### CCNA 200-301, Volume I

Chapter 29 Building a Wireless LAN

### Objectives

- Connecting a Cisco AP
- Accessing a Cisco WLC
- Connecting a Cisco WLC
- Configuring a WLAN

# Comparing Connections to Autonomous and Lightweight APs



#### Accessing a WLC with a Web Browser

iliilii cisco

#### Wireless LAN Controller

Welcome! Please click the login button to enter your user name and password

Login

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## Accessing the Advanced Configuration Interface



#### The Advanced WLC Configuration GUI

alada			Saye Configuration	Bing   Logout   Befresh			
Monitor	Summary	SECONTLA ABAYAREMENT OTALIANADO NETA TEEDONO	*	in Foune			
Summary	6000 Access Points Su	upported					
<ul> <li>Access Points</li> <li>Cisco CleanAir</li> <li>Statistics</li> <li>CDP</li> </ul>	cisco Cisco 8540 Wireless Controller		•				
<ul> <li>Rogues</li> <li>Redundancy</li> <li>Clients</li> <li>Sleeping Clients</li> <li>Multicast</li> </ul>							
Applications	Controller Summary	Rogue Summary					
> Lync	Management IP Address 192.168.199.199 , ::/128	Active Rogue APs	0	Detail			
Local Profiling	Service Port IP Address 192.168.1.1 , ::/128	Active Rogue Clients	0	Detail			
	Software 8.5.140.0	Adhoc Rogues	0	Detail			
	Emergency Image 8.2.166.0 Version	Rogues on Wired Network	Rogues on Wired Network 0				
	System wic Name	Session Timeout					
	Up Time 7 days, 1 hours, 56 minutes						
	System Time Wed Apr 17 15:13:51 2019	Top WLANs					

## Using WLC Ports

You can connect several different types of controller ports to your network:

- Service port: Used for out-of-band management, system recovery, and initial boot functions; always connects to a switch port in access mode.
- Distribution system port: Used for all normal AP and management traffic; usually connects to a switch port in 802.1Q trunk mode.
- Console port: Used for out-of-band management, system recovery, and initial boot functions; asynchronous connection to a terminal emulator (9600 baud, 8 data bits, 1 stop bit, by default).
- Redundancy port: Used to connect to a peer controller for high availability (HA) operation.

#### Cisco Wireless LAN Controller Ports



## Using WLC Interfaces

Cisco controllers support the following interface types

- Management interface: Used for normal management traffic, such as RADIUS user authentication, WLC-to-WLC communication, web-based and SSH sessions, SNMP, Network Time Protocol (NTP), syslog, and so on. The management interface is also used to terminate CAPWAP tunnels between the controller and its APs.
- Redundancy management: The management IP address of a redundant WLC that is part of a high availability pair of controllers. The active WLC uses the management interface address, while the standby WLC uses the redundancy management address.
- Virtual interface: IP address facing wireless clients when the controller is relaying client DHCP requests, performing client web authentication, and supporting client mobility.
- Service port interface: Bound to the service port and used for out-of-band management.
- Dynamic interface: Used to connect a VLAN to a WLAN.

#### Cisco Wireless LAN Controller Interfaces



#### Connecting Wired and Wireless Networks with a WLAN



#### Displaying the List of RADIUS Authentication Servers

ahaha							n Bing Lagaut B	
CISCO	MONITOR	<u>W</u> LANs <u>⊂</u>	ONTROLLER	WIRELESS SECURITY	MANAGEMENT CON	IMANDS HELP EEE	DBACK 🔥	Home
Security	RADIUS	Authenticat	ion Server	S			Apply Ne	w
* AAA	Auth Ca	lled Station ID T	ype AP M	AC Address:SSID				
* RADIUS Authentication	Use AES	Key Wrap	C (Des	igned for FIPS customers ar	d requires a key wrap cor	mpliant RADIUS server)		
Fallback	MAC De	limiter	Hypi	ten 💌				
DNS Downloaded AVP	Network User	Management	Server Index	Server Address(Ipv4/	Ipv6) Port	IPSec	Admin Status	
LDAP	P		1	192.168.200.28	1812	Disabled	Enabled	
Local Net Users	P		2	192.168.200.29	1812	Disabled	Enabled	
Disabled Clients User Login Policies AP Policies Password Policies								
Local EAP								
Advanced EAP								
Priority Order								
▶ Certificate								
Access Control Lists								
Wireless Protection     Policies								
▶ Web Auth								
TrustSec SXP								
Local Policies								

#### Configuring a New RADIUS Server

սիսիս		Save Configuration Ping Logout Refresh
CISCO MONITOR	WLANS CONTROLLER WIRELE	ESS SECURITY MANAGEMENT COMMANDS HELP FEEDBACK A Home
Security	RADIUS Authentication Ser	rvers > New < Back Apply
<ul> <li>AAA</li> <li>General</li> <li>RADIUS</li> <li>Authentication</li> <li>Accounting</li> <li>Fallback</li> <li>DNS</li> <li>Downloaded AVP</li> <li>TACACS+</li> <li>LDAP</li> <li>Local Net Users</li> <li>MAC Filtering</li> <li>Disabled Clients</li> <li>User Login Policies</li> <li>AP Policies</li> <li>Password Policies</li> <li>Local EAP</li> <li>Advanced EAP</li> <li>Priority Order</li> <li>Certificate</li> <li>Access Control Lists</li> <li>Wireless Protection Policies</li> <li>Web Auth</li> <li>TrustSec SXP</li> <li>Local Policies</li> </ul>	Server Index (Priority) Server IP Address(Ipv4/Ipv6) Shared Secret Format Shared Secret Confirm Shared Secret Key Wrap Port Number Server Status Support for RFC 3576 Server Timeout Network User Management IPSec	3       192.168.200.30         ASCII

#### Displaying a List of Dynamic Interfaces

սիսիս			and the second diversion of the	-	A 100 10 10 10	-	Saye Configuration   Ping   Lego.	A Befresh
CISCO	MONITOR WLAN CONTROLLER	I RELESS	SECURITY MANAG	SEMENT COMM	IANDS HELP EEEDBACI	ĸ		A Home
Controller	Interfaces						Entries 1 - 2 of 2	New
General								
Icons	Interface Name	<b>VLAN</b> Identifier	<b>IP Address</b>	Interface Type	<b>Dynamic AP Management</b>	1Pv6 Address		
Toucetory	management	untagged	192.168.199.199	Static	Enabled	::/128		
Interfaces	virtual	N/A	192.168.1.1	Static	Not Supported			
Internet oroups								
Multicast								
Internal DHCP Server								
Mobility Management								
Ports								

## Defining a Dynamic Interface Name and VLAN ID

ahaha									Save Configuration Ping	Logout Refresh
cisco	MONITOR	WLANs	CONTROLLER	WIRELESS	SECURITY	MANAGEMENT	COMMANDS	HELP	FEEDBACK	A Home
Controller	Interface	s > Nev	<i>,</i>						< Back	Apply
General	Interface	Name	Engineering							
Inventory	VLAN Id		100							
Interfaces										
Interface Groups										
Internal DHCP Server										
Mobility Management										
Ports										

#### Editing the Dynamic Interface Parameters

ahaha									Sa <u>v</u> e Con	figuration Ping	Logout Refresh
CISCO	MONITOR	<u>W</u> LANs	CONTROLLER	WIRELESS	SECURITY	MANAGEMENT	COMMANDS	HELP	EEEDBACK		n Home
Controller	Interfaces	> Edit								< Back	Apply
General											
Icons	General T	oformati	0.0								
Inventory	General A	mormau	011								
Interfaces	Interface	Name	Engine	ering							
Interface Groups	MAC Addr	855	50:17:	f:26:86:60							
Multicast	Configura	tion									
Fabric Configuration	Guest Lan										
Redundancy	Quarantin	e									
Mobility Management	Quarantin	e Vlan Id	0								
Ports	NAS-ID		none								
▶ NTP	Physical I	nformati	on								
▶ CDP	The interf	ace is attac	hed to a LAG.								
▶ PMIPv6	Enable Dy	namic AP N	lanagement	0							
Tunneling	Interface	Address									
F IPv6	VLAN Ider	tifier		100							
F mons	IP Address			192.168.100.10							
r Auvanceu	Netmask			255.255.255.0	_						
	Gateway			192.168.100.1							
	IPv6 Addr	ess		1							
	Prefix Len	gth		128							
	IPv6 Gate	way									
	Link Local	IPv6 Addre	195 1	e80::520f:80ff	fe9f:41fd/64						
	DHCP Info	ormation									
	Primary D	HCP Server		192.168.1.17							
	Secondary	DHCP Ser	ver	192.168.1.18							
	DHCP Pro	ky Mode		Global Q							

#### Displaying a List of WLANs



### Creating a New WLAN

li.ili. cisco		WLANs	CONTROLLER	WIRELESS	SECURITY	MANAGEMENT	COMMANDS	HELP	FEEDBACK	Saye Co
WLANS VULANS Advanced	WLANs > Type Profile Nam SSID ID	New	WLA Engin 1	N D eering eering						

#### Configuring the General WLAN Parameters

ahaha		Saye Configuration Ping Logout Befresh
CISCO	MONITOR WLANS CONTROL	LLER WIRELESS SECURITY MANAGEMENT COMMANDS HELP FEEDBACK A Home
WLANs WLANs IF Advanced	WLANs > Edit 'Engineerin General Security Qo	oS Policy-Mapping Advanced
	Profile Name Type SSID Status	Engineering WLAN Engineering S Enabled
	Security Policies	[WPA2][Auth(802.1X)] (Modifications done under security tab will appear after applying the changes.)
	Radio Policy Interface/Interface Group(G) Multicast Vian Feature Broadcast SSID	All Constraints of the second
	NAS-ID	none

### Layer 2 WLAN Security Type

Option	Description
None	Open authentication
WPA+WPA2	Wi-Fi protected access WPA or WPA2
802.1x	EAP authentication with dynamic WEP
Static WEP	WEP key security
Static WEP + 802.1x	EAP authentication or static WEP
СКІР	Cisco Key Integrity Protocol
None + EAP Passthrough	Open authentication with remote EAP authentication

#### Configuring Layer 2 WLAN Security

սիսիս	Sage Configuration Ping Logout Re	fresh
CISCO	MONITOR WLANS CONTROLLER WIRELESS SECURITY MANAGEMENT COMMANDS HELP EEEDBACK	ome
WLANs	WLANs > Edit 'Engineering' < Back Apple	
VLANS	General Security QoS Policy-Mapping Advanced	_
Advanced	Layer 2 Layer 3 AAA Servers	
	Layer 2 Security # WPA+WPA2 MAC Filtering <sup>®</sup>	
	Fast Transition     Adaptive       Over the DS     Image: Constraint of the second se	
	Protected Management Frame	
	PMF Disabled	
	WPA+WPA2 Parameters	
	WPA Policy	
	WPA2 Policy	
	WPA2 Encryption AES TKIP CCMP256 GCMP128 GCMP256	
	OSEN Policy	
	Authentication Key Management 12	
	802.1X Enable	
	CCKM Enable	
	PSK 🖾 Enable	
	FT 802.1X Enable	
	FT PSK Enable	
	PSK Format ASCI	
	······	
	SUITEB-1X Enable	
	SUTTEB192-1X Enable	
	WPA gtk-randomize State	

## Selecting RADIUS Servers for WLAN Authentication

աիսիս	Sa <u>v</u> e Configuration Ping Logout Befresh
	WLANS CONTROLLER WIRELESS SECURITY MANAGEMENT COMMANDS HELP FEEDBACK A Home
WLANs	WLANs > Edit 'Engineering'
VLANs	General Security QoS Policy-Mapping Advanced
Advanced	Layer 2 Layer 3 AAA Servers
	Select AAA servers below to override use of default servers on this WLAN Radius Servers Radius Server Overwrite interface Enabled Authentication Servers Accounting Servers EAP Parameters F Enabled F Enabled Enable Server 1 IP:192.168.200.28, Port:1812 None  Server 2 IP:192.168.200.30, Port:1812 None  Server 3 IP:192.168.200.30, Port:1812 None  Server 4 None None  Server 5 None None None  Server 6 None None None  Radius Server Accounting
	Interim Update 🔽 Interim Interval 0

#### Configuring QoS Settings

սիսիս					Sa <u>v</u> e C	Configuration Ping	Logout Refresh
cisco	MONITOR WLANS CON	TROLLER WIRELESS	SECURITY	MANAGEMENT	COMMANDS	HELP FEEDBACK	n Home
CISCO WLANs * WLANs * Advanced	MONITOR WLANS CON WLANS > Edit 'Engine General Security Quality of Service (QoS) Application Visibility AVC Profile Netflow Monitor Fastlane WMM WMM Policy	ROLLER WIRELESS eering' QoS Policy-Map Silver (best effort) Enabled none © Disable ©	SECURITY	anced	COMMANDS	HELP FEEDBACK	Apply
	7920 AP CAC 7920 Client CAC	Enabled					

#### Configuring Advanced WLAN Settings

					Save Configuration	Ping   Logout   Refresh
cisco	MONITOR WLANS CONTROLLER WI	RELESS SE	ECURITY MANAGE	MENT COMM	ANDS HELP FEEDBA	ACK A Home
WLANs	WLANs > Edit 'Engineering'				<	Back Apply
VLANS	General Security QoS Po	licy-Mappin	g Advanced			
Advanced	Allow AAA Override	Enabled			DHCP	
	Coverage Hole Detection	Enabled			DHCP Server	Override
	Aironet IE	Timeout (secs)	)		DHCP Addr. Assignmen	t 🗌 Required
	Diagnostic Channel 18	Enabled			OEAP	
	Override Interface ACL Laver2 Acl	IPv4 None	0	IPv6 None	Split Tunnel	Enabled
	URL ACL	None 🕤	-		Management Frame Pro	tection (MFP)
	P2P Blocking Action	Disabled	•		MFP Client Protection #	Optional
	Client Exclusion 2	Enabled	180 Timeout Value (secs)	)	DTIM Period (in beacon	intervals)
	Maximum Allowed Clients #	0			802.11a/n (1 - 255)	1
	Static IP Tunneling 11	Enabled			802.11b/g/n (1 - 255)	1
	Wi-Fi Direct Clients Policy	Disabled	0		NAC	
	Maximum Allowed Clients Per AP Radio	200			NAC State None	0
	Clear HotSpot Configuration	Enabled			Load Balancing and Ban	d Select
	Client user idle timeout(15-100000)	<u> </u>			Client Load Ralancing	

## Displaying WLANs Configured on a Controller

ahaha								Save Configuration Eing Logout Befresh			
CISCO	MONITOR	WLANS 1	CONTROLLER	WIRELESS	SECURITY	MANAGEMENT	COMMANDS	HELP	EEEDBACK	A Home	
WLANs	WLANs									Entries 1 - 1 of 1	
VLANS	Current Filter: None [Change Filter] [Clear Filter]							Crea	te New 🖸 Go		
Advanced	WLAN ID	Туре	Profile Na	me		WLAN SSID		Admin 1	Status Security Policie		
	01	WLAN	Engineering	0		Ingineering		Enabled	[WPA2][Auth(PS	K)]	

#### Configuring Management Access from Wireless Networks

