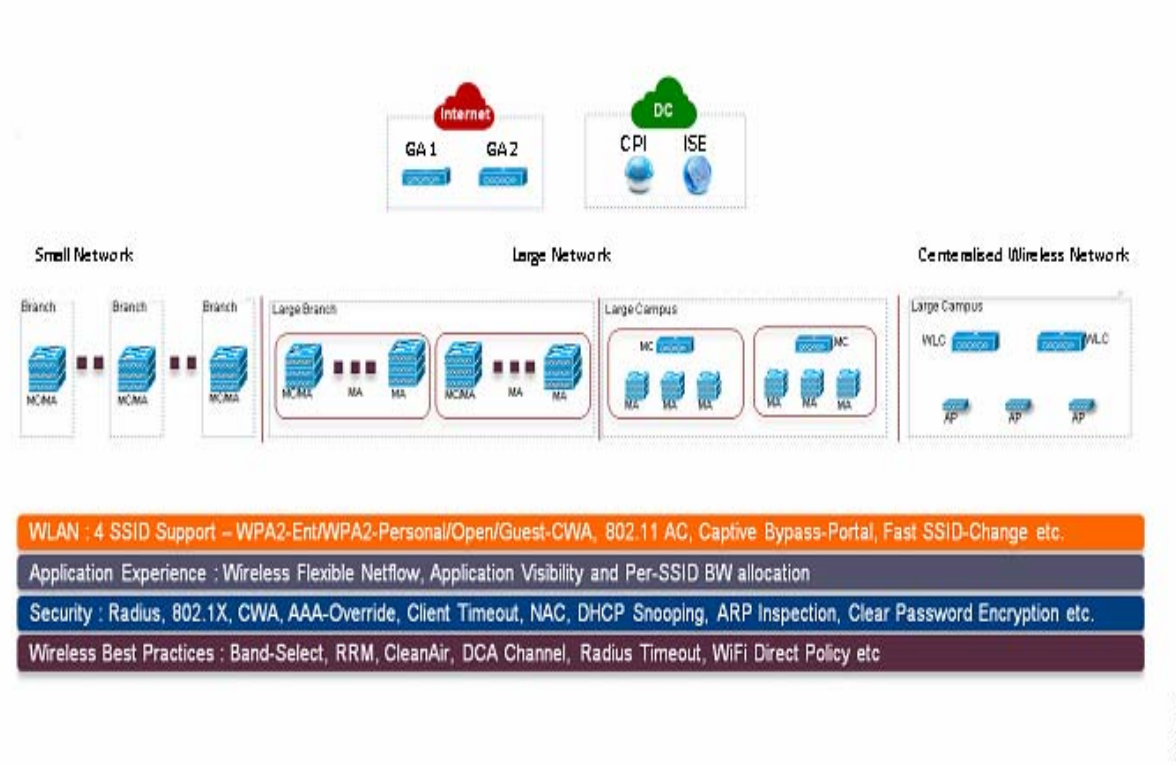
Using Converged Access Workflow

Converged Access Workflow Overview

The Converged Access workflow simplifies, automates and optimizes deployment of various enterprise-class next generation wireless deployment models for campus and branch networks. Cisco Prime Infrastructure can automate the converged access deployment of wireless networks using converged access components such as Catalyst 3650, 3850, 4500 SUP 8-E switches, and Cisco 5760 Wireless LAN controller (WLC). The catalyst switches can be deployed as Mobility Agent (MA), Mobility Controller (MC), and Guest Anchor controller (GA).

Figure 38-1 illustrates the wireless converged access deployment models.

Figure 38-1 Converged Access Workflow Overview



Single-Switch Small Network Deployment Model

This deployment model assumes single Catalyst 3650, 3850 or 4500 SUP 8-E switch deployed in Access layer in combined MA and MC roles. The Catalyst switches can be deployed in individual standalone system mode or in stackwise redundant supervisor mode.

Controller-Less Single/Multi-Domain Deployment Model

This deployment model consists of multiple sub-domains and allows inter-domain MC peering for end-to-end seamless roaming across sub-domains. The MA switches are deployed in Access layer while the MC switches can be placed in Distribution layer.

Controller-Based Single/Multi-Domain Deployment Model

A large scale converged access campus building is deployed with external 5760 WLC as MC. The Access layer switches are deployed as MA across multiple buildings with centralized 5760 MC. In such large network, multiple 5760 WLCs may co-exist for better load balancing and redundancy. Depending on the roaming requirement across different buildings, the inter-domain mobility peering between 5760 WLCs can be established.

Centralized Wireless Campus Deployment Model

In this deployment model, the switches in Access layer remain in traditional switching mode and wireless communication between Access Point (AP) and WLC is built as overlay network. In large scale campus deployments, multiple 5760 WLCs can be deployed for better load balancing and redundancy. To provide seamless large mobility domains, the inter-domain mobility peering 5760 WLCs can be established.

Key Benefits

- Simple Automated Deployment—Simplifies the converged access deployment by automating the device configuration process. Requires only a few deployment specific inputs from the network administrator and pushes the complete converged access configurations to the network devices.
- Error Free Deployment—The template-based configuration used by Cisco Prime Infrastructure avoids manual misconfigurations, making it easier to build/maintain enterprise-wide standardized configurations that are well understood by the network administrator.
- Optimized Deployment—The configuration templates used by Cisco Prime Infrastructure incorporates a large number of Cisco best practice guidelines, improving the deployment quality. Some of the best practice wireless technologies/features that are automatically included in the template are Band-Select, Radio Resource Management (RRM), Fast SSID-Change, CleanAir, and Wireless QoS.
- High Scalability—Supports large enterprises with thousands of branches. It not only reduces efforts to deploy greenfield branches, but also simplifies large scale conversion of traditional Ethernet based branch networks to converged access branches in an error-free way.

Related Topics

- Supported Cisco IOS-XE Platforms
- Prerequisites for Converged Access Deployment
- Converged Access Template-Based Deployment
- Guidelines for Entering Configuration Values

Supported Cisco IOS-XE Platforms

The following tables describe the supported Cisco IOS-XE platforms for small, large, and centralized network deployment models.

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Table 38-1 Supported Cisco IOS-XE for Small Network Deployment Mode

Device Role	Cisco IOS-XE Platform	System Mode	Software Version
Mobility Agent/Mobility Controller (Single-Switch)	Catalyst 3650	Single or StackWise	3.6.0 and later
	Catalyst 3850	Single or StackWise	3.6.0 and later
	Catalyst 4500 SUP 8-E	Single or Dual-SUP	3.7.0 and later
Guest Anchor WLC	CT5760 WLC	Single or StackWise	3.6.0 and later

Table 38-2 Supported Cisco IOS-XE for Large Network Deployment Model

Device Role	Cisco IOS-XE Platform	System Mode	Software Version
Mobility Agent	Catalyst 3650	Single or StackWise	3.6.0 and later
	Catalyst 3850	Single or StackWise	3.6.0 and later
	Catalyst 4500 SUP 8-E	Single or Dual-SUP	3.7.0 and later
Mobility Controller	Catalyst 3650	Single or StackWise	3.6.0 and later
	Catalyst 3850	Single or StackWise	3.6.0 and later
	Catalyst 4500 SUP 8-E	Single or Dual-SUP	3.7.0 and later
	CT5760 WLC	Single or StackWise	3.6.0 and later
Guest Anchor Controller	CT5760 WLC	Single or StackWise	3.6.0 and later

Table 38-3 Supported Cisco IOS-XE for Centralized Wireless Deployment Mode

Device Role	Cisco IOS-XE Platform	System Mode	Software Version
Mobility Controller	CT5760 WLC	Single or StackWise	3.6.0 and later
Guest Anchor WLC	CT5760 WLC	Single or StackWise	3.6.0 and later

Related Topics

- Converged Access Workflow Overview
- Prerequisites for Converged Access Deployment
- Converged Access Template-Based Deployment
- Guidelines for Entering Configuration Values

Prerequisites for Converged Access Deployment

To successfully deploy the Converged Access solution using the Converged Access Workflow, the wired infrastructure of the network should be set for further configuration required for converged access. This section describes the prerequisite configurations for Converged Access Workflow based deployment.

You can view the prerequisites using the **click here** link in the **Before you Begin** page in the Converged Access Workflow (**Services > Network Services > Converged Access**).

Related Topics

- Prerequisites for Layer 2 and Layer 3
- Prerequisites for Server Configuration
- Converged Access Workflow Overview
- Supported Cisco IOS-XE Platforms
- Converged Access Template-Based Deployment
- Guidelines for Entering Configuration Values

Prerequisites for Layer 2 and Layer 3

Table 38-4 describes the Layer 2 and Layer 3 prerequisites, and sample configuration for the Converged Access Workflow. In the sample configuration, the following nomenclature is used to represent the various wireless management VLANs in the MA and MC.

- WM_VLAN - Name of the Wireless Management VLAN
- WM_VLAN_id - ID of the Wireless Management VLAN
- WLAN1_Client_VLAN_Name - VLAN name of WLAN 1
- WLAN2_Client_VLAN_Name - VLAN name of WLAN 2
- WLAN3_Client_VLAN_Name - VLAN name of WLAN 3
- WLAN1_Client_VLAN_id - VLAN ID of WLAN 1

- WLAN2_Client_VLAN_id - VLAN ID of WLAN 2
- WLAN3_Client_VLAN_id - VLAN ID of WLAN 3

Note WLANx_Client_VLAN_id represents all the three client VLAN Ids.

Table 38-4 Layer 2 and Layer 3 Prerequisites for Converged Access Switches for Device Roles MA and MC

Task on Converged Access Switch	Sample Configuration
Wireless Management VLAN • Create wireless management VLAN with a network wide unique name. • Configure access ports connected to APs under this VLAN.	! Mgmt VLAN on Access Switch vlan <WM_VLAN_id> name <WM_VLAN> ! Apply VLAN to access ports connected to Access Points interface GigabitEthernet 1/0/x description Connected to Access-Points switchport mode access switchport access vlan <WM_VLAN_id>
Create Wireless Client VLANs • Create wireless client VLANs in VLAN database. The VLAN names are common across campus and branches.	! Create the wireless Client VLANs on Access Switch vlan <WLAN1_Client_VLAN_id> name <WLAN1_Client_VLAN_Name> vlan <WLAN2_Client_VLAN_id> name <WLAN2_Client_VLAN_Name> vlan <WLAN3_Client_VLAN_id> name <WLAN3_Client_VLAN_Name>
DHCP Snooping /ARP Inspection • Enable DHCP snooping and ARP inspection on each WLAN client VLANs in the access switch (for static or dynamic VLAN). • Configure upstream Layer 2 trunk as trusted for ARP inspection and DHCP snooping.	! Enable DHCP Snooping & ARP Inspection on all WLAN ! Client VLANs (Static or Dynamic) ip dhcp snooping ip dhcp snooping vlan name <WLANx_Client_VLAN_id> no ip dhcp snooping information option ip arp inspection vlan <WLANx_Client_VLAN_id> ip arp inspection validate source destination allow-zeros interface Port-Channel <id> description L2 Trunk to Upstream Router/Switch ip dhcp snooping trust ip arp inspection trust
Switch Trunk Ports • Configure trunk ports to the WAN router(s). The trunk must allow WM_VLAN and the Client VLANs, and must be a trusted port for DHCP snooping or ARP inspection. • Ensure that the other ends of the trunk ports are properly configured (not shown).	! Configure trunk port to other connected switches/router interface Port-channel1 description Connected to Upstream System switchport trunk allowed vlan add <WM_VLAN_id>, <WLAN1_Client_VLAN_id>,<WLAN2_Client_VLAN_id>, <WLAN3_Client_VLAN_id>, ip arp inspection trust ip dhcp snooping trust
Default Gateway • Ensure that default gateway is configured.	! Configure default-gateway <*ip default-gateway*>

Task on Converged Access Switch	Sample Configuration

Wireless Mobility Controller
• If you want Catalyst 3650, 3850, and 4500 SUP 8-E switches to be deployed as MC then configure the switches as MC, and reload them to make the configuration effective.
	`wireless mobility controller`
	`write memory`
	`reload`

AP Licenses • MC must have sufficient AP licenses to support all APs in its sub-domain, and activate the licenses on the APs. The activation does not require a reboot. • The GA does not require AP license.	`! Activate AP license on branch converged access switch` `license right-to-use activate ap-count <count> slot <ID> acceptEULA`
Security • Convert relevant authentication commands on the access switches to their Class-Based Policy Language (CPL) equivalents.	`authentication convert-to new-style` This command permanently converts the legacy configuration on the switch to identity-based networking services. On entering this command, a message is displayed for your permission to continue. Permit the conversion.

Update AP Interface Template
• Add wireless management VLAN to the AP interface template LAP_INTERFACE_TEMPLATE .
• Apply the updated template to each switch port connected to an AP.
• Verify that the VLANs are applied using the following command:
`show derived-config interface <interface id>`
 	
This step is not necessary if **autoconf enable** command is globally configured. In this case, the switch automatically detects the device types of the connected devices, and applies appropriate interface templates.
	`template LAP_INTERFACE_TEMPLATE`
	`switchport access vlan <Wireless_Mgmt_VLAN_id>`
	`! Associate the LAP_INTERFACE_TEMPLATE to switch`
	`! ports connected to APs. This puts the interface`
	`! in shutdown state; so issue a "no shut" command`
	`interface Gig 1/0/x`
	`source template LAP_INTERFACE_TEMPLATE`
	`no shutdown`

Table 38-5 describes the Layer 2 and Layer 3 prerequisites, and sample configuration for GA. In the sample configuration, the following nomenclature is used to represent the wireless management VLAN and Guest VLAN details for GA:

- WM_VLAN - Name of the Wireless Management VLAN
- WM_VLAN_id - ID of the Wireless Management VLAN
- GUEST_VLAN_Name - VLAN name of Guest Anchor Controller
- GUEST_VLAN_id - VLAN ID of Guest Anchor Controller

Table 38-5 Layer 2 and Layer 3 Prerequisites for Guest Anchor Controller

Task on Guest Anchor Controller	Sample Configuration for Guest Access Controller

Wireless Management VLAN
• Create wireless management VLAN with a network wide unique name.
	`! Mgmt VLAN on Access Switch`
	`vlan <WM_VLAN_id>`
	`name <WM_VLAN>`

Create Wireless Guest VLAN
• Create wireless Guest VLANs in VLAN database. The VLAN name must be common across all GAs.
	`! Create the wireless guest VLANS on Access Switch`
	`vlan <GUEST_VLAN_id>`
	`name <GUEST_VLAN_Name>`

DHCP Snooping / ARP Inspection
• Enable DHCP snooping and ARP inspection on the Guest VLAN.
• Configure Layer 2 trunk connected to the network as trusted for ARP inspection and DHCP snooping.
	`! Enable DHCP Snooping & ARP Inspection on Guest`
	`! VLAN`
	`ip dhcp snooping`
	`ip dhcp snooping vlan name <GUEST_VLAN_Name>`
	`no ip dhcp snooping information option`
	`ip arp inspection vlan <GUEST_VLAN_id>`
	`ip arp inspection validate source destination allow-zeros`
	`interface Port-Channel <id>`
	`description L2 Trunk to network`
	`ip dhcp snooping trust`
	`ip arp inspection trust`

Default Gateway • Ensure that default gateway is configured.	`ip default-gateway <ip address>`
Security • Convert relevant authentication commands on the access switches to their Class-Based Policy Language (CPL) equivalents.	`authentication convert-to new-style` This command permanently converts the legacy configuration on the switch to identity-based networking services. On entering this command, a message is displayed for your permission to continue. Permit the conversion.

Related Topics

- Prerequisites for Converged Access Deployment
- Prerequisites for Server Configuration

Prerequisites for Server Configuration

- Cisco Prime Infrastructure
  - All network-wide catalyst switches and 5760 WLCs must be configured with SNMP.
  - The Converged Access switches must be added to the inventory of Cisco Prime Infrastructure. You need to provide SNMP and Telnet credentials to add the devices to the inventory.
  - Link Cisco Prime Infrastructure with Cisco ISE engine as external server to centrally monitor end-to-end client connectivity and policy enforcement details.
- Cisco ISE/ACS
  - All network devices including catalyst switches and Guest Anchor WLC must be configured in Cisco ISE/ACS to enable centralized policy engine function.
  - AAA configuration is not required for converged access on individual network devices as it is automatically generated by Converged Access Workflow.
- DHCP Server—Internal or external DHCP server must be preconfigured with appropriate pool settings for wireless clients.
- DNS Server—Must be preconfigured with appropriate name-lookup process to successfully connect to the network.

Related Topics

- Prerequisites for Converged Access Deployment
- Prerequisites for Layer 2 and Layer 3

Converged Access Template-Based Deployment

Cisco Prime Infrastructure uses different templates for different deployment models. You need to select the appropriate template-based on your network topology as explained in Table 38-6:

Table 38-6 Network Topology and Configuration Template Mapping

Network Topology	Configuration Template
Single-switch small network	IOS-XE Controller - Small Network
Controller-less single/multi-domain branch	IOS-XE Controller - Large Network
Controller-based single/multi-domain branch	IOS-XE Controller - Large Network
Centralized wireless campus	IOS-XE Centralized Wireless Network

To deploy a converged access template:

Step 1 Choose **Services > Converged Access**.

Step 2 Click **Next** to choose the deployment model.

Step 3 From the **Select Deployment Model** drop-down list, choose any one of the following options:

- IOS-XE Controller - Small Network
- IOS-XE Controller - Large Network
- IOS-XE Centralized Wireless Network

Step 4 Click **Next** to choose the devices to be deployed.

Step 5 Choose the devices and click **Next** to apply the selected network configuration.

The selected device will be listed out in the left pane, and in the right pane you can configure the templates by entering the values for the Wireless Management, WLANs, Guest WLAN, Mobility, Security, Application Visibility and Control (AVC), and Quality of Services (QoS).

Step 6 Choose the devices individually and enter the **Wireless Management** configuration values.

Step 7 Click **Apply** and then **Next.**

Step 8 Enter the **WLANs** configuration values that are common to all the selected devices.

By default, the **All Selected Devices** check box is enabled. You can enter the WLAN configuration values for all the devices at the same time.

Step 9 Click **Apply** and then **Next**.

Step 10 (Optional) Enter the **Radio** configuration values that are common to all the selected devices. By default, the **All Selected Devices** check box is enabled.

Step 11 Click **Apply** and then **Next**.

Step 12 (Optional) Enter the **Guest WLAN** configuration values that are common to all the selected devices.

By default, the **All Selected Devices** check box is enabled.

Step 13 Click **Apply.**

Step 14 Choose the devices individually and enter the **Guest Controller** configuration values.

Step 15 Click **Apply** and then **Next**.

Step 16 Select the individual devices and enter the **Mobility** configuration values. The Mobility configuration fields will be available in the Converged Access Wizard only for large and centralized network deployments.

Step 17 Click **Apply** and then **Next**.

Step 18 (Optional) Enter the **Security** configuration values that are common to all the selected devices. By default, the **All Selected Devices** check box is enabled.

Step 19 Click **Apply** and then **Next**.

Step 20 (Optional) Enter the **AVC** and **QoS** configuration values that are common to all the selected devices. By default, the **All Selected Devices** check box is enabled.

Step 21 Click **Apply** and then **Next** to view the confirmation screen.

The confirmation screen allows you to view the device configuration information before deployment.

Step 22 (Optional) Enter the job name and click the **Date** radio button to schedule the deployment job.

Step 23 Click **Deploy**.

Related Topics

- Prerequisites for Converged Access Deployment
- Guidelines for Entering Configuration Values

Guidelines for Entering Configuration Values

This section provides the field descriptions for converged access template and guidelines for entering the global and local configuration values for the following deployment models with specific examples.

- Controller-less single-switch deployment model
- Controller-less single/multi-domain deployment model
- Controller-based single/multi-domain deployment model
- Centralized wireless campus deployment model

Related Topics

- Prerequisites for Converged Access Deployment
- Converged Access Template Field Descriptions
- Entering Configuration Values for Controller-Less Single/Multi-Domain Wireless Deployment Model
- Entering Configuration Values for Controller-Based Single/Multi-Domain Wireless Deployment Model
- Entering Configuration Values for Centralized Wireless Campus Deployment Model

Converged Access Template Field Descriptions

This section contains the field descriptions for converged access template.

Table 38-7 Wireless Management Field Descriptions

Field Name	Description
VLAN ID	VLAN ID of the selected device.
IP Address	Wireless management IP of the selected device.
Subnet mask	Subnet mask allocated to the selected device.

Table 38-8 WLAN Field Descriptions

Field	Description
SSID	Name of the wireless LAN.
ID	Wireless LAN ID. If SSID > 16, you need to manually enter the AP group name.

Table 38-8 WLAN Field Descriptions

Field	Description
Security	Allows you to customize the login window for configuring an external web server such as ISE. The following security options are available for WLAN: • WPA2-Enterprise • WPA2-Personal • OPEN For Guest WLAN, WebAuth (external) option alone is available.
Pre-Shred Key	This is a mandatory field, if you have a selected WPA2-Personal.The value must be alphanumeric and at least eight characters long.
Client VLAN Name	Name of the client VLAN. Can be alphanumeric.
AP Group	AP Group name is used to assign group name for the APs associated with WLAN and Client VLAN.
DHCP Required	This is an optional field. Check the **DHCP Required** check box for WLAN. This forces the wireless clients to use DHCP to get IP addresses. Clients with static address cannot access the network.
Radio	Radio bands used by WLAN.
Device Classification	You can turn on/off the device classification on the switch, using OUI and DHCP.
Device Profiling	You can turn on/off the device profiling. The following two options are available for device profiling: • Local profiling based on HTTP attributes • Radius profiling based on HTTP attributes
Client Exclusion	Turns on/off the client exclusion for the WLAN. When it is turned on, the misbehaving clients are added in an exclusion list so that they cannot access the network until the timeout is over. Clients may be added in the exclusion list due to excessive authentication attempts and using IP address of another client.
Client Exclusion Timeout (sec)	The timeout period for excluded clients.
Session Timeout (sec)	The timeout period for a client session. The client is re-authenticated before this period is over.

Table 38-9 Wireless Radio Field Descriptions

Field	Description
RF Group Name	Name of the RF group. Multiple MCs can be placed under a single RF group, to perform RRM in a globally optimized manner and perform network calculations on a per-radio basis.
Radio 2 GHz	This is an optional check box.
Radio 5 GHz	This check box is checked by default and it's mandatory. You cannot uncheck this check box

Table 38-9 Wireless Radio Field Descriptions

Field	Description
Disable Rates	These data rates are disabled. Clients cannot use these data rates to connect to access points.
Mandatory Rates	Clients must support these data rates in order to associate to an access point, although it may connect to the AP using one of the supported data rates.
Supported Rates	Clients that support this data rate may communicate with the access using the supported date rate. However, clients are not required to use this data rate in order to associate with the AP.
Country Code	Country code enables you to specify a particular country of operation. Configuring a country code ensures that each radio's broadcast frequency bands, interfaces, channels, and transmit power levels are compliant with country-specific regulation.

Table 38-10 Guest Services Field Descriptions

Field	Description
Anchor Controller IP	Wireless management IP of Guest Anchor device.
Anchor Group Name	Group name of Anchor device.
Foreign Controller	Wireless management IP of MC to which the Guest Anchor device is associated.

Refer Table 38-8 for Guest WLAN field descriptions.

Table 38-11 Security Field Descriptions

Field	Description
Radius Server (IPs)	IP address of the Remote Authentication Dial In User Service (RADIUS) server.
Key	Password of Radius server.
Device HTTP TACACS Authentication	Select this in order to enable TACACS based device authentication to access the converged access device.
TACACS+ Server IP(s)	IP address of the TACACS server.
Key	Password of the TACACS server.

Table 38-12 Application Services Field Descriptions

Field Name	Description
Netflow Collectors (IP:Port)	IP—The IP address of the Prime Infrastructure server. Port—The port on which the NetFlow monitor will receive the exported data. For Cisco Prime Infrastructure the default port is 9991. Example: 172.20.114.251:9991
WLAN-1 SSID Bandwidth(%)	Specify the maximum bandwidth percentage allowed for first WLAN.
WLAN-2 SSID Bandwidth(%)	Specify the maximum bandwidth percentage allowed for second WLAN.
WLAN-3 SSID Bandwidth(%)	Specify the maximum bandwidth percentage allowed for third WLAN.
Guest SSID Bandwidth(%)	Specify the maximum bandwidth percentage allowed for Guest WLAN.

Table 38-13 Wireless Mobility Field Descriptions

Field Name	Description
Role	Mobility Controller or Mobility Agent.
Controller IP	Wireless Management IP of Controller device.
Switch Peer Group Name	Peer group name in which the Agent is added.
Mobility Agent IP(s)	Wireless management IP of Mobility Agent devices. If you are entering more than one IP addresses, use semicolon to separate the IP addresses.
Peer Controller IP(s)	Wireless Management IP of peer controller device. If you are entering more than one IP addresses, use semicolon to separate the IP addresses.

Related Topics

- Prerequisites for Converged Access Deployment
- Converged Access Template-Based Deployment
- Entering Configuration Values for Controller-Less Single-Switch Deployment Model
- Entering Configuration Values for Controller-Less Single/Multi-Domain Wireless Deployment Model
- Entering Configuration Values for Controller-Based Single/Multi-Domain Wireless Deployment Model
- Entering Configuration Values for Centralized Wireless Campus Deployment Model

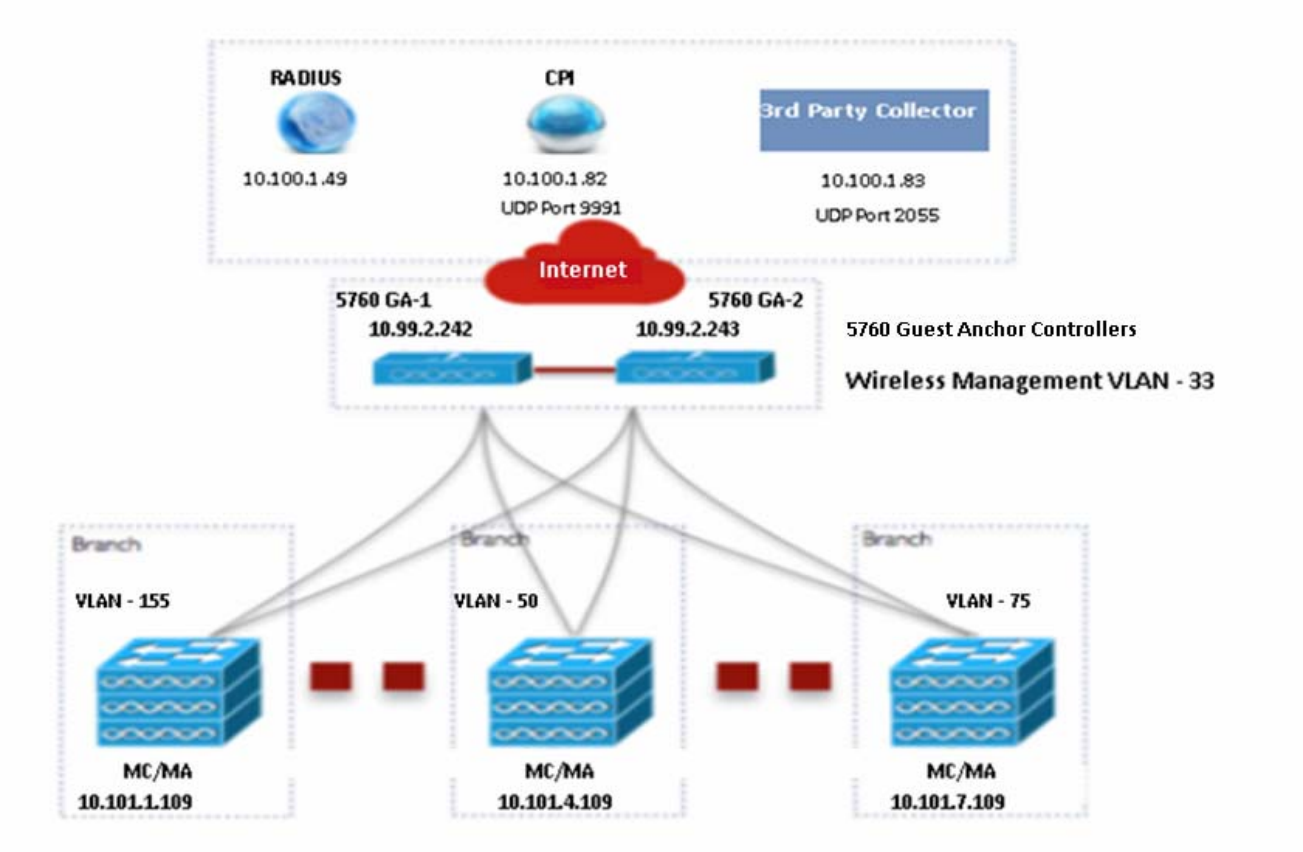
Entering Configuration Values for Controller-Less Single-Switch Deployment Model

A small-sized remote branch office or retail store may consists of a single converged access switch (standalone or stack) to provide network connectivity to the wired and wireless users.

For such network designs, the switch integrates both MC and MA functions. These networks may need guest wireless services, as well as common security and network access policy enforcement across all deployed sites.

The network administrator can use Cisco Prime Infrastructure IOS-XE Controller Small Network template to deploy converged access. Figure 38-2 illustrates the reference network for single-switch small network that shows three branch offices. Each site can be independently deployed using the workflow. Alternatively, one deployment workflow can deploy multiple sites. Prime Infrastructure allows you to configure the devices in five WLANs. Figure 38-2 illustrates three WLAN configuration scenario in the single-switch small network topology.

Figure 38-2 Controller-less Single-switch Small Network Model



	SSID	Security	Client VLAN Name	Guest VLAN Name
WLAN 1	ABCCorp_802.1X	WPA2-Enterprise	8021x-WiFi_VLAN	
WLAN 2	ABCCorp_PSK	WPA2-Personal	PSK-WiFi_VLAN	
WLAN 3	ABCCorp-OPEN	OPEN	OPEN_WiFi-VLAN	
Guest WLAN	ABCCorp_Guest	WebAuth-External		Guest_WiFi-VLAN

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You must enter the Wireless Management configuration values separately for each device. Table 38-14 describes the Wireless Management configuration values for MA/MC (10.100.1.109) and Guest Anchor (10.99.2.242) in the single-switch small network topology shown in Figure 38-2.

Table 38-14 Sample Wireless Management Configuration Values for MA/MC (10.100.1.109) and GA (10.99.2.242)

Data Field	*MA/MC*	GA
VLAN ID	155	33
IP	10.101.1.109	10.99.2.242
Subnet Mask	255.255.255.240	255.255.255.240

After applying the Wireless Management configuration values, you must enter at least one WLAN configuration values. up to Table 38-15 describes sample configuration of three WLANs for the single-switch small network topology shown in Figure 38-2.

Table 38-15 Sample WLAN Configuration Values for MC/MA and GA

Data Field	WLAN 1	WLAN 2	WLAN 3
SSID	ABCCorp_802.1x	ABCCorp_PSK	ABCCorp_OPEN
ID	1	2	3
Security	WPA2-Enterprise	WPA2-Personal	OPEN
Pre-Shared Key	—	CISCO123	—
Client VLAN Name	8021X-WiFi_VLAN	PSK-WiFi_VLAN	OPEN_WiFi_VLAN
AP Group	Ap-group-1		Ap-group-HR
DHCP			Yes (Check the DHCP check box)
Radio	All	802.11g	802.11a/g
Device Classification		Yes (Check the Device Classification check box)	
Device Profiling	None	Local	Both
Client Exclusion	Yes (check the Client Exclusion check box)	Yes (check the Client Exclusion check box)	Yes (check the Client Exclusion check box)
Timeout (sec)	60	100	100
Session Timeout (sec)	1800	2000	300

After applying the WLAN configuration values, enter the Wireless Radio configuration values for all the devices at the same time. Table 38-16 shows the Wireless Radio configuration values for MC/MA and GA in the single-switch small network topology shown in Figure 38-2.

Table 38-16 Sample Wireless Radio Configuration Values for MC/MA and GA

Data Field	Sample Configuration Value
RF Group Name	CA-RF
Radio 5 GHz	Yes (This check box is checked by default and it's mandatory. You cannot uncheck this check box.)
Disable Rates	RATE_6M;RATE_18M; RATE_54M
Mandatory Rates	RATE_6M;RATE_18M; RATE_54M
Supported Rates	RATE_6M;RATE_18M; RATE_54M
Radio 2 GHz	No (This is an optional check box)
Disable Rates	—
Mandatory Rates	—
Supported Rates	—
Country Code	UNITED STATES

After applying the Wireless Radio configuration values, enter the Guest Services configuration values for all the devices at the same time. Table 38-17 describes the Guest WLAN configuration values for all the devices in the single-switch small network topology shown in Figure 38-2.

Table 38-17 Sample Guest WLAN Configuration Values for MC/MA and GA

Data Field	Sample Configuration Values
SSID	ABCCorp_Guest
ID	15
Security	WebAuth-External
Pre-Shared Key	—
Client VLAN Name	Guest_WiFi_VLAN
AP Group	AP-group-guest
DHCP	yes (check the DHCP check box)
Radio	802.11a (or 802.11a/g, 802.11b/g, 802.11g, or All)
Device Classification	Yes (check the Device Classification check box)
Device Profiling	Both
Client Exclusion	ON
Timeout (sec)	100
Session Timeout (sec)	5000

Table 38-18 describes the sample Guest Controller configuration values for MC/MA (10.100.1.109) and GA in the single-switch small network topology shown in Figure 38-2.

Table 38-18 Sample Guest Controller Configuration Values for MC/MA (10.100.1.109) and GA

Data Field	MC/MA	GA
Anchor Controller IP	10.99.2.242; 10.99.2.243	10.99.2.242; 10.99.2.243
Anchor Group Name	CA-Mobility-SubDomain-3	CA-Mobility-SubDomain-3
Foreign Controllers	10.101.4.109	10.101.1. 109; 10.101.4.109; 10.101.7.109

After applying the Guest Services configuration values, enter the Security configuration values for all the devices at the same time. Table 38-19describes the sample Security configuration values for MC/MA and GA in the single-switch small network topology shown in Figure 38-2.

Table 38-19 Sample Security Configuration values for MC/MA and GA

Data Field	Sample Configuration Values
Radius Server (IPs)	10.100.1.49
Key	CISCO
Device HTTP TACACS Authentication	Yes (check the Device HTTP TACACS Authentication check box)
TACACS+ Server IP(s)	10.100.1.51
Key	cisco

After applying the Security configurations values, enter the AVC and QoS configuration values for all the devices. Table 38-20 describes the sample configuration values for MC/MA and GA in the single-switch small network topology shown in Figure 38-2.

Table 38-20 Sample AVC and QoS Configuration Values for MC/MA and GA

Data Field	Sample Configuration Values
Netflow Collectors (IP:Port)	10.100.1.02:9991; 10.100.1.03:2055
WLAN-1 SSID Bandwidth(%)	40
WLAN-2 SSID Bandwidth(%)	30
WLAN-3 SSID Bandwidth(%)	20
Guest SSID Bandwidth(%)	10

Related Topics

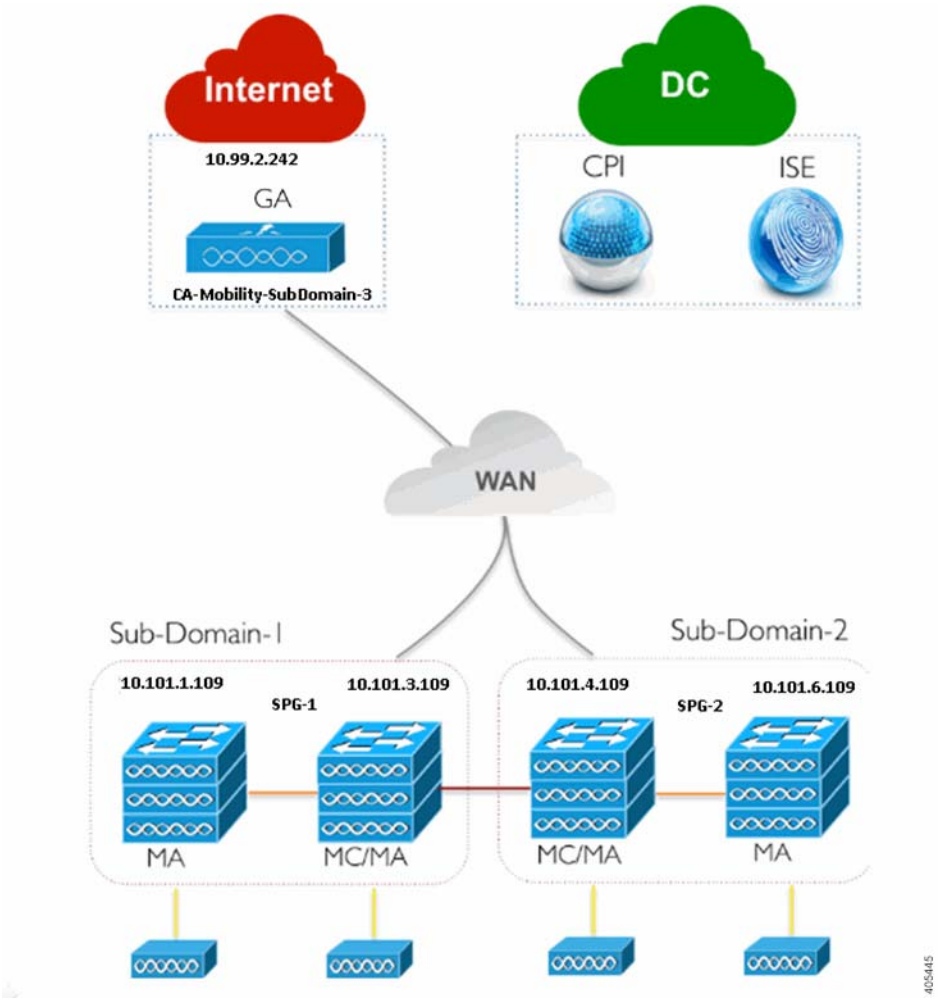
- Prerequisites for Converged Access Deployment
- Converged Access Template-Based Deployment
- Converged Access Template Field Descriptions
- Entering Configuration Values for Controller-Less Single/Multi-Domain Wireless Deployment Model

- Entering Configuration Values for Controller-Based Single/Multi-Domain Wireless Deployment Model
- Entering Configuration Values for Centralized Wireless Campus Deployment Model

Entering Configuration Values for Controller-Less Single/Multi-Domain Wireless Deployment Model

Figure 38-3 illustrates the controller-less deployment model that leverages Catalyst switches for MA and MC roles without depending on an external WLC. This converged access deployment model is suitable for large branches and campus, and can be implemented using Cisco Prime Infrastructure IOS-XE Controller Large Network template.

Figure 38-3 Controller-Less Large Branch Network Model



Enter the Wireless Management, WLANs, Wireless Radio, and Guest WLAN configuration values for all the devices as described in single-switch small network deployment model. Enter the Guest Controller configuration values and Mobility configuration values for MA, MC, and GA for the topology shown in Figure 38-3.

Table 38-21 Sample Guest Controller Configuration Values for MA, MC, and GA

Data Field	MA	MC	GA
Anchor Controller IP	10.99.2.242	10.99.2.242	10.99.2.242
Anchor Group Name	CA-Mobility-SubDomain-3	CA-Mobility-SubDomain-3	CA-Mobility-SubDomain-3
Foreign Controller	10.101.4.109	10.101.3.109	10.101.3.109

Table 38-22 describes the Mobility configuration values for MA, MC in SPG-1, and GA shown in Figure 38-3.

Table 38-22 Sample Mobility Configuration Values for MA, MC, and GA

Data Field	MA	MC	GA
Role	Agent	Controller	Controller
Controller IP	10.101.3.109	10.101.3.109	—
Switch Peer Group Name	SPG-1	SPG-1	—
Mobility Agent IP(s)	—	10.101.1.109	—
Peer Controller IP(s)	—	10.101.4.109	—

Repeat the same procedure for MA and MC in SPG-2 as shown in Figure 38-3.

After applying the Mobility configuration values, enter the Security, AVC and QoS configuration values as described in single-switch small network deployment model.

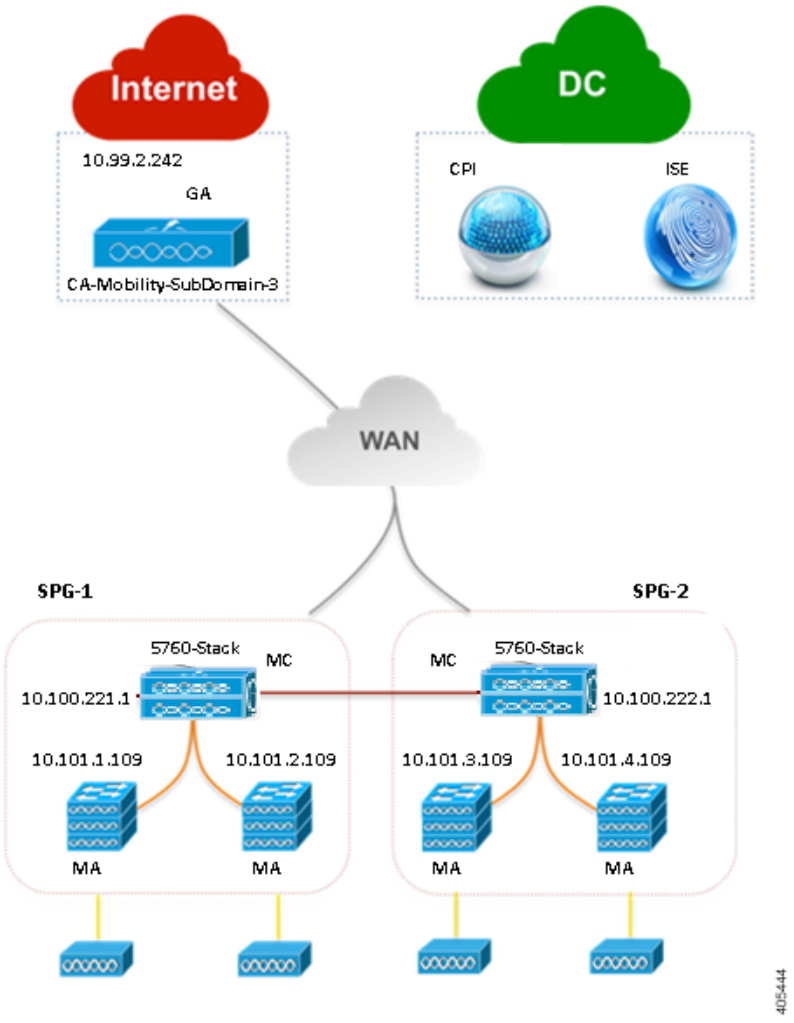
Related Topics

- Prerequisites for Converged Access Deployment
- Converged Access Template Field Descriptions
- Entering Configuration Values for Controller-Less Single-Switch Deployment Model
- Entering Configuration Values for Controller-Based Single/Multi-Domain Wireless Deployment Model
- Entering Configuration Values for Centralized Wireless Campus Deployment Model

Entering Configuration Values for Controller-Based Single/Multi-Domain Wireless Deployment Model

Figure 38-4 illustrates the controller-based single/multi-domain deployment model that leverages the same IOS-XE Controller Large Network template for deploying converged access with an external 5760 WLC as the MC.

Figure 38-4 Controller-Based Large Campus Model



Enter the configuration values as explained in controller-less single/multi-domain wireless deployment model.

Related Topics

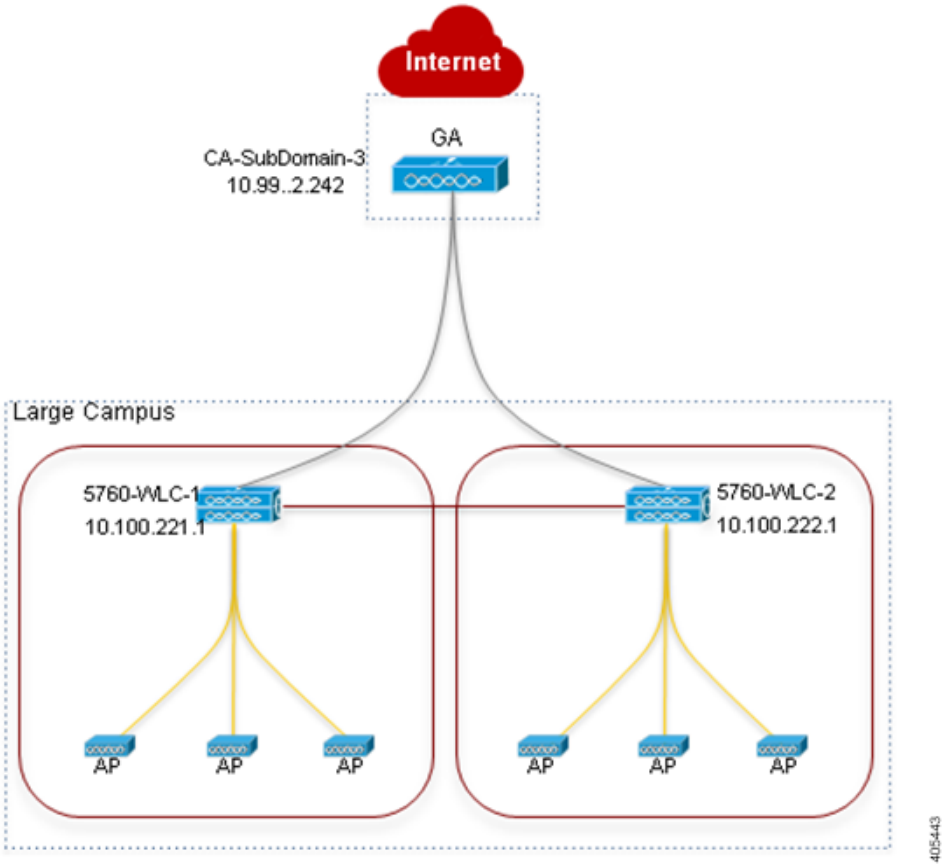
- Prerequisites for Converged Access Deployment
- Converged Access Template Field Descriptions
- Entering Configuration Values for Controller-Less Single-Switch Deployment Model
- Entering Configuration Values for Controller-Less Single/Multi-Domain Wireless Deployment Model
- Entering Configuration Values for Centralized Wireless Campus Deployment Model

Entering Configuration Values for Centralized Wireless Campus Deployment Model

Cisco Prime Infrastructure IOS-XE Centralized Wireless template supports traditional wireless deployment model using next-generation 5760-WLC. In this model, any generation Access layer switches are deployed in traditional Ethernet switch mode over which WLC and the APs build an overlay network using CAPWAP Tunneling mechanism.

Figure 38-5 illustrates 5760-WLC based Centralized Wireless deployment using IOS-XE Centralized template.

Figure 38-5 Centralized Campus Network Model



Enter the Wireless Management, WLANs, Wireless Radio, and Guest WLAN configuration values for all the devices as described in single-switch small network deployment model. Enter the Guest Controller configuration values and Mobility configuration values for 5760 WLC in SPG-1 and GA for the topology shown in Figure 38-5.

Table 38-23 Sample Guest Controller Configuration Values for 5760 WLC and GA

Data Field	5760 WLC	GA
Anchor Controller IP	10.99.2.242	10.99.2.242
Anchor Group Name	CA-Mobility-SubDomain-3	CA-Mobility-SubDomain-3
Foreign Controllers	10.100.222.1	10.100.221.1; 10.100.222.1

Table 38-24 Sample Mobility Configuration Values for 5760 WLC and GA

Data Field	5760 WLC	GA
Peer Controller IP(s)	10.100.222.1	—

Repeat the same procedure for 5760 WLC in SPG-2 shown in Figure 38-5. After applying the Mobility configuration values, enter the Security, AVC and QoS configuration values as described in single-switch small network deployment model.

Related Topics

- Prerequisites for Converged Access Deployment
- Converged Access Template Field Descriptions
- Entering Configuration Values for Controller-Less Single-Switch Deployment Model
- Entering Configuration Values for Controller-Less Single/Multi-Domain Wireless Deployment Model
- Entering Configuration Values for Controller-Based Single/Multi-Domain Wireless Deployment Model