



Configuring DHCP

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Restrictions for Configuring DHCP for WLANs

- The controller internal DHCP server does not support Cisco Aironet 600 Series OfficeExtend Access Point.
- Internal DHCP servers are not supported in Cisco Flex 7510 WLCs. As a workaround, you can use External DHCP servers.
- For WLANs with local switching and central DHCP feature enabled, clients with static IP addresses are not allowed. Enabling central DHCP will internally enable DHCP required option.

Information about Dynamic Host Configuration Protocol

You can configure WLANs to use the same or different Dynamic Host Configuration Protocol (DHCP) servers or no DHCP server. Two types of DHCP servers are available: internal and external.

This section contains the following subsections:

Internal DHCP Servers

The controllers contain an internal DHCP server. This server is typically used in branch offices that do not already have a DHCP server.

The wireless network generally contains a maximum of 10 APs or less, with the APs on the same IP subnet as the controller.

The internal server provides DHCP addresses to wireless clients, direct-connect APs, and DHCP requests that are relayed from APs. Only lightweight access points are supported. When you want to use the internal DHCP server, ensure that you configure SVI for client VLAN and set the IP address as DHCP server IP address.

DHCP option 43 is not supported on the internal server. Therefore, the access point must use an alternative method to locate the management interface IP address of the controller, such as local subnet broadcast, Domain Name System (DNS), or priming.

Also, an internal DHCP server can serve only wireless clients, not wired clients.

When clients use the internal DHCP server of the controller, IP addresses are not preserved across reboots. As a result, multiple clients can be assigned to the same IP address. To resolve any IP address conflicts, clients must release their existing IP address and request a new one.

Wired guest clients are always on a Layer 2 network connected to a local or foreign controller.



Note

- VRF is not supported in the internal DHCP servers.
 - DHCPv6 is not supported in the internal DHCP servers.
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External DHCP Servers

The operating system is designed to appear as a DHCP Relay to the network and as a DHCP server to clients with industry-standard external DHCP servers that support DHCP Relay, which means that each controller appears as a DHCP Relay agent to the DHCP server and as a DHCP server at the virtual IP address to wireless clients.

Because the controller captures the client IP address that is obtained from a DHCP server, it maintains the same IP address for that client during intra controller, inter controller, and inter-subnet client roaming.



Note

External DHCP servers can support DHCPv6.

DHCP Assignments

You can configure DHCP on a per-interface or per-WLAN basis. We recommend that you use the primary DHCP server address that is assigned to a particular interface.

You can assign DHCP servers for individual interfaces. You can configure the management interface, AP-manager interface, and dynamic interface for a primary and secondary DHCP server, and you can configure the service-port interface to enable or disable DHCP servers. You can also define a DHCP server on a WLAN. In this case, the server overrides the DHCP server address on the interface assigned to the WLAN.

Security Considerations

For enhanced security, we recommend that you require all clients to obtain their IP addresses from a DHCP server. To enforce this requirement, you can configure all WLANs with a DHCP Addr. Assignment Required setting, which disallows client static IP addresses. If DHCP Addr. Assignment Required is selected, clients

must obtain an IP address via DHCP. Any client with a static IP address is not allowed on the network. The controller monitors DHCP traffic because it acts as a DHCP proxy for the clients.

**Note**

- WLANs that support management over wireless must allow management (device-servicing) clients to obtain an IP address from a DHCP server.
- The operating system is designed to appear as a DHCP Relay to the network and as a DHCP server to clients with industry-standard external DHCP servers that support DHCP Relay. This means that each controller appears as a DHCP Relay agent to the DHCP server and as a DHCP server at the virtual IP address to wireless clients.

If slightly less security is tolerable, you can create WLANs with DHCP Addr. Assignment Required disabled. Clients then have the option of using a static IP address or obtaining an IP address from a designated DHCP server.

**Note**

DHCP Addr. Assignment Required is not supported for wired guest LANs.

You can create separate WLANs with DHCP Addr. Assignment Required configured as disabled. This is applicable only if DHCP proxy is enabled for the controller. You must not define the primary/secondary configuration DHCP server you should disable the DHCP proxy. These WLANs drop all DHCP requests and force clients to use a static IP address. These WLANs do not support management over wireless connections.

Configuring DHCP Per WLAN (GUI)

To configure a primary DHCP server for a management, AP-manager, or dynamic interface, see the Configuring Ports and Interfaces chapter.

When you want to use the internal DHCP server, you must set the management interface IP address of the controller as the DHCP server IP address.

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- Step 1** Choose **WLANs** to open the WLANs page.
 - Step 2** Click the ID number of the WLAN for which you want to assign an interface. The **WLANs > Edit (General)** page appears.
 - Step 3** On the **General** tab, uncheck the **Status** check box and click Apply to disable the WLAN.
 - Step 4** Reclick the ID number of the WLAN.
 - Step 5** On the **General** tab, choose the interface for which you configured a primary DHCP server to be used with this WLAN from the **Interface** drop-down list.
 - Step 6** Choose the **Advanced** tab to open the **WLANs > Edit (Advanced)** page.
 - Step 7** If you want to define a DHCP server on the WLAN that will override the DHCP server address on the interface assigned to the WLAN, check the **DHCP Server Override** check box and enter the IP address of the desired DHCP server in the **DHCP Server IP Addr** field. The default value for the check box is disabled.

Note The preferred method for configuring DHCP is to use the primary DHCP address assigned to a particular interface instead of the DHCP server override.

Note DHCP Server override is applicable only for the default group.

Note If a WLAN has the DHCP server override option enabled and the controller has DHCP proxy enabled, any interface mapped to the WLAN must have a DHCP server IP address or the WLAN must be configured with a DHCP server IP address.

Step 8 If you want to require all clients to obtain their IP addresses from a DHCP server, check the **DHCP Addr. Assignment Required** check box. When this feature is enabled, any client with a static IP address is not allowed on the network. The default value is disabled.

Note DHCP Addr. Assignment Required is not supported for wired guest LANs.

Note PMIPv6 supports only DHCP based clients and Static IP address is not supported.

Step 9 Click **Apply**.

Step 10 On the **General** tab, check the **Status** check box and click **Apply** to reenable the WLAN.

Step 11 Click **Save Configuration**.

Configuring DHCP Per WLAN (CLI)

Step 1 Disable the WLAN by entering this command:

```
config wlan disable wlan-id
```

Step 2 Specify the interface for which you configured a primary DHCP server to be used with this WLAN by entering this command:

```
config wlan interface wlan-id interface_name
```

Step 3 If you want to define a DHCP server on the WLAN that will override the DHCP server address on the interface assigned to the WLAN, enter this command:

```
config wlan dhcp_server wlan-id dhcp_server_ip_address [required]
```

The **required** is an optional argument. Using this argument forces DHCP address assignment to be applied to the WLAN.

Note The preferred method for configuring DHCP is to use the primary DHCP address assigned to a particular interface instead of the DHCP server override. If you enable the override, you can use the **show wlan** command to verify that the DHCP server has been assigned to the WLAN.

Note If a WLAN has the DHCP server override option enabled and the controller has DHCP proxy enabled, any interface mapped to the WLAN must have a DHCP server IP address or the WLAN must be configured with a DHCP server IP address.

Note PMIPv6 supports only DHCP based clients and Static IP address is not supported.

Step 4 Reenable the WLAN by entering this command:

```
config wlan enable wlan-id
```

Debugging DHCP (CLI)

Use these commands to debug DHCP:

- **debug dhcp packet** {enable | disable}—Enables or disables debugging of DHCP packets.
- **debug dhcp message** {enable | disable}—Enables or disables debugging of DHCP error messages.
- **debug dhcp service-port** {enable | disable}—Enables or disables debugging of DHCP packets on the service port.

DHCP Client Handling

Controller supports two modes of DHCP operations in case an external DHCP server is used, DHCP proxy mode and DHCP bridging mode.

The DHCP proxy mode serves as a DHCP helper function to achieve better security and control over DHCP transaction between the DHCP server and the wireless clients. DHCP bridging mode provides an option to make controller's role in DHCP transaction entirely transparent to the wireless clients.

Table 1: Comparison of DHCP Proxy and Bridging Modes

Handling Client DHCP	DHCP Proxy Mode	DHCP Bridging Mode
Modify giaddr	Yes	No
Modify siaddr	Yes	No
Modify Packet Content	Yes	No
Redundant offers not forwarded	Yes	No
Option 82 Support	Yes	No
Broadcast to Unicast	Yes	No
BOOTP support	No	Server
Per WLAN configurable	Yes	No
RFC Non-compliant	Proxy and relay agent are not exactly the same concept. But DHCP bridging mode is recommended for full RFC compliance.	No

SUMMARY STEPS

1. To enable client profiling, you must enable the **DHCP required** flag and disable the local authentication flag.
2. To configure a DHCP timeout value, use the **config dhcp timeout** command. If you have configured a WLAN to be in DHCP required state, this timer controls how long the controller will wait for a client to get a DHCP lease through DHCP.

DETAILED STEPS

	Command or Action	Purpose
Step 1	To enable client profiling, you must enable the DHCP required flag and disable the local authentication flag.	
Step 2	To configure a DHCP timeout value, use the config dhcp timeout command. If you have configured a WLAN to be in DHCP required state, this timer controls how long the controller will wait for a client to get a DHCP lease through DHCP.	