



CHAPTER 4

Configuring Orchestrator for EnergyWise Devices

- [Overview of EnergyWise Configuration in Orchestrator, page 4-1](#)
- [Configuring the EnergyWise Provisioning Server web.config file, page 4-6](#)
- [Configuring the EnergyWise Proxy Server, page 4-11](#)
- [Failover Configuration for the EnergyWise Proxy Server, page 4-12](#)
- [Troubleshooting, page 4-14](#)

Overview of EnergyWise Configuration in Orchestrator

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

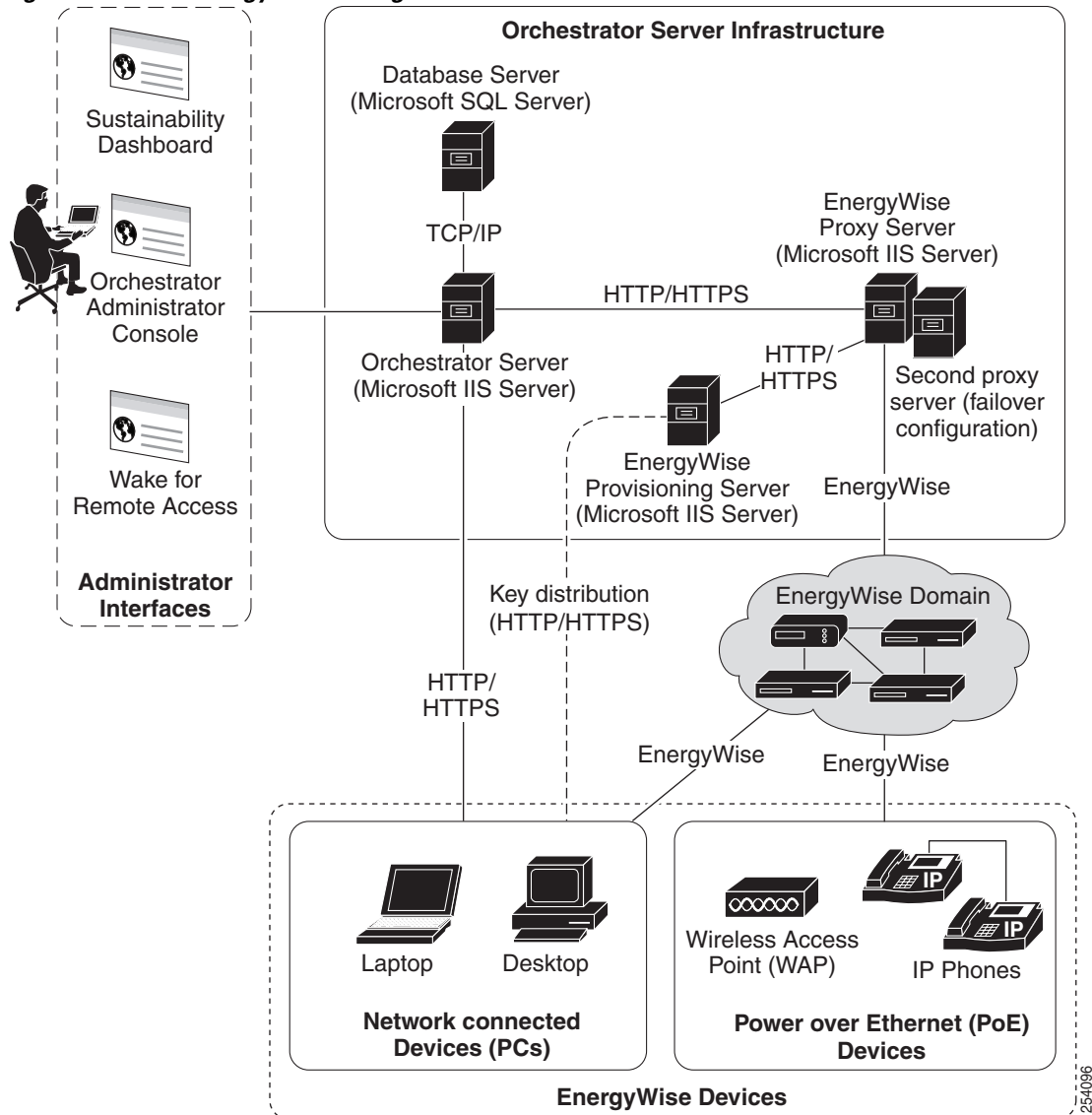
Orchestrator communicates with EnergyWise devices through the EnergyWise proxy server and gets configuration information from the EnergyWise provisioning server (See [Figure 4-1](#)).

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

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

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

Figure 4-1 EnergyWise Configuration in Orchestrator



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

General Steps for Configuring EnergyWise in Orchestrator

Table 4-1 Steps To Configure EnergyWise with Orchestrator

Step	Task	Description
Step 1	<p>Configure the EnergyWise domain structure, and enable the switches that are domain members.</p> <p>Note We recommend that you perform this step before installing Orchestrator.</p>	<p>You configure the EnergyWise domain using the command line interface (CLI). For details, see the “Configuring the EnergyWise Provisioning Server web.config file” section on page 4-6. For more details on creating and configuring EnergyWise domains, see the Cisco EnergyWise Configuration Guide on www.cisco.com.</p> <p>Note We recommend that you set the time on your switches to the system time of the machine running the EnergyWise proxy server. This ensures that events and reporting information coincide with policy-triggered actions on the switch. EnergyWise proxy servers should be set up to manage switches in the same time zone.</p>
Step 2	<p>Install Orchestrator following the steps described in Installing the Orchestrator server components.</p>	<p>Installs the Orchestrator server, database, EnergyWise provisioning server, and EnergyWise proxy server.</p>
Step 3	<p>Set up the configuration file on the EnergyWise provisioning server.</p>	<p>Orchestrator EnergyWise domain information is in the <code>web.config</code> file (XML format):</p> <pre>C:\inetpub\wwwroot\Cisco Systems\EnergyWiseProvisioningService.</pre> <p>Locate the section <code>energyWiseDomainConfig</code>. For each domain, specify the domain name, the primary and secondary (if needed) management switches, the primary and secondary (if needed) proxy servers, the end point secrets, and management secrets, and the management ports.</p> <p>For details, see the “Configuring the EnergyWise Provisioning Server web.config file” section on page 4-6.</p>
Step 4	<p>Start the EnergyWise proxy service, or restart it if it is already running. Restart all necessary services on the Orchestrator server.</p>	<p>Restart these services:</p> <ul style="list-style-type: none"> • EnergyWise Proxy Service • Microsoft IIS • ActiveMQ • Enterprise Power Management Processor <p>Note When you make a change to the <code>web.config</code> file on the EnergyWise provisioning server, you must restart the EnergyWise Proxy Service for the change to take effect.</p>

Notes on Orchestrator Support for EnergyWise Attributes

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

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

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

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

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

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

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

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- Step 1** In Orchestrator Administrator console, on the Policies menu, select **Edit Policies**.
 - Step 2** Select the **No Enforcement** policy.
 - Step 3** Clear the **Do not enforce this policy** option.
 - Step 4** Click **Save**. Wait until the recurrences have cleared. You can check this by using the show EnergyWise recurrences CLI command.
 - Step 5** Select the **Do not enforce this policy** option again.
 - Step 6** Click **Save**.
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EnergyWise Domains

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

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

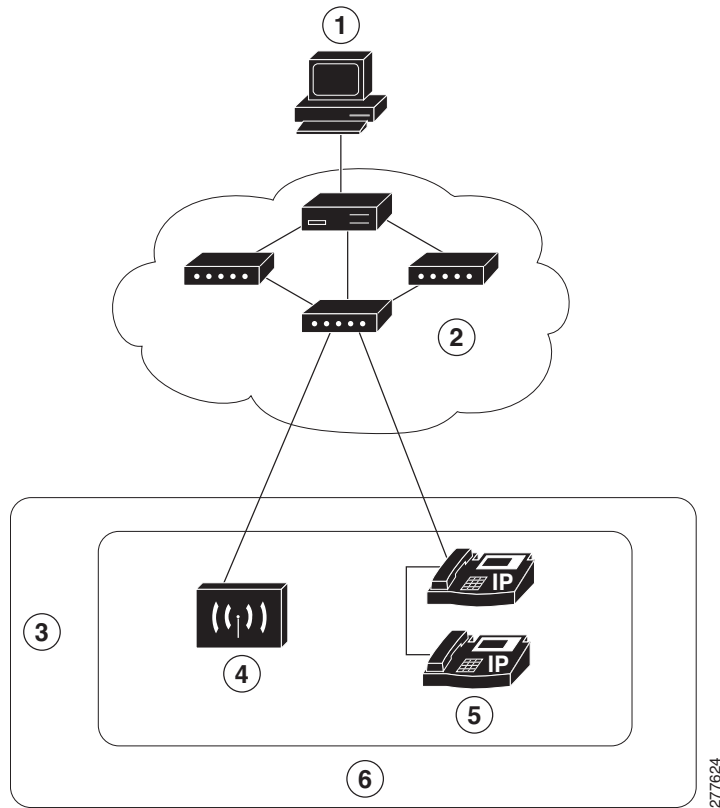
Only PoE devices are automatically recognized as end points of the domain, and only if the switch has been configured to join the EnergyWise domain. PCs, even if they are connected to an EnergyWise-enabled switch, are not recognized as end points of an EnergyWise domain.

An EnergyWise domain:

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

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

Figure 4-2 Overview of EnergyWise Domains



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

**Note**

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

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

Configuring the EnergyWise Provisioning Server web.config file

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

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

EnergyWise configuration file (web.config) example:

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

```

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

```

Table 4-2 EnergyWise Domain Elements

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

Table 4-2 EnergyWise Domain Elements (continued)

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

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

Table 4-3 ProxyDomain Elements

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

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

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

**Note**

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

Step 1

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

- Domain name
- End point secret key

**Note**

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

- Management port
- Management secret

**Note**

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

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

Step 2

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

Step 3

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

Step 4

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

**Note**

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

Configuring the EnergyWise Proxy Server

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

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

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

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

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

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



Note

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

Failover Configuration for the EnergyWise Proxy Server

The EnergyWise proxy server supports several configuration options.

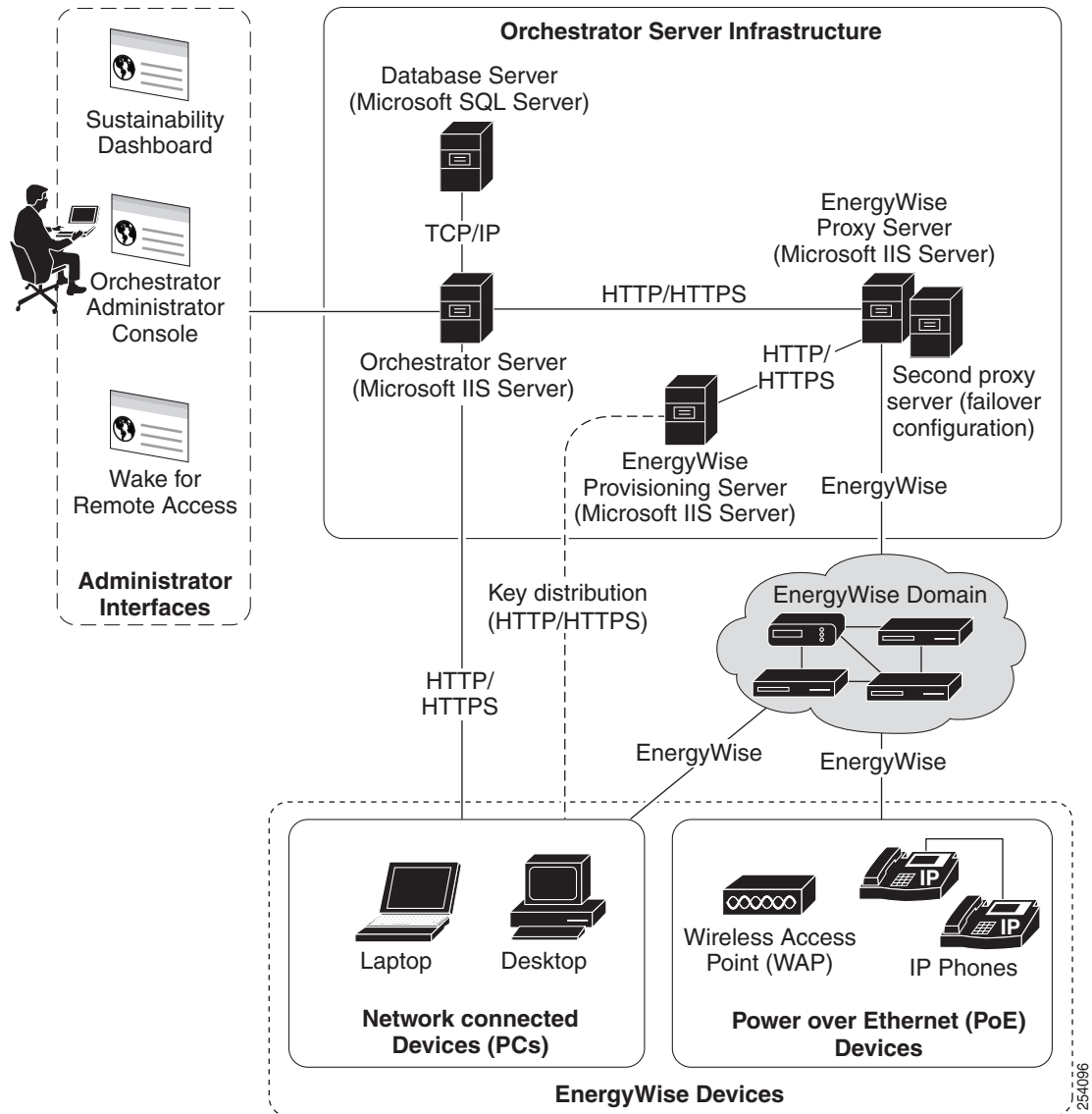
For a small to medium-sized EnergyWise installation with no backup, a single server can be a proxy for all EnergyWise devices across one or more domains.

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

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

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

Figure 4-3 Failover Configuration for the EnergyWise Proxy Server



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

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

Installing the EnergyWise Proxy Server

The EnergyWise proxy servers are installed separately from the Orchestrator installation. For details, see the [“Installing the EnergyWise Proxy Server”](#) section on page 4-13.

Troubleshooting

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

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

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- Step 1** In Orchestrator Administrator console, on the Policies menu, select **Edit Policies**.
 - Step 2** Select the **No Enforcement** policy.
 - Step 3** Clear the **Do not enforce this policy** option.
 - Step 4** Click **Save**. Wait until the recurrences have cleared. You can check this by using **show energywise recurrences** CLI command on the switch.
 - Step 5** Select the **Do not enforce this policy** option again.
 - Step 6** Click **Save**.
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