



SECURITY OPERATIONS FUNDAMENTALS V2

Lab 5: Stopping Reconnaissance Attacks

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Introduction

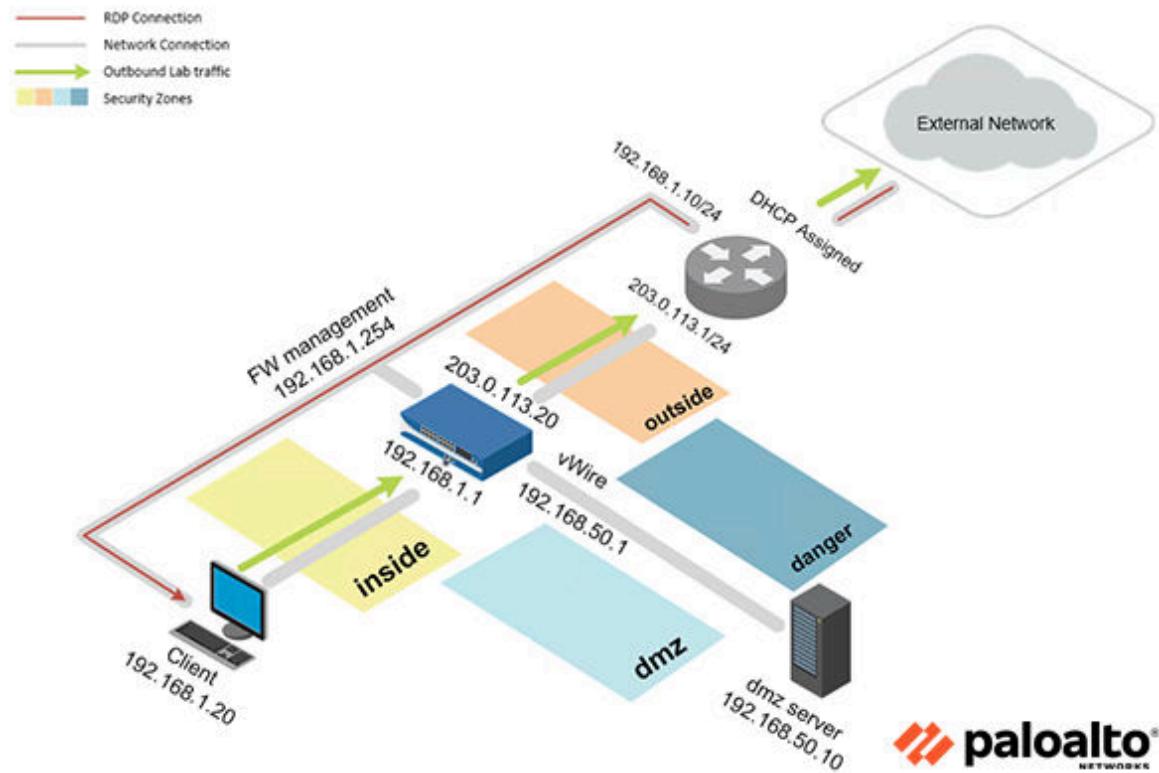
In this lab, you will utilize Zone Protection profiles to provide additional protection for specific network zones to protect the zones from attack. You will use *Nmap* on the client machine to perform a reconnaissance attack. This will test the Zone Protection Profiles of the Palo Alto Networks Firewalls.

Objective

In this lab, you will perform the following tasks:

- Create a Zone Protection Profile
- Apply the Zone Protection Profile to Zones and Commit
- Perform a Reconnaissance Attack on the DMZ Server
- Monitor and Analyze the Threat Logs

Lab Topology



Lab Settings

The information in the table below will be needed in order to complete the lab. The task sections below provide details on the use of this information.

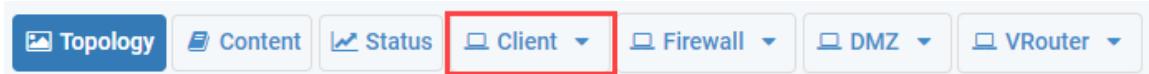
Virtual Machine	IP Address	Account (if needed)	Password (if needed)
Client	192.168.1.20	lab-user	Pal0Alt0!
DMZ	192.168.50.10	root	Pal0Alt0!
Firewall	192.168.1.254	admin	Pal0Alt0!

1 Stopping Reconnaissance Attacks

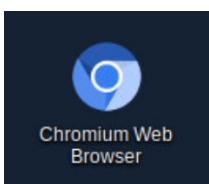
1.0 Load Lab Configuration

In this section, you will load the Firewall configuration file.

1. Click on the **Client** tab to access the client PC.



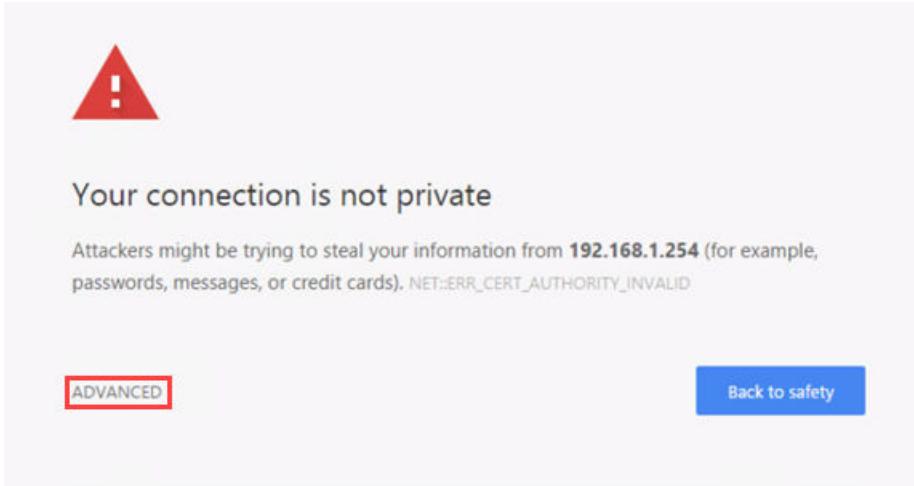
2. Log in to the client PC as username lab-user, password Pal0Alt0!.
3. Double-click the **Chromium Web Browser** icon located on the desktop.



4. In the *Chromium address* field, type `https://192.168.1.254` and press **Enter**.

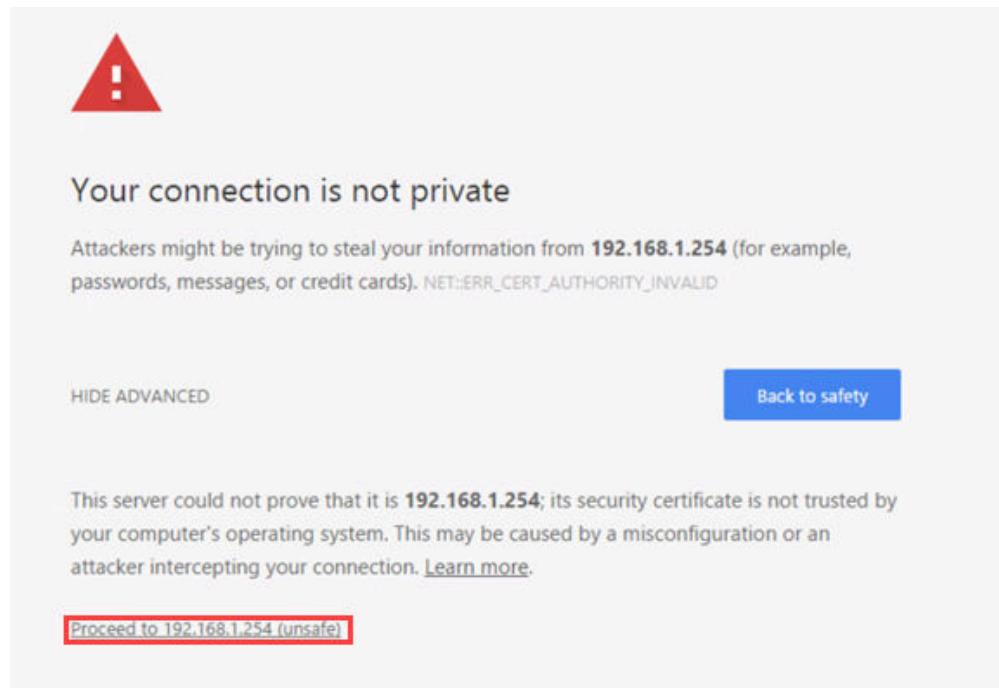


5. You will see a “*Your connection is not private*” message. Click on the **ADVANCED** link.



If you encounter the “*Unable to connect*” or “*502 Bad Gateway*” message while attempting to connect to the IP specified above, please wait an additional 1-3 minutes for the Firewall to fully initialize. Refresh the page to continue.

6. Click on **Proceed to 192.168.1.254 (unsafe)**.



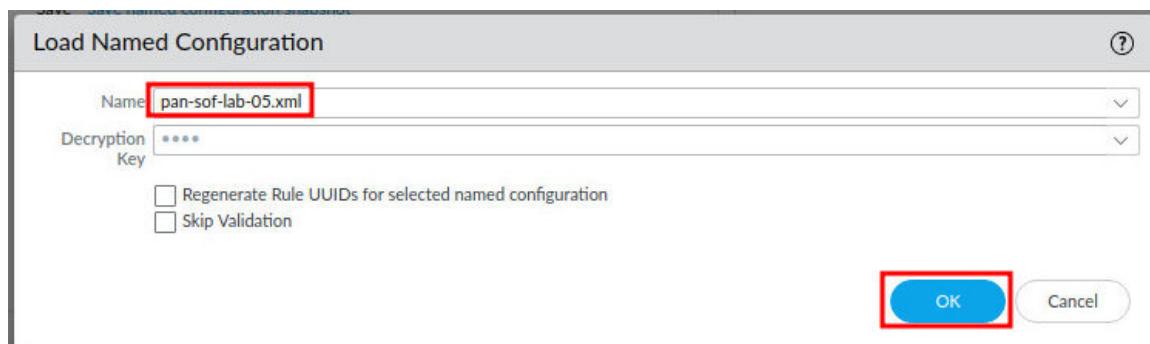
7. Log in to the Firewall web interface with username **admin**, password **PaloAlt0!**.



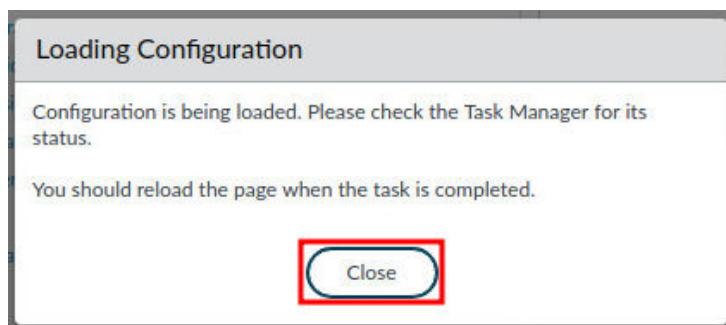
8. In the web interface, navigate to **Device > Setup > Operations** and click on **Load named configuration snapshot** underneath the *Configuration Management* section.

The screenshot shows the PA-VM web interface. The top navigation bar includes links for DASHBOARD, ACC, MONITOR, POLICIES, OBJECTS, NETWORK, and DEVICE. The DEVICE tab is selected. On the left, a sidebar menu under the 'Setup' heading lists various configuration options like High Availability, Config Audit, and Certificate Management. The main content area is titled 'Configuration Management' and contains several sub-options: Revert, Save, Load, Export, and Import. The 'Load' option, which is 'Load named configuration snapshot', is highlighted with a red box. To the right, there are sections for 'Device Operations' (Reboot Device, Shutdown) and 'Miscellaneous' (Custom Log, SNMP Set).

9. In the *Load Named Configuration* window, select **pan-sof-lab-05.xml** from the **Name** dropdown box and click **OK**.



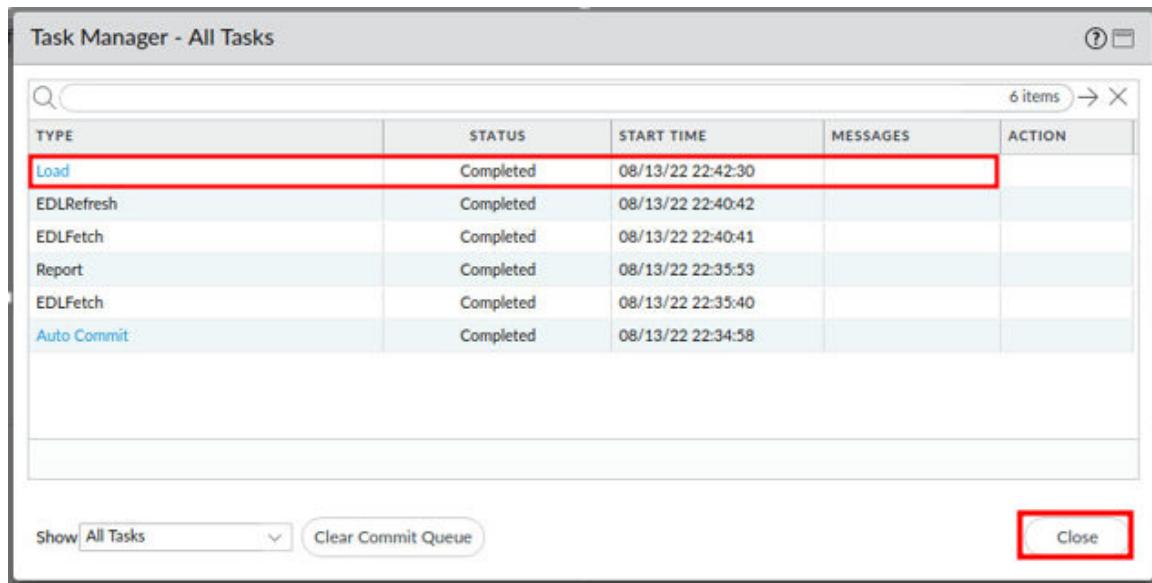
10. In the *Loading Configuration* window, a message will say *Configuration is being loaded. Please check the Task Manager for its status. You should reload the page when the task is completed.* Click **Close** to continue.



11. Click the **Tasks** icon located at the bottom-right of the web interface.

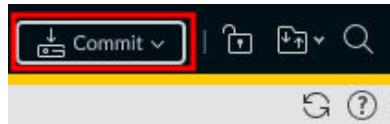


12. In the *Task Manager – All Tasks* window, verify the *Load* type has successfully completed. Click **Close**.

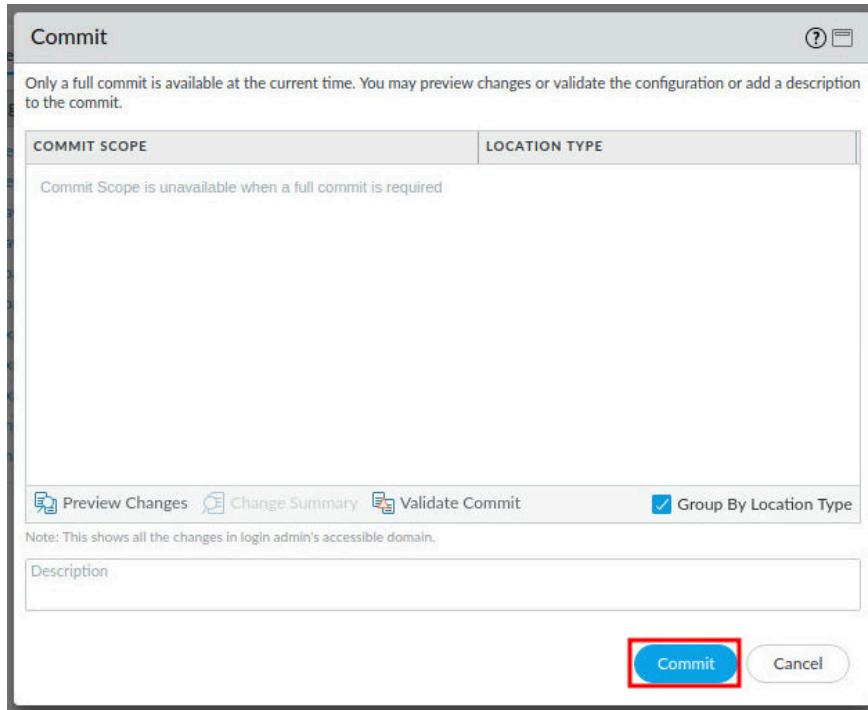


TYPE	STATUS	START TIME	MESSAGES	ACTION
Load	Completed	08/13/22 22:42:30		
EDLRefresh	Completed	08/13/22 22:40:42		
EDLFetch	Completed	08/13/22 22:40:41		
Report	Completed	08/13/22 22:35:53		
EDLFetch	Completed	08/13/22 22:35:40		
Auto Commit	Completed	08/13/22 22:34:58		

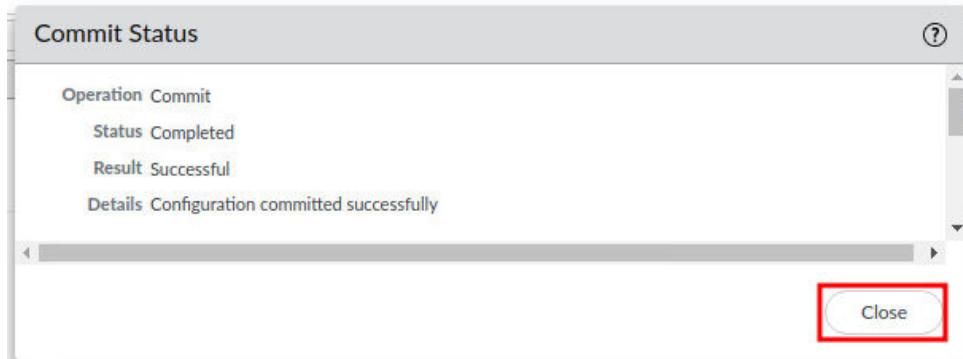
13. Click the **Commit** link located at the top-right of the web interface.



14. In the **Commit** window, click **Commit** to proceed with committing the changes.



15. When the commit operation successfully completes, click **Close** to continue.

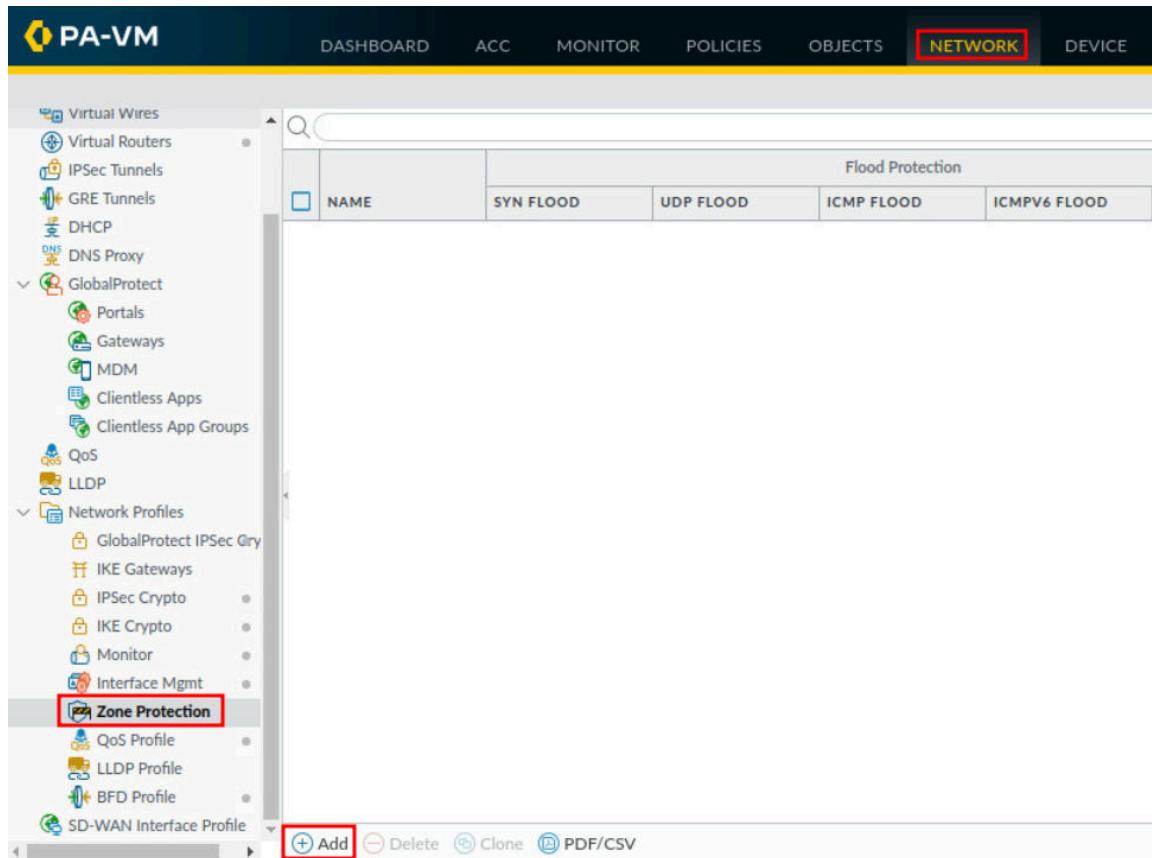


The commit process takes changes made to the Firewall and copies them to the running configuration, which will activate all configuration changes since the last commit.

1.1 Create a Zone Protection Profile

In this section, you will create a Zone Protection Profile. Zone Protection Profiles supplement additional protection between determined zones to protect the zones against attacks.

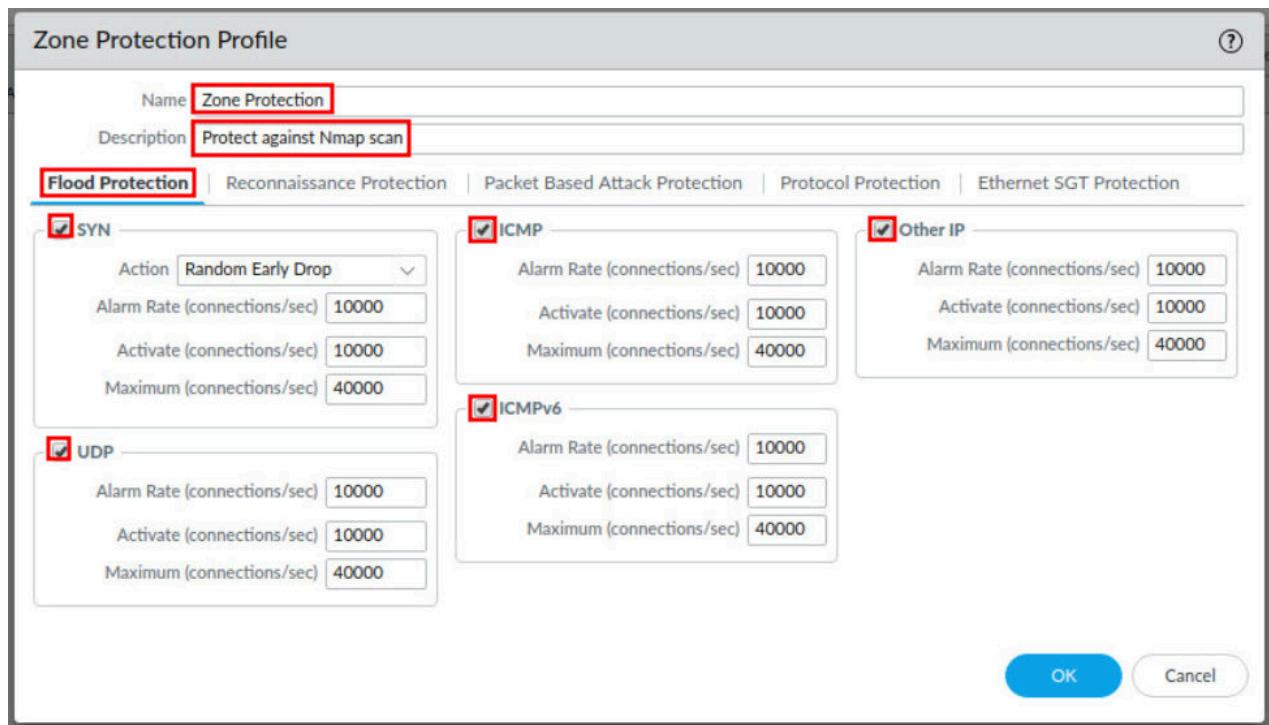
1. Navigate to **Network > Network Profiles > Zone Protection > Add**.



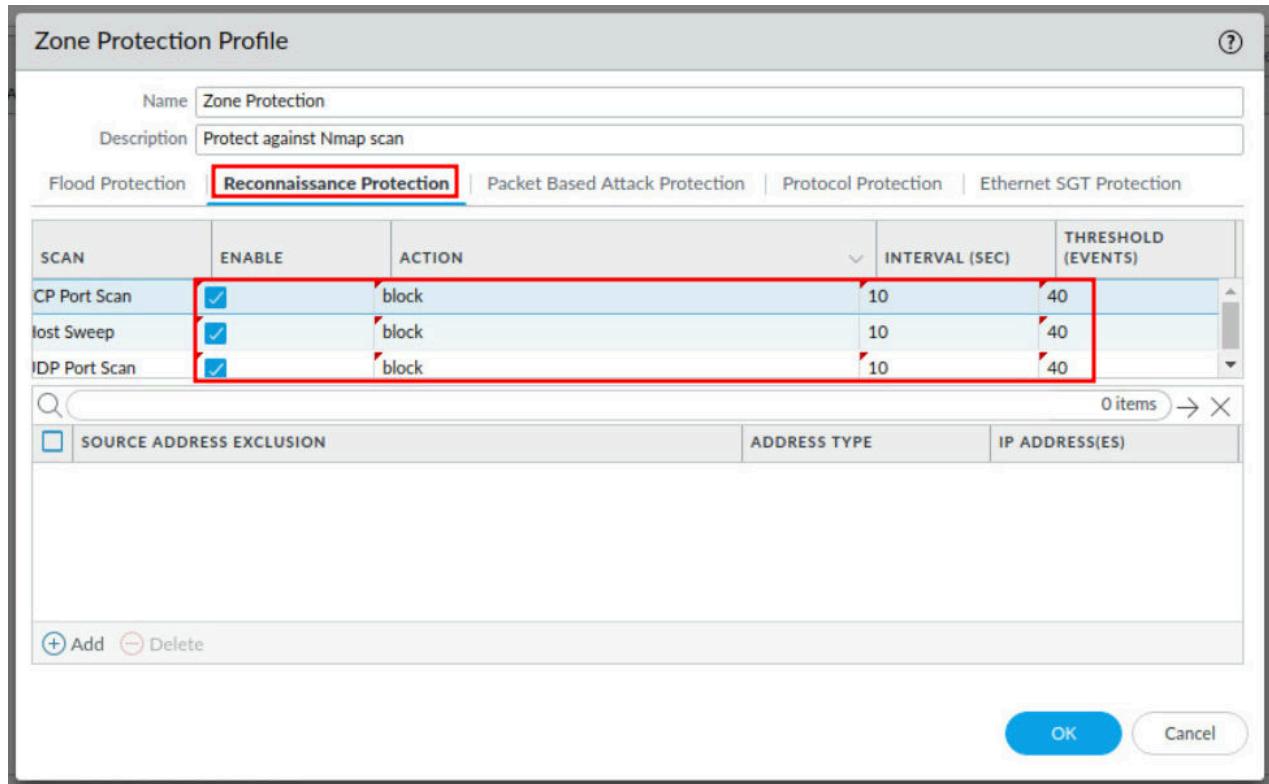
The screenshot shows the PA-VM interface with the following details:

- Top Navigation Bar:** DASHBOARD, ACC, MONITOR, POLICIES, OBJECTS, NETWORK (highlighted in red), DEVICE.
- Left Sidebar:** Virtual Wires, Virtual Routers, IPSec Tunnels, GRE Tunnels, DHCP, DNS Proxy, GlobalProtect (expanded), Portals, Gateways, MDM, Clientless Apps, Clientless App Groups, QoS, LLDP, Network Profiles (expanded), GlobalProtect IPSec Gtry, IKE Gateways, IPSec Crypto, IKE Crypto, Monitor, Interface Mgmt, Zone Protection (highlighted in red), QoS Profile, LLDP Profile, BFD Profile, SD-WAN Interface Profile.
- Central Content Area:** A table titled "Flood Protection" with columns: NAME, SYN FLOOD, UDP FLOOD, ICMP FLOOD, ICMPV6 FLOOD. There are no rows in the table.
- Bottom Action Bar:** + Add, Delete, Clone, PDF/CSV.

2. In the *Flood Protection* tab of the *Zone Protection Profile* window, type **Zone Protection** for the *Name* field. Then, type **Protect against Nmap scan** in the *Description* field. Next, click the checkboxes for **SYN**, **ICMP**, **Other IP**, **UDP**, and **ICMPv6**.

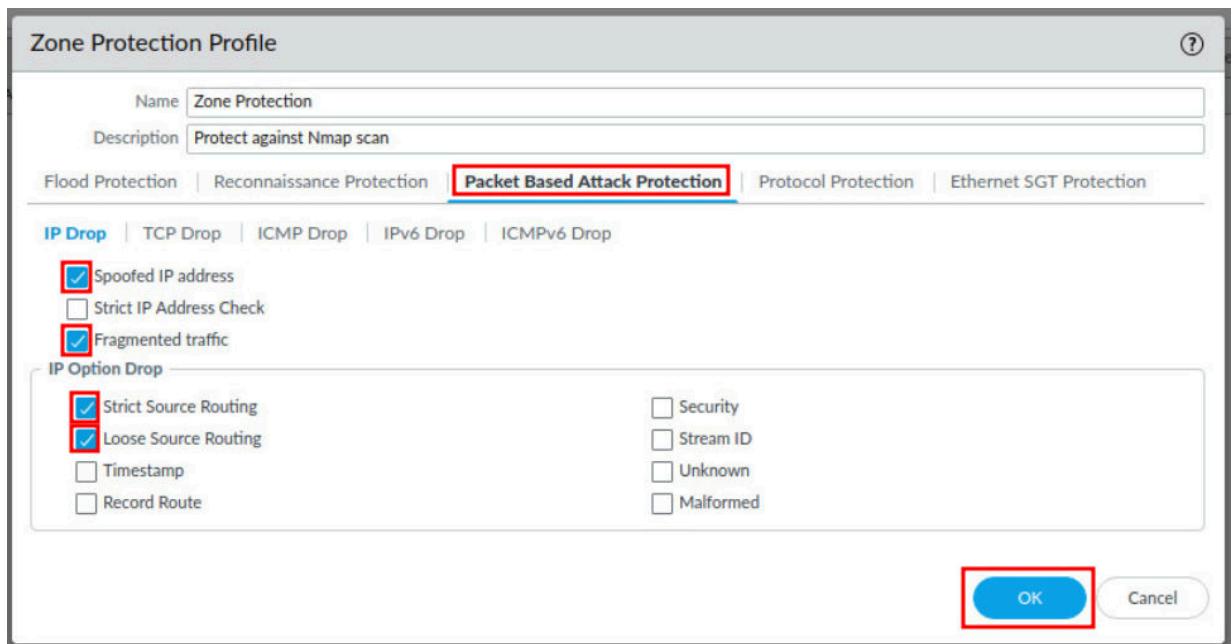


3. In the **Zone Protection Profile** window, click on the **Reconnaissance Protection** tab. Then, click the **Enable** checkboxes for **TCP Port Scan**, **Host Sweep**, and **UDP Port Scan**. Next, select **Block** for the **Action** column for all scans. Then, type **10** for the **Interval (sec)** column for all scans. Finally, type **40** for the **Threshold (events)** column for all scans.



SCAN	ENABLE	ACTION	INTERVAL (SEC)	THRESHOLD (EVENTS)
TCP Port Scan	<input checked="" type="checkbox"/>	block	10	40
Host Sweep	<input checked="" type="checkbox"/>	block	10	40
UDP Port Scan	<input checked="" type="checkbox"/>	block	10	40

4. In the **Zone Protection Profile** window, click on the **Packet Based Attack Protection** tab. Then, click the checkboxes for **Spoofed IP address**, **Fragmented traffic**, **Strict Source Routing**, and **Loose Source Routing**. Next, click the **OK** button.



5. Verify that your **Zone Protection Profile** is configured as shown.

	NAME	Flood Protection					Reconnaissance Protection		
		SYN FLOOD	UDP FLOOD	ICMP FLOOD	ICMPV6 FLOOD	OTHER IP FLOOD	TCP PORT SCAN	UDP PORT SCAN	HOST SWEEP
	<input checked="" type="checkbox"/> Zone Protection	<input checked="" type="checkbox"/>	block	block	block				

1.2 Apply the Zone Protection Profile to Zones and Commit

In this section, you will apply the Zone Protection Profile you created to the **inside**, **outside**, and **dmz** security zones. This will help control against network floods, reconnaissance, and other packet-based related attacks. Then, you will commit your changes to the Firewall.

1. Navigate to **Network > Zones**. Click on the **inside** zone.

NAME	TYPE	INTERFACES / VIRTUAL SYSTEMS	ZONE PROTECTION PROFILE	PACKET BUFFER PROTECTION	LOG SETTING	ENABLED
dmz	layer3	ethernet1/3		<input checked="" type="checkbox"/>		<input type="checkbox"/>
inside	layer3	ethernet1/2		<input checked="" type="checkbox"/>		<input type="checkbox"/>
outside	layer3	ethernet1/1		<input checked="" type="checkbox"/>		<input type="checkbox"/>

2. In the **Zone** window, select **Zone Protection** in the **Zone Protection Profile** field. Then, click the **OK** button.

Name: inside

Type: Layer3

INTERFACES: ethernet1/2

Zone Protection: Zone Protection

Enable Packet Buffer Protection:

User Identification ACL:

- Enable User Identification
- INCLUDE LIST

Select an address or address group or type in your own address. Ex: 192.168.1.20 or 192.168.1.0/24

Device-ID ACL:

- Enable Device Identification
- INCLUDE LIST

Select an address or address group or type in your own address. Ex: 192.168.1.20 or 192.168.1.0/24

Zone Protection:

Zone Protection Profile: Zone Protection

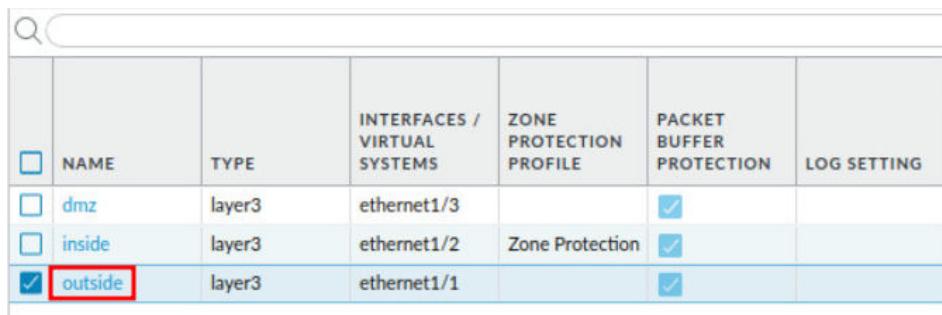
Enable Packet Buffer Protection:

EXCLUDE LIST:

Select an address or address group or type in your own address. Ex: 192.168.1.20 or 192.168.1.0/24

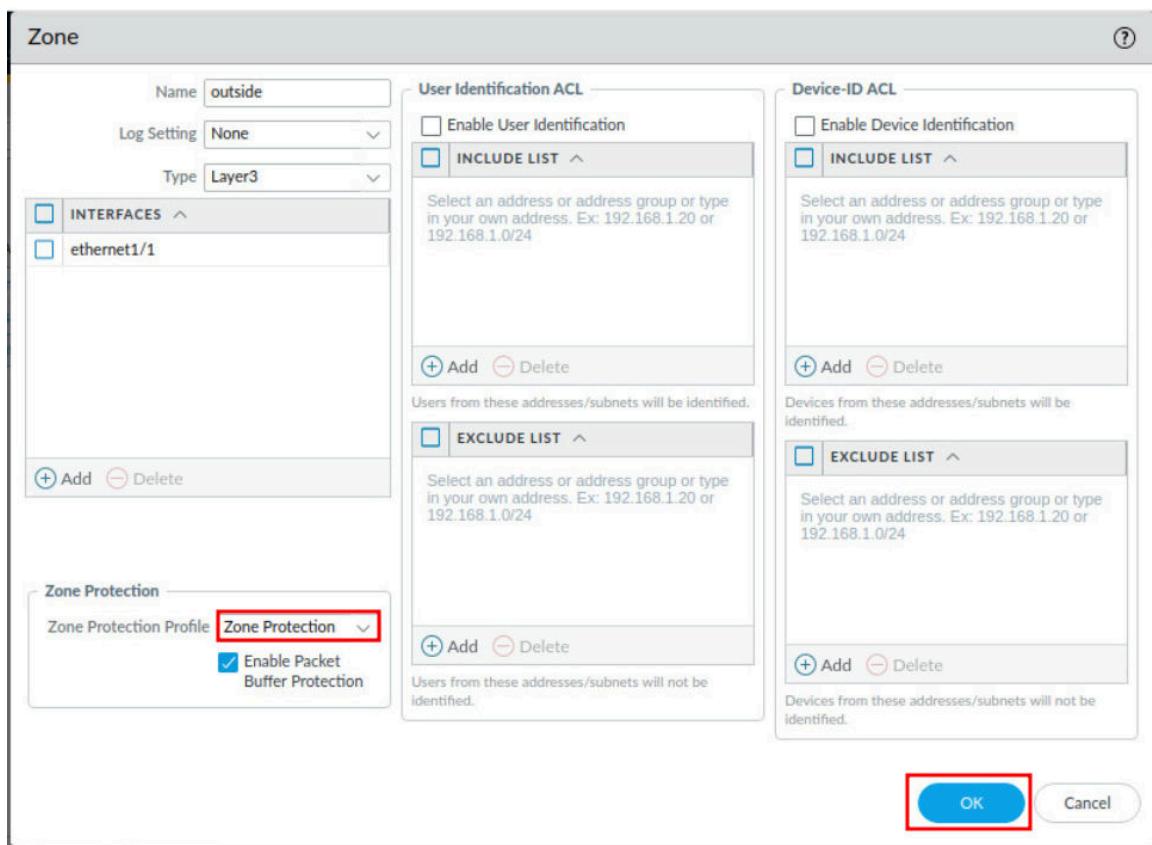
OK

3. Click on the **outside** zone.



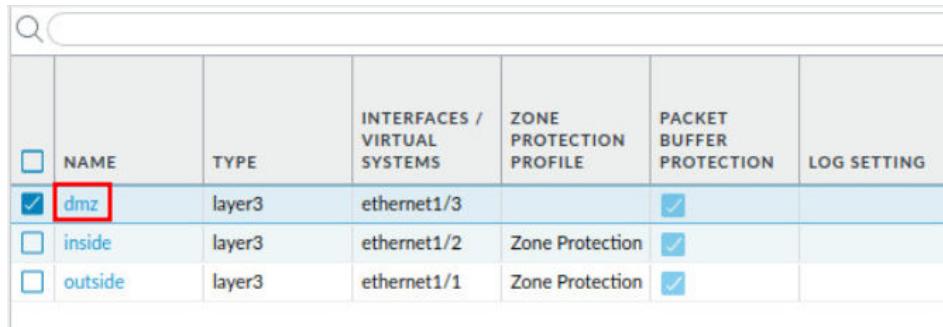
<input type="checkbox"/> NAME	TYPE	INTERFACES / VIRTUAL SYSTEMS	ZONE PROTECTION PROFILE	PACKET BUFFER PROTECTION	LOG SETTING
<input type="checkbox"/> dmz	layer3	ethernet1/3		<input checked="" type="checkbox"/>	
<input type="checkbox"/> inside	layer3	ethernet1/2	Zone Protection	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/> outside	layer3	ethernet1/1		<input checked="" type="checkbox"/>	

4. In the Zone window, select **Zone Protection** in the **Zone Protection Profile** field. Then, click the **OK** button.



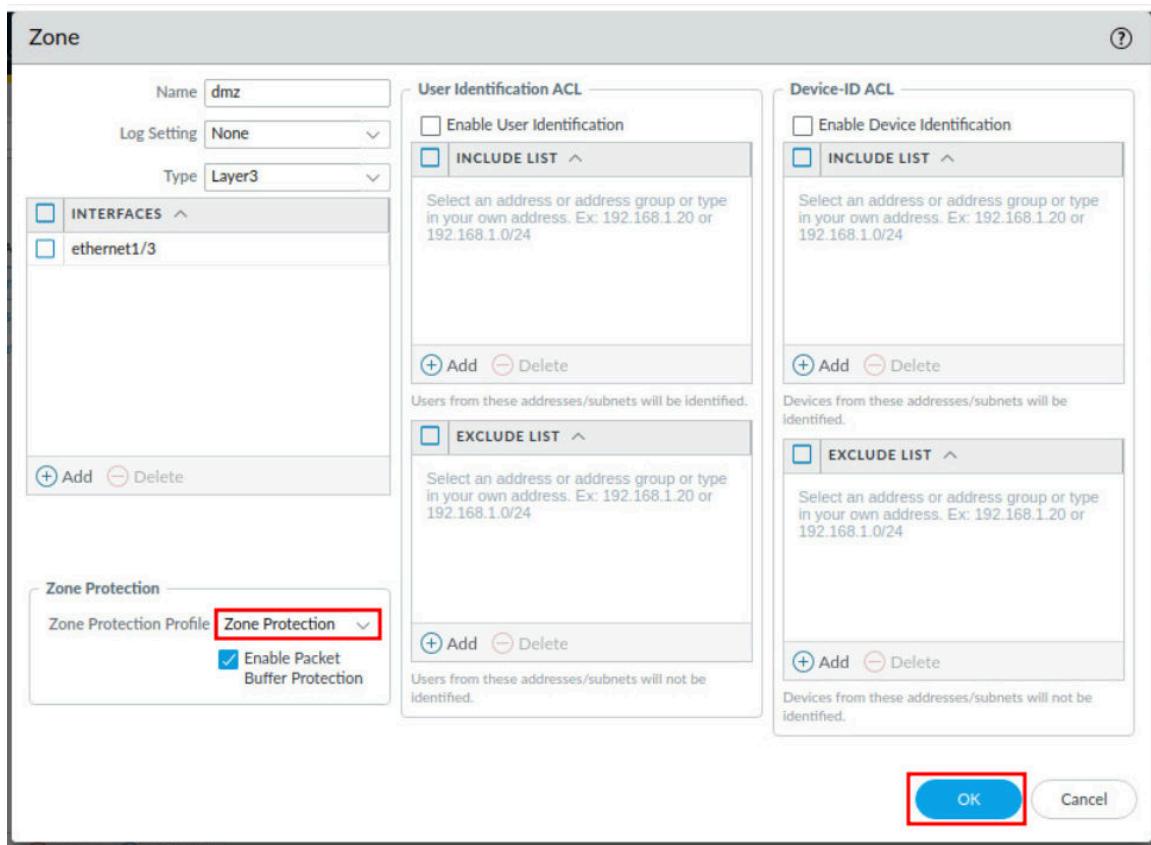
The screenshot shows the 'Zone' configuration window. The 'Name' field is set to 'outside'. Under 'INTERFACES', 'ethernet1/1' is selected. In the 'Zone Protection' section, the 'Zone Protection Profile' dropdown is set to 'Zone Protection' (highlighted with a red box) and has a checked checkbox for 'Enable Packet Buffer Protection'. The 'OK' button at the bottom right is also highlighted with a red box.

5. Click on the **dmz** zone.



	NAME	TYPE	INTERFACES / VIRTUAL SYSTEMS	ZONE PROTECTION PROFILE	PACKET BUFFER PROTECTION	LOG SETTING
<input type="checkbox"/>	dmz	layer3	ethernet1/3		<input checked="" type="checkbox"/>	
<input type="checkbox"/>	inside	layer3	ethernet1/2	Zone Protection	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	outside	layer3	ethernet1/1	Zone Protection	<input checked="" type="checkbox"/>	

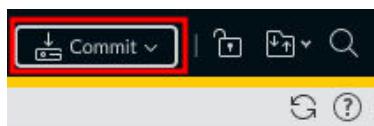
6. In the **Zone** window, select **Zone Protection** in the **Zone Protection Profile** field. Then, click the **OK** button.



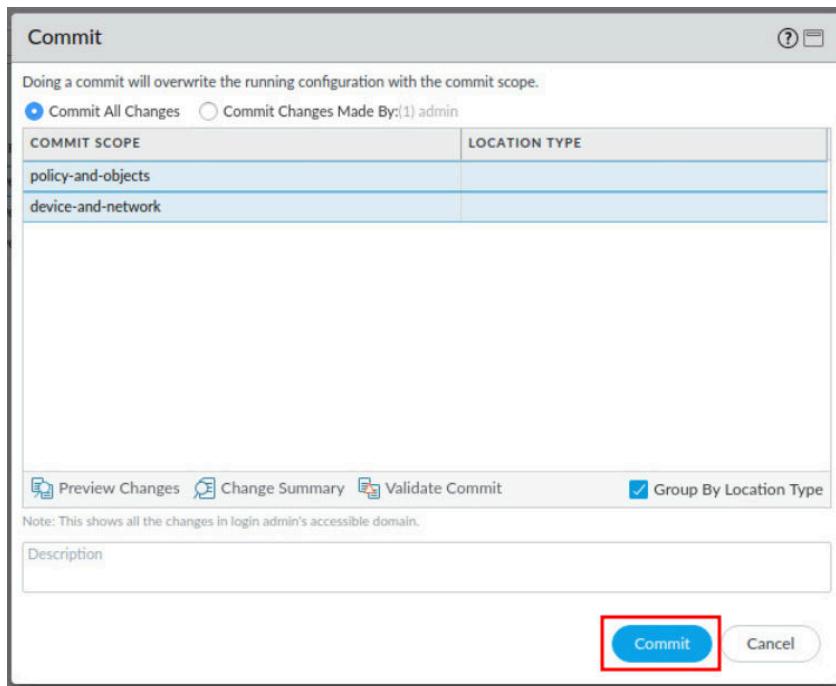
The dialog box shows the following settings:

- Name:** dmz
- Type:** Layer3
- INTERFACES:** ethernet1/3
- User Identification ACL:** Includes an **INCLUDE LIST** section with an 'Add' and 'Delete' button. It says: "Select an address or address group or type in your own address. Ex: 192.168.1.20 or 192.168.1.0/24".
- Device-ID ACL:** Includes an **INCLUDE LIST** section with an 'Add' and 'Delete' button. It says: "Select an address or address group or type in your own address. Ex: 192.168.1.20 or 192.168.1.0/24".
- Zone Protection:**
 - Zone Protection Profile:** Zone Protection (highlighted with a red box)
 - Enable Packet Buffer Protection:** Checked (highlighted with a red box)

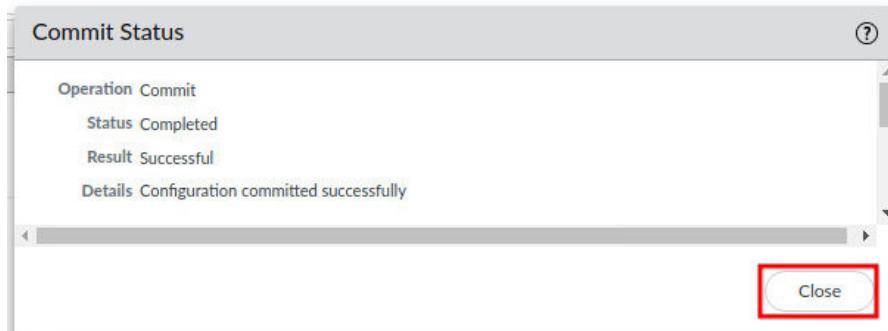
7. Click the **Commit** link located at the top-right of the web interface.



8. In the **Commit** window, click **Commit** to proceed with committing the changes.



9. When the commit operation successfully completes, click **Close** to continue.



10. Minimize Chromium in the upper-right corner.



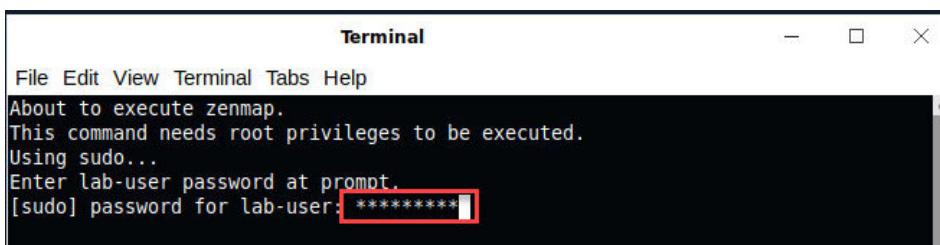
1.3 Perform a Reconnaissance Attack on the DMZ Server

In this section, you will use *Nmap* to perform a reconnaissance attack on the DMZ server. *Nmap* is used to scan networks as a host detection tool for penetration testing and to visualize network vulnerabilities.

1. Double-click the **Zenmap** icon located on the desktop.

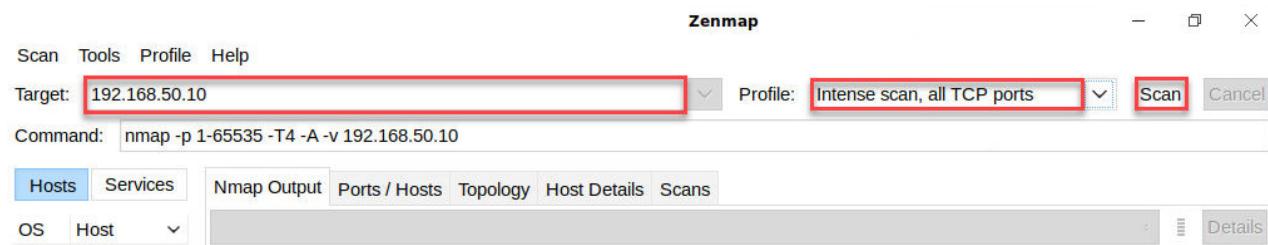


2. In the *Terminal* window, type `PaloAlt0!` for the password.



Zenmap adapts certain techniques to utilize the methods using the privilege level you are working in, that is, if you do not explicitly request something different.

3. In the *Zenmap* window, type `192.168.50.10` for the *Target* field. Then, select **Intense scan, all TCP ports** for the *Profile* field. Next, click the **Scan** button.



4. Minimize **Zenmap** in the upper-right corner.



1.4 Monitor and Analyze the Threat Logs

In this section, you will monitor and analyze the Threat Logs in the Palo Alto Networks Firewall.

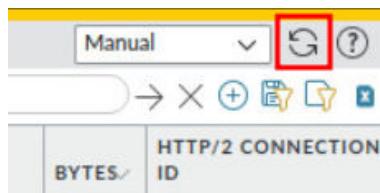
1. Click on **Chromium** on the taskbar to maximize.



2. Navigate to **Monitor > Logs > Threat**.

	RECEIVE TIME	TYPE	THREAT ID/NAME	FROM ZONE	TO ZONE	SOURCE ADDRESS
	09/25 22:52:52	scan	SCAN: TCP Port Scan	inside	dmz	192.168.1.20
	09/25 22:26:15	spyware	Suspicious TLS Evasion Found	inside	outside	192.168.1.20
	09/06 17:36:53	spyware	Suspicious TLS Evasion Found	inside	outside	192.168.1.20

3. Notice the *Type* is **scan**, and the *Name* is **SCAN: TCP Port Scan** from the **inside** zone to the **DMZ** zone. The attacker in this instance is **192.168.1.20**, which is the client machine, and the victim is **192.168.50.10**, which is the DMZ server. You may need to click the **Refresh** icon in the upper-right to see traffic as it flows. You may need to click **Refresh** multiple times for the logs to show.



After an administrator analyzes the logs present on the Firewall from the *Nmap* scan, the port scan activity is clearly visible. If this had been a malicious hacker scanning the network, the threat logs would have alerted the administrator. For the purposes of this lab, the security policy is set to allow all traffic. That security policy setting most likely would not be utilized in a production environment. If the security policy would have been set to deny traffic, an alert would have been triggered by the *Nmap* scan but the scan traffic would not have been allowed between the zones.

4. The lab is now complete; you may end the reservation.