Configuration and Troubleshooting Guide for Cisco EnergyWise Power Save Plus Feature on Cisco IP Phones

Guide

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This technical overview discusses the Cisco EnergyWise™ Power Save Plus mode on Cisco® IP Phones. It includes the following:

- Cisco EnergyWise Power Save Plus mode on Cisco IP Phones
- Cisco EnergyWise Power Save Plus benefits
- Architectural Overview
- Power Save Plus feature requirements
- Configuration
- User Experience and alerts
- Troubleshooting

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Overview

The Power Save Plus feature allows Cisco IP Phones to participate in a Cisco EnergyWise® technology-enabled system. Using this feature, the IP phones, when powered using Power over Ethernet (PoE), switch off and on at specified times that are configured by an administrator. The phones can report power usage to the Cisco EnergyWise domain to allow the tracking and control of power within the customer premises. The Power Save Plus mode would not be possible without the assistance of a Cisco EnergyWise compliant switch, which provides the ability to wake the phone back up by reapplying PoE.

The control of the phone power mode is intended to be through the Cisco Unified Communications Manager (Cisco UCM) administrator. Based on configuration, the Cisco EnergyWise domain can temporarily override the power state of the phone. If the Cisco EnergyWise Domain is allowed to modify the power state of the phone, the phone will transition to the alternate power level based on a message received by the Cisco EnergyWise domain. When Cisco EnergyWise control is disallowed, the phone is under the exclusive control of Cisco Unified Communications Manager administration. The IP phone will reject power-level requests coming from the Cisco EnergyWise Domain and follow only the time-of-day settings provided in the Cisco Unified Communications Manager-specified configuration file.

The IP phones in Power Save Plus mode will shut down and unregister from the Cisco Unified Communications Manager. The phones will wake up and register with the Cisco Unified Communications Manager when the Cisco EnergyWise Power Save Plus time window expires or when the select button (where applicable) is pressed on the phone. Cisco Unified Communications Manager Serviceability applications will receive Unregister and Out-of-Service events when the IP phones go into the Power Save Plus mode. Power Save Plus mode is different from the existing power-saving feature that turns off the backlight on the phones during off hours.

Cisco EnergyWise Benefits

The Cisco EnergyWise Power Save Plus feature allows the network to measure, monitor, and manage energy consumption on the IP phones. The Power Save Plus mode helps reduce power consumption and thereby lowers energy costs. Cisco IP Phones that operate in the Power Save Plus mode require 1 watt or less power during off hours. The Cisco EnergyWise Power Save Plus feature helps organizations automate and report power consumption across the network. Based on the configuration, administrators can control IP phone power consumption through either the Cisco Unified Communications Manager or a Cisco EnergyWise management server.

Requirements

Phone Firmware

Cisco Unified IP Phone Firmware 9.2(1) is required for the Cisco EnergyWise Power Save Plus feature.

Cisco Unified Communications Manager

For phones with Cisco EnergyWise support, the Cisco Unified Communications Manager Versions 7.1(5), 8.0, and 8.5 require device pack installation. The Cisco EnergyWise technology is included in Cisco Unified Communications Manager Version 8.6.

Phone Models

The following phone models support the Cisco EnergyWise Power Save Plus feature: Cisco Unified IP Phone 6901, 6911, 6921, 6941, 6945, 7900 Series, 8961, 9951, and 9971 models.

Cisco EnergyWise Compliant Cisco Switches

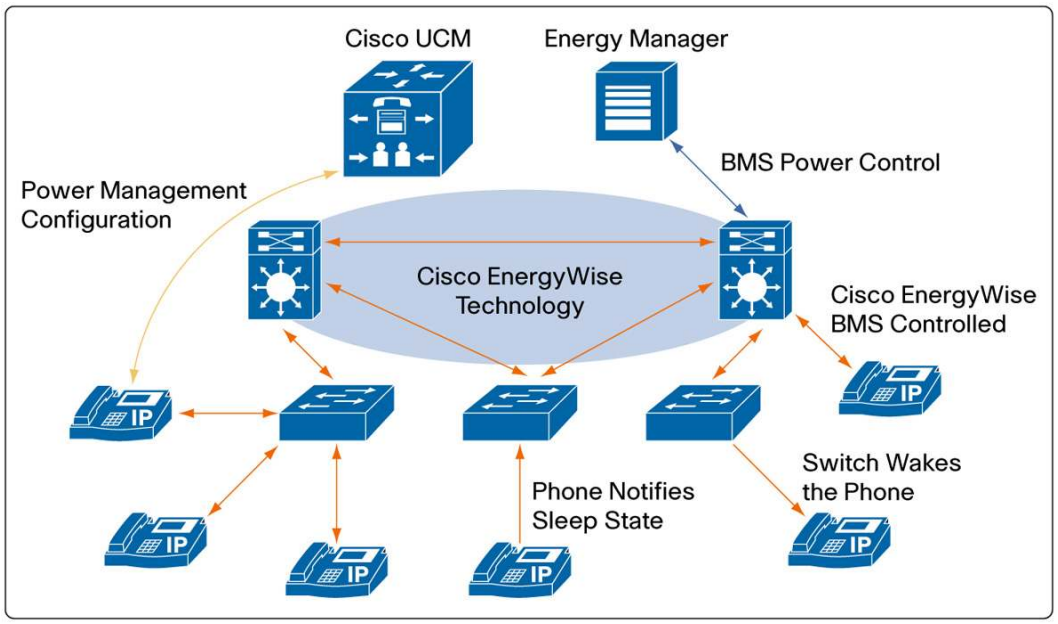
Cisco EnergyWise technology is supported on Cisco Catalyst® 3750-X, Catalyst 3750-E, Catalyst 3750V2, Catalyst 3750, Catalyst 3560-X, Catalyst 3560-E, Catalyst 3560, Catalyst 2960-S, and Catalyst 2960 Switches running Cisco IOS® Software Release 12.2(53)SE2 or later. This list is not exhaustive, and newer platforms and releases are added as they become available. For more information about Cisco EnergyWise platform support, please visit: http://www.cisco.com/en/US/docs/switches/lan/energywise/phase2_5/ios/release/notes/ol23554.html.

Architecture

The architectural flow for the Cisco EnergyWise Power Save Plus mode, as described in Figure 1, comprises the following components:

- Cisco EnergyWise compliant Cisco switch
- Cisco Unified Communications Manager
- Cisco IP Phones
- Cisco EnergyWise Energy Management System

Figure 1. Cisco EnergyWise IP Phones Architecture



Cisco EnergyWise Compliant Cisco Switches

The Cisco EnergyWise compliant switches participating in the Cisco EnergyWise domain are also called Cisco EnergyWise domain members. The participating IP phones are called endpoints. However, the switches, besides consuming power, also can send messages across the domain to other endpoints participating in the Cisco EnergyWise domain. Through these messages, the Cisco EnergyWise compliant switches are able to control the power-level settings that are sent to the participating endpoints, including Cisco IP Phones. In order to enable Cisco EnergyWise technology on a switch and configure it as a member of the Cisco EnergyWise domain, you must run two commands on the switch:

```
Switch(config)#energywise domain cisco security shared-secret 0 Secret
```

In this command, the Cisco EnergyWise domain and password are configured using the switch command-line interface (CLI).

```
Switch(config)#energywise endpoint security shared-secret 0 cisco
```

The endpoint security is set to a shared secret in this CLI command. It requires that a password be used to communicate with the connected domain members. In addition, the shared-secret level can be set between 0 (unencrypted) and 7 (hidden password), with default set to 0.

A single query to the Cisco switch can change the priority or retrieve the consumption of all IP phones in a Cisco EnergyWise domain. This intelligence by the network is possible because it is aware of the devices that are part of the domain and where they are located, allowing a query result to be sent back to the switch originating the query and up to a management station.

Cisco Unified Communications Manager

The Cisco EnergyWise Power Save Plus feature is configured on the Cisco Unified Communications Manager phone configuration page, which has the following fields related to the Power Save Plus feature:

- **Enable Power Save Plus:** The administrator selects the days of the week when the Power Save Plus mode needs to be enabled.
- **Phone On Time:** The administrator selects the time of the day during Power Save Plus mode when the phone turns on automatically.
- **Phone Off Time:** The administrator selects the time of the day during Power Save Plus mode when the phone turns off automatically.
- **Phone Off Idle Timer:** The administrator provides the number of minutes the phones must be idle before the device will request the power sourcing equipment (PSE) to power down the device.
- **Enable Audio Alert:** This checkbox is primarily for accessibility. If it is selected, the phone will play an audible alert 10 minutes prior to the time specified in Phone Off Time. The Audible Alert checkbox is disabled by default.
- **Cisco EnergyWise Domain:** The administrator specifies the Cisco EnergyWise domain in which the phone is participating. A Cisco EnergyWise domain is required for the Power Save Plus feature. The Cisco EnergyWise domain specified in the Cisco Unified Communications Manager should match the domain name configured on the switch.
- **Cisco EnergyWise Secret:** The administrator specifies the Cisco EnergyWise password (shared secret) used to communicate within the Cisco EnergyWise domain. The Cisco EnergyWise secret specified in the Cisco Unified Communications Manager should match the secret configured on the switch.
- **Allow Cisco EnergyWise Overrides:** The administrator needs to check this box in order to allow Cisco EnergyWise to send power-level updates to the phones. This ability is disabled (unchecked) by default.

Cisco IP Phones

When Cisco IP Phones power up using PoE and register to the Cisco Unified Communications Manager, they will download the Cisco EnergyWise Power Save Plus-specific configuration from the Cisco Unified Communications Manager. At that point, the Cisco EnergyWise domain and secret are verified with the Cisco EnergyWise switch. Upon successful verification, the phones will become part of the Cisco EnergyWise domain and participate in the Power Save Plus feature routine. The participating Cisco IP Phones provide the power sourcing equipment with the times when it needs to power off and on.

Energy Management System

In addition to controlling the IP phone power level from the Cisco Unified Communications Manager administration user interface, the Cisco EnergyWise Energy Management System provides an alternate method to monitor, measure, and regulate the power level on IP phones participating in the Cisco EnergyWise Power Save Plus feature. The IP phone power level can be overridden from the Cisco EnergyWise Energy Management provided the "Allow EnergyWise Override" checkbox has been enabled from the Cisco Unified Communications Manager IP phone administration page. The Cisco Prime™ LAN Management System (LMS) 4.1 with the Cisco EnergyWise WorkCenter, Verdiem Surveyor 6.0, and Joulex JEM 2.6 are examples of Cisco EnergyWise Management applications that can be used to override power levels on the IP phones.

User Experience

Based on the IP phone model, there are certain differences in the user experience just before and during the Power Save Plus mode. These differences can be classified in the two groups of IP phones:

- Cisco Unified IP Phone 6921, 6941, 6945, 6961, 8961, 9951, and 9971 models
- Cisco Unified IP Phone 6901, 6911, and 7900 Series models

User Experience: Cisco Unified IP Phone 6921, 6941, 6945, 6961, 8961, 9951, and 9971 Models

When the Cisco Unified IP Phone 6921, 6941, 6945, 6961, 8961, 9951, and 9971 models enter the Phone Save Plus mode, the PSE provides minimal power to illuminate the select key. The IP phones will unregister from the Cisco Unified Communications Manager and users will be unable to take any inbound calls. There will be no access to the line keys to make any outbound calls. In addition, the PC port and USB ports (if any) on the phone will not be available for use during the Power Save Plus mode.

You can manually override the Power Save Plus mode by pressing the illuminated Select key as highlighted in Figure 2. When you press the Select key, the phone sends instructions to the switch to send PoE to the phone. The phones will undergo a reboot and will re-register to the Cisco Unified Communications Manager shortly after. At that point, the IP phone is fully operational.

Figure 2. Illuminated Select Button on the Phone

User Experience: Cisco Unified IP Phone 6901, 6911, and 7900 Series Models

When the Cisco Unified IP Phone 6901 and 6911, and 7900 Series models enter the Power Save Plus mode, they are completely turned off, as is the switch port providing power to these phones. Because of hardware limitations, there is no illuminated key during the Power Save Plus mode. The PC port and USB ports (if any) on the IP phone are unavailable. Therefore, when the phones shut down, you will not be able to manually override the Power Save Plus mode from the phone. Phones unregister from the Cisco Unified Communications Manager and you will not be able to receive inbound calls. There will be no line access to make outbound calls. At this point, the only way to wake up the phone is to use the switch CLI to set the power level to 10 on the interface to which the phone is connected. In order to change the power level on the phones, the Cisco Unified Communications Manager administrator needs to enable the “Allow EnergyWise Overrides” checkbox on the Cisco Unified Communications Manager phone configuration page.

Alerts

The Cisco EnergyWise Power Save Plus feature provides both audio and visual alerts on the IP phones to warn you before your phone enters the Power Save Plus mode.

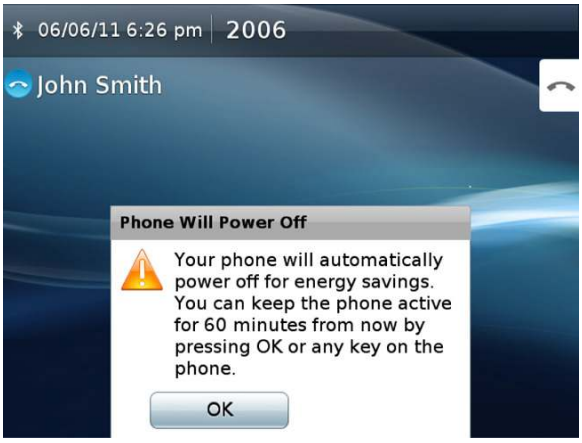
Audio Alert

Cisco Unified Communications Manager administrators can enable an audio alert from the IP phone administration page. The audio alert is disabled by default. When enabled, the phone ringtone loops four times with no space between plays at 10 minutes, 7 minutes, and 4 minutes prior to the phone off time. At 30 seconds prior to the phone off time, the ringtone loops 15 times or until the phone turns off.

Visual Alert

At 10 minutes prior to the phone off time, the select key begins to fast flash. An alert, as shown in Figure 3, is displayed on the phone, notifying you that your phone will power off. At this point, if you do not interact (in other words, the phone stays idle), it eventually powers off at the specified power-off time. Alternatively, if you acknowledge the warning message on the phone by pressing “OK” on the warning message, the phone defers going into the Power Save Plus mode by the time duration specified by the Cisco Unified Communications Manager administrator in the Phone Off Idle Timeout field on the Cisco Unified Communications Manager phone configuration page.

Figure 3. Power Save Plus Alert on Cisco Unified IP Phone 9971



Troubleshooting

This section summarizes some steps for troubleshooting problems related to the Power Save Plus mode:

1. Check the Status Messages on the phone for Cisco EnergyWise technology-related information under Applications > Administrator Settings > Status.
2. Use the following show command on the phone to find the Cisco EnergyWise timer set:
   `show jvm config-property device.display.energysave.`
3. Run the following debug commands on the phone:
   `debug jvm display debug`
   `debug jvm all debug`
4. Run the Cisco EnergyWise commands from the switch console:
   `show energywise AND show energywise children`

Contact Information

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References

- http://www.cisco.com/go/energywise/
- http://www.cisco.com/go/ipphones/9900/
- http://www.cisco.com/go/ipphones/8900/
- http://www.cisco.com/go/ipphones/7900/
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