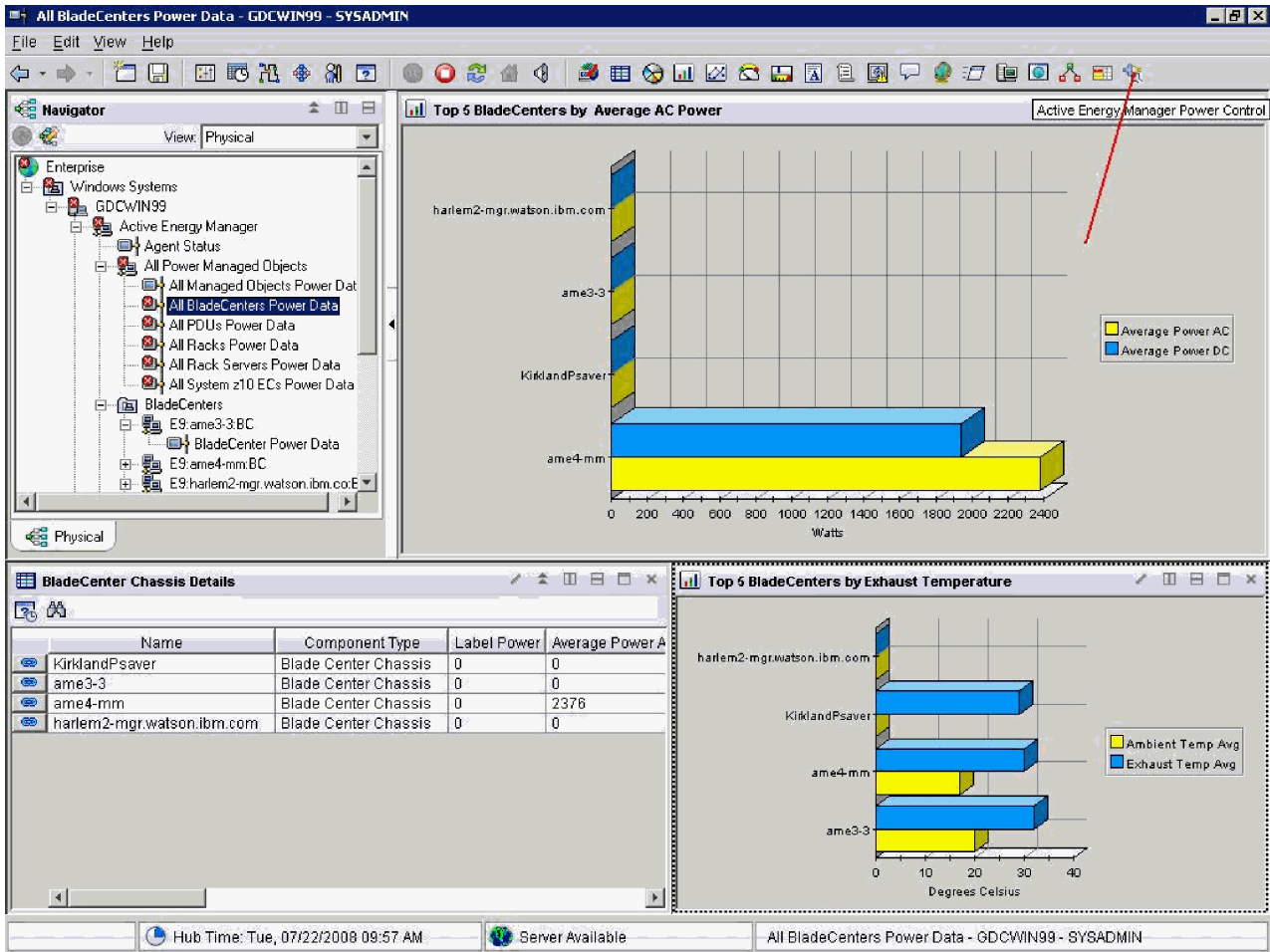


Figure 14. Active Energy Manager Power Control GUI toolbar icon

When the Active Energy Manager Power Control GUI icon is dropped in a portal workspace view (by double-clicking), the AEM Power Control Login window is displayed. This window contains the IP address of the selected system pre-filled on the portal navigator (if the selected system on the portal does not have an IP address associated with it, this value is shown as blank in the window) and the AEM Power Control Server's default port of 4321. You can accept the pre-filled values or can modify them as needed.



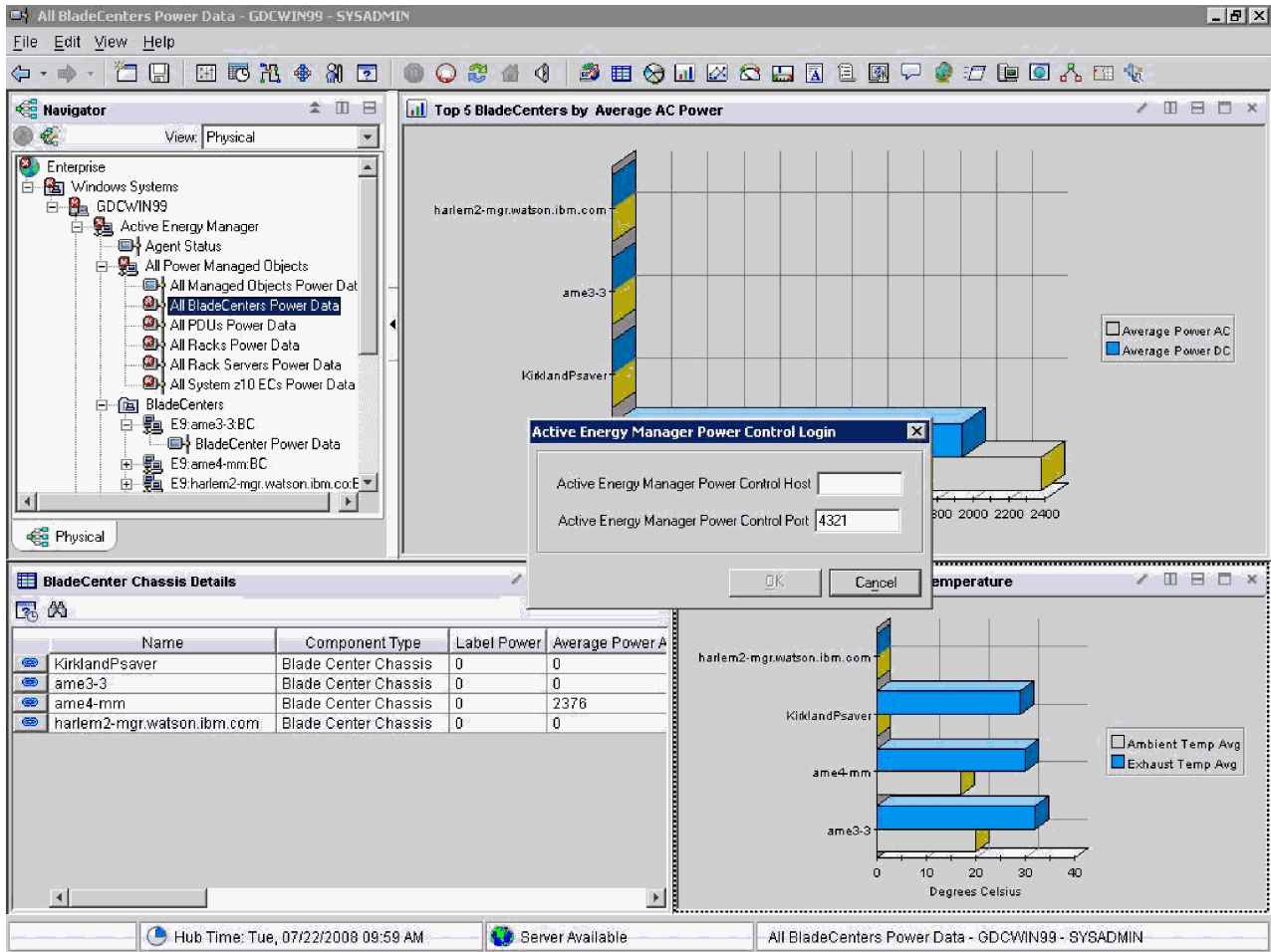


Figure 15. Active Energy Manager Power Control login window

The IP address and port mentioned previously are then used to validate connection to the AEM Power Control Server. If the connection is validated successfully, the validated AEM Power Control Server's IP address and port are then used to populate the AEM Power Control GUI. The IP address and port number of the AEM Power Control Server are displayed with the view's title in the portal when the connection to the Active Energy Manager Power Control Server is completed successfully and the Active Energy Manager Power Control GUI is launched as seen in Figure 16 on page 34.

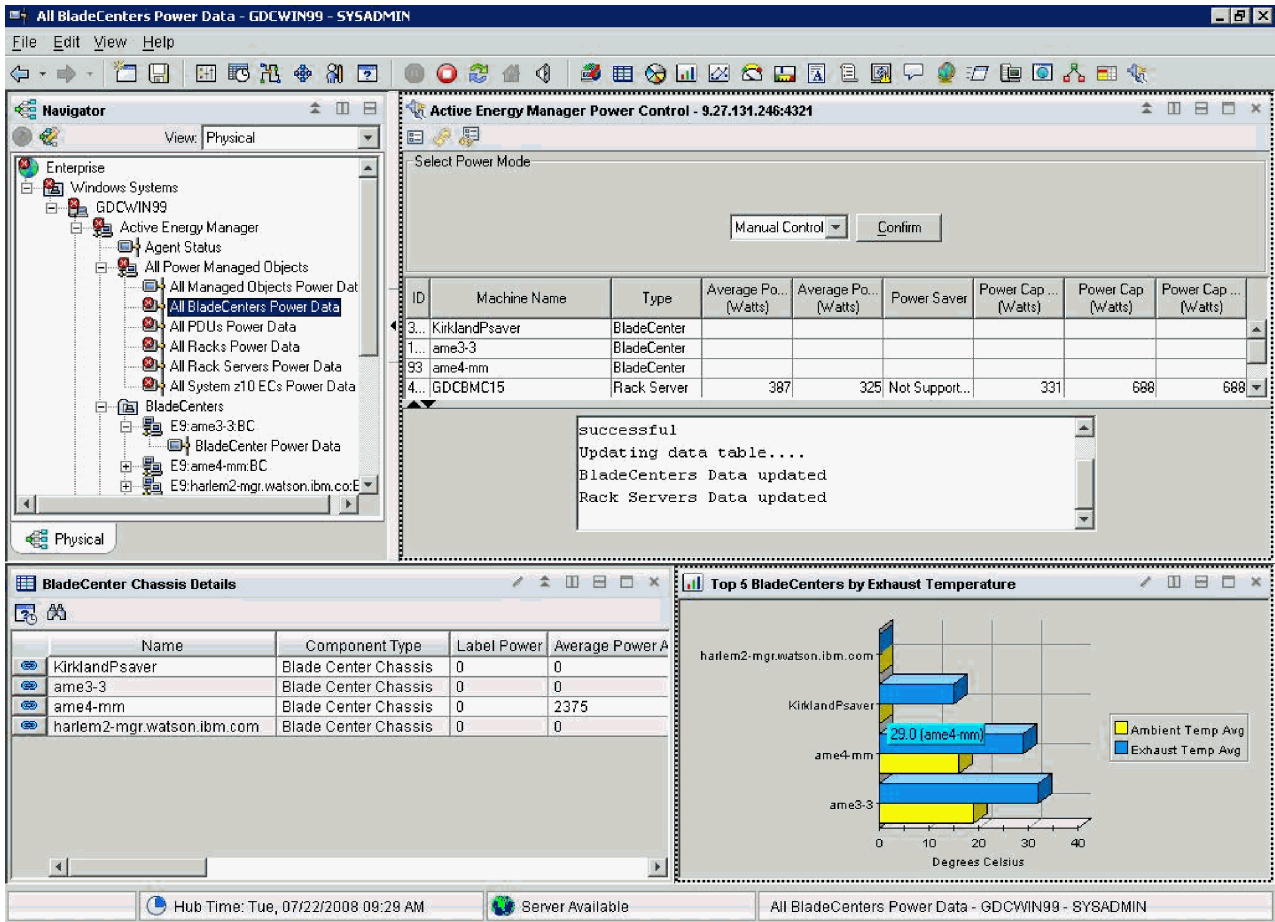


Figure 16. Active Energy Manager Power Control GUI

The Rack Servers and BladeCenters Energy Data table is populated with the Active Energy Manager supported hardware information and power data from the Active Energy Manager Power Control, as seen in the next section. Active Energy Manager-supported BladeCenters and Rack Servers visible from the Director Console and Active Energy Manager Console as managed objects are all included in the Active Energy Manager Power Control GUI.

If the initial connection validation fails, a message is displayed informing you that the IP address of the selected node does not apply to any Active Energy Manager Power Control Server or the Active Energy Manager Power Control Server is down. If the connection fails after the GUI is successfully launched, the connection is tried every 30 seconds and the status text box displays a "Connection to AEM Host fails" message.

## Power data table

When the Active Energy Manager Power Control GUI is successfully launched from the portal and connection is established to the Active Energy Manager Power Control Server, a power data table is displayed. This table contains Rack Servers and BladeCenters Energy Data that includes power data from the Active Energy Manager Power Control Server.

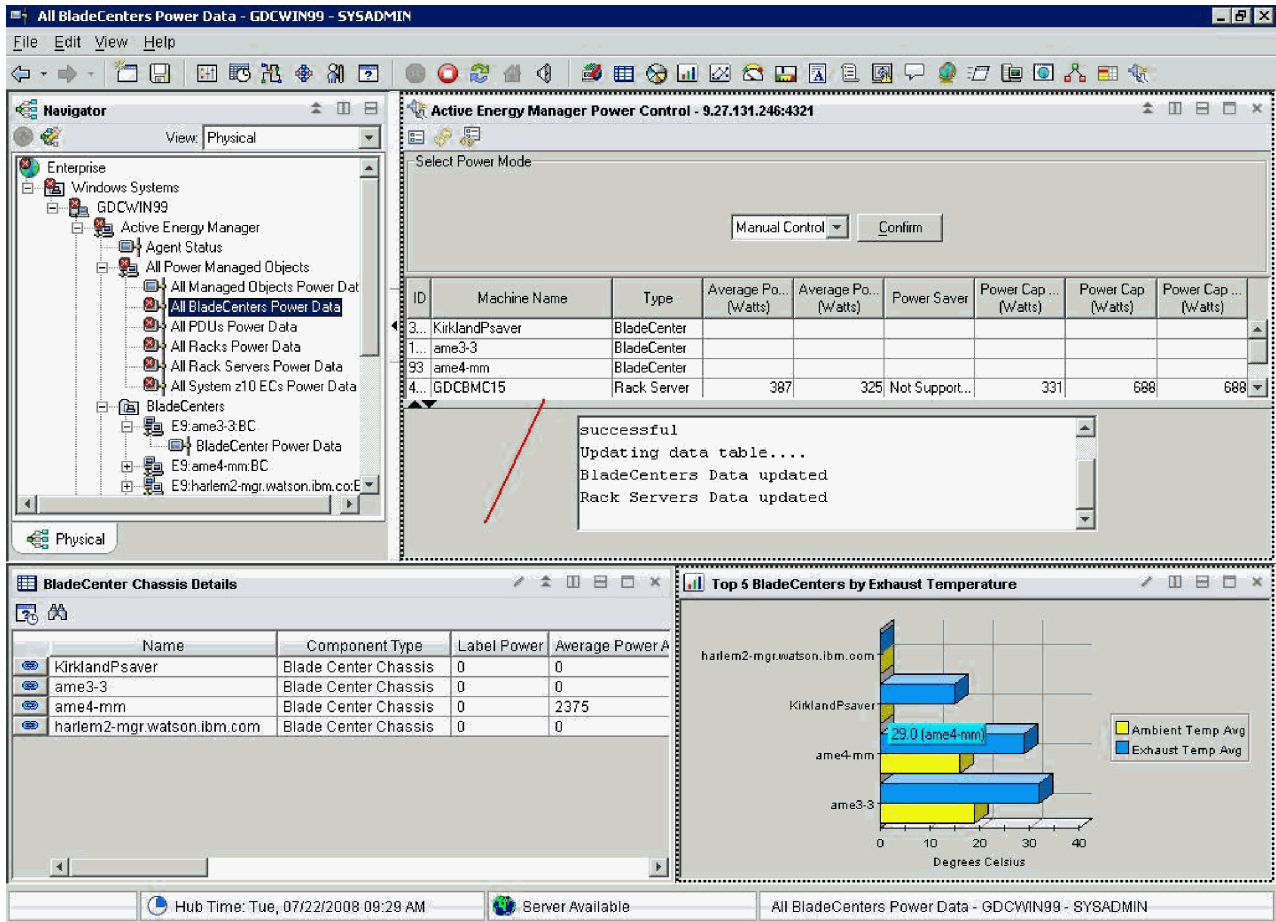


Figure 17. Power data table

Each entry on the table represents either an Active Energy Manager-supported rack server or BladeCenter as indicated by the **Type** column. If the type of the hardware is a BladeCenter, clicking the corresponding row creates a table showing the Blade Servers component as the target BladeCenter.

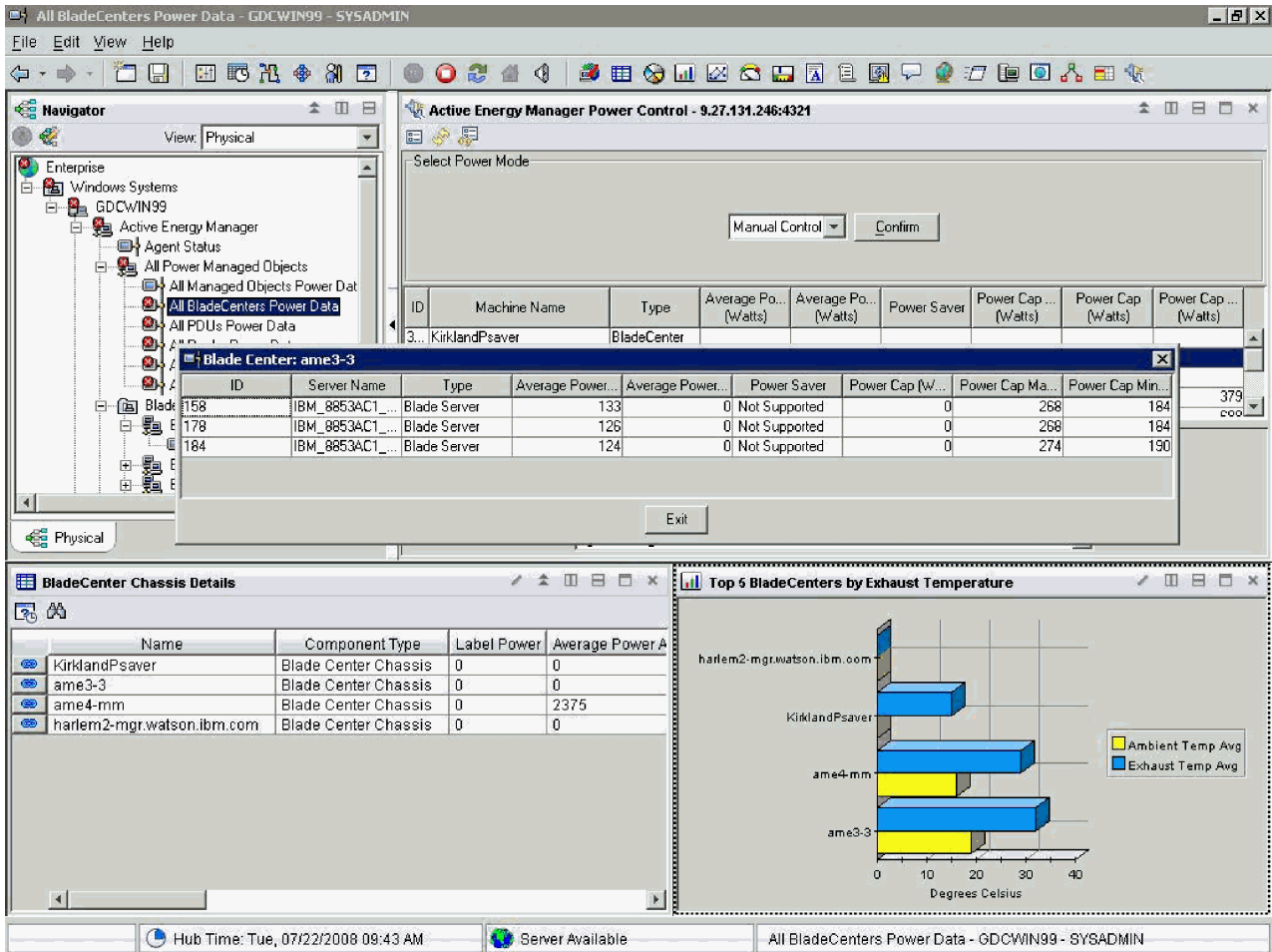


Figure 18. Blade Servers within a BladeCenter

The table shown in Figure 18 contains the same information and operates in the same way as the main Power Data table:

- **ID:** the object ID of the managed system that is defined by Active Energy Manager
- **Server Name:** the name of the system as shown on the Active Energy Manager and Director console
- **Type:** Rack Server or BladeCenter
- **Average Power AC:** the average power AC in Watts from AEM
- **Average Power DC:** the average power DC in Watts from AEM
- **Power Saver:** power saver mode, one of the three values: ON, OFF, and Not Supported
- **Power Cap:** the power cap value in Watts
- **Power Cap Max:** the maximum allowed Power Cap value. This value is system-dependent
- **Power Cap Min:** the minimum allowed Power Cap value. This value is system-dependent

The data in the table is refreshed based on the user settings. Refer to the “Active Energy Manager Power Control GUI settings” on page 40 section for more information on setting the power data table refresh rate.

## Select power mode

In this version, Full Power and Manual Control modes are available.

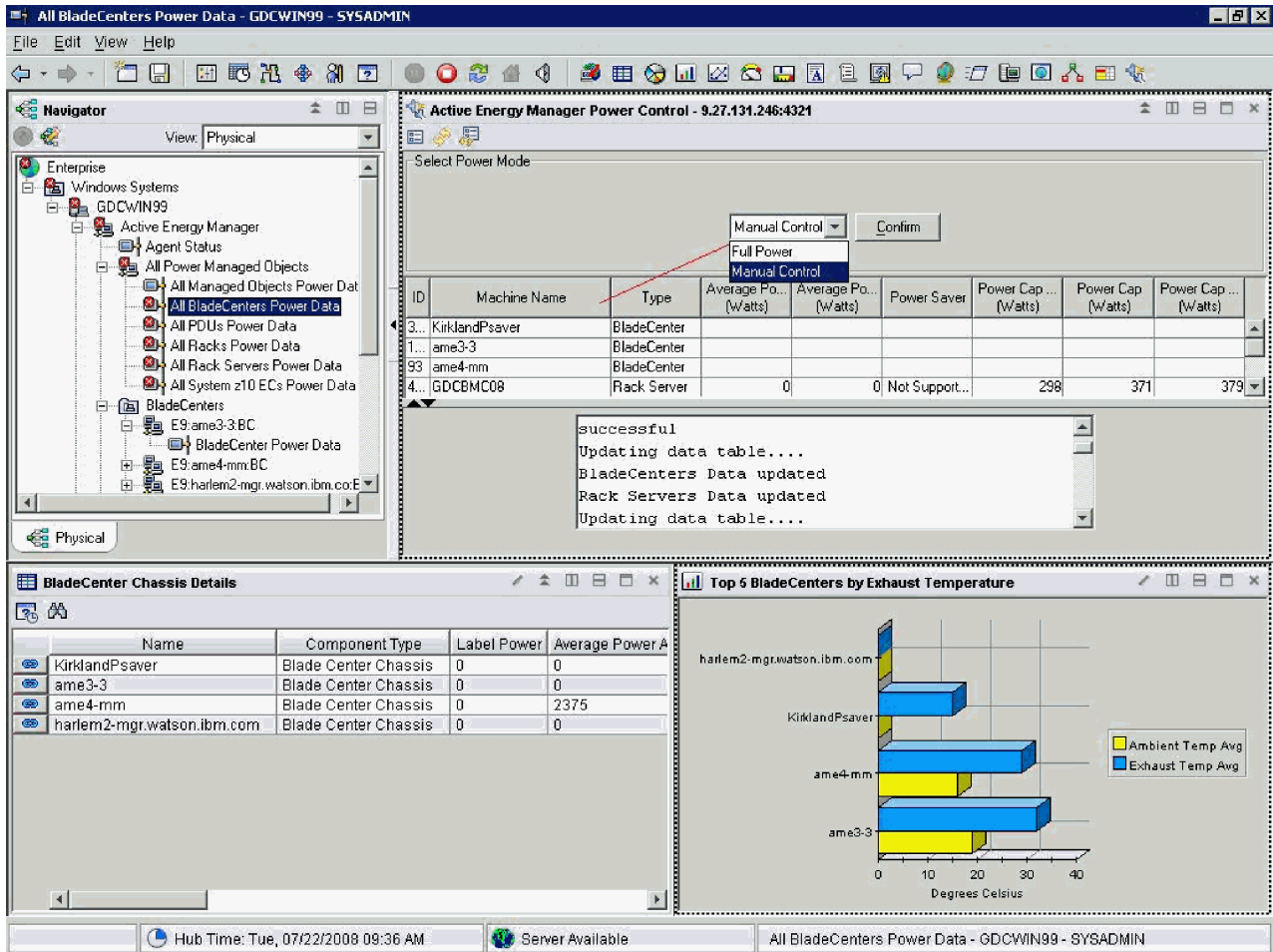


Figure 19. Power mode selection window

Selecting **Full Power** from the drop-down menu and clicking the **Confirm** button sets all systems to their maximum power cap values. A pop-up message is displayed that prompts you to reconfirm setting all the servers to full power.

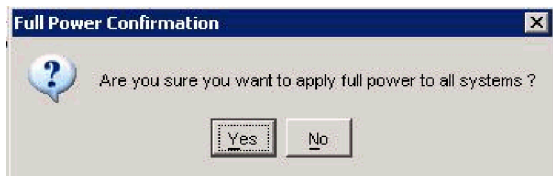


Figure 20. Full Power confirmation window

Selecting **Manual Control** from the drop-down menu followed by clicking the **Confirm** button enables manual control of the power cap and power saver mode of each of the Active Energy Manager-supported servers. Not all servers support power saver mode. The power cap and power saver values can be set on the Power Data table, which is discussed previously in the “Power data table” on page 34 section.

### Changing the power cap for rack servers

Figure 21 on page 38 shows the power cap settings for rack servers.



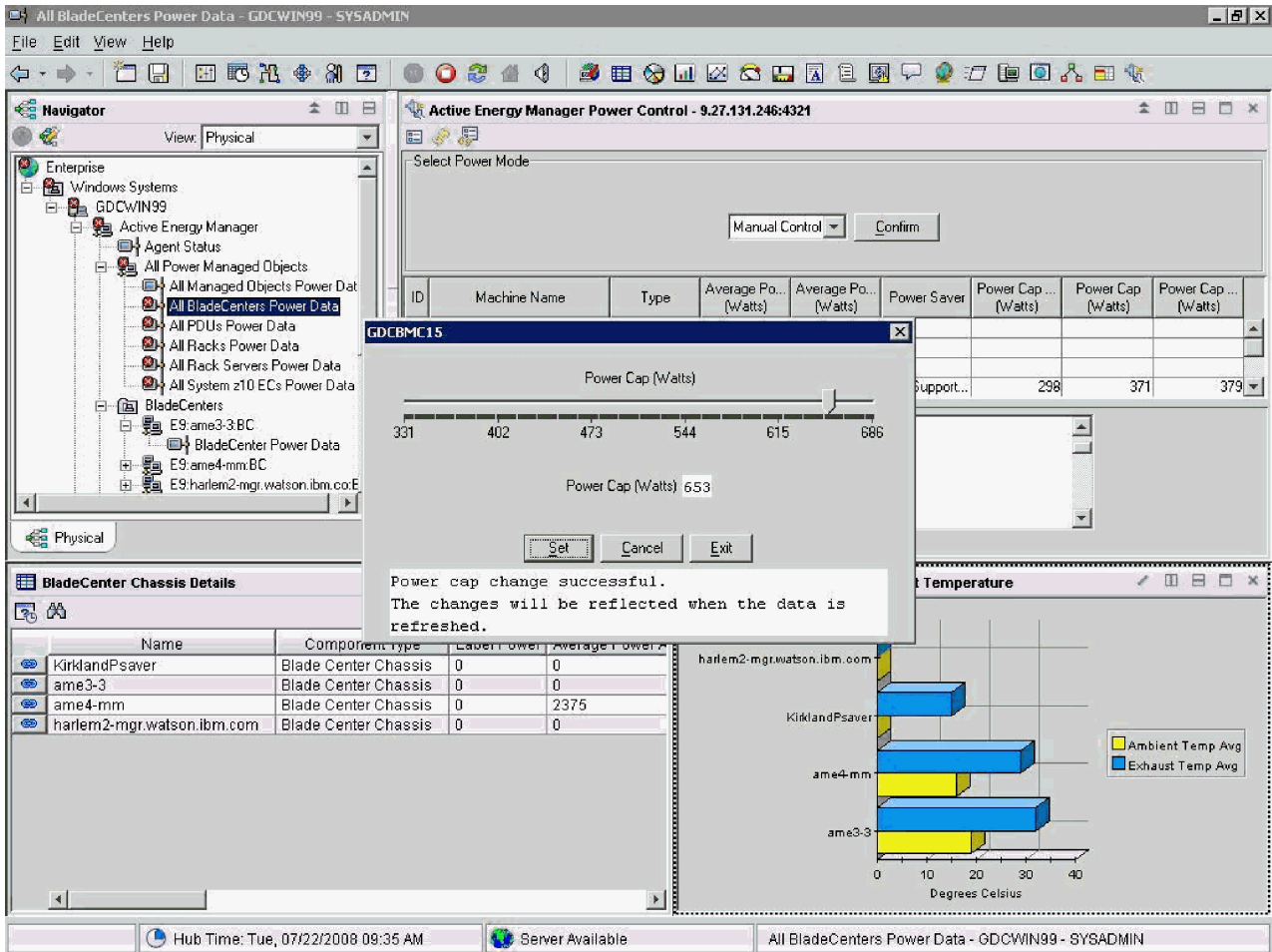


Figure 21. Power cap settings

To change the power cap for rack servers, use the following steps:

1. Select the server on the table by clicking the corresponding row.
2. Click the **Power Cap** cell of the selected row.

**Note:** Steps 1 and 2 can be combined into one step by clicking the **Power Cap** cell of the target row.

As shown in Figure 21, a slider is displayed for setting the power cap. The slider is initialized to the current power cap. The upper and lower bounds of the power cap slider represent the maximum and minimum power cap values that can be set for that specific server. To change the power cap value for the target server, set the desired power cap value by using the slider, and then click the **Set** button to send the power cap change command and the desired power cap value of the target server to the Active Energy Manager Power Control Server. Note that the Power Cap (Watts) text field is read-only and displays only the value chosen by the slider.

**Note:** Clicking the **Cancel** button always sets the slider back to the original value that was in force when you launched the Power Cap (watts) window regardless of the changes made using the **Set** button. However, the changes made using the **Set** button remain valid and are reflected in target server's power cap value in the Power Data table on the next GUI data refresh from the cache.

Clicking the **Exit** button exits the slider control.

## Changing the power saver mode for rack servers

Use the following steps to change the power saver mode for rack servers:

1. Select the server on the table by clicking the corresponding row.
2. Click the **Power Saver** cell of the selected row.

**Note:** Steps 1 and 2 can be combined into one step by clicking the **Power Saver** cell of the target row.

The Power Saver shows the following three possible values:

- **ON:** power saver mode is turned on
- **OFF:** power saver mode is turned off

A "Power Saver Mode Not Supported" message is displayed if you click a **Power Saver** cell with no supported power saver mode for the target server.

The screenshot displays the 'Active Energy Manager Power Control' interface. The main window shows a table of servers with columns for ID, Machine Name, Type, Average Power (Watts), Power Saver, Power Cap (Watts), and Power Cap (Watts). The selected row is for machine 'GDCBMC08', which is a 'Rack Server' with an average power of 205 Watts and a power saver mode of 'Not Support...'. A dialog box titled 'GDCBMC08' is open, displaying the message 'Power Saver Mode Not Supported' and an 'Exit' button. Below the main window, there are two smaller windows: 'BladeCenter Chassis Details' showing a table of chassis components, and 'Top 5 BladeCenters by Exhaust Temperature' showing a bar chart comparing ambient and exhaust temperatures for various blade centers.

ID	Machine Name	Type	Average Po... (Watts)	Average Po... (Watts)	Power Saver	Power Cap ... (Watts)	Power Cap (Watts)	Power Cap ... (Watts)
3...	KirklandPsaver	BladeCenter						
1...	ame3-3	BladeCenter						
93	ame4-mm	BladeCenter						
4	GDCBMC08	Rack Server	205	165	Not Support...	298	371	379

Name	Component Type	Label Power	Average Power A
KirklandPsaver	Blade Center Chassis	0	0
ame3-3	Blade Center Chassis	0	0
ame4-mm	Blade Center Chassis	0	2375
harlem2-mgr.watson.ibm.com	Blade Center Chassis	0	0

Figure 22. Clicking a Power Saver cell that has no supported power saver mode

By clicking a **Power Saver** cell with power saver mode support, the Power Saver Mode Selection GUI is displayed. Select the power saver mode and click the **Set** button to change the power saver mode for the target server. Click **Exit** to exit. It is important to note that after changing the power cap values or the power saver mode, the change might not be visible on the table immediately because there is a delay caused by the caching interval and Active Energy Manager polling interval; the modified value will be visible after the next cycle of cache refresh.

## Changing power cap and power saver mode for Blade Servers

To change the power cap and power saver mode of the Active Energy Manager-supported Blade Servers, click the row on the table representing the BladeCenter. A list of Blade Servers within the BladeCenter is displayed, as shown in Figure 23:

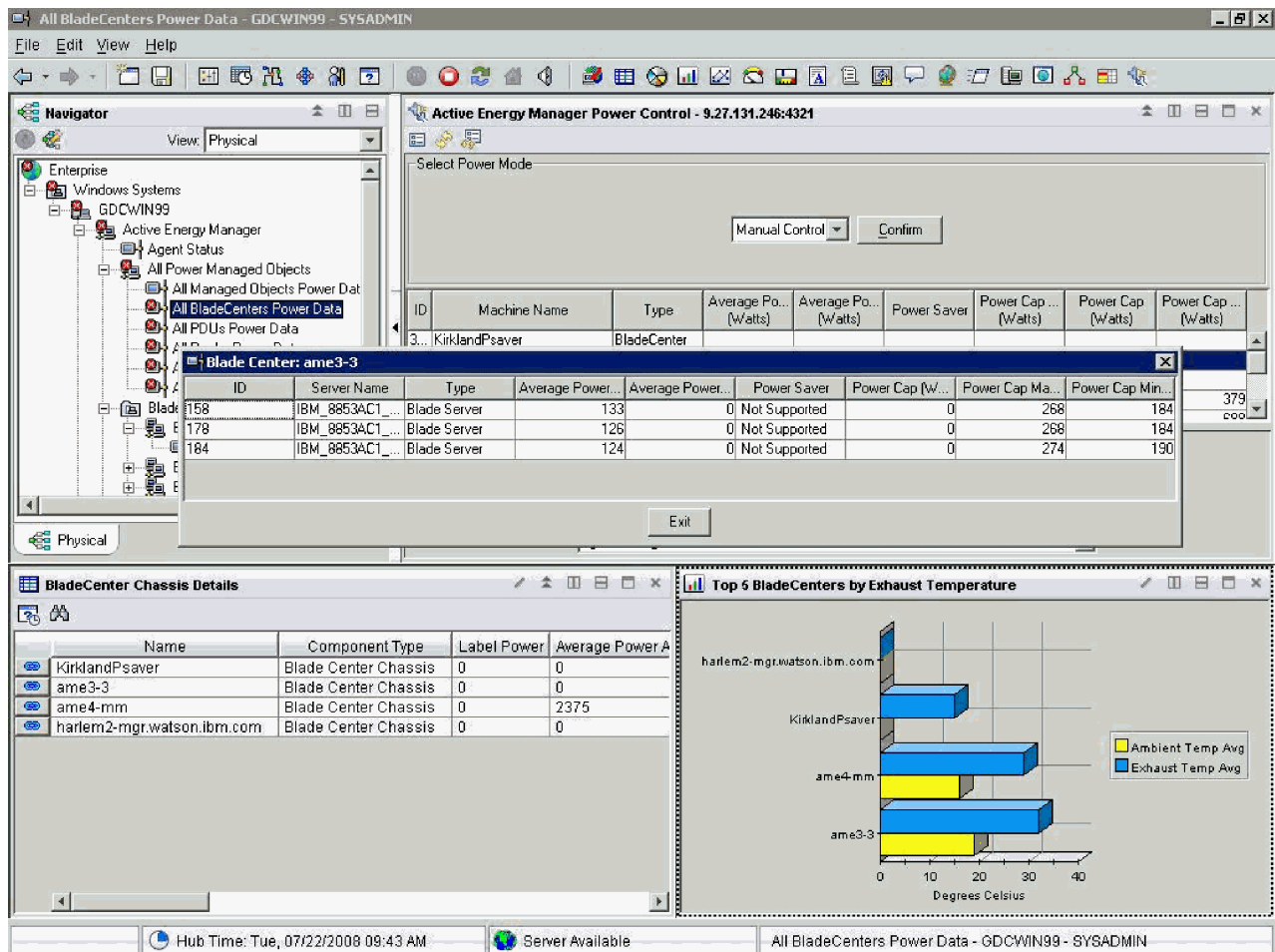


Figure 23. List of Blade Servers within the BladeCenter

Follow the same Rack Servers procedure to change the power cap values and power saver mode for Blade Servers.

## Active Energy Manager Power Control GUI settings

The Active Energy Manager Power Control GUI includes display data settings, such as which type of server information is displayed in the GUI, among others. See the display data settings shown in Figure 24 on page 41.



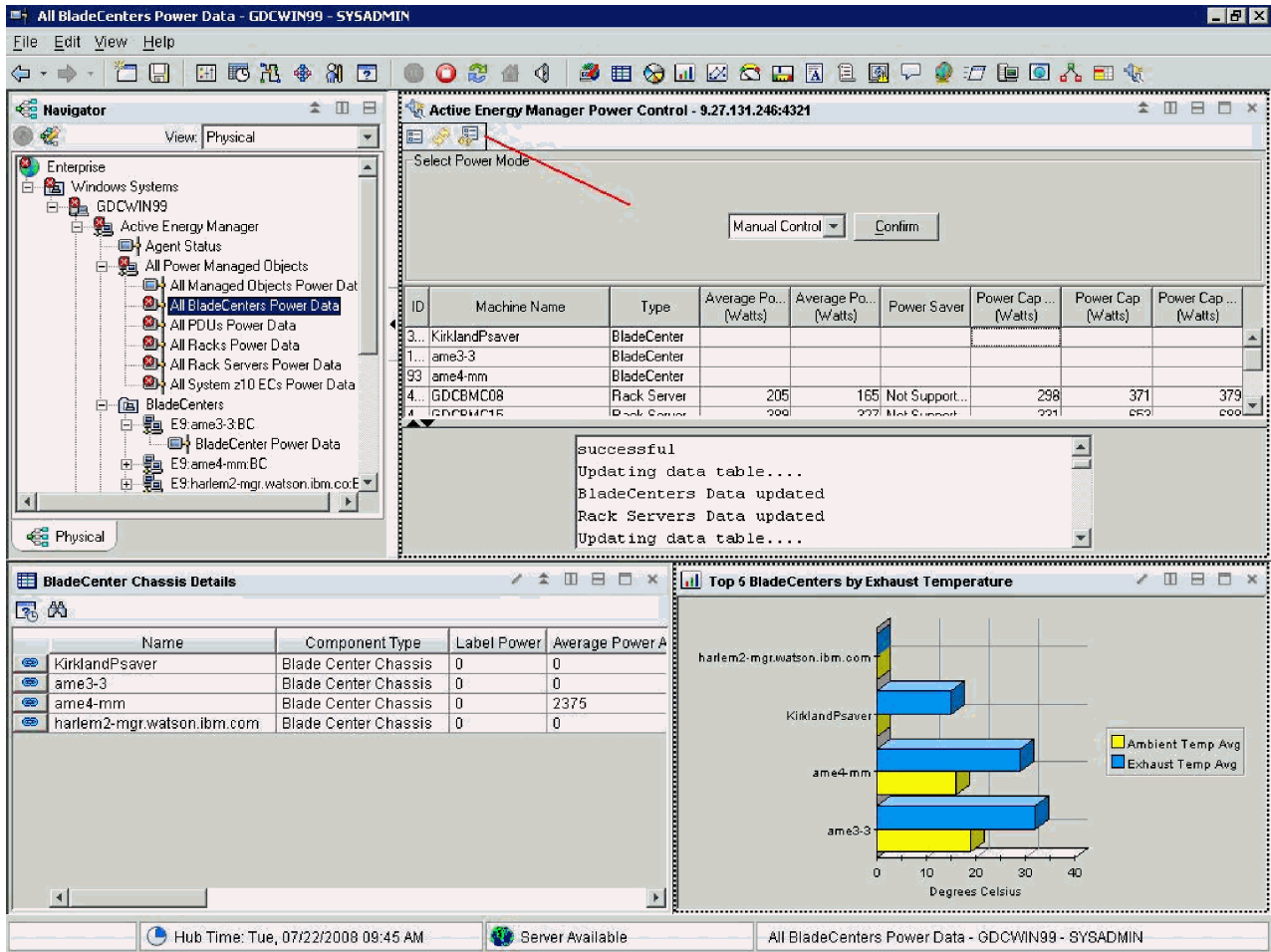


Figure 24. AEM Power Control GUI Settings Toolbar

These settings can be accessed through the toolbar at the top of the Active Energy Manager Power Control GUI, which are described in the following sections.

**Display Data settings:** The Display Data Settings window shows the following settings:

- **All Systems:** displays data of both BladeCenters and Rack Servers
- **BladeCenters:** displays BladeCenters data only
- **Rack Servers:** displays Rack Servers data only

Figure 25 on page 42 shows the Display Data Settings window.

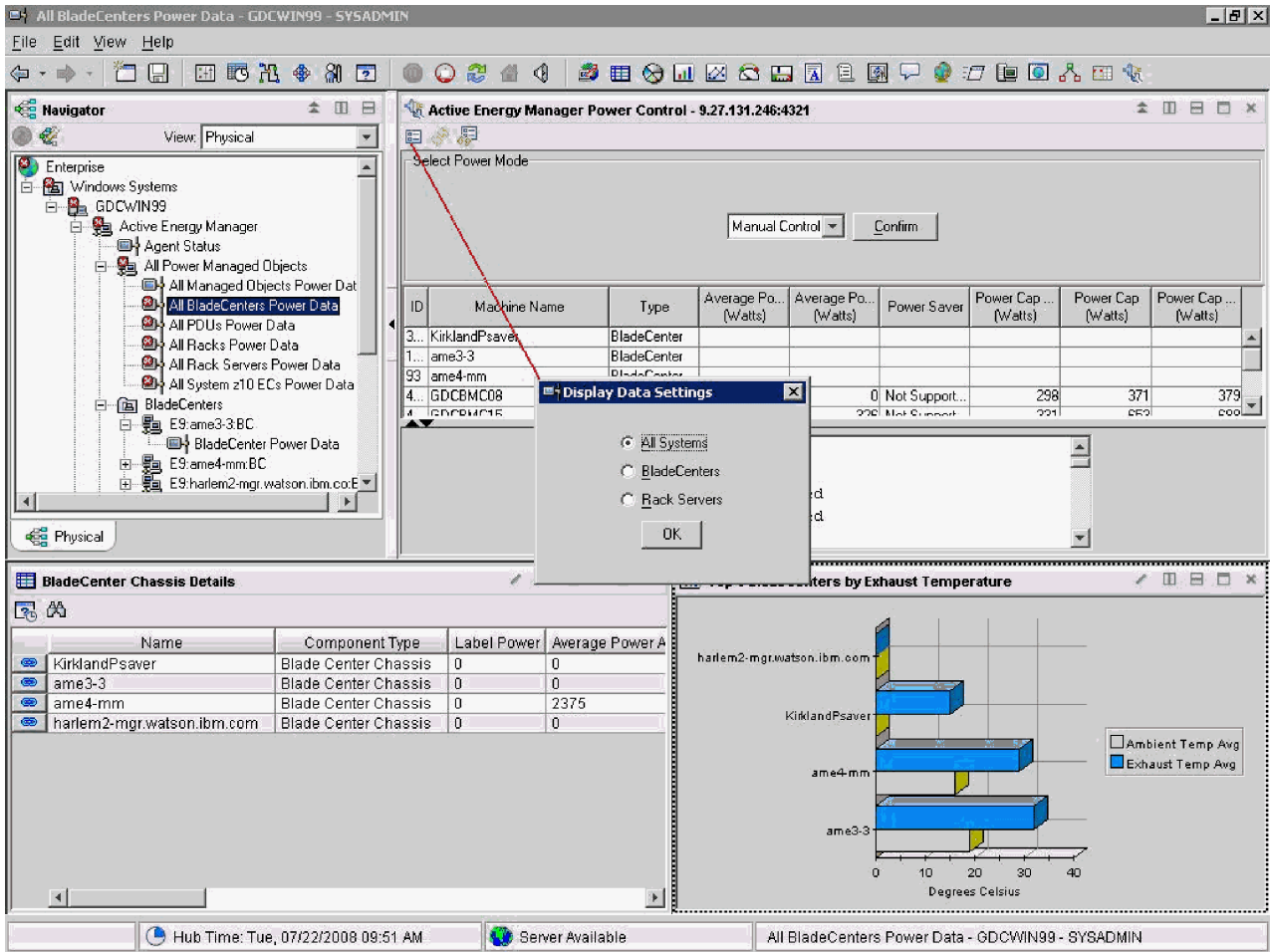


Figure 25. Display Data Settings window

**Refresh Now option:** The **Refresh Now** option refreshes data from cache immediately. Figure 26 on page 43 shows the **Refresh Now** option.

The screenshot displays the 'Active Energy Manager Power Control' interface. The 'Refresh Now' option is highlighted with a red arrow. The 'Refresh Settings' option is also visible. The interface includes a 'Select Power Mode' section with a 'Manual Control' dropdown and a 'Confirm' button. Below this is a table of power data for various machines, and a status window showing successful data updates.

ID	Machine Name	Type	Average Po... (Watts)	Average Po... (Watts)	Power Saver	Power Cap... (Watts)	Power Cap... (Watts)	Power Cap... (Watts)
3...	KirklandPsaver	BladeCenter						
1...	ame3-3	BladeCenter						
93	ame4-mm	BladeCenter						
4...	GDCBMC15	Rack Server	388	326	Not Support...	331	653	688
?	harlem2-mgr.watson.ibm.com	Blade Center	292	150	Not Support...	214	441	441

successful  
Updating data table....  
BladeCenters Data updated  
Rack Servers Data updated  
Updating data table....

Name	Component Type	Label Power	Average Power A
KirklandPsaver	Blade Center Chassis	0	0
ame3-3	Blade Center Chassis	0	0
ame4-mm	Blade Center Chassis	0	2375
harlem2-mgr.watson.ibm.com	Blade Center Chassis	0	0

Top 5 BladeCenters by Exhaust Temperature

harlem2-mgr.watson.ibm.com 0.0 (harlem2-mgr.watson.ibm.com)

KirklandPsaver

ame4-mm

ame3-3

Degrees Celsius

Legend: Ambient Temp Avg (yellow), Exhaust Temp Avg (blue)

Hub Time: Tue, 07/22/2008 09:49 AM Server Available All BladeCenters Power Data - GDCWIN99 - SYSADMIN

Figure 26. Refresh Now option

**Refresh Settings option:** The Refresh Settings option is shown in Figure 27 on page 44.

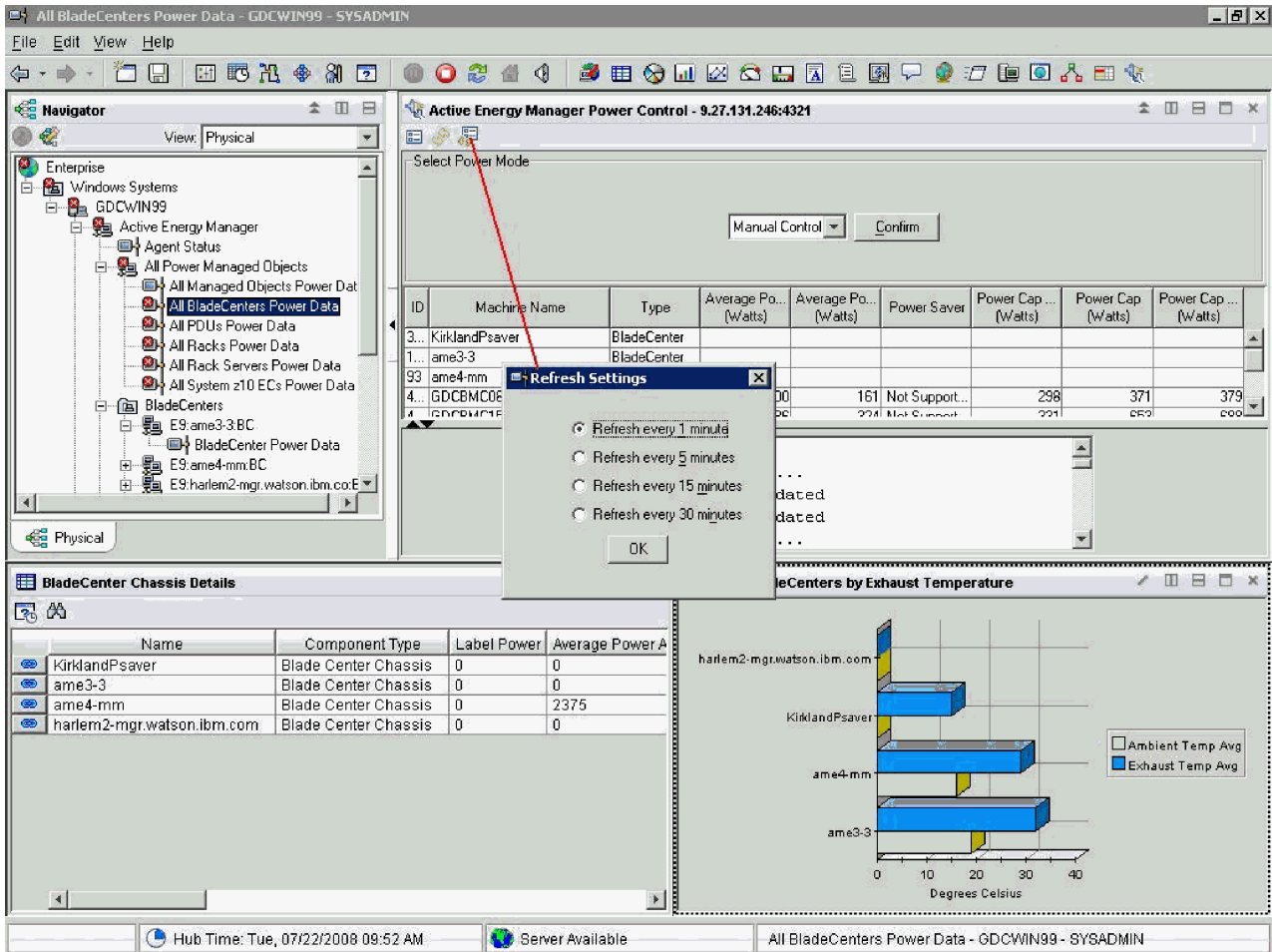


Figure 27. Refresh Settings option

This option provides the following choices:

- **Refresh every 1 minute:** refresh data from cache every 1 minute
- **Refresh every 5 minutes:** refresh data from cache every 5 minutes
- **Refresh every 15 minutes:** refresh data from cache every 15 minutes
- **Refresh every 30 minutes:** refresh data from cache every 30 minutes

## Monitoring the power and thermal data on an Eaton PDU

This section includes the following topics:

- Adding a PDU using the configuration program
- Turning on warehousing
- Viewing PDU workspaces

### Adding a PDU using the configuration program

Figure 28 on page 45 shows the **PDU Devices** tab of the Agent Configuration window.

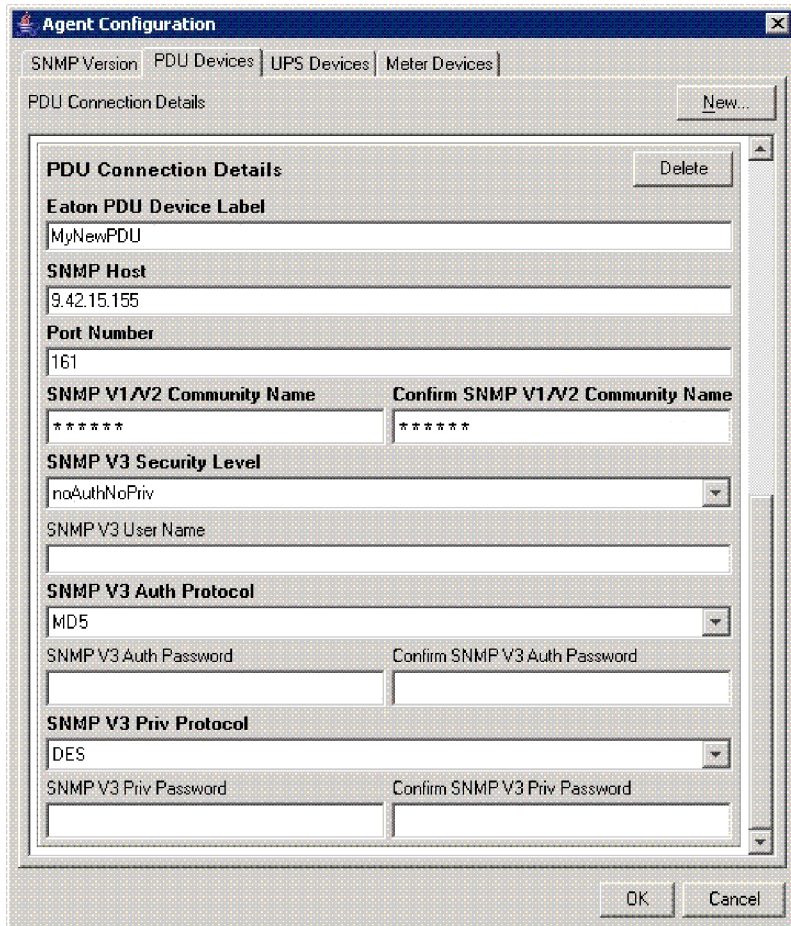


Figure 28. Adding an Eaton PDU in the Agent Configuration window

To add an Eaton PDU device, complete the following steps and review Figure 28.

1. Find or start the Manage Tivoli Enterprise Services application.
2. Find the Monitoring Agent for Eaton Power Xpert. Right-click the agent and select **Reconfigure**.
3. A pop-up window is displayed for Agent Advanced Configuration. Press the **OK** button. The Agent Advanced Configuration pop-up window opens. Press the **OK** button again.
4. The Agent Configuration window opens. The **SNMP Version** tab is displayed. All the devices monitored by the Eaton Power Xpert Agent must use the same SNMP version. You might need to talk to your facilities manager to find out the correct value. However, SNMP Version 1 is typical.
5. Click the **PDU Devices** tab, which shows you the parameters that need to be supplied to monitor a PDU. If the parameters are already filled out, then you probably already have a PDU defined to your Eaton Power Xpert Agent. Click the new button to see a new, blank PDU definition screen.
6. Enter the name of the PDU in the Eaton PDU Device Label.
7. Enter the IP address of the SNMP Host in that field.
8. Finally, enter the SNMP Community Name for SNMP V1/V2 or enter the security information for SNMP V3. For SNMP V1/V2, “public” is a very common Community Name.
9. Press the **OK** button.
10. Reconfiguring the agent will automatically stop it, so you will have to start it again by right-clicking on the agent and selecting **Start** from the context menu.

## Turning on warehousing

This procedure guides you through turning on warehousing, which instructs Tivoli Monitoring to capture the power and thermal measurements for later analysis. For warehousing to work, you must have installed the Warehouse Proxy Agent. If you have not installed the agent, you can still do so now.

If you want to use the Tivoli Common Reporting reports of Tivoli Monitoring for Energy Management, you will also need to turn on warehouse summary and pruning. If you have not installed the Summarization and Pruning Agent, it is not too late to do so.

To enable historical data collection, complete the following steps and review Figure 29 on page 47:

1. Log in to the portal GUI.
2. Click **Edit > History Configuration**.
3. Select **Eaton Power Xpert** from the **Select a product** drop-down list.
4. You can enable historical data collection for any of the following attributes. Select only the groups that start with:
  - KE8 WH PDU
  - KE8 WH UPS
  - KE8 METER
  - KE8 MTR
5. Select a **Collection Interval** of 5 minutes, a **Warehouse Interval** of 1 hour, and a **Collection Location of TEMA**.
6. Multi-select the attributes groups from the preceding list as appropriate.
7. If you will be using the Tivoli Common Reporting reports, check the **Hourly** and **Daily** boxes in the **Summarization** area. You may check any of the boxes.
8. Click **Configure Groups**, and then re-select the attributes selected in Step 4.
9. Click **Start Collection**.



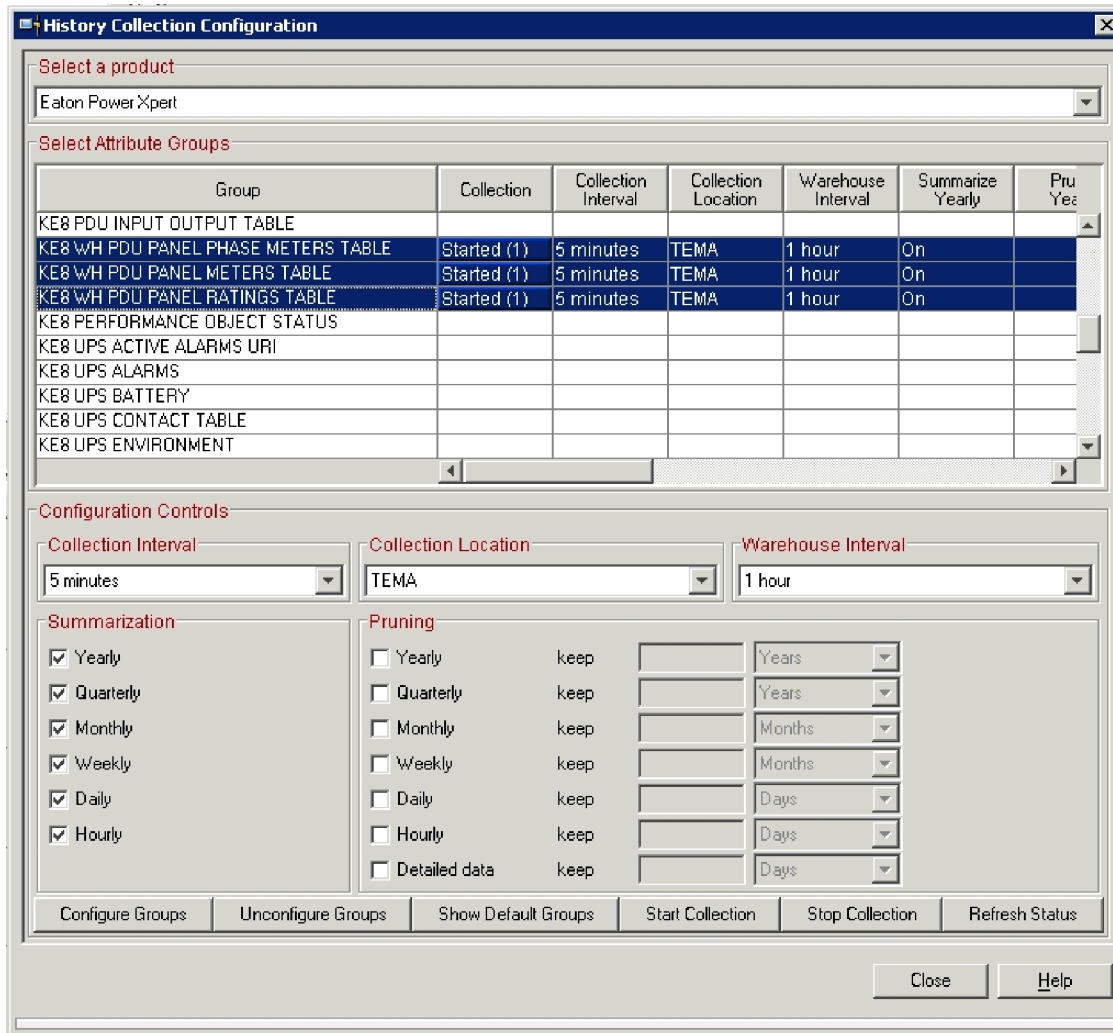


Figure 29. History Collection Configuration window

## Viewing PDU workspaces

There are many interesting views and workspaces for Tivoli Monitoring for Energy Management within the portal GUI. Here is how to navigate to some of the most interesting ones.

All these procedures take place within the portal GUI, so you must be logged in to perform them.

### Verifying the status of the Eaton Power Xpert Agent

To verify the status of the Eaton Power Xpert Agent, complete the following steps and review Figure 30 on page 48 and Figure 31 on page 48:

1. In the Physical View, the **Eaton Power Xpert** node is displayed. Expand the tree under the **Eaton Power Xpert** node to view the **Managed Systems** node.
2. Click the **Managed Systems** node, which changes the screen layout to show you a **Subnode Status**.
3. In the Subnode Status workspace, you can see the type, status, and any error code associated with each kind of object that the Eaton Power Xpert Agent is monitoring for you.

### Select Managed Systems under Eaton Power Xpert

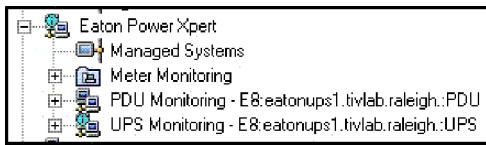


Figure 30. Select Managed Systems under Eaton Power Xpert

Query Name	Object Type	Object Status	Error Code
Managed_PDU_Systems	CONFIG DISCOVERY	ACTIVE	NO ERROR
Managed_UPS_Systems	CONFIG DISCOVERY	ACTIVE	NO ERROR
Managed_Meter_Systems	CONFIG DISCOVERY	ACTIVE	NO ERROR

Figure 31. The Subnode Status

**Viewing the status of PDUs:** Under the Eaton Power Xpert node in the Physical View, at the same level in the tree as Managed Systems, there is a tree entry for each of the following managed objects of the Eaton Power Xpert Agent:

- PDU Monitoring
- UPS Monitoring
- Meter Monitoring

The following procedure discusses PDUs, but the procedures and workspaces for UPSes are very similar. Follow these steps and review Figure 32:

1. Click the **PDU Monitoring** node.
2. Expand the tree below the **PDU Monitoring** node to see all of the PDUs being monitored.
3. Click one of the PDUs in the exposed tree.
4. Expand the tree below the selected PDU to see the characteristics of the PDU, such as PDU Metering Data and PDU Power Summary.
5. Click **PDU Metering Data** to view the workspaces that include power metering details.

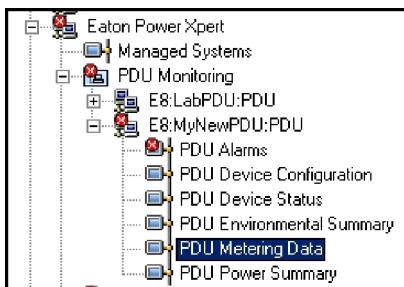


Figure 32. Selecting PDU Metering Data



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## Reporting on energy data using the Data Center Optimization for Energy Management feature

The Data Center Optimization for Energy Management feature provides many interesting reports using the data captured by the IBM Tivoli Monitoring for Energy Management agents. For more information on reporting, refer to the Tivoli Data Center Optimization for Energy Management User's Guide.

This section includes the following topics:

- Viewing Data Center Optimization for Energy Management reports.
- Viewing energy usage and estimated cost data with the Baseline power report.
- Viewing your Data Center Infrastructure Efficiency (DCiE) rating report.
- Viewing the Standby Recommendation report.
- Viewing the Data Center Power Usage Comparison report.

### Viewing Data Center Optimization for Energy Management reports

Once power and operating system data is collected in the Tivoli Data Warehouse, the energy rates and carbon unit energy mixes have been defined, and the servers have been imported, you are ready to generate reports. Generated reports are displayed in a browser window and can be saved on your local system using your browser controls.

To generate a report, do the following:

1. Use a Web browser to open the Tivoli Common Reporting login page.
2. Select **Energy > Optimization for Energy Management > Reports**.
3. Select **Generate Report** to display a list of available reports.

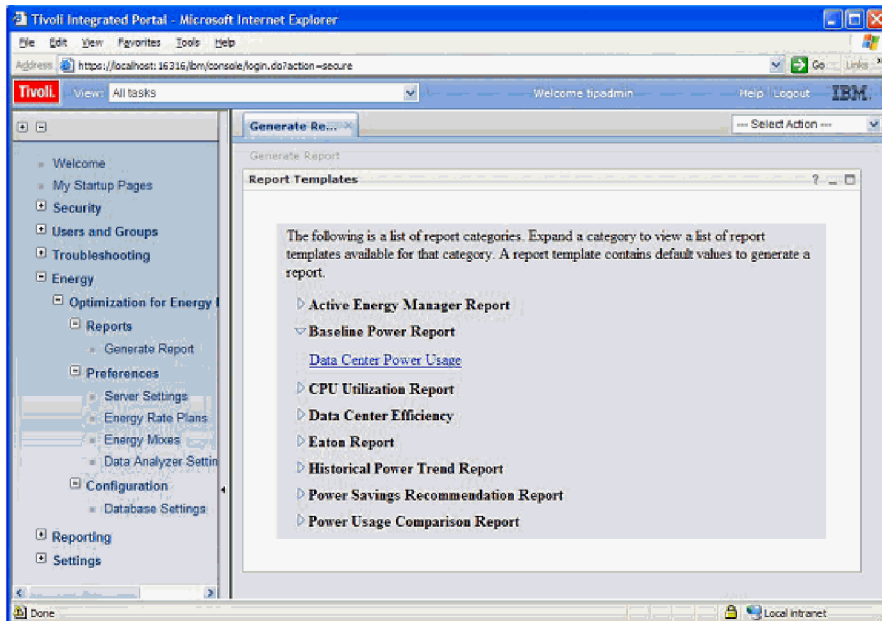


Figure 33. Selecting a report

Select the report you want to run. The Report Settings page opens for you to enter data to customize the report.

## Viewing energy usage and estimated cost data with the Baseline Power report

You can generate the Baseline Power report to view high level power usage, estimated power cost, and carbon emissions from your datacenter, including servers, limited facility equipments such as IPDUs, and racks.

To generate the report:

1. Login to the console and open the Generate Reports page.
2. Select the Baseline **Power Report > Data Center Power Usage** on the Generate Report tab.
3. Enter the data on the Report Settings page for the Rate Plan and the Carbon Unit Energy Mix.
4. Select one or more servers from the resource list, if applicable.
5. Select the report type (HTML or PDF) that you want and click **Generate Report**.

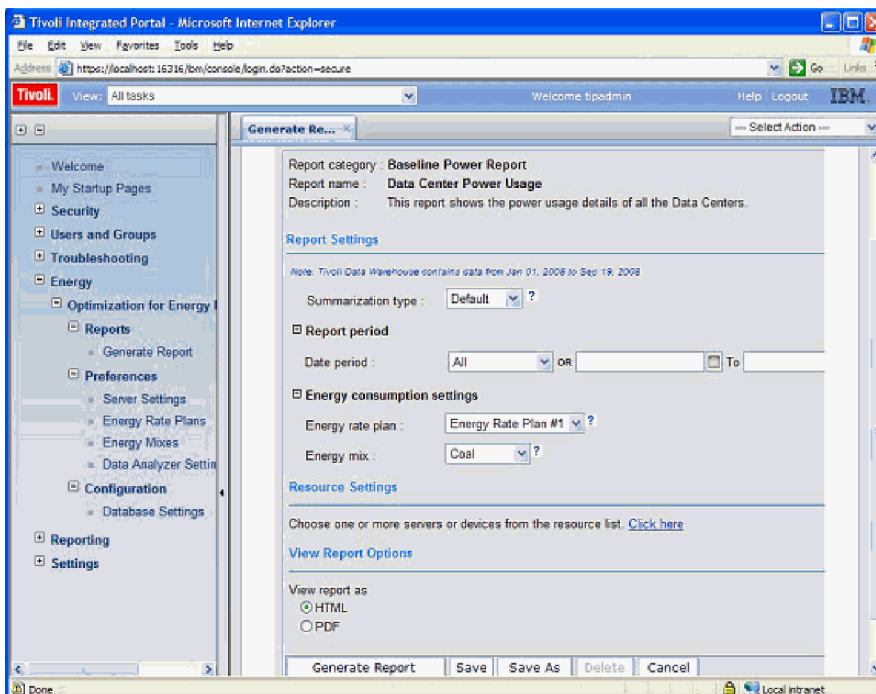


Figure 34. Selecting a Baseline Power report

The report opens in a new browser window.

The following figure shows an example HTML report:



Figure 35. Viewing HTML Baseline Power report

## Viewing your Data Center Infrastructure Efficiency rating report

Data Center Infrastructure Efficiency (DCiE) is a standard supported by the Green Grid. DCiE is defined as the percentage of Total Facility Power used by the IT Equipment Power, or (IT Equipment Power / Total Facility Power) X 100.

The Power Usage Effectiveness (PUE) is the reciprocal of the DCiE. The PUE is defined as the Total Facility Power divided by the IT Equipment Power. Data Center Optimization for Energy Management provides the DCiE and the PUE data in the Data Center Infrastructure Efficiency Report which you can view by selecting **Data Center Efficiency > Data Center Infrastructure Efficiency** in the Generate Report tab.

The following figure shows an example HTML report.

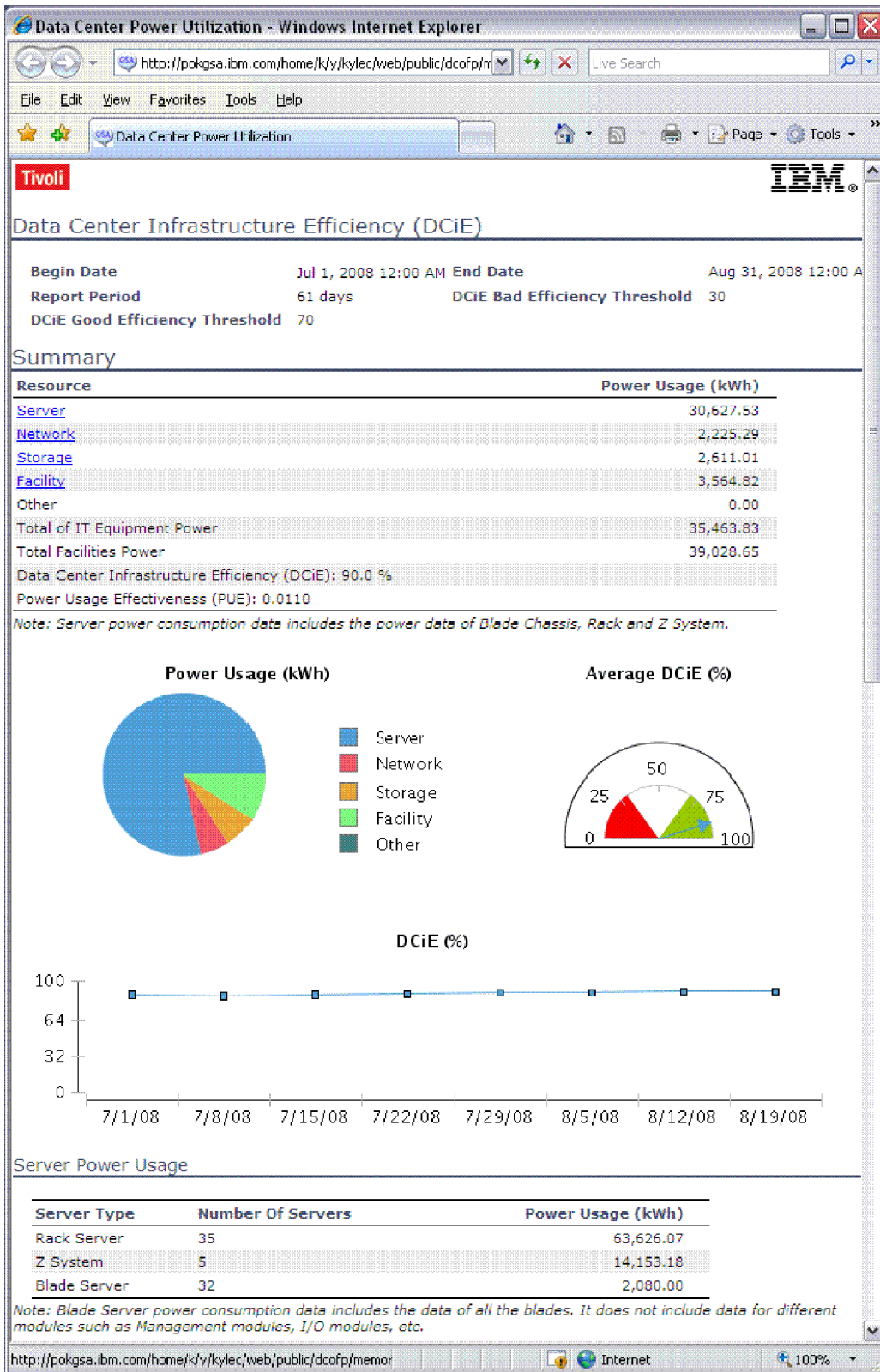


Figure 36. Viewing HTML DCiE rating report

## Viewing the Standby and Power-down Recommendations for Server Pool report

The Standby and Power-down Recommendations for Server Pool report provides recommendations to put servers into standby mode and to turn off servers when the CPU utilization and variance is below the specified thresholds.

You can generate the Standby Recommendation report by selecting **Power Savings Recommendations Report > Standby and Power-down Recommendations for Server Pool** from the Generate Report tab.

Once you enter the report customization information on the Report Settings page, the report opens in a new browser window.

The following figure shows an example HTML report.

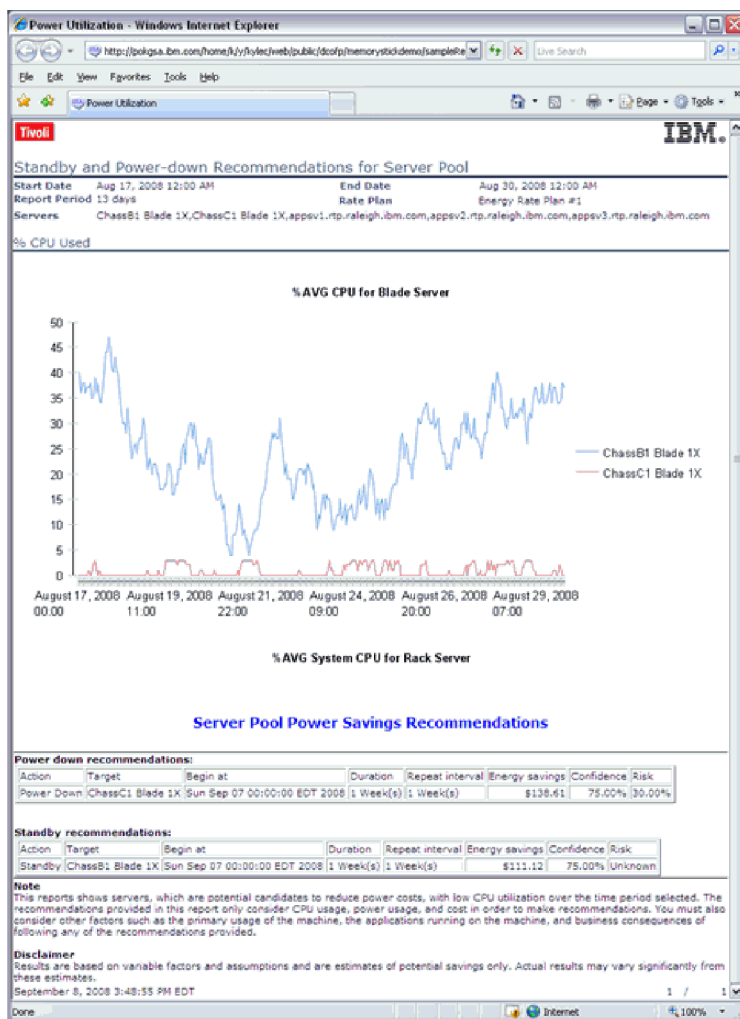


Figure 37. Viewing HTML Standby Recommendation report

## Viewing the Data Center Power Usage Comparison report

You can generate reports to view and compare energy consumption, estimated cost, carbon emission, and CPU utilization over two time periods. This is particularly useful if you want to compare the effect of optimizations made based on the Power Savings Recommendation reports.

Generate the report by selecting **Power Usage Comparison Report > Data Center Power Usage Comparison** from the Generate Report tab. Enter the customization information, including the time periods for which to display data and select Generate Report. The report will open in a new browser window.

The following figure shows an example HTML report.

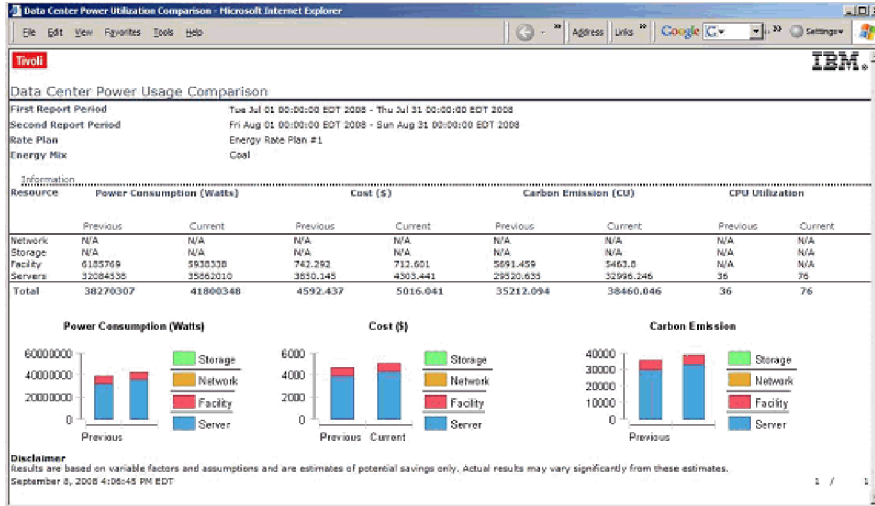


Figure 38. Viewing HTML Power Usage Comparison report

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## Appendix A. Support for problem solving

If you have a problem with your IBM software, you want to resolve it quickly. This section describes the following options for obtaining support for IBM software products:

- “Using IBM Support Assistant”
- “Obtaining fixes” on page 56
- “Receiving weekly support updates” on page 56
- “Contacting IBM Software Support” on page 57

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### Using IBM Support Assistant

The IBM Support Assistant is a free, stand-alone application that you can install on most workstations and also use to perform remote troubleshooting of other workstations. You can enhance the application by installing product-specific add-ons for the IBM products you use.

The IBM Support Assistant saves you the time it takes to search product, support, and educational resources. Several troubleshooting features are provided, including the ability to perform guided troubleshooting to aid in problem resolution and the ability to collect diagnostic information. The collected diagnostic information can then be used to self-diagnose the problem, or it can be included in an Electronic Service Request (ESR) submitted to IBM Support engineers.

For more information, and to download the IBM Support Assistant, see <http://www.ibm.com/software/support/isa>. Currently, the add-on is supported by IBM Support Assistant V4.0.1 or later. After you download and install the IBM Support Assistant, follow these steps to install the IBM Support Assistant add-on for the IBM Tivoli Monitoring product that you are using:

1. Start the IBM Support Assistant application.
2. From the **Update** menu bar, select **Find New** and **Product Add-ons**.
3. Under **Tivoli**, select your product, read the description, and then click **Next**. If your product is not included on the list under Tivoli, no add-on is available yet for the product.
4. Read the license and description, and if you comply, select **I accept the terms in the license agreements** and click **Next**.
5. Click **Finish** to proceed with the installation, and when prompted, restart the IBM Support Assistant to complete the installation.

The Tivoli Monitoring for Energy Management add-on provides the base functionality of most IBM Support Assistant add-ons and also provides automatic data collection of diagnostic files related to the Tivoli Monitoring for Energy Management agents.

To collect the diagnostic files and include them in an Electronic Service Request that can be sent to IBM Support engineers, view the Help files from the Help menu bar. To perform the collection of diagnostic files for self-diagnosis only, complete the following steps:

1. Start the IBM Support Assistant application.
2. From the Home screen, select **Analyze Problem**.
3. In the Select A Collector dialog box, expand the appropriate product name, and select the agent for which you want to collect diagnostic information. Choose **Add**.
4. After the agent or agents are added to the Collector Queue, choose **Collect All** to begin the collection.
5. Enter the information requested in the dialog boxes.
6. The final dialog box requests whether or not you want to upload the collection file to IBM Support or another FTP location. If you only want to view the collected files on your computer, choose **Do Not FTP the Logs**.



7. The collection has finished. You can view the collected files by clicking the compressed file in the **Collector Status** dialog box.

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## Obtaining fixes

A product fix might be available to resolve your problem. To determine which fixes are available for your Tivoli software product, follow these steps:

1. Go to the IBM Software Support Web site at <http://www.ibm.com/software/support>.
2. Under **Select a brand and/or product**, select **Tivoli**.  
If you click **Go**, the **Search within all of Tivoli support** section is displayed. If you don't click **Go**, you see the **Select a product** section.
3. Select your product and click **Go**.
4. Under **Download**, click the name of a fix to read its description and, optionally, to download it.  
If there is no **Download** heading for your product, supply a search term, error code, or APAR number in the field provided under **Search Support (this product)**, and click **Search**.

For more information about the types of fixes that are available, see the *IBM Software Support Handbook* at <http://techsupport.services.ibm.com/guides/handbook.html>.

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## Receiving weekly support updates

To receive weekly e-mail notifications about fixes and other software support news, follow these steps:

1. Go to the IBM Software Support Web site at <http://www.ibm.com/software/support>.
2. Click **My support** in the far upper-right corner of the page under **Personalized support**.
3. If you have already registered for **My support**, sign in and skip to the next step. If you have not registered, click **register now**. Complete the registration form using your e-mail address as your IBM ID and click **Submit**.
4. The **Edit profile** tab is displayed.
5. In the first list under **Products**, select **Software**. In the second list, select a product category (for example, **Systems and Asset Management**). In the third list, select a product sub-category (for example, **Application Performance & Availability** or **Systems Performance**). A list of applicable products is displayed.
6. Select the products for which you want to receive updates.
7. Click **Add products**.
8. After selecting all products that are of interest to you, click **Subscribe to email** on the **Edit profile** tab.
9. In the **Documents** list, select **Software**.
10. Select **Please send these documents by weekly email**.
11. Update your e-mail address as needed.
12. Select the types of documents you want to receive.
13. Click **Update**.

If you experience problems with the **My support** feature, you can obtain help in one of the following ways:

### Online

Send an e-mail message to [erchelp@ca.ibm.com](mailto:erchelp@ca.ibm.com), describing your problem.

### By phone

Call 1-800-IBM-4You (1-800-426-4968).



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## Contacting IBM Software Support

IBM Software Support provides assistance with product defects. The easiest way to obtain that assistance is to open a PMR or ETR directly from the IBM Support Assistant (see “Using IBM Support Assistant” on page 55).

Before contacting IBM Software Support, your company must have an active IBM software maintenance contract, and you must be authorized to submit problems to IBM. The type of software maintenance contract that you need depends on the type of product you have:

- For IBM distributed software products (including, but not limited to, Tivoli, Lotus®, and Rational® products, and DB2 and WebSphere® products that run on Windows or UNIX operating systems), enroll in Passport Advantage® in one of the following ways:

### Online

Go to the Passport Advantage Web site at [http://www.ibm.com/software/howtobuy/passportadvantage/pao\\_customers.htm](http://www.ibm.com/software/howtobuy/passportadvantage/pao_customers.htm) .

### By phone

For the phone number to call in your country, go to the IBM Software Support Web site at <http://techsupport.services.ibm.com/guides/contacts.html> and click the name of your geographic region.

- For customers with Subscription and Support (S & S) contracts, go to the Software Service Request Web site at <https://techsupport.services.ibm.com/ssr/login>.
- For customers with IBMLink™, CATIA, Linux, OS/390®, iSeries®, pSeries®, zSeries®, and other support agreements, go to the IBM Support Line Web site at <http://www.ibm.com/services/us/index.wss/so/its/a1000030/dt006>.
- For IBM eServer™ software products (including, but not limited to, DB2 and WebSphere products that run in zSeries, pSeries, and iSeries environments), you can purchase a software maintenance agreement by working directly with an IBM sales representative or an IBM Business Partner. For more information about support for eServer software products, go to the IBM Technical Support Advantage Web site at <http://www.ibm.com/servers/eserver/techsupport.html>.

If you are not sure what type of software maintenance contract you need, call 1-800-IBMSERV (1-800-426-7378) in the United States. From other countries, go to the contacts page of the *IBM Software Support Handbook on the Web* at <http://techsupport.services.ibm.com/guides/contacts.html> and click the name of your geographic region for phone numbers of people who provide support for your location.

To contact IBM Software support, follow these steps:

1. “Determining the business impact”
2. “Describing problems and gathering information” on page 58
3. “Submitting problems” on page 58

## Determining the business impact

When you report a problem to IBM, you are asked to supply a severity level. Use the following criteria to understand and assess the business impact of the problem that you are reporting:

### Severity 1

The problem has a *critical* business impact. You are unable to use the program, resulting in a critical impact on operations. This condition requires an immediate solution.

### Severity 2

The problem has a *significant* business impact. The program is usable, but it is severely limited.

### Severity 3

The problem has *some* business impact. The program is usable, but less significant features (not critical to operations) are unavailable.

#### Severity 4

The problem has *minimal* business impact. The problem causes little impact on operations, or a reasonable circumvention to the problem was implemented.

### Describing problems and gathering information

When describing a problem to IBM, be as specific as possible. Include all relevant background information so that IBM Software Support specialists can help you solve the problem efficiently. To save time, know the answers to these questions:

- Which software versions were you running when the problem occurred?
- Do you have logs, traces, and messages that are related to the problem symptoms? IBM Software Support is likely to ask for this information.
- Can you re-create the problem? If so, what steps were performed to re-create the problem?
- Did you make any changes to the system? For example, did you make changes to the hardware, operating system, networking software, and so on.
- Are you currently using a workaround for the problem? If so, be prepared to explain the workaround when you report the problem.

### Submitting problems

You can submit your problem to IBM Software Support in one of two ways:

#### Online

Click **Submit and track problems** on the IBM Software Support site at <http://www.ibm.com/software/support/probsub.html>. Type your information into the appropriate problem submission form.

#### By phone

For the phone number to call in your country, go to the contacts page of the *IBM Software Support Handbook* at <http://techsupport.services.ibm.com/guides/contacts.html> and click the name of your geographic region.

If the problem you submit is for a software defect or for missing or inaccurate documentation, IBM Software Support creates an Authorized Program Analysis Report (APAR). The APAR describes the problem in detail. Whenever possible, IBM Software Support provides a workaround that you can implement until the APAR is resolved and a fix is delivered. IBM publishes resolved APARs on the Software Support Web site daily, so that other users who experience the same problem can benefit from the same resolution.

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## Appendix B. 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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