Configure Catalyst 9800 WLC with LDAP Authentication for 802.1X and Web-auth

Contents

Introduction

This document describes how to configure a Catalyst 9800 in order to authenticate clients with a LDAP Server as the database for user credentials.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Microsoft Windows Servers
- Active Directory or any other LDAP database

Components Used

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

- C9800 EWC on C9100 Access Point (AP) that runs Cisco IOS® XE version 17.3.2a
- Microsoft Active Directory (AD) Server with QNAP Network Access Storage (NAS) that acts as LDAP database

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.

Configure LDAP with a Webauth SSID

Network Diagram

This article was written based on a very simple setup:

An EWC AP 9115 with IP 192.168.1.15

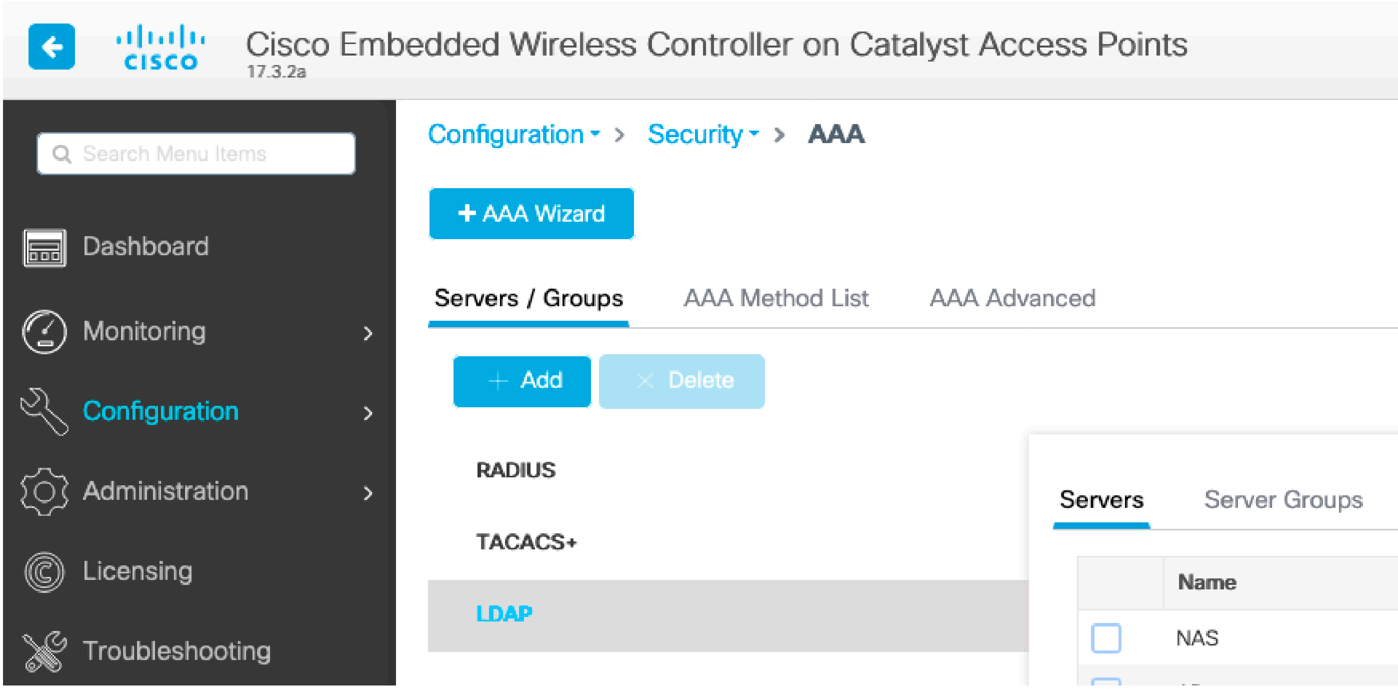
An Active Directory server with IP 192.168.1.192

A client that connects to the internal AP of the EWC

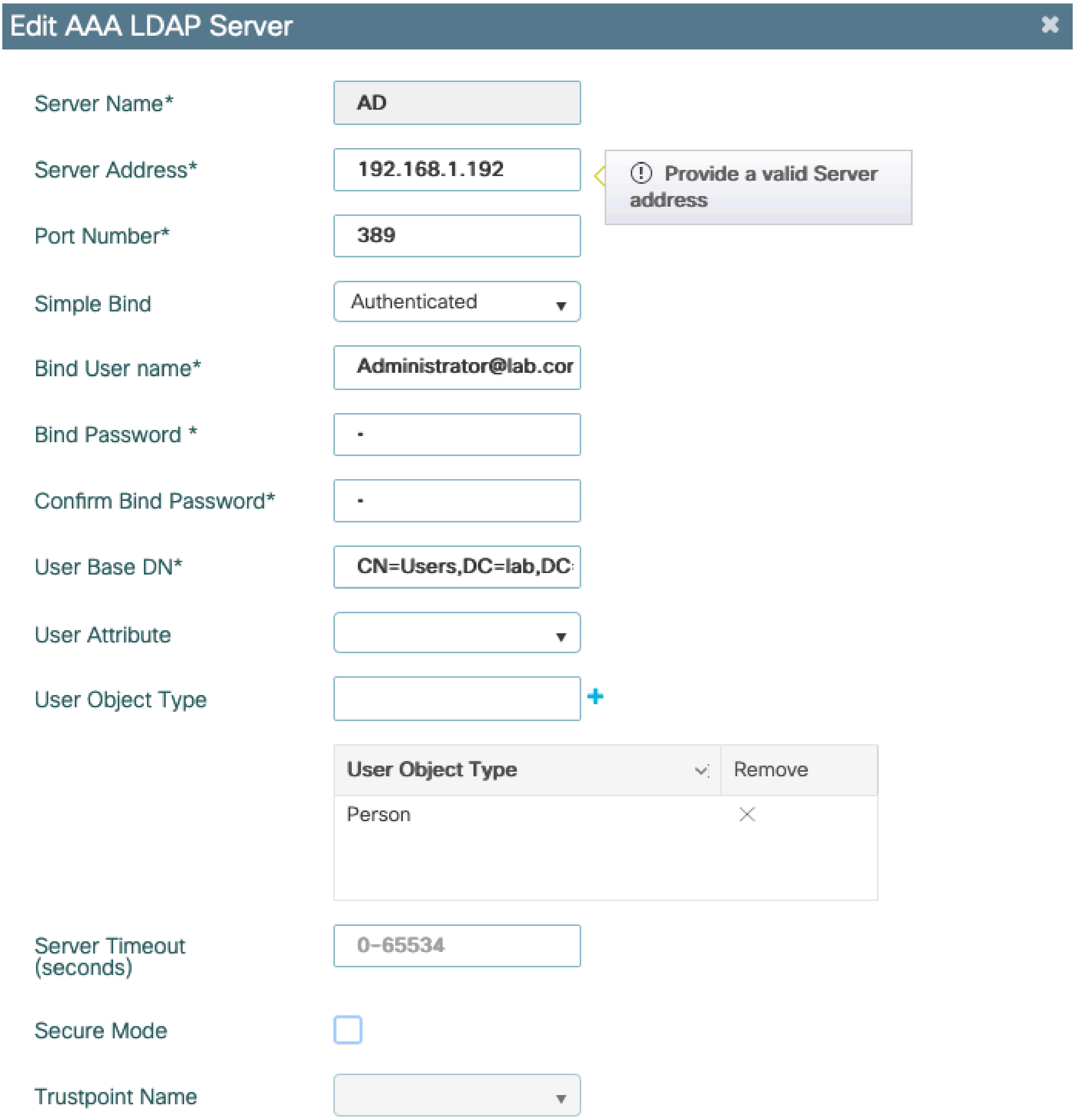
Configure the controller

Step 1. Configure the LDAP server.

Navigate to **Configuration** > **Security** > **AAA**> **Servers/Groups** > **LDAP** and click **+ Add**.



Chose a name for your LDAP server and fill in the details. For explanation on each field, refer to the section Understand LDAP Server Details of this document.



Edit AAA LDAP Server

Server Name*	AD
Server Address*	192.168.1.192
Port Number*	389
Simple Bind	Authenticated ▾
Bind User name*	Administrator@lab.cor
Bind Password *	·
Confirm Bind Password*	·
User Base DN*	CN=Users,DC=lab,DC:
User Attribute	▾
User Object Type	+
Server Timeout (seconds)	0-65534
Secure Mode	□
Trustpoint Name	▾

Provide a valid Server address

User Object Type	Remove
Person	×

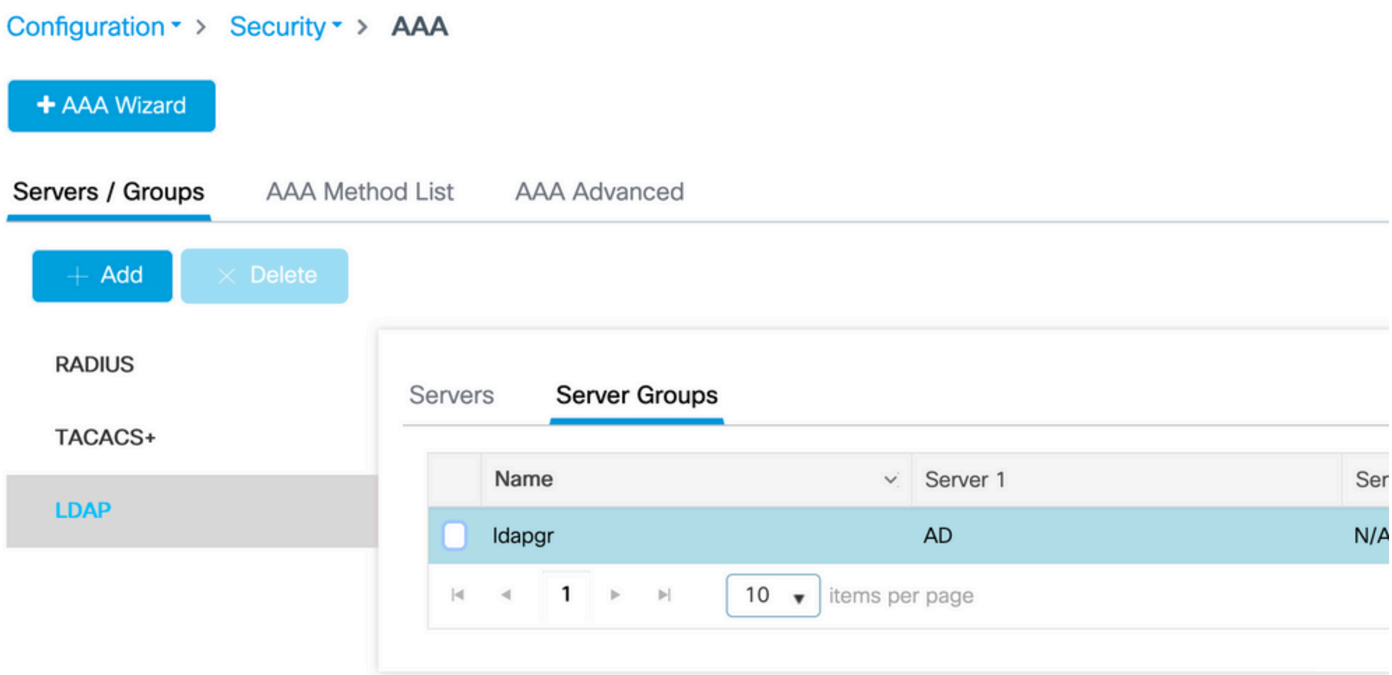
Save by clicking **Update and apply to device**.

CLI commands:

```
ldap server AD
 ipv4 192.168.1.192
 bind authenticate root-dn Administrator@lab.com password 6 WCGYHKTDQPV]DeaHLSPF_GZ[E_MNi_AAB
 base-dn CN=Users,DC=lab,DC=com
 search-filter user-object-type Person
```

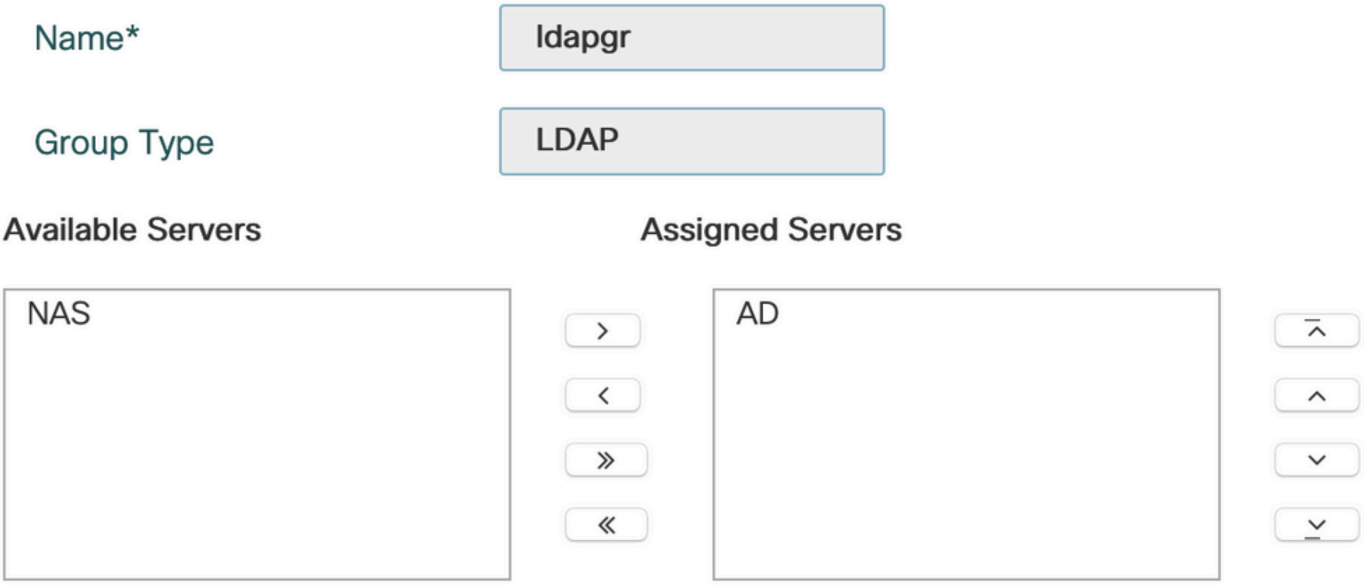
Step 2. Configure an LDAP server group.

Navigate to **Configuration** > **Security** > **AAA** > **Servers/ Groups** > **LDAP** > **Server Groups** and click **+ADD**.



	Name	Server 1	Ser
□	ldapgr	AD	N/A

Enter a name and add the LDAP server you configured in the previous step.



Name* ldapgr

Group Type LDAP

Available Servers: NAS

Assigned Servers: AD

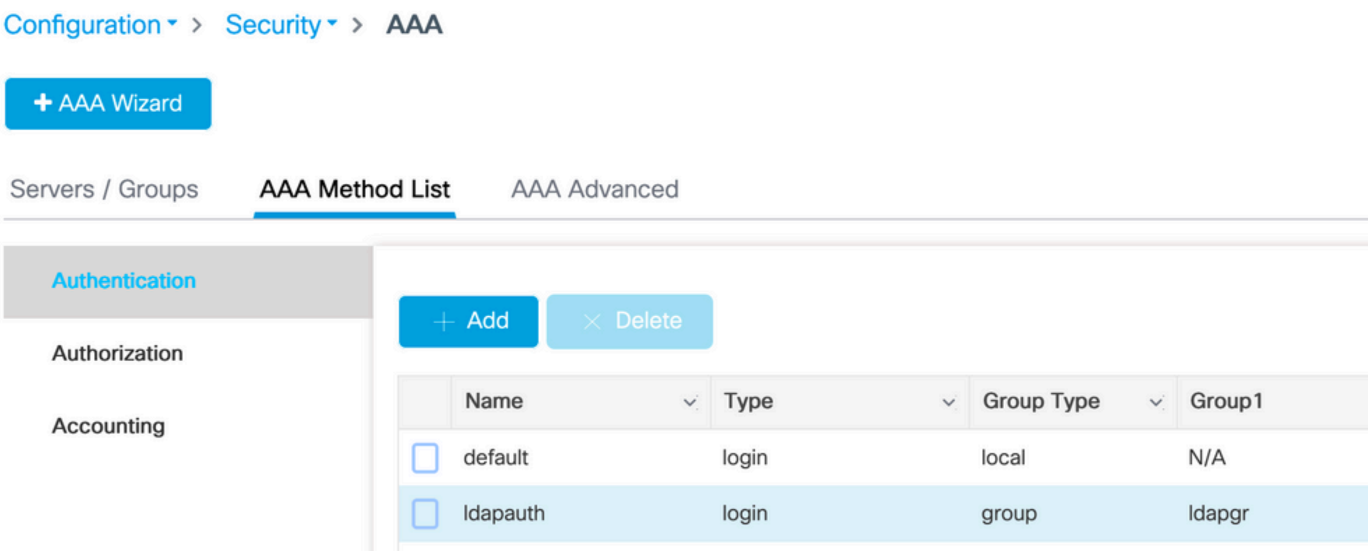
Click on **Update and apply** to save.

CLI commands :

```
aaa group server ldap ldapgr
 server AD
```

Step 3. Configure AAA authentication method.

Navigate to **Configuration** > **Security** > **AAA** > **AAA method List** > **Authetnication** and click **+Add**.



Configuration > Security > AAA

+ AAA Wizard

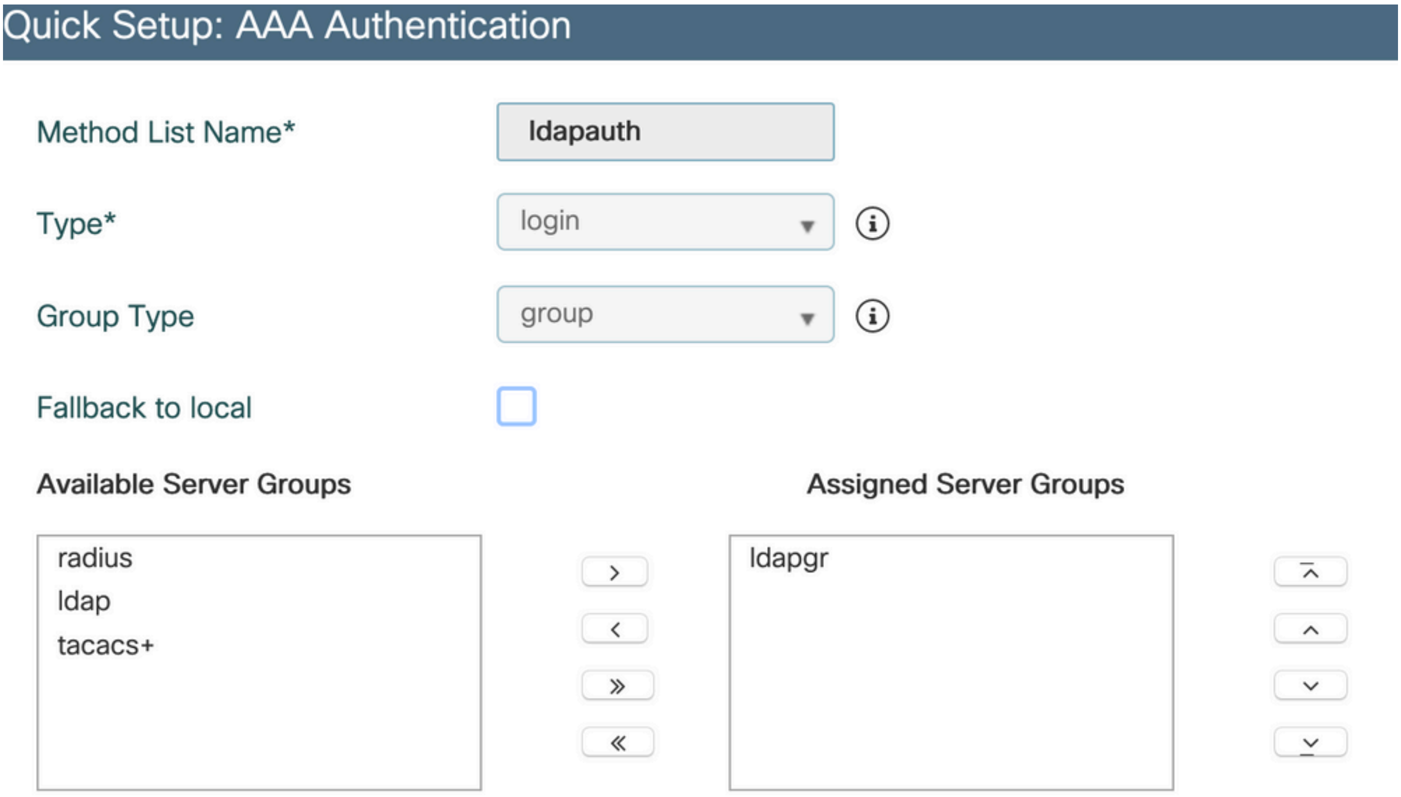
Servers / Groups | AAA Method List | AAA Advanced

Authentication
Authorization
Accounting

+ Add | × Delete

	Name	Type	Group Type	Group1
□	default	login	local	N/A
□	ldapauth	login	group	ldapgr

Enter a name, chose the **Login** type and point to the LDAP server group configured previously.



Quick Setup: AAA Authentication

Method List Name*	ldapauth
Type*	login
Group Type	group
Fallback to local	□

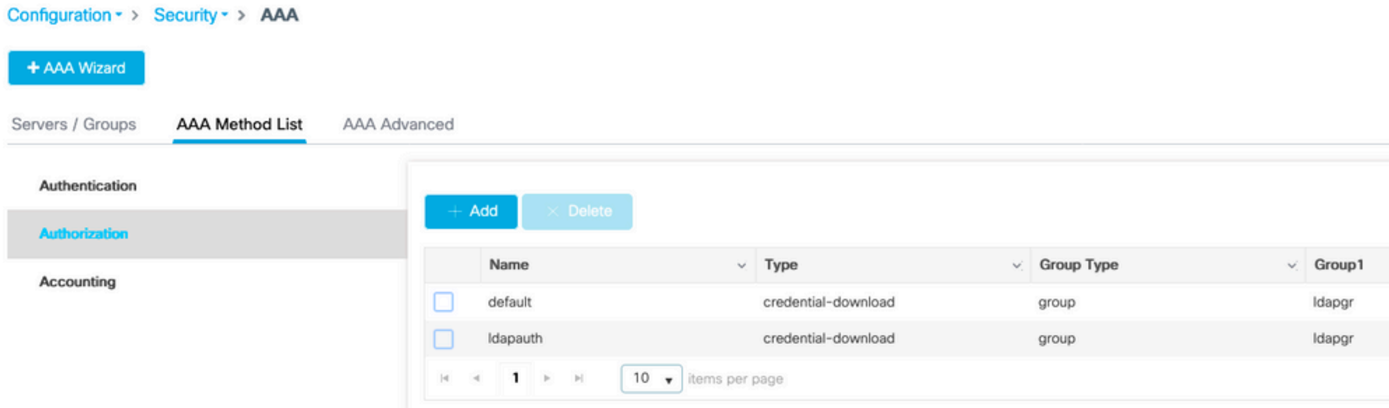
Available Server Groups	Assigned Server Groups
radius ldap tacacs+	ldapgr

CLI commands :

```
aaa authentication login ldapauth group ldapgr
```

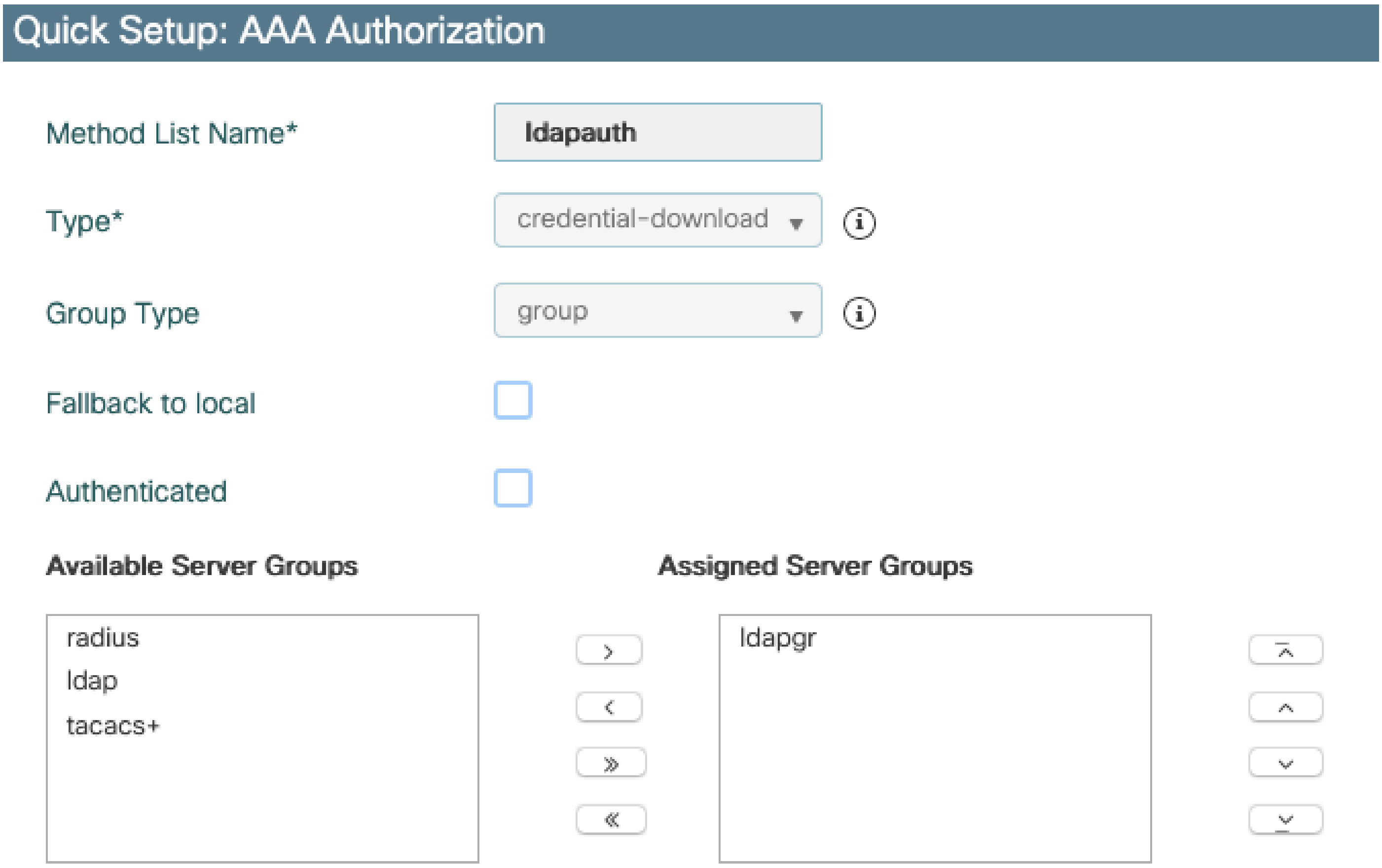
Step 4. Configure a AAA authorization method.

Navigate to **Configuration** > **Security** > **AAA** > **AAA method list** > **Authorization** and click **+Add**.



	Name	Type	Group Type	Group1
□	default	credential-download	group	ldapgr
□	ldapauth	credential-download	group	ldapgr

Create a credential-download type rule of the name of your choice and point it to the LDAP server group created previously.



Method List Name*	ldapauth
Type*	credential-download
Group Type	group
Fallback to local	□
Authenticated	□

Available Server Groups	Assigned Server Groups
radius ldap tacacs+	ldapgr

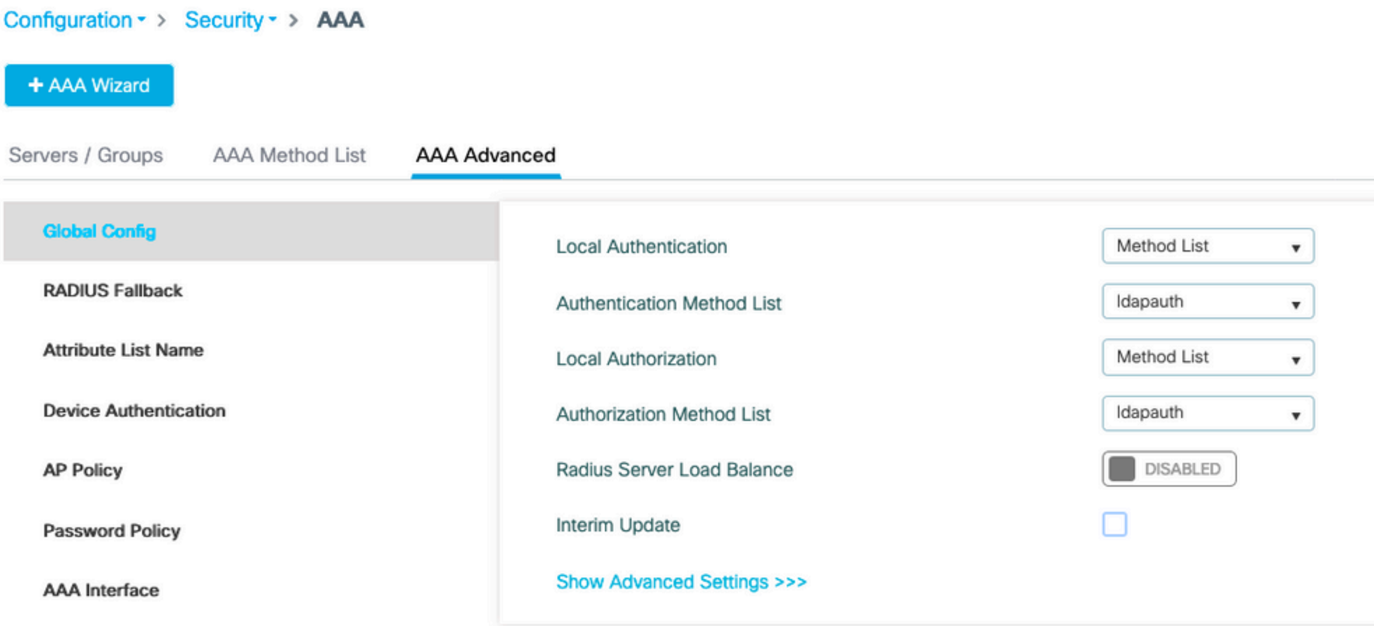
CLI commands :

```
aaa authorization credential-download ldapauth group ldapgr
```

Step 5. Configure local authentication.

Navigate to **Configuration** > **Security** > **AAA** > **AAA Advanced** > **Global Config**.

Set local authentication and local authorization to **Method List** and pick the authentication and authorization method configured previously.



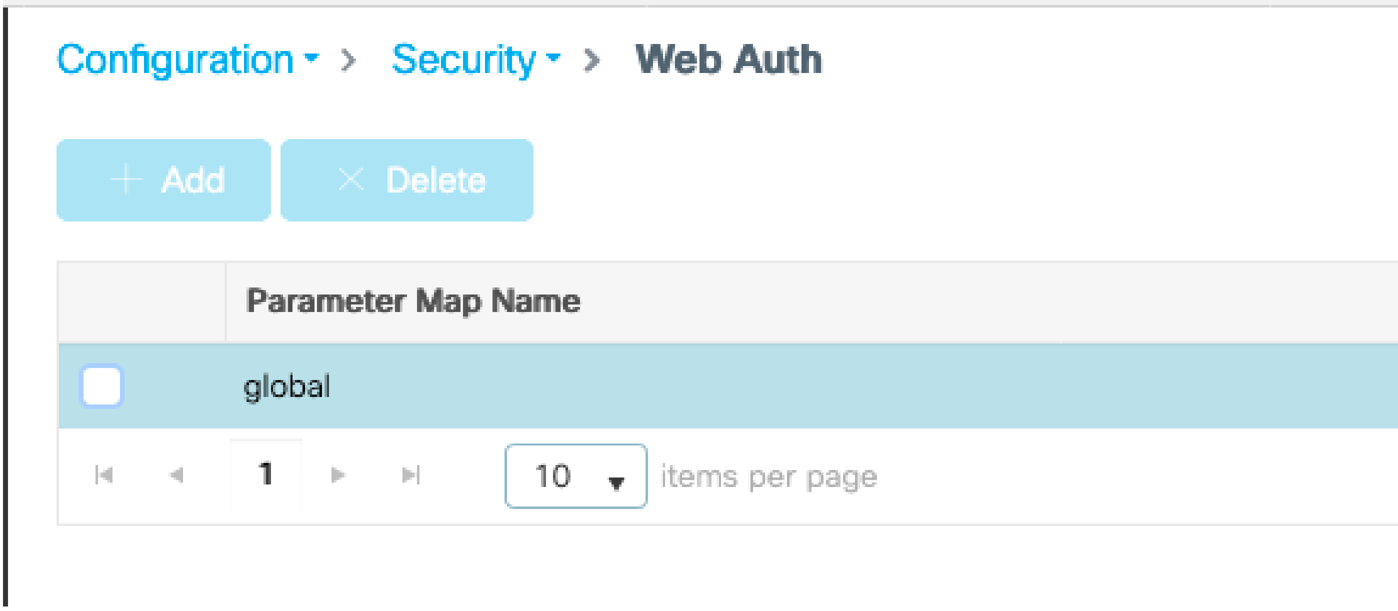
Local Authentication: Method List
Authentication Method List: ldapauth
Local Authorization: Method List
Authorization Method List: ldapauth
Radius Server Load Balance: DISABLED
Interim Update: □

CLI commands :

```
aaa local authentication ldapauth authorization ldapauth
```

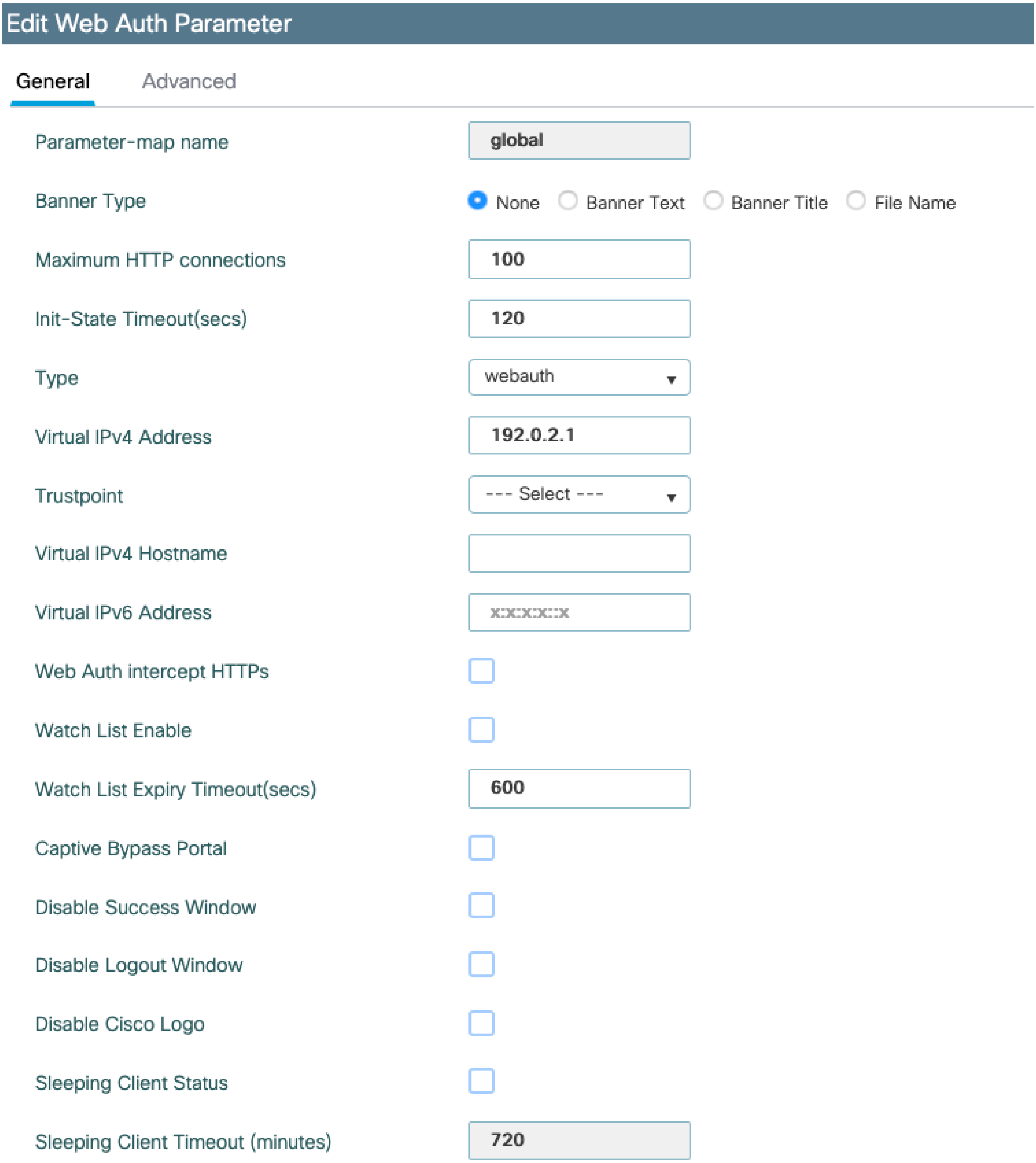
Step 6. Configure the webauth parameter-map.

Navigate to **Configuration** > **Security** > **Web Auth** and edit the **global** map.



	Parameter Map Name
□	global

Make sure to configure a virtual IPv4 address such as 192.0.2.1 (that specific IP/subnet is reserved for non-routable Virtual IP).



Edit Web Auth Parameter

General | Advanced

Parameter-map name	global
Banner Type	● None ○ Banner Text ○ Banner Title ○ File Name
Maximum HTTP connections	100
Init-State Timeout(secs)	120
Type	webauth
Virtual IPv4 Address	192.0.2.1
Trustpoint	--- Select ---
Virtual IPv4 Hostname	
Virtual IPv6 Address	X:X:X:X::X
Web Auth intercept HTTPs	□
Watch List Enable	□
Watch List Expiry Timeout(secs)	600
Captive Bypass Portal	□
Disable Success Window	□
Disable Logout Window	□
Disable Cisco Logo	□
Sleeping Client Status	□
Sleeping Client Timeout (minutes)	720

Click **Apply** to save.

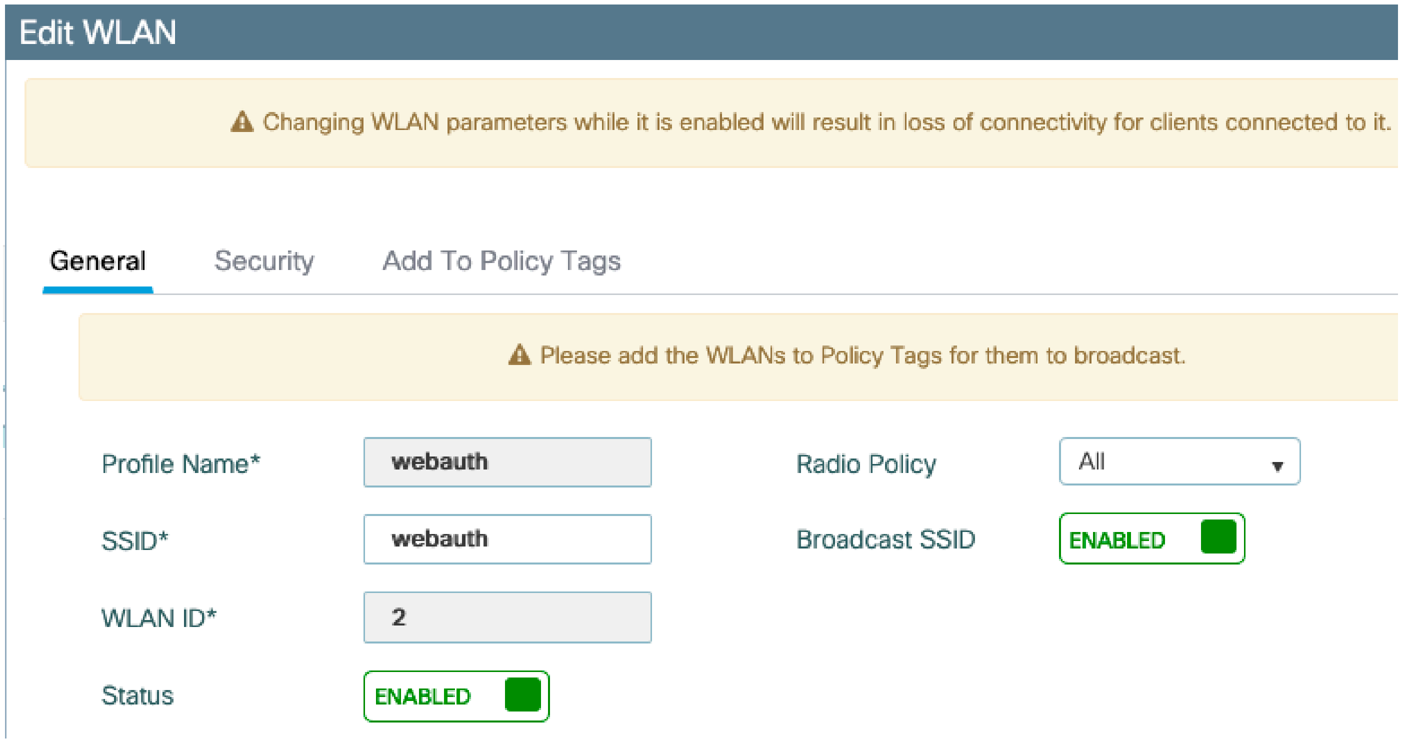
CLI commands :

```
parameter-map type webauth global
 type webauth
```

```
virtual-ip ipv4 192.0.2.1
```

Step 7. Configure a webauth WLAN.

Navigate to **Configuration** > **WLANs** and click **+Add**.



Edit WLAN

⚠ Changing WLAN parameters while it is enabled will result in loss of connectivity for clients connected to it.

⚠ Please add the WLANs to Policy Tags for them to broadcast.

Profile Name* webauth

SSID* webauth

WLAN ID* 2

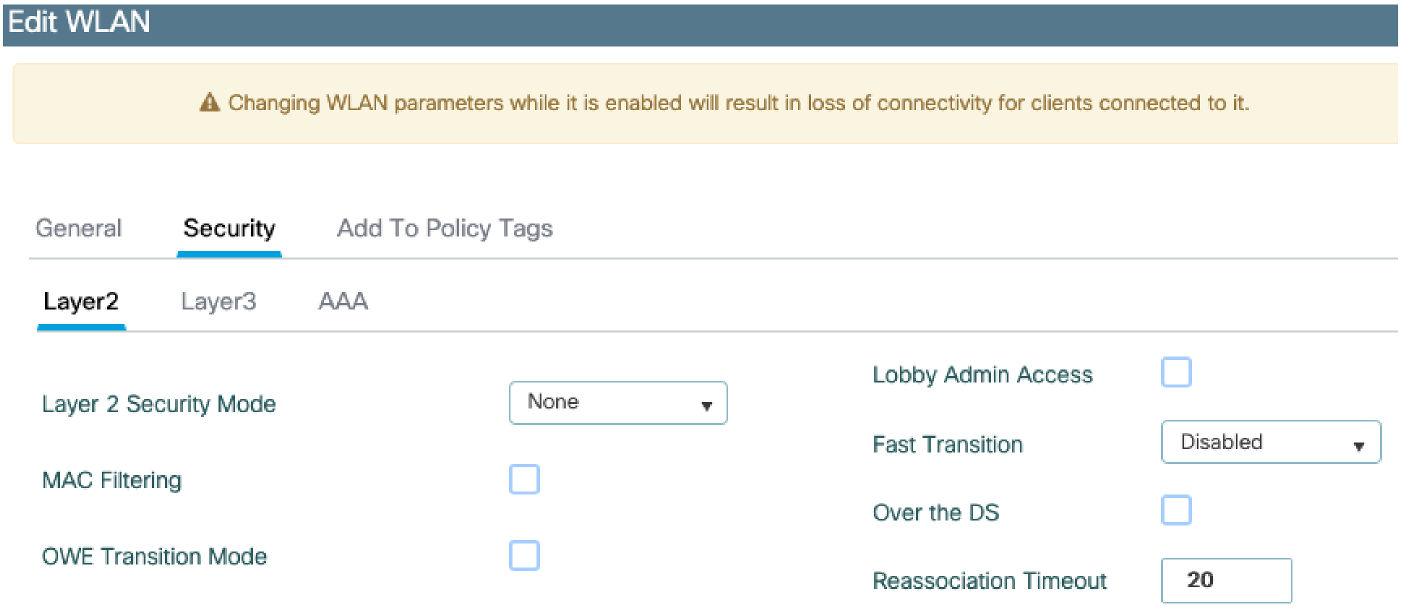
Status ENABLED

Radio Policy All

Broadcast SSID ENABLED

Configure the name, make sure it is in the enabled state, then move to the **Security** tab.

In the **Layer 2** sub-tab, make sure there no security and that Fast Transition is disabled.



Edit WLAN

⚠ Changing WLAN parameters while it is enabled will result in loss of connectivity for clients connected to it.

Layer 2 Security Mode None

MAC Filtering □

OWE Transition Mode □

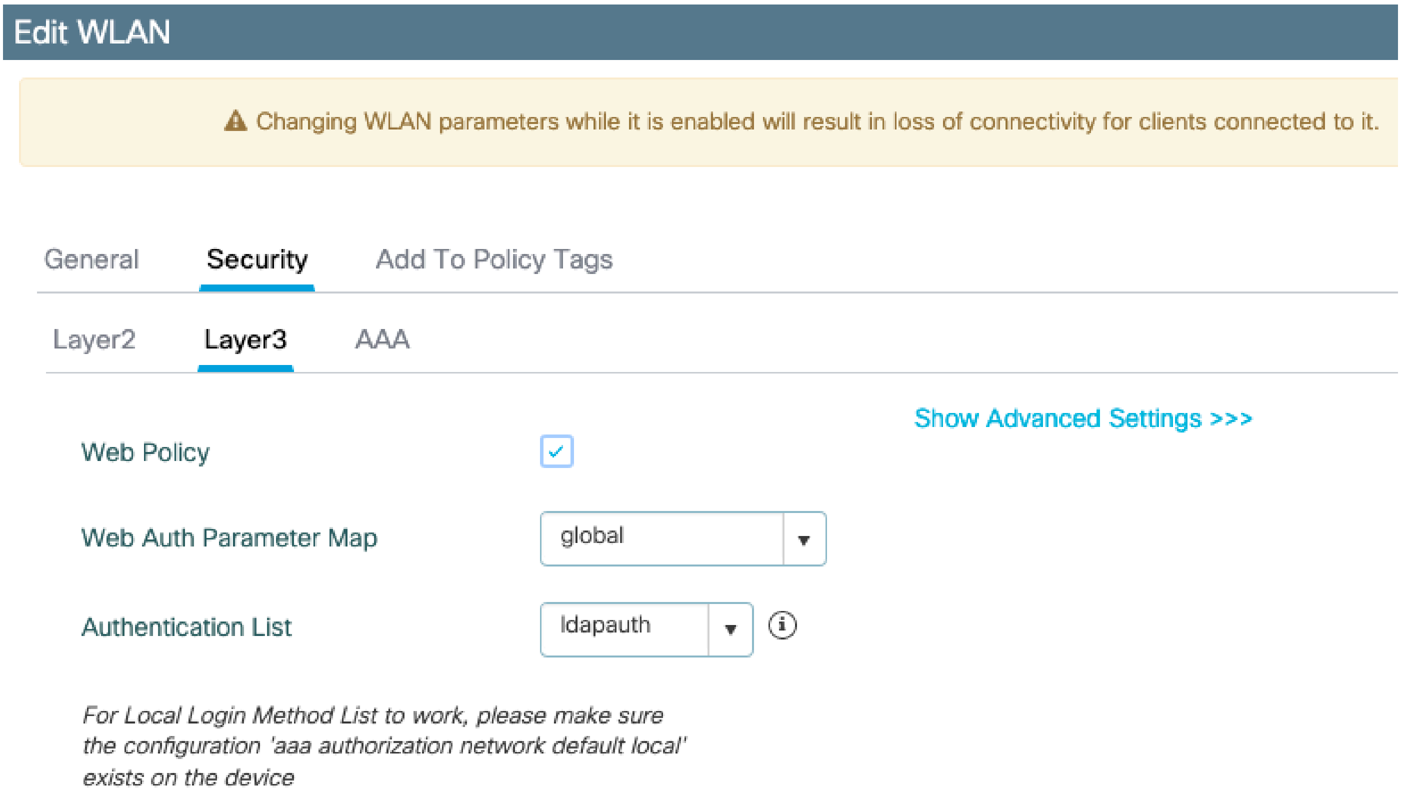
Lobby Admin Access □

Fast Transition Disabled

Over the DS □

Reassociation Timeout 20

In the **Layer3** tab, enable **web policy**, set the parameter map to **global** and set the authentication list to the aaa log in method configured previously.


Edit WLAN
⚠ Changing WLAN parameters while it is enabled will result in loss of connectivity for clients connected to it.
General
Security
Add To Policy Tags
Layer2
Layer3
AAA
Show Advanced Settings >>>

Web Policy ☑

Web Auth Parameter Map: global

Authentication List: ldapauth

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

Save by clicking **Apply**.

CLI commands :

```
wlan webauth 2 webauth
 no security ft adaptive
 no security wpa
 no security wpa wpa2
 no security wpa wpa2 ciphers aes
 no security wpa akm dot1x
 security web-auth
 security web-auth authentication-list ldapauth
 security web-auth parameter-map global
 no shutdown
```

Step 8. Make sure the SSID is broadcasted.

Navigate to **Configuration** > **Tags** and make sure the SSID is included in the policy profile currently service by the SSID (the default-policy-tag for a fresh new configuration if you have not configured tags yet). By default the default-policy-tag does not broadcast new SSIDs you create until you include them manually.

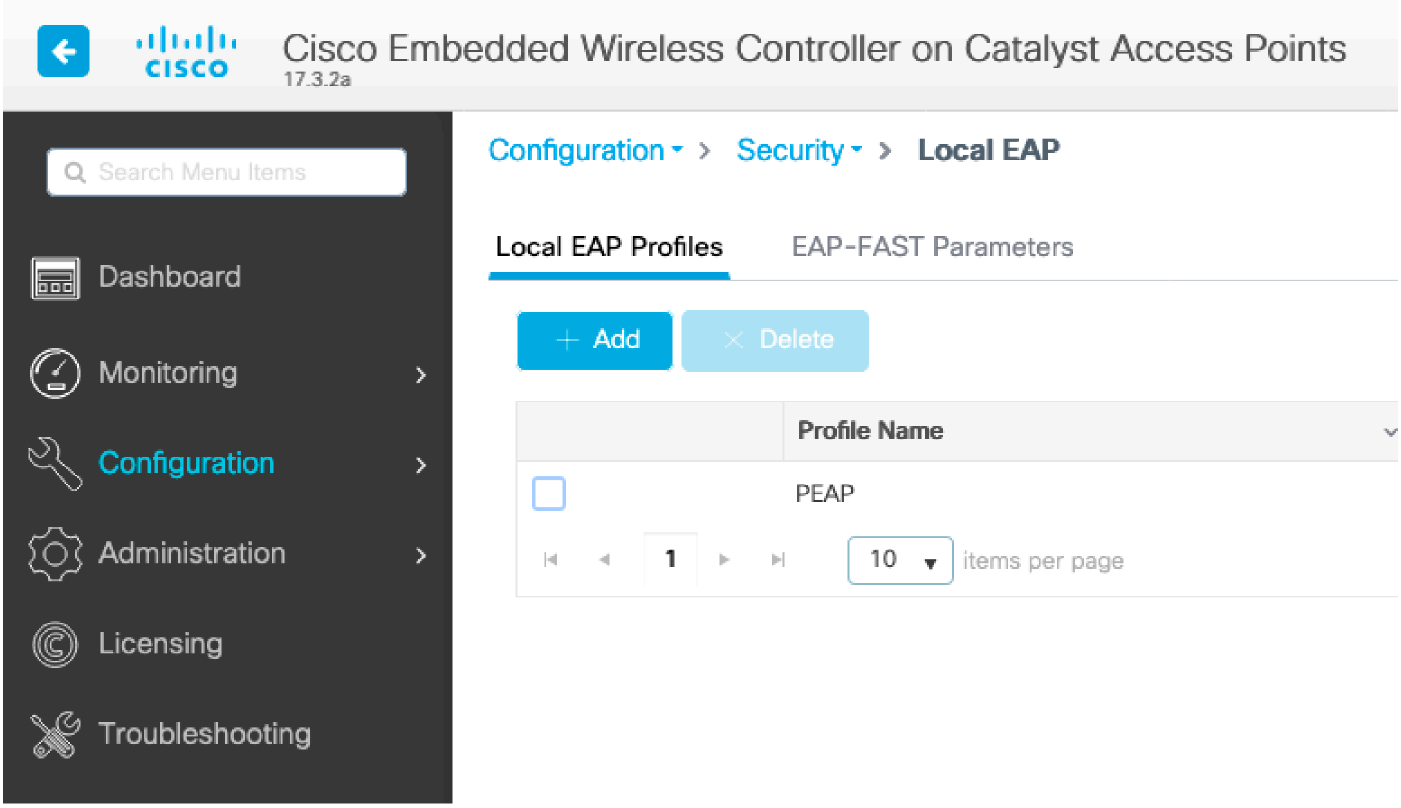
This article does not cover the configuration of policy profiles and assumes you are familiar with that part of the configuration.

Configure LDAP with a dot1x SSID (using Local EAP)

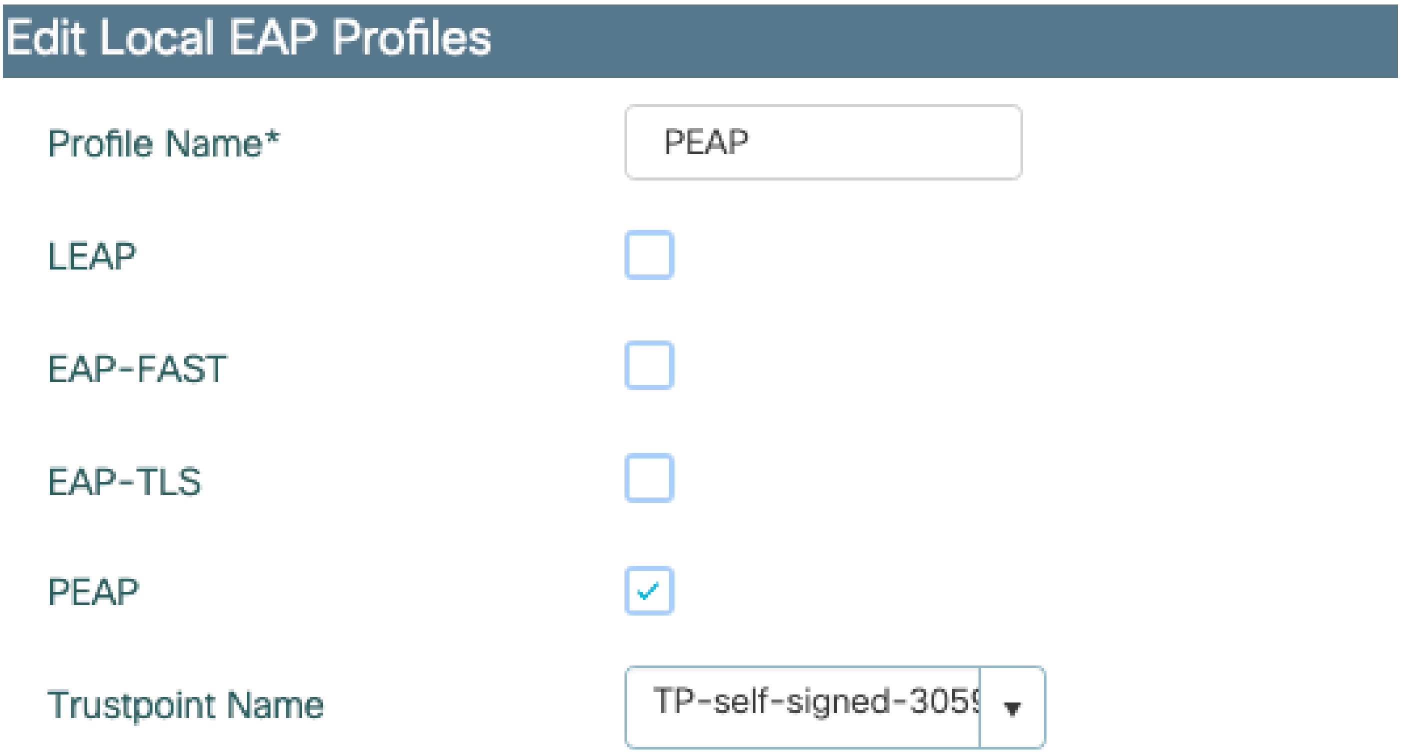
Configuring LDAP for a 802.1X SSID on the 9800 typically requires also configuring Local EAP. If you were to use RADIUS, then it would be your RADIUS server to establish a connection with the LDAP database and that is outside of the scope of this article.Before attempting this configuration it is advised to configure Local EAP with a local user configured on the WLC first, a configuration example is provided in the references section at the end of this article. Once done, you can try to move the user database towards LDAP.

Step 1. Configure a Local EAP profile

Navigate to **Configuration** > **Local EAP** and click **+Add**



Pick any name for your profile. Enable at least PEAP and pick a Trustpoint Name. By default, your WLC has only self-signed certificates, so it does not really matter which one you pick (typically TP-self-signed-xxxx is the best one for this purpose) but as new smartphones OS versions trust less and less self-signed certificates, consider installing a trusted publicly signed certificate.



Edit Local EAP Profiles

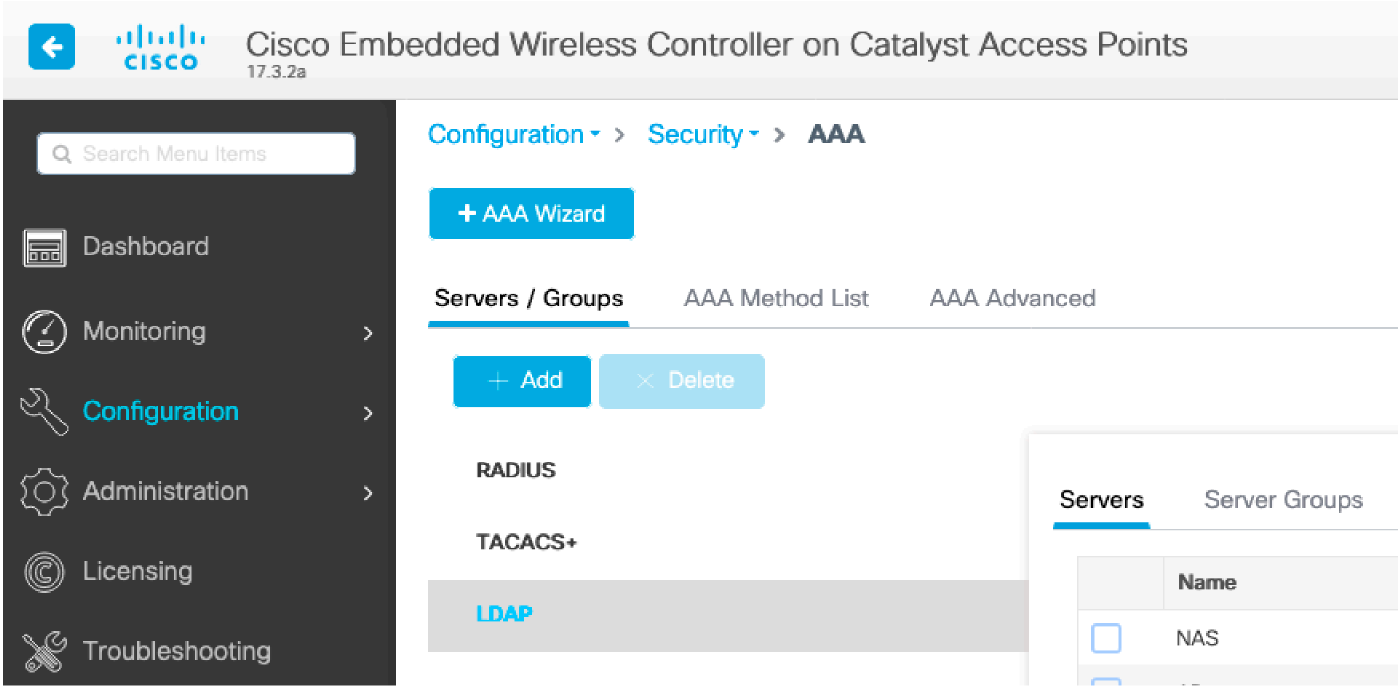
Profile Name*	PEAP
LEAP	□
EAP-FAST	□
EAP-TLS	□
PEAP	☑
Trustpoint Name	TP-self-signed-3059 ▾

CLI commands :

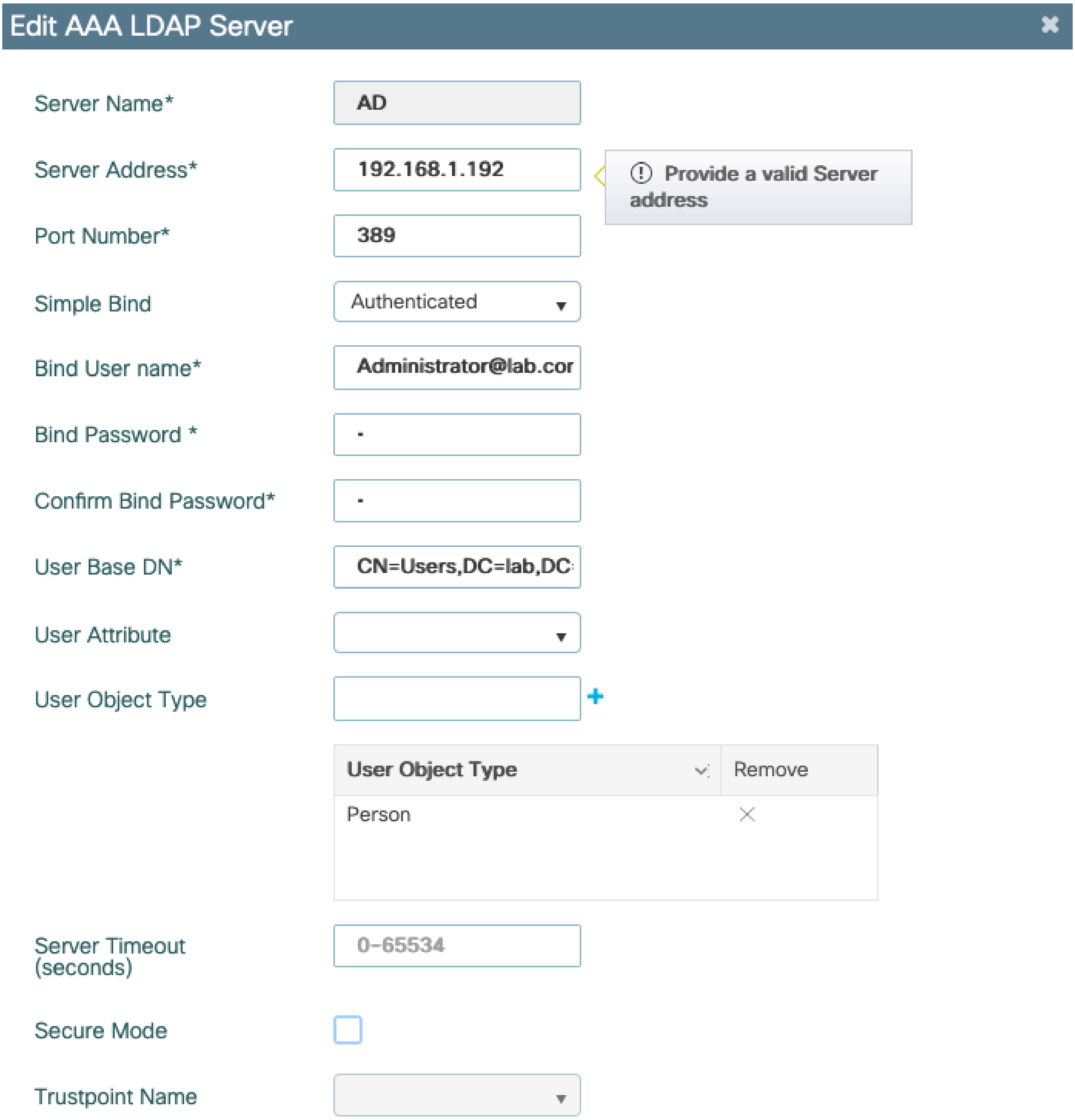
```
eap profile PEAP
 method peap
 pki-trustpoint TP-self-signed-3059261382
```

Step 2. Configure the LDAP server.

Navigate to **Configuration** > **Security** > **AAA**> **Servers/Groups** > **LDAP** and click **+ Add**.



Chose a name for your LDAP server and fill in the details. For explanation on each field, refer to the section Understand LDAP Server Details of this document.



Edit AAA LDAP Server

Server Name*	AD
Server Address*	192.168.1.192
Port Number*	389
Simple Bind	Authenticated
Bind User name*	Administrator@lab.cor
Bind Password *	•
Confirm Bind Password*	•
User Base DN*	CN=Users,DC=lab,DC:
User Attribute	
User Object Type	
Server Timeout (seconds)	0-65534
Secure Mode	□
Trustpoint Name	

Provide a valid Server address

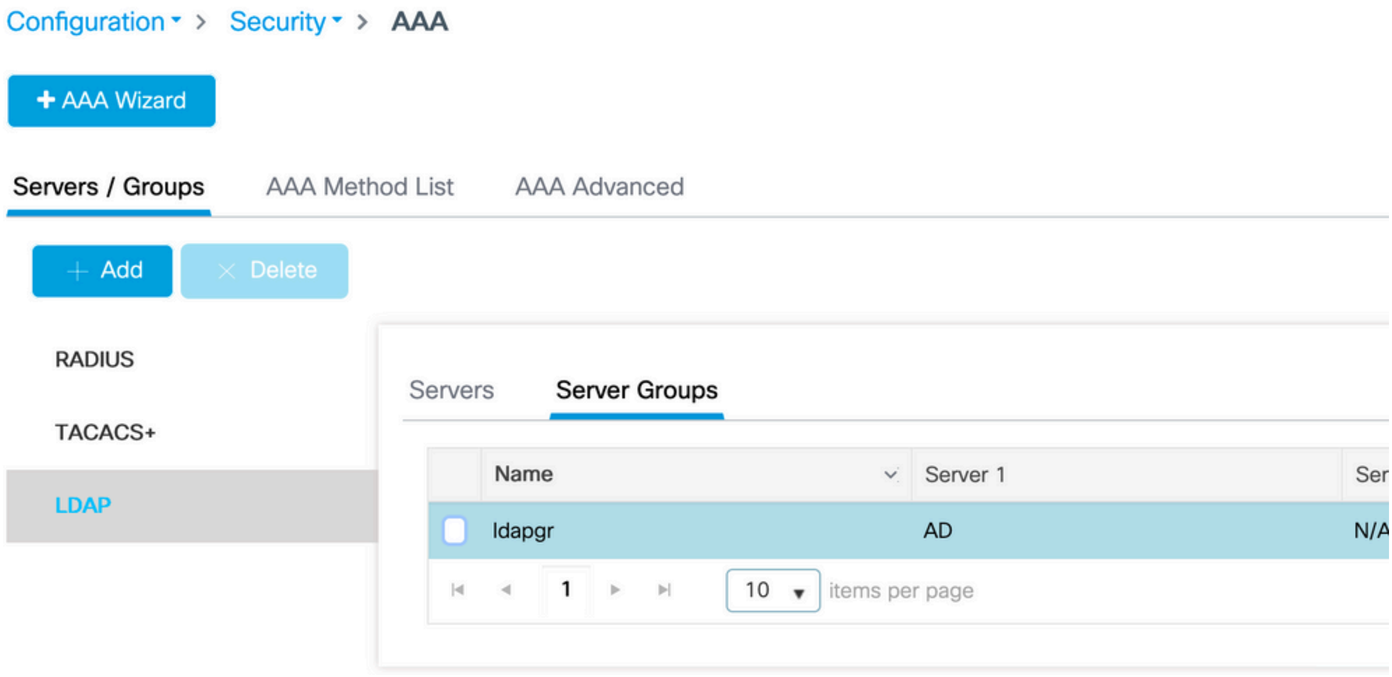
User Object Type	Remove
Person	×

Save by clicking **Update and apply to device**.

```
ldap server AD
 ipv4 192.168.1.192
 bind authenticate root-dn Administrator@lab.com password 6 WCGYHKTDQPV]DeaHLSPF_GZ[E_MNi_AAB
 base-dn CN=Users,DC=lab,DC=com
 search-filter user-object-type Person
```

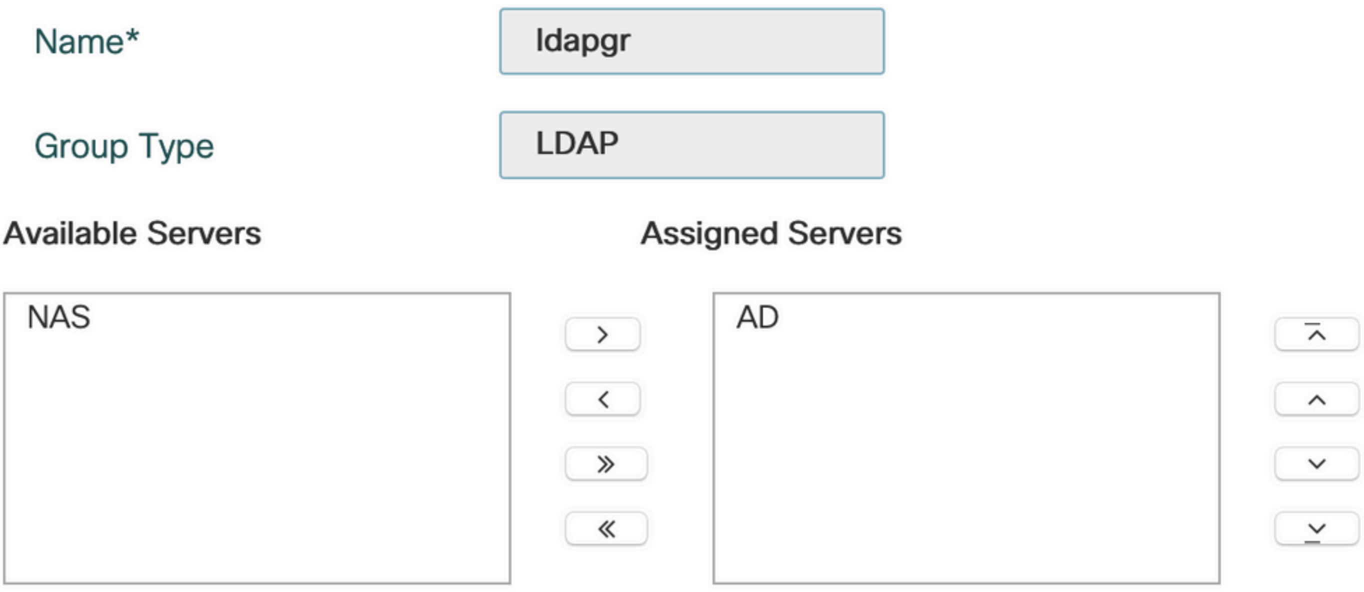
Step 3. Configure an LDAP server group.

Navigate to **Configuration** > **Security** > **AAA** > **Servers/ Groups** > **LDAP** > **Server Groups** and click **+ADD**.



	Name	Server 1	Ser
□	ldapgr	AD	N/A

Enter a name and add the LDAP server you configured in the previous step.



Name* ldapgr

Group Type LDAP

Available Servers: NAS

Assigned Servers: AD

Click on **Update and apply** to save.

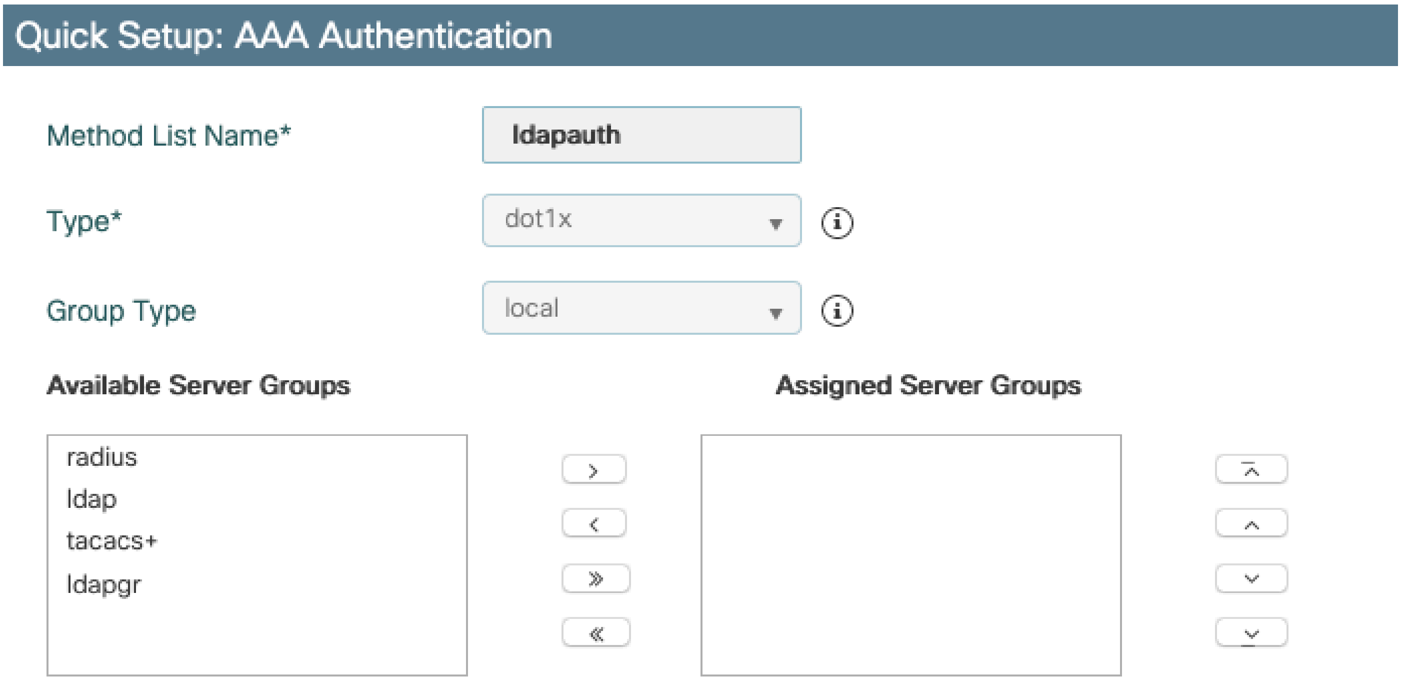
CLI commands:

```
aaa group server ldap ldapgr
 server AD
```

Step4. Configure a AAA Authentication method.

Navigate to **Configuration** > **Security** > **AAA** > **AAA Method List** > **Authentication** and click **+Add**,

Configure a **dot1x** type authentication method and point it to local only. It would be tempting to point to the LDAP server group but it is the WLC itself that acts as the 802.1X authenticator here (although the user database is on LDAP, but that is the authorization method job).



Quick Setup: AAA Authentication

Method List Name* ldapauth

Type* dot1x

Group Type local

Available Server Groups

radius
ldap
tacacs+
ldapgr

Assigned Server Groups

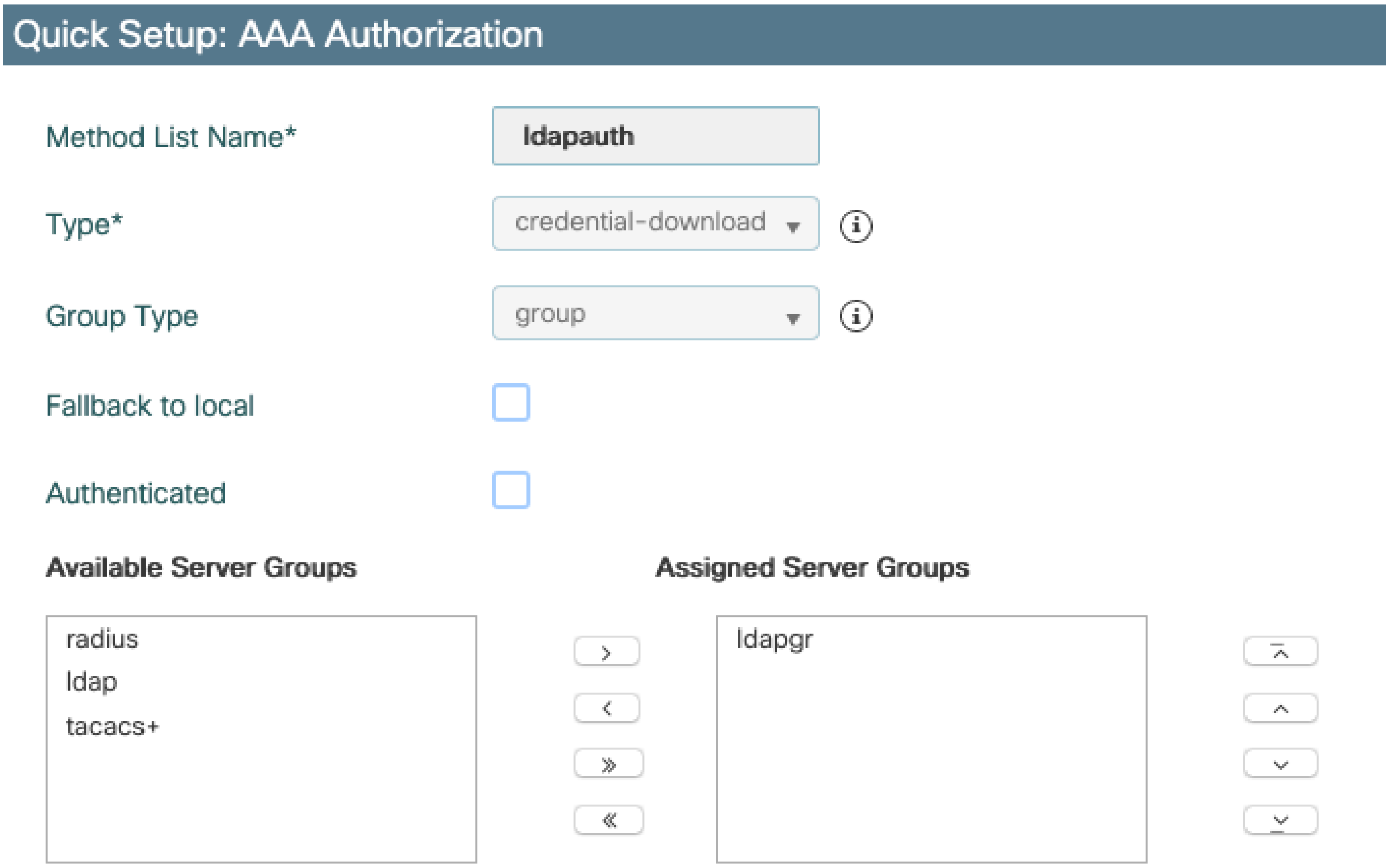
CLI command:

```
aaa authentication dot1x ldapauth local
```

Step 5. Configure a AAA authorization method.

Navigate to **Configuration** > **Security** > **AAA** > **AAA Method List** > **Authorization** and click **+Add**.

Create a **credential-download** type of authorization method and make it point to the LDAP group.



Quick Setup: AAA Authorization

Method List Name* ldapauth

Type* credential-download

Group Type group

Fallback to local □

Authenticated □

Available Server Groups: radius, ldap, tacacs+

Assigned Server Groups: ldapgr

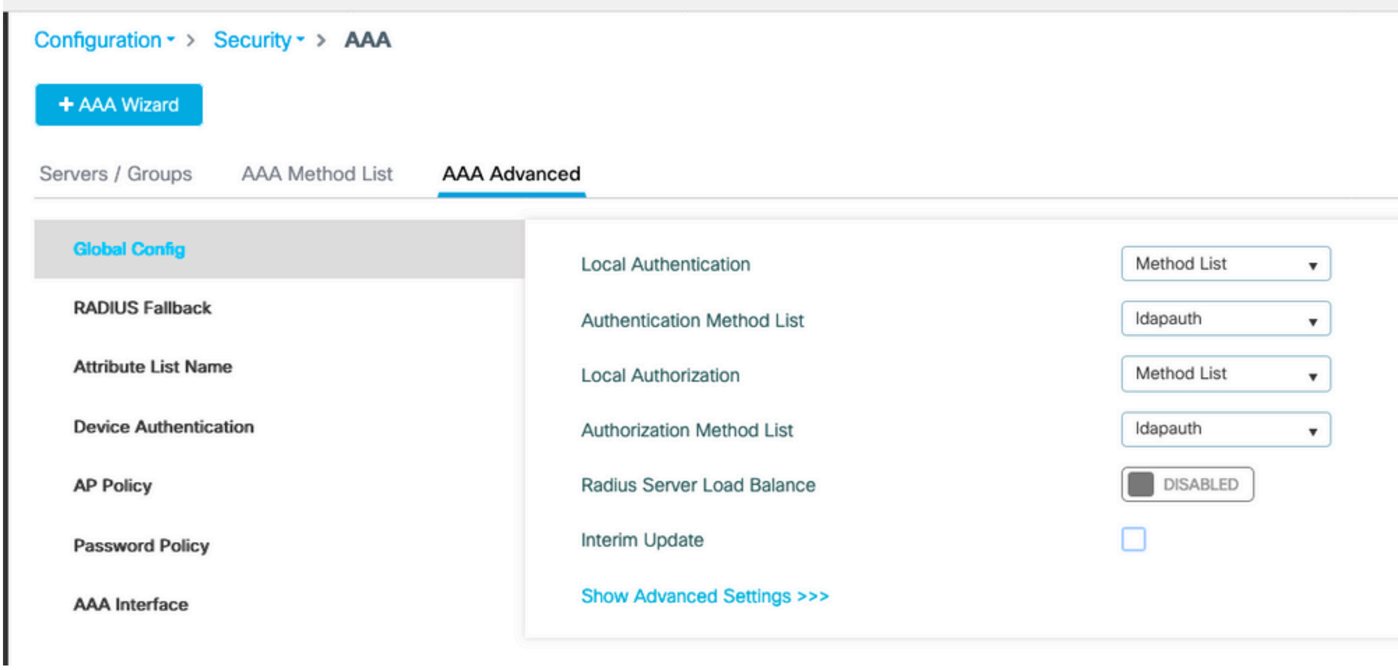
CLI command:

```
aaa authorization credential-download ldapauth group ldapgr
```

Step 6. Configure local authentication details.

Navigate to **Configuration** > **Security** > **AAA** > **AAA Method List** > **AAA advanced**.

Chose **Method List** for both authentication and authorization and pick the dot1x authentication method pointing locally and the credential-download authorization method pointing towards LDAP.



Local Authentication: Method List

Authentication Method List: ldapauth

Local Authorization: Method List

Authorization Method List: ldapauth

Radius Server Load Balance: DISABLED

Interim Update: □

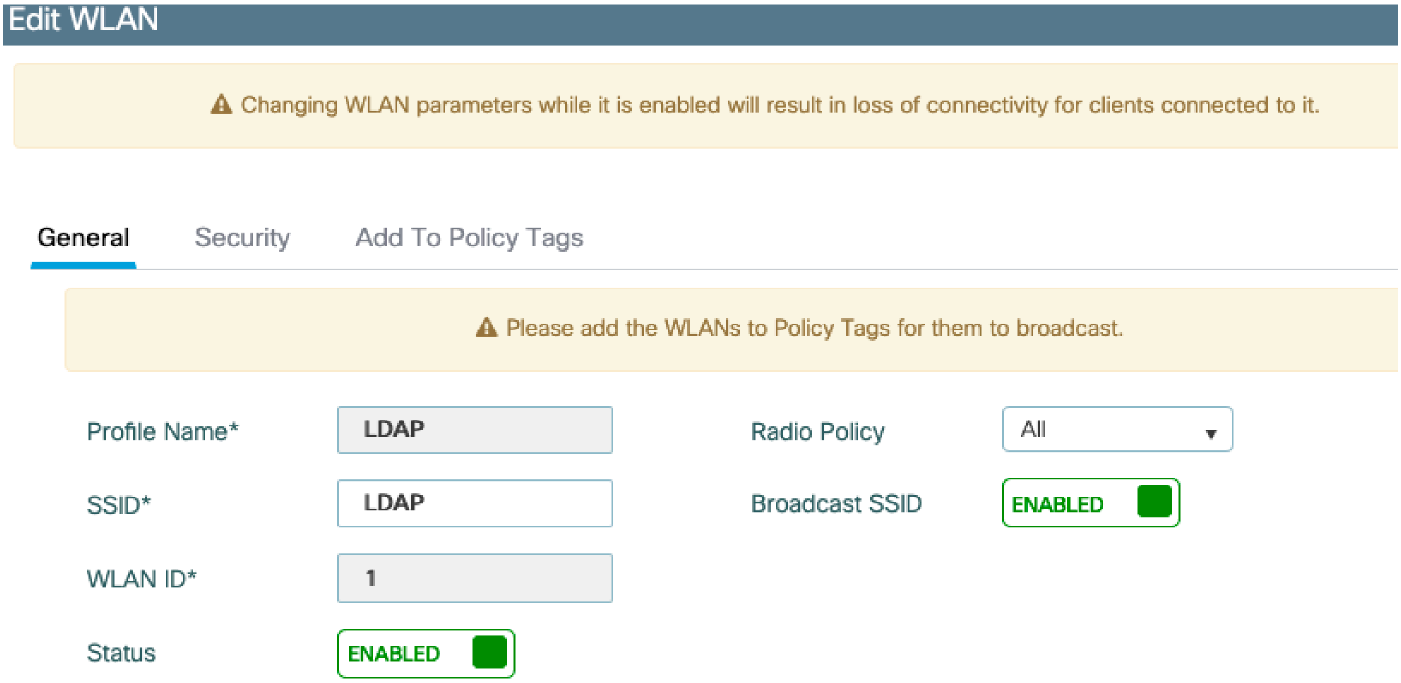
CLI command :

```
aaa local authentication ldapauth authorization ldapauth
```

Step 7. Configure a dot1x WLAN.

Navigate to **Configuration** > **WLAN** and click **+Add**.

Chose a profile and SSID name and make sure it is enabled.



Edit WLAN

⚠ Changing WLAN parameters while it is enabled will result in loss of connectivity for clients connected to it.

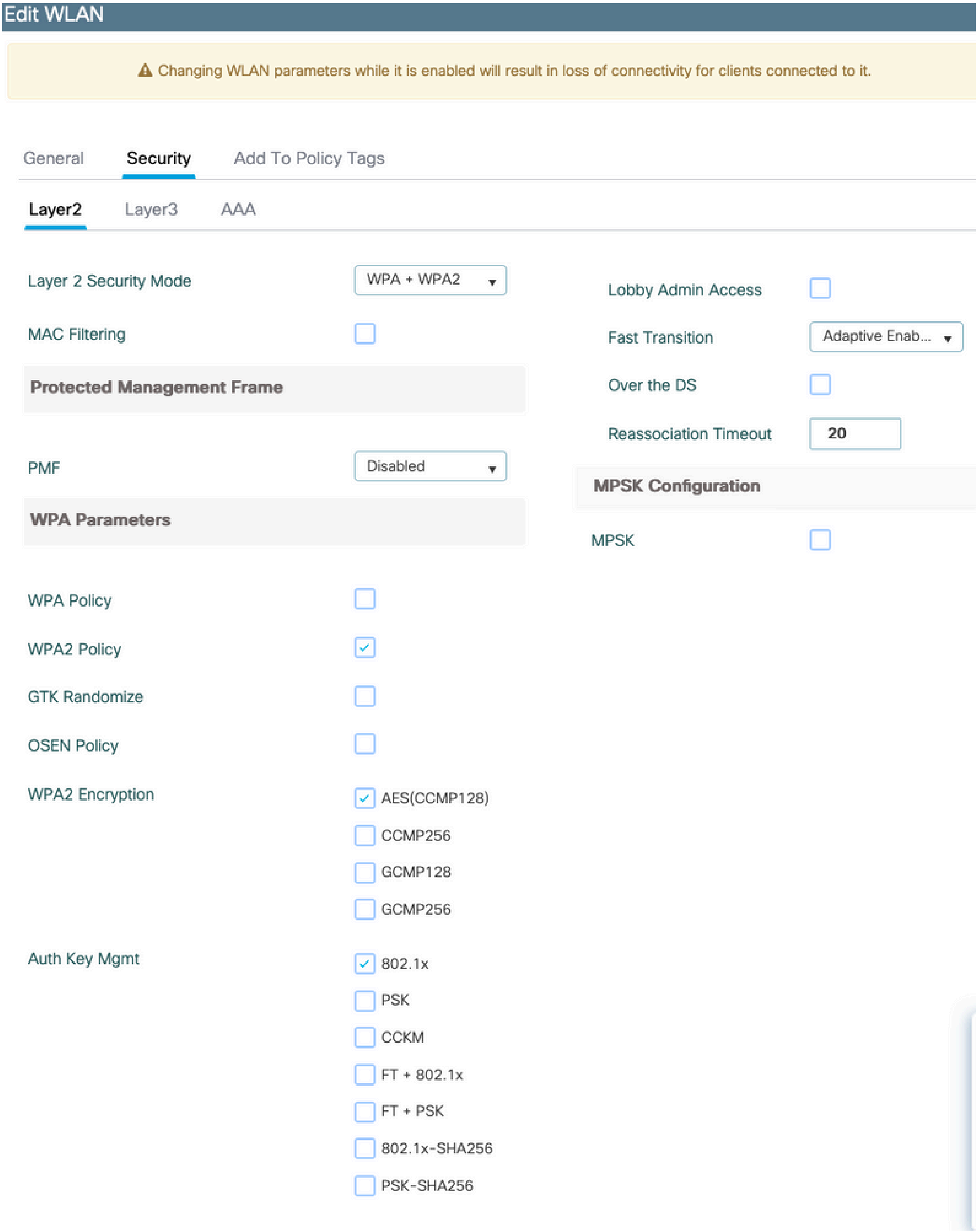
⚠ Please add the WLANs to Policy Tags for them to broadcast.

Profile Name*	LDAP	Radio Policy	All ▾
SSID*	LDAP	Broadcast SSID	ENABLED 🟩
WLAN ID*	1		
Status	ENABLED 🟩		

Move to the Layer 2 **security** tab.

Chose WPA+WPA2 as **Layer 2 security mode**.

Make sure WPA2 and AES are enabled in the **WPA Parameters** and enable **802.1X**.



Edit WLAN

⚠ Changing WLAN parameters while it is enabled will result in loss of connectivity for clients connected to it.

General | **Security** | Add To Policy Tags

Layer2 | Layer3 | AAA

Layer 2 Security Mode: WPA + WPA2

MAC Filtering: □

Protected Management Frame

PMF: Disabled

WPA Parameters

WPA Policy: □

WPA2 Policy: ☑

GTK Randomize: □

OSEN Policy: □

WPA2 Encryption: ☑ AES(CCMP128) □ CCMP256 □ GCMP128 □ GCMP256

Auth Key Mgmt: ☑ 802.1x □ PSK □ CCKM □ FT + 802.1x □ FT + PSK □ 802.1x-SHA256 □ PSK-SHA256

Lobby Admin Access: □

Fast Transition: Adaptive Enab...

Over the DS: □

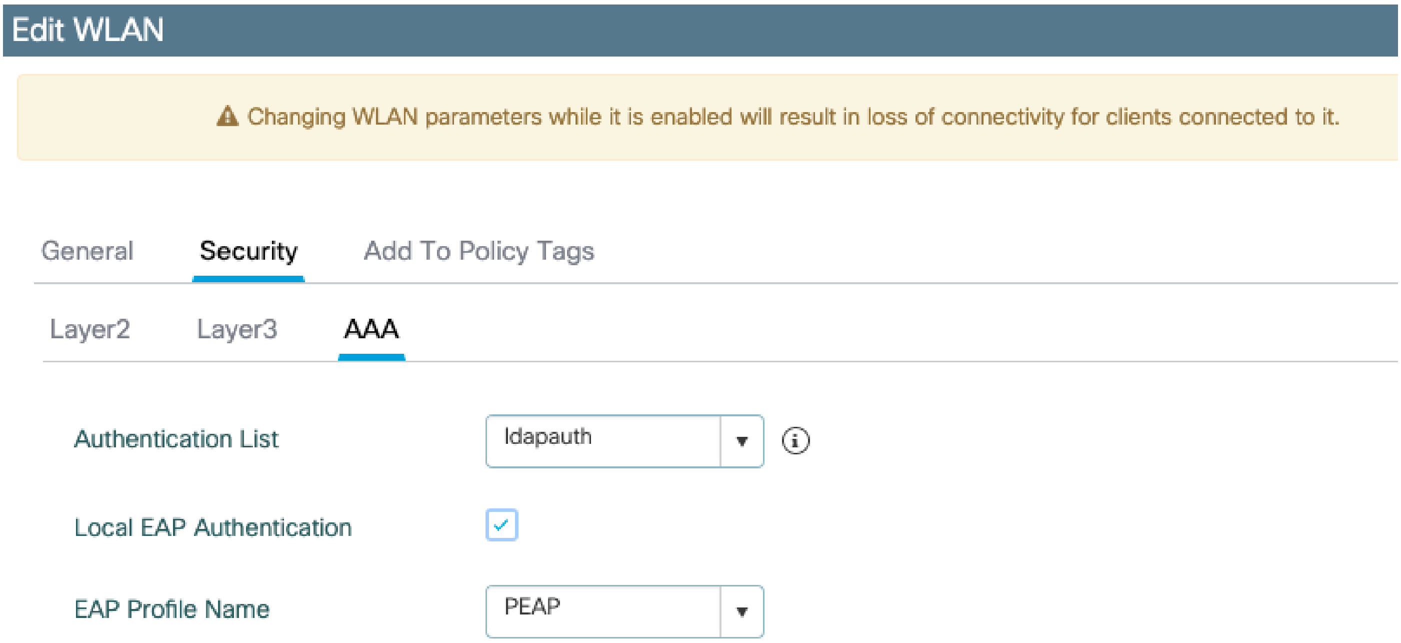
Reassociation Timeout: 20

MPSK Configuration

MPSK: □

Move to the **AAA** sub tab.

Pick the dot1x authentication method created earlier, enable Local EAP authentication and pick the EAP profile configured in the first step.


Edit WLAN

⚠ Changing WLAN parameters while it is enabled will result in loss of connectivity for clients connected to it.

Authentication List: ldapauth

Local EAP Authentication: ☑

EAP Profile Name: PEAP

Save by clicking **Apply**.

CLI commands:

```
wlan LDAP 1 LDAP
 local-auth PEAP
 security dot1x authentication-list ldapauth
 no shutdown
```

Step 8. Verify that the WLAN is broadcasted.

Navigate to **Configuration** > **Tags** and make sure the SSID is included in the policy profile currently service by the SSID (the default-policy-tag for a fresh new configuration if you have not configured tags yet). By default the default-policy-tag does not broadcast new SSIDs you create until you include them manually.

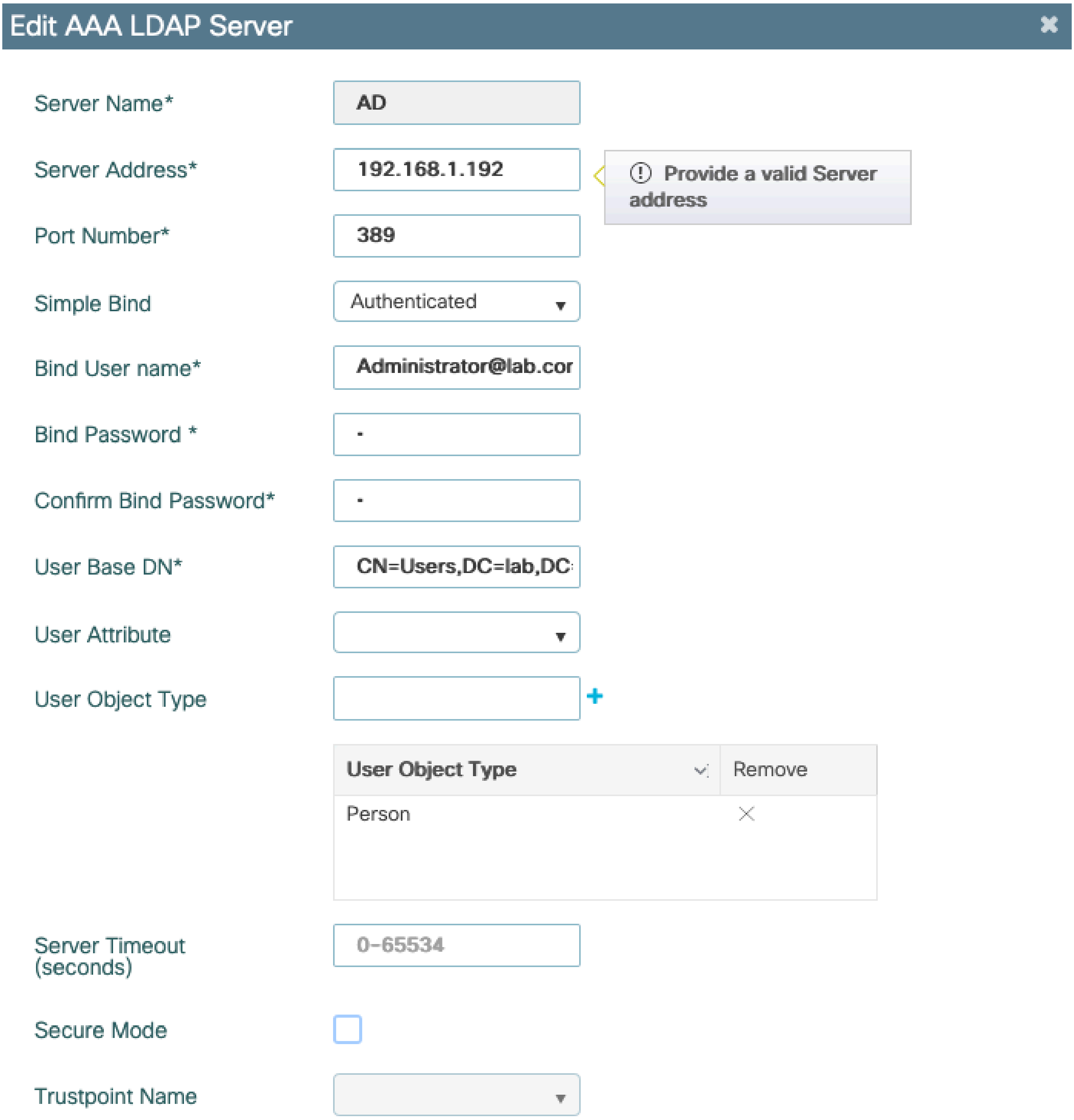
This article does not cover the configuration of policy profiles and assumes you are familiar with that part of the configuration.

If using Active Directory, you have to configure the AD server to send the attribute **userPassword**. This attribute needs to be sent to the WLC. This is because the WLC does the verification, not the AD server. You can also have issues authenticating with PEAP-mschapv2 method as the password is never sent in clear text and therefore cannot be checked with the LDAP database, only PEAP-GTC method would work with certain LDAP databases.

Understand LDAP server details

Understand fields on the 9800 web UI

Here is an example of a very basic Active Directory that acts as LDAP server configured on the 9800.



Edit AAA LDAP Server ✖

Server Name*	AD
Server Address*	192.168.1.192
Port Number*	389
Simple Bind	Authenticated ▾
Bind User name*	Administrator@lab.cor
Bind Password *	•
Confirm Bind Password*	•
User Base DN*	CN=Users,DC=lab,DC=
User Attribute	▾
User Object Type	+
Server Timeout (seconds)	0-65534
Secure Mode	□
Trustpoint Name	▾

ⓘ Provide a valid Server address

User Object Type	Remove
Person	×

Name and IP are hopefuilly self-explanatory.

Port: 389 is the default port for LDAP but your server can use another one.

Simple bind: It is very rare to have an LDAP database nowadays that supports unauthenticated bind (that means anyone can do an LDAP search on it without any authentication form). Authenticated simple bind is the most common type of authentication and what Active Directory allows by default. You can enter an administrator account name and password to be able to do search in the user database from there.

Bind Username: You need to point to a username with administrator privileges in Active Directory. AD tolerates the "user@domain" format for it while many other LDAP databases expect a "CN=xxx,DC=xxx" format for the username. An example with another LDAP database than AD is provided later in this article.

Bind password: Enter the password the admin username entered previously.

User Base DN: Enter here the search root, that is the location in your LDAP tree where searches start. In this example, all our uses are under the "Users" group, whose DN is "CN=Users,DC=lab,DC=com" (since the example LDAP domain is lab.com). An example of how to find out this User base DN is provided later in this section.

User attribute: This can be left empty, or point to an LDAP attribute-map that indicates which LDAP field counts as username for your LDAP database. However, due to Cisco bug ID CSCvv11813, the WLC attempts a authentication with the CN field no matter what.

User object type: This determines the type of objects that are considered as users. Typically this is Person. It could be Computers if you have an AD database and authenticates computer accounts, but there again LDAP provides for a lot of customization.

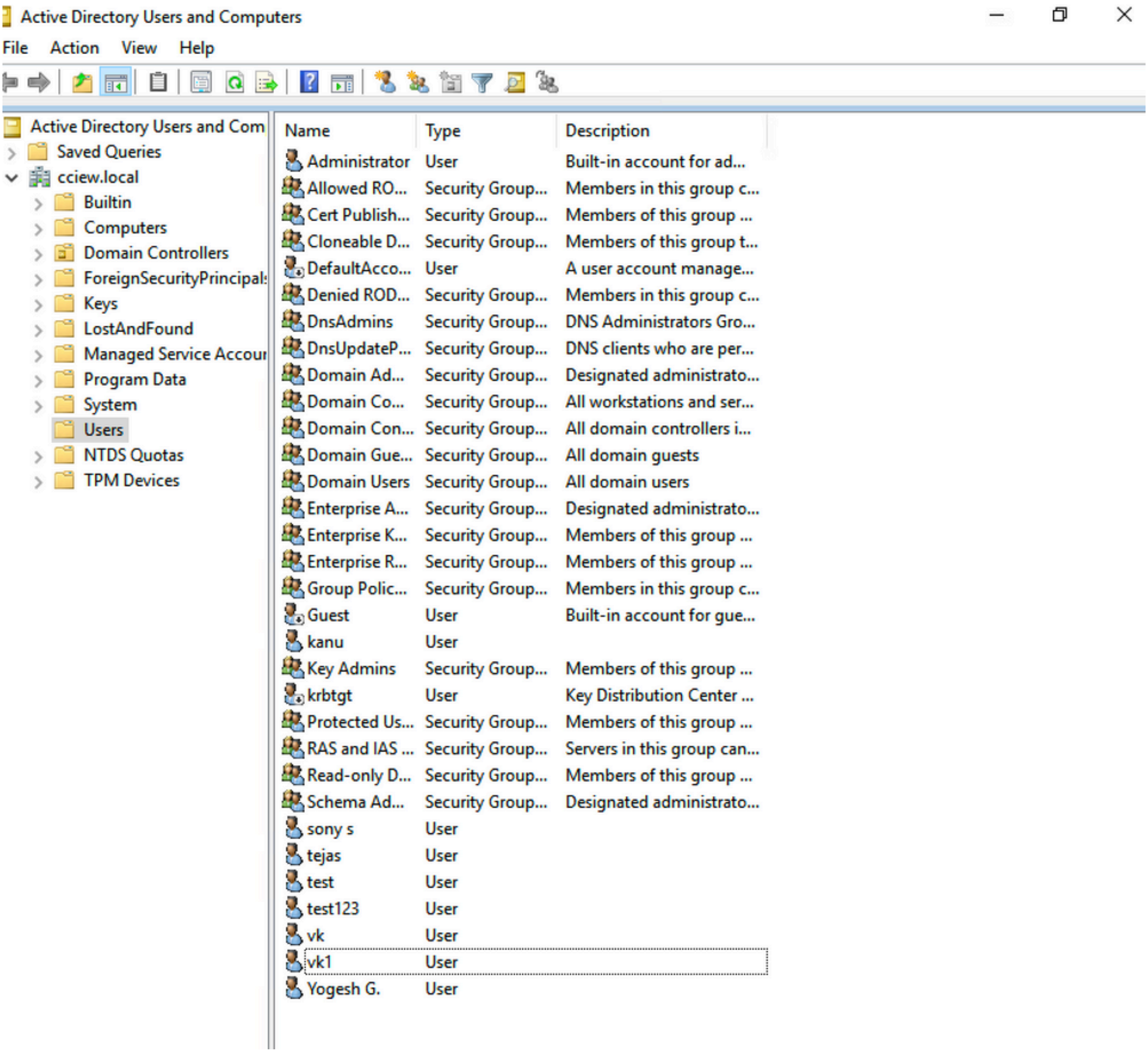
Secure mode enables Secure LDAP over TLS and requires you to select a Trustpoint on the 9800 to use a certificate for the TLS encryption.

LDAP 802.1x authentication with sAMAaccountName attribute.

This enhancement is introduced in 17.6.1 version.

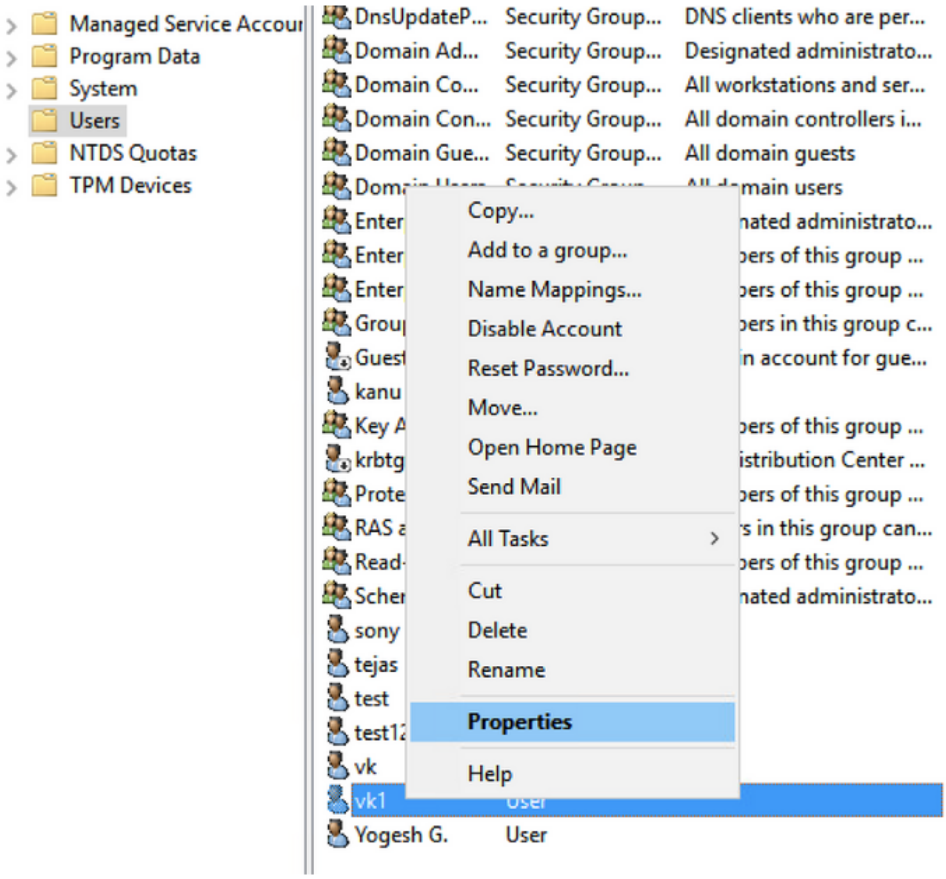
Configure userPassword attribute for the user.

Step 1. On the Windows server navigate to ActiveDirectory Users and Computers.

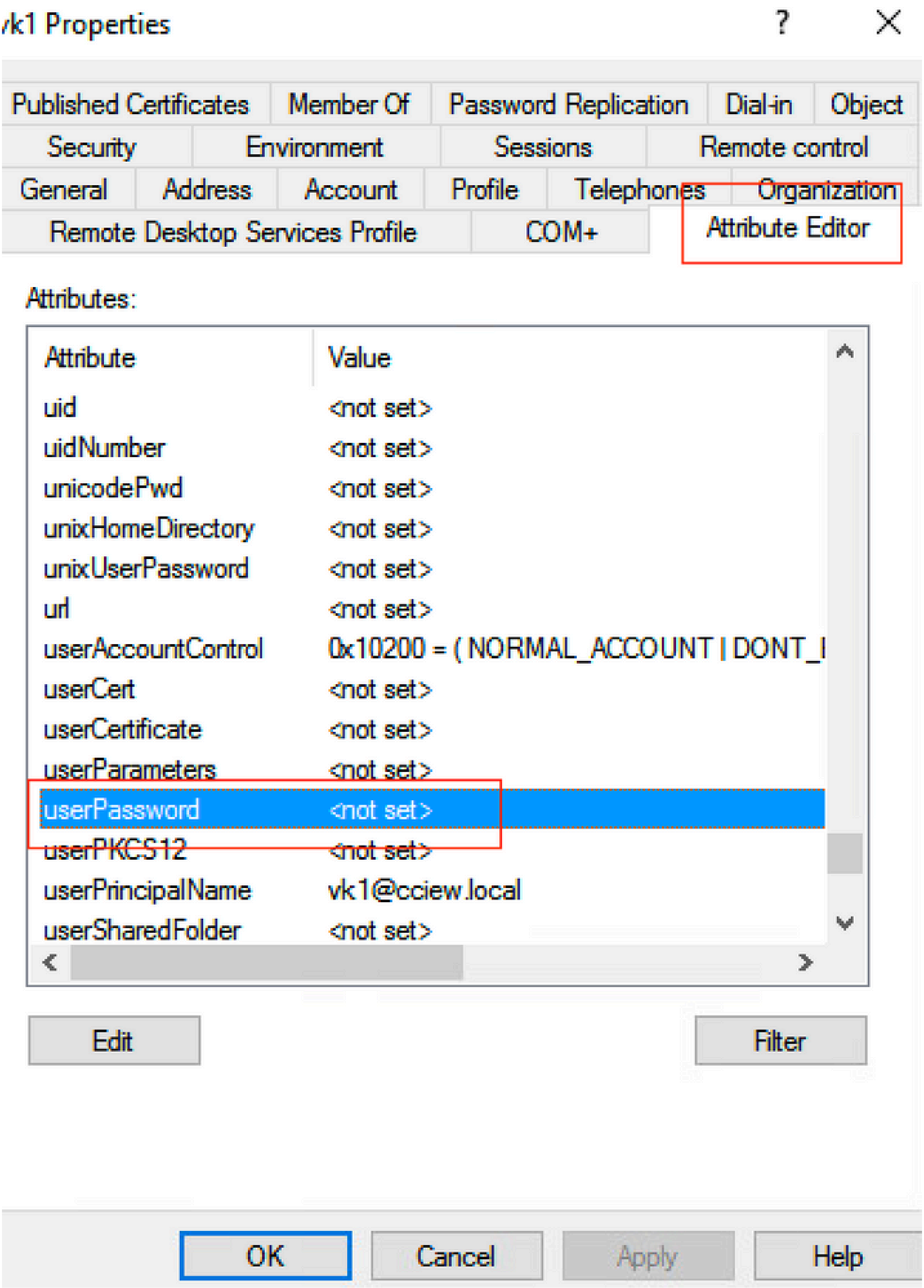


Name	Type	Description
Administrator	User	Built-in account for ad...
Allowed RO...	Security Group...	Members in this group c...
Cert Publish...	Security Group...	Members of this group ...
Cloneable D...	Security Group...	Members of this group t...
DefaultAcco...	User	A user account manage...
Denied ROD...	Security Group...	Members in this group c...
DnsAdmins	Security Group...	DNS Administrators Gro...
DnsUpdateP...	Security Group...	DNS clients who are per...
Domain Ad...	Security Group...	Designated administrato...
Domain Co...	Security Group...	All workstations and ser...
Domain Con...	Security Group...	All domain controllers i...
Domain Gue...	Security Group...	All domain guests
Domain Users	Security Group...	All domain users
Enterprise A...	Security Group...	Designated administrato...
Enterprise K...	Security Group...	Members of this group ...
Enterprise R...	Security Group...	Members of this group ...
Group Polic...	Security Group...	Members in this group c...
Guest	User	Built-in account for gue...
kanu	User	
Key Admins	Security Group...	Members of this group ...
krbtgt	User	Key Distribution Center ...
Protected Us...	Security Group...	Members of this group ...
RAS and IAS ...	Security Group...	Servers in this group can...
Read-only D...	Security Group...	Members of this group ...
Schema Ad...	Security Group...	Designated administrato...
sony s	User	
tejas	User	
test	User	
test123	User	
vk	User	
vk1	User	
Yogesh G.	User	

Step 2. Right click on the respective username and select properties.

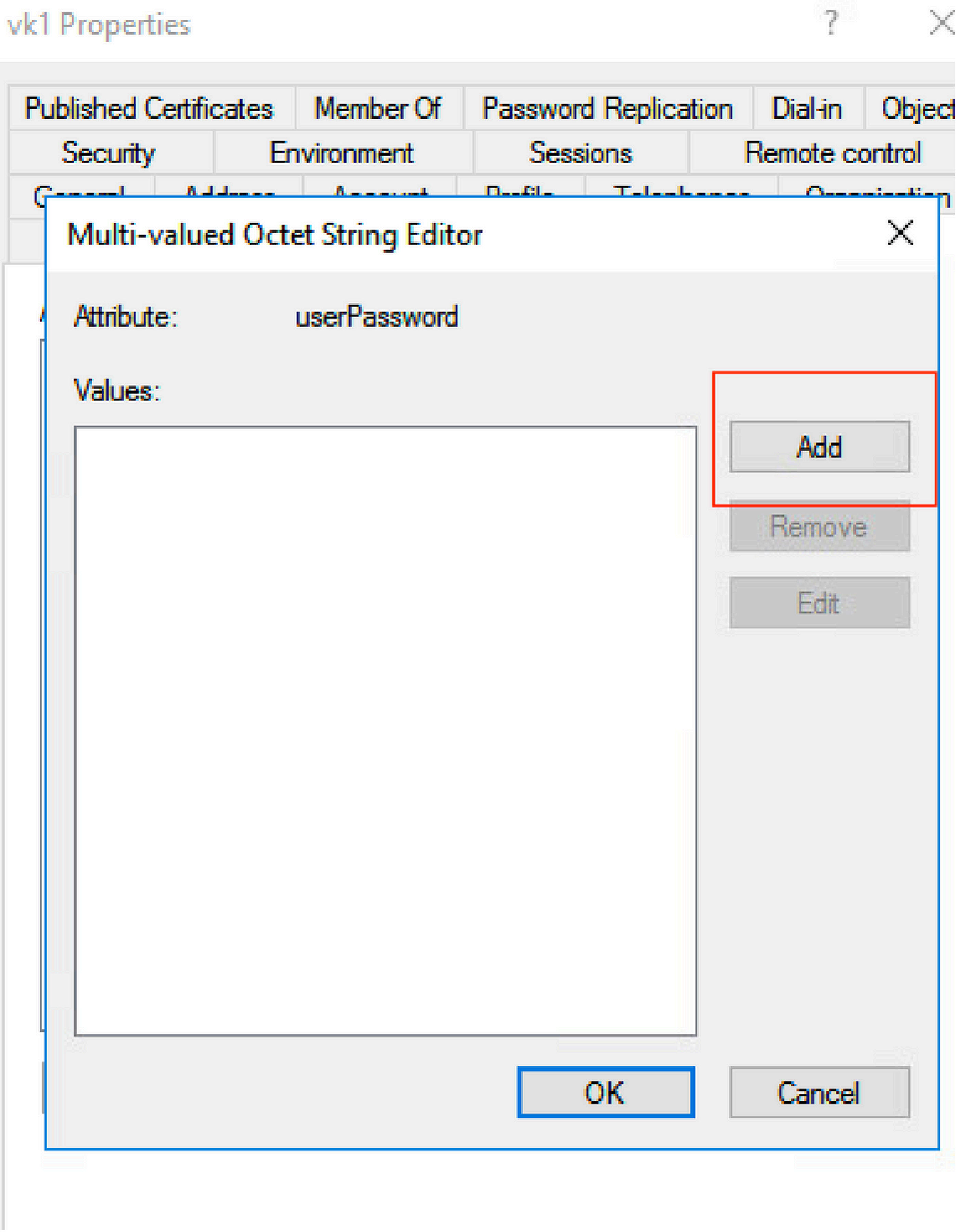


Step 3. Select attribute editor in the properties window.

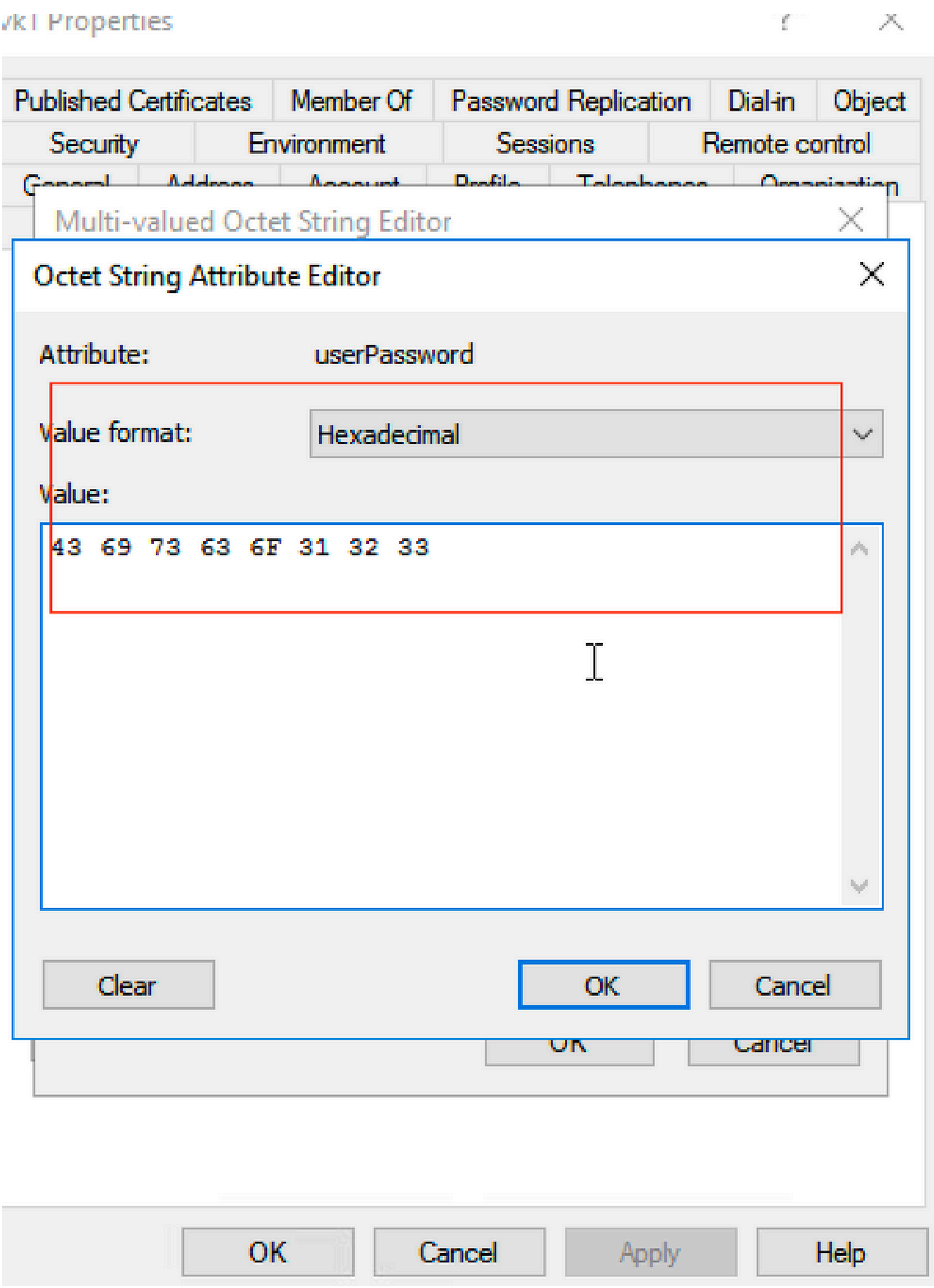


Attribute	Value
uid	<not set>
uidNumber	<not set>
unicodePwd	<not set>
unixHomeDirectory	<not set>
unixUserPassword	<not set>
url	<not set>
userAccountControl	0x10200 = (NORMAL_ACCOUNT | DONT_I
userCert	<not set>
userCertificate	<not set>
userParameters	<not set>
userPassword	<not set>
userPKCS12	<not set>
userPrincipalName	vk1@cciew.local
userSharedFolder	<not set>

Step 4. Configure userPassword attribute. This is the password for the user, which needs to be configured in Hex value.



Attribute: userPassword



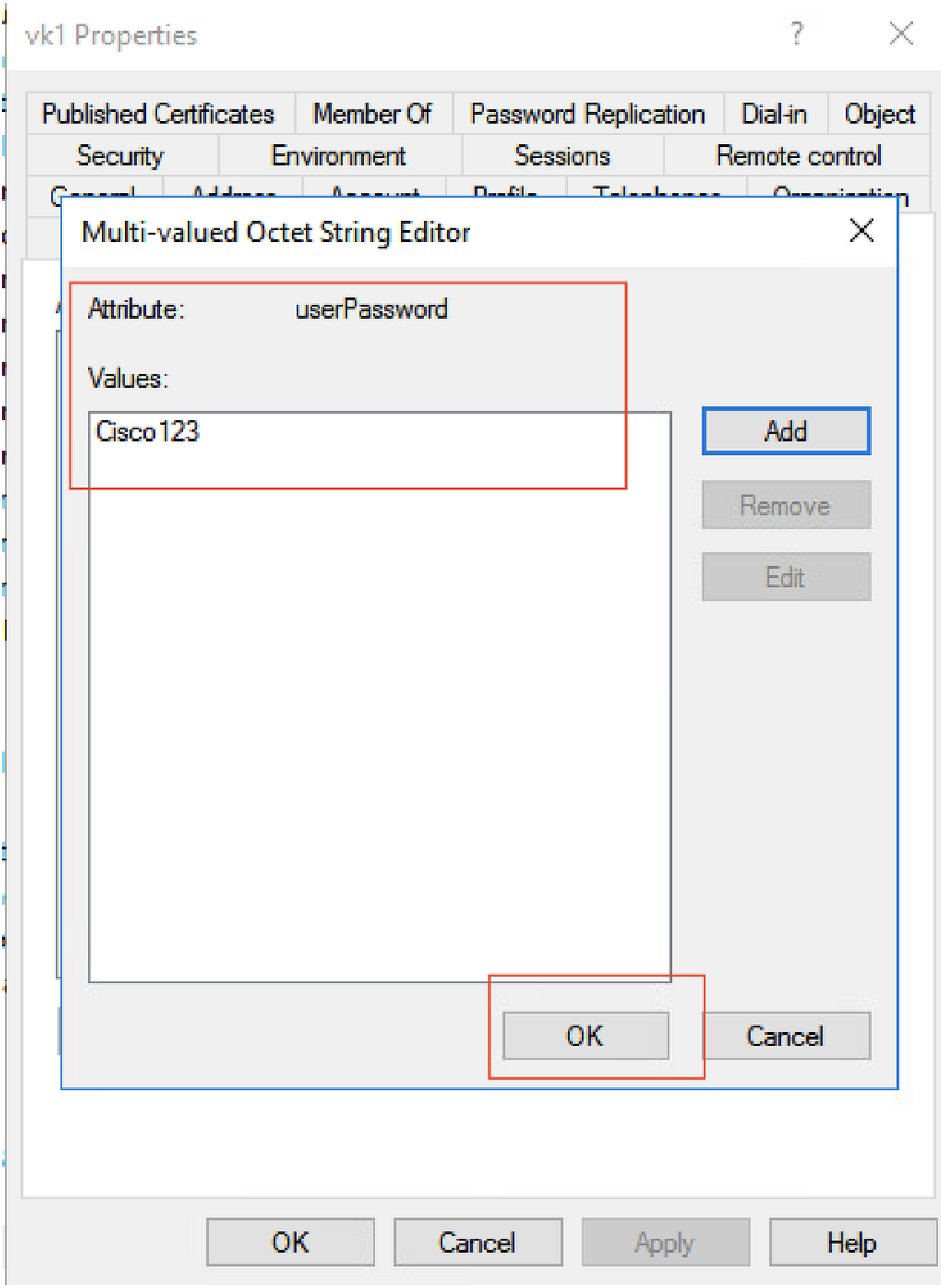
Attribute: userPassword

Value format: Hexadecimal

Value:

```
43 69 73 63 6F 31 32 33
```

Click ok, verify if it shows the correct password

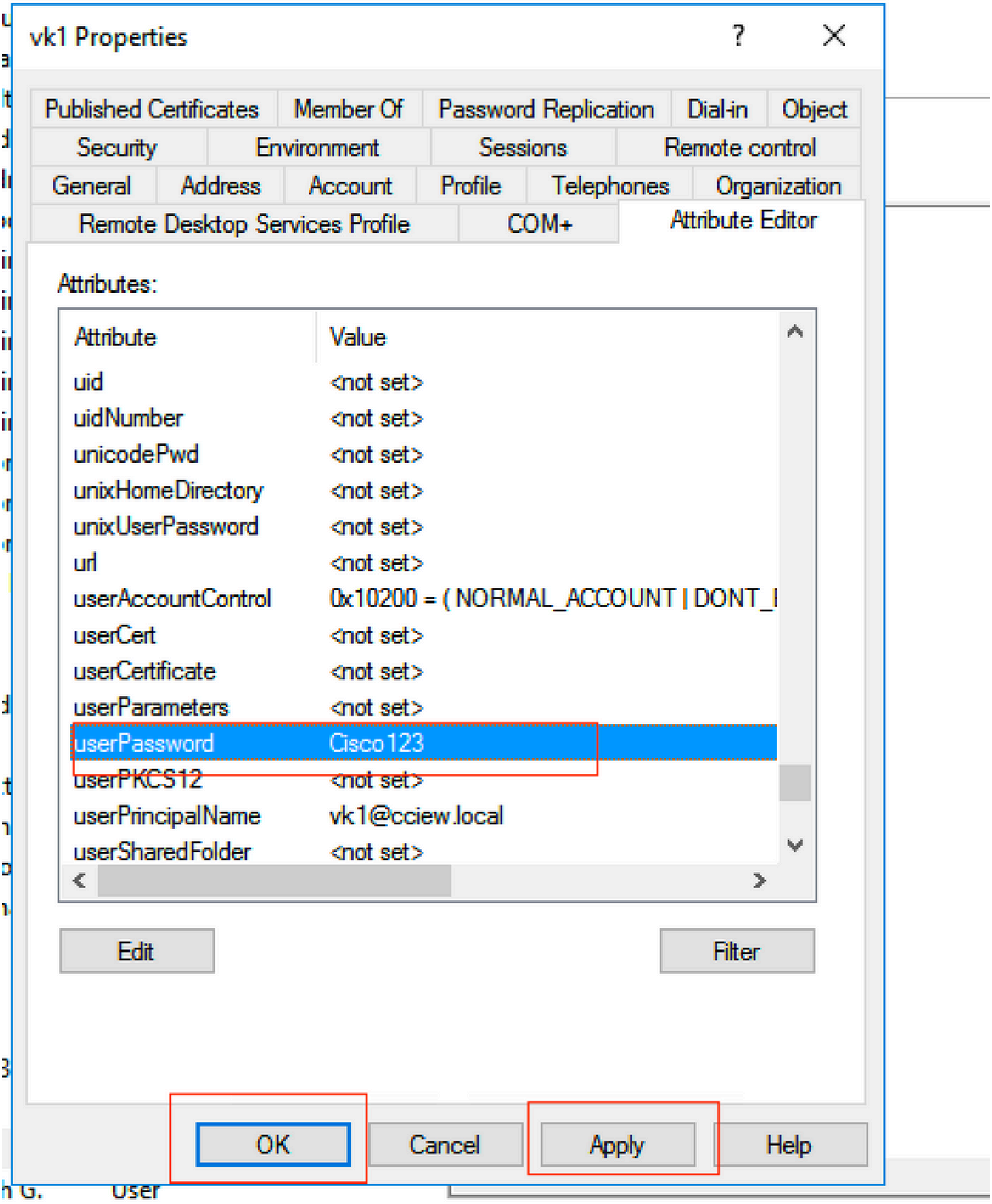


Attribute: userPassword

Values:

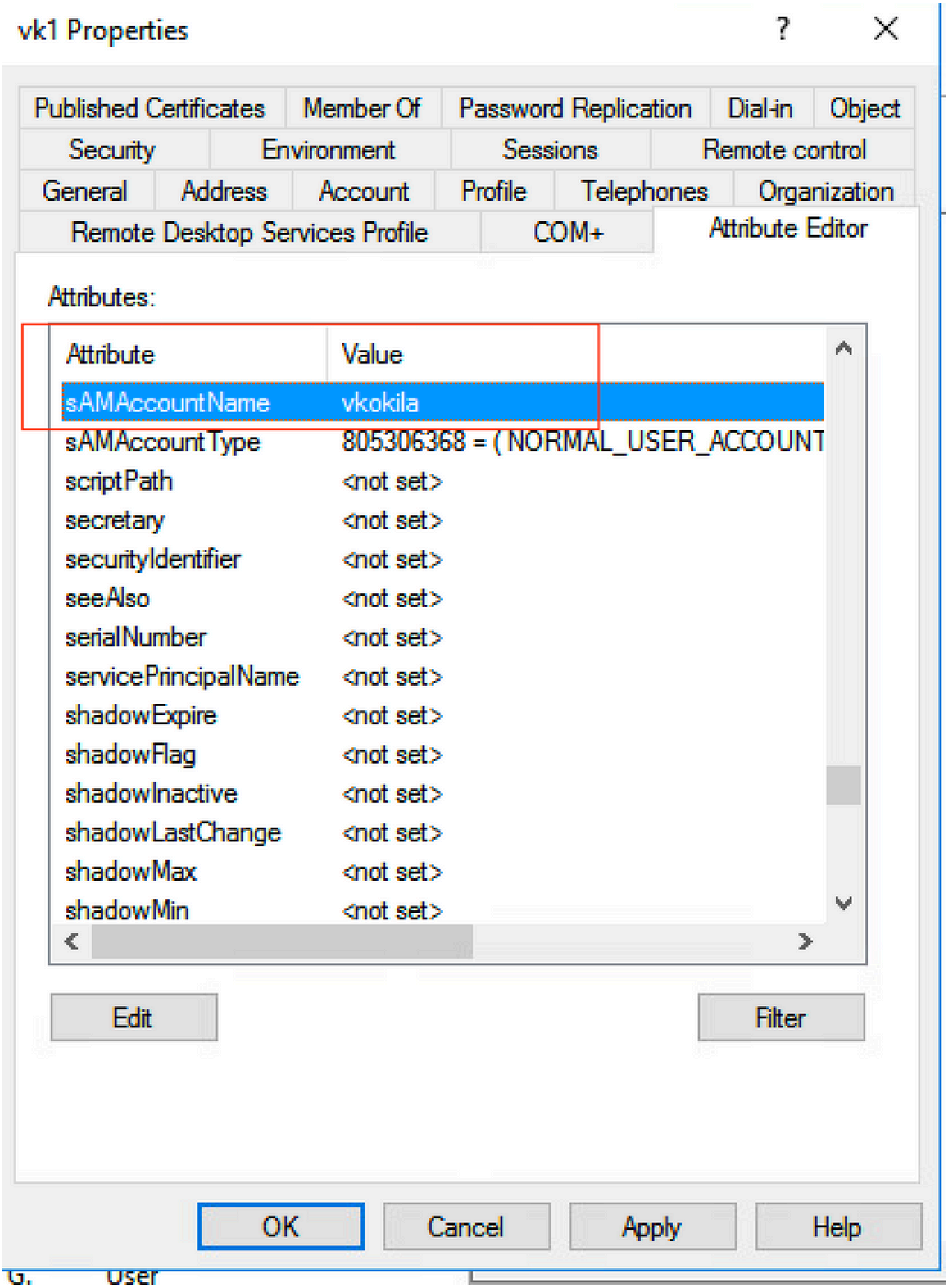
Cisco123

Step 5. Click Apply and then OK.



Attribute	Value
uid	<not set>
uidNumber	<not set>
unicodePwd	<not set>
unixHomeDirectory	<not set>
unixUserPassword	<not set>
url	<not set>
userAccountControl	0x10200 = (NORMAL_ACCOUNT | DONT_I
userCert	<not set>
userCertificate	<not set>
userParameters	<not set>
userPassword	Cisco123
userPKCS12	<not set>
userPrincipalName	vk1@cciew.local
userSharedFolder	<not set>

Step 6. Verify the sAMAccountName attribute value for the user and it would the username for authentication.



vk1 Properties

Attributes:

Attribute	Value
sAMAccountName	vkokila
sAMAccountType	805306368 = (NORMAL_USER_ACCOUNT
scriptPath	<not set>
secretary	<not set>
securityIdentifier	<not set>
seeAlso	<not set>
serialNumber	<not set>
servicePrincipalName	<not set>
shadowExpire	<not set>
shadowFlag	<not set>
shadowInactive	<not set>
shadowLastChange	<not set>
shadowMax	<not set>
shadowMin	<not set>

WLC Configuration

Step 1. Create LDAP attribute MAP.

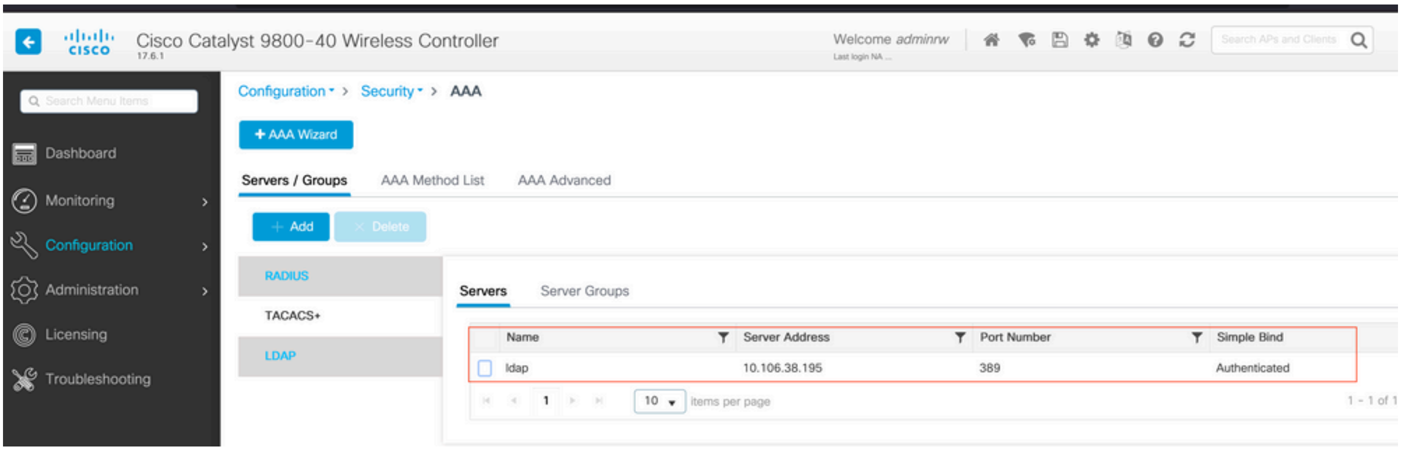
Step 2. Configure sAMAccountName attribute and type as username.

Step 3. Choose the created attribute MAP under the LDAP server configuration.

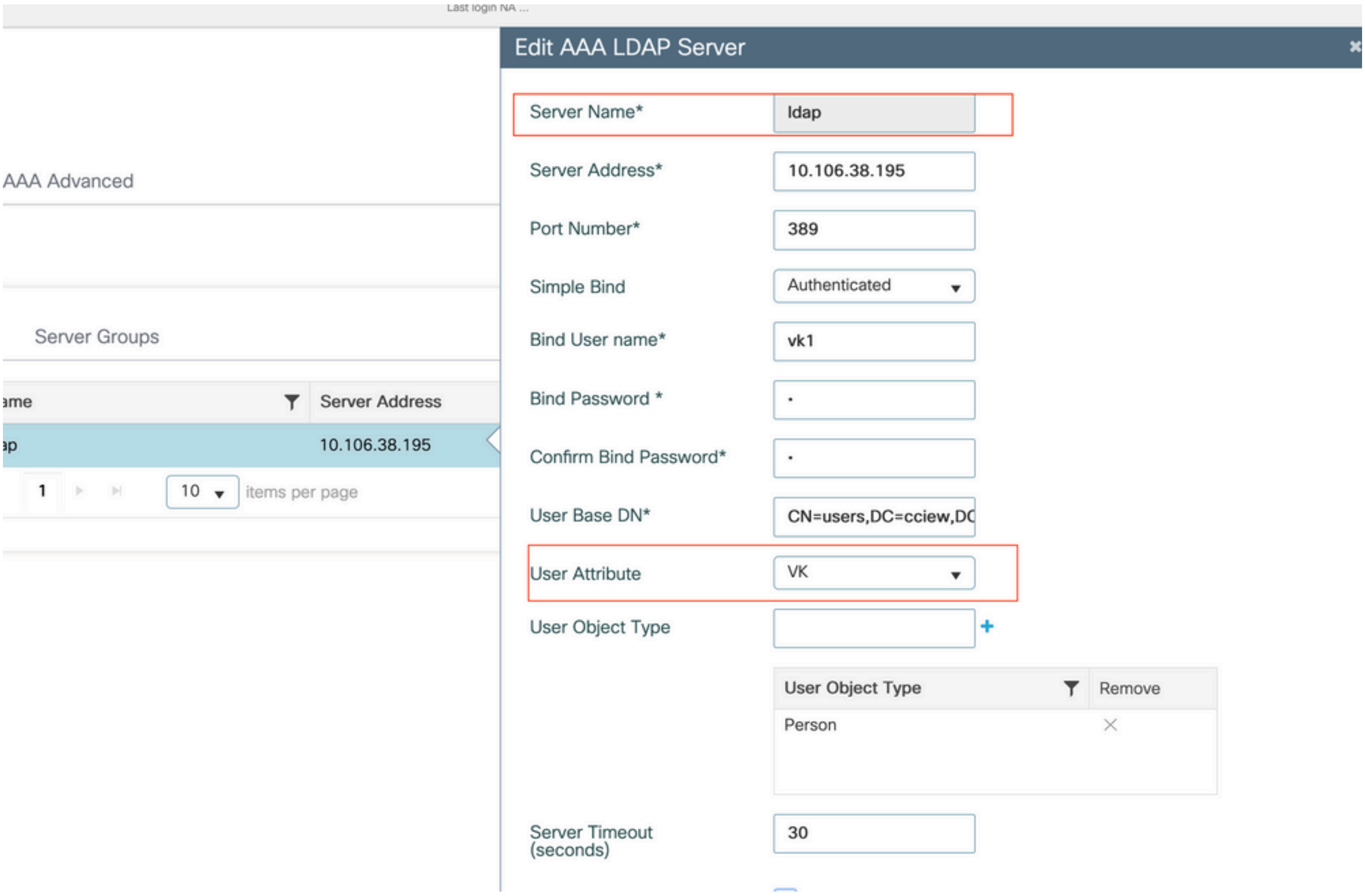
```
ldap attribute-map VK

 map type sAMAccountName username
```

```
ldap server ldap

 ipv4 10.106.38.195

 attribute map VK

 bind authenticate root-dn vk1 password 7 00271A1507545A545C

 base-dn CN=users,DC=cciew,DC=local

 search-filter user-object-type Person
```

Verify from Web Interface



	Name	Server Address	Port Number	Simple Bind
□	ldap	10.106.38.195	389	Authenticated



Edit AAA LDAP Server

Server Name* ldap

Server Address* 10.106.38.195

Port Number* 389

Simple Bind Authenticated

Bind User name* vk1

Bind Password * ·

Confirm Bind Password* ·

User Base DN* CN=users,DC=cciew,DC

User Attribute VK

User Object Type

User Object Type	Remove
Person	×

Server Timeout (seconds) 30

Verify

To verify your configuration, double check the CLI commands with the ones from this article.

LDAP databases typically do not provide authentication logs so it can be hard to know what is going on. Visit the Troubleshoot section of this article to see how to take traces and sniffer capture in order to see if a connection is established to the LDAP database or not.

Troubleshoot

To troubleshoot this, it is best to split this into two parts. The first part is validating the Local EAP portion. The second is validating that the 9800 is communicating with the LDAP server properly.

How to verify the authentication process on the controller

You can collect a Radioactive trace in order to get the debugs of the client connection.

Simply go to **Troubleshooting** > **Radioactive Trace**. Add the client MAC address (pay attention that your client can be using a random MAC and not its own MAC, you can verify this in the SSID profile on the client device itself) and hit start.

Once you reproduced the connection attempt, you can click on Generate and obtain the logs for the last X minutes. Make sure to click **internal** as some LDAP log lines do not appear if you do **notenable** it.

Here is an example of radioactive trace of a client successfully authenticating on a web authentication SSID. Some redundant parts were removed for clarity :

```
2021/01/19 21:57:55.890953 {wncd_x_R0-0}{1}: [client-orch-sm] [9347]: (note): MAC: 2e1f.3a65.9c09  Assoc
2021/01/19 21:57:55.891049 {wncd_x_R0-0}{1}: [client-orch-sm] [9347]: (debug): MAC: 2e1f.3a65.9c09  Rece
2021/01/19 21:57:55.891282 {wncd_x_R0-0}{1}: [client-orch-state] [9347]: (note): MAC: 2e1f.3a65.9c09  Cl
2021/01/19 21:57:55.891674 {wncd_x_R0-0}{1}: [dot11-validate] [9347]: (info): MAC: 2e1f.3a65.9c09  WiFi
2021/01/19 21:57:55.892114 {wncd_x_R0-0}{1}: [dot11] [9347]: (debug): MAC: 2e1f.3a65.9c09  dot11 send a
2021/01/19 21:57:55.892182 {wncd_x_R0-0}{1}: [dot11-frame] [9347]: (info): MAC: 2e1f.3a65.9c09  WiFi di
2021/01/19 21:57:55.892248 {wncd_x_R0-0}{1}: [dot11] [9347]: (info): MAC: 2e1f.3a65.9c09  dot11 send as
2021/01/19 21:57:55.892467 {wncd_x_R0-0}{1}: [dot11] [9347]: (note): MAC: 2e1f.3a65.9c09  Association su
2021/01/19 21:57:55.892497 {wncd_x_R0-0}{1}: [dot11] [9347]: (info): MAC: 2e1f.3a65.9c09  DOT11 state t
2021/01/19 21:57:55.892616 {wncd_x_R0-0}{1}: [client-orch-sm] [9347]: (debug): MAC: 2e1f.3a65.9c09  Stat
2021/01/19 21:57:55.892730 {wncd_x_R0-0}{1}: [client-orch-sm] [9347]: (debug): MAC: 2e1f.3a65.9c09  Sta
2021/01/19 21:57:55.892783 {wncd_x_R0-0}{1}: [client-orch-state] [9347]: (note): MAC: 2e1f.3a65.9c09  Cl
2021/01/19 21:57:55.892896 {wncd_x_R0-0}{1}: [client-auth] [9347]: (note): MAC: 2e1f.3a65.9c09  L2 Authe
2021/01/19 21:57:55.893115 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:57:55.893154 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:57:55.893205 {wncd_x_R0-0}{1}: [auth-mgr-feat_wireless] [9347]: (info): [2e1f.3a65.9c09:ca
2021/01/19 21:57:55.893211 {wncd_x_R0-0}{1}: [auth-mgr-feat_wireless] [9347]: (info): [2e1f.3a65.9c09:ca
2021/01/19 21:57:55.893254 {wncd_x_R0-0}{1}: [client-auth] [9347]: (info): MAC: 2e1f.3a65.9c09  Client a
2021/01/19 21:57:55.893461 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:unknown] auth me
2021/01/19 21:57:55.893532 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:57:55.893603 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:57:55.893649 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:57:55.893679 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:57:55.893731 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:57:55.894285 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:57:55.894299 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:57:55.894551 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:57:55.894587 {wncd_x_R0-0}{1}: [auth-mgr-feat_template] [9347]: (info): [2e1f.3a65.9c09:ca
2021/01/19 21:57:55.894593 {wncd_x_R0-0}{1}: [auth-mgr-feat_template] [9347]: (info): [0000.0000.0000:ca
2021/01/19 21:57:55.894827 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:57:55.894858 {wncd_x_R0-0}{1}: [auth-mgr-feat_template] [9347]: (info): [2e1f.3a65.9c09:ca
2021/01/19 21:57:55.894862 {wncd_x_R0-0}{1}: [auth-mgr-feat_template] [9347]: (info): [0000.0000.0000:ca
2021/01/19 21:57:55.895918 {wncd_x_R0-0}{1}: [auth-mgr-feat_wireless] [9347]: (info): [0000.0000.0000:un
2021/01/19 21:57:55.896094 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:57:55.896807 {wncd_x_R0-0}{1}: [webauth-sm] [9347]: (info): [        0.0.0.0]Starting Weba
2021/01/19 21:57:55.897106 {wncd_x_R0-0}{1}: [webauth-acl] [9347]: (info): capwap_90000004[2e1f.3a65.9c0
2021/01/19 21:57:55.897790 {wncd_x_R0-0}{1}: [epm-redirect] [9347]: (info): [0000.0000.0000:unknown] UR
2021/01/19 21:57:55.898813 {wncd_x_R0-0}{1}: [webauth-acl] [9347]: (info): capwap_90000004[2e1f.3a65.9c0
2021/01/19 21:57:55.899406 {wncd_x_R0-0}{1}: [epm-redirect] [9347]: (info): [0000.0000.0000:unknown] UR
2021/01/19 21:57:55.903552 {wncd_x_R0-0}{1}: [client-auth] [9347]: (info): MAC: 2e1f.3a65.9c09  Client a
2021/01/19 21:57:55.903575 {wncd_x_R0-0}{1}: [ewlc-infra-evq] [9347]: (note): Authentication Success. Re
2021/01/19 21:57:55.903592 {wncd_x_R0-0}{1}: [client-auth] [9347]: (info): MAC: 2e1f.3a65.9c09  Client a
2021/01/19 21:57:55.903709 {wncd_x_R0-0}{1}: [client-auth] [9347]: (info): MAC: 2e1f.3a65.9c09  Client a
2021/01/19 21:57:55.903774 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:57:55.903858 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:57:55.903924 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:57:55.904005 {wncd_x_R0-0}{1}: [client-orch-sm] [9347]: (debug): MAC: 2e1f.3a65.9c09  L2 A
2021/01/19 21:57:55.904173 {wncd_x_R0-0}{1}: [client-orch-sm] [9347]: (note): MAC: 2e1f.3a65.9c09  Mobil
2021/01/19 21:57:55.904181 {wncd_x_R0-0}{1}: [client-orch-state] [9347]: (note): MAC: 2e1f.3a65.9c09  Cl
2021/01/19 21:57:55.904245 {wncd_x_R0-0}{1}: [mm-transition] [9347]: (info): MAC: 2e1f.3a65.9c09  MMIF
2021/01/19 21:57:55.904410 {wncd_x_R0-0}{1}: [mm-client] [9347]: (info): MAC: 2e1f.3a65.9c09  Invalid t
2021/01/19 21:57:55.904777 {wncd_x_R0-0}{1}: [mm-client] [9347]: (debug): MAC: 2e1f.3a65.9c09  Received
2021/01/19 21:57:55.904955 {wncd_x_R0-0}{1}: [mm-client] [9347]: (debug): MAC: 2e1f.3a65.9c09  Add MCC
2021/01/19 21:57:55.905072 {wncd_x_R0-0}{1}: [mm-client] [9347]: (debug): MAC: 0000.0000.0000  Sending
2021/01/19 21:57:55.905157 {wncd_x_R0-0}{1}: [mm-client] [9347]: (debug): MAC: 2e1f.3a65.9c09  Received
2021/01/19 21:57:55.905267 {wncd_x_R0-0}{1}: [mm-transition] [9347]: (info): MAC: 2e1f.3a65.9c09  MMIF
2021/01/19 21:57:55.905283 {wncd_x_R0-0}{1}: [mm-client] [9347]: (info): MAC: 2e1f.3a65.9c09  Roam type
2021/01/19 21:57:55.905317 {wncd_x_R0-0}{1}: [mm-client] [9347]: (info): MAC: 2e1f.3a65.9c09  Mobility
2021/01/19 21:57:55.905515 {wncd_x_R0-0}{1}: [mm-client] [9347]: (note): MAC: 2e1f.3a65.9c09  Mobility
2021/01/19 21:57:55.905570 {wncd_x_R0-0}{1}: [client-orch-sm] [9347]: (debug): MAC: 2e1f.3a65.9c09  Proc
2021/01/19 21:57:55.906210 {wncd_x_R0-0}{1}: [ewlc-qos-client] [9347]: (info): MAC: 2e1f.3a65.9c09  Cli
2021/01/19 21:57:55.906369 {wncd_x_R0-0}{1}: [ewlc-qos-client] [9347]: (info): MAC: 2e1f.3a65.9c09  No
```

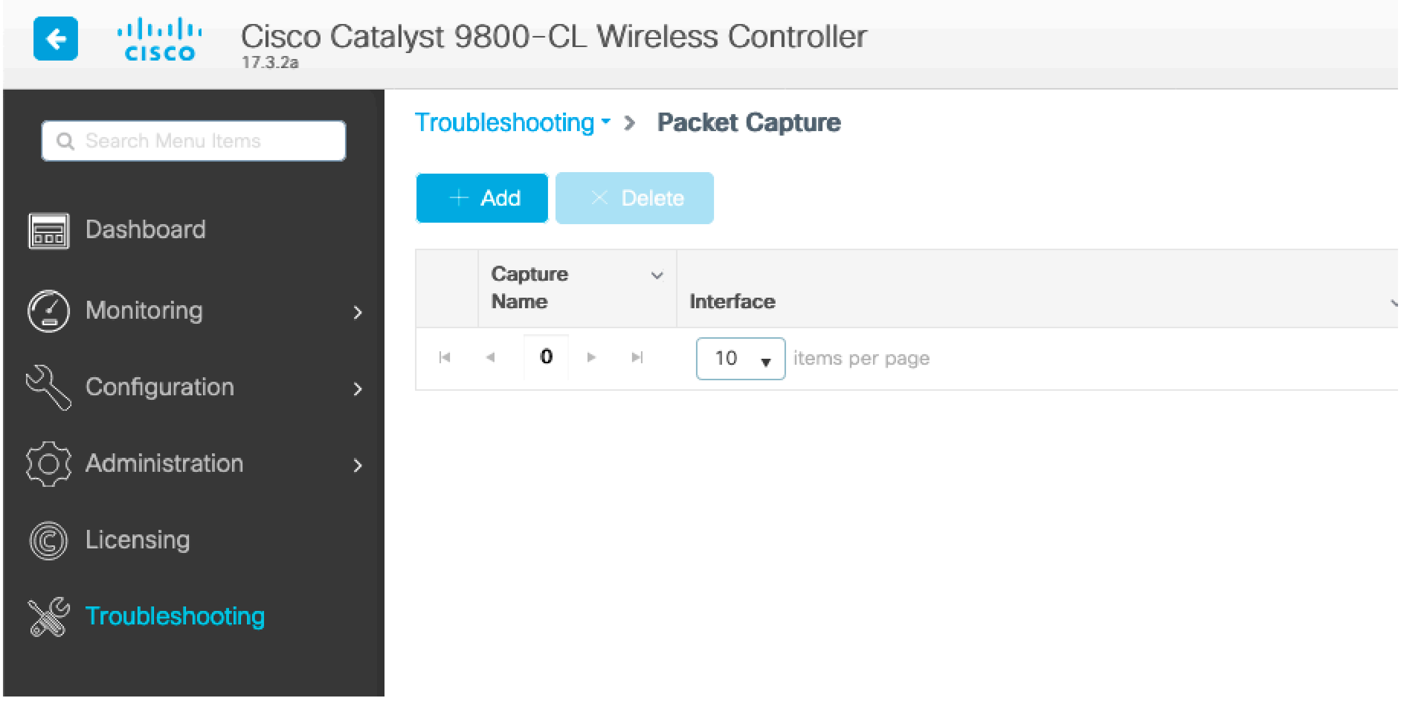
```
2021/01/19 21:57:55.906399 {wncd_x_R0-0}{1}: [ewlc-qos-client] [9347]: (info): MAC: 2e1f.3a65.9c09  No
2021/01/19 21:57:55.906486 {wncd_x_R0-0}{1}: [client-auth] [9347]: (note): MAC: 2e1f.3a65.9c09  ADD MOBI
2021/01/19 21:57:55.906613 {wncd_x_R0-0}{1}: [client-orch-state] [9347]: (note): MAC: 2e1f.3a65.9c09  Cl
2021/01/19 21:57:55.907326 {wncd_x_R0-0}{1}: [dot11] [9347]: (note): MAC: 2e1f.3a65.9c09  Client datapat
2021/01/19 21:57:55.907544 {wncd_x_R0-0}{1}: [ewlc-qos-client] [9347]: (info): MAC: 2e1f.3a65.9c09  Cli
2021/01/19 21:57:55.907594 {wncd_x_R0-0}{1}: [avc-afc] [9347]: (debug): AVC enabled for client 2e1f.3a6
2021/01/19 21:57:55.907701 {wncd_x_R0-0}{1}: [dpath_svc] [9347]: (note): MAC: 2e1f.3a65.9c09  Client da
2021/01/19 21:57:55.908229 {wncd_x_R0-0}{1}: [client-orch-state] [9347]: (note): MAC: 2e1f.3a65.9c09  Cl
2021/01/19 21:57:55.908704 {wncd_x_R0-0}{1}: [client-iplearn] [9347]: (info): MAC: 2e1f.3a65.9c09  IP-l
2021/01/19 21:57:55.918694 {wncd_x_R0-0}{1}: [client-auth] [9347]: (info): MAC: 2e1f.3a65.9c09  Client
2021/01/19 21:57:55.922254 {wncd_x_R0-0}{1}: [dot11k] [9347]: (info): MAC: 2e1f.3a65.9c09  Neighbor AP
2021/01/19 21:57:55.922260 {wncd_x_R0-0}{1}: [dot11k] [9347]: (info): MAC: 2e1f.3a65.9c09  Neighbor AP
2021/01/19 21:57:55.962883 {wncd_x_R0-0}{1}: [client-iplearn] [9347]: (note): MAC: 2e1f.3a65.9c09  Clie
2021/01/19 21:57:55.963827 {wncd_x_R0-0}{1}: [client-iplearn] [9347]: (info): MAC: 2e1f.3a65.9c09  Clie
2021/01/19 21:57:55.964481 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004
2021/01/19 21:57:55.965176 {wncd_x_R0-0}{1}: [client-iplearn] [9347]: (info): MAC: 2e1f.3a65.9c09  IP-l
2021/01/19 21:57:55.965550 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004
2021/01/19 21:57:55.966127 {wncd_x_R0-0}{1}: [client-iplearn] [9347]: (info): MAC: 2e1f.3a65.9c09  IP-l
2021/01/19 21:57:55.966328 {wncd_x_R0-0}{1}: [client-orch-sm] [9347]: (debug): MAC: 2e1f.3a65.9c09  Rec
2021/01/19 21:57:55.966413 {wncd_x_R0-0}{1}: [client-orch-sm] [9347]: (debug): MAC: 2e1f.3a65.9c09  Tri
2021/01/19 21:57:55.966424 {wncd_x_R0-0}{1}: [client-orch-state] [9347]: (note): MAC: 2e1f.3a65.9c09  Cl
2021/01/19 21:57:55.967404 {wncd_x_R0-0}{1}: [client-auth] [9347]: (note): MAC: 2e1f.3a65.9c09  L3 Auth
2021/01/19 21:57:55.967433 {wncd_x_R0-0}{1}: [client-auth] [9347]: (info): MAC: 2e1f.3a65.9c09  Client
2021/01/19 21:57:55.968312 {wncd_x_R0-0}{1}: [sisf-packet] [9347]: (debug): RX: ARP from interface capwa
2021/01/19 21:57:55.968519 {wncd_x_R0-0}{1}: [client-iplearn] [9347]: (info): MAC: 2e1f.3a65.9c09  iple
2021/01/19 21:57:55.968522 {wncd_x_R0-0}{1}: [client-iplearn] [9347]: (info): MAC: 2e1f.3a65.9c09  Clie
2021/01/19 21:57:55.968966 {wncd_x_R0-0}{1}: [client-iplearn] [9347]: (info): MAC: 2e1f.3a65.9c09  IP-l
2021/01/19 21:57:57.762648 {wncd_x_R0-0}{1}: [client-iplearn] [9347]: (info): MAC: 2e1f.3a65.9c09  iple
2021/01/19 21:57:57.762650 {wncd_x_R0-0}{1}: [client-iplearn] [9347]: (info): MAC: 2e1f.3a65.9c09  Clie
2021/01/19 21:57:57.763032 {wncd_x_R0-0}{1}: [client-iplearn] [9347]: (info): MAC: 2e1f.3a65.9c09  IP-l
2021/01/19 21:58:00.992597 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:00.992617 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:00.992669 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:00.992694 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:00.993558 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004
2021/01/19 21:58:00.993637 {wncd_x_R0-0}{1}: [auth-mgr-feat_template] [9347]: (info): [2e1f.3a65.9c09:c
2021/01/19 21:58:00.993645 {wncd_x_R0-0}{1}: [auth-mgr-feat_template] [9347]: (info): [0000.0000.0000:c
2021/01/19 21:58:00.996320 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004
2021/01/19 21:58:00.996508 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004
2021/01/19 21:58:00.996524 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004
2021/01/19 21:58:05.808144 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:05.808226 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:05.808251 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:05.860465 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:05.860483 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:05.860534 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:05.860559 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:06.628209 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:06.628228 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:06.628287 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:06.628316 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:06.628832 {wncd_x_R0-0}{1}: [webauth-page] [9347]: (info): capwap_90000004[2e1f.3a65.9
2021/01/19 21:58:06.629613 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004
2021/01/19 21:58:06.629699 {wncd_x_R0-0}{1}: [auth-mgr-feat_template] [9347]: (info): [2e1f.3a65.9c09:c
2021/01/19 21:58:06.629709 {wncd_x_R0-0}{1}: [auth-mgr-feat_template] [9347]: (info): [0000.0000.0000:c
2021/01/19 21:58:06.633058 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004
2021/01/19 21:58:06.633219 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004
2021/01/19 21:58:06.633231 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004
2021/01/19 21:58:06.719502 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:06.719521 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:06.719591 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
2021/01/19 21:58:06.719646 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.
```

```
2021/01/19 21:58:06.720038 {wncd_x_R0-0}{1}: [webauth-error] [9347]: (info): capwap_90000004[2e1f.3a65.9
2021/01/19 21:58:06.720623 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:58:06.720707 {wncd_x_R0-0}{1}: [auth-mgr-feat_template] [9347]: (info): [2e1f.3a65.9c09:ca
2021/01/19 21:58:06.720716 {wncd_x_R0-0}{1}: [auth-mgr-feat_template] [9347]: (info): [0000.0000.0000:ca
2021/01/19 21:58:06.724036 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:58:06.746127 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.9
2021/01/19 21:58:06.746145 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.9
2021/01/19 21:58:06.746197 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.9
2021/01/19 21:58:06.746225 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.9
2021/01/19 21:58:06.746612 {wncd_x_R0-0}{1}: [webauth-error] [9347]: (info): capwap_90000004[2e1f.3a65.9
2021/01/19 21:58:06.747105 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:58:06.747187 {wncd_x_R0-0}{1}: [auth-mgr-feat_template] [9347]: (info): [2e1f.3a65.9c09:ca
2021/01/19 21:58:06.747197 {wncd_x_R0-0}{1}: [auth-mgr-feat_template] [9347]: (info): [0000.0000.0000:ca
2021/01/19 21:58:06.750598 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:58:15.902342 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.9
2021/01/19 21:58:15.902360 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.9
2021/01/19 21:58:15.902410 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.9
2021/01/19 21:58:15.902435 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.9
2021/01/19 21:58:15.903173 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:58:15.903252 {wncd_x_R0-0}{1}: [auth-mgr-feat_template] [9347]: (info): [2e1f.3a65.9c09:ca
2021/01/19 21:58:15.903261 {wncd_x_R0-0}{1}: [auth-mgr-feat_template] [9347]: (info): [0000.0000.0000:ca
2021/01/19 21:58:15.905950 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:58:15.906112 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:58:15.906125 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:58:16.357093 {wncd_x_R0-0}{1}: [webauth-httpd] [9347]: (info): capwap_90000004[2e1f.3a65.9
2021/01/19 21:58:16.357443 {wncd_x_R0-0}{1}: [sadb-attr] [9347]: (info): Removing ipv6 addresses from th
2021/01/19 21:58:16.357674 {wncd_x_R0-0}{1}: [caaa-authen] [9347]: (info): [CAAA:AUTHEN:b7000080] DEBUG
2021/01/19 21:58:16.374292 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:58:16.374412 {wncd_x_R0-0}{1}: [ewlc-infra-evq] [9347]: (note): Authentication Success. Re
2021/01/19 21:58:16.374442 {wncd_x_R0-0}{1}: [client-auth] [9347]: (info): MAC: 2e1f.3a65.9c09  Client
2021/01/19 21:58:16.374568 {wncd_x_R0-0}{1}: [aaa-attr-inf] [9347]: (info):
<<            username   0 "Nico">>
2021/01/19 21:58:16.374574 {wncd_x_R0-0}{1}: [aaa-attr-inf] [9347]: (info):
<<    sam-account-name   0 "Nico">>
2021/01/19 21:58:16.374584 {wncd_x_R0-0}{1}: [aaa-attr-inf] [9347]: (info):
<<              method   0 1 [webauth]>>
2021/01/19 21:58:16.374592 {wncd_x_R0-0}{1}: [aaa-attr-inf] [9347]: (info):
<<       clid-mac-addr   0 2e 1f 3a 65 9c 09 >>
2021/01/19 21:58:16.374597 {wncd_x_R0-0}{1}: [aaa-attr-inf] [9347]: (info):
<<             intf-id   0 2415919108 (0x90000004)>>
2021/01/19 21:58:16.374690 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:58:16.374797 {wncd_x_R0-0}{1}: [auth-mgr] [9347]: (info): [2e1f.3a65.9c09:capwap_90000004]
2021/01/19 21:58:16.375294 {wncd_x_R0-0}{1}: [webauth-acl] [9347]: (info): capwap_90000004[2e1f.3a65.9c0
2021/01/19 21:58:16.376120 {wncd_x_R0-0}{1}: [epm-redirect] [9347]: (info): [0000.0000.0000:unknown] UR
2021/01/19 21:58:16.377322 {wncd_x_R0-0}{1}: [webauth-page] [9347]: (info): capwap_90000004[2e1f.3a65.9c
2021/01/19 21:58:16.378405 {wncd_x_R0-0}{1}: [client-auth] [9347]: (note): MAC: 2e1f.3a65.9c09  L3 Authe
2021/01/19 21:58:16.378426 {wncd_x_R0-0}{1}: [client-auth] [9347]: (info): MAC: 2e1f.3a65.9c09  Client
2021/01/19 21:58:16.379181 {wncd_x_R0-0}{1}: [ewlc-qos-client] [9347]: (info): MAC: 2e1f.3a65.9c09  Cli
2021/01/19 21:58:16.379323 {wncd_x_R0-0}{1}: [ewlc-qos-client] [9347]: (info): MAC: 2e1f.3a65.9c09  No
2021/01/19 21:58:16.379358 {wncd_x_R0-0}{1}: [ewlc-qos-client] [9347]: (info): MAC: 2e1f.3a65.9c09  No
2021/01/19 21:58:16.379442 {wncd_x_R0-0}{1}: [client-auth] [9347]: (note): MAC: 2e1f.3a65.9c09  ADD MOBI
2021/01/19 21:58:16.380547 {wncd_x_R0-0}{1}: [errmsg] [9347]: (info): %CLIENT_ORCH_LOG-6-CLIENT_ADDED_TO
2021/01/19 21:58:16.380729 {wncd_x_R0-0}{1}: [aaa-attr-inf] [9347]: (info): [ Applied attribute :bsn-vla
2021/01/19 21:58:16.380736 {wncd_x_R0-0}{1}: [aaa-attr-inf] [9347]: (info): [ Applied attribute :
2021/01/19 21:58:16.380812 {wncd_x_R0-0}{1}: [aaa-attr-inf] [9347]: (info): [ Applied attribute :    url
2021/01/19 21:58:16.380969 {wncd_x_R0-0}{1}: [ewlc-qos-client] [9347]: (info): MAC: 2e1f.3a65.9c09  Cli
2021/01/19 21:58:16.381033 {wncd_x_R0-0}{1}: [rog-proxy-capwap] [9347]: (debug): Managed client RUN stat
2021/01/19 21:58:16.381152 {wncd_x_R0-0}{1}: [client-orch-state] [9347]: (note): MAC: 2e1f.3a65.9c09  Cl
2021/01/19 21:58:16.385252 {wncd_x_R0-0}{1}: [ewlc-qos-client] [9347]: (info): MAC: 2e1f.3a65.9c09  Cli
2021/01/19 21:58:16.385321 {wncd_x_R0-0}{1}: [avc-afc] [9347]: (debug): AVC enabled for client 2e1f.3a6
```

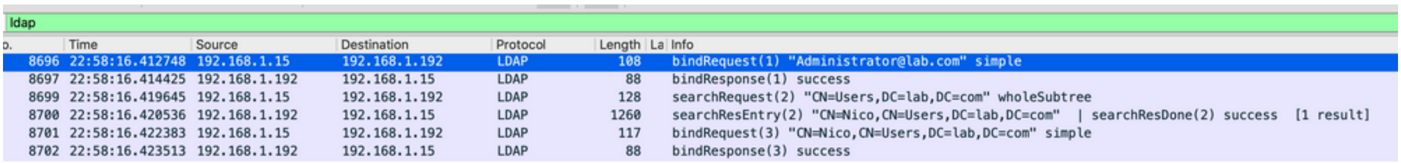
How to verify 9800 to LDAP connectivity

You can take an embedded capture in the 9800 in order to see what traffic is going towards LDAP.

To take a capture from the WLC, navigate to **Troubleshooting** > **Packet Capture** and click **+Add**. Chose the uplink port and start capturing.



Here is a sample success authentication for user **Nico**.



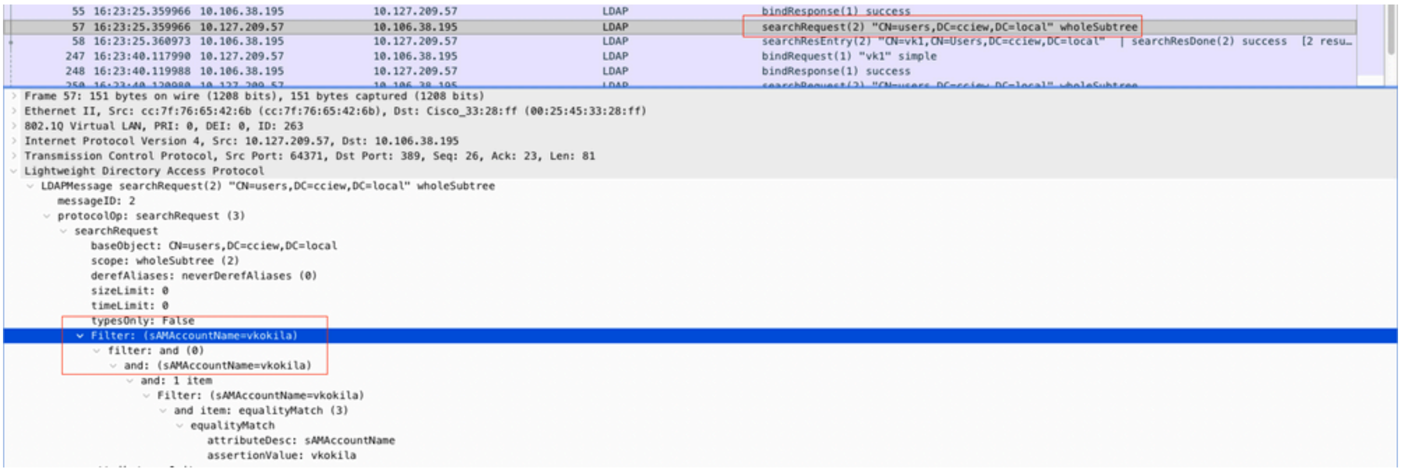
```
ldap
o.   Time            Source         Destination    Protocol  Length La Info
8696 22:58:16.412748 192.168.1.15   192.168.1.192  LDAP      108      bindRequest(1) "Administrator@lab.com" simple
8697 22:58:16.414425 192.168.1.192  192.168.1.15   LDAP       88      bindResponse(1) success
8699 22:58:16.419645 192.168.1.15   192.168.1.192  LDAP      128      searchRequest(2) "CN=Users,DC=lab,DC=com" wholeSubtree
8700 22:58:16.420536 192.168.1.192  192.168.1.15   LDAP     1260      searchResEntry(2) "CN=Nico,CN=Users,DC=lab,DC=com"  | searchResDone(2) success  [1 result]
8701 22:58:16.422383 192.168.1.15   192.168.1.192  LDAP      117      bindRequest(3) "CN=Nico,CN=Users,DC=lab,DC=com" simple
8702 22:58:16.423513 192.168.1.192  192.168.1.15   LDAP       88      bindResponse(3) success
```

The first 2 packets represent the WLC binding to the LDAP db, that is the WLC authenticating to the database with the admin user (in order to be able to perform a search).

These 2 LDAP packets represent the WLC doing a search in the base DN (here CN=Users,DC=lab,DC=com). The inside of the packet contains a filter for the username (here Nico). The LDAP database return the user attributes as a success.

The last 2 packets represent the WLC trying to authenticate with that user password to test if the password is the right one.

1. Collect EPC and check if sAMAccountName is applied as filter:



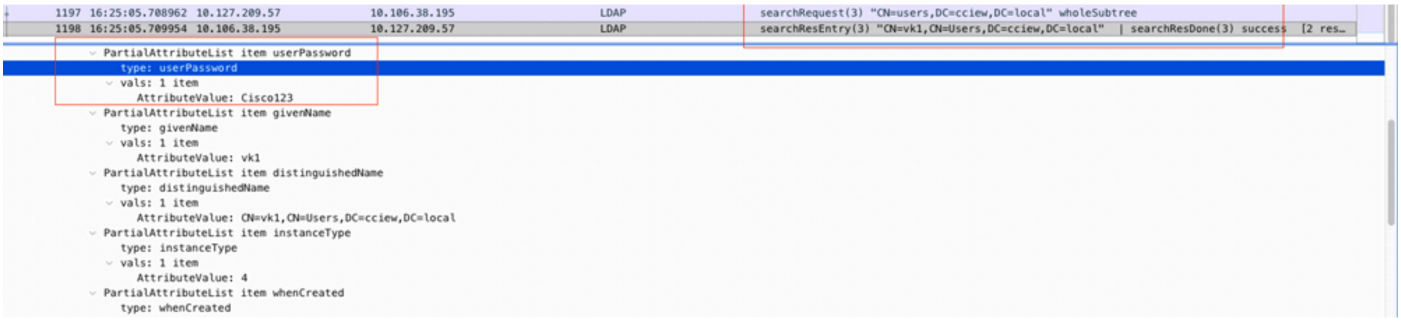
```
 55 16:23:25.359966 10.106.38.195   10.127.209.57   LDAP   bindResponse(1) success
 57 16:23:25.359966 10.127.209.57   10.106.38.195   LDAP   searchRequest(2) "CN=users,DC=cciew,DC=local" wholeSubtree
 58 16:23:25.360973 10.106.38.195   10.127.209.57   LDAP   searchResEntry(2) "CN=vk1,CN=Users,DC=cciew,DC=local"  | searchResDone(2) success  [2 resu…
247 16:23:40.117990 10.127.209.57   10.106.38.195   LDAP   bindRequest(1) "vk1" simple
248 16:23:40.119988 10.106.38.195   10.127.209.57   LDAP   bindResponse(1) success
```

```
> Frame 57: 151 bytes on wire (1208 bits), 151 bytes captured (1208 bits)
> Ethernet II, Src: cc:7f:76:65:42:6b (cc:7f:76:65:42:6b), Dst: Cisco_33:28:ff (00:25:45:33:28:ff)
> 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 263
> Internet Protocol Version 4, Src: 10.127.209.57, Dst: 10.106.38.195
> Transmission Control Protocol, Src Port: 64371, Dst Port: 389, Seq: 26, Ack: 23, Len: 81
v Lightweight Directory Access Protocol
  v LDAPMessage searchRequest(2) "CN=users,DC=cciew,DC=local" wholeSubtree
      messageID: 2
    v protocolOp: searchRequest (3)
      v searchRequest
          baseObject: CN=users,DC=cciew,DC=local
          scope: wholeSubtree (2)
          derefAliases: neverDerefAliases (0)
          sizeLimit: 0
          timeLimit: 0
          typesOnly: False
        v Filter: (sAMAccountName=vkokila)
          v filter: and (0)
            v and: (sAMAccountName=vkokila)
              v and: 1 item
                v Filter: (sAMAccountName=vkokila)
                  v and item: equalityMatch (3)
                    v equalityMatch
                        attributeDesc: sAMAccountName
                        assertionValue: vkokila
```

If the filter shows cn and if sAMAccountName is being used as the username, then authentication fails.

Reconfigure the ldap map attribute from WLC cli.

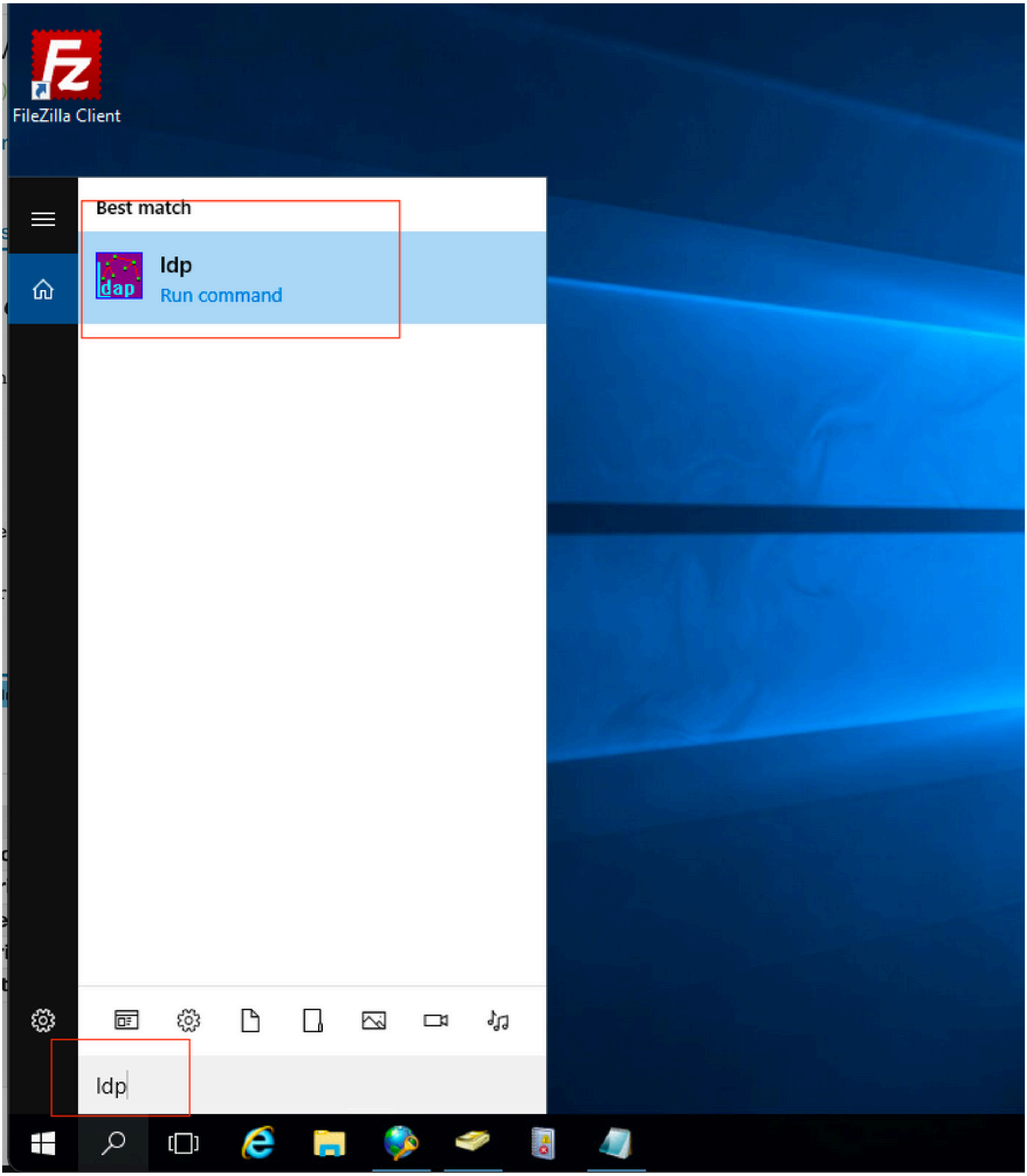
2. Ensure server returns userPassword in cleartext, else authentication fails.

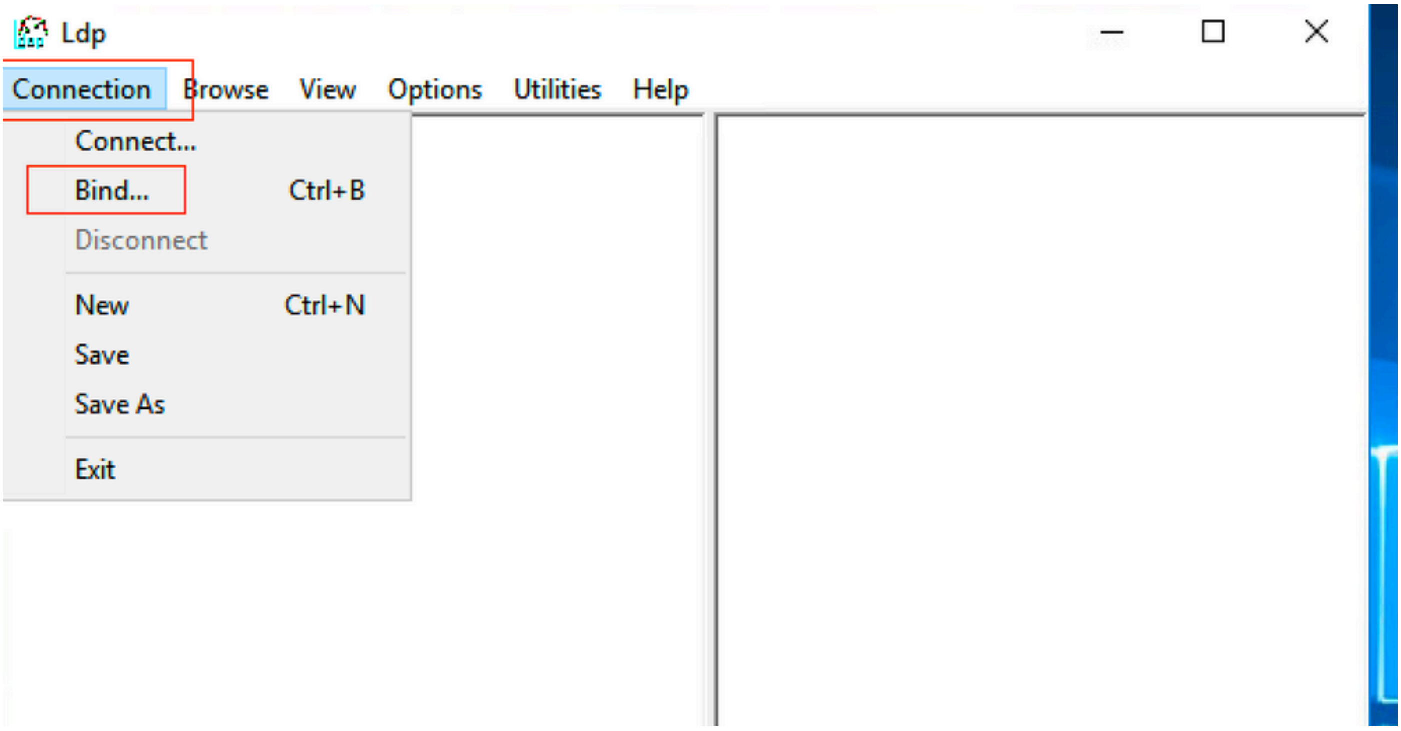


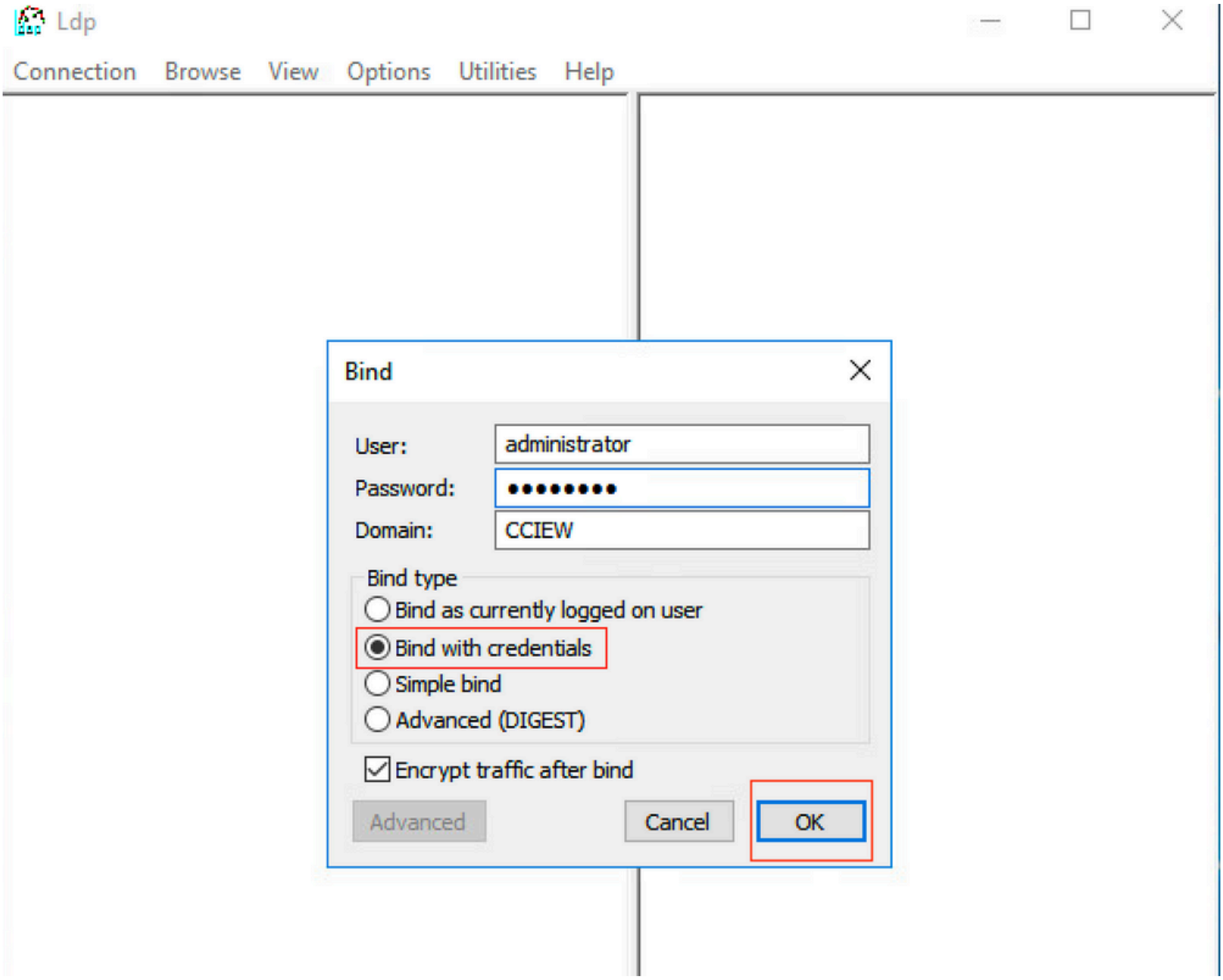
```
1197 16:25:05.708962 10.127.209.57   10.106.38.195   LDAP   searchRequest(3) "CN=users,DC=cciew,DC=local" wholeSubtree
1198 16:25:05.709954 10.106.38.195   10.127.209.57   LDAP   searchResEntry(3) "CN=vk1,CN=Users,DC=cciew,DC=local"  | searchResDone(3) success  [2 res…
```

```
    v PartialAttributeList item userPassword
        type: userPassword
      v vals: 1 item
          AttributeValue: Cisco123
    v PartialAttributeList item givenName
        type: givenName
      v vals: 1 item
          AttributeValue: vk1
    v PartialAttributeList item distinguishedName
        type: distinguishedName
      v vals: 1 item
          AttributeValue: CN=vk1,CN=Users,DC=cciew,DC=local
    v PartialAttributeList item instanceType
        type: instanceType
      v vals: 1 item
          AttributeValue: 4
    v PartialAttributeList item whenCreated
        type: whenCreated
```

3. Use the ldp.exe tool on the server to validate Base DN information.


FileZilla Client
Best match
ldp
Run command
ldp





User: administrator

Password: •••••••••

Domain: CCIEW

Bind type

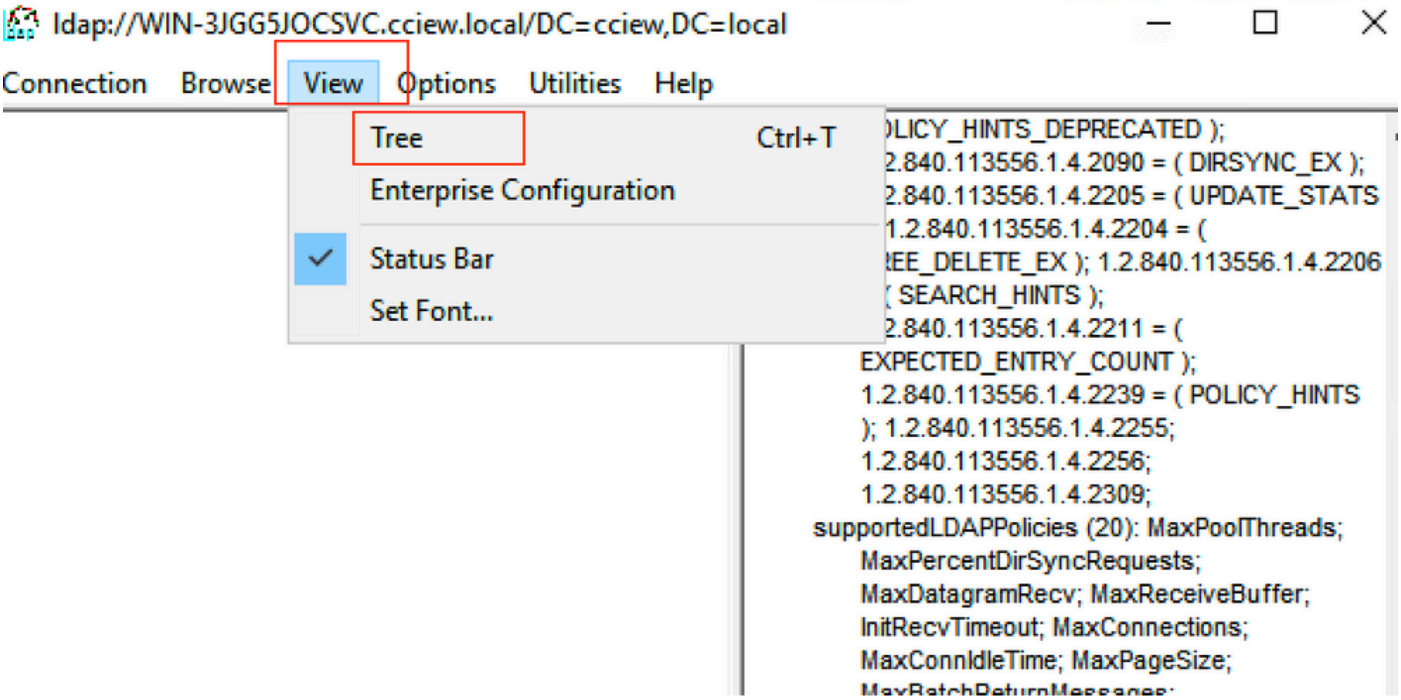
○ Bind as currently logged on user

● Bind with credentials

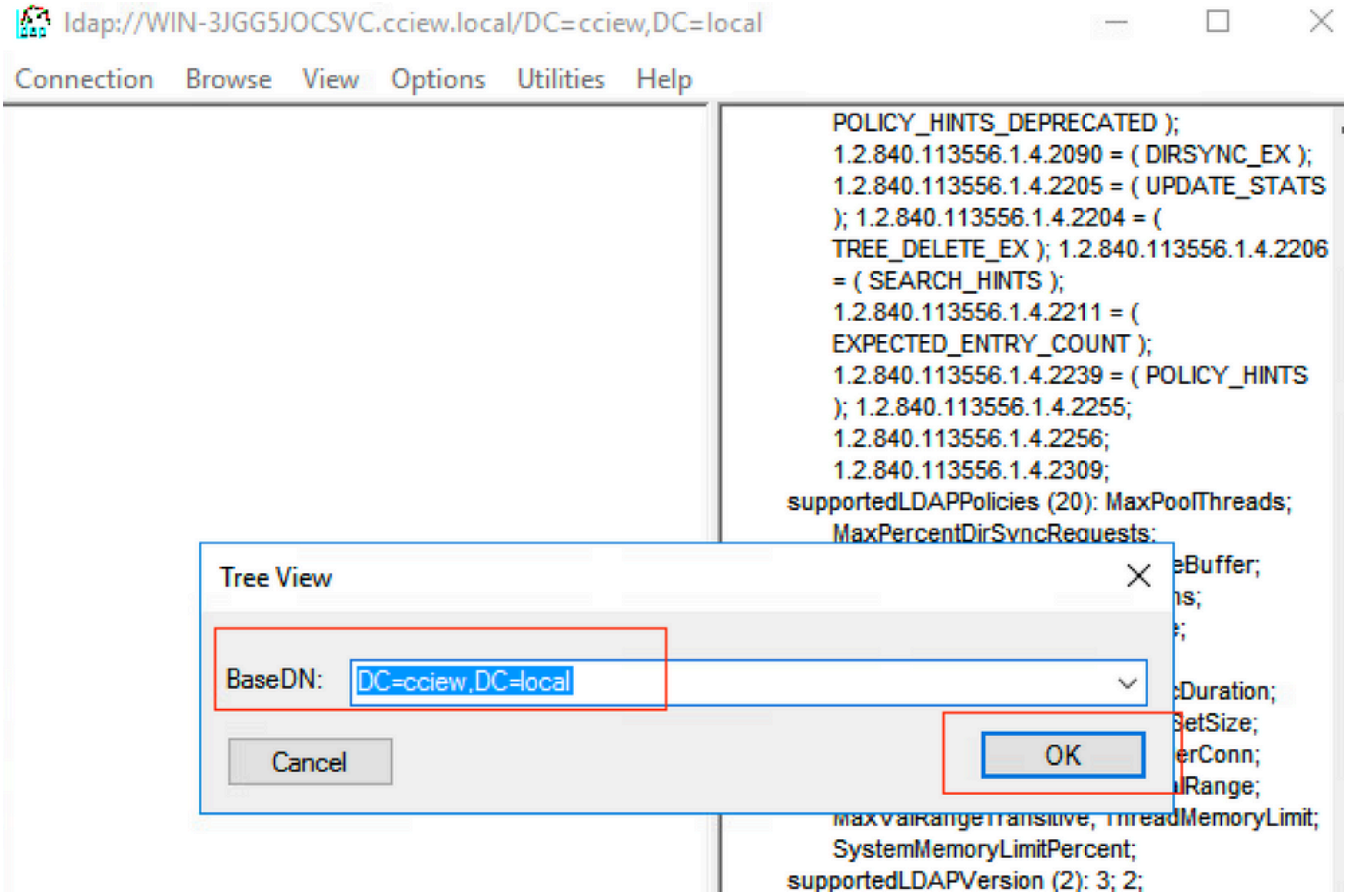
○ Simple bind

○ Advanced (DIGEST)

☑ Encrypt traffic after bind

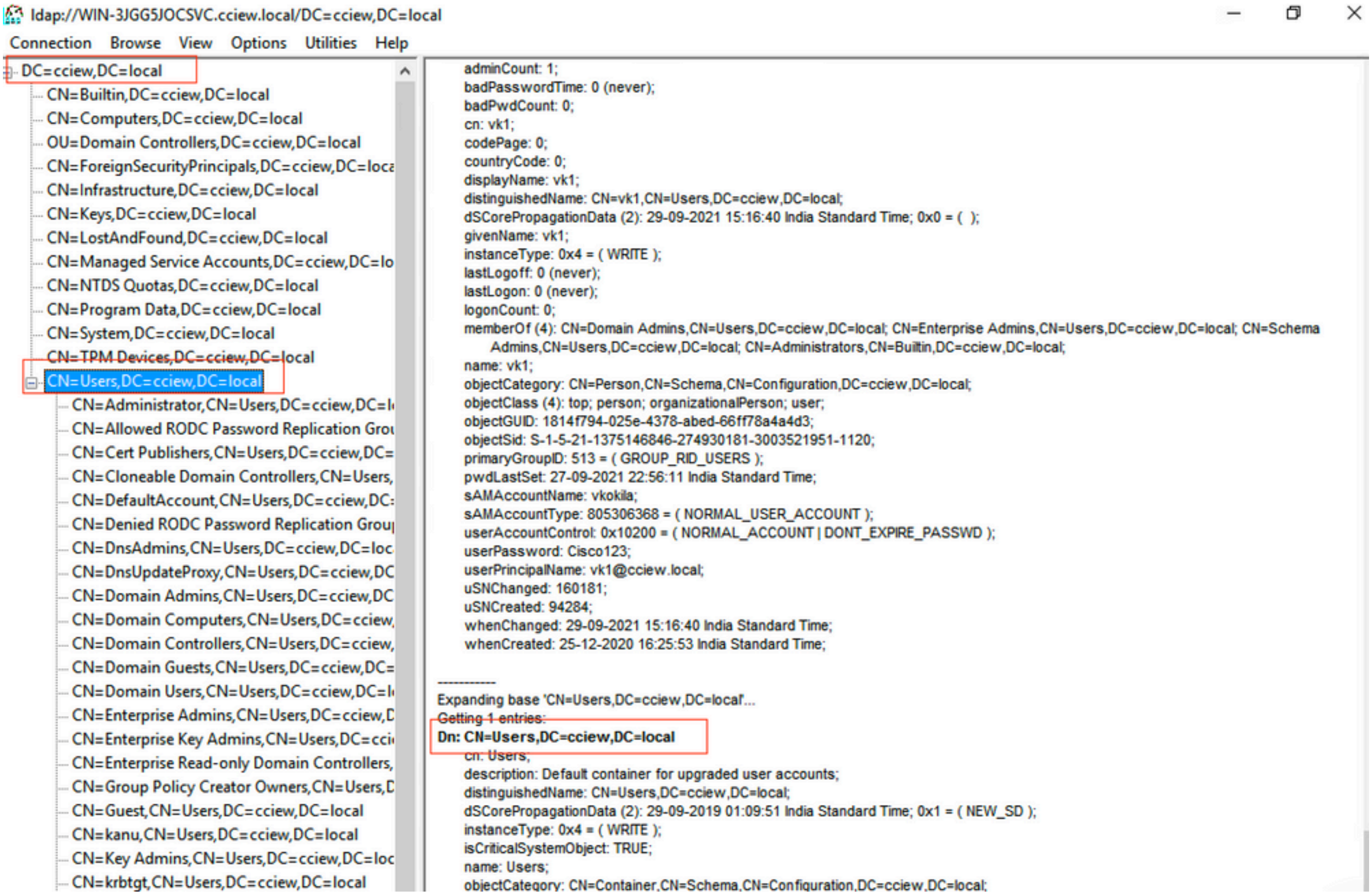


```
)LICY_HINTS_DEPRECATED );
2.840.113556.1.4.2090 = ( DIRSYNC_EX );
2.840.113556.1.4.2205 = ( UPDATE_STATS
1.2.840.113556.1.4.2204 = (
REE_DELETE_EX ); 1.2.840.113556.1.4.2206
( SEARCH_HINTS );
2.840.113556.1.4.2211 = (
    EXPECTED_ENTRY_COUNT );
    1.2.840.113556.1.4.2239 = ( POLICY_HINTS
    ); 1.2.840.113556.1.4.2255;
    1.2.840.113556.1.4.2256;
    1.2.840.113556.1.4.2309;
supportedLDAPPolicies (20): MaxPoolThreads;
    MaxPercentDirSyncRequests;
    MaxDatagramRecv; MaxReceiveBuffer;
    InitRecvTimeout; MaxConnections;
    MaxConnIdleTime; MaxPageSize;
    MaxBatchReturnMessages;
```



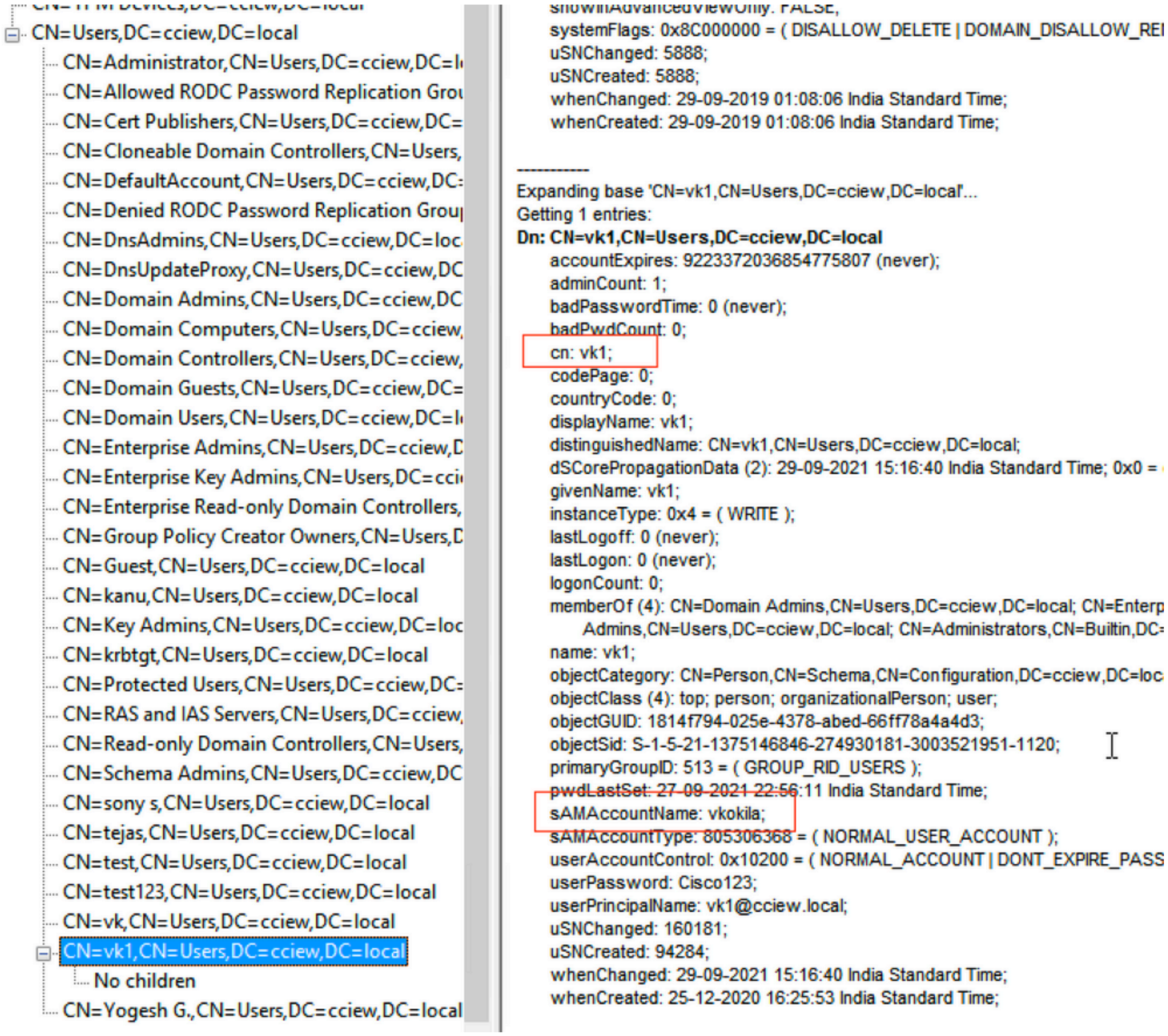
BaseDN: DC=cciew,DC=local

```
    POLICY_HINTS_DEPRECATED );
    1.2.840.113556.1.4.2090 = ( DIRSYNC_EX );
    1.2.840.113556.1.4.2205 = ( UPDATE_STATS
    ); 1.2.840.113556.1.4.2204 = (
    TREE_DELETE_EX ); 1.2.840.113556.1.4.2206
    = ( SEARCH_HINTS );
    1.2.840.113556.1.4.2211 = (
    EXPECTED_ENTRY_COUNT );
    1.2.840.113556.1.4.2239 = ( POLICY_HINTS
    ); 1.2.840.113556.1.4.2255;
    1.2.840.113556.1.4.2256;
    1.2.840.113556.1.4.2309;
supportedLDAPPolicies (20): MaxPoolThreads;
    MaxPercentDirSyncRequests;
                              eBuffer;
                              ns;
                              ;
                              Duration;
                              SetSize;
                              erConn;
                              lRange;
    MaxValRangeTransitive; ThreadMemoryLimit;
    SystemMemoryLimitPercent;
supportedLDAPVersion (2): 3; 2;
```



```
DC=cciew,DC=local
    CN=Builtin,DC=cciew,DC=local
    CN=Computers,DC=cciew,DC=local
    OU=Domain Controllers,DC=cciew,DC=local
    CN=ForeignSecurityPrincipals,DC=cciew,DC=loca
    CN=Infrastructure,DC=cciew,DC=local
    CN=Keys,DC=cciew,DC=local
    CN=LostAndFound,DC=cciew,DC=local
    CN=Managed Service Accounts,DC=cciew,DC=lo
    CN=NTDS Quotas,DC=cciew,DC=local
    CN=Program Data,DC=cciew,DC=local
    CN=System,DC=cciew,DC=local
    CN=TPM Devices,DC=cciew,DC=local
    CN=Users,DC=cciew,DC=local
        CN=Administrator,CN=Users,DC=cciew,DC=l
        CN=Allowed RODC Password Replication Grou
        CN=Cert Publishers,CN=Users,DC=cciew,DC=
        CN=Cloneable Domain Controllers,CN=Users,
        CN=DefaultAccount,CN=Users,DC=cciew,DC=
        CN=Denied RODC Password Replication Grou
        CN=DnsAdmins,CN=Users,DC=cciew,DC=loc
        CN=DnsUpdateProxy,CN=Users,DC=cciew,DC
        CN=Domain Admins,CN=Users,DC=cciew,DC
        CN=Domain Computers,CN=Users,DC=cciew,
        CN=Domain Controllers,CN=Users,DC=cciew,
        CN=Domain Guests,CN=Users,DC=cciew,DC=
        CN=Domain Users,CN=Users,DC=cciew,DC=l
        CN=Enterprise Admins,CN=Users,DC=cciew,D
        CN=Enterprise Key Admins,CN=Users,DC=cci
        CN=Enterprise Read-only Domain Controllers,
        CN=Group Policy Creator Owners,CN=Users,D
        CN=Guest,CN=Users,DC=cciew,DC=local
        CN=kanu,CN=Users,DC=cciew,DC=local
        CN=Key Admins,CN=Users,DC=cciew,DC=loc
        CN=krbtgt,CN=Users,DC=cciew,DC=local
```

```
    adminCount: 1;
    badPasswordTime: 0 (never);
    badPwdCount: 0;
    cn: vk1;
    codePage: 0;
    countryCode: 0;
    displayName: vk1;
    distinguishedName: CN=vk1,CN=Users,DC=cciew,DC=local;
    dSCorePropagationData (2): 29-09-2021 15:16:40 India Standard Time; 0x0 = (  );
    givenName: vk1;
    instanceType: 0x4 = ( WRITE );
    lastLogoff: 0 (never);
    lastLogon: 0 (never);
    logonCount: 0;
    memberOf (4): CN=Domain Admins,CN=Users,DC=cciew,DC=local; CN=Enterprise Admins,CN=Users,DC=cciew,DC=local; CN=Schema
        Admins,CN=Users,DC=cciew,DC=local; CN=Administrators,CN=Builtin,DC=cciew,DC=local;
    name: vk1;
    objectCategory: CN=Person,CN=Schema,CN=Configuration,DC=cciew,DC=local;
    objectClass (4): top; person; organizationalPerson; user;
    objectGUID: 1814f794-025e-4378-abed-66ff78a4a4d3;
    objectSid: S-1-5-21-1375146846-274930181-3003521951-1120;
    primaryGroupID: 513 = ( GROUP_RID_USERS );
    pwdLastSet: 27-09-2021 22:56:11 India Standard Time;
    sAMAccountName: vkokila;
    sAMAccountType: 805306368 = ( NORMAL_USER_ACCOUNT );
    userAccountControl: 0x10200 = ( NORMAL_ACCOUNT | DONT_EXPIRE_PASSWD );
    userPassword: Cisco123;
    userPrincipalName: vk1@cciew.local;
    uSNChanged: 160181;
    uSNCreated: 94284;
    whenChanged: 29-09-2021 15:16:40 India Standard Time;
    whenCreated: 25-12-2020 16:25:53 India Standard Time;

-----------
Expanding base 'CN=Users,DC=cciew,DC=local'...
Getting 1 entries:
Dn: CN=Users,DC=cciew,DC=local
    cn: Users;
    description: Default container for upgraded user accounts;
    distinguishedName: CN=Users,DC=cciew,DC=local;
    dSCorePropagationData (2): 29-09-2019 01:09:51 India Standard Time; 0x1 = ( NEW_SD );
    instanceType: 0x4 = ( WRITE );
    isCriticalSystemObject: TRUE;
    name: Users;
    objectCategory: CN=Container,CN=Schema,CN=Configuration,DC=cciew,DC=local;
```



```
CN=TPM Devices,DC=cciew,DC=local
CN=Users,DC=cciew,DC=local
    CN=Administrator,CN=Users,DC=cciew,DC=l
    CN=Allowed RODC Password Replication Grou
    CN=Cert Publishers,CN=Users,DC=cciew,DC=
    CN=Cloneable Domain Controllers,CN=Users,
    CN=DefaultAccount,CN=Users,DC=cciew,DC=
    CN=Denied RODC Password Replication Grou
    CN=DnsAdmins,CN=Users,DC=cciew,DC=loc
    CN=DnsUpdateProxy,CN=Users,DC=cciew,DC
    CN=Domain Admins,CN=Users,DC=cciew,DC
    CN=Domain Computers,CN=Users,DC=cciew,
    CN=Domain Controllers,CN=Users,DC=cciew,
    CN=Domain Guests,CN=Users,DC=cciew,DC=
    CN=Domain Users,CN=Users,DC=cciew,DC=l
    CN=Enterprise Admins,CN=Users,DC=cciew,D
    CN=Enterprise Key Admins,CN=Users,DC=cci
    CN=Enterprise Read-only Domain Controllers,
    CN=Group Policy Creator Owners,CN=Users,D
    CN=Guest,CN=Users,DC=cciew,DC=local
    CN=kanu,CN=Users,DC=cciew,DC=local
    CN=Key Admins,CN=Users,DC=cciew,DC=loc
    CN=krbtgt,CN=Users,DC=cciew,DC=local
    CN=Protected Users,CN=Users,DC=cciew,DC=
    CN=RAS and IAS Servers,CN=Users,DC=cciew,
    CN=Read-only Domain Controllers,CN=Users,
    CN=Schema Admins,CN=Users,DC=cciew,DC
    CN=sony s,CN=Users,DC=cciew,DC=local
    CN=tejas,CN=Users,DC=cciew,DC=local
    CN=test,CN=Users,DC=cciew,DC=local
    CN=test123,CN=Users,DC=cciew,DC=local
    CN=vk,CN=Users,DC=cciew,DC=local
    CN=vk1,CN=Users,DC=cciew,DC=local
        No children
    CN=Yogesh G.,CN=Users,DC=cciew,DC=local
```

```
    showInAdvancedViewOnly: FALSE;
    systemFlags: 0x8C000000 = ( DISALLOW_DELETE | DOMAIN_DISALLOW_REI
    uSNChanged: 5888;
    uSNCreated: 5888;
    whenChanged: 29-09-2019 01:08:06 India Standard Time;
    whenCreated: 29-09-2019 01:08:06 India Standard Time;

-----------
Expanding base 'CN=vk1,CN=Users,DC=cciew,DC=local'...
Getting 1 entries:
Dn: CN=vk1,CN=Users,DC=cciew,DC=local
    accountExpires: 9223372036854775807 (never);
    adminCount: 1;
    badPasswordTime: 0 (never);
    badPwdCount: 0;
    cn: vk1;
    codePage: 0;
    countryCode: 0;
    displayName: vk1;
    distinguishedName: CN=vk1,CN=Users,DC=cciew,DC=local;
    dSCorePropagationData (2): 29-09-2021 15:16:40 India Standard Time; 0x0 =
    givenName: vk1;
    instanceType: 0x4 = ( WRITE );
    lastLogoff: 0 (never);
    lastLogon: 0 (never);
    logonCount: 0;
    memberOf (4): CN=Domain Admins,CN=Users,DC=cciew,DC=local; CN=Enterp
        Admins,CN=Users,DC=cciew,DC=local; CN=Administrators,CN=Builtin,DC=
    name: vk1;
    objectCategory: CN=Person,CN=Schema,CN=Configuration,DC=cciew,DC=loc
    objectClass (4): top; person; organizationalPerson; user;
    objectGUID: 1814f794-025e-4378-abed-66ff78a4a4d3;
    objectSid: S-1-5-21-1375146846-274930181-3003521951-1120;
    primaryGroupID: 513 = ( GROUP_RID_USERS );
    pwdLastSet: 27-09-2021 22:56:11 India Standard Time;
    sAMAccountName: vkokila;
    sAMAccountType: 805306368 = ( NORMAL_USER_ACCOUNT );
    userAccountControl: 0x10200 = ( NORMAL_ACCOUNT | DONT_EXPIRE_PASS
    userPassword: Cisco123;
    userPrincipalName: vk1@cciew.local;
    uSNChanged: 160181;
    uSNCreated: 94284;
    whenChanged: 29-09-2021 15:16:40 India Standard Time;
    whenCreated: 25-12-2020 16:25:53 India Standard Time;
```

4. Check server statistics and attribute MAP.

<#root>

C9800-40-K9#show ldap server all

```
Server Information for ldap

================================

Server name              :ldap

Server Address           :10.106.38.195

Server listening Port    :389

Bind Root-dn             :vk1

Server mode              :Non-Secure
```

```
Cipher Suite            :0x00

Authentication Seq      :Search first. Then Bind/Compare password next

Authentication Procedure:Bind with user password

Base-Dn                 :CN=users,DC=cciew,DC=local

Object Class            :Person

Attribute map           :VK

Request timeout         :30

Deadtime in Mins        :0

State                   :ALIVE

---------------------------------

* LDAP STATISTICS *

Total messages  [Sent:2, Received:3]

Response delay(ms) [Average:2, Maximum:2]

Total search    [Request:1, ResultEntry:1, ResultDone:1]

Total bind      [Request:1, Response:1]

Total extended  [Request:0, Response:0]

Total compare   [Request:0, Response:0]

Search [Success:1, Failures:0]

Bind   [Success:1, Failures:0]

Missing attrs in Entry [0]

Connection   [Closes:0, Aborts:0, Fails:0, Timeouts:0]

----------------------------------

No. of active connections   :0

---------------------------------
```

Related Information

- Local EAP on 9800 configuration example
- Cisco Technical Support & Downloads