

Campus C-03 AGNI Lab Guide

EAP-TLS Wired Policy



This Lab Guide:

<https://github.com/arista-rockies/Workshops/tree/main/Campus>

Table of Contents

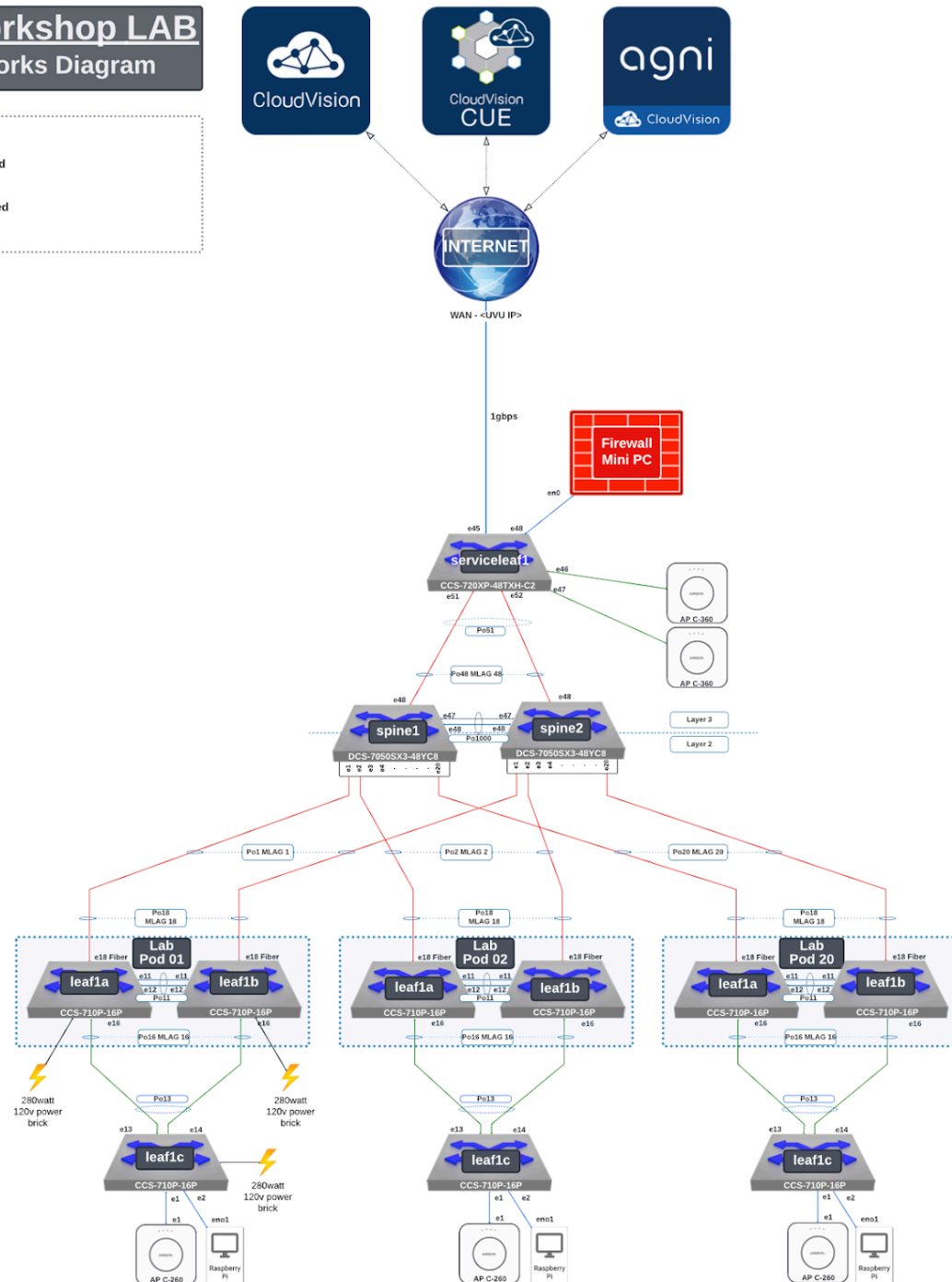
Full Lab Topology.....	2
POD Topology.....	3
NAC Lab #3 - Create EAP-TLS Wired Policy.....	4
1. Access CloudVision as a Service.....	4
2. Enable RadSec on campus-pod<xx>-leaf1c.....	6
3. Access AGNI from the LaunchPad.....	11
4. Create Wired EAP-TLS Network and Segment.....	12
5. Validate and Verify Wired EAP-TLS Device.....	18
Additional Information.....	20
A. 802.1x High-Level Overview.....	20
B. Configuring RadSec profile in EOS.....	21

Full Lab Topology

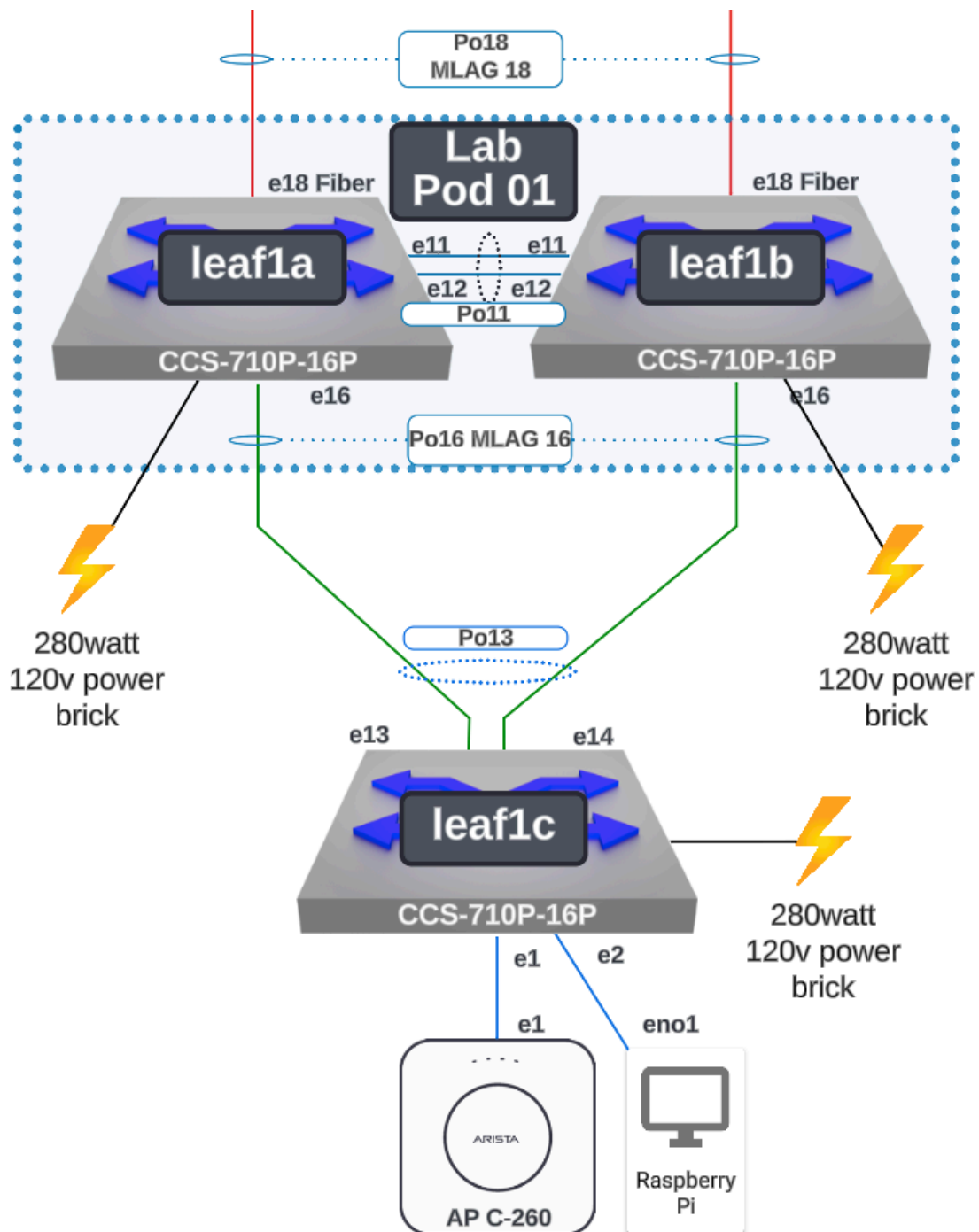
Arista Workshop LAB Lab Networks Diagram

Key:

- 10G link speed
- 5G link speed
- 2.5G link speed
- 1G link speed



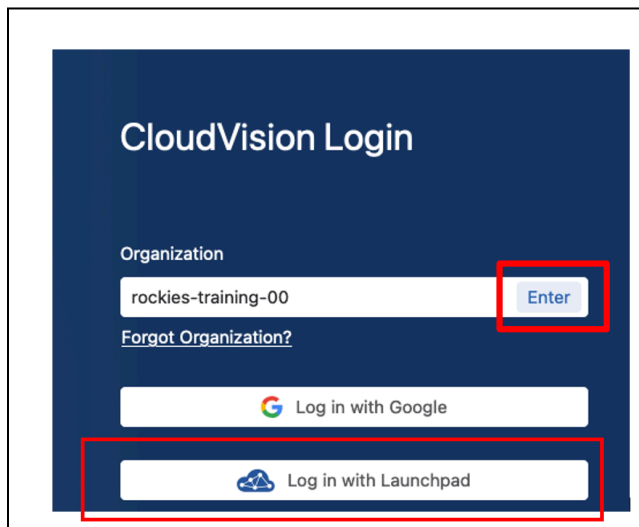
POD Topology



NAC Lab #3 - Create EAP-TLS Wired Policy

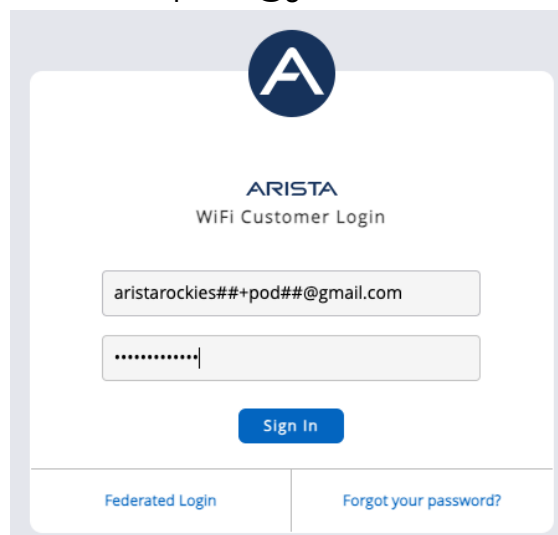
1. Access CloudVision as a Service

1. In your browser, enter the following URL: <https://www.arista.io/> to access CloudVision as a Service (CVaaS).
2. Enter the Organization name <rockies-training-##> in the “**Organization**” box, then click “**Enter**” (where ## is a 2 digit character between 01-20 that was assigned to your lab/Pod).

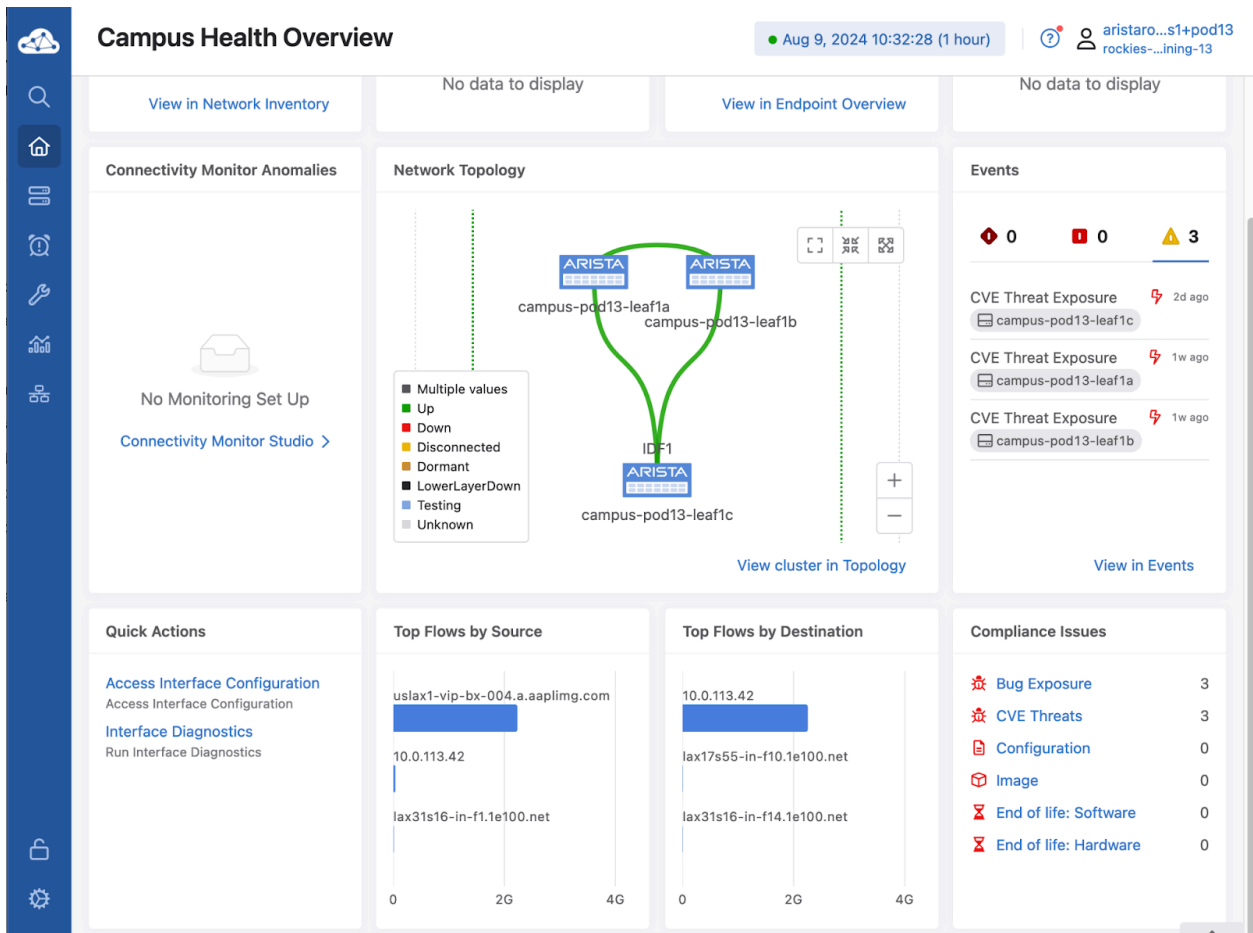


3. Click the Log in with Launchpad button and provide your assigned lab email address and password:

Email address format: aristarockies##+pod##@gmail.com



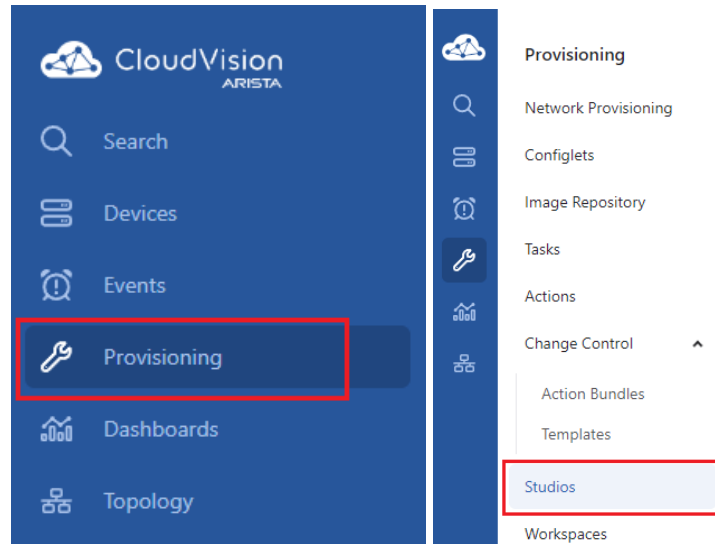
You will now be logged into CloudVision.



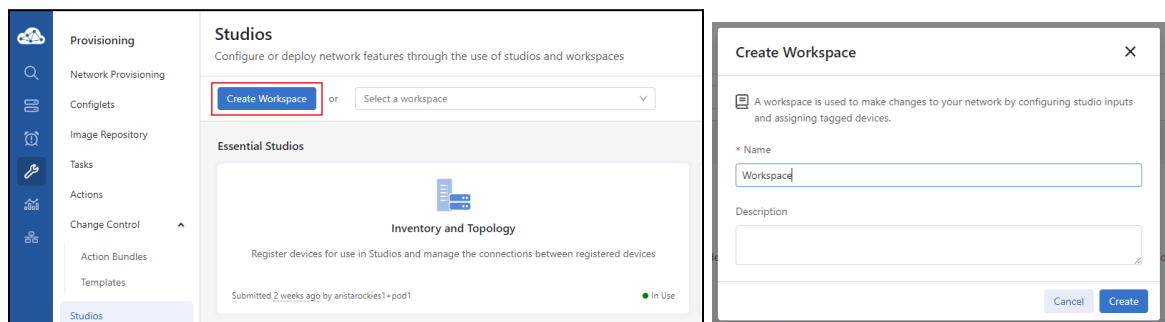
2. Enable RadSec on campus-pod<xx>-leaf1c

In this lab you will be configuring RadSec on the campus-podXX-leaf1c switches by adding the RadSec configuration to the leaf1c switches via the Static Configuration Studio.

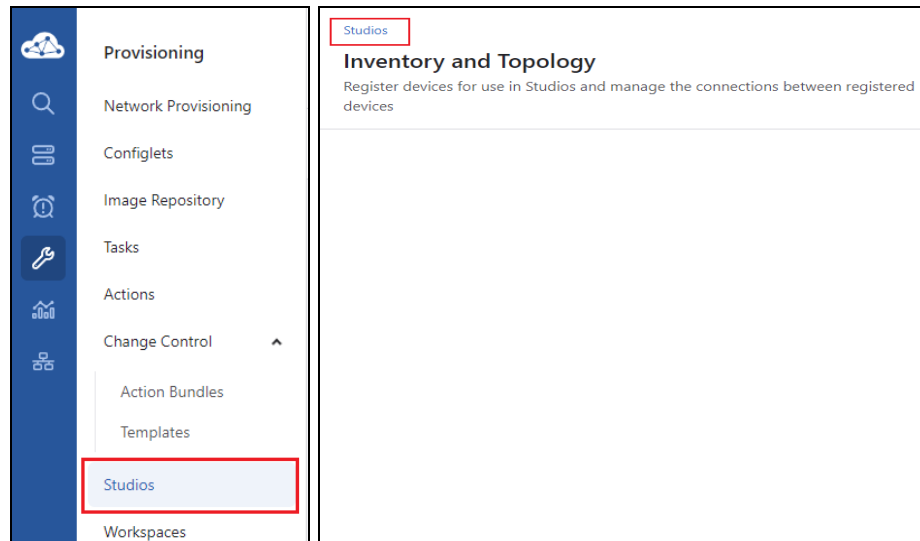
1. Login to CloudVision, then click on the “**Provisioning**” menu option, then choose “**Studios**”.



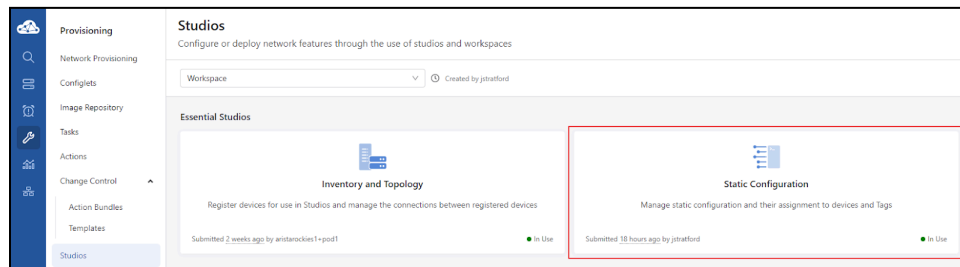
2. Create a workspace to propose changes to the Network Infrastructure. A workspace acts as a sandbox where you can stage your configuration changes before deploying them. Click “**Create a Workspace**”, give it any name you would like and click “**Create**”.



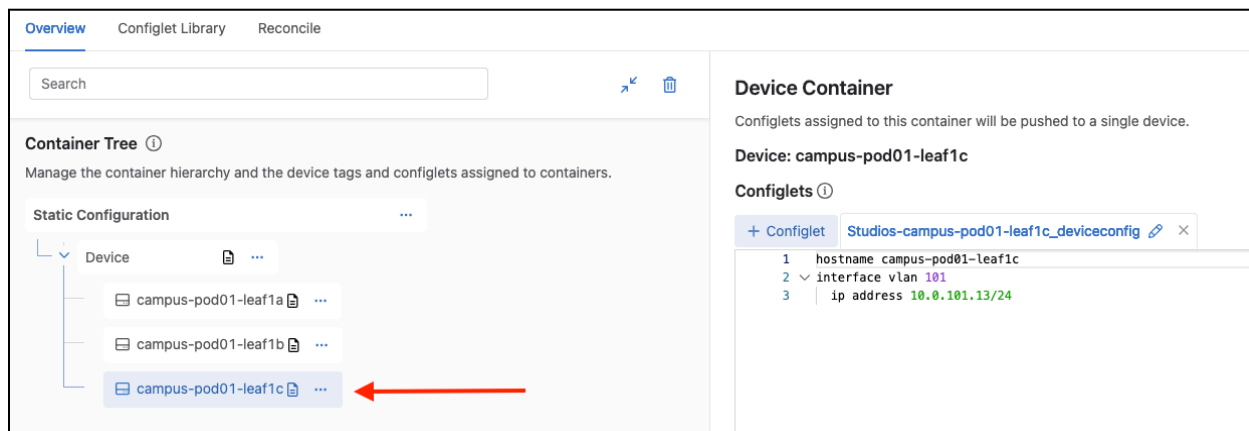
3. Apply the static configuration to the campus-podXX-leaf1c switch using Static Configuration Studio
Click on **Studios** at the Top OR Left side navigation pane



Launch the Static Configuration Studios



Expand the Device Container Tree and select the “campus-pod<xx>-leaf1c” switch.



In the Device Container window, click on “+ Configlet” followed by “Configlet Library”. Select the Configlet named “Studios-campus-pod<xx>-radsec-config” and click Assign to add the configlet to the “campus-pod<xx>-leaf1c” switch.

Assign configlets from library

Destination Container

Unnamed Container

Container Tag Query

device: campus-pod01-leaf1c

Select Configlet to Assign

Configlets

Search

<input checked="" type="checkbox"/>	Name	Assigned Containers	Status	Last Editor
<input type="checkbox"/>	Studios-campus-pod01-global-config	Device	Single	wwolesky
<input type="checkbox"/>	Studios-campus-pod01-leaf1a-deviceconfig	device: campus-pod01-leaf1	Single	jstratford
<input type="checkbox"/>	Studios-campus-pod01-leaf1b-deviceconfig	device: campus-pod01-leaf1	Single	jstratford
<input checked="" type="checkbox"/>	Studios-campus-pod01-leaf1c_deviceconfig	device: campus-pod01-leaf1	Single	wwolesky
<input checked="" type="checkbox"/>	Studios-campus-pod01-radsec-config	—	Unused	jstratford

Cancel

Assign

Click **Review Workspace** to review all the changes proposed to the CloudVision Studio

Static Configuration

Manage static configuration and their assignment to devices and Tags

RadSec

Build Succeeded

Created by wwolesky

Rebuild

Review Workspace

Overview

Configlet Library

Reconcile

Search

Container Tree

Manage the container hierarchy and the device tags and configlets assigned to containers.

Static Configuration

Device

campus-pod01-leaf1a

campus-pod01-leaf1b

campus-pod01-leaf1c

Device Container

Configlets assigned to this container will be pushed to a single device.

Device: campus-pod01-leaf1c

Configlets

Studios-campus-pod01-leaf1c_deviceconfig

Studios-campus-pod01-radsec-config

```

1 management security
2 ssl profile agni-server
3 certificate 718p.pem key 718p.key
4 trust certificate radsec_ca_certificate.pem
5
6 radius-server host radsec.beta.agni.arista.io tls ssl-profile agni-server timeout 10 retransmit 3
7
8 aaa group server radius agni-server-group
9 server radsec.beta.agni.arista.io tls
10
11 aaa authentication dot1x default group radius
12 aaa accounting dot1x default start-stop group radius
13

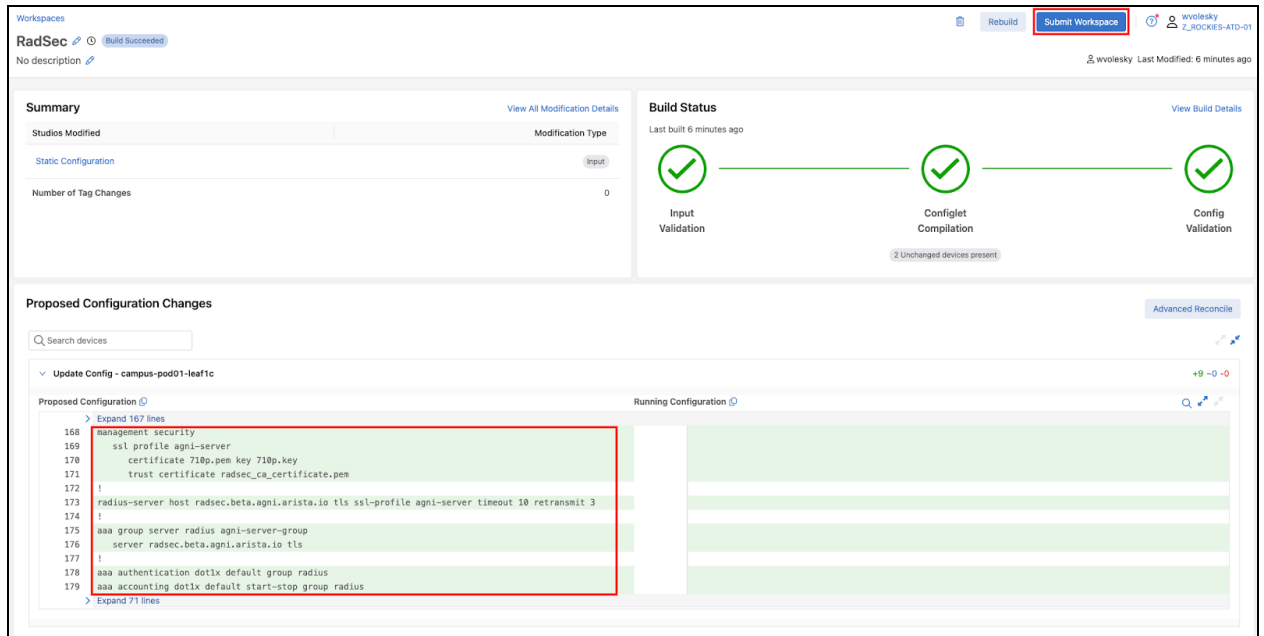
```

4. Review and Submit the Workspace

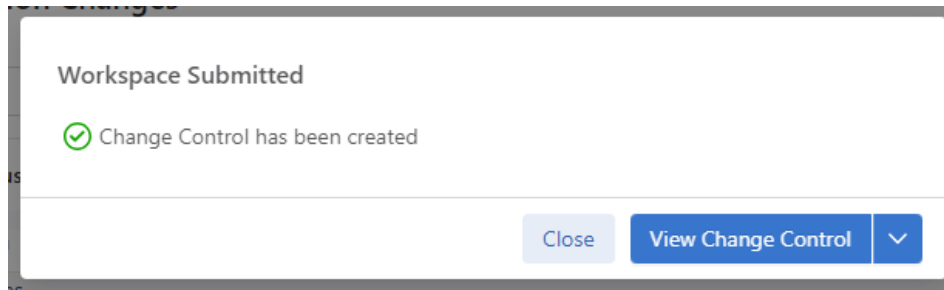
Review the workspace details showing the summary of modified studios, the build status, and the proposed configuration changes for each device.

Click **“Submit Workspace”**

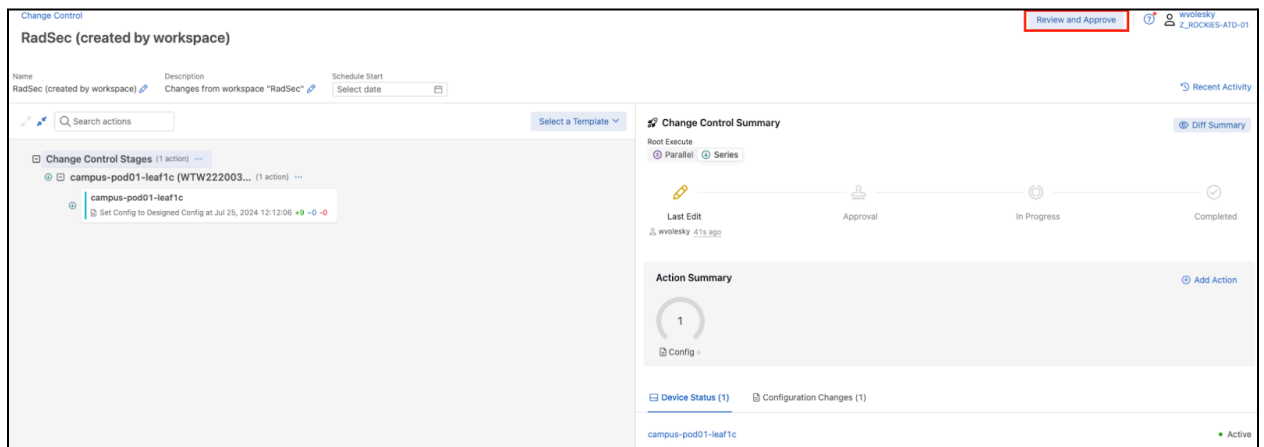
8



Click **“View Change Control”**



- Review, Approve and Execute the Change Control to apply the configuration changes
Click **“Review and Approve”**



Select **“Execute immediately”** and click **“Approve and Execute”**

Execute immediately ⓘ



Cancel

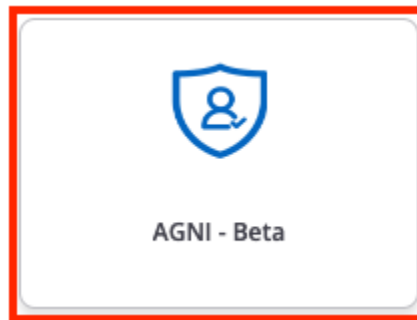
Approve and Execute

6. The change control will execute and apply all the RadSec configuration changes to the device. This will enable RadSec connectivity between the campus-pod<xx>-leaf1c switch and AGNI.

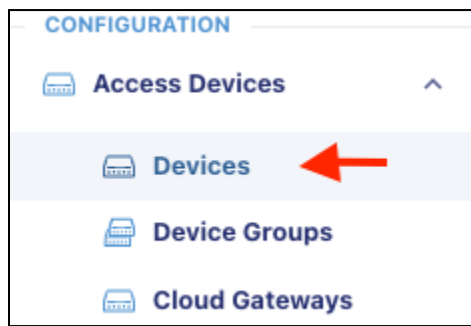
***Note:** The switch device certificate and the AGNI RadSec root certificate have already been provisioned on the switch.

See Section B. Configuring RadSec profile in EOS for additional information.

3. Access AGNI from the LaunchPad.



Click on **Access Devices - Devices** to confirm the RadSec connection is up.

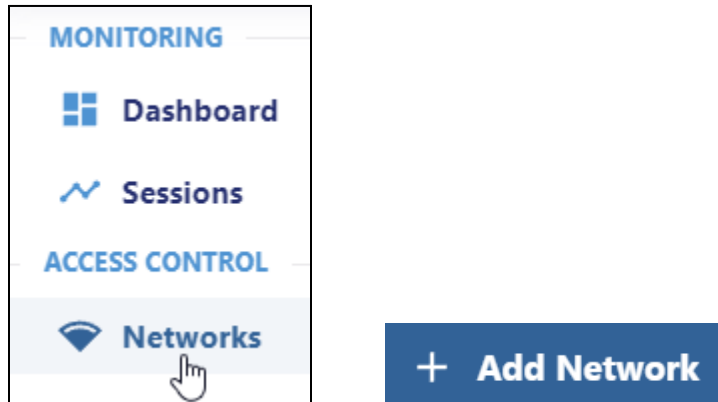


<input type="checkbox"/>	#	NAME	MAC ADDRESS	VENDOR	LOCATION	RADSEC STATUS
<input type="checkbox"/>	1	campus-pod01-leaf1c.cam...	2c:dd:e9:fd:84:90	Arista Switch	Arista CloudVision/Tenant/Undefined	●
<input type="checkbox"/>	2	POD-01-FL1	30:86:2d:30:42:2f	Arista WiFi	Locations/Corp/1st Floor	●

4. Create Wired EAP-TLS Network and Segment

In this section we will create a Network and Segment in Cloudvision AGNI to utilize a certificate based TLS authentication method on a wired connection with a Raspberry Pi.

Click on **Networks** and select **+ Add Network**



Fill in and select the Following fields on the “Add Network” page.

Name: **Wired-EAP-TLS**

Connection Type: **Wired**

Access Device Group: **Switches**

Status: **enabled**


Authentication type: **Client Certificate (Eap-TLS)**

Fallback to mac Authentication: **Enabled**

MAC Authentication Type: **Allow Registered Clients Only**

Onboarding: **Enabled**

Authorized User Groups: **Employees**



Add Network

Provide the following details to add a new Network

[< Back](#)

Name

Wired-EAP-TLS

Connection Type:

☐ Wireless

☒ Wired

Access Device Group

Switches

✕

+

Status:

Enabled

☒

Authentication

Authentication Type

Client Certificate (EAP-TLS)

Domain Machine Authentication:

Disabled

☐

Enable to allow machine authentication with domain machine certificates.

Trust External Certificates

Disabled

☐

Enable this setting to accept client certificates issued by external CAs.

Fallback To MAC Authentication

Enabled

MAC Authentication Type

Allow Registered Clients Only

Disallow user associated clients:

Disabled

☐

Enable to disallow user associated clients on this network.

Onboarding

Enabled

Authorized User Groups

Employees

Select Authorized User Groups...

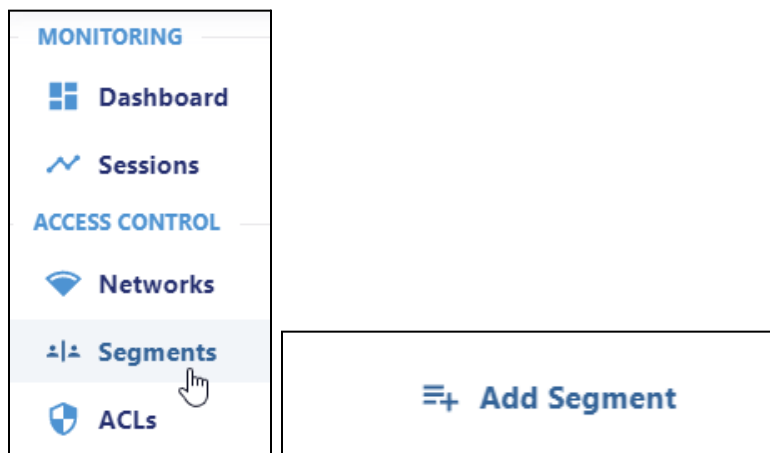
Cancel

Add Network

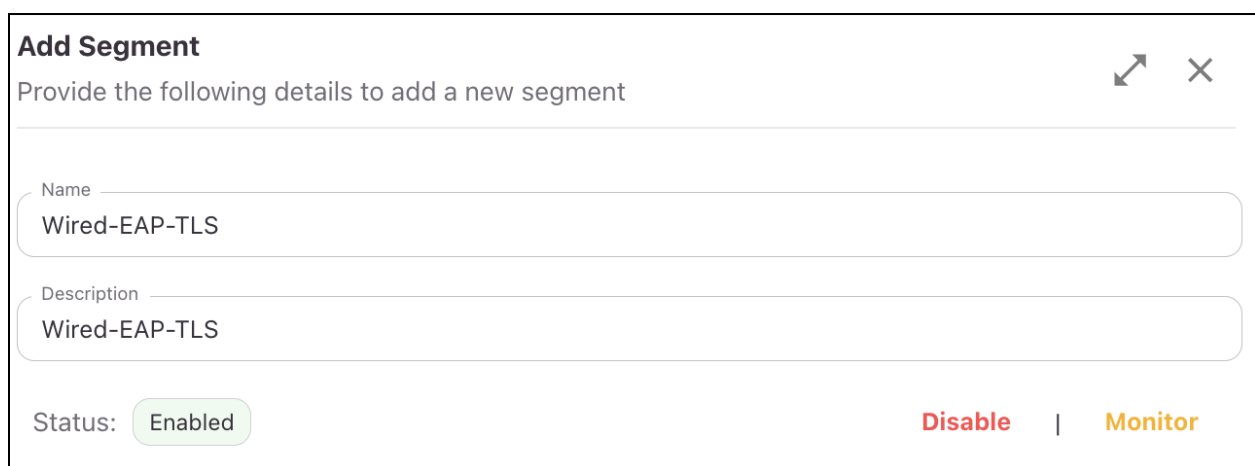
A dark blue rounded rectangular button with the text "Add Network" in white. A hand cursor icon is positioned over the bottom right corner of the button.

Click on **Add Network** at the bottom of the screen.

Next, click on **Segments** and then **+ Add Segment**



Next, type in the name: **Wired-EAP-TLS** and the Description as well.

A screenshot of a "Add Segment" form. The title "Add Segment" is at the top left, and "Provide the following details to add a new segment" is below it. On the top right are icons for a full-screen window and a close button. The form has two input fields: "Name" with the value "Wired-EAP-TLS" and "Description" with the value "Wired-EAP-TLS". At the bottom left, the "Status" is set to "Enabled" in a green pill. At the bottom right are two buttons: "Disable" in red and "Monitor" in orange, separated by a vertical line.

Next, let's **Add Conditions**. Note: Adding more than one condition means MATCH ALL

Add Condition

Select, **Network, Name, Is, Wired-EAP-TLS** from the drop down lists.

Network: Name

is

Wired-EAP-TLS

Let's add one more condition.

Add Condition

Select, **Network, Authentication Type, Is, Client Certificate (EAP-TLS)** from the drop down lists.

Network: Authentication Type

is

Client Certificate (EAP-TLS)

Your Conditions should now look like this.

Conditions

MATCHES ALL

Network: Name

is

Wired-EAP-TLS

×

Network: Authentication Type

is


Client Certificate (EAP-TLS)

×

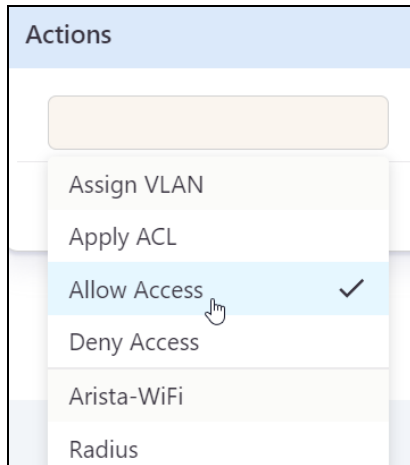
 Add Condition

Under Actions select **Add Action**.

Actions

 Add Action

Select Allow Access.



Finally, select Add Segment at the bottom of the page.

A screenshot of the 'Add Segment' form. The form has a title 'Add Segment' and a subtitle 'Provide the following details to add a new segment'. It contains several input fields: 'Name' with the value 'Wired-EAP-TLS' and 'Description' with the value 'Wired-EAP-TLS'. Below these is a 'Status' section with a green 'Enabled' button and red 'Disable' and 'Monitor' buttons. The 'Conditions' section, titled 'MATCHES ALL', contains two conditions: 'Network: Name is Wired-EAP-TLS' and 'Network: Authentication Type is Client Certificate (EAP-TLS)'. Below the conditions is an 'Add Condition' button. The 'Actions' section contains one action: 'Allow Access Allow default access'. Below the actions is an 'Add Action' button. At the bottom right of the form are 'Cancel' and 'Add Segment' buttons, with the 'Add Segment' button highlighted by a red rectangle.

You should now be able to expand and review your segment.

Wired-EAP-TLS

Conditions

Network:Name is Wired-EAP-TLS

Network:AuthType is Client Certificate (EAP-TLS)

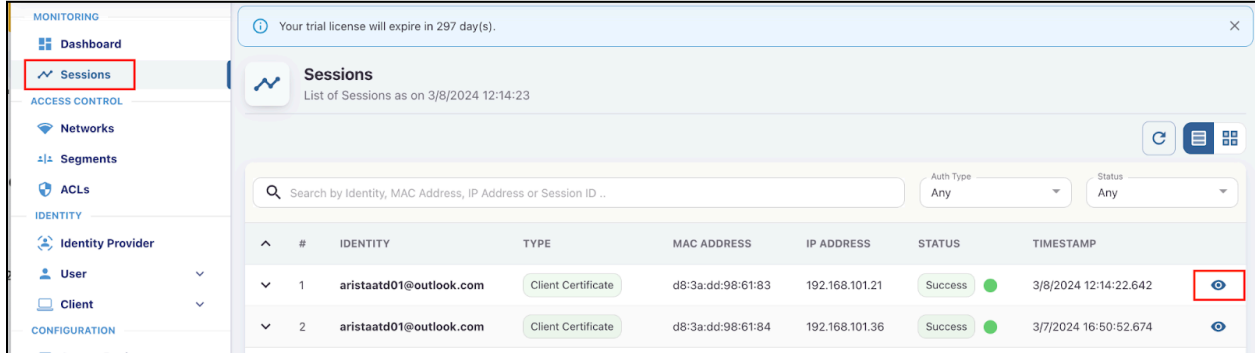
Actions

Allow Access

Next, unplug and plug your raspberry Pi into port 2 on the switch and click on **Sessions** to see if your ATD Raspberry Pi has a connection via the Wired connection. ***Note:** The Client Certificate has already been applied to the Raspberry Pi.

5. Validate and Verify Wired EAP-TLS Device

Once the device is connected you will be able to view the status of the connection and additional session details if you click on the Eye to the right of the device.



MONITORING

- Dashboard
- Sessions**
- ACCESS CONTROL
 - Networks
 - Segments
 - ACLs
- IDENTITY
 - Identity Provider
 - User
 - Client
- CONFIGURATION

Your trial license will expire in 297 day(s).

Sessions

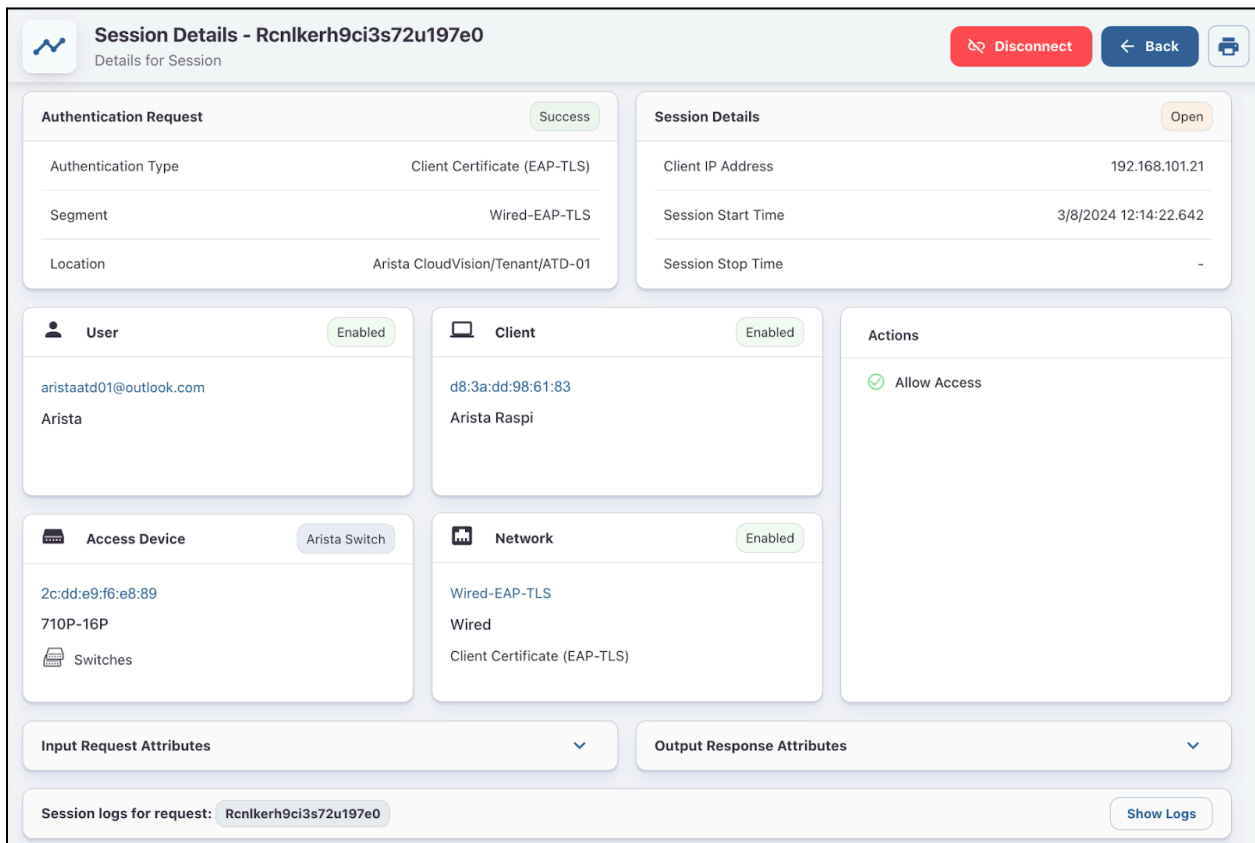
List of Sessions as on 3/8/2024 12:14:23

Search by Identity, MAC Address, IP Address or Session ID ..

Auth Type: Any Status: Any

#	IDENTITY	TYPE	MAC ADDRESS	IP ADDRESS	STATUS	TIMESTAMP	
1	aristaatd01@outlook.com	Client Certificate	d8:3a:dd:98:61:83	192.168.101.21	Success	3/8/2024 12:14:22.642	👁
2	aristaatd01@outlook.com	Client Certificate	d8:3a:dd:98:61:84	192.168.101.36	Success	3/7/2024 16:50:52.674	👁

AGNI will then display more in depth session information regarding the device and connection.



Session Details - Rcnlkerh9ci3s72u197e0

Details for Session

[Disconnect](#) [Back](#) [Print](#)

Authentication Request

Success

Authentication Type: Client Certificate (EAP-TLS)

Segment: Wired-EAP-TLS

Location: Arista CloudVision/Tenant/ATD-01

Session Details

Open

Client IP Address: 192.168.101.21

Session Start Time: 3/8/2024 12:14:22.642

Session Stop Time: -

User

Enabled

aristaatd01@outlook.com

Arista

Client

Enabled

d8:3a:dd:98:61:83

Arista Raspi

Access Device

Arista Switch

2c:dd:e9:f6:e8:89

710P-16P

Switches

Network

Enabled

Wired-EAP-TLS

Wired

Client Certificate (EAP-TLS)

Actions

✓ Allow Access

Input Request Attributes

▼

Output Response Attributes

▼

Session logs for request: Rcnlkerh9ci3s72u197e0 [Show Logs](#)

You can also validate the session on the switch by issuing the following commands in the switch CLI

```
710P-16P#show dot1x host
```

Port	Supplicant MAC	Auth State	Fallback	VLAN
Et2	d83a.dd98.6183	EAPOL SUCCESS	NONE	

710P-16P#**sh dot1x host mac d83a.dd98.6183 detail**

Operational:

Supplicant MAC: d83a.dd98.6183

User name: aristaatd01@outlook.com

Interface: Ethernet2

Authentication method: EAPOL

Supplicant state: SUCCESS

Fallback applied: NONE

Calling-Station-Id: D8-3A-DD-98-61-83

Reauthentication behaviour: DO-NOT-RE-AUTH

Reauthentication interval: 0 seconds

VLAN ID:

Accounting-Session-Id: 1x00000004

Captive portal:

AAA Server Returned:

Arista-WebAuth:

Class: Rcnlkerh9ci3s72u197e0|C4151a596-baab-444b-a4fd-ad40946d8b5f

Filter-Id:

Framed-IP-Address: 192.168.101.21 sourceArp

NAS-Filter-Rule:

Service-Type: None

Session-Timeout: 86400 seconds

Termination-Action: RADIUS-REQUEST

Tunnel-Private-GroupId:

Arista-PeriodicIdentity:

NAC LAB #3 COMPLETE

Additional Information

A. 802.1x High-Level Overview

For more information please refer to the TOI. [802.1X on Arista Switches](#)

Overview

802.1X is an IEEE standard protocol that prevents unauthorized devices from gaining access to the network.

802.1X defines three device roles:

- Supplicant (client)
- Authenticator (switch)
- Authentication server (RADIUS)

Before authentication is successful the switchport is in unauthorized mode and all traffic is blocked, but after authentication has succeeded, normal data can then flow through the switchport.

Description

802.1X port security controls who can send traffic through and receive traffic from individual switch ports. A supplicant needs to authenticate itself using “**Extensible Authentication Protocol over Lan**” (EAPoL) packets with the switch before it gains full access to the port. Arista switches act as an authenticator, passing the messages from 802.1X supplicants through to the RADIUS server and vice versa. 802.1X can operate in three different modes:

- Single Host Mode: Once the 802.1X supplicant is authenticated on the port, ONLY the traffic coming from the supplicant's MAC is allowed through the port.
- Multi-Host Mode: Once the 802.1X supplicant is authenticated on the port, traffic coming from ANY source MAC is allowed through the port.
- Multi-Host authenticated Mode: Multiple 802.1X supplicants can be allowed and ONLY the traffic coming from all authenticated supplicant's MAC is allowed through the port.

Single Host and Multi Host modes allow only one 802.1X supplicant to be authenticated for one port. Once it is successfully authenticated, no other 802.1X supplicant can be authenticated unless the current one logs off, but Multi-Host authenticated Mode allows multiple 802.1X supplicants simultaneously to be authenticated and provided access to the network. From

release 4.28.2F, one supplicant can replace another supplicant's session in single-host mode. For more details on the session replace configuration, please see [here](#)

Apart from 802.1X authentication, Arista switches also support MAC-Based Authentication (MBA) which allows devices not speaking 802.1X to have access to the network. By default the authenticator uses the non delimited MAC address(i.e. 001c73ff9b11) of such devices as the username/password in its RADIUS request packets. Depending on the MAC-Based Authentication configuration on the RADIUS server, it decides whether to authenticate the supplicant or not. Unlike 802.1X supplicants, multiple MBA supplicants can be allowed on a single port (irrespective of 802.1X mode). The MBA configuration is independent of the 802.1X host modes. MBA supplicants will not be considered to allow or reject unauthenticated traffic based on the host mode.

***Note:** From release 4.25.1F MBA supplicants can be controlled by Dot1x Host modes, for more details please refer [here](#).

Arista switches also support Dynamic VLAN assignment, which allows the RADIUS server to indicate the desired VLAN for the supplicant using the tunnel attributes with the Access-Accept message ("**Tunnel-Private-Group-ID**" in <https://tools.ietf.org/html/rfc2868>). Both 802.1X and MBA supplicants can be assigned a VLAN via the RADIUS server using this feature. It should be noted that only one VLAN per port is supported for platforms that do not support "**MAC based VLAN assignment**". On these platforms when the first host authenticates, the authenticator port is put in the respective VLAN (via dynamic VLAN assignment) and subsequently, all other hosts must belong to that VLAN as well. For details about which platforms support "**MAC Based VLAN Assignment**", please refer to the table in the "**Platform Compatibility**" paragraph.

802.1X features are supported on 802.1Q trunk ports allowing the user to have Port-Based Network Access Control (PNAC) on such a port. With this feature, traffic coming into an 802.1X enabled port with a VLAN tag can also be authenticated via both 802.1X or MBA.

By default, traffic from any unauthenticated device on an 802.1X enabled port is dropped. By configuring Authentication Failure VLAN on the authenticator switch, 802.1X or MBA supplicants' traffic can be put into a specific VLAN if the supplicant fails to authenticate via the RADIUS server.

B. Configuring RadSec profile in EOS

Reference the following article to Configure the RadSec profile in EOS:

<https://arista.my.site.com/AristaCommunity/s/article/Configuring-RadSec-profile-in-EOS>