Configure Local Web Authentication with External Authentication

Contents

Introduction

This document describes how to configure Local Web Authentication with External Authentication on a 9800 WLC and ISE.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- 9800 Wireless LAN Controllers (WLC) configuration
- Lightweight Access Points (LAPs)
- How to set up and configure an external web server Identity Services Engine (ISE).
- How to set up and configure DHCP and DNS servers.

Components Used

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

- 9800-L WLC Cisco IOS® XE, Version 17.9.3
- Identity Services Engine (ISE), Version 2.6 Patch 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.

Web Authentication

Web authentication is a Layer 3 security feature that allows guest users to have access to the network.

This feature is designed to provide easy and secure guest access to open SSIDs, without the need to configure a user profile, and it can also work with Layer 2 security methods.

The purpose of web authentication is to allow untrusted devices (guests) to access the network with limited network access privileges, through a guest WLAN that can be configured with security mechanisms, and the security of the network not compromised. For the guest users to have access to the network, they need to authenticate successfully, that is, they need to provide the correct credentials or accept the Acceptable Use Policy (AUP) to gain access to the network.

Web authentication is a benefit for companies because it drives user loyalty, makes the company compliant to use a disclaimer that the guest user must accept, and allows the company to engage with visitors.

To deploy web authentication, it must be taken in consideration how the guest portal and authentication are handled. There are two common methods:

- Local web authentication (LWA): A method of redirection of guest users to a portal directly from the WLC. The redirection and pre-WebAuth ACL are locally configured on the WLC.
- Central web authentication (CWA): A method of redirection of guest users where the redirection URL and the redirect ACL are centrally configured on an external server (for example ISE) and communicated to the WLC via RADIUS. In central web authentication the redirect URL and redirect ACL are centrally located on an external server (such as RADIUS). The RADIUS server is the one

that handles the authentication, it sends instructions to the WLC. In CWA, the WLC does not require a local web-auth certificate, only one certificate is needed on the central web portal, and requires a central authentication server, such as ISE. To read CWA in more detail navigate to Configure Central Web Authentication (CWA) on Catalyst 9800 WLC and ISE.

In Local Web Authentication, the web portal can be present on the WLC or on an external server. In LWA with External Authentication, the web portal is present on the WLC. In LWA with External Web Server, the web portal is present on an external server (such as DNA Spaces). An example of LWA with External Web Server is described in detail at: Configure DNA Spaces Captive Portal with Catalyst 9800 WLC.

Diagram of the different web authentication methods:

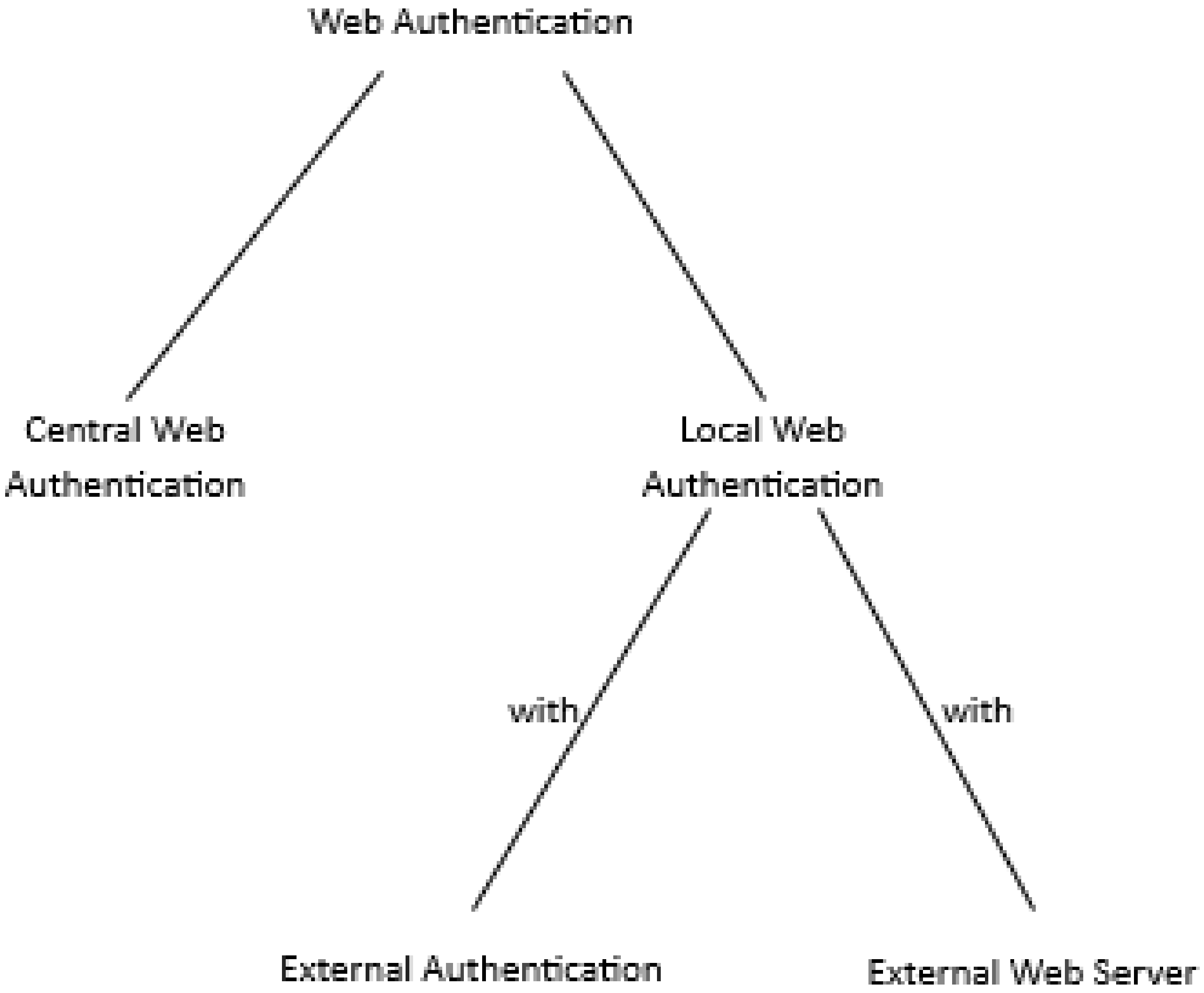
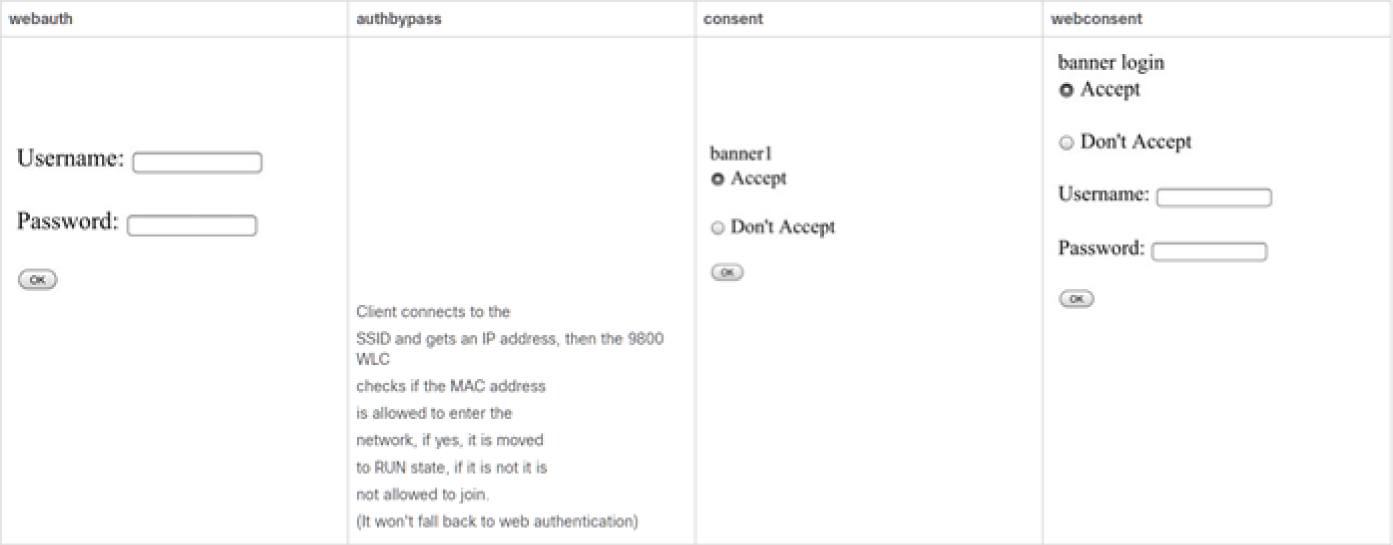


Diagram of the Different Web Authentication Methods

Types of authentication

There are four types of authentication to authenticate the guest user:

- Webauth: Enter username and password.
- Consent (web-passthrough): Accept AUP.
- Authbypass: Authentication based on the MAC address of the guest user device.
- Webconsent: A mix between username/password and accept AUP.



webauth	authbypass	consent	webconsent
Username: Password: OK	Client connects to the SSID and gets an IP address, then the 9800 WLC checks if the MAC address is allowed to enter the network, if yes, it is moved to RUN state, if it is not it is not allowed to join. (It won't fall back to web authentication)	banner1 ● Accept ○ Don't Accept OK	banner login ● Accept ○ Don't Accept Username: Password: OK

Four Types of Authentication to Authenticate the Guest User

Database for Authentication

The credentials for authentication can be store on an LDAP server, locally on the WLC or on the RADIUS server.

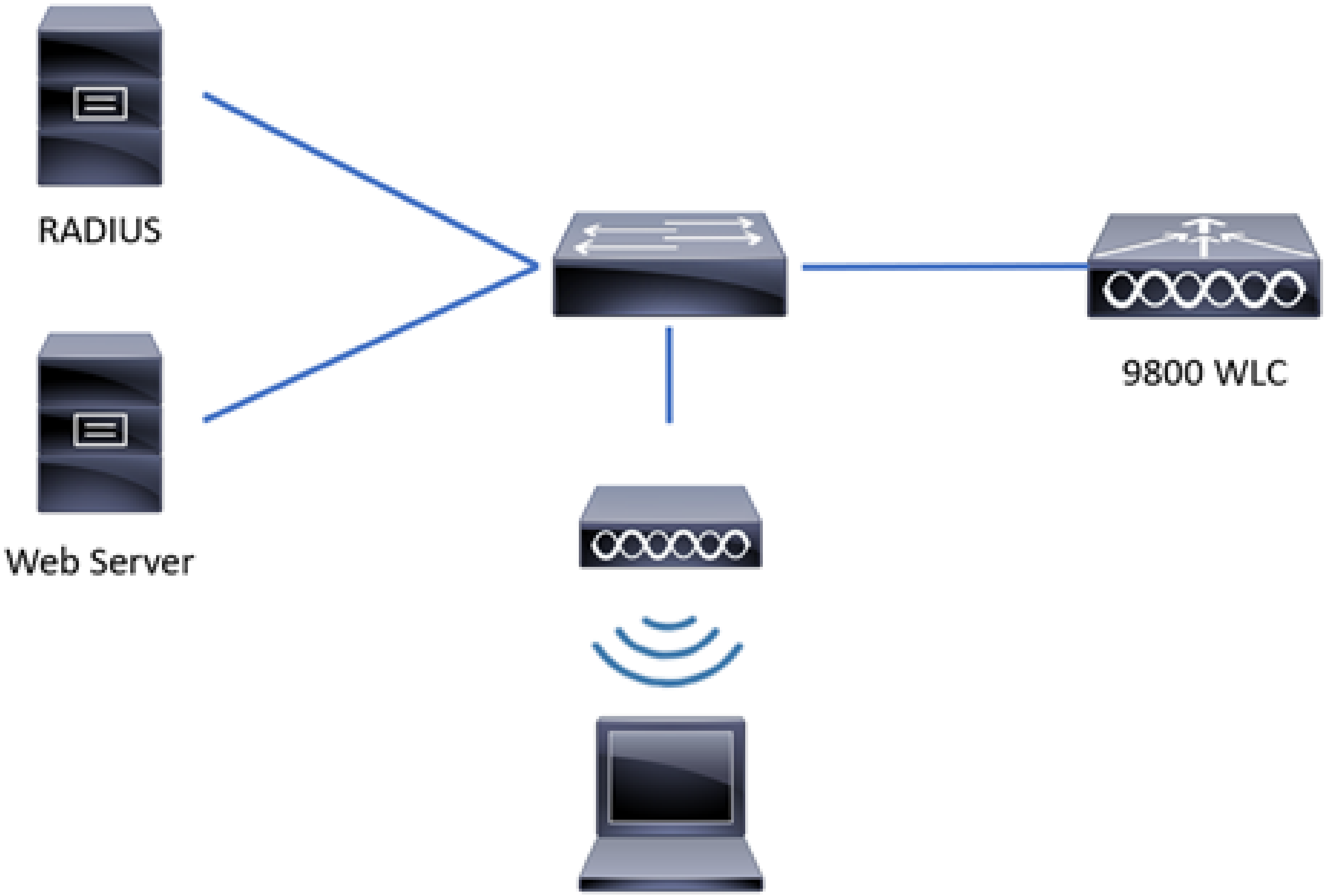
- Local database: The credentials (username and password) are stored locally on the WLC.
- LDAP database: The credentials are stored in the LDAP back-end database. The WLC queries the LDAP server for the credentials of a particular user in the database.
- RADIUS database: The credentials are stored at the RADIUS back-end database. The WLC queries the RADIUS server for credentials of a particular user in the database.

Local Web Authentication

In local web authentication the guest user is redirected to a web portal directly from the WLC.

The web portal can be in the WLC or in another server. What it makes local is the fact that the redirect URL and the ACL that matches traffic must be on the WLC (not the location of the web portal). In LWA, when a guest user connects to the guest WLAN, the WLC intercepts the connection from the guest user and redirects them to the web portal URL, where the guest user is asked to authenticate. When the guest user enters credentials (username and password), the WLC captures the credentials. The WLC authenticates the guest user with a LDAP server, RADIUS server or local database (database present locally on the WLC). In case of RADIUS server (an external server such as ISE), it can be used not also to store credentials, but also to provide options for device registration and self-provisioning. In case of an external web server, such as DNA Spaces, the web portal is present there. In LWA there is one certificate on the WLC and another on the web portal.

The image represents the generic topology of LWA:



Generic Topology of LWA

Devices in the network topology of LWA:

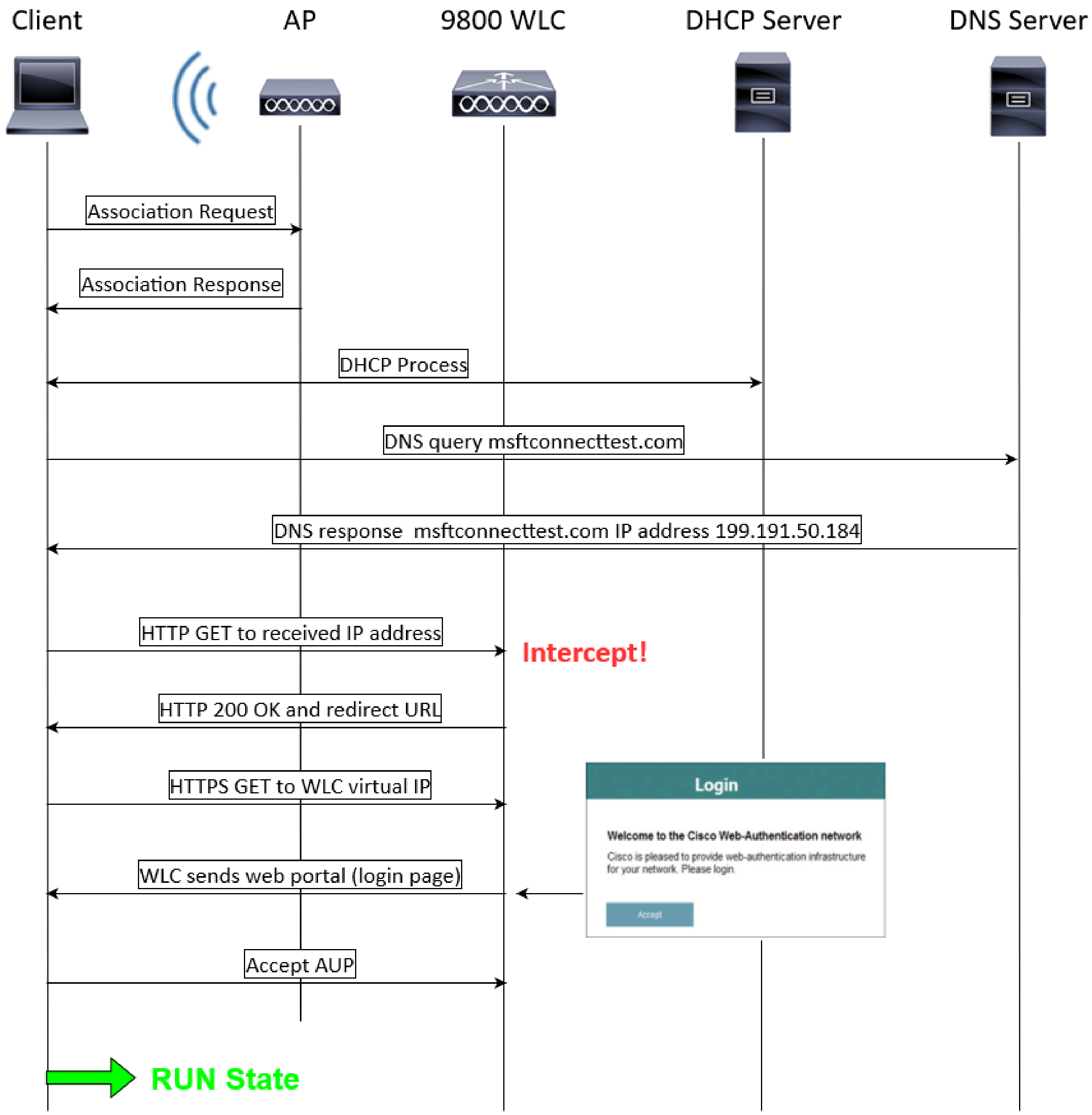
- Client: Sends requests to DHCP and DNS server, requests access to the guest WLAN, and responds to requests from the WLC.
- Access Point: Connected to a switch, broadcasts the guest WLAN, and provides wireless connection to guest users devices. It also allows DHCP and DNS packets before the guest user is authenticated (before enter valid credentials).
- WLC: Manages the APs and clients. The WLC hosts the redirect URL and the ACL that matches traffic. Intercepts HTTP requests from the guest users, redirects them to an web portal (log in page) where guest users have to authenticate. It captures the credentials and authenticates the guest users, and it sends access requests to an external server, LDAP server or local database to confirm if the credentials are valid.
- Authentication server: Responds to access requests from the WLC with access accept/reject. The authentication server validate the credentials from the guest user and notifies the WLC if the credentials are valid or not valid. If credentials are valid, the guest user is authorized to access the network (the authentication server provides options for device registration and self-provisioning). If credentials are not valid, the guest user is denied access to the network.

LWA flow:

- The guest user associates with an AP that broadcasts the guest WLAN.
- The guest user goes through the DHCP process in order to get an IP address.
- The guest user wants to make an internet connectivity check to the captive portal. If it is an Apple device, it tries the Apple captive portal; if it is an Android device it tries the Android captive portal; if it is a Windows device it tries the Windows connect test portal.
- The guest user sends a DNS query to ask for the captive portal IP address. The DNS server responds

to the query with the correspondent IP address.

- The guest user sends an HTTP GET message to the IP address of the captive portal.
- The WLC intercepts that message and replies to the guest user with HTTP 200 OK and the redirect URL.
- The guest user sends a HTTPS GET message to the WLC virtual IP and the WLC responds with the web portal.
- The guest user is asked to enter authentication credentials on the web portal.
- The web portal redirects the user back to the WLC with the provided credentials (if an external web portal is used).
- The WLC authenticates the guest user through a local database, or it sends a query to the RADIUS or LDAP server, to confirm if the credentials are correct (if the authentication type is webconsent or webauth).
- If the credentials are correct, the WLC authenticates the guest user and it goes to RUN state. If credentials are wrong, the WLC deletes the guest user.
- The WLC redirects the client back to the original URL that was entered in the web browser.

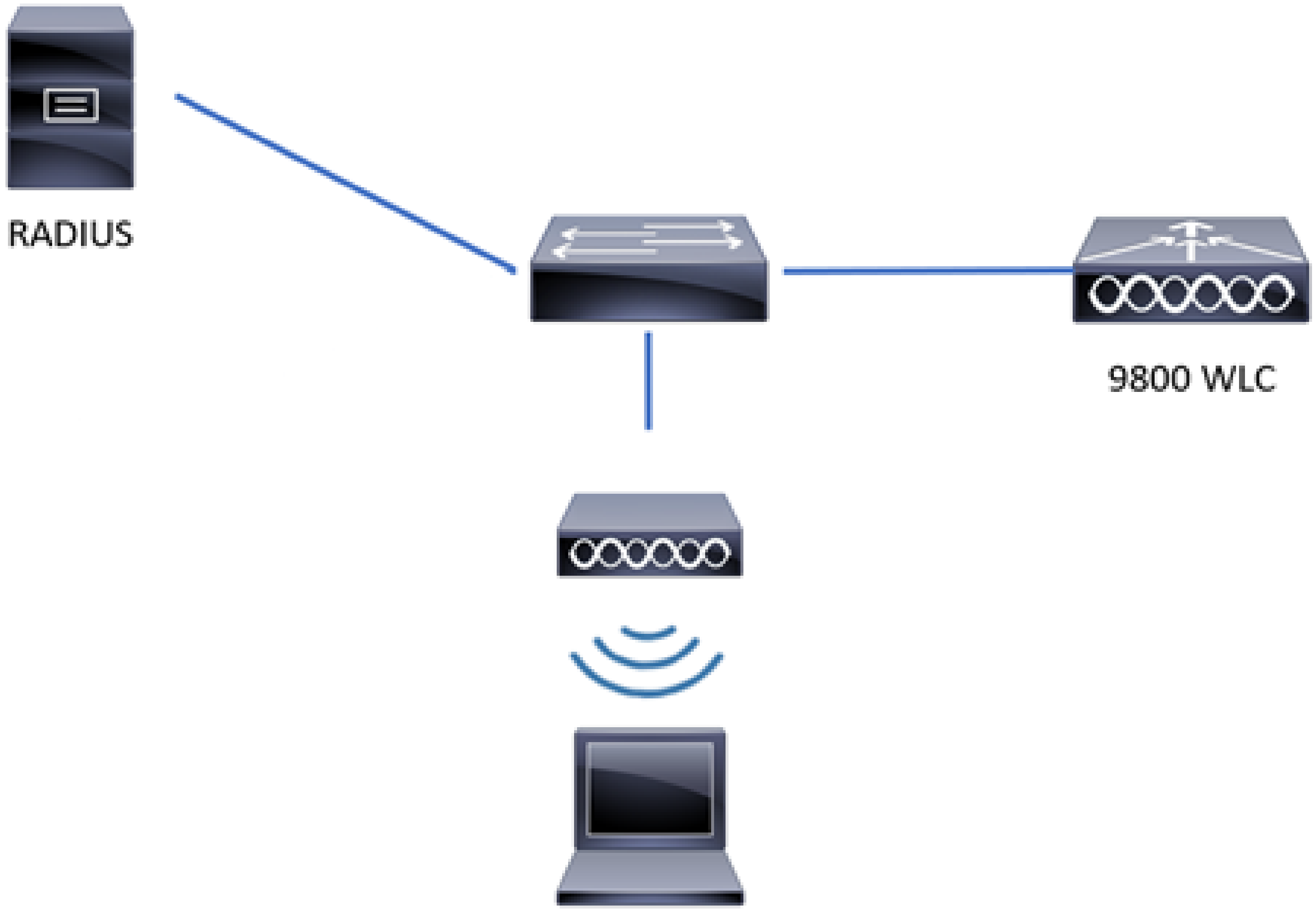

Client
AP
9800 WLC
DHCP Server
DNS Server
Association Request
Association Response
DHCP Process
DNS query msftconnecttest.com
DNS response msftconnecttest.com IP address 199.191.50.184
HTTP GET to received IP address
Intercept!
HTTP 200 OK and redirect URL
HTTPS GET to WLC virtual IP
WLC sends web portal (login page)
Accept AUP
RUN State
Login
Accept

Welcome to the Cisco Web-Authentication network

Cisco is pleased to provide web-authentication infrastructure for your network. Please login.

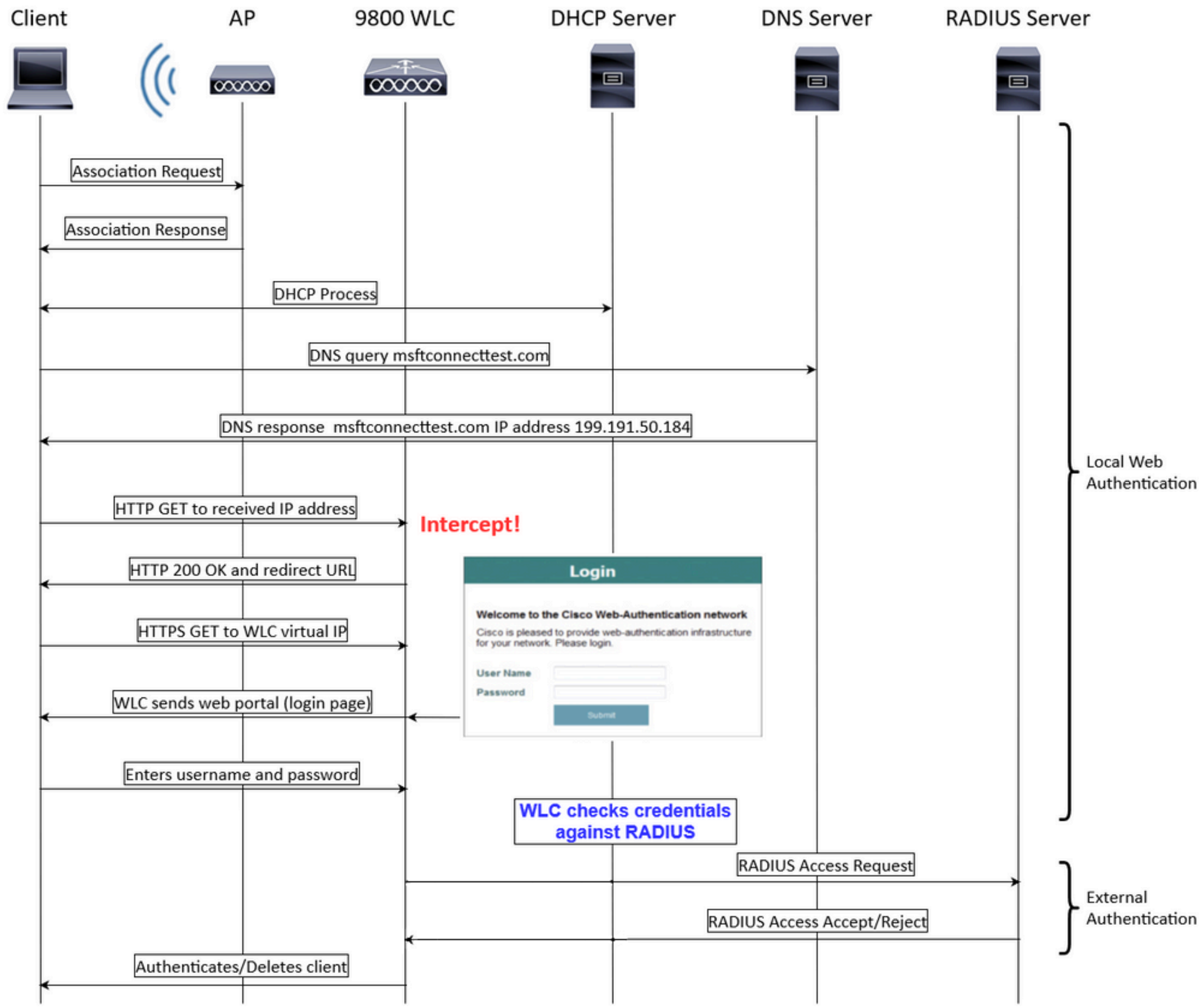
LWA Flow

Local Web Authentication with External Authentication



Generic Topology of LWA-EA

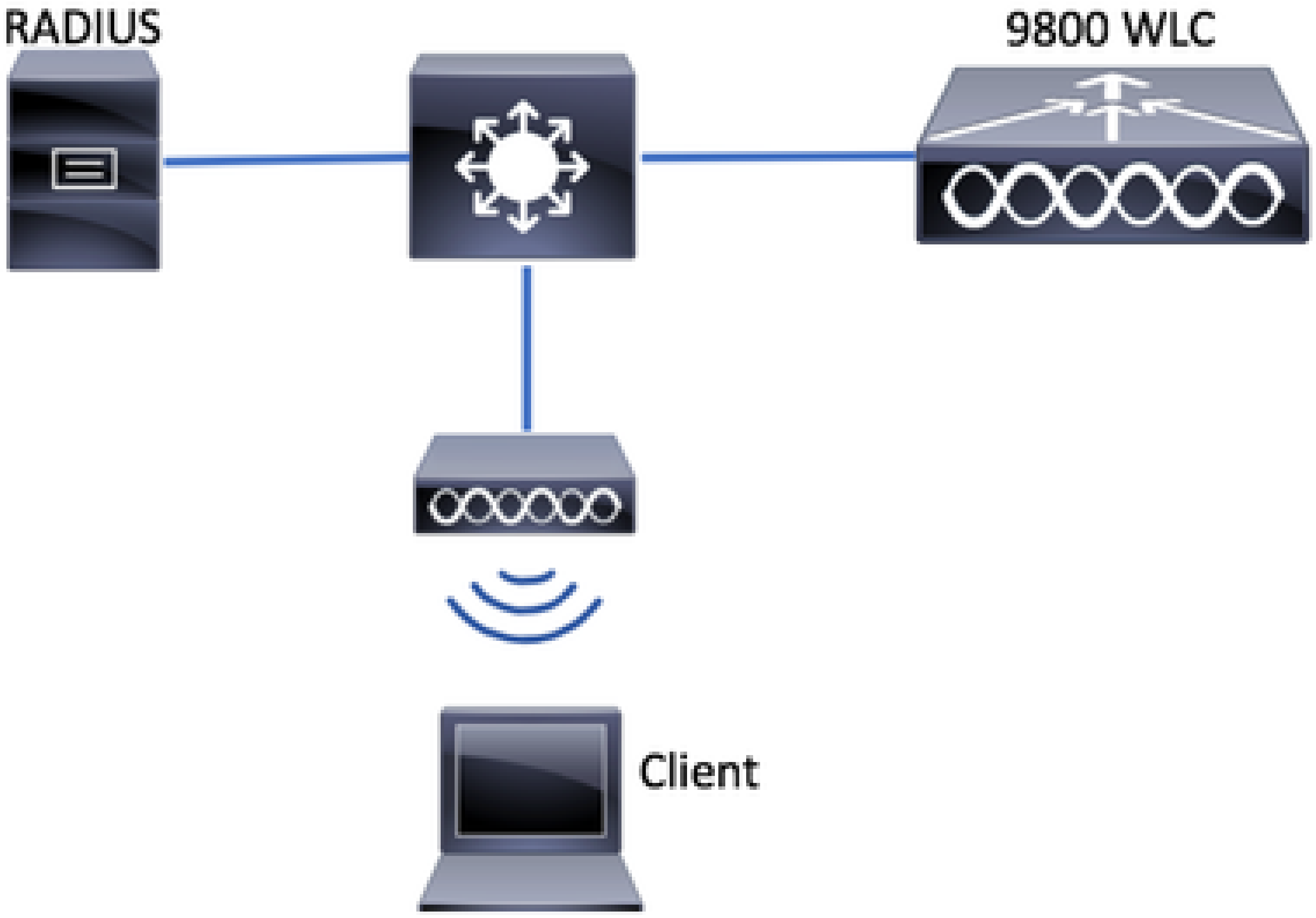
LWA-EA is a method of LWA where the web portal and redirection URL are located on the WLC and the credentials are stored on an external server, such as ISE. The WLC captures the credentials and authenticates the client through an external RADIUS server. When guest user enters credentials, the WLC checks the credentials against RADIUS, it sends a RADIUS Access Request and receives a RADIUS Access Accept/Reject from the RADIUS server. Then, if the credentials are correct, the guest user goes to RUN state. If the credentials are incorrect, the guest user is deleted by the WLC.


Client
AP
9800 WLC
DHCP Server
DNS Server
RADIUS Server
Association Request
Association Response
DHCP Process
DNS query msftconnecttest.com
DNS response msftconnecttest.com IP address 199.191.50.184
HTTP GET to received IP address
Intercept!
HTTP 200 OK and redirect URL
Login
Welcome to the Cisco Web-Authentication network
Cisco is pleased to provide web-authentication infrastructure for your network. Please login.
User Name
Password
Submit
HTTPS GET to WLC virtual IP
WLC sends web portal (login page)
Enters username and password
WLC checks credentials against RADIUS
RADIUS Access Request
RADIUS Access Accept/Reject
Authenticates/Deletes client
Local Web Authentication
External Authentication

LWA-EA Flow

Configure

Network Diagram



Network Diagram

Note: This configuration example only covers central switching/authentication. The flex local switching configuration have slight different requirements for to configure web authentication.

Configure Local Web Authentication with External Authentication on the CLI

Configure AAA Server and Server Group

```
9800WLC> enable
9800WLC# configure terminal
9800WLC(config)#radius server RADIUS
9800WLC(config-radius-server)#address ipv4 <ip address> auth-port 1812 acct-port 1813
9800WLC(config-radius-server)#key cisco
9800WLC(config-radius-server)#exit
9800WLC(config)#aaa group server radius RADIUSGROUP
9800WLC(config-sg-radius)#server name RADIUS
9800WLC(config-sg-radius)#end
```

Configure Local Authentication and Authorization

```
9800WLC> enable
9800WLC# configure terminal
9800WLC(config)#aaa new-model
9800WLC(config)#aaa authentication login LWA_AUTHENTICATION group RADIUSGROUP
9800WLC(config)#aaa authorization network LWA_AUTHORIZATION group RADIUSGROUP
9800WLC(config)#end
```

Configure Parameter Maps

```
9800WLC> enable
9800WLC# configure terminal
9800WLC(config)# parameter-map type webauth global
9800WLC(config-params-parameter-map)#virtual-ip ipv4 192.0.2.1
9800WLC(config-params-parameter-map)#trustpoint <trustpoint name>
9800WLC(config-params-parameter-map)#webauth-http-enable
9800WLC(config-params-parameter-map)#end
```

Configure WLAN Security Parameters

```
9800WLC> enable
9800WLC# configure terminal
9800WLC(config)#wlan LWA_EA 1 LWA_EA
9800WLC(config-wlan)#no security wpa
9800WLC(config-wlan)#no security wpa wpa2
9800WLC(config-wlan)#no security wpa wpa2 ciphers aes
9800WLC(config-wlan)#no security wpa akm dot1x
9800WLC(config-wlan)#security web-auth
9800WLC(config-wlan)#security web-auth authentication-list LWA_AUTHENTICATION
9800WLC(config-wlan)#security web-auth parameter-map global
9800WLC(config-wlan)#no shutdown
9800WLC(config-wlan)#end
```

Create Wireless Policy Profile

```
9800WLC> enable
9800WLC# configure terminal
9800WLC(config)#wireless profile policy POLICY_PROFILE
9800WLC(config-wireless-policy)#vlan <vlan name>
9800WLC(config-wireless-policy)#no shutdown
9800WLC(config-wireless-policy)#end
```

Create a Policy Tag

```
9800WLC> enable
9800WLC# configure terminal
9800WLC(config)#wireless tag policy POLICY_TAG
9800WLC(config-policy-tag)#wlan LWA_EA policy POLICY_PROFILE
9800WLC(config-policy-tag)# end
```

Assign a Policy Tag to an AP

```
9800WLC> enable
9800WLC# configure terminal
9800WLC(config)#ap <MAC address>
9800WLC(config-ap-tag)#policy-tag POLICY_TAG
9800WLC(config-ap-tag)#end
```

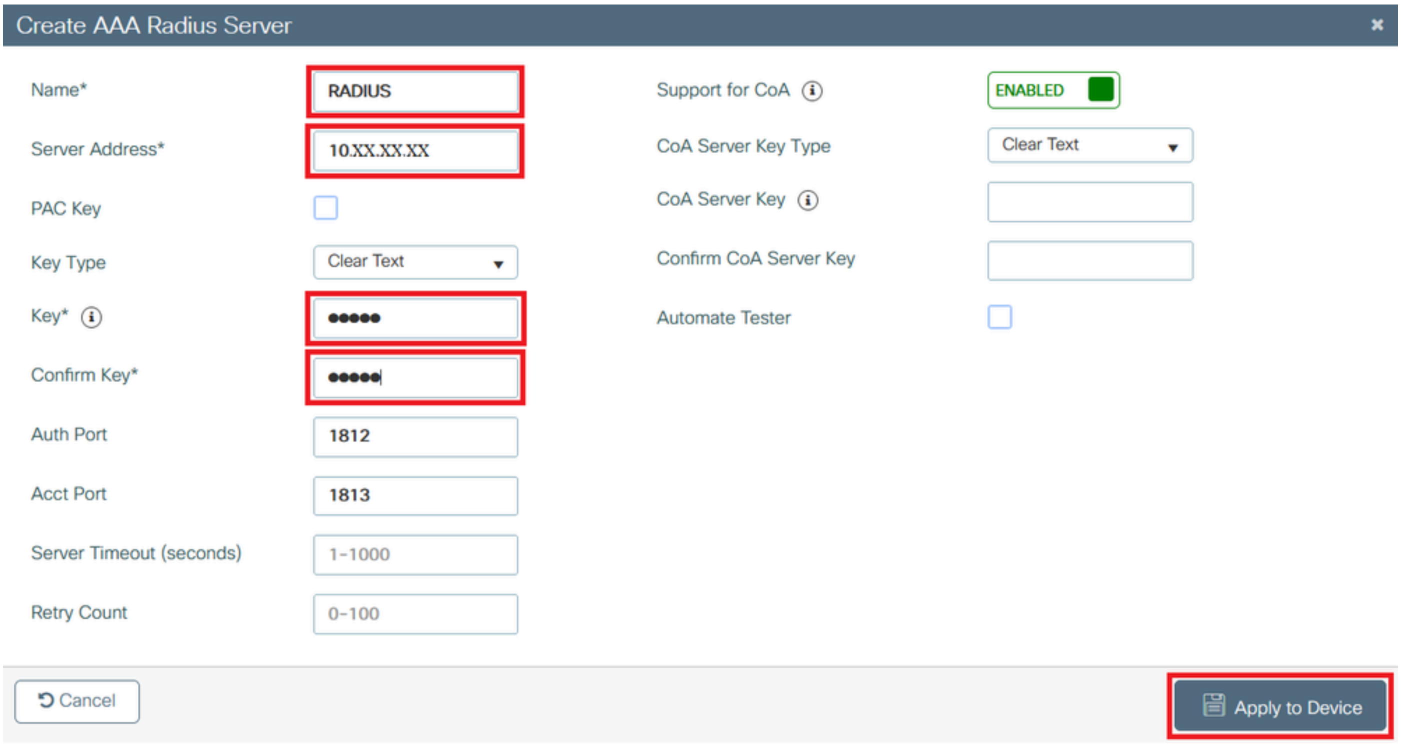
To finish the configuration on the ISE side, please jump to the section ISE Configuration.

Configure Local Web Authentication with External Authentication on the WebUI

AAA Configuration on 9800 WLC

Step 1. Add the ISE server to the 9800 WLC configuration.

Navigate to **Configuration** > **Security** > **AAA** > **Servers/Groups** > **RADIUS** > **Servers** > **+ Add** and enter the RADIUS server information as shown in the image:



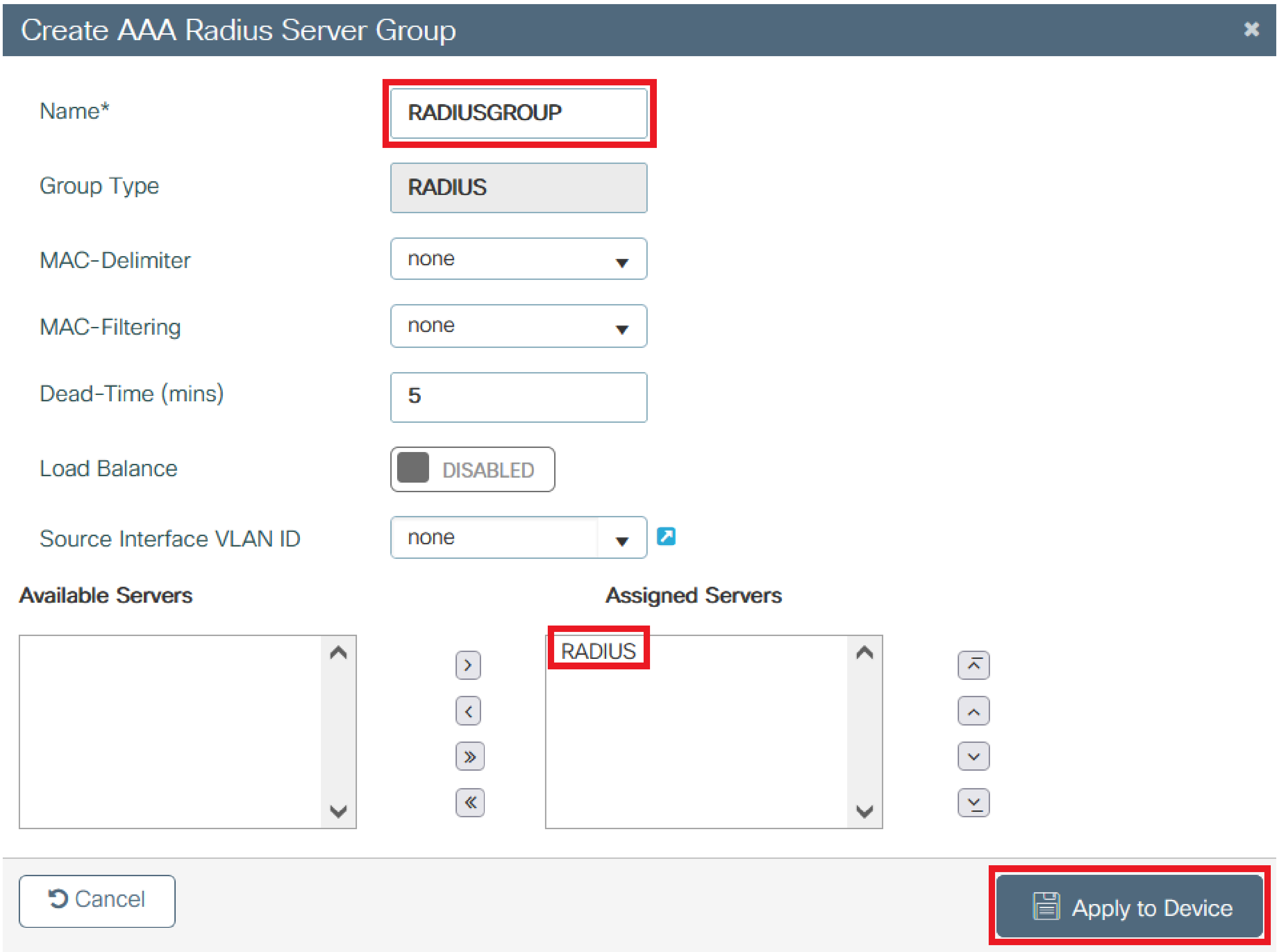
Create AAA Radius Server

Name*	RADIUS	Support for CoA	ENABLED
Server Address*	10.XX.XX.XX	CoA Server Key Type	Clear Text
PAC Key	□	CoA Server Key	
Key Type	Clear Text	Confirm CoA Server Key	
Key*	●●●●●	Automate Tester	□
Confirm Key*	●●●●●		
Auth Port	1812		
Acct Port	1813		
Server Timeout (seconds)	1-1000		
Retry Count	0-100		

AAA Configuration on 9800 WLC

Step 2. Add the RADIUS server group.

Navigate to **Configuration** > **Security** > **AAA** > **Servers/Groups** > **RADIUS** > **Servers Group** > + **Add** and enter the RADIUS server group information:



Create AAA Radius Server Group

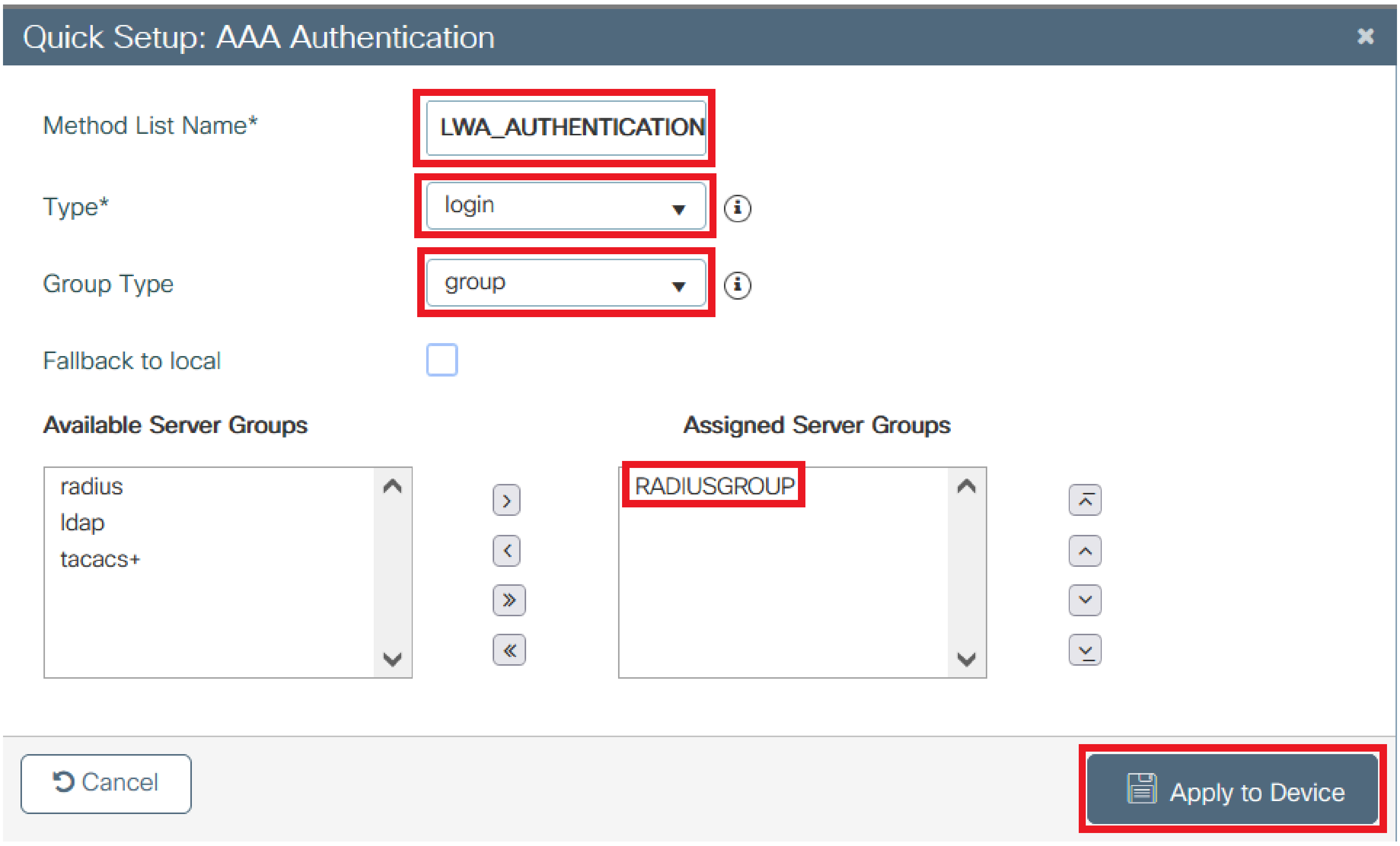
Name*	RADIUSGROUP
Group Type	RADIUS
MAC-Delimiter	none
MAC-Filtering	none
Dead-Time (mins)	5
Load Balance	DISABLED
Source Interface VLAN ID	none

Available Servers	Assigned Servers
	RADIUS

Add the RADIUS Server Group

Step 3. Create an authentication method list.

Navigate to **Configuration** > **Security** > **AAA** > **AAA Method List** > **Authentication** > **+ Add:**



Quick Setup: AAA Authentication

Method List Name*: LWA_AUTHENTICATION

Type*: login

Group Type: group

Fallback to local: □

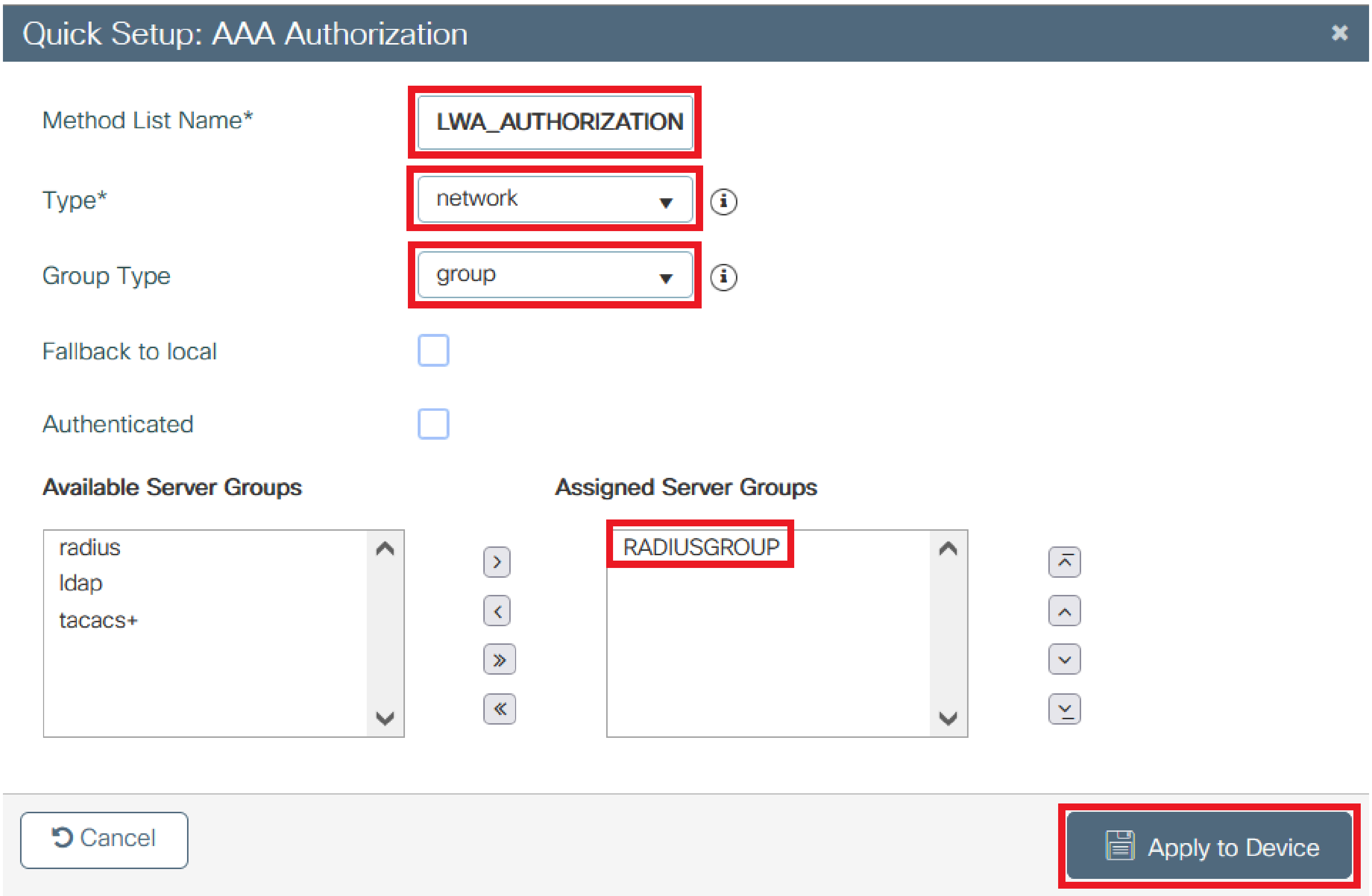
Available Server Groups: radius, ldap, tacacs+

Assigned Server Groups: RADIUSGROUP

Create an Authentication Method List

Step 4. Create an authorization method list.

Navigate to **Configuration** > **Security** > **AAA** > **AAA Method List** > **Authorization** > **+ Add:**



Quick Setup: AAA Authorization

Method List Name*: LWA_AUTHORIZATION

Type*: network

Group Type: group

Fallback to local: □

Authenticated: □

Available Server Groups: radius, ldap, tacacs+

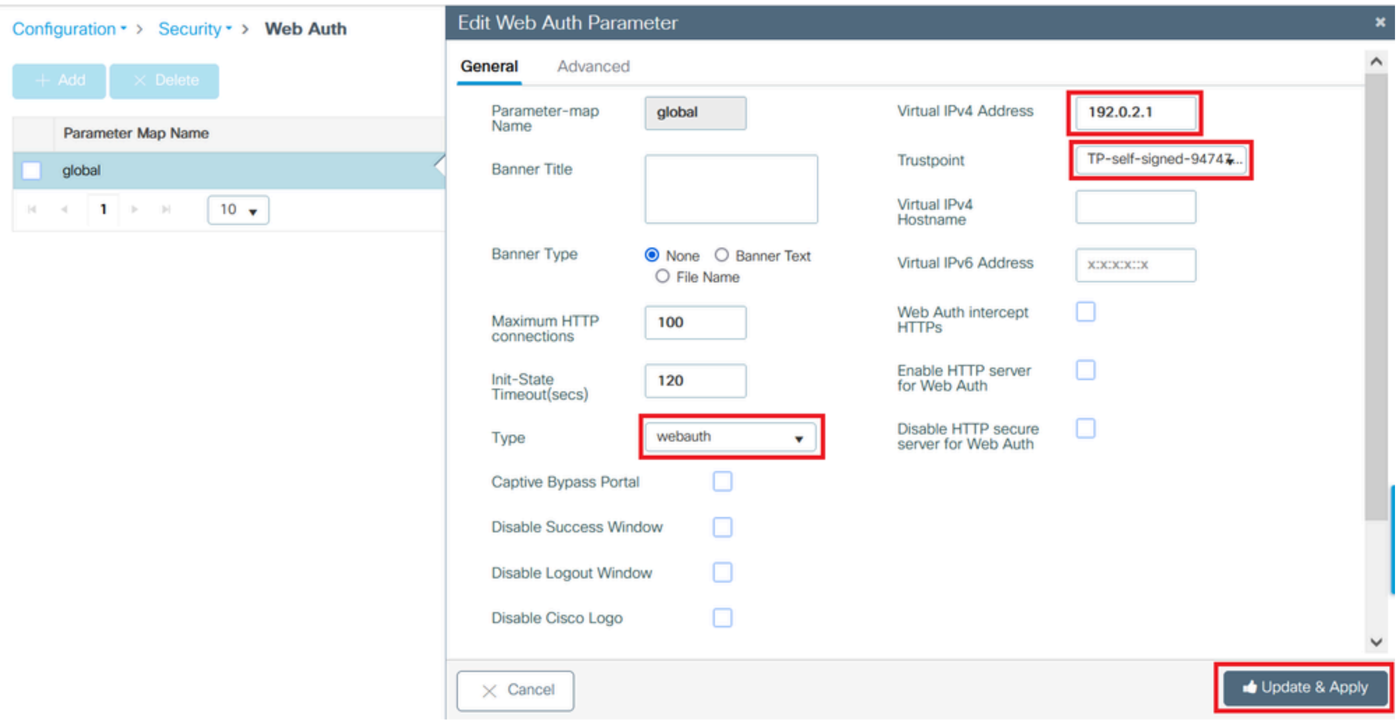
Assigned Server Groups: RADIUSGROUP

Create an Authorization Method List

WebAuth Configuration

Create or edit a parameter map. Select the type as **webauth**, the **Virtual IPv4 Address** must be an address not used on the network to avoid IP addresses conflict, and add a **Trustpoint**.

Navigate to **Configuration** > **Security** > **Web Auth** > **+ Add** or select an parameter map:



Configuration > Security > Web Auth

+ Add   × Delete

	Parameter Map Name
□	global

Edit Web Auth Parameter

General   Advanced

Parameter-map Name: global

Banner Title:

Banner Type: ● None ○ Banner Text ○ File Name

Maximum HTTP connections: 100

Init-State Timeout(secs): 120

Type: webauth

Captive Bypass Portal □

Disable Success Window □

Disable Logout Window □

Disable Cisco Logo □

Virtual IPv4 Address: 192.0.2.1

Trustpoint: TP-self-signed-94747...

Virtual IPv4 Hostname:

Virtual IPv6 Address: X:X:X:X::X

Web Auth intercept HTTPs □

Enable HTTP server for Web Auth □

Disable HTTP secure server for Web Auth □

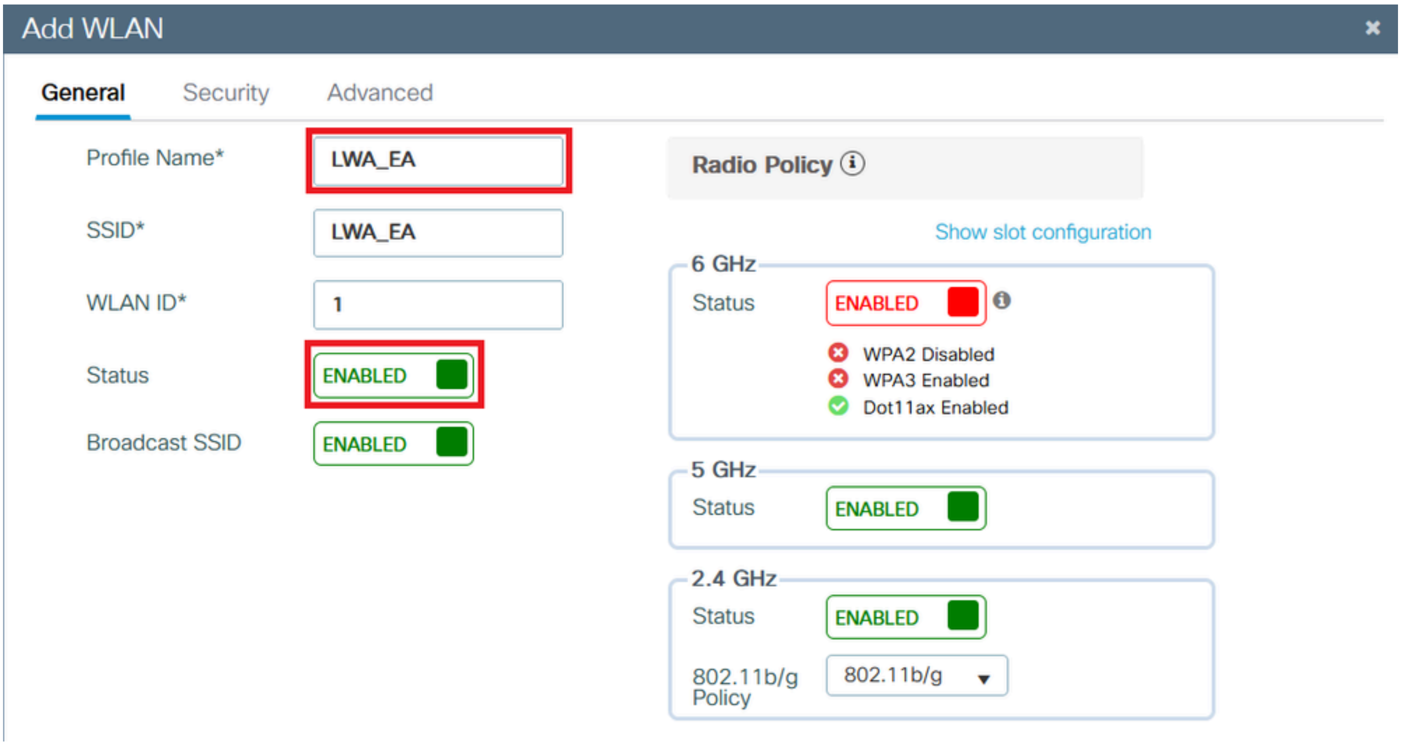
× Cancel   Update & Apply

WebAuth Configuration

WLAN Configuration

Step 1. Create the WLAN.

Navigate to **Configuration** > **Tags & Profiles** > **WLANs** > **+ Add** and configure the network as needed.



Add WLAN

General | Security | Advanced

Profile Name* LWA_EA

SSID* LWA_EA

WLAN ID* 1

Status ENABLED

Broadcast SSID ENABLED

Radio Policy

Show slot configuration

6 GHz

Status ENABLED

WPA2 Disabled

WPA3 Enabled

Dot11ax Enabled

5 GHz

Status ENABLED

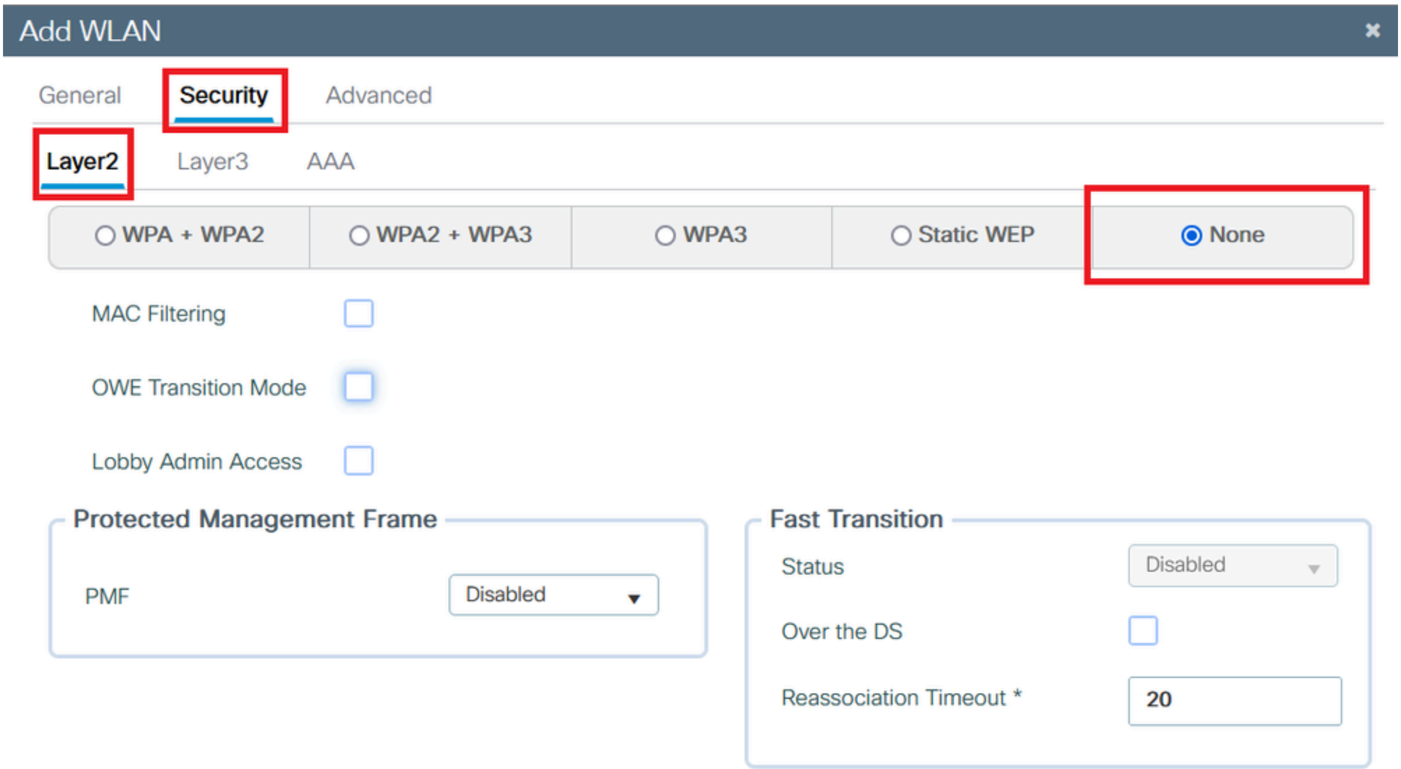
2.4 GHz

Status ENABLED

802.11b/g Policy 802.11b/g

Create the WLAN

Step 2. Navigate to **Security** > **Layer2** and on **Layer 2 Security Mode** select **None**.



Add WLAN

General | Security | Advanced

Layer2 | Layer3 | AAA

○ WPA + WPA2 ○ WPA2 + WPA3 ○ WPA3 ○ Static WEP ● None

MAC Filtering □

OWE Transition Mode □

Lobby Admin Access □

Protected Management Frame

PMF Disabled

Fast Transition

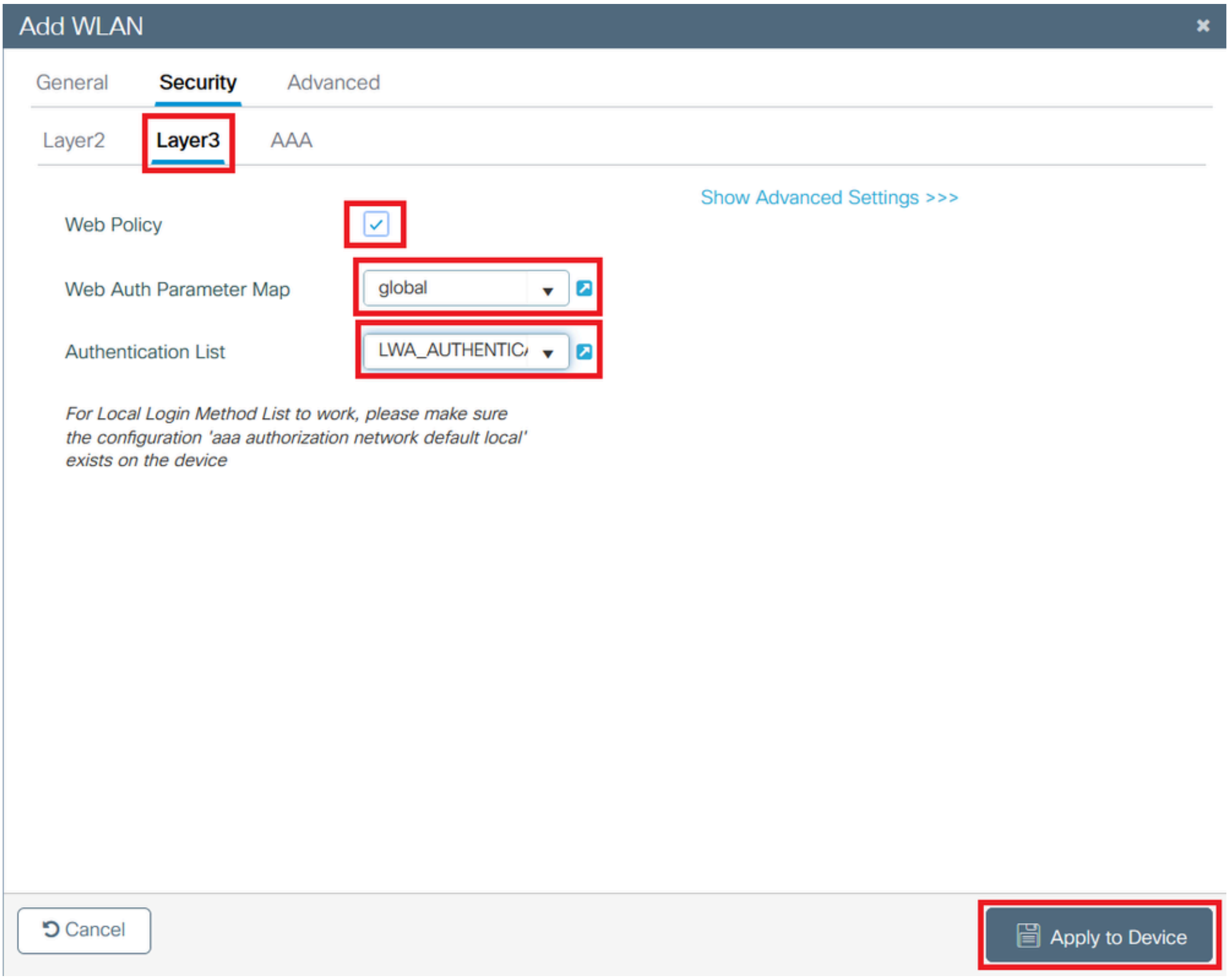
Status Disabled

Over the DS □

Reassociation Timeout * 20

Create the WLAN Security

Step 3. Navigate to **Security** > **Layer3** and on **Web Policy** tick the box, on **Web Auth Parameter Map** select the parameter name, and on **Authentication List** select select the authentication list created previously.



Web Policy ☑

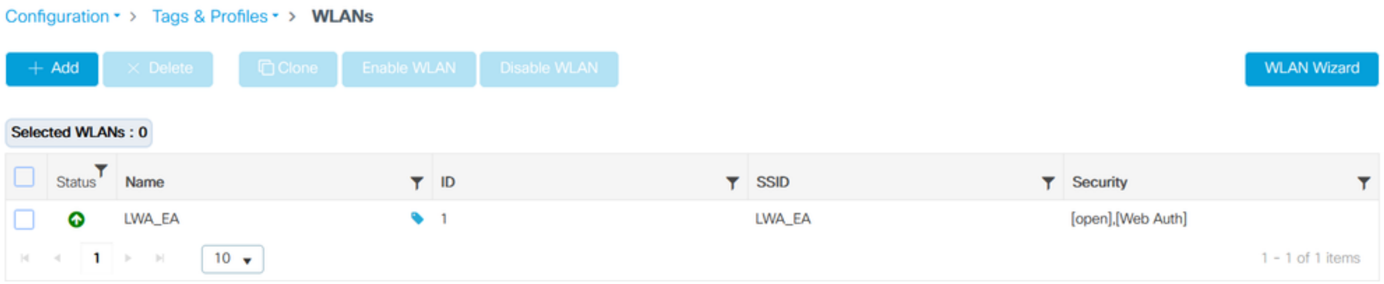
Web Auth Parameter Map: global

Authentication List: LWA_AUTHENTIC/

For Local Login Method List to work, please make sure the configuration 'aaa authorization network default local' exists on the device

Create the WLAN Authentication List

The WLAN is displayed on the WLAN list:



Selected WLANs : 0

□	Status	Name	ID	SSID	Security
□	●	LWA_EA	1	LWA_EA	[open],[Web Auth]

1 - 1 of 1 items

Created WLAN

Policy Profile Configuration

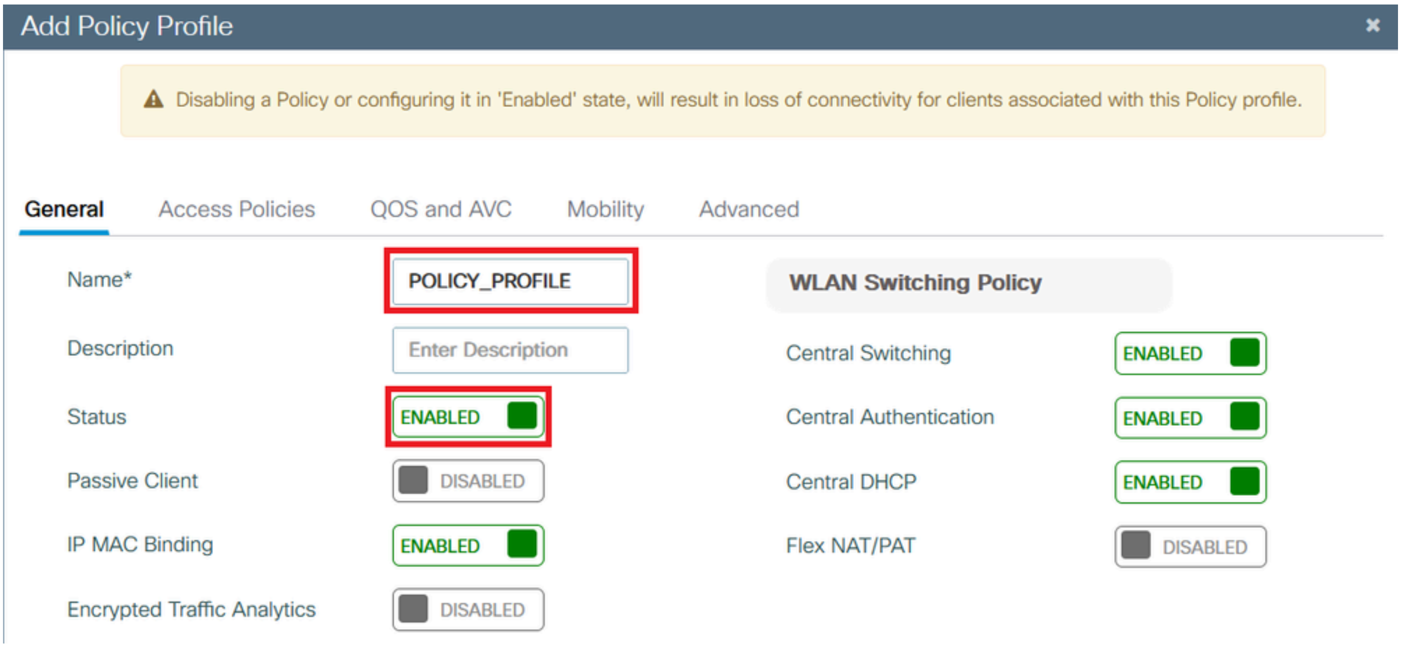
Inside a Policy Profile, you can select the VLAN that assigns the clients, among other settings.

You can either use your default policy profile or you can create a new one.

Step 1. Create a new **Policy Profile**.

Navigate to **Configuration** > **Tags & Profiles** > **Policy** and either configure your default policy profile or create a new one.

Ensure the profile is enabled.



Disabling a Policy or configuring it in 'Enabled' state, will result in loss of connectivity for clients associated with this Policy profile.

Name* POLICY_PROFILE

Description Enter Description

Status ENABLED

Passive Client DISABLED

IP MAC Binding ENABLED

Encrypted Traffic Analytics DISABLED

WLAN Switching Policy

Central Switching ENABLED

Central Authentication ENABLED

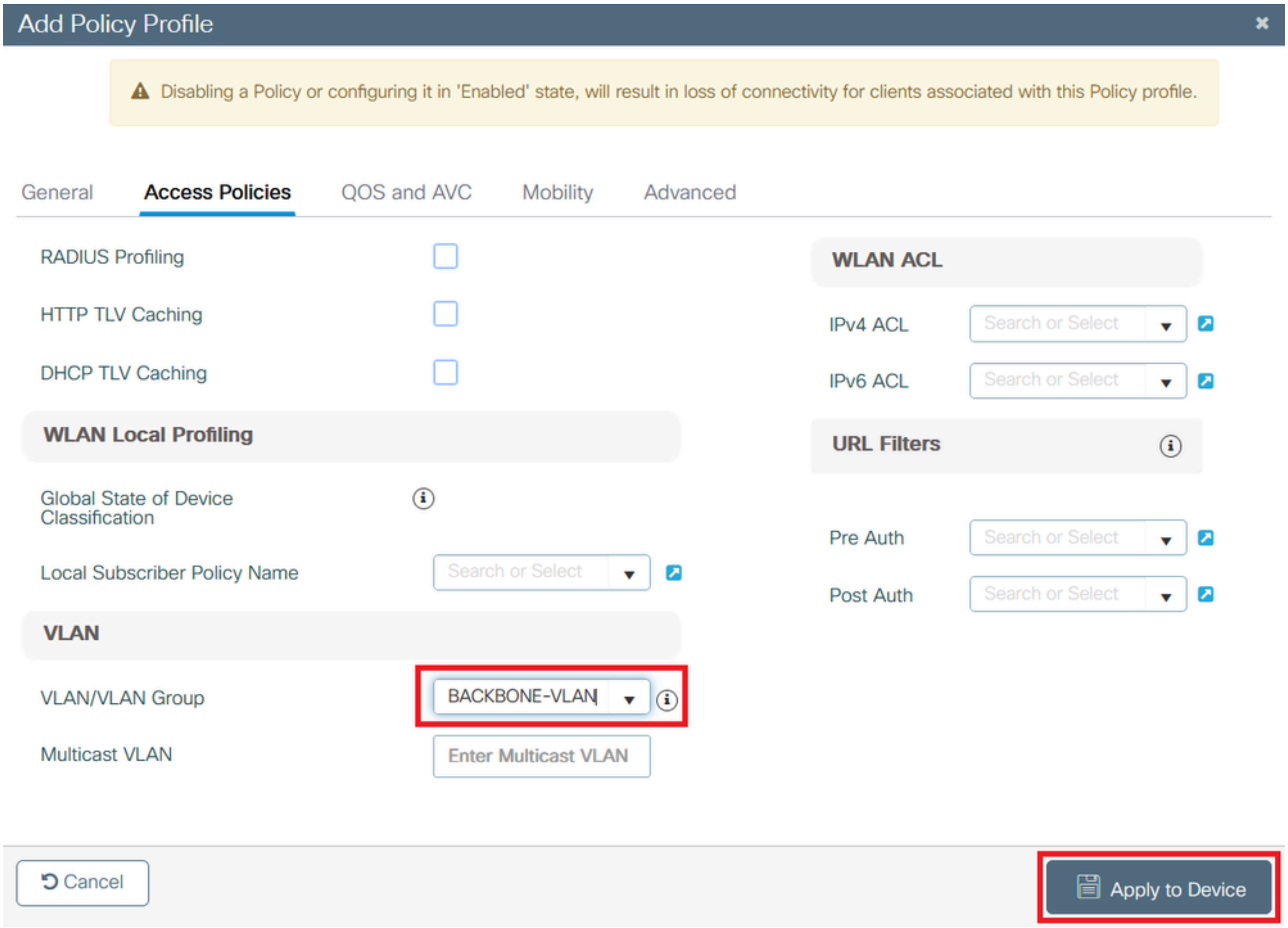
Central DHCP ENABLED

Flex NAT/PAT DISABLED

Create a New Policy Profile

Step 2. Select the VLAN.

Navigate to the **Access Policies** tab and select the VLAN name from the drop-down or manually type the VLAN-ID.



Add Policy Profile

Disabling a Policy or configuring it in 'Enabled' state, will result in loss of connectivity for clients associated with this Policy profile.

RADIUS Profiling □

HTTP TLV Caching □

DHCP TLV Caching □

WLAN Local Profiling

Global State of Device Classification

Local Subscriber Policy Name: Search or Select

VLAN

VLAN/VLAN Group: BACKBONE-VLAN

Multicast VLAN: Enter Multicast VLAN

WLAN ACL

IPv4 ACL: Search or Select

IPv6 ACL: Search or Select

URL Filters

Pre Auth: Search or Select

Post Auth: Search or Select

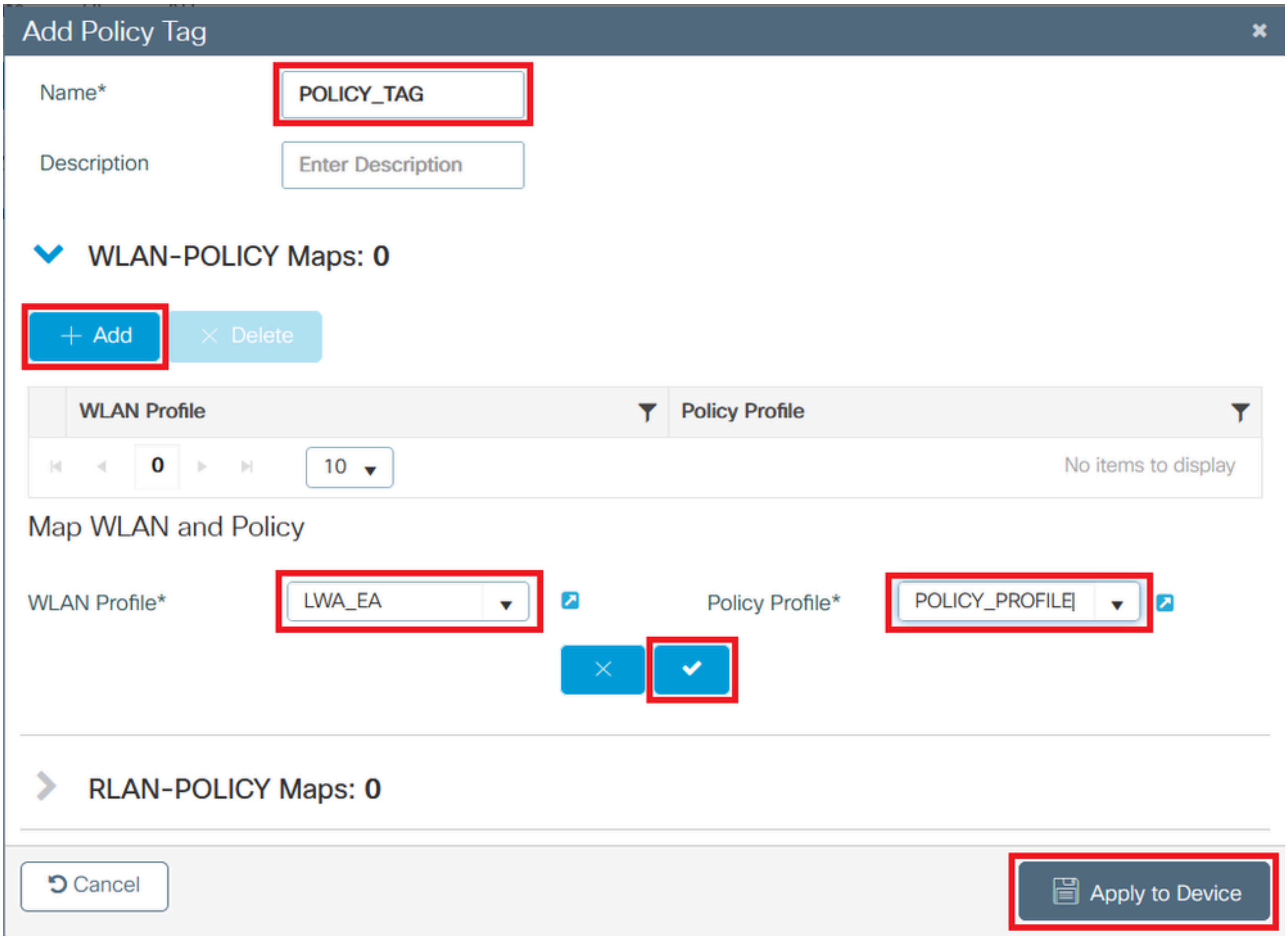
Select the VLAN

Policy Tag Configuration

Inside the Policy Tag is where you link your SSID with your Policy Profile. You can either create a new Policy Tag or use the default-policy tag.

Navigate to **Configuration** > **Tags & Profiles** > **Tags** > **Policy** and add a new one if needed as shown in the image.

Select **+ Add** and link your WLAN Profile to the desired Policy Profile.



Add Policy Tag

Name*: POLICY_TAG

Description: Enter Description

WLAN-POLICY Maps: 0

WLAN Profile	Policy Profile
	No items to display

Map WLAN and Policy

WLAN Profile*: LWA_EA

Policy Profile*: POLICY_PROFILE

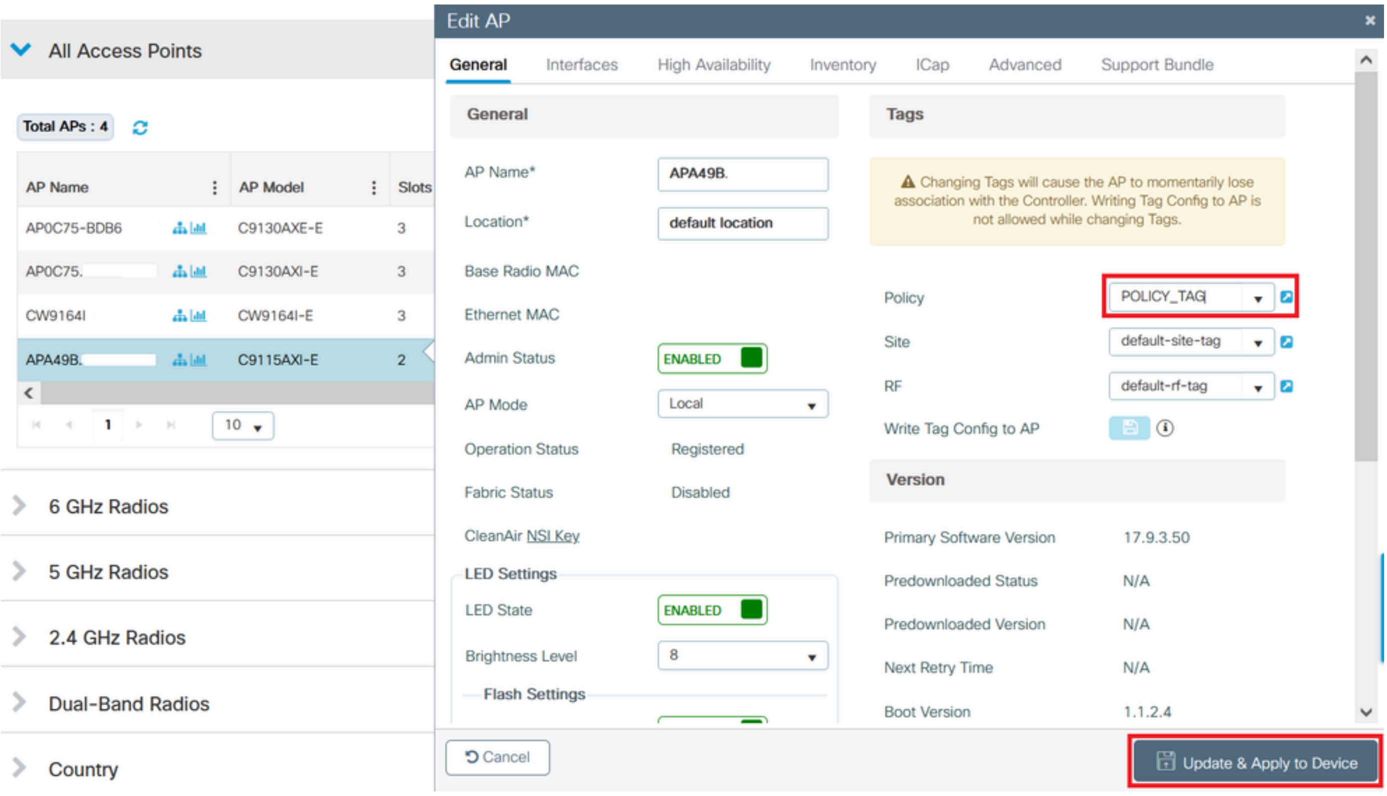
RLAN-POLICY Maps: 0

Policy Tag Configuration

Policy Tag Assignment

Assign the Policy Tag to the needed APs.

In order to assign the tag to one AP, navigate to **Configuration** > **Wireless** > **Access Points** > **AP Name** > **General Tags,** make the needed assignment and then click **Update & Apply to Device.**



AP Name	AP Model	Slots
APOC75-BDB6	C9130AXE-E	3
APOC75.[redacted]	C9130AXI-E	3
CW9164I	CW9164I-E	3
APA49B.[redacted]	C9115AXI-E	2

AP Name* APA49B.

Location* default location

Base Radio MAC

Ethernet MAC

Admin Status ENABLED

AP Mode Local

Operation Status Registered

Fabric Status Disabled

CleanAir NSI Key

LED State ENABLED

Brightness Level 8

⚠ Changing Tags will cause the AP to momentarily lose association with the Controller. Writing Tag Config to AP is not allowed while changing Tags.

Policy POLICY_TAG

Site default-site-tag

RF default-rf-tag

Write Tag Config to AP

Primary Software Version 17.9.3.50

Predownloaded Status N/A

Predownloaded Version N/A

Next Retry Time N/A

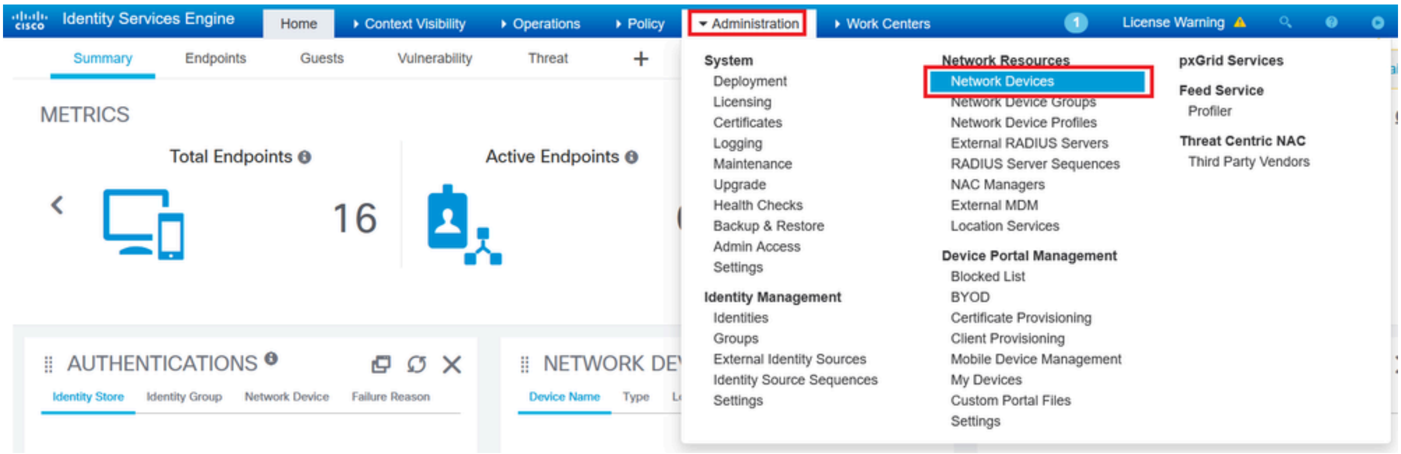
Boot Version 1.1.2.4

Policy Tag Assignment

ISE Configuration

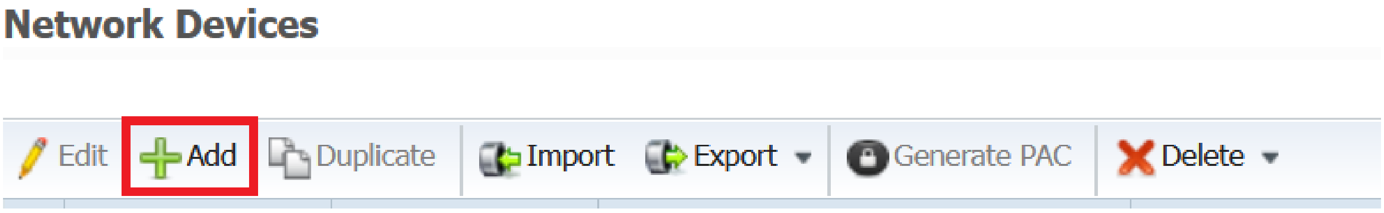
Add 9800 WLC to ISE

Step 1. Navigate to **Administration** > **Network Resources** > **Network Devices** as shown in the image.



Add 9800 WLC to ISE

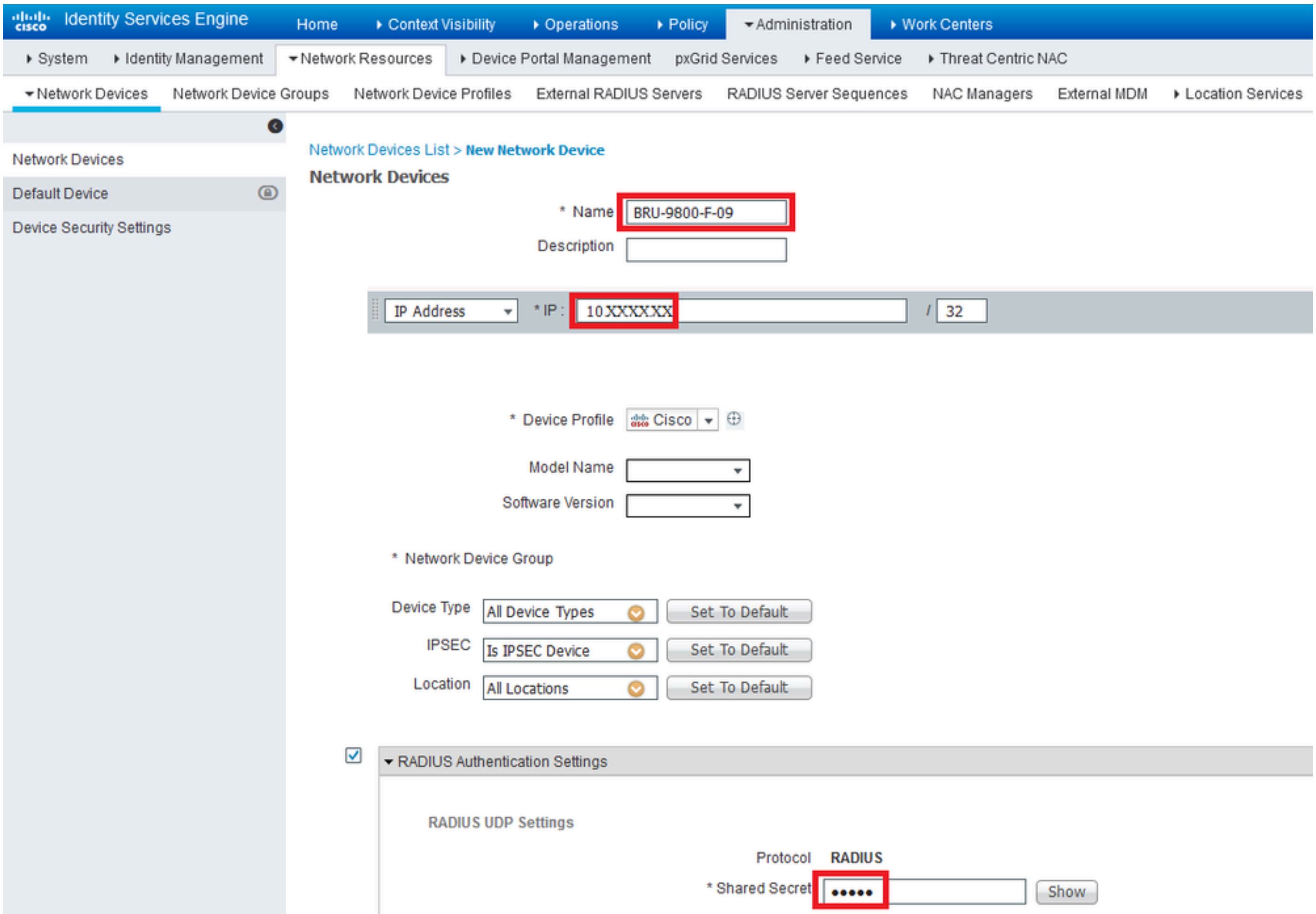
Step 2. Click +**Add**.



Add Network Devices

Optionally, it can be a specified Model name, software version, description, and assign Network Device groups based on device types, location or WLCs.

Step 3. Enter the 9800 WLC settings as shown in the image. Enter the same RADIUS key defined upon server creation on the WLC side. Then click **Submit**.



Network Devices List > **New Network Device**

Network Devices

* Name: BRU-9800-F-09

Description:

IP Address ▾ * IP : 10.XXXXXX / 32

* Device Profile: Cisco

Model Name:

Software Version:

* Network Device Group

Device Type: All Device Types [Set To Default]

IPSEC: Is IPSEC Device [Set To Default]

Location: All Locations [Set To Default]

☑ RADIUS Authentication Settings

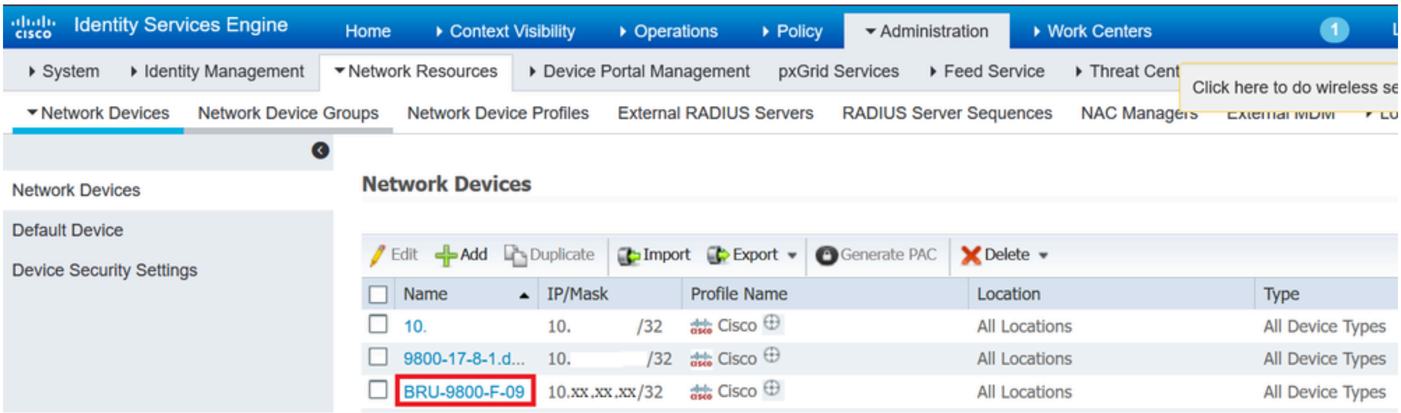
RADIUS UDP Settings

Protocol: **RADIUS**

* Shared Secret: ●●●●● [Show]

9800 WLC Settings

Step 4. Navigate to **Administration** > **Network Resources** > **Network Devices**, you can see the network devices list.



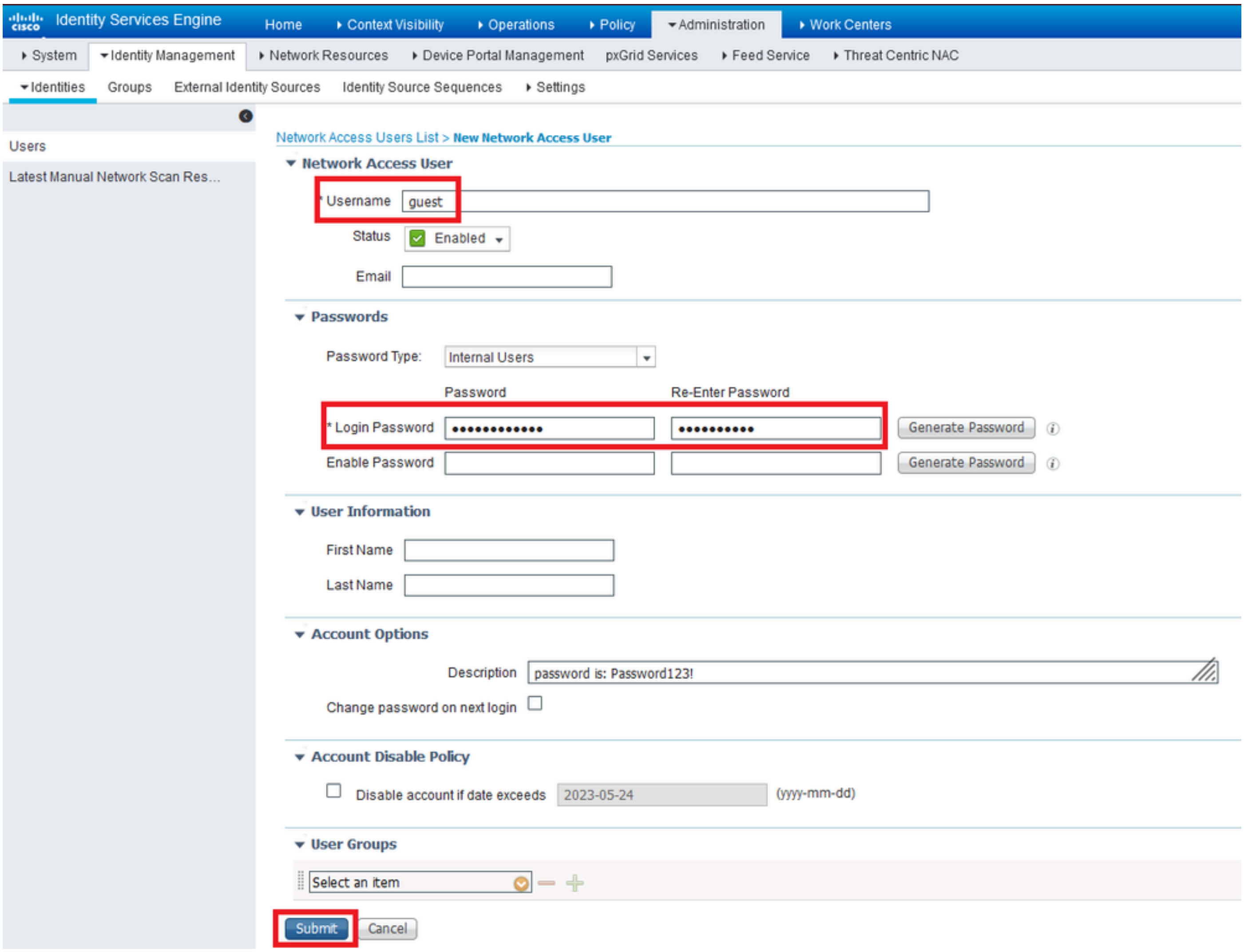
Network Devices

□	Name ▲	IP/Mask	Profile Name	Location	Type
□	10.	10. /32	Cisco	All Locations	All Device Types
□	9800-17-8-1.d...	10. /32	Cisco	All Locations	All Device Types
□	BRU-9800-F-09	10.xx.xx.xx/32	Cisco	All Locations	All Device Types

Network Devices List

Create New User on ISE

Step 1. Navigate to **Administration** > **Identity Management** > **Identities** > **Users** > **Add**. Enter the username and password for the guest user, and click **Submit**.



* Username: guest

Status: ☑ Enabled

Email:

Password Type: Internal Users

	Password	Re-Enter Password
* Login Password	•••••••••••••	•••••••••••
Enable Password		

First Name:

Last Name:

Description: password is: Password123!

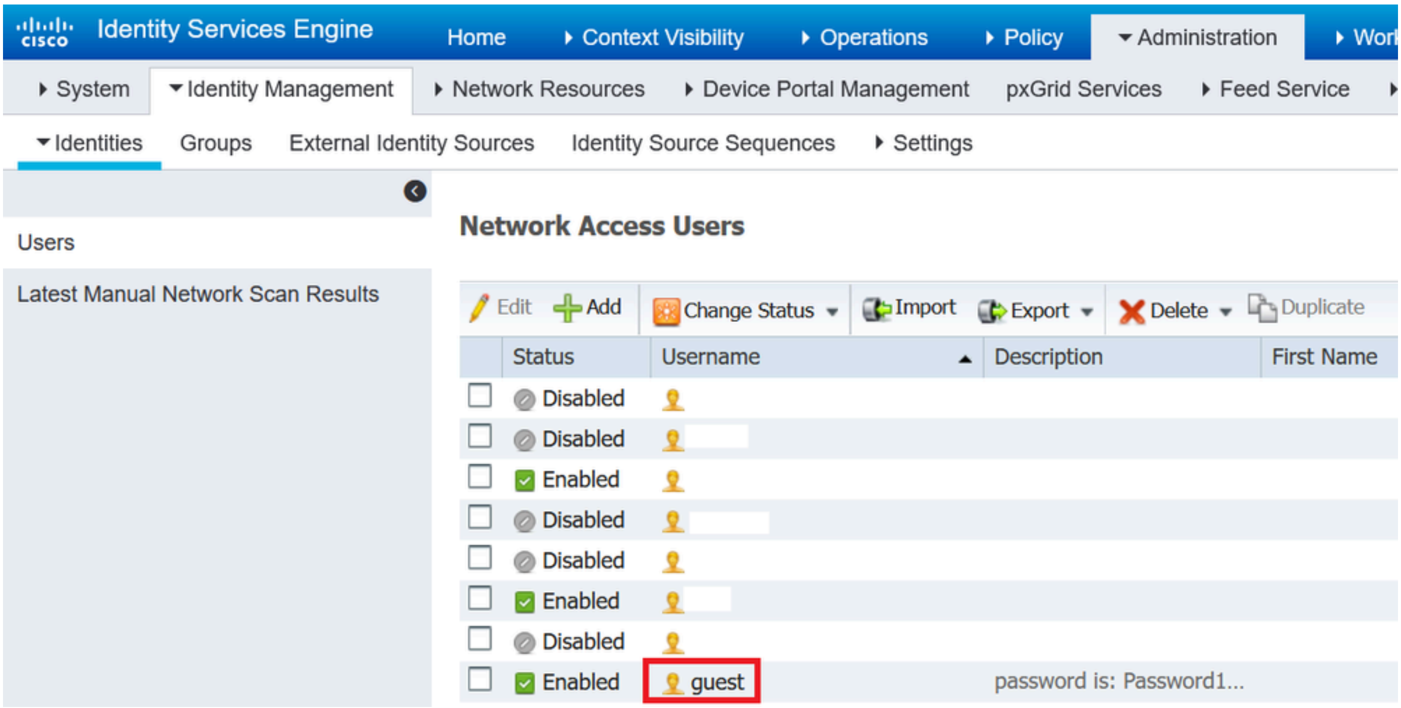
Change password on next login □

□ Disable account if date exceeds 2023-05-24 (yyyy-mm-dd)

Select an item

Create New User on ISE

Step 2. Navigate to **Administration** > **Identity Management** > **Identities** > **Users**, you can see the users list.



Network Access Users

	Status	Username	Description	First Name
□	Disabled			
□	Disabled			
□	Enabled			
□	Disabled			
□	Disabled			
□	Enabled			
□	Disabled			
□	Enabled	guest	password is: Password1...	

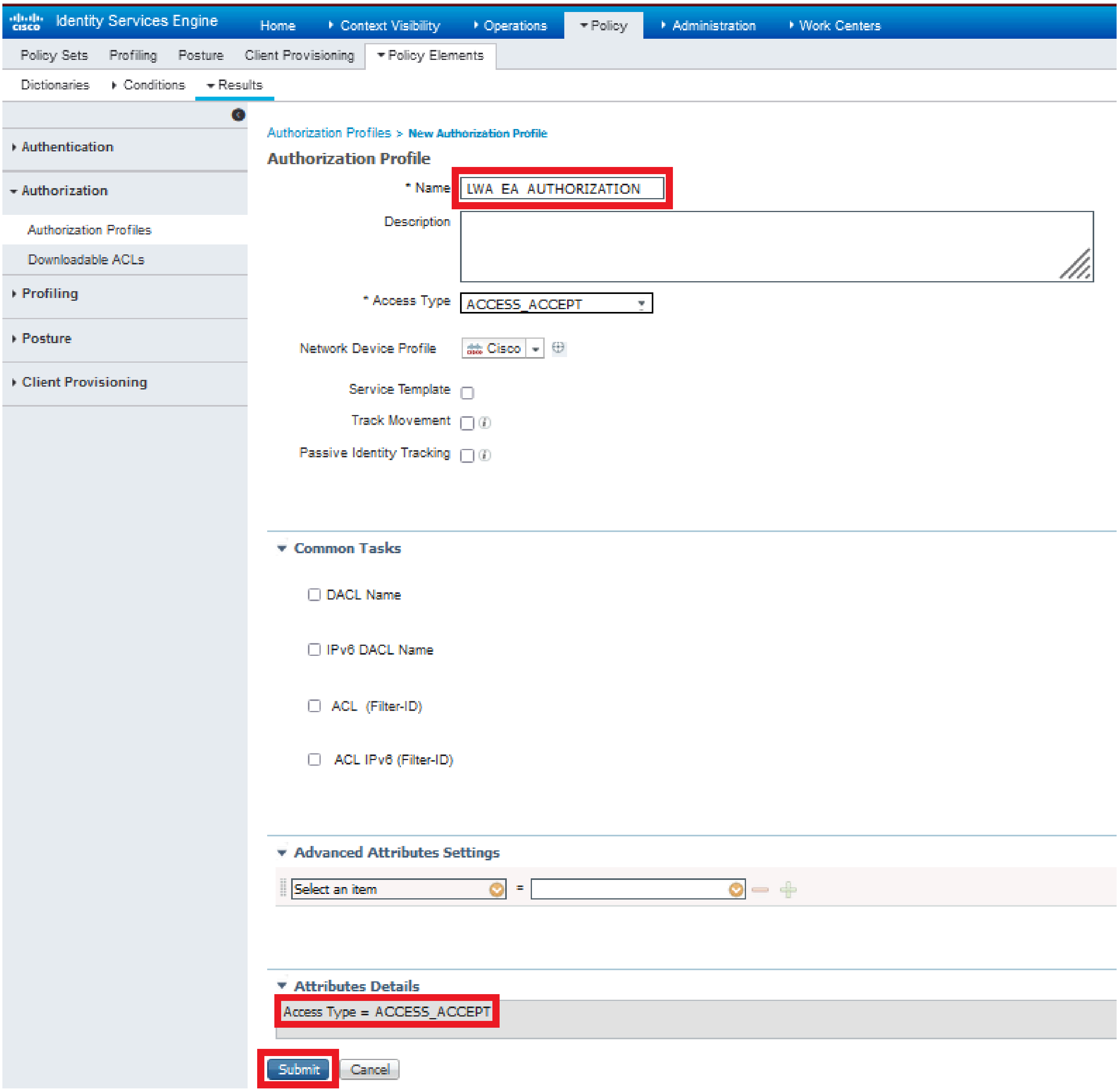
Network Access Users List

Create Authorization Profile

The policy profile is the result assigned to a client based on its parameters (as mac address, credentials, WLAN used and so on). It can assign specific settings like Virtual Local Area Network (VLAN), Access Control Lists (ACLs), Uniform Resource Locator (URL) redirects and so on.

These steps show how to create the authorization profile needed to redirect the client to the authentication portal. Note that in recent versions of ISE, a Cisco_Webauth authorization result already exists. Here, you can edit it to modify the redirection ACL name in order to match what you configured on the WLC.

Step 1. Navigate to **Policy** > **Policy Elements** > **Results** > **Authorization** > **Authorization Profiles.** Click **add** in order to create authorization profile **LWA_EA_AUTHORIZATION**. The Attributes Details must be Access Type=ACCESS_ACCEPT. Click **Submit**.



* Name: LWA_EA_AUTHORIZATION

Description:

* Access Type: ACCESS_ACCEPT

Network Device Profile: Cisco

Service Template □

Track Movement □

Passive Identity Tracking □

□ DACL Name

□ IPv6 DACL Name

□ ACL (Filter-ID)

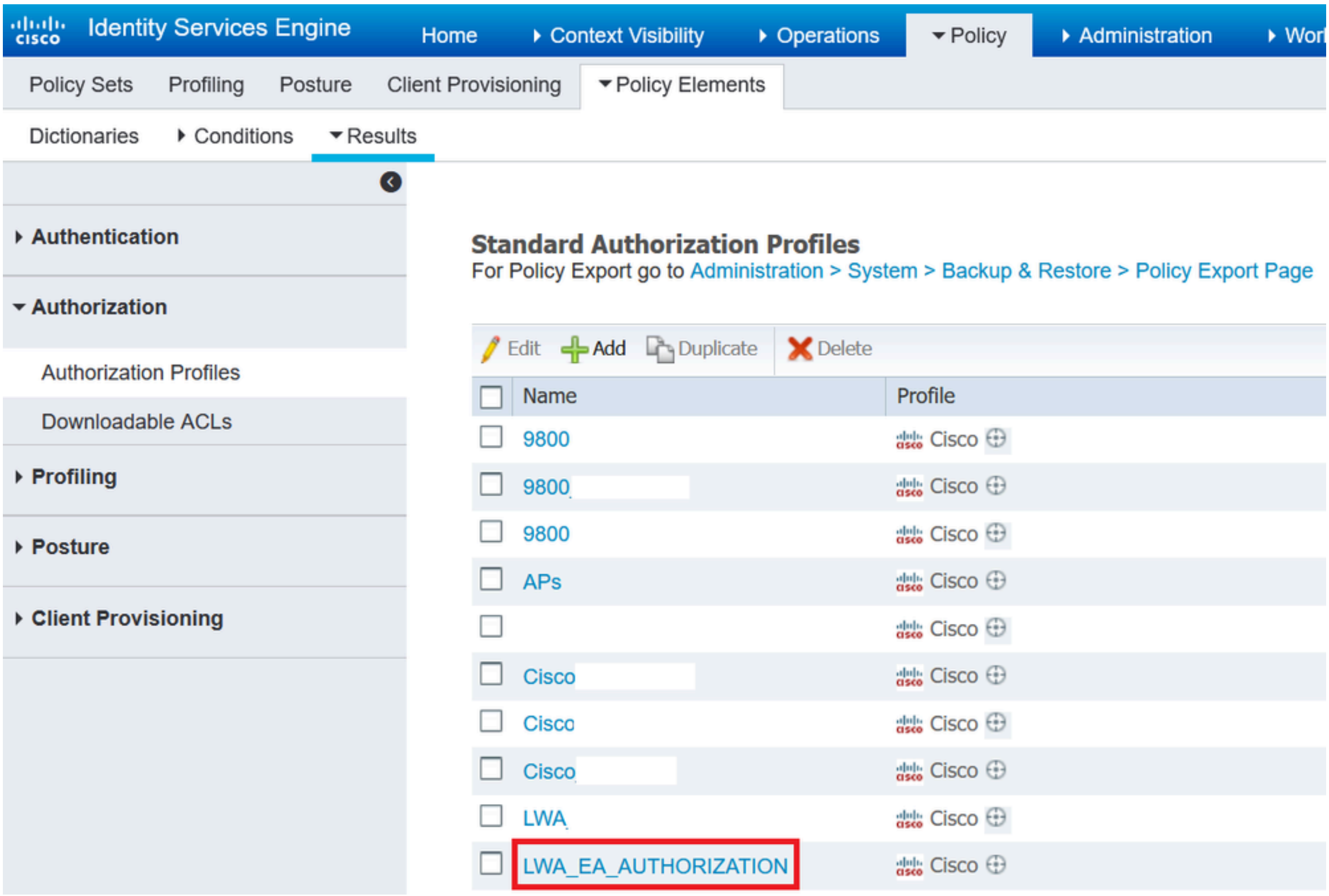
□ ACL IPv6 (Filter-ID)

Select an item =

Access Type = ACCESS_ACCEPT

Create Authorization Profile

Step 2. Navigate to **Policy** > **Policy Elements** > **Results** > **Authorization** > **Authorization Profiles,** you can see the authorization profiles.



Standard Authorization Profiles

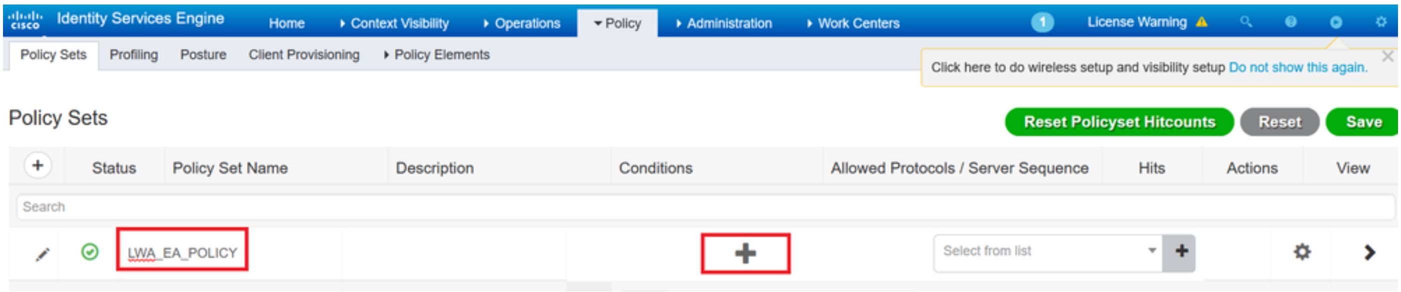
For Policy Export go to Administration > System > Backup & Restore > Policy Export Page

	Name	Profile
□	9800	Cisco
□	9800 [redacted]	Cisco
□	9800	Cisco
□	APs	Cisco
□		Cisco
□	Cisco [redacted]	Cisco
□	Cisco	Cisco
□	Cisco [redacted]	Cisco
□	LWA	Cisco
□	LWA_EA_AUTHORIZATION	Cisco

Authorization Profiles List

Configure Authentication Rule

Step 1. Navigate to **Policy** > **Policy Sets**. Select Add and type the name of the policy set **LWA_EA_POLICY**. Click on the column **Conditions**, and this window pops up.



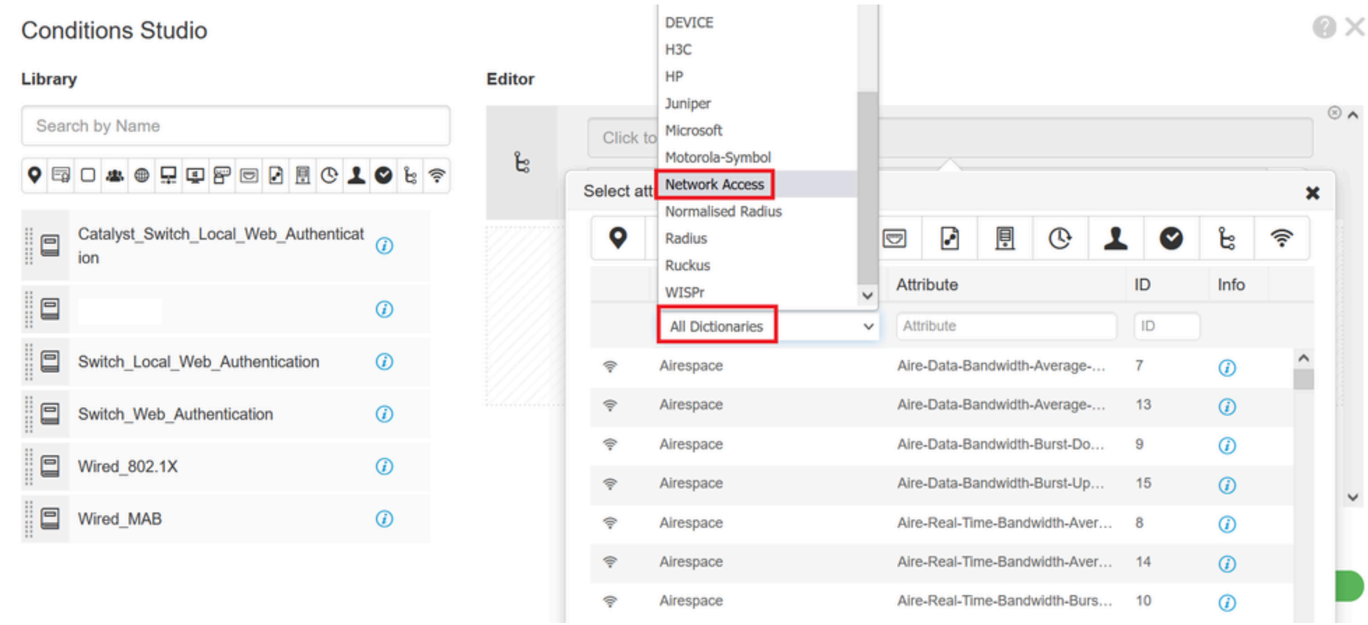
Click here to do wireless setup and visibility setup Do not show this again.

Policy Sets

Status	Policy Set Name	Description	Conditions	Allowed Protocols / Server Sequence	Hits	Actions	View
✓	LWA_EA_POLICY		+	Select from list		⚙	>

Configure Authentication Rule

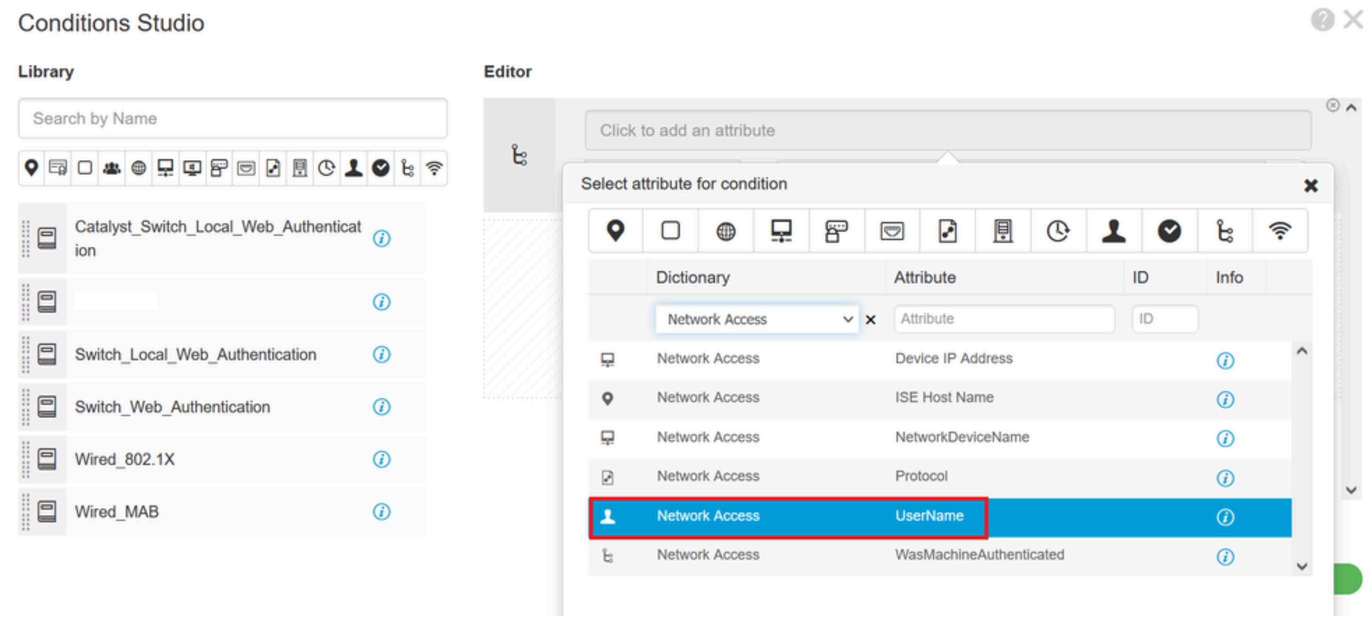
Step 2. On **Dictionary** select **Network Access**.



Dictionary	Attribute	ID
Airespace	Aire-Data-Bandwidth-Average-...	7
Airespace	Aire-Data-Bandwidth-Average-...	13
Airespace	Aire-Data-Bandwidth-Burst-Do...	9
Airespace	Aire-Data-Bandwidth-Burst-Up...	15
Airespace	Aire-Real-Time-Bandwidth-Aver...	8
Airespace	Aire-Real-Time-Bandwidth-Aver...	14
Airespace	Aire-Real-Time-Bandwidth-Burs...	10

Dicionary Network Access

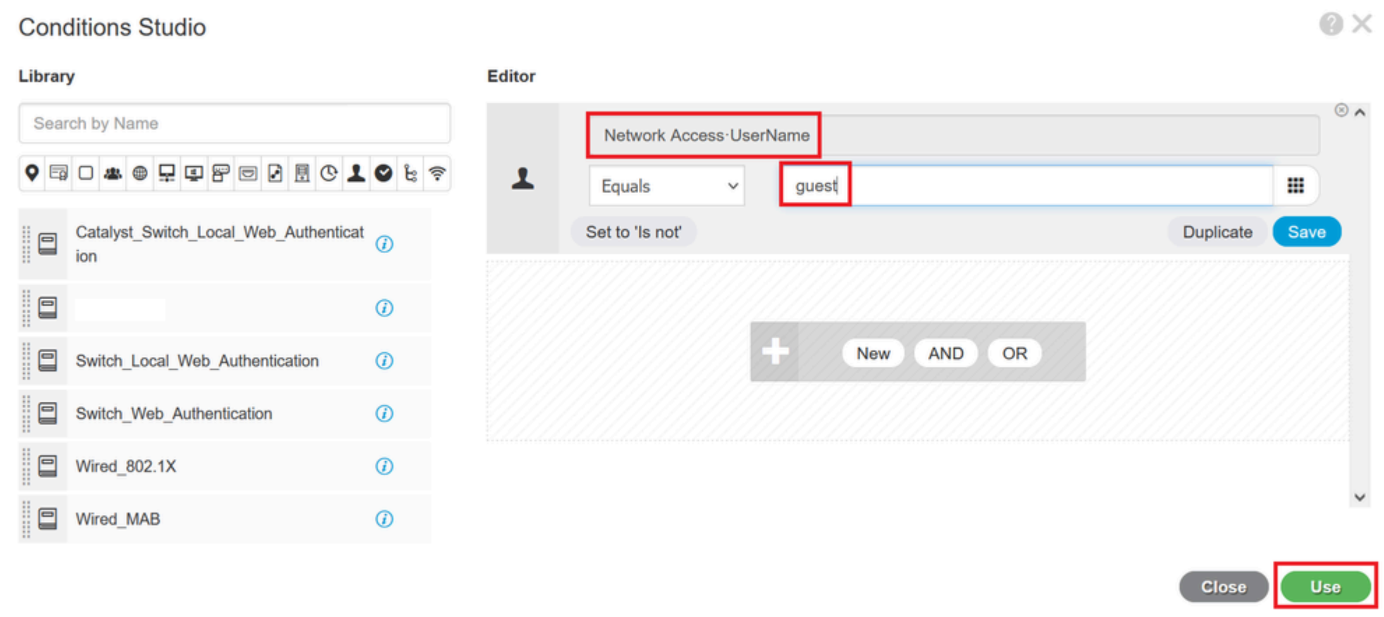
Step 3. On **Attribute** select **Username**.


Conditions Studio
Library
Search by Name
Catalyst_Switch_Local_Web_Authentication
Switch_Local_Web_Authentication
Switch_Web_Authentication
Wired_802.1X
Wired_MAB
Editor
Click to add an attribute
Select attribute for condition
Attribute
ID

Dictionary	Attribute	ID	Info
Network Access			
Network Access	Device IP Address		
Network Access	ISE Host Name		
Network Access	NetworkDeviceName		
Network Access	Protocol		
Network Access	UserName		
Network Access	WasMachineAuthenticated		

Attribute Username

Step 4. Set **Equals** and type **guest** on the text box (the username defined on **Administration** > **Identity Management** > **Identities** > **Users**).

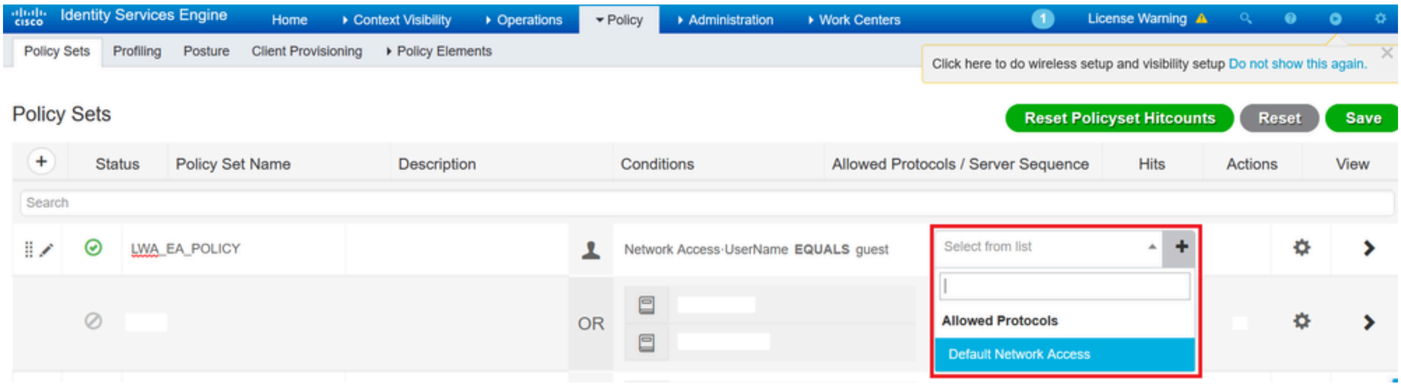


Network Access·UserName
Equals guest

Username Guest

Step 5. Click **Save** in order to save the changes.

Step 6. Navigate to **Policy** > **Policy Sets**. On the policy set you created, on column **Allowed Protocols/Server Sequence** select **Default Network Access**.



	Status	Policy Set Name	Description	Conditions	Allowed Protocols / Server Sequence	Hits	Actions	View
	✓	LWA_EA_POLICY		Network Access·UserName EQUALS guest	Allowed Protocols Default Network Access			

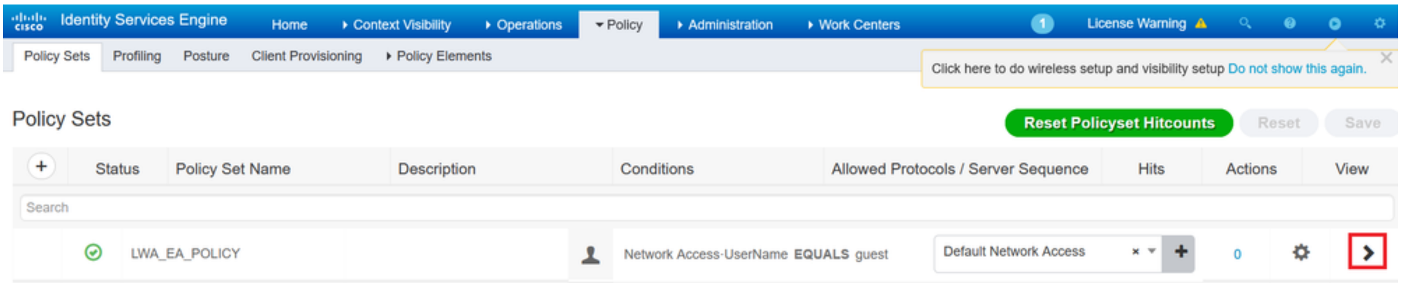
Policy Sets

Step 7. Click **Save** in order to save the changes.

Configure Authorization Rules

The authorization rule is the one in charge to determine which permissions (which authorization profile) result is applied to the client.

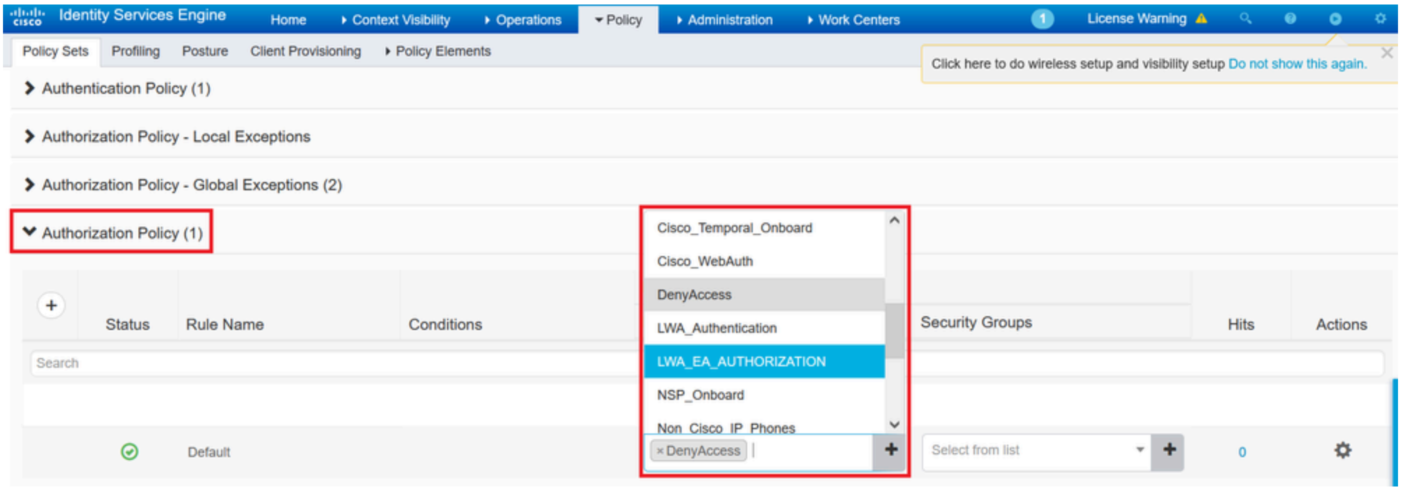
Step 1. Navigate to **Policy** > **Policy Sets**. Click on the arrow icon on the policy set you created.



	Status	Policy Set Name	Description	Conditions	Allowed Protocols / Server Sequence	Hits	Actions	View
	✓	LWA_EA_POLICY		Network Access·UserName EQUALS guest	Default Network Access	0		>

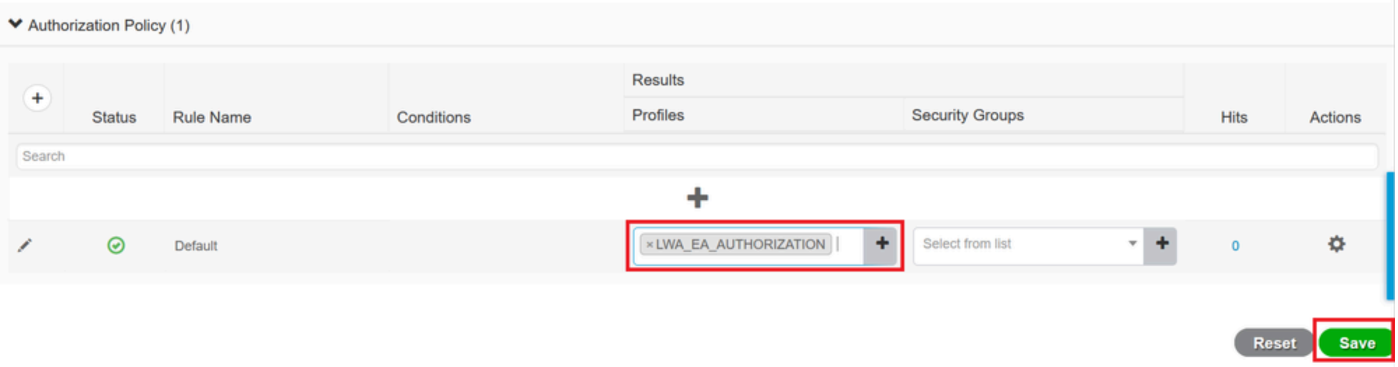
Policy Set Arrow

Step 2. On the same Policy set page, expand **Authorization Policy** as shown in the image. On **Profiles** column delete **DenyAccess** and add **LWA_EA_AUTHORIZATION**.



Authorization Policy

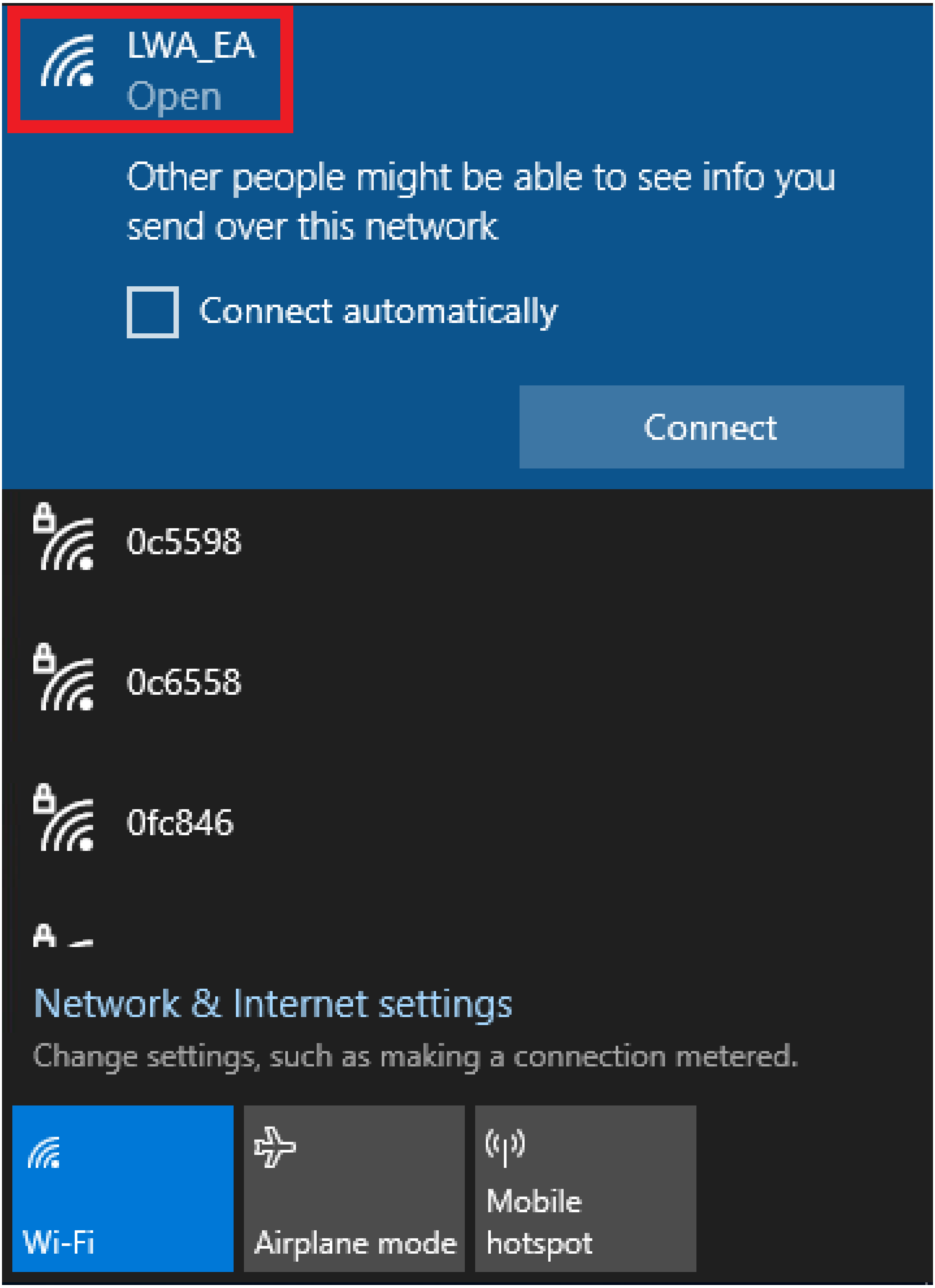
Step 3. Click **Save** in order to save the changes.



Change Authorization Policy

Connect Guest Client

Step 1. On your computer/phone navigate to the Wi-Fi networks, find the SSID **LWA_EA** and select **Connect**.



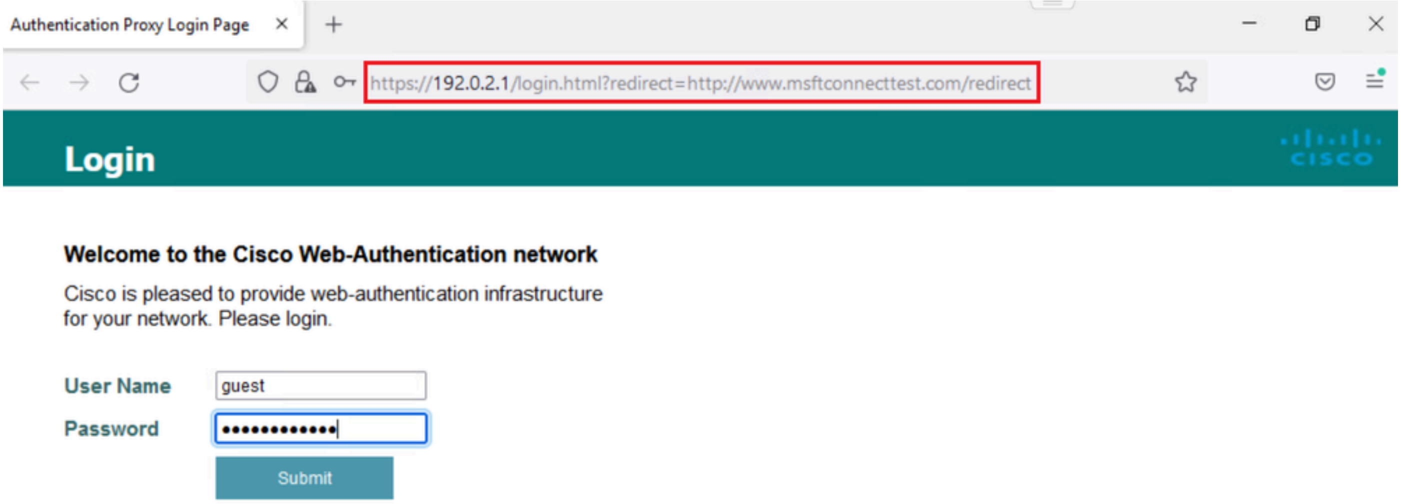
Other people might be able to see info you send over this network

□ Connect automatically

Change settings, such as making a connection metered.

Connect Guest Client

Step 2. A browser window pops up, with the log in page. The redirect URL is in the URL box, and you have to type the **Username** and **Password** to gain access to the network. Then select **Submit**.


Authentication Proxy Login Page
https://192.0.2.1/login.html?redirect=http://www.msftconnecttest.com/redirect
Login
cisco

Welcome to the Cisco Web-Authentication network

Cisco is pleased to provide web-authentication infrastructure for your network. Please login.

User Name: guest

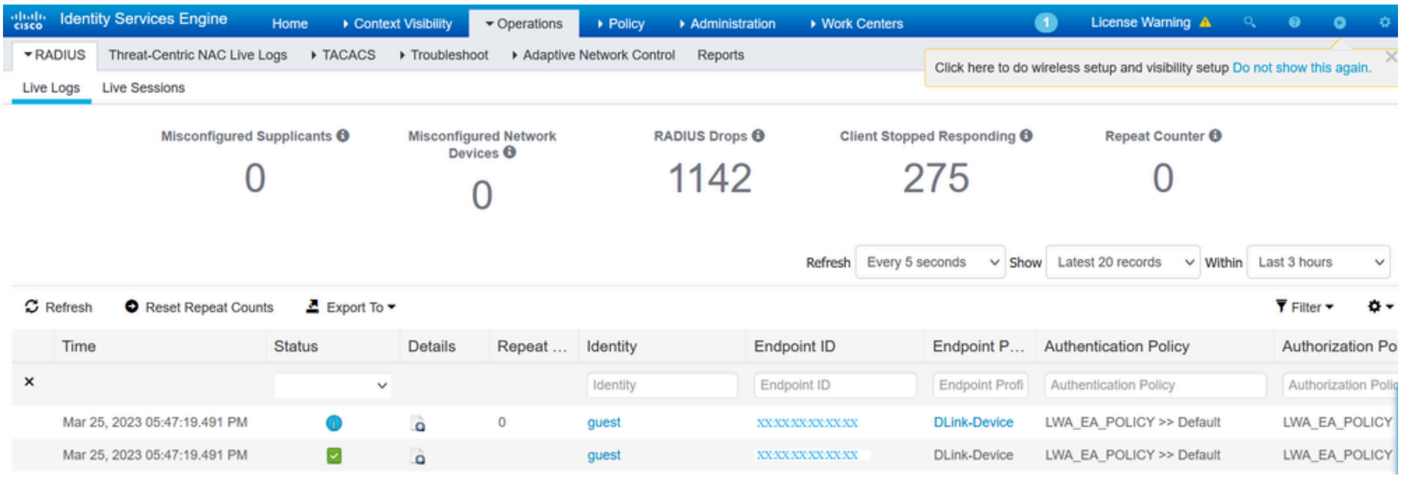
Password: ••••••••••••

Submit

Login Page with Redirect URL

Note: The URL presented was provided by the WLC. It contains the WLC Virtual IP and the redirect for the Windows connect test URL.

Step 3. Navigate to **Operations** > **RADIUS** > **Live Logs**. You can see the client device authenticated.



Click here to do wireless setup and visibility setup Do not show this again.

Misconfigured Supplicants	Misconfigured Network Devices	RADIUS Drops	Client Stopped Responding	Repeat Counter
0	0	1142	275	0

Refresh: Every 5 seconds; Show: Latest 20 records; Within: Last 3 hours

Time	Status	Details	Repeat ...	Identity	Endpoint ID	Endpoint P...	Authentication Policy	Authorization Po
Mar 25, 2023 05:47:19.491 PM	●		0	guest	XX:XX:XX:XX:XX:XX	DLink-Device	LWA_EA_POLICY >> Default	LWA_EA_POLICY
Mar 25, 2023 05:47:19.491 PM	✓			guest	XX:XX:XX:XX:XX:XX	DLink-Device	LWA_EA_POLICY >> Default	LWA_EA_POLICY

Radius Live Logs

Verify

Use this section in order to confirm that your configuration works properly.

Show WLAN Summary

<#root>

```
9800WLC#show wlan summary

Number of WLANs: 3
ID Profile Name SSID Status Security
```

```
-------------------------------------------------
1 WLAN1 WLAN1 DOWN [WPA2][802.1x][AES]
2 WLAN2 WLAN2 UP [WPA2][PSK][AES],MAC Filtering

34 LWA_EA LWA_EA UP [open],[Web Auth]


9800WLC#

show wlan name LWA_EA


WLAN Profile Name : LWA_EA
================================================
Identifier : 34
Description :
Network Name (SSID) : LWA_EA
Status : Enabled
Broadcast SSID : Enabled
Advertise-Apname : Disabled
Universal AP Admin : Disabled
(...)
Accounting list name :
802.1x authentication list name : Disabled
802.1x authorization list name : Disabled
Security

802.11 Authentication : Open System


Static WEP Keys : Disabled

Wi-Fi Protected Access (WPA/WPA2/WPA3) : Disabled


OWE Transition Mode : Disabled
OSEN : Disabled
FT Support : Adaptive
FT Reassociation Timeout (secs) : 20
FT Over-The-DS mode : Disabled
PMF Support : Disabled
PMF Association Comeback Timeout (secs): 1
PMF SA Query Time (msecs) : 200

Web Based Authentication : Enabled


IPv4 ACL : Unconfigured
IPv6 ACL : Unconfigured
Conditional Web Redirect : Disabled
Splash-Page Web Redirect : Disabled
Webauth On-mac-filter Failure : Disabled

Webauth Authentication List Name : LWA_AUTHENTICATION



Webauth Authorization List Name : Disabled



Webauth Parameter Map : global


Band Select : Disabled
Load Balancing : Disabled
```

```
(...)
```

Show Parameter Map Configuration

```
9800WLC#show running-config | section parameter-map type webauth global

parameter-map type webauth global
type webauth
virtual-ip ipv4 192.0.2.1
trustpoint 9800-17-3-3_WLC_TP
webauth-http-enable
```

Show AAA Information

<#root>

```
9800WLC#show aaa method-lists authentication

authen queue=AAA_ML_AUTHEN_LOGIN
name=default valid=TRUE id=0 :state=ALIVE : LOCAL
```

name=LWA_AUTHENTICATION valid=TRUE id=E0000007 :state=ALIVE : SERVER_GROUP RADIUSGROUP

```
authen queue=AAA_ML_AUTHEN_ENABLE
authen queue=AAA_ML_AUTHEN_PPP
authen queue=AAA_ML_AUTHEN_SGBP
(...)

9800WLC#show aaa method-lists authorization

author queue=AAA_ML_AUTHOR_SHELL
name=default valid=TRUE id=0 :state=ALIVE : LOCAL
author queue=AAA_ML_AUTHOR_NET
name=default valid=TRUE id=0 :state=ALIVE : LOCAL
name=rq-authoAAA valid=TRUE id=83000009 :state=ALIVE : SERVER_GROUP RADIUSGROUP
```

name=LWA_AUTHORIZATION valid=TRUE id=DB00000A :state=ALIVE : SERVER_GROUP RADIUSGROU

```
P
author queue=AAA_ML_AUTHOR_CONN
author queue=AAA_ML_AUTHOR_IPMOBILE
author queue=AAA_ML_AUTHOR_RM
(...)

9800WLC#show aaa servers
```

RADIUS: id 3, priority 1, host 10.48.39.247,
auth-port 1812, acct-port 1813, hostname RADIUS

```
State: current UP, duration 171753s, previous duration 0s
Dead: total time 0s, count 0
```

```
Platform State from SMD: current UP, duration 171753s, previous duration 0s
SMD Platform Dead: total time 0s, count 0
Platform State from WNCD (1) : current UP
(...)
```

Troubleshoot

Common Issues

These are several guides on how to troubleshoot Web Authentication issues, such as:

- Users cannot authenticate.
- Certificate problems.
- Redirection URL does not work.
- Guest users cannot connect to the guest WLAN.
- Users do not obtain an IP address.
- Redirection to the Web Authentication Log in Page fails.
- After successful Authentication, guest users fail to get access to the Internet.

These guides describe troubleshoot steps in detail:

- Troubleshoot Common Issues for Web Authentication
- Other Situations to Troubleshoot

Conditional Debug and Radio Active Trace and Embedded Packet Capture

You can enable conditional debug and capture Radio Active (RA) trace, which provides debug level traces for all processes that interact with the specified condition (client mac address in this case). In order to enable conditional debug, use the steps in the guide, Conditional Debug and RadioActive trace.

You can also collect Embedded Packet capture (EPC). EPC is a packet capture facility that allows a view into packets destined to, sourced from, and passes through the Catalyst 9800 WLCs, namely DHCP, DNS, HTTP GET packets in LWA. These captures can be exported for offline analysis with Wireshark. For detailed steps on how to do this, refer to Embedded Packet Capture.

Example of a Successful Attempt

This is the output from the RA_traces for a successful attempt to identify each of the phases upon the association/authentication process, while in connection to a guest SSID with RADIUS server.

802.11 association/authentication:

[client-orch-sm] [17062]: (note): MAC: 0c0e.766c.0e97 Association received. BSSID cc70.edcf.552f, WLAN LWA_EA, Slot 1 AP cc70.edcf.5520, DO_NOT_MOVE.Static_AP1
[client-orch-sm] [17062]: (debug): MAC: 0c0e.766c.0e97 Received Dot11 association request. Processing started,SSID: LWA_EA, Policy profile: POLICY_PROFILE, AP Name: DO_NOT_MOVE.Static_AP1, Ap Mac Address: cc70.edcf.5520BSSID MAC0000.0000.0000wlan ID: 1RSSI: -49, SNR: 46
[client-orch-state] [17062]: (note): MAC: 0c0e.766c.0e97 Client state transition: S_CO_INIT -> S_CO_ASSOCIATING
[dot11-validate] [17062]: (info): MAC: 0c0e.766c.0e97 Dot11 ie validate ext/supp rates. Validation Passed for Supported rates radio_type 2
[dot11-validate] [17062]: (info): MAC: 0c0e.766c.0e97 WiFi direct: Dot11 validate P2P IE. P2P IE not present.

```
[dot11] [17062]: (debug): MAC: 0c0e.766c.0e97 dot11 send association response. Framing association response with resp_status_code: 0
[dot11] [17062]: (debug): MAC: 0c0e.766c.0e97 Dot11 Capability info byte1 1, byte2: 11
[dot11-frame] [17062]: (info): MAC: 0c0e.766c.0e97 WiFi direct: skip build Assoc Resp with P2P IE: Wifi direct policy disabled
[dot11] [17062]: (info): MAC: 0c0e.766c.0e97 dot11 send association response. Sending assoc response of length: 130 with resp_status_code: 0, DOT11_STATUS: DOT11_STATUS_SUCCESS
[dot11] [17062]: (note): MAC: 0c0e.766c.0e97 Association success. AID 1, Roaming = False, WGB = False, 11r = False, 11w = False Fast roam = False
[dot11] [17062]: (info): MAC: 0c0e.766c.0e97 DOT11 state transition: S_DOT11_INIT -> S_DOT11_ASSOCIATED
[client-orch-sm] [17062]: (debug): MAC: 0c0e.766c.0e97 Station Dot11 association is successful.
```

IP Learn process:

```
[client-orch-state] [17062]: (note): MAC: 0c0e.766c.0e97 Client state transition: S_CO_DPATH_PLUMB_IN_PROGRESS -> S_CO_IP_LEARN_IN_PROGRESS
[client-iplearn] [17062]: (info): MAC: 0c0e.766c.0e97 IP-learn state transition: S_IPLEARN_INIT -> S_IPLEARN_IN_PROGRESS
[client-auth] [17062]: (info): MAC: 0c0e.766c.0e97 Client auth-interface state transition: S_AUTHIF_L2_WEBAUTH_DONE -> S_AUTHIF_L2_WEBAUTH_DONE
[client-iplearn] [17062]: (note): MAC: 0c0e.766c.0e97 Client IP learn successful. Method: DHCP IP: 10.48.39.243
[client-iplearn] [17062]: (info): MAC: 0c0e.766c.0e97 IP-learn state transition: S_IPLEARN_IN_PROGRESS -> S_IPLEARN_COMPLETE
[client-orch-sm] [17062]: (debug): MAC: 0c0e.766c.0e97 Received ip learn response. method: IPLEARN_METHOD_DHCP
```

Layer 3 authentication:

```
[client-orch-sm] [17062]: (debug): MAC: 0c0e.766c.0e97 Triggered L3 authentication. status = 0x0, Success
[client-orch-state] [17062]: (note): MAC: 0c0e.766c.0e97 Client state transition: S_CO_IP_LEARN_IN_PROGRESS -> S_CO_L3_AUTH_IN_PROGRESS
[client-auth] [17062]: (note): MAC: 0c0e.766c.0e97 L3 Authentication initiated. LWA
[client-auth] [17062]: (info): MAC: 0c0e.766c.0e97 Client auth-interface state transition: S_AUTHIF_L2_WEBAUTH_DONE -> S_AUTHIF_WEBAUTH_PENDING
```

```
[webauth-httpd] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]GET rcvd when in LOGIN state
[webauth-httpd] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]HTTP GET request
[webauth-httpd] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]Parse GET, src [10.48.39.243] dst [10.107.221.82] url [http://firefox detect portal/]
[webauth-httpd] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]Read complete: parse_request return 8
[webauth-io] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]56538/219 IO state READING -> WRITING
[webauth-io] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]56538/219 IO state WRITING -> READING
[webauth-io] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]56539/218 IO state NEW -> READING
[webauth-io] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]56539/218 Read event, Message ready
[webauth-httpd] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]POST rcvd when in LOGIN state
```

Layer 3 authentication successful, move the client to the RUN state:

```
[auth-mgr] [17062]: (info): [0c0e.766c.0e97:capwap_90000004] Received User-Name guest for client
0c0e.766c.0e97
[auth-mgr] [17062]: (info): [0c0e.766c.0e97:capwap_90000004] auth mgr attr add/change notification is
received for attr auth-domain(954)
[auth-mgr] [17062]: (info): [0c0e.766c.0e97:capwap_90000004] Method webauth changing state from
'Running' to 'Authc Success'
[auth-mgr] [17062]: (info): [0c0e.766c.0e97:capwap_90000004] Context changing state from 'Running' to
'Authc Success'
[auth-mgr] [17062]: (info): [0c0e.766c.0e97:capwap_90000004] auth mgr attr add/change notification is
received for attr method(757)
[auth-mgr] [17062]: (info): [0c0e.766c.0e97:capwap_90000004] Raised event AUTHZ_SUCCESS (11)
[auth-mgr] [17062]: (info): [0c0e.766c.0e97:capwap_90000004] Context changing state from 'Authc
Success' to 'Authz Success'
[webauth-acl] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]Applying IPv4 logout
ACL via SVM, name: IP-Adm-V4-LOGOUT-ACL, priority: 51, IIF-ID: 0
[webauth-sess] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]Param-map used:
global
[webauth-state] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]Param-map used:
global
[webauth-state] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]State
AUTHC_SUCCESS -> AUTHZ
[webauth-page] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]Sending Webauth
success page
[webauth-io] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]56539/218 IO state
AUTHENTICATING -> WRITING
[webauth-io] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]56539/218 IO state
WRITING -> END
[webauth-httpd] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]56539/218 Remove
IO ctx and close socket, id [99000029]
[client-auth] [17062]: (note): MAC: 0c0e.766c.0e97 L3 Authentication Successful. ACL:[]
[client-auth] [17062]: (info): MAC: 0c0e.766c.0e97 Client auth-interface state transition:
S_AUTHIF_WEBAUTH_PENDING -> S_AUTHIF_WEBAUTH_DONE
[webauth-httpd] [17062]: (info): capwap_90000004[0c0e.766c.0e97][ 10.48.39.243]56538/219 Remove
IO ctx and close socket, id [D7000028]
[errmsg] [17062]: (info): %CLIENT_ORCH_LOG-6-CLIENT_ADDED_TO_RUN_STATE: R0/0: wncd:
Username entry (guest) joined with ssid (LWA_EA) for device with MAC: 0c0e.766c.0e97
[aaa-attr-inf] [17062]: (info): [ Applied attribute :bsn-vlan-interface-name 0 " VLAN0039"  ]
[aaa-attr-inf] [17062]: (info): [ Applied attribute : timeout 0 1800 (0x708) ]
[aaa-attr-inf] [17062]: (info): [ Applied attribute : url-redirect-acl 0 " IP-Adm-V4-LOGOUT-ACL"  ]
[ewlc-qos-client] [17062]: (info): MAC: 0c0e.766c.0e97 Client QoS run state handler
[rog-proxy-capwap] [17062]: (debug): Managed client RUN state notification: 0c0e.766c.0e97
[client-orch-state] [17062]: (note): MAC: 0c0e.766c.0e97 Client state transition:
S_CO_L3_AUTH_IN_PROGRESS -> S_CO_RUN
```

Related Information

- Cisco Technical Support & Downloads