Cisco EnergyWise Orchestrator Installation Guide

Cisco EnergyWise Phase 2
June 2010

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

Text Part Number: OL-19817-02

Cisco EnergyWise Orchestrator Installation Guide

CONTENTS

Preface

Conventions

Command-line interface (CLI) syntax descriptions use these conventions:

- Commands and keywords are in **boldface** text.
- Arguments for which you supply values are in *italic*.
- Square brackets ([ ]) mean optional elements.
- Braces ({ }) group required choices, and vertical bars (|) separate the alternative elements.
- Braces and vertical bars within square brackets ([{ | }]) mean a required choice within an optional element.

Interactive examples use these conventions:

- Terminal sessions and system displays are in `screen` font.
- Information that you enter is in **`boldface screen`** font.
- Nonprinting characters, such as passwords or tabs, are in angle brackets (< >).

Interactive examples use these conventions:

Note Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this manual.

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Warning **IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Related Publications

- *Cisco EnergyWise Configuration Guide, EnergyWise Phase 2*
- *Cisco IOS Release Notes for Cisco EnergyWise, EnergyWise Phase 2*
- Software documentation http://www.cisco.com/cisco/web/support/index.html.

Cisco EnergyWise partner documentation: http://developer.cisco.com/web/esdk/home.

- *Cisco EnergyWise Documentation Roadmap*
- *Cisco EnergyWise Partner Development Guide*
- *Cisco EnergyWise Programmer Reference Guide for the End Point SDK*
- *Cisco EnergyWise Programmer Reference Guide for the Management API*
- *Cisco IOS Release Notes for the Cisco EnergyWise Configuration Guide, EnergyWise Phase 2*

Obtaining Documentation and Support on the Cisco Developer Network

Cisco partners can access the EnergyWise documents, API and SDK software code, and Cisco IOS software by joining the Cisco Developer Network at http://developer.cisco.com/web/esdk/home.

You must have a support contract and license to access EnergyWise resources on the Cisco Developer Network and on TAC. The business development manager who registered your licence must set your Cisco.com account with the appropriate access privileges.

The forum, wiki, and resources on the Cisco Developer Network provide a self-help knowledge base and community for EnergyWise application developers and programmers. You can get additional support by opening a case in the TAC Service Request Tool at

http://tools.cisco.com/ServiceRequestTool/create/launch.do.

Obtaining Documentation, Support, and Security Guidelines

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed, and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.

CHAPTER 1

Introduction to Cisco EnergyWise Orchestrator

Cisco EnergyWise Orchestrator

- Measure—Orchestrator identifies the time that a device is in each power state and the usage data for PCs and EnergyWise-enabled devices (for example, IP phones, switches, routers, and wireless access points).
- Monitor and report—Data collected by Orchestrator is reported in charts and graphs that show device and user activity.
- Regulate—Orchestrator manages the power states of network-connected devices by direct commands and scheduled policies that you define.

Orchestrator Features

- Administration of device power states from a Web-based console.
- Device management in real time or using policies and scheduled power schemes.
- Agent-based PC power management with minimal impact to end-users, business applications, or IT maintenance activity.
- The ability to collect actual usage information for PCs to help you author intelligent power management policies.
- Remote access to office PCs and Wake on LAN support. Users can wake client PCs over the Web, schedule requests to work around scheduled maintenance windows.
- Group-oriented administration with role-based security privileges.
- Event reporting for analysis and management
- Dashboard views for high-level reporting of environmental impact.

- Unified control of devices through Cisco EnergyWise-enabled devices through network-based measurement of power draw and network-based control of device power levels. (Requires Cisco EnergyWise-enabled network hardware and Power over Ethernet [PoE] devices)

Configuring Power Management

From a PC perspective, successfully waking a computer at the correct time is just as important as putting it to sleep at the right time.

A device can be a PC or an EnergyWise-enabled router, switch, IP phone, or wireless access point (WAP).

In Operational server mode, Orchestrator begins collecting data for all devices as each device connects to the system. The data updates each time a device checks in. You can then display this data in different reports and device views.

Note Orchestrator runs in either Operational and Baseline mode. Policies are enforced in Operational mode. Baseline mode is used for measuring energy use only.

In Operational server mode, Orchestrator uses *policies* to manage network-connected PCs. A policy can be assigned to one or more devices in any group.

Policies contain these types of settings:

- Scheduled PC power schemes that specify the amount of time of user inactivity before a device changes to a lower power state. Each scheme can have a unique schedule.
- An unscheduled PC power scheme that runs in the background 24/7 when no other power schemes are scheduled.
- Scheduled power level changes (such as wake, shutdown, sleep, or restart). Power level changes apply to PCs or PoE devices.
- Device wake-up settings.
- Logging and data collection settings for PCs.

You can assign policies manually or through assignment rules that you create. Each device can have only one assigned policy, but each policy can have multiple schemes and power-level changes, each with its own schedule.

Note All power settings in policies apply to PCs. For other types of devices, only scheduled power level changes apply. Orchestrator collects data for all device types for reporting purposes.

Devices can be assigned to administrative groups, either manually or through assignment rules that you create. You can use groups to organize devices and apply role-based permissions for delegated administration.

System Components

Figure 1-1 shows the Orchestrator components before integration with Cisco Energywise.

Figure 1-1 Orchestrator System Components

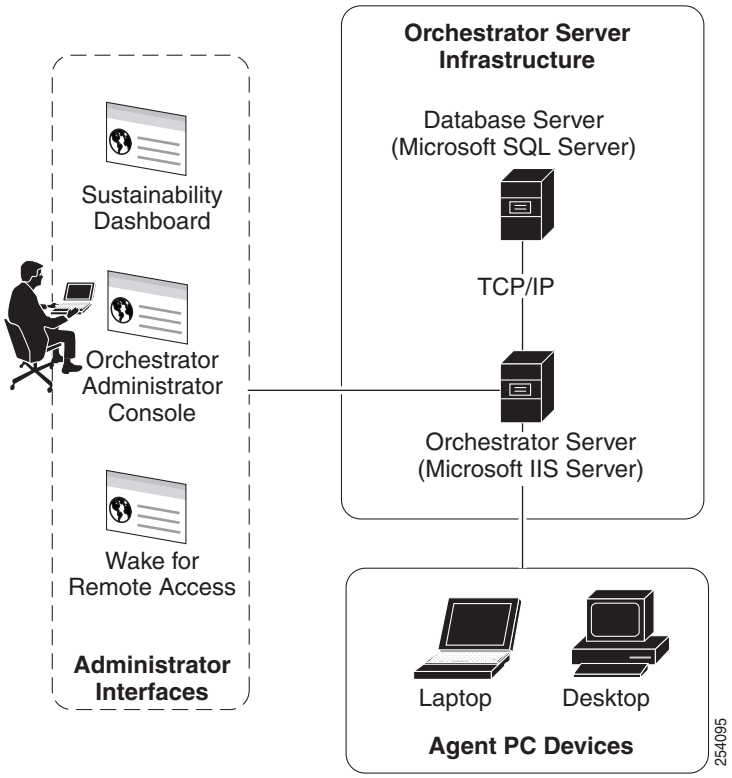


Figure 1-2 show the same Orchestrator components after integration with Cisco EnergyWise devices:

Figure 1-2 Orchestrator System Components for EnergyWise Devices

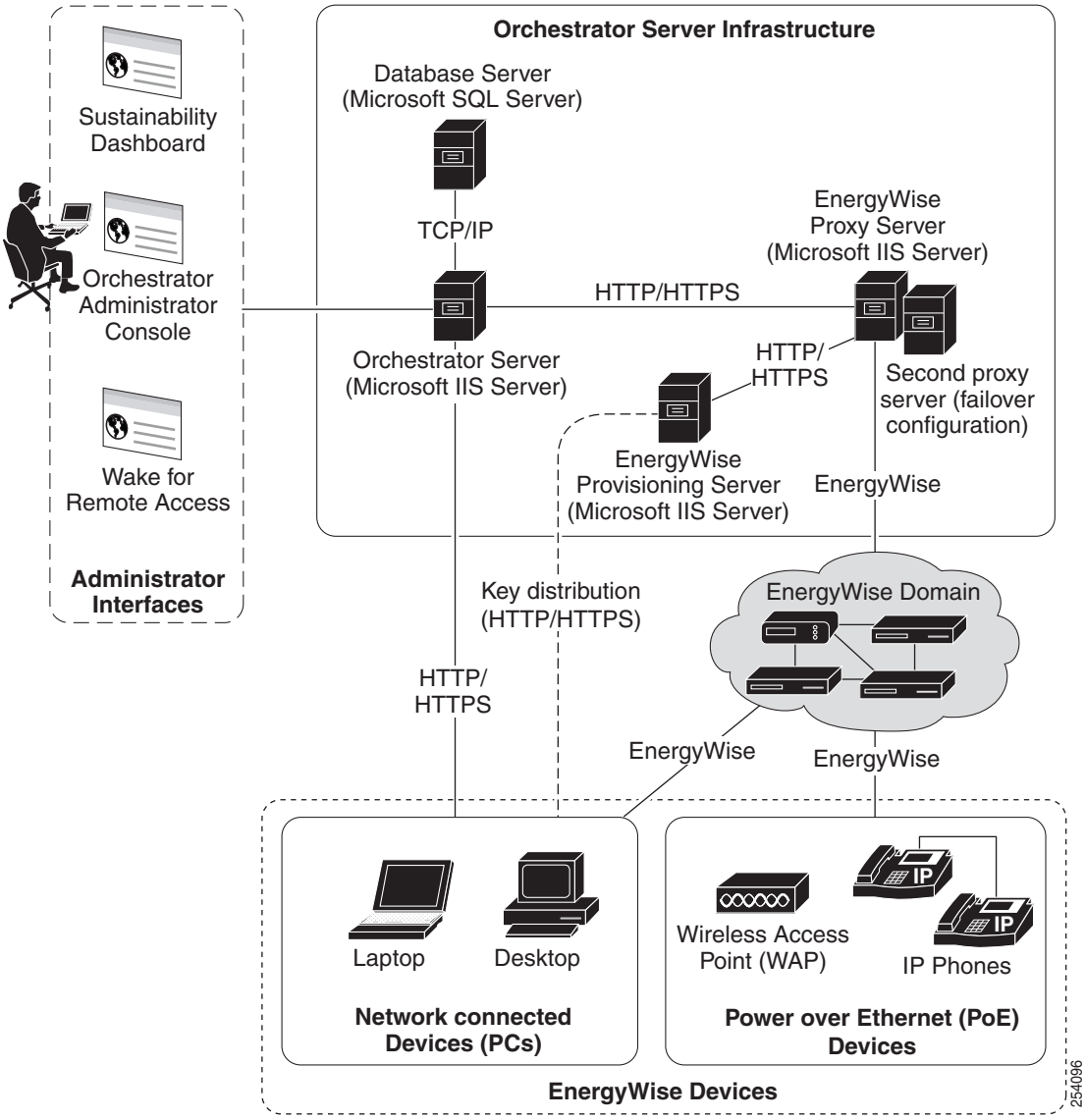


Table 1-1 Orchestrator System Components for EnergyWise Devices

Component	Description
Orchestrator server	Manages policy distribution, sends power-state change instructions to devices, and captures data to send to the Orchestrator database. The Orchestrator server communicates directly with PCs and indirectly with EnergyWise-enabled devices through the EnergyWise proxy server.
Enterprise power management database	An Microsoft SQL server database that stores power state and other device data sent to the server.

Table 1-1 Orchestrator System Components for EnergyWise Devices (continued)

Component	Description
Administrator web server	A computer running Microsoft IIS 6.0. The administrator console is a Web application hosted on an IIS server. You use the administrator console to • Configure and schedule power state changes. • Add, arrange, remove, and monitor devices. • Manage and delegate permissions. • Perform other management tasks.
EnergyWise proxy server	A bridge between the Orchestrator server and the EnergyWise protocol. The proxy service acts as a proxy for EnergyWise devices to the Orchestrator server. It polls EnergyWise attributes (such as device and power usage information), sending EnergyWise commands, and sending EnergyWise status to the Orchestrator server.
EnergyWise provisioning server	Manages the assignment of EnergyWise domains to instances of the EnergyWise Proxy Service.
Agent PC devices	Desktop and laptop PCs (sometimes referred to as clients) that receive and enforce power management instructions from the Orchestrator server.
PoE devices	Network connected devices that support the Cisco EnergyWise protocol, such as Catalyst Power over Ethernet (PoE) switches, all Cisco PoE IP phones and wireless access points. Each device in an EnergyWise domain is called an end point.

Note In a basic installation, the EnergyWise proxy server and provisioning server can run on the same system as the Orchestrator power management server. In large installations, multiple power management servers and proxy servers can provide for load balancing.

Cisco EnergyWise

Orchestrator supports Cisco EnergyWise Phase 2. You can configure Orchestrator to recognize IP phones and wireless access points that are connected to Cisco network devices. For a list of supported devices, see the release notes for Cisco EnergyWise, EnergyWise Phase 2, on Cisco.com.

For more details on EnergyWise support in Orchestrator, see Chapter 4, "Configuring Orchestrator for EnergyWise Devices."

For other information about EnergyWise, see the Cisco EnergyWise documentation available on Cisco.com.

Getting Started with Power Management

Setting Up Power Management

The administrator console shows you how devices use energy. You can set up policies with scheduled power schemes to enforce power management.

You can set up administrative groups and power management policies in any order. You can first define security groups to control administrative permissions and access to devices and power management settings in a network.

Step	Task	Description
Step 1	In your web browser, enter the URL for the local web site on the computer where you installed the Orchestrator server, such as http://hostname/Admin/ where hostname = Orchestrator power management server name. For details, see Open the Administrator console.	Open the Administrator console to display and manage devices, groups, policies, and server settings.
Step 2	On the Devices menu, click Filtered Search, and click the tab (Groups, Policies, or Subnets) that you want to use to filter the display. In the Search tab, select different options in the drop-down filter lists to display the sets of devices.	Display devices to get an overall picture of what devices are connecting to Orchestrator. Use different filtering and sorting option to see different sets of devices.
Step 3	On the Devices menu, select **Manage Groups**.	Create groups that reflect your needs for organizing and controlling access to devices.
Step 4	On the Devices menu, click **Filtered Search** for manual assignment. To automatically assign devices to specific groups, on the Devices menu, click **Configure Group Assignment Rules**.	Determine how you want to see and work with sets of devices in administrative groups. Assign devices to groups manually or through assignment rules.
Step 5	To configure security settings: On the Permissions menu, click **Edit Roles**.	Configure security settings to control administrator access to devices and policies. (optional)
Step 6	To run Orchestrator in Baseline mode, see Chapter 8, "Gathering Data and Creating Initial Power Management Policies", and the "Determining Initial Policy Settings from User and System Activity" section on page 8-5. See also the "Viewing Reports" chapter of the *Cisco EnergyWise Orchestrator Administrator Guide*.	Run Orchestrator in Baseline mode for two weeks to monitor energy usage and determine policy assignment. **Note** To display data for the Operational State report, you must first run the summarization process. For details, see the "Data Summarization Process" section in the *Cisco EnergyWise Orchestrator Administrator Guide*.

Step	Task	Description
Step 7	On the Policies menu, click **Edit Policies**. Click the various tabs and buttons on this page to control the policy settings and to schedule including schemes, power-level changes, and power-state transition rules.	Determine the policies you need to enforce power management in your organization. Modify existing policies or create new ones to meet your needs.
Step 8	On the Devices menu, click **Filtered Search** for manual assignment. To automatically assign policies to devices, on the **Devices** menu, click **Configure Policy Assignment Rules**.	Assign policies to devices manually or through assignment rules.
Step 9	In the Server menu, click **Configure Server Settings**. For Server mode, click **Operational**.	Begin policy enforcement by setting Orchestrator to Operational mode.
Step 10	In the Reports menu, click a report type or event display.	Review reports on user and device activity to fine tune group and policy assignment.

Orchestrator Implementation Phases

1. Preparing for installation—This includes obtaining the necessary hardware, IIS, and database servers, installing any software required for running the Orchestrator system or administrator console, setting up the database, configuring any PC clients for Wake on LAN, configuring PCs and other devices for Cisco EnergyWise, setting permissions, and deciding how to roll out to clients and notifying users.

   Where to start: "Preparing the Server Installation Environment" section on page 2-6.

2. Installation—You install the Orchestrator software and perform tests to validate the installation and system connections.

   All of the installation procedures are in this guide. Depending on your organization and system, you might not need to complete all of them.

   Where to start: "Installing and Setting Server Components" section on page 3-1.

3. Baseline data collection—Before you enforce power management policies, you need to establish the baseline-level power use without using any power management. Collecting baseline data involves one process for PCs and another for other EnergyWise devices.

   Creating security groups: While the server is collecting energy use data from PCs, you can plan and configure groups for delegated administration.

4. Enforcement—After you determine the baseline energy use for devices, you create initial power management policies based on user activity.Then you can start enforcing policies on devices.

CHAPTER 2

Preparing for the Orchestrator Server Installation

Power Management Server Component Requirements

Table 2-1 Power Management Server Component Requirements

Component	Requirements
Operating system	Microsoft Windows Server 2003 SP2, 32-bit
Web server	Microsoft Internet Information Services (IIS) 6.0
Prerequisite software for the power management services	Install these before running Orchestrator setup program: Java 6 update 17 .NET 3.5 Must be installed before you can use Orchestrator: ActiveMQ 5.3
Administrator console	Adobe Flash Player 10 Internet Explorer 7

Database Requirements

The power management server and Sustainability Dashboard communicate with a Microsoft SQL Server database to store and retrieve client and power-state transition data for reporting.

Table 2-2 Database Requirements

Component	Requirements
Supported versions	Microsoft SQL Server 2005 SP3 (x86) Microsoft SQL Server 2008 SP1 (x86) (US English versions)
Database size and location	Database can reside locally on the Orchestrator server computer or remotely on a separate computer.

System Size and Scalability

Best practice is to dedicate the power management server to Orchestrator and not to any additional critical services.

With sufficient hardware, a single power management server can manage up to 70,000 clients.

Orchestrator Client Agent Supported Operating Systems

All operating systems must have the latest patches installed.

- Windows 7 RTM (x86 and x64)
- Microsoft Windows Vista SP2 (x86)
- Windows XP with SP3 (x86)

Server Installation Options and Prerequisites

When you run the Orchestrator setup program, you can select a typical or an advanced installation option.

- The typical installation installs all components in the Table 2-3. It assumes the computer you use to run the setup program hosts both the power management and web services. You are prompted for database credentials.

  Components are installed in standard default locations, for example, Program Files and Inetpub\wwwroot on the local computer. It assigns default port 80 for HTTP communications.

  The typical installation suits typical small to medium-sized networks with centralized administration.
- You can use the advanced installation to select components to install. For some components, you are prompted to provide or confirm location and port details.

The advanced installation gives more flexibility in enterprise-level networks so that you can host any of the Orchestrator components on separate computers. For example, you can host the queueing service on one computer, the power management service on another, and the power management processor on a third.

Installing components on separate computers takes some manual post-installation configuration. See the "Installing and Setting Server Components" section on page 3-1 for information on where this configuration is needed.

Prerequisite Software

Some Orchestrator server components require the additional software included on the distribution disk.

- The .NET 3.5 framework and Java 6 update 17 must be installed before you run the Orchestrator installer.
- ActiveMQ 5.3 is requires for the power management service processor component.

  If you plan to run all of the server components on the same computer, install ActiveMQ before you run the Orchestrator installation.
- Adobe Flash Player 10 must be installed on the computer that will run the Administrator console.

Server Configuration Requirements

If Windows Firewall is enabled on the Orchestrator server computer and you will use web-based Orchestrator components, such as the Sustainability Dashboard and Wake for Remote Access, you need to configure the firewall to allow those components access.

For information, see the "Configuring Windows Firewall to Allow Web Components to Access the Server" section on page 7-9.

Server Installation Components

Table 2-3 Server Installation Components

Component	Service Name and Type	Description
Power management service	PMPService (web)	Communicates power management activity between managed devices and the database, and between devices and server.
Power management database	SQL server database (outside of Orchestrator)	Stores power-state and user-activity data. Requires SQL Server 2005 or 2008. During installation you are prompted for the database server, name, instance, and authentication method. For other database requirements, see the "Setting Up the Database Environment" section on page 2-7.

Table 2-3 Server Installation Components (continued)

Component	Service Name and Type	Description
Administrator	Admin (web)	Web server API and administrator console that runs on top. Requires .NET 3.5 and IIS 6.0 running on Windows Server 2003. During installation, you are prompted to confirm the web site and HTP port. The browser-based user interface requires Adobe Flash Player 10.
EnergyWise provisioning service	EWProvService (web)	Facilitates communication between the power management server and the EnergyWise protocol, which enables managing and measuring power use on non-PC EnergyWise devices.
Enterprise power management processor	Enterprise power management service (Windows)	Windows service that performs critical power management server functions. Required if you install the PMP.
Power management queue service	ActiveMQ service (Windows)	Enables asynchronous messaging between the administrator API and the PMP (between server and clients). Requires ActiveMQ 5.3, which comes with the Orchestrator distribution and is installed if it is not detected.

Web Site Files and Virtual Directories

The installer creates these IIS virtual directories for the components that you install:

- Admin: Administrator API and Administrator console.
- EWProvService: Cisco EnergyWise provisioning
- PMPService

Note You install the Cisco EnergyWise Proxy Server through a separate setup program. For information, see the "Installing the EnergyWise Proxy Server" section on page 3-6.

Users and Permissions Required for Installation and Deployment

Creating User Accounts for Orchestrator and EnergyWise Services

Each service installed with Orchestrator runs under a corresponding user account. You must configure the permissions for the user account to allow the service to access other components of Orchestrator.

In general the Orchestrator services require administrator permissions on the computer where the services are installed. However, instead of using the local system account or an administrator account that is also a personal account, it is more secure and useful for troubleshooting if you create a user specifically for running Orchestrator components.

Services Installed with Orchestrator Server Setup Program

The Orchestrator setup program installs a number of services. Two are Windows services that run on the power management server. The others are web services that run through IIS. Often the power management and web servers are hosted on the same computer as is the case if you choose the **Typical** installation path in the Orchestrator setup program.

For the Typical installation path, default options are used, and all components are installed on the same computer. The Orchestrator IIS application pool runs under the network account, the Enterprise Power Management Processor runs under the local system account, and the IIS default web site is used with all of its default settings. The web services (PMPService, Admin, and EWProvService) run under the identity of the application pool.

If you select the **Advanced** path, you can install individual components and specify users that run the services.

Table 2-4 Services Installed with Orchestrator Server Setup Program

Service	Permission Needed
AdminService web service	The equivalent of local administrator permissions on the server and on the computers that run the Administrator console. Must be a member of the Windows group IIS_WPG on the IIS server. Additional administrative permissions for performing power management tasks on client agents are configured in roles in the Orchestrator Administrator console.
Enterprise power management processor (background processor)	Permission to run as a Windows service.

Table 2-4 Services Installed with Orchestrator Server Setup Program (continued)

Service	Permission Needed
PMPService	The equivalent of local administrator permissions on the power management and web servers. Must be a member of the Windows group IIS_WPG on the IIS server. **data_reader** and **data_writer** permissions on the power management database in SQL Server.
ActiveMQ (message queueing) service user	Permission to run as a Windows service.
EWProvService (EnergyWise provisioning service)	Must be a member of the Windows group IIS_WPG on the IIS server.
EnergyWise proxy service	Permission to run as a Windows service on the EnergyWise proxy server computer.

Permissions Required For Sustainability Dashboard

Table 2-5 Services Installed with Sustainability Dashboard

Services	Permissions Needed
Sustainability Dashboard web site	**data_reader** permissions in SQL Server.
Dashboard summarization	**data_reader** and **data_writer** permissions in SQL Server.

Users and Services

User that runs the Wake for Remote Access service

- Must be a member of the Windows group IIS_WPG on the IIS server.
- Must be a member of a Orchestrator security role that has Change Device State permissions on all relevant security groups that are set up in the Administrator console.

Preparing the Server Installation Environment

By default, Internet Explorer Enhanced Security is enabled Windows 2003 server. To avoid security-related errors during installation, you can disable this component. You do this in the Control Panel in the Add/Remove Windows Components section under Add/Remove Programs.

Step 1 Log in as domain administrator on the server on which you want to install the Orchestrator services.

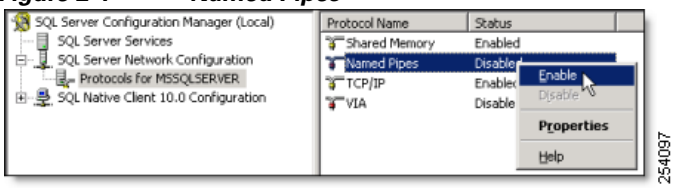
Step 2 In the Windows Control Panel, go to Add/Remove programs / Windows Components / Application server, and click Details. Select ASP.NET and IIS if they are not already enabled.

Step 3 Prepare the database:

a. Make sure the SQL Server is updated to the latest service pack or patch.

b. Open SQL Server Configuration Manager, navigate to Protocols for MSSQLSERVER, and enable Named Pipes.

Figure 2-1 Named Pipes



c. Restart the SQL Server from the Services console or the command line. From the command line use:

net stop mssqlserver and **net start mssqlserver**.

Step 4 Install the .NET 3.5 and Java 6 update 17 pre-requisite software if it is not already on the computer.

- In the Orchestrator distribution, open the pre-reqs folder, and run dotnetfx35setup.exe and JavaSetup6u17.exe, following the wizard instructions.

Step 5 Register Windows Communication Foundation (WCF) with IIS:

- Open a command window and run this command:
  "C:\Windows\Microsoft.NET\Framework\v3.0\Windows Communication Foundation\ServiceModelReg.exe" -i -x

Setting Up the Database Environment

You need to decide where to host the database. If your overall implementation is relatively compact, you might put it on the same computer as the server. Usually the database resides on a separate server maintained by a database administrator.

Using a Local Database

If the server will host both the database and the Orchestrator server, log in as a local administrator, and create the Orchestrator database during installation.

If you decide to create a user for Orchestrator, make sure it has the appropriate database permissions. See the Using a Remote Database section for more information.

Using a Remote Database

You can host the power management database on a separate computer, either in the same domain or across domains. If you use a remote database, you can create and configure the database before or after you install Orchestrator, or the installer can create the database.

- Creating the database during installation

The database administrator (DBA) grants permission on the SQL server to allow the user running the Orchestrator installation program to create a new database. After installation, the DBA can reduce permissions for that user for administration.

Required permissions—The Orchestrator user must be a member of the dbcreator role during installation. After installation, the minimum permissions required are db_datareader and db_datawriter.

- Creating the database independently of Orchestrator installation

  If the DBA creates the database separately use either of these options to configure it:

  – Create it before installation. The user installing Orchestrator points to it during installation. The setup program then creates and configures the database tables.

    Required permissions—The user running the Orchestrator installer and service must have db_datareader anddb_datawriter permission on the database.

  – The DBA creates and configures the database before or after the installation so that the installer does not use the database server. During installation, database credentials are entered so that the installation program can write the proper settings to the configuration files.

    The SQL scripts for creating the tables for Orchestrator are in the distribution package.

To set up the remote database environment:

1. See the "Enabling SQL Remote Connections" section on page 2-8.
2. Configure database or permissions for your process:
   – Go to Setting Database Permissions for the Orchestrator Installation, page 2-9, if you want the installer to configure the database tables.
   – Go to Creating and Configuring the Database Manually, page 2-10, if your organization has specific database processes and you do not want the installer to access the database server.

Enabling SQL Remote Connections

Assumptions:

- You want to use Orchestrator with a remote database.
- You created or designated the Windows user that will install and run Orchestrator.
- SQL Server is installed on the computer that will host the database.

The steps are based on SQL Server 2005. If you are using a different version, some settings might vary.

To enable remote database connections:

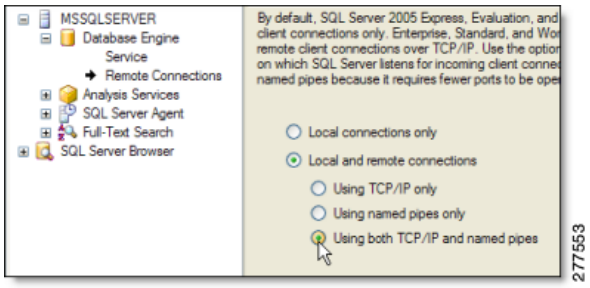
Step 1 On the Windows Start menu, choose **Microsoft SQL Server 2005 / Configuration Tools / SQL Server Surface Area Configuration**.

Step 2 Verify that the correct database server is listed, change it if necessary, and click **Surface Area Configuration for Services and Connections**.

Step 3 Expand the item that represents the appropriate instance of SQL Server.

Step 4 Under Database Engine (see Figure 2-2), open **Remote Connections**, and under Local and Remote Connections, select **Using TCP/IP and named pipes** and click **OK**.

Figure 2-2 Database Engine



After completing this procedure:

Allowing communications through the database port

The default port used by SQL Server is 1433. If you run a firewall application on the SQL Server host computer, make sure that network requests to SQL Server are allowed to pass through the firewall on this port. Refer to your SQL Server documentation for more information.

Setting Database Permissions for the Orchestrator Installation

Step 1 On the Windows Start menu, choose **All Programs / Microsoft SQL Server / SQL Server Management Studio**.

Step 2 In the Connect to Server dialog box, specify the SQL Server name and instance, and click **Connect**.

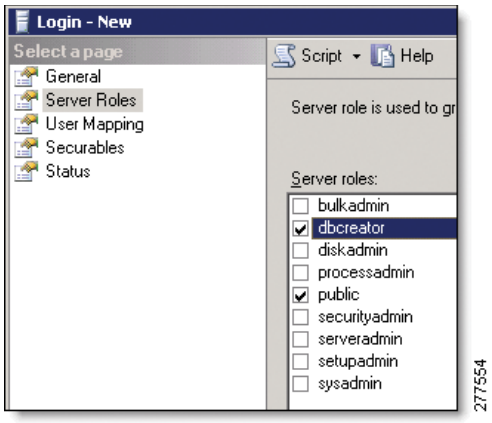
Step 3 Under the Security folder, right-click **Logins**, and choose **New Login**.

Step 4 In the Login - New dialog box, under Login name:

- In the format [domain name]\[user name], enter the Orchestrator server domain and the Windows user you created for installing Orchestrator.
- Select **Windows authentication**.

Step 5 Select **Server Roles** (see Figure 2-3), and check the **dbcreator** check box.

Figure 2-3 Server Roles



After the installation, you can assign a role to the Orchestrator user to reduce permission levels. The minimum post-installation permissions are db_datareader and db_datawriter.

Creating and Configuring the Database Manually

You can configure the Orchestrator database independently of installation so the installer does not need to access the database server.

You can do this manual process before or after installation.

Step 1 In the Orchestrator distribution folder, go to the pre-reqs\Database folder, which contains this script.

- EnterprisePowerManagementDb.sql

Note Other scripts might exist in the folder. You need only the one specified here.

Step 2 Use the process to make the script file available from the database server, for example, copy it to a shared network location.

Step 3 In SQL Server Management Studio, create a new database and name it Enterprise Power Management Server.

Step 4 Right-click the Users folder for the database, and choose Add Log in.

Step 5 Add the user that you designated to run the Orchestrator services.

Step 6 Add the user to the appropriate role, or configure permissions manually.

The required permissions are db_datareader and db_datawriter.

Step 7 Click **New Query**, and in the list of available databases, select the **EnterprisePowerManagementDB**.

Step 8 In Windows Explorer, navigate to the location of the script file listed in step 1, drag it to the empty new query tab in SQL Server Management Studio, and click the Execute button to run it.

CHAPTER 3

Installing the Orchestrator Server Components

Installing and Setting Server Components

Assumptions:

- You have followed the steps in the "Preparing the Server Installation Environment" section on page 2-6, and you have the web site and database connection information.
- You have created any user accounts that you need to run the Orchestrator services.

Step 1 Log on to the server computer as the domain administrator and then go to the Orchestrator distribution folder.

Step 2 Run OrchestratorServerSetup.exe.

Step 3 Accept the license agreement and select the setup type you want.

The remaining steps are specific to the advanced option, through which you can customize settings that are not editable in the typical installation.

For more specific information about the typical installation settings, see "Server Installation Options and Prerequisites" section on page 2-2.

Tip See the Feature Description text for the selected components that need to be installed at the same time.

Step 4 On the Destination Folder page, confirm or customize the location of the files that will be installed on the computer.

Step 5 On the Web Services Configuration page, make any changes you need to the web site, application pool, and user to run the web services.

- If you specify a different web site from the default, you also need to specify an http port other than 80. IIS designates port 80 for its default web site.
- Network Service is the recommended user. By default it is the least privileged account that has enough permissions to run the services.

Step 6 On the Database Configuration page, review and confirm the database server and connection information.

Step 7 On the Service Logon page, specify the user you want to run the Orchestrator power management service.

Again, Network Service is the default user. If you select Logon User Account to enter a user and password you created for Orchestrator, the setup program grants that user "log on as a service" permission on that computer.

Step 8 When you are done configuring each component, finish the setup program.

Step 9 Open the Orchestrator Administrator console in a browser: http://[your_site_name.com]/Admin/default.aspx. Use administrator level credentials to log in.

After completing this procedure:

If you granted db_creator or equivalent permissions to the user running the Orchestrator installer, you can reduce those permissions. If the user is also the user that will run the service, minimum required permissions are db_datareader and db_datawriter.

In addition, if you install individual server components on separate computers, you need to do some additional manual configuration. For information, see any of these topics:

- Configure access to the queue service after installation
- Create and configure the Orchestrator database manually (if the database is not installed yet)

Note If you install all of the components on one computer, you do not need to perform these extra configuration steps manually, because they are completed by the setup program.

Uninstalling or Changing the Server Configuration

Choose **Add or Remove Programs** in the Windows Control Panel to uninstall or change Orchestrator server components.

This starts the setup .msi file and gives you the appropriate options for the components installed. Run this process on each computer that hosts an Orchestrator server component that you want to uninstall or change.

Note If you uninstall the Power Management queue service, you need to manually delete the ActiveMQ-3.5 folder and its Bin and Data subfolders.

Configuring Access to the Queue Service After Installation

When you install Orchestrator server components on separate computers, you might need to set up proper access between the server components and the queueing service (ActiveMQ). This topic describes when, where, and how to modify configuration settings.

- This information applies only if you used the Advanced installation option to install particular server components on separate computers.
- The components that this issue affects are listed in the table later in this topic.
- If you use either the Typical or Advanced option to install the components on the same computer at the same time, you do not need to complete this process (it is completed during installation).
- You copy information from the activemq.xml file that is installed with ActiveMQ. (The location is given in the procedure below.)
- You modify the Verdiem.Enterprise.common.config file that is installed with specific Orchestrator server components, only when that server component is not installed on the same computer as ActiveMQ.

Table 3-1 lists each server component for which a Verdiem.Enterprise.common.config file is installed and the file location.

Table 3-1 Verdiem.common.config File Location

Orchestrator component	Verdiem.common.config location
Enterprise Power Management processor	Program Files\Cisco Systems\Cisco EnergyWise Orchestrator\BackgroundProcessor
PMP service	Inetpub\wwwroot\Cisco Systems\PMPService\bin
Administrator	Inetpub\wwwroot\Cisco Systems\Administrator\bin

Modifying the Files

When you modify the files, you copy the user name and password that was set for ActiveMQ during installation from activemq.xml to the Verdiem.Enterprise.common.config file for each server component that is hosted on a separate computer. In the .config file, you also specify the name of the server on which ActiveMQ is installed.

Step 1 On the computer that hosts ActiveMQ, navigate to and open the activemq.xml file for editing.

The file is in this location: Program Files\Cisco Systems\Cisco EnergyWise Orchestrator\activemq-5.3.0\conf.

Step 2 Find the following code:

```
<simpleAuthenticationPlugin>
<users>
<authenticationUser username="PowerMgmtMQ" password="[randomly generated password]"
groups="PowerMgmtGroup"/>
</users>
</simpleAuthenticationPlugin>
```

Note The password value is automatically generated during installation.

Step 3 Open the Verdiem.Enterprise.common.config file for the server component you installed on a separate computer. (See the table preceding this procedure for file locations.)

Find this code:

```
<MessageQueueConfiguration>
<add key="BrokerUri"
value="activemq:failover:(tcp://localhost:61616?jms.useRetroactiveConsumer=true)"/>
<add key="BrokerUserName" value="PowerMgmtMQ" />
<add key="BrokerPassword" value="[randomly generated password]" />
</MessageQueueConfiguration>
```

Step 4 Copy information from activemq.xml to Verdiem.Enterprise.common.config, so that the attributes match between files The table shows the matching attributes:

Table 3-2 Attributes

activemq.xml	Verdiem.Enterprise.common.config
username value "PowerMgmtMQ	"add key="BrokerUserName" value="PowerMgmtMQ"
password value "[generated_password]	"add key="BrokerPassword" value="[generated_password]"

Step 5 In addition, in the Verdiem.Enterprise.commmon.config file, in the node that contains the BrokerUri key, replace localhost with the name of the server on which ActiveMQ is installed.

Step 6 Save and close the files.

Setting Database Permissions for Post-installation Administration

If you give the Orchestrator user owner or creator permissions during installation, you can reduce those permissions for ongoing administration.

Note If a DBA at your organization set up the database independently of the installation, you might not need to complete these steps. Confirm with the DBA that the user running the Orchestrator Administrator service has write access to the Enterprise Power Management database.

Step 1 Open the SQL Server Management Studio and go to **Databases / Enterprise Power Management Database / Security / Roles / Database Roles**.

Step 2 Add the user that will run the Orchestrator Administrator service to a role that gives the user write access to the database.

Step 3 Remove the Orchestrator user from dbcreator or other ownership roles.

Server Settings and Descriptions

Displaying the Server Settings

To access the settings, in the Orchestrator Administrator, on the Server menu, click **Configure Server Settings**, and select the **Settings** tab.

Table 3-3 Server Settings List

Setting	Description
Maximum items per search result	Sets the number of devices to display in Manage Devices or View Events, that match the search parameters that you set in the left navigation panel. This is set to 2000 by default. If viewing or browsing devices is slow, reduce the number of devices in the list.
Server mode	Set this to Baseline to temporarily suspend policy enforcement and to only measure user activity and power state transitions. Use baseline mode when you want to determine the normal energy use over the network without power management. You would do this only under the direction of Cisco Technical Support. Set it to Operational to begin or resume policy enforcement. Baseline mode is enabled by default when you first deploy Orchestrator.
Wake job processing interval	The number of seconds to wait after sending a wake job before sending the next one. This parameter takes effect if you set the wake batch size to a number that is less than the total number of clients to wake. The default value is 10 seconds.
Wake job batch size	The number of clients to wake in one batch. This works with the Wake job processing interval. A subsequent wake batch is sent after the number of seconds set in Wake job processing interval. By default, Orchestrator wakes 100 clients at a time.
Device check-in interval	The number of minutes the client device waits before requesting power-state updates from the server. By default, this is set to 10 minutes.
Proxies per broadcast domain	The number of PC clients in each subnet to keep awake at all times to receive magic packet requests from the server and to relay them to the other clients in their broadcast segment. This setting takes effect only if you enable Wake on WAN. By default, this is set to 2 proxies.
Exclude devices with licensing disabled in the device lists	When enabled (default), displays only licensed devices in browse and search-result lists.
Do not display interface devices in the device lists	When selected (default), excludes empty ports (ports or switches with no end points) from the device list.

Table 3-3 Server Settings List (continued)

Setting	Description
Use server default settings	Enabled by default. Clear the check box to change default settings, such as the maximum number of devices that appear in search results.
Maximum items per search result	Sets the number of items that appear on the Administrator console when searching and browsing devices. By default, this is set to 2000. A status message shows the number of devices in the current tab. If more devices exist than are shown in the list, the status message also shows the total number of devices.

Installing the EnergyWise Proxy Server

The EnergyWise proxy server is installed separately from the Orchestrator installation. You must run the installation on each computer that will act as an EnergyWise proxy server.

For configurations that include a primary and secondary proxy server, you need to ensure that the *proxyAuthorizedUser* and *proxyIdentifier* in the web.config file on the EnergyWise provisioning server match exactly the information provided for login credentials (Login User Account or Network Service Account) and the Proxy Identifier during installation. For details on a failover configuration, see the "Failover Configuration for the EnergyWise Proxy Server" section on page 4-12.

If two different user accounts are required for a primary and secondary proxy server, you will need to define a separate proxyDomains section under proxyConfigurations for each user account in web.config. Both proxyDomains sections should refer to the same list of domains and the same proxy identifier to retrieve the same configurations for failover.

For details about configuring Orchestrator for EnergyWise devices, see the "Overview of EnergyWise Configuration in Orchestrator" section on page 4-1, the "Configuring the EnergyWise Proxy Server" section on page 4-11, and the "Configuring the EnergyWise Provisioning Server web.config file" section on page 4-6.

Note We recommend that you set the time on your switches to the system time of the machine running the EnergyWise proxy server. This ensures that events and reporting information coincide with policy-triggered actions on the switch. We recommend that you set up EnergyWise proxy servers to manage switches located in the same time zone.

Step 1 For each computer on which you plan to install the proxy server, log in as the user that you expect will run the EnergyWise Proxy Service.

Step 2 Run OrchestratorEWProxyServerSetup.exe on each computer that will act as proxy server.

For example, in a failover configuration, you need to run the installation for a primary proxy server and then again for a secondary proxy server.

Step 3 Enter or verify the URLs for the Orchestrator power management server and the EnergyWise provisioning server.

Step 4 Enter the Proxy Identifier. Using the same ID for both the primary and secondary proxy server enables the servers to retrieve the same configuration information.

The ID that you create must match the corresponding proxyIdentifier entry that you provide in the web.config file on the EnergyWise provisioning server.

Step 5 Enter the login credentials for the proxy service.

- Login User Account. If you select Login User Account, the user account name must be a fully qualified computer name that includes the machine or domain name and the account name. For example, MYDOMAIN\MyAccountName.
- Network Service Account. If you select Network Service Account, you need to specify NT AUTHORITY\NETWORK SERVICE as the value for proxyAuthorizedUser in the web.config file on the EnergyWise provisioning server.

Note A Network Service Account login is not currently supported for separate host configurations where the proxy server is installed on a different computer than the provisioning server.

The user account name that you enter must match the proxyAuthorizedUser entry under proxyDomains in the web.config file on the EnergyWise provisioning server.

If two different user accounts are required for a primary and secondary proxy server, you need to define a separate proxyDomains section under proxyConfigurationsfor each user account in web.config. Each proxyDomains section should refer to the same list of domains and the same proxy identifier to retrieve the same configurations for failover.

Step 6 Click Next, and then click Install.

CHAPTER 4

Configuring Orchestrator for EnergyWise Devices

Overview of EnergyWise Configuration in Orchestrator

The Orchestrator installation includes the EnergyWise proxy server and EnergyWise provisioning server.

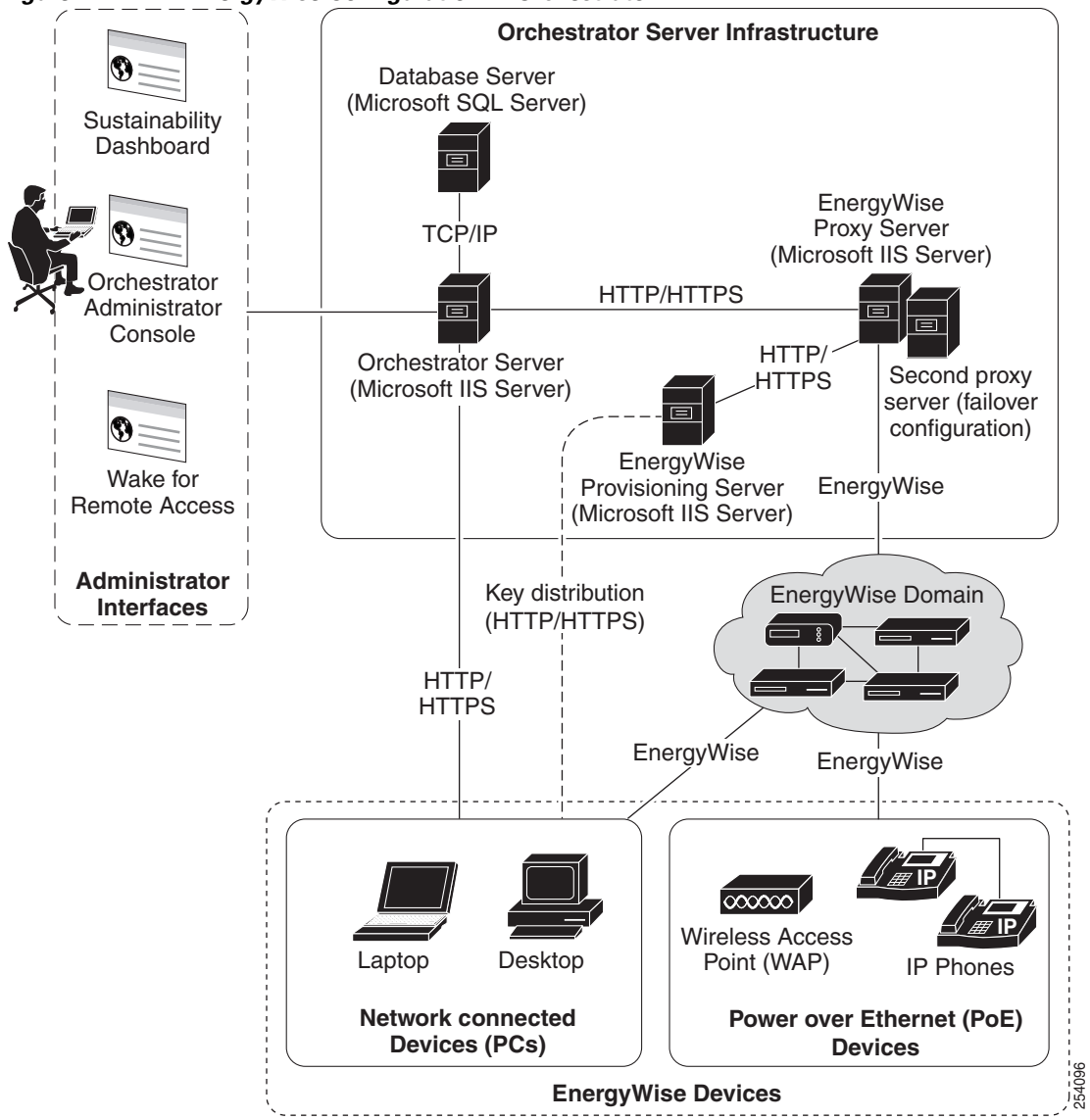
Orchestrator communicates with EnergyWise devices through the EnergyWise proxy server and gets configuration information from the EnergyWise provisioning server (See Figure 4-1).

- The EnergyWise proxy server is a bridge between the Orchestrator power management server and the EnergyWise protocol. The EnergyWise proxy server acts as a proxy for EnergyWise devices to the Orchestrator power management server and polls EnergyWise attributes (such as device and watt draw information), sending EnergyWise commands, and reports EnergyWise status to the Orchestrator power management server.

  The proxy server can be installed and run on different or multiple servers for a failover configuration. For more details, see "Failover Configuration for the EnergyWise Proxy Server" section on page 4-12.

- The EnergyWise provisioning server manages the assignment of EnergyWise domains to instances of the EnergyWise provisioning server.

Figure 4-1 EnergyWise Configuration in Orchestrator



The Orchestrator server communicates directly with PCs, and communicates with EnergyWise-enabled devices through the EnergyWise proxy server.

General Steps for Configuring EnergyWise in Orchestrator

Table 4-1 Steps To Configure EnergyWise with Orchestrator

Step	Task	Description
Step 1	Configure the EnergyWise domain structure, and enable the switches that are domain members. **Note** We recommended that you perform this step before installing Orchestrator.	You configure the EnergyWise domain using the command line interface (CLI). For details, see the "Configuring the EnergyWise Provisioning Server web.config file" section on page 4-6. For more details on creating and configuring EnergyWise domains, see the Cisco EnergyWise Configuration Guide on www.cisco.com. **Note** We recommend that you set the time on your switches to the system time of the machine running the EnergyWise proxy server. This ensures that events and reporting information coincide with policy-triggered actions on the switch. EnergyWise proxy servers should be set up to manage switches in the same time zone.
Step 2	Install Orchestrator following the steps described in Installing the Orchestrator server components.	Installs the Orchestrator server, database, EnergyWise provisioning server, and EnergyWise proxy server.
Step 3	Set up the configuration file on the EnergyWise provisioning server.	Orchestrator EnergyWise domain information is in the `web.config` file (XML format): *`C:\Inetpub\wwwroot\Cisco Systems\EnergyWiseProvisioningService.`* Locate the section *energyWiseDomainConfig*. For each domain, specify the domain name, the primary and secondary (if needed) management switches, the primary and secondary (if needed) proxy servers, the end point secrets, and management secrets, and the management ports. For details, see the "Configuring the EnergyWise Provisioning Server web.config file" section on page 4-6.
Step 4	Start the EnergyWise proxy service, or restart it if it is already running. Restart all necessary services on the Orchestrator server.	Restart these services: • EnergyWise Proxy Service • Microsoft IIS • ActiveMQ • Enterprise Power Management Processor **Note** When you make a change to the *`web.config file`* on the EnergyWise provisioning server, you must restart the EnergyWise Proxy Service for the change to take effect.

Notes on Orchestrator Support for EnergyWise Attributes

For most changes that you make to EnergyWise attributes directly on the switch using the CLI (such as Roles, Keywords, Power Level, and so on), the EnergyWise proxy server sends the change to the Orchestrator server and the changes will be reflected in the Orchestrator database and Administrator console.

However, Orchestrator does not translate the EnergyWise recurrence attribute into Orchestrator policies. EnergyWise recurrence strings that you set for devices (on the switch via CLI or another management application) will be overwritten whenever the Orchestrator server updates the policy that is assigned to the device. This can occur when:

- Orchestrator changes from Baseline to Operational server mode and Orchestrator begins policy enforcement.
- An administrator clears the Do not enforce this policy option for a device assigned policy while Orchestrator is in Operational mode.
- A policy is modified and saved (in Operational mode), and Orchestrator sends the updated policy information to a device.

The EnergyWise proxy server will not overwrite recurrences on a switch when it first starts up. Unless a policy update occurs, Orchestrator does not overwrite preexisting recurrences.

For specific details on setting EnergyWise attributes using the EnergyWise command line interface (CLI), see the Cisco EnergyWise Configuration Guide on Cisco.com. For related details, see Allow power level changes to client agents from a Cisco EnergyWise switch.

Unless a policy update occurs, Orchestrator does not overwrite preexisting recurrences. If previously set recurrences exist on any switches or ports when EnergyWise proxy service is started for the first time, Orchestrator will not overwrite those recurrences.

If the **No Enforcement** policy is assigned to ports when the EnergyWise proxy service starts for the first time, and you want to clear the preexisting recurrences, use this procedure:

Step 1 In Orchestrator Administrator console, on the Policies menu, select **Edit Policies**.

Step 2 Select the **No Enforcement** policy.

Step 3 Clear the **Do not enforce this policy** option.

Step 4 Click **Save**. Wait until the recurrences have cleared. You can check this by using the show EnergyWise recurrences CLI command.

Step 5 Select the **Do not enforce this policy** option again.

Step 6 Click **Save**.

EnergyWise Domains

Cisco EnergyWise is a network-based technology that monitors and manages the power usage of devices in an EnergyWise network.

Any network-connected devices and Cisco Power over Ethernet (PoE) devices that are connected to EnergyWise-enabled switches are automatically recognized as end points of an EnergyWise domain.

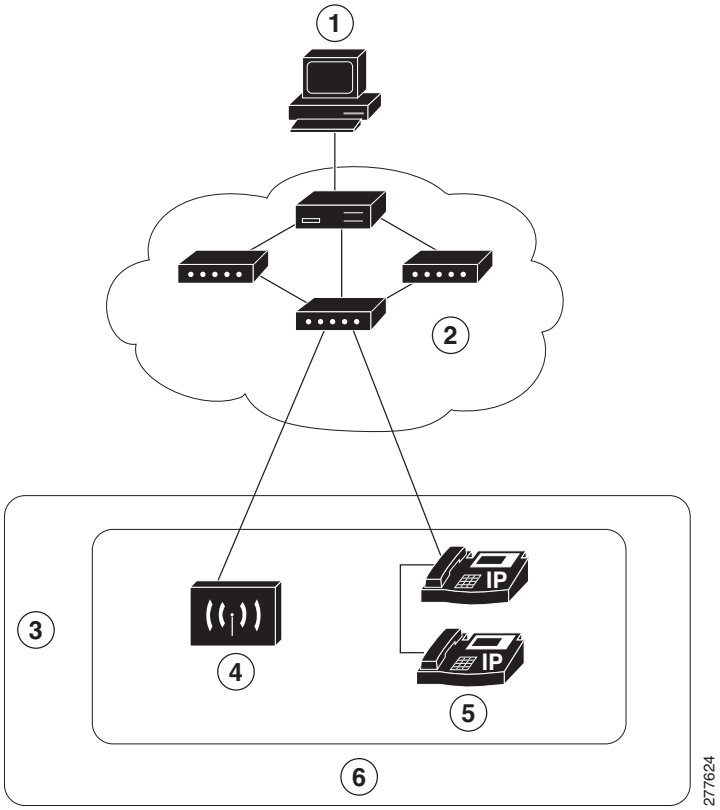
Only PoE devices are automatically recognized as end points of the domain, and only if the switch has been configured to join the EnergyWise domain. PCs, even if they are connected to an EnergyWise-enabled switch, are not recognized as end points of an EnergyWise domain.

An EnergyWise domain:

- Is a virtual network domain with Cisco network devices that receive and forward messages to other domain members and to end points. The EnergyWise domain of a network is independent of the physical domain as long as there is connectivity across physical domains.
- Consists of Cisco domain members and end points. An end point can be a device connected to the network, such as an IP phone or wireless access point (WAP).

An EnergyWise network discovers EnergyWise devices and monitors their power consumption.

Figure 4-2 Overview of EnergyWise Domains



1	Management station	**2**	EnergyWise domain
3	End points	**4**	Wireless Access Point (WAP)
5	IP phones	**6**	Power over Ethernet (PoE) devices

Note Orchestrator supports Cisco EnergyWise Phase 2. You can configure Orchestrator to recognize EnergyWise devices (IP phones and wireless access points) that are connected to Cisco network devices. For a list of supported devices, see the release notes for Cisco EnergyWise, EnergyWise Phase 2 on Cisco.com.

For more details on creating and configuring EnergyWise domains, see the *Cisco EnergyWise Configuration Guide* on Cisco.com.

Configuring the EnergyWise Provisioning Server web.config file

The EnergyWise provisioning server provisioning server is a .NET web service that is used to configure the EnergyWise proxy server (or multiple proxy servers) with EnergyWise domain information and configuration parameters for each of the domains.

All EnergyWise domain configurations for Orchestrator is in the web.config file in *C:\Inetpub\wwwroot\Cisco Systems\EnergyWiseProvisioningService*.

EnergyWise configuration file (web.config) example:

```
<energyWiseDomainConfig>
    <energyWiseDomains>
      <energyWiseDomain>
        <collectionInterval>900000</collectionInterval>
        <domainName>Domain1</domainName>
        <endpointSecret>shhhhh</endpointSecret>
        <managementPort>43440</managementPort>
        <managementSecret>secret</managementSecret>
        <primaryManagementServer>10.20.2.1</primaryManagementServer>
        <primaryProxyServer>192.168.1.2</primaryProxyServer>
        <secondaryProxyServer>192.168.1.4</secondaryProxyServer>
        <timeout>6000</timeout>
      </energyWiseDomain>
      <energyWiseDomain>
        <collectionInterval>60000</collectionInterval>
        <domainName>Domain2</domainName>
        <endpointSecret>shhhhh</endpointSecret>
        <managementPort>43440</managementPort>
        <managementSecret>secret</managementSecret>
        <primaryManagementServer>10.51.0.1</primaryManagementServer>
        <primaryProxyServer>192.168.1.2</primaryProxyServer>
        <secondaryProxyServer>192.168.1.4</secondaryProxyServer>
        <timeout>10000</timeout>
      </energyWiseDomain>
    </energyWiseDomains>
    <proxyConfigurations>
      <proxyDomains>
        <proxyAuthorizedUser>machineName_or_domainName\accountName</proxyAuthorizedUser>
        <proxyDomainList>
          <proxyDomain>
            <proxyDomainName>Domain1</proxyDomainName>
          </proxyDomain>
          <proxyDomain>
            <proxyDomainName>Domain2</proxyDomainName>
          </proxyDomain>
          <proxyDomain>
            <proxyDomainName>Domain3</proxyDomainName>
          </proxyDomain>
```

```
          <proxyDomain>
            <proxyDomainName>Domain4</proxyDomainName>
          </proxyDomain>
        </proxyDomainList>
        <proxyIdentifier>proxyIdOne</proxyIdentifier>
      </proxyDomains>
    </proxyConfigurations>
</energyWiseDomainConfig>
```

Table 4-2 EnergyWise Domain Elements

Element Name	Descriptions
collectionInterval	The time in milliseconds between polls of the EnergyWise domain by the EnergyWise proxy server. The default is 900000.
domainName	The EnergyWise domain name previously configured on the switch or router.
endpointSecret	The end point secret key for the domain previously configured on the switch or router. **Note** This key must be the same in the provisioning server web.config file and in the EnergyWise domain configuration.
managementPort	The TCP port through which the management station communicates with the EnergyWise domain. The default is 43440.
managementSecret	The management secret for the domain previously configured on the switch or router. In EnergyWise, this is the management password on the switch that the management station uses to communicate with the domain. **Note** This key must be the same in the provisioning server web.config file and in the EnergyWise domain configuration.
primaryManagementServer	An IP address or DNS name of the EnergyWise-enabled switch or router through which orchestrator communicates with this EnergyWise domain. It is the primary node and entry point for an EnergyWise domain.
secondaryManagementServer	The secondary EnergyWise-enabled switch or router with which to communicate. If none is available, enter the value for the primary management server.
primaryProxyServer	An IP address or DNS name where the primary EnergyWise proxy server is running. For each domain, there can be exactly one primary proxy server.

Table 4-2 EnergyWise Domain Elements (continued)

Element Name	Descriptions
secondaryProxyServer	An IP address or DNS name where a secondary proxy server is running (for failover configurations). The secondary proxy server monitors the primary proxy server and acts as the backup for the primary proxy server if it fails to respond. For each domain, there can be only one secondary proxy server.
timeout	The timeout in milliseconds for an EnergyWise query. This parameter specifies the EnergyWise query timeout, which affects the amount of time EnergyWise queries wait for responses. The default is 10000. For example: `<timeout>15000</timeout>` The query takes at least this amount of time (in milliseconds). The *timeout* is the time elapsed without any new responses from the EnergyWise domain. In the example, the query finishes 15000 milliseconds after the last response.

You must define the association between the proxy server and the domains under management.

Table 4-3 ProxyDomain Elements

Element Name	Description
proxyAuthorizedUser	The user account under which the proxy server is running (or multiple proxy servers in a failover configuration). If you select **Login User Account**, the user account name must be a fully qualified computer name that includes the machine or domain name and the account name, for example: MYDOMAIN\MyAccountName **Note** The proxyAuthorizedUser account entry must match the value provided during the proxy server installation. If you select **Network Service Account**, you need to manually edit the web.config file on the EnergyWise provisioning server and specify NT AUTHORITY\NETWORK SERVICE as the value for *proxyAuthorizedUser* **Note** A Network Service Account login is not currently supported for separate host configurations where the proxy server is installed on a different computer than the provisioning server. If two different user accounts are required for a primary and secondary proxy server, you will need to define a separate <proxyDomains> section under proxyConfigurations for each user account in web.config. Each proxyDomains section should refer to the same list of domains and the same proxy identifier.
proxyDomainList	The list of proxy domains managed by the proxy server under the specified *proxyAuthorizedUser* account.
proxyIdentifier	The identifier (an arbitrary name specified during the proxy server installation) by which the proxy server is known. This ID determines the configuration information that is retrieved by the proxy server. Using the same ID for both the primary and secondary proxy server enables the servers to retrieve the same configuration information. The ID you create must match the corresponding *proxyIdentifier* entry that you provided during the proxy server installation. This value is also stored in the energywise-proxy.properties file on the proxy server computer.

The EnergyWise proxy server discovers EnergyWise devices in the configured domains and registers them with the Orchestrator power management server. These devices are then manageable through Orchestrator through the EnergyWise proxy server.

Whenever you make a change to the web.config file on the EnergyWise provisioning server, you must restart the EnergyWise Proxy Service for the change to take effect. You should also restart these services on the Orchestrator server: Microsoft IIS, ActiveMQ, and Enterprise Power Management Processor.

Note If you start the EnergyWise proxy service and the EnergyWise provisioning service is not available (for any reason), the EnergyWise proxy service will not be able to communicate with the provisioning server to get its information. To enable the proxy service to get configuration information from the provisioning server, you will need to restart the EnergyWise proxy service when you know the EnergyWise provisioning server is available.

Step 1 Locate the energyWiseDomainConfig section in the file. For each EnergyWise domain you want enter the

- Domain name
- End point secret key

Note This key must be the same in the provisioning server web.config file and in the EnergyWise domain configuration.

- Management port
- Management secret

Note This key must be the same (exactly) in the provisioning server web.config file and in the EnergyWise domain configuration.

- IP address of the switch or router in primary management server
- IP address of the primary EnergyWise proxy server
- IP address of the secondary EnergyWise proxy server, if used

Step 2 After you enter a section for each EnergyWise domain you want to configure, create an entry in proxyDomainList for each domain. These should match one-for-one with the information that you entered in the energyWiseDomain configuration.

Step 3 In the proxyDomains section, define the association between the proxy server and the domains under management.

Step 4 Restart the EnergyWise Proxy Service for the change to take effect.

Note Whenever you make a change to the web.config file on the EnergyWise provisioning server, you must restart the EnergyWise Proxy Service for the changes to take effect. You must also restart these services on the Orchestrator server: Microsoft IIS, ActiveMQ, and Enterprise Power Management Processor.

Configuring the EnergyWise Proxy Server

The EnergyWise proxy server is installed separately from the Orchestrator installation. You must run the installation on each computer that will act as an EnergyWise proxy server. The options you choose during the installation process and the values that you enter in the web.config file on the EnergyWise provisioning server are the settings that determine the proxy server configuration.

The EnergyWise proxy server has no user interface. A typical implementation installs the EnergyWise proxy server on the same computer as the Orchestrator power management server. You can run it on a different or multiple servers for a failover configuration. For details, see the "Failover Configuration for the EnergyWise Proxy Server" section on page 4-12 and the "Installing the EnergyWise Proxy Server" section on page 4-13.

The default configuration settings for the proxy server are stored in the energywise-proxy.properties file.

During startup, the EnergyWise proxy server connects to the EnergyWise provisioning server and receives its Energywise configuration information for each of the EnergyWise domains it manages. A single EnergyWise proxy server can be the proxy for multiple EnergyWise domains.

The proxy server receives the EnergyWise configuration parameters from the provisioning server for each EnergyWise domain it manages:

- EnergyWise domain name
- EnergyWise management key
- IP address of the primary EnergyWise management switch
- IP Address of the secondary EnergyWise management switch (if used)
- Communication port to use on primary switch
- Communication port to use on secondary switch (if used)
- Collection (polling) interval
- IP address of primary proxy server
- IP address of secondary proxy server (if used for a failover configuration)

Note

- If you start the EnergyWise proxy service and the EnergyWise provisioning service is not available (for any reason), the EnergyWise proxy service will not be able to access the web.config file on the provisioning server. To enable the proxy service to access the web.config file, you will need to restart the EnergyWise proxy service when you know the EnergyWise provisioning server is available.
- We recommend that you set the time on your switches to the system time of the machine running the EnergyWise proxy server. This ensures that events and reporting information coincide with policy-triggered actions on the switch. We recommend that you set up EnergyWise proxy servers to manage switches in the same time zone.

Failover Configuration for the EnergyWise Proxy Server

The EnergyWise proxy server supports several configuration options.

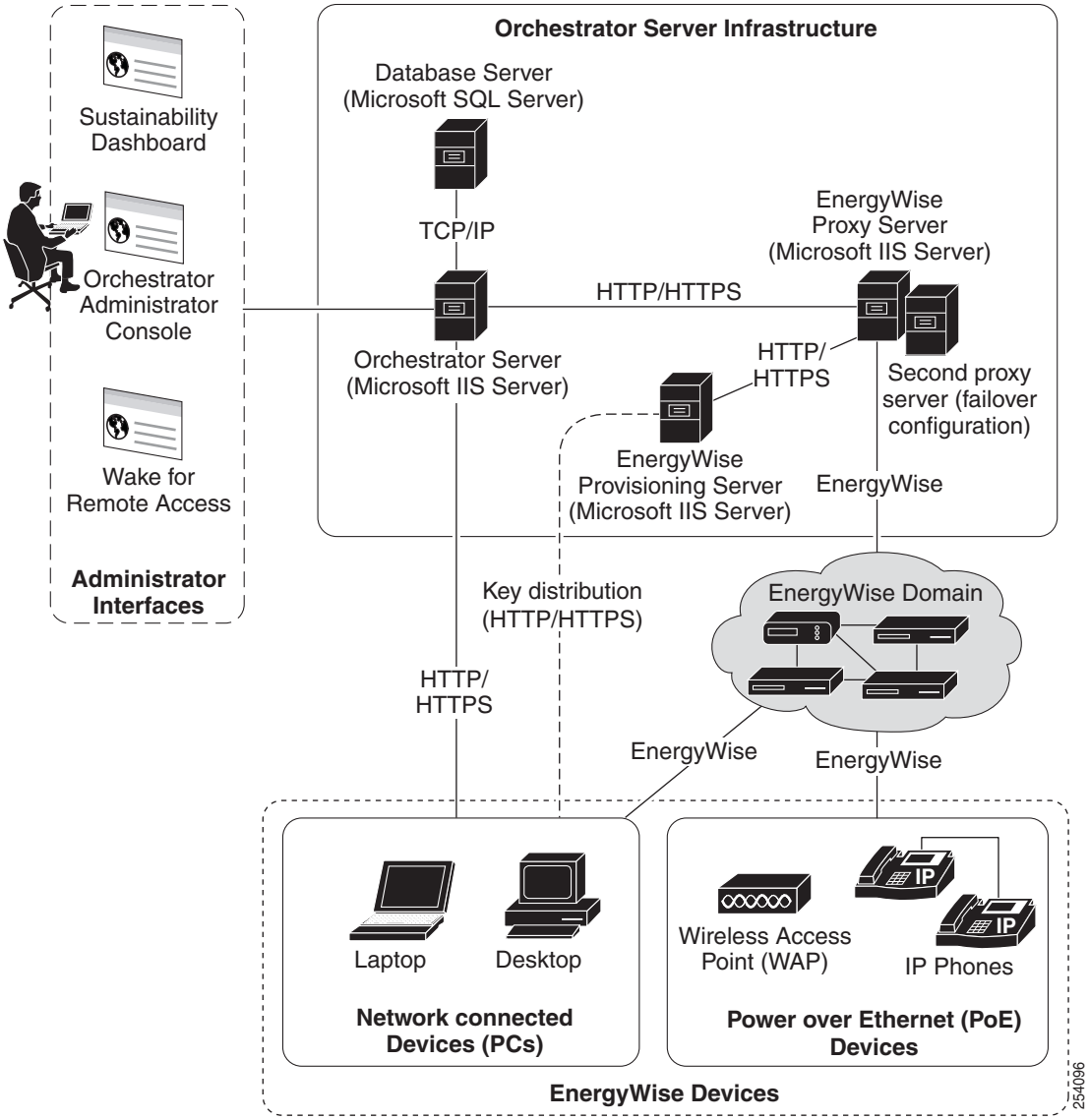
For a small to medium-sized EnergyWise installation with no backup, a single server can be a proxy for all EnergyWise devices across one or more domains.

For a large EnergyWise installation, the domain management responsibilities can be split evenly over several EnergyWise proxy servers, each with a separate backup.

In a failover configuration, each EnergyWise domain is assigned a separate primary and secondary proxy server. This information is defined in the web.config file on the EnergyWise provisioning server. For details, see the Configuring the EnergyWise Provisioning Server web.config file section.

When the primary proxy server for a set of domains starts, it monitors and manages those domains. When a secondary proxy server starts, it monitors the primary server for the domains for which it is defined as a secondary proxy server.

Figure 4-3 Failover Configuration for the EnergyWise Proxy Server



If the proxy server fails (stops responding to status requests from the secondary proxy server), the secondary proxy server begins to monitor and manage the domains that its primary proxy server is responsible for. The secondary proxy server continues attempting to determine the status of the primary proxy server. When the secondary proxy server gets a valid status response from the primary proxy server, it stops managing and allows control to return to the primary proxy server.

The recommended configuration is a secondary proxy server for every primary proxy server.

Installing the EnergyWise Proxy Server

The EnergyWise proxy servers are installed separately from the Orchestrator installation. For details, see the "Installing the EnergyWise Proxy Server" section on page 4-13.

Troubleshooting

Recurrence Settings On an EnergyWise Device Do Not Match The Policy Settings

If the No Enforcement policy is assigned to ports when the EnergyWise proxy service starts for the first time, and you want to clear the preexisting recurrences, use this procedure:

Step 1 In Orchestrator Administrator console, on the Policies menu, select **Edit Policies**.

Step 2 Select the **No Enforcement** policy.

Step 3 Clear the **Do not enforce this policy** option.

Step 4 Click **Save**. Wait until the recurrences have cleared. You can check this by using **show energywise recurrences** CLI command on the switch.

Step 5 Select the **Do not enforce this policy** option again.

Step 6 Click **Save**.

CHAPTER 5

Orchestrator Client Distribution

Installing the Orchestrator Client Agent from the Setup Program

To use the setup program, you need to know the address of the power management server computer.

Step 1 On the client computer, log in as a local administrator and copy the Orchestrator client distribution files to the client computer.

Step 2 Run the setup file, and follow the installation wizard instructions.

a. On the Installation Configuration page, enter the URL of the Orchestrator server.

b. On the same page, leave the **Add Cisco as a trusted publisher** check box checked.

Installing or Uninstalling Orchestrator Client Agent By Using the Command Line

This topic provides the command line parameters for installing or uninstalling the client agent silently.

Installation Process

This procedure is to run the silent installation directly on the client computer. You can use this same command with your standard software distribution process to push the client agent to multiple computers and other agent-based devices.

Step 1 Copy the files for the Orchestrator client agent distribution to a location on the client computer.

Step 2 To run the silent installation, open a command window, change to the directory that contains the setup file, and then enter this command:

```
setup
OrchestratorAgentSetup.exe /s /v"/qn INSTALLDIR=\"C:\Program
Files\Cisco\EnergyWiseOrchestratorClient\" INSTALLCERTIFICATE=yes
PMP_URL=http://OrchestratorServerName/PMPService/PMPService.svc/PMP"
```

Step 3 If you want to create an installation log file, add the /log parameter with the /qn parameter and specify the location. For example:

OrchestratorAgentSetup.exe /s /v"/qn [other parameters] /log setup_log.txt"

Tip A reliable location for setup_log.txt is the same directory as the setup file. However, you can use a different path and file name. Either way, the directory that you specify must exist on the client computer.

Confirming Client Installation

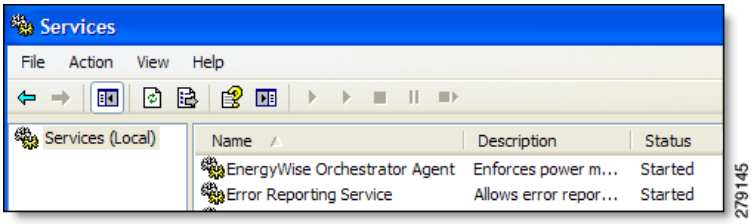
If you installed the client agent by sending a distribution package from your desktop management system to a large number of PCs, verifying its success is usually a two-phase process:

- After the package runs, you can check the reports in the desktop management system to confirm that it ran successfully.
- After a week or two, use the Orchestrator Administrator console to see the number of PCs that are checking in with the server and the number of licenses that are used.

Troubleshooting

If it looks as if a computer is not checking in properly, check that the client agent is running on that computer:

1. Open the Windows Services console: Click **Start menu / Run**, and type services.msc.
2. Confirm that the status of the EnergyWise Orchestrator Agent shows Started.



Parameters and Descriptions

Common parameters for a standard silent installation include:

- **/s** —silences the setup.exe file.
- **/v "[attributes]"**—passes everything inside the quotations to the .msi application.
- **/qn**—used inside the quotations of the /v parameter to silence the .msi application.

You can specify additional attributes to the .msi runtime.

- **INSTALLDIR=\"[path]"**—specifies the parent directory in which you want to install the client application files on the client computer.
- **INSTALLCERTIFICATE=yes**—sets Cisco as a trusted publisher.
- **PMP_URL=[url]**—specifies the web address to the PMP service on the Orchestrator server.

Uninstalling Orchestrator Client

You can uninstall the client agent from the Add/Remove Programs component of the Windows control panel on the client computer, or you can use this command from the client distribution directory:

```
msiexec /q /x "EnergyWise Orchestrator Agent.msi"
```

If you did not copy the distribution files to the client, you can run a silent uninstall by using the Orchestrator product code instead the .msi file name.

For example:

```
mxiexec /q /x {8188xxxx-xxxx-xxxxxxxx-xxxxxxxxxxxx}
```

In this example the x characters represent the product code.

To find the product code, open the Windows registry editor (regedit.exe), and navigate to **HKEY_LOCAL_MACHINE / SOFTWARE / Microsoft / Windows / CurrentVersion / Uninstall / {8188...}**, where 8188 is the beginning of the EnergyWise product code. Copy the code that represents **EnergyWise Orchestrator**.

Distributing the Orchestrator Client Agent by Disk Image

Step 1 On the computer that you want to use as the image, install the client agent from the setup program (OrchestratorAgentSetup.exe).

Step 2 Verify that the client connects to the server.

Step 3 In the Windows Services console, stop the EnergyWise Orchestrator Agent service:

a. Right-click **My Computer,** and choose **Manage**.

b. In the Computer Management console, expand **Services and Applications**.

c. Under Services, right-click **EnergyWise Orchestrator Agent,** and choose **Stop**.

Step 4 In the Program Files\Cisco Systems\EnergyWise Orchestrator Agent\Data\ folder, delete these files:

- eventstore: contains power state and event history
- policy: contains power management instructions

When you transfer the image to new computers, you want them to begin with a clean history and no policy, so that they receive instructions only from the server.

Step 5 In the same folder, open the server.config file in a text editor such as Notepad, and remove the text that assigns an id to the client:

"clientID": "xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx"

This enables a new unique id to be assigned to each computer when the agent is installed.

Step 6 In the text that remains, confirm that the path to your Orchestrator power management service is correct. It looks something like this:

{"serverURL":"http:\/server_name.local\/PMPService\/PMPService.svc\/PMP"}

Step 7 Delete all files from the following folder (but do not delete the folder):

- Program Files\CiscoSystems\EnergyWise Orchestrator Agent\Logs

---

After you prepare the prototype computer, you can copy its image to the other client computers.

To prevent collisions among Orchestrator clients when they connect to the server, each computer that receives the disk image must have

- a unique DNS name
- a unique MAC address

For information about completing the image installation, refer to the software documentation.

Deploying the Orchestrator Client Agent using Group Policy

This process involves two separate procedures: create the transform file from the client installer package (.msi) and then add the transform and package to a Group Policy object.

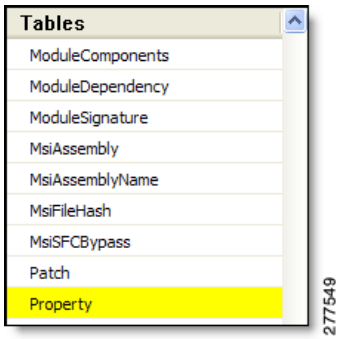
To create the transform file, you need a transform editor. This uses Orca, although you can use any transform editor.

Orca is a database table editor for creating and editing Windows Installer packages and merge modules. It is available in the Windows Installer SDK, which you can download from the Microsoft Download Center.

Step 1 Start Orca, and in the client agent folder of your Orchestrator distribution, open **EnergyWise Orchestrator Agent.msi**.

Step 2 From the Transform menu, choose **New Transform**.

Step 3 In the Tables column, select **Property**.



Step 4 Confirm these properties and values:

a. PMP_URL: the address of the power management web server that hosts the PMP service.

b. SERVER_NAME: the name of the power management server.

c. SERVER_PORT: the port number to use for the network (HTTP port 80 by default).

Step 5 From the Transform menu, choose **Generate Transform**.

Step 6 Enter a name for the transform file (.mst), save it, and exit Orca.

Creating the Group Policy Object for Orchestrator Client Installation

After you create a transform file from the Orchestrator Client installer package, you can add it and the package to a Group Policy object to install the client software.

Before you perform this procedure, create the transform file that you will use in this procedure.

Note This procedure is from the Group Policy Object Editor Help and is modified to include the information specific to Orchestrator.

Step 1 Open the Group Policy Object Editor by choosing **Start menu > Run** and entering gpedit.msc.

Step 2 Select **Computer Configuration > Software Settings > Software Installation**.

Step 3 Right-click in the details pane, and click **New> Package**.

Step 4 In the Open dialog box, from the Orchestrator distribution folder, browse to **OrchestratorClient>EnergyWise Orchestrator Agent.msi**, and click **Open**.

Step 5 In the Deploy Software dialog box, click **Advanced**, and click **OK**.

Step 6 In the properties dialog box for the package, in the Modifications tab, click **Add**.

Step 7 In the Open dialog box, go to the transform file that you created for the Orchestrator Client installer, and click **Open**.

Step 8 Make sure that you are done configuring any modifications, and in the Orchestrator Client AgentProperties window, click **OK**.

Note The package is immediately assigned or published when you click OK. If the modifications are not properly configured, you have to uninstall or upgrade the package with a correctly configured version.

Step 9 Close the **Group Policy Object Editor**.

Step 10 To put the Group Policy updates into effect, either restart the computers, or run the command **gpupdate /force** to refresh the Group Policy settings.

Note If you get an error that validation of the installer package has failed, try editing the default language properties of the package. To do this, right-click the package and choose **Properties**. On the Deployment tab, click **Advanced**, and then select the **Ignore language when deploying this package** check box.

Distributing the Orchestrator Client Agent through a Microsoft ConfigMgr Package

Creating a ConfigMgr package for Orchestrator Client Agent Installation

Step 1 From the **Orchestrator distribution**, copy the Client folder to a Configuration Manager site server or to a shared network folder.

Step 2 Open the Configuration Manager console, and go to **Site Database>Computer Management> Software Distribution>Packages**.

Step 3 Right-click **Packages,** and choose **New>Package**.

Step 4 Follow the New Package Wizard instructions:

- **a.** On the General page, enter a name for the package, and complete any additional fields that you want.
- **b.** On the Data Source page, select This Package Contains Source Files, and click **Set**. In the *Set Source Directory* dialog box, under Source directory location, click the type of connection, enter the source directory, and click **OK**.
- **c.** On the Distribution Settings page, select **High** for Sending Priority.

Step 5 When you complete the wizard steps, click **Close**.

The package appears under the Packages node of the site tree in the Configuration Manager console.

Step 6 Expand the package, right-click **Distribution Points**, and choose **New Distribution Points**.

Step 7 Check the check box beside the name of each server that you want to make distribution points, and click **Next**.

The wizard creates the distribution points.

Step 8 Click **Close** to return to the site tree.

Step 9 Right-click Programs, choose **New / Program**, and follow the New Program wizard instructions, entering the specific setting for this program:

On the General page, for Command line, enter the command with the parameters that you want to install the client agent.

For a sample command line and a list of available parameters, see the "Installing or Uninstalling Orchestrator Client Agent By Using the Command Line" section on page 5-1.

Creating an Advertisement to Distribute a Orchestrator Client Package

After you create the installation package, select distribution points, and create the program that runs the installer to distribute the Orchestrator agent through Configuration Manager.

If you have not created the package for the Orchestrator client agent, see the "Creating a ConfigMgr package for Orchestrator Client Agent Installation" section on page 5-6.

Step 1 In the Configuration Manager console, set up a collection of clients that you want to target for the Orchestrator client agent distribution.

You can base the collection on a query or on direct membership rules.

Step 2 Right-click the collection, and choose **Distribute> Software**.

Step 3 Follow the *Distribute Software to Collection* Wizard instructions:

- **a.** On the Package page, select **Select an existing package**, click **Browse**, and select the Orchestrator Client installation package that you created.
- **b.** On the Advertise Program page, show that you want to advertise a program from this package.
- **c.** On the Select Program page, click the program that you created for this distribution.
- **d.** On the Advertisement pages, configure the settings for the name, any subcollections to advertise to, and the schedule.
- **e.** On the Assign Program page, select **Yes**, to assign the program.
- **f.** Complete the wizard.

After the installation has completed, validate the installation.

Validating Orchestrator Client Installation through ConfigMgr

After you distribute Orchestrator client agent through a Configuration Manager, use the Orchestrator Administrator console to confirm that the distribution was successful.

If you have not distributed the Orchestrator client agent to a collection, see the "Creating a ConfigMgr package for Orchestrator Client Agent Installation" section on page 5-6.

Step 1 On the Orchestrator server computer, open the Orchestrator Administrator console in a browser.

Step 2 On the Manage Devices page, use the device filters to select the groups in the PC device family that represents the computers that received the Configuration Manager distribution.

Step 3 Confirm that the PC clients appear in the device list and that they each show these status settings:

- Last Connected: Today
- Licensed: Yes
- Profile: current
- Monitor: current

Note If the number of PCs that match your search criteria exceeds the number that appear in the device list, you need to refine the search to see all of them.

CHAPTER 6

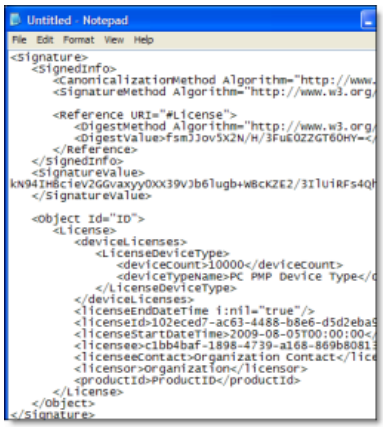
Licensing Devices

How the License File Works

Device licenses are stored in an XML file (see Figure 6-1). You import the file into the system through the Administrator console. The server measures energy use or applies policies only on devices that are licensed.

The license file includes the product and license ID, the number of devices in the Orchestrator system, the effective dates, and other information that helps the server recognize which devices to measure or manage.

Figure 6-1 License File Example



277547

Obtaining License Files

During the evaluation period, your Cisco representative works with you to determine the number of devices you want to license. When you deploy Orchestrator, your Cisco representative generates a single license file that contains the number of licenses determined, the license types, and other required data.

When you receive the file, you complete the steps in the Administrator console to apply the license to your devices.

Viewing License Information

In the server settings of the Administrator console, you can see all licenses applied to an instance of Orchestrator as well as status information:

- Dates for when the license became active and when it expires
- Device families covered by the license and number of devices in each family
- Number of total licenses available and in use
- Licensee (your organization name), licensor's organization and individual contact names
- License unique ID

When you display a list of devices, you can also display a column that shows whether each device is licensed.

Manage Licenses Page

You can add or remove license files and monitor license allocation from the Manage Licenses page.

Click Manage Licenses on the Server menu to see the license settings.

Table 6-1 Licenses Page

Settings	Description
Device	The type of device that is licensed under the selected license file. • PC PMP—Computers on which the Orchestrator client agent is installed and on which you enforce policies. (Power Management Protocol (PMP) • EnergyWise—Agentless devices that are configured for a Cisco EnergyWise domain and are managed by Orchestrator, for example, EnergyWise-enabled switches, WAPs, IP phones.
Total Licenses	The number of devices that are allowed to be licensed through the selected license files.
Total Allocated / Total Remaining	The number of licenses in the selected license file that are in use and the number that can still be used.

Table 6-1 Licenses Page

Settings	Description
Start / End	The start and end dates during which the selected license file is valid.
Licensee	The organization to whom the license is issued.
Contact	The person or organization to contact to renew the license or to change its criteria.
Licensor	The organization that issued the license.
ID	The globally unique string used to identify and verify the license file, automatically generated when the file is created by the Licensor.

Adding or Removing a License File

To license devices, you obtain a license file from your Cisco representative and then activate it to the system though the Administrator console.

This task describes how to add or remove a license file that you have already obtained for the number of device licenses you need.

Step 1 Log on to the server computer.

Step 2 You can use options for saving the license file to the server local drive:

- Save the file attachment from e-mail.
- Download the file from the customer portal address that you were given.

Step 3 The license file is an XML file. If you received a .zip file, extract it, and confirm that the license file shows the .xml extension.

Note If the file does not show the .xml extension, open it in Notepad to confirm that it is an XML file, close it, and change or add the extension. If that does not work or if the file is not an XML file, contact your Cisco representative to resolve the problem.

Step 4 Open the Administrator console, and on the Server Settings menu, click **Manage Licenses**.

Step 5 Click **Add License File**:

a. For Files of type, replace type Text by entering *.* to show all files.

b. Go to the license file location, select the file, and click **Open**.

If you want to remove an existing license, select the file, and click **Delete**.

If you add a license file, its information appears in the Administrator console, showing the number of licenses, where the license came from, and so on.

When you remove a license file, devices that are associated with it become unlicensed. Power use on those devices is not managed or measured.

CHAPTER 8

Gathering Data and Creating Initial Power Management Policies

Establishing the Baseline Level of Energy Usage

When measuring savings achieved through policy enforcement, an accurate starting point, or *baseline*, is important.

Overview of Baseline Data Collection Process

The baseline is the amount of energy that devices use without centralized power management. It is important in determining initial power management policies and in post-enforcement reporting. Only with an accurate baseline can you obtain reliable results when measuring savings from policy enforcement.

For PC clients in the Orchestrator system, you complete the baseline data collection process after installation but before you enforce power management policies:

1. Run the system with the Baseline server mode enabled for several weeks of normal network operation.

   During this time, clients report their use to the server, energy use is measured, but no policies are enforced.

2. Generate a data availability report that shows the number of clients reporting to the server each day during that period of time.
3. From the data availability report, select a 2-week period during which a consistent number of clients reported to the server each day.

   Make sure that this 2-week period meets the requirements in the "Criteria for Selecting the Baseline Date Range" section on page 8-2.
4. Run a baseline report for the 2-week period to obtain the *baseline number* for the average rate of energy use for the PC CPU and display during that time specified. The baseline numbers are used in system-health and energy-savings reports.

For non-PC EnergyWise devices, the baseline energy usage levels are calculated automatically:

1. Devices are assumed to be always on at power level 10.
2. Power draw depends on the device and its version, with values hard-coded into the device.

Criteria for Selecting the Baseline Date Range

Within the time period during which you let the system run in Baseline mode, you select a 2-week time span that is used to calculate the baseline numbers. To get an accurate baseline calculation, the 2-week time period should meet these criteria:

- All days must reflect normal business operation.

  Holidays, hardware transitions, power outages, and other events that affect normal computer operation alter the data collected, producing inaccurate baseline.
- The time span should show a consistent number of devices reporting to the server, and the number should be 90 percent or more of the licensed devices.

Additional Required Reporting Information

To determine the baseline for PCs, in addition to the date range, you need to complete the Global Settings page in the Sustainability Dashboard so that the values reflect your environment. The values include:

- The per-kilowatt hour (kWh) rate that you pay for electricity.
- Your currency unit.
- (Optional) Carbon emissions settings. Default values are provided, but you can change them by using the references on the Global Settings page.

Setting the Server to Baseline Mode

Enable the Baseline server mode in the Administrator console when you want to measure energy usage without enforcing policies.

Step 1 In the Orchestrator administration console, from the Server menu, choose **Configure Server Settings**.

Step 2 For Server mode, click **Baseline**.

After you set the server to Baseline mode, let it run for several weeks of normal operation.

Note The server must remain in Baseline mode throughout the entire data-collection period. If you put into Enforcement mode, reporting data does not accurately reflect normal energy use.

Selecting the 2-Week Baseline Period

In the Sustainability Dashboard, you can run a report to determine which 2-week period is the best for calculating the baseline.

- You understand the baseline data collection process described in the "Establishing the Baseline Level of Energy Usage" section on page 8-1.
- The server has been running in Baseline mode for at least 2 weeks.

Step 1 Open the Sustainability Dashboard, and click the **Baseline Report** tab.

Step 2 Choose the top-level group in the hierarchy so that you are reporting on all groups.

Step 3 For Query Type, select **Data Availability**, enter the start and end dates for the time period during which the server was set to Baseline mode, and click **Run**.

Step 4 In the data returned, determine the 2-week period that meets the criteria for selecting the baseline date range, specified in the "Establishing the Baseline Level of Energy Usage" section on page 8-1.

After you use the criteria specified to determine the start and end dates of the baseline data period, you complete the baseline process by running these reports against that time period:

- PC State and User Activity report in the Administrator console. This shows you the gaps between user activity and energy use, and your initial policies can address the areas where the gaps are widest.
- Baseline report in the Sustainability Dashboard. This calculates a baseline number that you enter in the Global Settings page of the dashboard. Future reports that show energy savings depend on this baseline number.

See the "Generating the Baseline Numbers for Future Energy-Savings Reports" section on page 8-4.

For more information see these topics in the *Cisco EnergyWise Orchestrator Administrator Guide*.

- Viewing Reports
- Data Availability Report
- Baseline Report

Generating the Baseline Numbers for Future Energy-Savings Reports

After you select the baseline date range, you can obtain the CPU and display baseline numbers.

- Make sure that you have run the Data Availability report, described in the "Selecting the 2-Week Baseline Period" section on page 8-3, and determined the baseline period start and end dates from that report.

Step 1 Open the Sustainability Dashboard, and click the **Baseline Report** tab.

Step 2 Choose the top-level group in the hierarchy so that you are calculating the number for all groups.

Alternatively, if you have designated a first-phase set of devices that includes a representative sampling of your network, select those devices.

Step 3 For Query Type, select **Baseline**, enter the start and end dates for your baseline period, and click **Run**.

For details on determining which two-week period is the best to select for calculating the baseline, see the "Selecting the 2-Week Baseline Period" section on page 8-3.

The baseline numbers for PC CPU and display are generated and entered as the *Average kWh per PC per year* values on the Global Settings page in the Sustainability Dashboard. These values are used in subsequent reports and charts that you generate to show energy savings.

Comparing Energy Use with User Activity

You determine initial policy settings by viewing the level of energy usage without power management along side the energy spent from user activity.

This task assumes the following:

- You understand the baseline data collection process described in the "Establishing the Baseline Level of Energy Usage" section on page 8-1.
- You have followed the steps in the "Selecting the 2-Week Baseline Period" section on page 8-3.

Step 1 On the Reports menu, click **Operational State Report - PC State and User Activity**.

Step 2 Enter the appropriate dates in the Starting and Ending boxes.

In this case, enter the start and end dates of your baseline data collection period.

Step 3 For View, select **By day**.

Step 4 Click **Search**.

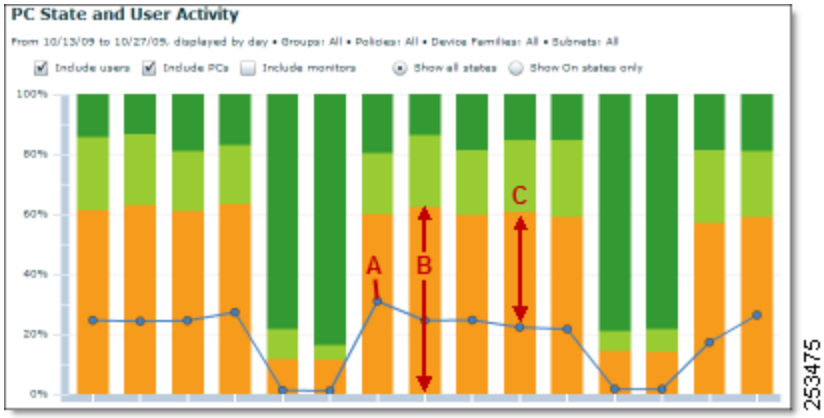
Note Typically the baseline data collection period involves all PC clients in the system. If you are using only a subset, use the **Groups** or **Subnets** filters to run the report on the relevant computers.

Step 5 In the report display, enable these settings:

- **Include users**.

- **Include PCs** (you can enable **Include monitors** as necessary).
- Select **Show all states** or **Show On states only**, depending on your viewing preference.

Figure 8-1 Report Showing the Daily PC and User Activity Over 2 Weeks



In Figure 8-1, compare the percentage of time that users are active (**A**) with the percentage of time that the computers and monitors are on (**B**). The space between them (**C**) is the area of potential savings from policy enforcement.

After completing this task, follow the instructions in the "Generating the Baseline Numbers for Future Energy-Savings Reports" section on page 8-4. To set policies, see the "Determining Initial Policy Settings from User and System Activity" section on page 8-5.

Tip After the system is running with policies enforced, you can run this report again to compare the total energy use with the original baseline report.

Determining Initial Policy Settings from User and System Activity

This topic describes how to display a user and system activity report, which you use to determine how to optimize power use through power management policies.

After you run the system in Baseline mode for at least 2 weeks of normal operation, determine policy settings. You will see hourly activity over a few days to see trends in user activity that you can build policies around.

Step 1 On the Reports menu, click **Operational State Report - PC State and User Activity**.

Step 2 In the Starting and Ending fields, enter a date range that is 4 days within your normal business week. For example, Monday–Thursday for a Monday–Friday week.

Step 3 For View, select **By hour**.

Step 4 Click **Search**.

Note Typically, the baseline data collection period involves all PC clients in the system. If you are using only a subset, use the **Groups** or **Subnets** filters to run the report on the relevant computers.

Step 5 In the report display, enable these settings:

- **Include users**.
- **Include PCs** (you can enable **Include monitors** as necessary).
- Select **Show all states** or **Show On states only**, depending on your viewing preference.

The graph should show a trend of higher user activity during working hours, tapering off toward the end of the work day.

Step 6 If the graph shows consistent use over the weekdays, change the date range to 1 day, Tuesday or Wednesday:

a. Change the dates on the left so that both the Starting and Ending fields show the same date.

b. Click **Search**.

Note If the 4-day graph shows inconsistent usage, find a different 4-day date range within the baseline period that shows consistent and predictable use before you display only 1 day.

Step 7 Note the times when user activity increases and decreases during the day.

Step 8 Use this data to create your initial power management policies.

Figure 8-2 is an example that shows user and system activity during 1 day.

Figure 8-2 User and System Activity During 1 Day

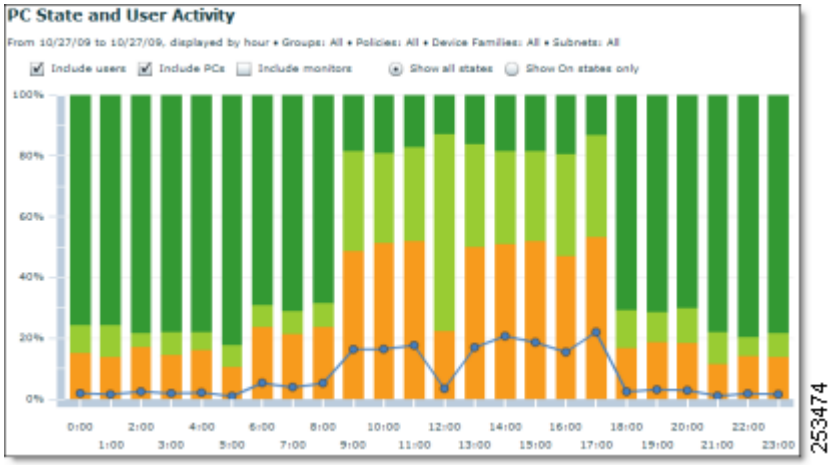


Figure 8-3 shows most of the user activity occurring between 6:00am and 6:00pm, so it might make sense to configure power schemes to match this activity level.

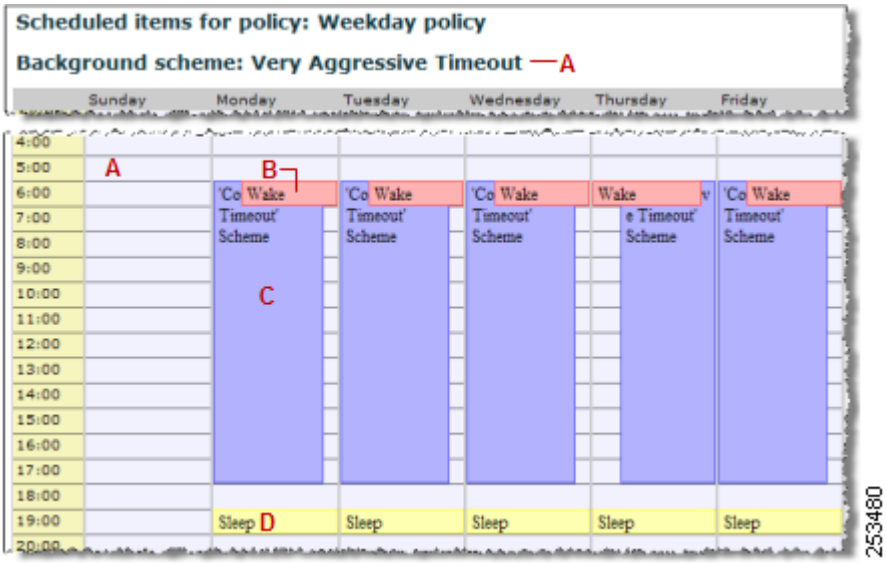
In a weekday policy based on this data, you might include these:

- A—Background scheme that changes computers to standby mode after a short period of inactivity, for example, after 10 minutes of idle time.

- B—Scheduled power-state change that wakes computers at 6:00 a.m.
- C—Daytime scheme that increases the amount of idle time before PCs change to standby mode.
- D—Scheduled power-state change at 7:00 p.m. that changes computers to sleep mode.

This step is optional, because if no scheme is scheduled, the background scheme will take effect, and the computers will transition to sleep when idle for the amount of time you specified.

Figure 8-3 Example Policy Created Based On User Activity



After you create your initial policies, you assign them to devices. After that, you can refine them to include assignment rules and other settings.

For more information, see "Managing Policies" and "Assign Policies To Devices" in the *Cisco EnergyWise Orchestrator Administrator Guide*.

Enforcing Policies

After you determine initial policies and assign them to devices, you can take the server out of Baseline mode to start measuring and managing power use on the devices.

This topic assumes either of the following situations:

- You have created initial power management policies after completing the baseline data collection phase, and you have assigned the policies to devices.
- You have set the server to Baseline mode for another reason, such as at the suggestion of a Technical Support representative for troubleshooting purposes.

If you have not obtained baseline numbers or created initial policies yet, see an overview of the process at Establishing the baseline level of energy use.

If you have created policies but you have not assigned them to devices, see "Assign Policies To Devices" in the *Orchestrator Administrator Guide*.

When you are ready to start enforcing policies, complete the procedure.

Step 1 Make sure that the policies you're using are not disabled:

a. On the **Policies** menu, click **Edit Policies**, and then select a policy name in the list.

b. Confirm that the **Do not enforce this policy** box is not selected.

Figure 8-4 Do Not Enforce This Policy Box

Step 2 On the **Server** menu in the Administrator console, click **Configure Server Settings**.

Step 3 For **Server mode**, select **Operational**.

When the server is in Operational mode, devices follow policy instructions and device data is reported to the Orchestrator database.

Determining Whether Devices Are Following Policy Instructions

This topic shows you how to use event log data to quickly determine whether devices successfully transition power states according to policy instructions.

Specifically, the section describes how to:

- Display one day of system and user activity for PC clients that have the same policy assignment.
- Compare activity with the policy settings.

Step 1 On Reports menu, click **Operational State Report - PC State and User Activity**.

Step 2 In the navigation panel on the left, under Chart:

a. Enter the same date for both the start and end dates.

b. For View, select **By hour**.

Step 3 Under Device Filter, use the Policies filter to specify the policy that you want to check.

Step 4 Click **Search**.

Step 5 In the report display, enable these settings:

- **Include users**.
- **Include PCs** (you can enable **Include monitors** as necessary).
- Select **Show all states** or **Show On states only**, depending on your viewing preference.

Step 6 Confirm that the policy settings match the activity. If you are not sure, verify the policy settings:

a. From the Policies menu, click **Edit Policies**.

b. Select the policy, and click the **Schedule** tab.

APPENDIX 9

Important Notice

Disclaimer

Cisco EnergyWise enables you to reduce energy consumption in your network by turning off the power to devices when they are not in use. If IP phones are part of your network, they can also be turned off through EnergyWise, in which case calls cannot be made or received, and the phones cannot be turned on except by the network administrator or according to rules established in EnergyWise by the network administrator. Laws in the location of your network might require phones to remain available for emergencies. It is your responsibility to identify the laws which apply and to comply with them. Even in the absence of a law, we strongly recommend that you designate certain phones which will always be on and available to make and receive emergency calls. These phones should be clearly identified, and all employees or others who might require emergency access to make or receive calls should be informed of the availability of these phones.

Statement 361—VoIP and Emergency Calling Services Do Not Function If Power Fails

Warning **Voice over IP (VoIP) service and the emergency calling service do not function if power fails or is disrupted. After power is restored, you might have to reset or reconfigure equipment to regain access to VoIP and the emergency calling service. In the USA, this emergency number is 911. You need to be aware of the emergency number in your country.**

Waarschuwing **Voice over IP (VoIP)-service en de service voor noodoproepen werken niet indien er een stroomstoring is. Nadat de stroomtoevoer is hersteld, dient u wellicht de configuratie van uw apparatuur opnieuw in te stellen om opnieuw toegang te krijgen tot VoIP en de noodoproepen. In de VS is het nummer voor noodoproepen 911. U dient u zelf op de hoogte te stellen van het nummer voor noodoproepen in uw land.**

Varoitus Voice over IP (VoIP) -palvelu ja hätäpuhelupalvelu eivät toimi, jos virta katkeaa tai sen syötössä esiintyy häiriöitä. Kun virransyöttö on taas normaali, sinun täytyy mahdollisesti asettaa tai määrittää laitteisto uudelleen, jotta voisit jälleen käyttää VoIP-palvelua ja hätäpuhelupalvelua. Yhdysvalloissa hätänumero on 911. Selvitä, mikä on omassa kotimaassasi käytössä oleva hätänumero.

Attention Le service Voice over IP (VoIP) et le service d'appels d'urgence ne fonctionnent pas en cas de panne de courant. Une fois que le courant est rétabli, vous devrez peut-être réinitialiser ou reconfigurer le système pour accéder de nouveau au service VoIP et à celui des appels d'urgence. Aux États-Unis, le numéro des services d'urgence est le 911. Vous devez connaître le numéro d'appel d'urgence en vigueur dans votre pays.

Warnung Bei einem Stromausfall oder eingeschränkter Stromversorgung funktionieren VoIP-Dienst und Notruf nicht. Sobald die Stromversorgung wieder hergestellt ist, müssen Sie möglicherweise die Geräte zurücksetzen oder neu konfigurieren, um den Zugang zu VoIP und Notruf wieder herzustellen. Die Notrufnummer in den USA lautet 911. Wählen Sie im Notfall die für Ihr Land vorgesehene Notrufnummer.

Avvertenza Il servizio Voice over IP (VoIP) e il servizio per le chiamate di emergenza non funzionano in caso di interruzione dell'alimentazione. Ristabilita l'alimentazione, potrebbe essere necessario reimpostare o riconfigurare l'attrezzatura per ottenere nuovamente l'accesso al servizio VoIP e al servizio per le chiamate di emergenza. Negli Stati Uniti, il numero di emergenza è 911. Si consiglia di individuare il numero di emergenza del proprio Paese.

Advarsel Tjenesten Voice over IP (VoIP) og nødanropstjenesten fungerer ikke ved strømbrudd. Etter at strømmen har kommet tilbake, må du kanskje nullstille eller konfigurere utstyret på nytt for å få tilgang til VoIP og nødanropstjenesten. I USA er dette nødnummeret 911. Du må vite hva nødnummeret er i ditt land.

Aviso O serviço Voice over IP (VoIP) e o serviço de chamadas de emergência não funcionam se houver um corte de energia. Depois do fornecimento de energia ser restabelecido, poderá ser necessário reiniciar ou reconfigurar o equipamento para voltar a utilizar os serviços VoIP ou chamadas de emergência. Nos EUA, o número de emergência é o 911. É importante que saiba qual o número de emergência no seu país.

¡Advertencia! El servicio de voz sobre IP (VoIP) y el de llamadas de emergencia no funcionan si se interrumpe el suministro de energía. Tras recuperar el suministro es posible que deba que restablecer o volver a configurar el equipo para tener acceso a los servicios de VoIP y de llamadas de emergencia. En Estados Unidos el número de emergencia es el 911. Asegúrese de obtener el número de emergencia en su país.

Varning! Tjänsten Voice over IP (VoIP) och larmnummertjänsten fungerar inte vid strömavbrott. Efter att strömmen kommit tillbaka måste du kanske återställa eller konfigurera om utrustningen för att få tillgång till VoIP och larmnummertjänsten. I USA är det här larmnumret 911. Du bör ta reda på det larmnummer som gäller i ditt land.

Figyelem Az IP csatornán történő hangátvitel (VoIP) és a segélyhívó szolgáltatás nem működik, ha az áramellátás megszűnik vagy megszakad. Az áramellátás helyreállítását követően előfordulhat, hogy alaphelyzetbe kell állítani vagy újra kell konfigurálni a berendezést, hogy újra hozzáférhessen a VoIP és a segélyhívó szolgáltatáshoz. Az Egyesült Államokban a segélyhívó szám 911. Tisztában kell lennie a saját országának segélyhívó számával.

a
Предупреждение

Служба передачи голоса по IP (VoIP) и служба экстренных вызовов не будут работать, если произошел сбой питания. После восстановления питания, возможно, потребуется перенастроить оборудование, чтобы возобновить доступ к службе VoIP и службе экстренных вызовов. В США телефон службы экстренных вызовов 911. Вам необходимо знать телефон этой службы в своей стране.

警告 如果电源出现故障或中断，您将无法使用 Voice over IP (VoIP) 服务与紧急呼叫服务。电源恢复之后，您可能需要重新设置或重新配置设备，以便重新获得进入 VoIP 与紧急呼叫服务的权限。在美国，此紧急呼叫号码是 911。您必须知道本国的紧急呼叫号码。

警告 電源障害や停電の場合、ボイス オーバー アイピー (VoIP) サービスと緊急呼出しサービスは機能しません。電源の回復後、VoIP と緊急呼出しサービスにアクセスするには機器をリセットまたは再設定する必要があります。米国内の緊急呼出し番号は 911 です。お住まいの地域の緊急呼出し番号をあらかじめ調べておいてください。

Statement 1071—Warning Definition

Warning

IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Waarschuwing

BELANGRIJKE VEILIGHEIDSINSTRUCTIES

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus **TÄRKEITÄ TURVALLISUUSOHJEITA**

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention **IMPORTANTES INFORMATIONS DE SÉCURITÉ**

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung **WICHTIGE SICHERHEITSHINWEISE**

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza **IMPORTANTI ISTRUZIONI SULLA SICUREZZA**

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI

Advarsel **VIKTIGE SIKKERHETSINSTRUKSJONER**

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE

Aviso **INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES

¡Advertencia! **INSTRUCCIONES IMPORTANTES DE SEGURIDAD**

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES

Varning! **VIKTIGA SÄKERHETSANVISNINGAR**

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR

Figyelem **FONTOS BIZTONSÁGI ELOÍRÁSOK**

Ez a figyelmezeto jel veszélyre utal. Sérülésveszélyt rejto helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplo figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján keresheto meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Предупреждение **ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ**

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ

警告 重要的安全性说明

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

警告 安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

주의 중요 안전 지침

이 경고 기호는 위험을 나타냅니다. 작업자가 신체 부상을 일으킬 수 있는 위험한 환경에 있습니다. 장비에 작업을 수행하기 전에 전기 회로와 관련된 위험을 숙지하고 표준 작업 관례를 숙지하여 사고를 방지하십시오. 각 경고의 마지막 부분에 있는 경고문 번호를 참조하여 이 장치와 함께 제공되는 번역된 안전 경고문에서 해당 번역문을 찾으십시오.

이 지시 사항을 보관하십시오.

Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham o dispositivo.

GUARDE ESTAS INSTRUÇÕES

Advarsel VIGTIGE SIKKERHEDSANVISNINGER

Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemesbeskadigelse. Før du begynder arbejde på udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standardprocedurer til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte advarsler, der fulgte med denne enhed.

GEM DISSE ANVISNINGER

تحذير

إرشادات الأمان الهامة

يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض لإصابات. قبل بدء العمل، احذر مخاطر التعرض للصدمات الكهربائية وكن على علم بالإجراءات القياسية للحيلولة دون وقوع أي حوادث. استخدم رقم البيان الموجود في أخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز.

قم بحفظ هذه الإرشادات

Upozorenje

VAŽNE SIGURNOSNE NAPOMENE

Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prouzročiti tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane uz električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. U prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju koji se nalazi uz pojedino upozorenje pronaći i njegov prijevod.

SAČUVAJTE OVE UPUTE

Upozornění

DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY

Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazům. Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených bezpečnostních upozorněních, která jsou přiložena k zařízení.

USCHOVEJTE TYTO POKYNY

Προειδοποίηση

ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ

Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τους κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνήθεις πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή.

ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ

אזהרה

הוראות בטיחות חשובות

סימן אזהרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד כלשהו, עליך להיות מודע לסכנות הכרוכות במעגלים חשמליים ולהכיר את הנהלים המקובלים למניעת תאונות. השתמש במספר ההוראה המסופק בסופה של כל אזהרה כד לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה

Opomena

ВАЖНИ БЕЗБЕДНОСНИ НАПАТСТВИЈА
Симболот за предупредување значи опасност. Се наоѓате во ситуација што може да предизвика телесни повреди. Пред да работите со опремата, бидете свесни за ризикот што постои кај електричните кола и треба да ги познавате стандардните постапки за спречување на несреќни случаи. Искористете го бројот на изјавата што се наоѓа на крајот на секое предупредување за да го најдете неговиот период во преведените безбедносни предупредувања што се испорачани со уредот.
ЧУВАЈТЕ ГИ ОВИЕ НАПАТСТВИЈА

Ostrzeżenie

WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA

Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń.

NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ

Upozornenie

DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY

Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhľadajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu.

USCHOVAJTE SI TENTO NÁVOD

Opozorilo

POMEMBNI VARNOSTNI NAPOTKI

Ta opozorilni simbol pomeni nevarnost. Nahajate se v situaciji, kjer lahko pride do telesnih poškodb. Preden pričnete z delom na napravi, se morate zavedati nevarnosti udara električnega toka, ter tudi poznati preventivne ukrepe za preprečevanje takšnih nevarnosti. Uporabite obrazložitveno številko na koncu posameznega opozorila, da najdete opis nevarnosti v priloženem varnostnem priročniku.

SHRANITE TE NAPOTKE!

警告

重要安全性指示
此警告符號代表危險，表示可能造成人身傷害。使用任何設備前，請留心電路相關危險，並熟悉避免意外的標準作法。您可以使用每項警告後的聲明編號，查詢本裝置隨附之安全性警告譯文中的翻譯。
請妥善保留此指示