ULTIMATE TEST DRIVE

Secure Access Service Edge (SASE)

Workshop Guide

Table of Contents

How to Use This Guide

The activities outlined in this Ultimate Test Drive Workshop Guide are meant to contain all the information necessary to navigate the workshop interface, complete the workshop activities, and troubleshoot any potential issues with the UTD environment. This guide is meant to be used in conjunction with the information and guidance provided by your facilitator.

Notes:

This workshop covers only basic topics and is not a substitute for training classes conducted by Palo Alto Networks Authorized Training Centers. Please contact your partner or regional sales manager for more information on available training and how to register for one near you.

Unless specified, the Google® Chrome™ web browser will be used to perform any tasks outlined in the following activities (Chrome is pre-installed on the student desktop of the workshop PC).

Terminology:
Tab refers to the seven tabs along the top of each screen in the GUI.

Node refers to the options associated with each tab, found in the left-hand column of each screen.

Activity 0 – Initiate the UTD Workshop

In this activity, you will:

- ***Log in to the Ultimate Test Drive Workshop from your laptop.***
- ***Learn the layout of the environment and its various components.***

Task 1 – Log In to Your Ultimate Test Drive Class Environment

Step 1: Verify that your laptop is equipped with a modern browser that supports HTML 5.0. We recommend using the latest version of Firefox®, Chrome, or Internet Explorer®/Edge®.

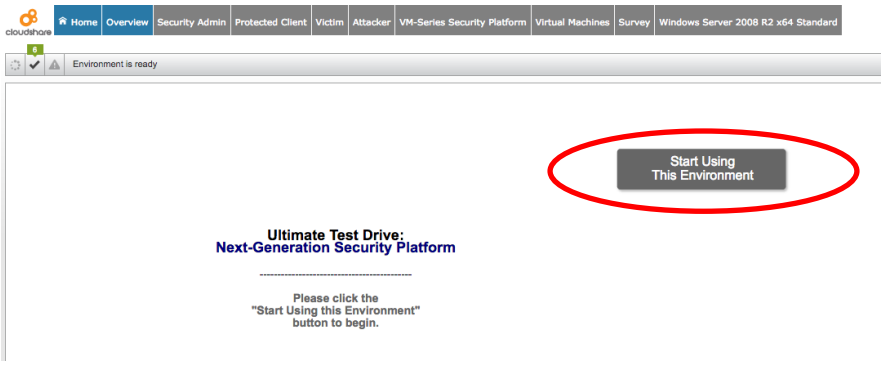
Step 2: Open a browser window and navigate to the class URL. If you have an invitation email, you will find the class URL and passphrase there. Otherwise, your instructor will provide them.

Enter your email address and the class passphrase.

Step 3: Complete the registration form and click **Login** at the bottom.

Step 4: Once you have logged in, the system will create a unique UTD environment for you. Please note that this process may take a while, as indicated by the green progress bar at the top of the screen.

Once the environment has been created, the system will display a welcome page. Click **Start Using This Environment** to begin.



This will display a list of all virtual systems that constitute the UTD environment.

Take note of the shortcut menu at the top of your browser window. You will use this menu throughout the workshop to switch between the available desktops.

Task 2 - Understand the UTD Environment Setup

This UTD environment consists of the following components:

A. **Panorama-UI**: Panorama is used for management of Prisma Access.

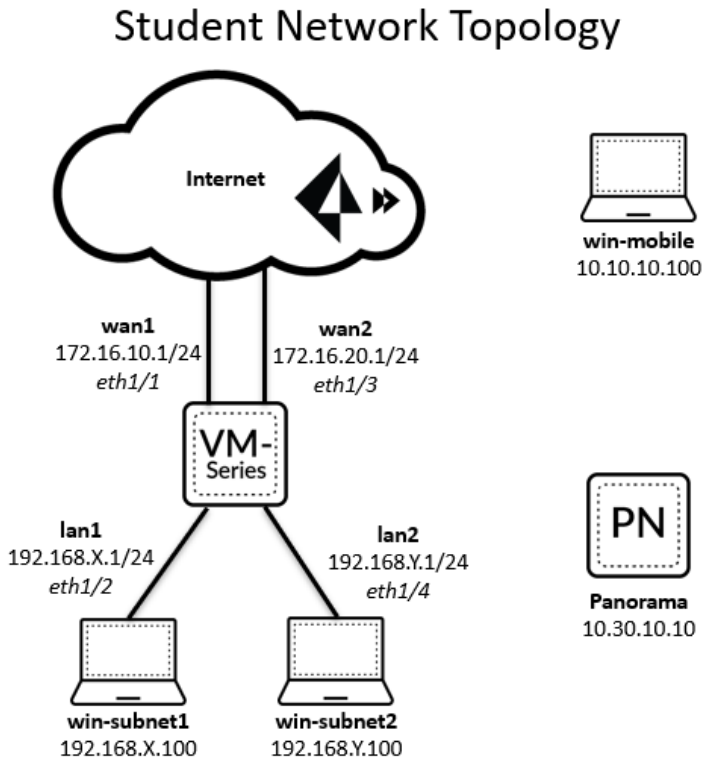
B. **NGFW-Branch-UI**: Used to establish IPSec tunnel only. No security policy enforcement is done from this VM.

C. **Win-subnet1**: Windows VM in subnet1. Each student will have their own unique subnet.

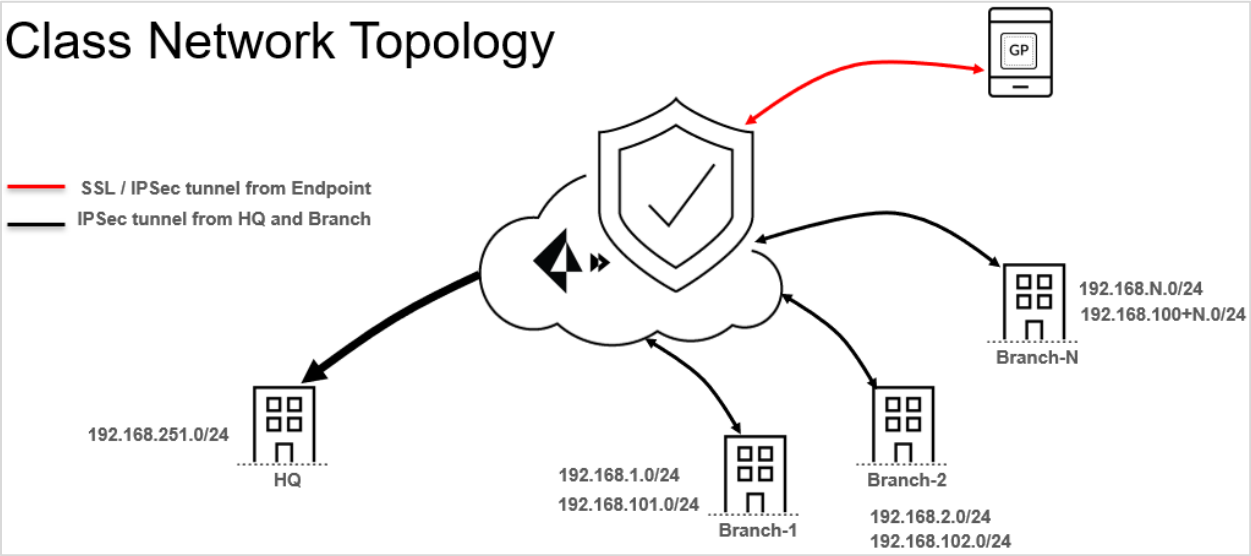
D. **Win-subnet2**: Windows VM in subnet2. Each student will have their own unique subnet.

E. **Win-mobile**: Windows VM running GlobalProtect agent for remote user. Each student will be logged in with their own unique login.

Review the diagram below to better understand the UTD environment setup.



Each student will be assigned a unique Student-ID which will be used for the configuration of your Branch Office.



Each student will represent one Branch Office. Each Branch Office will have two WAN links and two LAN links.

End of Activity 0

Activity 1 – Configure Branch Office Network

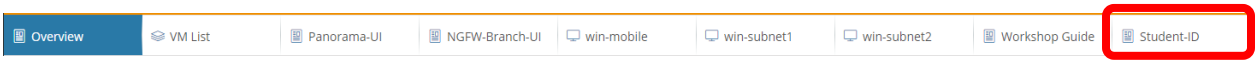
In this activity, you will:

- ***Retrieve your assigned Student-ID***
- ***Access the NGFW-Branch, win-subnet1, and win-subnet2 VMs***
- ***Configure your own environment to a unique IP subnet***

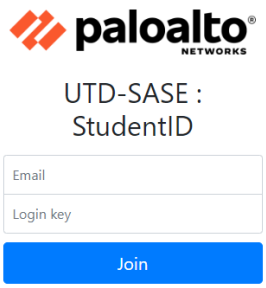
Task 1 – Retrieve assigned Student-ID

These are pre-requisite steps necessary to get your environment ready for the workshop. These are specific to your personal workshop environment and not related to Prisma Access.

Step 1: Click the **Student-ID** tab. Click the **Student-ID** icon to launch the browser. The **UTD-SASE: Student-ID** page should load.

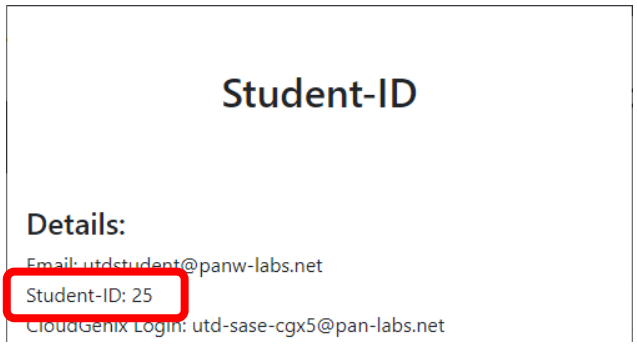


Step 2: Enter your ***email*** and for the **Login key:** use ***utd1234***.



Click **Join**.

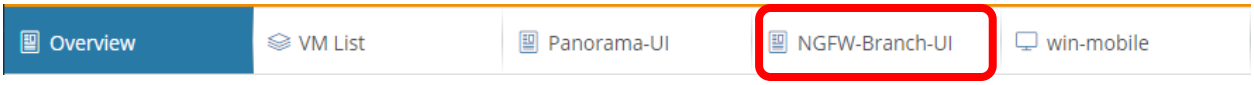
Step 3: Get **Student-ID**. Your **Student-ID** will be used throughout this workshop. It is important to use your assigned value as to not interfere with others who are doing this workshop.



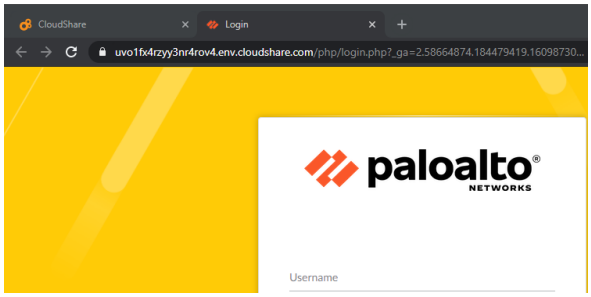
Task 2 – Configure NGFW-Branch

These are pre-requisite steps necessary to get your environment ready for the workshop. These are specific to your personal workshop environment and not related to Prisma Access.

Step 1: Click the **NGFW-Branch-UI** tab.

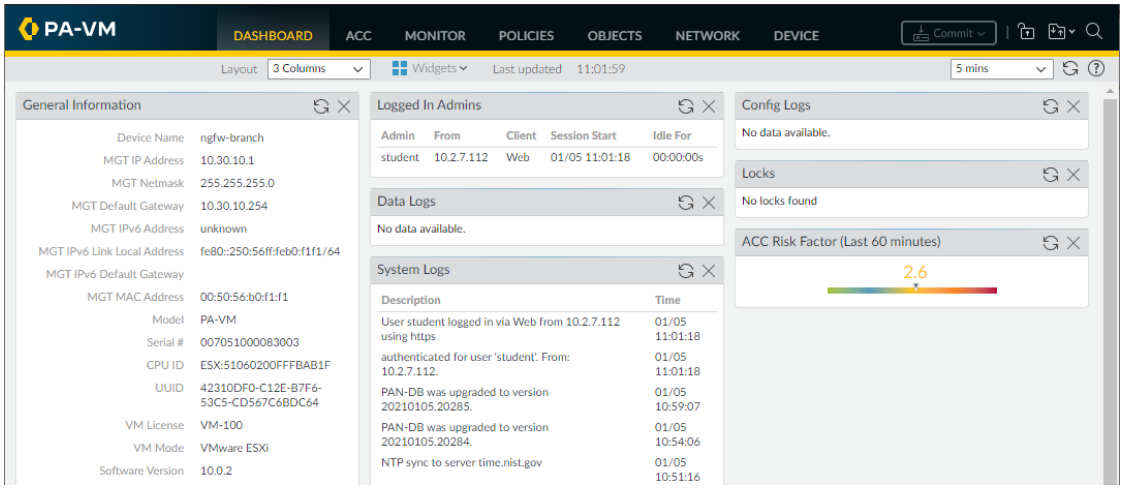


This will open a new tab in your browser with the login page for the **NGFW-Branch** VM.

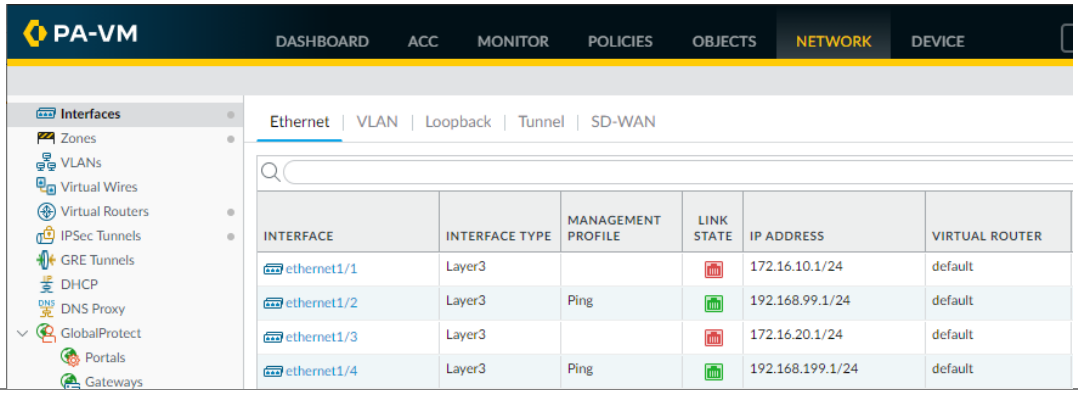


Step 2: Log in with the following credentials:

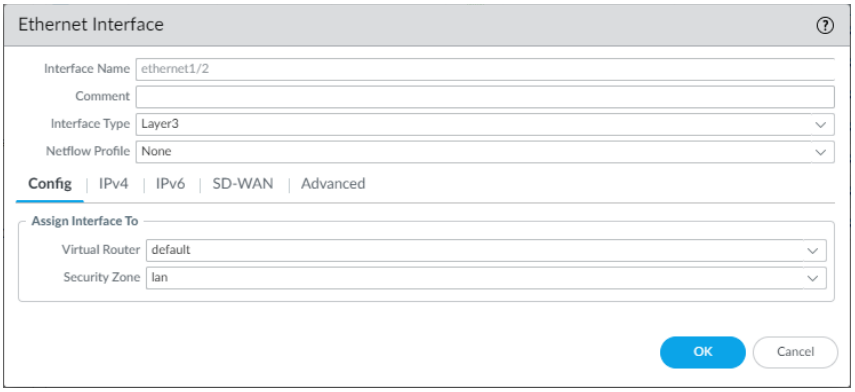
Name: *student*
Password: *utd1234*



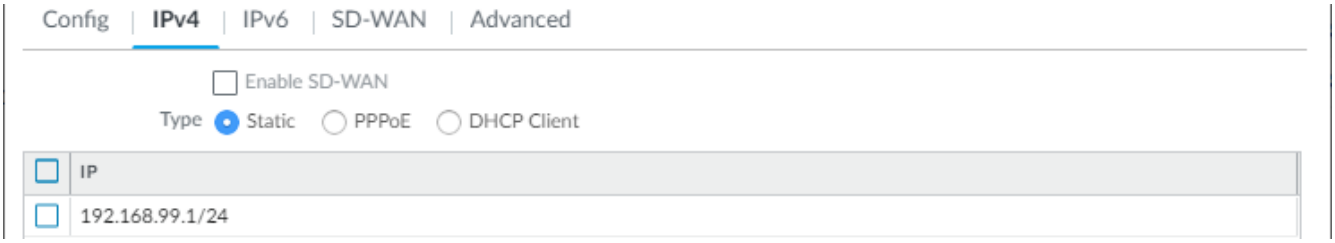
Step 3: Go to **Network > Interfaces**.



Step 4: Click **ethernet1/2**. This brings up the **Ethernet Interface** window.

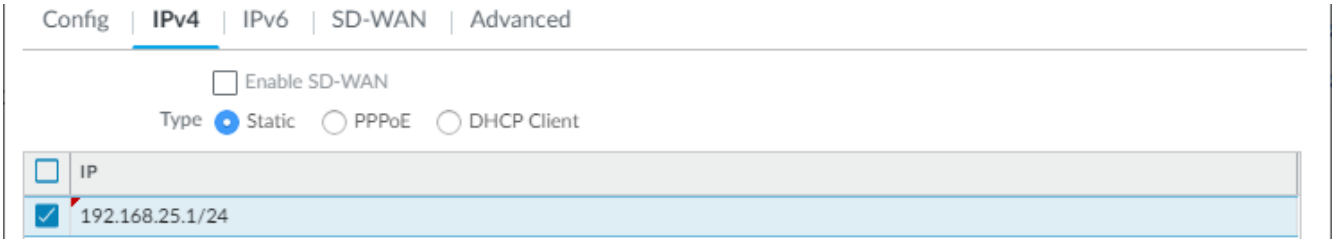


Step 5: Click the **IPv4** tab.



Click **192.168.99.1/24** and change the IP to ***192.168.X.1/24***, where ***X*** is your assigned **Student-ID**.

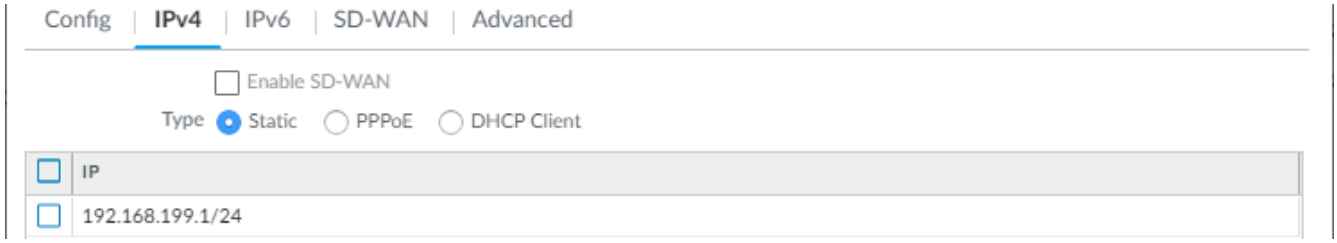
If your **Student-ID** is **25**, this would be ***192.168.25.1/24***. It is important to use your assigned value as to not conflict with other students.



Click **OK**.

Step 6: Click **ethernet1/4** to bring up the **Ethernet Interface** window for this interface.

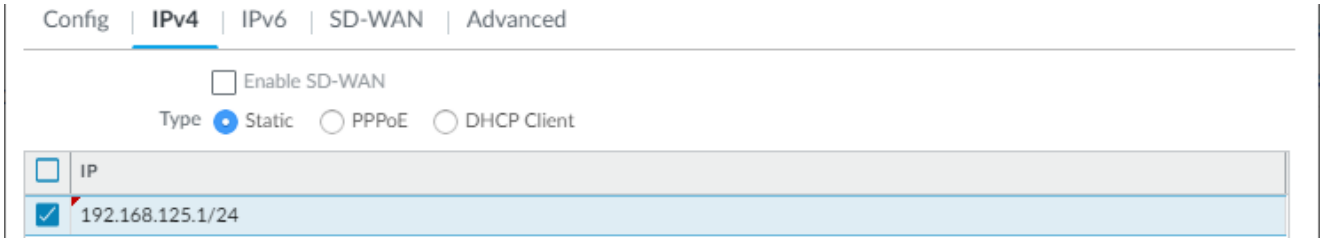
Step 7: Click the **IPv4** tab.



Click **192.168.199.1/24** and change the IP to ***192.168.Y.1/24***, where ***Y*** is your assigned **Student-ID+100**.

If your **Student-ID** is **25**, this would be ***192.168.125.1/24***. It is important to use your assigned value as to

not conflict with other students.



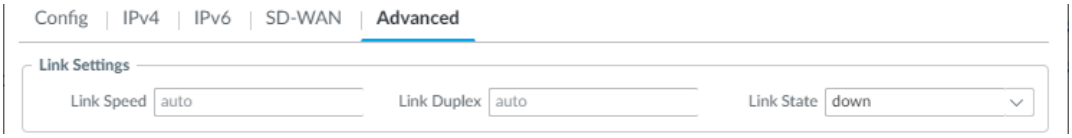
Click **OK**.

For **Student-ID 25**, the results will be:

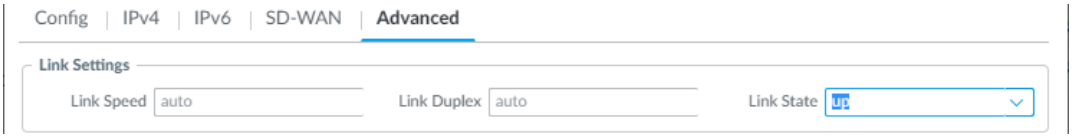
INTERFACE	INTERFACE TYPE	MANAGEMENT PROFILE	LINK STATE	IP ADDRESS
ethernet1/1	Layer3			172.16.10.1/24
ethernet1/2	Layer3	Ping		192.168.25.1/24
ethernet1/3	Layer3			172.16.20.1/24
ethernet1/4	Layer3	Ping		192.168.125.1/24

Step 8: Click **ethernet1/1** to bring up the **Ethernet Interface** window for this interface.

Step 9: Click the **Advanced** tab.



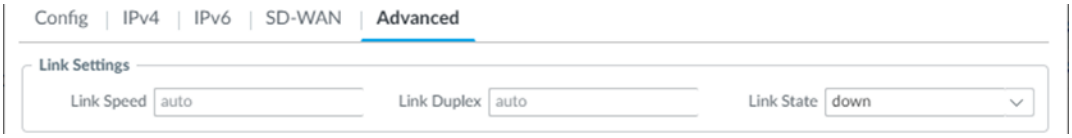
Change the **Link State** from **down** to **up**.



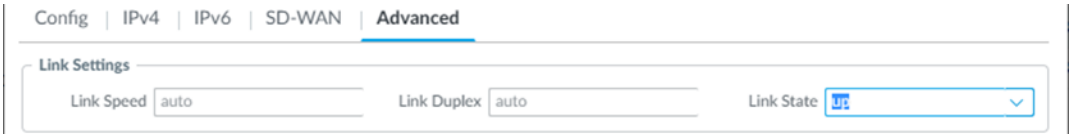
Click **OK.**

Step 10: Click **ethernet1/3** to bring up the **Ethernet Interface** window for this interface.

Step 11: Click the **Advanced** tab.



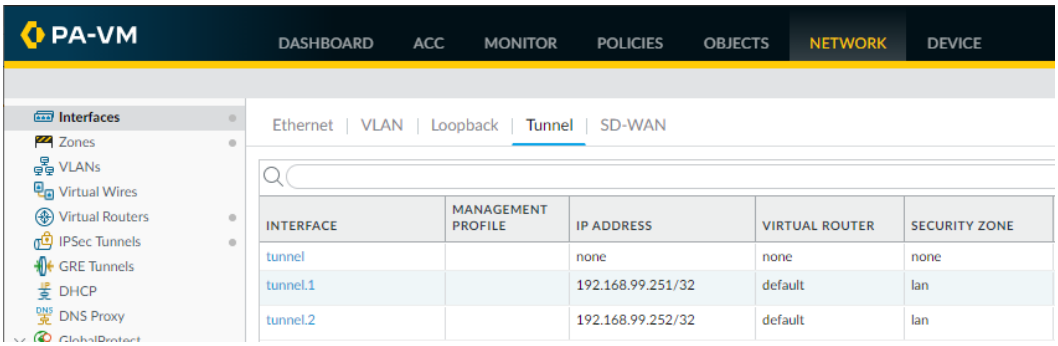
Change the **Link State** from **down** to **up**.



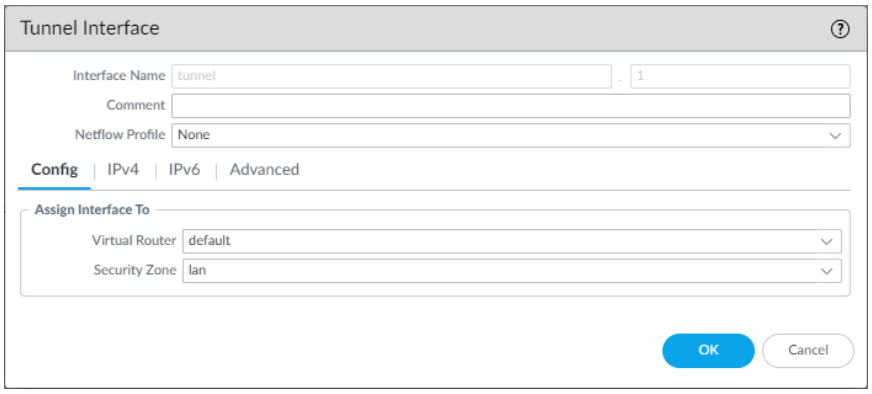
Click **OK.**

Note: The red **Link State** icons will not change at this point as you have not committed the configuration.

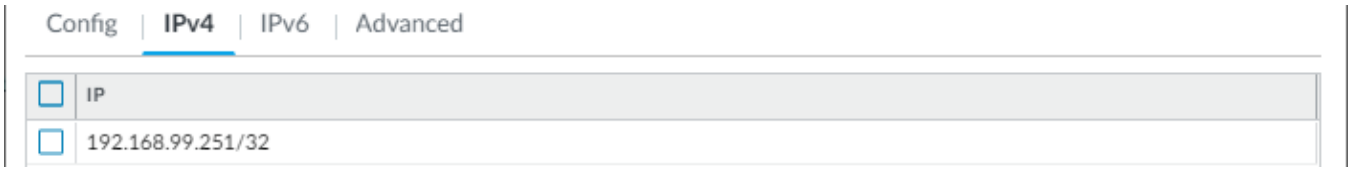
Step 12: From **Network > Interfaces**, select the **Tunnel** tab.



Step 13: Click **tunnel.1** to bring up the **Tunnel Interface** window.

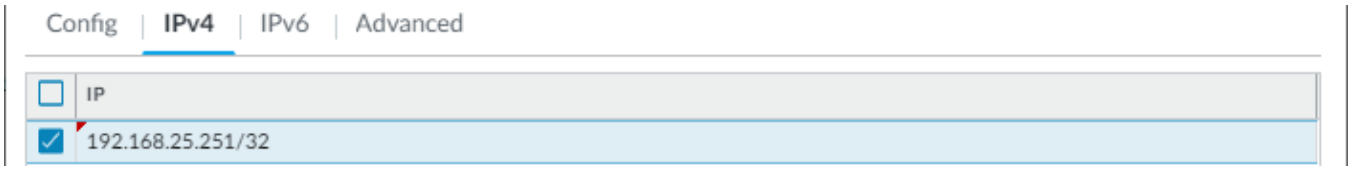


Step 14: Click the **IPv4** tab.



Click **192.168.99.251/32** and change the IP to ***192.168.X.251/32***, where ***X*** is your assigned **Student-ID**.

If your **Student-ID** is **25**, this would be ***192.168.25.251/32***. It is important to use your assigned value as to not conflict with other students.



Click **OK**.

Step 15: Click **tunnel.2** to bring up the **Tunnel Interface** window for that interface.

Step 16: Click the **IPv4** tab.

Click **192.168.99.252/32** and change the IP to ***192.168.X.252/32***, where ***X*** is your assigned **Student-ID**.

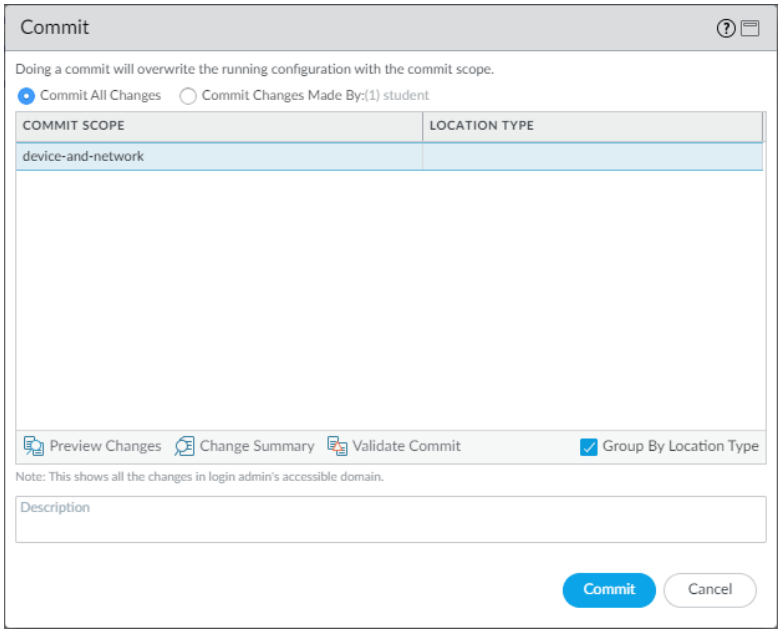
If your **Student-ID** is **25**, this would be ***192.168.25.252/32***. It is important to use your assigned value as to not conflict with other students.

Click **OK**.

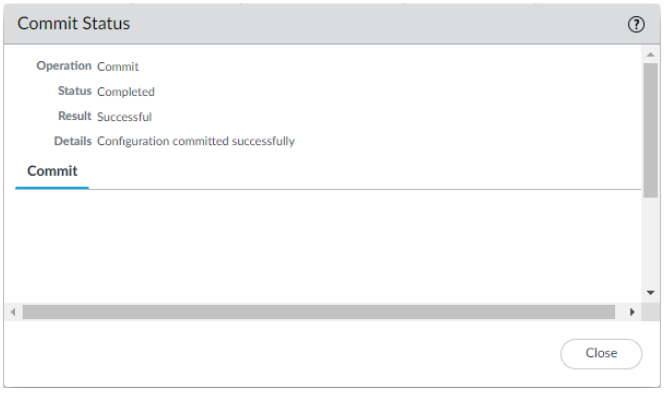
For **Student-ID 25**, the results will be:

INTERFACE	MANAGEMENT PROFILE	IP ADDRESS	VIRTUAL ROUTER
tunnel		none	none
tunnel.1		192.168.25.251/32	default
tunnel.2		192.168.25.252/32	default

Step 17: From the upper right-hand corner, click **Commit**. This brings up the **Commit** window.



Step 18: Click the **Commit** button.



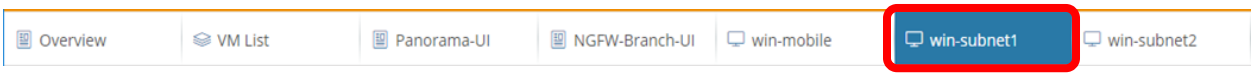
Once the commit has completed, click **Close**.

Step 19: Navigate to **Network > Interfaces > Ethernet** and verify all interfaces are up.

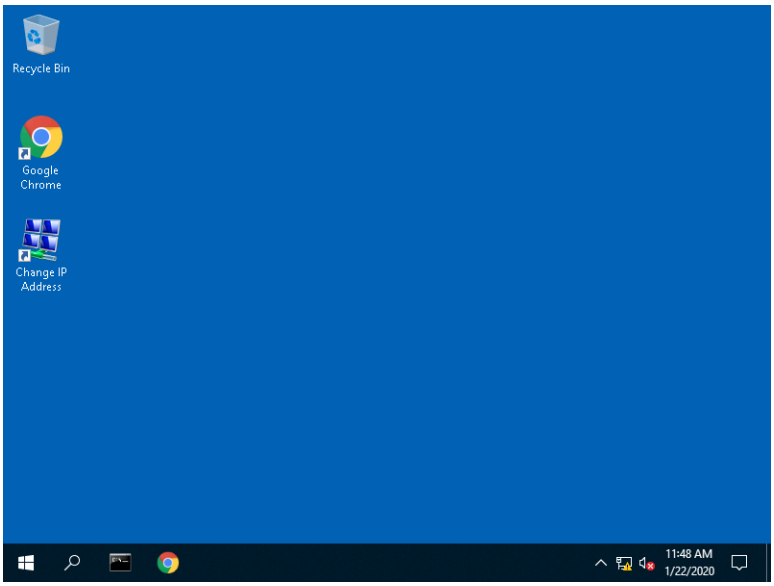
INTERFACE	INTERFACE TYPE	MANAGEMENT PROFILE	LINK STATE	IP ADDRESS
ethernet1/1	Layer3			172.16.10.1/24
ethernet1/2	Layer3	Ping		192.168.25.1/24
ethernet1/3	Layer3			172.16.20.1/24
ethernet1/4	Layer3	Ping		192.168.125.1/24

Task 3 – Configure win-subnet1

Step 1: Click the **win-subnet1** tab to access that desktop in your browser.

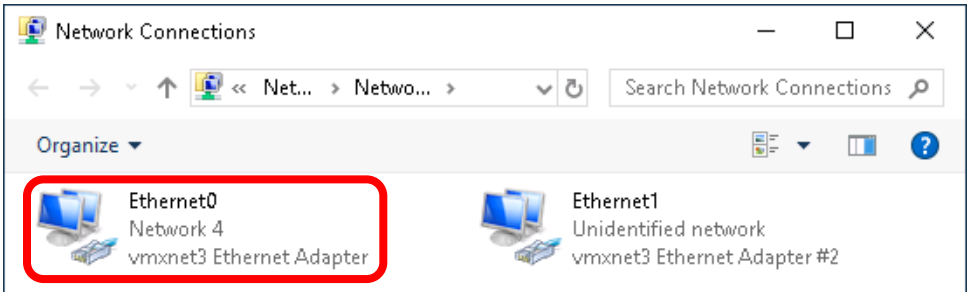


Step 2: You will be connected to the **win-subnet1** desktop through your browser.

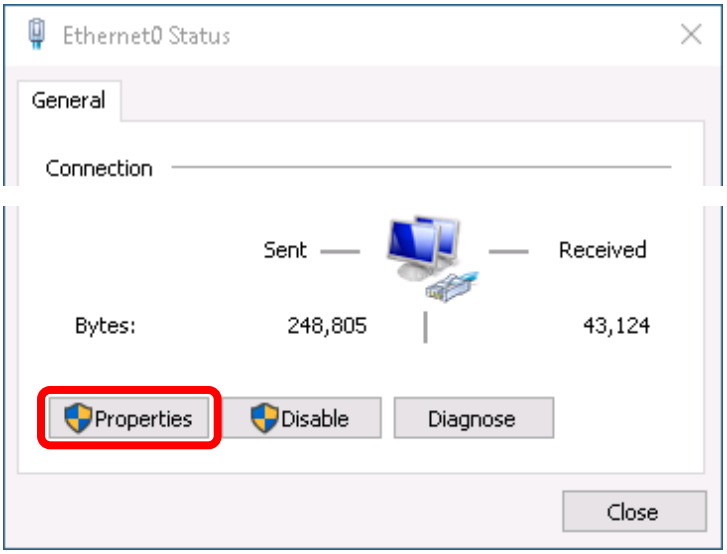


Step 3: Double-click the **Change IP Address** icon on the Desktop to bring up the **Network Connections** window.

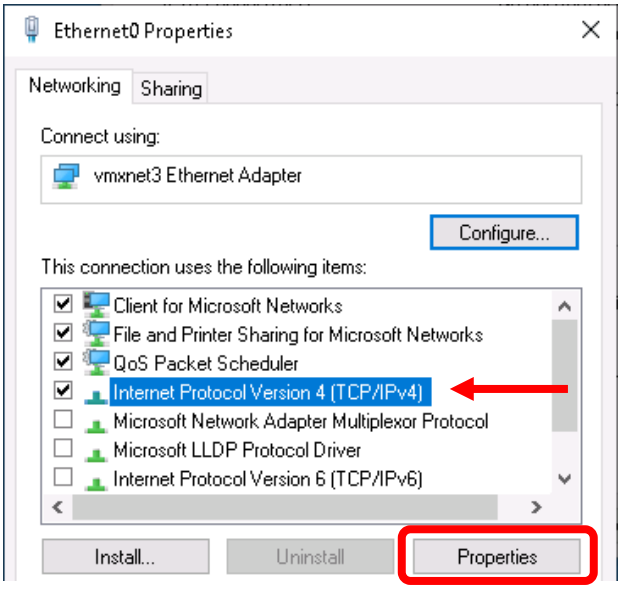
Step 4: Double-click on **Ethernet0**. **Note:** Do not change the IP address on **Ethernet1**).



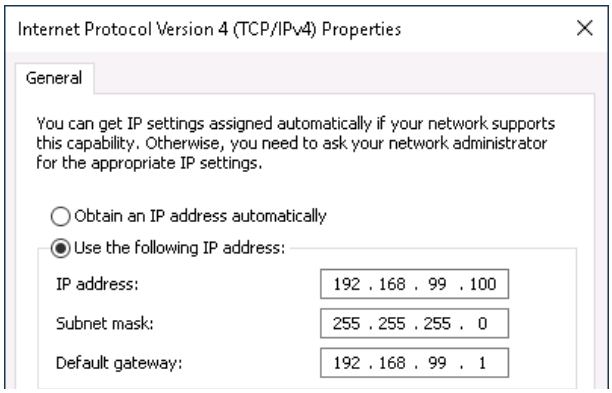
Step 5: From the **Ethernet0 Status** window, click **Properties**.



Step 6: From the **Ethernet0 Properties** window, click to select **Internet Protocol Version 4 (TCP/IPv4)** then click **Properties**.



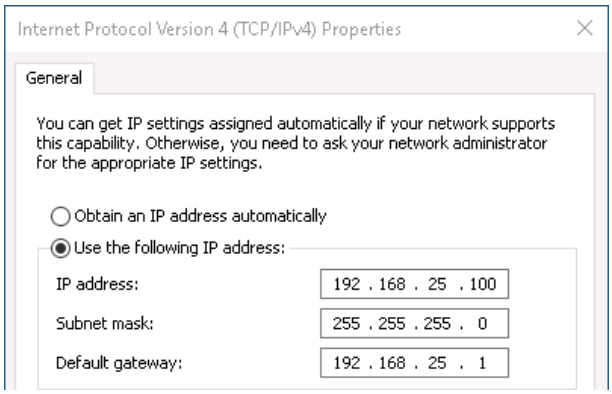
Step 7: On the **Internet Protocol Version 4 (TCP/IPv4) Properties** window,



Change **IP address: 192.168.99.100** to ***192.168.X.100*****,** where ***X*** is your assigned ***Student-ID***.

Change **Default gateway: 192.168.99.1** to ***192.168.X.1***, where ***X*** is your assigned ***Student-ID***.

If your **Student-ID** is **25**, this would be ***192.168.25.100*** and ***192.168.25.1*** respectively. It is important to use your assigned value to establish connectivity to the **NGFW-Branch** VM.



Click **OK**.

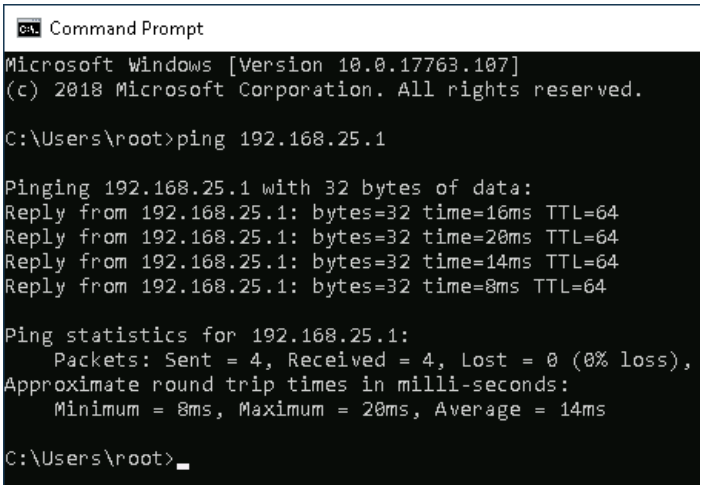
From the **Ethernet0 Properties** window, click **Close**.

From the **Ethernet0 Status** window, click **Close**. If prompted from a **Networks** window, click **No**.

On the **Network Connections** window, click the **X** to close the window.

Step 8: From the Windows taskbar, click the **Command Prompt**  icon to launch the **Command Prompt**.

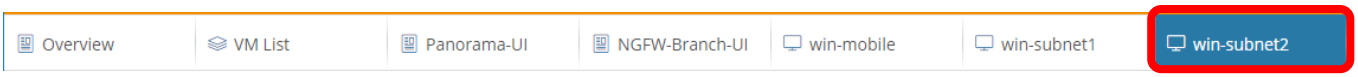
Type ***ping 192.168.X.1***, where ***X*** is your assigned ***Student-ID***.



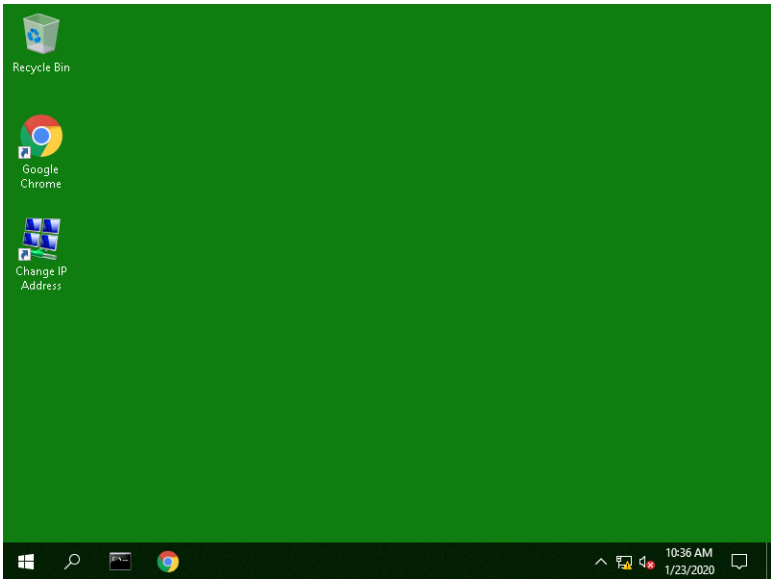
Close the **Command Prompt** window.

Task 4 – Configure win-subnet2

Step 1: Click the **win-subnet2** tab to access that desktop in your browser.



Step 2: You will be connected to the **win-subnet2** desktop through your browser.



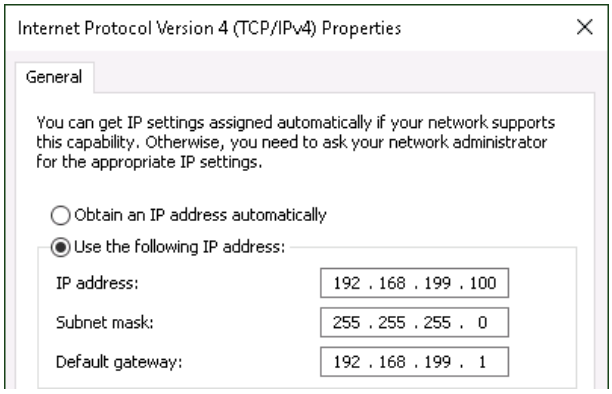
Step 3: Double-click the **Change IP Address** icon on the Desktop to bring up the **Network Connections** window.

Step 4: Double-click on **Ethernet0**. **Note:** Do not change the IP address on **Ethernet1**).

Step 5: From the **Ethernet0 Status** window, click **Properties**.

Step 6: From the **Ethernet0 Properties** window, click to select **Internet Protocol Version 4 (TCP/IPv4)** then click **Properties**.

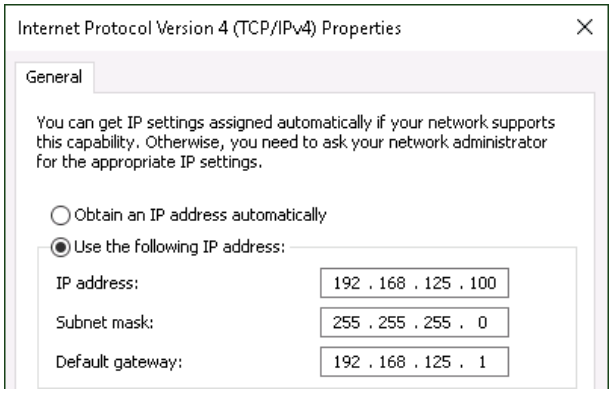
Step 7: On the **Internet Protocol Version 4 (TCP/IPv4) Properties** window,



Change **IP address: 192.168.199.100** to ***192.168.Y.100*****,** where ***Y*** is your assigned ***Student-ID+100***.

Change **Default gateway: 192.168.199.1** to ***192.168.Y.1***, where ***Y*** is your assigned ***Student-ID+100***.

If your **Student-ID** is **25**, this would be ***192.168.125.100*** and ***192.168.125.1*** respectively. It is important to use your assigned value to establish connectivity to the **NGFW-Branch** VM.



Click **OK**.

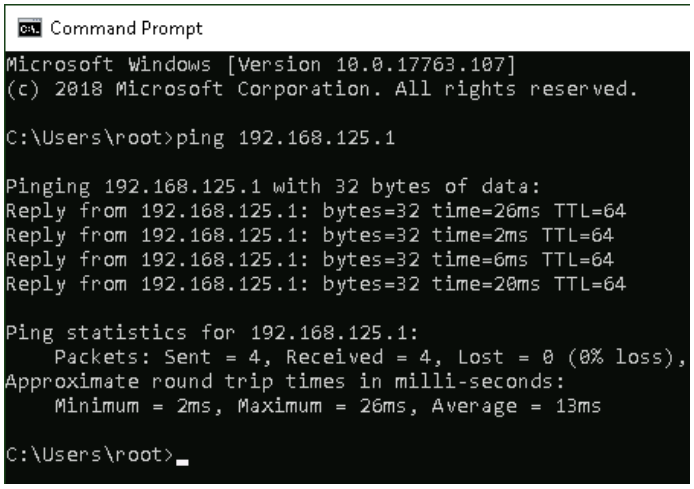
From the **Ethernet0 Properties** window, click **Close**.

From the **Ethernet0 Status** window, click **Close**. If prompted from a **Networks** window, click **No**.

On the **Network Connections** window, click the **X** to close the window.

Step 8: From the Windows taskbar, click the **Command Prompt**  icon to launch the **Command Prompt**.

Type ***ping 192.168.Y.1***, where ***Y*** is your assigned ***Student-ID+100***.



Close the **Command Prompt** window.

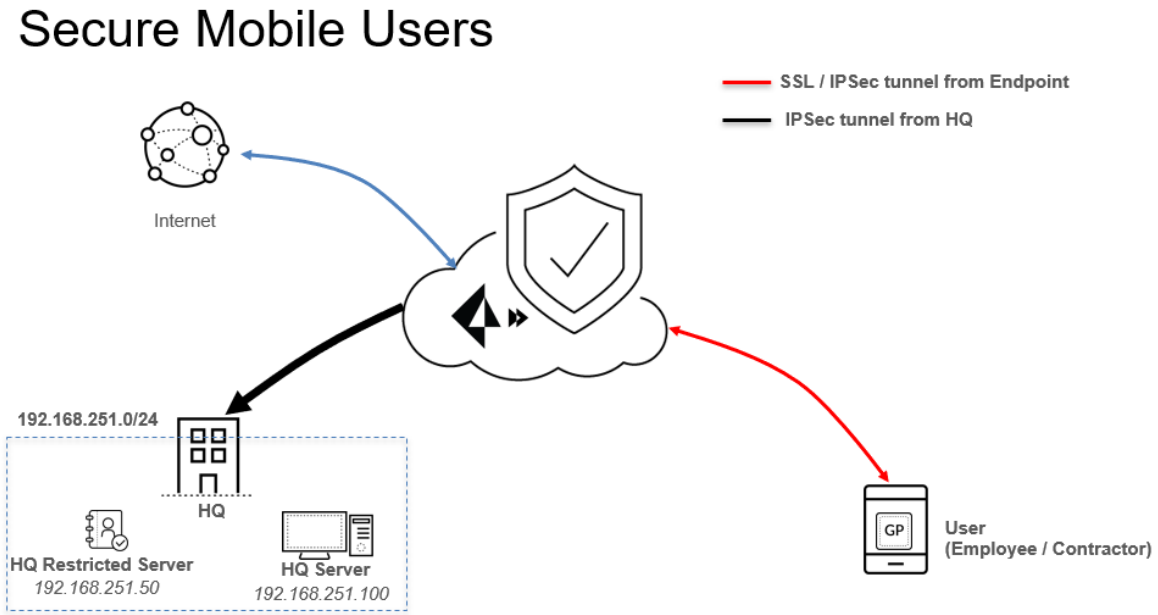
End of Activity 1

Activity 2 – Secure Mobile Users with Prisma Access

In this activity, you will:

- ***Access win-mobile VM***
- ***Access Panorama and review Prisma Access configuration for Mobile Users***
- ***Demonstrate how mobile user traffic is secured***

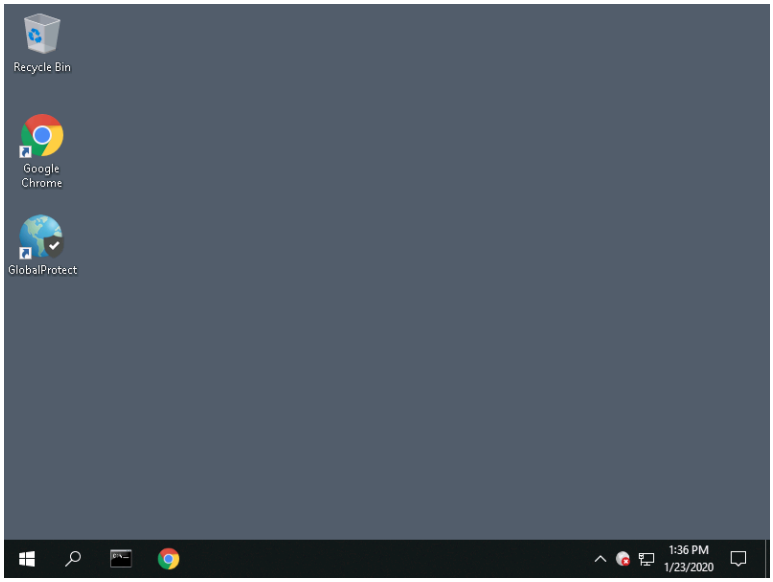
Prisma Access is a Secure Access Service Edge delivered from multiple regions in the cloud. The GlobalProtect agent on user endpoints automatically determines the best Gateway for the user and tunnels traffic to this location. This allows for consistent security and access to the internet, cloud applications and private data center apps with better user experience. The 100+ points of presence allows security inspection closer to the user with better localization, instead of back-hauling all traffic to the Data Center.



Task 1 – Log in to GlobalProtect Application

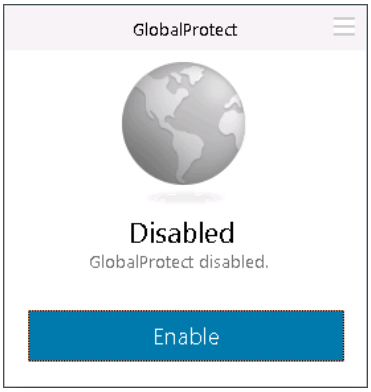
Step 1: Click the **win-mobile** tab to access that desktop in your browser.

Step 2: You will be connected to the **win-mobile** desktop.



Step 3: From the system tray, click the **GlobalProtect**  icon.

Step 4: Click the **Enable** button.



Step 5: Sign in to the **GlobalProtect** application with the following credentials:

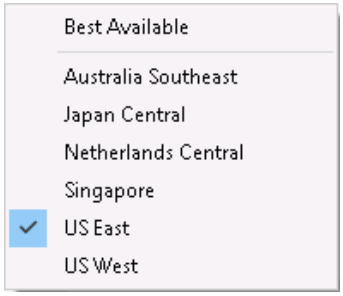
Username: ***contractor[X]*** where ***[X]*** is your **Student-ID** (e.g. contractor25)
Password: ***utd1234***

Click **Sign In**.

This will establish a secure tunnel from the **win-mobile** VM to nearest available **Prisma Access** gateway.

Depending on which CloudShare regional data center your workshop is originating from, you are likely to see the **Gateway** as **US-East**, **Netherlands Central**, or **Singapore**.

Step 6: Click the **Gateway** drop-down to see the available gateways that are user selectable for this Prisma Access tenant.

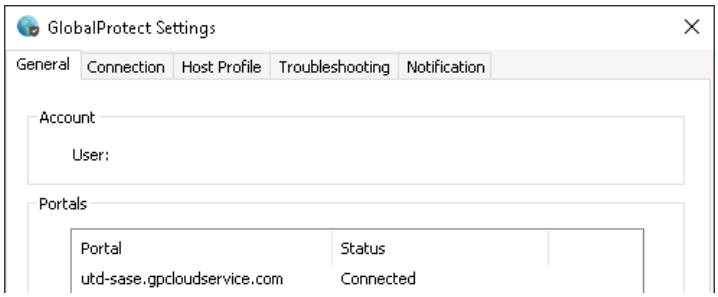


Click into the **GlobalProtect** window to dismiss the drop-down list.

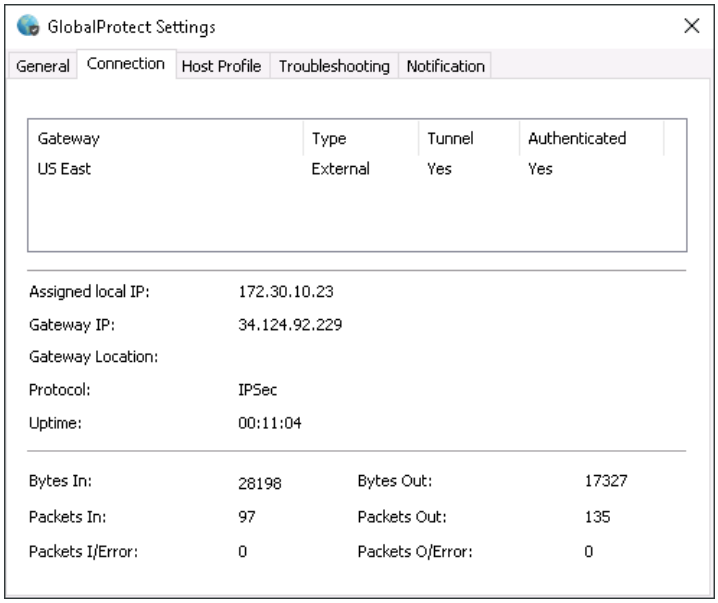
Note: This list is a small subset of the locations available. See https://docs.paloaltonetworks.com/prisma/prisma-access/prisma-access-panorama-admin/prepare-the-prisma-access-infrastructure/list-of-prisma-access-locations.html for the current list. In addition, the selectable list, as seen in this Prisma Access tenant, is also configurable as a subset off all your available gateway locations.

Note: You may get a notification regarding a new version of the GlobalProtect agent being available. You may choose to update or not, it should not affect your lab.

Step 7: Click the hamburger ☰ icon then select **Settings** to bring up the **GlobalProtect Settings** window.

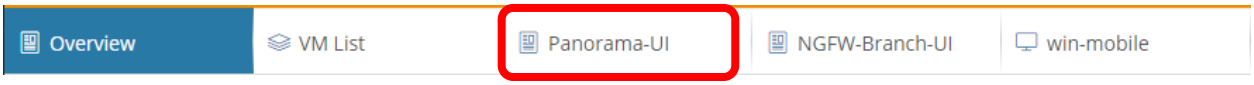


Step 8: Click the **Connection** tab to see the details on this connection to the Prisma Access gateway.

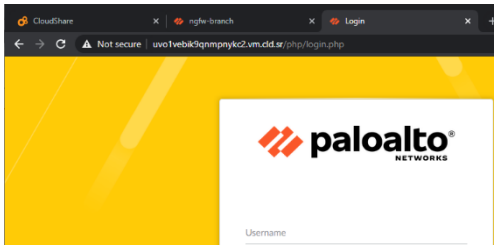


Task 2 – Access Panorama for Prisma Access Management

Step 1: Click the **Panorama-UI** tab.

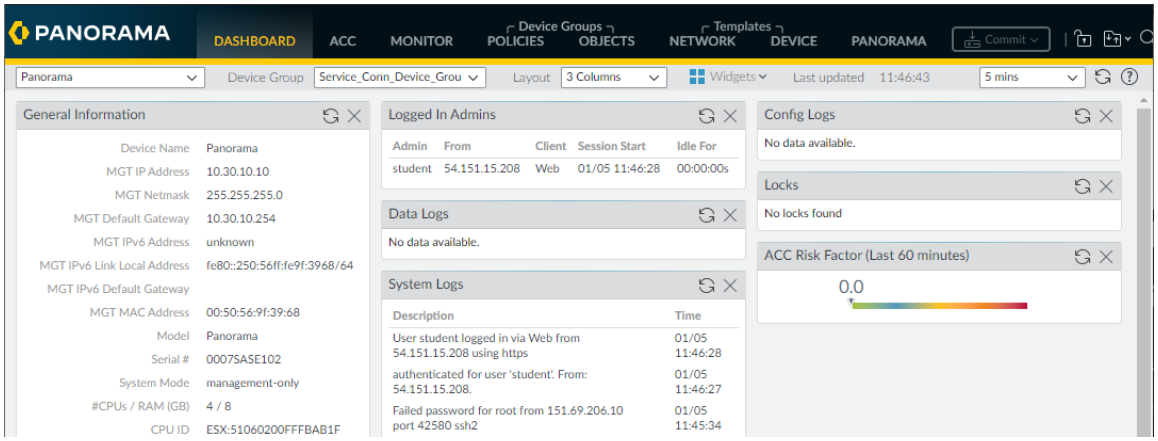


This will open a new tab in your browser with the login page for the **Panorama** VM.

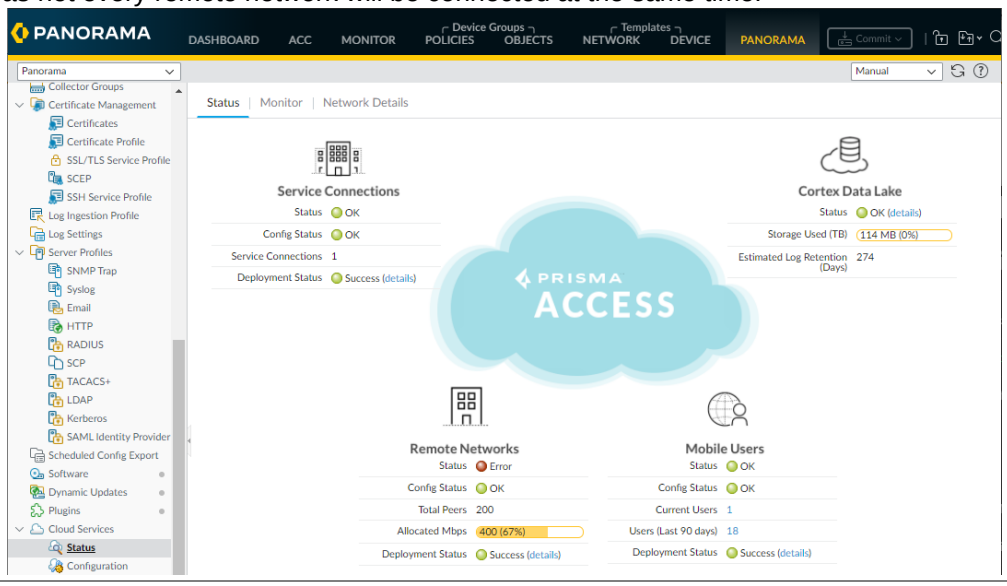


Step 2: Log in with the following credentials:

Name: *student*
Password: *utd1234*

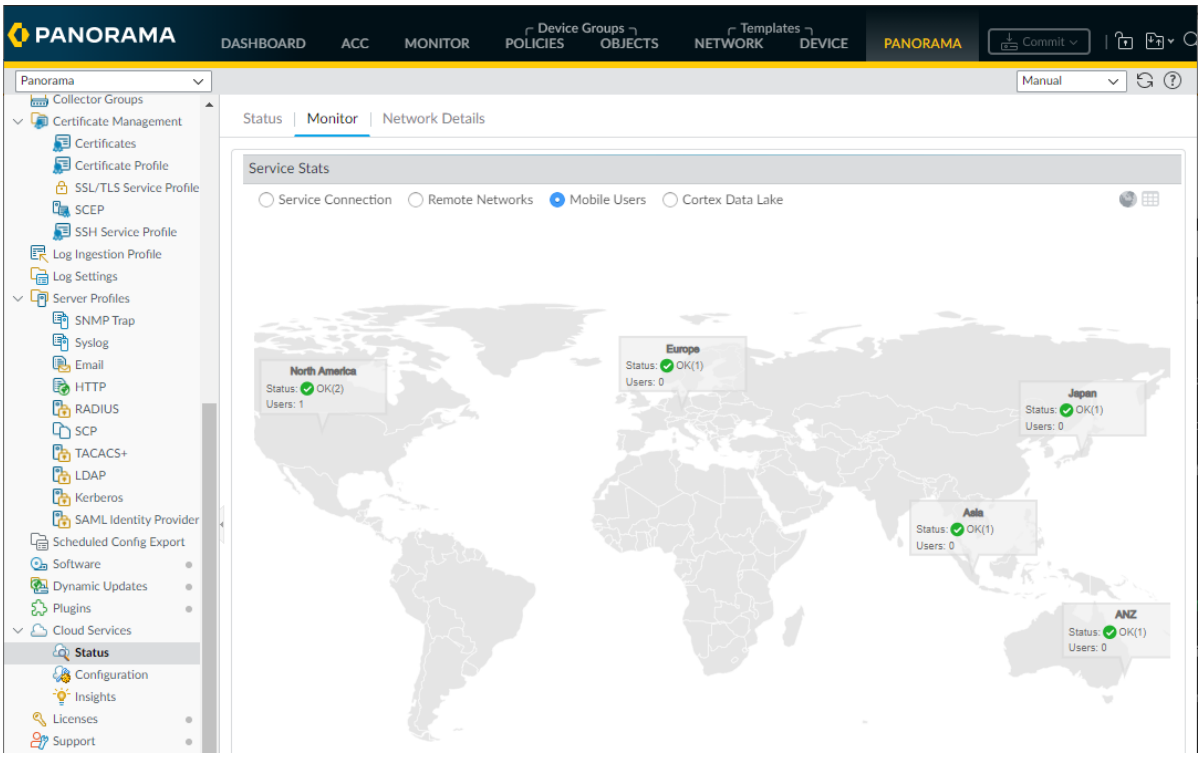


Step 3: Navigate to **Panorama > Cloud Services > Status > Status**. This will show the overall status of the Prisma Access tenant. **Note:** The **Remote Networks status** will be in **Error**. This is expected in this workshop as not every remote network will be connected at the same time.

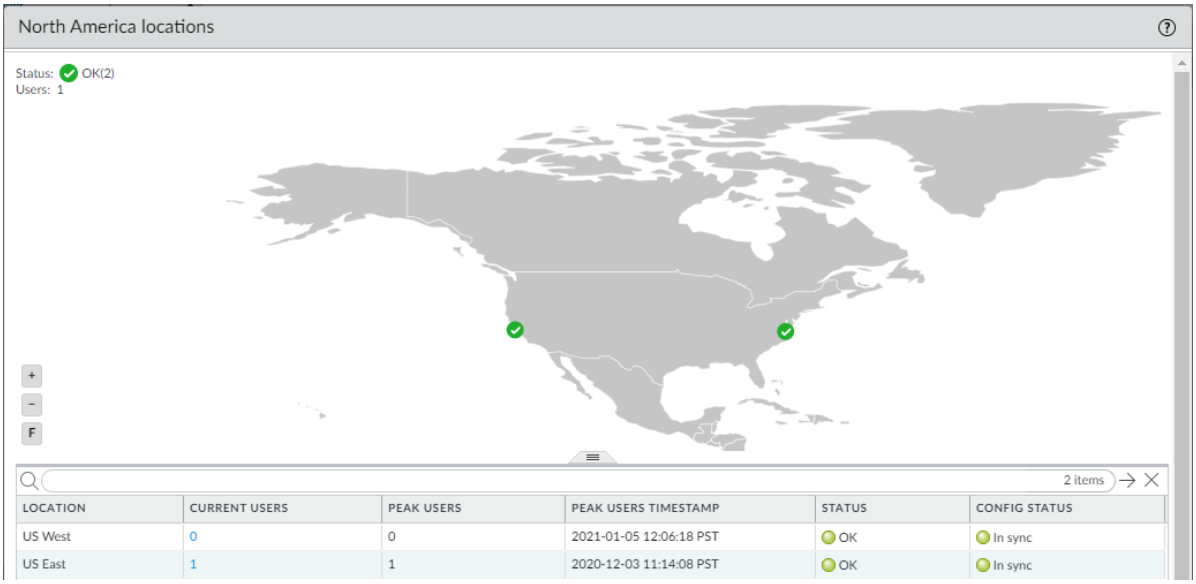


Step 4: Navigate to **Panorama > Cloud Services > Status > Monitor > Mobile Users**.

This will show a summary of each region indicating status, number of gateways and how many mobile users are currently connected. As you can see here, this Prisma Access tenant has two gateways enabled in **North America**, and one each in **Europe**, **Asia**, **Japan**, and **ANZ**. This is a small subset of what is available. See the URL in the previous activity for the entire list.

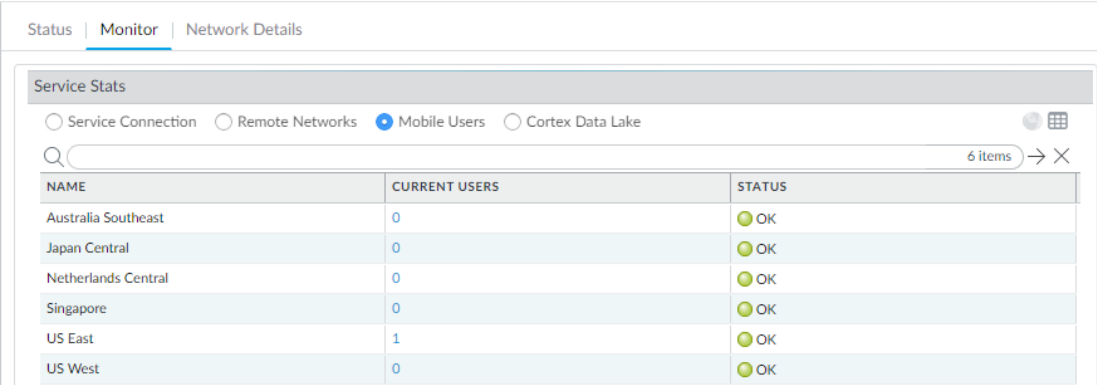


Step 5: Click on the **North America** status to bring up the **North America locations** window. This will show the gateway locations for that region as well as how many users are connected to each gateway in that region.

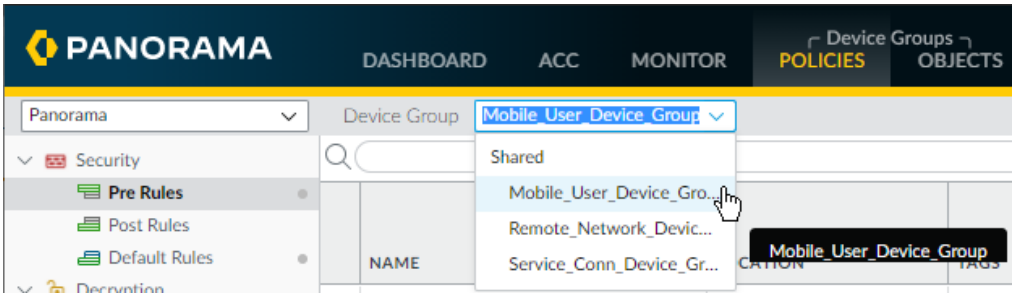


Click **Close**.

Step 6: In the upper right-hand corner, click the table icon to see a different view.



Step 7: Navigate to **Policies > Security > Pre Rules**. Make sure the **Device Group** is set to **Mobile_User_Device_Group**.



Step 8: Review the **Security Policies**.

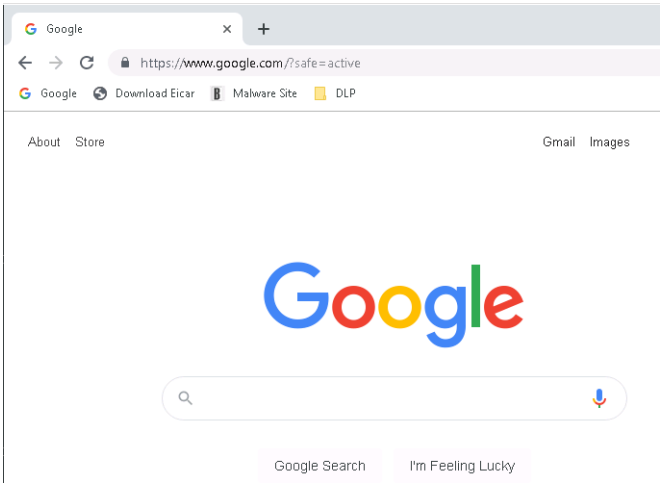
What access does the user (employee/contractor) have to HQ servers?

What security features are enabled in the **Secure-Internet-Traffic** policy?

					Source				Destination	
	NAME	LOCATION	TAGS	TYPE	ZONE	ADDRESS	USER	DEVICE	ZONE	ADDRESS
1	Deny QUIC	Mobile_User_Device_Group	none	universal	PrismaAccess-Remote-Users	any	any	any	Internet	any
2	Deny QUIC-UDP	Mobile_User_Device_Group	none	universal	PrismaAccess-Remote-Users	any	any	any	Internet	any
3	Secure-Internet-Traffic	Mobile_User_Device_Group	none	universal	PrismaAccess-Remote-Users	any	any	any	Internet	any
4	Secure-Access-to-HQ-Restricted-Server	Mobile_User_Device_Group	none	universal	PrismaAccess-Remote-Users	any	employee	any	HQ	Restricted-Server
5	Deny-Access-to-HQ-Restricted-Server	Mobile_User_Device_Group	none	universal	PrismaAccess-Remote-Users	any	contractor	any	HQ	Restricted-Server
6	Secure-Access-to-HQ-and-Branch-Office	Mobile_User_Device_Group	none	universal	PrismaAccess-Remote-Users	any	contractor employee	any	Branch-Office HQ	any

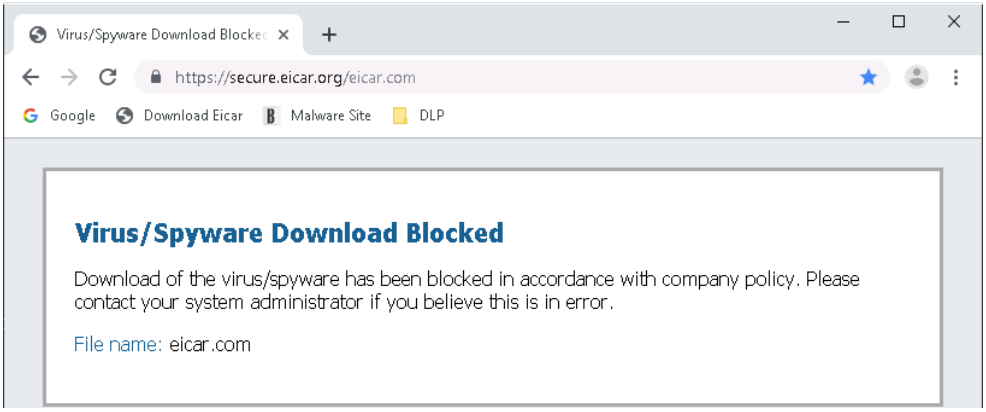
Task 3 – Access Internet from win-mobile VM

Step 1: From the **win-mobile** VM, launch the **Chrome** browser. Use the **Google** bookmark to browse to ***https://www.google.com***. This should be successful.

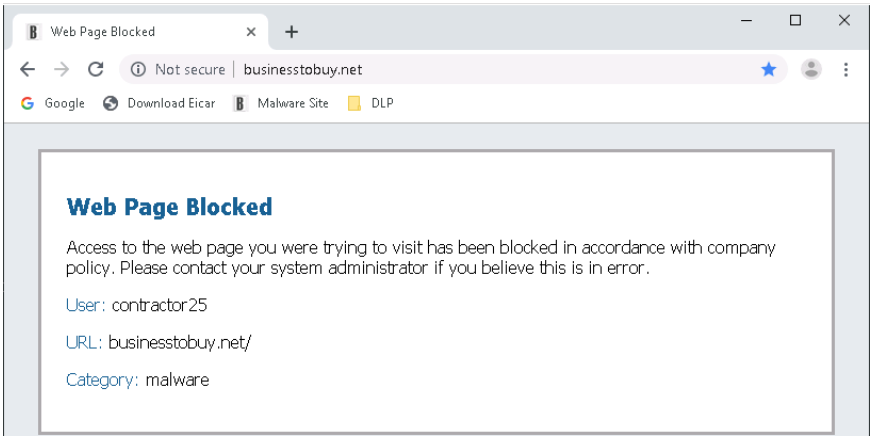


Step 2: Use the **Download Eicar** bookmark to go to ***https://secure.eicar.org/eicar.com***. This should be blocked as a security threat by the anti-virus signatures.

Note: Prisma Access is capable of performing decryption. You can't defend against what you can't see.



Step 3: Use the **Malware Site** bookmark to go to ***http://businesstobuy.net***. This should be blocked as a malware site by **URL Filtering**.



Summary:

- ✓ Security is delivered from the cloud and closer to where the users are.
- ✓ Security capabilities such as URL Filtering, Threat Prevention and WildFire are included.
- ✓ Removes the need to back-haul users' traffic to the HQs or the data center.

End of Activity 2

Activity 3 – Next Generation Secure Remote Access

In this activity, you will:

- ***Demonstrate how User-ID can control access***

Remote users who are connected to Prisma Access can securely access enterprise applications in their HQ or in their branch sites. The HQs and the branch sites are on-boarded to the Cloud Service as well.

Prisma Access allows administrators to control access to enterprise applications based on User / User-Groups, device compliance state and / or the specific application being accessed.

- **Authenticate First** – GlobalProtect agent requires users to successfully authenticate to set up the tunnel. Various authentication methods such as Multi-Factor authentication (MFA), SAML, RADIUS, Active Directory, Certificates are supported
- **Authorize Access –** Successfully setting up a tunnel does not provide access to all application and resources in the HQs / branch office. Only authorized users from authorized devices can access those specific applications that are available for them.
    - **User-ID –** based on user and the user group the user belongs to
    - **Host Information Profile (HIP) –** based on the compliance state of the device from where the application is accessed.
    - **App-ID –** based on application the user is accessing
    - **Services -** based on the service / ports on which the application is accessed.

Task 1 – Control Access with User-ID

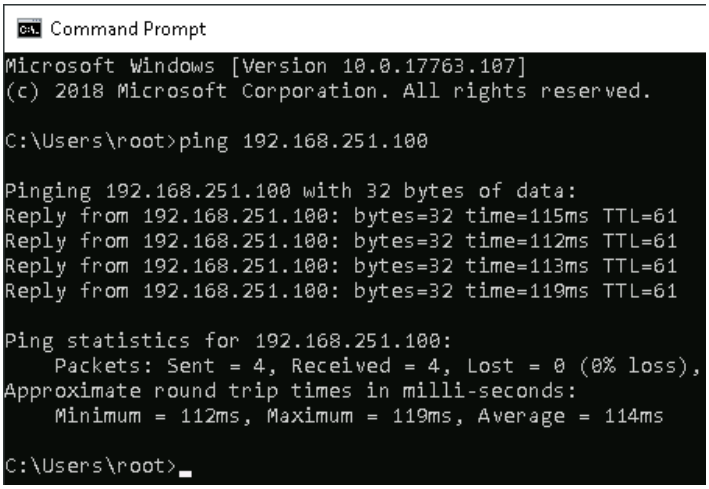
Step 1: Recall that the security policies for the **Mobile_User_Device_Group** (**Panorama-UI: Policies > Security > Pre Rules**) are:

					Source				Destination	
	NAME	LOCATION	TAGS	TYPE	ZONE	ADDRESS	USER	DEVICE	ZONE	ADDRESS
1	Deny QUIC	Mobile_User_Device_Group	none	universal	PrismaAccess-Remote-Users	any	any	any	Internet	any
2	Deny QUIC-UDP	Mobile_User_Device_Group	none	universal	PrismaAccess-Remote-Users	any	any	any	Internet	any
3	Secure-Internet-Traffic	Mobile_User_Device_Group	none	universal	PrismaAccess-Remote-Users	any	any	any	Internet	any
4	Secure-Access-to-HQ-Restricted-Server	Mobile_User_Device_Group	none	universal	PrismaAccess-Remote-Users	any	employee	any	HQ	Restricted-Server
5	Deny-Access-to-HQ-Restricted-Server	Mobile_User_Device_Group	none	universal	PrismaAccess-Remote-Users	any	contractor	any	HQ	Restricted-Server
6	Secure-Access-to-HQ-and-Branch-Office	Mobile_User_Device_Group	none	universal	PrismaAccess-Remote-Users	any	contractor employee	any	Branch-Office HQ	any

The **HQ-Restricted-Server** (IP: 192.168.251.50) is only allowed access by the **employee** user group (**Secure-Access-to-HQ-Restricted-Server**). The **contractor** user group is denied (**Deny-Access-to-HQ-Restricted-Server**).

Step 2: From the **win-mobile** VM, launch the **Command Prompt** from the Windows taskbar.

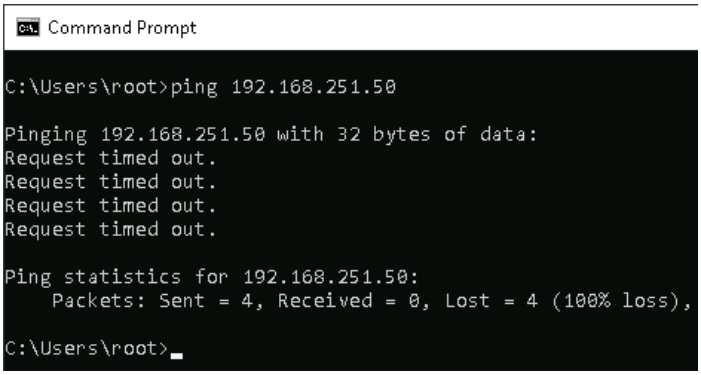
Type ***ping 192.168.251.100***



As you are still logged into a **contractor[*X*]** account and are part of the **contractor** user group, you have access to the 192.168.251.100 server. The security policy **Secure-Access-to-HQ-and-Branch-Office** applies to this host.

Step 3: Now try to ping the **HQ-Restricted-Server**.

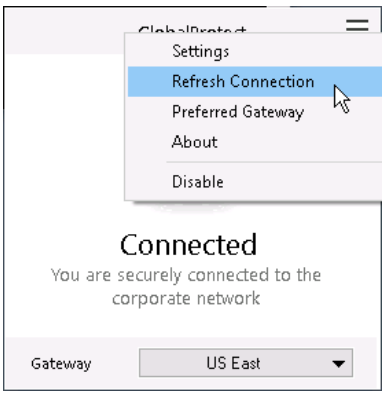
Type ***ping 192.168.251.50***



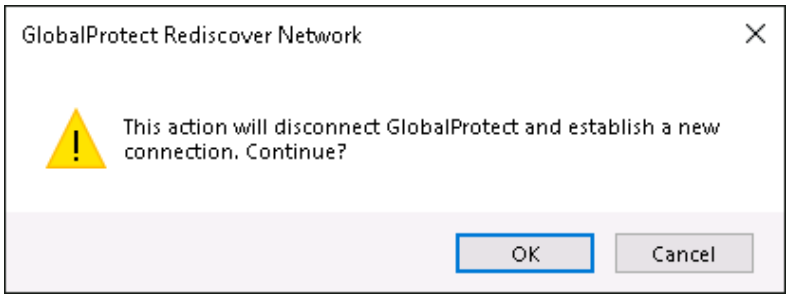
The ping fails as expected due to the **Deny-Access-to-HQ-Restricted-Server** security policy.

Step 4: Bring up the **GlobalProtect** application by clicking the icon in the system tray.

Step 5: Click on **Settings** (hamburger icon) **> Refresh Connection**



Step 6: Click **OK** on the **GlobalProtect Rediscover Network** window.



Step 7: In the **GlobalProtect Sign In** window, log in with the following credentials:

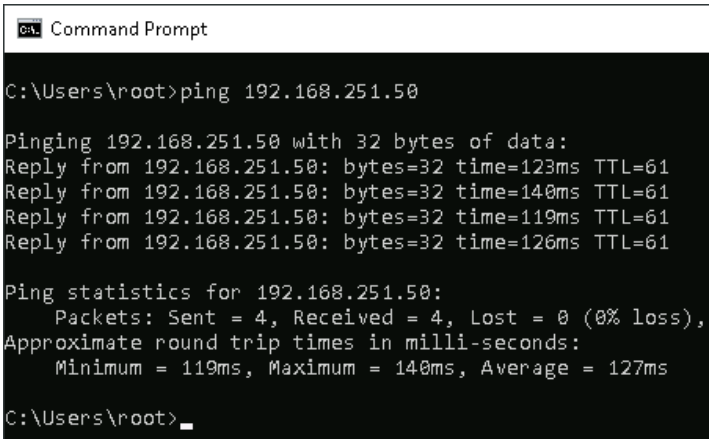
Username: *employee[X]* where ***[X]*** is your **Student-ID** (e.g. employee25)
Password: *utd1234*

Click **Sign In**.

This will establish a new secure tunnel logged into an **employee[*X*]** account and part of the **employee** user group.

Step 8: As an **employee**, try to ping the **HQ-Restricted-Server**.

Type ***ping 192.168.251.50***



The ping is successful as the **Secure-Access-to-HQ-Restricted-Server** is applied here.

You may also ***ping 192.168.251.100*** confirm you still have access to the other HQ server.

Summary:

- ✓ Next Gen Secure remote access to internal applications.
- ✓ Successful tunnel set up and authentication does not automatically provide access to internal applications.
- ✓ Authenticate first and authorize only based on who the user is, what group the user belongs to, the state of the device from where the user is requesting access, the application being accessed, and the ports and services being used

End of Activity 3

Activity 4 – Use Remote Networks to Secure Branches (1 WAN Link)

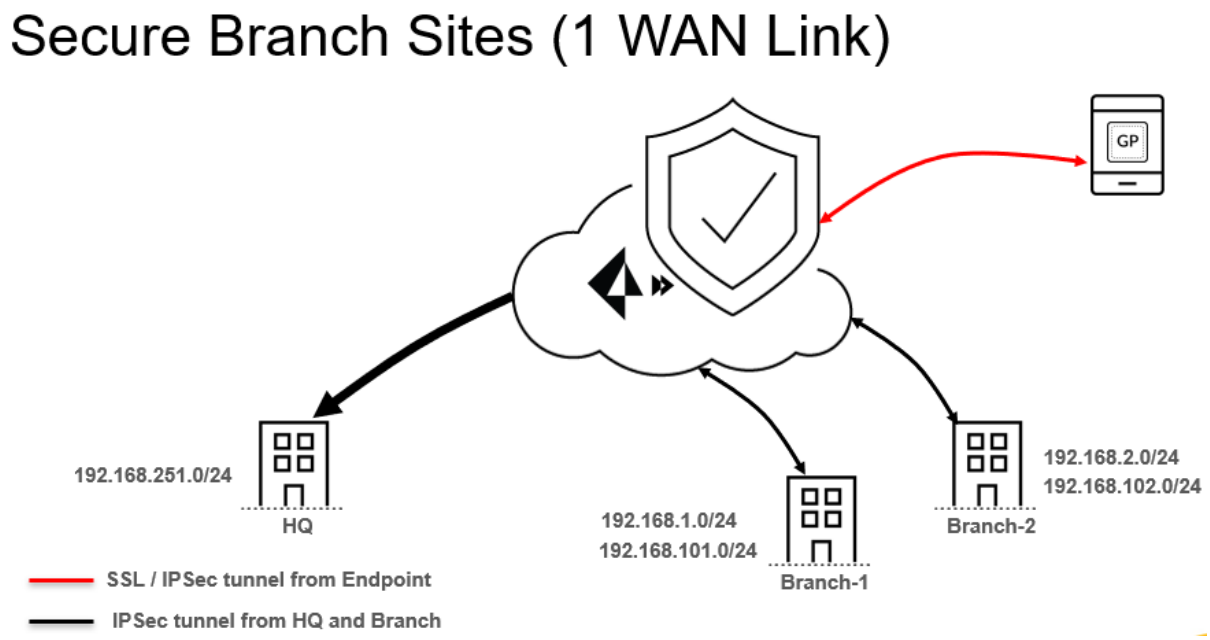
In this activity, you will:

- ***Access Panorama and review configuration for remote network***
- ***Configure branch/remote network to establish IPSec tunnel to Prisma Access***
- ***Demonstrate that branch/remote network is secure***

Prisma Access provides consistent security for all your branch offices without deploying expensive hardware or back-hauling traffic to your data center. All the branch sites have the same set of security policies and controls, centrally managed from Panorama. You can on-board your branch sites to any of the 100+ points of presence available in Prisma Access.

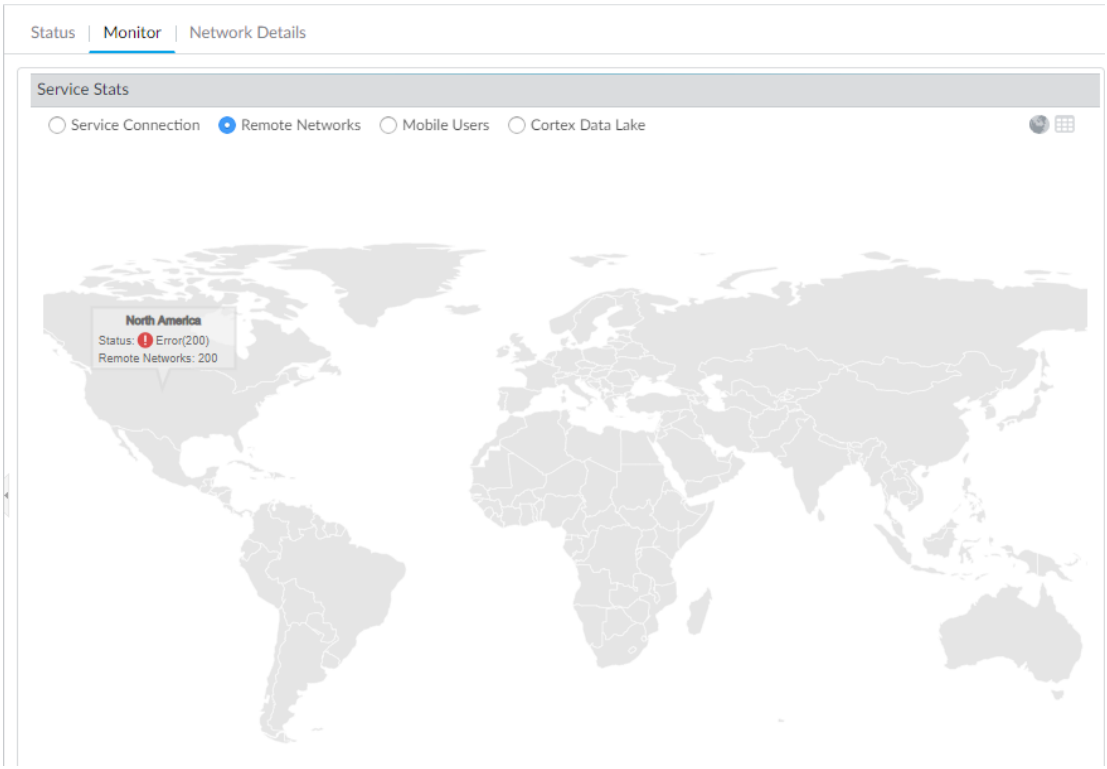
To on-board you need to set up a site-to-site IPSec tunnel from your branch to Prisma Access. You can use any IPSec VPN capable device, including SD-WAN devices to set up this tunnel.

In this workshop you will use a VM-Series firewall as the on-premise device.



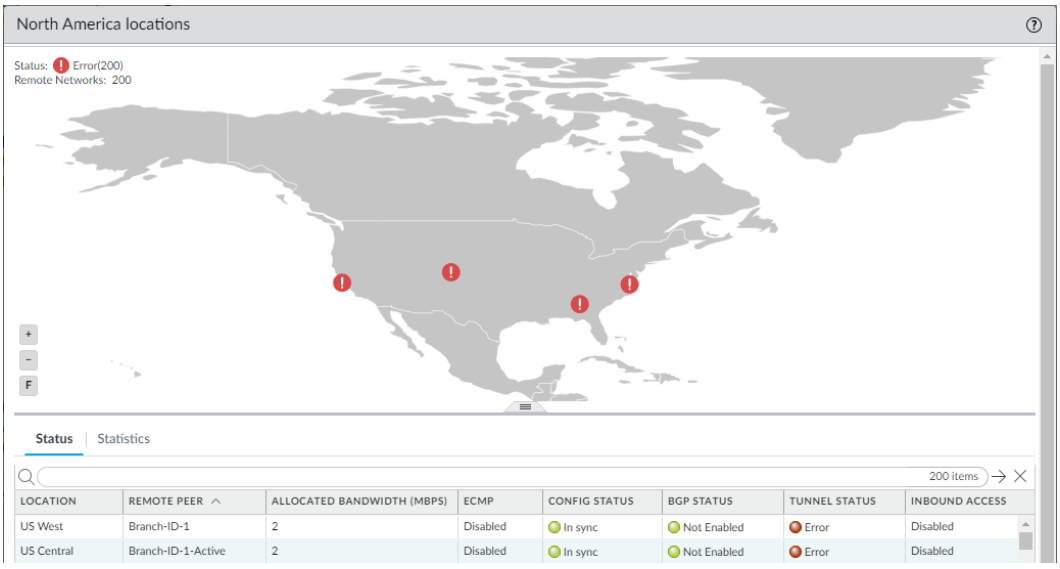
Task 1 – Review Prisma Access Remote Networks from Panorama

Step 1: From the **Panorama-UI** browser tab, navigate to **Panorama > Cloud Services > Status > Monitor > Remote Networks**



As was mentioned in activity 2, task 2, it is expected to see **Error** as not every Remote Network will be connected in our lab.

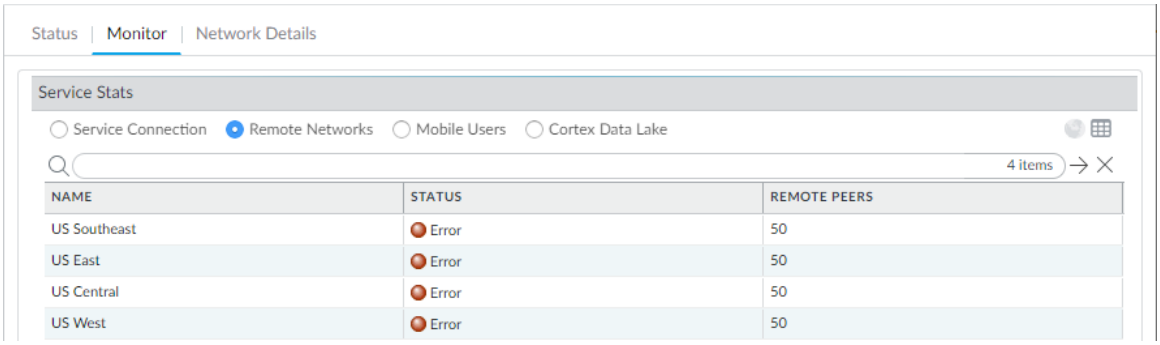
Step 2: Click on **North America** to bring up the **North America locations** window.



You may review the details of each Remote Network here.

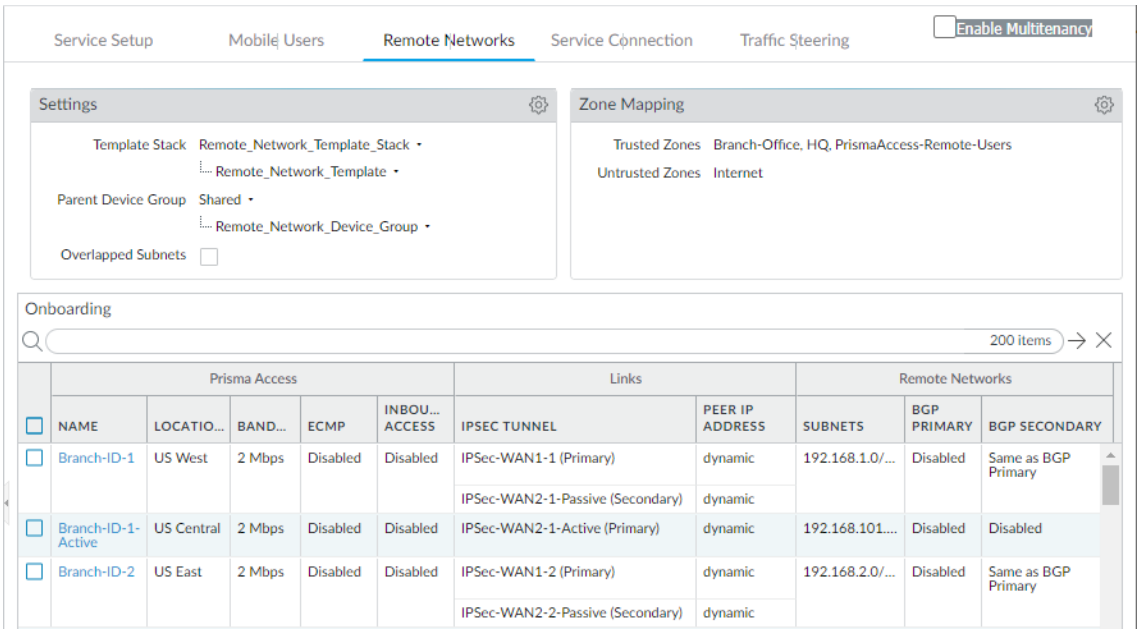
Click **Close**.

Step 3: In the upper right-hand corner, click the table icon.



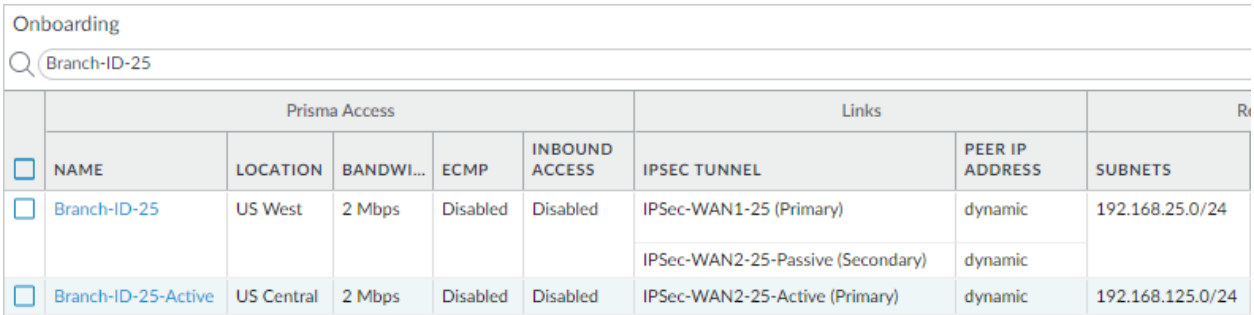
This will show the number of Remote Networks per region.

Step 4: Navigate to **Panorama > Cloud Services > Configuration > Remote Networks**

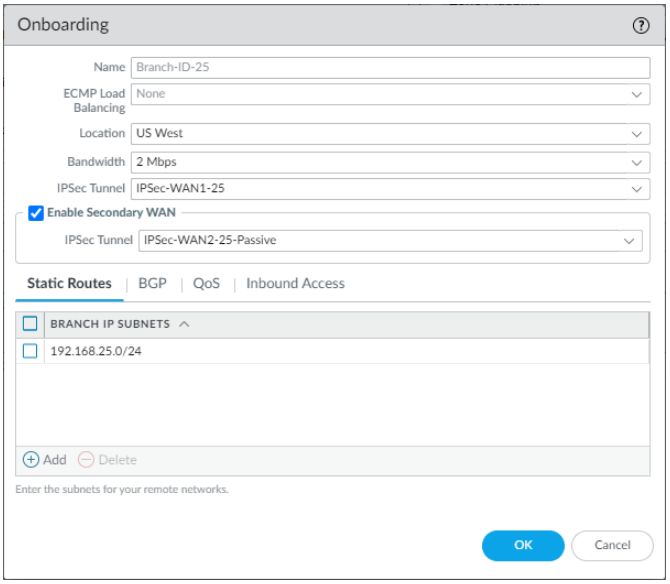


Step 5: Under **Onboarding**, in the search box, type ***Branch-ID-X***, where ***X*** is your assigned **Student-ID.**

If your **Student-ID** is **25**, this would look like:



Step 6: Click **Branch-ID-X** to review the configuration for that remote network.



What is the assigned **Bandwidth**?

What regional cloud **Location** will your remote network connect to?

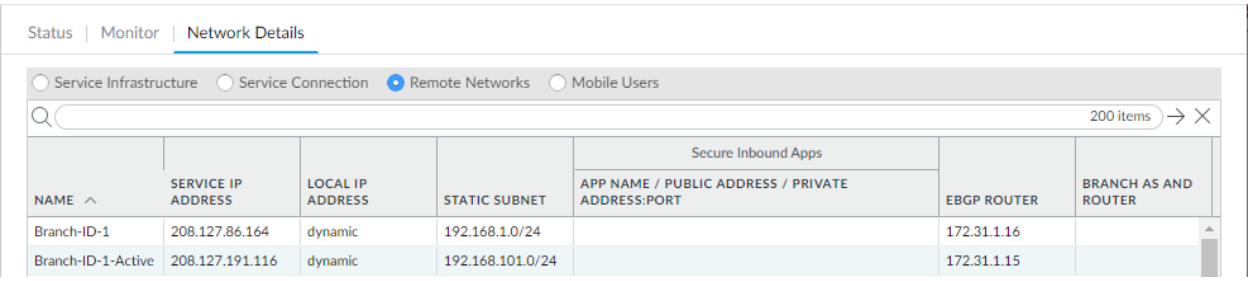
What **IPSec Tunnel** profile which be applied?

Which of your **Branch IP Subnets** can be reached via this tunnel?

Is a **Secondary WAN** link available?

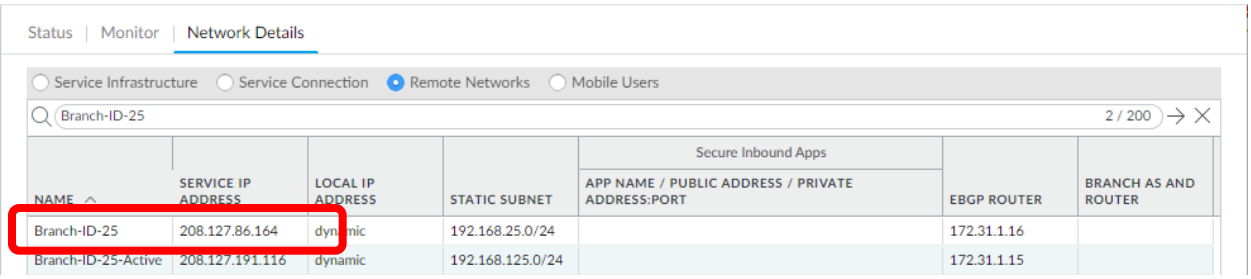
Click **Cancel**.

Step 7: Navigate to **Panorama > Cloud Services > Status > Network Details > Remote Networks**



Step 8: From the search box, type ***Branch-ID-X***, where ***X*** is your assigned **Student-ID.**

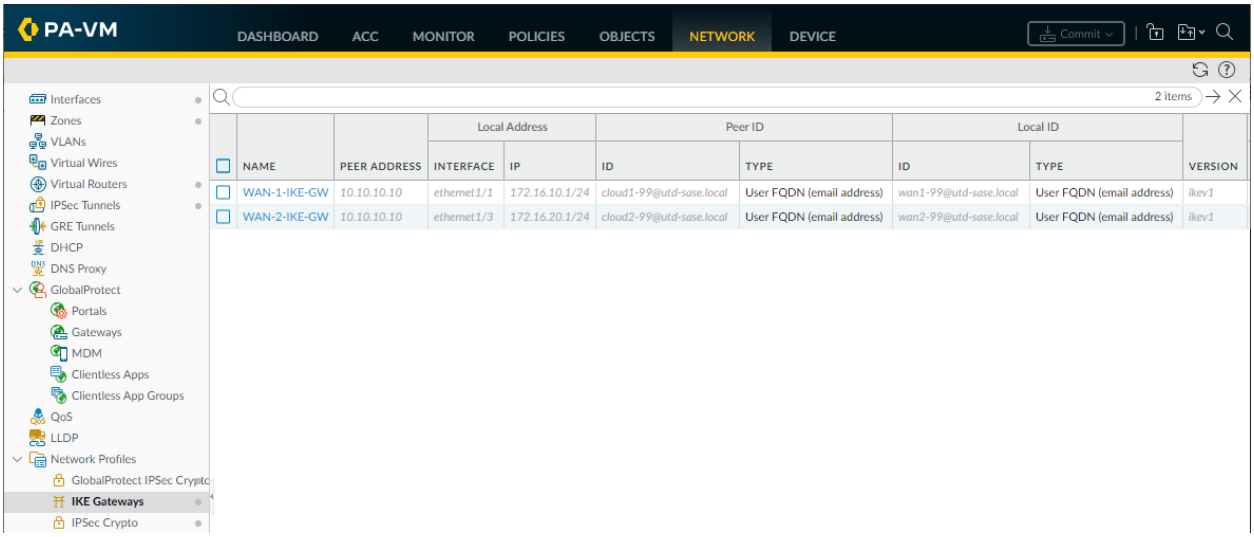
If your **Student-ID** is **25**, this would look like:



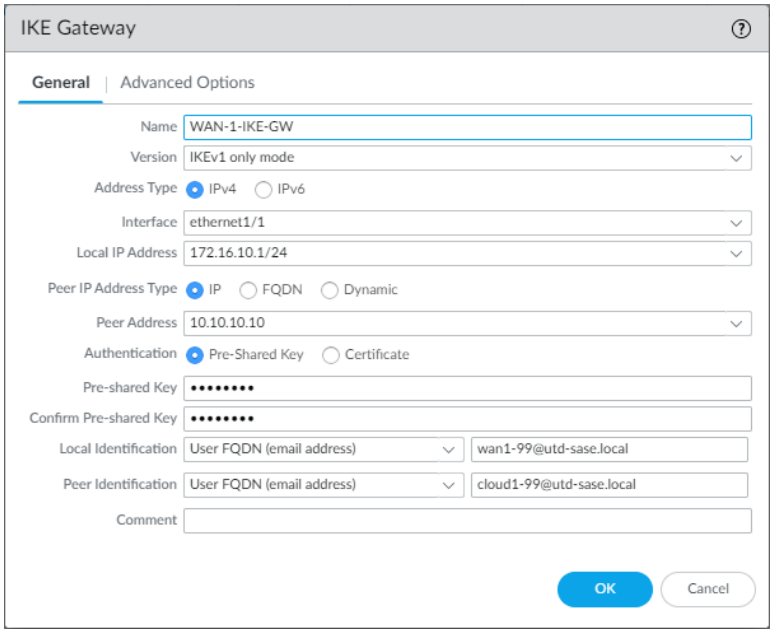
Record the **Service IP Address** for your **Branch-ID-*X***. This will be used in the next task. **Note:** Do not use the IP for Branch-ID-*X*-Active for this activity- it will be used later.

Task 2 – Configure IPSec Tunnel on NGFW

Step 1: From the **NGFW-Branch-UI** (***student* / *utd1234)*** tab, navigate to **Network > Network Profiles > IKE Gateways**.



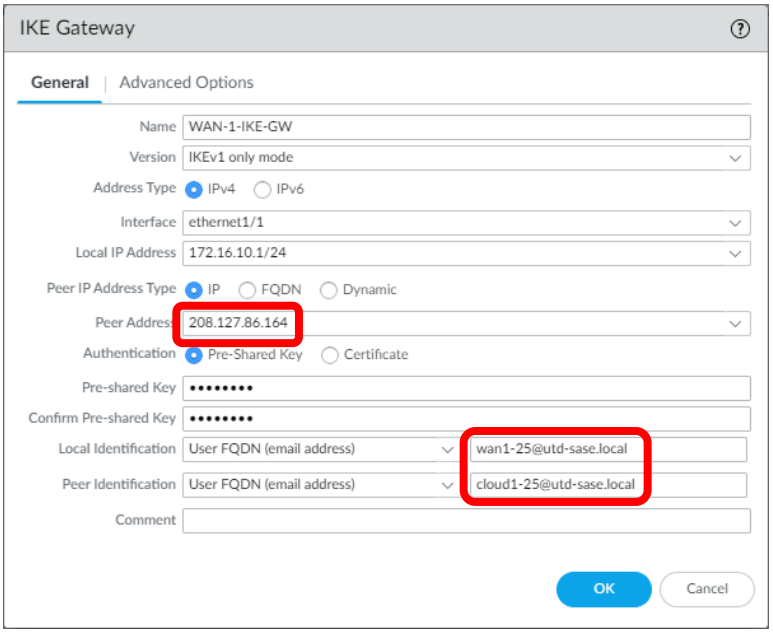
Step 2: Click **WAN-1-IKE-GW** to open the **IKE Gateway** window.



Step 3: Update the **Peer Address (10.10.10.10)** with the **Service IP Address** you recorded in the previous task in Panorama.

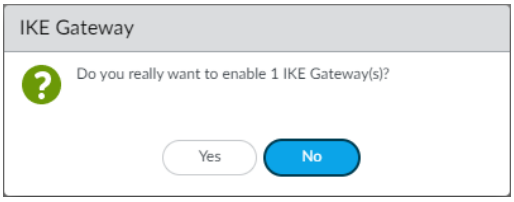
Also, change the **Local Identification** and **Peer Identification** values of **wan1-99@utd-sase.local** and **cloud1-99@utd-sase.local**, replacing the **99** with your **Student-ID**.

If your **Student-ID** is **25**, this would be ***wan1-25@utd-sase.local*** and ***cloud1-25@utd-sase.local***.



Click **OK**.

Step 4: Select **WAN1-IKE-GW** and click **Enable** Enable at the bottom of the page.

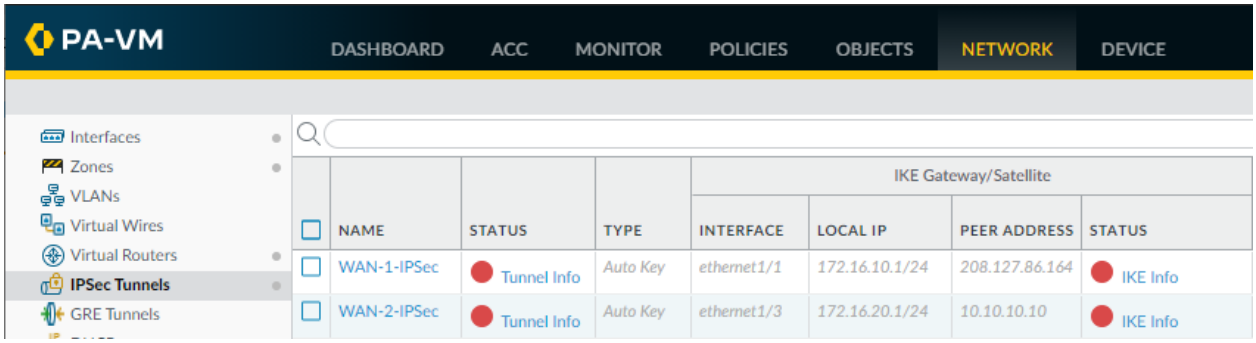


Click **Yes**.

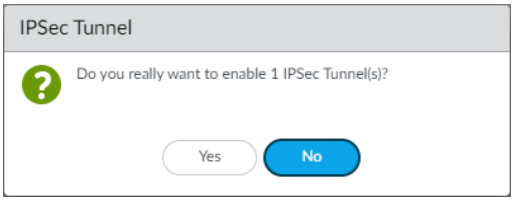
	NAME	PEER ADDRESS	Local Address	
			INTERFACE	IP
☐	WAN-1-IKE-GW	208.127.86.164	ethernet1/1	172.16.10.1/24
☐	WAN-2-IKE-GW	10.10.10.10	ethernet1/3	172.16.20.1/24

The text should change from grey to black.

Step 5: Navigate to **Network > IPSec Tunnels**.

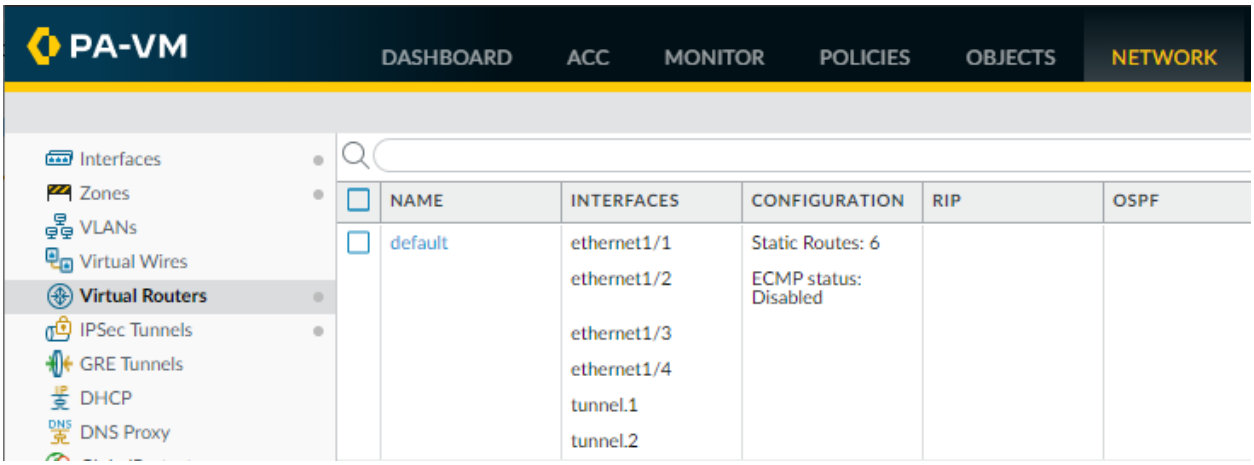


Step 6: Select **WAN-1-IPSec** and click **Enable** Enable.



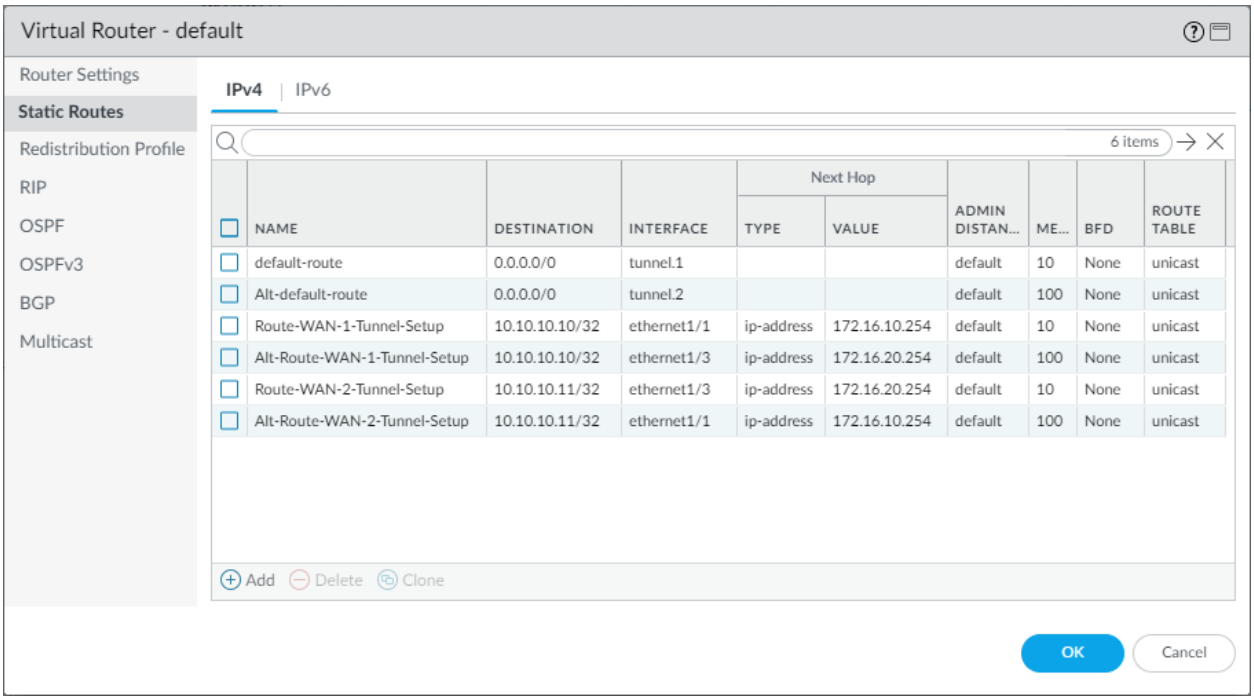
Click **Yes**.

Step 7: Navigate to **Network > Virtual Routers**.

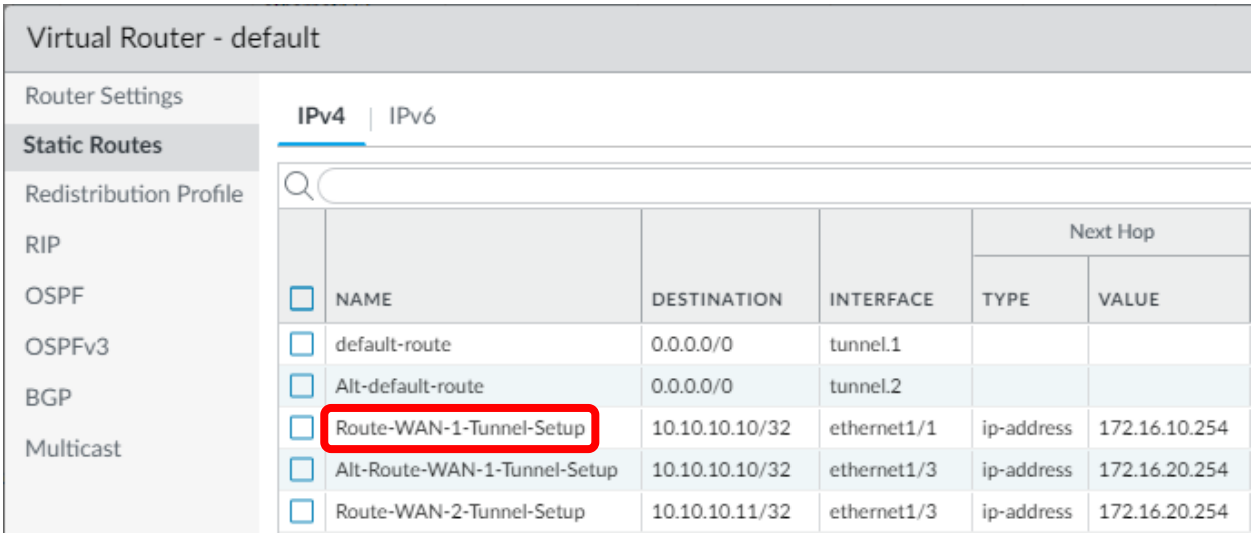


Step 8: Click **default** to open the **Virtual Router – default** window.

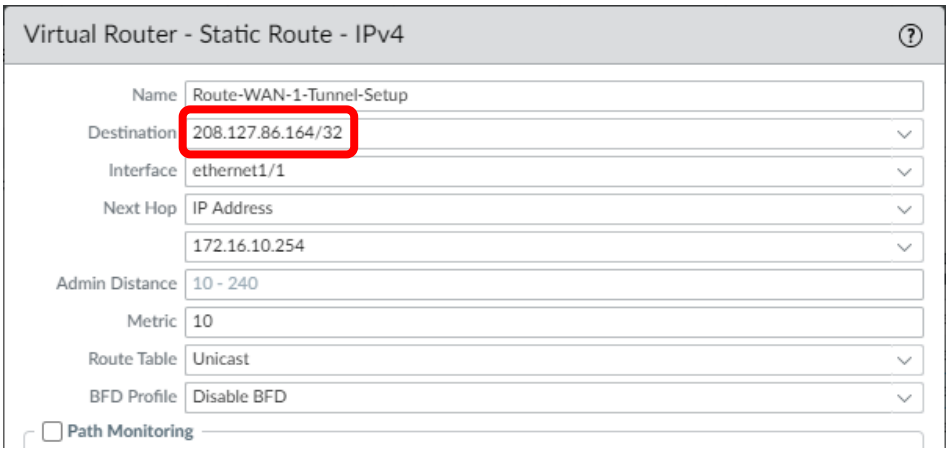
Select the **Static Routes** node.



Step 9: Click **Route-WAN-1-Tunnel-Setup**.



Step 10: Update the **Destination** of **10.10.10.10/32** with the **Service IP Address** previously recorded.
Note: Make sure to append ***/32*** to the IP. This allows the IPSec tunnel to be set up with Prisma Access over ethernet1/1.



Click **OK** to close the **Virtual Router – Static Route – IPv4** window.
Click **OK** to close the **Virtual Router – default** window.

Step 11: **Commit** your changes.

Step 12: Navigate to **Network > IPSec Tunnels** to confirm that **WAN-1-IPSec** is up.

	NAME	STATUS	TYPE	IKE Gateway/Satellite				Tunnel Interface				
				INTERFACE	LOCAL IP	PEER ADDRESS	STATUS	INTERF...	VIRTUAL ROUTER	VIRT... SYST...	S... Z...	ST...
	WAN-1-IPSec	Tunnel Info	Auto Key	ethernet1/1	172.16.10.1/24	208.127.86.164	IKE Info	tunnel.1	default (Show Routes)	vsys1	lan	
	WAN-2-IPSec	Tunnel Info	*Auto Key*	*ethernet1/3*	*172.16.20.1/24*	*10.10.10.10*	IKE Info	*tunnel.2*	default (Show Routes)	*vsys1*	*lan*	

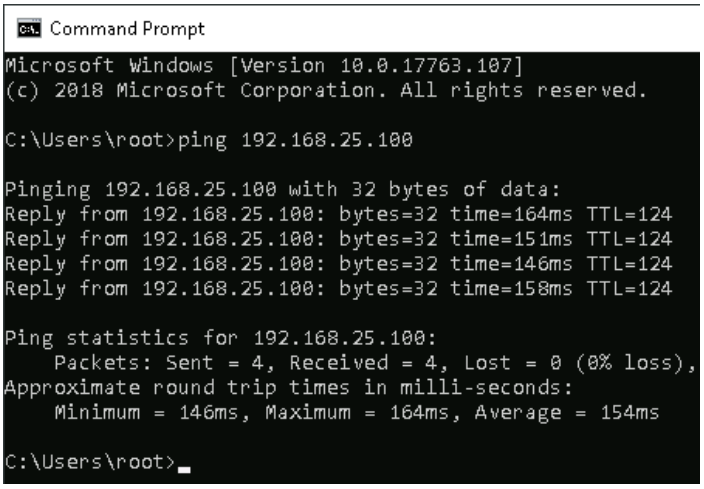
Troubleshooting: If the tunnel does not come up, verify the following:

- Confirm **IKE Gateway** is using correct **Peer Address,** and **Local** and **Peer Identification** settings.
- Confirm the **IKE Gateway** and **IPSec Tunnel** are enabled.
- Confirm **Virtual Router** settings are correct for **Static Route**.
- Confirm **Student-ID** values in **Interfaces** and **Tunnel**.
- Review logs at **Monitor > System** to confirm if IKE phase-1 and IKE phase-2 are up. It may help to search ***(subtype eq vpn)*** to help filter messages. If you see:
  IKE phase-1 negotiation is failed as initiator, aggressive mode. Failed SA… Due to timeout.
  Proceed to the next list item.
- If all of the above are correct, reboot the NGFW via **Device > Setup > Operations > Device Operations > Reboot Device**. If this step is necessary, it is due to the lab environment. Please let your instructor know you needed to perform this operation.

Task 3 – Verify Secured Remote Network

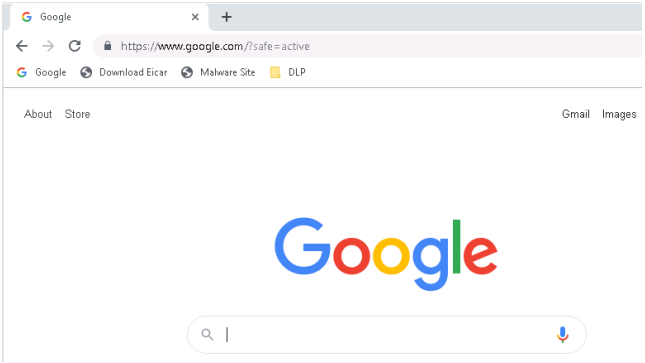
Step 1: From the **win-mobile** VM and connected as a remote user (***employeeX***) to Prisma Access, access resources in your branch/remote network.

Type ***ping 192.168.X.100***, where ***X*** is your assigned ***Student-ID***.

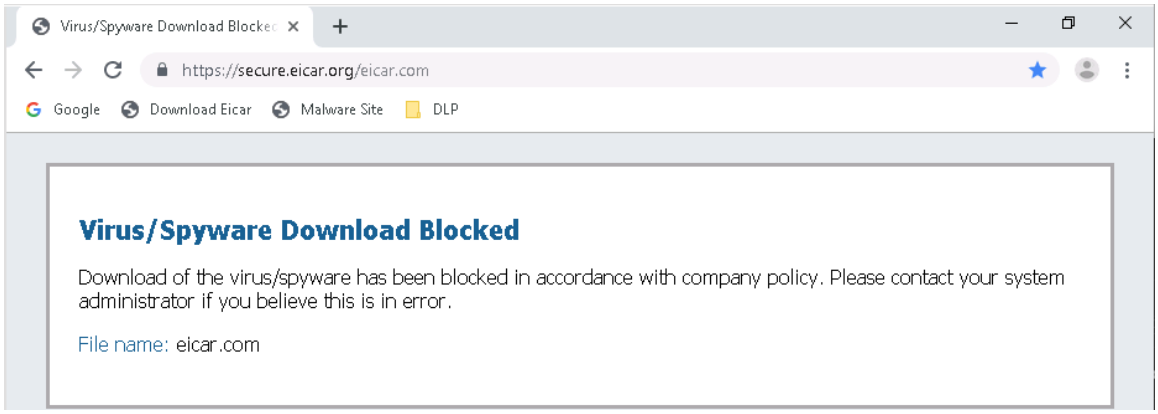


Note: You should also be able to access other branch/remote networks if they are connected. If Student-ID 10 is connected, you should be able to ping 192.168.10.100 as well.

Step 2: From the **win-subnet1** VM, launch **Chrome**. Use the **Google** bookmark to browse to ***www.google.com***. This should be successful.



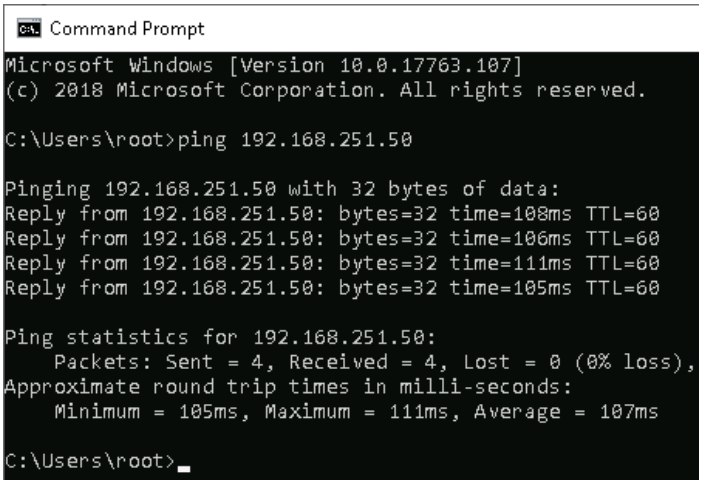
Step 3: Use the **Download Eicar** bookmark to go to ***https://secure.eicar.org/eicar.com***. This should be blocked as a security threat by the anti-virus signatures.



Note: As before, Prisma Access is able to decrypt your SSL/TLS based traffic. Branch office and remote users have the same protections.

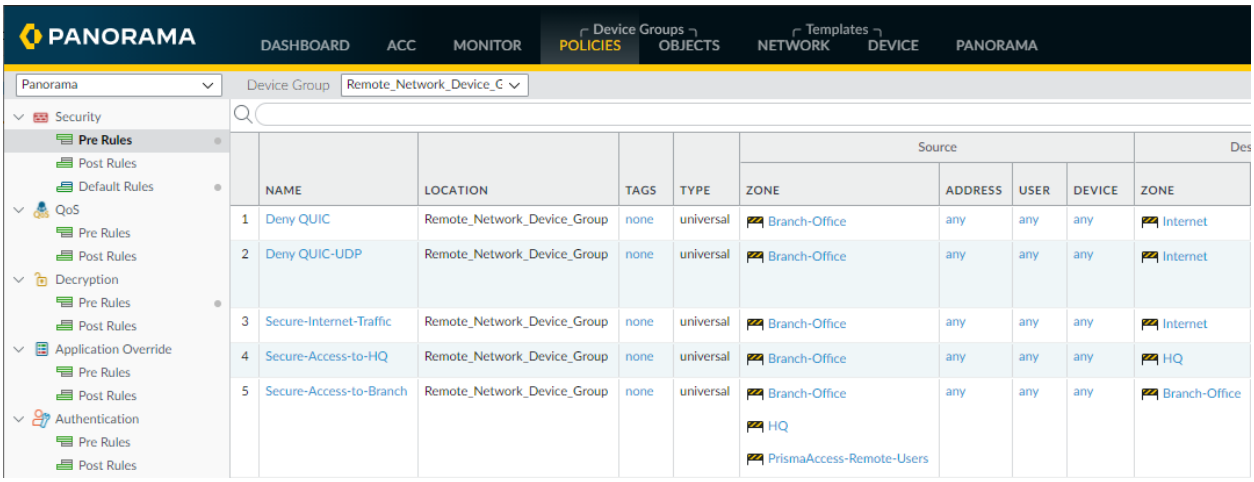
Step 4: Use the **Malware Site** bookmark to go to ***http://businesstobuy.net***. This should be blocked as a malware site by **URL Filtering**.

Step 5: From the **Command Prompt**, type ***ping 192.168.251.50***



As a user within the Remote Network, you should have access to the **HQ-Restricted-Server**.

Step 6: From the **Panorama-UI** tab, navigate to **Policies > Security > Pre Rules**. Change the **Device Group** to **Remote_Network_Device_Group**.



Review the security policies that are applied to the branch/remote networks.

Summary:

- ✓ Branch offices secured by Prisma Access
- ✓ Secured consistently and operationally efficiently
- ✓ Enables secure communication between
  - Remote mobile users and the branch
  - Remote branch offices
  - Remote branch offices and HQ

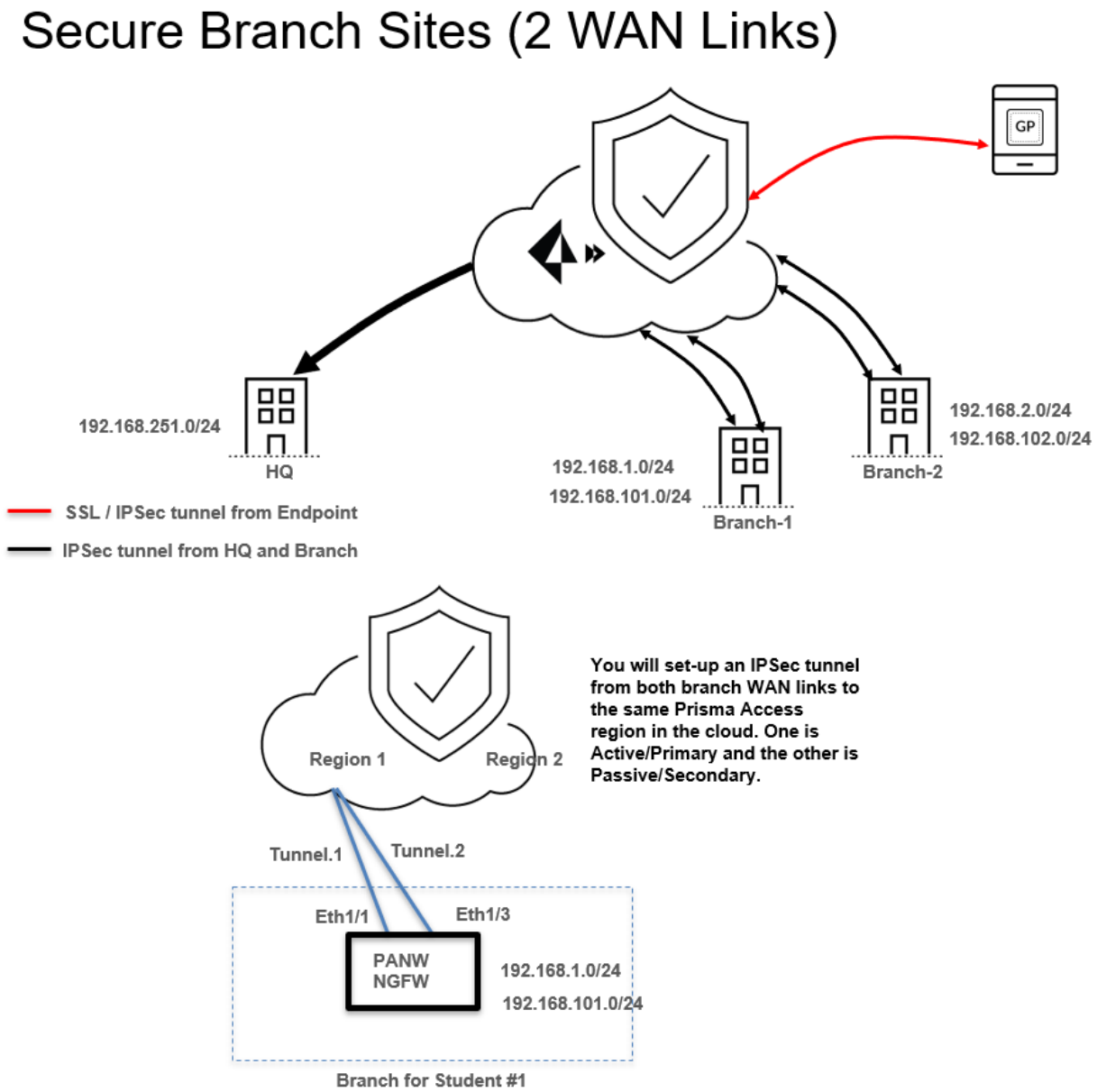
End of Activity 4

Activity 5 – Secure Branch Sites with 2 WAN Links (Active/Passive)

In this activity, you will:

- ***Configure branch/remote network to establish active/passive IPSec tunnels to Prisma Access***
- ***Demonstrate IPSec tunnel failover***

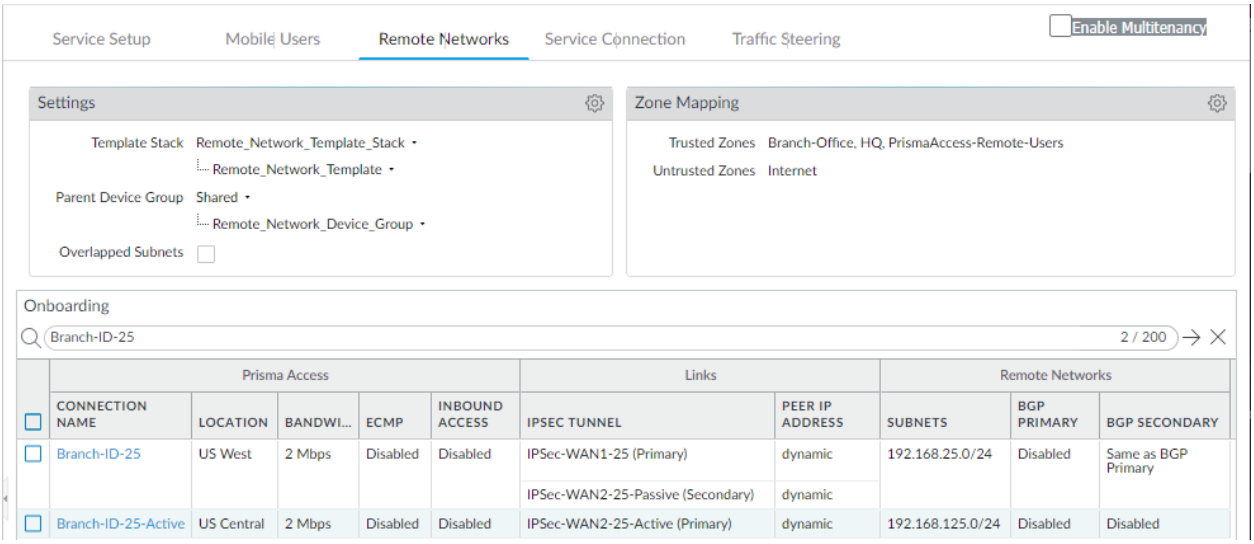
You can on-board your remote network or branch office using more than 1 WAN link. In this activity, you will on-board using 2 WAN links and use the 2nd WAN link as a Secondary or Passive. The Secondary Tunnel will become active in case the tunnel through Primary WAN link is identified as down.



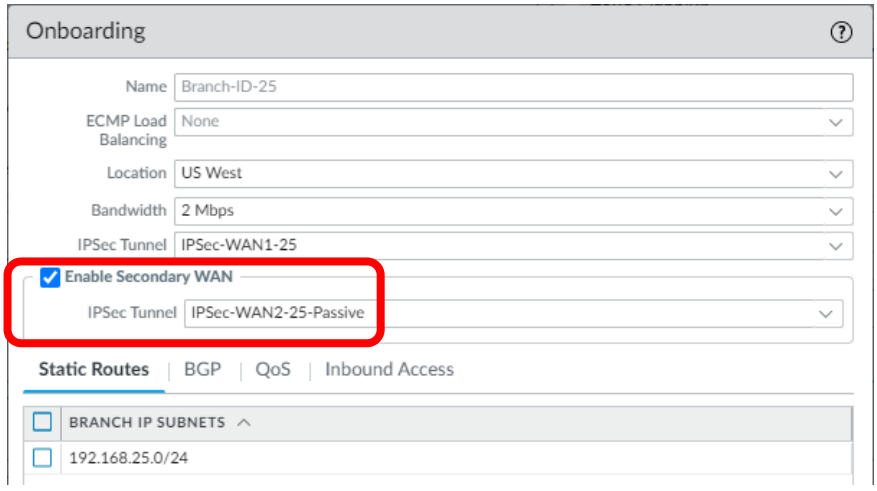
Task 1 – Review Remote Network Secondary WAN Configuration

Step 1: From the **Panorama-UI** browser tab, navigate to **Panorama > Cloud Services > Configuration > Remote Networks**.

Click **Branch-ID-X**, where **X** is your assigned **Student-ID**.

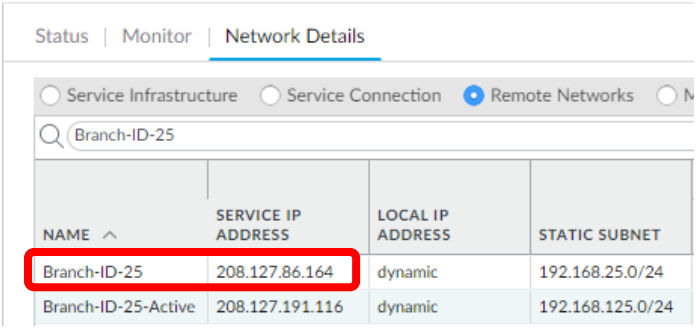


Step 2: Confirm that **Enable Secondary WAN** is checked and note which **IPSec Tunnel** it will use.



Click **Cancel**.

Step 3: Navigate to **Panorama > Cloud Services > Status > Network Details > Remote Networks**.

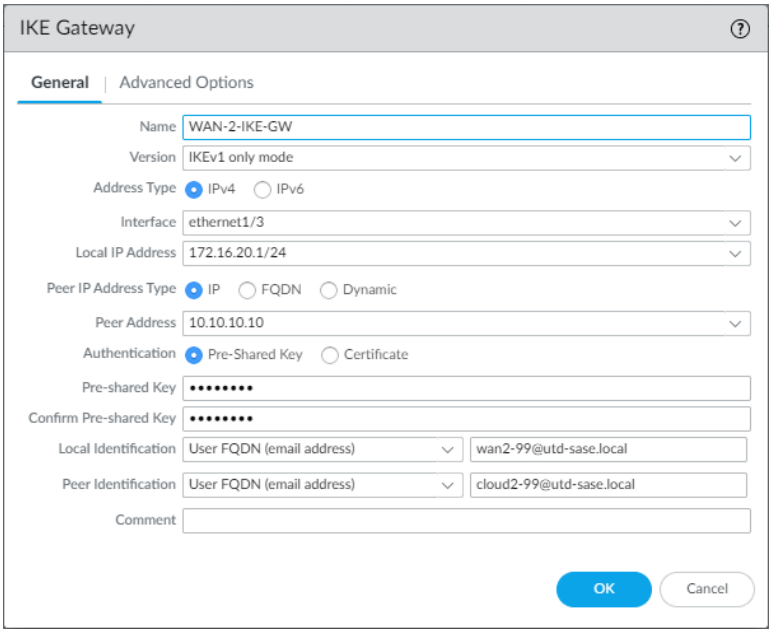


You will be using the same **Service IP Address** as the previous activity as the secondary/passive link will be used in the event of a failure with the primary/active connection.

Task 2 – Configure Secondary/Passive IPSec Tunnel on NGFW

Step 1: From the **NGFW-Branch-UI** tab, navigate to **Network > Network Profiles > IKE Gateways**.

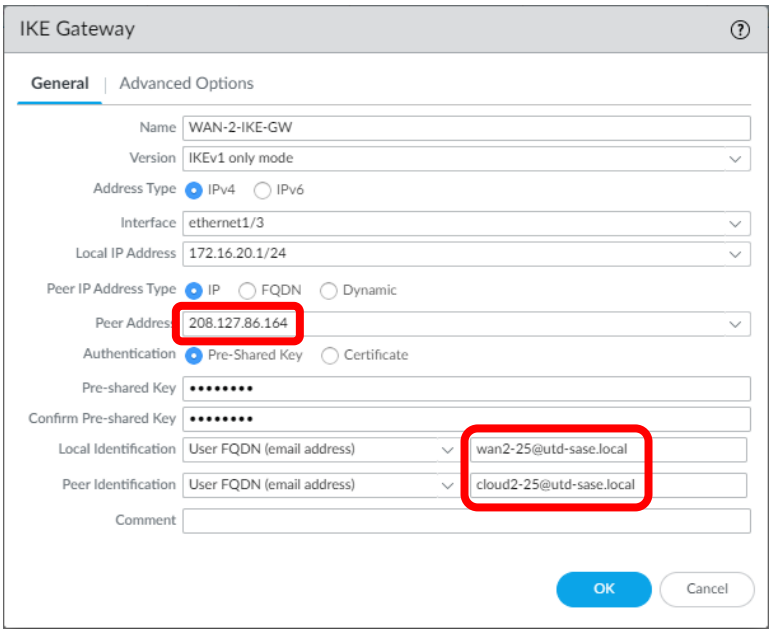
Step 2: Click **WAN-2-IKE-GW** to open the **IKE Gateway** window.



Step 3: Update the **Peer Address (10.10.10.10)** with the **Service IP Address** you recorded in the previous task in Panorama.

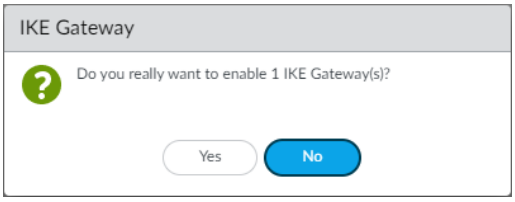
Also, change the **Local Identification** and **Peer Identification** values of **wan2-99@utd-sase.local** and **cloud2-99@utd-sase.local**, replacing the **99** with your **Student-ID**.

If your **Student-ID** is **25**, this would be ***wan2-25@utd-sase.local*** and ***cloud2-25@utd-sase.local***.



Click **OK**.

Step 4: Select **WAN2-IKE-GW** and click **Enable** Enable at the bottom of the window.

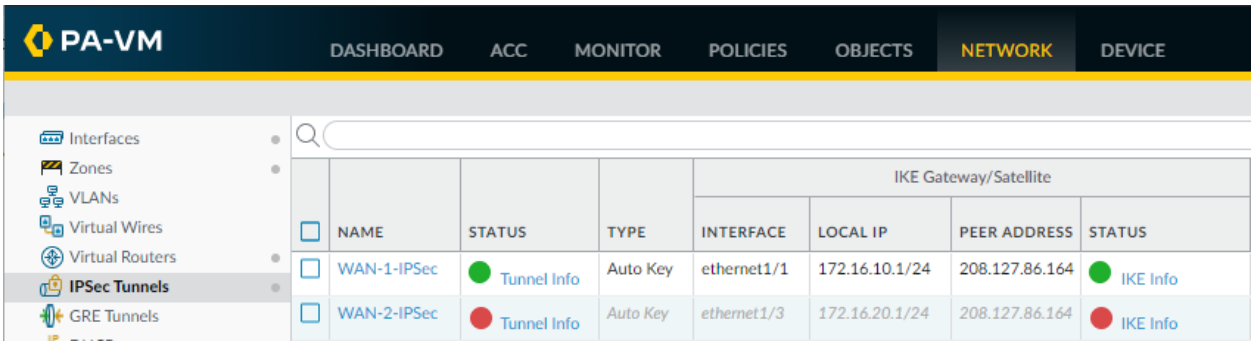


Click **Yes**.

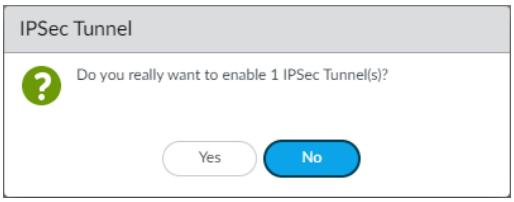
	NAME	PEER ADDRESS	Local Address	
			INTERFACE	IP
☐	WAN-1-IKE-GW	208.127.86.164	ethernet1/1	172.16.10.1/24
☐	WAN-2-IKE-GW	208.127.86.164	ethernet1/3	172.16.20.1/24

The text should change from grey to black.

Step 5: Navigate to **Network > IPSec Tunnels**.

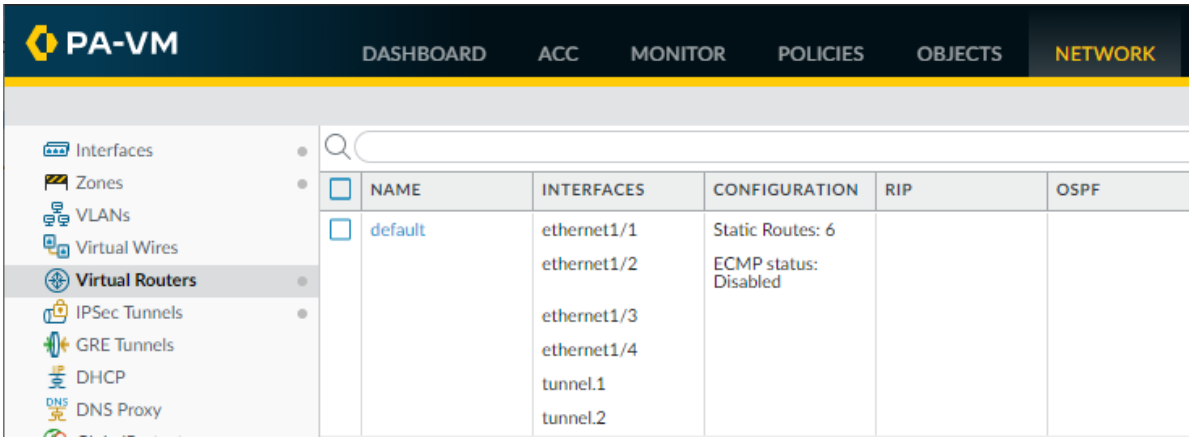


Step 6: Select **WAN-2-IPSec** and click **Enable** Enable.



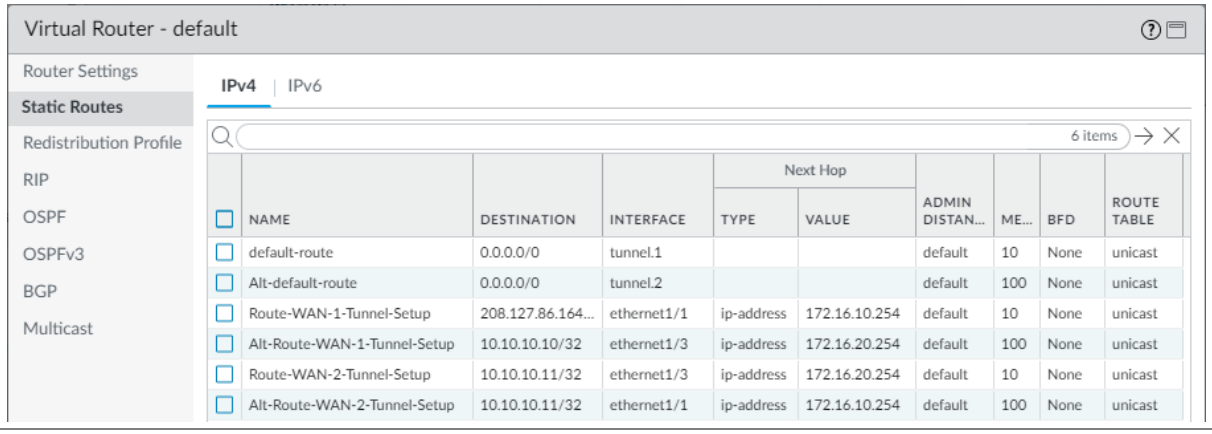
Click **Yes**.

Step 7: Navigate to **Network > Virtual Routers**.

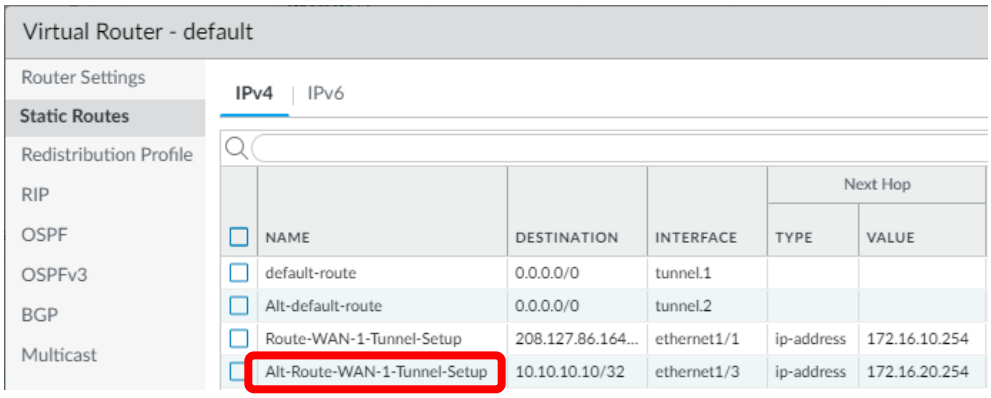


Step 8: Click **default** to open the **Virtual Router – default** window.

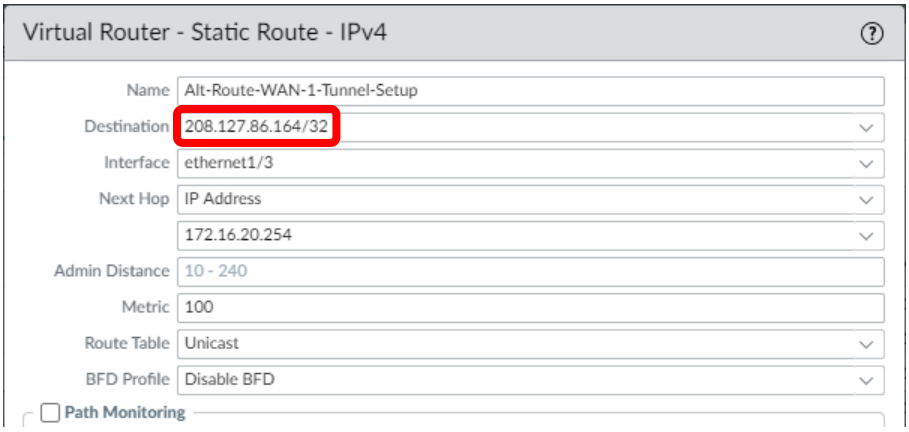
Select the **Static Routes** node.



Step 9: Click **Alt-Route-WAN-1-Tunnel-Setup**.



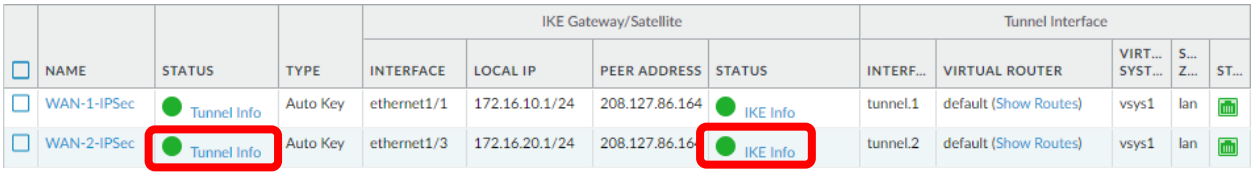
Step 10: Update the **Destination** of **10.10.10.10/32** with the **Service IP Address** (from **Branch-ID-X**) previously recorded. **Note:** Make sure to append ***/32*** to the IP. This allows the IPSec tunnel to be set up with Prisma Access over ethernet1/3.



Click **OK** to close the **Virtual Router – Static Route – IPv4** window.
Click **OK** to close the **Virtual Router – default** window.

Step 11: **Commit** your changes.

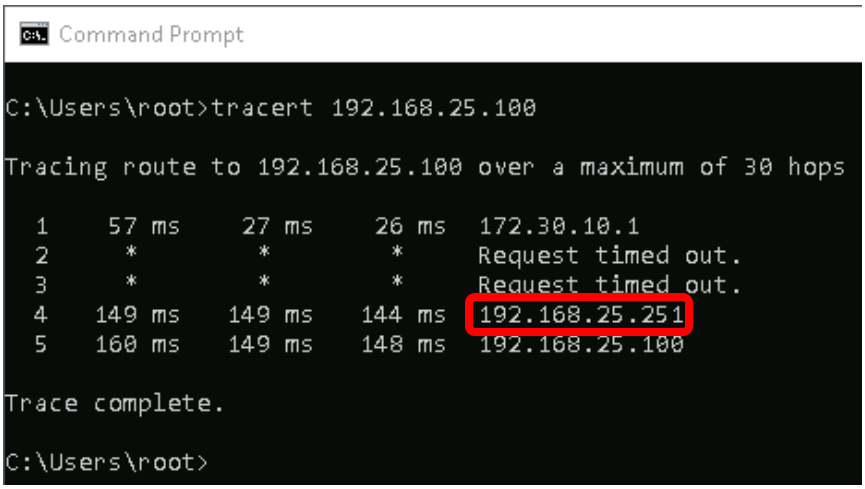
Step 12: Navigate to **Network > IPSec Tunnels** to confirm that **WAN-2-IPSec** is up.



Task 3 – Verify IPSec Tunnel Failover

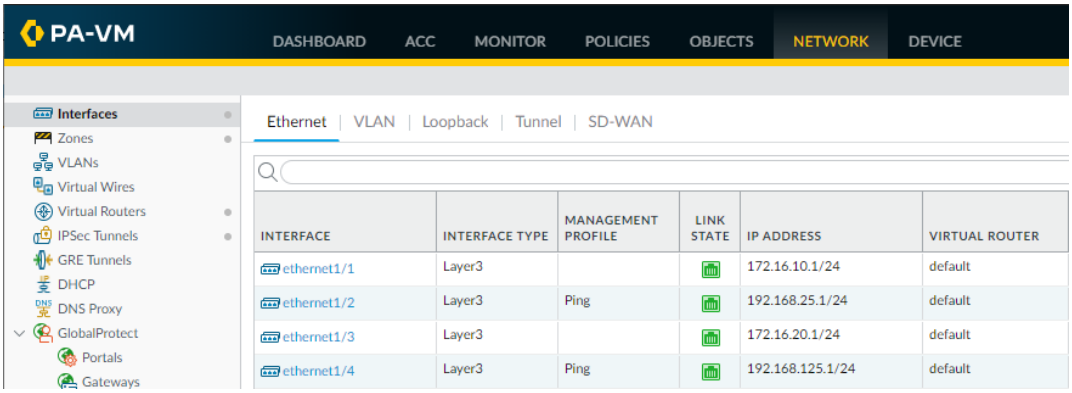
Step 1: From **win-mobile**, use the **Command Prompt** to trace the route to your remote network.

Type ***tracert 192.168.X.100***, where ***X*** is your assigned **Student-ID**.



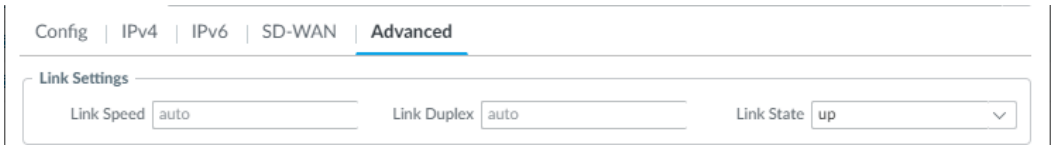
Notice that the network packets travel through **tunnel.1** (**192.168.X.251**).

Step 2: From the **NGFW-Branch-UI** tab, navigate to **Network > Interfaces > Ethernet**.

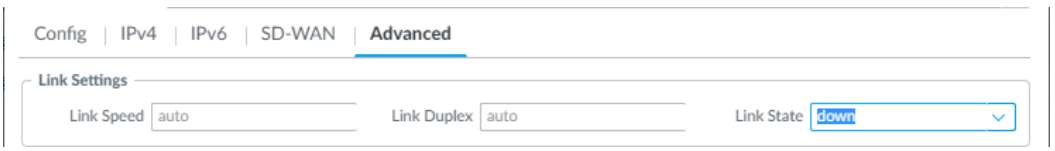


Step 3: Click **ethernet1/1** to bring down the **Ethernet Interface** window for this interface.

Step 4: Click the **Advanced** tab.



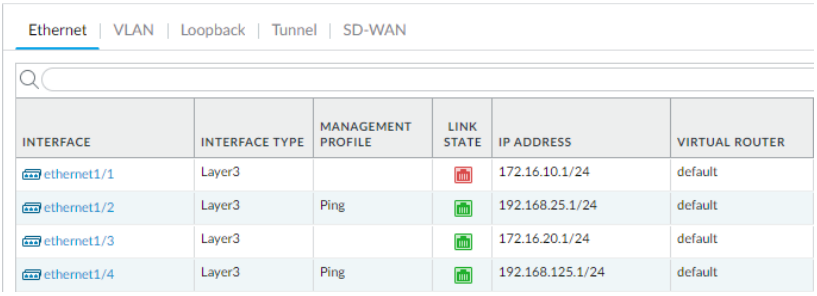
Change the **Link State** from **up** to **down**.



Click **OK.**

Step 5: **Commit** your changes.

Step 6: Verify that **ethernet1/1** is down.



INTERFACE	INTERFACE TYPE	MANAGEMENT PROFILE	LINK STATE	IP ADDRESS	VIRTUAL ROUTER
ethernet1/1	Layer3			172.16.10.1/24	default
ethernet1/2	Layer3	Ping		192.168.25.1/24	default
ethernet1/3	Layer3			172.16.20.1/24	default
ethernet1/4	Layer3	Ping		192.168.125.1/24	default

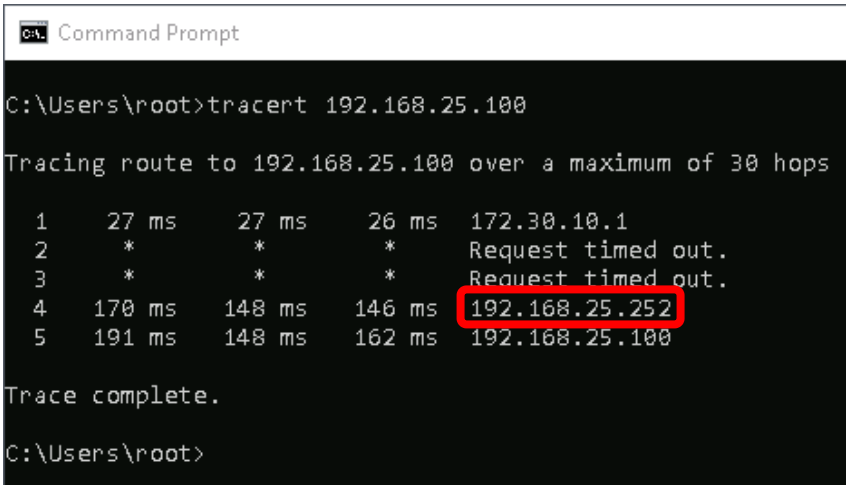
Step 7: Navigate to **Network > IPSec Tunnels**. Verify that the **WAN-1-IPSec** tunnel is down.

				IKE Gateway/Satellite				Tunnel Interface				
NAME	STATUS	TYPE	INTERFACE	LOCAL IP	PEER ADDRESS	STATUS	INTERF...	VIRTUAL ROUTER	VIRT... SYST...	S... Z...	ST...
WAN-1-IPSec	Tunnel Info	Auto Key	ethernet1/1	172.16.10.1/24	208.127.86.164	IKE Info	tunnel.1	default (Show Routes)	vsys1	lan	
WAN-2-IPSec	Tunnel Info	Auto Key	ethernet1/3	172.16.20.1/24	208.127.86.164	IKE Info	tunnel.2	default (Show Routes)	vsys1	lan	

Note: It will take a few minutes for the GUI to reflect the IKE Gateway and IPSec tunnel to be down. If you see the red status icon, then the tunnel is likely already down. You will verify this in the next step.

Step 8: From **win-mobile**, use the **Command Prompt** to trace the route to your remote network.

Type ***tracert 192.168.X.100***, where ***X*** is your assigned **Student-ID**.



Notice that the network packets now travel through **tunnel.2** (**192.168.X.252**).

Step 9: From the **NGFW-Branch-UI** tab, navigate to **Network > Interfaces > Ethernet**.

Bring up **ethernet1/1**.

Commit.

Step 10: You may also do the ***tracert 192.168.X.100*** again to confirm that traffic is going back through **tunnel.1**.

Summary:

- ✓ Branch offices can be on-boarded to Prisma Access using 2 WAN links.
- ✓ Prisma Access monitors the tunnel and automatically falls back to using the Secondary WAN link.

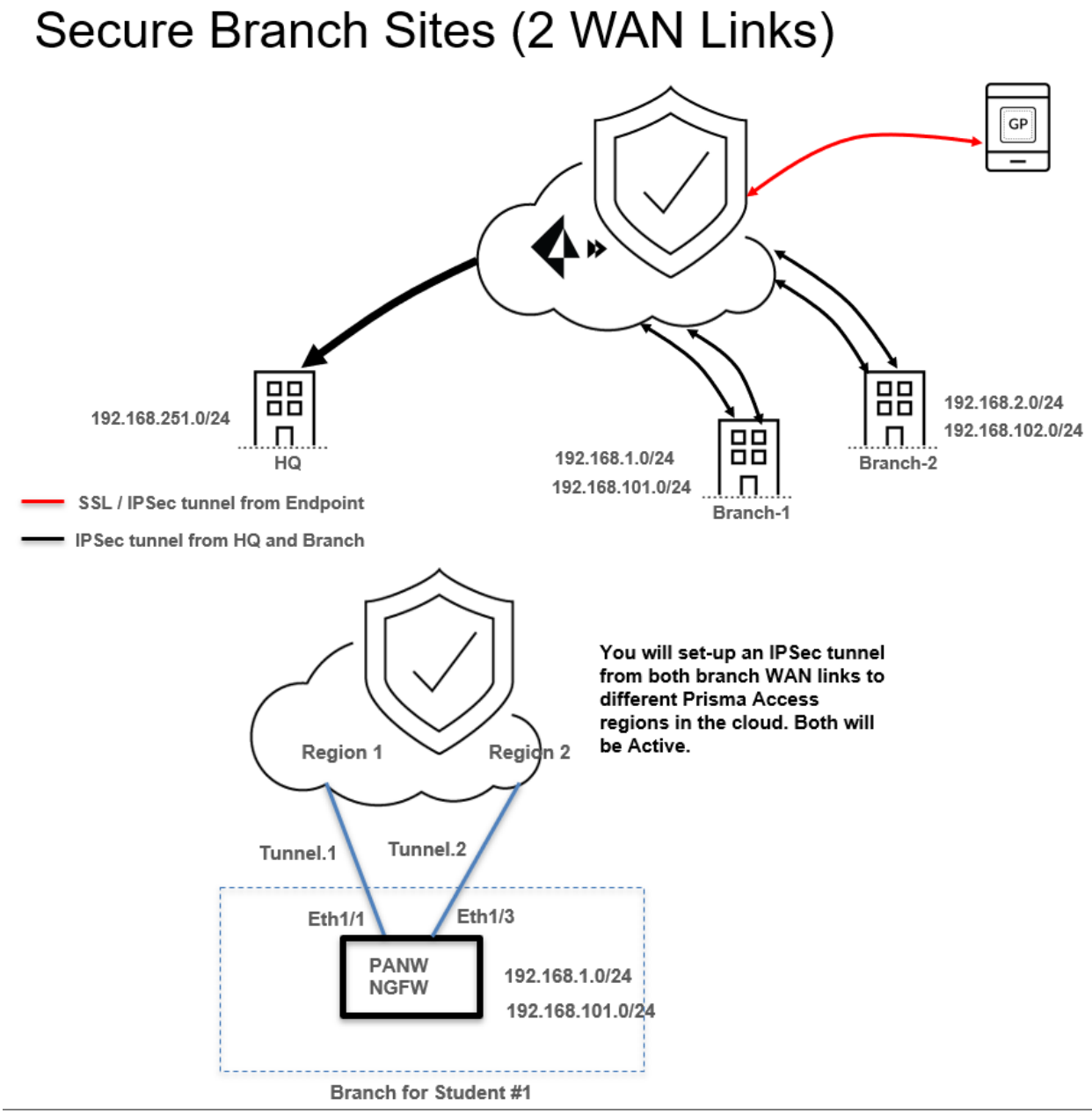
End of Activity 5

Activity 6 – Secure Branch Sites with 2 WAN Links (Active/Active)

In this activity, you will:

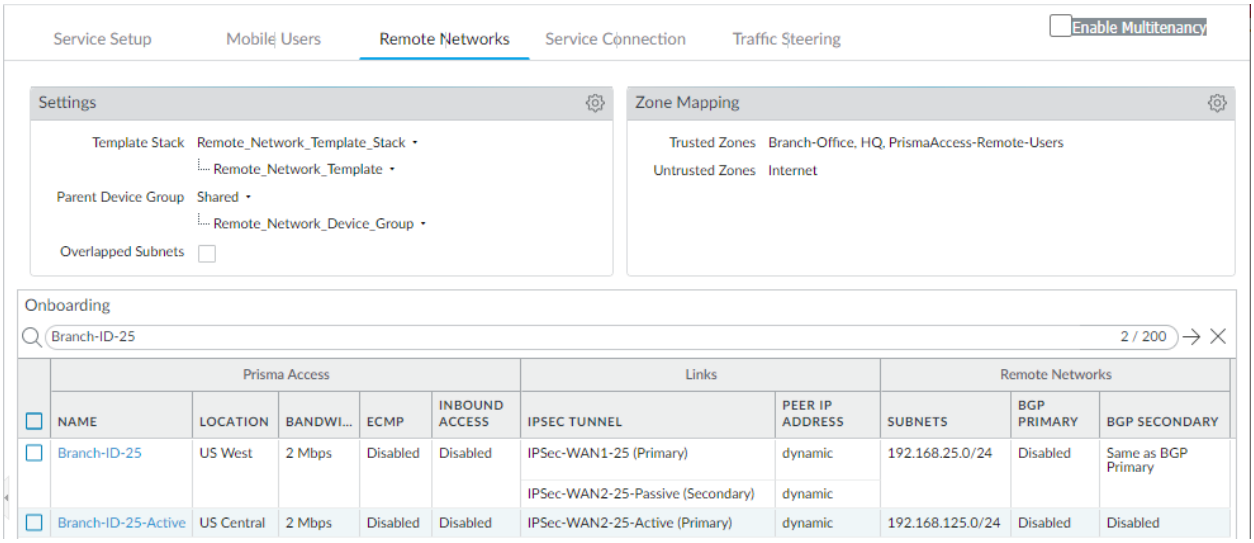
- ***Configure branch/remote network to establish active/active IPSec tunnels to Prisma Access***
- ***Demonstrate concurrent access to subnets***

From your remote branch office, you can also have more than one actively used connection to Prisma Access. You will configure them as individual Remote Networks configuration in Panorama and specify their individual Bandwidth requirement and Region in the Cloud.

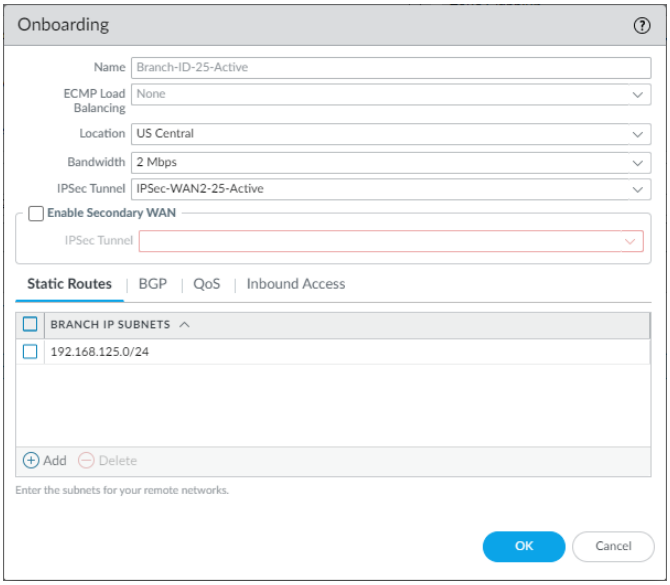


Task 1 – Review Prisma Access Remote Networks from Panorama

Step 1: From the **Panorama-UI** browser tab, navigate to **Panorama > Cloud Services > Configuration > Remote Networks**



Step 2: Click **Branch-ID-X-Active** to review the configuration for that remote network.



What is the assigned **Bandwidth**?

What regional cloud **Location** will your remote network connect to?

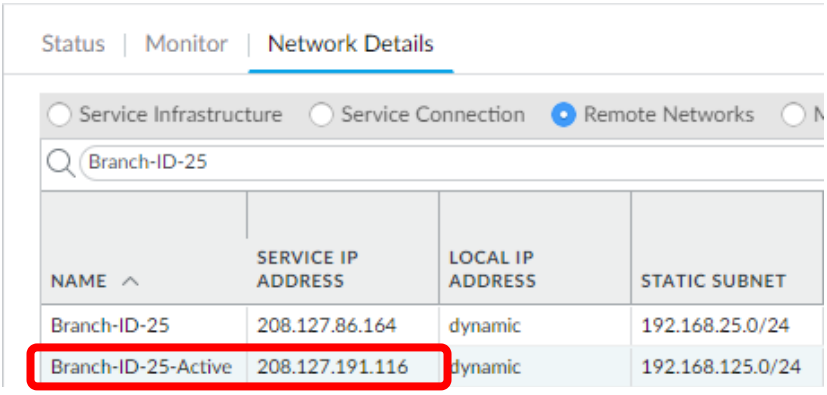
What **IPSec Tunnel** profile will be applied?

Which of your **Branch IP Subnets** can be reached via this tunnel?

How does this differ from **Branch-ID-X**?

Click **Cancel**.

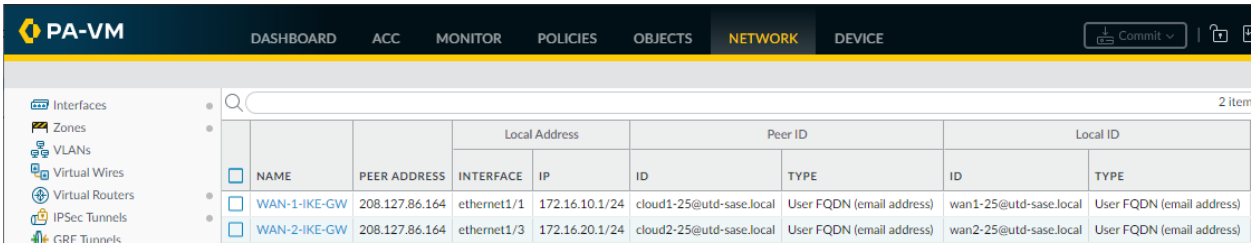
Step 3: Navigate to **Panorama > Cloud Services > Status > Network Details > Remote Networks**.



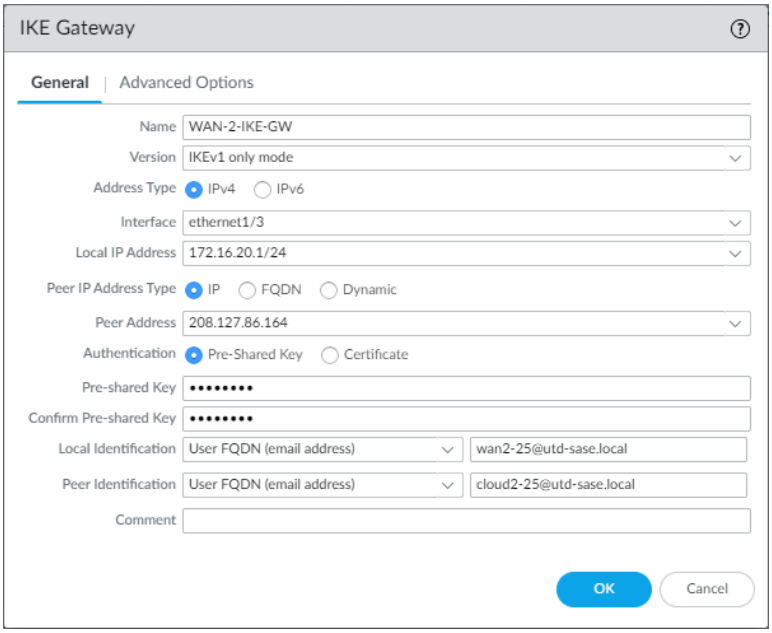
Record the **Service IP Address** for your **Branch-ID-*X-Active***. This will be used to establish two active IPSec tunnels.

Task 2 – Configure Secondary/Active IPSec Tunnel on NGFW

Step 1: From the **NGFW-Branch-UI** tab, navigate to **Network > Network Profiles > IKE Gateways**.

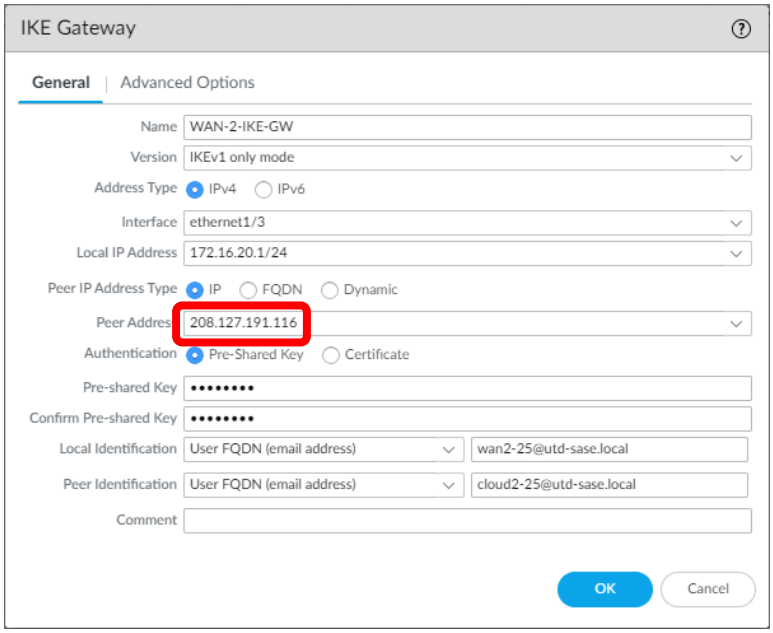


Step 2: Click **WAN-2-IKE-GW** to open the **IKE Gateway** window.



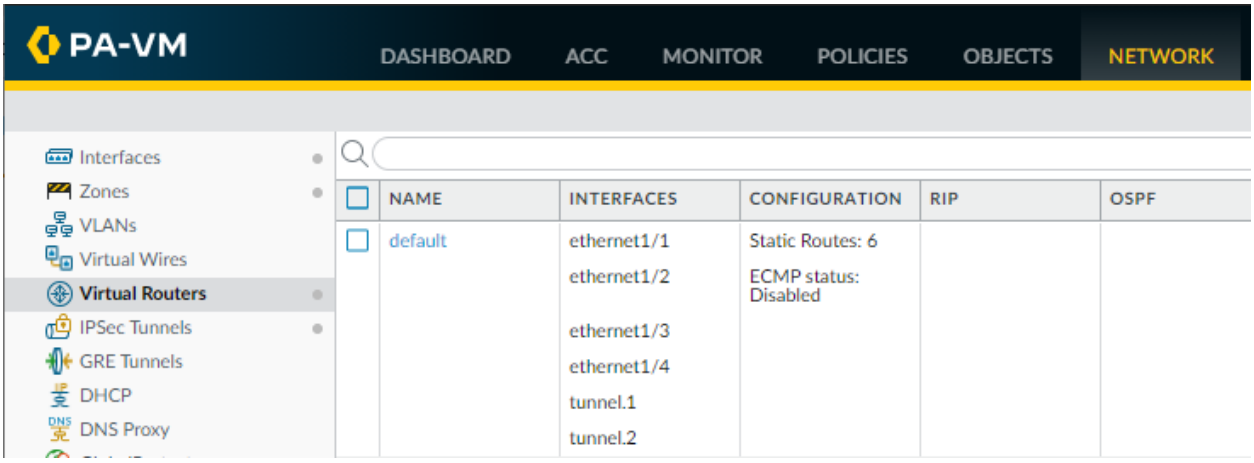
Step 3: Update the **Peer Address** with the **Service IP Address** you recorded in the previous task in Panorama.

There is no need to change the **Local Identification** and **Peer Identification** as you did previously.



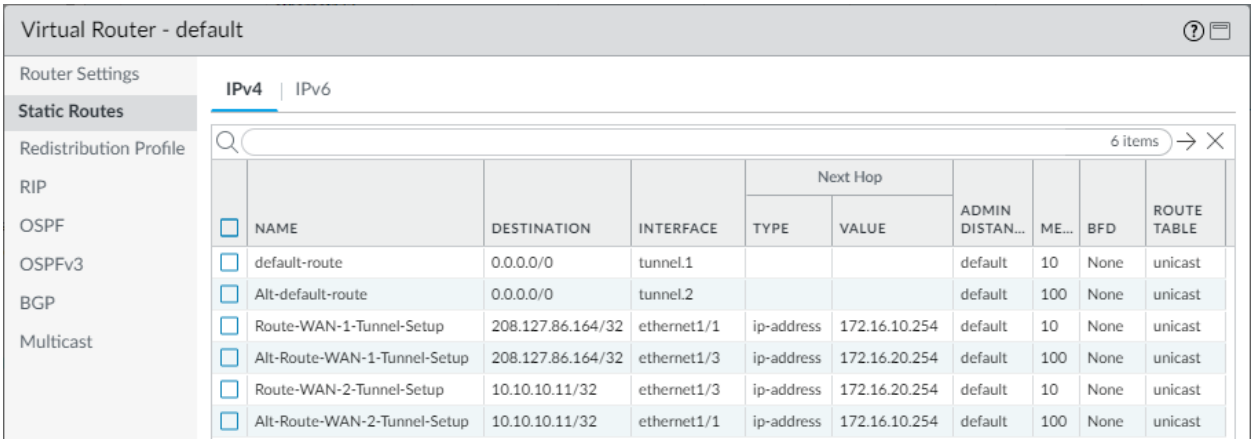
Click **OK**.

Step 4: Navigate to **Network > Virtual Routers**.

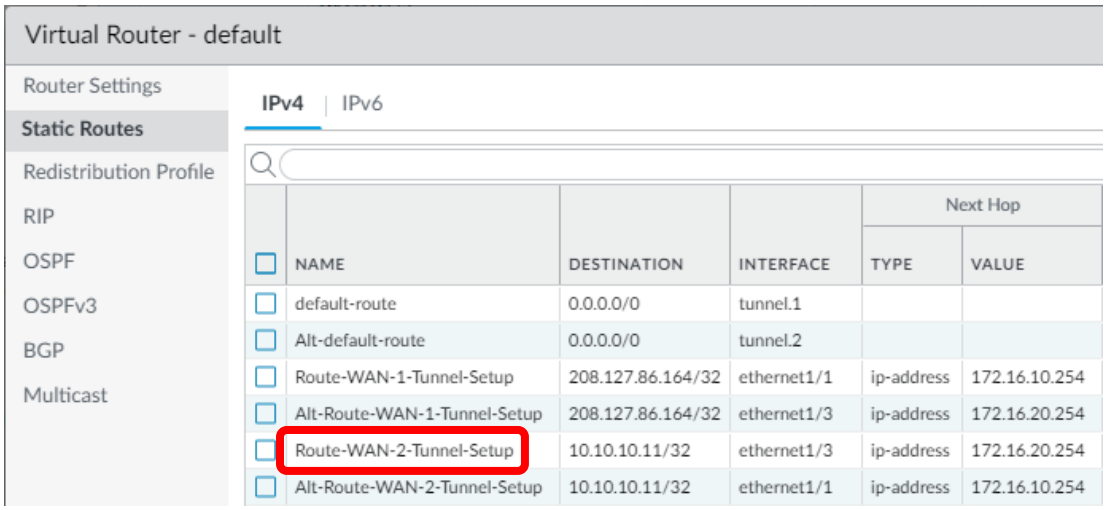


Step 5: Click **default** to open the **Virtual Router – default** window.

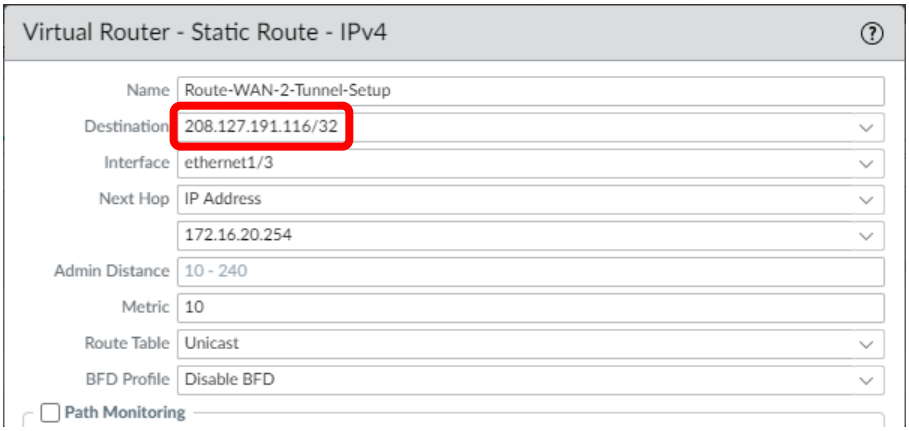
Select the **Static Routes** node.



Step 6: Click **Route-WAN-2-Tunnel-Setup**.

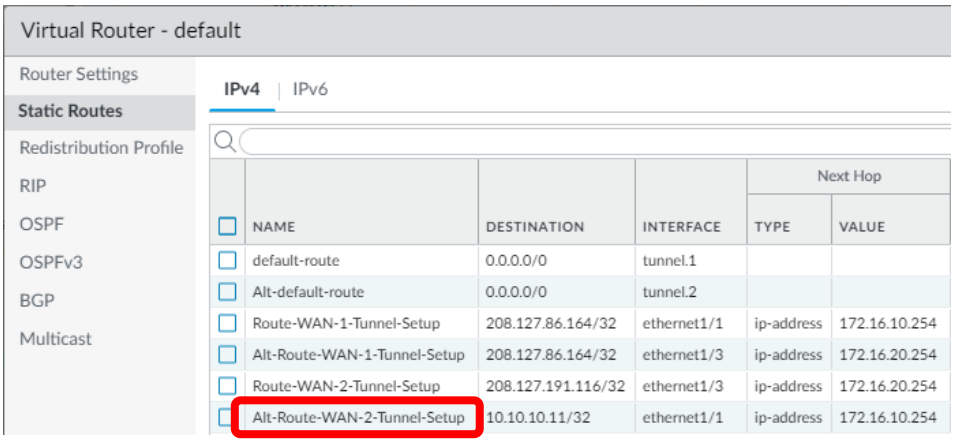


Step 7: Update the **Destination** of **10.10.10.11/32** with the **Service IP Address** previously recorded.
Note: Make sure to append ***/32*** to the IP. This allows the IPSec tunnel to be set up with Prisma Access over ethernet1/3.

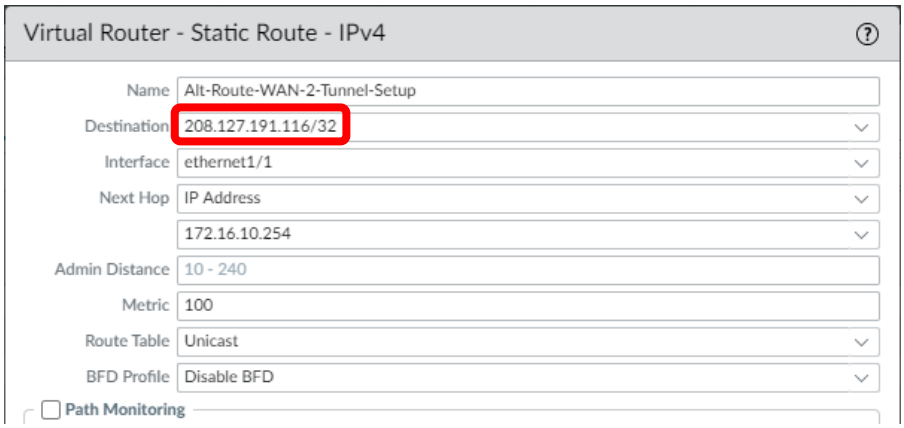


Click **OK**.

Step 8: Click **Alt-Route-WAN-2-Tunnel-Setup**.



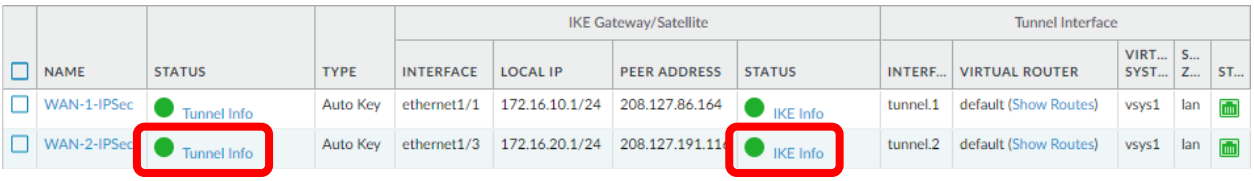
Step 9: Update the **Destination** of **10.10.10.11/32** with the **Service IP Address** previously recorded.
Note: Make sure to append ***/32*** to the IP. This is the same IP as in step 7.



Click **OK** to close the **Virtual Router – Static Route – IPv4** window.
Click **OK** to close the **Virtual Router – default** window.

Step 10: **Commit** your changes.

Step 11: Navigate to **Network > IPSec Tunnels** to confirm that **WAN-2-IPSec** is up.

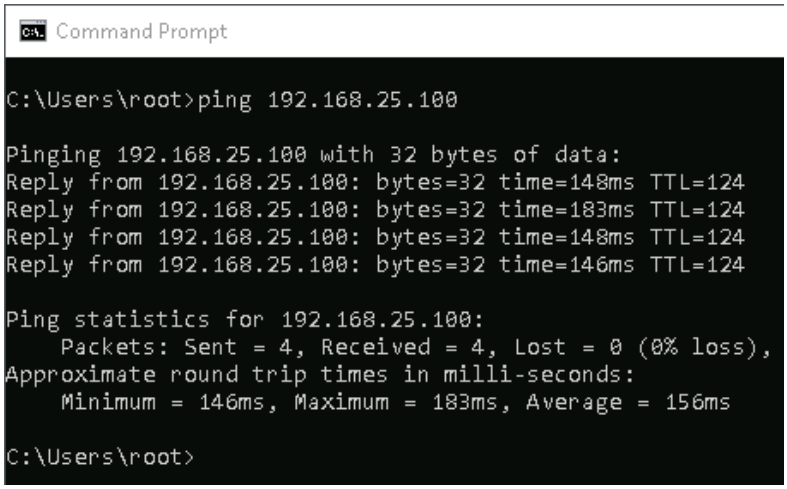


Note: The **Peer Address** for **WAN-1-IPSec** is different than **WAN-2-IPSec**.You have two active tunnels now.

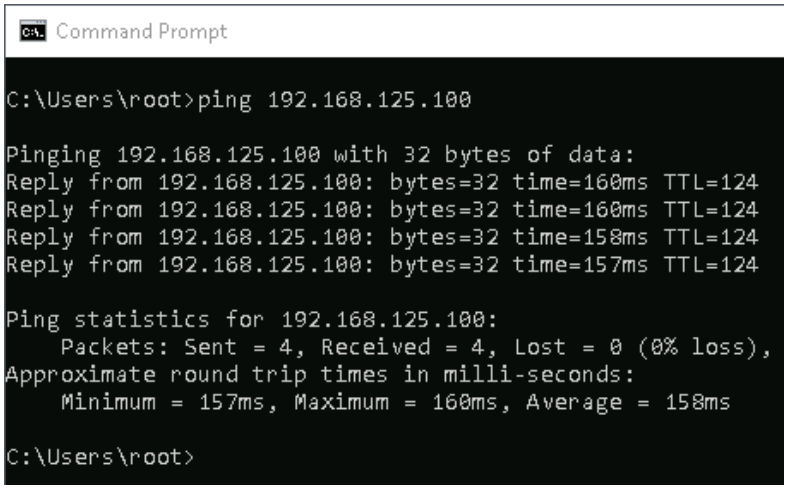
Task 3 – Verify Two Active IPSec Tunnels

Step 1: From **win-mobile**, use the **Command Prompt** to trace the route to your remote network.

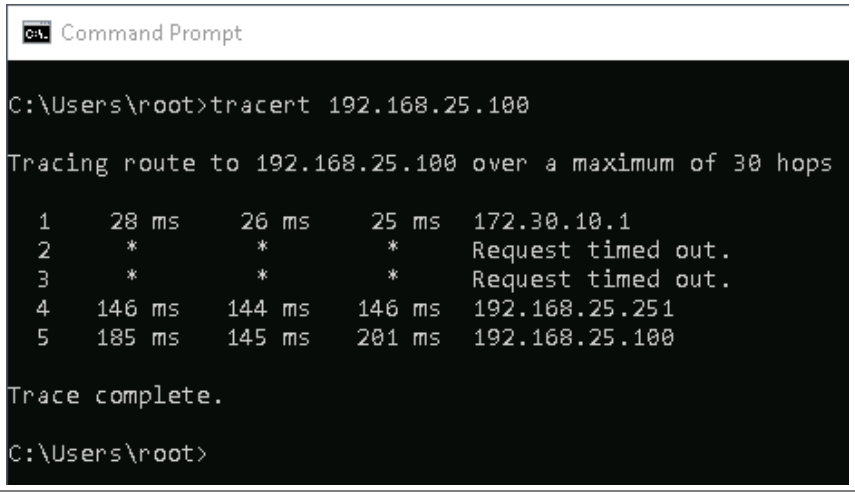
Type ***ping 192.168.X.100***, where ***X*** is your assigned **Student-ID**.



Step 2: Type ***ping 192.168.Y.100***, where ***Y*** is your assigned **Student-ID+100**.

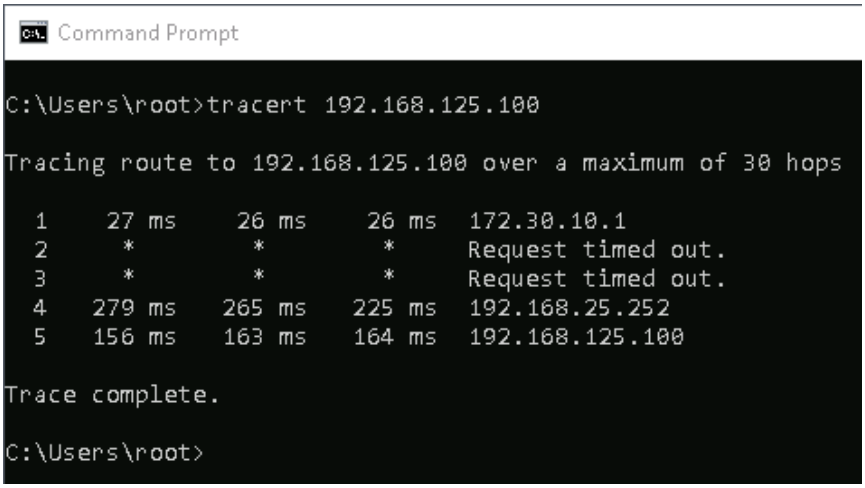


Step 3: Type ***tracert 192.168.X.100***, where ***X*** is your assigned **Student-ID**.



Notice that the network packets travel through **tunnel.1** (**192.168.X.251**).

Step 4: Type ***tracert 192.168.Y.100***, where ***Y*** is your assigned **Student-ID+100**.



Notice that the network packets travel through **tunnel.2** (**192.168.X.252**).

Summary:

- ✓ Next Gen Secure remote access to internal applications.
- ✓ Successful tunnel set up does not automatically provide access to internal applications.
- ✓ Authenticate first and authorize only based on who the user is, what group the user belongs to, the state of the device from where the user is requesting access, the application being accessed, and the ports and services being used

End of Activity 6

Activity 7 – Enterprise DLP with Prisma Access

In this activity, you will:

- ***Review Enterprise DLP on Panorama***
- ***Attempt to upload sensitive content***

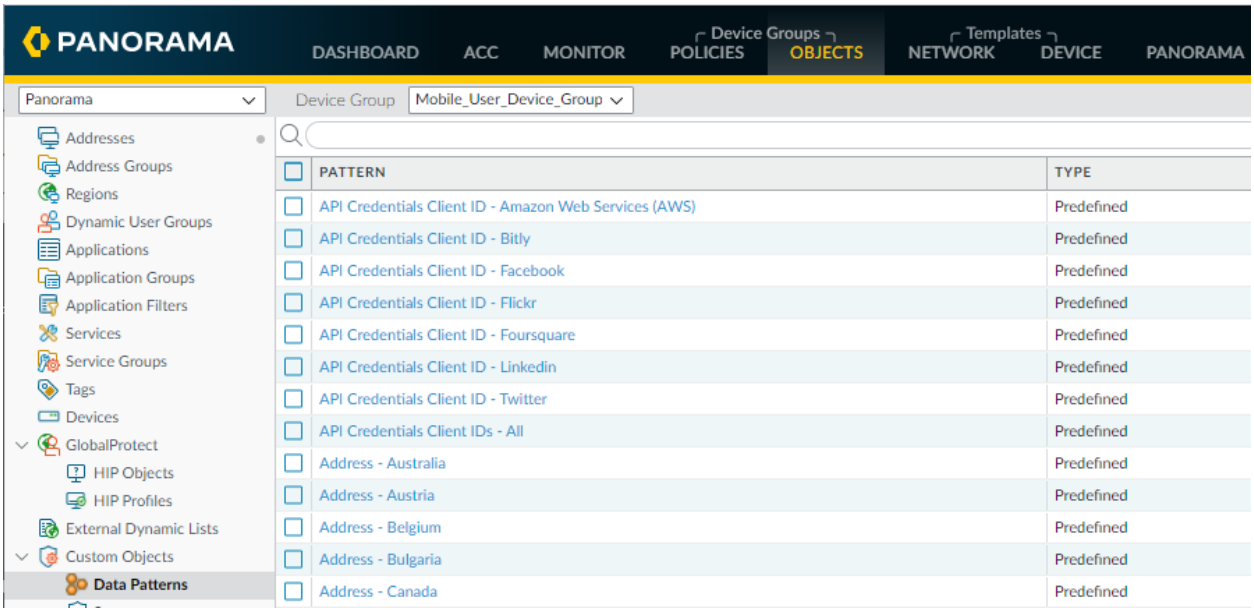
Data loss prevention (DLP) is a set of tools and processes that allow you to protect sensitive information against unauthorized access, misuse, extraction, or sharing. DLP on Prisma Access enables you to use Prisma Access to enforce your organization's data security standards and prevent the loss of sensitive data across mobile users and remote networks.

DLP on Prisma Access, also known as Enterprise DLP, is a cloud-based service that uses supervised machine learning algorithms to sort sensitive documents into Financial, Legal, Healthcare, and other categories for document classification to guard against exposures, data loss and data exfiltration. These patterns can identify the sensitive information in your cloud apps and protect them from exposure.

Enterprise DLP offers hundreds of data patterns and many predefined data filtering profiles, and it is designed to automatically make new patterns and profiles available to you for use in Data Filtering policies, as soon as they are added to the cloud service.

Task 1 – Review Enterprise DLP on Panorama

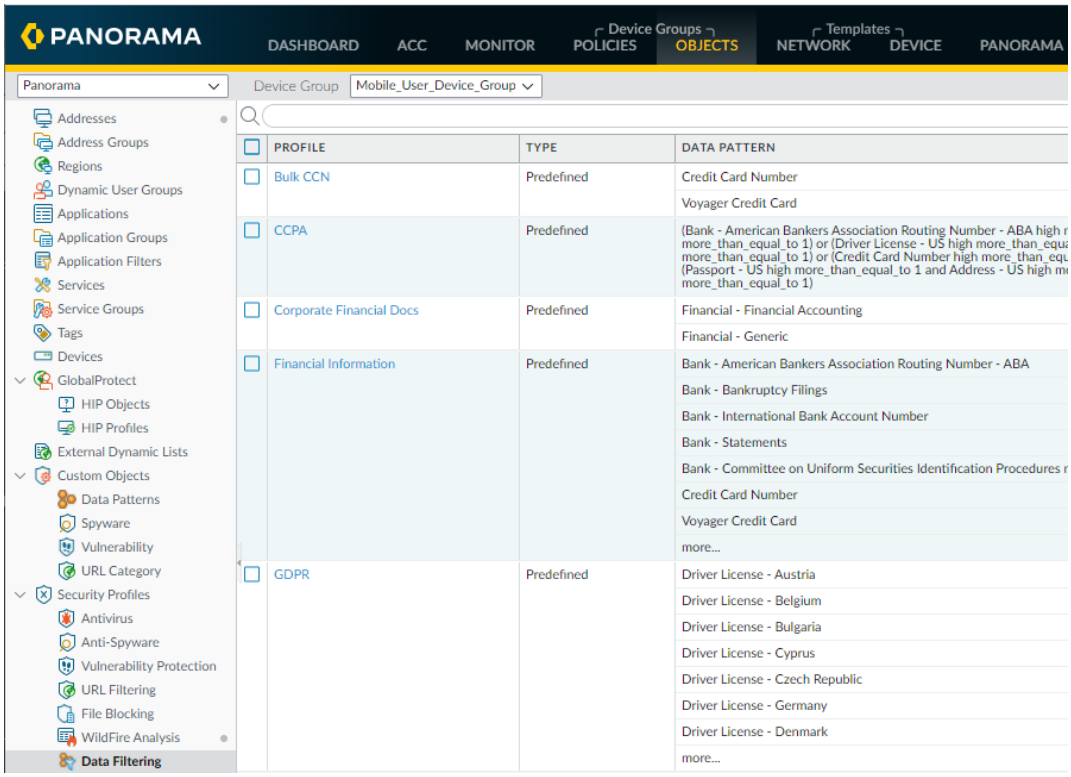
Step 1: From the **Panorama-UI** browser tab, navigate to **Objects > Custom Objects > Data Patterns**.



Predefined data patterns and built-in settings make it easy for you to protect files that contain certain file properties (such as a document title or author), credit card numbers, regulated information from different countries (such as driver's license numbers), and third-party DLP labels. To improve detection rates for the sensitive data in your organization supplement the predefined data patterns, you can define custom data patterns that are specific to your content inspection and data protection requirements. In a custom data pattern, you can also define regular expressions and file properties to look for metadata or attributes

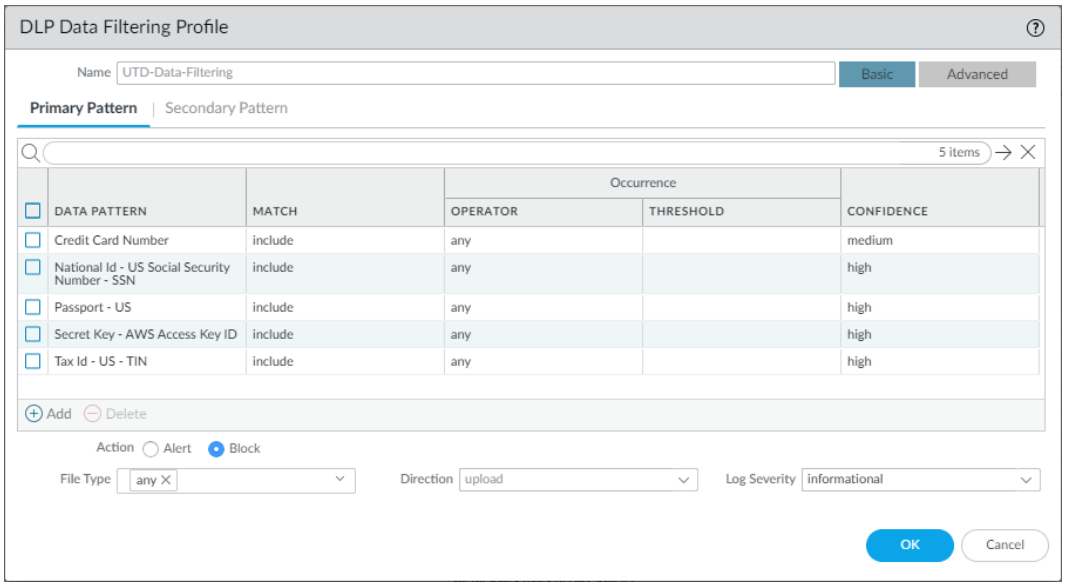
in the file's custom or extended properties and use it in a data filtering profile.

Step 2: Navigate to **Objects > Security Profiles > Data Filtering**.



Data filtering profiles are a collection of data patterns that are grouped together to scan for a specific object or type of content. To perform content analysis, the predefined data profiles have data patterns that include industry-standard data identifiers, keywords, and built-in logic in the form of machine learning, regular expressions, and checksums for legal and financial data patterns. When you use the data filtering profile in a Data Filtering policy rule, the firewall can inspect the content for a match and take action.

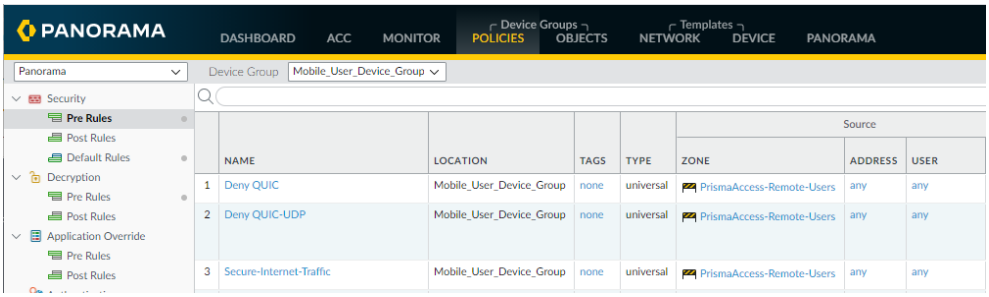
Step 3: Scroll down and click on **UTD-Data-Filtering** to open the profile.



Using the predefined **Data Patterns**, a custom **Data Filtering** profile has been created. Note that the **Action** is set to **Block**.

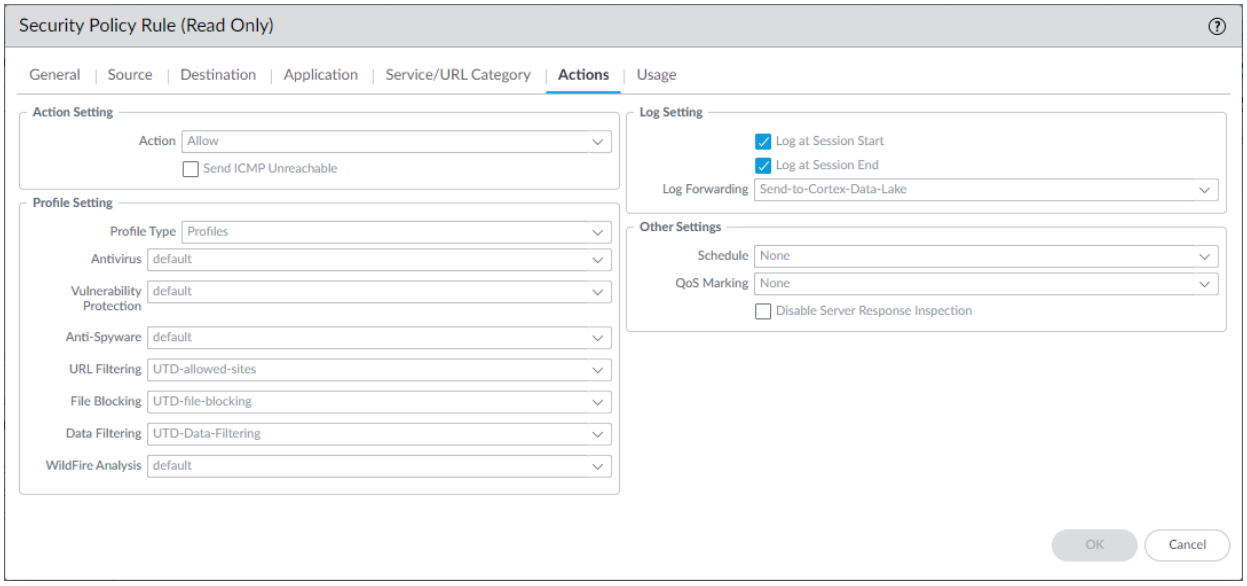
Click **Cancel**.

Step 4: Navigate to **Policies > Security > Pre Rules**. The **Device Group** should be set to **Mobile_User_Device_Group**.



Step 5: Click on **Secure-Internet-Traffic** to open the **Security Policy** profile.

Click on **Actions**.

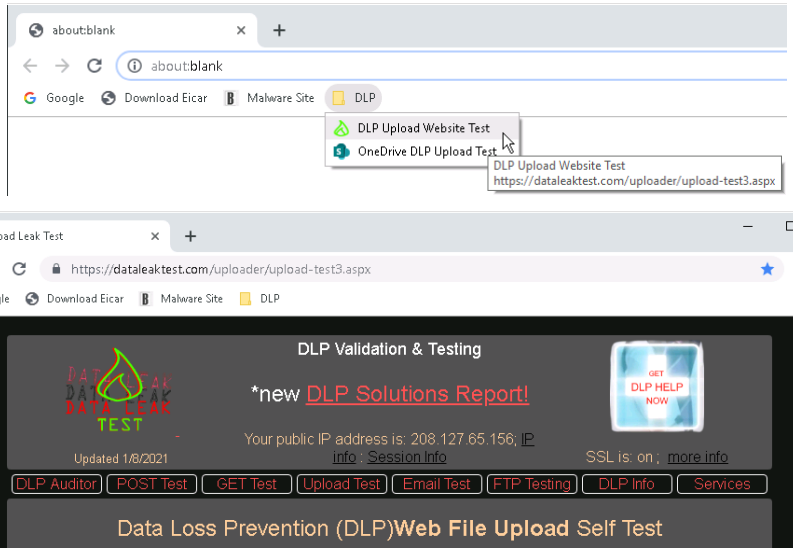


Note that the **Data Filtering** profile is set to **UTD-Data-Filtering**. Also notice that a **File Blocking** profile is set. Not only can Prisma Access inspect data in motion but can also block undesired file types.

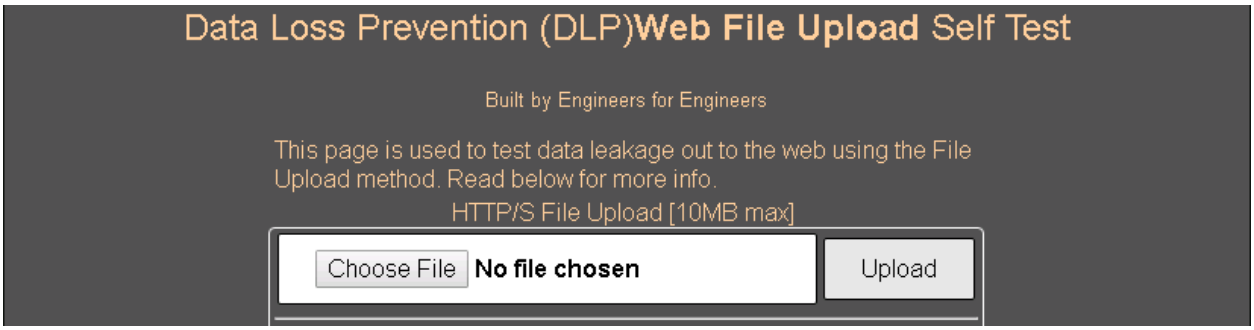
Click **Cancel**.

Task 2 – Attempt Upload of Sensitive Content from Mobile User

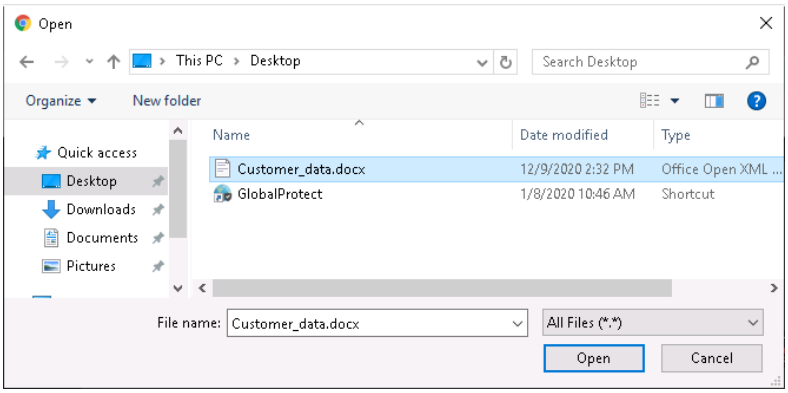
Step 1: From the **win-mobile** VM, use the **Chrome** browser bookmarks to go to **DLP > DLP Upload Website Test**.



Step 2: Click the **Choose File** button to review the configuration for that remote network.



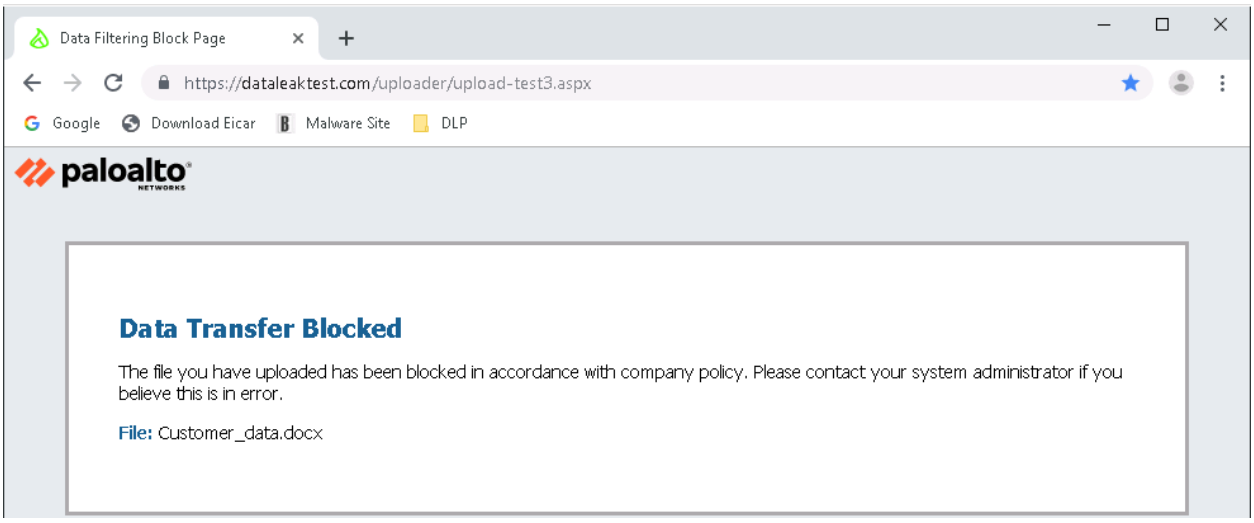
Step 3: From the **File Explorer** pop-up, click **Desktop** on the left-hand column and select **Customer_data.docx**.



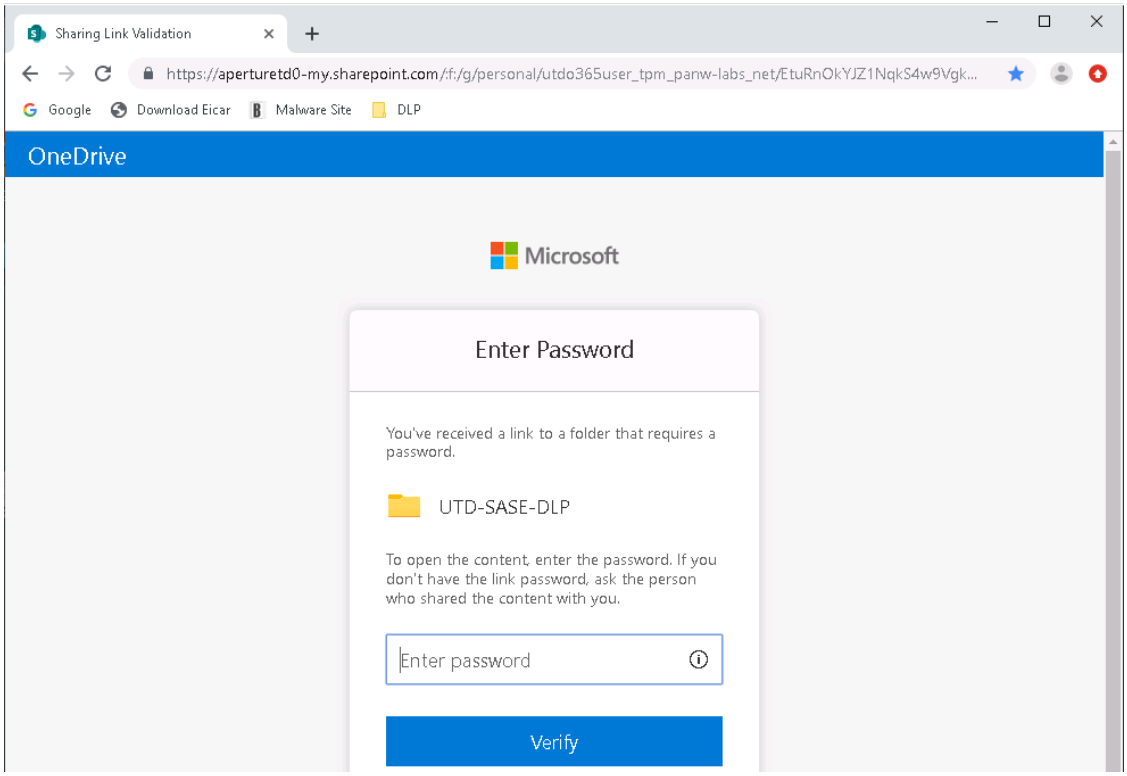
Click **Open**.

Step 4: Click the **Upload** button.

Step 5: The upload of the file containing sensitive data is blocked.

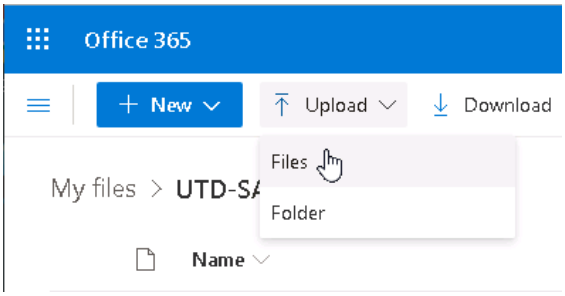


Step 6: Use the **Chrome** browser bookmark to go to **DLP > OneDrive DLP Upload Test**.

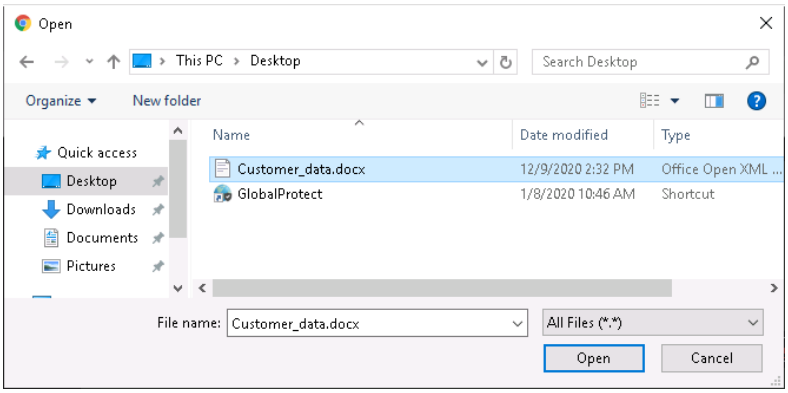


In the **Enter password** box, type ***utd1234*** and click **Verify**.

Step 7: Click **Upload > Files**.

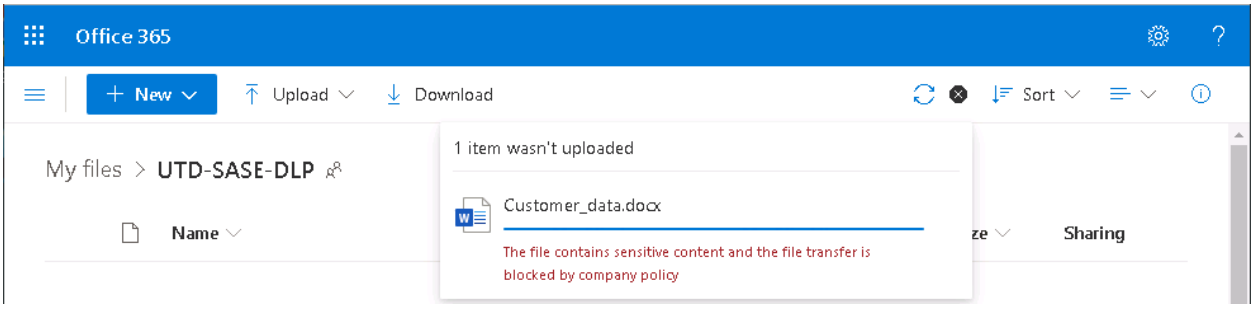


Step 8: From the **File Explorer** pop-up, click **Desktop** on the left-hand column and select **Customer_data.docx**.



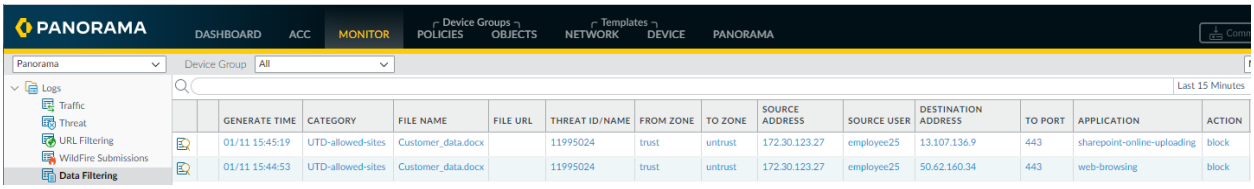
Click **Open**.

Step 9: The file containing sensitive is blocked.



Task 3 – Review Logs in Panorama

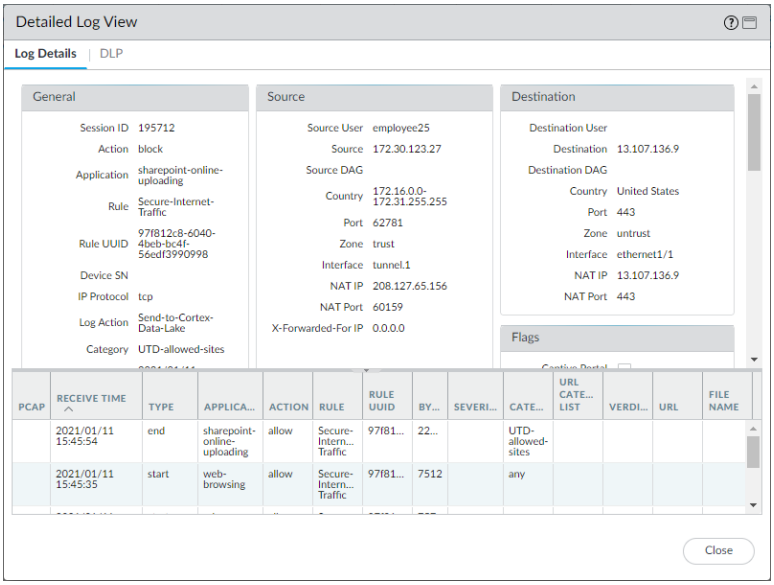
Step 1: From the **Panorama-UI** browser tab, navigate to **Monitor > Logs > Data Filtering**.



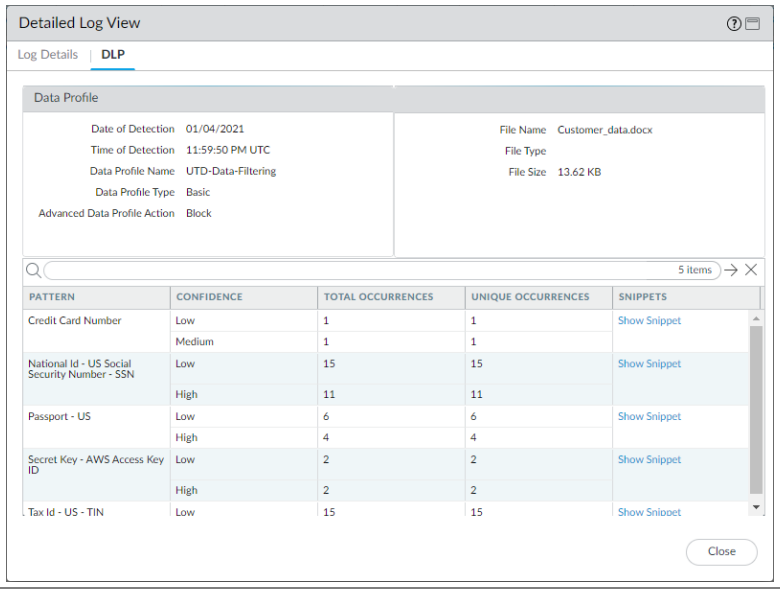
As the log entries are not real-time, it may take several minutes for your file upload attempts to show up.

You may use a filter of ***(user.src eq employeeX)*** **where** *X* **is your assigned** Student-ID**.**

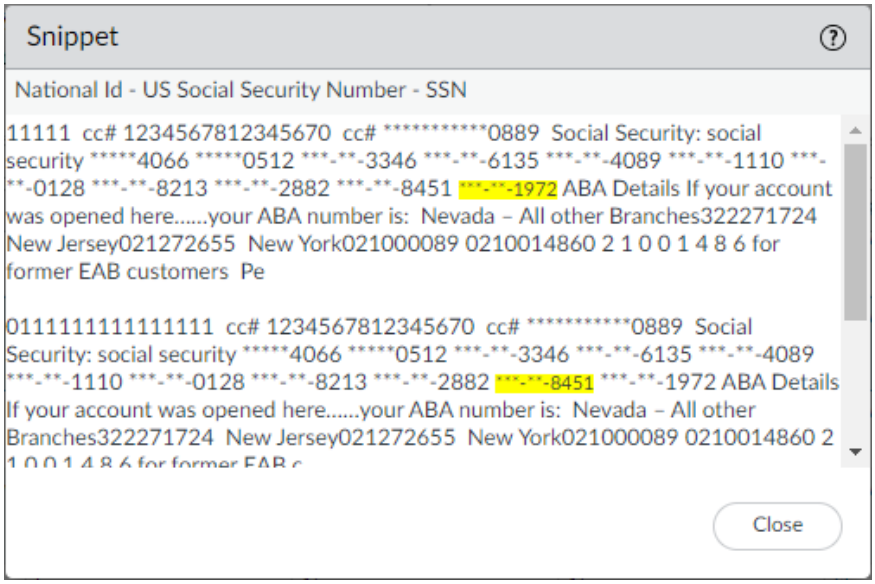
Step 2: Click on the magnifying glass to open the **Detailed Log View**.



Click the **DLP** tab.



Step 3: Click **Show Snippet** on any entry that has a **Medium** or **High Confidence**.



Prisma Access extracts a snippet of the sensitive data that caused the alert or block notification. A snippets enables forensics by allowing you to verify why an uploaded file generated an alert notification or was blocked. By default, Prisma Access uses data masking to partially mask the snippets to prevent the sensitive data from being exposed. You can configure Prisma Access to completely mask the sensitive information, unmask the snippets, or disable snippet extraction and viewing.

Click **Close**.

Task 4 – [Optional] Attempt Upload of Sensitive Content from Remote Network

Step 1: You may use **win-subnet1** and repeat the steps of **Task 2** to see consistent security no matter where you users are located.

End of Activity 7

Activity 8 – Prisma SD-WAN: Actionable Analytics - Identify & Measure

In this activity, you will:

- ***Observe the way the Prisma SD-WAN identifies, measures, and prioritizes application traffic***

Prisma SD-WAN was formerly known as CloudGenix SD-WAN. This lab guide will have references to both names.

It is not enough for network administrators to set it and forget it. They need visibility to verify that their intended policy actually took effect, as well as be able to profile the application from the perspective of Layer 7 reachability and verify its performance.

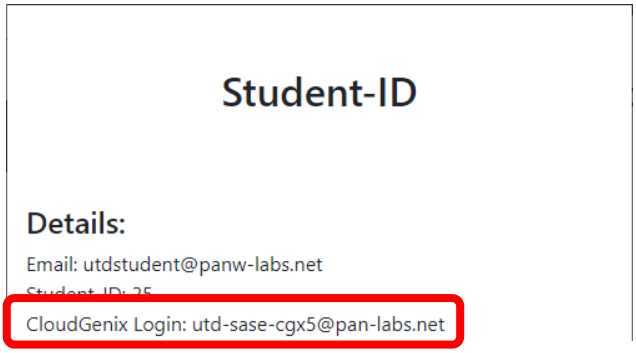
Typically, all other solutions require a third party NetFlow collector to gain these types of insights, which is yet another system to manage and maintain just to gain visibility into the applications on your network. Even if such a system was properly configured to collect and analyze the data, because the information is being collected from a packet-based architecture, a book-ended solution is required. Otherwise, key performance indicators will be missing.

With Prisma SD-WAN, you gain immediate visibility into the changes made to the policy and application performance from a variety of perspectives. All of this without having to set up a third party NetFlow collector or some add-on to the base platform.

Let's explore the analytics captured and displayed for the top applications.

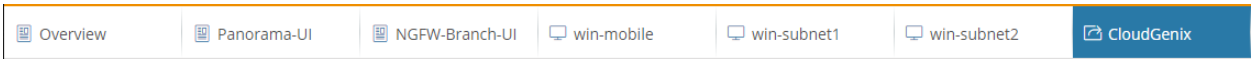
Task 1 – Log in to CloudGenix Portal

Step 1: Click the **Student-ID** tab.



Retrieve your assigned **CloudGenix Login**.

Step 2: Click the **CloudGenix** tab.



Step 3: Enter your assigned login.

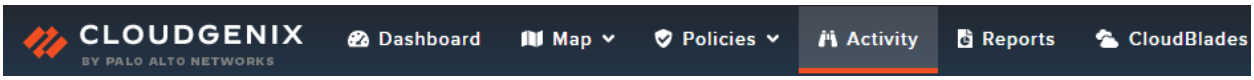
Click **Login**.

Step 4: Click into the **Password** field. Select your assigned login.

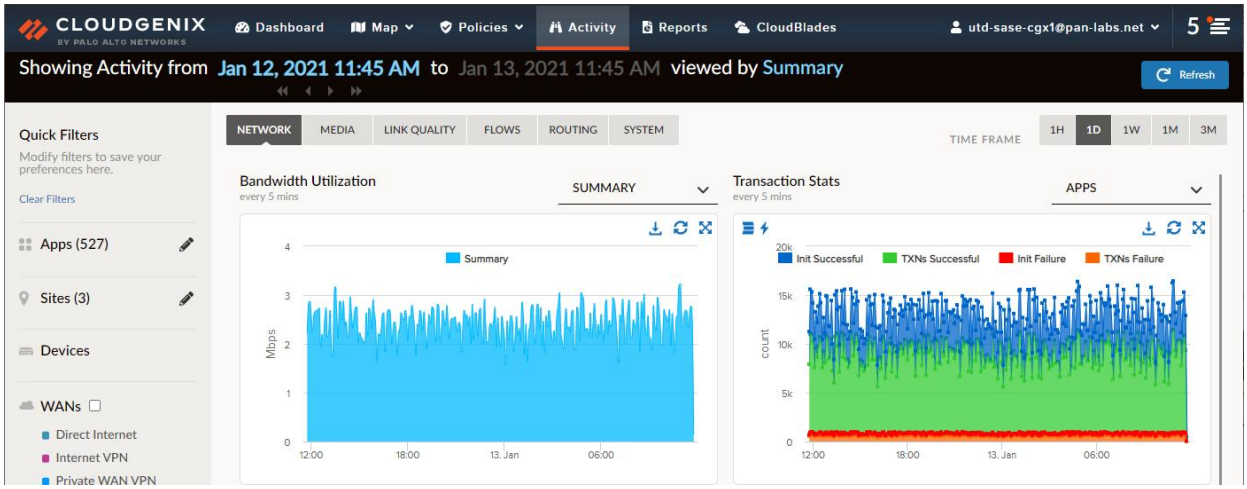
Click **Login**.

Task 2 – Network Analytics

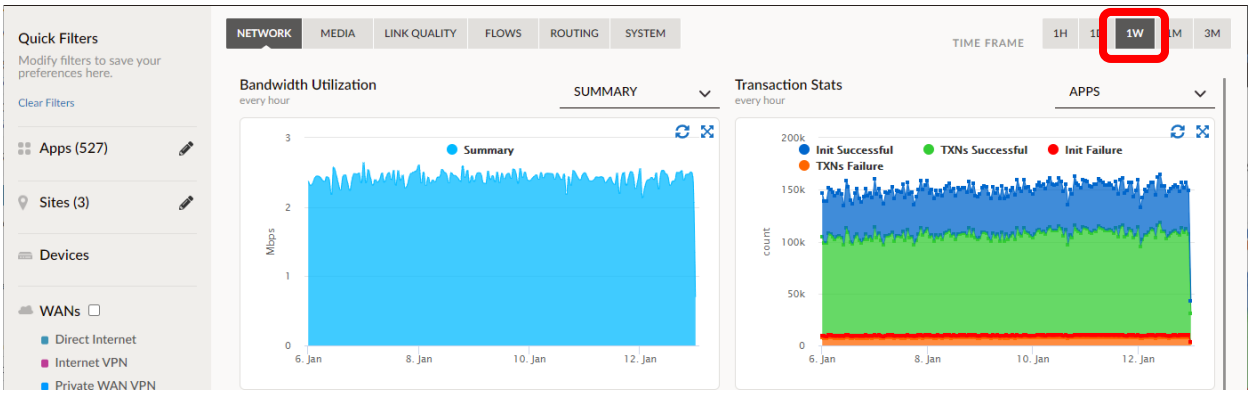
Step 1: Click the **Activity** tab. Then click **Network** if not already selected.



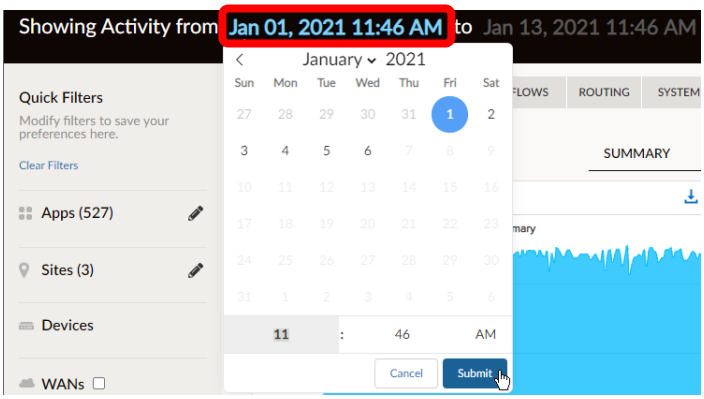
Network analytics will be shown. The default **Time Frame** is last day (**1D**).



Step 2: Click **1W** from **Time Frame**, the graphs will update for the selected period of time.



Click the date (in blue) and pick another day. Click **Submit**.

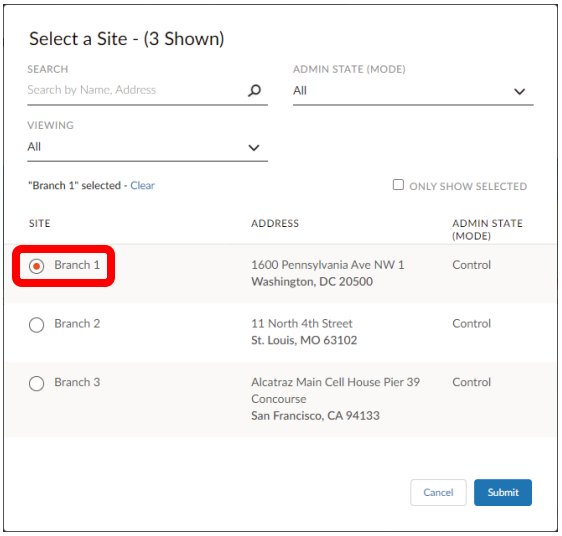


Up to 3 months of granular data is available.

Click **1D** from **Time Frame** to set the graphs back to the default view.

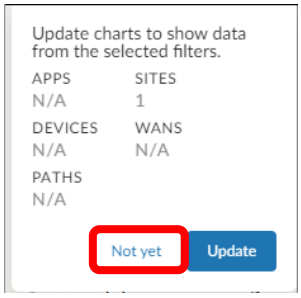
Step 3: In the left-hand column, under **Quick Filters**, click the pencil icon for **Sites**.

Select **Branch 1**.



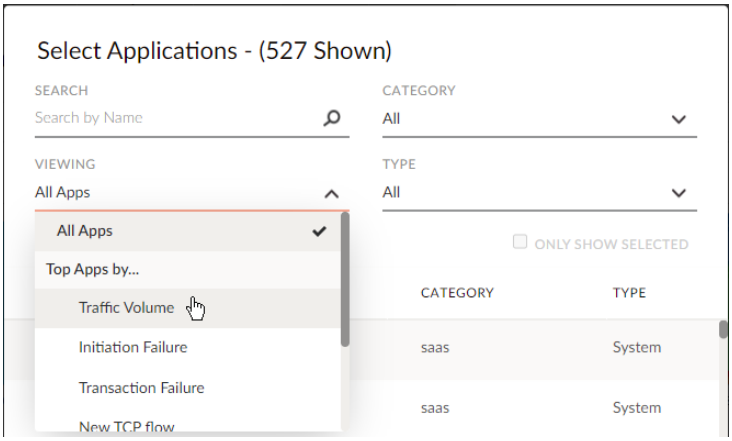
Click **Submit**.

Click **Not yet** on the window prompting you to update charts.



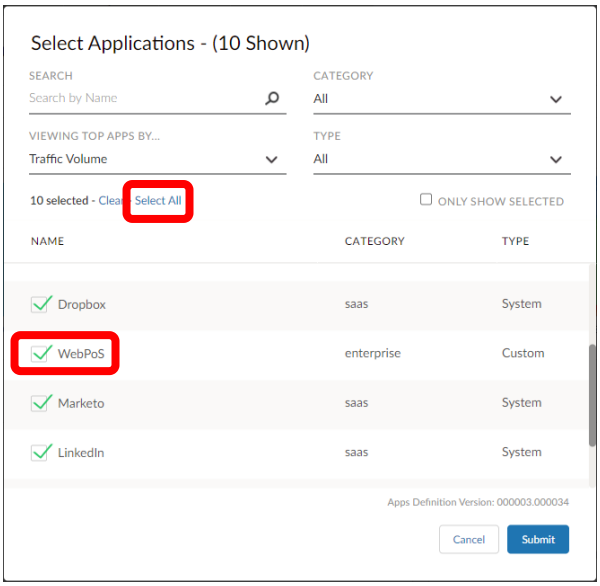
Step 4: Again, under **Quick Filters**, click the pencil icon for **Apps**.

In the drop-down box for **VIEWING > Top Apps by…**, select **Traffic Volume**.



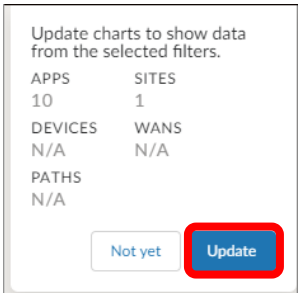
Click **Select All**.

Verify **WebPoS** is selected.



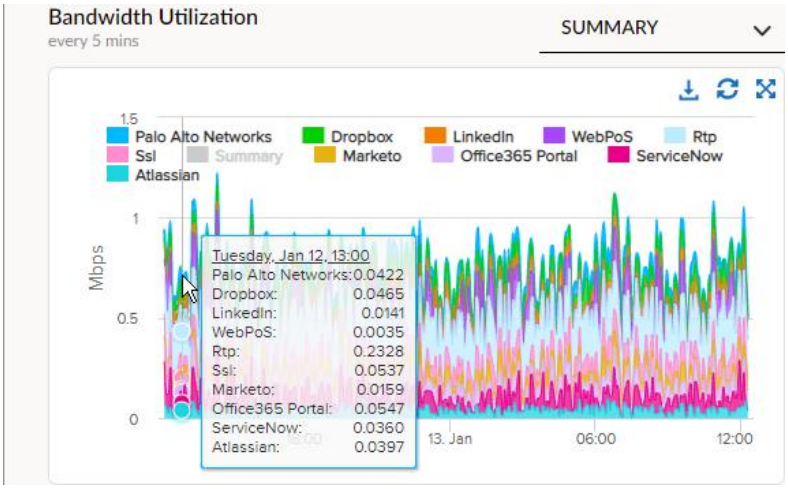
Click **Submit**.

Click **Update**

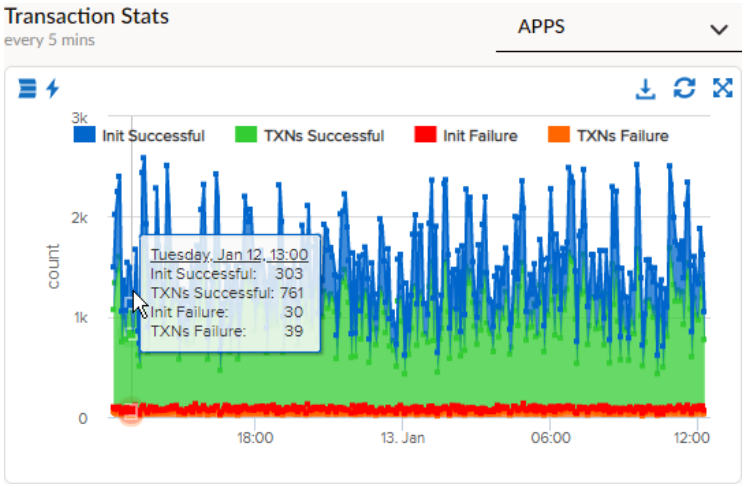


Step 5: Both the **Bandwidth Utilization** and **Transaction Stats** graphs have updated with new information.

The **Bandwidth Utilization** graph details the how much bandwidth each of the top 10 applications are using over the course of the past 1 day, measured at 5-minute increments.



Transaction Stats provides full accounting for TCP applications.



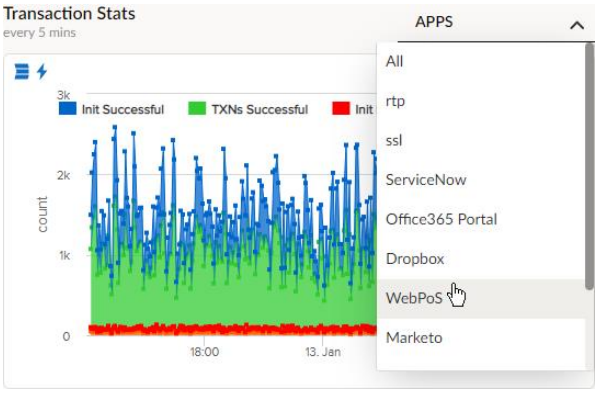
Init Successful - Quantity of successful TCP 3-way handshakes.
TXNs Successful - The number of successful TCP transactions after a 3-way handshake is established.
Init Failure - Quantity of failed TCP 3-way handshakes.
TXNs Failure - The number of failed TCP transactions after a 3-way handshake is established.

Init Failures can be indicative of a few issues:

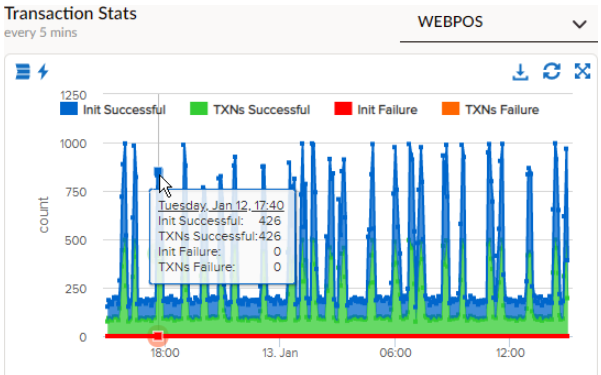
- Application Issues - The application could be down or experiencing intermittent issues
- Firewall Issues - Incorrect firewall rules may be blocking traffic
- Network issues beyond the reach of SD-WAN (ie in the data center)

Transaction (TXN) Failures usually represent loss somewhere in the network path, inside or outside of the direct control of the app-fabric.

Step 6: Click **APPS** on the **Transaction Stats** window and select **WebPoS**.

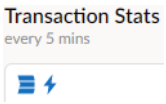


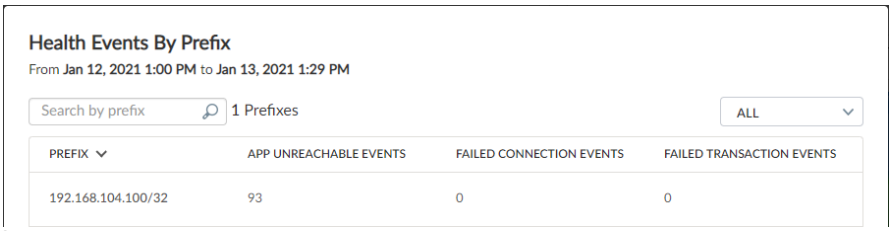
The Prisma SD-WAN also captures and aggregates transaction stats on a per app, per server basis.



Note: WebPoS is a user-defined custom L7 application. We'll explore what this means in the next activity.

Click the blue lightning bolt in the top-left of the **Transaction Stats** window. A new page is displayed with accounting of transaction statistics for WebPoS on a per prefix (server) basis.



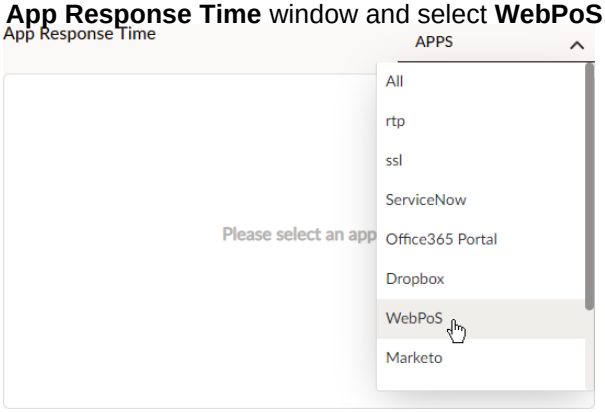


Application health event definitions:

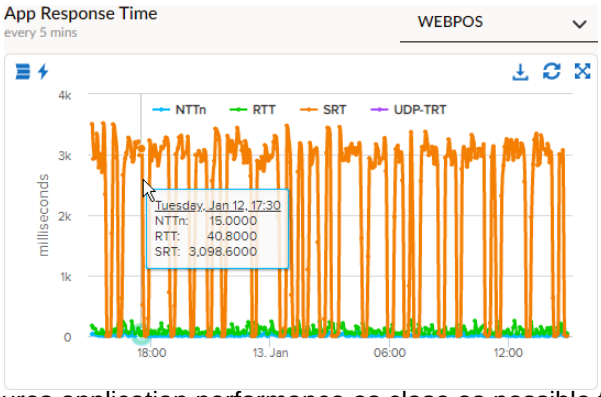
- **App Unreachable Events** - The number of periods (10 second interval) the given prefix is unreachable
- **Failed Connection Events** - The number of failed flows (3-Way Handshake) in the given time period
- **Failed Transaction Events** - The number of failed transactions (Retransmission required) in the given time period

Click anywhere outside the window to return to the **Network Analytics** page.

Step 7: Click **APPS** on the **App Response Time** window and select **WebPoS**.



The **App Response Time** details for **WebPoS** will be displayed.



The Prisma SD-WAN measures application performance as close as possible to the user, which is at the branch. In fact, many CloudGenix customers refer to this graph as their **Time to Innocence** graph. Application Performance is measured across several key metrics including:

- **Server Response Time** (SRT) - SRT represents the amount of time the server is waiting to fetch data before putting it on the wire.
- **Round Trip Time** (RTT) - RTT represents the round trip time of the TCP traffic while on the wire.
- **Network Transmission Time, Normalized** (NTTn) - Time consumed by the network for processing application requests normalized to an iMIX packet size.
- **UDP Transaction Round Trip** (UDP-TRT) - If DNS is the selected application, this metric is used to gauge the DNS response time.

Real World Applicability

A global manufacturing organization had recently deployed Office 365 to their global workforce using their legacy SD-WAN solution and the internet as a transport. Very quickly the end users began to experience performance issues with many applications. This set off a series of troubleshooting sessions to diagnose the issue. At the conclusion Microsoft had determined that the network was to blame. This put the network team in a position where they were required to prove to IT leadership that the network was not the issue.

Unfortunately, their legacy SD-WAN solution required bookends (a device on each end of the connection) in order to provide visibility into the performance of the network - something not practical nor possible with most SaaS solutions.

This gap in performance data forced the network team to evaluate solutions capable of monitoring and measuring application traffic in more granular detail, without the need deploy an appliance in the Microsoft Office 365 cloud.

They brought in Prisma SD-WAN as one of the potential solutions to evaluate. After understanding how the CloudGenix system works they quickly deployed the solution at a branch where many users were complaining.

After a very short amount of time monitoring the picture became clear. The RTT (Round Trip Time) values between the branch and the Office 365 front end were within acceptable values. However, there were periods of time where the SRT (Server Response Time) was spiking to several thousand milliseconds for long periods of time.

With this new information the network team went back to Microsoft and helped them identify when and where issues were occurring. This set about a rapid replacement of their legacy SD-WAN with the Prisma SD-WAN.

Next, we'll explore how Prisma SD-WAN identifies and measures real-time media applications.

Task 3 – Media Analytics

Due to the sensitive nature of real-time media applications the Prisma SD-WAN measures and treats them separately out of the box. For example, the system measures the quality of each voice and video call in high detail - no synthetic probes are used.

Let's explore this by reviewing actual RTP audio traffic at Branch 1.

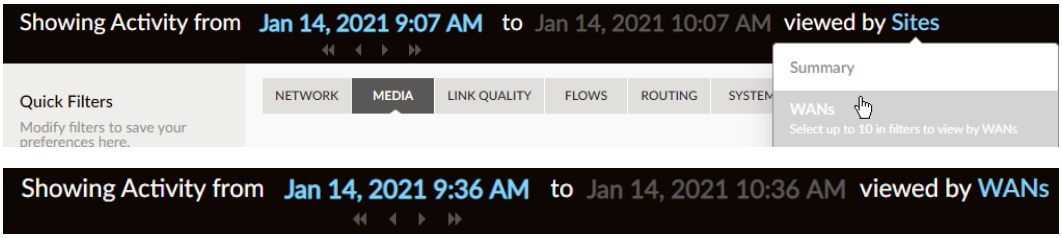
Step 1: Under **Quick Filters**, click **Clear Filters.**

Step 2: Click **Media** to display the media analytics.

Step 3: Select **1H** from the **Time Frame** selector.

Step 4: From **Quick Filters**, click the checkbox for **WANs**. Select **Not yet** when prompted to update charts.

Step 5: From the top of the page, change **viewed by Sites** to **viewed by WANs**.

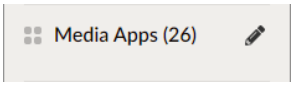


Step 6: Under **Quick Filters**, click the pencil icon for **Sites**.

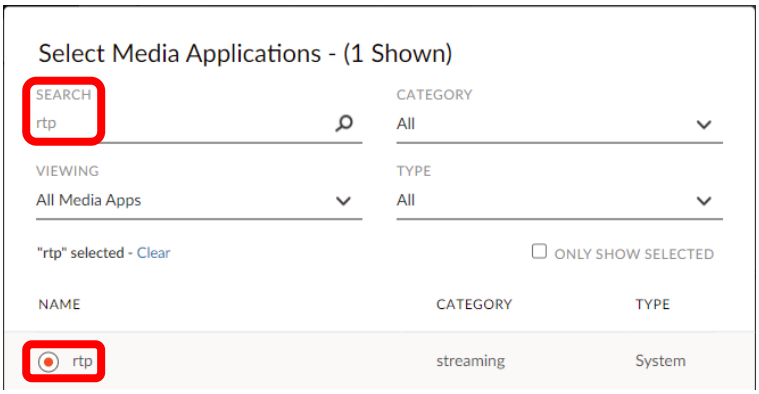
Select **Branch 1** and then click **Submit**.

Click **Not yet** when prompted to update charts.

Step 7: Under **Quick Filters**, click the pencil icon for **Media Apps**.



Under **Search**, type ***rtp*** and then select **rtp**.

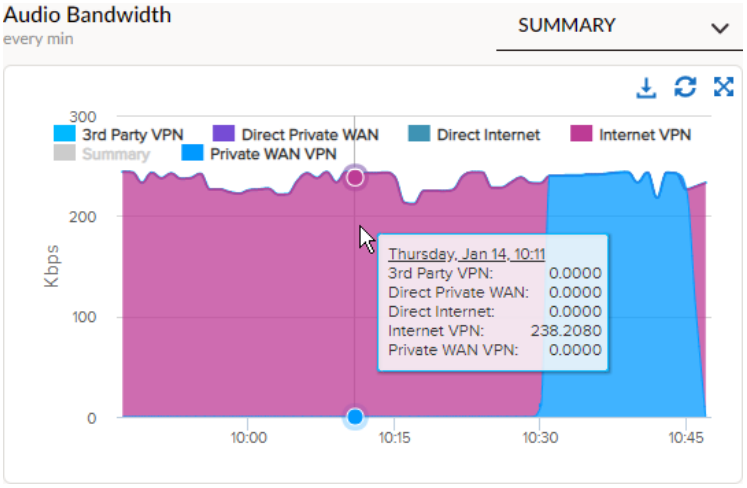


Click **Submit**.

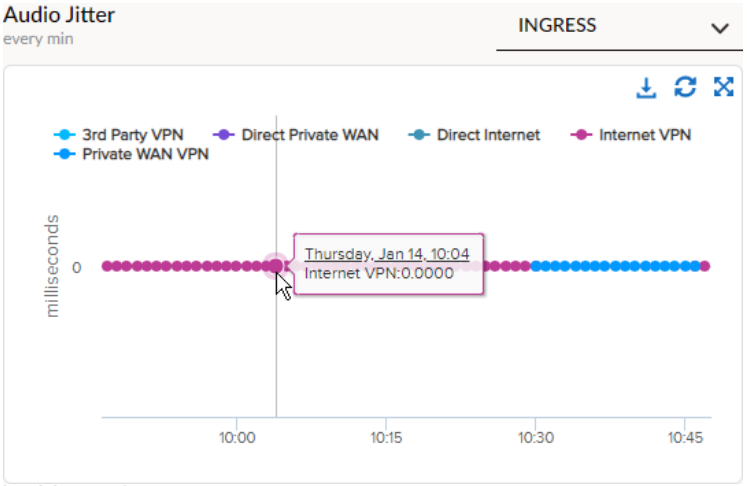
Click **Update** when prompted to update charts.

Step 8: Media analytics for the RTP audio sessions are now displayed.

Audio Bandwidth - The amount of bandwidth that the RTP audio streams are consuming.

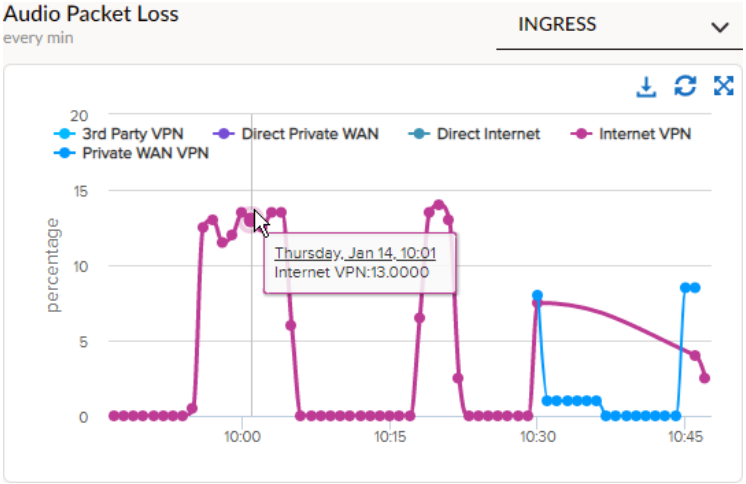


Audio Jitter - The variance in delay (ms) of the RTP audio traffic.



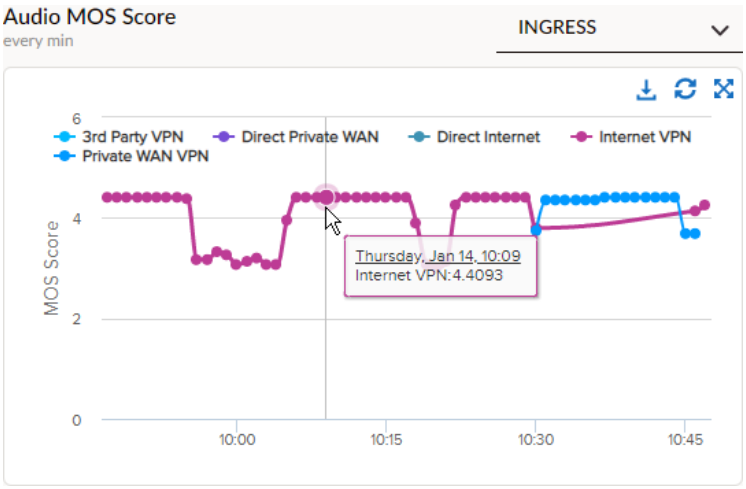
Note there is no jitter in this environment.

Audio Packet Loss - The packet loss % of the RTP audio traffic.

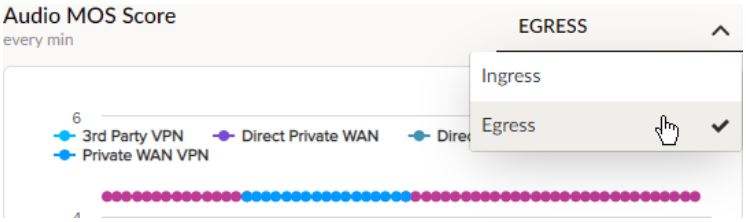


Note that extreme network conditions have been introduced into this environment to cause the Prisma SD-WAN to react to quality issues.

Audio MOS Score - The Mean Opinion Score of the audio traffic calculated using industry standard metrics.



Note that the above metrics default to displaying the **Ingress** metrics, which are measured on the traffic coming into the branch site from the WAN. Egress traffic is measured from the branch LAN going to the WAN. The view can easily be changed between **Ingress** and **Egress** on each individual graph.



Real World Applicability

Two companies merged and were required to connect the network under a new uniform solution. One company used MPLS exclusively along with centralized applications in a colocation facility. The other company used only internet VPN for WAN transport and relied exclusively on Microsoft Azure for IaaS. Needless to say, finding a new network solution to meet the requirements of both companies was challenging and a versatile solution was desired.

In the meantime, the Columbus, OH branch repeatedly complained about voice quality issues running over the internet. They went as far as adding a dedicated internet connection for voice but, this didn't provide much relief. As such, once the Prisma SD-WAN rollout began this was one of the first sites to be deployed.

However, a few days after deploying the voice issues still persisted. Had Prisma SD-WAN failed to correct the issue?

The network administrator dug into the details of the situation and found that ingress (traffic coming into the site from the internet) VoIP traffic for the UCaaS solution was clean - no signs of issues. He then looked at egress (traffic coming into the LAN) and found many spikes of packet loss of up to 18.5%.

Next, he reviewed the interface statistics on the Prisma SD-WAN ION hardware and found there were hundreds of thousands of errors in the past 24 hours. After some additional troubleshooting on the switch it was determined that the cable running between the switch and the ION was bad.

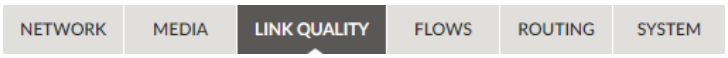
To summarize, without proper data the administrator spent an entire year operating under the assumption that VoIP issues were caused by a WAN transport issue. However, it was as simple as a bad cable that was used to connect the switch to the WAN. With proper visibility the administrator was able to identify the issue within just a few minutes.

Next, we'll explore how the Prisma SD-WAN measures link quality.

Task 4 – Link Quality

Step 1: Under **Quick Filters**, click **Clear Filters**.

Step 2: Click **Link Quality** to display the media analytics.

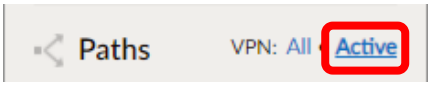


Step 3: Under **Quick Filters**, click the pencil icon for **Sites**.

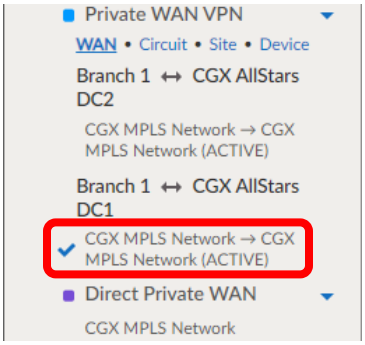
Select **Branch 1** and click **Submit**.

Click **Not yet** when prompted to update charts.

Step 4: Under **Quick Filters**, click **Active**.

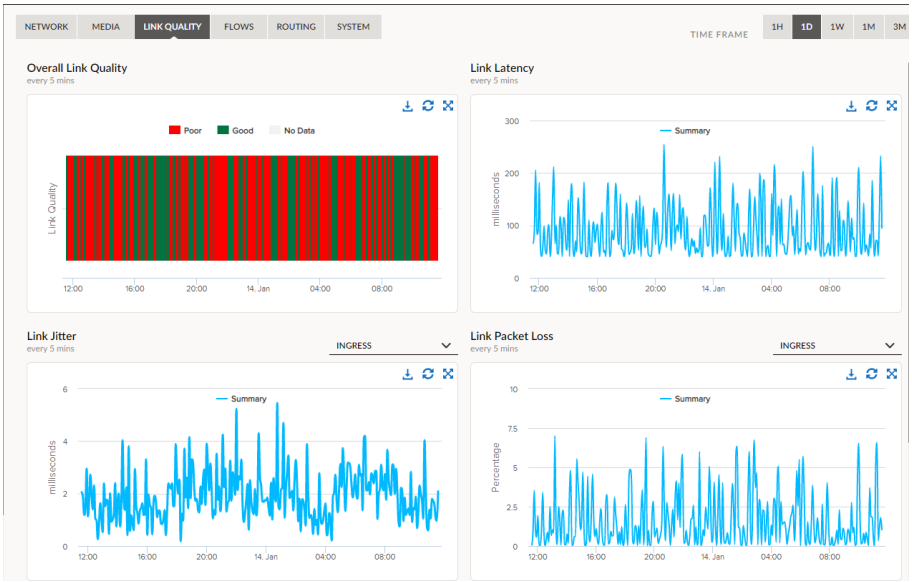


Select the VPN between **Branch 1** and **CGX AllStars DC1**.



Click **Update** when prompted to update charts.

Step 5: The graphs are now populated with detailed link quality metrics.



- **Overall Link Quality** - A simple chart representing whether the link is generally good enough (or not) to support a real-time media session. By default, a good link is defined as have less than 150ms of latency, 50ms of jitter, and 3% packet loss. This can be tuned on a per app / per connection basis.
- **Link Latency** - The round-trip latency between Branch 1 and DC 1.
- **Link Jitter** - The uni-directional jitter between Branch 1 and DC 1.
- **Link Packet Loss** - The uni-directional packet loss between Branch 1 and DC 1.
- **Link MoS** - A synthetic calculation of the Mean Opinion Score based upon the link metrics.

Real World Applicability

A global engineering firm paid premium prices for their high-quality, high-bandwidth MPLS connections. However, many sites still experienced random issues causing user performance issues with the traffic running over MPLS.

As is the norm with most Prisma SD-WAN proof-of-value trials, the solution was deployed at the site with the most user complaints. Once deployed the network administrators had instant visibility into the health of all transports and applications.

They reviewed the link quality of the MPLS connection and found immediate issues. The packet loss was spiking well above acceptable thresholds, up to 6% during business hours.

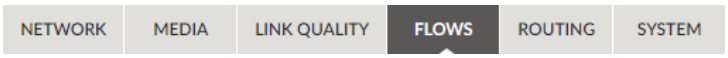
With this new information the network team was able to go back to carrier with precise information detailing the time and severity of the issues, leading to further investigation by the carrier, and ultimate resolution. The engineering firm proceeded to roll out the app-fabric at over 100 global locations on several continents.

Task 5 – Flow Browser

The Prisma SD-WAN keeps a record of every application session that passes through the system. This provides the ability to view granular details about the session not possible with other solutions, all with no increase in overhead.

Step 1: Under **Quick Filters**, click **Clear Filters**.

Step 2: Click **Flows** to display the media analytics.



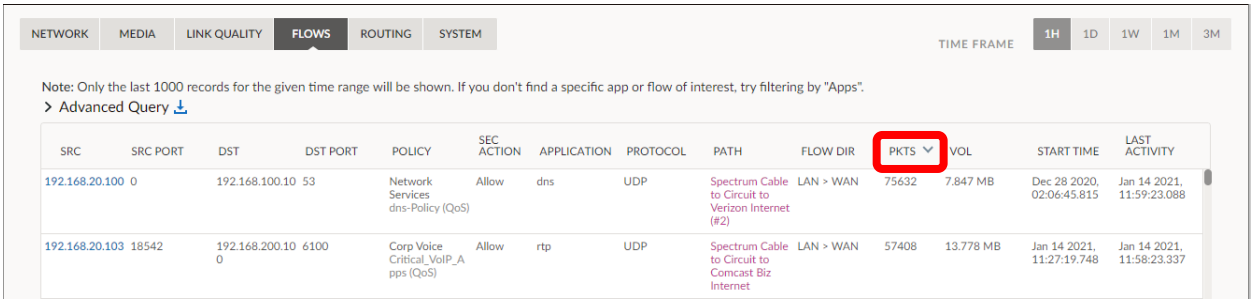
Step 3: Under **Quick Filters**, click the pencil icon for **Sites**.

Select **Branch 1** and click **Submit**.

Click **Update** when prompted to update charts.

Step 4: The **Flow Browser** will display the most recent 1000 flows.

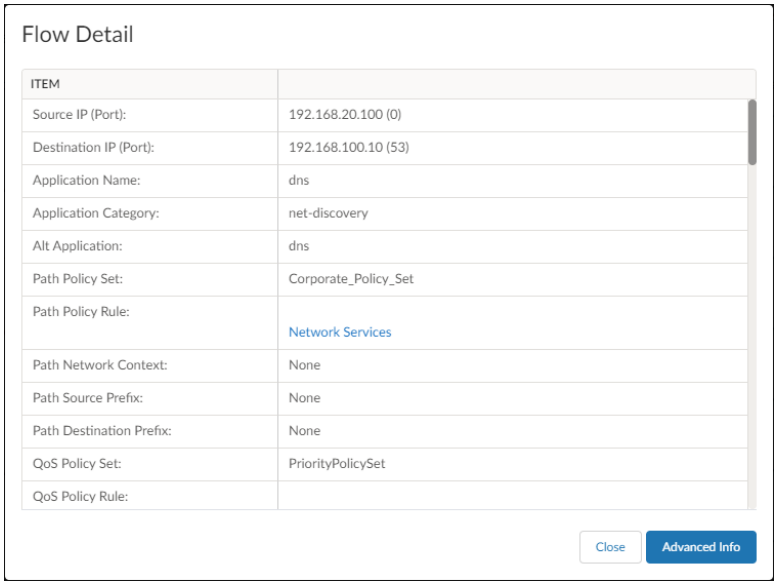
Each column can be clicked to sort the data. Click the **PKTS** (packets) column twice to sort by the number of packets from highest to lowest.



Step 5: Click the **SRC** (source) IP of the top TCP flow.

SRC	SRC PORT	DST	DST PORT	POLICY	SEC ACTION	APPLICATION	PROTOCOL	PATH	FLOW DIR	PKTS	VOL
192.168.20.100	0	192.168.100.10	53	Network Services dns-Policy (QoS)	Allow	dns	UDP	Spectrum Cable to Circuit to Verizon Internet (#2)	LAN > WAN	75632	7.847 MB

A new scrollable window will display with the flow details.

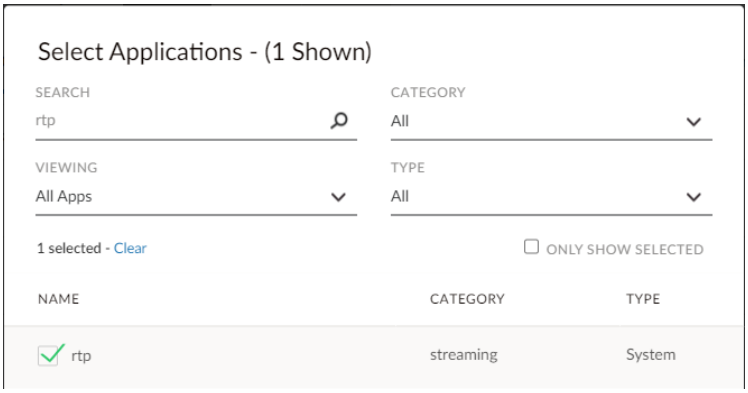


Each row provides detailed information about the flow. We'll cover some of the top used information:

- Flow Decision Bitmap - A detailed accounting of why a flow decision was made.
- Hovering over the Flow Decision Data (click Advanced Info) will reveal additional information about the path selection determination for the flow.
- Source IP (Port)
- Destination (Port)
- Application name
- Path Information - What Path policy criteria was matched to.
- QoS Information - What QoS policy criteria was matched to.
- Security Information - What Security policy (ZBFW) criteria was matched.
- Chosen WAN Path - What path did App-fabric chose for the application session.
- EndPoint - Which DC or Service Group was chosen to send the traffic to (if applicable).
- Domain Detected - What domain (if any) was detected for the flow.
- Start and end time of the flow.
- DSCP Fields Detected
- TCP Specific Fields - Similar to wireshark, the app-fabric provides TCP accounting for each flow. This includes OOO, SACK, Retransmits, RST, SYN, and FIN counts. This information is useful when troubleshooting application / network issues.
- VLAN ID
- Application Performance Metrics - Just like at the application/site level, the App-Fabric provides performance accounting on a per application session basis. This information is crucial in separating server issues from network issues.

Step 6: Under **Quick Filters**, click the pencil icon for **Apps**.

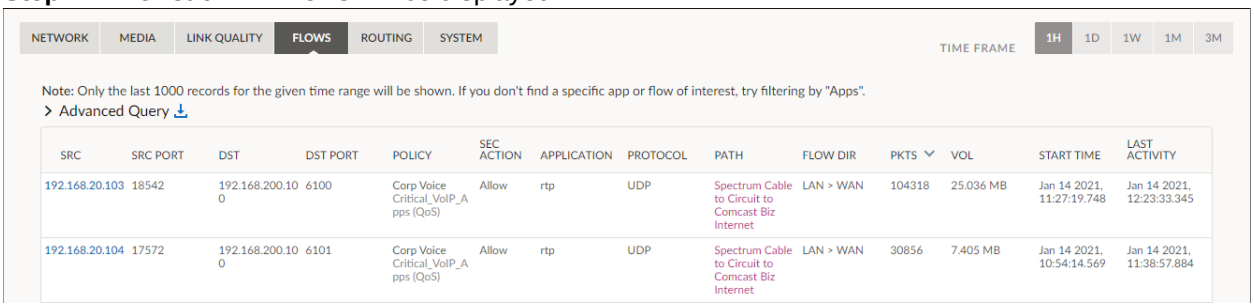
Under **Search**, type ***rtp*** and then select **rtp**.



Click **Submit**.

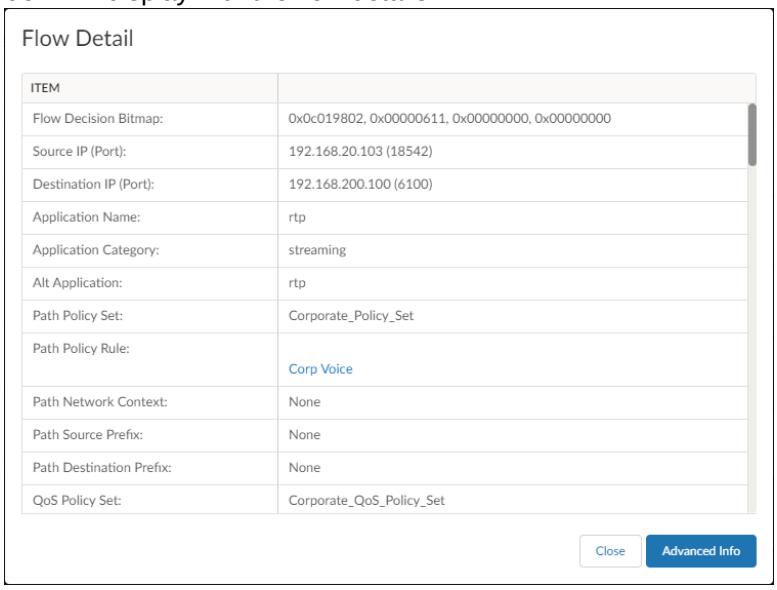
Click **Update** when prompted to update charts.

Step 7: The list of RTP flows will be displayed.



Step 8: Click the **SRC** (source) IP of the top TCP flow.

A new scrollable window will display with the flow details.



Just like a TCP application you will have detailed information about the RTP call. However, instead of TCP specific metrics there will be real-time media specific metrics including:

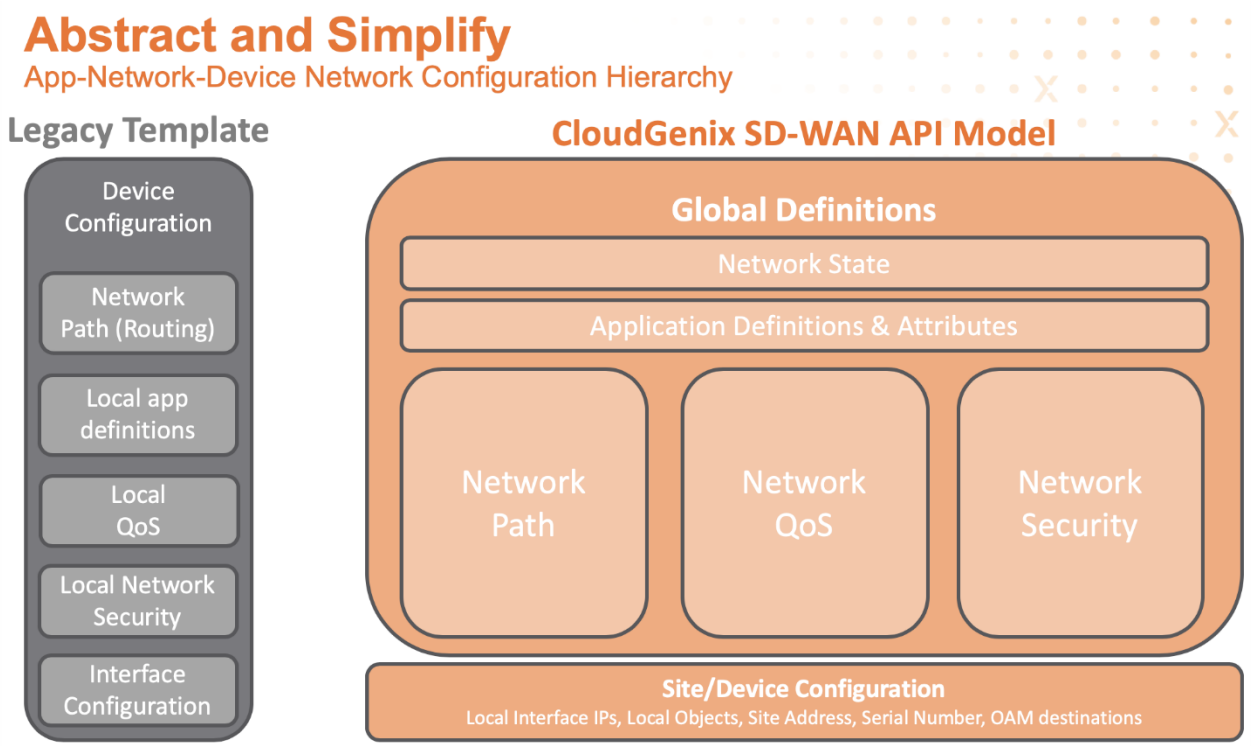
- Flow Decision Bitmap - A detailed accounting of why a flow decision was made.
- Hovering over the Flow Decision Data will reveal additional information about the path selection determination for the flow.
- Source IP (Port)
- Destination (Port)
- Application name
- Path Information - What Path policy criteria was matched to.
- QoS Information - What QoS policy criteria was matched to.
- Security Information - What Security policy (ZBFW) criteria was matched to.
- Chosen WAN Path - What path did App-fabric chose for the application session.
- EndPoint - Which DC or Service Group was chosen to send the traffic to (if applicable).
- Domain Detected - What domain (if any) was detected for the flow.
- Start and end time of the flow
- DSCP Fields Detected
- Codec - The detected codecs used throughout the life of the call in each direction.
- VLAN ID
- RTM Performance - Bidirectionally measure Min/Max/Average
    - Packet loss
    - Jitter
    - MoS

End of Activity 8

Activity 9 – Prisma SD-WAN: Application Policy

In this activity, you will:

- ***Examine application policies that ensure performance and compliance***



The Prisma SD-WAN provides a complete policy framework designed to fit the needs of the user and the application. This is achieved by applying Path, QoS, Security, and NAT (if applicable) rules on a per-application basis.

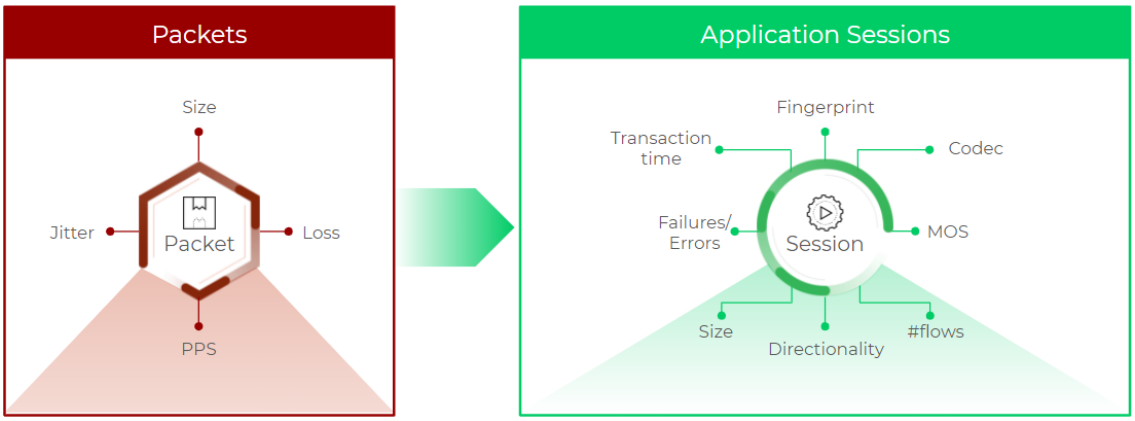
Consider an organization that has recently made the shift to adopt cloud services such as Microsoft Office 365 and Salesforce. To date its security policy dictated that all traffic destined for the Internet must transit through the centralized data center firewalls via the private WAN. After numerous complaints about application performance for Office 365 and Salesforce, the security team grants an exception to allow both of these applications to go direct to the Internet since they are encrypted and trusted applications.

Given that Prisma SD-WAN is an application-defined architecture that operates at the application-session level, the network administrator is enabled to easily accomplish the task of selectively sending Office 365 and Salesforce traffic direct to the Internet.

In this activity we'll verify that the operations team has correctly configured the system to achieve the user intent by reviewing:

- Application Definitions
- Path Policies
- QoS Policies

Task 1 – Application Definitions



As the name suggests, the Prisma SD-WAN is an application-based system. Not only does Prisma SD-WAN use a purpose-built application ID engine to perform app identification, it is an essential component of the system. In other words, it's not a feature that can be turned on or off, but, a core part of how the system works.

The system has two main types of application definitions:

System Apps
- These are applications maintained by the Palo Alto Networks team for commonly used applications.
- There are over 500 applications out of the box.
- Application definitions are automatically updated as needed, typically 1-2 times per quarter.
- Users can optionally add overrides to the default system applications.

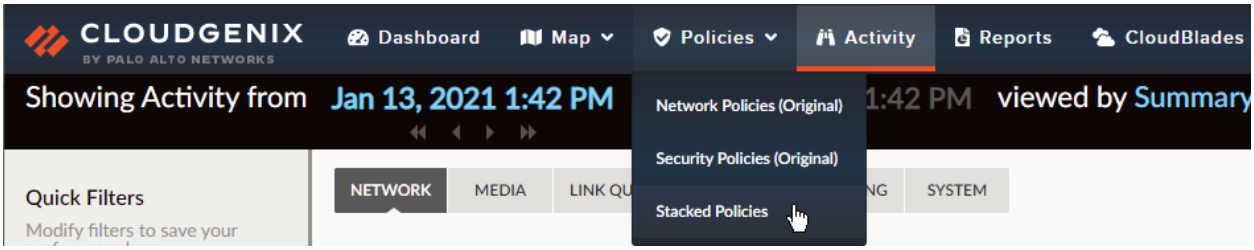
Custom Apps
- These are applications created and maintained by the customer.

Both **System Apps** and **Custom Apps** can match on many criteria
- **L7 Rule** - Use a domain name to match the application.
- **L3/L4 Rule** - Use a combination of Prefix filters (source and/or destination), protocols, and port numbers to match the application.
- **Signature** - Some system applications also leverage deep packet inspect and a subsequent signature to identify the application.

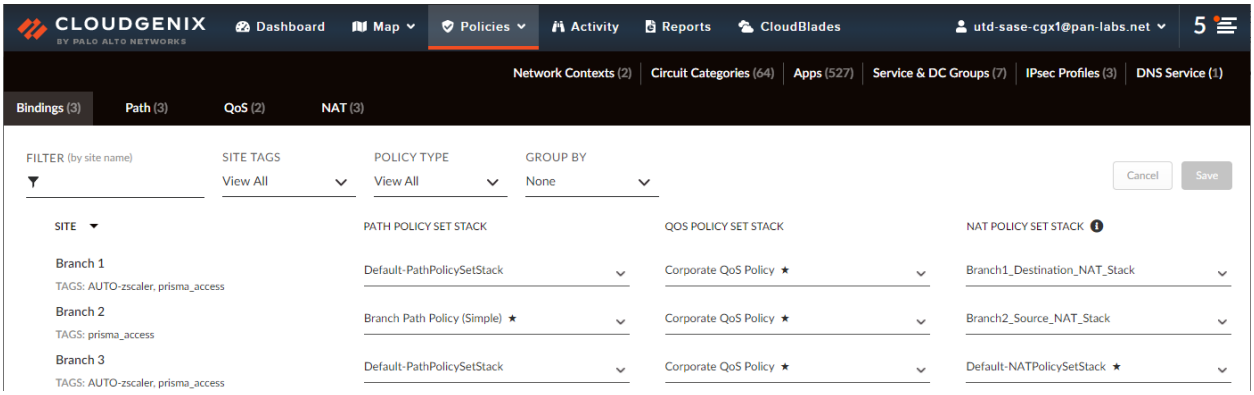
Each application definition includes configuration options that help the system determine how to handle the traffic. These options are:
- **App Category** - Used primarily for organizational purposes.
- **Transfer Type** - The designated transfer type has an impact on how QoS is applied to any app sessions that match the application definition.
- **Ingress Traffic Percentage** - During the path selection process this helps the system determine if the application is upload heavy or download heavy and it will place the session on the appropriate link.
- **Connection Idle Timeout** - The amount of time that a session will stay active in the system with no packets observed on the wire.
- **Path Affinity** - Enable the system to group sessions of a like application onto the same link.
- **Using App Reachability Detection** - The Prisma SD-WAN system is capable of detecting brown-out conditions for all TCP applications. This detection can be disabled selectively on a per-application basis.

- **Network Scan App** - In some networks customers leverage automated scanning utilities to discover vulnerable systems. These systems sometimes flood the network with traffic across all ports. In order to prioritize this traffic properly below that of production traffic, it can be defined as a Network Scan App. This is typically done using source prefix filters in the application definition.

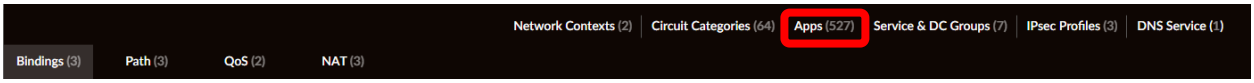
Step 1: Click the **Policies** tab, and then select **Stacked Policies**.



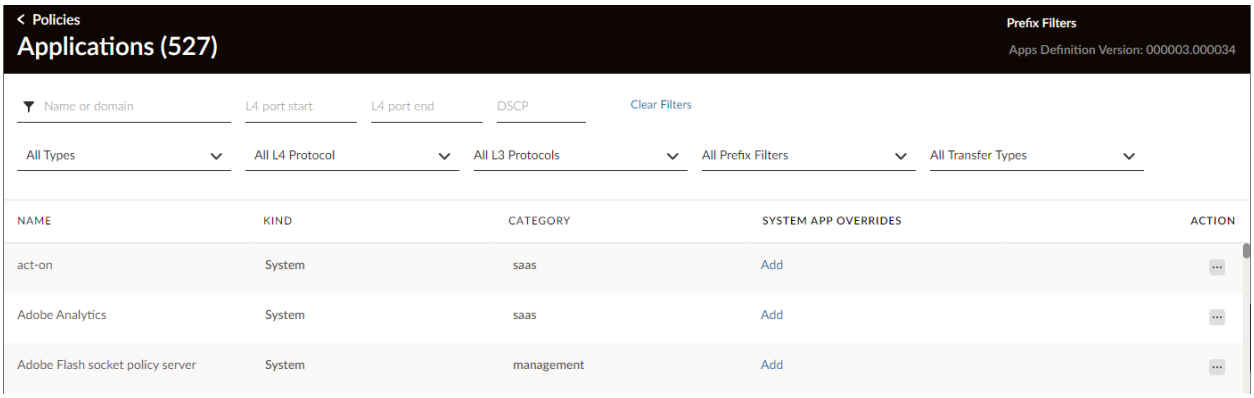
The **Policy Bindings** are now displayed.



Step 2: Click **Apps**

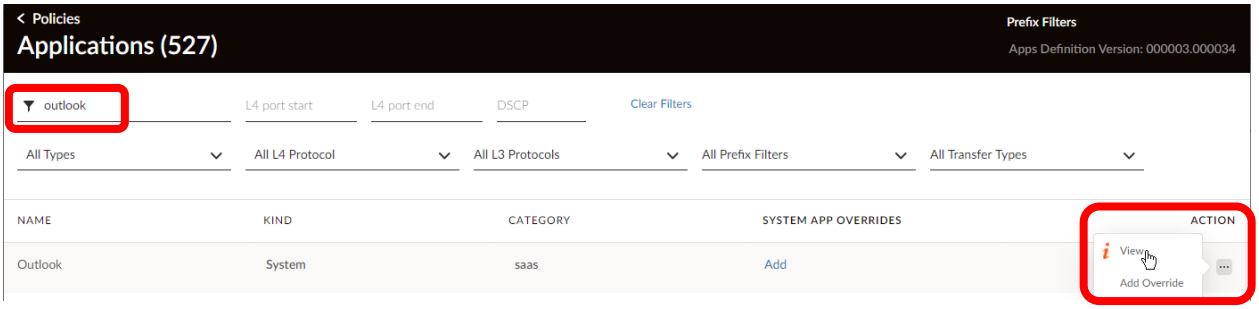


This displays a full list of all **Application Definitions**.



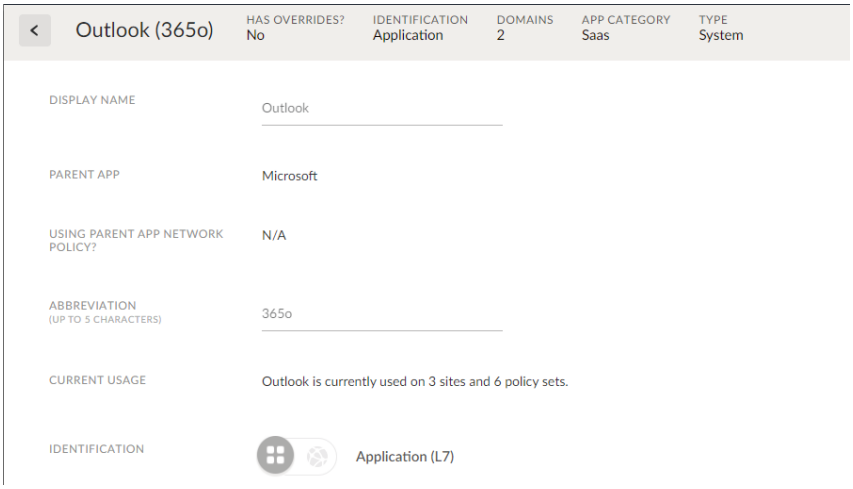
Note that they can be sorted and filtered in many ways.

Step 3: In the **Name or domain** filter box, type ***outlook***.



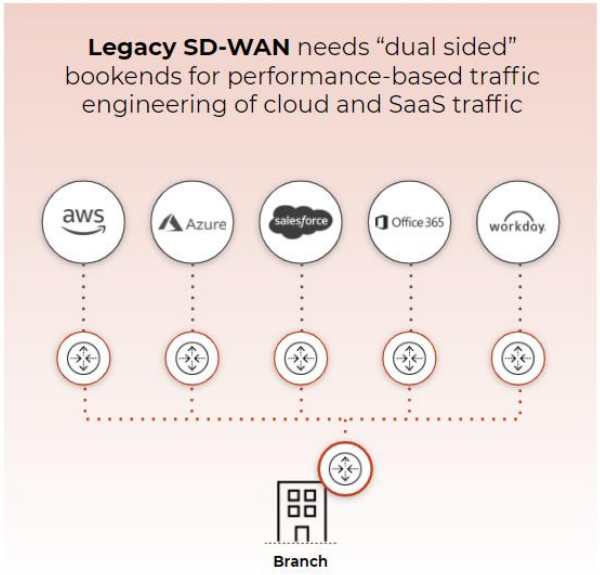
Under **Action**, click the ellipses and then select **View**.

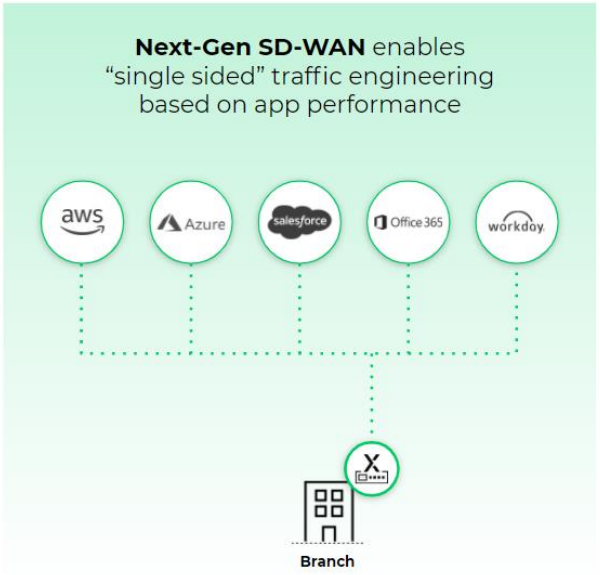
The Outlooks system application definition will be displayed.



Next, we will look how applications are used in path policies.

Task 2 – Path Policies





Path policies determine how the various paths available to the Prisma SD-WAN are used to fulfill business intent.

There is significant control in the path policy framework. Match criteria include:

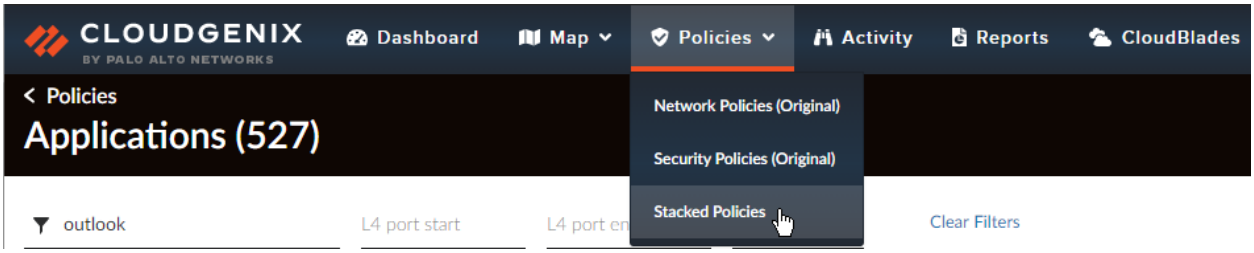
- **Context** - An optional identifier applied at the device interface level used to signify certain types of networks or users. Guest and PoS (point of sale) are commonly used Contexts.
- **Prefixes** - Global and local prefix filters can be optionally matched as source and/or destination criteria.
- **Apps** - Both system and custom (user-defined) applications can be matched.

Path selection options include:

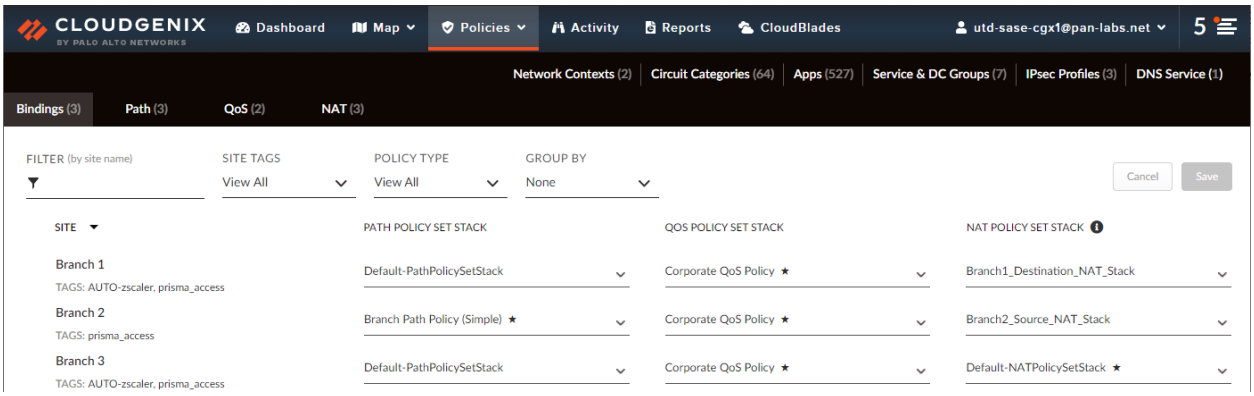
- **Paths** - Granular control of which site connections are used to forward traffic.
- **Active** - Paths that are actively used to forward traffic in a load-shared manner.
- **Backup** - Paths that are used when active paths are down or when quality issues occur.
- **L3 Failure Path** - Paths that are used only when all active and backup paths are down.
- **Service and DC Groups**
- **Service Group** - Used to direct traffic to a 3rd Party service group. A common example would be to send untrusted traffic to Palo Alto Networks Prisma Access solution for further security inspection.
- **DC Group** - One or more CloudGenix Data Center locations that can be used as transit points.

Since we have approval from the security team to send Salesforce and Office 365 traffic directly onto the internet to maximize performance, we'll explore how to verify the change was made successfully by the operations team.

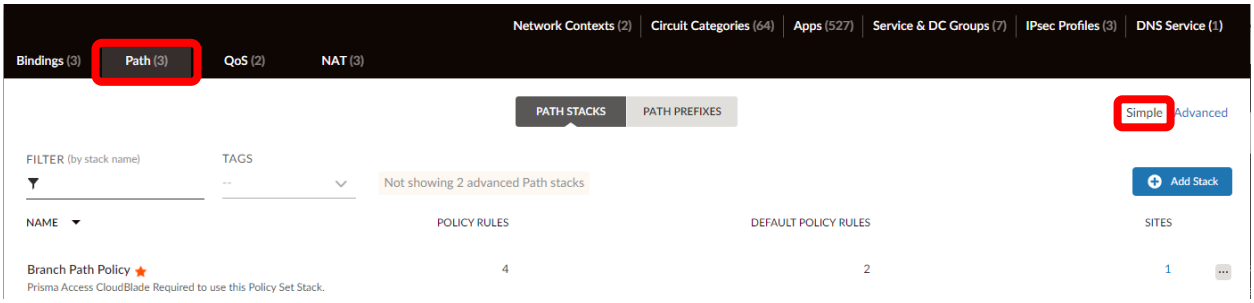
Step 1: Click the **Policies** tab, and then select **Stacked Policies**.



The **Policy Bindings** are now displayed.

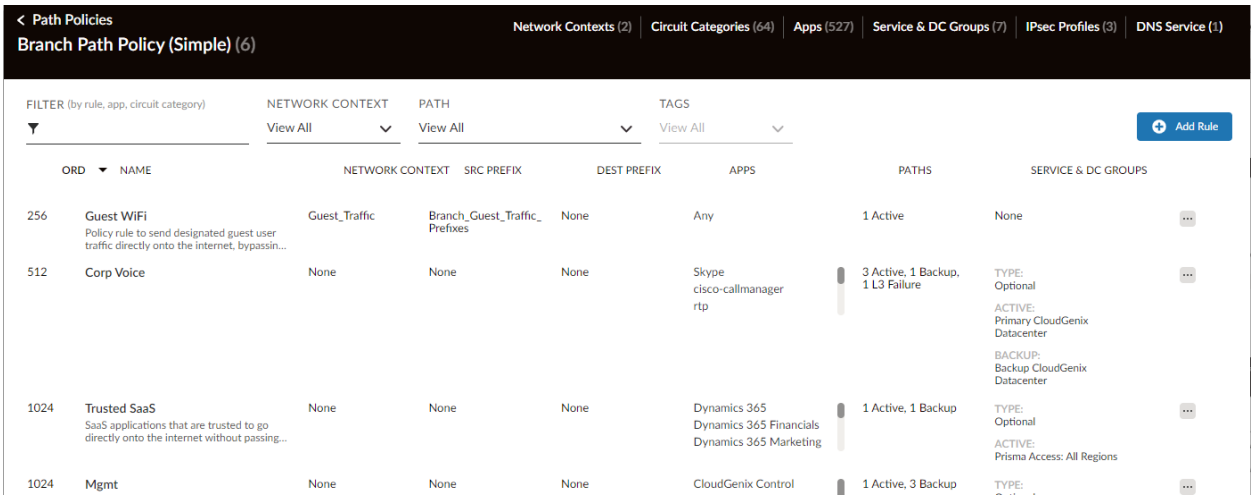


Step 2: Click the **Path** tab and then **Simple**.

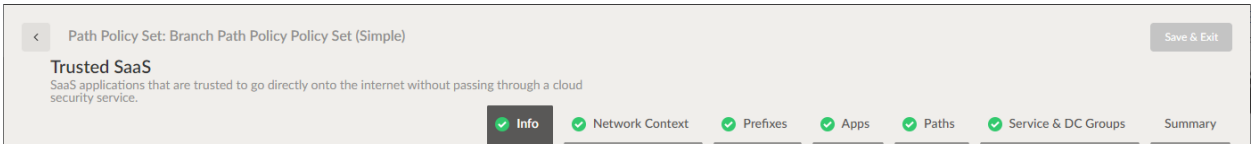


The **Branch Path Policy** is displayed.

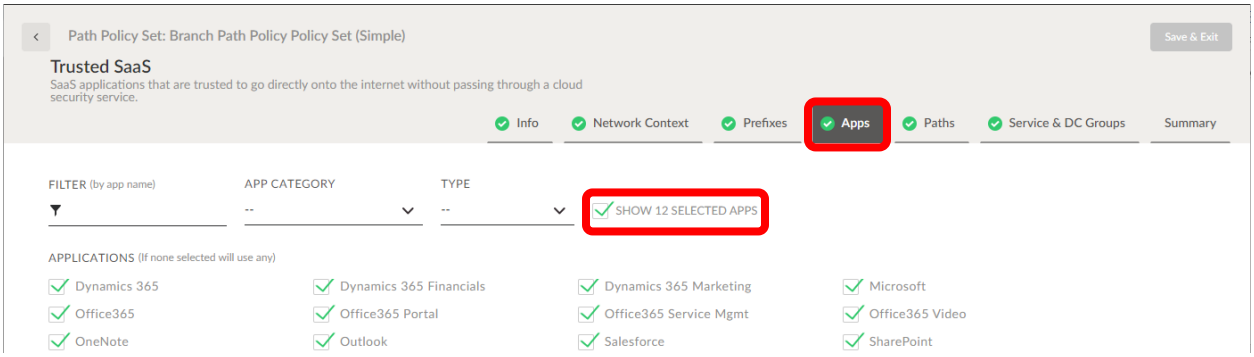
Step 3: Click **Branch Path Policy** to view the list of rules.



Step 4: Click on the **Trusted SaaS** policy.

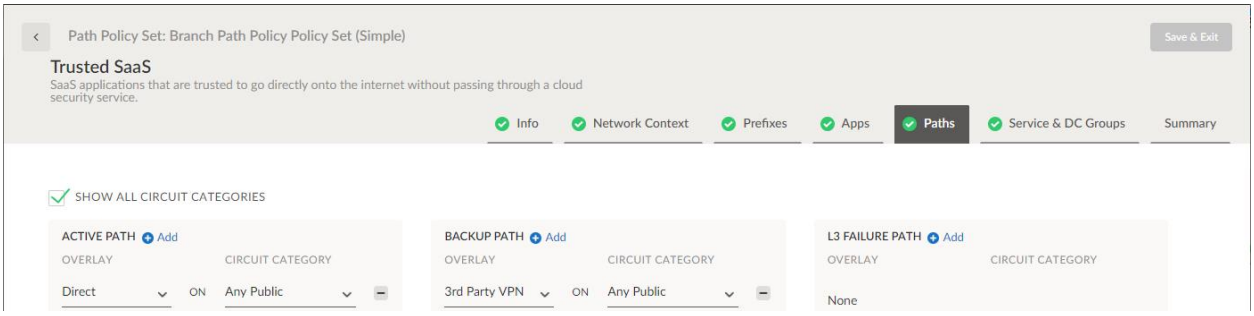


Click on the **Apps** tab and then select the checkbox for **Show** *X* **Selected Apps**.



Note that, in this rule, both Salesforce and Office365 have been selected.

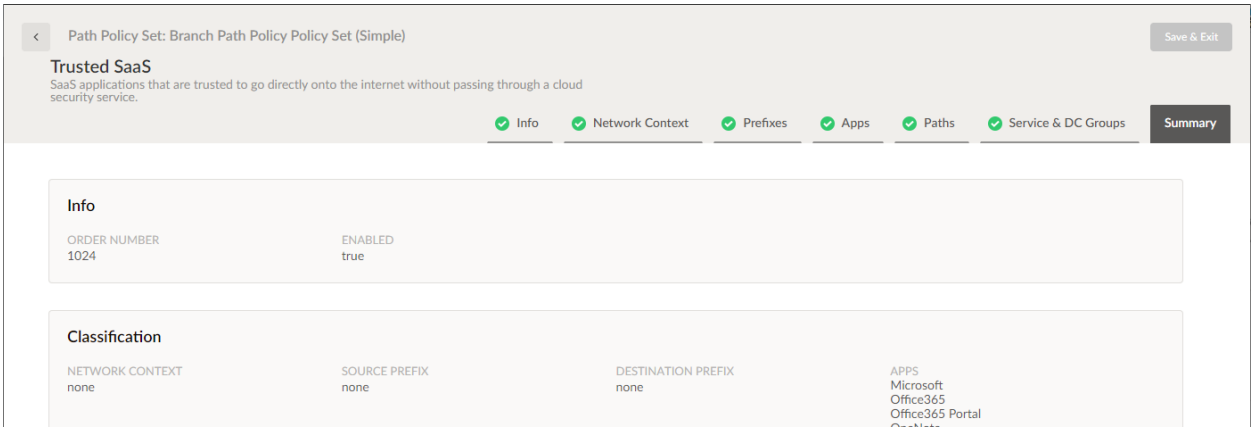
Step 5: Click on the **Paths** tab.



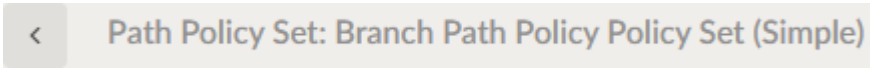
Note the path selection configuration:

- **Active Path** - Direct on Ethernet Internet
- **Backup Path** - Direct on Internet Cable
- **L3 Failure Path** - Direct on Metered 3G/4G/LTE

Step 6: Click on the **Summary** tab to view all the settings for the Trusted SaaS path policy rule.

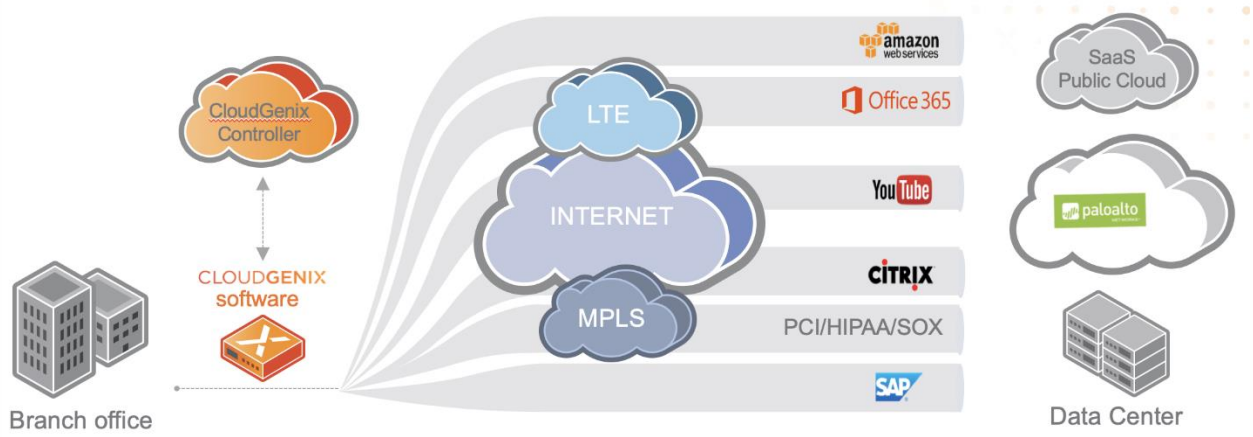


Step 7: Click on the back arrow at the top left-hand corner of the page.



Next, we will look at how applications are used in QoS policies.

Task 3 – QoS Policies



The Prisma SD-WAN system follows a simple QoS model utilizing shaping. There are four top level queues called **Priority** levels:

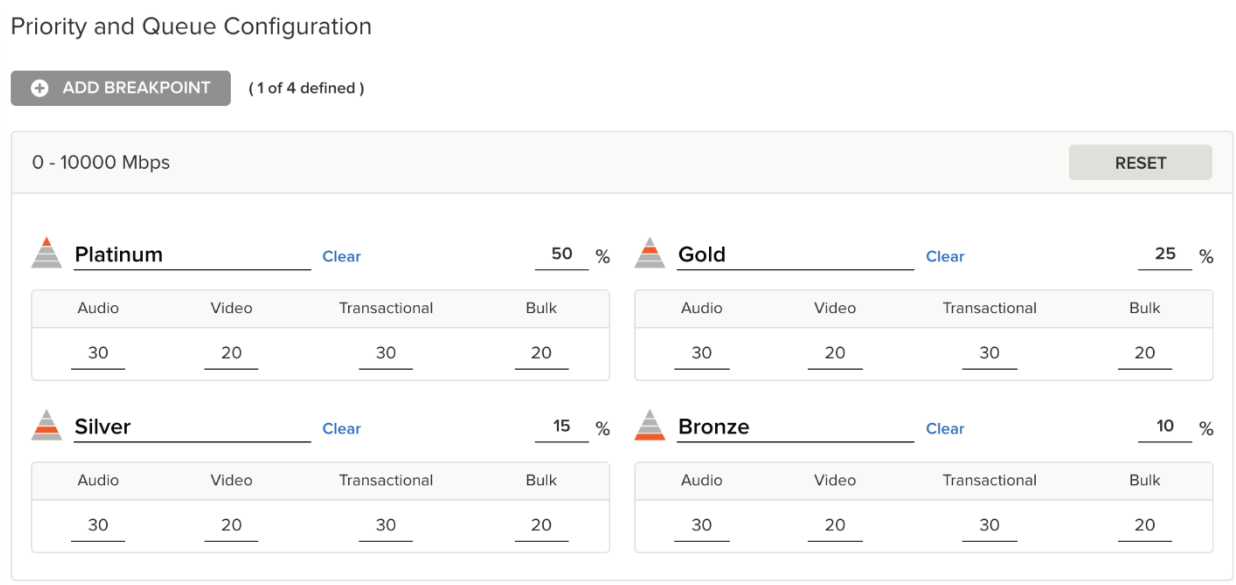
- Platinum
- Gold
- Silver
- Bronze

Each **Priority** (top-level queue) is allocated a configurable percentage share of the circuit bandwidth. This value is leveraged to shape traffic in times of congestion.

Each **Priority** level has 4 sub-queues, one for each transfer type:

- Real-Time Audio
- Real-Time Video
- Transactional
- Bulk

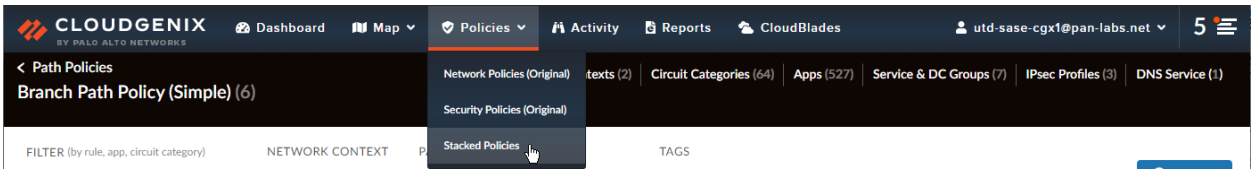
This is a view into how the bandwidth percentages are allocated:



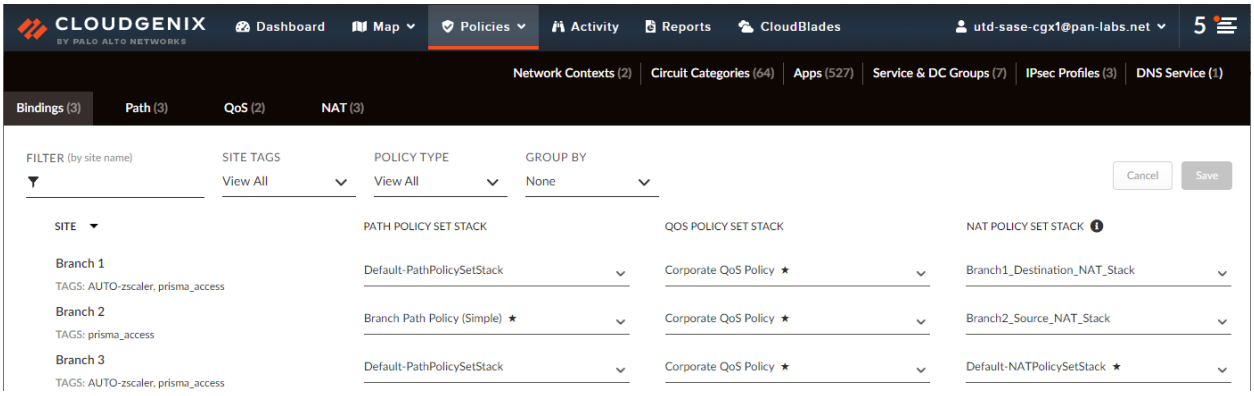
The transfer type is specified in the application definition which was covered earlier in this task.

In our example the company uses a wide variety of applications to conduct business. Specifically, the sales division uses the salesforce.com SaaS application as the primary CRM system. We will ensure that the operations team has mapped both applications into the Gold queue.

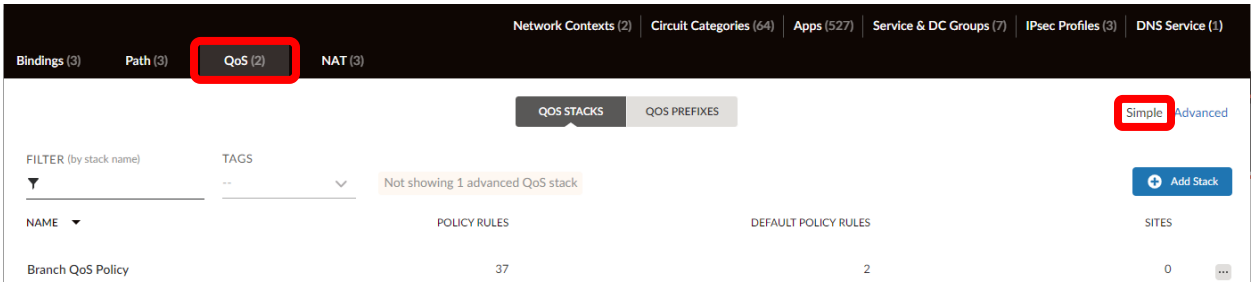
Step 1: Click the **Policies** tab, and then select **Stacked Policies**.



The **Policy Bindings** are now displayed.

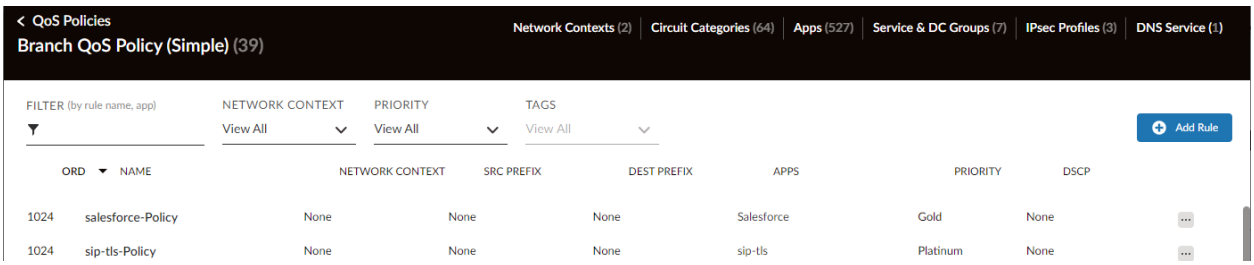


Step 2: Click the **QoS** tab and then **Simple**.

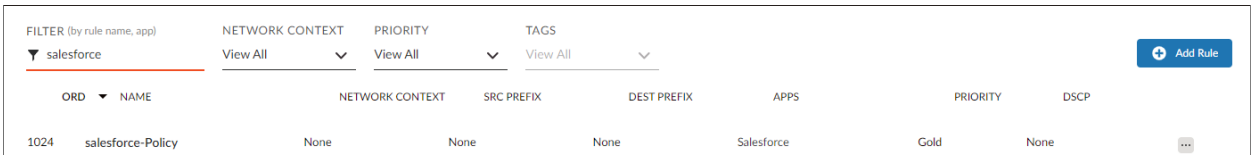


The **Branch QoS Policy** is displayed.

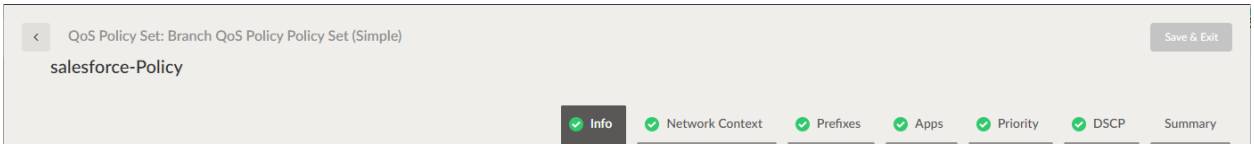
Step 3: Click on **Branch QoS Policy** to view the list of rules.



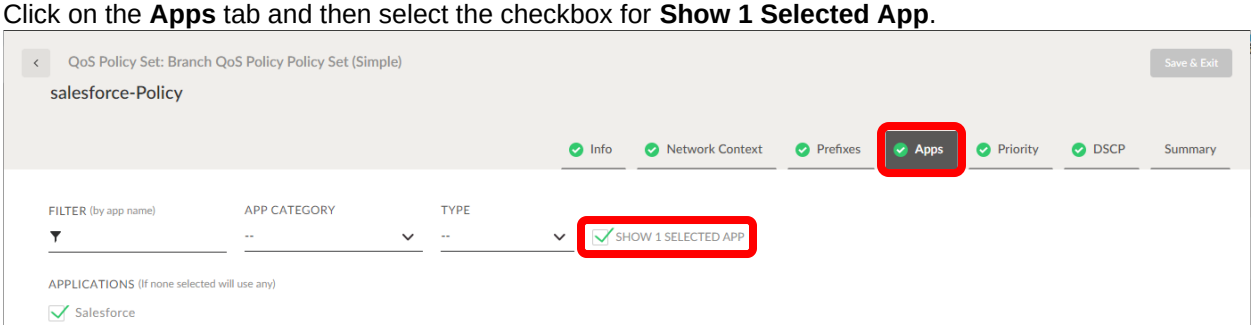
Step 4: In the **Filter (by rule, name, app)** box, type ***salesforce***.



Step 5: Click on **salesforce-Policy**.

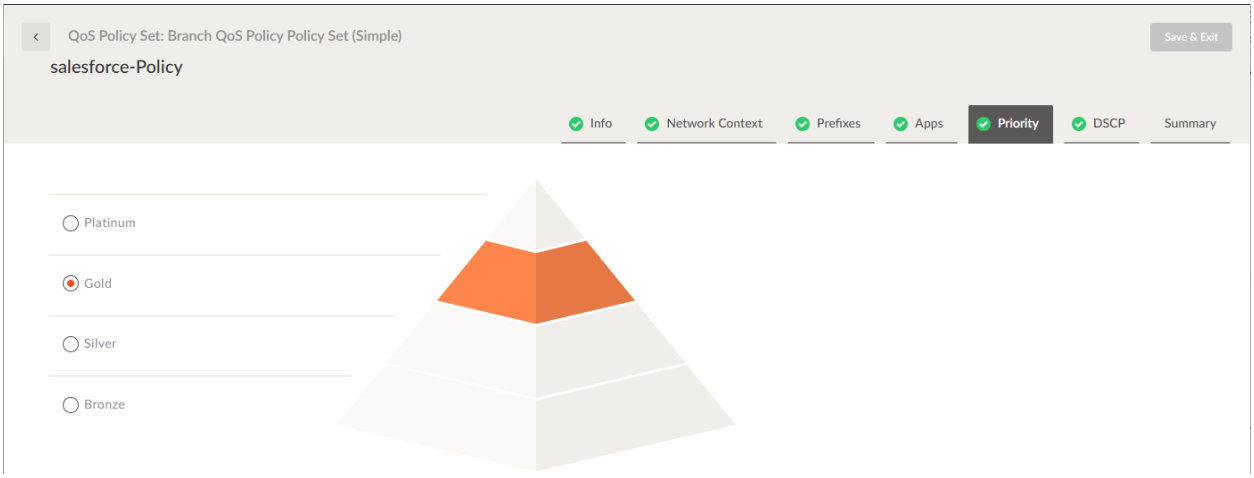


Click on the **Apps** tab and then select the checkbox for **Show 1 Selected App**.



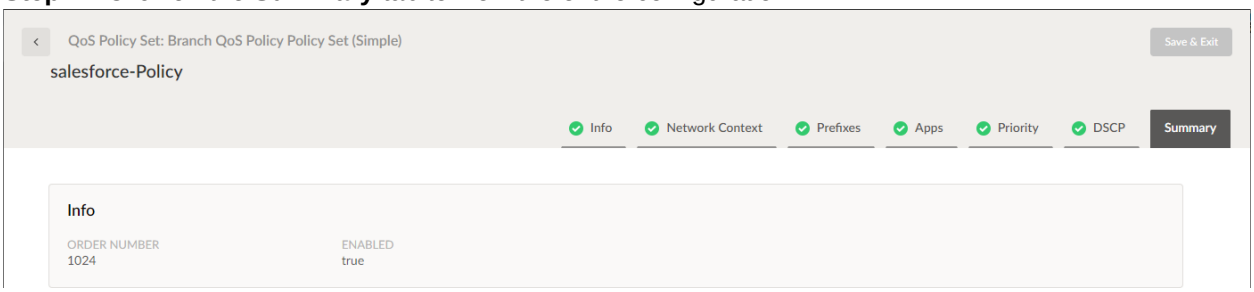
Note that, in this rule, only Salesforce has been selected.

Step 6: Click on the **Priority** tab.

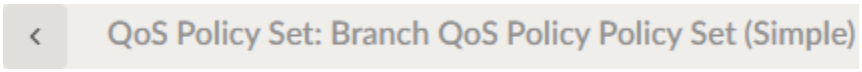


Confirm that Gold is the selected priority.

Step 7: Click on the **Summary** tab to view the entire configuration.



Step 8: Click on the back arrow at the top left-hand corner of the page.



End of Activity 9

Activity 10 – Prisma SD-WAN: Application Defined

In this activity, you will:

- ***Review the network infrastructure that enables policy enforcement***

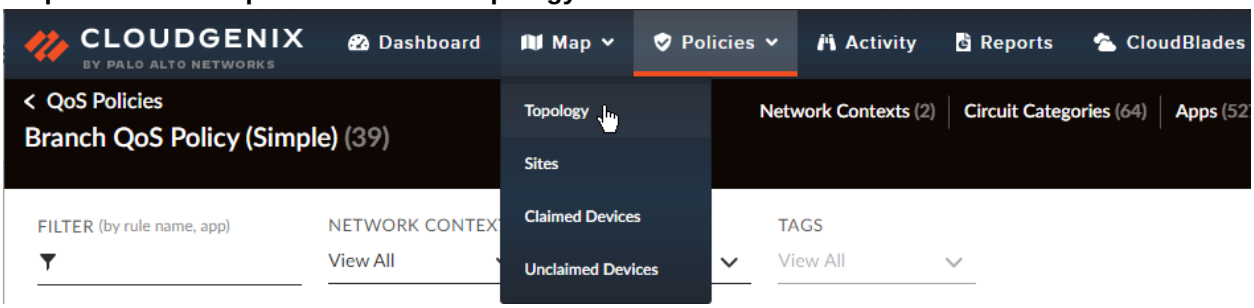
The foundation of the Prisma SD-WAN system is that it is application defined. It is comprised of the sites and devices and is responsible for the identification of applications, application monitoring, inter-site VPN connections, connections to 3rd party services, and policy instantiation.

In this section we'll explore how the logical application fabric is configured and built.

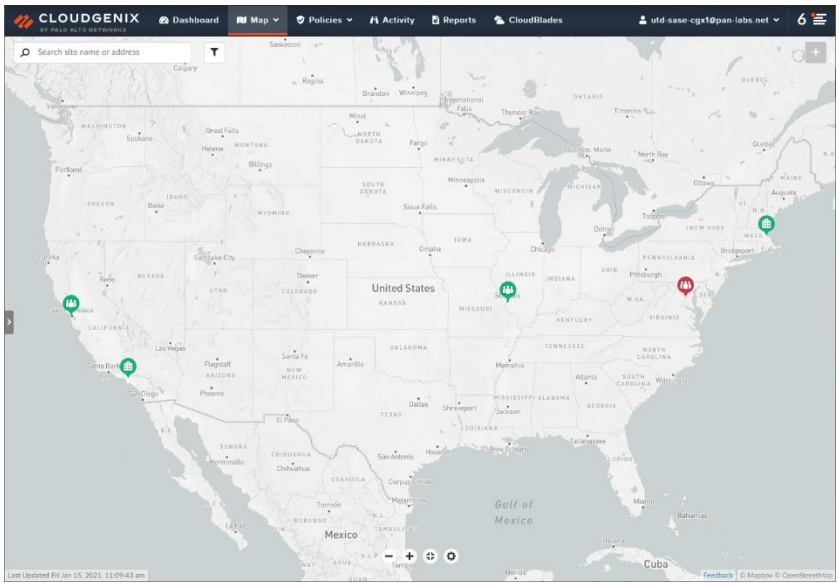
Let's get started by reviewing the topology.

Task 1 – Topology

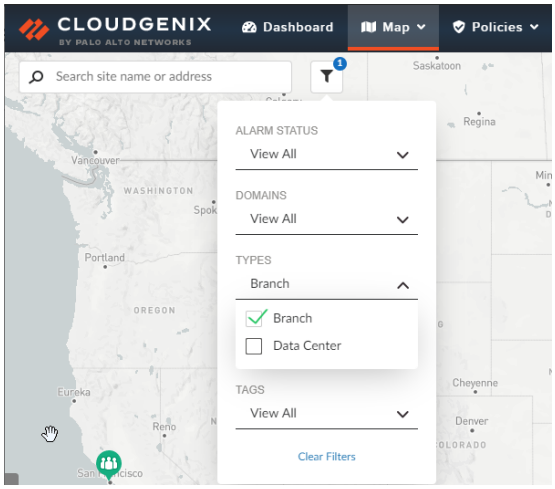
Step 1: Click on **Map** and then select **Topology**.



The map is displayed. By default, all sites are visible but can be filtered.

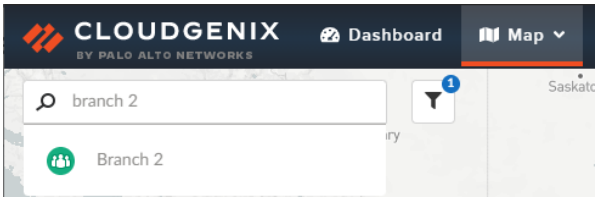


Step 2: Click on the filter icon. Expand **Types** and select **Branch**.



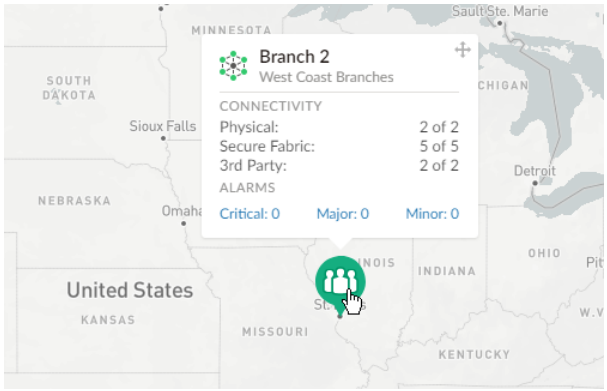
Only branch sites are shown.

Step 3: In the **Search site name or address** box, type ***branch 2***.



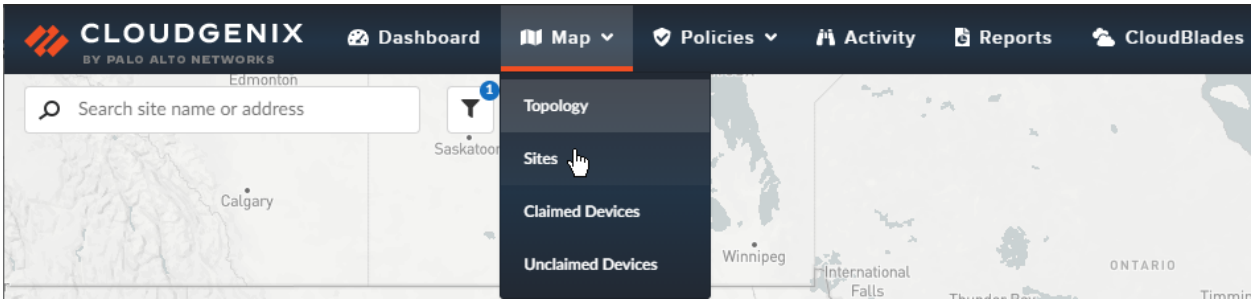
Select **Branch 2**.

Branch 2 is centered on the map.

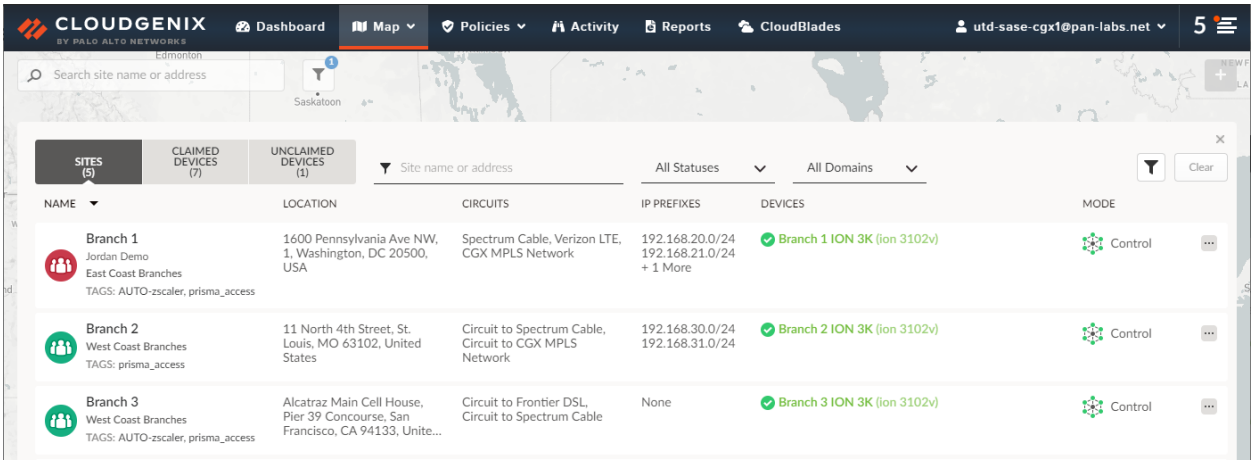


Task 2 – Site Review

Step 1: Click on **Map** and then select **Sites**.



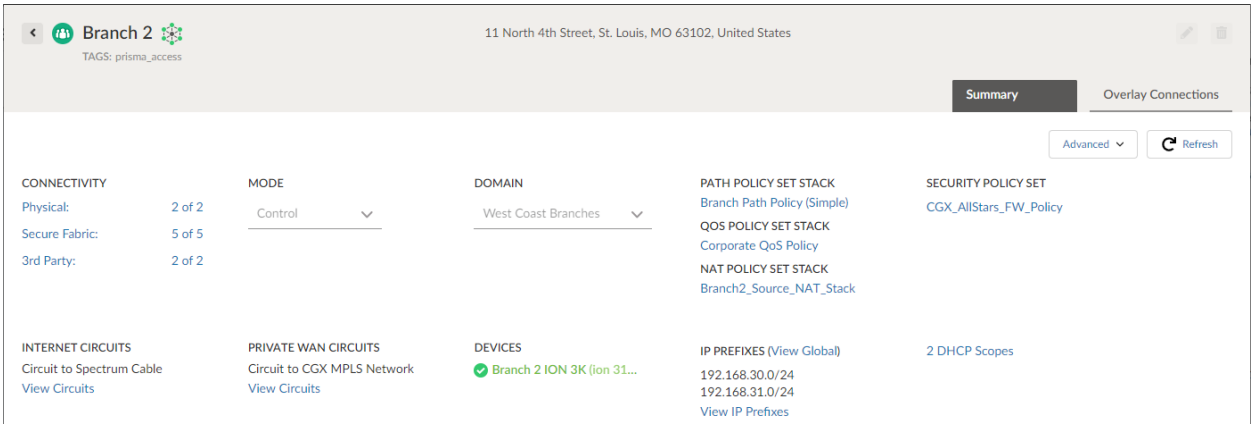
A list of sites is displayed.



You can search for sites by name or address as well as filter the list of sites using multiple criteria.

Step 2: Click on **Branch 2**.

The site overview panel will be displayed.



This panel provides a single point to configure and manage the branch, including:

Connectivity

- **Physical** - The state of the Internet and Private WAN connections.
- **Secure Fabric** - State and configuration of the CloudGenix VPNs between sites.
- **3rd Party** - The state of the traditional IPSEC Tunnels used to connect to services such as Prisma Access for Remote Networks.

Alarms

- A list of all standing alarms organized by alarm severity.
- If alarms are present, they can be clicked, and additional details viewed with the events widget.

Circuits

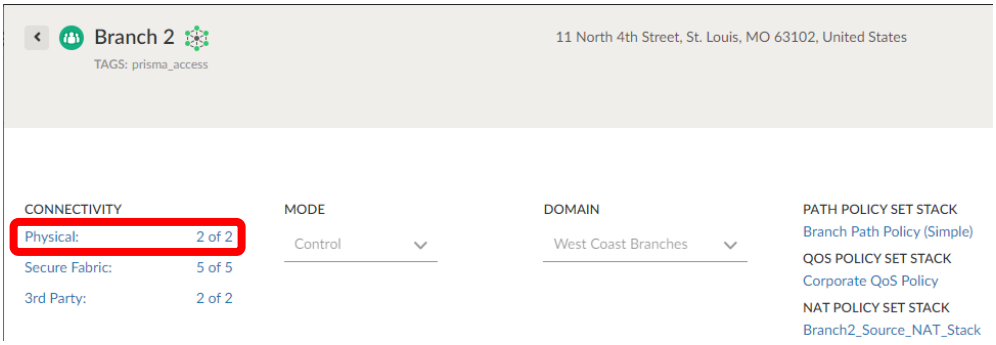
- Internet - Site-level configuration information for public internet circuits.
- Private WAN - Site-level configuration information for private circuits including MPLS and P2P links.

Devices - List of devices assigned to the site.

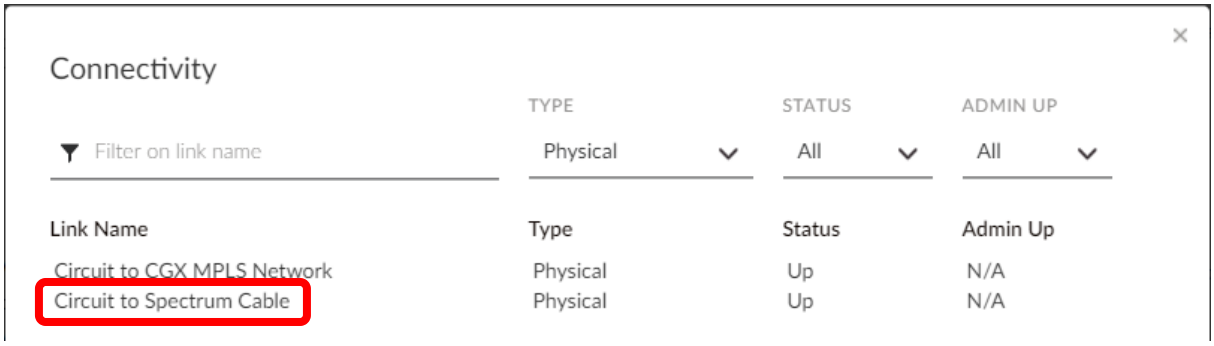
Task 3 – Physical Connectivity

Each CloudGenix site is connected by one or more physical connections.

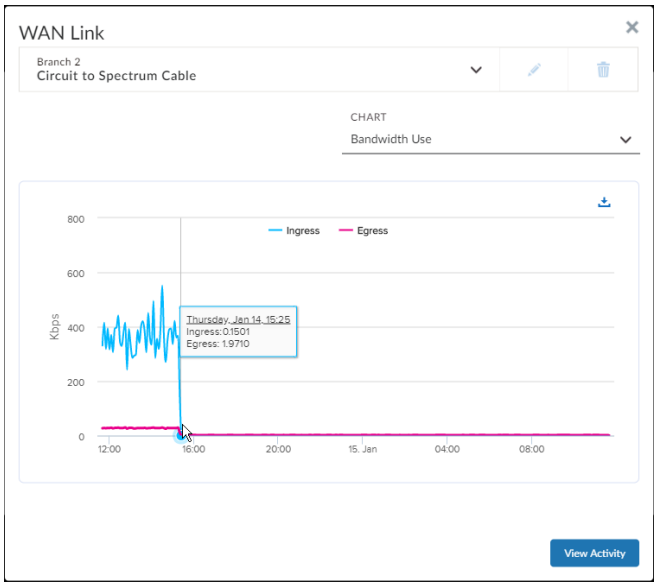
Step 1: To view the physical connection, click on **Physical**.



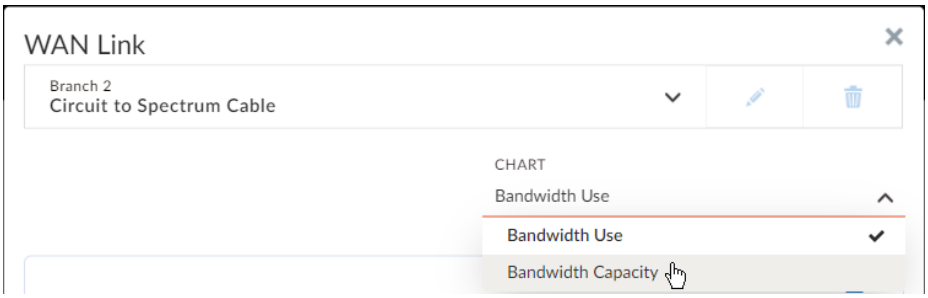
Step 2: Click on **Circuit to Spectrum Cable**.



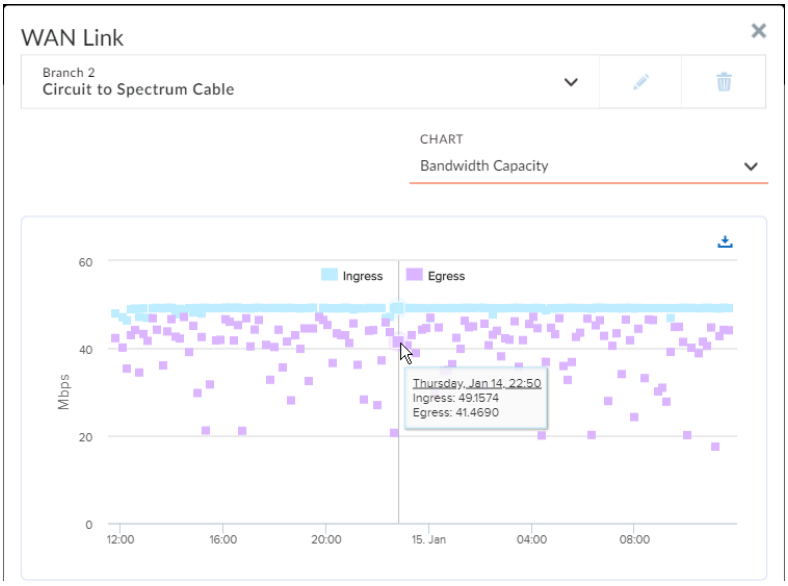
The **ingress** and **egress** underlay utilization of the Spectrum Cable connection will be displayed:



Step 3: To view the measured bandwidth, click the drop-down for **Chart** and select **Bandwidth Capacity**.



The Prisma SD-WAN system performs automatic carrier bandwidth capacity measurements. This is done in a manner that does not affect performance of the connection by using a custom algorithm. The system provides a view of throughput over time on a per connection basis which can be utilized to hold your carrier accountable.



Step 4: Click on the ✕ in the top right-hand corner of the **WAN Link** view to return to the **Connectivity** view.

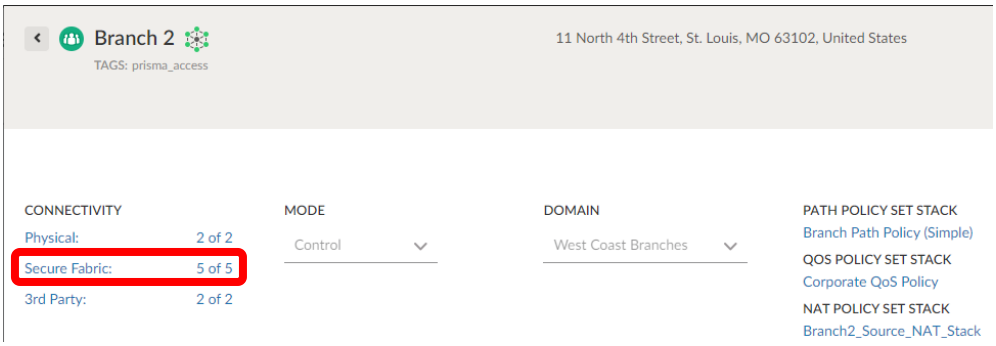
Click on the ✕ in the top right-hand corner of the **Connectivity** view to return to the **Site Overview** panel.

Task 4 – Secure Fabric

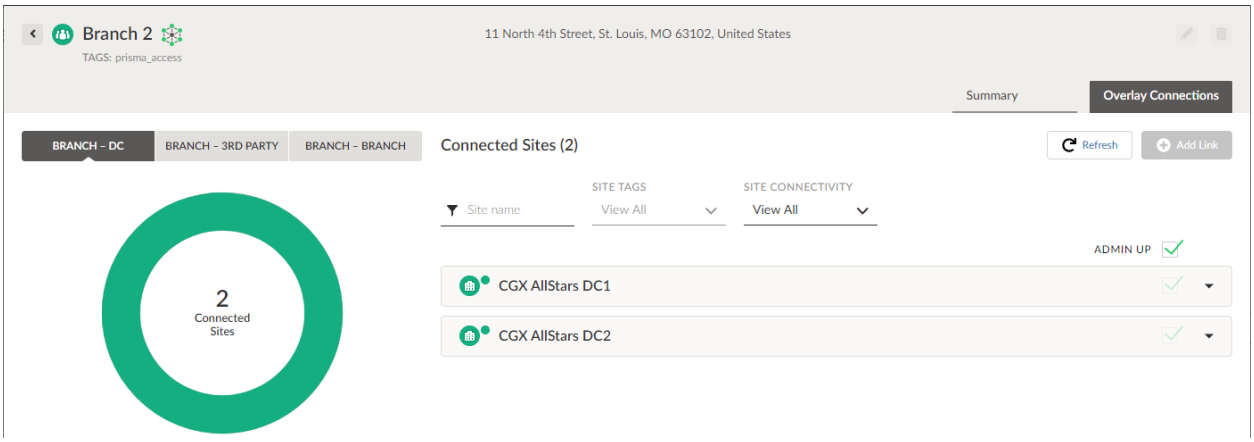
The Secure Fabric is the collection of VPNs between CloudGenix sites and services such as Prisma Access for Remote Networks.

The fabric supports multiple topologies including hub and spoke (default), partial mesh, and full mesh.

Step 1: To view the secure fabric links, click on **Secure Fabric**.



The **Secure Fabric Management** is displayed.



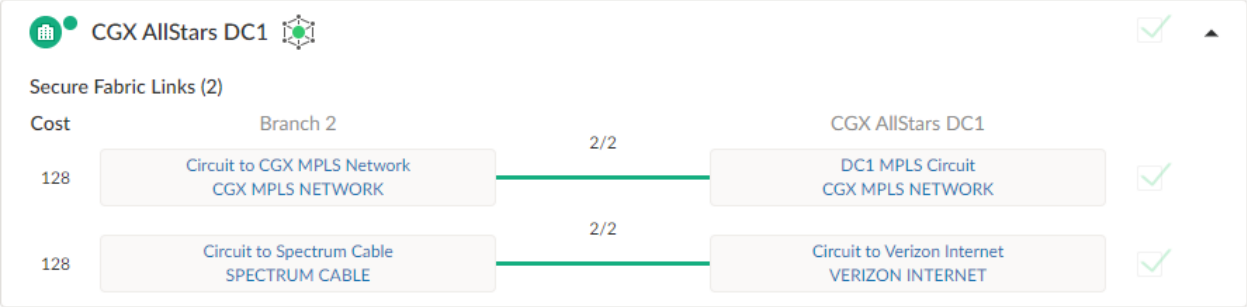
Connectivity is organized into 3 tabs:

- **Branch to DC** - Tunnels to CloudGenix hub locations.
- **Branch to Branch** - Tunnels from one CloudGenix branch to another CloudGenix branch.
- **Branch to 3rd Party** - IPSEC Tunnels connecting to services such as Prisma Access.

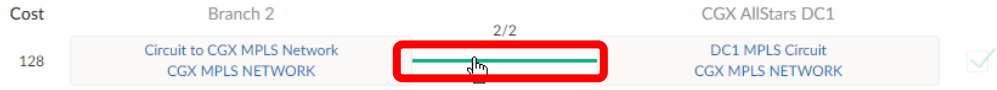
Each tab will:

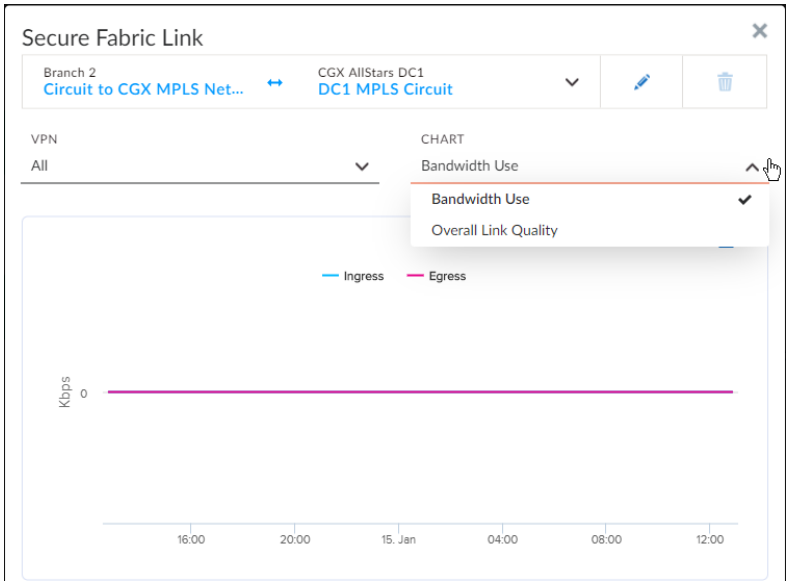
- Detail the state of the tunnels.
- Allow an administrator to build new tunnels (Branch to Branch only).
- Allow an administrator to control the admin state (Up / Down) of a tunnel.
- View additional information about the tunnel such as:
    - Bandwidth Use
    - Link Quality

Step 2: Click on **CGX AllStars DC1** to view additional tunnel information.



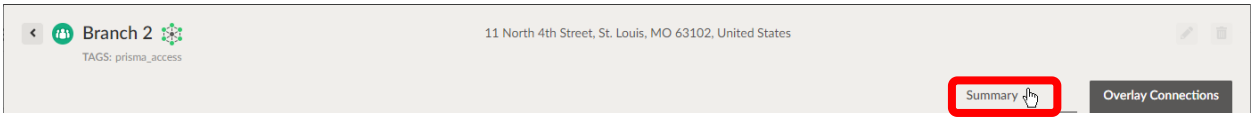
Click on the first green line to view **Bandwidth Use** and **Overall Link Quality**.





Step 3: **:** Click on the ✕ in the top right-hand corner of the **Secure Fabric Link** view.

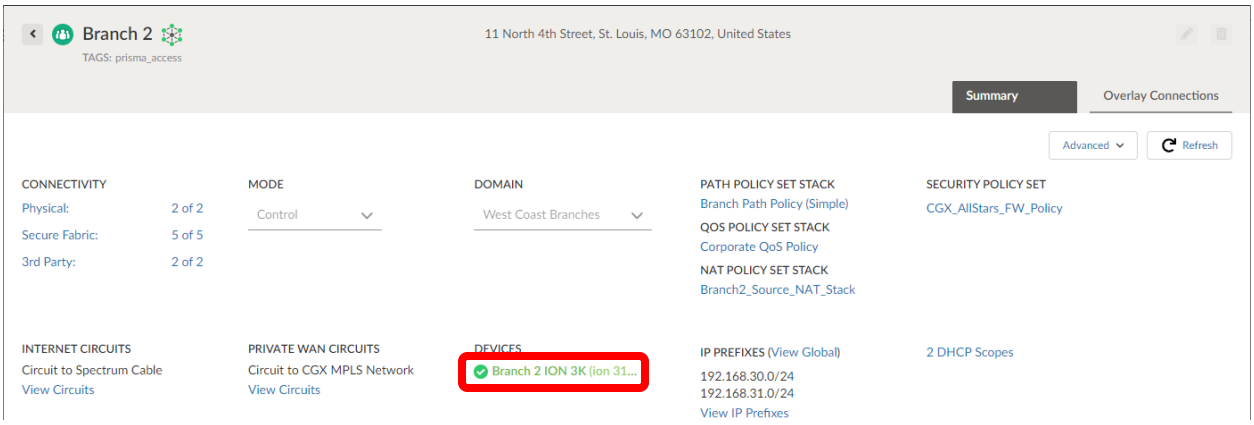
Click the **Summary** tab.



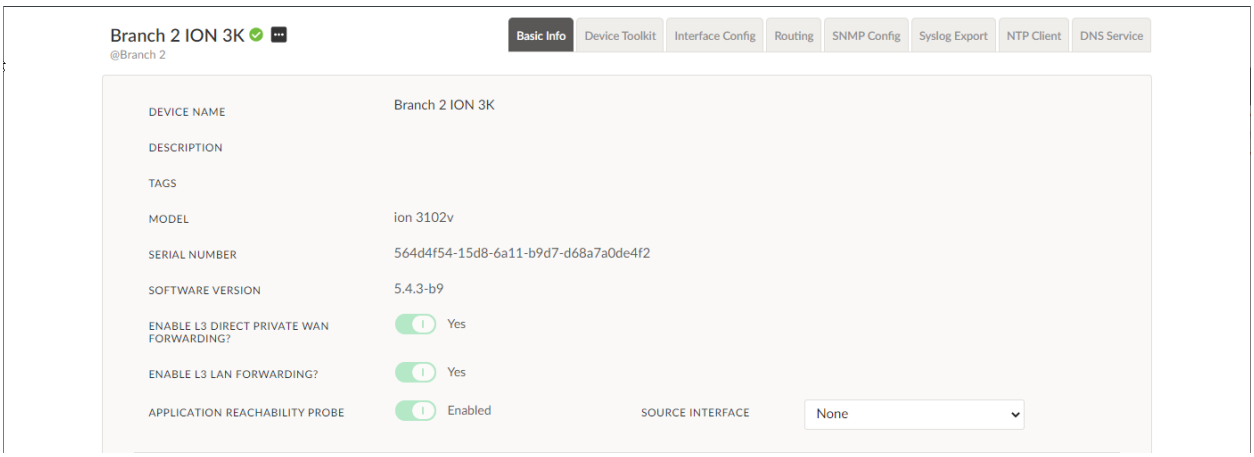
Task 5 – Devices

The physical or virtual devices are called IONs - **I**nstant **O**n **N**etworks.

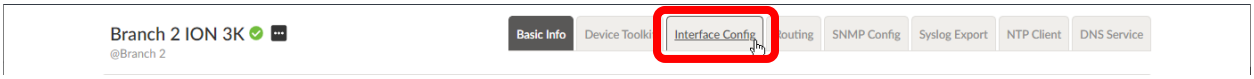
Step 1: To view the **Device** configuration, click on **Branch 2 ION 3K**.



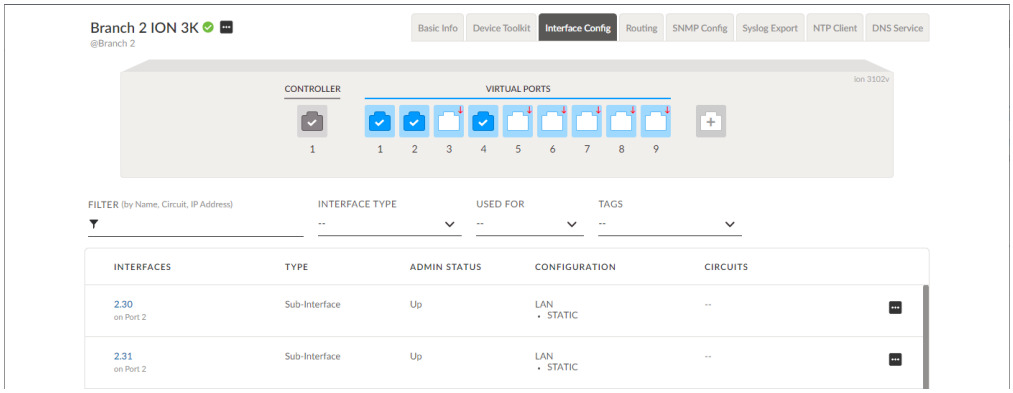
The **Basic Info** is displayed for this ION device.



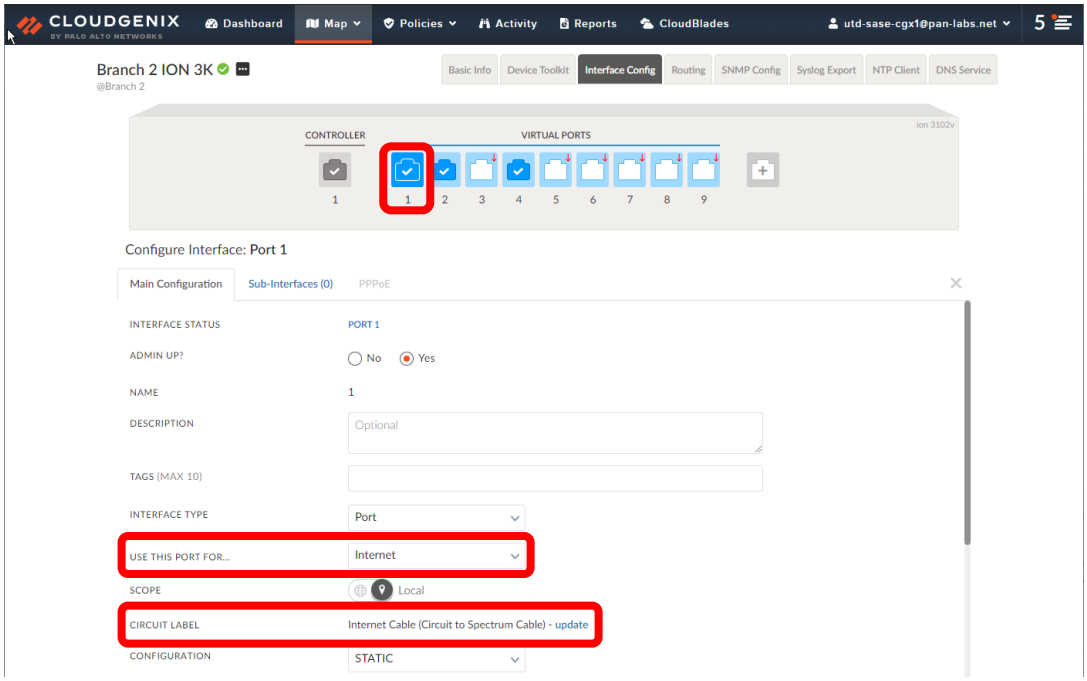
Step 2: Click on the **Interface Config** tab.



Interfaces are displayed in a visual and list format.



Step 3: Click on **Port 1**.



Note that the interface is used for Internet and there is an internet circuit label attached. When this is set, the system automatically configures many parameters, including:

- Firewall rules are configured to only allow IPSEC and ESP inbound from the internet to the device.
- A NAT boundary is defined and any traffic that is configured (via policy) to go direct on the internet will be automatically NATd to the interface IP address.
- CloudGenix VPN tunnels are automatically established to all hub nodes.

There are many more configuration options available including SNMP, Routing, Syslog, NTP, etc.

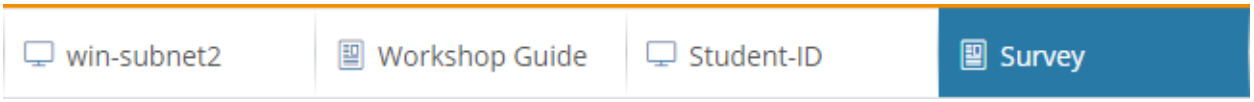
End of Activity 10

Activity 11 - Feedback on Ultimate Test Drive

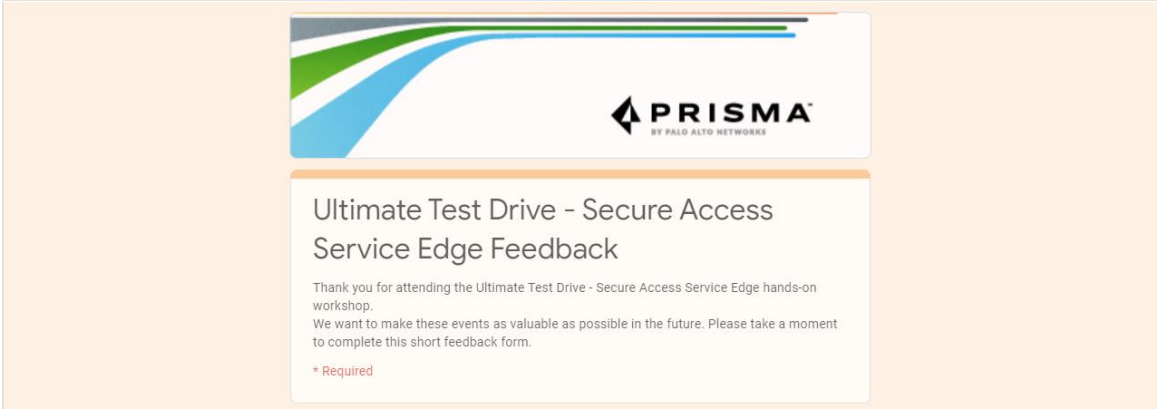
Thank you for attending the Ultimate Test Drive workshop. We hope you enjoyed the presentation and the labs that we have prepared for you. Please take a few minutes to complete the online survey form to tell us what you think.

Task 1 – Take the online survey

Step 1: In your lab environment, click the **Survey** tab.



Step 2: Please complete the survey and let us know what you think about this workshop.



End of Activity 11.

Appendix-1: Network Diagram

LAB SETUP