



Overview

The Cisco Aironet 1300 Series Outdoor Access Point/Bridge is available in autonomous and lightweight products. The autonomous product can support standalone network configurations with all configuration settings maintained within the unit. The autonomous product can be configured for multiple operating roles such as, access point, bridge, and workgroup bridge. The lightweight product operates in conjunction with a Cisco wireless LAN controller with all configuration information maintained within the controller. The lightweight product can be only configured as an access point.

Product Terminology

The following terms refer to the autonomous and lightweight products:

- The term *access point/bridge* describes both autonomous and lightweight products.
- The term *autonomous access point/bridge* describes only the autonomous product.
- The term *lightweight access point* describes only the lightweight product.
- The term *access point* describes the product when configured to operate as an access point.
- The term *bridge* describes the product when configured to operate as a bridge.

Autonomous Access Point/Bridge

The autonomous access point/bridge (model: AIR-BR1310G) supports a management system based on Cisco IOS software. The access point/bridge is a Wi-Fi certified, wireless LAN transceiver. The autonomous access point/bridge uses a single mini-PCI radio (IEEE 802.11b-compliant or IEEE 802.11g-compliant) that can be upgraded to future radio technologies.

The autonomous access point/bridge serves as the connection point between wireless and wired networks or as the center point of a stand-alone wireless network. In large installations, wireless users within radio range of an access point can roam throughout a facility while maintaining uninterrupted access to the network.

You can configure and monitor the autonomous access point/bridge using the command-line interface (CLI), the browser-based management system, or Simple Network Management Protocol (SNMP).

Lightweight Access Point

The lightweight access point (model: AIR-LAP1310G) is part of the Cisco Integrated Wireless Network Solution and requires no manual configuration before they are mounted. The lightweight access point is automatically configured by a Cisco wireless LAN controller (hereafter called a *controller*) using the Lightweight Access Point Protocol (LWAPP).

The lightweight access points contain one integrated radio: a 2.4-GHz radio (IEEE 802.11g). Using a controller, you can configure the radio settings.

In the Cisco Centralized Wireless LAN architecture, access points operate in the lightweight mode (as opposed to autonomous mode). The lightweight access points associate to a controller. The controller manages the configuration, firmware, and controls transactions such as 802.1x authentication. In addition, all wireless traffic is tunneled through the controller.

LWAPP is an Internet Engineering Task Force (IETF) draft protocol that defines the control messaging for setup and path authentication and run-time operations. LWAPP also defines the tunneling mechanism for data traffic.

In an LWAPP environment, a lightweight access point discovers a controller by using LWAPP discovery mechanisms and then sends it an LWAPP join request. The controller sends the lightweight access point an LWAPP join response allowing the access point to associate with the controller. When the lightweight access point is associated, it downloads its software if the versions on the lightweight access point and controller do not match. After a lightweight access point associates with a controller, you can reassign it to any controller on your network.

LWAPP secures the control communication between the lightweight access point and controller by means of a secure key distribution, using X.509 certificates on both the lightweight access point and controller.

This chapter provides information on the following topics:

- [Key Features, page 1-3](#)
- [Network Examples with Autonomous Access Point/Bridges, page 1-9](#)
- [Network Examples with Lightweight Access Points, page 1-13](#)

Guidelines for Using a Lightweight Access Point/Bridge

You should keep these guidelines in mind when you use a lightweight access point/bridge:

- A lightweight access points/bridge can communicate only with Cisco 2006 series wireless LAN controllers or 4400 series controllers. Cisco 4100 series, Airespace 4012 series, and Airespace 4024 series controllers are not supported because they lack the memory required to support access points running Cisco IOS software.
- A lightweight access points/bridge does not support Wireless Domain Services (WDS) and cannot communicate with WDS devices. However, the controller provides functionality equivalent to WDS when the access point associates to it.
- A lightweight access points/bridge supports eight BSSIDs per radio and a total of eight wireless LANs per access point. When a lightweight access point associates to a controller, only wireless LANs with IDs 1 through 8 are pushed to the access point.
- A lightweight access points/bridge does not support Layer 2 LWAPP. They must get an IP address and discover the controller using DHCP, DNS, or IP subnet broadcast.
- The lightweight access point console port is enabled for monitoring and debugging purposes (all configuration commands are disabled when the access point is associated to a controller).

Key Features

Key features of the access point/bridge:

- Unlicensed IEEE 802.11g 2.4-GHz radio operation
- Enclosure supports indoor or outdoor installations
- Dual-coax 100-Mbps Ethernet ports
- Four LEDs
- Inline power over dual-coax cables
- Console serial interface on power injector
- Integrated antenna or external antenna configurations (see [Figure 1-1](#))

The autonomous access point/bridge supports these additional key features:

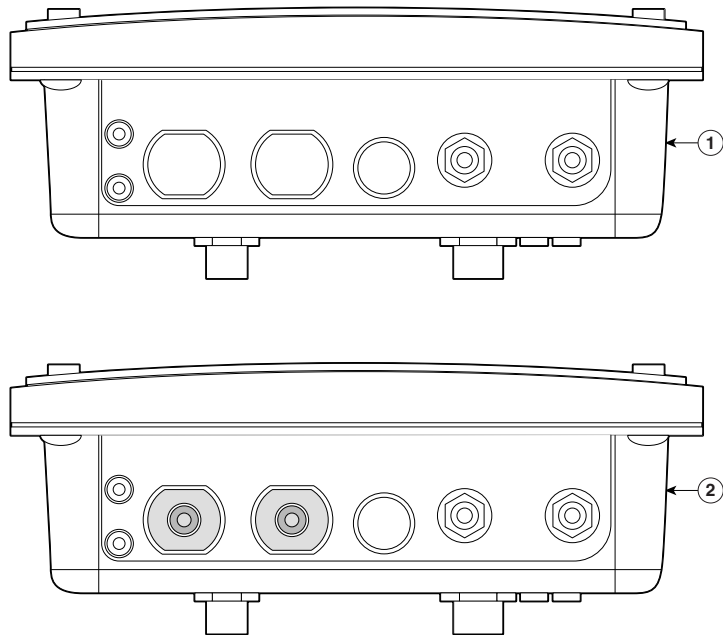
- Receive Signal Strength Indicator (RSSI) LED patterns for easy antenna alignment
- Control using Cisco IOS commands, Internet browser, SNMP, or serial interface
- Operating modes:
 - Root and non-root bridge
 - Access point
 - Workgroup bridge
 - Automatic install modes

The lightweight access point supports these additional key features:

- Centralized control using a controller
- Access point operating mode

Figure 1-1 shows the two outdoor access point/bridge configurations.

Figure 1-1 Access Point Configurations



1	Integrated antenna access point/bridge configuration	2	External antenna access point/bridge configuration with external antenna connectors
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Note

Antenna connectors are available only on the external antenna access point/bridge configuration.


Note

The external antenna access point/bridge configuration does not ship with an external antenna. An external antenna must be purchased.

Power

The access point/bridge receives inline power from the Cisco Aironet Power Injector (hereafter called the *power injector*). Dual-coax cables are used to provide Ethernet data and power from the power injector to the access point/bridge. The power injector is an external unit designed for operation in a sheltered environment, such as inside a building or vehicle. The power injector also functions as an Ethernet repeater by connecting to a Category 5 LAN backbone and using the dual-coax cable interface to the access point/bridge.

The power injector is available in two models:

- Cisco Aironet Power Injector LR2—standard version (included with the access point/bridge)
 - 48-VDC input power
 - Uses the 48-VDC power module (included with the access point/bridge)

- Cisco Aironet Power Injector LR2T—optional transportation version
 - 12- to 40-VDC input power

**Note**

The power injector and the power module must not be placed in an outdoor unprotected environment. The power module must not be placed in a building's environmental air space, such as above a suspended ceiling.

Integrated Antenna

The access point/bridge is available with an integrated 13-dBi patch array antenna. The antenna is covered with a radome to protect it from environmental elements. The integrated antenna is vertically polarized.

**Note**

Some international regulatory regions may restrict the integrated antenna access point/bridge configuration.

External Antenna

The access point/bridge is available in an external antenna configuration (see [Figure 1-1](#)) for use with Cisco Aironet 2.4-GHz antennas. Two reverse-TNC type RF connectors are provided on the end of the unit to support single or diversity antenna configurations. The antennas connect to the access point/bridge antenna connectors using a coax cable. [Table 1-1](#) lists the external antennas supported by the access point/bridge.

Table 1-1 Supported External Antennas

Antenna	Description
AIR-ANT2506	5.2-dBi omnidirectional antenna with vertical polarization
AIR-ANT3549	9-dBi patch wall mount antenna
AIR-ANT2410Y-R	10-dBi yagi antenna
AIR-ANT24120 ¹	12-dBi omnidirectional antenna with vertical polarization
AIR-ANT1949 ¹	13.5-dBi yagi antenna
AIR-ANT2414S-R ¹	14-dBi sector antenna with vertical polarization
AIR-ANT3338 ¹	21-dBi dish antenna

1. Not supported by the lightweight access point (AIR-LAP1310G)

**Note**

To meet regulatory restrictions, the external antenna access point/bridge unit and the external antenna must be professionally installed. The network administrator or other IT professional responsible for installing and configuring the unit is a suitable professional installer. Following installation, access to the unit should be password protected by the network administrator to maintain regulatory compliance.

Ethernet Ports

The access point/bridge dual-coax Ethernet ports consists of a pair of 75-ohm F-type connectors, linking the unit to your 100BASE-T Ethernet LAN through the power injector. The dual-coax cables are used to send and receive Ethernet data and to supply inline 48-VDC power from the power injector to the access point/bridge. For the location of the ports, refer to [Figure 1-3](#).

Enclosure

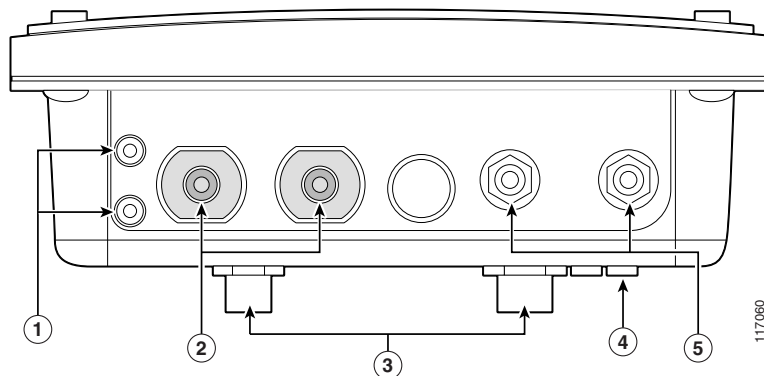
The access point/bridge uses an enclosure that supports indoor or outdoor operating environments. (refer to “[Access Point Specifications](#)” section on page C-1).

Connectors

The connectors (see [Figure 1-2](#)) provided depend upon the access point/bridge configuration:

- Integrated antenna access point/bridge configuration
 - Dual-coax Ethernet connectors—used to provide Ethernet signals and in-line power
- External antenna access point/bridge configuration
 - Dual-coax Ethernet connectors—used to provide Ethernet signals and in-line power
 - Dual antenna connectors—used to support a single antenna or dual-diversity antennas

Figure 1-2 Access Point Connector Locations

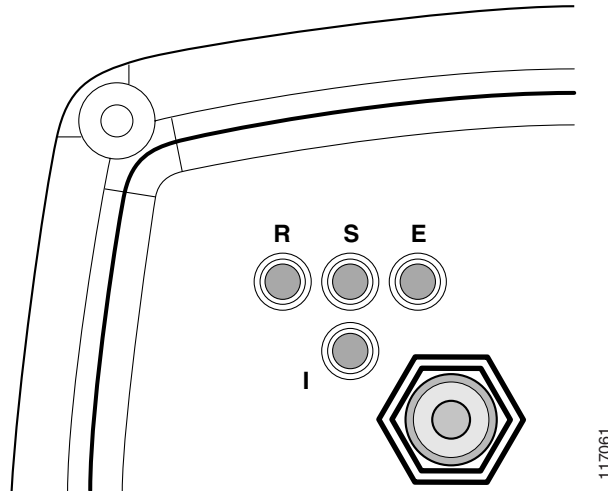


1	Ground lug mounting screws	3	Mounting posts
2	Left antenna connector (external antenna access point/bridge configuration only)	4	LEDs
	Primary right antenna connector (external antenna access point/bridge configuration only)	5	Dual-coax Ethernet ports (F-Type connectors)

LEDs

Four LEDs are located on back of the housing to report radio activity, status, and Ethernet activity (see [Figure 1-3](#)).

Figure 1-3 LEDs



R	Radio LED (R)	E	Ethernet LED (E)
S	Status LED (S)	I	Install LED (I)

- The install LED indicates that installation mode is activated. During installation mode, the other LEDs provide signal strength readings used for antenna alignment.



Note The install LED is not used on the lightweight access points.

- The radio LED blinks green to indicate radio traffic activity. The light is normally off, but it blinks green whenever a packet is received or transmitted over the radio link. This LED also provides signal strength readings during installation mode. On autonomous access points, this LED also provides signal strength readings during installation mode.
- The status LED indicates association status. Blinking green indicates that the access point/bridge is not associated with another bridge. Steady green indicates that the unit is associated with at least one other bridge. On autonomous access points, this LED also provides signal strength readings during installation mode.
- The Ethernet LED indicates Ethernet traffic. This LED blinks green when a packet is received or transmitted over the Ethernet infrastructure. The LED is off when the Ethernet link not working or the port is shutdown. On autonomous access points, this LED also provides signal strength readings during installation mode.

When the lightweight access point is searching for a controller, the Radio, Status, and Ethernet LEDs sequentially blink green, red and amber.

For additional information on the LEDs, refer to the [“Checking the LEDs on an Autonomous Access Point/Bridge”](#) section on page 4-2 or the [“Checking the LEDs on Lightweight Access Points”](#) section on page 5-2.

Operating Roles for the Autonomous Access Point/Bridge

The autonomous access point/bridge unit can be configured into one of seven operating roles from the Express Setup page:

**Note**

The lightweight access point only supports the access point operating role.

- **Install Automatic**—Activates the bridge install and alignment mode. Specifies that the unit automatically determines the network role. If the unit is able to associate to another Cisco Aironet root bridge within 60 seconds, the unit assumes a non-root bridge role. If the unit is unable to associate with another Cisco Aironet root bridge within 60 seconds, the unit assumes a root bridge role.

You can also pre-configure the unit into root bridge or non-root bridge modes and avoid the 60-second automatic detection phase.

- **Install Root Bridge**—Activates the root bridge install and alignment mode. Specifies that the unit is configured as a root bridge and accepts associations with non-root bridges.
- **Install Non-Root Bridge**—Activates the non-root bridge install and alignment mode. Specifies that the unit is configured as a non-root bridge and attempts to associate with a root bridge.
- **Root Bridge**—Specifies that the unit is operating as a root bridge and that it connects directly to the main Ethernet LAN network. In this mode, the unit accepts associations from other Cisco Aironet bridges and wireless client devices.
- **Non-Root Bridge**—Specifies that the unit is operating as a non-root bridge, that it connects to a remote LAN network, and that it must associate with a Cisco Aironet root bridge using the wireless interface.
- **Root Bridge with Wireless Clients**—Specifies that the unit is operating as a root bridge and accepts wireless client associations.
- **Non-Root Bridge with Wireless Clients**—Specifies that the unit is operating as a non-root bridge and accepts wireless client associations.
- **Access Point**—Specifies that the unit operates as an access point connected to the main Ethernet LAN network. In this mode, wireless client devices are allowed to associate to the unit.
- **Repeater**—Specifies that the unit is operating as a repeater (also called *repeater non-root*) that is not connected to the wired LAN and supports wireless clients.
- **Workgroup Bridge**—Specifies that the unit operates as a workgroup bridge connected to a small wired Ethernet LAN network through an Ethernet hub or switch. The workgroup bridge must associate to a Cisco Aironet access point or a Cisco Aironet bridge.
- **Scanner**—This setting is enabled when your product is being used by the Cisco WLSE to monitor wireless data traffic.

**Note**

On initial power up, an autonomous access point/bridge running Cisco IOS Release 12.3(2)JA2 and earlier defaults to the Install-Mode role. On initial power up, an autonomous access point/bridge running Cisco IOS Release 12.3(4)JA or later defaults to the Root AP role.

Refer to the *Cisco IOS Software Configuration Guide for Access Points* and to the *Cisco IOS Software Configuration Guide for Cisco Aironet Access Points* for additional information on the operating modes supported by the unit.

Network Examples with Autonomous Access Point/Bridges

This section describes the autonomous access point/bridge's role in three common wireless network configurations. The unit's default configuration is an access point.

The autonomous 1300 series access point/bridge can be configured in access point, repeater, bridge, and workgroup bridge wireless operating modes.

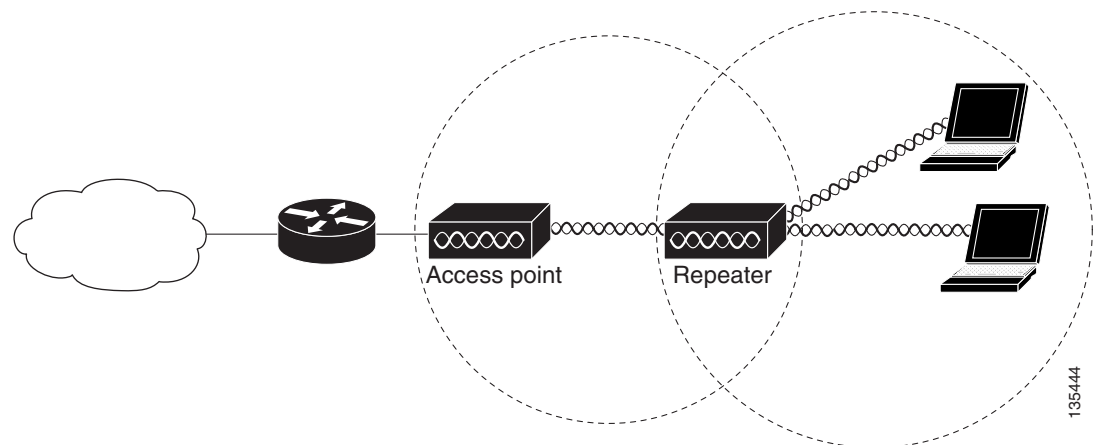
Repeater Unit that Extends Wireless Range

An autonomous access point can be configured as a stand-alone repeater to extend the range of your infrastructure or to overcome an obstacle that blocks radio communication. The repeater forwards traffic between wireless users and the wired LAN by sending packets to either another repeater or to an access point connected to the wired LAN. The data is sent through the route that provides the best performance for the client. [Figure 1-4](#) shows an autonomous access point acting as a repeater. Consult the *Cisco IOS Software Configuration Guide for Access Points* for instructions on setting up an access point as a repeater.

**Note**

Non-Cisco client devices might have difficulty communicating with repeater access points.

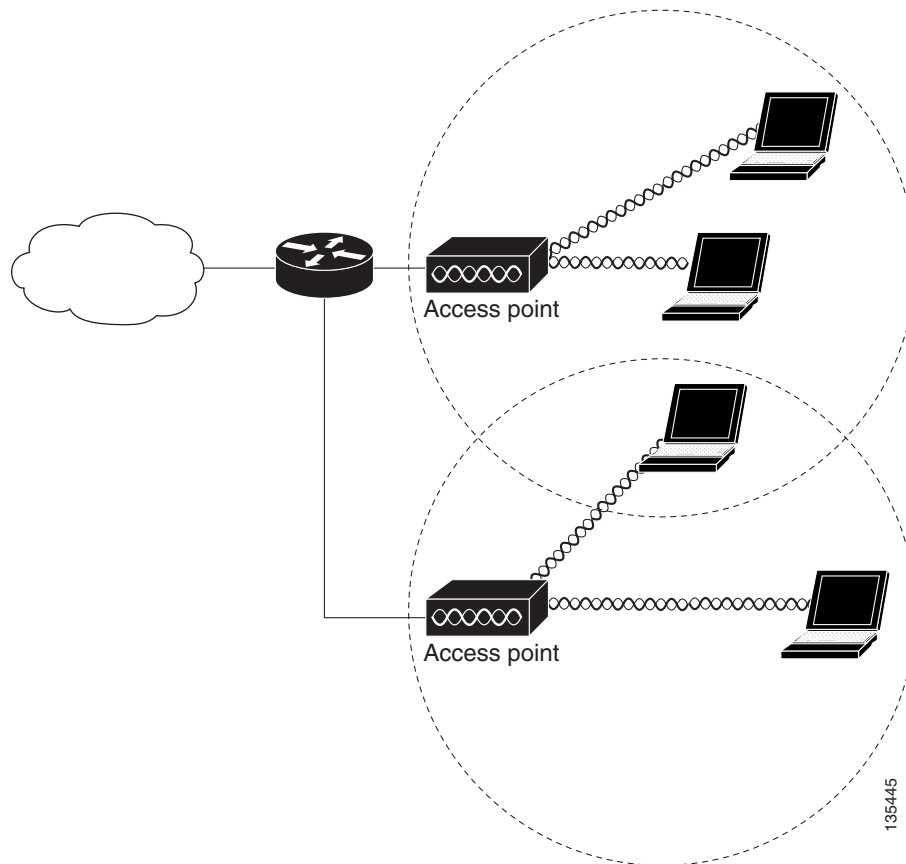
Figure 1-4 Access Point as Repeater



Root Access Point on a Wired LAN

An autonomous access point connected directly to a wired LAN provides a connection point for wireless users. If more than one autonomous access point is connected to the LAN, users can roam from one area of a facility to another without losing their connection to the network. As users move out of range of one access point, they automatically connect to the network (associate) through another access point. The roaming process is seamless and transparent to the user. [Figure 1-5](#) shows access points acting as root units on a wired LAN.

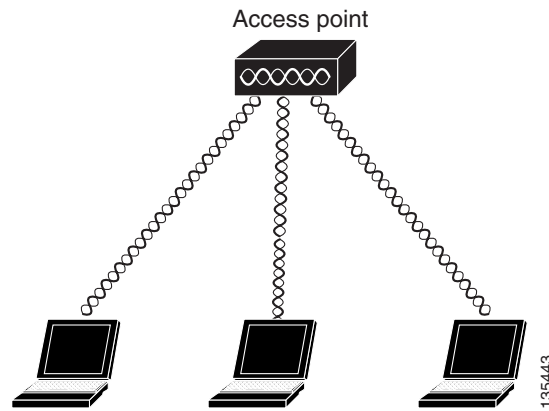
Figure 1-5 Access Points as Root Units on a Wired LAN



Central Unit in an All-Wireless Network

In an all-wireless network, an autonomous access point acts as a stand-alone root unit. The autonomous access point is not attached to a wired LAN; it functions as a hub linking all stations together. The access point serves as the focal point for communications, increasing the communication range of wireless users. [Figure 1-6](#) shows an autonomous access point in an all-wireless network.

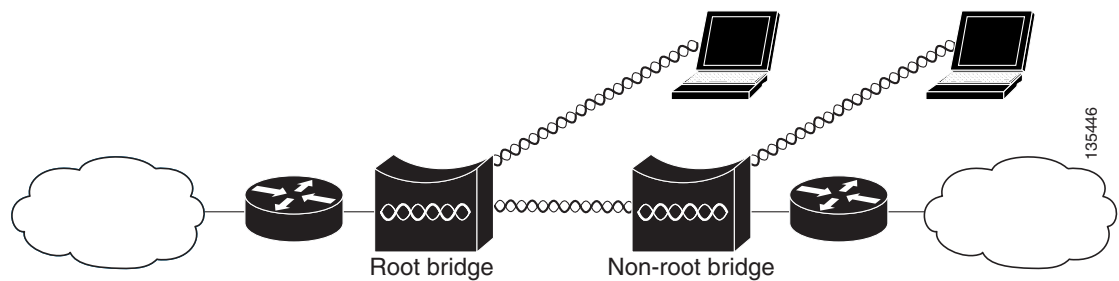
Figure 1-6 Access Point as Central Unit in All-Wireless Network



Bridge Network with Wireless Clients

The access point supports root bridge and non-root bridge roles used to interconnect a remote LAN to the main LAN (see [Figure 1-7](#)). The bridge units can also support wireless clients.

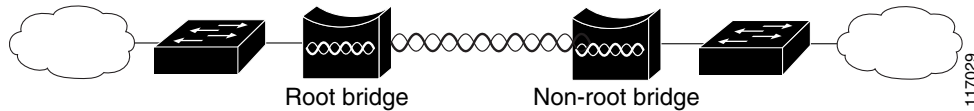
Figure 1-7 Root Bridge and Non-Root Bridge with Clients



Point-to-Point Bridge Configuration

In a point-to-point bridge configuration, two bridges interconnect two LAN networks using a wireless communication link (see [Figure 1-8](#)). The bridge connected to the main LAN network is classified as a root bridge and the other bridge is classified as a non-root bridge.

Figure 1-8 Point-to-Point Bridge Configuration



Workgroup Bridge Network

The access point supports a workgroup bridge role to interconnect remote Ethernet workstations to the main LAN. The workgroup bridge can communicate with an access point (see [Figure 1-9](#)) or with a bridge (see [Figure 1-10](#)).

Figure 1-9 Workgroup Bridge Communicating with an Access Point

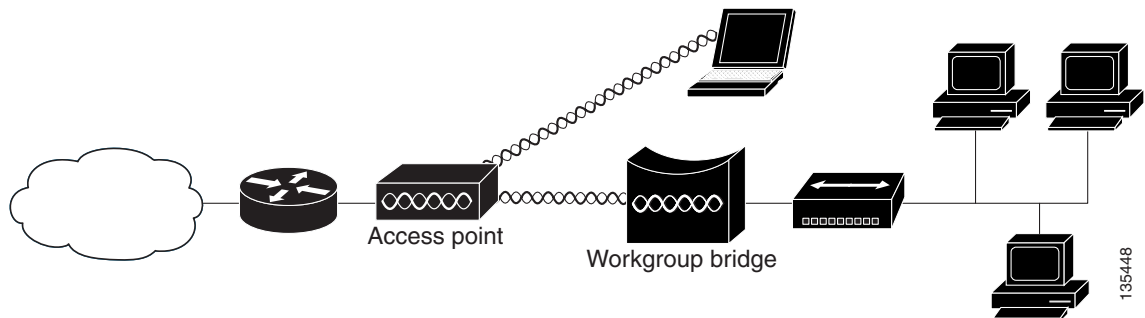
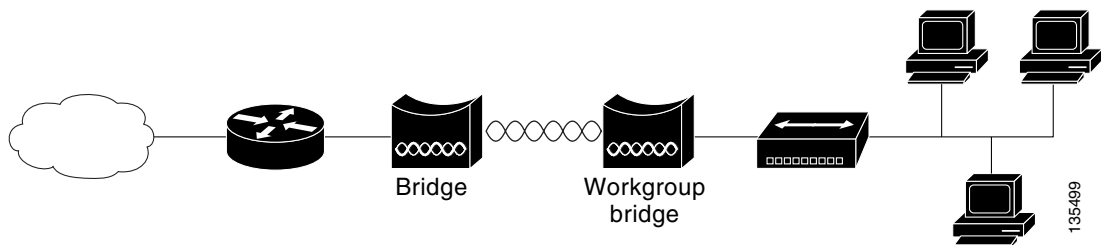


Figure 1-10 Workgroup Bridge Communicating with a Bridge



Network Examples with Lightweight Access Points

The lightweight access points support Layer 3 network operation. Lightweight access points and controllers in Layer 3 configurations use IP addresses and UDP packets, which can be routed through large networks. Layer 3 operation is scalable and recommended by Cisco.

This section illustrates a typical wireless network configuration containing lightweight access points and a Cisco Wireless LAN Controller (see [Figure 1-11](#)).

Figure 1-11 Typical Lightweight Access Point Network Configuration Example

