

Configure CMX to Import Multiple Wireless LAN Controllers

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Introduction

This document describes the use of a Comma Separated Value (CSV) file to import Wireless LAN Controller (WLC) into Connected Mobile Experiences (CMX).

Prerequisites

Requirements

Cisco recommends to have knowledge of these topics:

- AireOS WLC concepts and configuration
- 9800 WLC concepts and configuration
- CMX concepts and configuration
- Simple Network Management Protocol (SNMP) concepts and configuration
- Network Mobility Services Protocol (NMSP) concepts and configuration

Components Used

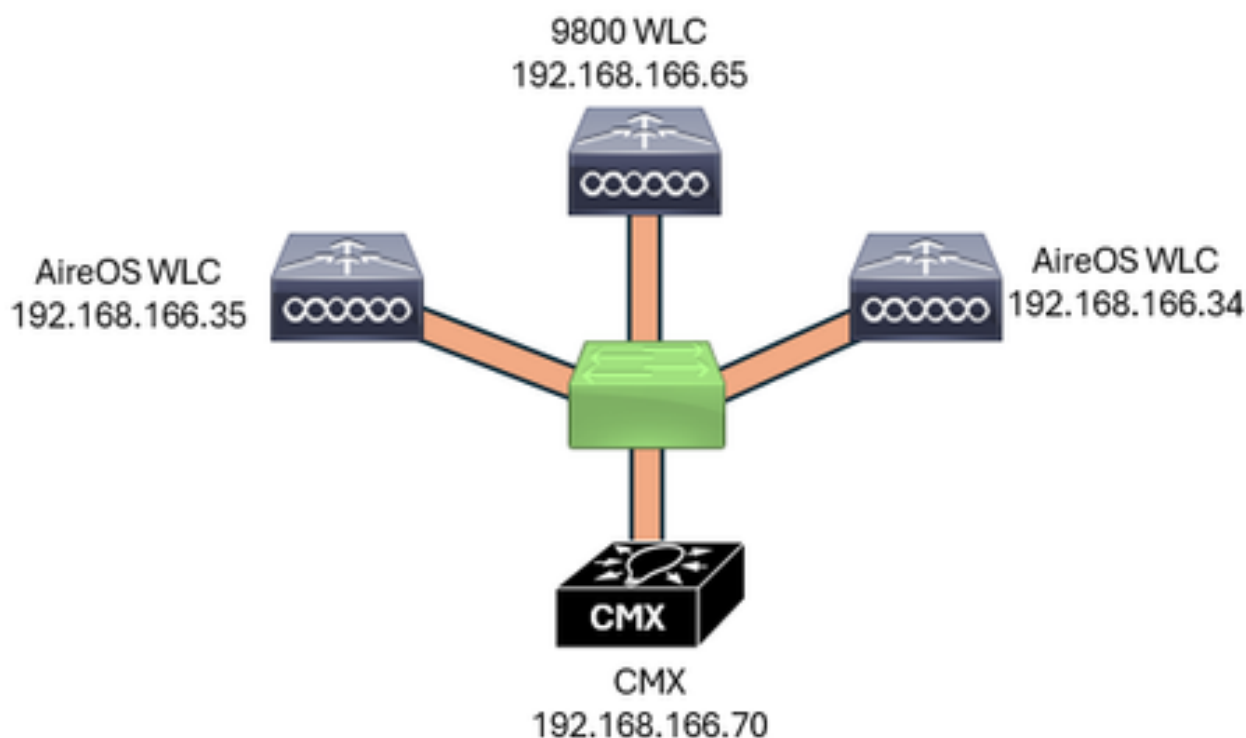
The information in this document is based on these software and hardware versions:

- Catalyst 9800 Wireless Controller Series (Catalyst 9800-CL), Cisco IOS® XE Cupertino 17.9.4
- AIR-CTVM Wireless Controller Series (AireOS Cloud), version 8.10.196
- CMX, version 10.6.3

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

Network Diagram



Network Diagram

Configurations

SNMP Configuration on AireOS WLC

CMX communicates over SNMP with the WLC to gather WLC details and information. Hence, the WLC must be configured with SNMP.

SNMP Version 2

WLC GUI:

Navigate to **Management > SNMP > Communities > New** as shown in the image.

CISCO

MONITORWLANsCONTROLLERWIRELESSSECURITYMANAGEMENTCOMMANDSHelp

Save ConfigurationPingLogoutRefresh

Management

SNMP v1 / v2c Community

SummarySNMPGeneralSNMP V3 UsersCommunitiesTrap ReceiversTrap ControlsTrap LogsHTTP-HTTPS

Community NameIP Address(Ipv4/Ipv6)IP Mask/Prefix LengthAccess ModeStatus

IPSec Parameters

IPSec☐

ApplyNew...

SNMP Version 2 Configuration

Enter the SNMP details:

CISCO

MONITORWLANsCONTROLLERWIRELESSSECURITYMANAGEMENTCOMMANDSHelp

Save ConfigurationPingLogoutRefresh

Management

SNMP v1 / v2c Community > New

SummarySNMPGeneralSNMP V3 UsersCommunitiesTrap ReceiversTrap ControlsTrap LogsHTTP-HTTPS

Community NameCMXcommunity

IP Address(Ipv4/Ipv6)192.168.166.70

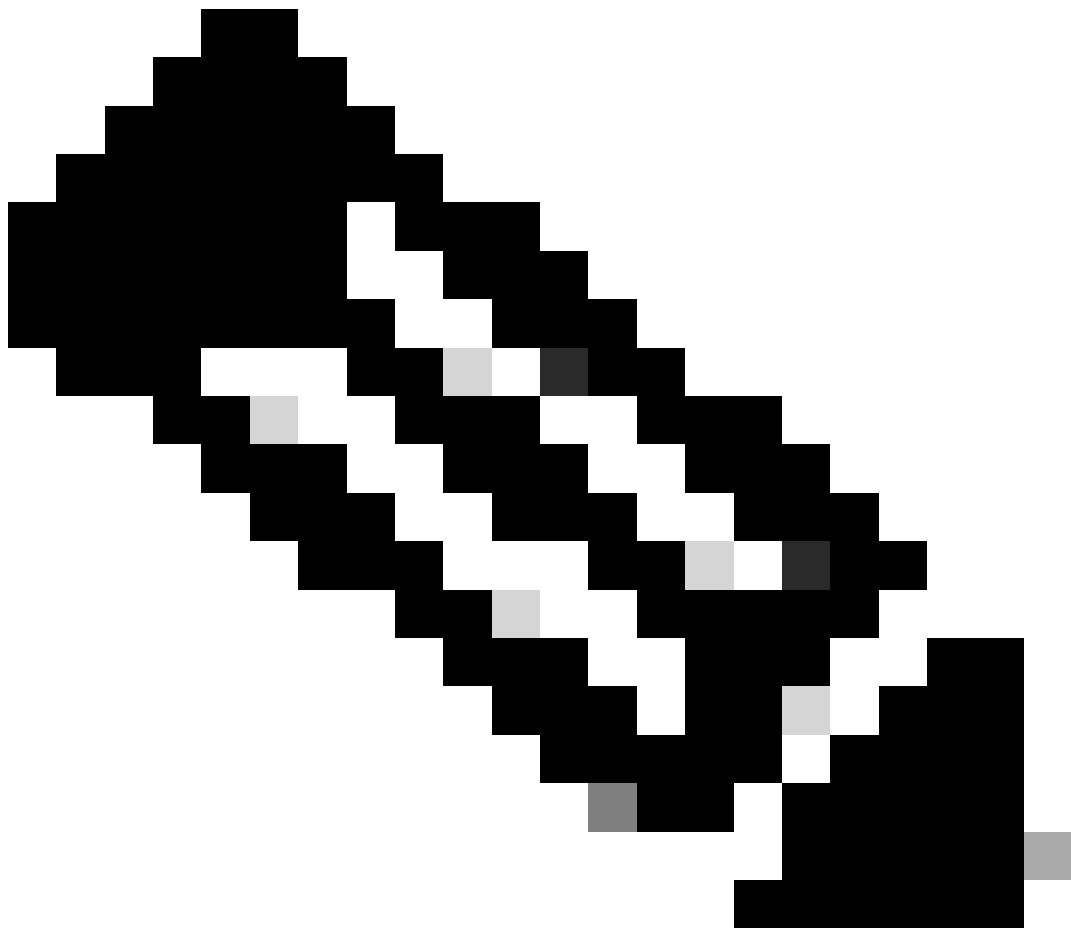
IP Mask/Prefix Length255.255.255.255

Access ModeRead/Write

StatusEnable

< BackApply

SNMP Version 2 Configuration Details



Note: SNMP Access Mode must be set as Read/Write. SNMP Status must be set to Enable.

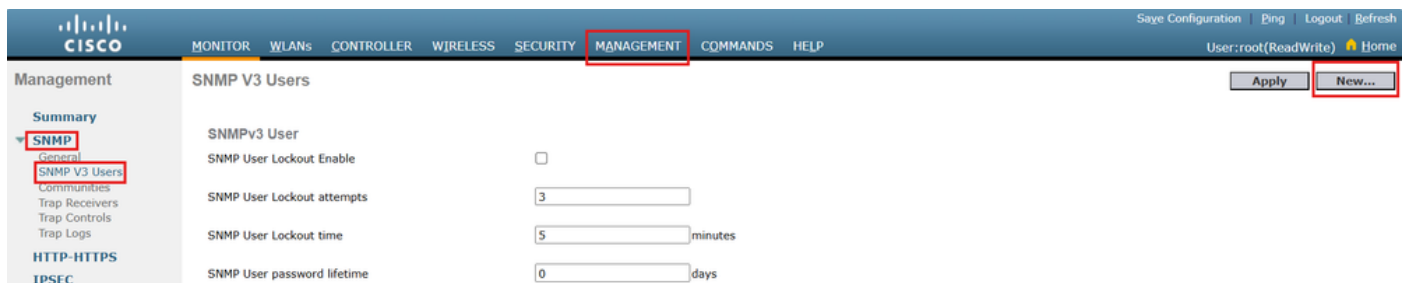
WLC CLI:

```
(Cisco Controller) >config snmp community create CMXcOmmunity
(Cisco Controller) >config snmp community ipaddr 192.168.166.70 255.255.255.255 CMXcOmmunity
(Cisco Controller) >config snmp community accessmode rw CMXcOmmunity
(Cisco Controller) >config snmp community mode enable CMXcOmmunity
```

SNMP Version 3

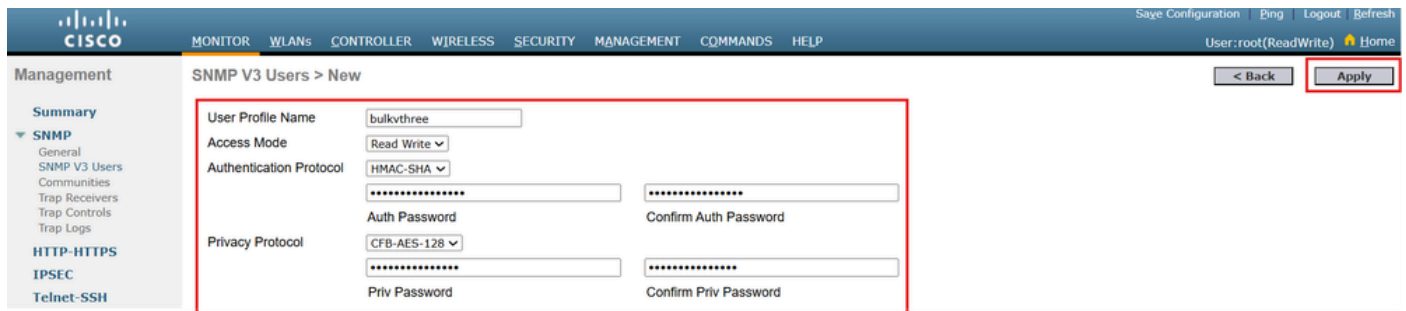
WLC GUI:

Navigate to **Management > SNMP > SNMP V3 Users > New** as shown in the image.



SNMP Version 3 Configuration

Enter SNMP details:



SNMP Version 3 Configuration Details



Note: SNMP Access Mode must be configured as Read/Write. SNMP Authentication Protocol can be SHA or MD5. SNMP Privacy Protocol can be AES or DES.

WLC CLI:

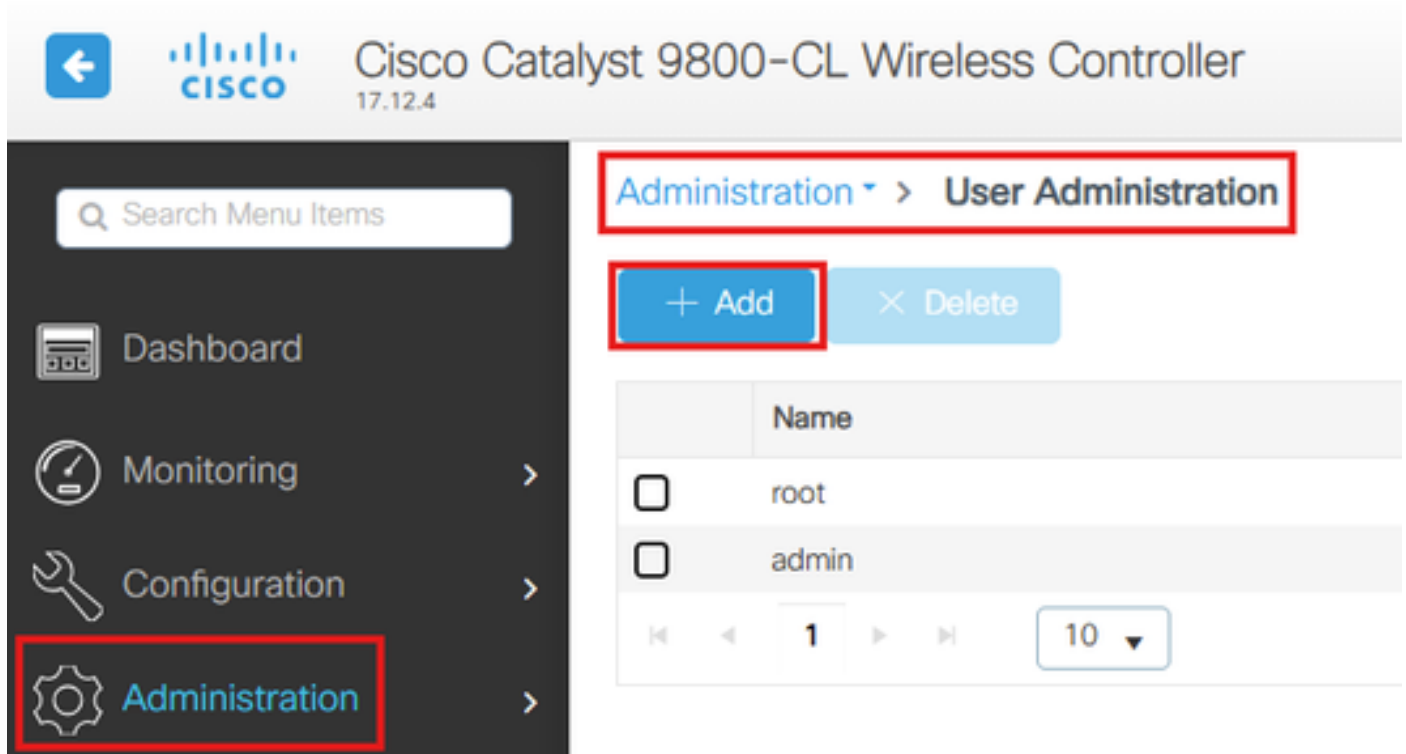
```
(Cisco Controller) >config snmp v3user create bulkvthree rw hmacsha aesfb128 makEsnmpw0rkbulk version3
```

SSH Access Configuration on 9800 WLC

Configure a User Administration the CMX can use to access the WLC.

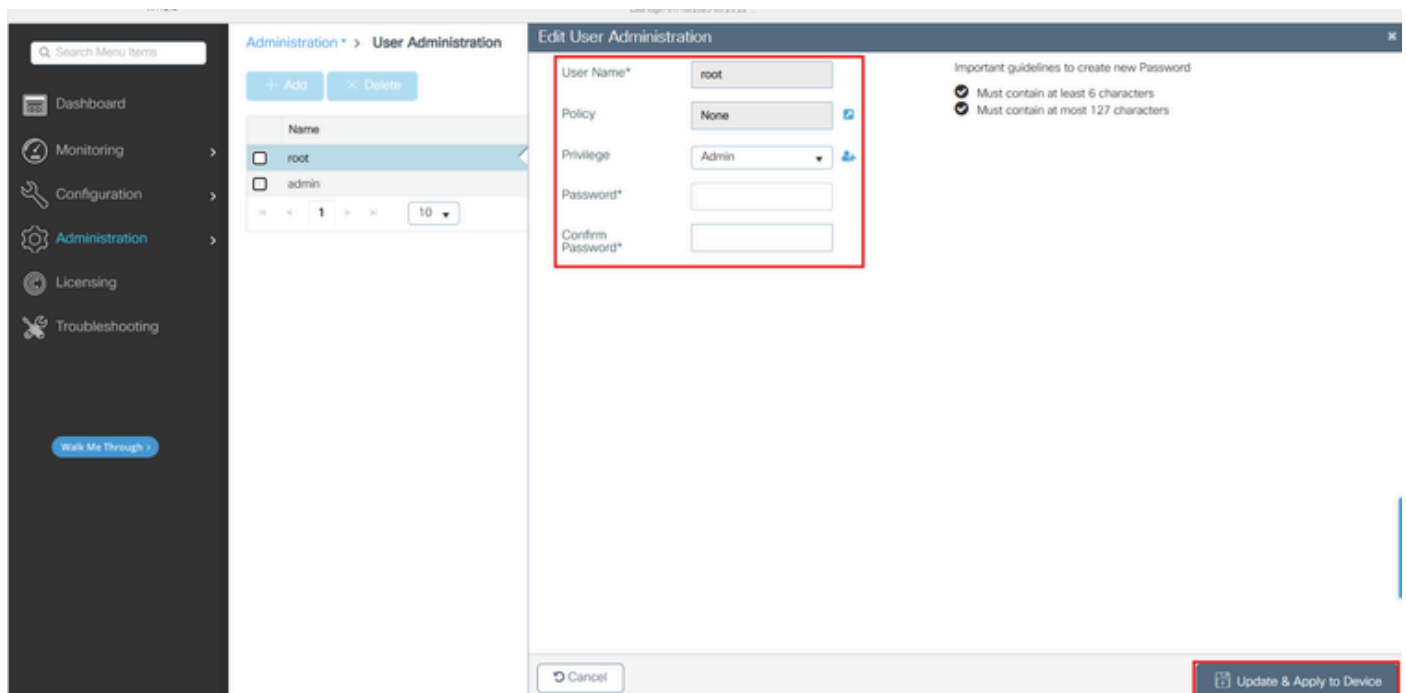
WLC GUI:

Navigate to **Administration > User Administration > Add** as shown in the image.



WLC User Config

Enter the user details and click **Update & Apply to Device**:



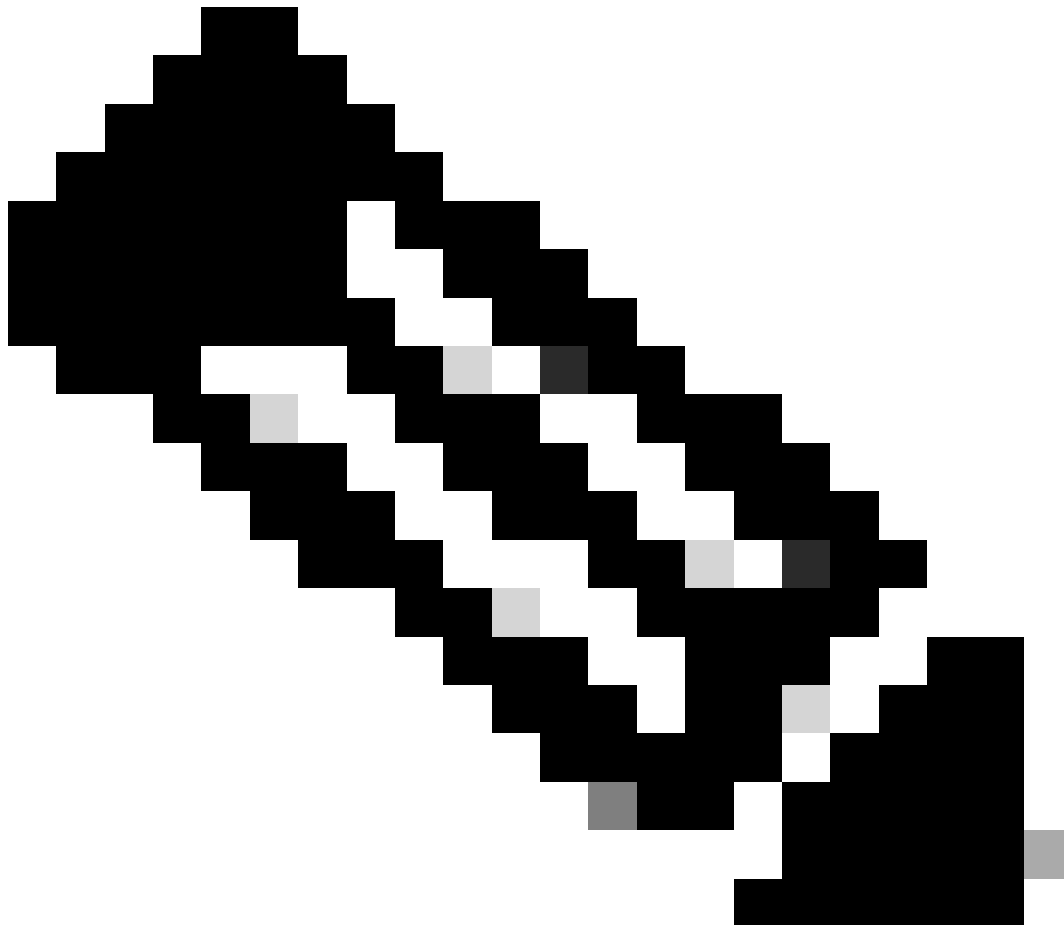
WLC User Information Configuration

WLC CLI:

```
#conf t
(config)#username root privilege 15 password 0 RtpW2121!
(config)#end
```

Configure privilege access to the WLC with a password the CMX can use to access. This configuration can only be done via CLI as follows:

```
#conf t
(config)#enable password 0 RtpW2121!
(config)#end
```



Note: Configure the level of security of the passwords of your preference.

Enter the WLC Information in the TXT Editor

The CSV file can be created directly in a Excel sheet, however, most network administrators are comfortable working with Notepad++ or any text editor. In this document, the creation of the WLCs entries are first done in Notepad++, and once created the document is saved as a CSV file.

The information to be added to the text editor depends on the type of WLC, it is as follows:

AireOS:

- WLC, WLC IP Address, WLC Version, SNMP Version, SNMP Information

SNMP versions:

- SNMP Version 2
 - WLC, WLC IP Address, WLC Version, SNMP Version, Community Name
- SNMP Version 3
 - WLC, WLC IP Address, WLC Version, SNMP Version, SNMP Username, SNMP Authentication Protocol, SNMP Authentication Password, SNMP Privacy Protocol, SNMP Privacy Password

9800 WLC:

- Catalyst (IOS XE) WLC, WLC IP Address, WLC Version, SSH Username, SSH Password, Enable Password

Based on the prior information, three WLCs are used in this document to exemplify AireOS SNMP Version 2, SNMP Version 3, and 9800 WLC configuration to cover all the possible configurations for his process. The configuration of the WLCs to use in this document is as follows:

AireOS:

- SNMP Version 2
 - WLC, 192.168.166.33, 8.10.196.0, v2c, CMXcommunity
- SNMP Version 3
 - WLC, 192.168.166.34, 8.10.196.0, v3, bulkvthree, hmacsha, makeSnmpwOrkbulk, aesfb128, version3workinG



Note: The authentication types supported are hmacmd5 or hmacsha. The private types supported are des or aesfb128. These parameters are case sensitive.

9800 WLC:

- Catalyst (IOS XE) WLC,192.168.166.65,17.09.04,root, RtpW2121!, RtpW2121!

CMX is capable to understand if the WLC type is AireOS or 9800 WLC by the first column of the CSV entry. If the first column shows WLC the CMX understands the WLC is an AireOS, however, if the first column shows Catalyst (IOS XE) WLC CMX understands it is a 9800 WLC.

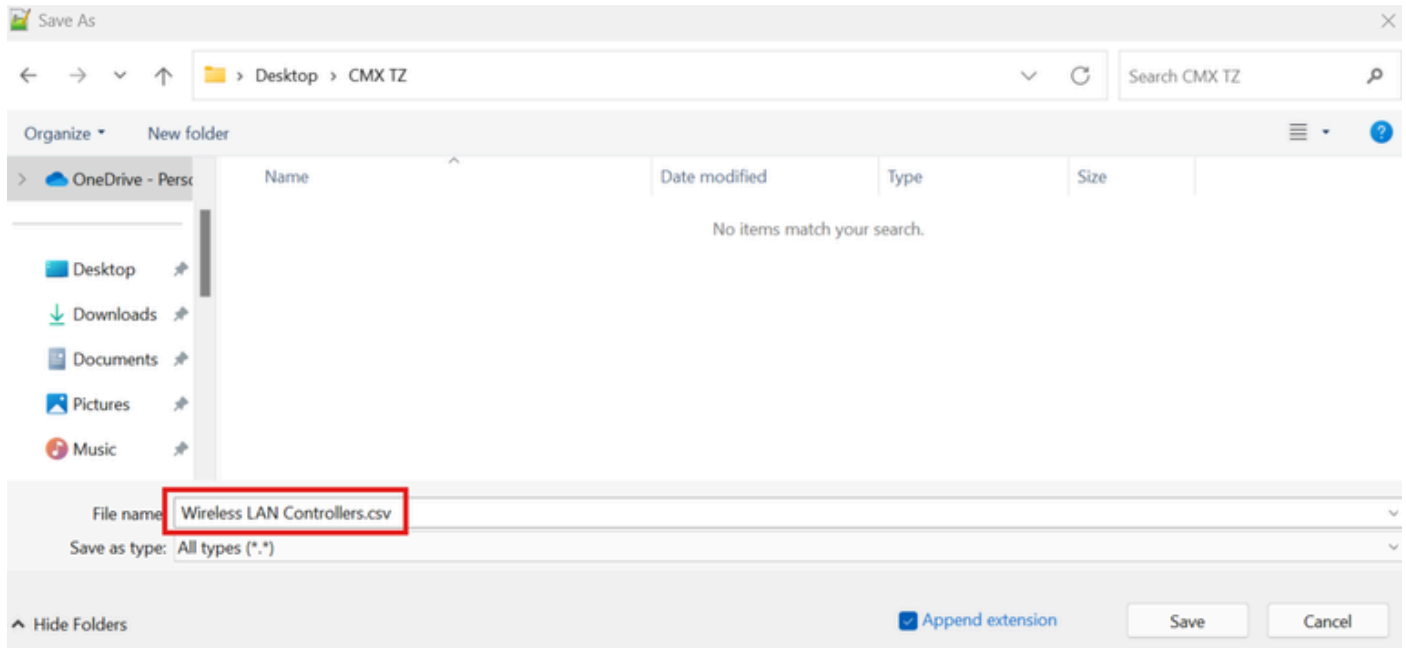
Notepad++ Configuration:

```
Wireless LAN Controllers.txt
1 WLC,192.168.166.33,8.10.196.0,v2c,CMXc0mmunity
2 WLC,192.168.166.34,8.10.196.0,v3,bulkvthree,hmacsha,makEsnmpw0rkbulk,aesfb128,version3workinG
3 Catalyst (IOS-XE) WLC,192.168.166.65,17.09.04,root,RtpW2121!,RtpW2121!
```

Wireless LAN Controllers

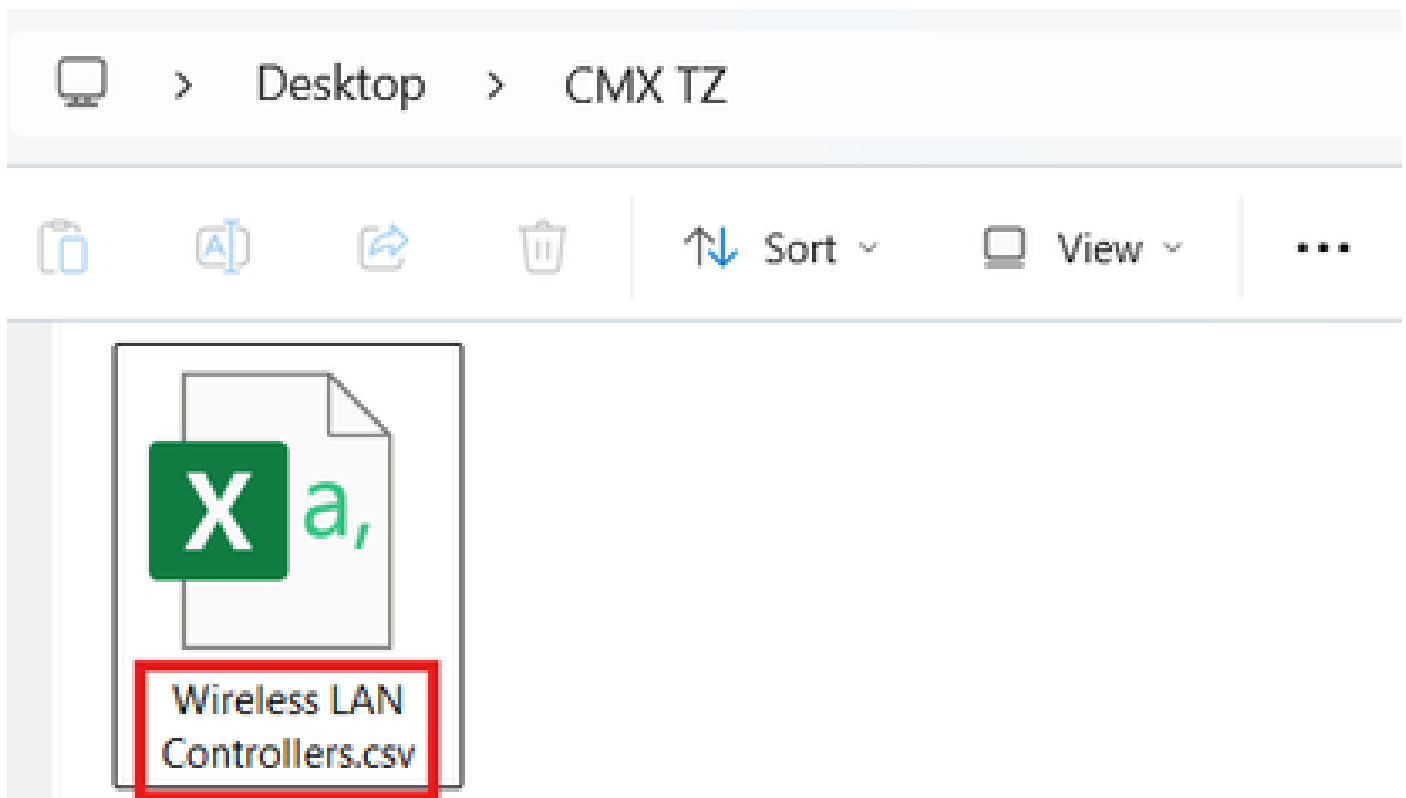
Save the File as CSV

Ensure the extension of the file is .csv, that way the file is not saved as txt but with the correct extension CMX supports.



Save File as CSV

The file shows saved as a CSV file.



File shows saved as CSV

If the file is open it shows the proper information.

	A	B	C	D	E	F	G	H	I
1	WLC	192.168.166.33	8.10.196.0	v2c	CMXc0mmunity				
2	WLC	192.168.166.34	8.10.196.0	v3	bulkvthree	hmacsha	makEsnmpw0rkbulk	aescfb128	version3workinG
3	Catalyst (IOS-XE) WLC	192.168.166.65	17.09.04	root	RtpW2121!	RtpW2121!			

CSV File Open Shows the Information of the WLCs

Import the CSV File into CMX

A transfer method such as Secure File transfer Protocol (SFTP) or Secure Copy Protocol (SCP) is needed to move the file from the current server to the CMX. Programs such as MobaXterm or WinSCP can offer drag and drop options to move the file easily. The Wireless LAN Controllers.csv file is in the server which runs SFTP, a connection from the CMX to the server via SFTP is performed and the file is transferred as follows:

```
<#root>
```

```
[cmxadmin@cmx1063 ~]$
```

```
sftp tac@192.168.166.91
```

```
tac@192.168.166.91's
```

```
password:
```

```
Connected to 192.168.166.91.
```

```
sftp>
```

```
cd Desktop/CMX TZ
```

```
sftp>
```

```
dir
```

```
Wireless LAN Controllers.csv
```

```
sftp>
```

```
get "Wireless LAN Controllers.csv"
```

```
Fetching /cygdrive/c/Users/tac/Desktop/CMX/Wireless LAN Controllers.csv to Wireless LAN Controllers.csv
/cygdrive/c/Users/tac/Desktop/CMX/Wireless LAN Controllers.csv 100% 224 2.3KB/s 00:00
```

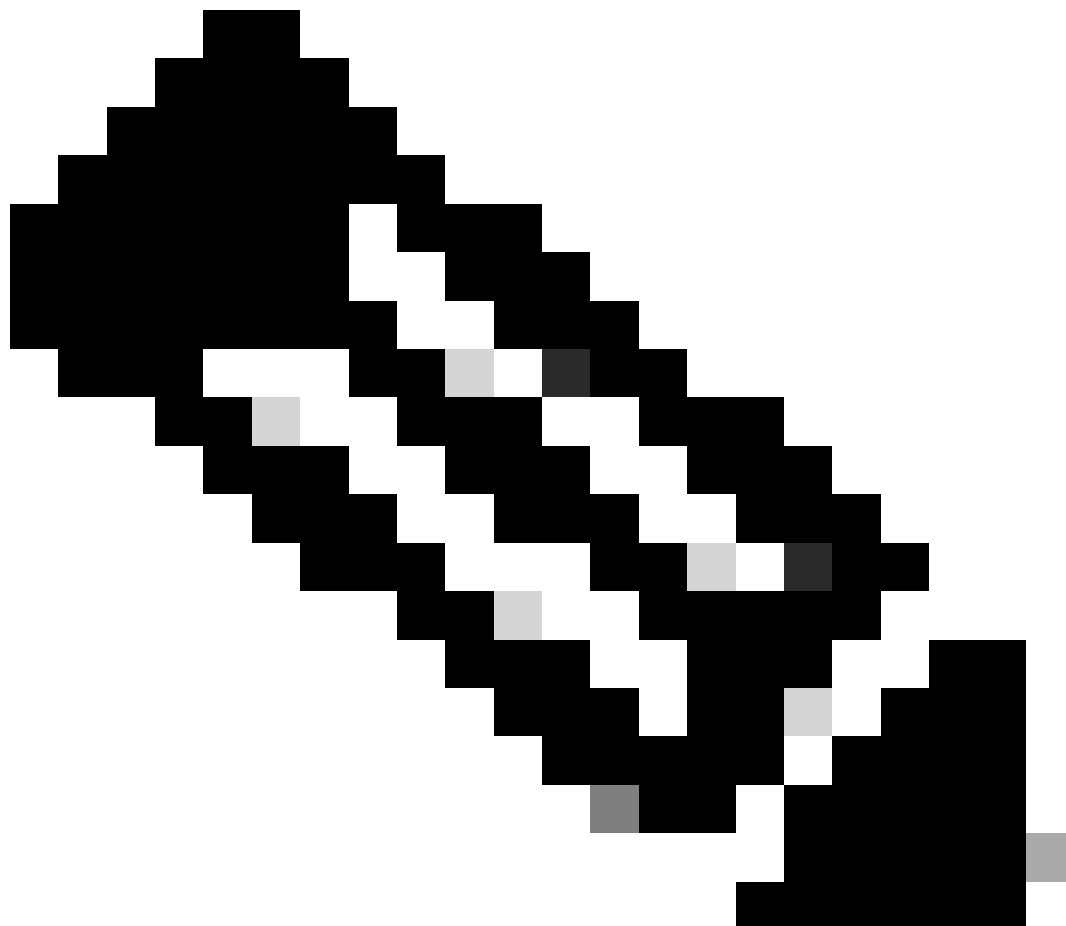
```
sftp>
```

```
exit
```

```
[cmxadmin@cmx1063 ~]$
```

```
ls -lh
```

```
total 28K
dr-xr-xr-x. 2 cmxadmin cmxadmin 4.0K Aug 29 2022 bin
-rw-r--r--. 1 cmxadmin cmxadmin 224 Jan 22 14:29 Wireless LAN Controllers.csv
[cmxadmin@cmx1063 ~]$
```



Note: If the name of the file has spaces, ensure to use quotes to pull the file using SFTP, this way the SFTP considers the name of the file with spaces as a single string.

Execute the File in CMX

Make a SSH connection to the CMX, and run the commands as follows:

```
<#root>
```

```
[cmxadmin@cmx1063 ~]$
```

```
cmxctl config controllers import
```

Please specify import type [PI/FILE] [FILE]:

FILE

Please enter CSV file path:

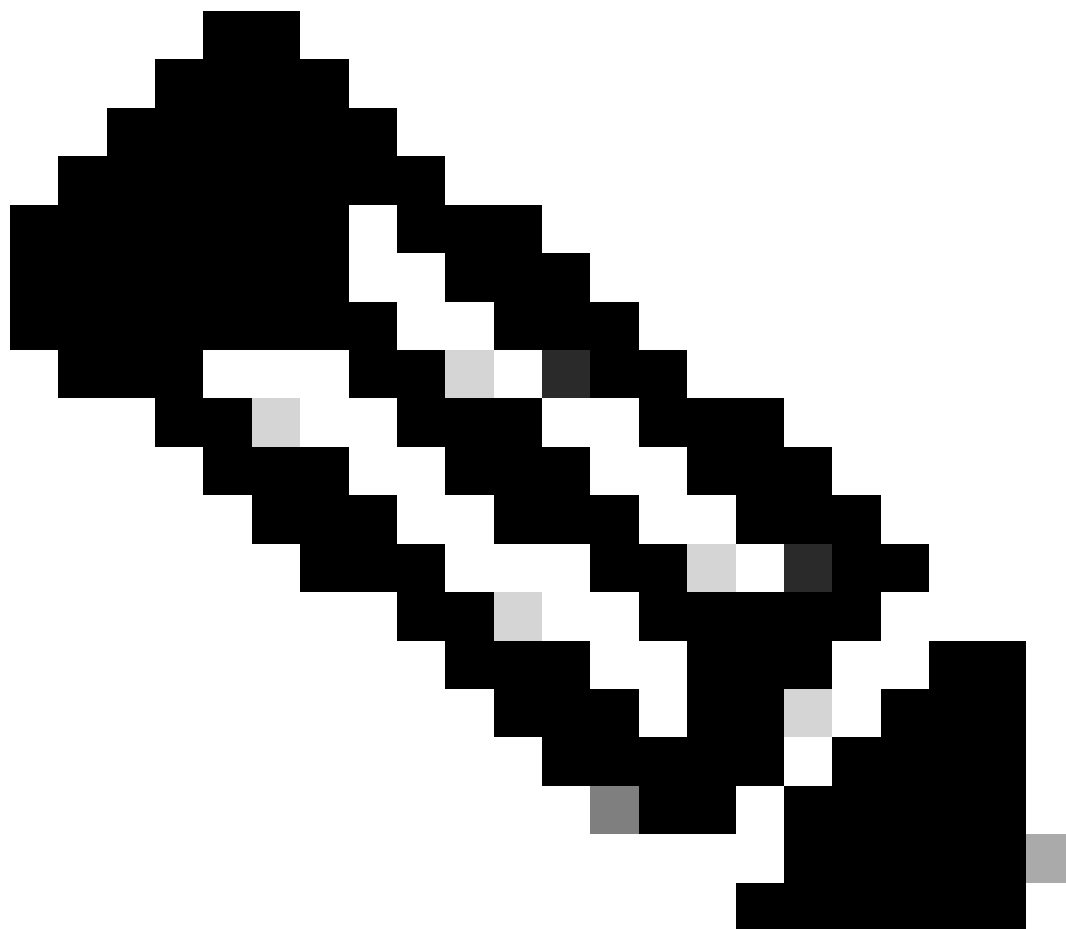
/home/cmxadmin/Wireless LAN Controllers.csv

Controller Added 192.168.166.33

Controller Added 192.168.166.34

Controller Added 192.168.166.65

[cmxadmin@cmx1063 ~]\$



Note: The file path always starts with /home/cmxadmin/.

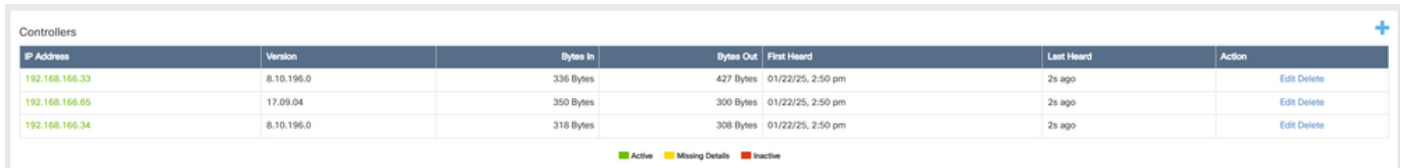
Verify

Verify from CMX

From the CMX GUI and CLI, the WLCs added can be checked to confirm they are working the correct way.

CMX GUI:

Navigate to **SYSTEM**, scroll down to find the WLCs, they must show the IP Address in green as shown in the image, any other color means there is a problem.



IP Address	Version	Bytes In	Bytes Out	First Heard	Last Heard	Action
192.168.166.33	8.10.196.0	336 Bytes	427 Bytes	01/22/25, 2:50 pm	2s ago	Edit Delete
192.168.166.65	17.09.04	350 Bytes	300 Bytes	01/22/25, 2:50 pm	2s ago	Edit Delete
192.168.166.34	8.10.196.0	318 Bytes	308 Bytes	01/22/25, 2:50 pm	2s ago	Edit Delete

Active Missing Details Inactive

CMX GUI

CMX CLI:

<#root>

```
[cmxadmin@cmx1063 ~]$
```

```
cmxctl config controllers show
```

```
+-----+-----+-----+-----+
| IP Address | Type | Version | SHA2 | Status |
+-----+-----+-----+-----+
| 192.168.166.65 | Catalyst (IOS XE) WLC | 17.09.04 | Yes |
```

ACTIVE

```
|
+-----+-----+-----+-----+
| 192.168.166.33 | AireOS WLC | 8.10.196.0 | Yes |
```

ACTIVE

```
|
+-----+-----+-----+-----+
| 192.168.166.34 | AireOS WLC | 8.10.196.0 | Yes |
```

ACTIVE

```
|
+-----+-----+-----+-----+
[cmxadmin@cmx1063 ~]$
```

Verify from WLC

From the WLC the connectivity with CMX can be verified via GUI and CLI.

AireOS GUI:

Navigate to **Monitor > Cloud Services > CMX** as shown in the image.

Monitor

- Summary
- Access Points
- Cisco CleanAir
- Statistics
- CDP
- Rogues
- Clients
- Sleeping Clients
- Multicast
- Applications
- Local Profiling
- Cloud Services**
 - CMX**
 - Telemetry
 - Network Assurance
 - Webhook

CMX Server

CMX Server IP	Services	Sub-Services	AP Monitor Service Configuration	Group Subscriptions
192.168.166.70	RSSI	Mobile Station Tags	▲ ● ▼	None
	Info	Mobile Station		
	Statistics	Mobile Station		

AireOS Verify CMX Connection

AireOS WLC CLI:

```
<#root>
```

```
(Cisco Controller) >
```

```
show nmosp status
```

```
Number of Nmsp TLS Connections supported..... 5
Number of Nmsp HTTPS Connections supported..... 1
CMX Server      Echo Resp  Echo Req  Tx Data  Rx Data
-----
192.168.166.70      847       847      861     17
(Cisco Controller) >
```

9800 WLC GUI:

Navigate to **Monitor > Wireless > NMSP > DNA Spaces Information** as shown in the image.

Monitoring > Wireless > NMSP

Cloud Services **DNA Spaces Information** Statistics Controller Settings

Status	DNA Spaces IP	Transport	Tx Echo Response	Rx Echo Request	Tx Data Frame	Rx Data Frame	Connections	Disconnections	Unsupported Messages
●	192.168.166.70	TLS	883	883	6	17	3	2	0

1 10 View Aggregated Service Subscription Status 1 - 1 of 1 items

CMX Check from 9800 WLC GUI

9800 WLC CLI:

```
<#root>
```

#

show nmosp status

NMSP Status

DNA Spaces/CMX IP Address	Active	Tx Echo Resp	Rx Echo Req	Tx Data	Rx Data	Transport
192.168.166.70	Active	877	877	6	17	TLS

Troubleshoot

It is recommended to troubleshoot simultaneously from CMX and WLC, protocols such as SNMP and NMSP are considered a two way conversation protocols, troubleshoot from both devices to understand the conversation while SNMP and NMSP is negotiated is vital for a successful troubleshoot.

AireOS WLC Troubleshoot

SNMP debugs can be enabled as follows:

(Cisco Controller) >debug snmp all enable

NMSP Debugs can be enabled as follows:

(Cisco Controller) >debug nmosp all enable

To disable the debugs the command goes as follows:

(Cisco Controller) >debug disable-all

9800 WLC Troubleshoot

NMSP debugs can be enabled as follows:

#set platform software trace nmospd chassis active R0 all-modules verbose

Packet capture, filter with CMX IP Address as follows:


```
#config t
(config)#ip access-list extended NMSP
(config-ext-nacl)#permit ip host <CMX IP Address> any
(config-ext-nacl)#permit ip any host <CMX IP Address>
#monitor capture NMSP interface <Interface - port> both access-list NMSP buffer size 100
#monitor capture NMSP start
```

To collect the debugs and monitor capture the commands as follows:

```
#request platform software trace archive last 1 days target bootflash:NMSPArchive
#monitor capture NMSP stop
#monitor capture NMSP export bootflash:NMSP.pcap
```

To disable the debugs and packet capture as follows:

```
#no monitor capture NMSP
#set platform software trace nmspd chassis active R0 all-modules notice
```

CMX Troubleshoot

Collect CMX logs as follows:

```
[cmxadmin@cmx1063 ~]$ cmxos techsupport dump
```