Cisco EnergyWise, Cisco IOS Configuration Guide for Catalyst 2960-X Switches, EnergyWise Version 2.8

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Preface

This Preface contains the following topics:

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Document Conventions

This document uses the following conventions:

Convention	Description
^ or Ctrl	Both the ^ symbol and Ctrl represent the Control (Ctrl) key on a keyboard. For example, the key combination **^D** or **Ctrl-D** means that you hold down the Control key while you press the D key. (Keys are indicated in capital letters but are not case sensitive.)
bold font	Commands and keywords and user-entered text appear in **bold** font.
Italic font	Document titles, new or emphasized terms, and arguments for which you supply values are in *italic* font.
`Courier` font	Terminal sessions and information the system displays appear in `courier` font.
`Bold Courier` font	**`Bold Courier`** font indicates text that the user must enter.
[x]	Elements in square brackets are optional.
...	An ellipsis (three consecutive nonbolded periods without spaces) after a syntax element indicates that the element can be repeated.
|	A vertical line, called a pipe, indicates a choice within a set of keywords or arguments.

Convention	Description
[x | y]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
{x | y}	Required alternative keywords are grouped in braces and separated by vertical bars.
[x {y | z}]	Nested set of square brackets or braces indicate optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
< >	Nonprinting characters such as passwords are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

Reader Alert Conventions

This document may use the following conventions for reader alerts:

Note   Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the manual.

Tip   Means *the following information will help you solve a problem.*

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

Timesaver   Means *the described action saves time*. You can save time by performing the action described in the paragraph.

Warning   **Means *reader be warned.* In this situation, you might perform an action that could result in bodily injury.**

Related Documentation

See the latest EnergyWise release notes for the following information (not orderable but available on Cisco.com):

- For the list of devices that EnergyWise supports, see the "Supported Devices" section.

- For Device Manager requirements, see the "System Requirements" section.

- For upgrade information, see the "Downloading Software" section.

For information about the Cisco IOS Release commands, see the Cisco IOS documentation set on Cisco.com.

For initial configuration information, see the "Using Express Setup" section in the getting started guide or the "Configuring the Switch with the CLI-Based Setup Program" appendix in the hardware installation guide.

This guide does not describe how to install your network device. For information, see the hardware installation guide for your device.

For Network Assistant requirements, see *Getting Started with Cisco Network Assistant* (not orderable but available on Cisco.com). This guide does not provide detailed information on the GUIs for embedded Device Manager or for Cisco Network Assistant (hereafter referred to as *Network Assistant*), which you can use to manage the domain member. However, the concepts in this guide are applicable for the GUI user. For information about Device Manager, see the domain member online help.

For cluster requirements, see the release notes for Cisco Network Assistant (not orderable but available on Cisco.com).

For information about the management application programming interface (MAPI) and endpoint software development kit (SDK), go to the Cisco Developer Network.

Obtaining Documentation and Support on the Cisco Developer Network

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

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

The forum, wiki, and other resources on the Cisco Developer Network provide a self-help knowledge base and community for Cisco EnergyWise application developers and programmers. You can get additional support by opening a case in the TAC Service Request Tool:http://tools.cisco.com/ServiceRequestTool/create/launch.do

Obtaining Documentation and Submitting a Service Request

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.

Using the Command-Line Interface

Information About Using the Command-Line Interface

Command Modes

The Cisco IOS user interface is divided into many different modes. The commands available to you depend on which mode you are currently in. Enter a question mark (?) at the system prompt to obtain a list of commands available for each command mode.

You can start a CLI session through a console connection, through Telnet, a SSH, or by using the browser.

When you start a session, you begin in user mode, often called user EXEC mode. Only a limited subset of the commands are available in user EXEC mode. For example, most of the user EXEC commands are one-time commands, such as **show** commands, which show the current configuration status, and **clear** commands, which clear counters or interfaces. The user EXEC commands are not saved when the switch reboots.

To have access to all commands, you must enter privileged EXEC mode. Normally, you must enter a password to enter privileged EXEC mode. From this mode, you can enter any privileged EXEC command or enter global configuration mode.

Using the configuration modes (global, interface, and line), you can make changes to the running configuration. If you save the configuration, these commands are stored and used when the switch reboots. To access the various configuration modes, you must start at global configuration mode. From global configuration mode, you can enter interface configuration mode and line configuration mode.

This table describes the main command modes, how to access each one, the prompt you see in that mode, and how to exit the mode.

Table 1: Command Mode Summary

Mode	Access Method	Prompt	Exit Method	About This Mode
User EXEC	Begin a session using Telnet, SSH, or console.	`Switch>`	Enter **logout** or **quit**.	Use this mode to • Change terminal settings. • Perform basic tests. • Display system information.
Privileged EXEC	While in user EXEC mode, enter the **enable** command.	`Switch#`	Enter **disable** to exit.	Use this mode to verify commands that you have entered. Use a password to protect access to this mode.
Global configuration	While in privileged EXEC mode, enter the **configure** command.	`Switch(config)#`	To exit to privileged EXEC mode, enter **exit** or **end**, or press **Ctrl-Z**.	Use this mode to configure parameters that apply to the entire switch.
VLAN configuration	While in global configuration mode, enter the **vlan** *vlan-id* command.	`Switch(config-vlan)#`	To exit to global configuration mode, enter the **exit** command. To return to privileged EXEC mode, press **Ctrl-Z** or enter **end**.	Use this mode to configure VLAN parameters. When VTP mode is transparent, you can create extended-range VLANs (VLAN IDs greater than 1005) and save configurations in the switch startup configuration file.
Interface configuration	While in global configuration mode, enter the **interface** command (with a specific interface).	`Switch(config-if)#`	To exit to global configuration mode, enter **exit**. To return to privileged EXEC mode, press **Ctrl-Z** or enter **end**.	Use this mode to configure parameters for the Ethernet ports.

Mode	Access Method	Prompt	Exit Method	About This Mode
Line configuration	While in global configuration mode, specify a line with the **line vty** or **line console** command.	`Switch(config-line)#`	To exit to global configuration mode, enter **exit**. To return to privileged EXEC mode, press **Ctrl-Z** or enter **end**.	Use this mode to configure parameters for the terminal line.

Using the Help System

You can enter a question mark (?) at the system prompt to display a list of commands available for each command mode. You can also obtain a list of associated keywords and arguments for any command.

SUMMARY STEPS

1. **help**
2. *abbreviated-command-entry* **?**
3. *abbreviated-command-entry* <Tab>
4. **?**
5. *command* **?**
6. *command keyword* **?**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**help** **Example:** `Switch# `**`help`**	Obtains a brief description of the help system in any command mode.
Step 2	*abbreviated-command-entry* **?** **Example:** `Switch# `**`di?`** `dir disable disconnect`	Obtains a list of commands that begin with a particular character string.
Step 3	*abbreviated-command-entry* <Tab> **Example:** `Switch# `**`sh conf`**`<tab>` `Switch# `**`show configuration`**	Completes a partial command name.

	Command or Action	Purpose
Step 4	**?** **Example:** `Switch> ?`	Lists all commands available for a particular command mode.
Step 5	*command* **?** **Example:** `Switch> show ?`	Lists the associated keywords for a command.

Step 6	*command keyword* **?**
	
	Example:
	`Switch(config)# cdp holdtime ?`
	` <10-255> Length of time (in sec) that receiver`
	` must keep this packet`
		Lists the associated arguments for a keyword.

Understanding Abbreviated Commands

You need to enter only enough characters for the switch to recognize the command as unique.

This example shows how to enter the **show configuration** privileged EXEC command in an abbreviated form:

```
Switch# show conf
```

No and Default Forms of Commands

Almost every configuration command also has a **no** form. In general, use the **no** form to disable a feature or function or reverse the action of a command. For example, the **no shutdown** interface configuration command reverses the shutdown of an interface. Use the command without the keyword **no** to reenable a disabled feature or to enable a feature that is disabled by default.

Configuration commands can also have a **default** form. The **default** form of a command returns the command setting to its default. Most commands are disabled by default, so the **default** form is the same as the **no** form. However, some commands are enabled by default and have variables set to certain default values. In these cases, the **default** command enables the command and sets variables to their default values.

CLI Error Messages

This table lists some error messages that you might encounter while using the CLI to configure your switch.

Table 2: Common CLI Error Messages

Error Message	Meaning	How to Get Help
`% Ambiguous command: "show con"`	You did not enter enough characters for your switch to recognize the command.	Reenter the command followed by a question mark (?) without any space between the command and the question mark. The possible keywords that you can enter with the command appear.
`% Incomplete command.`	You did not enter all of the keywords or values required by this command.	Reenter the command followed by a question mark (?) with a space between the command and the question mark. The possible keywords that you can enter with the command appear.
`% Invalid input detected at '^' marker.`	You entered the command incorrectly. The caret (^) marks the point of the error.	Enter a question mark (?) to display all of the commands that are available in this command mode. The possible keywords that you can enter with the command appear.

Configuration Logging

You can log and view changes to the switch configuration. You can use the Configuration Change Logging and Notification feature to track changes on a per-session and per-user basis. The logger tracks each configuration command that is applied, the user who entered the command, the time that the command was entered, and the parser return code for the command. This feature includes a mechanism for asynchronous notification to registered applications whenever the configuration changes. You can choose to have the notifications sent to the syslog.

Note   Only CLI or HTTP changes are logged.

How to Use the CLI to Configure Features

Configuring the Command History

The software provides a history or record of commands that you have entered. The command history feature is particularly useful for recalling long or complex commands or entries, including access lists. You can customize this feature to suit your needs.

Changing the Command History Buffer Size

By default, the switch records ten command lines in its history buffer. You can alter this number for a current terminal session or for all sessions on a particular line. This procedure is optional.

SUMMARY STEPS

1. **terminal history** [**size** *number-of-lines*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**terminal history** [**size** *number-of-lines*] **Example:** `Switch# terminal history size 200`	Changes the number of command lines that the switch records during the current terminal session in privileged EXEC mode. You can configure the size from 0 to 256.

Recalling Commands

To recall commands from the history buffer, perform one of the actions listed in this table. These actions are optional.

Note The arrow keys function only on ANSI-compatible terminals such as VT100s.

SUMMARY STEPS

1. **Ctrl-P** or use the **up arrow** key
2. **Ctrl-N** or use the **down arrow** key
3. **show history**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**Ctrl-P** or use the **up arrow** key	Recalls commands in the history buffer, beginning with the most recent command. Repeat the key sequence to recall successively older commands.
Step 2	**Ctrl-N** or use the **down arrow** key	Returns to more recent commands in the history buffer after recalling commands with **Ctrl-P** or the up arrow key. Repeat the key sequence to recall successively more recent commands.

	Command or Action	Purpose
Step 3	**show history** **Example:** `Switch# show history`	Lists the last several commands that you just entered in privileged EXEC mode. The number of commands that appear is controlled by the setting of the **terminal history** global configuration command and the **history** line configuration command.

Disabling the Command History Feature

The command history feature is automatically enabled. You can disable it for the current terminal session or for the command line. This procedure is optional.

SUMMARY STEPS

1. **terminal no history**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**terminal no history** **Example:** `Switch# terminal no history`	Disables the feature during the current terminal session in privileged EXEC mode.

Enabling and Disabling Editing Features

Although enhanced editing mode is automatically enabled, you can disable it and reenable it.

SUMMARY STEPS

1. **terminal editing**
2. **terminal no editing**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**terminal editing** **Example:** `Switch# terminal editing`	Reenables the enhanced editing mode for the current terminal session in privileged EXEC mode.

	Command or Action	Purpose
Step 2	**terminal no editing** **Example:** `Switch# `**`terminal no editing`**	Disables the enhanced editing mode for the current terminal session in privileged EXEC mode.

Editing Commands Through Keystrokes

The keystrokes help you to edit the command lines. These keystrokes are optional.

Note The arrow keys function only on ANSI-compatible terminals such as VT100s.

Table 3: Editing Commands

Editing Commands	Description
Ctrl-B or use the **left arrow** key	Moves the cursor back one character.
Ctrl-F or use the **right arrow** key	Moves the cursor forward one character.
Ctrl-A	Moves the cursor to the beginning of the command line.
Ctrl-E	Moves the cursor to the end of the command line.
Esc B	Moves the cursor back one word.
Esc F	Moves the cursor forward one word.
Ctrl-T	Transposes the character to the left of the cursor with the character located at the cursor.
Delete or **Backspace** key	Erases the character to the left of the cursor.
Ctrl-D	Deletes the character at the cursor.
Ctrl-K	Deletes all characters from the cursor to the end of the command line.
Ctrl-U or **Ctrl-X**	Deletes all characters from the cursor to the beginning of the command line.
Ctrl-W	Deletes the word to the left of the cursor.

Esc D	Deletes from the cursor to the end of the word.
Esc C	Capitalizes at the cursor.
Esc L	Changes the word at the cursor to lowercase.
Esc U	Capitalizes letters from the cursor to the end of the word.
Ctrl-V or Esc Q	Designates a particular keystroke as an executable command, perhaps as a shortcut.
Return key	Scrolls down a line or screen on displays that are longer than the terminal screen can display. **Note** The More prompt is used for any output that has more lines than can be displayed on the terminal screen, including **show** command output. You can use the **Return** and **Space** bar keystrokes whenever you see the More prompt.
Space bar	Scrolls down one screen.
Ctrl-L or Ctrl-R	Redisplays the current command line if the switch suddenly sends a message to your screen.

Editing Command Lines That Wrap

You can use a wraparound feature for commands that extend beyond a single line on the screen. When the cursor reaches the right margin, the command line shifts ten spaces to the left. You cannot see the first ten characters of the line, but you can scroll back and check the syntax at the beginning of the command. The keystroke actions are optional.

To scroll back to the beginning of the command entry, press **Ctrl-B** or the left arrow key repeatedly. You can also press **Ctrl-A** to immediately move to the beginning of the line.

Note The arrow keys function only on ANSI-compatible terminals such as VT100s.

The following example shows how to wrap a command line that extends beyond a single line on the screen.

SUMMARY STEPS

1. **access-list**
2. **Ctrl-A**
3. **Return** key

DETAILED STEPS

	Command or Action	Purpose
Step 1	**access-list** **Example:** `Switch(config)# `**`access-list 101 permit tcp`** **`10.15.22.25 255.255.255.0 10.15.22.35`** `Switch(config)# $ `**`101 permit tcp`** **`10.15.22.25 255.255.255.0 10.15.22.35`** **`255.25`** `Switch(config)# $`**`t tcp 10.15.22.25`** **`255.255.255.0 131.108.1.20 255.255.255.0`** **`eq`** `Switch(config)# $`**`15.22.25 255.255.255.0`** **`10.15.22.35 255.255.255.0 eq 45`**	Displays the global configuration command entry that extends beyond one line. When the cursor first reaches the end of the line, the line is shifted ten spaces to the left and redisplayed. The dollar sign ($) shows that the line has been scrolled to the left. Each time the cursor reaches the end of the line, the line is again shifted ten spaces to the left.
Step 2	**Ctrl-A** **Example:** `Switch(config)# `**`access-list 101 permit tcp`** **`10.15.22.25 255.255.255.0 10.15.2$`**	Checks the complete syntax. The dollar sign ($) appears at the end of the line to show that the line has been scrolled to the right.
Step 3	**Return** key	Execute the commands. The software assumes that you have a terminal screen that is 80 columns wide. If you have a different width, use the **terminal width** privileged EXEC command to set the width of your terminal. Use line wrapping with the command history feature to recall and modify previous complex command entries.

Searching and Filtering Output of show and more Commands

You can search and filter the output for **show** and **more** commands. This is useful when you need to sort through large amounts of output or if you want to exclude output that you do not need to see. Using these commands is optional.

SUMMARY STEPS

1. {**show** | **more**} *command* | {**begin** | **include** | **exclude**} *regular-expression*

DETAILED STEPS

	Command or Action	Purpose
Step 1	{**show**	**more**} *command*	{**begin**	**include**	**exclude**} *regular-expression*	Searches and filters the output.

Command or Action	Purpose
Example: `Switch# `**`show interfaces	include protocol`** `Vlan1 is up, line protocol is up` `Vlan10 is up, line protocol is down` `GigabitEthernet1/0/1 is up, line protocol is down` `GigabitEthernet1/0/2 is up, line protocol is up`	Expressions are case sensitive. For example, if you enter **| exclude output**, the lines that contain **output** are not displayed, but the lines that contain **output** appear.

Accessing the CLI on a Switch Stack

You can access the CLI through a console connection, through Telnet, a SSH, or by using the browser.

You manage the switch stack and the stack member interfaces through the . You cannot manage stack members on an individual switch basis. You can connect to the through the console port or the Ethernet management port of one or more stack members. Be careful with using multiple CLI sessions on the . Commands that you enter in one session are not displayed in the other sessions. Therefore, it is possible to lose track of the session from which you entered commands.

✎

Note We recommend using one CLI session when managing the switch stack.

If you want to configure a specific stack member port, you must include the stack member number in the CLI command interface notation.

Accessing the CLI Through a Console Connection or Through Telnet

Before you can access the CLI, you must connect a terminal or a PC to the switch console or connect a PC to the Ethernet management port and then power on the switch, as described in the hardware installation guide that shipped with your switch.

If your switch is already configured, you can access the CLI through a local console connection or through a remote Telnet session, but your switch must first be configured for this type of access.

You can use one of these methods to establish a connection with the switch:

- Connect the switch console port to a management station or dial-up modem, or connect the Ethernet management port to a PC. For information about connecting to the console or Ethernet management port, see the switch hardware installation guide.

- Use any Telnet TCP/IP or encrypted Secure Shell (SSH) package from a remote management station. The switch must have network connectivity with the Telnet or SSH client, and the switch must have an enable secret password configured.

  - The switch supports up to 16 simultaneous Telnet sessions. Changes made by one Telnet user are reflected in all other Telnet sessions.

  - The switch supports up to five simultaneous secure SSH sessions.

After you connect through the console port, through the Ethernet management port, through a Telnet session or through an SSH session, the user EXEC prompt appears on the management station.

Configuring EnergyWise

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Prerequisites for Configuring EnergyWise

Prerequisites for Activity Check

- Ensure that all packets from the IP phone have the class of service (CoS) value at 5. Use the **show mls qos maps cos-output-q** privileged EXEC command to display the CoS output queue threshold map.

- Use the **auto qos voip** interface configuration command to enable auto quality of service (auto-QoS) for VoIP on the PoE port.

- Use the **auto qos voip cisco-phone** interface configuration command to enable auto-QoS on the IP phone. The switch does not change the CoS value in the packet that comes from the IP phone.

- If the switch is connected to the IP phone through multiple Cisco devices, use the **auto qos voip trust** interface configuration command to ensure that they trust the CoS value in incoming packets and do not change it.

Prerequisites for Wake on LAN

- Check that you have enabled Wake on LAN (WoL) in the BIOS and the NIC of the PC that you want to wake up. Refer to your PC documentation for instructions on how to enable WoL in the BIOS and the NIC.

- WoL packets are sent as Layer 2 broadcast packets. To prevent broadcast storms, remove loops by using the Spanning Tree Protocol (STP).

- Check that an EnergyWise WoL query always has a name or keyword attribute associated with it. The importance, name, and keyword fields in the WoL query packet refer to attributes set on the interface that the PC connects to. WoL packets are sent only from interfaces where the name or key word attribute is set, which prevents broadcast storms. For example, enter this command:

```
DomainMember# configure terminal
DomainMember(config)# interface gigabitethernet 0/1
DomainMember(config-if)# energywise name PC-1
DomainMember(config-if)# end
DomainMember(config)# end
DomainMember# energywise query importance 100 name PC-1 wol mac <mac-address>
```

Prerequisites for SNMP Endpoint Proxy

- If your device is part of a stack configuration, check that you have installed the same XML file on all the devices within the stack. This ensures that any stack member that is elected as the master (in case of a master failover) has the XML file that the EnergyWise SNMP proxy uses for translation.

- The community string that you configure for an SNMP proxy matches the community string that is configured on the SNMP device. Check with your system administrator about the SNMP device community string.

Prerequisites for Hibernation

- Check that you have configured an EnergyWise domain before configuring hibernation.

- If you are running a query to hibernate the switch, check that you have already configured a hibernation end time. If you are configuring a Cisco IOS time-based recurrence, ensure that you configure hibernation start and end times. If you have not configured an end-time, you cannot hibernate the switch.

- If you have configured multiple recurrences using the **energywise level** *level* **recurrence importance** *importance* **time-range** *time-range-name* global configuration command, the recurrence you configured first is effective. Only after you remove the first recurrence does the next recurrence take effect.

- Check that you have not configured overlapping time periods when configuring the periodic condition. In case of overlaps, the system considers the earlier time-period. For example, if you have configured

```
DomainMember(config-time-range)# periodic weekday 9:30 to 11:30
```

and

```
DomainMember(config-time-range)# periodic weekday 10:30 to 12:30
```

The switch hibernates from 9:30 a.m. to 11:30 a.m. The second periodic condition is disregarded because the switch will already be in hibernation.

- Check that there is a minimum time interval of 5 minutes between one hibernation end time and the next hibernation start time (the next hibernation start time should be greater than the total time taken for system boot).

- When multiple switches are connected as neighbors, the system adds a 1-to-3-minute delay to the hibernation end time across the switches to avoid network traffic bottlenecks.

- When you the configure hibernation on a switch stack:

  ◦ We recommend that you ensure that all the members on the stack support hibernation. If you configure hibernation on a mixed switch stack, only supported devices hibernate at the scheduled time.

  ◦ By running a query, ensure that you run the query on the stack master.

Related Topics

Restrictions for Configuring EnergyWise

Voice over IP and the Emergency Calling Services

⚠

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. Statement 361.

For more information, see the "Important Notice" appendix.

Hibernation

The system does not perform activity check before hibernating (scheduled or immediate hibernation). This means that the switch configured to hibernate at a certain time will do so even if a PoE port on the switch is sending or receiving traffic.

Information About Configuring EnergyWise

Cisco EnergyWise Network

In a network, Cisco EnergyWise monitors and manages the power usage of network devices and devices connected to the network.

Figure 1: Cisco EnergyWise Network
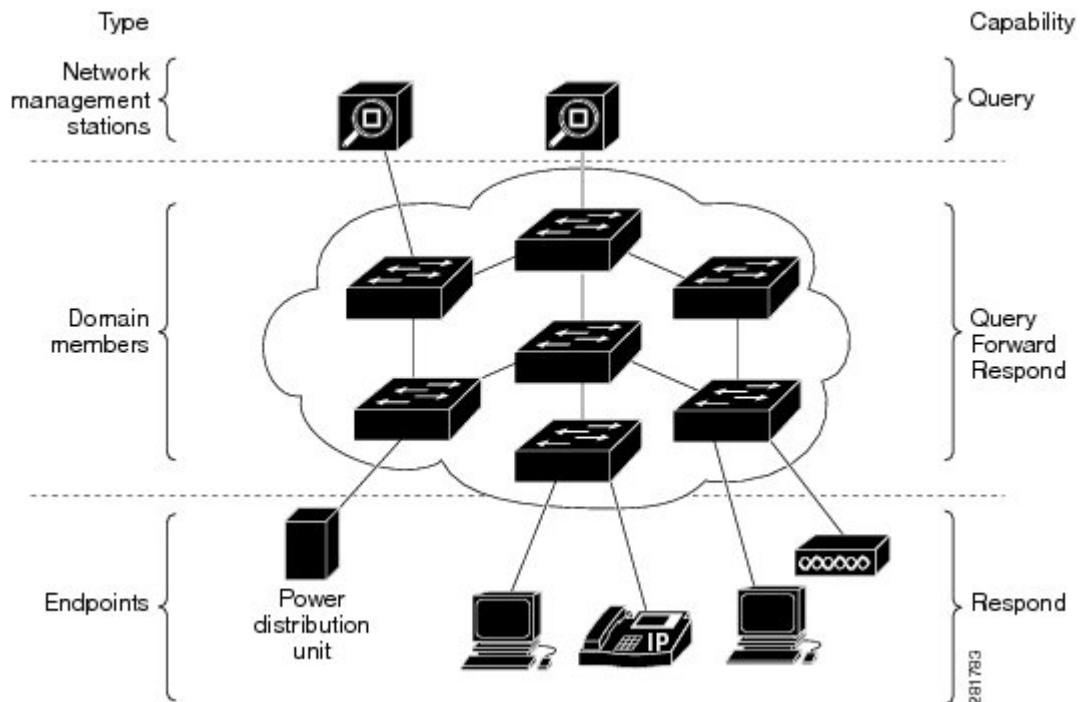
- Management stations—Control applications and devices that use EnergyWise to monitor and manage the power usage of domain members and endpoints. Management stations also send queries to domain members.

- Domain members—This group includes Cisco switches, routers, and network devices. They forward messages across an EnergyWise domain to endpoints. They also forward and reply to queries from the management station and other domain members and aggregate power-usage information from the endpoints.

- Endpoints—Devices that are connected to a domain member and that use power. They respond to queries but do not send or forward them. You can install the SDK library on IP endpoints. A Cisco EnergyWise domain member can also use SNMP to communicate with endpoint devices.

Domain members and endpoints receive power from an AC or DC power source or a power supply.

PoE domain members and endpoints also receive power from PoE switches or Cisco EtherSwitch service modules. For example, IP phones and access points connected to a PoE switch receive power from the switch.

EnergyWise Domain

A Cisco EnergyWise domain is considered to be one unit of power management. The domain consists of Cisco networking devices, Power over Ethernet (PoE) endpoints, and endpoints running agents that are built using the software development kit (SDK) library. This domain is similar to a network-management community such as a VLAN Trunking Protocol (VTP) domain.

For example, if you have a building with a core router, 10 access switches, and 400 endpoints, such as phones, access points, and PCs, you can create an EnergyWise domain called MyBuilding with the router and switches as domain members.

If you want to implement power management applications on a management station and endpoints, all the domain members must run Cisco EnergyWise Version 2.6 or later.

After you enable and configure EnergyWise on the core router and access switches, the MyBuilding domain configures itself. Neighbor relationships are set among the domain members.

- Domain members use CDP when it is enabled or EnergyWise UDP messages to automatically discover neighbors.

- You can manually configure static neighbors.

Each domain member sets up a parent-child relationship with an attached endpoint. For example, an IP phone (child) is connected to a PoE switch (parent), or a PC (child) is connected to a router (parent).

After the domain is set, a domain member can forward queries and control messages to other domain members and endpoints. You can do the following:

- Use SNMP or a management station to query every domain member or endpoint.

- Use the domain member CLI to run an EnergyWise query to receive or set power usage information.

- Use a management application, server, or domain member CLI to define power usage policies or receive power usage information.

Related Topics

Power Level Energy Management

Cisco EnergyWise uses a set of power levels to consistently manage power usage. A power level is a measure of the energy consumed by devices in an EnergyWise network.

The range is from 0 to 10. The default is 10.

Table 4: Power Levels

Category	Level	Description
Operational	10	Full
Operational	9	High

Category	Level	Description
Operational	8	Reduced
Standby	7	Medium
Standby	6	Frugal
Standby	5	Low
Standby	4	Ready
Standby	3	Standby
Nonoperational	2	Sleep
Nonoperational	1	Hibernate
Nonoperational	0	Shut

The devices in an EnergyWise network can be from different manufacturers.

Note A Cisco switch does not support level 0. You cannot turn off the power on a switch.

A PoE endpoint, such as an IP phone, receives power from a PoE switch port. The following are the PoE endpoint power characteristics:

- The power level applies to the port.
- The port supports levels 0 to 10.
- If the port power level is 0, the port does not provide power to connected endpoints.
- If the power level is between 1 and 10, the port is operational.

Hibernation

You can manage the power usage of the switch during periods of nonoperation, by setting the power level to hibernate. A hibernation end time determines when the power level is restored to operational.

- Power level 1 denotes hibernation.
- Power levels 2 to 10 denote that the switch is operational.

You can use these methods to hibernate the switch:

- Configure a Cisco IOS time-based recurrence with scheduled hibernation start and end times.
- Run an EnergyWise query to hibernate the switch immediately.
- Use SNMP.

☞

Important Irrespective of the method you use, before you hibernate the switch ensure that you have configured a hibernation end-time by configuring the **periodic** command in the time-range configuration mode and associating that time range with the **energywise level** global configuration command.

Related Topics

Attributes

The following table describes Cisco EnergyWise attributes.

Table 5: Cisco EnergyWise Attributes

Attribute	Definition	Defaults
Importance	Device rating based on the business or deployment context.	The range is from 1 (least important) to 100 (most important). The default is 1.
Keywords	Device description (other than the name or role) for which query results are filtered.	None.
Name	Device identity for which query results are filtered.	For a PoE port, the short version of the port name. For example, Gi0.2 for Gigabit Ethernet 0/2. For a domain member, the hostname. For an endpoint, see the endpoint documentation. We recommend that you use the hostname.
Role	Device function based on the business or deployment context.	For a PoE port, the default is interface. For a domain member, the default can be the model number or the supervisor model number. For an endpoint, see the endpoint documentation.

Related Topics

Security

A Cisco EnergyWise network has three levels of security to prevent unauthorized communication.

- The management secret authenticates communication between the domain members and the management station.

- The domain secret authenticates communication between domain members.

- The endpoint secret authenticates communication between domain members and endpoints.

The network enforces security with *shared secrets*, also referred to as passwords.

Figure 2: Cisco EnergyWise Security Levels
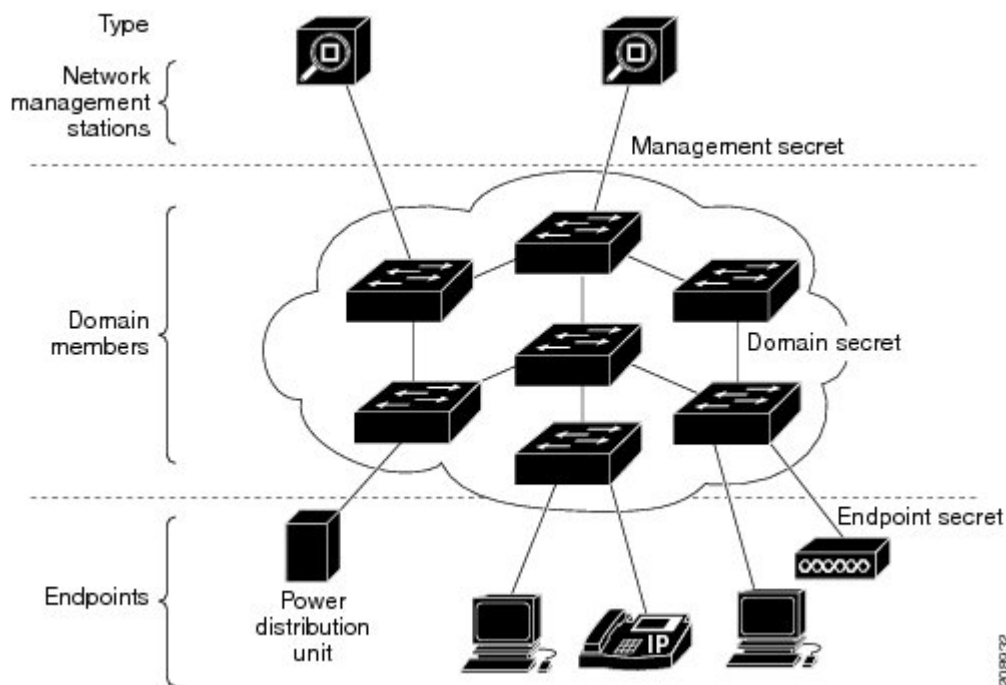
Recurrences

A recurrence is an event that repeats on a regular schedule. You can use this feature to schedule jobs to run periodically or at certain times or date. For example, you can configure the domain member to power an endpoint or interface on and off based on the time or date.

A recurrence uses the domain member time.

When configuring recurrences, you specify the time in CRON format (24-hour format). Cron is the time-based job scheduler in Unix computer operating systems.

When a recurrence occurs, changes to the Cisco EnergyWise power level exist only in the running configuration and are not saved in the startup configuration. If the domain member fails and then restarts, it uses the power level in the saved startup configuration.

Related Topics

Time Format and Time Zone

For time format, use the 24-hour clock. The time zone is based on the domain member.

- To set a recurrence at a specific time, enter the **energywise level** *level* **recurrence importance** *importance* **at** *minute hour day_of_month month day_of_week* interface configuration command.

  For example, to configure a recurrence that occurs every day at 06:34, enter the **energywise level** *level* **recurrence importance at 34 6 * * *** command.

  - *minute* is 34.

  - *hour* is 6.

  - *day_of_month* is the wildcard (*) for every day in the month.

  - *month* is the wildcard (*) for every month.

  - *day_of_week* is the wildcard (*) for every day in the week.

- To set 06:34 in a time range, enter the **absolute 06:34 * * 2009** and the **periodic 06:34** interface configuration commands.

Note When configuring recurrences, do not schedule multiple recurrence events to start at the same time. We recommend that you configure events at least 15 minutes apart.

Day of the Month and Day of the Week Recurrences

When you use the *day_of_month* and the *day_of_week* variables in the **energywise level** *level* **recurrence importance** *importance* **at** *minute hour day_of_month month day_of_week* interface configuration command, follow these guidelines:

- The recurrence occurs when either the *day_of_month* or the *day_of_week* occurs first (in releases earlier than the Cisco EnergyWise Version 2.7 releases). See the *Release Notes for Cisco EnergyWise, EnergyWise Version 2.7* on Cisco.com for software releases with Cisco EnergyWise Version 2.7.

- If you specify both the *day_of_month* and the *day_of_week*, the event occurs when either the *day_of_month* or the *day_of_week* is first.

- If you specify the *day_of_month* and use a wildcard (*) for the *day_of_week*, the event occurs on the *day_of_month*.

- If you use a wildcard for the *day_of_month* and specify the *day_of_week*, the event occurs on the *day_of_week*.

- If you use wildcards for both the *day_of_month* and the *day_of_week*, the event occurs on any day.

Queries

The management station sending a query receives all the power-usage responses from the EnergyWise domain. The domain members use neighbor relationships to forward the query.

For secure communication, the domain members use a shared secret and send only authenticated queries to the endpoints.

Figure 3: Query Requests and Replies
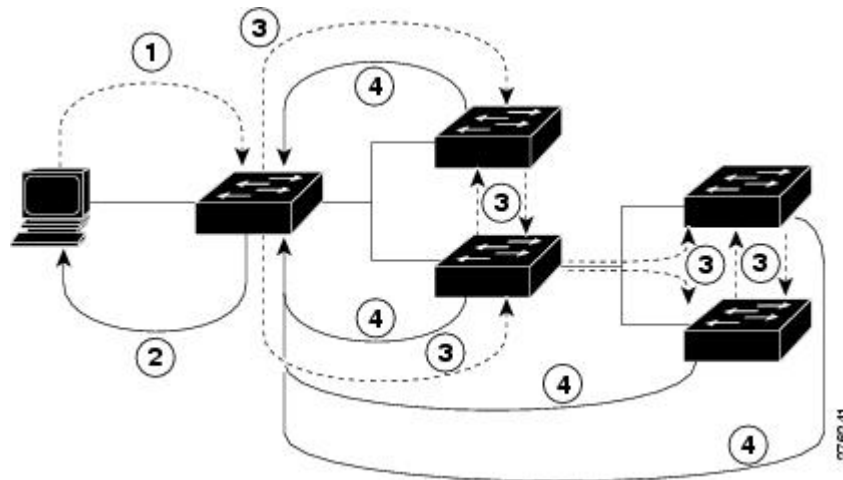
Table 6: Query Requests and Replies

Number	Process
1	The management station sends queries and messages to the domain.
2	The domain member replies to queries and messages from the management station.
3	The domain member sends queries and messages to other domain members and endpoints.
4	The domain member replies to queries and messages from other domain members and endpoints.

EnergyWise supports the following query types:

- Collect—Receives power-usage information in watts (W) from the domain members and endpoints.

- Save—Saves the running configuration of a domain member. Use the **energywise allow query save** global configuration command.

- Set—Changes the power level of a domain member or endpoint in the running configuration.

- Sum—Summarizes the information from domain members and endpoints.

You can use these attributes to filter the results:

- Importance—Rate your devices based on the business or deployment context. For example, a desk phone has a lower importance than a business-critical emergency phone. The range is from 1 (least important) to 100 (most important). The default is 1.

- Keywords—Describes the device (other than the name or role).

- Name—Identifies the device.

- Role—Specifies the device function based on the business or deployment context.

- Usage—Specifies the energy usage type of the Cisco EnergyWise device. The default is consumer.

  - All—Devices of all usage types.

  - Consumer—A device that consumes power, such as a switch.

  - Meter—A device that measures the pass-through power, such as a power distribution unit (PDU) that sends power from a source to a connected device.

  - Producer—A device that generates power, such as a solar panel.

The query results show domain members and endpoints with importance values less than or equal to the specified value in the query.

Related Topics

Activity Check

You can use this feature to ensure that the switch does not power off a phone that is in use. For example, if you have a Cisco IP phone connected to a PoE port and activity check is enabled, the switch does not power off the phone if it is sending or receiving voice traffic. If the phone is not in use, it powers off within approximately 1 minute. If a PC is connected to the switch port of the phone, the PC loses network connectivity when the phone is powered off.

You can configure activity check on these Cisco devices:

- Catalyst 6500 series switches (See the Cisco IOS Release Notes for Cisco EnergyWise for the list of specific devices.)

- Catalyst 4500 series switches (See the Cisco IOS Release Notes for Cisco EnergyWise for the list of specific devices.)

Note Before powering off a PoE port, Catalyst 6500 series switches and Catalyst 4500 series switches use interface statistics to determine whether a Cisco IP phone connected to the PoE port is not sending or receiving traffic.

- Catalyst 3750-X, 3750-E, 3750, 3560-X, 3650-E, 3560, and 2960 switches.

- Cisco EtherSwitch service modules (NME-16ES-1G, NME-16ES-1G-P, NME-X-23ES-1G, NME-X-23ES-1G-P, NME-XD-24ES-1S-P, NME-XD-48ES-2S-P).

- Cisco enhanced EtherSwitch service modules (SM-D-ES2-48, SM-D-ES3-48-P, SM-D-ES3G-48-P, SM-ES2-16-P, SM-ES2-24, SM-ES2-24-P, SM-ES3-16-P, SM-ES3-24-P, SM-ES3G-16-P, SM-ES3G-24-P).

Related Topics

Testing Activity Check

After you have enabled activity check, perform the following checks to make sure that the switch powers off the port only when a connected Cisco IP phone is not sending or receiving voice traffic.

While making a phone call, set the port power level to 0. The switch should not power off the IP phone. To set the port power level, you can:

- Run a query (using the CLI or the management application programming interface [MAPI]) — The switch performs an activity check before powering off.

- Use a recurrence—The switch performs an activity check before powering off.

- Use the CLI—The switch does not perform an activity check and powers off the PoE port immediately.

Use the **show mls qos interface statistics** privileged EXEC command to display the port QoS statistics, including the number of packets in queue 1.

Wake on LAN

Wake on LAN (WoL) is an Ethernet computer networking standard that uses a network message called a magic packet to wake up an endpoint device. The magic packet contains the MAC address of the destination endpoint device (typically a PC). For example, you can send a WoL magic packet to a PC. The listening PC waits for a magic packet addressed to it and then initiates the system to wake up.

WoL is implemented on the motherboard (BIOS) and the network interface. It is operating-system independent. WoL could be disabled by default on some PCs.

Related Topics

WoL with Cisco EnergyWise

You can configure the EnergyWise domain member to send a WoL magic packet to a specific endpoint device or all endpoint devices in the EnergyWise network. When a WoL-enabled PC is connected to the domain

member, it receives the WoL magic packet and the power level of the PC changes from nonoperational to operational.

Some network interface cards (NICs) have a SecureOn feature with which you can store a hexadecimal password within the NIC. When you send WoL packets to NICs with SecureOn, the NICs store this password as part of the packet, making the wake up process secure. If the PC you are trying to wake up has an NIC that supports SecureOn, the domain member must send a magic packet with the hexadecimal password to power on the PC.

SNMP Endpoint Proxy with Cisco EnergyWise

Simple Network Management Protocol (SNMP) is an application-layer protocol that provides a message format for communication between managers and agents. SNMP provides a standardized framework and a common language used for the monitoring and management of devices in a network.

You can monitor, control, and report the energy usage of endpoint devices that are connected to a Cisco network even if a Cisco EnergyWise agent is not installed on these devices. An EnergyWise domain member can use SNMP to communicate with these endpoint devices.

To use SNMP, you have to configure an EnergyWise SNMP proxy on the domain member that the endpoint device is connected to. When you send a query from the domain member (where EnergyWise SNMP proxy is configured) to the SNMP device, the query is translated to an SNMP request and the SNMP response is translated back to an EnergyWise response.

EnergyWise translates queries with the help of an XML file that is stored in the flash drive of the domain member. The number of XML files you need depends on the number and type of devices that you use. For example, if you have one or more printers using SNMP, you need to load one XML file for each printer type and model. You have to configure one EnergyWise SNMP proxy for each printer.

The following figure shows how a domain member running EnergyWise SNMP Proxy enables an SNMP-capable printer to join the EnergyWise domain.

Figure 4: An SNMP-Capable Printer Joining the EnergyWise Domain
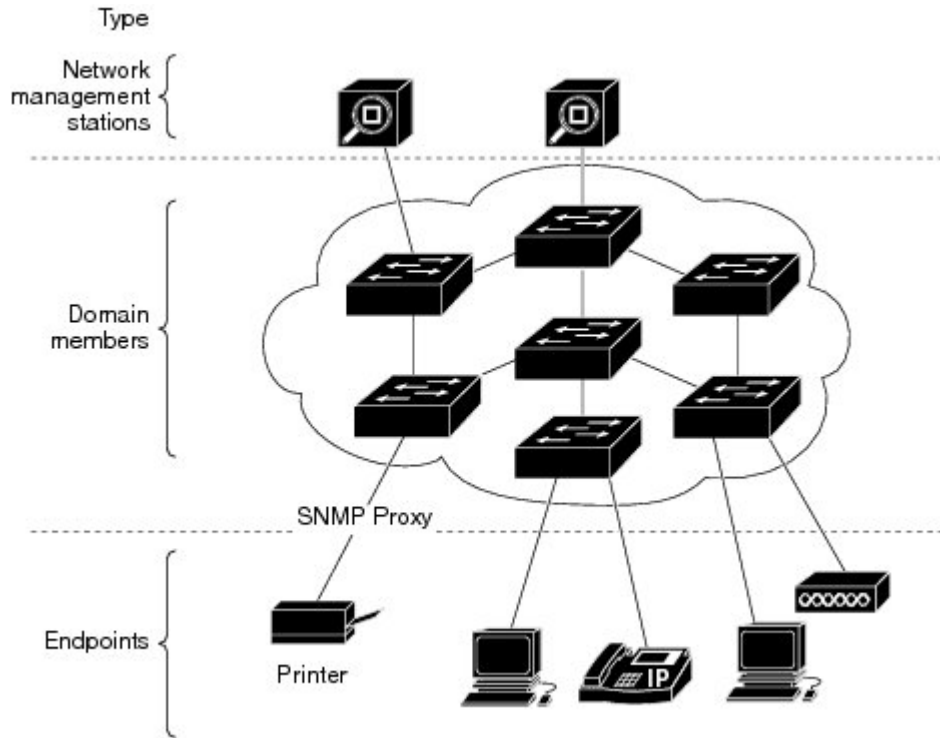
To display all the devices for which you have configured an SNMP proxy, use the **show energywise proxies** privileged EXEC command.

For EnergyWise proxy-related debugging, use the **debug energywise endpoint** and **debug energywise query** privileged EXEC commands.

> **Note** An EnergyWise query using this command cannot be translated to an SNMP request: **energywise query importance** *importance* {**keywords** *word,word,...* | **name** *name*} **collect delta** privileged EXEC command. You can use all other EnergyWise query commands.

Related Topics

Configuration Guidelines

Enabling Cisco EnergyWise and Powering Devices

By default, Cisco EnergyWise is disabled on the domain member.

If you enter the **no energywise level** interface configuration command, the domain member does not immediately change to the default power level. The power level changes when you restart the domain member or enter the **energywise level** *level* command.

Domain Member with PoE Ports

For a domain member with PoE ports, such as a PoE-capable switch:

- When you add an endpoint to an EnergyWise domain, it becomes an EnergyWise domain member and EnergyWise is enabled on the new domain member and all the PoE ports.

- When you use the **energywise level 0** interface configuration command, the port does not provide power to connected endpoints.

- You cannot use the **energywise level 0** global configuration command to power off the domain member.

Error-Disabled Ports

If a port is error-disabled:

- It appears as an EnergyWise domain member or endpoint in the **show** command output and in the *collect* query results. The query results show that the port uses 0 watts.

- It does not respond to a *set* query.

PoE and EnergyWise Interactions

You can configure EnergyWise on the port and configure the port power level.

The following table shows you how to find out if a domain member port participates in Cisco EnergyWise. For each combination of port and PoE mode check the matrix entry, if it is **Yes**, then the port participates in Cisco EnergyWise; if it is **No**, then the port does not participate in EnergyWise.

For example, if the port is PoE and the **PoE** mode is **never**, the table matrix entry is **No**; this means Cisco EnergyWise is not disabled even if the port power is off.

Table 7: Domain Member Port Participation in Cisco EnergyWise

Port	PoE Mode—auto	PoE Mode—never	PoE mode—static
PoE	Yes	No	Yes
Non-PoE	No	No	No

When you change the port mode using the **power inline auto** or **power inline static** interface configuration commands, changes are effective immediately. You do not need to restart the domain member.

If Cisco EnergyWise is disabled, the domain member can use PoE to manage the port power usage.

When you configure a recurrence for PoE interfaces, EnergyWise functions the same way as when the **power inline** and **no power inline** interface configuration commands are executed. You might see messages that show the interface going up and down at time of the event.

CLI Compatibility

Follow these guidelines for EnergyWise to work properly:

- All domain members must run Cisco EnergyWise Version 1 or Cisco EnergyWise Version 2.6 or later.

- All domain members must have the same domain name and security mode.

- If your switch is stacking-capable and is a member of a switch stack, all the stack members must run the same Cisco EnergyWise version.

- If your domain member is running Cisco EnergyWise Version 1, and you upgrade your software to a release supporting Cisco EnergyWise Version 2.6 or later:

  ◦ The EnergyWise settings in the running configuration are updated. The domain member sets the management password as the same domain password in the **energywise domain** command.

  ◦ Enter the **copy running-config startup-config** privileged EXEC command to save the EnergyWise settings in the configuration file.

- If your domain member is running Cisco EnergyWise Version 2.6 or later and you need to downgrade to Cisco EnergyWise Version 1.0 due to domain member compatibility issues, enter the **no energywise domain** global configuration command to disable EnergyWise before downgrading your software to a release supporting EnergyWise Version 1.

To display the Cisco EnergyWise version running on your domain member, use the **show energywise version** privileged EXEC command. The Cisco EnergyWise version is referred to as the EnergyWise specification in the command output.

To display the software version running on your domain member, use the **show version** privileged EXEC command.

In Cisco EnergyWise Version 1, these commands were modified:

- **energywise domain** *domain-name* **secret [0 | 7]** *password* global configuration command

  We recommend that you reconfigure the EnergyWise domain with the **energywise domain** *domain-name* **security** {*ntp-shared-secret* | *shared-secret*} **[0 | 7]** *shared-secret* [**protocol udp port** *udp-port-number* [interface *interface-id* | **ip** *ip-address*]] global configuration command.

  If you do not reconfigure the domain, the domain member synchronizes the management password with the domain password.

- **energywise management** *tcp-port-number* global configuration command

  We recommend that you reconfigure the management password for the domain with the **energywise management security shared-secret [0 | 7]** *shared-secret* **port** *tcp-port-number* global configuration command.

How to Configure EnergyWise

Enabling Cisco EnergyWise

SUMMARY STEPS

1. **configure terminal**
2. **service password-encryption**
3. **energywise domain** *domain-name* **security** {**ntp-shared-secret** | **shared-secret** } [**0** | **7**] *domain-password* [**protocol udp port** *udp-port-number* [**interface** *interface-id* | **ip** *ip-address*]]
4. **end**
5. **show energywise**
6. **show energywise domain**
7. **copy running-config startup-config**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** DomainMember# **configure terminal**	Enters the global configuration mode.
Step 2	**service password-encryption** **Example:** DomainMember(config)#**service password-encryption**	(Optional) Enables password encryption. If you set a hidden password in Step 3, enter this command.
Step 3	**energywise domain** *domain-name* **security** {**ntp-shared-secret**	**shared-secret** } [**0**	**7**] *domain-password* [**protocol udp port** *udp-port-number* [**interface** *interface-id*	**ip** *ip-address*]] **Example:** DomainMember(config)# **energywise domain cisco security shared-secret cisco protocol udp** **port 43440 ip 2.2.4.30**	Enables Cisco EnergyWise on the network device, assigns it to a domain with the specified domain-name, sets the domain security mode, and sets the domain password to authenticate all communication in the domain. • **ntp-shared-secret**—Sets a strong password with NTP. If the time between members varies ±30 seconds, the domain member drops events. • **shared-secret**—Sets a strong password without NTP. • (Optional) **0**—Uses a plain-text password. This is the default. • (Optional) **7**—Uses a hidden password. If you do not enter **0** or **7**, the default is **0**. • (Optional) **port** *udp-port-number*—Specifies the UDP port that communicates with the domain. The range is from 1 to 65000. The default is 43440.

	Command or Action	**Purpose**
		• (Optional) **interface** *interface-id*—Specifies the port that communicates with the domain if the IP address is dynamically assigned. We recommend that you specify the *interface-id* value. You should use this in a bridged network.
		• (Optional) **ip** *ip-address*—Specifies the IP address that communicates with the domain if the interface is a switched virtual interface (SVI) and VLAN trunking protocol (VTP) pruning is enabled. You should use this in a routed network.
		For the *domain-name* and *domain-password*:
		• You can enter alphanumeric characters and symbols such as #, (, $, !, and &.
		• Do not enter an asterisk (*) or a space between the characters or symbols.
Step 4	**end** **Example:** DomainMember(config)# **end**	Returns to privileged EXEC mode.
Step 5	**show energywise** **Example:** DomainMember# **show energywise**	Verifies your entries
Step 6	**show energywise domain** **Example:** DomainMember# **show energywise domain**	Verifies your entries.
Step 7	**copy running-config startup-config** **Example:** DomainMember# **copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

Configuring Domain Member or Endpoint Attributes

SUMMARY STEPS

1. **configure terminal**
2. **energywise importance** *importance*
3. **energywise keywords** *word, word, word...*
4. **service password-encryption**
5. **energywise management security shared-secret** [**0** | **7**] *mgmt-password* [**port** *tcp-port-number*]
6. **energywise name** *name*
7. **energywise neighbor** [*hostname* | *ip-address*] *udp-port-number*
8. **energywise role** *role*
9. **energywise allow query** [**save** | **set**]
10. **energywise endpoint security** [**none** | **shared-secret** [**0** | **7**] *shared-secret*]
11. **end**
12. **show energywise**
13. **show energywise domain**
14. **copy running-config startup-config**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** DomainMember# **configure terminal**	Enters the global configuration mode.
Step 2	**energywise importance** *importance* **Example:** DomainMember(config)#**energywise importance 65**	Sets the importance. The range is from 1 to 100. The default is 1.
Step 3	**energywise keywords** *word, word, word...* **Example:** DomainMember(config)# **energywise keywords lab1,devlab**	Assigns at least one keyword. When assigning multiple keywords, separate the keywords with commas, and do not use spaces between keywords. • You can enter alphanumeric characters and symbols such as #, (, $, !, and &. • Do not enter an asterisk (*) or a space between the characters or symbols. By default, keywords are not defined.
Step 4	**service password-encryption**	(Optional) Enables password encryption.

	Command or Action	Purpose
	Example: DomainMember(config)# **service password-encryption**	If you set a hidden password in Step 3, enter this command.
Step 5	**energywise management security shared-secret** [**0** | **7**] *mgmt-password* [**port** *tcp-port-number*] **Example:** DomainMember(config)# **energywise management security shared-secret cisco port 1055**	Sets the management password on the domain member that the management station uses to communicate with the domain. • (Optional) **0**—Uses a plain-text password. • (Optional) **7**—Uses a hidden password. If you do not enter **0** or **7**, the default is **0**. For the *mgmt-password*: • You can enter alphanumeric characters and symbols such as #, (, $, !, and &. • Do not enter an asterisk (*) or a space between the characters or symbols. (Optional) port tcp-port-number—Specifies the TCP port for management access. The range is from 1025 to 65535. The default is 43440. By default, the management password is not set.
Step 6	**energywise name** *name* **Example:** DomainMember(config)# **energywise name LabSwitch**	Specifies the EnergyWise-specific name. • You can enter alphanumeric characters and symbols such as #, (, $, !, and &. • Do not enter an asterisk (*) or a space between the characters or symbols. The default is the host name.
Step 7	**energywise neighbor** [*hostname* | *ip-address*] *udp-port-number* **Example:** DomainMember(config)# **energywise neighbor member1 43440**	Assigns a static neighbor. • Domain Name System (DNS) hostname (*hostname*) or IP address (*ip-address*). • UDP port (*udp-port-number*) that sends and receives queries. The range is from 1 to 65000. By default, static neighbors are not assigned.
Step 8	**energywise role** *role* **Example:** DomainMember(config)# **energywise role role.labaccess**	Specifies the role in the EnergyWise domain. For example, lobby.b20. • You can enter alphanumeric characters and symbols such as #, (, $, !, and &. • Do not enter an asterisk (*) or a space between the characters or symbols.

	Command or Action	**Purpose**
		The default is the model number.
Step 9	**energywise allow query** [**save** | **set**] **Example:** DomainMember(config)# **energywise allow query save**	Configures the domain member to respond to queries from the management station or another domain member. • **save**—Responds to a query to save the running configuration. • **set**—Responds to a query to change the power level or the EnergyWise attributes. By default, the domain member responds to the set query.

Step 10	**energywise endpoint security** [**none** | **shared-secret** [**0** | **7**] *shared-secret*]
	
	Example:
	DomainMember(config)# **energywise endpoint security shared-secret cisco**
		Sets the security mode for an endpoint.
		
		• **none**—Disables security.
		
		• **shared-secret**—Uses a password for secure communication with the domain member.
		
		• (Optional) **0**—Uses a plain-text password.
		
		• (Optional) **7**—Uses a hidden password.
		
		If you do not enter **0** or **7**, the default is **0**.
		
		• For the shared-secret:
		
		  ◦ You can enter alphanumeric characters and symbols such as #, (, \$, !, and &.
		
		  ◦ Do not enter an asterisk (*) or a space between the characters or symbols.
		
		By default, the password is not set.

Step 11	**end** **Example:** DomainMember(config)# **end**	Returns to privileged EXEC mode.
Step 12	**show energywise** **Example:** DomainMember# **show energywise**	Verifies your entries
Step 13	**show energywise domain** **Example:** DomainMember# **show energywise domain**	Verifies your entries.
Step 14	**copy running-config startup-config** **Example:** DomainMember# **copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

Related Topics

Powering the PoE Port

SUMMARY STEPS

1. **configure terminal**
2. **interface** *interface-id*
3. **energywise level** *level*
4. **end**
5. **show energywise**
6. **show energywise domain**
7. **copy running-config startup-config**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** DomainMember# **configure terminal**	Enters the global configuration mode.
Step 2	**interface** *interface-id* **Example:** DomainMember(config)# **interface gigabitethernet1/0/2**	Specifies the port or the range of ports to be configured and enters interface configuration mode.
Step 3	**energywise level** *level* **Example:** DomainMember(config-if)# **energywise level 3**	Manually powers on the port. • For a connected PoE endpoint, enter a power level of 10. • For an non-PoE-capable endpoint, enter a power level from 1 to 10. The endpoint determines the appropriate action.

	Command or Action	**Purpose**
Step 4	**end** **Example:** DomainMember(config-if)#**end**	Returns to privileged EXEC mode.
Step 5	**show energywise** **Example:** DomainMember# **show energywise**	Verifies your entries
Step 6	**show energywise domain** **Example:** DomainMember# **show energywise domain**	Verifies your entries.
Step 7	**copy running-config startup-config** **Example:** DomainMember# **copy running-config startup-config**	(Optional) Saves your entries in the configuration file. **Note** The power level that you set in Step 3 is the default power level when the domain member restarts.

Configuring Port Attributes

Before You Begin

Before entering the **energywise activitycheck** command in Step 7:

- Verify that automatic quality of service (auto-QoS) is enabled on the port and on the connected IP phone.

- If the domain member is connected to the IP phones through multiple Cisco devices, verify that they trust the CoS value in the incoming packets.

For more information about activity check and configuring auto-QoS, see Activity Check, on page 23.

SUMMARY STEPS

1. **configure terminal**
2. **interface** *interface-id*
3. **energywise importance** *importance*
4. **energywise keywords** *word, word, word...*
5. **energywise name** *name*
6. **energywise role** *role*
7. **energywise activitycheck**
8. **energywise allow query set**
9. **end**
10. **show running-config**
11. **copy running-config startup-config**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** DomainMember# **configure terminal**	Enters the global configuration mode.
Step 2	**interface** *interface-id* **Example:** DomainMember(config)# **interface gigabitethernet1/0/2**	Specifies the port or the range of ports to be configured, and enters interface configuration mode.
Step 3	**energywise importance** *importance* **Example:** DomainMember (config-if)# **energywise importance 90**	Sets the importance. The range is from 1 to 100. The default is 1.
Step 4	**energywise keywords** *word, word, word...* **Example:** DomainMember (config-if)# **energywise keywords lab**	Assigns at least one keyword. When assigning multiple keywords, separate the keywords with commas, and do not use spaces between keywords. • You can enter alphanumeric characters and symbols such as #, (, $, !, and &. • Do not enter an asterisk (*) or a space between the characters or symbols. By default, keywords are not defined.
Step 5	**energywise name** *name*	Specifies the EnergyWise-specific name.

	Command or Action	Purpose
	Example: DomainMember (config-if)# **energywise name labphone.5**	• You can enter alphanumeric characters and symbols such as #, (, $, !, and &. • Do not enter an asterisk (*) or a space between the characters or symbols. The default is the host name.
Step 6	**energywise role** *role* **Example:** DomainMember (config-if)# **energywise role role.labphone**	Specifies the role in the EnergyWise domain. For example, lobby.b20. • You can enter alphanumeric characters and symbols such as #, (, $, !, and &. • Do not enter an asterisk (*) or a space between the characters or symbols. The default is the model number.
Step 7	**energywise activitycheck** **Example:** DomainMember (config-if)# **energywise activitycheck**	Verifies that the connected IP phone is not sending or receiving traffic before the domain member powers off the port. **Note** The domain member cannot determine if the IP phone is in the hold state.
Step 8	**energywise allow query set** **Example:** DomainMember (config-if)# **energywise role role.labphone**	If the interface receives a query from the management station or another domain member, configures the interface to respond to a query changing the power level and the EnergyWise attributes. By default, the domain member responds to this query.
Step 9	**end** **Example:** DomainMember (config-if)# **end**	Returns to privileged EXEC mode.
Step 10	**show running-config** **Example:** DomainMember# **show running-config**	Verifies your entries.
Step 11	**copy running-config startup-config** **Example:** DomainMember# **copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

Related Topics

Configuring Recurrences

SUMMARY STEPS

1. **show energywise**
2. **configure terminal**
3. **time-range** *time-range-name*
4. **absolute start** *hh:mm day_of_month month year*
5. **periodic** *days_of_the_week hh:mm*
6. **interface** *interface-id*
7. **energywise level** *level* **recurrence importance** *importance* {**at** *minute hour day_of_month month day_of_week* | **time-range** *time-range-name*}
8. **end**
9. **show energywise recurrence**
10. **copy running-config startup-config**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**show energywise** **Example:** `DomainMember# show energywise`	Verifies that EnergyWise is enabled.
Step 2	**configure terminal** **Example:** `DomainMember# configure terminal`	Enters the global configuration mode.
Step 3	**time-range** *time-range-name* **Example:** `DomainMember(config)# time-range onfirstfloor`	Assigns a name to the time range, and enters the time-range configuration mode. If you do not configure a time range, go to Step 6. The time range is based on the system clock. • If EnergyWise is not running on the endpoint (for example, a PoE endpoint), the specified times are based on the domain member time zone. • If an agent or client is running on the endpoint, the specified times are based on the endpoint time zone. Use the **absolute** and the **periodic** time-range configuration commands to specify times and days for a recurrence. You can use one absolute condition and multiple periodic conditions.

	Command or Action	**Purpose**
Step 4	**absolute start** *hh:mm day_of_month month year* **Example:** `DomainMember(config-time-range)#` **`absolute start 0:00 1 August 2009`**	Sets the start time and day for the recurrence. If the **absolute** condition has an end time and day, the domain member ignores these values. • *hh:mm*—Specifies the time (24-hour format) in hours and minutes. • *day month year*—Specifies the date. 　◦ *day_of_month*—The range is from 1 to 31. Use * for the wildcard. 　◦ *month*—The range is from January to December. Use * for the wildcard. 　◦ *year*—The minimum year is 1993.
Step 5	**periodic** *days_of_the_week hh:mm* **Example:** `DomainMember(config-time-range)#` **`periodic weekdays 06:00 to 22:00`** `DomainMember(config-time-range)#` **`periodic weekend 10:00 to 16:00`**	Sets the weekly start time and day for the recurrence. • *days_of_the_week*—Valid values: 　◦ **Monday**, **Tuesday**, **Wednesday**, **Thursday**, **Friday**, **Saturday**, or **Sunday**—Enter a single day, a range of days with a dash between the starting and ending days, or multiple days separated by a comma. 　◦ **daily**—Enter if the recurrence starts from Monday to Sunday. 　◦ **weekdays**—Enter if the recurrence starts from Monday to Friday. 　◦ **weekend**—Enter if the event occurs on Saturday and Sunday. • *hh:mm*—Specifies the time (24-hour format) in hours and minutes.
Step 6	**interface** *interface-id* **Example:** `DomainMember(config)#` **`interface gigabitethernet1/0/2`**	Specifies the port or a range of ports to be configured, and enters interface configuration mode.
Step 7	**energywise level** *level* **recurrence importance** *importance* {**at** *minute hour day_of_month month day_of_week* | **time-range** *time-range-name*} **Example:** `DomainMember(config-if)#` **`energywise level 10 recurrence importance 70 time-range onfirstfloor`**	Schedules a power-on or power-off event. • **level** *level* —Specifies the power level. 　◦ To power off the endpoint, enter **0**. 　◦ To power on the endpoint: 　　If it is a PoE endpoint, enter **10**. 　　If it is another powered device, enter a power level from 1 to 10. The endpoint determines the appropriate action. • **importance** *importance*—The event occurs if the importance value of the endpoint is less than or equal to the importance value. The range is from 1 to 100.

	Command or Action	Purpose

		• **at** *minute hour day_of_month month day_of_week*—Specifies the time (24-hour format) in cron format for the recurrence.
		
		  ◦ *minute*—The range is from 0 to 59. Use * for the wildcard.
		
		  ◦ *hour*—The range is from 0 to 23. Use * for the wildcard.
		
		  ◦ *day_of_month*—The range is from 1 to 31. Use * for the wildcard.
		
		  ◦ *month*—The range is from 1 (January) to 12 (December). Use * for the wildcard.
		
		  ◦ *day_of_week*—The range is from 0 (Sunday) to 6 (Saturday). Use * for the wildcard.
		
		• **time-range** *time-range-name*—Specifies the time range for the recurrence.
		
		The event uses the domain member time.
		
		Repeat this step to schedule another event.

Step 8	**end** **Example:** DomainMember(config)# **end**	Returns to privileged EXEC mode.
Step 9	**show energywise recurrence** **Example:** DomainMember# **show energywise recurrence**	Verifies your entries.
Step 10	**copy running-config startup-config** **Example:** DomainMember# **copy running-config startup-config**	(Optional) Saves your entries in the configuration file.

Related Topics

Using Queries to Manage Power in the Domain

Note If the timeout value in the **energywise query importance** privileged EXEC command is too short, the management station does not receive query results even if the domain members and endpoints respond to the query. For example, if you want to power off a specific phone but the timeout value in the **energywise query importance** command is too short, the phone is not powered off. When configuring the timeout, configure a minimum of 6 seconds to display correct output.

In the procedure, Steps 2 and 3 are interchangeable. You can perform either Step 2 or Step 3.

SUMMARY STEPS

1. **energywise query analyze domain** *domain-name*

2. **energywise query importance** *importance* {**keywords** *word*, *word*,... | **name** *name*} **collect** {**delta** | **usage**} [**all** [**timeout** *timeout*] | **consumer** [**timeout** *timeout*] | **meter** [**timeout** *timeout*] | **producer** [**timeout** *timeout*] | **timeout** *timeout*]

3. **energywise query importance** *importance* {**keywords** *word*, *word*,... | **name** *name*} **sum** {**delta** | **usage**} [**all** [**timeout** *timeout*] | **consumer** [**timeout** *timeout*] | **meter** [**timeout** *timeout*] | **producer** [**timeout** *timeout*] | **timeout** *timeout*]

4. **energywise query importance** *importance* {**keywords** *word*, *word*,... | **name** *name*} **set level** *level* [**all** [**timeout** *timeout*] | **consumer** [**timeout** *timeout*] | **meter** [**timeout** *timeout*] | **producer** [**timeout** *timeout*] **timeout** timeout]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**energywise query analyze domain** *domain-name* **Example:** `DomainMember# energywise query analyze domain`	Runs a query to analyze and display information about the domain, including the domain size and the number of members and endpoints.
Step 2	**energywise query importance** *importance* {**keywords** *word*, *word*,...	**name** *name*} **collect** {**delta**	**usage**} [**all** [**timeout** *timeout*]	**consumer** [**timeout** *timeout*]	**meter** [**timeout** *timeout*]	**producer** [**timeout** *timeout*]	**timeout** *timeout*] **Example:** `DomainMember# energywise query importance 100 name * collect usage consumer`	Runs a query to display power information for the domain members and endpoints. Runs a query to change the power level and to power on or off the domain members, PoE ports, or endpoints. • **importance** *importance*—Filters the results based on the importance value. Only domain members and endpoints with importance values less than or equal to the specified value respond to the query. The importance range is from 1 to 100. • **keywords** *word*, *word*—Filters the results based on one or more keywords. **Note** Do not run a query with **keywords** *. No results are generated.

Command or Action	Purpose

	• **name** *name*—Filters the results based on the name. For the wildcard, use * or *name** with the asterisk at the end of the name phrase.
	
	• **collect** {**delta** | **usage**}—Displays power-usage information in watts (W) from the domain members and endpoints.
	
	   ◦ **delta**—Displays the delta vector with the difference between the actual power usage and the maximum power usage for each power level for what-if calculations.
	
	   ◦ **usage**—Displays the actual power usage.
	
	• **sum** {**delta** | **usage**}—Displays the summary of the power-usage information from domain members and endpoints.
	
	   ◦ **delta**—Displays the delta vector.
	
	   ◦ **usage**—Displays the actual power usage.
	
	• (Optional) **all**—Displays EnergyWise devices of all usage types.
	
	• (Optional) **consumer**—Filters the results to display devices that consume power, such as a switch. This is the default usage type.
	
	• (Optional) **meter**—Filters the results to display devices that measure the pass-through power, such as a PDU that sends power from a source to a connected device.
	
	• (Optional) **producer**—Filters the results to display devices that generate power, such as a solar panel.
	
	• (Optional) **timeout** *timeout*—Sets the time in seconds that the management station waits for query results. When configuring the timeout, configure a minimum of 6 seconds to display correct output.
	
	The default **timeout** is 6 seconds. The range is from 1 to 180.
	
	Repeat this step to run another query.

Step 3   **energywise query importance** *importance* {**keywords** *word, word,...* | **name** *name*} **sum** {**delta** | **usage**} [**all** [**timeout** *timeout*] | **consumer** [**timeout** *timeout*] | **meter** [**timeout** *timeout*] | **producer** [**timeout** *timeout*] | **timeout** *timeout*]
 	
Example:
`DomainMember# energywise query`
`importance 90 keyword lobby sum`
`usage`
	You can perform Step 2 or Step 3

Step 4 **energywise query importance** *importance* {**keywords** *word, word,...* | **name** *name*}	(Optional) Runs a query to change the power level and to power on or off the domain members, PoE ports, or endpoints.

Command or Action	Purpose
set level *level* [**all** [**timeout** *timeout*] | **consumer** [**timeout** *timeout*] | **meter** [**timeout** *timeout*] | **producer** [**timeout** *timeout*] **timeout** timeout] **Example:** `DomainMember# energywise query importance 80 name shipping.2 set level 0`	**Note** Use this query with care. It affects both the domain member on which you enter the command and other domain members and endpoints that match the query criteria. • **importance** *importance*— Filters the results based on the importance value. Only domain members and endpoints with values less than or equal to the specified value appear. The range is from 1 to 100. • **keywords** *word*, *word*...—Filters the results based on one or more keywords. **Note** Do not run a query with **keywords***. No results are generated. • **name** *name*—Filters the results based on the name. For the wildcard, use * or *name** with the asterisk at the end of the name phrase. • **set level** *level*— Sets the power level of the domain members, endpoints, or PoE ports. The range is from 0 to 10. • (Optional) **all**—Displays EnergyWise devices of all usage types. • (Optional) **consumer**—Filters the results to display devices that consume power, such as a switch. This is the default usage type. • (Optional) **meter**—Filters the results to display devices that measure the pass-through power, such as a PDU that sends power from a source to a connected device. • (Optional) **producer**—Filters the results to display devices that generate power, such as a solar panel. • (Optional) **timeout** *timeout*—Sets the time in seconds that the management station waits for query results. When configuring the timeout, configure a minimum of 6 seconds to display correct output. The default is 6 seconds. The range is from 1 to 180. Repeat this step to run another query.

Hibernating Immediately

To activate the hibernation immediately, run the following EnergyWise query in the privileged EXEC mode:

Before You Begin

Check that you have configured a hibernation end time.

SUMMARY STEPS

1. **energywise query importance** *importance* **name** *name* **set level** *level*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**energywise query importance** *importance* **name** *name* **set level** *level* **Example:** `DomainMember# `**`energywise query importance 90`** **`name cisco building1 set level 1`**	Immediately hibernates all the switches in the domain matching the given name. Hibernation ends at the time that you have specified by using the **energywise level** global configuration command.

The switch console displays the scheduled hibernation end times before hibernating. For example:

```
=========================================
Power level: Hibernation
Hibernation start time:--- -- ---- --:--:--
Hibernation end time: May 02 2013 03:00:00
To end hibernation ahead of schedule, push the Mode button.
=========================================
```

Related Topics

Configuring Hibernation Start and End Times

Follow this procedure to configure a Cisco IOS time-based recurrence with scheduled hibernation start and end times.

SUMMARY STEPS

1. **show energywise**
2. **configure terminal**
3. **time-range** *time-range-name*
4. **absolute start** *hh:mm day_of_month month year*
5. **periodic** *days_of_the_week hh:mm* **to** *hh:mm*
6. **exit**
7. **energywise level** *level* **recurrence importance** *importance* **time-range** *time-range-name*
8. **exit**
9. **show energywise recurrence**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**show energywise** **Example:** `DomainMember# show energywise`	Verifies that EnergyWise is enabled.
Step 2	**configure terminal** **Example:** `DomainMember# configure terminal`	Enters the global configuration mode.
Step 3	**time-range** *time-range-name* **Example:** `DomainMember(config)# time-range building1`	Assigns a name to the time range and enters the time-range configuration mode. The time range is based on the system clock. If EnergyWise is not running on the switch (for example, a PoE switch), the specified times are based on the domain member time zone. After entering the **time-range** *time-range-name* command, configure the **periodic** time-range configuration command, the **absolute** time-range configuration command, or a combination of the commands to define when the feature is in effect. Multiple periodic commands are allowed in a time range; only one absolute command is allowed.
Step 4	**absolute start** *hh:mm day_of_month month year* **Example:** `DomainMember(config-time-range)# absolute start 0:00 1 August 2013`	Sets the start time and day for the recurrence. If the absolute condition has an end time and day, the domain member ignores these values. **Note** If you configure an absolute condition for hibernation, you must configure an associated periodic condition with the start and end times. For more information, see the absolute time-range configuration command in the *Cisco IOS Configuration Fundamentals Command Reference*.

Step 5	**periodic** *days_of_the_week hh:mm* **to** *hh:mm*
	
	Example:
	`DomainMember(config-time-range)# periodic weekdays 00:00 to 05:30`
	`DomainMember(config-time-range)# periodic weekdays 21:00 to 23:59`
		Sets the weekly start time and day for the recurrence. You can specify these values:
		
		• *days_of_the_week* —Valid values:
		
		  ◦ **Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, or Sunday**—Enter a single day, a range of days with a dash between the starting and ending days, or multiple days separated by a comma.
		
		  ◦ **daily**—Enter if the recurrence applies from Monday to Sunday.
		
		  ◦ **weekdays**—Enter if the recurrence applies from Monday to Friday.
		
		  ◦ **weekend**—Enter if the recurrence applies on Saturday and Sunday.
		
		• **to** *hh:mm*—Sets the ending day and time. Specifies the time in hours and minutes (24-hour format).
		
		You can enter multiple periodic conditions. For each periodic condition you must enter the start and end time. The **absolute start***hh:mm day_of_month month year* time-range configuration command, if configured, takes precedence over

	Command or Action	**Purpose**
		the periodic start. If an absolute condition is not configured, the periodic start applies. For more information, see the periodic time-range configuration command in the *Cisco IOS Configuration Fundamentals Command Reference*.

Step 6	**exit**
	
	Example:
	`DomainMember(config-time-range)#`
	`exit`
		Exits the time-range configuration mode and returns to the global configuration mode.

Step 7	**energywise level** *level* **recurrence importance** *importance* **time-range** *time-range-name*
	
	Example:
	`DomainMember(config)# energywise`
	`level 1 recurrence importance 100`
	`time-range building1`
		Sets the power level and schedules a recurrence.
		
		• **level** *level* —Sets the power level.
		
		To hibernate, enter power level 1.
		
		• **recurrence** —Denotes that the configured event should recur at the specified time.
		
		• **importance** *importance* —The event occurs if the importance value of the switch is less than or equal to the importance value. The range is from 1 to 100.
		
		• **time-range** *time-range-name*—Assigns a time range to the event.
		
		Recurrences use the domain member time. To see domain member time, enter the **show clock** privileged EXEC command.
		
		If you configure multiple recurrences using this comment, the system uses the one that is configured first. Only after the first recurrence is removed does the next recurrence with the **energywise level 1** configuration take effect.

Step 8	**exit** **Example:** `DomainMember(config)# exit`	Exits the global configuration mode.

Step 9	**show energywise recurrence**
	
	Example:
	`DomainMember# show energywise`
	`recurrences`
		Displays the EnergyWise settings and status for recurrence.

The switch console displays the scheduled hibernation start and end times before hibernating. For example:

```
Building configuration...
[OK]
Apr 20 20:51:59.235: %SYS-5-CONFIG_I: Configured from console by console
=========================================
Power level: Hibernation
Hibernation start time: Apr 20 2013 20:52:00
Hibernation end time: Apr 20 2013 20:58:00
To end hibernation ahead of schedule, push the Mode button.
```

===

Related Topics

Configuring Activity Check

SUMMARY STEPS

1. **configure terminal**
2. **interface** *interface-id*
3. **energywise activity check**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `DomainMember# configure terminal`	Enters the global configuration mode.
Step 2	**interface** *interface-id* **Example:** `DomainMember(config)# interface gigabitethernet0/2`	Specifies the port or a range of ports to be configured, and enters the interface configuration mode. In the examples, the *interface-id* is in this format: *type slot-or-module-number/port-number*, for example, gigabitethernet 0/5. To specify an interface, see your device software documentation.
Step 3	**energywise activity check** **Example:** `DomainMember(config-if)# energywise activitycheck`	Configures the domain member to wait until a Cisco IP phone connected to a PoE port is not sending or receiving traffic before the domain member powers off the port. **Note** The domain member cannot determine if the IP phone is in the hold state.

What to Do Next

Proceed to test activity check.

Related Topics

Configuring SNMP Endpoint Proxy

Before You Begin

Save the XML file on the TFTP server. This action enables you to load the XML file in this procedure.

SUMMARY STEPS

1. **copy tftp**:*//IP address/XML file*
2. **configure terminal**
3. **snmp-server manager**
4. **energywise proxy mapping** *map_name word*
5. **interface** *interface-id*
6. *energywise proxy mapping map_name* **protocol** *protocol* **host** *host* **discovery-interval** *interval* **port** *port*
7. **energywise proxy protocol** *protocol* **version** *version* **community-string** *community-string*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**copy tftp**:*//IP address/XML file* **Example:** `copy tftp://2.2.2.201/xyz/example1.xml`	Uses TFTP to load the XML files on to the domain member. • *IP address*—IP address of the TFTP server. • *XML file*—Path to the XML file. You cannot delete an XML file that is in use. Before deleting an XML file, check that none of the proxies are using that file. To display all the XML files on your flash directory, use the **dir** privileged EXEC command.
Step 2	**configure terminal** **Example:** `DomainMember# configure terminal`	Enters the global configuration mode.
Step 3	**snmp-server manager** **Example:** `DomainMember(config)# snmp-server manager`	Enables the SNMP server manager and allows the domain member to act as an SNMP manager. By acting as an SNMP manager, the domain member can send SNMP requests to agents and receive SNMP responses and notifications from agents. By default, the SNMP manager is disabled.
Step 4	**energywise proxy mapping** *map_name word* **Example:** `DomainMember(config)# energywise proxy mapping aliasmapname1 flash:/example1.xml`	Sets an alias for the XML file. • **mapping** *map_name*—Sets an alias for the XML file. • *word*—Denotes the exact XML file name that is stored on the flash directory of the switch.

	Command or Action	Purpose
Step 5	**interface** *interface-id* **Example:** `DomainMember(config)# `**`interface`** **`gigabitethernet1/0/2`**	Specifies the port or the range of ports to be configured, and enters interface configuration mode.
Step 6	*energywise proxy mapping map_name* **protocol** *protocol* **host** *host* **discovery-interval** *interval* **port** *port* **Example:** `DomainMember(config-if)# `**`energywise`** **`proxy mapping aliasmapname1 protocol`** **`snmp host 2.2.2.11 port`** **`161`**	Sets up the XML file and configures credentials. • **mapping** *map_name*—Refers to the alias that you configure for the XML file in Step 5. • **protocol** *protocol* —Specifies the translation protocol for the device. For SNMP devices, the protocol is SNMP. • **host** *host*—Specifies the IP address of the SNMP device. • **discovery-interval**—Configures the interval for discovery updates from the SNMP device specified by the host and port, in seconds. The default interval is 180 seconds. • **port** *port*—Specifies the TCP or UDP port number for the SNMP device.
Step 7	**energywise proxy protocol** *protocol* **version** *version* **community-string** *community-string* **Example:** `DomainMember(config-if)# `**`energywise`** **`proxy snmp version v2c community-string`** **` private`**	Configures an SNMP proxy on one or more interfaces. • **protocol** *protocol*—Specifies the translation protocol for the device. For SNMP devices, the protocol is SNMP. • **version** *version*—Specifies the SNMP version. Use version SNMPv2c. • **community-string** *community-string*—Specifies the level of access. This should match the community string that is configured on the SNMP device.

Related Topics

Using WoL with a MAC Address

SUMMARY STEPS

1. **energywise query importance** *importance* {**keywords** *word*, *word*,... | **name** *name*} **wol mac** *mac-address* [**password** *password* | **port** *tcp-port-number* [**password** *password*]]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**energywise query importance** *importance* {**keywords** *word*, *word*,... | **name** *name*} **wol mac** *mac-address* [**password** *password* | **port** *tcp-port-number* [**password** *password*]] **Example:** `DomainMember# energywise query importance 100 keyword PC wol mac 0123.4567.89ab`	Sends a WoL magic packet to a specific device or to all devices in the EnergyWise network. • **importance** *importance*—Only domain members and endpoints with importance values less than or equal to the specified value respond to the query. The range is from 1 to 100. • **keywords** *word*, *word*...—Filters the results based on one or more keywords. **Note** If you know that the PC that you want to power on is connected to an interface with the keyword **PC**, use the **energywise query importance 100 keyword PC wol mac** *mac-address* command. You can also use a name qualifier. • **name** *name*—Filters the results based on the name. For the wildcard, use * or *name** with the asterisk at the end of the name phrase. • **wol mac** *mac-address*—Filters the results based on the MAC address and powers on only the device with the matching MAC address. **Note** If you do not know where the device is located, use the **energywise query importance 100 name * wol mac** *mac-address* command to send the WoL packet to all the domain members. • (Optional) **password** *password*—Sets the password for the WoL-enabled endpoint. • (Optional) **port** *port-number*—Specifies a port number to communicate with the EnergyWise domain. The default is 7.

Related Topics

Using WoL Without a MAC Address

To use WoL without entering a MAC address, first configure the EnergyWise endpoint device to include off-state caching and WoL. To wake up the device and set its power level, use the **energywise query** privileged EXEC command. For example, enter this command:

`DomainMember# energywise query importance 100 keywords pc set level 10`

Device MAC addresses are cached along with their keywords or names. The domain member matches the keywords or name you enter with the cached keywords, names, and MAC addresses and sends the WoL packet to the matching device.

The WoL packet is sent only if the device is powered off.

Related Topics

Monitoring and Troubleshooting EnergyWise

Monitoring EnergyWise

Use the following commands to monitor EnergyWise.

Table 8: show Privileged EXEC Commands

Command	Purpose
show energywise	Displays the settings and status for the domain member or endpoint.
show energywise children	Displays the status of the connected endpoints.
show energywise provisioned	Displays a summary of the EnergyWise information for the domain member and the connected endpoints.
show energywise domain	Displays the domain to which the domain member or endpoint belongs.
show energywise events	Display the last ten events (messages) sent to other domain members or endpoints in the domain.
show energywise neighbor	Displays the neighbor tables for the domain member.
show energywise recurrences	Displays the EnergyWise settings and status for recurrence.
show energywise statistics	Displays the counters for events and errors.
show energywise usage	Displays the actual power usage on the domain member or endpoint.
show energywise version	Displays the EnergyWise version.
show version	Displays the software version.
show power inline	Displays the PoE status.
show cdp neighbors	Displays the neighbors discovered by CDP.

Verifying Power Usage

This example shows you how to verify that the Cisco 7960 IP Phone uses 6.3 W and that the Cisco 7970G IP Phone uses 10.3 W:

```
Switch# show energywise usage children
Interface Name Usage Caliber
--------- ---- ----- -------
Switch 144.0 (W) max
Gi0/1 Gi0.1 6.3 (W) trusted
Gi0/2 Gi0.2 10.3 (W) trusted
```

Detecting Communication Failures

Use the EnergyWise debug mode commands to show communication failures.

Table 9: Detecting Communication Failures

Command	Purpose
debug energywise debug	Displays errors such as invalid sequence numbers and communication errors on the domain.
debug energywise discovery	Displays all EnergyWise discovery information.
debug energywise endpoint	Displays information about EnergyWise endpoints running a client or agent and helps detect mismatched domain names, secrets, and sequence numbers of connected endpoints.
debug energywise ha	Displays EnergyWise high availability (HA) information for devices that have HA capability.
debug energywise management	Displays information about authentication failures and EnergyWise management stations running power management applications.
debug energywise packet	Displays EnergyWise packet trace information.
debug energywise query	Displays query information relating to the device from which the query is initiated.
debug energywise trace	Displays information about all the EnergyWise processes relating to the device from which the query is initiated.
debug energywise wol	Displays Wake on LAN (WoL) query information relating to the device from which the query is initiated.

Disabling EnergyWise

To disable EnergyWise, enter the interface configuration commands followed by the global configuration commands.

Table 10: Interface Configuration Commands for Disabling EnergyWise

Command	Purpose
no energywise	Disables EnergyWise on the PoE port or on the endpoint.
no energywise activitycheck	Configures the domain member not to wait until a Cisco IP phone connected to a PoE port is not sending or receiving voice traffic before the domain member powers off the port.
no energywise allow query set	Configures the interface to drop all set queries for the interface and children. If configured, you cannot change the power level or EnergyWise attributes of connected devices on the interface. To prevent power levels on all interfaces from being changed, apply the command to all interfaces.
no energywise [**importance** | **keywords** [*word*, *word*, ...]| **level** | **name** [*name*] | **role** [*role*]]	Removes the EnergyWise configuration on a domain member port. If you enter the **no energywise level** command, the domain member changes the power level to the default only when you restart the domain member or you enter the **energywise level** *level* command.
no energywise level *level* **recurrence importance** *importance* {**at** *minute hour day_of_month month day_of_week* | **timerange** timerange-name}	Removes the recurrence configuration on a domain member port.

Table 11: Global Configuration Commands for Disabling EnergyWise

Command	Purpose
no energywise allow query save	Configures the domain member not to respond to a query that saves the running configuration.

Command	Purpose
no energywise allow query set	Configures the domain member to drop all set queries for the parent entity.
	If configured, you cannot change the power level or EnergyWise attributes of the domain member. This configuration does not apply to the interfaces or endpoints connected to any interfaces.
no energywise domain	Disables EnergyWise on the domain member.
no energywise endpoint	Configures the domain member not to establish parent-child relationships with connected EnergyWise-compatible endpoints. The endpoints cannot receive queries or messages from the domain member.
no energywise {*importance* | **keywords** [*word ,word,...*] | **name** | **neighbor** [*hostname* | *ip-address*] *udp-port-number* | **role**}	Removes the EnergyWise configuration on the domain member.
no energywise management	Configures the domain member to not communicate with a connected management station that sends queries.

Configuration Examples for EnergyWise

Examples: Setting the Domain

The following example displays how to set the domain:

```
DomainMember# show energywise
Interface Role Name Usage Lvl Imp Type
--------- ---- ---- ----- --- --- ----
fanfare jsmith 1009.0(W) 5 100 paren


DomainMember# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DomainMember(config)# energywise domain cisco security ntp-shared-secret cisco protocol
udp port 43440 ip 2.2.4.30
DomainMember(config)# energywise importance 50
DomainMember(config)# energywise keywords lab1,devlab
DomainMember(config)# energywise name LabSwitch
DomainMember(config)# energywise neighbor member1 43440
DomainMember(config)# energywise role role.labaccess
DomainMember(config)# energywise allow query save
DomainMember(config)# end

DomainMember# show energywise domain
Name : member1
Domain : cisco
Protocol : udp
```

```
        IP : 2.2.2.21
        Port : 43440

DomainMember# show energywise neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Id Neighbor Name Ip:Port Prot Capability
-- ------------- ------- ---- ----------
1 member-21 2.2.2.21:43440 udp S I
2 member-31 2.2.4.31:43440 static S I
3 member-22 2.2.2.22:43440 cdp S I
```

Related Topics

Examples: Manually Managing Power

The following example displays how to manually manage the power.

To power on the lab IP phones:

```
DomainMember# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DomainMember(config)# energywise domain cisco security shared-secret cisco protocol udp
port 43440 ip 2.2.4.44
DomainMember(config)# interface gigabitethernet0/3
DomainMember(config-if)# energywise importance 65
DomainMember(config-if)# energywise name labphone.5
DomainMember(config-if)# energywise role role.labphone
DomainMember(config-if)# end
```

To power off an IP phone connected to a PoE port:

```
DomainMember# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DomainMember(config)# energywise domain cisco security shared-secret cisco protocol udp
port 43440 ip 2.2.4.44
DomainMember(config)# interface gigabitethernet0/2
DomainMember(config-if)# energywise importance 65
DomainMember(config-if)# energywise name labphone.5
DomainMember(config-if)# energywise role role.labphone
DomainMember(config-if)# energywise level 0
DomainMember(config-if)# end
```

The domain member powers the IP phone whether Cisco EnergyWise is enabled or not.

Examples: Automatically Managing Power

The following example displays how to automatically manage the power:

```
DomainMember# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DomainMember(config)# energywise domain cisco security shared-secret cisco protocol udp
port 43440 ip 2.2.4.30
DomainMember(config)# interface gigabitethernet1/0/3
DomainMember(config-if)# energywise level 10 recurrence importance 90 at 0 8 * * *
DomainMember(config-if)# energywise level 0 recurrence importance 90 at 0 20 * * *
DomainMember(config-if)# energywise importance 50
DomainMember(config-if)# energywise name labInterface.3
DomainMember(config-if)# energywise role role.labphone
DomainMember(config-if)# end
```

```
DomainMember# show energywise recurrences
Id Addr Class Action Lvl Cron
-- ---- ----- ------ --- ----
1 Gi0/3 QUERY SET 10 minutes: 0 hour: 8 day: * month: * weekday: *
2 Gi0/3 QUERY SET 0 minutes: 0 hour: 20 day: * month: * weekday: *

DomainMember# show running-config
<output truncated>
interface GigabitEthernet0/3
energywise level 10 recurrence at 0 8 * * *
energywise level 0 recurrence at 0 20 *
energywise importance 50
energywise role role.labphone
energywise name labInterface.3
end
<output truncated>
```

To automatically power on the lab IP phones at 08:00 and power off at 20:00:

```
DomainMember# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DomainMember(config)# energywise domain cisco security shared-secret cisco protocol udp
port 43440 ip 2.2.4.30
DomainMember(config)# interface gigabitethernet1/0/3
DomainMember(config-if)# energywise level 10 recurrence importance 90 at 0 8 * * *
DomainMember(config-if)# energywise level 0 recurrence importance 90 at 0 20 * * *
DomainMember(config-if)# energywise importance 50
DomainMember(config-if)# energywise name labInterface.3
DomainMember(config-if)# energywise role role.labphone
DomainMember(config-if)# end

DomainMember# show energywise recurrences
Id Addr Class Action Lvl Cron
-- ---- ----- ------ --- ----
1 Gi0/3 QUERY SET 10 minutes: 0 hour: 8 day: * month: * weekday: *
2 Gi0/3 QUERY SET 0 minutes: 0 hour: 20 day: * month: * weekday: *


DomainMember# show running-config
<output truncated>
interface GigabitEthernet0/3
energywise level 10 recurrence at 0 8 * * *
energywise level 0 recurrence at 0 20 *
energywise importance 50
energywise role role.labphone
energywise name labInterface.3
end
<output truncated>
```

To automatically power on the PCs on the first floor at 06:00 and power off at 21:00:

```
DomainMember# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DomainMember(config)# service password-encryption
DomainMember(config)# energywise domain cisco security shared-secret cisco protocol udp
port 43440 ip 2.2.4.30

DomainMember(config)# time-range onfirstfloor
DomainMember(config-time-range)# absolute start 0:00 1 August 2009
DomainMember(config-time-range)# periodic daily 06:00 to 21:00

DomainMember(config)# time-range offfirstfloor
DomainMember(config-time-range)# absolute start 0:00 1 August 2009
DomainMember(config-time-range)# periodic daily 00:00 to 05:55
DomainMember(config-time-range)# periodic daily 21:01 to 23:59
DomainMember(config-time-range)# exit

DomainMember(config)# interface gigabitethernet0/3
DomainMember(config-if)# energywise level 10 recurrence importance 70 time-range onfirstfloor
DomainMember(config-if)# energywise level 0 recurrence importance 70 time offfirstfloor
DomainMember(config-if)# energywise name floor.1
```

```
DomainMember(config-if)# energywise role pc-mgr
DomainMember(config-if)# end

DomainMember# show energywise recurrences
Id Addr Class Action Lvl Cron
-- ---- ----- ------ --- ----
1 Gi0/3 QUERY SET 10 onfirstfloor
2 Gi0/3 QUERY SET 0 offfirstfloor


DomainMember# show running-config
<output truncated>
interface GigabitEthernet0/3
energywise level 10 recurrence importance 70 time-range onfirstfloor
energywise level 0 recurrence importance 70 time-range offfirstfloor
energywise role pc-mgr
energywise name floor.1
end
<output truncated>
```

Note Cisco EnergyWise uses only the start time for the **absolute** condition. Any configured end times are ignored. However, a start and end time is mandatory for the **periodic** condition.

Examples: Querying to Analyze Domains

This example shows how to display information about the domain, such as the number of members, endpoints and the domain size:

```
DomainMember# energywise query analyze domain
EnergyWise is currently analyzing the domain, please wait...
EnergyWise Domain Statistics
----------------------------
Querying from HW Model: WS-C3560G-48PS
Number of Domain Members: 3
Number of Endpoints: 1
```

Related Topics

Examples: Querying with the Name Attribute

In this example, Switch 1 and Switch 2 are in the same domain. shipping.1 is a PoE port on Switch 1, and shipping.2 is a PoE port on Switch 2.

The example shows the power usage of the domain members and endpoints with names beginning with shipping and with importance values less than or equal to 80. Run this query on Switch 1:

```
DomainMember# energywise query importance 80 name shipping.* collect usage
EnergyWise query, timeout is 6 seconds:
Host Name Usage Level Imp
---- ---- ----- ----- ---
192.168.20.1 shipping.1 6.3 (W) 10 1
192.168.20.2 shipping.2 8.5 (W) 10 1
Queried: 2 Responded: 2 Time: 0.4 seconds
```

The first row (shipping.1) is from Switch 1. The second row (shipping.2) is from Switch 2, a neighbor of Switch 1.

Related Topics

Examples: Querying with Keywords

In this example, Switch 1 and Switch 2 are in the same domain. shipping.1 is a PoE port on Switch 1, and shipping.2 is a PoE port on Switch 2.

The example shows the power usage of IP phones with different names, different roles, and importance values less than or equal to 80, but all that have the Admin keyword. Run this query on Switch 1:

```
DomainMember# energywise query importance 80 keyword Admin collect usage
EnergyWise query, timeout is 6 seconds:
Host Name Usage Level Imp
---- ---- ----- ----- ---
192.168.40.2 shipping.1 6.3 (W) 10 1
192.168.50.2 orders.1 10.3 (W) 10 1
192.168.60.3 pc.1 200.0 (W) 8 75
Queried: 3 Responded: 3 Time: 0.5 seconds
```

Switch 1 reports two phones connected to Switch 2, a neighbor of Switch 1.

✎

Note   Do not run a query with keywords *. No results are generated.

Related Topics

Examples: Querying to Set Power Levels

In these examples shipping.1 and shipping.2 are PoE ports on Switch 1. Run these queries on Switch 1:

- Set the power level of PoE port shipping.2 to 0:

  ```
  DomainMember# energywise query importance 80 name shipping.2 set level 0
  ```

- Set the power level of PoE ports shipping.1 and shipping.2 to 0:

  ```
  DomainMember# energywise query importance 90 name shipping.* set level 0
  ```

- Set the power level of devices that have the keyword Admin to 10:

  ```
  DomainMember# energywise query importance 60 keyword Admin set level 10
  EnergyWise query, timeout is 6 seconds:
  !!!!
  Success rate is (2/2) setting entities
  Queried: 2 Responded: 2 Time: 0.15 seconds
  ```

To show the power usage of EnergyWise devices with usage type **all**:

```
DomainMember# energywise query importance 100 name * collect usage all
EnergyWise query, timeout is 6 seconds:
Host Name Usage Level Imp
---- ---- ----- ----- ---
10.1.2.83 SEP5475d0db0dcb 3.8 (W) 10 5
```

```
10.1.2.71 SEP1C17D340834E 8.8 (W) 10 1
10.1.2.68 SEP3037A61748E2 8.8 (W) 10 1
10.1.2.211 Local_InfeedA_Outlet1 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet2 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet3 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet4 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet5 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet6 34.0 (W) 0 50
```

To show the power usage of an IP phone with usage type **consumer**:

```
DomainMember# energywise query importance 100 name * collect usage consumer
EnergyWise query, timeout is 6 seconds:
Host Name Usage Level Imp
---- ---- ----- ----- ---
10.1.2.83 SEP5475d0db0dcb 3.8 (W) 10 5
10.1.2.71 SEP1C17D340834E 8.8 (W) 10 1
10.1.2.68 SEP3037A61748E2 8.8 (W) 10 1
```

To show the power usage of a PDU outlet with usage type **meter**:

```
DomainMember# energywise query importance 100 name * collect usage meter
EnergyWise query, timeout is 6 seconds:
Host Name Usage Level Imp
---- ---- ----- ----- ---
10.1.2.211 Local_InfeedA_Outlet1 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet2 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet3 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet4 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet5 0.0 (W) 0 50
10.1.2.211 Local_InfeedA_Outlet6 34.0 (W) 0 50
```

Related Topics

Queries, on page 22

Example: Hibernating a Switch

This example shows you how to configure a Cisco IOS time-based recurrence. Time-range building1hibernate is created and the periodic condition is used to configure the hibernation start and end times from 01:00 a.m. to 09:00 a.m. on weekdays.

1 Configure the energywise domain:

```
DomainMember(config)# energywise domain cisco security shared-secret cisco protocol udp
 port43440 ip 2.2.4.30
```

2 Create a time-range name and configure periodic conditions:

```
DomainMember(config)# time-range building1hibernate
DomainMember(config-time-range)# periodic weekdays 01:00 to 09:00
DomainMember(config-time-range)# exit
```

3 Configure the recurrence:

```
DomainMember(config)# energywise level 1 recurrence importance 100 time-range
building1hibernate
```

Related Topics

Configuring Hibernation Start and End Times, on page 44

Hibernating Immediately, on page 43

Examples: Activity Check

Example: CoS Values Mapped to Queue and Threshold Values

In this example, CoS value 5 is mapped to queue 1 and threshold 3 on the Gigabit Ethernet 0/1 port:

```
Cos-outputq-threshold map:
cos: 0 1 2 3 4 5 6 7
---------------------------------------------------------------
queue-threshold: 4-3 4-2 3-3 2-3 3-3 1-3 2-3 2-3
```

Example: PoE Port Configuration

```
<output truncated>
interface GigabitEthernet0/1
srr-queue bandwidth share 10 10 60 20
queue-set 2
priority-queue out
mls qos trust device cisco-phone
mls qos trust cos
auto qos voip cisco-phone
service-policy input AutoQoS-Police-CiscoPhone
<output truncated>
```

Example: Testing Activity Check

This example shows you how to test activity check. The example uses the **show mls qos maps cos-output-q** privileged EXEC command to show which output queue and threshold is mapped to CoS 5 for voice traffic. The **show mls qos interface statistics** privileged EXEC command then displays the number of packets in the output queue to determine if the domain member (an IP phone in this case) is sending out packets.

```
DomainMember# show mls qos maps cos-output-q
Cos-outputq-threshold map:
cos: 0 1 2 3 4 5 6 7
-------------------------------------------------
queue-threshold: 2-1 2-1 3-1 3-1 4-1 1-1 4-1 4-1
<output truncated>
```

CoS 5 is mapped to queue-threshold: 1-1 (queue 1 and threshold 1):

```
DomainMember# show mls qos interface statistics
output queues enqueued:
queue: threshold1 threshold2 threshold3
-------------------------------------------------
queue 0: 0 0 0
queue 1: 0 0 0
queue 2: 0 0 0
queue 3: 0 0 0
<output truncated>
```

The output queue for queue 1 and threshold 1 is 0, which means that the phone is not sending out packets and the switch can power off the phone. If a phone conversation was in progress, the output queue would have nonzero packets in the output queue.

Related Topics

Configuring Activity Check, on page 47

Example: Configuring SNMP Endpoint Proxy

This example shows how to configure an SNMP endpoint proxy:

```
DomainMember# copy tftp://2.2.2.201/xyz/example1.xml
DomainMember# configure terminal
DomainMember# snmp-server manager
DomainMember(config)# energywise proxy mapping Xerox1 flash:/example1.xml
DomainMember(config)# interface gigabitethernet0/3
DomainMember(config-if)# energywise proxy mapping Xerox1 protocol snmp host 2.2.2.11 port
161
DomainMember(config-if)# energywise proxy snmp v2c community-string private
```

Related Topics

Additional References

Related Documents

Related Topic	Document Title
List of Cisco network devices supporting Cisco EnergyWise	Cisco IOS Release Notes for Cisco EnergyWise, EnergyWise Version 2.8
EnergyWise Commands	Cisco EnergyWise IOS Command Reference Guide for Catalyst 2960-X Switches, EnergyWise Version 2.8
Cisco Integrated Service Routers Generation 2 (ISR G2)	Configuring Cisco EnergyWise Feature for Branch Routers
IP-Enabled Energy Management	IP-Enabled Energy Management: A Proven Strategy for Administering Energy as a Service
Cisco EnergyWise partner documentation	Go to the Cisco Developer Network. • *Cisco EnergyWise Documentation Roadmap* • *Cisco EnergyWise Partner Development Guide* • *Cisco EnergyWise Programmer Reference Guide for the Endpoint SDK* • *Cisco EnergyWise Programmer Reference Guide for the Management API*

MIBs

MIB	MIBs Link
Cisco EnergyWise domain members support the CISCO-ENERGYWISE-MIB.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco IOS MIB Locator found at the following URL: http://www.cisco.com/go/mibs

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/support

Feature Information for EnergyWise

Feature	Cisco IOS Release	Description
EnergyWise Version 2.8	Cisco IOS Release 15.0(2)EX	This feature was introduced.
Hibernation	Cisco IOS Release 15.0(2)EX3	This feature was introduced.

XML Schema for SNMP Endpoint Proxy

XML Schema

Use the rules of the schema to create an XML file. The XML file that you create maps MIB Object Identifiers (MIB OIDs) to the EnergyWise attributes. We recommend that you have one XML file for each MIB.

To use SNMP Endpoint proxy, you have to implement the following schema:

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
<!-- Definition of Simple Elements -->
<xs:element name="description" type="xs:string" />
<!-- Definiton of Attributes -->
<xs:attribute name="name" type="xs:string" />
<xs:attribute name="datatype" type="xs:string" />
<xs:attribute name="value" type="xs:string" />
<xs:attribute name="default" type="xs:string" />
<xs:attribute name="invalue" type="xs:integer" />
<xs:attribute name="outvalue" type="xs:integer" />
<xs:attribute name="lowerrange" type="xs:integer" />
<xs:attribute name="upperrange" type="xs:integer" />
<!-- Definition of Complex Elements -->
<xs:element name="mapping" >
<xs:complexType>
<xs:attribute ref="invalue" />
<xs:attribute ref="outvalue" />
<xs:attribute ref="lowerrange" />
<xs:attribute ref="upperrange" />
</xs:complexType>
</xs:element>
<xs:element name="oid" >
<xs:complexType>
<xs:sequence>
<xs:element ref="mapping" maxOccurs="unbounded" minOccurs="0" />
</xs:sequence>
<xs:attribute ref="name" />
<xs:attribute name="action" >
<xs:simpleType>
<xs:restriction base="xs:string">
<xs:enumeration value="get" />
<xs:enumeration value="set" />
</xs:restriction>
```

```
          </xs:simpleType>
          </xs:attribute>
          <xs:attribute ref="datatype" />
          <xs:attribute ref="value" />
          </xs:complexType>
          </xs:element>
          <xs:element name="constant" >
          <xs:complexType>
          <xs:attribute name="type" use="required">
          <xs:simpleType>
          <xs:restriction base="xs:string">
          <xs:enumeration value="level" />
          <xs:enumeration value="importance" />
          <xs:enumeration value="string" />
          <xs:enumeration value="watts" />
          <xs:enumeration value="integer" />
          </xs:restriction>
          </xs:simpleType>
          </xs:attribute>
          <xs:attribute ref="value" />
          </xs:complexType>
          </xs:element>
          <xs:element name="method">
          <xs:complexType>
          <xs:sequence>
          <xs:element ref="description" minOccurs="0" maxOccurs="1" />
          <xs:choice minOccurs="0">
          <xs:element ref="oid" />
          <xs:element ref="constant" />
          </xs:choice>
          </xs:sequence>
          <xs:attribute name="name" use="required">
          <xs:simpleType>
          <xs:restriction base="xs:string">
          <xs:enumeration value="fn_get_usage" />
          <xs:enumeration value="fn_get_keywords" />
          <xs:enumeration value="fn_set_keywords" />
          <xs:enumeration value="fn_get_importance" />
          <xs:enumeration value="fn_set_importance" />
          <xs:enumeration value="fn_get_name" />
          <xs:enumeration value="fn_set_name" />
          <xs:enumeration value="fn_get_role" />
          <xs:enumeration value="fn_set_role" />
          <xs:enumeration value="fn_get_level" />
          <xs:enumeration value="fn_set_level" />
          <xs:enumeration value="fn_get_deviceType" />
          <xs:enumeration value="fn_get_units" />
          <xs:enumeration value="fn_get_usageCaliber" />
          <xs:enumeration value="fn_get_entityCategory" />
          </xs:restriction>
          </xs:simpleType>
          </xs:attribute>
          <xs:attribute name="action" use="required">
          <xs:simpleType>
          <xs:restriction base="xs:string">
          <xs:enumeration value="cache" />
          <xs:enumeration value="constant" />
          <xs:enumeration value="nack" />
          <xs:enumeration value="oid" />
          </xs:restriction>
          </xs:simpleType>
          </xs:attribute>
          <xs:attribute ref="value" />
          <xs:attribute ref="default" />
          </xs:complexType>
          </xs:element>
          <xs:element name="interface">
          <xs:complexType>
          <xs:sequence>
          <xs:element ref="method" maxOccurs="unbounded" minOccurs="0" />
          </xs:sequence>
          <xs:attribute name="protocol">
          <xs:simpleType>
```

```
<xs:restriction base="xs:string">
<xs:enumeration value="snmp" />
</xs:restriction>
</xs:simpleType>
</xs:attribute>
</xs:complexType>
</xs:element>
<xs:element name="CiscoEnergyWise">
<xs:complexType>
<xs:all>
<xs:element ref="interface" />
</xs:all>
<xs:attribute name="version" default="1.0" />
</xs:complexType>
</xs:element>
</xs:schema>
```

Sample XML

The following sample XML code uses the EnergyWise MIB:

```
<?xml version="1.0" ?>
- <CiscoEnergyWise version="1.0">
- <interface protocol="snmp" version="v2c">
- <method name="fn_get_usage" action="oid">
<oid name="cewEntEnergyUsage" action="get" value="1.3.6.1.4.1.9.9.683.1.6.1.8.1001" />
</method>
- <method name="fn_get_units" action="oid">
<oid name="cewEntEnergyUnits" action="get" value="1.3.6.1.4.1.9.9.683.1.6.1.7.1001" />
</method>
- <method name="fn_set_keywords" action="oid">
<oid name="cewEntKeyword" action="set" datatype="string"
value="1.3.6.1.4.1.9.9.683.1.6.1.3.1001" />
</method>
- <method name="fn_get_keywords" action="oid">
<oid name="cewEntKeyword" action="get" value="1.3.6.1.4.1.9.9.683.1.6.1.3.1001" />
</method>
- <method name="fn_set_importance" action="oid">
<oid name="cewEntImportanceInt" action="set" datatype="unsigned32"
value="1.3.6.1.4.1.9.9.683.1.6.1.12.1001" />
</method>
- <method name="fn_get_importance" action="oid">
<oid name="cewEntImportanceInt" action="get" value="1.3.6.1.4.1.9.9.683.1.6.1.12.1001" />
</method>
- <method name="fn_set_name" action="oid">
<oid name="cewEntName" action="set" datatype="string"
value="1.3.6.1.4.1.9.9.683.1.6.1.4.1001" />
</method>
- <method name="fn_get_name" action="oid">
<oid name="cewEntName" action="get" value="1.3.6.1.4.1.9.9.683.1.6.1.4.1001" />
</method>
- <method name="fn_set_role" action="oid">
<oid name="cewEntRoleDescription" action="set" datatype="string"
value="1.3.6.1.4.1.9.9.683.1.6.1.5.1001" />
</method>
- <method name="fn_get_role" action="oid">
<oid name="cewEntRoleDescription" action="get" value="1.3.6.1.4.1.9.9.683.1.6.1.5.1001" />
</method>
- <method name="fn_set_level" action="oid">
- <oid name="cewEntEnergyLevel" action="set" datatype="integer"
value="1.3.6.1.4.1.9.9.683.1.6.1.10.1001">
<mapping invalue="0" outvalue="1" />
<mapping invalue="1" outvalue="2" />
<mapping invalue="2" outvalue="3" />
<mapping invalue="3" outvalue="4" />
<mapping invalue="4" outvalue="5" />
<mapping invalue="5" outvalue="6" />
<mapping invalue="6" outvalue="7" />
```

```
<mapping invalue="7" outvalue="8" />
<mapping invalue="8" outvalue="9" />
<mapping invalue="9" outvalue="10" />
<mapping invalue="10" outvalue="11" />
</oid>
</method>
- <method name="fn_get_level" action="oid">
- <oid name="cewEntEnergyLevel" action="get" value="1.3.6.1.4.1.9.9.683.1.6.1.10.1001">
<mapping invalue="1" outvalue="0" />
<mapping invalue="2" outvalue="1" />
<mapping invalue="3" outvalue="2" />
<mapping invalue="4" outvalue="3" />
<mapping invalue="5" outvalue="4" />
<mapping invalue="6" outvalue="5" />
<mapping invalue="7" outvalue="6" />
<mapping invalue="8" outvalue="7" />
<mapping invalue="9" outvalue="8" />
<mapping invalue="10" outvalue="9" />
<mapping invalue="11" outvalue="10" />
</oid>
</method>
- <method name="fn_get_usageCaliber" action="oid">
<oid name="cewEntEnergyUsageCaliber" action="get" value="1.3.6.1.4.1.9.9.683.1.6.1.9.1001"
/>
</method>
- <method name="fn_get_entityCategory" action="cache">
<description>Let the switch return cache the consumer category for this
device.</description>
</method>
- <method name="fn_get_deviceType" action="constant">
<constant type="string" value="Printer" />
</method>
</interface>
</CiscoEnergyWise>
```

APPENDIX B

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 that apply and to comply with them. Even in the absence of a law, we strongly recommend that you designate certain phones that 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	l 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!	l 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.
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	Для обеспечения соответствия требованиям по предельным значениям облучения радиочастотами (РЧ) антенны данного устройства должны располагаться на расстоянии не ближе 2 м от пользователей.
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。

I N D E X

T

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    without a MAC address **50**
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