



## System Configuration

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- [Information About New Configuration Model, on page 1](#)
- [Configuring a Wireless Profile Policy \(GUI\), on page 3](#)
- [Configuring a Wireless Profile Policy \(CLI\), on page 4](#)
- [Configuring a Flex Profile, on page 5](#)
- [Configuring an AP Profile \(GUI\), on page 6](#)
- [Configuring an AP Profile \(CLI\), on page 9](#)
- [Configuring an RF Profile \(GUI\), on page 10](#)
- [Configuring an RF Profile \(CLI\), on page 10](#)
- [Enhanced Site Tag-Based Load Balancing, on page 11](#)
- [Configuring Policy Tag \(GUI\), on page 14](#)
- [Configuring a Policy Tag \(CLI\), on page 14](#)
- [Configuring Wireless RF Tag \(GUI\), on page 15](#)
- [Configuring Wireless RF Tag \(CLI\), on page 15](#)
- [Attaching a Policy Tag and Site Tag to an AP \(GUI\), on page 16](#)
- [Attaching Policy Tag and Site Tag to an AP \(CLI\), on page 17](#)
- [Time Management, on page 18](#)
- [AP Filter, on page 18](#)
- [Configuring Access Point for Location Configuration, on page 22](#)

## Information About New Configuration Model

The configuration of Cisco Embedded Wireless Controller on Catalyst Access Points is simplified using different tags, namely rf-tag, policy-tag, and site-tag. The access points would derive their configuration from the profiles that are contained within the tags.

Profiles are a collection of feature-specific attributes and parameters applied to tags. The rf-tag contains the radio profiles, the policy-tag contains the WLAN profile and policy profile, and the site-tag contains the flex profile and ap-join profile.

### Policy Tag

The policy tag constitutes mapping of the WLAN profile to the policy profile. The WLAN profile defines the wireless characteristics of the WLAN. The policy profile defines the network policies and the switching policies for the client (Quality of Service [QoS] is an exception which constitutes AP policies as well).

The policy tag contains the map of WLAN policy profile. There can be a maximum of 16 such entries per policy tag. Changes to the map entries are effected based on the status of the WLAN profile and policy profile. For example, if a map (WLAN1 and Policy1) is added to the policy tag, and both the WLAN profile and the policy profile are enabled, the definitions are pushed to the APs using the policy tag. However, if one of them is in disabled state, the definition is not pushed to the AP. Similarly, if a WLAN profile is already being broadcast by an AP, it can be deleted using the no form of the command in the policy tag.

### Site Tag

The site tag defines the properties of a site and contains the flex profile and the AP join profile. The attributes that are specific to the corresponding flex or remote site are part of the flex profile. Apart from the flex profile, the site tag also comprises attributes that are specific to the physical site (and hence cannot be a part of the profile that is a reusable entity). For example, the list of primary APs for efficient upgrade is a part of a site tag rather than that of a flex profile.

If a flex profile name or an AP profile name is changed in the site tag, the AP is forced to rejoin the controller by disconnecting the Datagram Transport Layer Security (DTLS) session. When a site tag is created, the AP and flex profiles are set to default values (default-ap-profile and default-flex-profile).

### RF Tag

The RF tag contains the 2.4 GHz and 5 GHz RF profiles. The default RF tag contains the global configuration. Both these profiles contain the same default values for global RF profiles for the respective radios.

### Profiles

Profiles are a collection of feature-specific attributes and parameters applied to tags. Profiles are reusable entities that can be used across tags. Profiles (used by tags) define the properties of the APs or its associated clients.

### WLAN Profile

WLAN profiles are configured with same or different service set identifiers (SSIDs). An SSID identifies the specific wireless network for the controller to access. Creating WLANs with the same SSID allows to assign different Layer 2 security policies within the same wireless LAN.

To distinguish WLANs having the same SSID, create a unique profile name for each WLAN. WLANs with the same SSID must have unique Layer 2 security policies so that clients can select a WLAN based on the information advertised in the beacon and probe responses. The switching and network policies are not part of the WLAN definition.

### Policy Profile

Policy profile broadly consists of network and switching policies. Policy profile is a reusable entity across tags. Anything that is a policy for a client that is applied on an AP or controller is moved to the policy profile, for example, VLAN, ACL, QoS, session timeout, idle timeout, AVC profile, bonjour profile, local profiling, device classification, BSSID QoS, and so on. However, all the wireless-related security attributes and features on the WLAN are grouped under the WLAN profile.

### Flex Profile

Flex profile contains policy attributes and remote site-specific parameters. For example, the EAP profiles that can be used when the AP acts as an authentication server for local RADIUS server information, VLAN-ACL mapping, VLAN name-to-ID mapping, and so on.

### AP Join Profile

The default AP join profile values will have the global AP parameters and the AP group parameters. The AP join profile contains attributes that are specific to AP, such as CAPWAP, IPv4 and IPv6, UDP Lite, High Availability, Retransmit config parameters, Global AP failover, Hyperlocation config parameters, Telnet and SSH, 11u parameters, and so on.



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**Note** Telnet is not supported for the following Cisco AP models: 1542D, 1542I, 1562D, 1562E, 1562I, 1562PS, 1800S, 1800T, 1810T, 1810W, 1815M, 1815STAR, 1815TSN, 1815T, 1815W, 1832I, 1840I, 1852E, 1852I, 2802E, 2802I, 2802H, 3700C, 3800, 3802E, 3802I, 3802P, 4800, IW6300, ESW6300, 9105AXI, 9105AXW, 9115AXI, 9115AXE, 9117I, APVIRTUAL, 9120AXI, 9120AXE, 9124AXI, 9124AXD, 9130AXI, 9130AXE, 9136AXI, 9162I, 9164I, and 9166I.

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### RF Profile

RF profile contains the common radio configuration for the APs. RF profiles are applied to all the APs that belong to an AP group, where all the APs in that group have the same profile settings.

### Association of APs

APs can be associated using different ways. The default option is by using Ethernet MAC address, where the MAC is associated with policy-tag, site tag, and RF tag.

In filter-based association, APs are mapped using regular expressions. A regular expression (regex) is a pattern to match against an input string. Any number of APs matching that regex will have policy-tag, site tag, and RF tag mapped to them, which is created as part of the AP filter.

In AP-based association, tag names are configured at the PnP server and the AP stores them and sends the tag name as part of discovery process.

In location-based association, tags are mapped as per location and are pushed to any AP Ethernet MAC address mapped to that location.

### Modifying AP Tags

Modifying an AP tag results in DTLS connection reset, forcing the AP to rejoin the controller. If only one tag is specified in the configuration, default tags are used for other types, for example, if only policy tag is specified, the default-site-tag and default-rf-tag will be used for site tag and RF tag.

## Configuring a Wireless Profile Policy (GUI)

### Procedure

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- Step 1** Choose **Configuration > Tags & Profiles > Policy**.
- Step 2** On the **Policy Profile** page, click **Add**.
- Step 3** In the **Add Policy Profile** window, in **General** tab, enter a name and description for the policy profile. The name can be ASCII characters from 32 to 126, without leading and trailing spaces. Do not use spaces as it causes system instability.

**Step 4** To enable the policy profile, set **Status** as **Enabled**.

**Step 5** In the WLAN Switching Policy section, choose the following, as required:

- No Central Switching: Tunnels both the wireless user traffic and all control traffic via CAPWAP to the centralized controller where the user traffic is mapped to a dynamic interface/VLAN on the controller. This is the normal CAPWAP mode of operation.
- Central Authentication: Tunnels client data to the controller, as the controller handles client authentication.
- No Central DHCP: The DHCP packets received from AP are centrally switched to the controller and then forwarded to the corresponding VLAN based on the AP and the SSID.
- Central Association Enable: When central association is enabled, all switching is done on the controller.
- Flex NAT/PAT: Enables Network Address Translation(NAT) and Port Address Translation (PAT) mode.

**Step 6** Click **Save & Apply to Device**.

## Configuring a Wireless Profile Policy (CLI)

Follow the procedure given below to configure a wireless profile policy:



**Note** When a client moves from an old controller to a new controller (managed by Cisco Prime Infrastructure), the old IP address of the client is retained, if the IP address is learned by ARP or data gleaning. To avoid this scenario, ensure that you enable **ipv4 dhcp required** command in the policy profile. Otherwise, the IP address gets refreshed only after a period of 24 hours.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 2</b>	<b>wireless profile policy <i>profile-policy</i></b>  <b>Example:</b> Device(config)# wireless profile policy rr-xyz-policy-1	Configures WLAN policy profile and enters wireless policy configuration mode.
<b>Step 3</b>	<b>idle-timeout <i>timeout</i></b>  <b>Example:</b> Device(config-wireless-policy)# idle-timeout 1000	(Optional) Configures the duration of idle timeout, in seconds.

	Command or Action	Purpose
<b>Step 4</b>	<b>vlan <i>vlan-id</i></b> <b>Example:</b> Device(config-wireless-policy)# vlan 24	Configures VLAN name or VLAN ID.
<b>Step 5</b>	<b>no shutdown</b> <b>Example:</b> Device(config-wireless-policy)# no shutdown	Saves the configuration and exits configuration mode and returns to privileged EXEC mode.
<b>Step 6</b>	<b>show wireless profile policy summary</b> <b>Example:</b> Device# show wireless profile policy summary	Displays the configured policy profiles. <b>Note</b> (Optional) To view detailed information about a policy profile, use the <b>show wireless profile policy detailed <i>policy-profile-name</i></b> command.

## Configuring a Flex Profile

Follow the procedure given below to set a flex profile:

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 2</b>	<b>wireless profile flex <i>flex-profile</i></b> <b>Example:</b> Device(config)# wireless profile flex rr-xyz-flex-profile	Configures a Flex profile and enters Flex profile configuration mode.
<b>Step 3</b>	<b>description</b> <b>Example:</b> Device(config-wireless-flex-profile)# description xyz-default-flex-profile	(Optional) Enables default parameters for the flex profile.
<b>Step 4</b>	<b>arp-caching</b> <b>Example:</b> Device(config-wireless-flex-profile)# arp-caching	(Optional) Enables ARP caching.
<b>Step 5</b>	<b>end</b> <b>Example:</b>	Saves the configuration and exits configuration mode and returns to privileged EXEC mode.

	Command or Action	Purpose
	Device(config-wireless-flex-profile)# end	
<b>Step 6</b>	<b>show wireless profile flex summary</b>  <b>Example:</b> Device# show wireless profile flex summary	(Optional) Displays the flex-profile parameters.  <b>Note</b> To view detailed parameters about the flex profile, use the <b>show wireless profile flex detailed flex-profile-name</b> command.

## Configuring an AP Profile (GUI)

### Before you begin

The default AP join profile values will have the global AP parameters and the AP group parameters. The AP join profile contains attributes that are specific to AP, such as CAPWAP, IPv4/IPv6, UDP Lite, High Availability, retransmit configuration parameters, global AP failover, Hyperlocation configuration parameters, Telnet/SSH, 11u parameters, and so on.

### Procedure

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- Step 1** Choose **Configuration > Tags & Profiles > AP Join**.
- Step 2** On the **AP Join Profile** page, click **Add**.  
The **Add AP Join Profile** page is displayed.
- Step 3** In the **General** tab, enter a name and description for the AP join profile.
- Step 4** Check the **LED State** check box to set the LED state of all APs connected to the device to blink so that the APs are easily located.
- Step 5** In the **Client** tab and **Statistics Timer** section, enter the time in seconds that the AP sends its 802.11 statistics to the controller.
- Step 6** In the **TCP MSS Configuration** section, check the **Adjust MSS Enable** check box to enter value for Adjust MSS. You can enter or update the maximum segment size (MSS) for transient packets that traverse a router. TCP MSS adjustment enables the configuration of the maximum segment size (MSS) for transient packets that traverse a router, specifically TCP segments with the SYN bit set.
- In a CAPWAP environment, a lightweight access point discovers a device by using CAPWAP discovery mechanisms, and then sends a CAPWAP join request to the device. The device sends a CAPWAP join response to the access point that allows the access point to join the device.
- When the access point joins the device, the device manages its configuration, firmware, control transactions, and data transactions.
- Step 7** In the **AP** tab, you can configure the following:
- General
    - a) In the **General** tab, check the **Switch Flag** check box to enable switches.

- b) Check the **Power Injector State** check box if power injector is being used. Power Injector increases wireless LAN deployment flexibility of APs by providing an alternative powering option to local power, inline power-capable multiport switches, and multiport power patch panels.
- c) From the **Power Injector Type** drop-down list, choose power injector type from the following options:
  - **Installed**: If you want the AP to examine and remember the MAC address of the currently connected switch port. (This selection assumes that a power injector is connected.)
  - **Override**: To enable the AP to operate in high-power mode without first verifying a matching MAC address.
- d) In the **Injector Switch MAC** field, enter the MAC address of the switch.
- e) From the **EAP Type** drop-down list, choose the EAP type as *EAP-FAST*, *EAP-TLS*, or *EAP-PEAP*.
- f) From the **AP Authorization Type** drop-down list, choose the type as either *CAPWAP DTLS +* or *CAPWAP DTLS*.
- g) In the **Client Statistics Reporting Interval** section, enter the interval for 5 GHz and 2.4 GHz radios in seconds.
- h) Check the **Enable** check box to enable extended module.
- i) From the **Profile Name** drop-down list, choose a profile name.
- j) Click **Save & Apply to Device**.
  - **Hyperlocation**: Cisco Hyperlocation is a location solution that allows to track the location of wireless clients with the accuracy of one meter. Selecting this option disables all other fields in the screen, except NTP Server.
- a) In the **Hyperlocation** tab, check the **Enable Hyperlocation** check box.
- b) Enter the **Detection Threshold** value to filter out packets with low RSSI. The valid range is –100 dBm to –50 dBm.
- c) Enter the **Trigger Threshold** value to set the number of scan cycles before sending a BAR to clients. The valid range is 0 to 99.
- d) Enter the **Reset Threshold** value to reset value in scan cycles after trigger. The valid range is 0 to 99.
- e) Enter the **NTP Server** IP address.
- f) Click **Save & Apply to Device**.
  - **BLE**: If your APs are Bluetooth Low Energy (BLE) enabled, they can transmit beacon messages that are packets of data or attributes transmitted over a low energy link. These BLE beacons are frequently used for health monitoring, proximity detection, asset tracking, and in-store navigation. For each AP, you can customize BLE Beacon settings configured globally for all APs.
- a) In the **BLE** tab, enter a value in the **Beacon Interval** field to indicate how often you want your APs to send out beacon advertisements to nearby devices. The range is from 1 to 10, with a default of 1.
- b) In the **Advertised Attenuation Level** field, enter the attenuation level. The range is from 40 to 100, with a default of 59.
- c) Click **Save & Apply to Device**.

**Step 8**

In the **Management** tab, you can configure the following:

- **Device**

- a) In the **Device** tab, enter the **IPv4/IPv6 Address** of the TFTP server, **TFTP Downgrade** section.
- b) In the **Image File Name** field, enter the name of the software image file.
- c) From the **Facility Value** drop-down list, choose the appropriate facility.

- d) Enter the IPv4 or IPv6 address of the host.
- e) Choose the appropriate **Log Trap Value**.
- f) Enable Telnet and/or SSH configuration, if required.
- g) Enable core dump, if required.
- h) Click **Save & Apply to Device**.

- User

- a) In the **User** tab, enter username and password details.
- b) Choose the appropriate password type.
- c) In the **Secret** field, enter a custom secret code.
- d) Choose the appropriate secret type.
- e) Choose the appropriate encryption type.
- f) Click **Save & Apply to Device**.

- Credentials

- a) In the **Credentials** tab, enter local username and password details.
- b) Choose the appropriate local password type.
- c) Enter 802.1x username and password details.
- d) Choose the appropriate 802.1x password type.
- e) Enter the time in seconds after which the session should expire.
- f) Enable local credentials and/or 802.1x credentials as required.
- g) Click **Save & Apply to Device**.
- a) In the **CDP Interface** tab, enable the CDP state, if required.
- b) Click **Save & Apply to Device**.

**Step 9** In the **Rogue AP** tab, check the **Rogue Detection** check box to enable rogue detection.

**Step 10** In the **Rogue Detection Minimum RSSI** field, enter the RSSI value.

This field specifies the minimum RSSI value for which a Rogue AP should be reported. All Rogue APs with RSSI lower than what is configured will not be reported to controller.

**Step 11** In the **Rogue Detection Transient Interval** field, enter the transient interval value.

This field indicates how long the Rogue AP should be seen before reporting the controller.

**Step 12** In the **Rogue Detection Report Interval** field, enter the report interval value.

This field indicates the frequency (in seconds) of Rogue reports sent from AP to controller.

**Step 13** Check the **Rogue Containment Automatic Rate Selection** check box to enable rogue containment automatic rate selection.

Here, the AP selects the best rate for the target Rogue, based on its RSSI.

**Step 14** Check the **Auto Containment on FlexConnect Standalone** check box to enable the feature.

Here, the AP will continue containment in case it moves to flexconnect standalone mode.

**Step 15** Click **Save & Apply to Device**.

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# Configuring an AP Profile (CLI)

Follow the procedure given below to configure and AP profile:

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 2</b>	<b>ap profile <i>ap-profile</i></b> <b>Example:</b> Device(config)# ap profile xyz-ap-profile	Configures an AP profile and enters AP profile configuration mode. <b>Note</b> In an AP profile, the <b>EAP-FAST</b> is the default EAP type. <b>Note</b> When you delete a named profile, the APs associated with that profile will not revert to the default profile.
<b>Step 3</b>	<b>description <i>ap-profile-name</i></b> <b>Example:</b> Device(config-ap-profile)# description "xyz ap profile"	Adds a description for the ap profile.
<b>Step 4</b>	<b>cdp</b> <b>Example:</b> Device(config-ap-profile)# cdp	Enables CDP for all Cisco APs.
<b>Step 5</b>	<b>end</b> <b>Example:</b> Device(config-ap-profile)# end	Saves the configuration and exits configuration mode and returns to privileged EXEC mode.
<b>Step 6</b>	<b>show ap profile name <i>profile-name</i> detailed</b> <b>Example:</b> Device# show ap profile name xyz-ap-profile detailed	(Optional) Displays detailed information about an AP join profile.

## Configuring an RF Profile (GUI)

### Procedure

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- Step 1** Choose **Configuration** > **Tags & Profiles** > **RF**.
  - Step 2** On the **RF Profile** page, click **Add**.
  - Step 3** In the **General** tab, enter a name for the RF profile. The name can be ASCII characters from 32 to 126, without leading and trailing spaces.
  - Step 4** Choose the appropriate **Radio Band**.
  - Step 5** To enable the profile, set the status as **Enable**.
  - Step 6** Enter a **Description** for the RF profile.
  - Step 7** Click **Save & Apply to Device**.
- 

## Configuring an RF Profile (CLI)

Follow the procedure given below to configure an RF profile:

### Before you begin

Ensure that you use the same RF profile name that you create here, when configuring the wireless RF tag too. If there is a mismatch in the RF profile name (for example, if the RF tag contains an RF profile that does not exist), the corresponding radios will not come up.

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 2</b>	<b>ap dot11 24ghz rf-profile rf-profile</b> <b>Example:</b> Device(config)# ap dot11 24ghz rf-profile rfprof24_1	Configures an RF profile and enters RF profile configuration mode. <b>Note</b> Use the <b>24ghz</b> command to configure the 802.11b parameters. Use the <b>5ghz</b> command to configure the 802.11a parameters.
<b>Step 3</b>	<b>default</b> <b>Example:</b> Device(config-rf-profile)# default	(Optional) Enables default parameters for the RF profile.

	Command or Action	Purpose
<b>Step 4</b>	<b>no shutdown</b> <b>Example:</b> Device(config-rf-profile)# no shutdown	Enables the RF profile on the device.
<b>Step 5</b>	<b>end</b> <b>Example:</b> Device(config-rf-profile)# end	Exits configuration mode and returns to privileged EXEC mode.
<b>Step 6</b>	<b>show ap rf-profile summary</b> <b>Example:</b> Device# show ap rf-profile summary	(Optional) Displays the summary of the available RF profiles.
<b>Step 7</b>	<b>show ap rf-profile name <i>rf-profile</i> detail</b> <b>Example:</b> Device# show ap rf-profile name rfprof24_1 detail	(Optional) Displays detailed information about a particular RF profile.

## Enhanced Site Tag-Based Load Balancing

### Feature History for Enhanced Site Tag-Based Load Balancing

This table provides release and related information for the feature explained in this module.

This feature is also available in all the releases subsequent to the one in which they are introduced in, unless noted otherwise.

*Table 1: Feature History for Enhanced Site Tag-Based Load Balancing*

Release	Feature	Feature Information
Cisco IOS XE Dublin 17.10.1	Enhanced Site Tag-Based Load Balancing	The Site Tag-based load balancing is available from Cisco IOS-XE Gibraltar 16.10.1 release.  When the first AP from a site joins the controller, it takes the decision to load balance the entire site. However, this is done without knowing the site load.  The enhancement to load balancing feature introduced in Cisco IOS-XE 17.10.1 specifies a site load to help with better load balancing.

## Information About Enhanced Site Tag-Based Load Balancing

Load balancing of APs is done among session handling processes called Wireless Network Control Daemon (WNCD). The load balancer assigns APs to WNCDs based on site tags. The decision to load balance a site tag to a WNCD is taken when the first AP from that site tag joins the controller.

Prior to this enhancement, the controller had no indication about the size of the site. Therefore, the site size is not taken into consideration for this load balancing decision. The system works well only if the sites are of approximately equal size. However, in case where you have sites of disparate sizes, it is possible for some WNCDs to be more loaded than the others. This enhancement allows you to configure a site load, thus allowing the system to take better load balancing decisions.

The behavior of the load balancing feature in the controller reboot case is as follows:

- After you have configured the feature in one or more site tags and rebooted the controller, after the reboot, even before any APs join, the load balancing feature retains the site tags that are used actively in persistent memory and load balances them during bootup. The load balancing during bootup occurs in descending order of the configured site load.
- After you have configured the load balancing feature in a site tag with APs already joined, the load balancing remains unchanged unless all APs, including those not in the site tag, disconnects or the controller reboots.

## Prerequisites for Enhanced Site Tag-Based Load Balancing

- You must have configured the site load.
- We recommended that you configure all the named sites with a load value.



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**Note** The configured load is only an estimate. It will only be used for site load balancing. Specifically, it does not prevent APs, or clients from joining or associating.

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## Use Cases

To cater to a variety of use cases, the site load configuration is designed to be a load factor rather than an absolute number. Specifically, it need not be the number of APs in a site, although, for most practical purposes, the number of APs can be used as a good approximation of the load. The following are the two use cases:

- Sites with normal client density and roaming load. You can use AP count as a good approximate site load in these cases. Examples of such sites are cubicle areas in offices and hospitals.
- Sites with high client density and roaming load. For these, you can use a higher load configuration than the number of APs. For example, if the number of APs in such a site is 200, you can use a load factor of 300 or 400 to compensate for higher client load. Examples of such sites include stadiums, cafeterias, and conference floors.

## Configuring Site Load (CLI)

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 2</b>	<b>wireless tag site <i>site-tag</i></b> <b>Example:</b> Device(config)# wireless tag site areal	Configures site tag and enters site tag configuration mode.
<b>Step 3</b>	<b>load <i>load</i></b> <b>Example:</b> Device(config-site-tag)# load 200	Configures the site load. The <i>load</i> is the estimate of the relative load reserved for the site. Values range between 0 to 1000. The default value 0 means no load recommendation for the site.
<b>Step 4</b>	<b>end</b> <b>Example:</b> Device(config-site-tag)# end	Returns to privileged EXEC mode.

## Verifying Enhanced Site Tag-Based Load Balancing Configuration

To view detailed information about a site, use the following command:

```
Device# show wireless tag site detailed areal
Site Tag Name      : areal
Description        :
-----
AP Profile         : default-ap-profile
Local-site         : Yes
Image Download Profile: default
Fabric AP DHCP Broadcast : Disabled
Fabric Multicast Group IPv4 Address : 232.255.255.1
Site Load       : 200
```

To view the default site tag type for WNCN instances, use the following command:

```
Device# show wireless loadbalance tag affinity
Tag      Tag type      No of AP's Joined  Wncd Instance
-----
areal    SITE TAG        50                 0
area2    SITE TAG        50                 0
area3    SITE TAG        100                1
area4    SITE TAG        150                2
```

## Configuring Policy Tag (GUI)

### Procedure

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- Step 1** Choose **Configuration > Tags & Profiles > Tags > Policy**.
  - Step 2** Click **Add** to view the **Add Policy Tag** window.
  - Step 3** Enter a name and description for the policy tag. The name can be ASCII characters from 32 to 126, without leading and trailing spaces.
  - Step 4** Click **Add** to map WLAN and policy.
  - Step 5** Choose the WLAN profile to map with the appropriate policy profile, and click the tick icon.
  - Step 6** Click **Save & Apply to Device**.
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## Configuring a Policy Tag (CLI)

Follow the procedure given below to configure a policy tag:

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"><li>• Enter your password if prompted.</li></ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>wireless tag policy</b> <i>policy-tag-name</i> <b>Example:</b> Device(config-policy-tag)# wireless tag policy default-policy-tag	Configures policy tag and enters policy tag configuration mode. <b>Note</b> When performing LWA, the clients connected to a controller gets disconnected intermittently before session timeout.
<b>Step 4</b>	<b>description</b> <i>description</i> <b>Example:</b> Device(config-policy-tag)# description "default-policy-tag"	Adds a description to a policy tag.
<b>Step 5</b>	<b>remote-lan</b> <i>name</i> <b>policy</b> <i>profile-policy-name</i> { <i>ext-module</i>   <i>port-id</i> }	Maps a remote-LAN profile to a policy profile.

	Command or Action	Purpose
	<b>Example:</b> <pre>Device(config-policy-tag)# remote-lan rr-xyz-rlan-aa policy rr-xyz-rlan-policy1 port-id 2</pre>	
<b>Step 6</b>	<b>wlan</b> <i>wlan-name</i> <b>policy</b> <i>profile-policy-name</i> <b>Example:</b> <pre>Device(config-policy-tag)# wlan rr-xyz-wlan-aa policy rr-xyz-policy-1</pre>	Maps a policy profile to a WLAN profile.
<b>Step 7</b>	<b>end</b> <b>Example:</b> <pre>Device(config-policy-tag)# end</pre>	Exits policy tag configuration mode, and returns to privileged EXEC mode.
<b>Step 8</b>	<b>show wireless tag policy summary</b> <b>Example:</b> <pre>Device# show wireless tag policy summary</pre>	(Optional) Displays the configured policy tags. <b>Note</b> To view detailed information about a policy tag, use the <b>show wireless tag policy detailed policy-tag-name</b> command.

## Configuring Wireless RF Tag (GUI)

### Procedure

- 
- Step 1** a) Choose **Configuration > Tags & Profiles > Tags > RF**.
- Step 2** Click **Add** to view the **Add RF Tag** window.
- Step 3** Enter a name and description for the RF tag. The name can be ASCII characters from 32 to 126, without leading and trailing spaces.
- Step 4** Choose the required **5 GHz Band RF Profile**, **5 GHz Band RF Profile**, and **2.4 GHz Band RF Profile** to be associated with the RF tag.
- Step 5** Click **Update & Apply to Device**.
- 

## Configuring Wireless RF Tag (CLI)

Follow the procedure given below to configure a wireless RF tag:

### Before you begin

- You can use only two profiles (2.4-GHz and 5-GHz band RF profiles) in an RF tag.
- Ensure that you use the same AP tag name that you created when configuring the AP tag task too.

**Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 2</b>	<b>wireless tag rf <i>rf-tag</i></b> <b>Example:</b> Device(config)# wireless tag rf rftag1	Creates an RF tag and enters wireless RF tag configuration mode.
<b>Step 3</b>	<b>24ghz-rf-policy <i>rf-policy</i></b> <b>Example:</b> Device(config-wireless-rf-tag)# 24ghz-rf-policy rfprof24_1	Attaches an IEEE 802.11b RF policy to the RF tag.  To configure a dot11a policy, use the <b>5ghz-rf-policy</b> command.
<b>Step 4</b>	<b>description <i>policy-description</i></b> <b>Example:</b> Device(config-wireless-rf-tag)# description Test	Adds a description for the RF tag.
<b>Step 5</b>	<b>end</b> <b>Example:</b> Device(config-wireless-rf-tag)# end	Exits configuration mode and returns to privileged EXEC mode.
<b>Step 6</b>	<b>show wireless tag rf summary</b> <b>Example:</b> Device# show wireless tag rf summary	Displays the available RF tags.
<b>Step 7</b>	<b>show wireless tag rf detailed <i>rf-tag</i></b> <b>Example:</b> Device# show wireless tag rf detailed rftag1	Displays detailed information of a particular RF tag.

## Attaching a Policy Tag and Site Tag to an AP (GUI)

**Procedure**

- 
- Step 1** Choose **Configuration > Wireless > Access Points**.  
The **All Access Points** section displays details of all the APs on your network.
- Step 2** To edit the configuration details of an AP, select the row for that AP.  
The **Edit AP** window is displayed.



- Step 3** In the **General** tab and **Tags** section, specify the appropriate policy, site, and RF tags, that you created on the **Configuration > Tags & Profiles > Tags** page.
- Step 4** Click **Update & Apply to Device**.

## Attaching Policy Tag and Site Tag to an AP (CLI)

Follow the procedure given below to attach a policy tag and a site tag to an AP:

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 2</b>	<b>ap mac-address</b> <b>Example:</b> Device(config)# ap F866.F267.7DFB	Configures a Cisco AP and enters AP profile configuration mode. <b>Note</b> The <i>mac-address</i> should be a wired mac address.
<b>Step 3</b>	<b>policy-tag policy-tag-name</b> <b>Example:</b> Device(config-ap-tag)# policy-tag rr-xyz-policy-tag	Maps a policy tag to the AP.
<b>Step 4</b>	<b>site-tag site-tag-name</b> <b>Example:</b> Device(config-ap-tag)# site-tag rr-xyz-site	Maps a site tag to the AP.
<b>Step 5</b>	<b>rf-tag rf-tag-name</b> <b>Example:</b>	Associates the RF tag.
<b>Step 6</b>	<b>end</b> <b>Example:</b> Device(config-ap-tag)# end	Saves the configuration, exits configuration mode, and returns to privileged EXEC mode.
<b>Step 7</b>	<b>show ap tag summary</b> <b>Example:</b> Device# show ap tag summary	(Optional) Displays AP details and the tags associated to it.
<b>Step 8</b>	<b>show ap name &lt;ap-name&gt; tag info</b> <b>Example:</b> Device# show ap name ap-name tag info	(Optional) Displays the AP name with tag information.

	Command or Action	Purpose
<b>Step 9</b>	<b>show ap name &lt;ap-name&gt; tag detail</b> <b>Example:</b> Device# show ap name ap-name tag detail	(Optional) Displays the AP name with tag details.

## Time Management

The date and time of the system on EWC is configured when you run the initial wireless express setup wizard. You can change or configure the time from the GUI menu by choosing **Administration > Time**.

You can configure a Network Time Protocol (NTP) server to synchronize date and time, if it was not configured during the wireless express setup. Greenwich Mean Time (GMT) is used as the standard for setting the time zone on the controller. You can also update or add the specific NTP server to EWC.



**Note** EWC APs do not track time when powered off. Therefore, we recommend you to configure NTP to keep a proper time across reboots on the EWC.

## AP Filter

### Introduction to AP Filter

The introduction of tags in the new configuration model in the Cisco Embedded Wireless Controller on Catalyst Access Points has created multiple sources for tags to be associated with access points (APs). Tag sources can be static configuration, AP filter engine, per-AP PNP, or default tag sources. In addition to this, the precedence of the tags also plays an important role. The AP filter feature addresses these challenges in a seamless and intuitive manner.

AP filters are similar to the access control lists (ACLs) used in the controller and are applied at the global level. You can add AP names as filters, and other attributes can be added as required. Add the filter criteria as part of the discovery requests.

The AP Filter feature organizes tag sources with the right priority, based on the configuration.

You cannot disable the AP filter feature. However, the relative priority of a tag source can be configured using **ap filter-priority priority filter-name** command.



**Note** You can configure tag names at the PnP server (similar to the Flex group and AP group) and the AP stores and send the tag name as part of discovery and join requests.

## Set Tag Priority (GUI)

### Procedure

- 
- Step 1** Choose **Configuration > Tags & Profiles > Tags > AP > Tag Source**.
- Step 2** Drag and Drop the Tag Sources to change priorities.
- 

## Set Tag Priority

Multiple tag sources might result in ambiguity for network administrators. To address this, you can define priority for tags. When an AP joins the controller, the tags are picked based on priority. If precedence is not set, the defaults are used.

Use the following procedure to set tag priority:

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters the global configuration mode.
<b>Step 2</b>	<b>ap tag-source-priority source-priority source {filter   pnp}</b> <b>Example:</b> Device(config)# ap tag-source-priority 2 source pnp	Configures AP tag source priority. <b>Note</b> It is not mandatory to configure AP filter. It comes with default priorities for Static, Filter, and PnP.
<b>Step 3</b>	<b>end</b> <b>Example:</b> Device(config)# end	Exits configuration mode and returns to privileged EXEC mode.
<b>Step 4</b>	<b>ap tag-sources revalidate</b> <b>Example:</b> Device# ap tag-sources revalidate	Revalidates AP tag sources. The priorities become active only after this command is run. <b>Note</b> If you change the priorities for Filter and PnP, and want to evaluate them, run the <b>revalidate</b> command.

## Create an AP Filter (GUI)

### Procedure

- 
- Step 1** Choose **Configuration > Tags & Profiles > Tags > AP > Filter**.
- Step 2** Click **Add**.
- Step 3** In the **Associate Tags to AP** dialog box which is displayed, enter the **Rule Name**, the **AP name regex** and the **Priority**. Optionally, you can also choose the policy tag from the **Policy Tag Name** drop-down list, the site tag from the **Site Tag Name** drop-down list and the RF tag from the **RF Tag Name** drop-down list.
- Step 4** Click **Apply to Device**.
- 

## Create an AP Filter (CLI)

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters the global configuration mode.
<b>Step 2</b>	<b>ap filter name</b> <i>filter_name</i>  <b>Example:</b> Device(config)# ap filter filter-1	Configures an AP filter.
<b>Step 3</b>	<b>ap name-regex</b> <i>regular-expression</i>  <b>Example:</b> Device(config-ap-filter)# ap name-regex testany	Configures the AP filter based on regular expression.  For example, if you have named an AP as <b>ap-1ab-12</b> , then you can configure the filter with a regular expression, such as <b>ap-1ab-\d+</b> , to match the AP name.
<b>Step 4</b>	<b>tag policy</b> <i>policy-tag</i>  <b>Example:</b> Device(config-ap-filter)# tag policy pol-tag1	Configures a policy tag for this filter.
<b>Step 5</b>	<b>tag rf</b> <i>rf-tag</i>  <b>Example:</b> Device(config-ap-filter)# tag rf rf-tag1	Configures an RF tag for this filter.
<b>Step 6</b>	<b>tag site</b> <i>site-tag</i>  <b>Example:</b> Device(config-ap-filter)# tag site sitel	Configures a site tag for this filter.

	Command or Action	Purpose
<b>Step 7</b>	<b>end</b> <b>Example:</b> Device(config-ap-filter)# end	Exits configuration mode and returns to privileged EXEC mode.

## Set Up and Update Filter Priority (GUI)

### Procedure

- Step 1** Choose **Configuration > Tags & Profiles > Tags > AP > Filter**.
- Step 2**
- If you want to setup a new AP filter, then click **Add**. In the **Associate Tags to AP** dialog box which is displayed, enter the **Rule Name**, the **AP name regex** and the **Priority**. Optionally, you can also select the **Policy Tag Name**, the **Site Tag Name** and the **RF Tag Name**. Click **Apply to Device**.
  - If you want to update the priority of an existing AP filter, click on the Filter and in the **Edit Tags** dialog box and change the **Priority**. In case the Filter is Inactive, no priority can be set to it. Click **Update and Apply to Device**.

## Set Up and Update Filter Priority

Follow the procedure given below to set and update filter priority:

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 2</b>	<b>ap filter priority <i>priority</i> filter-name</b> <i>filter-name</i> <b>Example:</b> Device(config)# ap filter priority 10 filter-name test1	Configure AP filter priority. Valid values range from 0 to 1023; 0 is the highest priority.  <b>Note</b> A filter without a priority is not active. Similarly, you cannot set a filter priority without a filter.
<b>Step 3</b>	<b>end</b> <b>Example:</b> Device(config-ap)# end	Exits configuration mode and returns to privileged EXEC mode.

## Verify AP Filter Configuration

The following **show** commands are used to display tag sources and filters, and their priorities.

To view the tag source priorities, use the following command:

```
Device# show ap tag sources
```

```
Priority Tag source
-----
0 Static
1 Filter
2 AP
3 Default
```

To view the available filters, use the following command:

```
Device# show ap filter all
```

Filter Name Tag	regex	Policy Tag	RF Tag	Site
first	abcd	pol-tag1	rf-tag1	
site-tag1				
test1	testany			site1
filter1	testany			

To view the list of active filters, use the following command:

```
Device# show ap filters active
```

Priority Site Tag	Filter Name	regex	Policy Tag	RF Tag
10	test1	testany		
site1				

To view the source of an AP tag, use the following command:

```
Device# show ap tag summary
```

```
Number of APs: 4
```

AP Name	AP Mac	Site Tag Name	Policy Tag Name	RF Tag Name	Misconfigured Tag Source
AP002A.1034.CA78	002a.1034.ca78	named-site-tag	named-policy-tag	named-rf-tag	No Filter
AP00A2.891C.2480	00a2.891c.2480	named-site-tag	named-policy-tag	named-rf-tag	No Filter
AP58AC.78DE.9946	58ac.78de.9946	default-site-tag	default-policy-tag	default-rf-tag	No AP
AP0081.C4F4.1F34	0081.c4f4.1f34	default-site-tag	default-policy-tag	default-rf-tag	No Default

## Configuring Access Point for Location Configuration

### Information About Location Configuration

During location configuration, you can perform the following:

- Configure a site or location for an AP.

- Configure a set of tags for this location.
- Add APs to this location.

Any location comprises of the following components:

- A set of unique tags, one for each kind, namely: Policy, RF and Site.
- A set of ethernet MAC addresses that applies to the tags.

This feature works in conjunction with the existing tag resolution scheme. The location is considered as a new tag source to the existing system. Similar, to the static tag source.

## Prerequisite for Location Configuration

If you configure an access point in one location, you cannot configure the same access point in another location.

## Configuring a Location for an Access Point (GUI)

### Before you begin



**Note** When you create local and remote sites in the Basic Setup workflow, corresponding policies and tags are created in the backend. These tags and policies that are created in the Basic Setup cannot be modified using the Advanced workflow, and vice versa.

### Procedure

- Step 1** Choose **Configuration > Wireless Setup > Basic**.
- Step 2** On the **Basic Wireless Setup** page, click **Add**.
- Step 3** In the **General** tab, enter a name and description for the location.
- Step 4** Set the **Location Type** as either *Local* or *Flex*.
- Step 5** Use the slider to set **Client Density** as *Low*, *Typical* or *High*.
- Step 6** Click **Apply**.

## Configuring a Location for an Access Point (CLI)

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b>  <b>Example:</b> Device# <code>configure terminal</code>	Enters global configuration mode.

	Command or Action	Purpose
<b>Step 2</b>	<b>ap location name</b> <i>location_name</i> <b>Example:</b> Device(config)# <b>ap location name</b> <b>location1</b>	Configures a location for an access point. Run the <b>no</b> form of this command to remove location for an access point.
<b>Step 3</b>	<b>tag</b> { <b>policy</b> <i>policy_name</i>   <b>rf</b> <i>rf_name</i>   <b>site</b> <i>site_name</i> } <b>Example:</b> Device(config-ap-location)# <b>tag policy</b> <b>policy_tag</b> Device(config-ap-location)# <b>tag rf</b> <i>rf_tag</i> Device(config-ap-location)# <b>tag site</b> <b>site_tag</b>	Configures tags for the location.
<b>Step 4</b>	<b>location</b> <i>description</i> <b>Example:</b> Device(config-ap-location)# <b>location</b> <b>description</b>	Adds description to the location.
<b>Step 5</b>	<b>end</b> <b>Example:</b> Device(config-ap-location)# <b>end</b>	Returns to privileged EXEC mode. Alternatively, you can also press <b>Ctrl-Z</b> to exit global configuration mode.

## Adding an Access Point to the Location (GUI)



**Note** When the tag source is not set to location, the AP count and AP location tagging will not be correctly reflected on the web UI. To change static tag source on the AP, run the **no ap ap-mac** command on the controller to change AP tag source to default (which is location).

### Procedure

- Step 1** Choose **Configuration > Wireless Setup > Basic**.
- Step 2** On the **Basic Wireless Setup** page, click **Add** to configure the following:
- General
  - Wireless Networks
  - AP Provisioning
- Step 3** In the **AP Provisioning** tab and **Add/Select APs** section, enter the AP MAC address and click the right arrow to add the AP to the associated list.



You can also add a CSV file from your system. Ensure that the CSV has the MAC Address column.

- Step 4** Use the search option in the **Available AP List** to select the APs from the Selected AP list and click the right arrow to add the AP to the associated list.
- Step 5** Click **Apply**.

## Adding an Access Point to the Location (CLI)

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>configure terminal</b>  <b>Example:</b> Device# <code>configure terminal</code>	Enters global configuration mode.
<b>Step 2</b>	<b>ap location name</b> <i>location_name</i>  <b>Example:</b> Device(config)# <code>ap location name location1</code>	Configures a location for an access point.
<b>Step 3</b>	<b>ap-eth-mac</b> <i>ap_ethernet_mac</i>  <b>Example:</b> Device(config-ap-location)# <code>ap-eth-mac 188b.9dbe.6eac</code>	Adds an access point to the location.
<b>Step 4</b>	<b>end</b>  <b>Example:</b> Device(config-ap-location)# <code>end</code>	Returns to privileged EXEC mode. Alternatively, you can also press <b>Ctrl-Z</b> to exit global configuration mode.  <b>Note</b> After adding an AP to a location, the AP may reset automatically to get the new configuration

## Configuring SNMP in Location Configuration

### SNMP

EWC does not support SNMP and does not implement the SNMP MIBs of Cisco Catalyst 9800 Series Wireless Controllers, although EWC might respond to some of the object identifiers (OIDs).

## Verifying Location Configuration

To view the summary of AP location configuration, use the following command:

Device# **show ap location summary**

Location Name	Description	Policy Tag	RF Tag	Site Tag
first	first floor	default-policy-tag	default-rf-tag	default-site-tag
second	second floor	default-policy-tag	default-rf-tag	default-site-tag

To view the AP location configuration details for a specific location, use the following command:

Device# **show ap location details first**

```

Location Name.....: first
Location description.....: first floor
Policy tag.....: default-policy-tag
Site tag.....: default-site-tag
RF tag.....: default-rf-tag

```

Configured list of APs

```

005b.3400.0af0
005b.3400.0bf0

```

To view the AP tag summary, use the following command:

Device# **show ap tag summary**

```

Number of APs: 4
AP Name      AP Mac      Site Tag Name  Policy Tag Name  RF Tag Name
Misconfigured Tag Source
-----
Asim_5-1     005b.3400.02f0  default-site-tag  default-policy-tag  default-rf-tag  Yes
Filter
Asim_5-2     005b.3400.03f0  default-site-tag  default-policy-tag  default-rf-tag  No
Default
Asim_5-9     005b.3400.0af0  default-site-tag  default-policy-tag  default-rf-tag  No
Location
Asim_5-10    005b.3400.0bf0  default-site-tag  default-policy-tag  default-rf-tag  No
Location

```

## Verifying Location Statistics

To view the AP location statistics, use the following command:

Device# **show ap location stats**

Location name	APs joined	Clients joined	Clients on 11a	Clients on 11b
first	2	0	3	4
second	0	0	0	0