Cisco EnergyWise Configuration Guide

EnergyWise Phase 1
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Cisco EnergyWise Configuration Guide

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Preface

Audience

This guide is for the networking professional managing the Catalyst switch, hereafter referred to as the *switch,* and other Cisco network devices, hereafter referred to as the *network devices*. In this document, *switch* refers to a Cisco network device, such as a switch, router, or access point.

Before using this guide, you should have experience working with the Cisco IOS software and be familiar with the concepts and terminology of Ethernet and local area networking.

Purpose

This document describes how to configure Cisco EnergyWise in your network and has

- Cisco EnergyWise concepts
- Configuration procedures
- Examples
- EnergyWise-specific Cisco IOS command-line interface (CLI) commands
- Troubleshooting procedures

For a list of supported devices, see Appendix A “Supported Platforms.”

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

For information about the standard Cisco IOS Release 12.2 commands, see the Cisco IOS documentation set on Cisco.com.

This guide does not provide detailed information on the graphical user interfaces (GUIs) for the embedded device manager or for Cisco Network Assistant (hereafter referred to as *Network Assistant)* that you can use to manage the switch. However, the concepts in this guide are applicable to the GUI user. For information about the device manager, see the switch online help. For information about Network Assistant, see *Getting Started with Cisco Network Assistant*, available on Cisco.com.

For documentation updates, see the release notes for this release.

Conventions

This publication uses these conventions to convey instructions and information:

Command descriptions use these conventions:

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

Interactive examples use these conventions:

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

Notes, cautions, and timesavers use these conventions and symbols:

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

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

Related Publications

For more information about the Cisco network devices, see the documentation on Cisco.com at http://www.cisco.com/cisco/web/support/index.html.

Note Before installing, configuring, or upgrading the switch, see these documents:

- 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.
- For device manager requirements, see the "System Requirements" section in the release notes (not orderable but available on Cisco.com).
- For Network Assistant requirements, see the *Getting Started with Cisco Network Assistant* (not orderable but available on Cisco.com).
- For cluster requirements, see the *Release Notes for Cisco Network Assistant* (not orderable but available on Cisco.com).
- For upgrading information, see the "Downloading Software" section in the release notes.

Obtaining Documentation, Obtaining Support, and Security Guidelines

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

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

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

CHAPTER 1

Managing Single Entities

Use Cisco EnergyWise to manage the energy usage of entities in an EnergyWise network.

If your switch is stacking-capable, unless otherwise noted, the term *switch* refers to a standalone switch and to a switch stack.

Note The examples in this document are for a Catalyst 3750-E or 3750 switch (for example, gigabitethernet 1/0/5). To specify an interface on your network device, see your device software documentation.

For more information about EnergyWise, go to http://www.cisco.com/en/US/products/ps10195/tsd_products_support_series_home.html.

EnergyWise Entity

An EnergyWise entity is a physical or logical device with EnergyWise enabled, such as a Catalyst switch, a power over Ethernet (PoE) port, or a PoE device.

EnergyWise uses a distributed model to *manage* energy usage.

- Switches are grouped in an EnergyWise domain and become domain entities. They receive messages from and send them to other domain entities.
- An entity in the EnergyWise domain responds to queries.
- An entity *participating* in EnergyWise controls the power usage of connected PoE devices, such as an IP phone, an IP camera, or a PoE-enabled device. For example, a Catalyst switch can power off the IP phone.

On an EnergyWise-enabled entity

- The entity always participates in EnergyWise.
- PoE ports participate in EnergyWise.
- Non-PoE ports do not participate in EnergyWise.

EnergyWise Domain

An EnergyWise domain can be an EnergyWise network.

The domain is treated as one unit of power management.

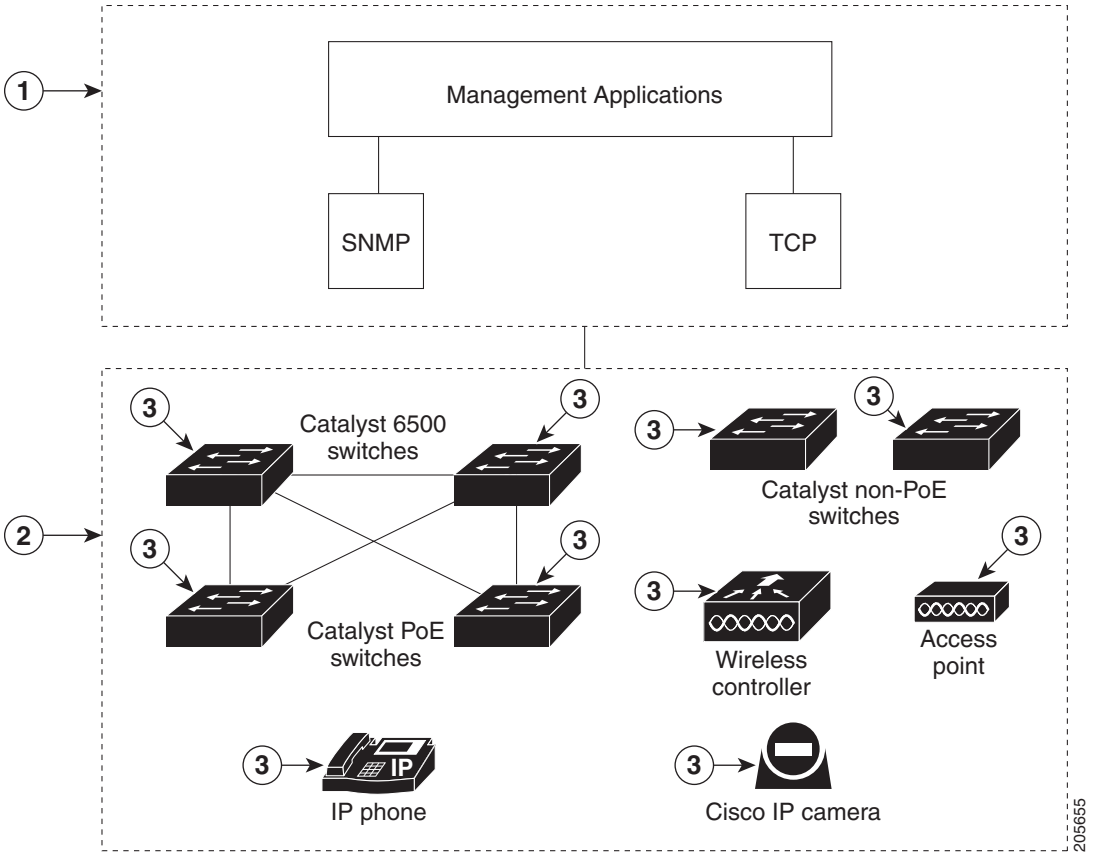
Entities have neighbor-to-neighbor relationships with other domain entities.

For more information, see Chapter 4, “Configuration Examples.”

EnergyWise Network

An EnergyWise network has EnergyWise entities in a domain.

Figure 1-1 Typical Network



1	Entity managing power usage	**3**	Entities
2	Domain		

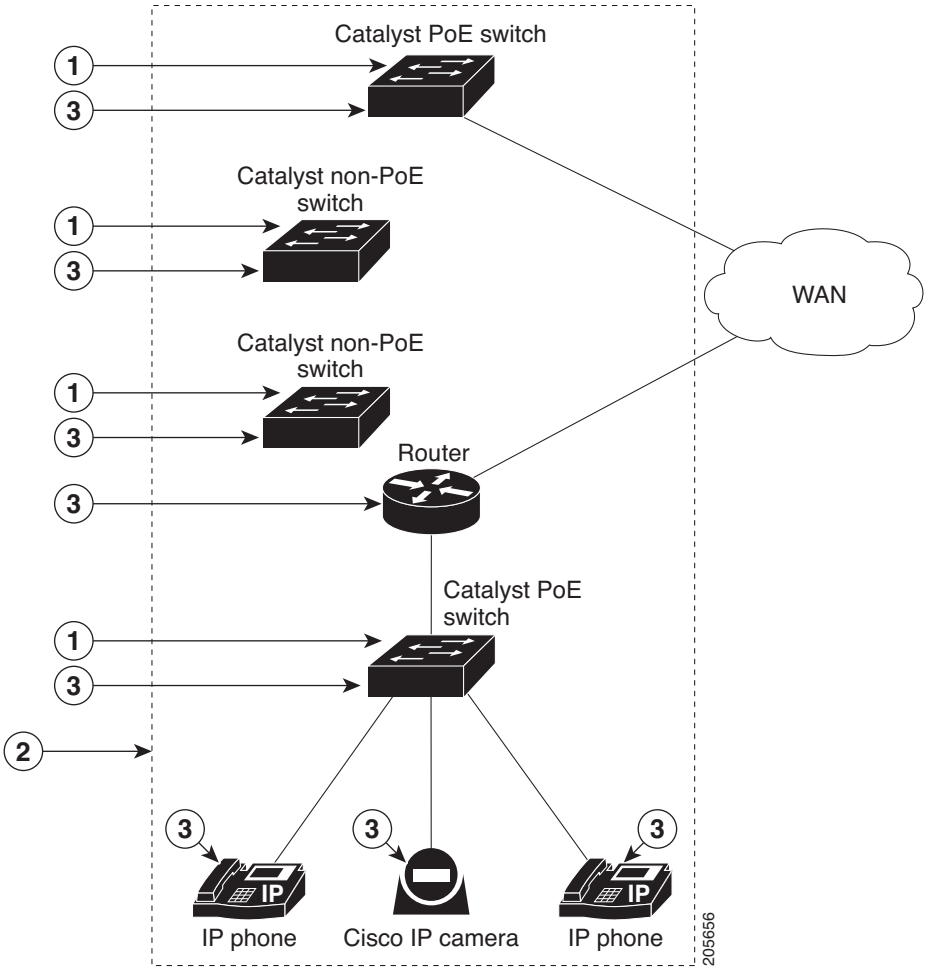
Single PoE Switch Scenario

Managing the power usage when

- A PoE entity powers on or off the connected entities.
- A PoE entity applies a network policy that powers on and powers off connected entities. The specified times are local times based on the PoE-entity time zone. For example, IP phones are powered on at 7:00 a.m. (0700) local time, and they are powered off at 7:00 p.m. (1900) local time.

  This is also known as a *recurring event*.

Figure 1-2 Single PoE Switch Example



1	Entity managing power usage	**3**	Entities
2	Domain		

EnergyWise Power Level

The EnergyWise power level is for a PoE switch port.

The range is from 0 to 10.

The default power level is 10.

A Catalyst switch does not support level 0.

A PoE port supports level 0 to level 10.

If the power level is 0, the port is powered off.

If the power level is from 1 to 10, the port is powered on. If the power level is 0, enter any value in this range to power on the PoE port or the switch.

When the power level changes, the port determines the action for the connected entities.

EnergyWise Importance

Set the EnergyWise importance value on a PoE port or a switch to rank domain entities.

The range is from 1 to 100.

The default importance value is 1.

EnergyWise Names, Roles, and Keywords

Set an EnergyWise-specific entity name to identify the domain entity.

- For a PoE port, the default is a short version of the port name; for example, Gi1.0.2 for Gigabit Ethernet 1/0/2.
- For a switch, the default is the hostname.

Set the role of the domain entity to differentiate it from other entities.

- For a PoE port, the default is *interface*.
- For a switch, the default is the model number.

Set at least one keyword describing an entity to differentiate it from other entities.

Supported MIBs

EnergyWise supports the CISCO-ENERGYWISE-MIB.

To access information about this MIB, go to http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml and click **SNMP v2 MIBs**.

You can also use FTP to access the MIB files. To get a MIB file:

Step 1 Make sure that your FTP client is in passive mode.

Note Some FTP clients do not support passive mode.

Step 2 Use FTP to access the server **ftp.cisco.com**.

Step 3 Log in with the username **anonymous**.

Step 4 Enter your e-mail username when prompted for the password.

Step 5 At the ftp> prompt, change directory to **/pub/mibs/v2**.

Step 6 Use the **get** *MIB_filename* command to obtain a copy of the MIB file.

Configuration Guidelines

By default, EnergyWise is disabled.

When you add an entity to a domain, EnergyWise is enabled on the entity and its PoE ports.

Use the **energywise level 0** interface configuration command to power off a PoE port.

You cannot use the **energywise level 0** global configuration command to power off the entity.

If you enter the **no energywise level** command, the switch does not immediately change the power level to the default. The power level changes when the switch restarts or you enter the **energywise level** *level* command.

If you schedule the entity to power on the PoE port at 7:00 a.m. (0700), the port powers on within 1 minute, between 7:00 a.m.(0700) and 7:01 a.m. (0701) local time.

PoE and EnergyWise Interactions

Table 1-1 Does the Entity Participate in EnergyWise?

	PoE Mode		
EnergyWise Entity	**auto**	**never**	**static**
PoE port	Yes	No	Yes
Non-PoE port	No	No	No

If the PoE port mode is **never**, the port power is off, but EnergyWise is not disabled. You can

- Configure EnergyWise on the port.
- Configure the port power level. The level takes effect after you change the port mode to **auto** or **static**. You do not need to restart the switch.

If EnergyWise is disabled, the entity can use PoE to manage port power.

Manually Managing Power

Powering the Entity

	Command	Purpose
Step 1		Go to privileged EXEC mode.
Step 2	**show energywise**	(Optional) Verify that EnergyWise is disabled.

	Command	Purpose
Step 3	**configure terminal**	Enter global configuration mode.
Step 4	**energywise domain** *domain-name* **secret** [**0** | **7**] *password* [**protocol udp port** *udp-port-number* [**interface** *interface-id* | **ip** *ip-address*]]	Enable EnergyWise on the entity, assign the entity to a domain with the specified *domain-name*, and set the *password* for secure communication among the entities in the domain. • (Optional) **0**—Use an unencrypted password. This is the default. • (Optional) **7**—Use a hidden password. If you do not enter **0** or **7**, the entity uses the default value of 0. • (Optional) **port** *udp-port-number*—Specify the UDP port that sends and receives queries. The range is from 1 to 65000. The default is 43440. • (Optional) **interface** *interface-id*—Specify the port from which the EnergyWise messages are sent. • (Optional) **ip** *ip-address*—Specify the IP address from which the EnergyWise messages are sent. For the *domain-name* and *password* • You can enter alphanumeric characters and symbols such as #, (, %, !, and &. • Do not use an asterisk (*) or a blank space between the characters and symbols. By default, no domain and password are assigned.
Step 5	**end**	Return to privileged EXEC mode.
Step 6	**show energywise** **show energywise domain**	Verify your entries.
Step 7	**copy running-config startup-config**	(Optional) Save your entries in the configuration file.

Configuring Entity Attributes

	Command	Purpose
Step 1		Go to privileged EXEC mode.
Step 2	**show energywise**	(Optional) Verify that EnergyWise is enabled.
Step 3	**configure terminal**	Enter global configuration mode.
Step 4	**energywise importance** *importance*	(Optional) Set the importance of the entity. The range is from 1 to 100. The default is 1.

	Command	Purpose
Step 5	**energywise keywords** *word,word,...*	(Optional) Assign at least one keyword for the entity. 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 use an asterisk (*) or a blank space between the characters and symbols. By default, no keywords are defined.
Step 6	**energywise management** *tcp-port-number*	(Optional) Specify the TCP port that sends and receives queries. The range is from 1025 to 65535. The default is 43440.
Step 7	**energywise name** *name*	(Optional) Specify the EnergyWise-specific entity name. • You can enter alphanumeric characters and symbols such as #, (, %, !, and &. • Do not use an asterisk (*) or a blank space between the characters and symbols. The default is the hostname.
Step 8	**energywise neighbor** [*hostname*| *ip-address*] *udp-port-number*	(Optional) Assign a static neighbor. • (Optional) 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, no static neighbors are assigned.
Step 9	**energywise role** *role*	(Optional) Specify the role of the entity in the EnergyWise domain. For example, lobby.b20. • You can enter alphanumeric characters and symbols such as #, (, %, !, and &. • Do not use an asterisk (*) or a blank space between the characters and symbols. The default is the model number.
Step 10	**end**	Return to privileged EXEC mode.
Step 11	**show energywise** **show energywise domain**	Verify your entries.
Step 12	**copy running-config startup-config**	(Optional) Save your entries in the configuration file.

Powering the PoE Port

	Command	Purpose
Step 1		Go to privileged EXEC mode.
Step 2	**configure terminal**	Enter global configuration mode.
Step 3	**interface** *interface-id*	Specify the port or the range of ports to be configured, and enter interface configuration mode.
Step 4	**energywise level 0** or **energywise level 10**	(Optional) Manually power off the port, or Manually power on the port.
Step 5	**end**	Return to privileged EXEC mode.
Step 6	**show energywise domain** **show energywise children**	Verify your entries.
Step 7	**copy running-config startup-config**	(Optional) Save your entries in the configuration file. **Note** The power level that you set in Step 4 is the default power level when the switch restarts.

Configuring PoE-Port Attributes

	Command	Purpose
Step 1		Go to privileged EXEC mode.
Step 2	**configure terminal**	Enter global configuration mode.
Step 3	**interface** *interface-id*	Specify the port or the range of ports to be configured, and enter interface configuration mode.
Step 4	**energywise importance** *importance*	(Optional) Set the importance of the port. The range is from 1 to 100. The default is 1.
Step 5	**energywise keywords** *word,word,...*	(Optional) Assign at least one keyword for the port. 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 use an asterisk (*) or a blank space between the characters and symbols. By default, no keywords are defined.

	Command	Purpose
Step 6	**energywise name** *name*	(Optional) Specify the EnergyWise-specific port name. • You can enter alphanumeric characters and symbols such as #, (, %, !, and &. • Do not use an asterisk (*) or a blank space between the characters and symbols. The default is a short version of the port name; for example, Gi1.0.2 for Gigabit Ethernet 1/0/2.
Step 7	**energywise role** *role*	(Optional) Specify the role of the port in the domain. For example, lobbyport. • You can enter alphanumeric characters and symbols such as #, (, %, !, and &. • Do not use an asterisk (*) or a blank space between the characters and symbols. By default, the role is *interface*.
Step 8	**end**	Return to privileged EXEC mode.
Step 9	**show energywise domain** **show energywise children**	Verify your entries.
Step 10	**copy running-config startup-config**	(Optional) Save your entries in the configuration file.

Automatically Managing Power (Recurring Event)

	Command	Purpose
Step 1		Go to privileged EXEC mode.
Step 2	**show energywise**	(Optional) Verify that EnergyWise is enabled.
Step 3	**configure terminal**	Enter global configuration mode.

	Command	Purpose
Step 4	**energywise domain** *domain-name* **secret** [**0** | **7**] *password* [**protocol udp port** *udp-port-number* [**interface** *interface-id* | **ip** *ip-address*]]	Enable EnergyWise on the entity, assign the entity to a domain with the specified *domain-name*, and set the *password* for secure communication among the entities in the domain. • (Optional) **0**—Use an unencrypted password. This is the default. • (Optional) **7**—Use a hidden password. If you do not enter **0** or **7**, the entity uses the default value of 0. • (Optional) **port** *udp-port-number*—Specify the UDP port that sends and receives queries. The range is from 1 to 65000. The default is 43440. • (Optional) **interface** *interface-id*—Specify the port that sends EnergyWise messages. • (Optional) **ip** *ip-address*—Specify the IP address of the port that sends EnergyWise messages. For the *domain-name* and *password*, • You can enter alphanumeric characters and symbols such as #, (, %, !, and &. • Do not use an asterisk (*) or a blank space between the characters and symbols. By default, no domain and password are assigned.
Step 5	**interface** *interface-id*	Specify the port or a range of ports to be configured, and enter interface configuration mode.
Step 6	**energywise level 10 recurrence importance** *importance* **at** *minute hour day_of_month month day_of_week*	(Optional) Schedule the power-on recurring event. • **importance** *importance*—The recurring event occurs if the importance value of the entity connected to a switch is less than or equal to the specified importance value. The range is from 1 to 100. • *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. **Note** The specified time is the local time based on the PoE-entity time zone.

	Command	Purpose
Step 7	**energywise level 0 recurrence importance** *importance* **at** *minute hour day_of_month month day_of_week*	(Optional) Schedule the power-off recurring event. • **importance** *importance*—The recurring event occurs if the importance value of the entity connected to a switch is less than or equal to the specified importance value. The range is from 1 to 100. • *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. **Note** The specified time is the local time based on the PoE-entity time zone.
Step 8	**end**	Return to privileged EXEC mode.
Step 9	**show energywise recurrence**	Verify your entries.
Step 10	**copy running-config startup-config**	(Optional) Save your entries in the configuration file.

Examples

Setting Up the Domain

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# energywise domain cisco secret cisco protocol udp port 43440 ip 2.2.4.30
Switch(config)# energywise importance 50
Switch(config)# energywise keywords lab1,devlab
Switch(config)# energywise name LabSwitch
Switch(config)# energywise neighbor TG3560G-21 43440
Switch(config)# energywise role role.labaccess
Switch(config)# end
Switch# show energywise domain
Name      : TG3560G-41
Domain    : cisco
Protocol  : udp
IP        : 2.2.2.21

Port      : 43440
```

```
Switch# 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    TG3560G-21                   2.2.2.21:43440         udp    S I
2    TG3560G-31                   2.2.4.31:43440         static S I
3    TG3560G-22                   2.2.2.22:43440         cdp    S I
```

Manually Managing Power

To power on the lab IP phones now:

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# energywise domain cisco secret cisco protocol udp port 43440 ip 2.2.4.44
Switch(config)# interface gigabitethernet1/0/3
Switch(config-if)# energywise importance 65
Switch(config-if)# energywise name labphone.5
Switch(config-if)# energywise role role.labphone
Switch(config-if)# end
```

Automatically Managing Power

The lab IP phones automatically power on at 8:00 a.m. (0800) local time and power off at 8:00 p.m.(2000) local time.

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

Switch# show energywise recurrences
Id     Addr       Class Action Lvl Cron
--     ----       ----- ------ --- ----
1      Gi1/0/3    QUERY SET    10  minutes: 0 hour: 8 day: * month: * weekday: *
2      Gi1/0/3    QUERY SET     0  minutes: 0 hour: 20 day: * month: * weekday: *

Switch# show running-config
<output truncated>
interface GigabitEthernet1/0/3
energywise level 10 recurrence at 0 8 * * *
 energywise level 0 recurrence at 0 20 * * *
 energywise importance 50
 energywise role role.lobbyaccess
 energywise name lobbyInterface.3
end
<output truncated>
```

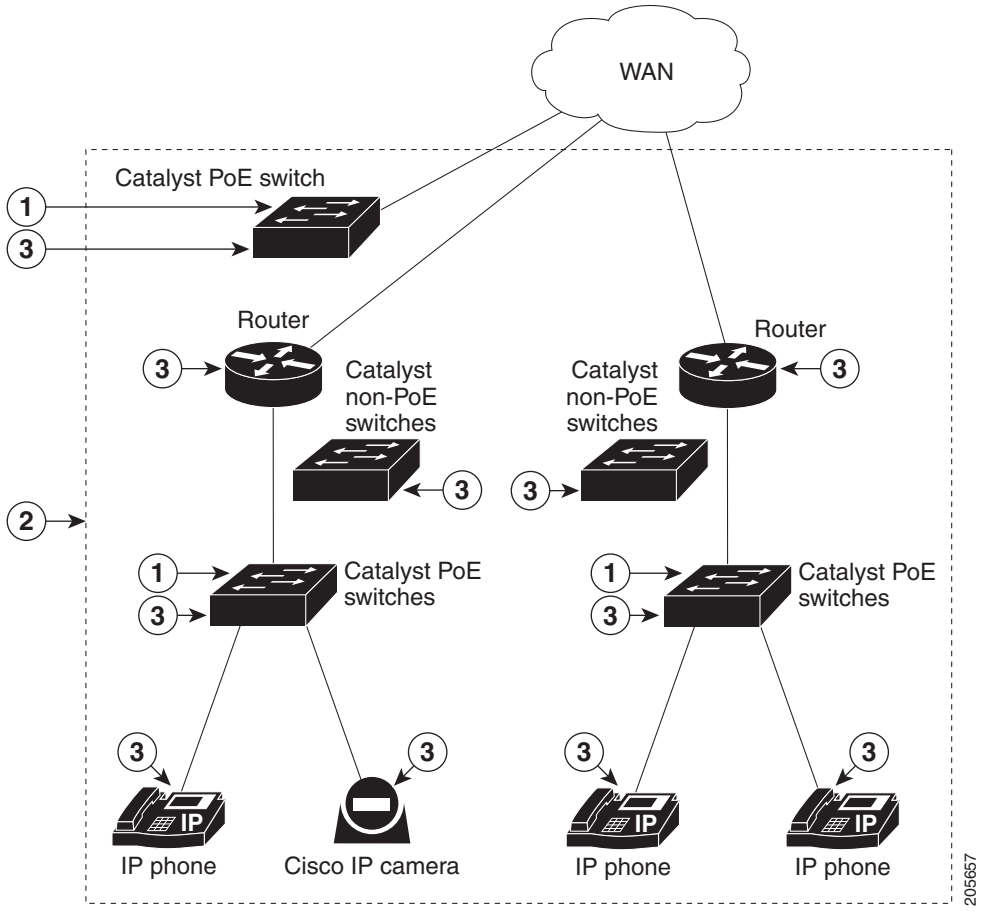
CHAPTER 2

Managing Multiple Entities

Note The examples in this document are for a Catalyst 3750-E or 3750 switch (for example, gigabitethernet 1/0/5). To specify an interface on your network device, see your device software documentation.

Multiple PoE Switch Scenario

Figure 2-1 Multiple PoE Switches Example



1	Entity managing power usage	**3**	Entities
2	Domain		

EnergyWise Query

- Collect power usage information.
- Summarize power information from entities.
- Set parameters. Only the setting in the running configuration changes.

Use these attributes to filter results:

- Importance.
- Entity name.
- One or more keywords for a port or for a group of ports.

Use EnergyWise importance values to select entities in a query. For example, an office phone is less important than an emergency phone that should never be in sleep mode.

Query results show entities, such as PoE ports, with importance values less than or equal to the specified value in the query.

The entity sending a query to all domain entities receives the results.

Using Queries to Manage Power in the Domain

	Command	Purpose
Step 1		Go to privileged EXEC mode.
Step 2	**energywise query importance** *importance* {**keywords** *word,word,...* | **name** *name*} **collect** {**delta** | **usage**} or **energywise query importance** *importance* {**keywords** *word,word,...* | **name** *name*} **sum** {**delta** | **usage**}	(Optional) Run a query to display power information for the domain entities and PoE ports. • **importance** *importance*—Filter the results based on the importance value. Only entities with values less than or equal to the specified value appear. The *importance* range is from 1 to 100. • (Optional) **keywords** *word,word,...*—Filter the results based on one or more of the specified keywords. • (Optional) **name** *name* —Filter 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**}—Display the delta or usage values for the entities and PoE ports. – **delta**—Display 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**—Display the actual power usage. • **sum** {**delta** | **usage**}—Display the sum of the delta or usage values for the entities and PoE ports. – **delta**—Display the delta vector. – **usage**—Display the actual power usage. **Note** In the results with the **sum** keyword, the *Responded* total is not accurate. The Queried total is accurate and is the total number of entities that respond to the query. Repeat this step to run another query.

	Command	Purpose
Step 3	**energywise query importance** *importance* {**keywords** *word,word,...* | **name** *name*} **set level** *level*	(Optional) Run a query to power on or power off the domain entities or PoE ports. **Caution** Use this query with care because it affects the entity on which you enter the command *and* other domain entities that match the query criteria. • **importance** *importance*—Filter the results based on the importance value. Only entities with values less than or equal to the specified value appear. The *importance* range is from 1 to 100. • (Optional) **keywords** *word,word,...*—Filter the results based on one or more of the specified keywords. • (Optional) **name** *name* —Filter 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*—Set the power level of the entities or PoE ports. The range is from 0 to 10. Repeat this step to run another query.

Examples

In these examples, Switch 1 and Switch 2 are in the same domain. The entity called *shipping.1* is a PoE port on Switch 1, and the entity called *shipping.2* is a PoE port on Switch 2.

Querying with the Name Attribute

To show the power usage of the domain entities with names beginning with *shipping* and with importance values less than or equal to 80, run this query on Switch 1:

```
Switch# energywise query importance 80 name shipping.* collect usage
EnergyWise query, timeout is 3 seconds:

Host            Name            Usage
----            ----            -----
192.168.20.1    shipping.1      6.3 (W)
192.168.20.2    shipping.2      8.5 (W)

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.

Querying with Keywords

To show the power usage of IP phones with different names, different roles, and importance values less than or equal to 80, but all with the *Admin* keyword, run this query on Switch 1:

```
Switch# energywise query importance 80 keyword Admin collect usage
EnergyWise query, timeout is 3 seconds:

Host            Name            Usage
----            ----            -----
192.168.40.2    shipping.1      6.3 (W)
192.168.50.2    orders.1       10.3 (W)

Queried:  2    Responded:  2      Time:  0.5 seconds
```

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

Querying to Set Power Levels

Run these queries on Switch 1 to

- Set the power level of the *shipping.2* entity to 0:

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

- Manually set the power level of the *shipping.1* entity and the *shipping.2* entity to 0:

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

- Set the power level of entities with the keyword *Admin* to 10:

  ```
  Switch# energywise query importance 60 keyword Admin set level 10
  EnergyWise query, timeout is 3 seconds:
  !!!!
  Success rate is (2/2) setting entities

  Queried:  2    Responded:  2      Time:  0.15 seconds
  ```

  Verify the power levels:

  ```
  Switch# energywise query importance 85 keyword Admin collect usage
  EnergyWise query, timeout is 3 seconds:

  Host            Name            Usage
  ----            ----            -----
  192.168.40.2    shipping.1      0.0 (W)
  192.168.50.2    orders.1        0.0 (W)

  Queried:  2    Responded:  2      Time:  0.9 seconds
  ```

  You can also use the **show energywise usage** privileged EXEC command on Switch 1 and Switch 2 to verify the power levels.

CHAPTER 3

EnergyWise CLI Commands

Note The examples in this document are for a Catalyst 3750-E or 3750 switch (for example, gigabitethernet 1/0/5). To specify an interface on your network device, see your device software documentation.

clear energywise neighbors

Use the **clear energywise neighbors** privileged EXEC command to delete the EnergyWise neighbor tables.

clear energywise neighbors

Syntax Description This command has no arguments or keywords.

Defaults No default is defined.

Command Modes Privileged EXEC

Command History

Release	Modification
12.2(50)SE	This command was introduced on the • Catalyst 3750-E, 3750, 3560-E, 3560, and 2960 switches • Cisco Catalyst Blade Switch 3040 for FSC • Cisco Catalyst Blade Switch 3130 and 3032 for Dell • Cisco Catalyst Blade Switch 3030 for Dell • Cisco Catalyst Blade Switch 3120 for HP • Cisco Catalyst Blade Switch 3020 for HP • Cisco Catalyst Switch Module 3110 and 3012 for IBM BladeCenter
12.2(52)SE	This command was introduced on the Catalyst 2975 switch.

Examples

This example shows how to delete the neighbor tables:

```
Switch# clear energywise neighbors
Cleared all non static energywise neighbors
```

You can verify that the tables were deleted by entering the **show energywise neighbors** privileged EXEC command.

Related Commands

Command	Description
show energywise neighbors	Displays the EnergyWise neighbor tables.

energywise (global configuration)

Use the **energywise** global configuration command to enable and configure EnergyWise on an entity. Use the **no** form of this command to disable EnergyWise and to remove the EnergyWise configuration.

energywise {**importance** *importance* | **keywords** *word,word,...* | **level** *level* | **management** *tcp-port-number* | **name** *name* | **neighbor** [*hostname*| *ip-address*] *udp-port-number* | **role** *role*}

no energywise {**importance | keywords | management | name | neighbor | role**}

Syntax Description

importance *importance*	Set the importance of the entity. The range is from 1 to 100.
keywords *word,word,...*	Assign at least one keyword for the entity. 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 #, (, %, !, or &. • Do not use an asterisk (*) or a blank space between the characters and symbols.
level *level*	Set the power level of the entity. The range is from 1 to 10.
management *tcp-port-number*	Specify the TCP port that sends and receives queries. The range is from 1025 to 65535.
name *name*	Specify the EnergyWise-specific entity name. • You can enter alphanumeric characters and symbols such as #, (, %, !, or &. • Do not use an asterisk (*) or a blank space between the characters and symbols.
neighbor [*hostname*| *ip-address*] *udp-port-number*	Assign a static neighbor: • (Optional) Hostname (*hostname*) or IP address (*ip-address*). • UDP port (*udp-port-number*) that sends and receives queries. The range is from 1 to 65000.
role *role*	Specify the role of the entity in the EnergyWise domain. For example, lobby.b20. • You can enter alphanumeric characters and symbols such as #, (, %, !, or &. • Do not use an asterisk (*) or a blank space between the characters and symbols.

Defaults

EnergyWise is disabled.

The importance is 1.

No keywords are defined.

The power level is 10.

The *tcp-port-number* is 43440.

The name is the hostname.

No neighbors are assigned.

The role is the model number.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(50)SE	This command was introduced on the • Catalyst 3750-E, 3750, 3560-E, 3560, and 2960 switches • Cisco Catalyst Blade Switch 3040 for FSC • Cisco Catalyst Blade Switch 3130 and 3032 for Dell • Cisco Catalyst Blade Switch 3030 for Dell • Cisco Catalyst Blade Switch 3120 for HP • Cisco Catalyst Blade Switch 3020 for HP • Cisco Catalyst Switch Module 3110 and 3012 for IBM BladeCenter
12.2(52)SE	The **management** *udp-port-number* syntax and *udp-port-number* range were incorrect. The correct syntax is **management** *tcp-port-number*, and the correct range is from 1025 to 65535.
12.2(52)SE	This command was introduced on the Catalyst 2975 switch.

Usage Guidelines

When you add an entity to a domain, EnergyWise is enabled on the entity and its PoE ports.

If you enter the **no energywise level** command, the switch does not immediately change the power level to the default. The power level changes when the switch restarts or you enter the **energywise level** *level* command.

Examples

This example shows how to enable EnergyWise, assign the entity to a domain, and set the password.

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# energywise domain cisco secret cisco protocol udp port 43440 ip 2.2.4.30
Switch(config)# energywise importance 50
Switch(config)# energywise keywords lab1,devlab
Switch(config)# energywise management 60500
Switch(config)# energywise name Entity01
Switch(config)# energywise neighbor TG3560G-21 43440
Switch(config)# energywise role role.labaccess
Switch(config)# end
```

Related Commands

Command	Description
show energywise	Displays the EnergyWise settings and status.
show energywise domain	Displays the domain to which the entity belongs.
show energywise recurrence	Displays the recurring event settings and status.

energywise (interface configuration)

Use the **energywise** interface configuration command to configure EnergyWise on the power over Ethernet (PoE) port. Use the **no** form of this command to disable EnergyWise and to remove the EnergyWise configuration.

energywise [**importance** *importance* | **keywords** *word,word,...* | **level** *level* [**recurrence importance** *importance* **at** *minute hour day_of_month month day_of_week*] | **name** *name* | **role** *role*]

no energywise [**importance** | **keywords** | **level** | **name** | **role**]

Syntax Description

importance *importance*	(Optional) Set the importance of the port. The range is from 1 to 100.
keywords *word,word,...*	Assign at least one keyword for the port. 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 #, (, %, !, or &. • Do not use an asterisk (*) or a blank space between the characters and symbols.
level *level*	(Optional) Set the power level of the port. The range is from 0 and 10. If the power level is 0, the port is powered off. If the power level is from 1 to 10, the port is powered. You can enter any value this range to power the PoE port.
recurrence importance *importance* **at** *minute hour day_of_month month day_of_week*	(Optional) Schedule the power-on or power-off recurring event. • **importance** *importance*—The recurring event occurs if the importance value of the entity connected to the switch is less than or equal to the specified importance value. The range is from 1 to 100. • *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. **Note** The specified times are local times based on the PoE-entity time zone.

name *name*	(Optional) Specify the EnergyWise-specific port name. • You can enter alphanumeric characters and symbols such as #, (, %, !, or &. • Do not use an asterisk (*) or a blank space between the characters and symbols.
role *role*	(Optional) Specify the role of the port in the domain. For example, lobbyport. • You can enter alphanumeric characters and symbols such as #, (, %, !, or &. • Do not use an asterisk (*) or a blank space between the characters and symbols.

Defaults

The importance is 1.

No keywords are defined.

The power level is 10.

The name is the short version of the port name; for example, Gi1.0.2 for Gigabit Ethernet 1/0/2.

The role is the model number.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(50)SE	This command was introduced on the • Catalyst 3750-E, 3750, 3560-E, 3560, and 2960 switches • Cisco Catalyst Blade Switch 3040 for FSC • Cisco Catalyst Blade Switch 3130 and 3032 for Dell • Cisco Catalyst Blade Switch 3030 for Dell • Cisco Catalyst Blade Switch 3120 for HP • Cisco Catalyst Blade Switch 3020 for HP • Cisco Catalyst Switch Module 3110 and 3012 for IBM BladeCenter
12.2(52)SE	This command was introduced on the Catalyst 2975 switch.

Usage Guidelines

If you enter the **no energywise level** command, the switch does not immediately change the power level to the default. The power level changes when the switch restarts or you enter the **energywise level** *level* command.

Examples

This example shows how to enable and configure EnergyWise on the PoE port.

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

Related Commands

Command	Description
show energywise	Displays the EnergyWise settings and status.
show energywise domain	Displays the domain to which the entity belongs.
show energywise recurrence	Displays the recurring event settings and status.

energywise domain

Use the **energywise domain** global configuration command to enable EnergyWise on the entity, assign the entity to a domain, and set the password for secure communication among the domain entities. Use the **no** form of this command to disable EnergyWise and to remove the EnergyWise configuration.

energywise domain *domain-name* **secret** [**0** | **7**] *password* [**protocol udp port** *udp-port-number* [**interface** *interface-id* | **ip** *ip-address*]]

no energywise domain

Syntax Description

domain *domain-name*	Assign the entity to a domain with the specified *domain-name*. • You can enter alphanumeric characters and symbols such as #, (, %, !, or &. • Do not use an asterisk (*) or a blank space between the characters and symbols.
secret [**0**	**7**] *password*	Set the *password* for secure communication among the entities in the domain. • (Optional) **0**—Use an unencrypted password. • (Optional) **7**—Use an hidden password. If you do not enter **0** or **7**, the entity uses the default value of 0. • You can enter alphanumeric characters and symbols such as #, (, %, !, or &. • Do not use an asterisk (*) or a blank space between the characters and symbols.
port *udp-port-number*	(Optional) Specify the UDP port that sends and receives queries. The range is from 1 to 65000.
interface *interface-id*	(Optional) Specify the port from which the EnergyWise messages are sent.
ip *ip-address*	(Optional) Specify the IP address from which the EnergyWise messages are sent.

Defaults

EnergyWise is disabled, and the entity is not assigned to a domain.

The password is not set.

The *udp-port-number* is 43440.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(50)SE	This command was introduced on the • Catalyst 3750-E, 3750, 3560-E, 3560, and 2960 switches • Cisco Catalyst Blade Switch 3040 for FSC • Cisco Catalyst Blade Switch 3130 and 3032 for Dell • Cisco Catalyst Blade Switch 3030 for Dell • Cisco Catalyst Blade Switch 3120 for HP • Cisco Catalyst Blade Switch 3020 for HP • Cisco Catalyst Switch Module 3110 and 3012 for IBM BladeCenter
12.2(52)SE	This command was introduced on the Catalyst 2975 switch.

Usage Guidelines

If you enter the **energywise domain** *domain-name* **secret** [**0** | **7**] *password* command, the entity selects the first available port to communicate with the network and with management applications.

Examples

This example shows how to enable EnergyWise, set the *domain-name* and *password*, and specify the IP address:

```
Switch(config)# energywise domain cisco secret cisco protocol udp port 43440 ip 2.2.4.30
```

Related Commands

Command	Description
show energywise	Displays the EnergyWise settings and status.
show energywise domain	Displays the domain to which the entity belongs.

energywise query

Use the **energywise query** privileged EXEC command to display power information or to power the entities or PoE ports in the domain.

energywise query importance *importance* {**keywords** *word,word,...* | **name** *name*} **collect** {**delta** | **usage**}

energywise query importance *importance* {**keywords** *word,word,...* | **name** *name*} **set level** *level*

energywise query importance *importance* {**keywords** *word,word,...* | **name** *name*} **sum** {**delta** | **usage**}

Syntax Description

importance *importance*	Filter the results based on the importance value. Only entities with values less than or equal to the specified value appear. The *importance* range is from 1 to 100.
keywords *word,word,...*	Filter the results based on one or more of the specified keywords. When specifying multiple keywords, separate the keywords with commas, and do not use spaces between keywords. • You can enter alphanumeric characters and symbols such as #, (, %, !, or &. • Do not use an asterisk (*) or a blank space between the characters and symbols.
name *name*	Filter the results based on the name. For the wildcard, use * or *name** with the asterisk at the end of the name phrase. • You can enter alphanumeric characters and symbols such as #, (, %, !, or &. • Do not use an asterisk (*) or a blank space between the characters and symbols.
collect {**delta** | **usage**}	Display the delta or usage values for the entities or the PoE ports. • **delta**—Display 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**—Display the actual power usage.
set level *level*	Set the power level of the entities or the PoE ports. The range is from 0 to 10. An entity supports level 1 to level 10. A PoE port supports level 0 to level 10.
sum {**delta** | **usage**}	Display the sum of the delta or usage values for the entities or the PoE ports. • **delta**—Display the delta vector. • **usage**—Display the actual power usage.

Defaults

The importance value is 1.

The power level is 10.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(50)SE	This command was introduced on the • Catalyst 3750-E, 3750, 3560-E, 3560, and 2960 switches • Cisco Catalyst Blade Switch 3040 for FSC • Cisco Catalyst Blade Switch 3130 and 3032 for Dell • Cisco Catalyst Blade Switch 3030 for Dell • Cisco Catalyst Blade Switch 3120 for HP • Cisco Catalyst Blade Switch 3020 for HP • Cisco Catalyst Switch Module 3110 and 3012 for IBM BladeCenter
12.2(52)SE	This command was introduced on the Catalyst 2975 switch.

Usage Guidelines

In the results from the **sum** keyword, the *Responded* total is not accurate. The Queried total is accurate and is the total number of entities that respond to the query.

To power on or power off ports, enter the **energywise query** {**keywords** *word,word,...* | **name** *name*} **set level** *level* command.

Caution Use this query with care because it affects the entity on which you enter the command *and* other domain devices that match the query criteria.

Examples

These examples show how to filter with the entity name.

```
Switch# energywise query name phone* collect usage
EnergyWise query, timeout is 3 seconds:

Host            Name            Usage
----            ----            -----
2.2.2.21        phone           0.0 (W)
2.2.2.21        phone           15.4 (W)
2.2.2.21        phoneA          0.0 (W)
2.2.2.22        phone           0.0 (W)
2.2.2.21        phoneB          0.0 (W)
2.2.2.22        phoneC          15.4 (W)
2.2.2.21        phone           0.0 (W)
2.2.2.23        phoneD          15.4 (W)
2.2.2.21        phone           0.0 (W)

Queried:  9    Responded:  9      Time:  0.26 seconds
```

```
Switch# energywise query name * sum usage
EnergyWise query, timeout is 3 seconds:

Total Usage
-----------
346.3 (W)

Queried:  147    Responded:  147      Time:  0.121 seconds

Switch# energywise query name lobby* collect usage

EnergyWise query, timeout is 3 seconds:

Host            Name              Usage
----            ----              -----
2.2.4.30        lobbyInterface.17 10.0 (W)

Queried:  1    Responded:  1      Time:  0.7 seconds

Switch# energywise query name Fa1.0.4* sum usage

EnergyWise query, timeout is 3 seconds:

Total Usage
-----------
129.0 (W)

Queried:  10    Responded:  10      Time:  0.6 seconds
```

This example shows the sum of the delta values and the potential power change in the domain.

```
Switch# energywise query name * sum delta
EnergyWise query, timeout is 3 seconds:

Level   Label       Delta Power (W)
-----   -----       -----------
0       Shut        -12.9
1       Hibernate   +723.8
2       Sleep       +723.8
3       Standby     +723.8
4       Ready       +723.8
5       Low         +723.8
6       Frugal      +723.8
7       Medium      +723.8
8       Reduced     +723.8
9       High        +723.8
10      Full        +723.8

Queried:  48    Responded:  48      Time:  0.15 seconds
```

This example shows the power usage in the domain.

```
Switch# show energywise children
Interface   Role              Name                  Usage      Lvl   Imp  Type
---------   ----              ----                  -----      ---   ---  ----
            control           SwitchA               86.0  (W)  10    100  parent
Gi1/0/1     interface         Gi1.0.1               0.0   (W)  10    20   child
.
.
.
Gi1/0/6     interface         Gi1.0.6               0.0   (W)  10    20   child
Gi1/0/7     role.lobbyaccess  lobbyInterface.7      0.0   (W)  10    50   child
Gi1/0/8     interface         Gi1.0.8               0.0   (W)  10    20   child
<output truncated>
```

```
Switch# energywise query name * set level 0
EnergyWise query, timeout is 3 seconds:
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!
Success rate is (48/48) setting entities

Queried:  48   Responded:  48     Time:  0.996 seconds

Switch# energywise query name * set level 10
EnergyWise query, timeout is 3 seconds:
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!
Success rate is (48/48) setting entities

Queried:  48   Responded:  48     Time:  0.996 seconds
```

This example shows how to filter results with keywords.

```
Switch(config)# interface gigabitethernet1/0/2
Switch(config-if)# energywise keywords lobby,sattelite
Switch(config-if)# energywise keywords public
Switch(config-if)# end
Switch# show running-config interface gigabitethernet1/0/2
!
interface GigabitEthernet1/0/2
 energywise level 0 recurrence importance 90 at 0 8 * * *
 energywise level 10 recurrence importance 90 at 0 20 * * *
 energywise importance 50
 energywise role role.lobbyaccess
 energywise keywords lobby,sattelite,public
 energywise name lobbyInterface.2
end

Switch# energywise query keyword lobby collect usage
EnergyWise query, timeout is 3 seconds:

Host            Name              Usage
----            ----              -----
2.2.4.30        lobbyInterface.17 15.4 (W)

Queried:  1    Responded:  1      Time:  0.0 seconds


Switch# energywise query keyword satellite sum usage
EnergyWise query, timeout is 3 seconds:

Total Usage
-----------
15.4 (W)

Queried:  1    Responded:  1      Time:  0.11 seconds
```

show energywise

Use the **show energywise** privileged EXEC command to display the EnergyWise settings, the status of the entity, and the status of the power over Ethernet (PoE) ports.

show energywise neighbors [**categories** | **children** | **domain** | **events** | **level** [**children** | **current** [**children**] | **delta** | **delta children**] | **neighbors** | **recurrences** | **statistics** | **usage** [**children**] | **version**] [| {**begin** | **exclude** | **include**} *expression*]

Syntax Description

categories	(Optional) Display the power levels.
children	(Optional) Display the status of the entity and the PoE ports.
domain	(Optional) Display the domain to which the entity belongs.
events	(Optional) Displays the last ten events (messages) sent to other entities in the domain.
level [**children** | **current** [**children**] | **delta** | **delta children**]	(Optional) Display the power levels. • **children**—Actual power levels for the entity and the PoE ports. • **current**—Actual power levels for the entity. (Optional) **children**—Actual power levels for the entity and the PoE ports. • **delta**—Delta vector for the entity. For more information, see the **energywise query** command. (Optional) **children**—Delta vector for the entity and the PoE ports.
neighbors	(Optional) Display the neighbor table for the domain to which the entity belongs.
recurrence	(Optional) Display the EnergyWise settings and status for recurring events.
statistics	(Optional) Display the counters for events and errors.
usage [**children**]	(Optional) Display the actual power usage for the entity. • **children—**Display the actual power usage for the PoE ports.
version	(Optional) Display the EnergyWise version.
| begin	(Optional) Display begins with the line that matches the *expression*.
| exclude	(Optional) Display excludes lines that match the *expression*.
| include	(Optional) Display includes lines that match the specified *expression*.
expression	Expression in the output to use as a reference point.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(50)SE	This command was introduced on the • Catalyst 3750-E, 3750, 3560-E, 3560, and 2960 switches • Cisco Catalyst Blade Switch 3040 for FSC • Cisco Catalyst Blade Switch 3130 and 3032 for Dell • Cisco Catalyst Blade Switch 3030 for Dell • Cisco Catalyst Blade Switch 3120 for HP • Cisco Catalyst Blade Switch 3020 for HP • Cisco Catalyst Switch Module 3110 and 3012 for IBM BladeCenter
12.2(52)SE	This command was introduced on the Catalyst 2975 switch.

Usage Guidelines

Expressions are case sensitive. For example, if you enter | **exclude output**, the lines that contain *output* do not appear, but the lines that contain *Output* appear.

Examples

```
Switch# show energywise
Interface   Role              Name                Usage      Lvl   Imp  Type
---------   ----              ----                -----      ---   ---  ----
            Switch            lobby.1             558.0 (W)  10    1    parent

Switch# show energywise children
Interface   Role              Name                Usage      Lvl   Imp  Type
---------   ----              ----                -----      ---   ---  ----
            Switch            lobby.1             558.0 (W)  10    1    parent
Gi1/0/1     interface         Gi1.0.1             0.0   (W)  1     1    child
Gi1/0/2     interface         Gi1.0.2             0.0   (W)  1     1    child
Gi1/0/3     interface         Gi1.0.3             0.0   (W)  1     1    child
Gi1/0/4     interface         Gi1.0.4             0.0   (W)  1     1    child
Gi1/0/5     interface         Gi1.0.5             0.0   (W)  1     1    child
Gi1/0/6     interface         Gi1.0.6             0.0   (W)  1     1    child
<output truncated>

Switch# show energywise domain
Name      : TG3560G-41
Domain    : cisco
Protocol  : udp
IP        : 2.2.2.21
Port      : 43440

Switch# show energywise events
------------------------------------------
Sequence:  246818   References:  0:1   Errors:
Class:     PN_CLASS_QUERY
Action:    PN_ACTION_CPQR_POWERNET_QUERY_SET
Reply To:  8.8.8.24:43440
------------------------------------------
Sequence:  246827   References:  0:1   Errors:
Class:     PN_CLASS_DISCOVERY
Action:    PN_ACTION_CPQR_POWERNET_DISCOVERY_DISCOVERY_UPDATE
Reply To:  8.8.8.24:43440
------------------------------------------
```

```
Switch# show energywise level
                                                    Levels (Watts)
Interface   Name              0     1     2     3     4     5     6     7     8     9     10
---------   ----              ------------------------------------------------------------
            lobby.1           0.0   558.0 558.0 558.0 558.0 558.0 558.0 558.0 558.0 558.0 558.0


Switch# show energywise level children
                                                    Levels (Watts)
Interface   Name              0     1     2     3     4     5     6     7     8     9     10
---------   ----              ------------------------------------------------------------
            lobby.1           0.0   558.0 558.0 558.0 558.0 558.0 558.0 558.0 558.0 558.0 558.0
Gi1/0/1     Gi1.0.1           0.0   15.4  15.4  15.4  15.4  15.4  15.4  15.4  15.4  15.4  15.4
Gi1/0/2     Gi1.0.2           0.0   15.4  15.4  15.4  15.4  15.4  15.4  15.4  15.4  15.4  15.4
Gi1/0/3     Gi1.0.3           0.0   15.4  15.4  15.4  15.4  15.4  15.4  15.4  15.4  15.4  15.4
Gi1/0/4     Gi1.0.4           0.0   15.4  15.4  15.4  15.4  15.4  15.4  15.4  15.4  15.4  15.4
Gi1/0/5     Gi1.0.5           0.0   15.4  15.4  15.4  15.4  15.4  15.4  15.4  15.4  15.4  15.4
<output truncated>
```

```
Switch# show energywise level current
Interface   Name                    Level  Value
---------   ----                    -----  -----
            lobby.1                 10     558.0 (W)

Switch# show energywise level current children
Interface   Name                    Level  Value
---------   ----                    -----  -----
            lobby.1                 10     558.0 (W)
Gi1/0/1     Gi1.0.1                 1      15.4  (W)
Gi1/0/2     Gi1.0.2                 1      15.4  (W)
Gi1/0/3     Gi1.0.3                 1      15.4  (W)
Gi1/0/4     Gi1.0.4                 1      15.4  (W)
Gi1/0/5     Gi1.0.5                 1      15.4  (W)
<output truncated>
```

```
Switch# show energywise level delta
                                                      Levels (Watts)
Interface   Name                   0      1      2      3      4      5      6      7      8      9      10
---------   ----                   ------------------------------------------------------------------------
           lobby.1                -558.0 0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0

Switch# show energywise level delta child
                                                      Levels (Watts)
Interface   Name                   0      1      2      3      4      5      6      7      8      9      10
---------   ----                   ------------------------------------------------------------------------
            lobby.1                -558.0 0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0    0.0
Gi1/0/1     Gi1.0.1                0.0    15.4   15.4   15.4   15.4   15.4   15.4   15.4   15.4   15.4   15.4
Gi1/0/2     Gi1.0.2                0.0    15.4   15.4   15.4   15.4   15.4   15.4   15.4   15.4   15.4   15.4
Gi1/0/3     Gi1.0.3                0.0    15.4   15.4   15.4   15.4   15.4   15.4   15.4   15.4   15.4   15.4
<output truncated>
```

```
Switch# 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    Switch.A                   2.2.2.29:43440        udp    S I
5    Switch.B                   2.2.2.22:43440        udp    S I
7    Switch.C                   2,2,2,33:43440        cdp    S I
```

```
Switch# show energywise recurrences
Id      Addr        Class Action Lvl Cron
--      ----        ----- ------ --- ----
2       Gi1/0/17    QUERY SET     3  minutes: 0 hour: 8 day: * month: * weekday: *
3       Gi1/0/18    QUERY SET     3  minutes: 0 hour: 8 day: * month: * weekday: *
4       Gi1/0/19    QUERY SET     3  minutes: 0 hour: 8 day: * month: * weekday: *

Switch# show energywise statistics
Children:  48  Errors:  2  Drops:  0  Events:  14

Switch# show energywise usage
Interface   Name                      Usage       Caliber
---------   ----                      _____       _______
            lobby.1                   558.0 (W)   max

Switch# show energywise usage child
Interface   Name                      Usage       Caliber
---------   ----                      _____       _______
            lobby.1                   558.0 (W)   max
Gi1/0/1       Gi1.0.1                 0.0   (W)   presumed
Gi1/0/2       Gi1.0.2                 0.0   (W)   presumed
Gi1/0/3       Gi1.0.3                 0.0   (W)   presumed
Gi1/0/4       Gi1.0.4                 0.0   (W)   presumed
<output truncated>

Switch# show energywise version
EnergyWise is Enabled
IOS Version:  12.2(50)SE
EnergyWise Specification:  1.0.1
```

Related Commands

Command	Description
energywise (global configuration)	Enables and configures EnergyWise on the entity.
energywise (interface configuration)	Configures EnergyWise on the PoE port.

CHAPTER 4

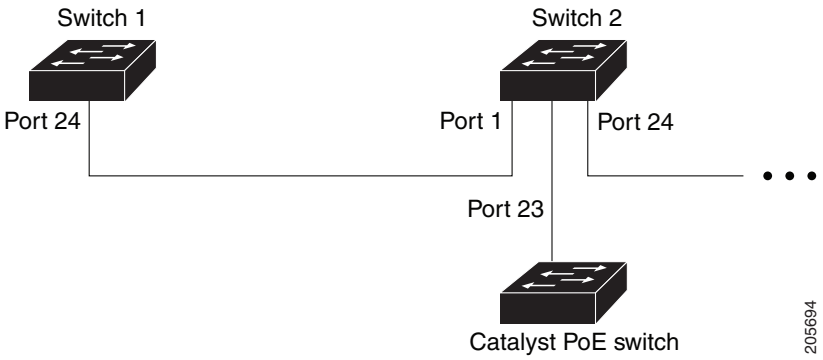
Configuration Examples

Note The examples in this document are for a Catalyst 3750-E or 3750 switch (for example, gigabitethernet 1/0/5). To specify an interface on your network device, see your device software documentation.

Managing Power in a LAN

Multiple switches connected in the same LAN and in the same EnergyWise domain.

Figure 4-1 EnergyWise with LANs



The domain configuration includes

- UDP default port (43440)
- Gigabit Ethernet port 1/0/23 on Switch 2 with a connected Catalyst PoE switch.

On Switch 1, configure the domain:

```
Switch(config)# energywise domain cisco secret 0 cisco protocol udp port 43440 interface
gigabitethernet1/0/23
```

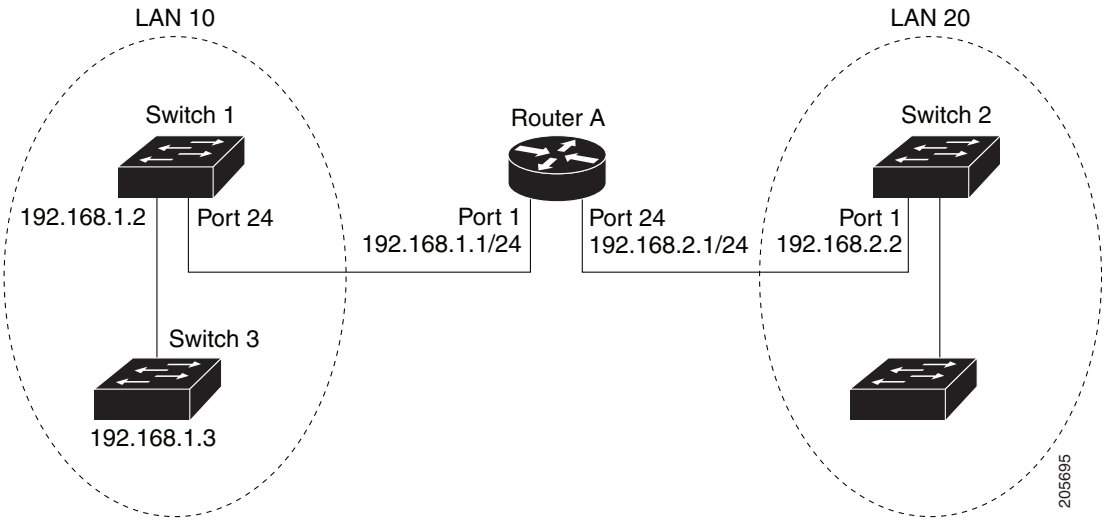
On Switch 1, verify that the EnergyWise protocols discovered the neighbors:

```
Switch# 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
--   -------------            -------                 ----   ----------
4    Switch-2                 192.168.20.2:43440      udp    S I
```

Managing Power with IP Routing

Switch 1 and Switch 2 are in a *disjointed domain*. Neighbors might not be discovered automatically.

Figure 4-2 EnergyWise with IP Routing



On Switch 1, to prevent a disjointed domain, manually assign Switch 2 as a static neighbor or the reverse.

```
Switch(config)# energywise neighbor 192.168.2.2 43440
```

Switch 1 discovers Switch 3 as a neighbor because they are in the same LAN.

On Switch 1, verify neighbor discovery.

```
Switch# 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
--   -------------          -------                 ----     ----------
6    Switch-2               192.168.2.2:43440       static   S I
9    Switch-3               192.168.1.3:43440       cdp      S I
```

Switch 1 uses both static and dynamic protocols to detect neighbors.

Verify that switches are in the same domain:

```
Switch# energywise query name * collect usage
EnergyWise query, timeout is 3 seconds:
Host            Name            Usage
----            ----            -----
192.168.1.2     Switch-1        96.0 (W)
192.168.40.2    shipping.1      6.3 (W)
192.168.40.2    guest.1         10.3 (W)
192.168.50.2    shipping.2      8.5 (W)
192.168.50.2    lobby.1         10.3 (W)

Queried:  72    Responded:  72      Time:  0.65 second
```

In a routed network, a switch port assigned to a VLAN can be connected to a router interface. The IP address of the VLAN SVI is 192.168.1.2, and the IP address of the router interface is 192.168.1.1.

Configure the domain:

```
Switch(config)# energywise domain cisco secret 0 cisco protocol udp port 43440 ip
192.168.1.2
```

Note To prevent a disjointed domain, you can also configure a helper address on Router A and specify that the router use UDP to forward broadcast packets with the

ip helper-address *address* interface configuration command.

ip forward-protocol udp [*port*] global configuration command.

CHAPTER 5

Troubleshooting EnergyWise

Note The examples in this document are for a Catalyst 3750-E or 3750 switch (for example, gigabitethernet 1/0/5). To specify an interface on your network device, see your device software documentation.

Using CLI Commands

Table 5-1 EnergyWise Commands

Command	Purpose
clear energywise neighbors privileged EXEC	Delete the EnergyWise neighbor tables on the entity. It immediately discovers the neighbors and recreates the table.
no energywise interface configuration	Disable EnergyWise on the PoE port.
no energywise domain global configuration	Disable EnergyWise on the entity.

Table 5-2 show Privileged EXEC Commands

Command	Purpose
show energywise	Display the settings and status for the entity.
show energywise children	Display the status of the entity and the PoE ports in the domain.
show energywise domain	Display the domain to which the entity belongs.
show energywise events	Display the last ten events (messages) sent to other entities in the domain.
show energywise neighbors	Display the neighbor tables for the domains to which the entity belongs.
show energywise recurrences	Display the EnergyWise settings and status for recurring events.

Table 5-2 show Privileged EXEC Commands (continued)

Command	Purpose
show energywise statistics	Display the counters for events and errors.
show energywise usage	Display the actual power usage on the entity.
show energywise version	Display the current EnergyWise version.
show version	Display the software version.
show power inline	Display the PoE status.
show cdp neighbors	Display the neighbors discovered by CDP.

For more information about the commands, see the command reference for this release.

Verifying the Power Usage

This example shows that the Cisco 7960 IP Phone uses 6.3 watts and that the Cisco 7970G IP Phone uses 10.3 watts.

```
Switch# show energywise usage children
Interface   Name            Usage      Caliber
---------   ----            -----      -------
            Switch          144.0 (W)  max
Gi1/0/1     Gi1.0.1           6.3 (W)  trusted
Gi1/0/2     Gi1.0.2          10.3 (W)  trusted
```

APPENDIX A

Supported Platforms

To display the EnergyWise version and the Cisco IOS software running on the domain member, use the **show energywise version** and **show version** privileged EXEC command-line interface (CLI) commands.

For EnergyWise Phase 1, the version is EnergyWise Specification 0.1.12.

Table A-1 Cisco Domain Memebers Supporting EnergyWise Specification 0.1.12

Network Device	Minimum Cisco IOS Release
Catalyst 3750-E switch	12.2(50)SE
Catalyst 3750 switch	12.2(50)SE
Catalyst 3560-E switch	12.2(50)SE
Catalyst 3560 switch	12.2(50)SE
Catalyst 2975 switch	12.2(52)SE
Catalyst 2960 switch running the LAN base image	12.2(50)SE
Cisco Catalyst Blade Switch 3040 for FSC	12.2(50)SE
Cisco Catalyst Blade Switch 3130 and 3032 for Dell	12.2(50)SE
Cisco Catalyst Blade Switch 3030 for Dell	12.2(50)SE
Cisco Catalyst Blade Switch 3120 for HP	12.2(50)SE
Cisco Catalyst Blade Switch 3020 for HP	12.2(50)SE
Cisco Catalyst Switch Module 3110 and 3012 for IBM BladeCenter	12.2(50)SE