# Understand FlexConnect on Catalyst 9800 Wireless Controller

Introduction

This document describes the FlexConnect feature and its general configuration on 9800 Wireless Controllers.

Background Information

FlexConnect refers to the capability of an Access Point (AP) to decide whether the traffic from the wireless clients is put directly on the network at the AP level (Local switching) or if the traffic is centralized to the 9800 controller (Central Switching).
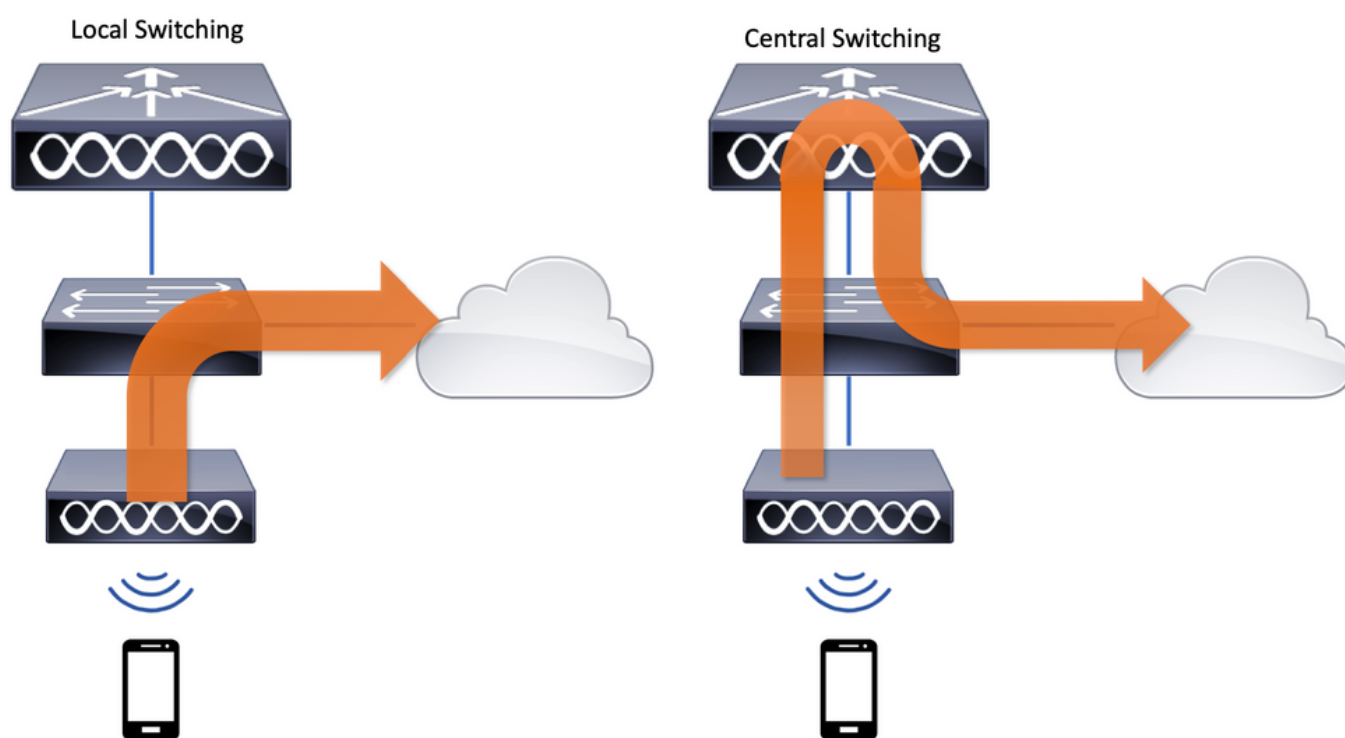
Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

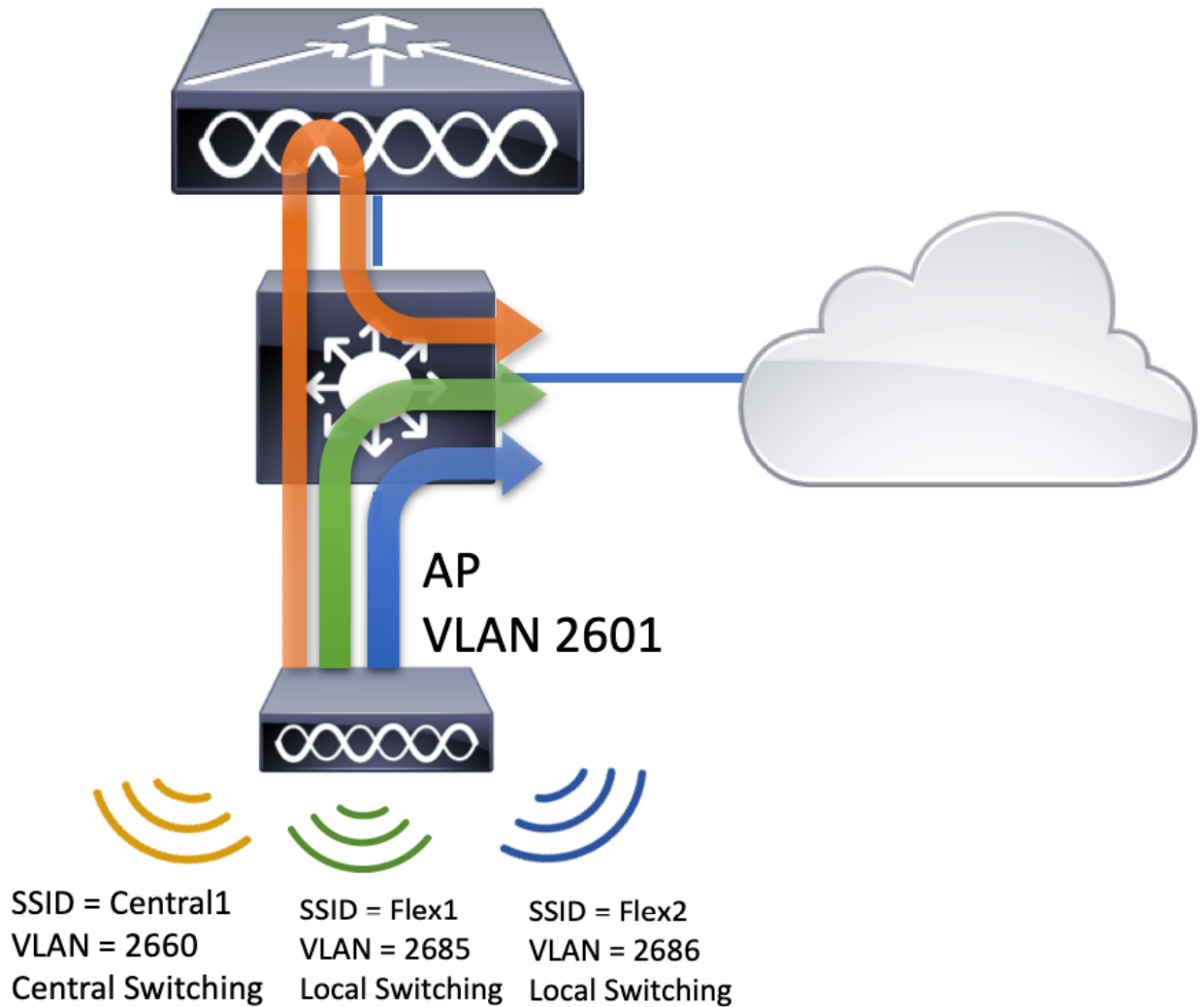The information in this document is based on these software and hardware versions:

- Cisco Catalyst 9800 Wireless Controllersrunning IOS-XE Gilbraltar v16.10

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.
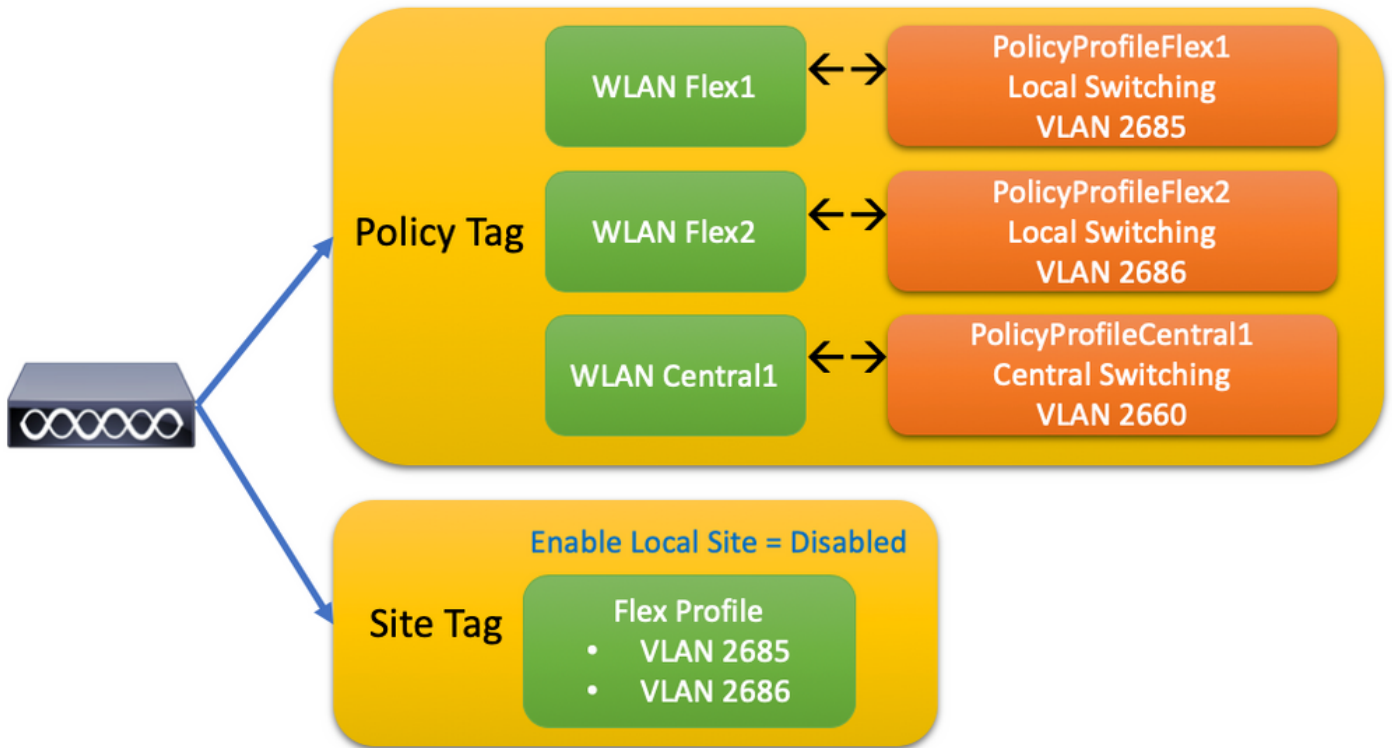
Network Diagram

This document is based on this topology:

AP
VLAN 2601

SSID = Central1   SSID = Flex1   SSID = Flex2
VLAN = 2660   VLAN = 2685   VLAN = 2686
Central Switching   Local Switching   Local Switching

Configurations

This is the visual scheme of the configuration that is needed to accomplish the scenario of this document:

In order to configure a FlexConnect Local Switching Service Set Identifier (SSID) here are the general steps you need to follow:

1. Create/Modify a WLAN profile
2. Create/Modify a Policy Profile
3. Create/Modify a Policy Tag
4. Create/Modify a Flex Profile
5. Create/Modify a Site Tag
6. Policy Tag Assignment to AP

These sections explain how to configure each them, step by step.

Create/Modify a WLAN Profile

You can use this guide to create the three SSIDs:

Create your SSID

Create/Modify a Policy Profile

Step 1. Navigate to **Configuration > Tags & Profiles > Policy.** Either select the name of a pre-existing one or click **+ Add** to add a new one.
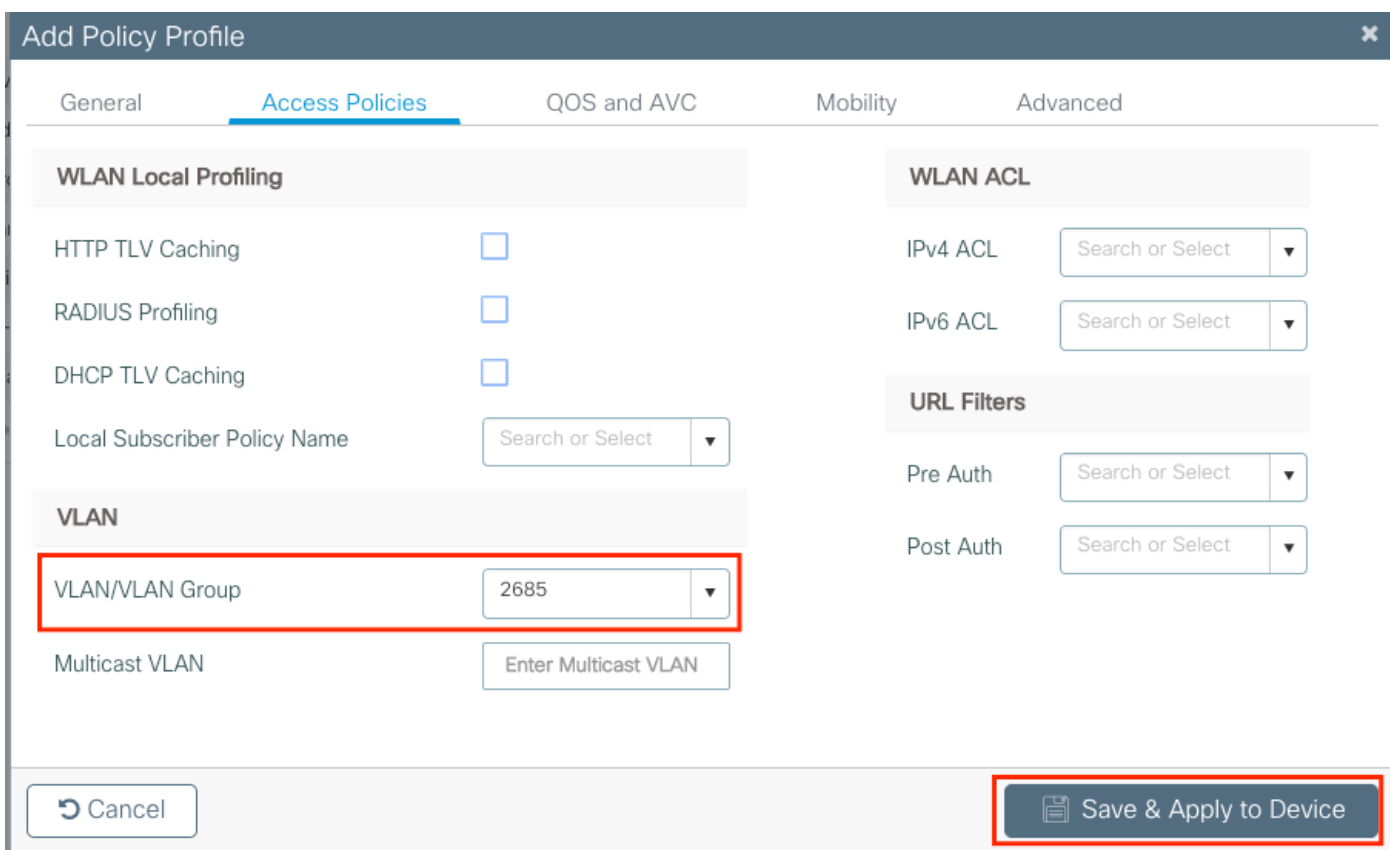

When you disable **Central Switching** this warning message appears, click **Yes** and continue with the configuration.
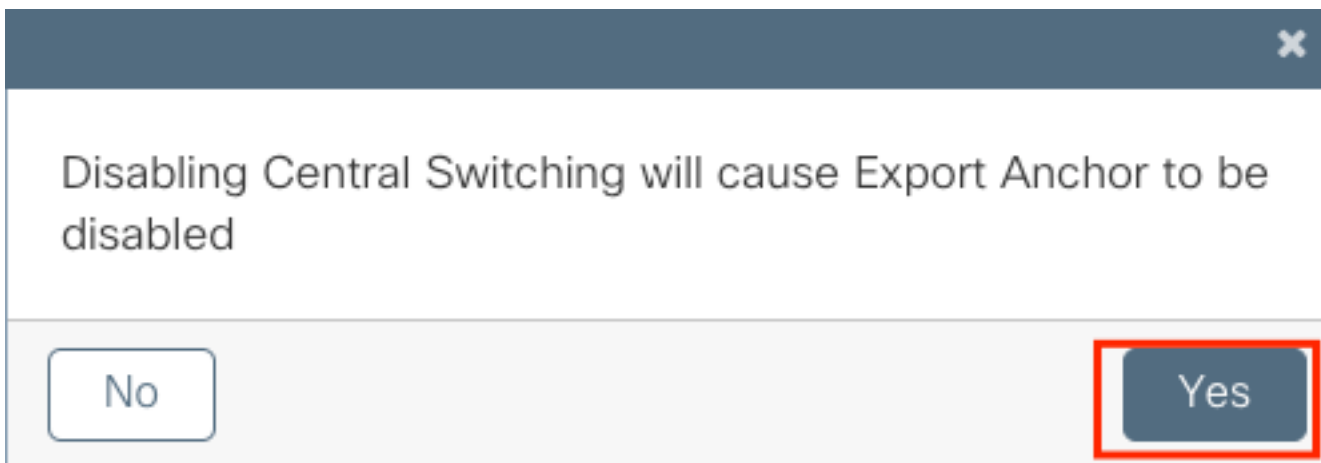
Step 2. Go to the **Access Policies** tab and type the VLAN (You do not see it in the dropdown list because this VLAN does not exists on the 9800 WLC).

After that, click **Save & Apply to Device.**

> **Note**: It is possible to use a VLAN that already exists on the 9800 WLC as local switching. If you select the VLAN from the dropdown list, you are selecting the VLAN name, not the VLAN ID, so pay a lot of attention to it, as you need to use the exact same VLAN name selected in the Policy Profile when you add the the VLANs in the Flex Profile. This bug has been filed for this behavior: CSCvn48234

Step 3. Repeat the same for the PolicyProfileFlex2

Add Policy Profile

General **Access Policies** QOS and AVC Mobility Advanced

⚠ Configuring in enabled state will result in loss of connectivity for clients associated with this profile.

			WLAN Switching Policy	
Name*	PolicyProfileFlex2			
Description	Enter Description		Central Switching	DISABLED
Status	ENABLED		Central Authentication	ENABLED
Passive Client	DISABLED		Central DHCP	DISABLED
Encrypted Traffic Analytics	DISABLED		Central Association	DISABLED
CTS Policy			Flex NAT/PAT	DISABLED
Inline Tagging	☐			
SGACL Enforcement	☐			
Default SGT	2-65519			

↺ Cancel   💾 Apply to Device

Add Policy Profile

General **Access Policies** QOS and AVC Mobility Advanced

WLAN Local Profiling   **WLAN ACL**

HTTP TLV Caching	☐		IPv4 ACL	Search or Select ▾
RADIUS Profiling	☐		IPv6 ACL	Search or Select ▾
DHCP TLV Caching	☐		**URL Filters**	
Local Subscriber Policy Name	Search or Select ▾			
VLAN			Pre Auth	Search or Select ▾
VLAN/VLAN Group	2686 ▾		Post Auth	Search or Select ▾
Multicast VLAN	Enter Multicast VLAN			

↺ Cancel   💾 Save & Apply to Device

Step 4. For the centrally switched SSID, ensure its needed VLAN exists on the 9800 WLC and if not, create it.

Note: In Flex Connect APs with locally switched WLANs, the traffic is switched at the AP and the DHCP requests from the client will go into the wired network via the AP interface directly. The AP does not have any SVI in the client subnet so it is not able to do DHCP proxy, and thus, the DHCP relay configuration (DHCP Server IP Address), in the Policy Profile > Advanced tab, has no meaning for locally switched WLANs. In these scenarios, the switchport needs to allow the client VLAN and then, if the DHCP server is in a different VLAN, you need the IP helper configured in the client SVI/default gateway so that it knows where to send the DHCP request from the client.

[Declare Client's VLANs](#)

Step 5. Create a Policy Profile for the Central SSID.

Navigate to **Configuration > Tags & Profiles > Policy.** Either select the name of a pre-existing one or click **+ Add** to add a new one.

You should end up with three Policy Profiles.

CLI:

```
# config t

# vlan 2660
# exit # wireless profile policy PolicyProfileFlex1 # no central switching # vlan 2685 # no
shutdown # exit # wireless profile policy PolicyProfileFlex2 # no central switching # vlan 2686
# no shutdown # exit # wireless profile policy PolicyProfileCentral1 # vlan VLAN2660 # no
shutdown # end
```

Create/Modify a Policy Tag

The Policy tag is the setting that allows you to specify which SSID is linked to which Policy Profile.

Step 1. Navigate to **Configuration > Tags & Profiles > Tags > Policy**. Either select the name of a pre-existing one or click **+ Add** to add a new one.

Step 2. Inside the Policy Tag, click **+Add**, from the drop down list select the**WLAN Profile**name you want to add to the Policy Tag and **Policy Profile** to which you want to link it. After that click the check mark.

Repeat for the three SSIDs, after that click **Save & Apply to Device.**

CLI:
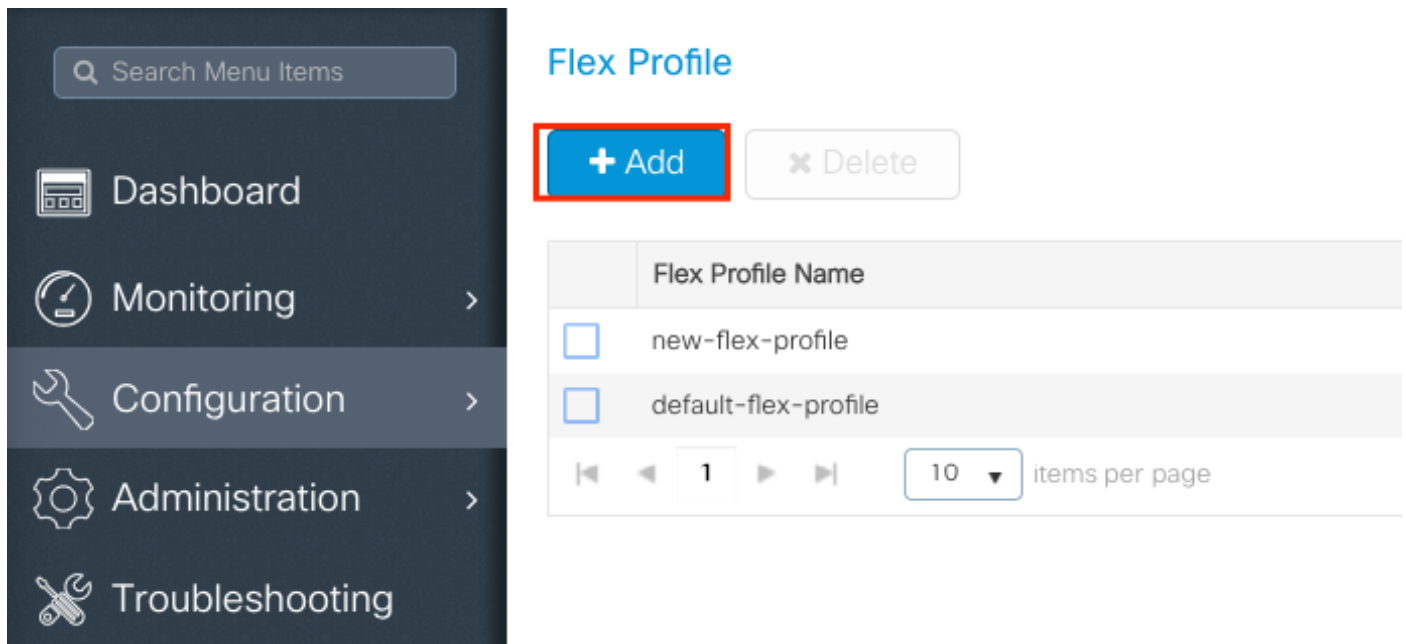
```
# config t

# wireless tag policy PolicyTag1
# wlan Flex1 policy PolicyProfileFlex1
# wlan Flex2 policy PolicyProfileFlex2
# wlan Central1 policy PolicyProfileCentral1
```

```
# end
```
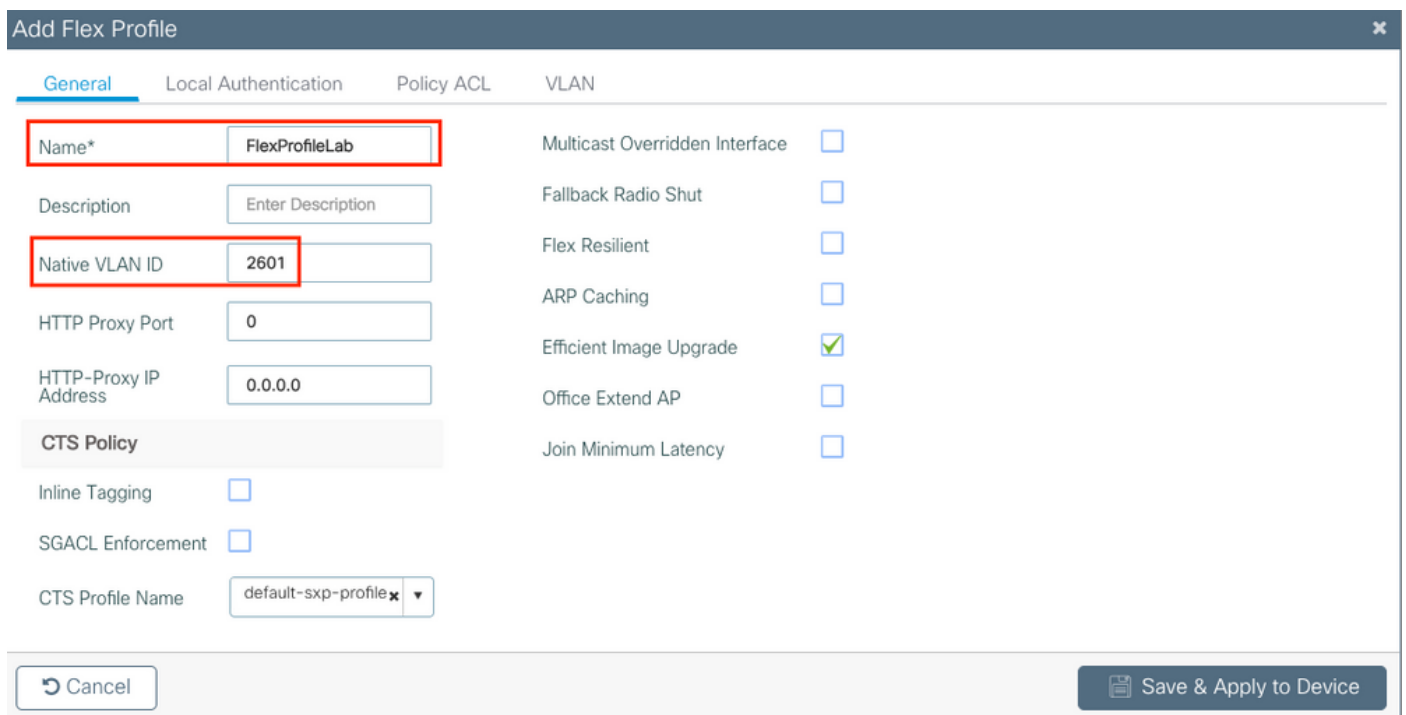
Create/Modify a Flex Profile

In the topology used for this document you notice that there are two SSIDs in Local Switching with two different VLANs. Inside the Flex Profile is where you specify the AP's VLAN (Native VLAN) and any other VLAN that the AP needs to be aware of, in this case, the VLANs used by the SSIDs.

Step 1. Navigate to **Configuration > Tags & Profiles > Flex** and either create a new one or modify an existing one.

Step 2. Define a name for your Flex Profile and specify the AP's VLAN (Native VLAN ID).

Step 3. Navigate to the **VLAN** tab and specify the needed VLAN.

In this scenario, there are clients on VLANs 2685 and 2686. These VLANs does not exist on the

9800 WLC, add them to the Flex Profile so they exists on the AP.

> **Note**: When you created the Policy Profile, If you selected a VLAN name instead of VLAN ID, ensure the VLAN name here in the Flex Profile is the exact same one. This bug has been filed for this behavior: CSCvn48234

Repeat for the needed VLANs.

Notice that the VLAN used for Central switching was not added, as the AP does not need to be aware about it.

CLI:

```
# config t
# wireless profile flex FlexProfileLab # native-vlan-id 2601 # vlan-name VLAN2685 # vlan-id 2685
# vlan-name VLAN2686 # vlan-id 2686 # end
```

Create/Modify a Site Tag

The Site tag is the setting that allows you to specify which AP join and/or Flex Profile is assigned to the APs.

Step 1. Navigate to **Configuration > Tags & Profiles > Tags > Site**. Either select the name of a pre-existing one or click **+ Add** to add a new one.
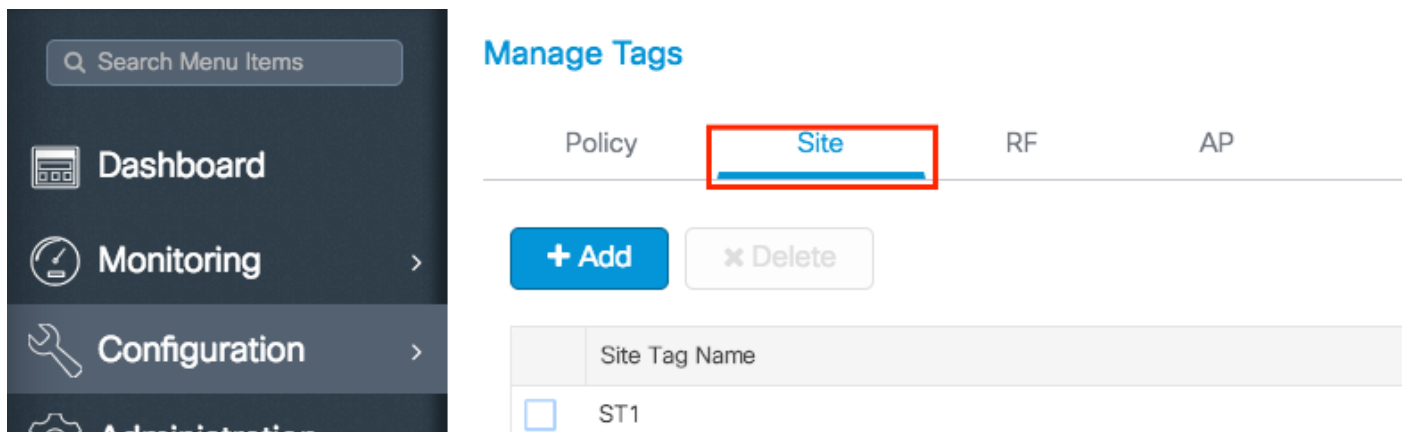
Step 2. Inside the Site Tag, disable **Enable Local Site**option (Any AP that receives a Site Tag with the **Enable Local Site** setting disabled is converted into FlexConnect mode). Once it is disabled you can also select the**Flex Profile.** After that click Save & Apply to Device.

CLI:
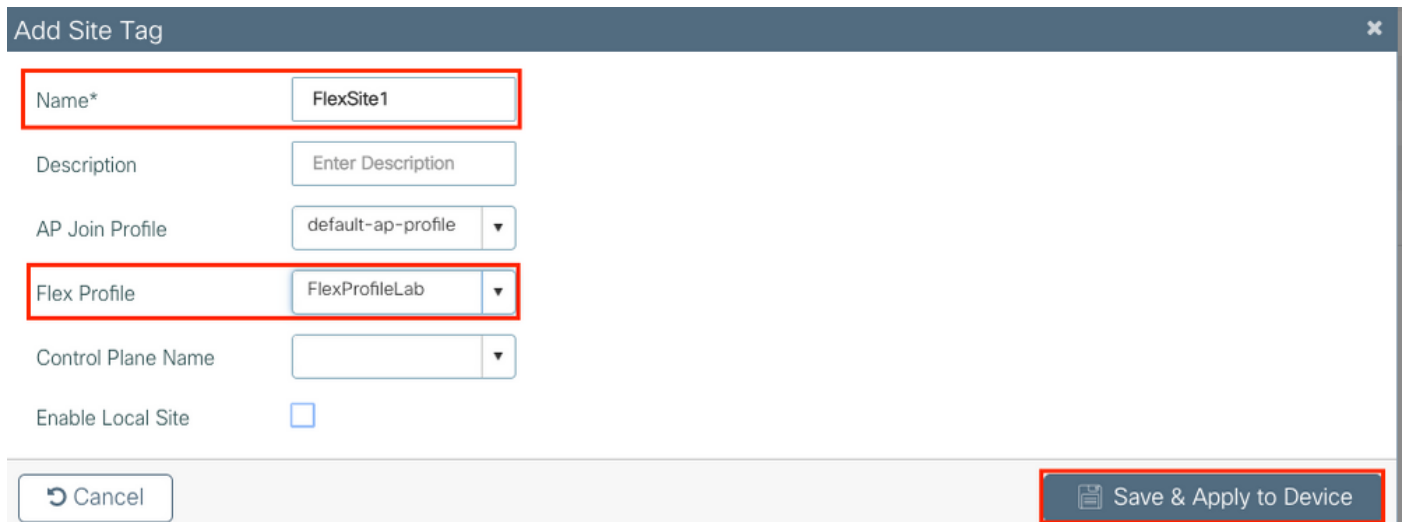
```
# config t
# wireless tag site FlexSite1
# flex-profile FlexProfileLab
# no local-site
```

Policy Tag Assignment to AP

You can assign a Policy Tag directly to an AP or assign the same Policy Tag to a group of APs at the same time. Choose the one that fits you.

Policy Tag Assignment per AP

Navigate to **Configuration > Wireless > Access Points > AP name > General > Tags.** From the **Site**dropdown list select the desired Tags and click **Update & Apply to Device.**

Edit AP ✕

General   Interfaces   High Availability   Inventory   Advanced

General

AP Name*	AP1702-05
Location*	karlcisn-WS
Base Radio MAC	00c3.㏑㏑㏑.㏑㏑㏑
Ethernet MAC	00f.㏑㏑㏑㏑.㏑㏑㏑
Admin Status	Enabled ▾
AP Mode	Flex ▾
Operation Status	Registered
Fabric Status	Disabled

Tags

⚠ Changing Tags will cause the AP to momentarily lose association with the Controller.

Policy	PolicyTag1 ▾
Site	FlexSite1 ▾
RF	default-rf-tag ▾

Version

Primary Software Version	16.10.1.0
Predownloaded Status	N/A
Predownloaded Version	N/A
Next Retry Time	N/A
Boot Version	15.3.0.0
IOS Version	15.3(3)JPG1$
Mini IOS Version	0.0.0.0

IP Config

CAPWAP Preferred Mode	Not Configured
DHCP IPv4 Address	172.16.1.110
Static IP (IPv4/IPv6)	☐

Time Statistics

Up Time	6 days 20 hrs 27 mins 53 secs
Controller Association Latency	5 days 18 hrs 0 mins 30 secs

↺ Cancel   💾 Update & Apply to Device

Note: Be aware that after change the policy tag on an AP, it loses its association to the 9800 WLCs and join back within about 1 minute.

Note: If the AP is configured in Local mode (or any other mode) and then it gets a Site Tag with **Enable Local Site** setting disabled, the AP reboots and comes back in FlexConnect mode.

CLI:

```
# config t
# ap <ethernet-mac-addr>
# site-tag <site-tag-name>
# end
```

Policy Tag Assignment for Multiple APs

Navigate to **Configuration > Wireless Setup > Advanced > Start Now**

Click on **Tag APs :=** icon, after that select the list of APs that you want to assign the tags to (You can click on the point down arrow next to **AP name** [or any other field] to filter the list of APs).

Once you have selected the desired APs, click on **+ Tag APs.**

Start

Tags & Profiles

WLAN Profile

Policy Profile

Policy Tag

AP Join Profile

Flex Profile

Site Tag

RF Profile

RF Tag

Apply

Tag APs

Done

+ Tag APs

Number of APs: 2
Selected Number of APs: 2

	AP Name	AP Model	AP MAC	AP Mode	Admin Status	Operation Status	Policy Tag	Site Tag	RF Tag	Location	Country	Hyperlocation Method
☑	AP3802-karlcisn	AIR-AP3802I-A-K9	0042.68c6.4120	Local	Disabled	Registered	Location-typical-density	Location-typical-density	Location-typical-density	default location	MX	Local
☑	AP2802-01	AIR-AP2802I-B-K9	2c5a.0f40.6900	Local	Enabled	Registered	PT1	default-site-tag	default-rf-tag	CALO	US	Local

|◄ ◄ 1 ► | 10 ▾ items per page   1 - 2 of 2 items ↻

Select the tags that you want to assign to the APs and click **Save & Apply to Device.**

Tag APs ✖

Tags

Policy   PT1 ▾

Site   ST1 ▾

RF   default-rf-tag ▾

Changing AP Tag(s) will cause associated AP(s) to reconnect

↺ Cancel   💾 Save & Apply to Device

Note: Be aware that after change the policy tag on an AP, it loses its association to the 9800 WLCs and join back within about 1 minute.

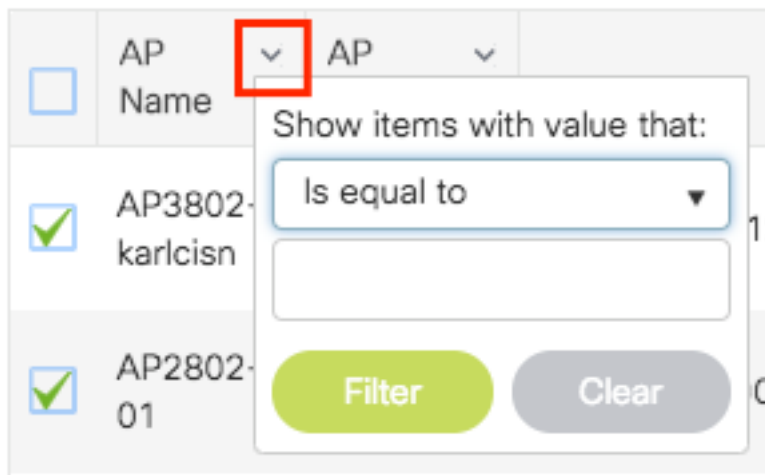|	AP Name	AP Model	AP MAC	AP Mode	Admin Status	Operation Status	Policy Tag	Site Tag	RF Tag	Location	Country	Hyperlocation Method

items per page

Note: If the AP is configured in Local mode (or any other mode) and then it gets a Site Tag with **Enable Local Site** setting disabled, the AP reboots and comes back in FlexConnect mode.

CLI:

There is no CLI option to assign the same Tag to multiple APs.

Verification

You can use these commands to verify the configuration.

VLANs/Interfaces Configuration

```
# show vlan brief
# show interfaces trunk
# show run interface <interface-id>
```

WLAN Configuration

```
# show wlan summary
# show run wlan [wlan-name] # show wlan { id <wlan-id> | name <wlan-name> | all }
```

AP Configuration

```
# show ap summary
# show ap tag summary
# show ap name <ap-name> tag { info | detail }

# show ap name <ap-name> tag detail
AP Name : AP2802-01 AP Mac : 0896.ad9d.143e Tag Type Tag Name ----------------------------
Policy Tag PT1 RF Tag default-rf-tag Site Tag default-site-tag Policy tag mapping -------------
---- WLAN Profile Name Policy Name VLAN Central Switching IPv4 ACL IPv6 ACL -------------------
---------------------------------------------------------------------------------------------
------------------------------------------------------------------------- psk-pbl-ewlc
ctrl-vl2602 VLAN0210 ENABLED Not Configured Not Configured Site tag mapping ---------------
Flex Profile : default-flex-profile AP Profile : default-ap-profile Local-site : Yes RF tag
mapping -------------- 5ghz RF Policy : Global Config 2.4ghz RF Policy : Global Config
```

Tag Configuration

```
# show wireless tag { policy | rf | site } summary
# show wireless tag { policy | rf | site } detailed <tag-name>
```

Profile Configuration

```
# show wireless profile { flex | policy } summary
# show wireless profile { flex | policy } detailed <profile-name> # show ap profile <AP-join-
profile-name> detailed
```