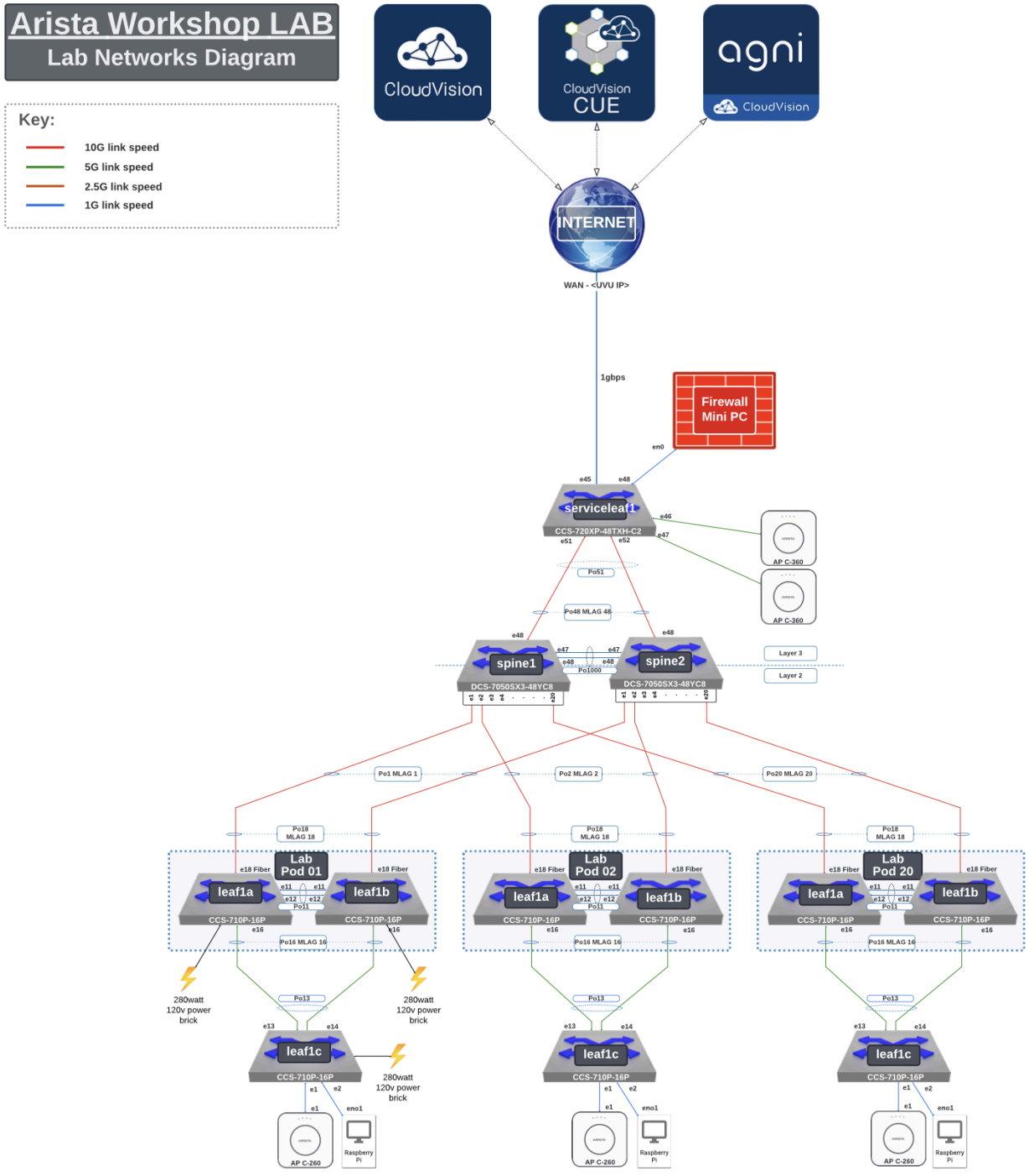
Campus C-03 AGNI Lab Guide
EAP-TLS Wired Policy

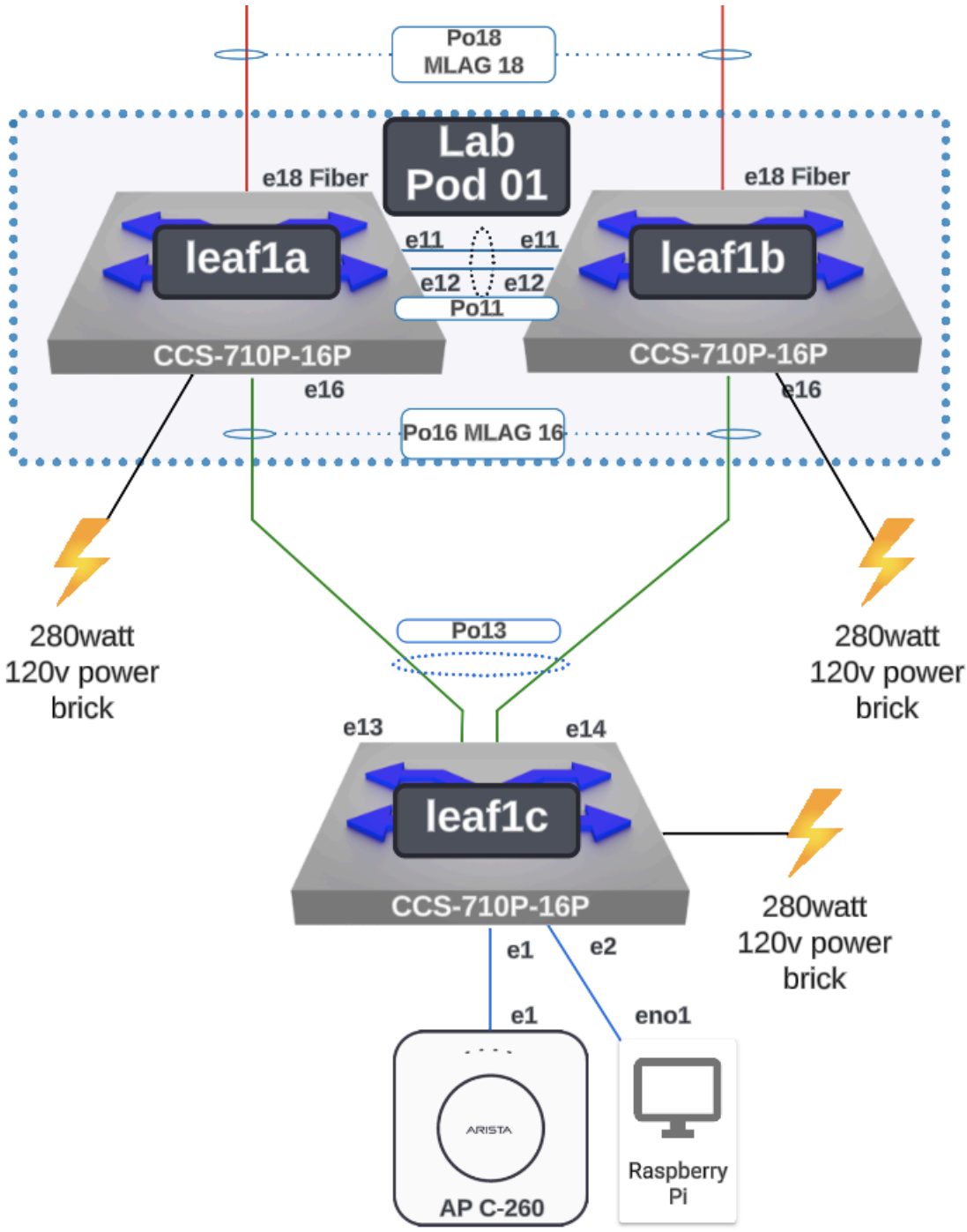
This Lab Guide:
https://github.com/arista-rockies/Workshops/tree/main/Campus

Table of Contents

Full Lab Topology



POD Topology

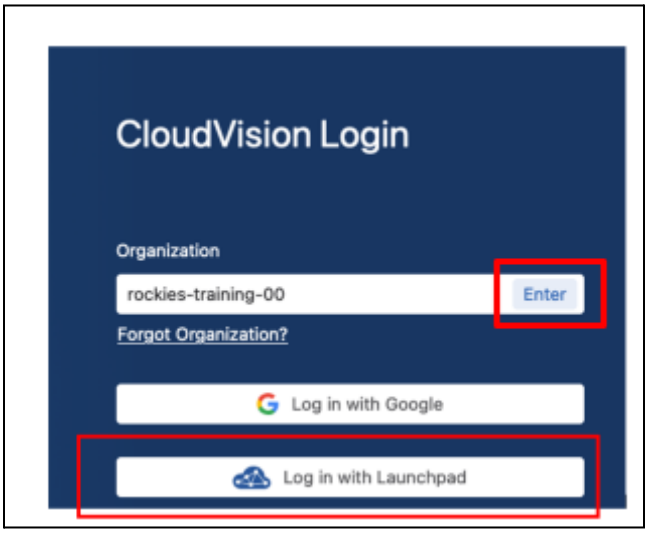


NAC Lab #3 - Create EAP-TLS Wired Policy

1. Access CloudVision as a Service

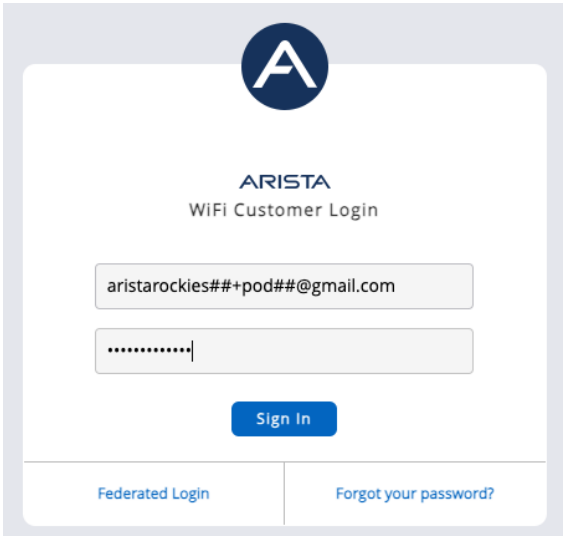
1. In your browser, enter the following URL: https://www.arista.io/ to access CloudVision as a Service (CVaaS).

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).

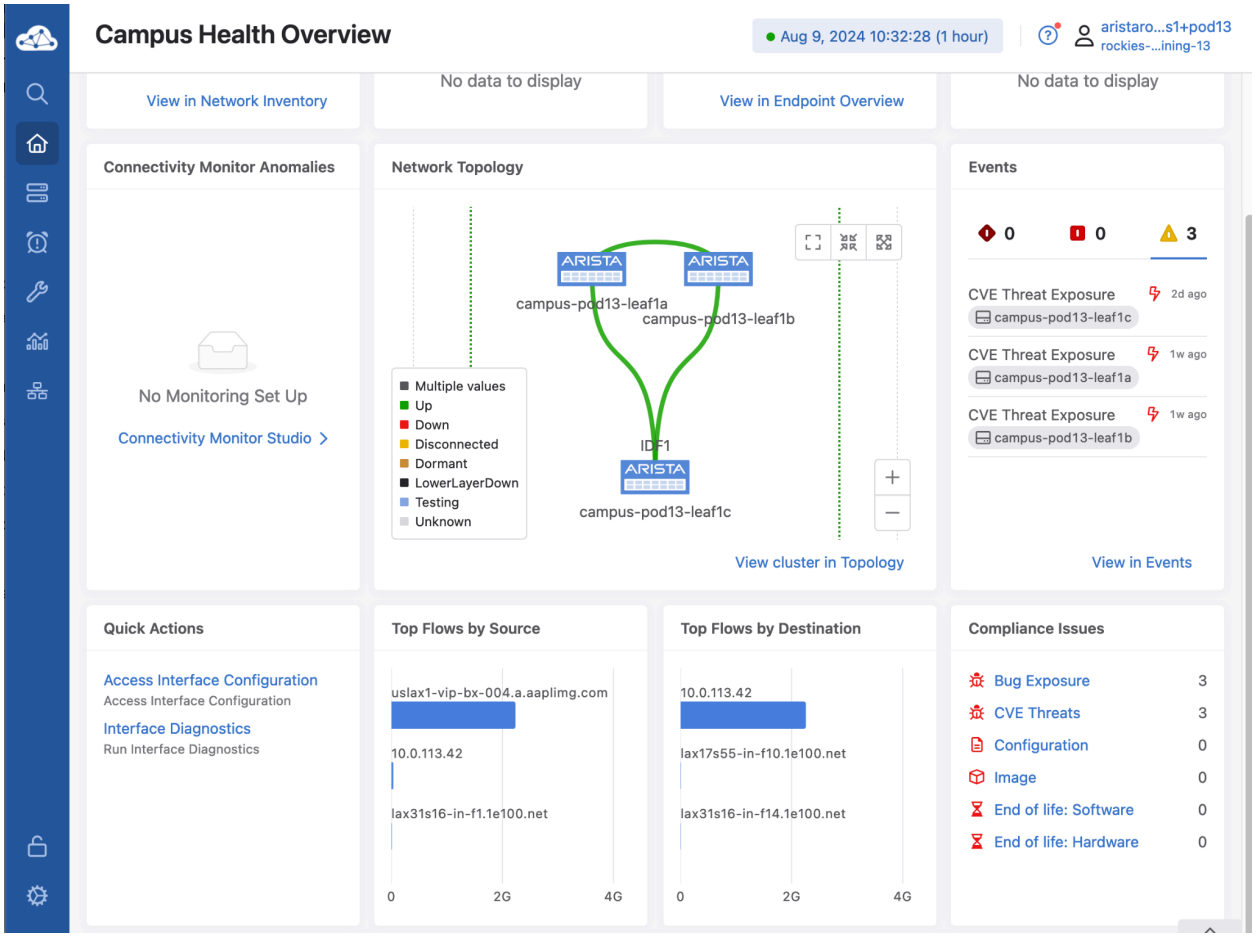


3. Click the Log in with Launchpad button and provide your assigned lab email address and password:

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



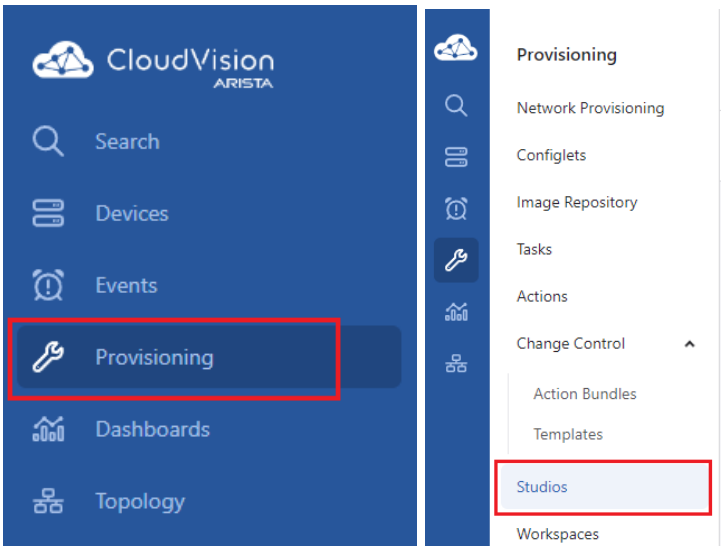
You will now be logged into CloudVision.



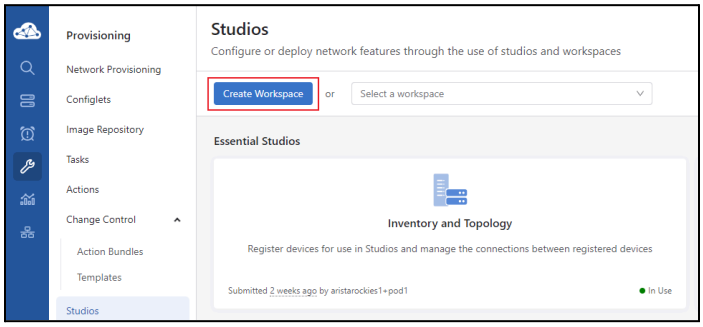
2. Enable RadSec on campus-pod<xx>-leaf1c

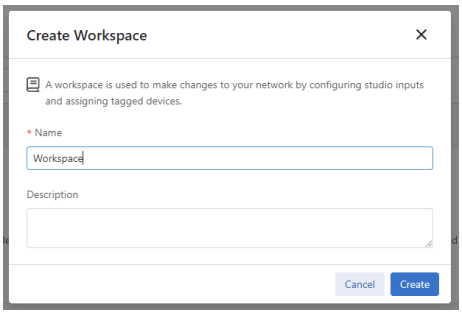
In this lab you will be configuring RadSec on the campus-podXX-leaf1c switches by adding the RadSec configuration to the leaf1c switches via the Static Configuration Studio.

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

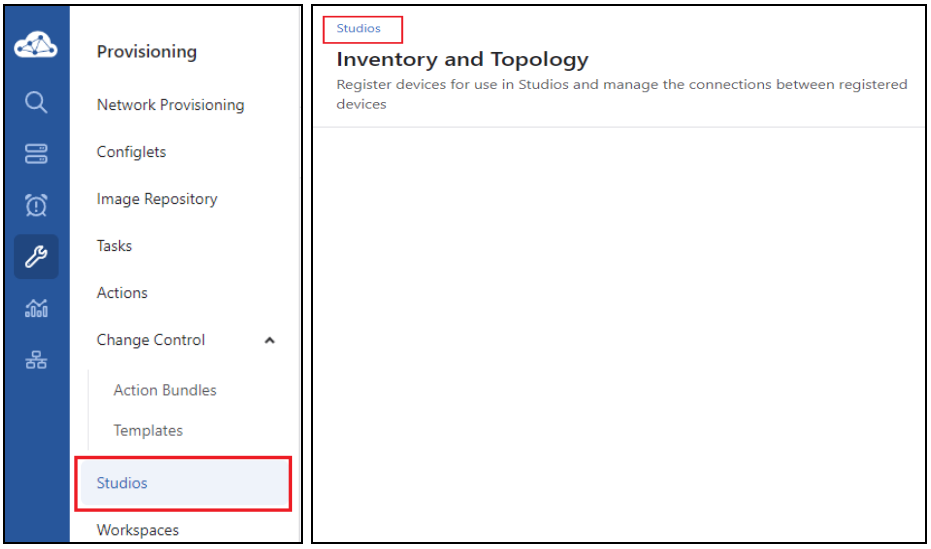


2. Create a workspace to propose changes to the Network Infrastructure. A workspace acts as a sandbox where you can stage your configuration changes before deploying them. Click "**Create a Workspace**", give it any name you would like and click "**Create**".

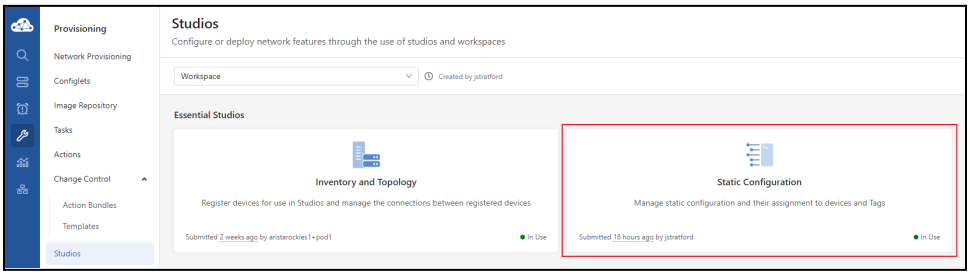




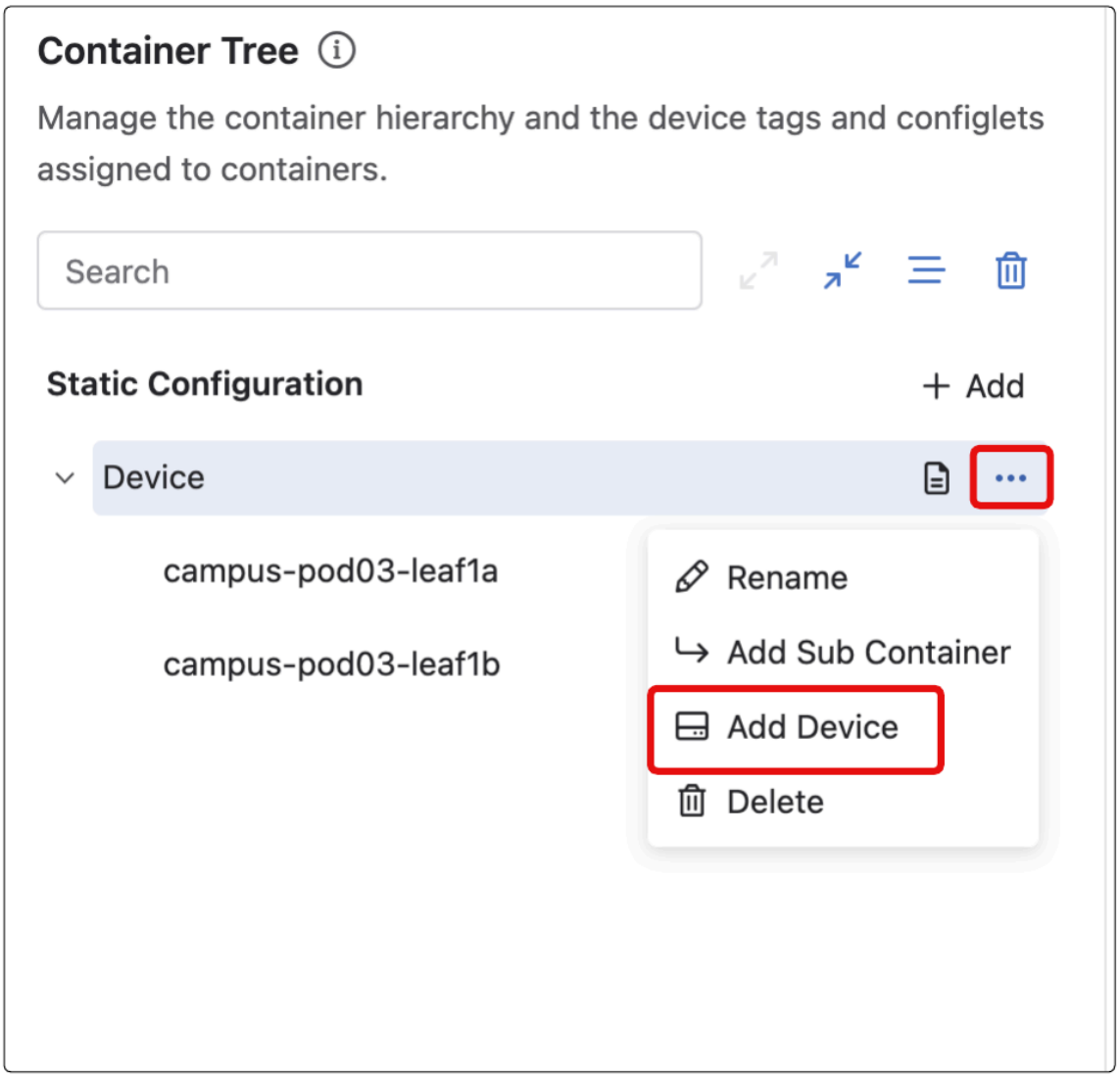
3. Apply the static configuration to the campus-podXX-leaf1c switch using Static Configuration Studio
   Click on **Studios** at the Top OR Left side navigation pane



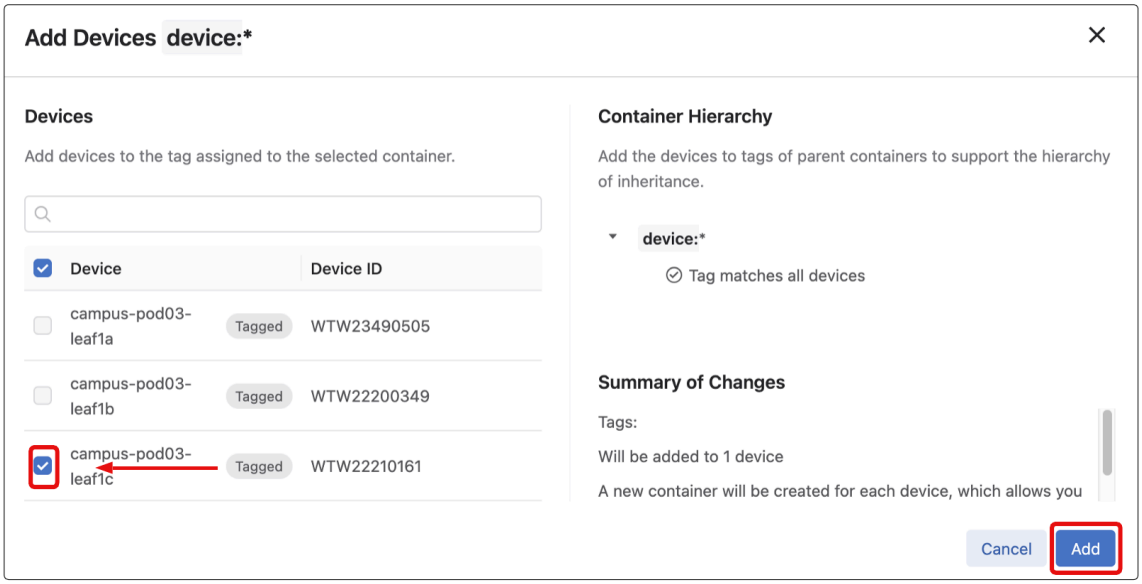
Launch the Static Configuration Studios



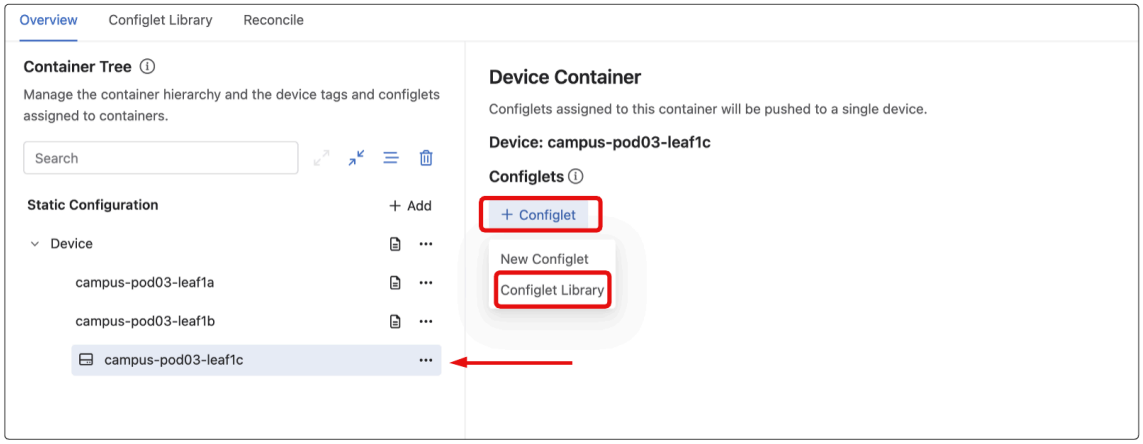
Expand the Device Container Tree and select the **“Three Dots”** and select **“Add Device”.**


Container Tree
Manage the container hierarchy and the device tags and configlets assigned to containers.
Search
Static Configuration
+ Add
Device
campus-pod03-leaf1a
campus-pod03-leaf1b
Rename
Add Sub Container
Add Device
Delete

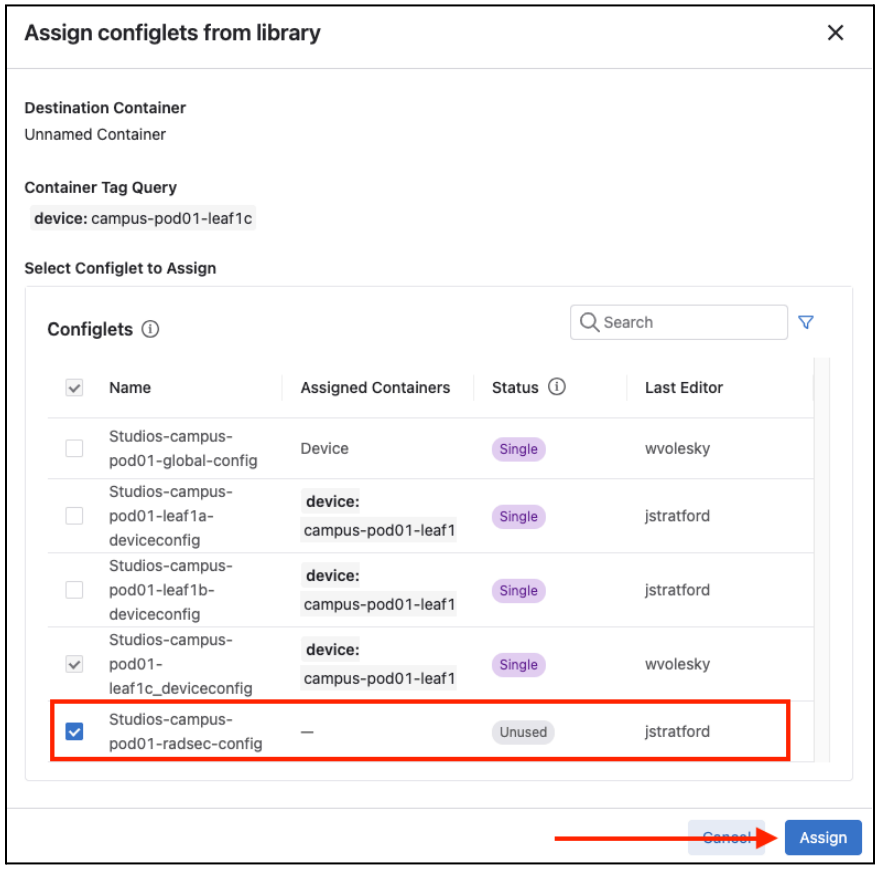
Select the radial button next to **“campus-pod<xx>-leaf1c”** and select **“Add”**



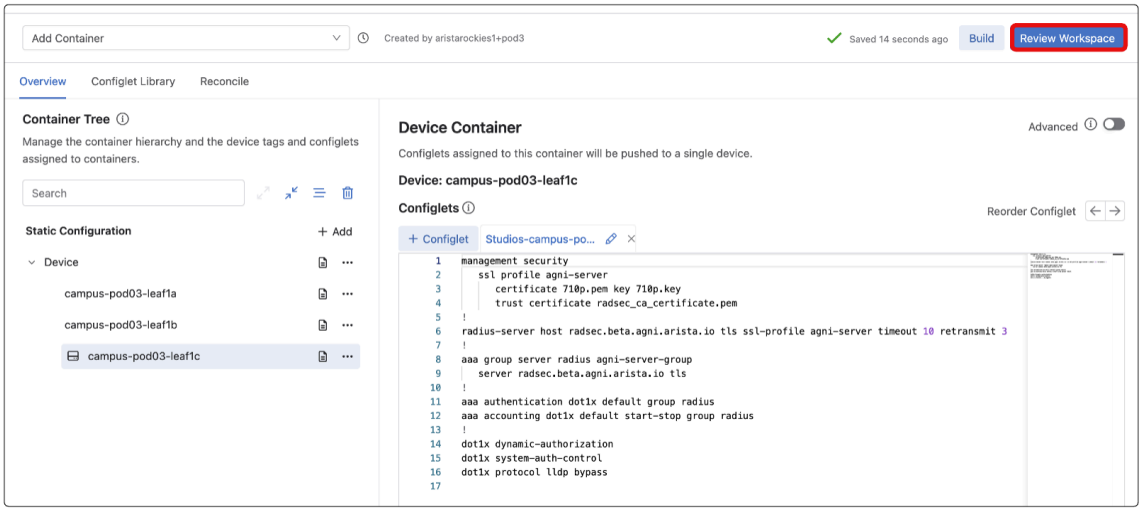
In the Device Container window, click on “**+ Configlet**” followed by “**Configlet Library**”.



Select the Configlet named **“Studios-campus-pod<xx>-radsec-config”** and click Assign to add the configlet to the **“campus-pod<xx>-leaf1c”** switch.

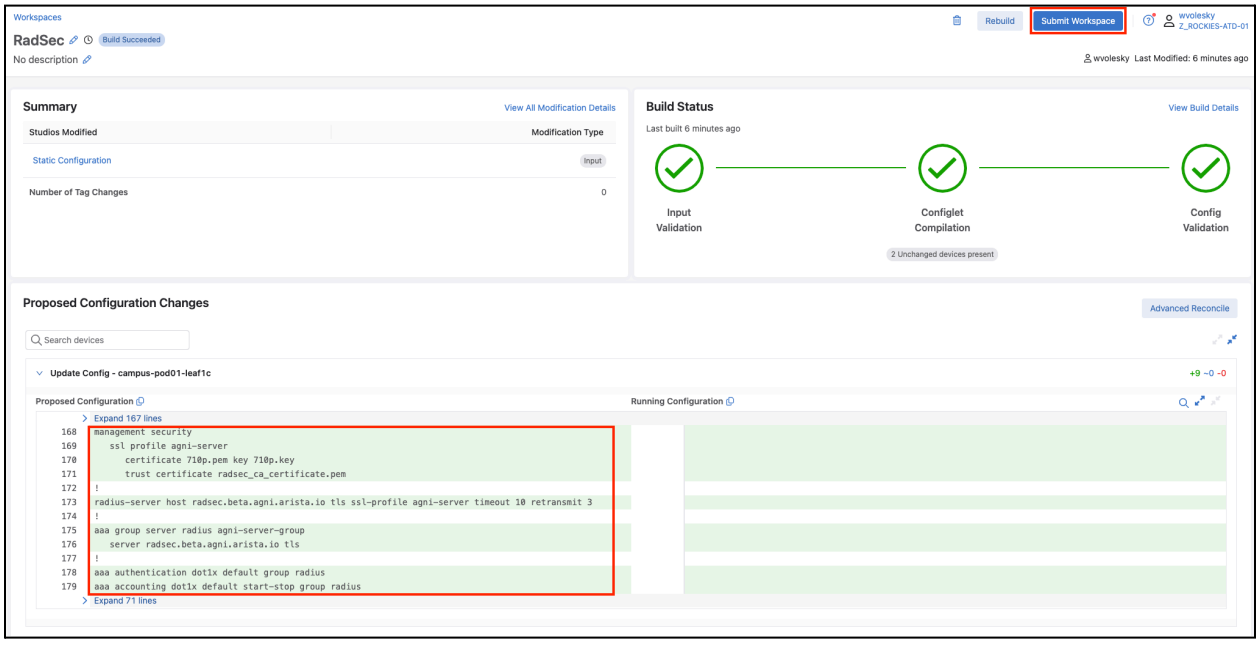


Click **Review Workspace** to review all the changes proposed to the CloudVision Studio

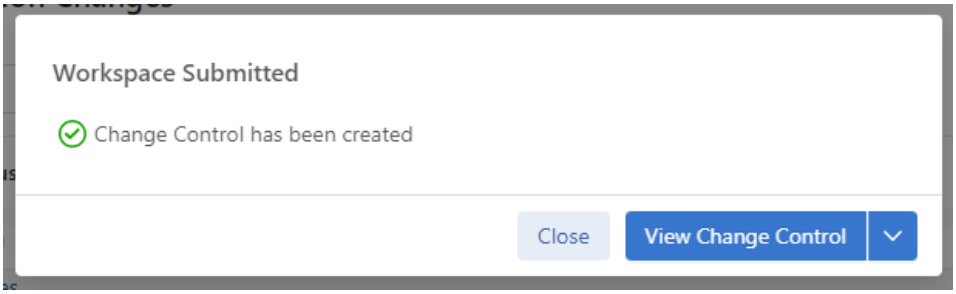


4. Review and Submit the Workspace
   Review the workspace details showing the summary of modified studios, the build status, and the proposed configuration changes for each device.

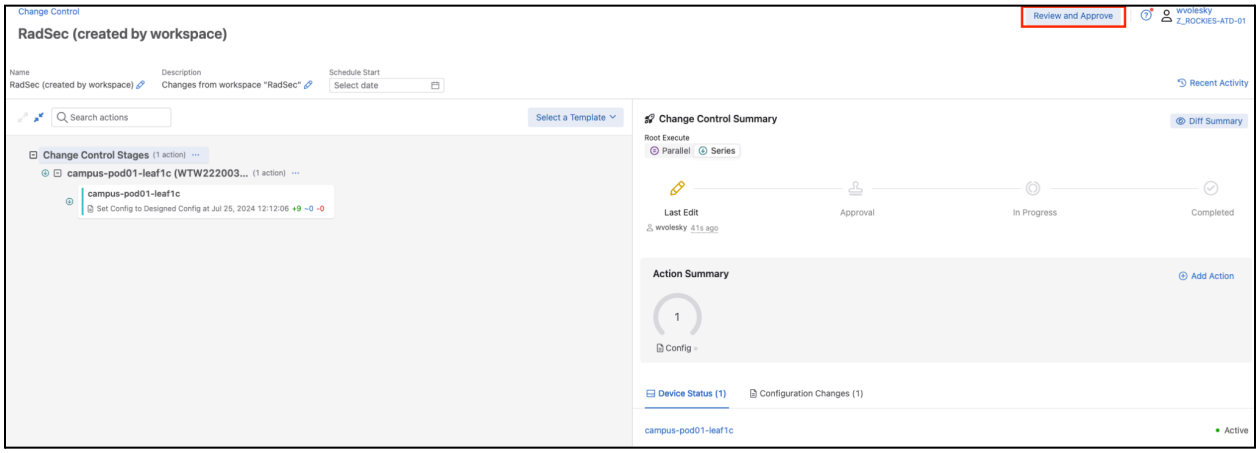
   Click “**Submit Workspace**”



Click “**View Change Control**”



5. Review, Approve and Execute the Change Control to apply the configuration changes
   Click “Review and Approve”



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

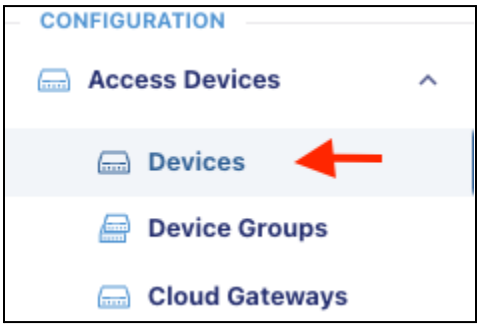
6. The change control will execute and apply all the RadSec configuration changes to the device. This will enable RadSec connectivity between the campus-pod<xx>-leaf1c switch and AGNI.

***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.



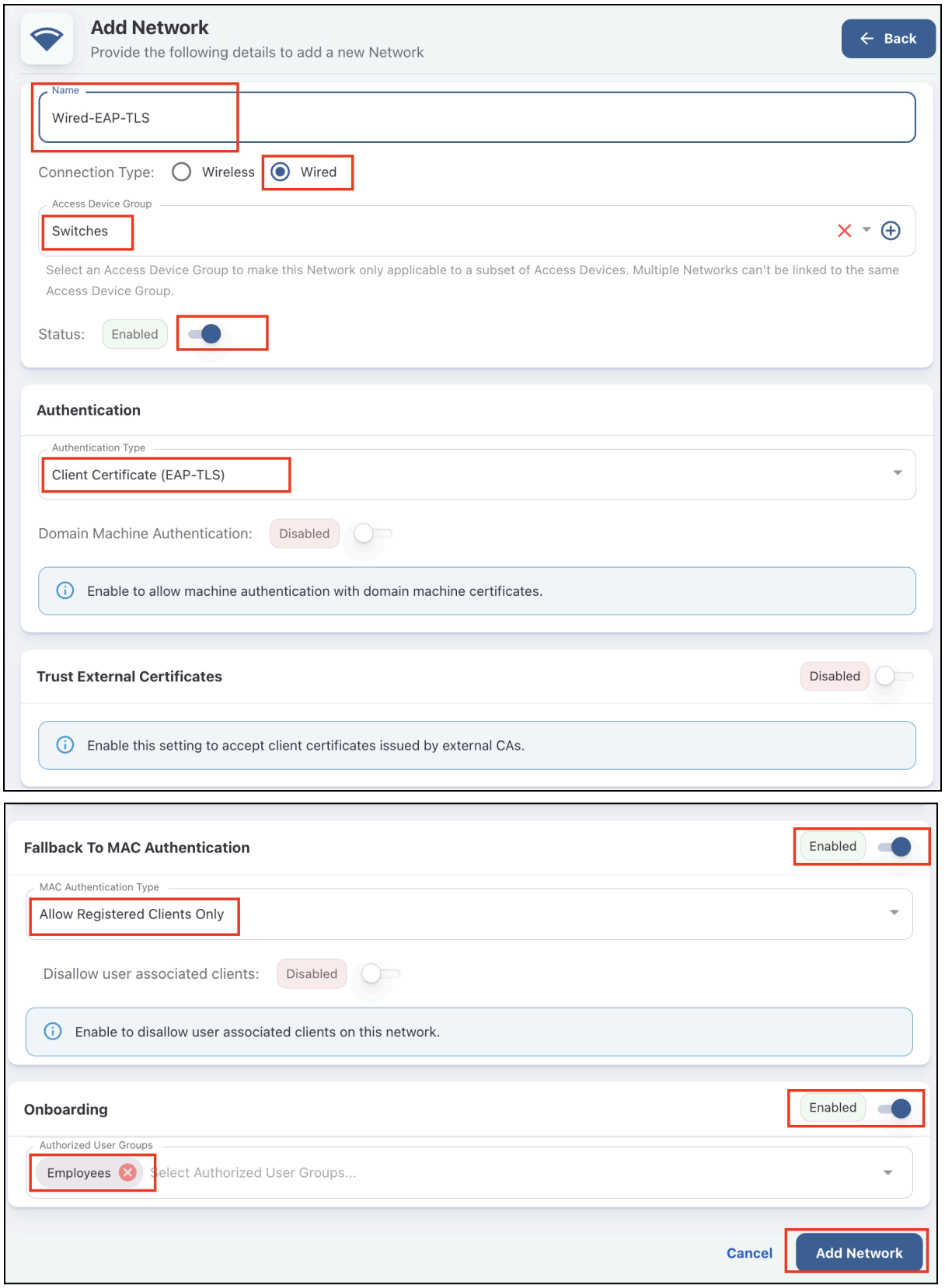
4. Create Wired EAP-TLS Network and Segment

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**

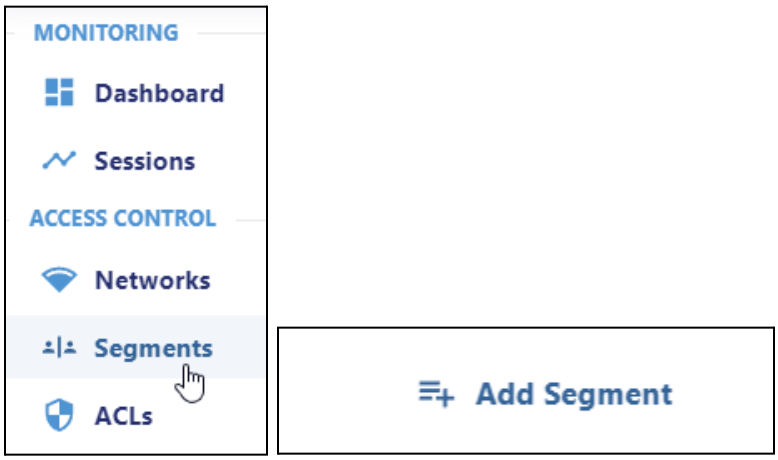
Fill in and select the Following fields on the “Add Network” page.

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
Select an Access Device Group to make this Network only applicable to a subset of Access Devices. Multiple Networks can't be linked to the same Access Device Group.
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

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.

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

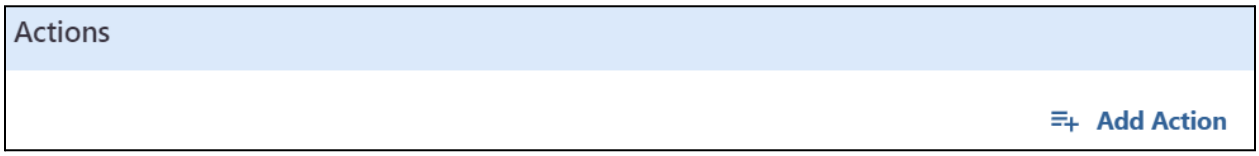
Select, **Network, Name, Is, Wired-EAP-TLS** from the drop down lists.

Let's add one more condition.

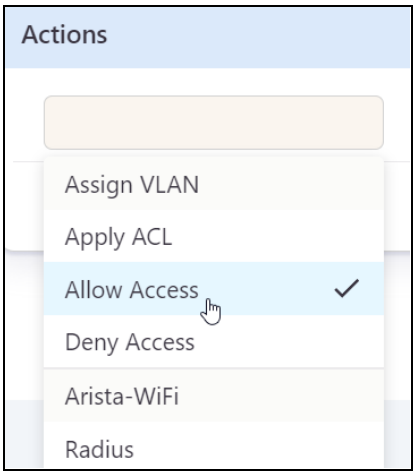
Select, **Network, Authentication Type, Is, Client Certificate (EAP-TLS)** from the drop down lists.

Your Conditions should now look like this.

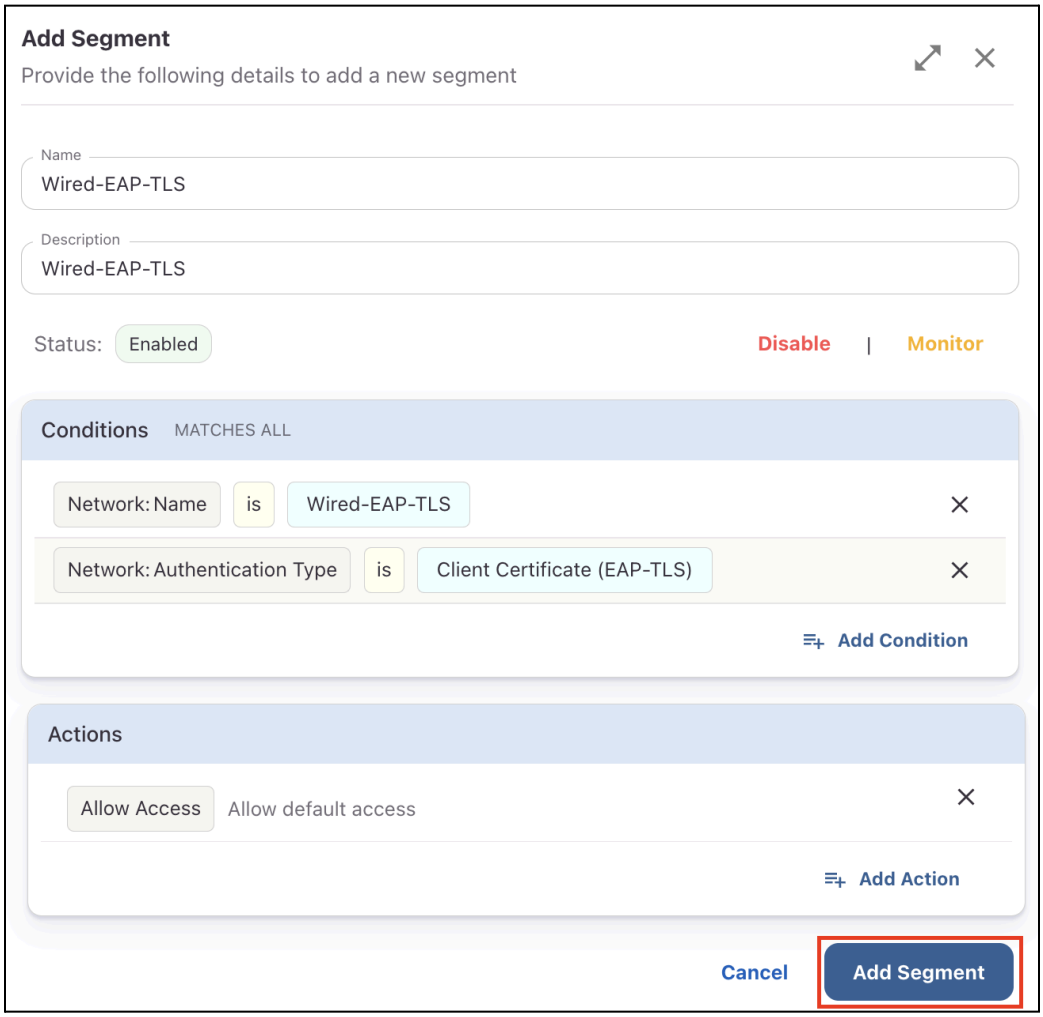
Under Actions select **Add Action**.



Select Allow Access.



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

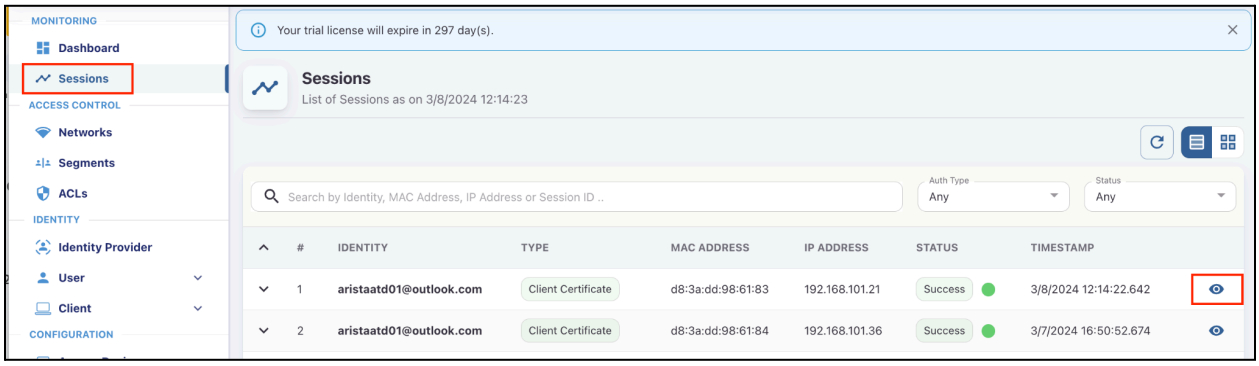


You should now be able to expand and review your segment.

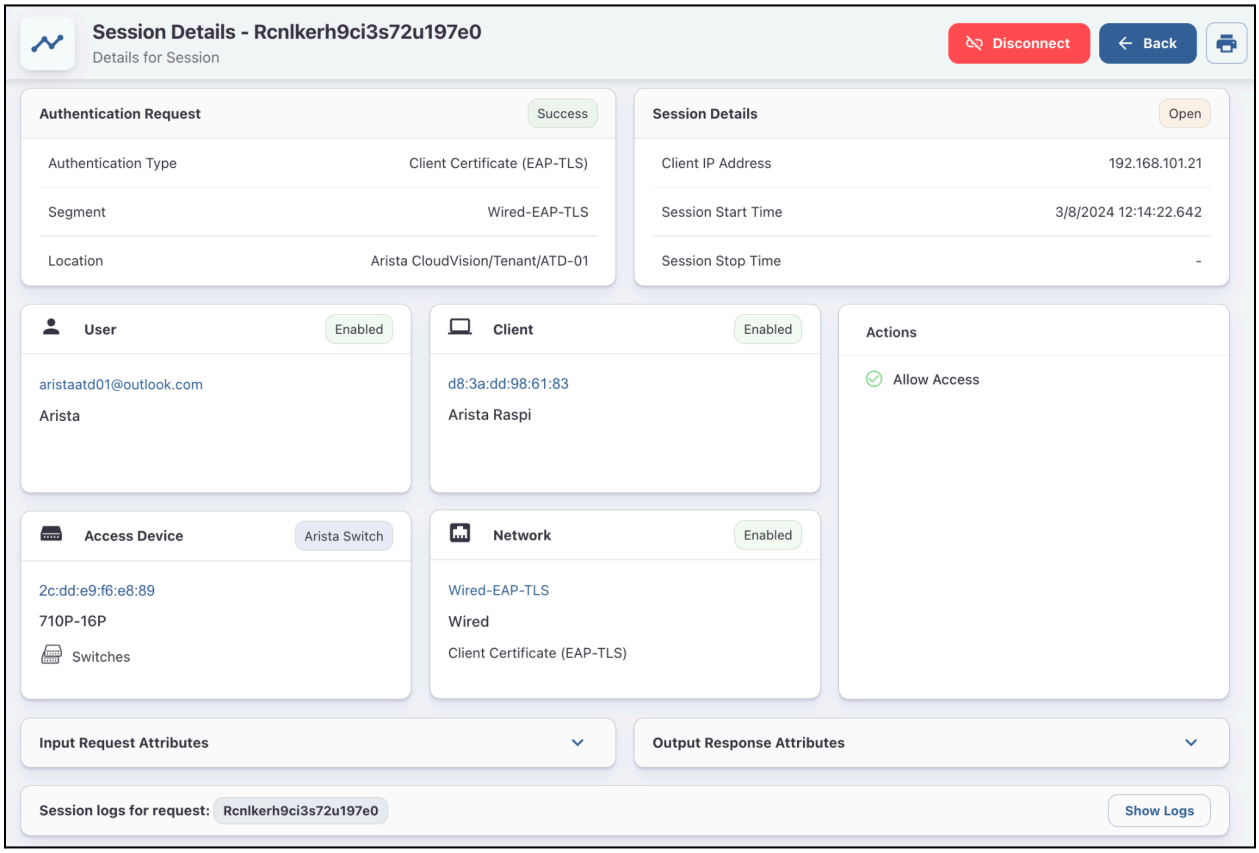
Next, unplug and plug your raspberry Pi into port 2 on the switch and click on **Sessions** to see if your ATD Raspberry Pi has a connection via the Wired connection. ***Note:** The Client Certificate has already been applied to the Raspberry Pi.

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.



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



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.

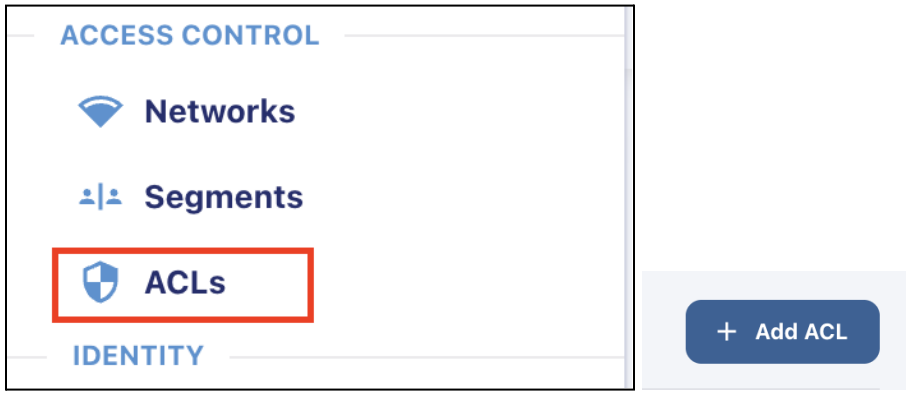
B. Configuring RadSec profile in EOS

Reference the following article to Configure the RadSec profile in EOS:
https://arista.my.site.com/AristaCommunity/s/article/Configuring-RadSec-profile-in-EOS

C. Adding Access Control Lists for Wired Users

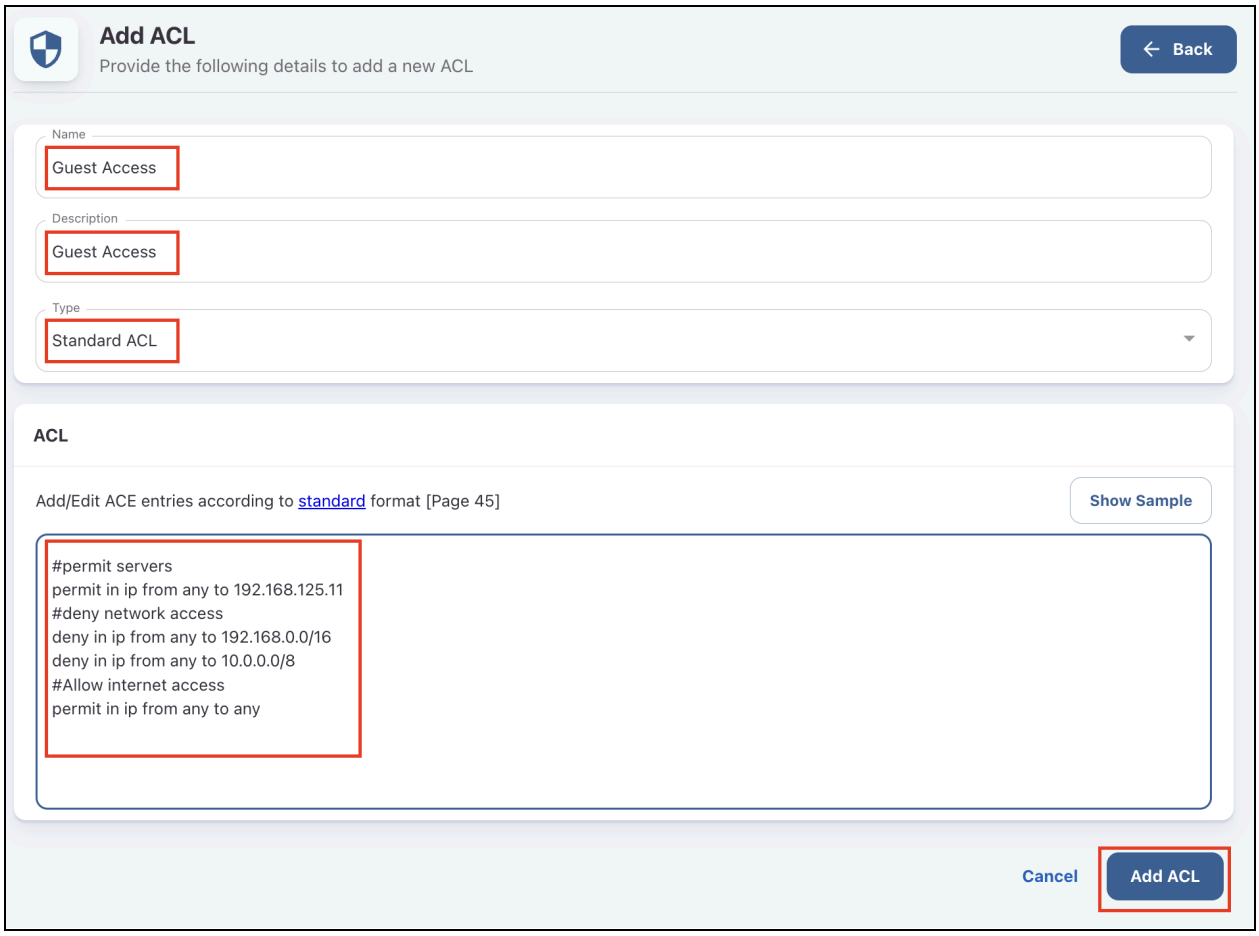
In this section we will add an acl to AGNI which we can push to the switch.

First navigate to **Access Control - > ACLs** and **+ Add ACL** in the upper right corner

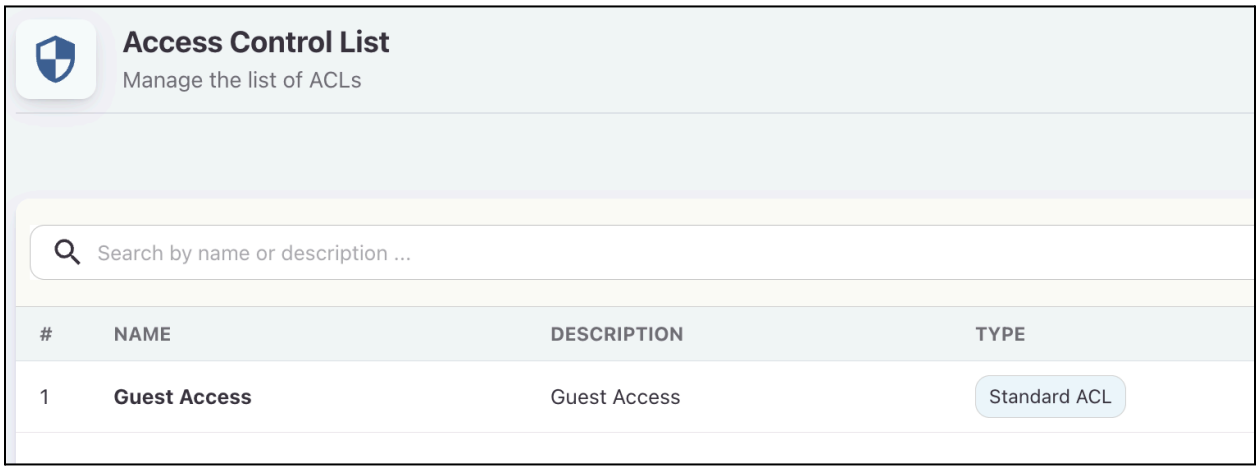


Next fill in the **Name** and **Description** fields with **Guest Access** and ACL Field with the below config then select **Add ACL**

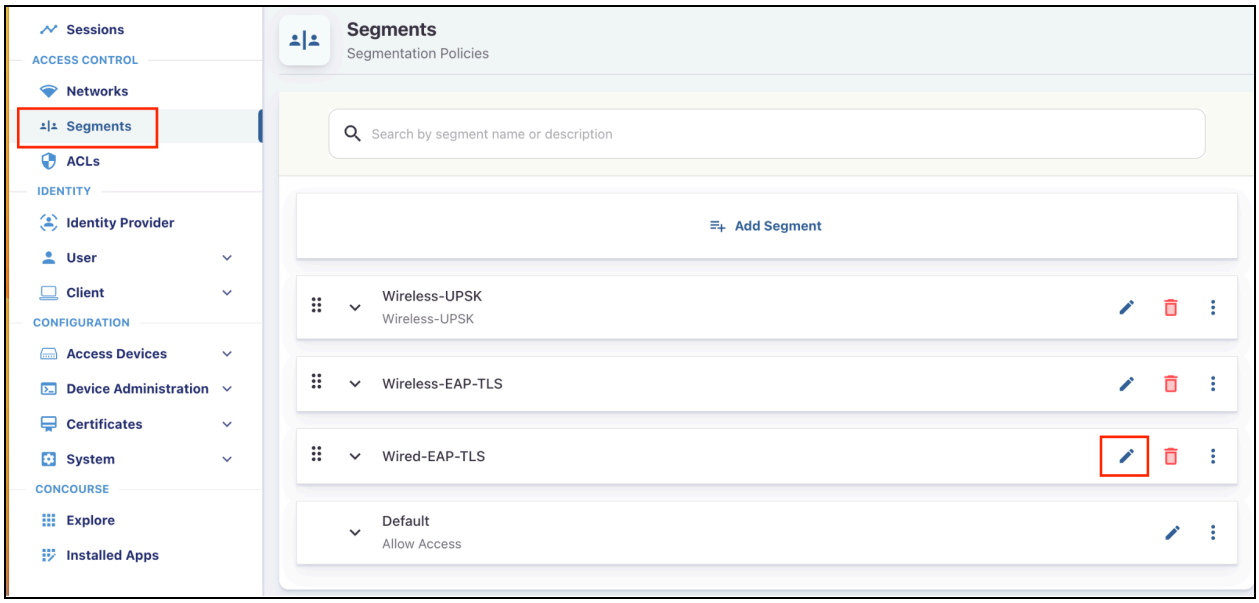
```
#permit servers
permit in ip from any to 192.168.125.11
#deny network access
deny in ip from any to 192.168.0.0/16
deny in ip from any to 10.0.0.0/8
#Allow internet access
permit in ip from any to any
```



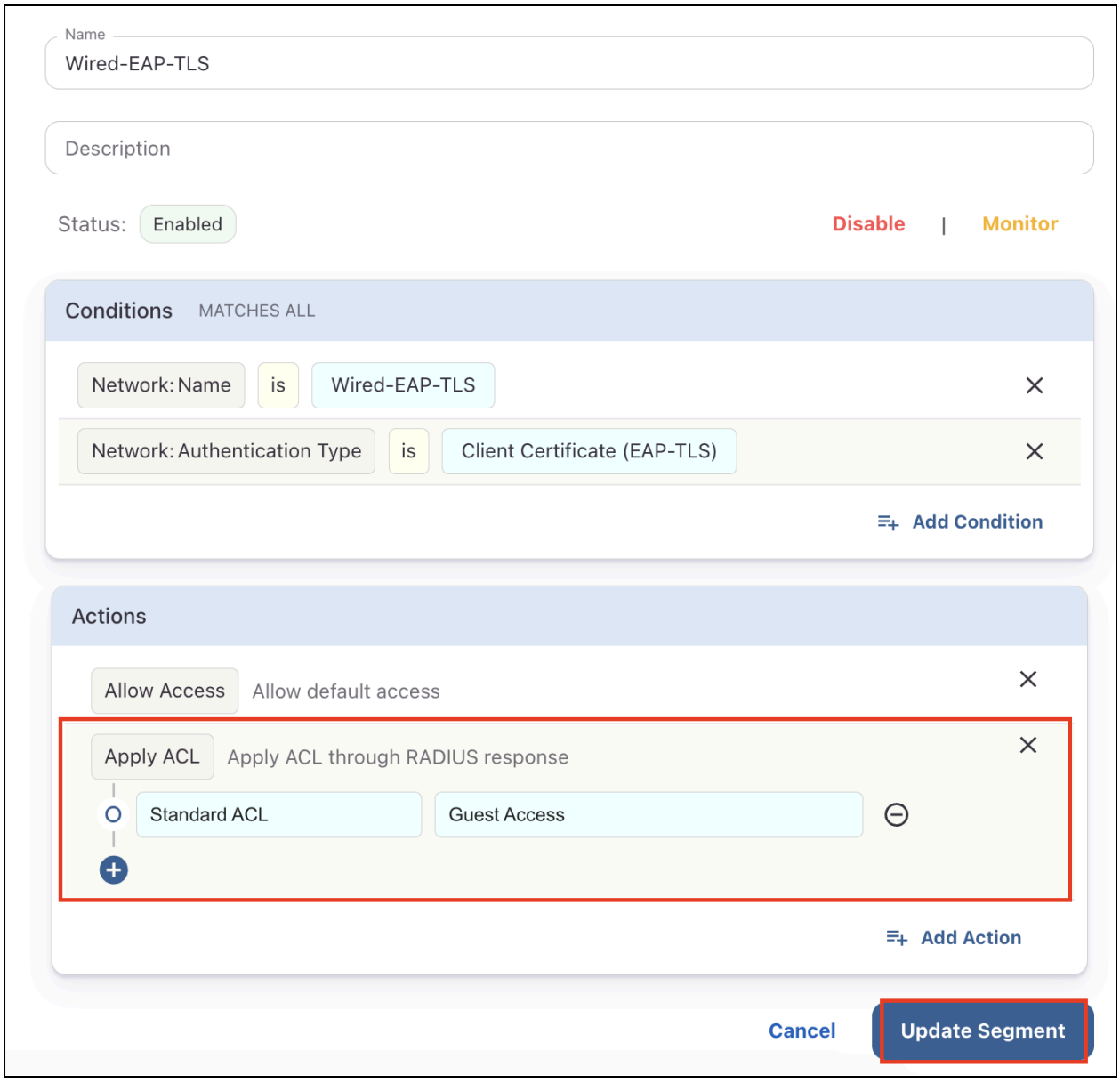
It should now show in the Access Control list



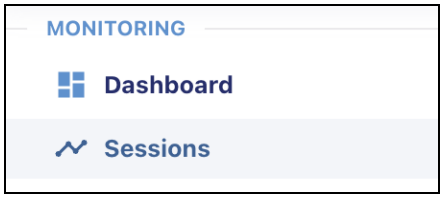
Next we will apply it to a Segment. Navigate to **Segments**, then select edit on the **Wired-EAP-TLS** segment

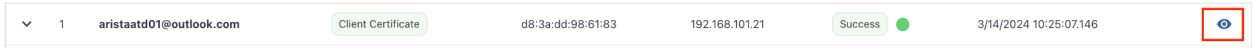


Next under the actions section Select **Add Action** and choose **Apply ACL** from the drop down list then choose **Standard ACL** and **Guest Access** to build out the Action. When complete it should look as below. You can then select "**Update Segment**"

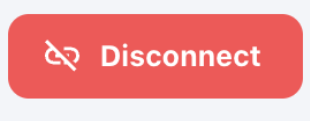


From here navigate back to the **Sessions** screen and find the client session for the raspberry pi select the **eye** on the right hand side to view details.

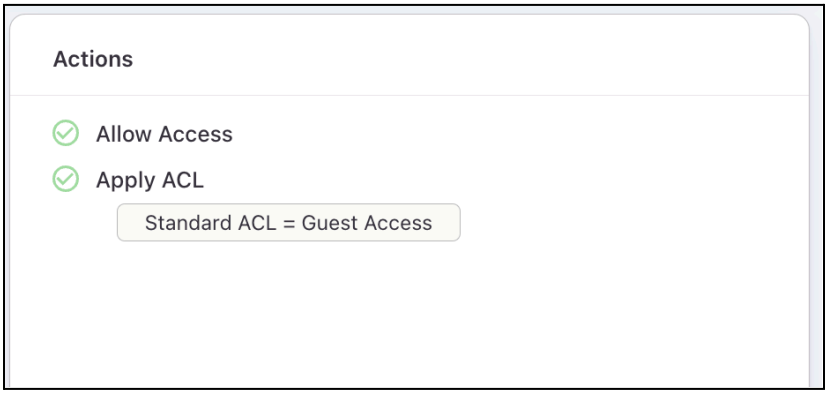




At the top of the session details page select the **Disconnect** button to disconnect and re-authenticate the session.



Next you will then see a new session come up as the client re-authenticates you can validate the acl being applied by selecting the **Eye** next to this new session and viewing the details



Next we can validate on the switch by issuing **Show dot1x host** command

```
710P-16P# sh dot1x host
Port      Supplicant MAC Auth  State                 Fallback              VLAN
--------- -------------- ----- --------------------- --------------------- ----
Et2       d83a.dd98.6183 EAPOL SUCCESS               NONE
```

Take this mac address and issue the command **show dot1x host mac <mac from above> detail** here we will see the Access list applied in the Nas-Filter-Rule

```
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: 1x00000007
Captive portal:

AAA Server Returned:
Arista-WebAuth:
Class: Rcnpghgo78m8s712rvjbg|C4151a596-baab-444b-a4fd-ad40946d8b5f
Filter-Id:
Framed-IP-Address: 192.168.101.21 sourceArp
NAS-Filter-Rule: permit in ip from any to 192.168.2.1
                 deny in ip from any to 192.168.0.0/19
                 permit in ip from any to any
Service-Type: None
Session-Timeout: 86400 seconds
Termination-Action: RADIUS-REQUEST
Tunnel-Private-GroupId:
Arista-PeriodicIdentity:
```

Lastly issue the **show ip access-lists** command to view the dynamic access list applied

```
710P-16P#sh ip access-lists
IP Access List 802.1x-5877942182543360 [dynamic]
        10 permit ip any host 192.168.2.1
        20 deny ip any 192.168.0.0/19 [match 312 bytes in 4 packets, 0:00:22 ago]
        30 permit ip any any
```

You can try pinging the device ip from your laptop to confirm acl functionality.

This completes the Access Control List lab.