Configure DHCP OPTION 43 for Lightweight Access Points

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Introduction

This document describes how to use DHCP Option 43 for lightweight access points.

Prerequisites

The document provides sample configurations for DHCP Option 43 for lightweight Cisco Aironet access points (LAPs) for these DHCP servers:

- Microsoft Windows 2008 Enterprise DHCP Server
- Cisco IOS® DHCP Server
- Linux Internet Systems Consortium (ISC) DHCP Server
- Cisco Network Registrar DHCP Server
- Lucent QIP DHCP Server

When a Cisco Wireless Unified architecture is deployed, the LAPs can use a vendor-specific DHCP Option 43 to join specific Wireless LAN Controllers (WLCs) when the WLC is in a different subnet than the LAP. Refer to Wireless LAN Controller and Lightweight Access Point Basic Configuration Example and Lightweight AP (LAP) Registration to a Wireless LAN Controller (WLC) for information on how to configure an access point (AP) to join a WLC.

Requirements

Cisco recommends that you have knowledge of these topics:

- Basic knowledge on Cisco Unified Wireless Network (CUWN)
- Basic knowledge of DHCP

Components Used

This document is not restricted to specific software and hardware versions.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Background Information

Vendor Specific DHCP Options

RFC 2132 defines two DHCP Options that are relevant to vendor specific options. They are Option 60 and Option 43. DHCP Option 60 is the Vendor Class Identifier (VCI). The VCI is a text string that uniquely identifies a type of vendor device. This table lists the VCIs used by Cisco APs:

Access Point	Vendor Class Identifier (VCI)
Cisco Aironet 1530 Series	Cisco AP c1530
Cisco 3201 Lightweight Access Point	Cisco Bridge/AP/WGB c3201
AP801 (embedded in 86x/88x Series ISRs)	Cisco AP801
AP802 (embedded in 88x Series ISRs)	Cisco AP802
Cisco Aironet 2700 Series	Cisco AP c2700[6]
Cisco Aironet 3700 Series	Cisco AP c3700[7]
Cisco Aironet 700 Series	Cisco AP c700[6]
Cisco Aironet 1700 Series	Cisco AP c1700
Cisco Aironet 1800s Series	Cisco AP c1800
Cisco Aironet 1810 Series (incl OEAP)	Cisco AP c1810

Cisco Aironet 1815 Series (I,W,T)	Cisco AP c1815[9]
1131 ISR containing 1101AX AP module	Cisco AP ISR-AP1101AX
Cisco Aironet 1830 Series	Cisco AP c1830
Cisco Aironet 1840 Series	Cisco AP c1840
Cisco Aironet 1850 Series	Cisco AP c1850
Cisco Industrial Wireless 3700 Series	Cisco AP iw3702
Cisco Aironet 1570 series	Cisco AP c1570
Cisco Aironet 3800 series	Cisco AP c3800
Cisco Aironet 2800 series	Cisco AP c2800
Cisco Aironet 4800 series	Cisco AP c4800
Cisco Aironet 1560 Series	Cisco AP c1560
Cisco Aironet 1540 Series[8]	Cisco AP c1540
6300 Series Embedded Services Access Points	Cisco AP ESW6300
Catalyst IW6300 Heavy Duty Series Access Points	Cisco AP IW6300
Cisco Catalyst 9105AXI Series	Cisco AP C9105AX
Cisco Catalyst 9105AXW Series	Cisco AP C9105AXW
Cisco Catalyst 9115AX Series	Cisco AP C9115AX
Cisco Catalyst 9117AX Series	Cisco AP C9117AX
Cisco Catalyst 9120AX Series	Cisco AP C9120AX
Cisco Catalyst 9124AX Series	Cisco AP C9124AX
Cisco Catalyst 9130AX Series	Cisco AP C9130AX
Cisco Catalyst 9136 Series	Cisco AP C9136[1]
Cisco 9162 Series	Cisco AP CW9162
Cisco 9163 Series	Cisco AP CW9163
Cisco 9164 Series	Cisco AP CW9164
Cisco 9166 Series	Cisco AP CW9166
Cisco 9166D1 Series	Cisco AP CW9166D1
Cisco IW9167EH	Cisco AP IW9167EH
Cisco 9172H	Cisco Wireless AP

	CW9172H[2]
Cisco 9172I	Cisco Wireless AP CW9172I[2]
Cisco 9176I[5]	Cisco Wireless AP CW9176I[5]
Cisco 9176D1	Cisco Wireless AP CW9176D1
Cisco 9178I[5]	Cisco Wireless AP CW9178I[5]
Cisco 9179F	Cisco Wireless AP CW9179F

[1] Early manufactured 9136 can ship with a software that send "Cisco AP" in the option 60. This was fixed in 17.8 and later software versions.

[2] Early manufacturing image of 9172 can use a VCI string of "Cisco AP CW9172". This gets fixed to the expected string once they joined a WLC.

[5] Early manufacturing image (before 17.15.2) use a VCI string that does not include the letter I at the end, for example Cisco Wireless AP CW9176 instead of Cisco Wireless AP CW9176I.

[6] Any 2700/700/1530 Series AP that runs 7.6 or later.

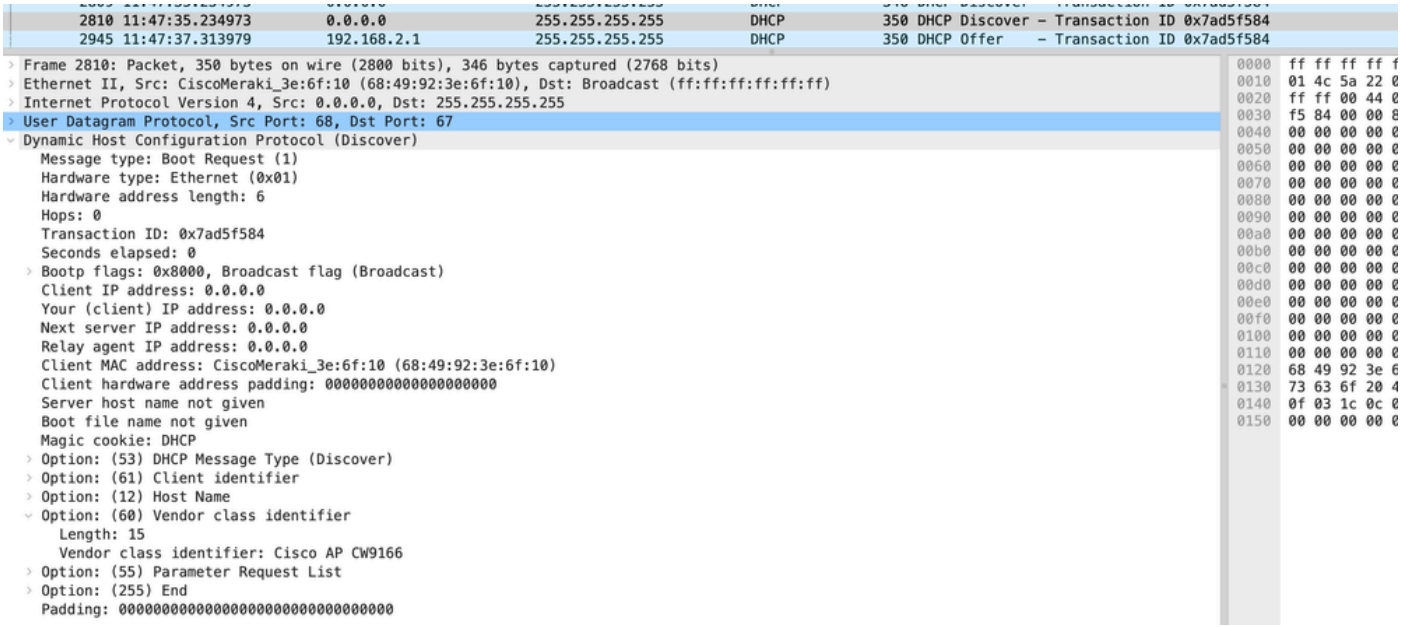
[7] Any 3700 Series AP that runs 7.6 or later software.

[8] 1540s that run pre-FCS manufacturing code can use "Cisco AP c1560".

[9] 1815s that run pre-FCS manufacturing code can use "Cisco AP c1810".

Learn more at Cisco Wireless Solutions Software Compatibility Matrix.

Option 60 is included in the initial DHCP **discover** message a DHCP client broadcasts in search of an IP address. Option 60 is used by DHCP clients (LAPs in this case) to identify itself to the DHCP server.

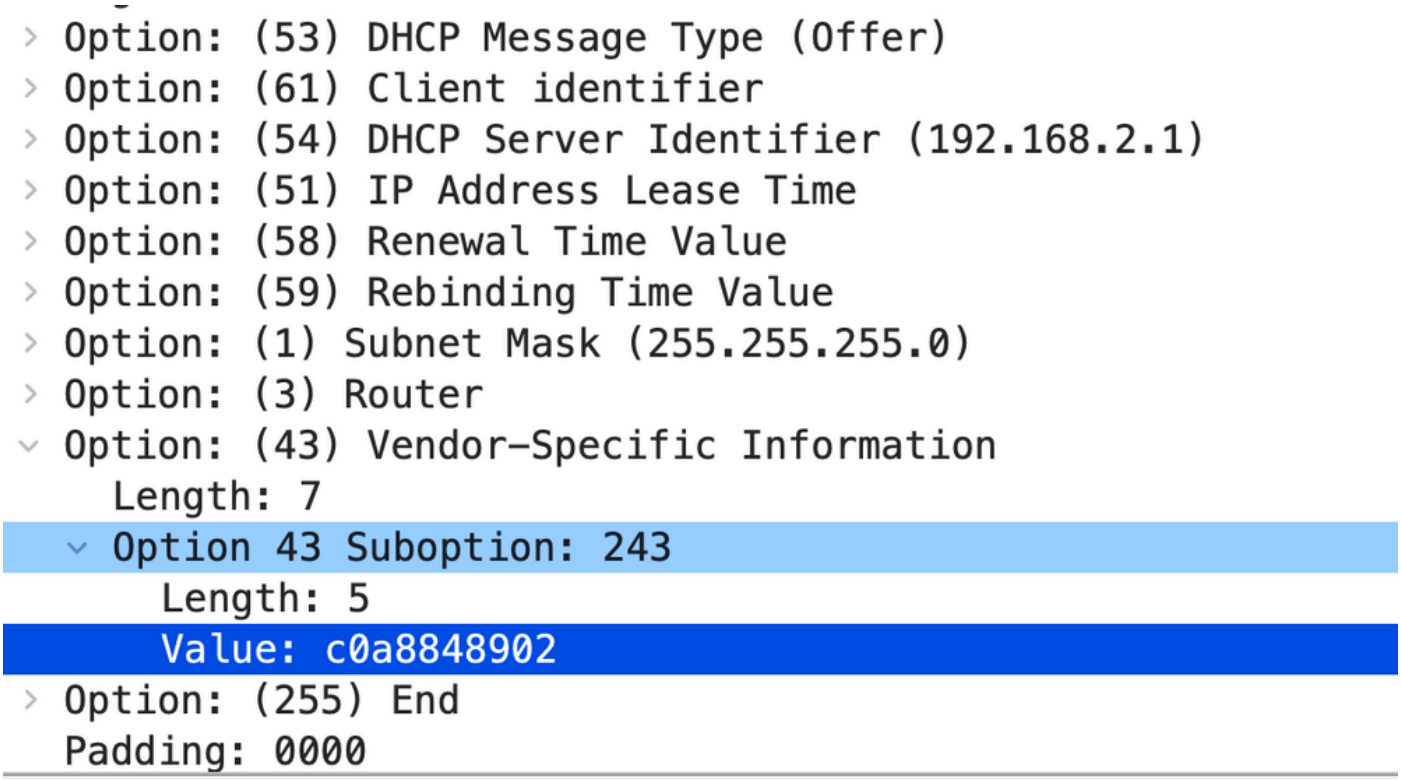


AP DHCP Discover Message

Leveraging option 60 is not a required and your DHCP pools can return option 43 for any type of clients. However, the DHCP server can be programmed to return one or more WLAN controller management interface IP addresses based on the VCI of the AP. To do this, program the DHCP server to recognize the VCI for each access point type, and then define the vendor specific information.

On the DHCP server, the vendor specific information is mapped to VCI text strings. When the DHCP server sees a recognizable VCI in a DHCP **discover** from a DHCP client, it returns the mapped vendor specific information in its DHCP **offer** to the client as DHCP Option 43. On the DHCP server , option 43 is defined in each DHCP pool (Scope) that offers IP address to the LAPs.

RFC 2132 defines that DHCP servers must return vendor specific information as DHCP Option 43. The RFC allows vendors to define encapsulated vendor-specific suboption codes between 0 and 255. The suboptions are all included in the DHCP offer as type-length-value (TLV) blocks embedded within Option 43. The definition of the suboption codes and their related message format is left to the vendors. Suboption 241 is decimal for "f104" and suboption 243 is used for the "f30x" of the Fast offline Migration.



DHCP Offer

Option 43 Format explained

The classic WLC provision method (f1xxx)

When DHCP servers are programmed to offer WLAN Controller IP addresses as Option 43 for Cisco Aironet LAPs, the suboption TLV block is defined in this way:

- **Type** – 0xf1 (decimal 241).
- **Length** – Number of controller IP addresses * 4.
- **Value** – List of the WLC management interfaces, typically translated to hexadecimal values.

Examples:

- To provision WLC IP address 192.168.1.10 for your APs, use option 43 0xf104.c0a8.010a

f1 for the option type. 04 because you only provide one WLC IP address (so the length is 4). c0 is 192 in hex. a8 is 168 in hex. 01 is 01 in hex and 0a is 10 in hex.

- To provision WLC IP addresses 192.168.1.10 and 192.168.1.11 for your APs, use option 43 0xf108.c0a8.010a.c0a8.010b
- f1 for the option type. 08 because you provide two WLC IP addresses (so the length is 2*4). c0 is 192 in hex. a8 is 168 in hex. 01 is 01 in hex and 0a is 10 in hex. and we repeat the second address with 0b at the end for "11".

The EWC conversion method(f2xxx)

We can convert a group of APs from EWC to CAPWAP mode via option 43 by using the F2 start.

- F2<size><WLC-IP(s)>
- F2 is the type
- Size is the number of WLC IP addresses provided multiplied by 4 + 1
- Example : f205c0a88202 gives the WLC IP address 192.168.130.2 and converts the AP to CAPWAP mode

The fast offline migration(f3xxx)

The option 43 string for DHCPv4 Fast offline migration allows to auto-convert a Wi-Fi7 AP between Catalyst and Meraki mode:

- F3 <size> <IP array> Mode=<1|2>, where Mode = 1 -> Meraki and 2 -> Catalyst
- Example String: f305ac10011802 (“normal” option 43 “f104ac100118” becomes “f305ac10011802”)
- Change type from f1 to f3.
- Change length from 04 to 05 (because we are adding "01" or "02" at the end of the WLC IPs to precise which mode is desired), or 09 in case of 2 WLC IPs (so basically <amount of WLC IPs provided> * 4 + 1)
- Add the suboption at the end; 01 for Meraki, 02 for Catalyst
- Cisco IOS/IOS-XE configuration example for WLC discovery using DHCPv4:
    - ip dhcp pool vlan192
    - network 192.168.200.0 255.255.255.0
    - default-router 192.168.200.1
    - option 43 hex f305.ac10.0118.02

Refer to the Global Use AP deployment guide for more details on this mode.

The semantics of DHCP server configuration vary based on the DHCP server vendor. This document contains specific instructions on the Microsoft DHCP server, Cisco IOS DHCP server, Linux ISC DHCP Server, Cisco Network Registrar DHCP server, and Lucent QIP DHCP Server. For other DHCP server products, consult the vendor documentation for instructions on vendor specific options.

Wave 2, Wi-Fi 6, and Wi-Fi 6E access points are able to understand the Fast Offline Migration "f30x"/suboption 243 option 43 as long as they run Cisco IOS-XE 17.15.2 or later. They obviously ignore the Catalyst/Meraki conversion part but are able to figure out the WLC IP address from the option 43 and join the WLC. This means you can use a unique option 43 for all your AP models.

Configure

Note: Use Cisco Support Tools (registered customers only) to learn more about the commands used in this section.

Microsoft DHCP Server

This section describes the configurations necessary on the Microsoft DHCP server to use DHCP Option 43 for WLAN Controller discovery.

Cisco Lightweight Access Points

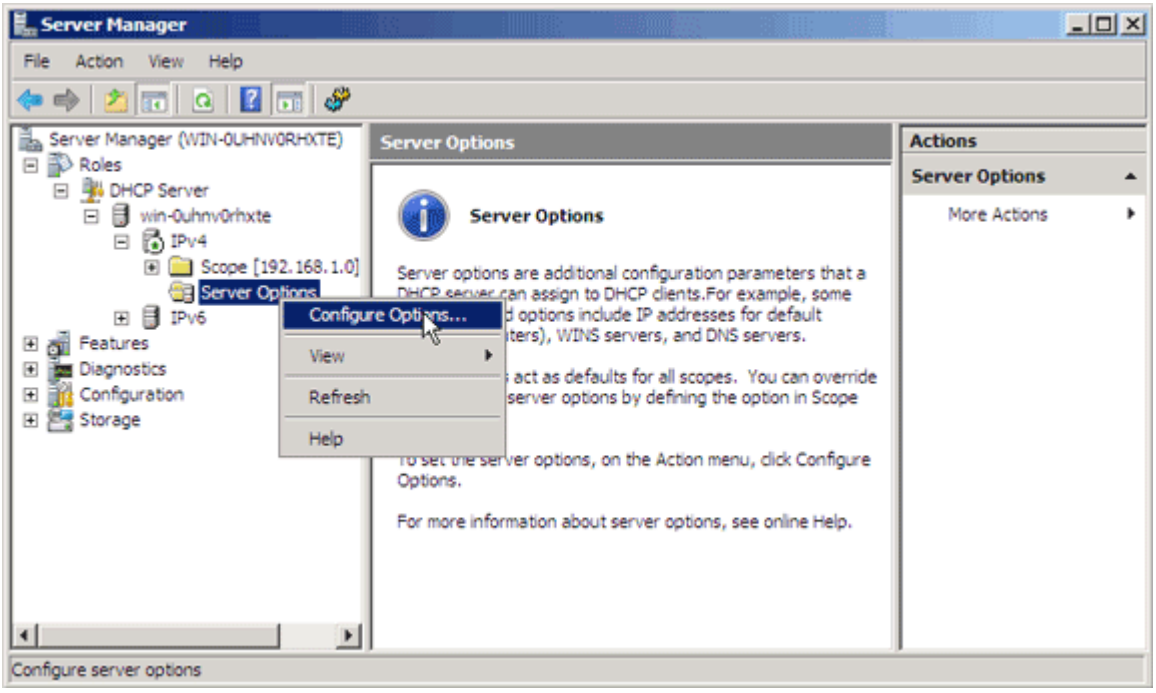
The method described in the previous section can be used if you have multiple device types on the same scope and you want them to receive different WLC IP addresses via Option 43. But, if all of the DHCP clients in the scope are Cisco IOS APs, you can use this procedure to define DHCP Option 43.

Before you begin, understand this information:

- Option 43 suboption code
- Management IP address(es) of WLAN controller(s)

Complete these steps to define DHCP Option 43 on the Windows DHCP server:

1. In the DHCP Server scope, right-click **Server Options** and choose **Configure Options**.

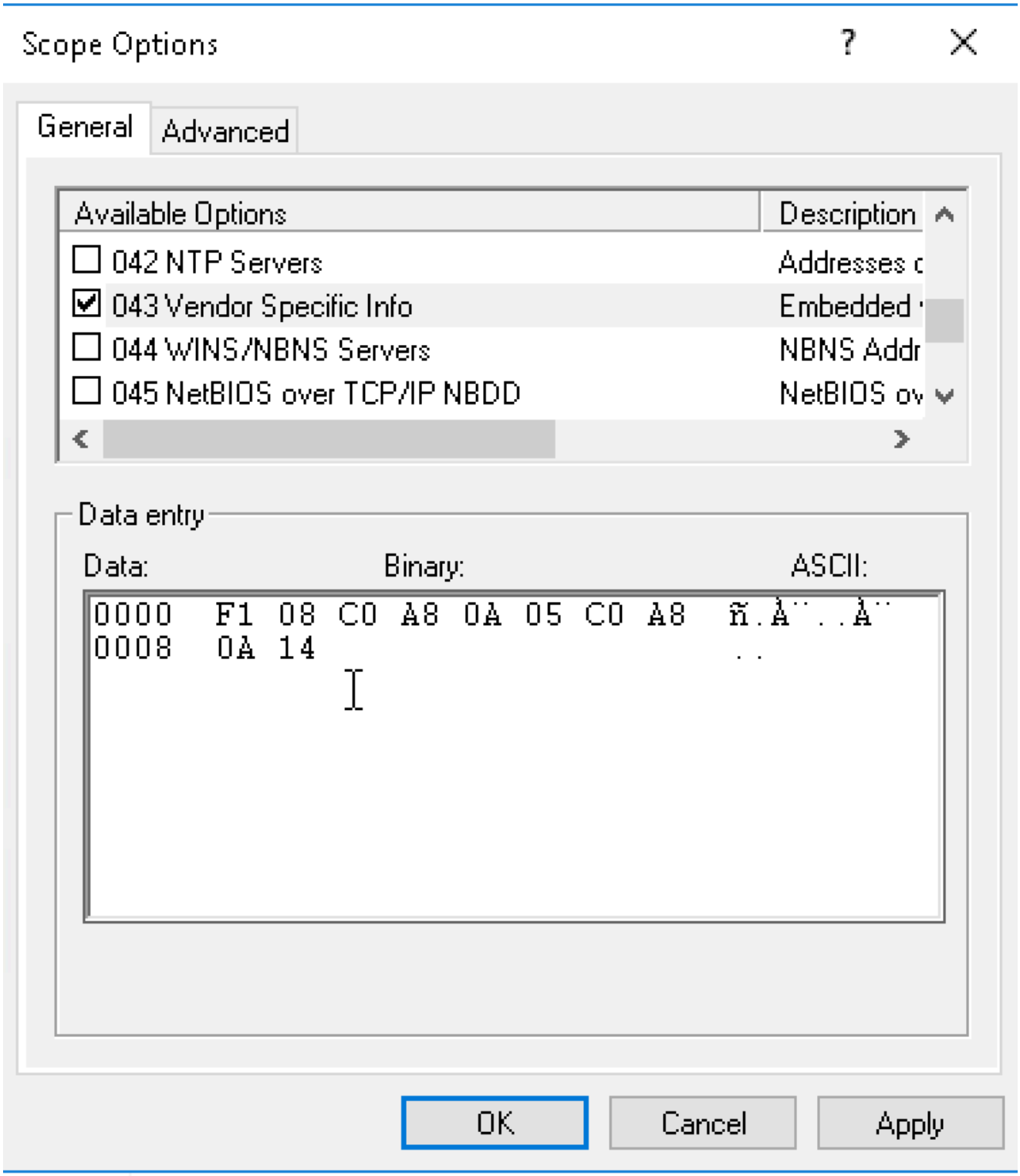


2. On the General tab, scroll to Option 43 and check the **043 Vendor Specific Info** check box.
3. Enter the Option 43 suboption in hex.

Note: TLV values for the Option 43 suboption: Type + Length + Value. Type is always the suboption code 0xf1. Length is the number of controller management IP addresses times 4 in hex. Value is the IP address of the controller listed sequentially in hex. For example, suppose there are two controllers with management interface IP addresses, 192.168.10.5 and 192.168.10.20. The type is 0xf1. The length is 2 * 4 = 8 = 0x08. The IP addresses translates to c0a80a05 (192.168.10.5) and c0a80a14 (192.168.10.20). When the string is assembled, it yields f108c0a80a05c0a80a14. The Cisco IOS command that is added to the DHCP scope is **option 43 hex f108c0a80a05c0a80a14**.

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4. Click **Apply** and then **OK**. DHCP Option 43 is now configured and the DHCP server sends the option 43 to the LAPs.



Cisco IOS DHCP Server

Cisco Aironet APs (Cisco IOS)

Complete these steps to configure DHCP Option 43, in the embedded Cisco IOS DHCP server, for all Cisco Aironet APs that run Cisco IOS. This includes all APs except for the VxWorks 1000 Series (see the next section) and the 600 Series OEAP which does not use Option 43.

1. Enter configuration mode at the Cisco IOS CLI.
2. Create the DHCP pool, which includes the necessary parameters such as the default router and server name. This is an example DHCP scope:

```
ip dhcp pool <pool name>
network <ip network> <netmask>
default-router <default-router IP address>
dns-server <dns server IP address>
```

3. Add the Option 43 line with this syntax:

```
option 43 hex <hexadecimal string>
```

The hexadecimal string in step 3 is assembled as a sequence of the TLV values for the Option 43 suboption: Type + Length + Value. Type is always the suboption code 0xf1. Length is the number of controller management IP addresses times 4 in hex. Value is the IP address of the controller listed sequentially in hex.

For example, suppose there are two controllers with management interface IP addresses, 192.168.10.5 and 192.168.10.20. The type is 0xf1. The length is 2 * 4 = 8 = 0x08. The IP addresses translate to c0a80a05 (192.168.10.5) and c0a80a14 (192.168.10.20). When the string is assembled, it yields f108c0a80a05c0a80a14. The Cisco IOS command that is added to the DHCP scope is:

```
option 43 hex f108c0a80a05c0a80a14
```

Linux ISC DHCP Server

The information in this section describes how the Linux ISC server is configured to return vendor specific information to lightweight Cisco Aironet Series APs. This example configures the Linux ISC server to return vendor specific information to the 1140, 1200, 1130 and 1240 Series Lightweight APs. This configuration can be modified and applied to other series of LAPs.

```
ddns-update-style interim;
     allow bootp;
     option space Cisco_LWAPP_AP;
     option Cisco_LWAPP_AP.server-address code 241 = array of ip-address;
     subnet 192.168.247.0 netmask 255.255.255.0 {
     authoritative;
     option routers 192.168.247.1;
     option subnet-mask 255.255.255.0;
     option domain-name "cisco.com";
     option domain-name-servers 192.168.247.2, 192.168.247.3;
     range dynamic-bootp 192.168.247.11 192.168.247.254;
     default-lease-time 300;

class "Cisco-AP-c1140" {

       match if option vendor-class-identifier = "Cisco AP c1140";
       option vendor-class-identifier "Cisco AP c1140";
```

```
      vendor-option-space Cisco_LWAPP_AP;
      option Cisco_LWAPP_AP.server-address 192.168.247.5; }

class "Cisco AP c1200" {

  match if option vendor-class-identifier = "Cisco AP c1200";
  option vendor-class-identifier "Cisco AP c1200";
  vendor-option-space Cisco_LWAPP_AP;
  option Cisco_LWAPP_AP.server-address 192.168.247.55; }


class "Cisco AP c1130" {

  match if option vendor-class-identifier = "Cisco AP c1130";
  option vendor-class-identifier "Cisco AP c1130";
  vendor-option-space Cisco_LWAPP_AP;
  option Cisco_LWAPP_AP.server-address 192.168.247.5; }


class "Cisco AP c1240" {

  match if option vendor-class-identifier = "Cisco AP c1240";
  option vendor-class-identifier "Cisco AP c1240";
  vendor-option-space Cisco_LWAPP_AP;
  option Cisco_LWAPP_AP.server-address 192.168.247.5; }

}
```

Cisco Network Registrar DHCP Server

The Cisco Network Registrar DHCP server supports Vendor Specific attributes. Refer to this example for Creating Vendor Option Set for Cisco AP Devices.

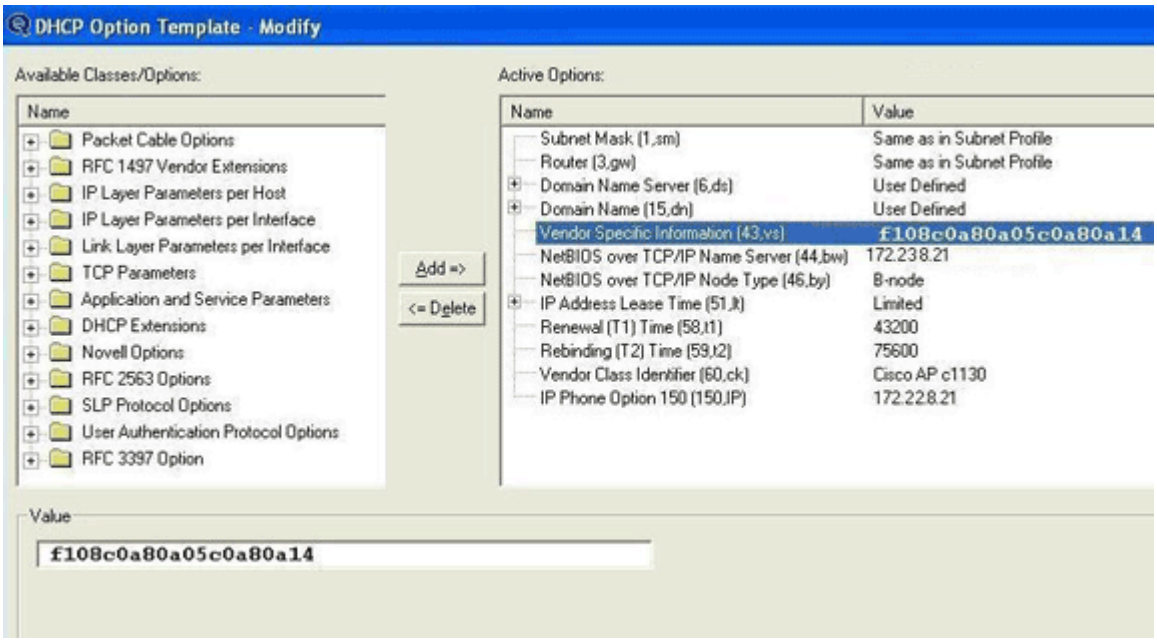
Lucent QIP DHCP Server

This section provides a few tips for how to configure the Lucent QIP DHCP server to return vendor specific information to lightweight Cisco Aironet Series APs.

Note: For complete information and the steps involved, refer to the documentation provided by the vendor.

The DHCP Option 43 can contain any vendor specific information. The DHCP server passes this information in the form of a hex string to the clients that receive the DHCP offer.

On the Lucent QIP DHCP server, the vendor-specific information can be provided on the DHCP Option Template- Modify page. In the Active Options area, choose **Vendor Specific Information**, and enter the information in the Value field.



To include the controller IP addresses in the DHCP option 43 message, enter the information to the DHCP Option template in QIP as a single hex value: **[ip hex]**.

To send more than one IP address with DHCP Option 43, enter the information to the DHCP Option template in QIP as a single hex value:**[ip hex ip hex]** and **not [ip hex],[ip hex]**. In this case, the comma in the middle causes problems for DHCP to parse the string passed from QIP.

For example, suppose there are two controllers with management interface IP addresses, 192.168.10.5 and 192.168.10.20. The type is 0xf1. The length is 2 * 4 = 8 = 0x08. The IP addresses translate to c0a80a05 (192.168.10.5) and c0a80a14 (192.168.10.20). When the string is assembled, it yields f108c0a80a05c0a80a14. On the Lucent QIP DHCP server, the hex string that needs to be added to the DHCP scope is:

<#root>

[f108c0a80a05c0a80a14]

The hex string must be given within square brackets. The square brackets are mandatory. Once the DHCP option 43 is modified to reflect this value, the LAPs can find and register with the controller.

Verify

Use this section to verify your configuration.

The Output Interpreter Tool (registered customers only) supports certain **show** commands. Use the Output Interpreter Tool to view an analysis of **show** command output.

If you use 1130 /1200/1230/1240 Series LAPs which have a console port, you can check that the WLC IP addresses are provided to the LAPs during DHCP IP address assignment. This is a sample output from a Cisco 1230 Series LAP:

<#root>

```
*Mar  1 00:00:17.497: %LINEPROTO-5-UPDOWN: Line protocol on Interface
      Dot11Radio1, changed state to down
*Mar  1 00:00:17.898: %LINEPROTO-5-UPDOWN: Line protocol on Interface
      Dot11Radio0, changed state to down
*Mar  1 00:00:25.352: %DOT11-6-FREQ_USED: Interface Dot11Radio0, frequency
      2447 selected
*Mar  1 00:00:25.353: %LINK-3-UPDOWN: Interface Dot11Radio0, changed state
      to up
*Mar  1 00:00:26.352: %LINEPROTO-5-UPDOWN: Line protocol on Interface
      Dot11Radio0, changed state to up
*Mar  1 00:00:29.440: %LWAPP-5-CHANGED: LWAPP changed state to DISCOVERY
*Mar  1 00:00:29.475: %LINK-5-CHANGED: Interface Dot11Radio0, changed state
      to reset
*Mar  1 00:00:29.704: %LINK-3-UPDOWN: Interface Dot11Radio1, changed state
      to up
*Mar  1 00:00:30.121: Logging LWAPP message to 255.255.255.255.

%SYS-6-LOGGINGHOST_STARTSTOP: Logging to host 255.255.255.255 started - CLI
      initiated
%LINK-3-UPDOWN: Interface Dot11Radio0, changed state to up
%LINK-5-CHANGED: Interface Dot11Radio1, changed state to reset
%LINK-3-UPDOWN: Interface Dot11Radio1, changed state to up
%LINK-5-CHANGED: Interface Dot11Radio0, changed state to reset
%LINK-3-UPDOWN: Interface Dot11Radio0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Dot11Radio1, changed state
      to up
Translating "CISCO-LWAPP-CONTROLLER"...domain server (255.255.255.255)
%DHCP-6-ADDRESS_ASSIGN:

Interface FastEthernet0 assigned DHCP address
      A.B.C.D, mask 255.0.0.0, hostname AP001b.d4e3.a81b


%LWAPP-3-CLIENTEVENTLOG:

Controller address 192.168.10.5 obtained through DHCP


%LWAPP-3-CLIENTEVENTLOG:

Controller address 192.168.10.5 obtained through DHCP
```

If you use a Cisco IOS DHCP server, enter the **show ip dhcp binding** command to view the list of the DHCP addresses assigned to DHCP clients. Example:

<#root>

```
2800-ISR-TSWEB#
```

```
show ip dhcp binding



Bindings from all pools not associated with VRF:
IP address          Client-ID/              Lease expiration        Type
                    Hardware address/
                    User name
192.168.25.1        000b.855b.fbd0          Jun 29 2007 11:49 AM    Automatic
```

On the WLC CLI, you can enter the **show ap summary** command to verify that the APs registered with the WLC. Example:

```
<#root>

    ((Cisco Controller) >

show ap summary



    AP Name        Slots  AP Model   Ethernet MAC       Location          Port
    -------------  -----  ---------  -----------------  ----------------  ----
    ap:5b:fb:d0    2      AP1010     00:0b:85:5b:fb:d0  default_location  1
```

If you have Wireless LANs configured, you can enter the **show client summary** command to see the clients that are registered with the WLC:

```
<#root>

(Cisco Controller) >

show client summary



    Number of Clients.............................. 1

    MAC Address        AP Name        Status         WLAN  Auth  Protocol  Port
    -----------------  -------------  -------------  ----  ----  --------  ----
    00:40:96:a1:45:42  ap:64:a3:a0    Associated     4     Yes   802.11a   1
```

Troubleshoot

Use this section to troubleshoot your configuration.

The Output Interpreter Tool (registered customers only) supports certain **show** commands. Use the Output

Interpreter Tool to view an analysis of **show** command output.

Note: Refer to Important Information on Debug Commands before you use **debug** commands.

Enter the **debug dhcp message enable** command on the WLC to view the sequence of events that occur between the DHCP server and client. Example:

<#root>

```
(Cisco Controller) >Thu Jun 28 17:07:53 2007: 00:0b:85:5b:fb:d0
      dhcp option len,
    including the magic cookie = 38
Thu Jun 28 17:07:53 2007: 00:0b:85:5b:fb:d0 dhcp option:


received DHCP DISCOVER msg


Thu Jun 28 17:07:53 2007: 00:0b:85:5b:fb:d0 dhcp option:
      skipping option 57, len 2
Thu Jun 28 17:07:53 2007: 00:0b:85:5b:fb:d0 dhcp option:
      skipping option 55, len 6
Thu Jun 28 17:07:53 2007: 00:0b:85:5b:fb:d0 dhcp option:


    vendor class id = Airespace.AP1200 (len 16)


Thu Jun 28 17:07:53 2007: 00:0b:85:5b:fb:d0 dhcpParseOptions: options end,
    len 38, actual 64
Thu Jun 28 17:07:53 2007: dhcpd: sending 300 bytes raw
    0.0.0.0:68 -> 10.77.244.212:1067
Thu Jun 28 17:07:53 2007: dhcpd: Received 300 byte dhcp packet
    from 0xd4f44d0a 10.77.244.212:68
Thu Jun 28 17:07:58 2007: 00:0b:85:5b:fb:d0 dhcp option len, including
    the magic cookie = 50
Thu Jun 28 17:07:58 2007: 00:0b:85:5b:fb:d0 dhcp option: received DHCP
      REQUEST msg
Thu Jun 28 17:07:58 2007: 00:0b:85:5b:fb:d0 dhcp option:

requested ip =
      192.168.25.1


Thu Jun 28 17:07:58 2007: 00:0b:85:5b:fb:d0 dhcp option:

server id =
      192.168.25.10


Thu Jun 28 17:07:58 2007: 00:0b:85:5b:fb:d0 dhcp option: skipping option 57,
      len 2
Thu Jun 28 17:07:58 2007: 00:0b:85:5b:fb:d0 dhcp option: skipping option 55,
      len 6
```

This is the **debug lwapp packet enable** command output from the WLC that indicates that DHCP option 43 is used as the discovery method to discover WLC IP addresses:

<#root>

```
Thu Jun 28 17:51:47 2007: Received LWAPP DISCOVERY REQUEST from AP
      00:0b:85:5b:fb:d0
    to 00:0b:85:33:84:a0 on port '1'
Thu Jun 28 17:51:47 2007: Successful transmission of LWAPP Discovery-Response
    to AP 00:0b:85:5b:fb:d0 on Port 1
Thu Jun 28 19:22:39 2007: Start of Packet
Thu Jun 28 19:22:39 2007: Ethernet Source MAC (LRAD):      00:D0:58:AD:AE:CB
Thu Jun 28 19:22:39 2007: Msg Type       :
Thu Jun 28 19:22:39 2007:    DISCOVERY_REQUEST
Thu Jun 28 19:22:39 2007: Msg Length     :   31
Thu Jun 28 19:22:39 2007: Msg SeqNum     :   0
Thu Jun 28 19:22:39 2007:
        IE            :

 UNKNOWN IE 58


Thu Jun 28 19:22:39 2007:     IE Length     :   1
Thu Jun 28 19:22:39 2007:     Decode routine not available, Printing Hex Dump
Thu Jun 28 19:22:39 2007:

00000000: 03

                                                .
Thu Jun 28 19:22:39 2007:
```

The value of the IE 58 parameter indicates the discovery type. For DCHP Option 43 it is 3.

If you use the Cisco IOS DHCP server on the router, you can enter the **debug dhcp detail** command and the **debug ip dhcp server events** command to view the DHCP client and server activity. Here is an example from the **debug ip dhcp server events** command:

<#root>

```
*Jun 28 11:49:33.107: DHCPD: Sending notification of DISCOVER:
*Jun 28 11:49:33.107:   DHCPD: htype 1 chaddr 000b.855b.fbd0
*Jun 28 11:49:33.107:   DHCPD: remote id 020a0000c0a8190a01000000
*Jun 28 11:49:33.107:   DHCPD: circuit id 00000000
*Jun 28 11:49:33.107: DHCPD: Seeing if there is an internally specified
      pool class:
*Jun 28 11:49:33.107:   DHCPD: htype 1 chaddr 000b.855b.fbd0
*Jun 28 11:49:33.107:   DHCPD: remote id 020a0000c0a8190a01000000
*Jun 28 11:49:33.107:   DHCPD: circuit id 00000000
*Jun 28 11:49:38.603: DHCPD: Sending notification of ASSIGNMENT:
*Jun 28 11:49:38.603:  DHCPD: address 192.168.25.1 mask 255.255.255.0
*Jun 28 11:49:38.603:   DHCPD: htype 1 chaddr 000b.855b.fbd0
*Jun 28 11:49:38.603:   DHCPD: lease time remaining (secs) = 86400
*Jun 28 11:49:38.607: DHCPD:
```

```
Sending notification of ASSIGNMENT:


*Jun 28 11:49:38.607:  DHCPD:

address 192.168.25.1 mask 255.255.255.0


*Jun 28 11:49:38.607:   DHCPD: htype 1 chaddr 000b.855b.fbd0
*Jun 28 11:49:38.607:   DHCPD: lease time remaining (secs) = 86400
```

Enter the **show ip dhcp binding** command to view the list of the DHCP addresses assigned to DHCP clients.

<#root>

```
2800-ISR-TSWEB#

show ip dhcp binding



Bindings from all pools not associated with VRF:
IP address          Client-ID/              Lease expiration        Type
                    Hardware address/
                    User name
192.168.25.1        000b.855b.fbd0          Jun 29 2007 11:49 AM    Automatic
```

Related Information

- Configure the Lightweight Access Point to join the respective Wireless LAN Controller
- Wireless Product Support
- Global Use AP Deployment Guide
- Jiri blog on converting hundreds of APs to capwap mode