Preface

This guide will help you to install a Cisco Aironet Lightweight Access Point Protocol (LWAPP)-enabled access point on your wireless network. The following Cisco Aironet access points currently support LWAPP:

- Cisco Aironet 1130AG
- Cisco Aironet 1200 series with 802.11g or the latest 802.11a radio (or both)
- Cisco Aironet 1240AG

LWAPP-enabled access points are part of the Cisco Integrated Wireless Network Solution and require no manual configuration before they are mounted. The access point is configured by an LWAPP-capable Cisco wireless LAN controller.

Safety Information

The FCC with its action in ET Docket 96-8 has adopted a safety standard for human exposure to radio frequency (RF) electromagnetic energy emitted by FCC certified equipment. When used with approved Cisco Aironet antennas, Cisco Aironet products meet the uncontrolled environmental limits found in

OET-65 and ANSI C95.1, 1991. Proper installation of this radio according to the instructions found in this manual will result in user exposure that is substantially below the FCC recommended limits.

- Do not hold any component containing a radio so that the antenna is very close to or touching any exposed parts of the body, especially the face or eyes, while transmitting.

- The use of wireless devices in hazardous locations is limited to the constraints posed by the safety directors of such environments.

Warnings

Translated versions of the following safety warnings are provided in Appendix A of the appropriate *Cisco Aironet Access Point Hardware Installation Guide*.

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Warning **Read the installation instructions before you connect the system to its power source.** Statement 1004

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Warning **This product must be connected to a Power-over-Ethernet (PoE) IEEE 802.3af compliant power source or an IEC60950 compliant limited power source.** Statement 353

Warning   **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 20A** Statement 1005

Warning   **Do not operate your wireless network device near unshielded blasting caps or in an explosive environment unless the device has been modified to be especially qualified for such use.** Statement 245B

Warning   **In order to comply with FCC radio frequency (RF) exposure limits, antennas should be located at a minimum of 7.9 inches (20 cm) or more from the body of all persons.** Statement 332

Warning   **Do not work on the system or connect or disconnect cables during periods of lightning activity.** Statement 1001

Introduction

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

LWAPP is an 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 Cisco Aironet LWAPP-enabled access point discovers a controller by using LWAPP discovery mechanisms and then sends it an LWAPP join request. The controller sends the access point an LWAPP join response allowing the access point to join the controller. When the access point is joined, the controller downloads its software if the versions on the access point and controller do not match.

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

After an access point joins a controller, you can reassign it to any controller on your network.

It is possible to convert an LWAPP-enabled Cisco Aironet access point to autonomous mode. Refer to the product documentation for detailed instructions. See also the "Reverting the Access Point Back to Autonomous Mode" section on page 17 to access the documentation on Cisco.com.

Guidelines for Using LWAPP-Enabled Cisco Aironet Access Points

You should keep these guidelines in mind when you use an LWAPP-enabled Cisco Aironet access point:

- LWAPP-enabled access points can only communicate 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.

- LWAPP-enabled access points do not support Wireless Domain Services (WDS). The access points communicate only with Cisco wireless LAN controllers and cannot communicate with WDS devices. However, the controller provides functionality equivalent to WDS when the access point associates to it.

- LWAPP-enabled access points support 8 BSSIDs per radio and a total of 8 wireless LANs per access point. When an LWAPP-enabled access point associates to a controller, only wireless LANs with IDs 1 through 8 are pushed to the access point.

- LWAPP-enabled access points do not support Layer 2 LWAPP. They must get an IP address and discover the controller using DHCP, DNS, or IP subnet broadcast.

- An LWAPP-enabled access point console port provides read-only access to the unit.

Using DHCP Option 43

You can use DHCP Option 43 to provide a list of WLAN controller IP addresses to the access points, enabling the access point to find and join a WLAN controller.

Cisco Aironet access points use the type-length-value (TLV) format for DHCP option 43. DHCP servers must be programmed to return the option based on the access point's DHCP Vendor Class Identifier (VCI) string (DHCP Option 60).

The following table lists the VCI strings for Cisco access points capable of operating in lightweight mode.

Access Point	VCI String
Cisco Aironet 1130 Series	Cisco AP c1130
Cisco Aironet 1200 Series	Cisco AP c1200
Cisco Aironet 1240 Series	Cisco AP c1240

This is the format of the TLV block:

- Type: 0xf1 (decimal 241)
- Length: Number of controller IP addresses * 4
- Value: List of the IP addresses of controller management interfaces

Refer to the product documentation for your DHCP server for instructions on configuring DHCP Option 43. The *Application Note: Upgrading Autonomous Cisco Aironet Access Points To Lightweight Mode* contains example steps for configuring Option 43 on a DHCP server. See the "Reverting the Access Point Back to Autonomous Mode" section on page 17 for instructions on how to access this document on Cisco.com.

Getting Started

This guide assumes that a site survey has been performed (or you have used the site planning tool), that access point locations have been selected, and that you intend to install an access point in each location.

You should have the following information about your wireless network available:

- Access point locations.

- Access point mounting options: hanging from a ceiling, in the ceiling plenum, on a desktop, or on a flat vertical or horizontal surface.

- Access point power options: power supplied by a DC power supply, PoE from a network device, or a PoE power injector/hub (usually located in a wiring closet).

Note Plenum-mounted access points must be powered using PoE to comply with safety regulations.

If you do not have a map, Cisco recommends that you make one so you can record the MAC addresses from each location and return them to the person who is planning or managing your wireless network.

Unpacking the Access Point

Follow these steps to unpack the access point:

1. Open the shipping container and carefully remove the contents.

2. Return all packing materials to the shipping container and save it.

3. Ensure that all items are included in the shipment. Check each item for damage. If any item is damaged or missing, notify your authorized Cisco sales representative.

Installation Summary

Installing the access point involves these operations:

- Performing a pre-installation configuration
- Mounting the access point
- Deploying the access point on the wireless network

Performing a Pre-Installation Configuration

The following procedures are designed to ensure that your access point installation and initial operation go as expected.
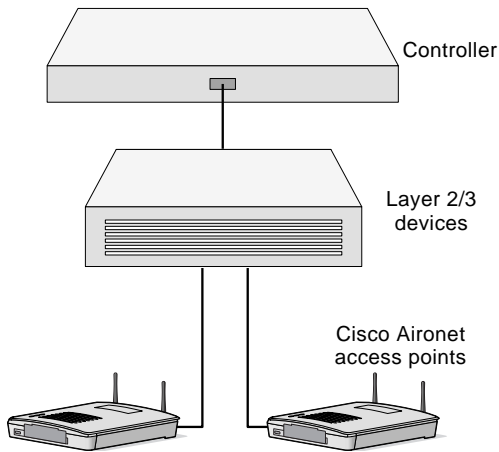
Note Perform the following procedure on your access point before deploying it in its final location.

Configuration Setup

The figure below explains the configuration setup.

Controller

Layer 2/3
devices

Cisco Aironet
access points

142425

Follow these steps to perform the pre-installation configuration.

1. Configure the Cisco Wireless LAN Controller in **LWAPP Layer 3 Mode** and be sure its DS Port is connected to the network. Use the CLI, web-browser interface, or Cisco WCS procedures as described in the appropriate *Cisco Wireless LAN Controller Guide*.

   a. Be sure that access points have Layer 3 IP connectivity to the Cisco Wireless LAN Controller Management and AP-Manager Interface.

b. Set the Cisco Wireless LAN Controller as the Master so that new access points always associate with it.

c. Make sure DHCP is enabled on the network. The access point must receive its IP address using DHCP.

d. The access point must be able to find the IP address of the controller. This can be accomplished using DHCP, DNS, OTAP, or IP subnet broadcast. This guide describes the DHCP method to convey the controller IP address. For other methods, refer to the product documentation. See also the "Using DHCP Option 43" section on page 6 for more information.

2. Apply power to the access point:

a. Use PoE from an orderable inline power injector. If you do not have PoE available, use an orderable Cisco Aironet external power supply to power the access point.

Note Cisco Aironet 1130AG and 1240AG Access Points support 802.3af PoE. Cisco Aironet 1200 and 1230 Access Points are not 802.3af compliant. Cisco recommends that you use Cisco 802.3af-capable PoE switches or power injectors whenever possible. Cisco 802.3af-compatible switches are backward compatible and will power non-802.3af access points.

b. After you power up the access point, it begins a power up sequence that you can check by observing the access point LEDs (Ethernet Status, and Radio LEDs (or the Status LED light ring on some models). The sequence varies slightly depending on the access point you are using.

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> **Note** See the *Hardware Installation Guide* for a complete description of your access point's LED behavior. The guides are available on Cisco.com.

c. As the access point attempts to connect to the controller, the LEDs cycle through a green, red, and amber sequence (or green, red and orange for the Status LED light ring).

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> **Note** This sequence can continue for up to five minutes. If the access point remains in this mode for more than five minutes, the access point is unable to find the Master Cisco Wireless LAN Controller. Check the connection between the access point and the Cisco Wireless LAN Controller and be sure the access point and the Cisco Wireless LAN Controller are on the same subnet.

d. If the access point shuts down, check the power source.

e. After the access point finds the Cisco Wireless LAN Controller, it attempts to download the new Operating System code if the access point code version differs from the Cisco Wireless LAN Controller code version. While this is happening, the Ethernet, Status, and Radio LEDs are solid green (or the Status LED light ring blinks dark blue).

3. If the operating system download is successful, the access point reboots.

4. Configure the access point if required. Use the controller CLI, controller GUI, or Cisco WCS to customize the access point-specific 802.11a, 802.11b and 802.11g network settings.

5. If the pre-installation configuration was successful, the Ethernet, Status, and Radio LEDs will be green (or the Status LED light ring will be light green) indicating normal operation. Disconnect the access point and mount it at the location where you intend to deploy it on the wireless network.

6. If your access point does not indicate normal operation, turn it off and repeat the pre-installation configuration.

> **Note** When you are installing a Layer 3 access point on a different subnet than the Cisco Wireless LAN Controller, be sure that a DHCP server is reachable from the subnet where you will be installing the access point, and that the subnet has a route back to the Cisco Wireless LAN Controller. Also be sure that the route back to the Cisco Wireless LAN Controller has destination UDP ports 12222 and 12223 open for LWAPP communications. Ensure the route back to the Primary, Secondary, and Tertiary Cisco Wireless LAN Controller allows IP packet fragments. Finally, be sure that if address translation is used, that the access point and the Cisco Wireless LAN Controller have a static 1-to-1 NAT to an outside address. (Port Address Translation is not supported.)

Mounting the Access Point

Detailed mounting instructions are in the *Cisco Aironet Hardware Configuration Guide* for the access point you are mounting. These documents are available on Cisco.com.

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Warning	**This product must be connected to a Power over Ethernet (PoE) IEEE 802.3af compliant power source or an IEC60950 compliant limited power source.** Statement 353

Deploying the Access Point on the Wireless Network

After you have mounted the access point, follow these steps to deploy it on the wireless network.

1. Connect and power up the access point.

2. Verify that the LEDs or LED light ring are in the same state they were in when you completed the pre-installation configuration. (Step 5 on page 14). If no LEDs or the LED light ring are on, the access point is most likely not receiving power.

   f. If all the LEDs or the LED light ring blink sequentially for more than five minutes, the access point is unable to find its Primary, Secondary, and Tertiary Cisco Wireless LAN Controller. Check the connection between the access point and the Cisco Wireless LAN Controller, and be sure the access point and the Cisco Wireless LAN Controller are either on the same subnet or that the access

point has a route back to its Primary, Secondary, and Tertiary Cisco Wireless LAN Controller. Also, if the access point is not on the same subnet as the Cisco Wireless LAN Controller, be sure there is a properly configured DHCP server on the same subnet as the access point. See the for additional information.

3. Reconfigure the Cisco Wireless LAN Controller so it is not the Master.

   a. A Master Cisco Wireless LAN Controller should only be used for configuring access points and not in a working network.

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   Note The Master Cisco Wireless LAN Controller is normally not used in a deployed network, so the Master Cisco Wireless LAN Controller setting is automatically disabled upon reboot or operating system upgrade.

Reverting the Access Point Back to Autonomous Mode

It is possible to revert an LWAPP-enabled Cisco Aironet access point back to autonomous mode. Please refer to *Upgrading Autonomous Cisco Aironet Access Points to Lightweight Mode* for detailed instructions on reverting to autonomous mode. Use this URL to browse to that document on Cisco.com or follow the steps below to navigate to the URL:

http://www.cisco.com/en/US/products/ps6366/prod_technical_reference_list.html

1. Open your web browser and go to http://www.cisco.com.

2. Click **Technical Support and Documentation**. A pop-up window appears.

3. Click **Technical Support and Documentation**. The Technical Support & Documentation page appears.

4. In the Product Support section, click **Wireless**. The Wireless Support Resources page appears.

5. In the Wireless LAN Access section, click **Cisco Aironet 1200 Series**. The Cisco Aironet 1200 Series Introduction page appears.

6. In the Reference Guides section, click **Technical References**. The Cisco Aironet 1200 Series Technical Reference page appears.

7. Click **Upgrading Cisco Aironet Autonomous Access Points to Lightweight Mode**.

In Case of Difficulty

If you followed the instructions in previous sections of this guide, you should have had no trouble getting your access point installed and running. If you do experience difficulty, before contacting Cisco, look for a solution to your problem in this guide or the troubleshooting chapter of the *Cisco Aironet Point Hardware Installation Guide* for the access point you are using. These, and other documents, are available on Cisco.com. Follow these steps to access and download these documents:

1. Open your web browser and go to http://www.cisco.com.
2. Click **Technical Support and Documentation**. A pop-up window appears.
3. Click **Technical Support and Documentation**. The Technical Support & Documentation page appears.
4. In the Product Support section, click **Wireless**. The Wireless Support Resources page appears.
5. Select the appropriate product section. The Introduction page for the product appears.
6. Select and download the appropriate document.

The Technical Support and Documentation page also contains valuable technical support resources.

Compliance Information

This equipment has been tested and found to comply with the European Telecommunications Standard ETS 300.328. This standard covers Wideband Data Transmission Systems referred to in CEPT recommendation T/R 10.01.

This type-accepted equipment is designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed in accordance with the instruction manual, may cause harmful interference to radio communications.

The Declarations of Compliance for this product relevant to the European Union and other countries following EU Directive 1999/5/EC (R&TTE Directive) can be found in the *Cisco Aironet Access Point Hardware Installation Guide* for the access point you are using. This guide is available on Cisco.com.

Cisco One-Year Limited Hardware Warranty Terms

There are special terms applicable to your hardware warranty and various services that you can use during the warranty period. Your formal Warranty Statement, including the warranties and license agreements applicable to Cisco software, is available on Cisco.com. Follow these steps to access and download the *Cisco Information Packet* and your warranty and license agreements from Cisco.com.

1. Launch your browser, and go to this URL:

   http://www.cisco.com/univercd/cc/td/doc/es_inpck/cetrans.htm

   The Warranties and License Agreements page appears.

2. To read the *Cisco Information Packet*, follow these steps:

   a. Click the **Information Packet Number** field, and make sure that the part number 78-5235-03A0 is highlighted.

   b. Select the language in which you would like to read the document.

   c. Click **Go**.

   The Cisco Limited Warranty and Software License page from the Information Packet appears.

d. Read the document online, or click the **PDF** icon to download and print the document in Adobe Portable Document Format (PDF).

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> **Note** You must have Adobe Acrobat Reader to view and print PDF files. You can download the reader from Adobe's website: http://www.adobe.com

3. To read translated and localized warranty information about your product, follow these steps:

   a. Enter this part number in the Warranty Document Number field:

      78-10747-01C0

   b. Select the language in which you would like to view the document.

   c. Click **Go**.

      The Cisco warranty page appears.

   d. Read the document online, or click the **PDF** icon to download and print the document in Adobe Portable Document Format (PDF).

You can also contact the Cisco service and support website for assistance:

http://www.cisco.com/public/Support_root.shtml.

Duration of Hardware Warranty

One (1) Year

Replacement, Repair, or Refund Policy for Hardware

Cisco or its service center will use commercially reasonable efforts to ship a replacement part within ten (10) working days after receipt of a Return Materials Authorization (RMA) request. Actual delivery times can vary, depending on the customer location.

Cisco reserves the right to refund the purchase price as its exclusive warranty remedy.

To Receive a Return Materials Authorization (RMA) Number

Contact the company from whom you purchased the product. If you purchased the product directly from Cisco, contact your Cisco Sales and Service Representative.

Complete the information below, and keep it for reference.

Company product purchased from	
Company telephone number	
Product model number	
Product serial number	
Maintenance contract number	