PALO ALTO NETWORKS EDU 210

Lab 15: Implementing Day-One Best Practice Configuration

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Contents

Introduction

You intend to cut over, all production networks to use the Palo Alto Networks firewall this weekend during a maintenance window. Before the change, you want to implement as many of the best practices from Palo Alto Networks as you can before the firewall cut over. You realize that maintaining a secure network is a continuous process and that you will need to review logs, alerts, and reports each day to help you fine-tune the configuration.

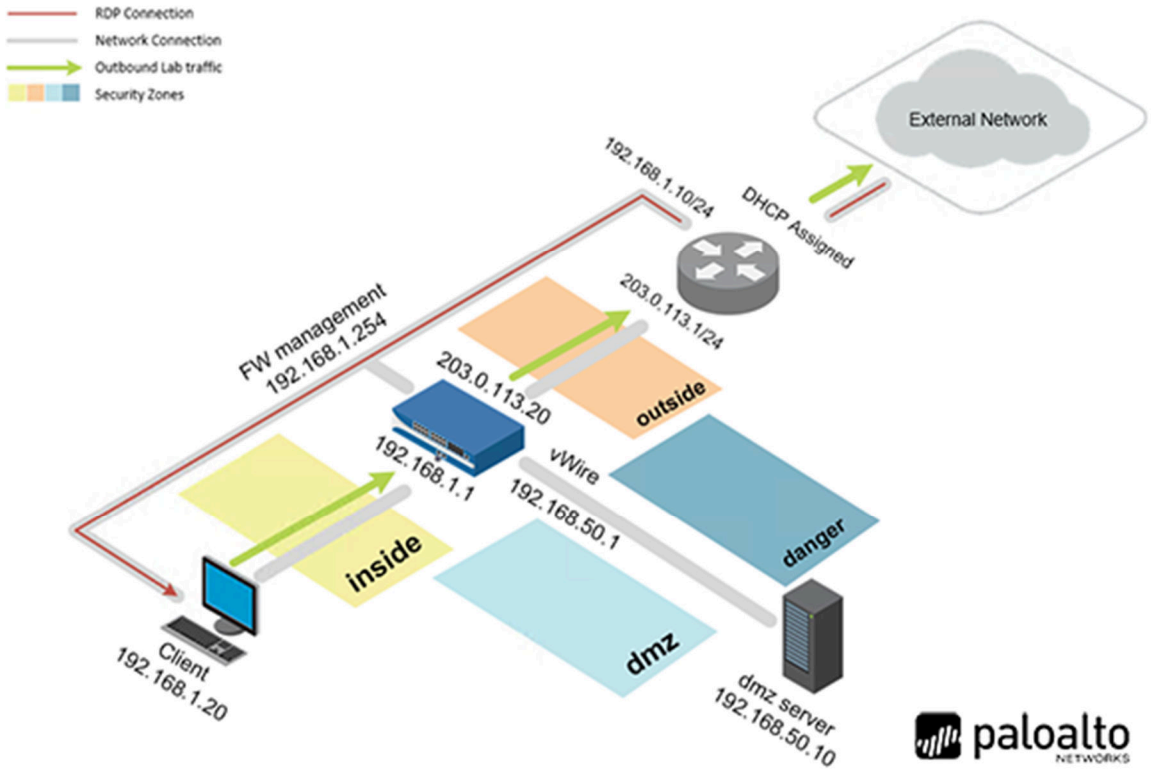
Nevertheless, there are several tasks that you can complete before the firewall goes into production so that you start with a solid, secure network.

Objective

In this lab, you will perform the following tasks:

- Load a baseline configuration
- Generate traffic without profiles and examine logs
- Create security profiles
- Create a security group
- Apply the security group to existing security policy rules
- Generate traffic with profiles and examine logs
- Create tags
- Enable policy rulebase settings and observe behavior

Lab Topology



Lab Settings

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

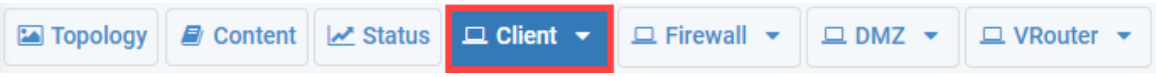
Virtual Machine	IP Address	Account (if needed)	Password (if needed)
Client	192.168.1.20	lab-user	**Pal0Alt0!**
DMZ	192.168.50.10	root	**Pal0Alt0!**
Firewall	192.168.1.254	admin	**Pal0Alt0!**
VRouter	192.168.1.10	root	**Pal0Alt0!**

1 Blocking Threats in Encrypted Traffic

1.1 Apply a Baseline Configuration to the Firewall

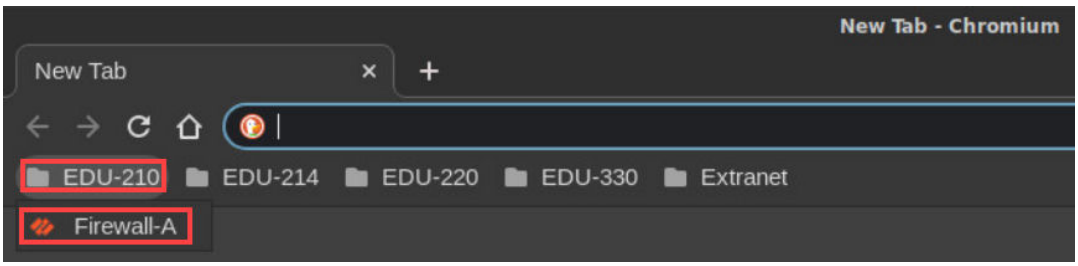
In this section, you will load the firewall configuration file.

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

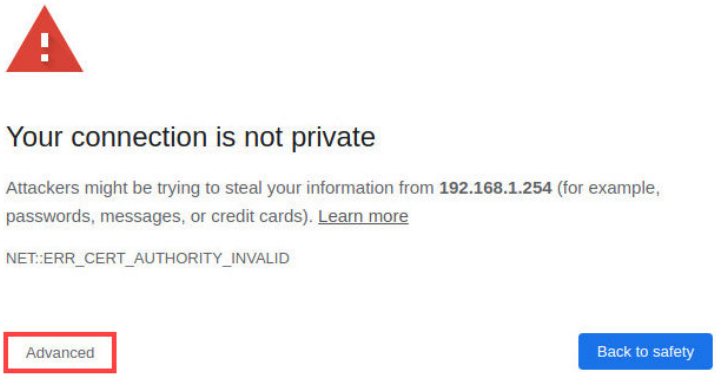


2. Double-click the **Chromium Web Browser** icon located on the desktop.

3. In the *Chromium* web browser, click on the **EDU-210** bookmark folder in the bookmarks bar and then click on **Firewall-A**.

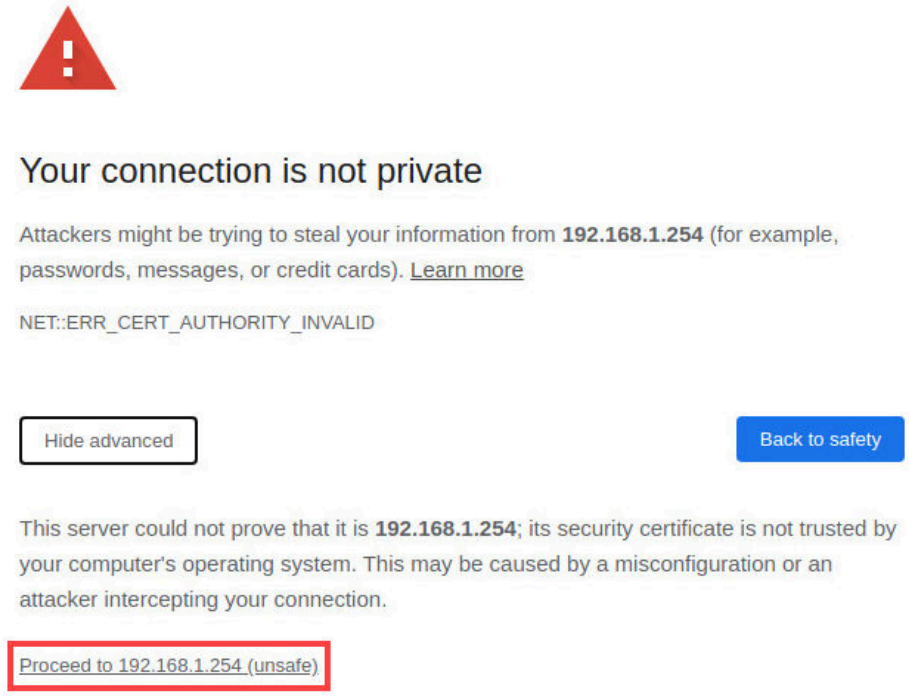


4. You will see a "*Your connection is not private*" message. Next, click on the **ADVANCED** link.



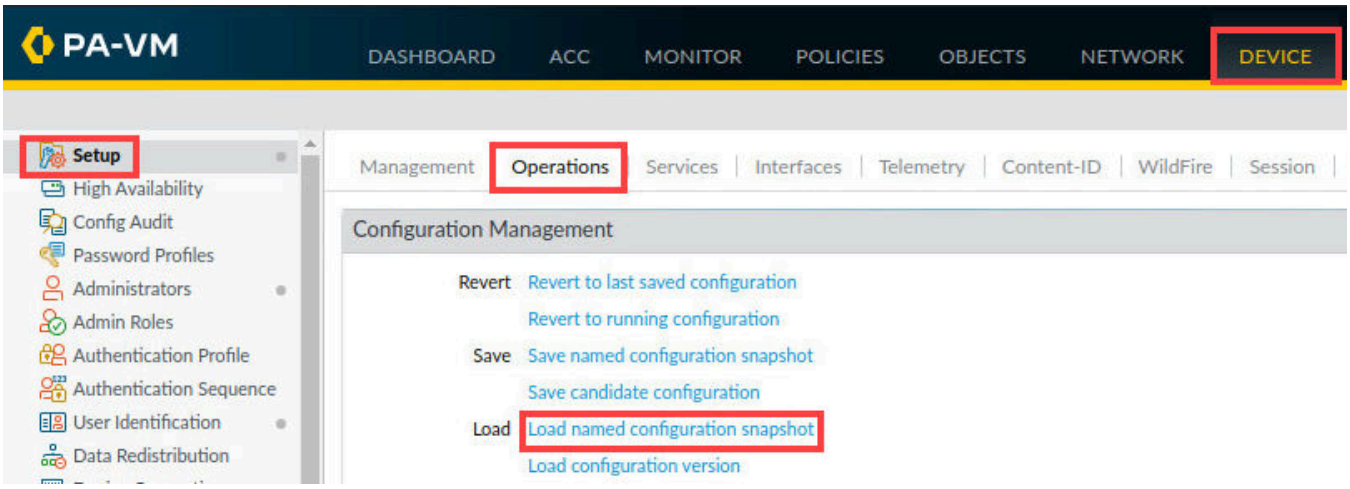
If you experience the “Unable to connect” or “502 Bad Gateway” message while attempting to connect to the specified IP above, please wait an additional 1-3 minutes for the Firewall to fully initialize. Refresh the page to continue.

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



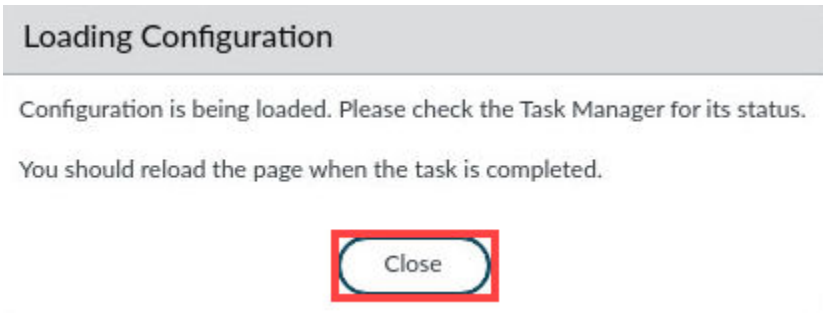
6. Log in to the firewall web interface as username **`admin`**, password **`Pal0Alt0!.`**

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

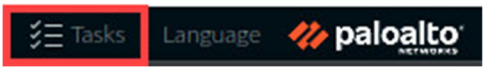


8. In the *Load Named Configuration* window, select **edu-210-lab-15.xml** from the *Name* dropdown box and click **OK**.

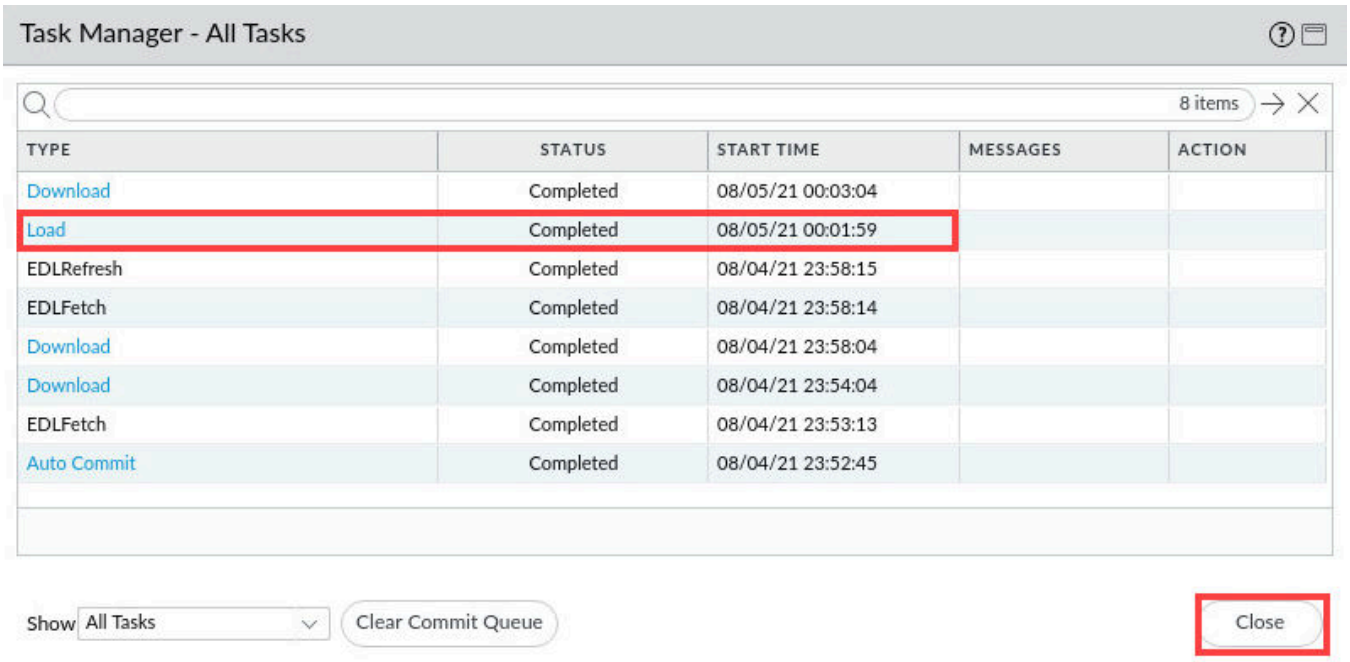
9. In the Loading Configuration window, a message will show *Configuration is being loaded*. *Please check the Task Manager for its status. You should reload the page when the task is completed.* Click **Close** to continue.



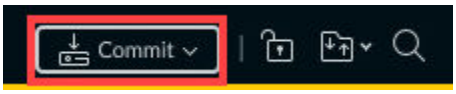
10. Click the **Tasks** icon located at the bottom-right of the web interface.



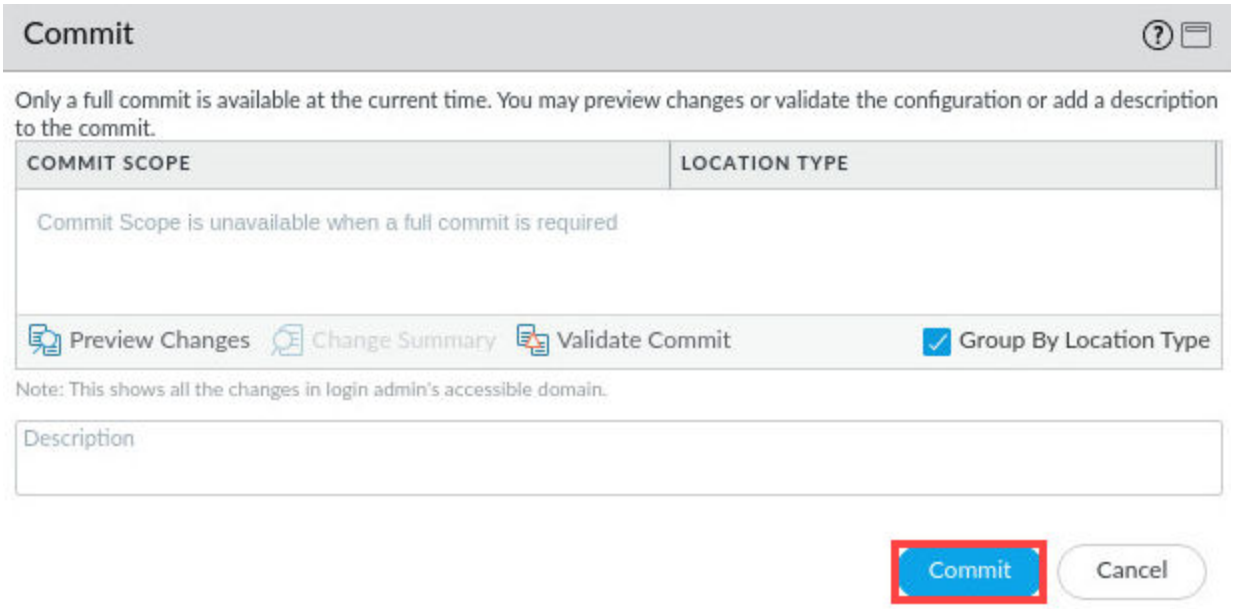
11. In the *Task Manager – All Tasks* window, verify the *Load* type has successfully completed. Click **Close**.



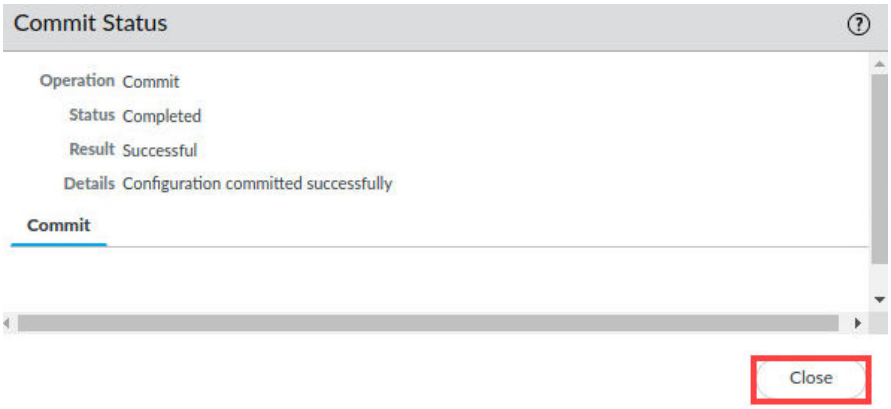
12. Click the **Commit** link located at the top-right of the web interface.



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

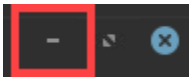


14. When the *Commit* operation successfully completes, click **Close** to continue.



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.

15. Minimize the *Palo Alto Networks Firewall* and continue to the next task.

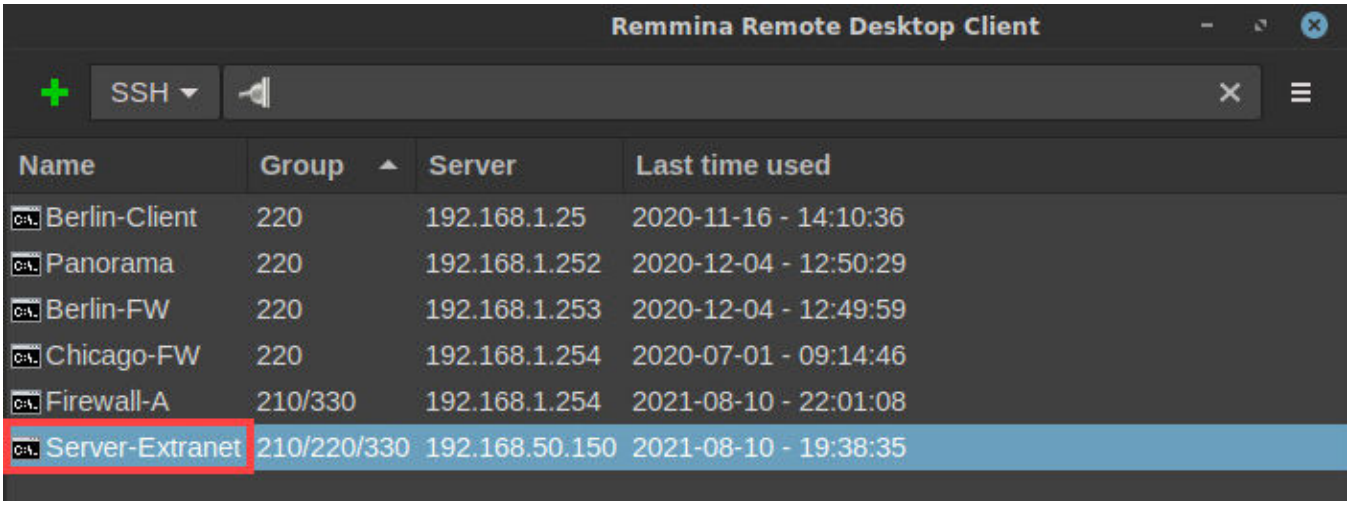


1.2 Generate Traffic Without Security Profiles

In this section, you will create a new security policy rule and attempt to leave out the description. This will let you see what happens when an administrator does not provide adequate information when creating a rule.

1. On the *client desktop*, open the **Remmina** application.

2. Double-click the entry for **Server-Extranet**.



> **Please Note** This action will open an SSH connection to the server and automatically log you in with appropriate credentials.

3. In the CLI connection, enter the following command to change the working directory.

```
paloalto42@extranet1:~$ cd pcaps92019/attack.pcaps/ <Enter>
```

4. In the CLI connection, enter the following command to run the simulated attacks.

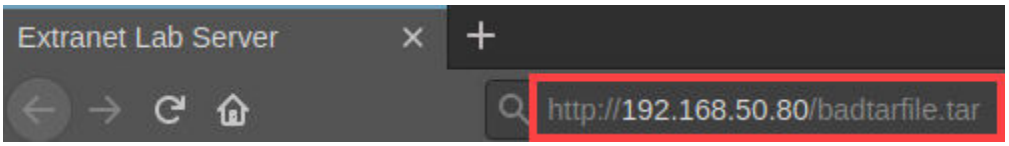
```
paloalto42@extranet1:~/pcaps92019/attack.pcaps$ ./malwareattacks.sh <Enter>
```

> **Please Note** This script takes about 6 minutes to complete. Allow the **malwareattacks** script to run uninterrupted.

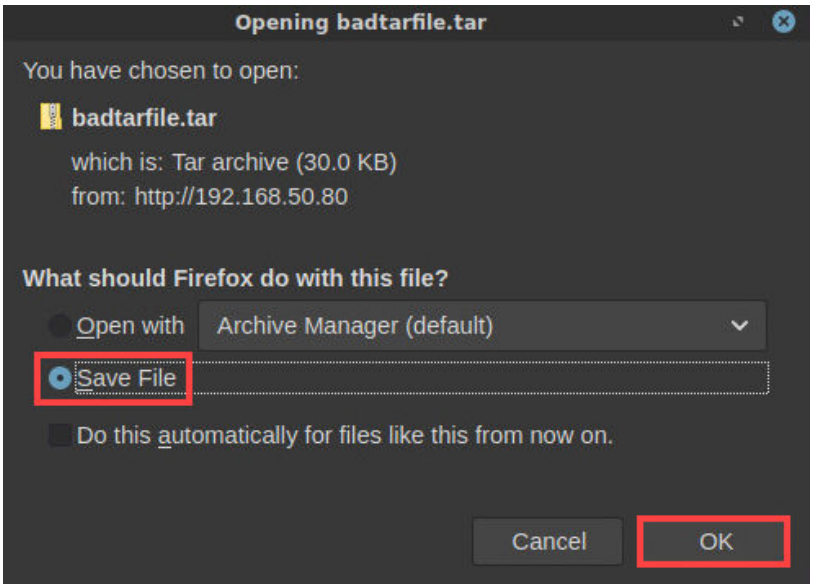
5. Minimize the *Remmina* connection window.

6. On the *client desktop*, open the **Firefox Web Browser** application.

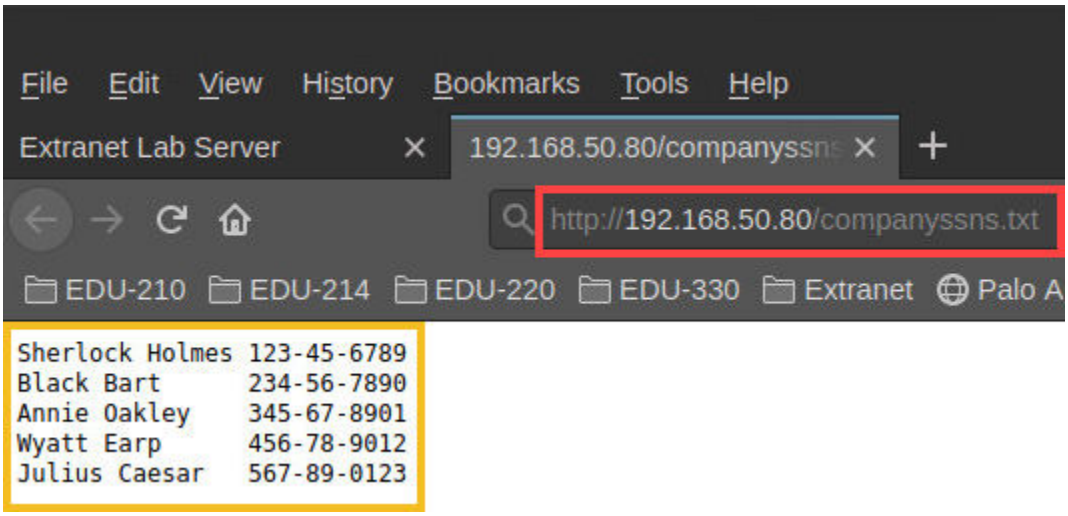
7. Type **`http://192.168.50.80/badtarfile.tar`** and press **Enter**.



8. In the *Opening badtarfile.tar* window, select **Save File**. Click **OK**.

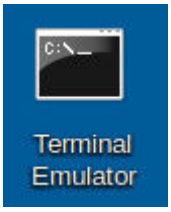


9. In the *Firefox Web Browser*, open a new tab. Type **`http://192.168.50.80/companyssns.txt`** and press **Enter.** The browser will display a file with *fictitious names* and *social security numbers.*



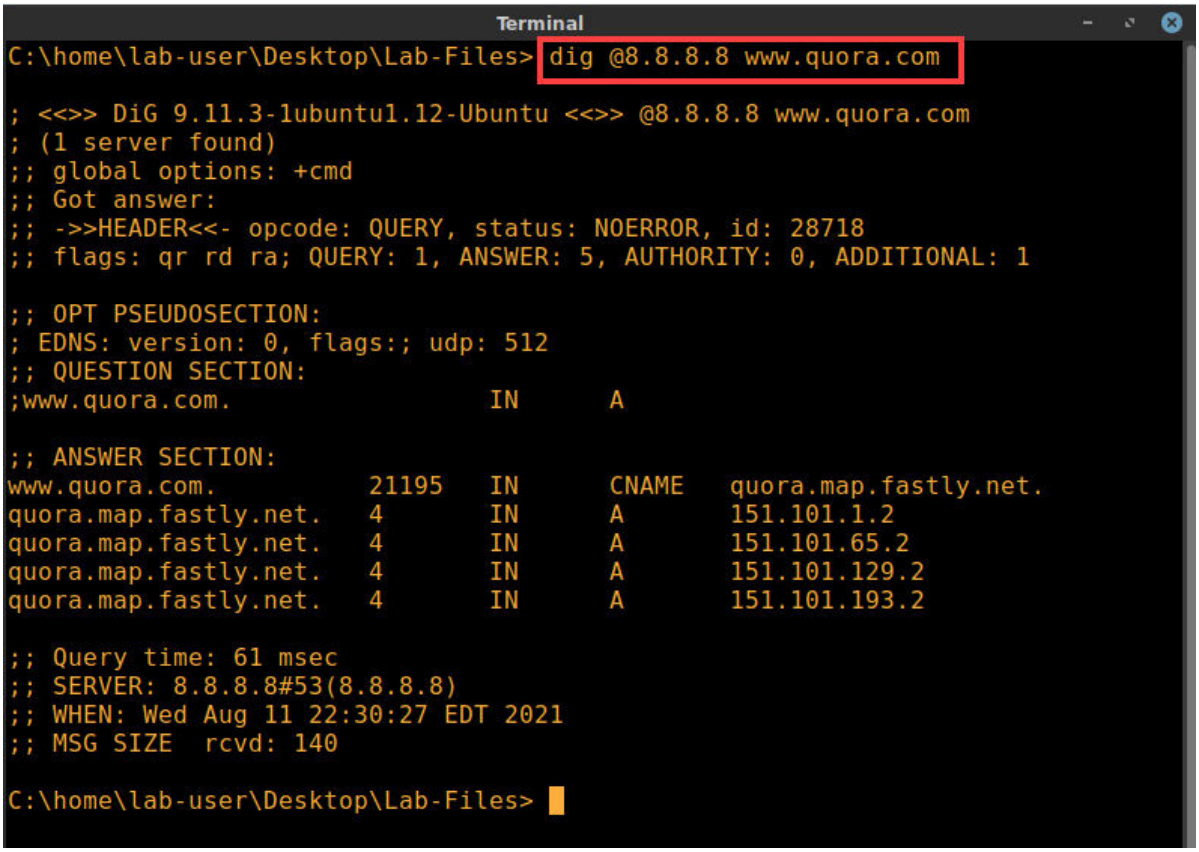
10. Close the *Firefox browser*.

11. On the *client desktop*, open **Terminal Emulator**.



12. Enter the following command to generate a DNS query using **dig** to resolve a URL to an IP address. The command returns a public IP address, indicating that the URL is accessible.

```
C:\home\lab-user\Desktop\Lab-Files> dig @8.8.8.8 www.quora.com
```



Please Note

Quora.com is one of the entries included in the malicious domains external dynamic list you configured in an earlier lab.

Also note that you may see a different IP address than what the screen shot shows.

13. Leave the Terminal Emulator window open because you will use it again later in this lab.
14. Reopen the *PA-VM firewall* by clicking on the **Chromium** icon in the taskbar.

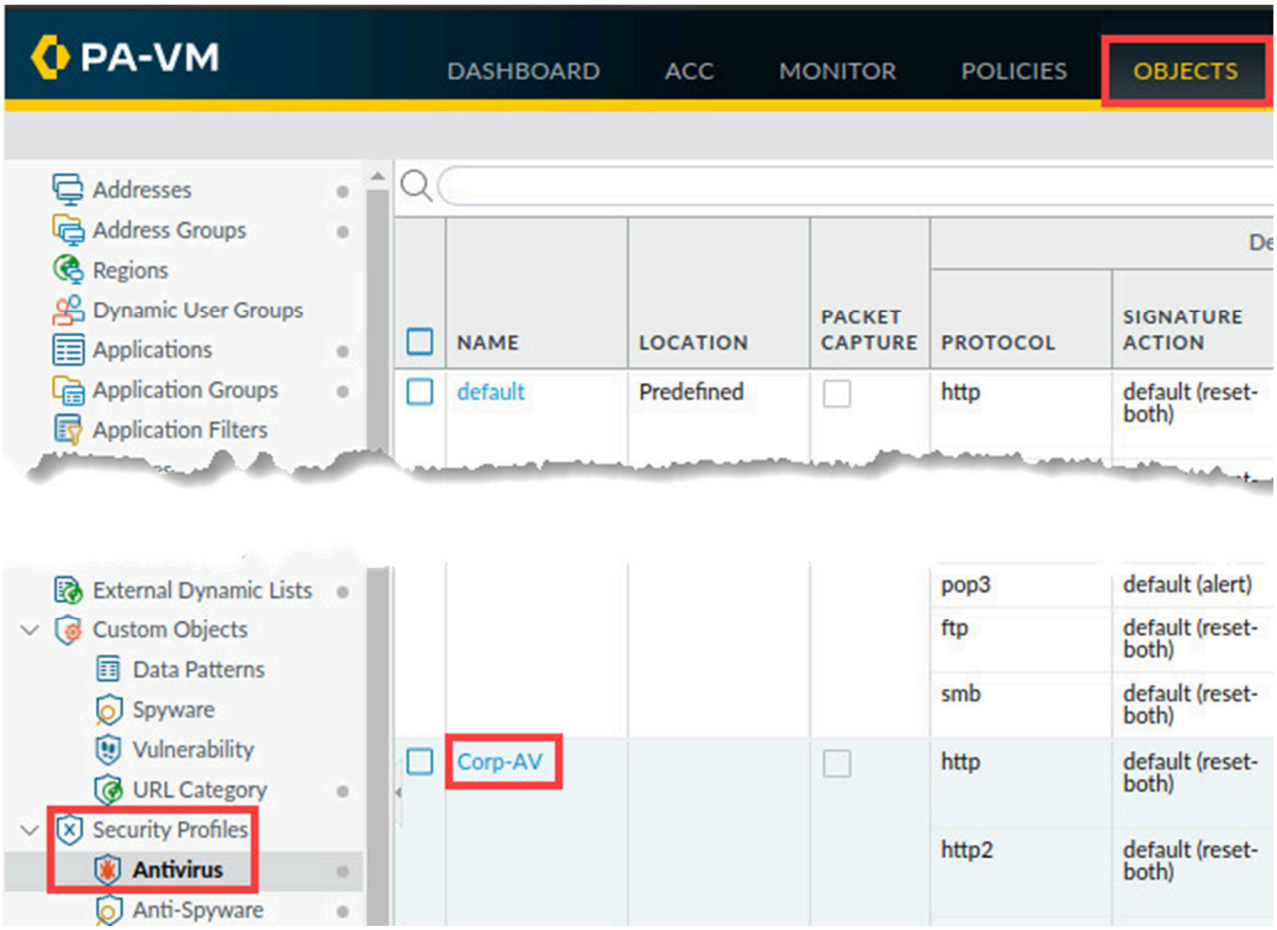
15. Leave the *Palo Alto Networks Firewall* open and continue to the next task.

1.3 Modify Existing Security Policies

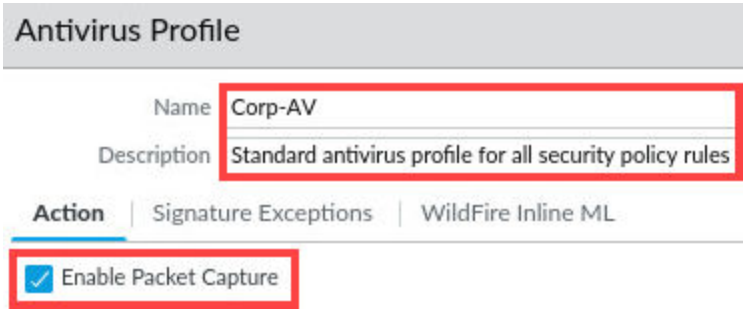
In previous labs, you created Security Profiles to inspect traffic for spyware and virus signatures. You created a Security Profile for WildFire that forwards unknown executable files to the WildFire cloud for inspection. And you created a URL Filtering Profile to prevent users from browsing to potentially harmful categories of websites.

In this section, you will review these profiles.

1. Select **Objects > Security Profiles > Antivirus**. Click **Corp-AV.**



2. In the *Antivirus Profile* window, for *Description*, enter **`Standard antivirus profile for all security policy rules`**. Check the box for **Enable Packet Capture**.

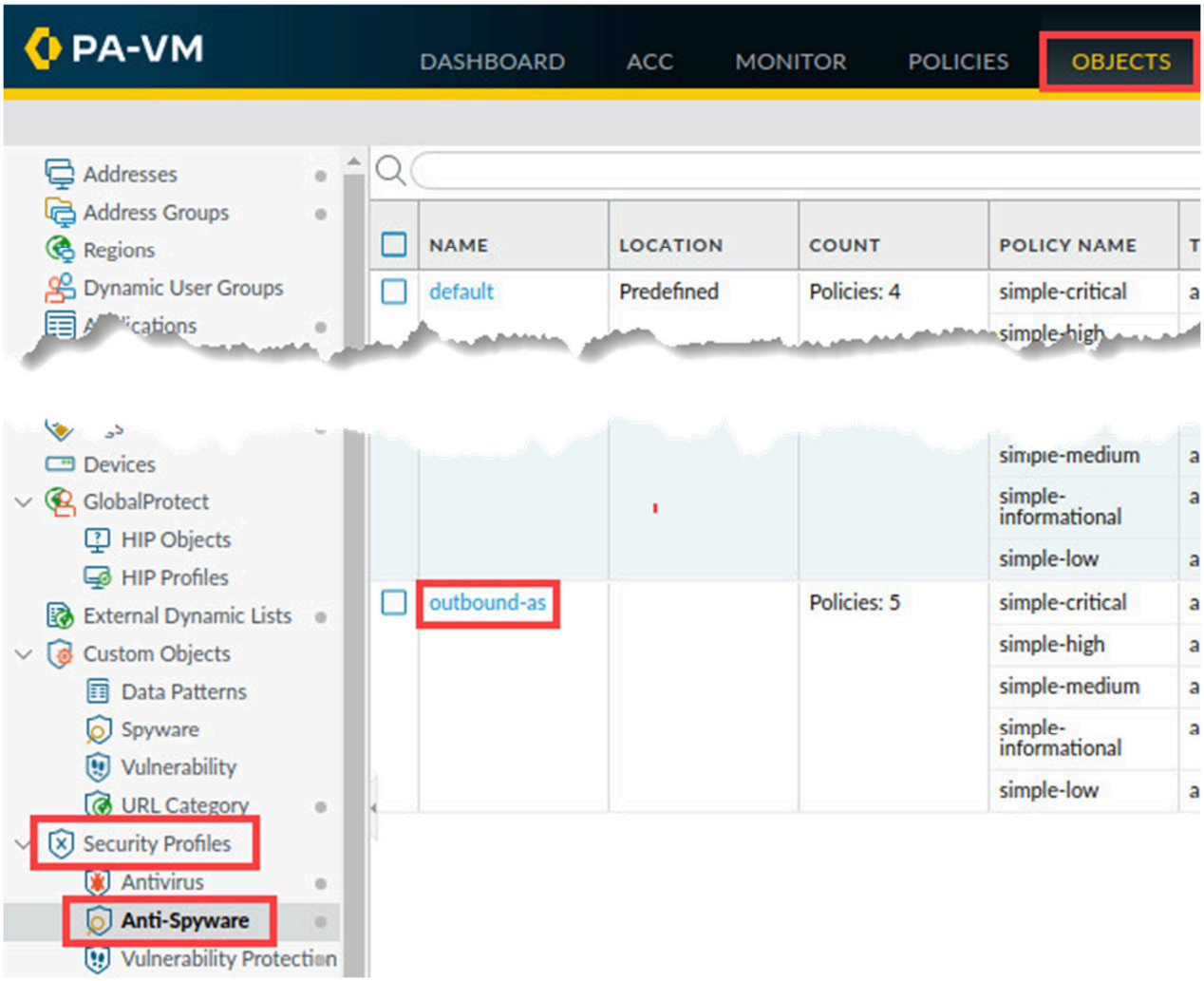


Please Note

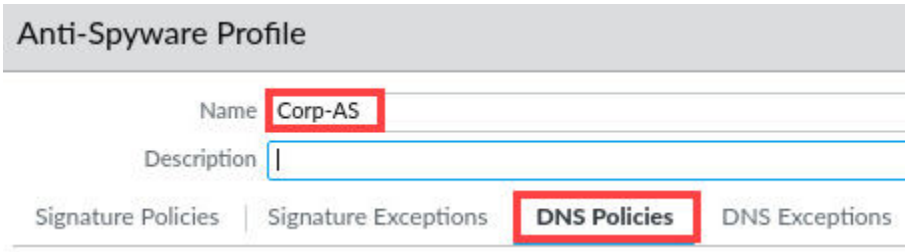
Enabling Packet Capture instructs the firewall to take very small packet captures (more like packet snippets) that contains patterns in traffic which match the signatures used in the profile.

3. Click **OK** to close the *Antivirus Profile* window.

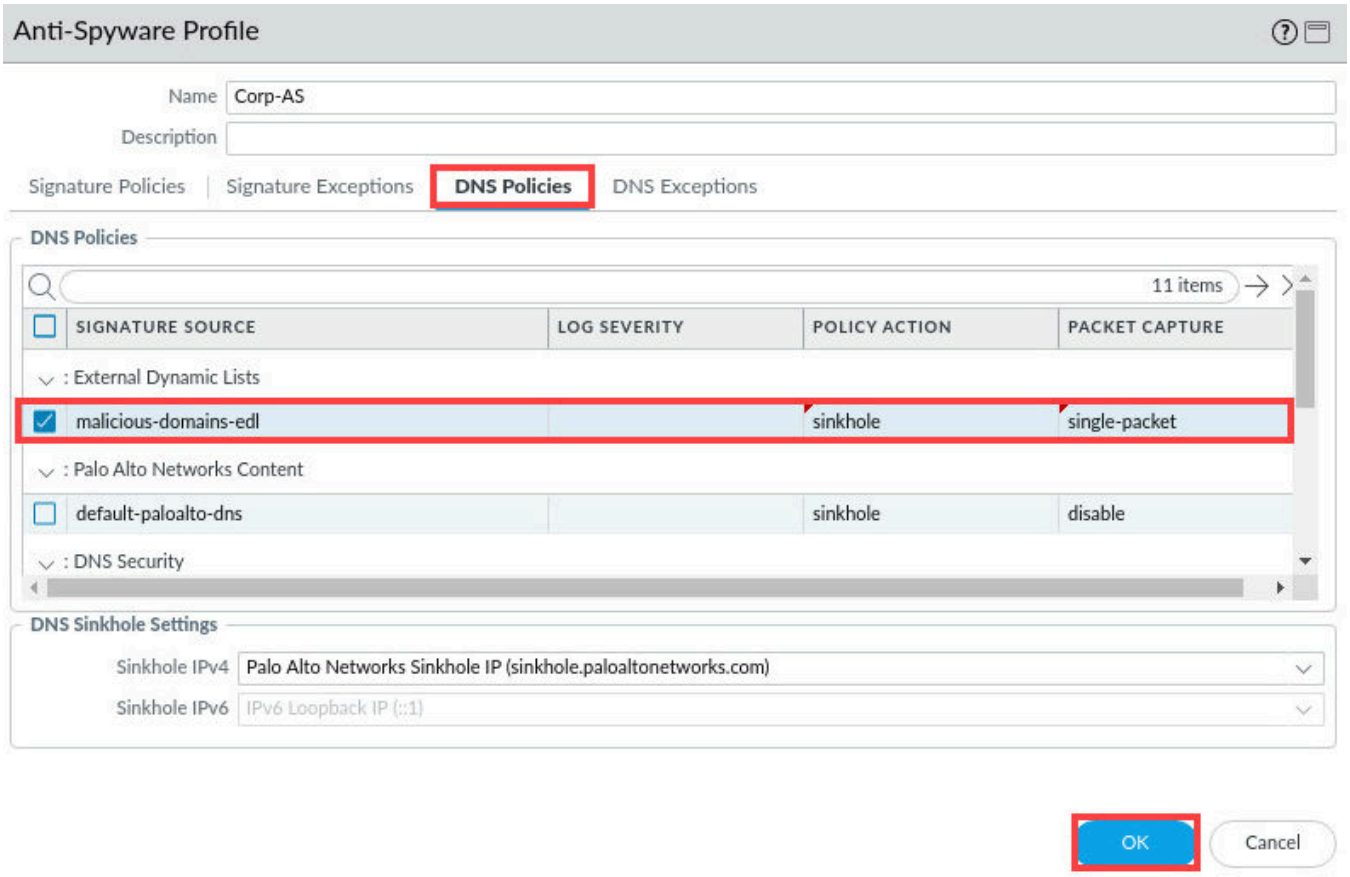
4. Select **Objects > Security Profiles > Anti-Spyware**. Click **outbound-as**.



5. In the *Anti-Spyware Profile* window, change the *Name* to **Corp-AS**. Select the tab for **DNS Policies.**



6. On the *DNS Policies* tab, for the **malicious-domains-edl** entry, change the *Policy Action* to **sinkhole**. Change the *Packet Capture* to **single-packet.** Click **OK.**

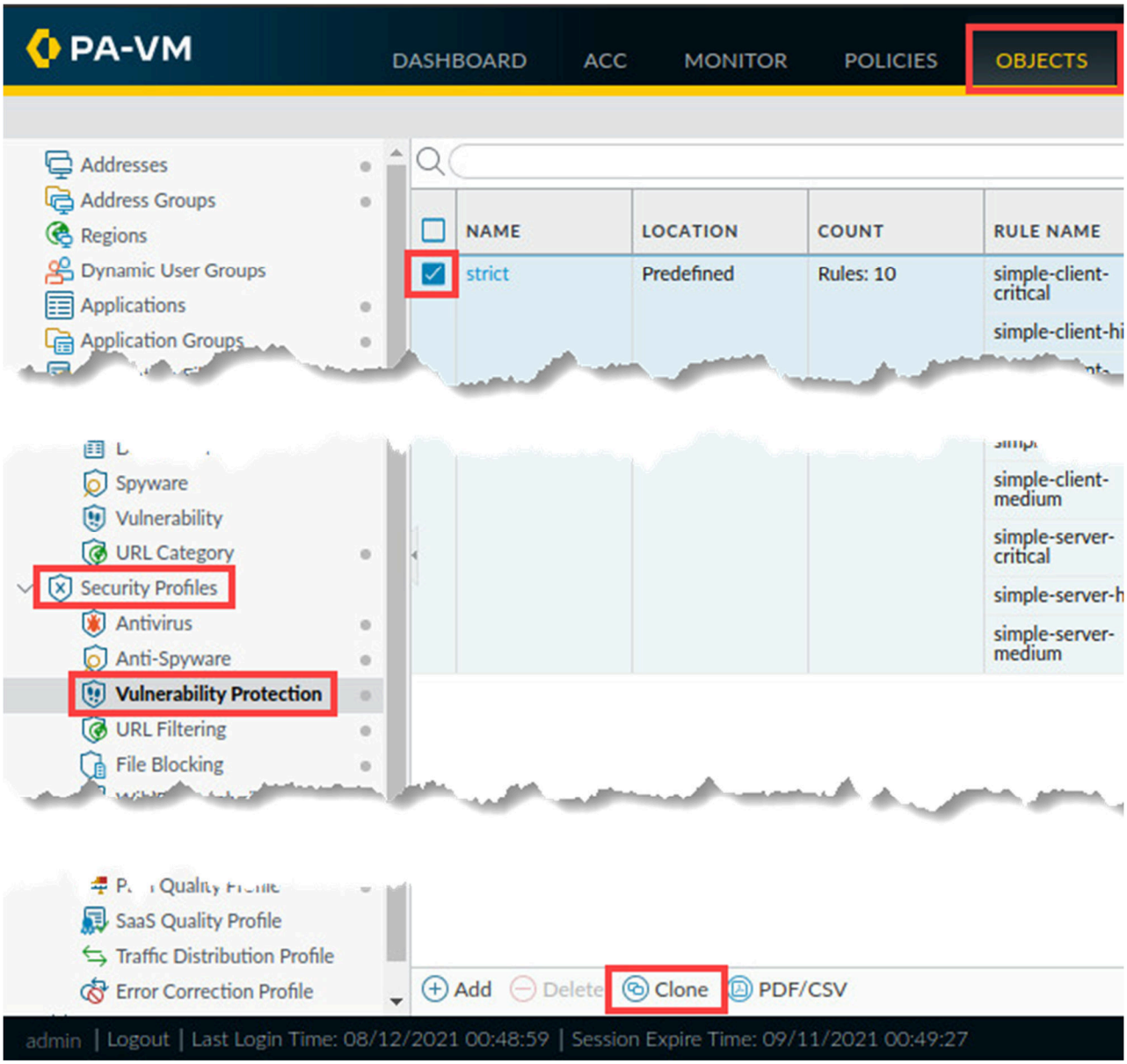


7. Leave the *Palo Alto Networks Firewall* open and continue to the next task.

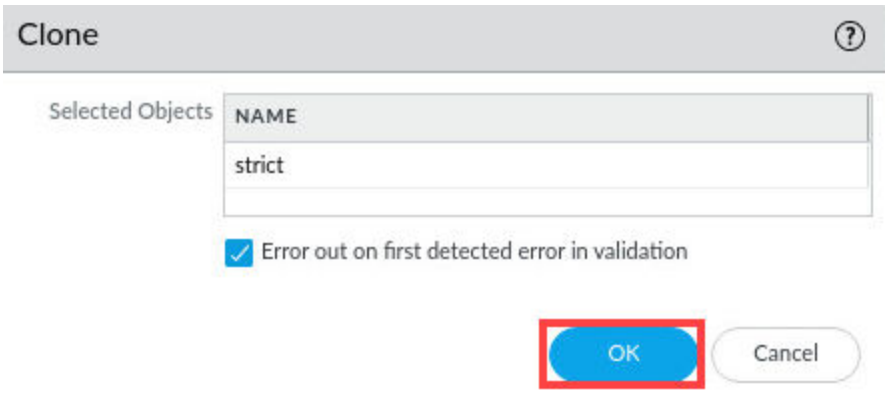
1.4 Create A Corporate Vulnerability Security Profile

In this section, you will create a vulnerability Security Profile. Palo Alto Networks provides two vulnerability profiles which you can use as the basis for your own – strict and default.

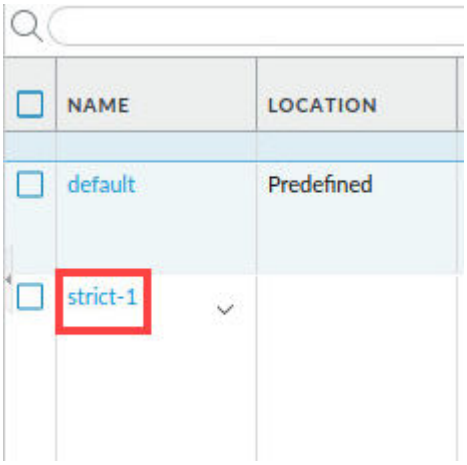
1. Select **Objects > Security Profiles > Vulnerability Protection**. Place a check in the box beside **strict.** Click **Clone.**



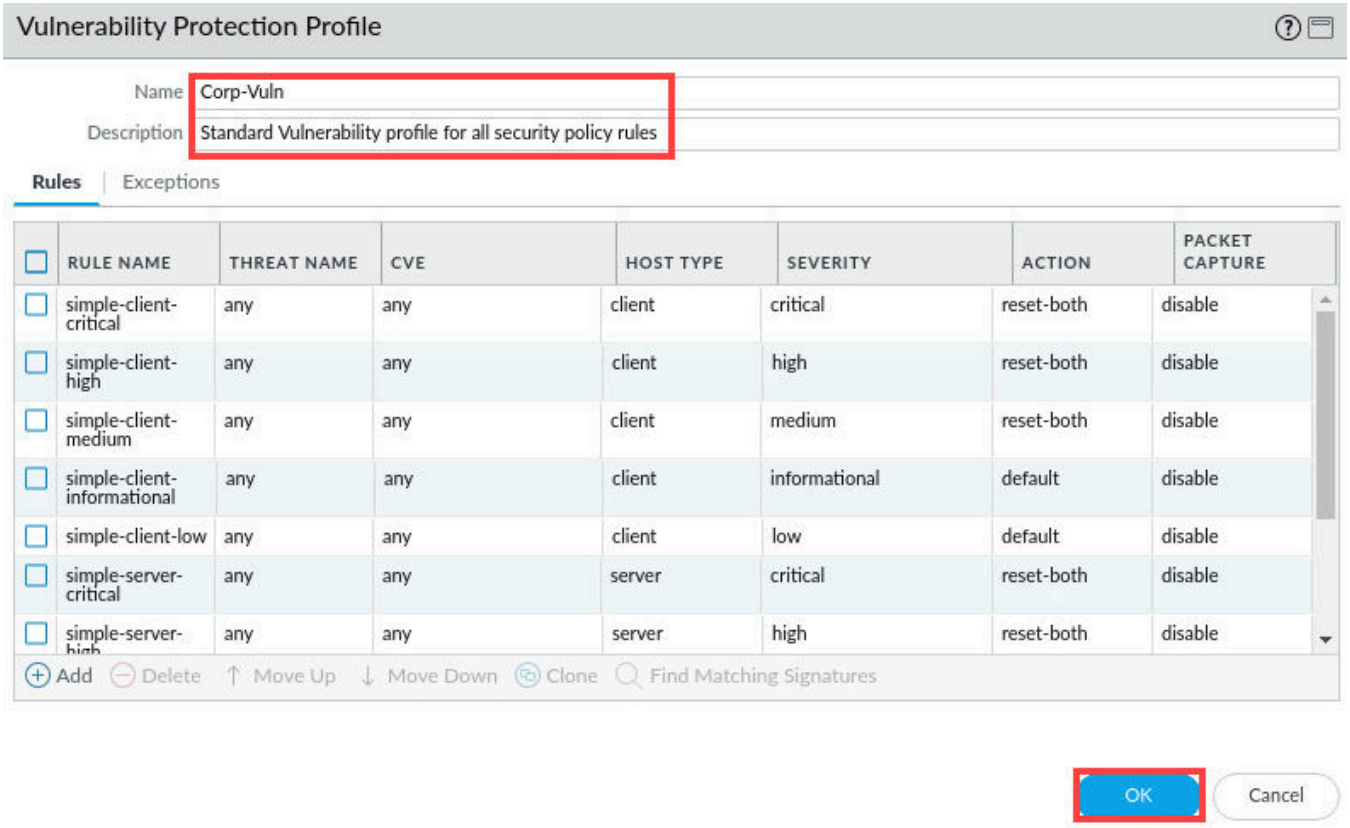
2. In the *Clone* window, click **OK**.



3. Click the entry for **strict-1** to open it.



4. In the *Vulnerability Protection Profile* window, change the *Name* to **`Corp-Vuln`**. For *Description*, enter **`Standard vulnerability profile for all security policy rules`**. Click **OK**.



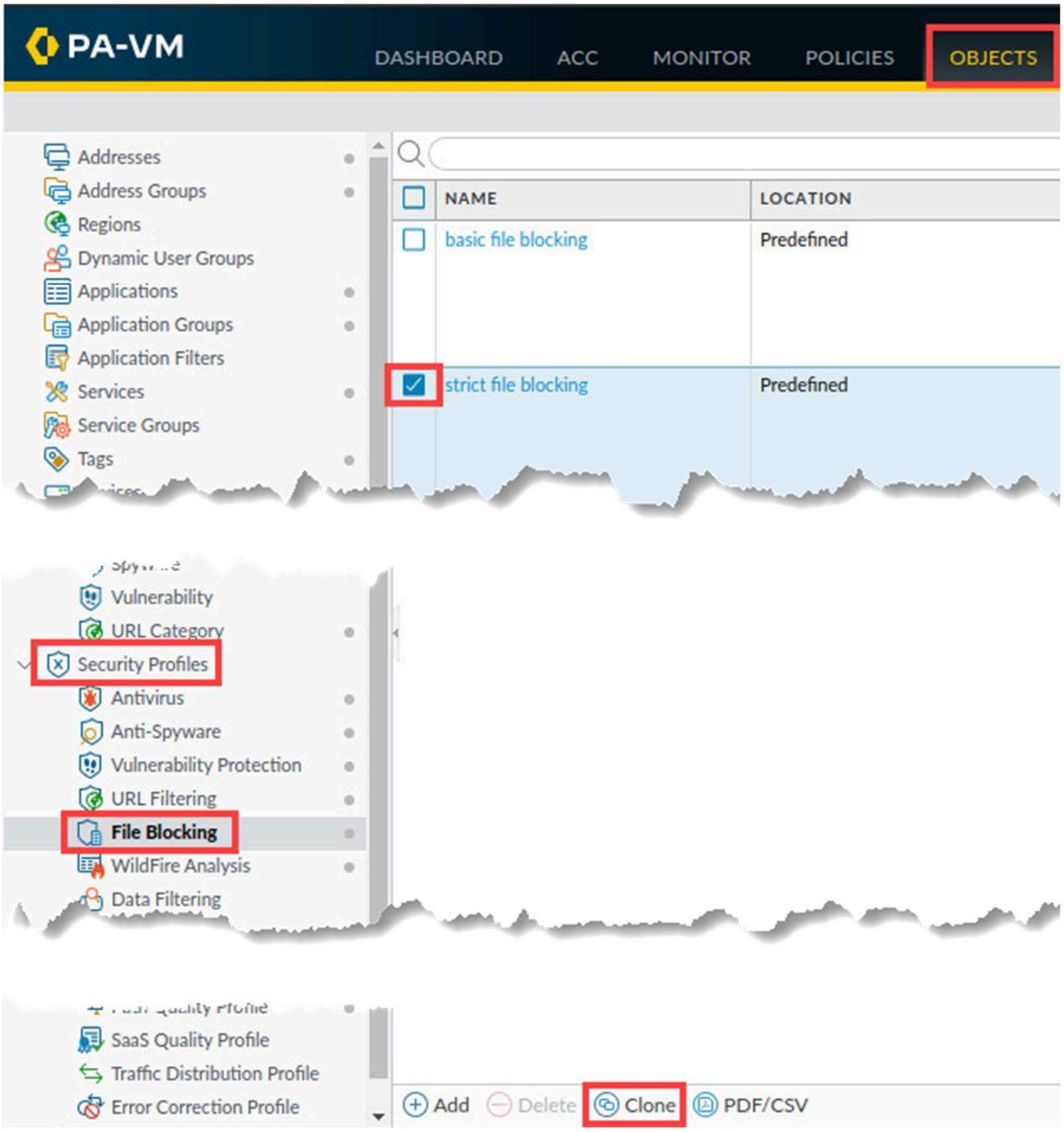
5. Leave the *Palo Alto Networks Firewall* open and continue to the next task.

1.5 Create A Corporate File Blocking Profile

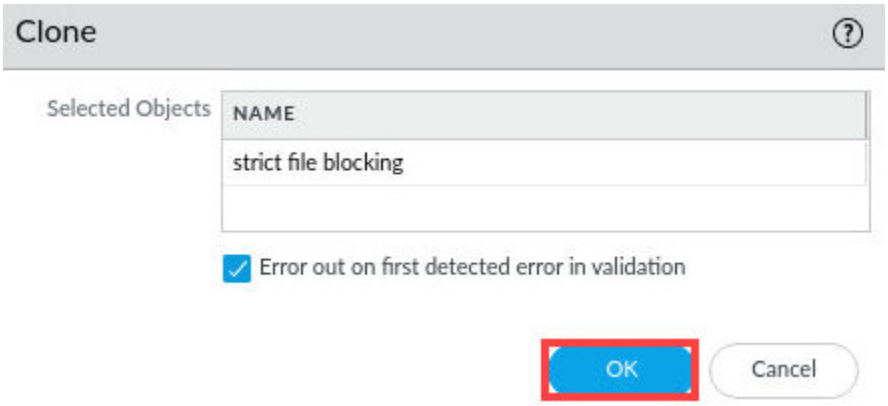
In this section, you will configure a File Blocking Security Profile that the firewall will use to help detect, report, and block attempts to download potentially harmful filetypes. Palo Alto Networks provides two file blocking profiles that you can use as the basis for your own – basic file blocking and strict file blocking.

You will clone the strict file blocking profile and modify it to function as your Corp-FileBlock profile.

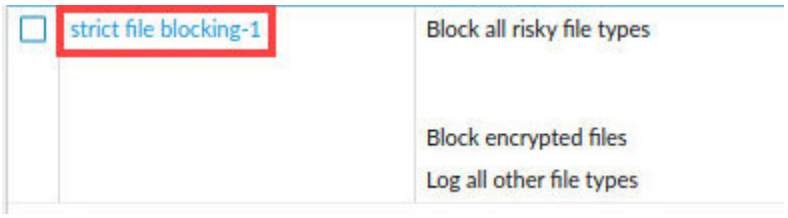
1. Select **Objects > Security Profiles > File Blocking**. Place a check beside the entry for **strict file blocking**. Click **Clone**.



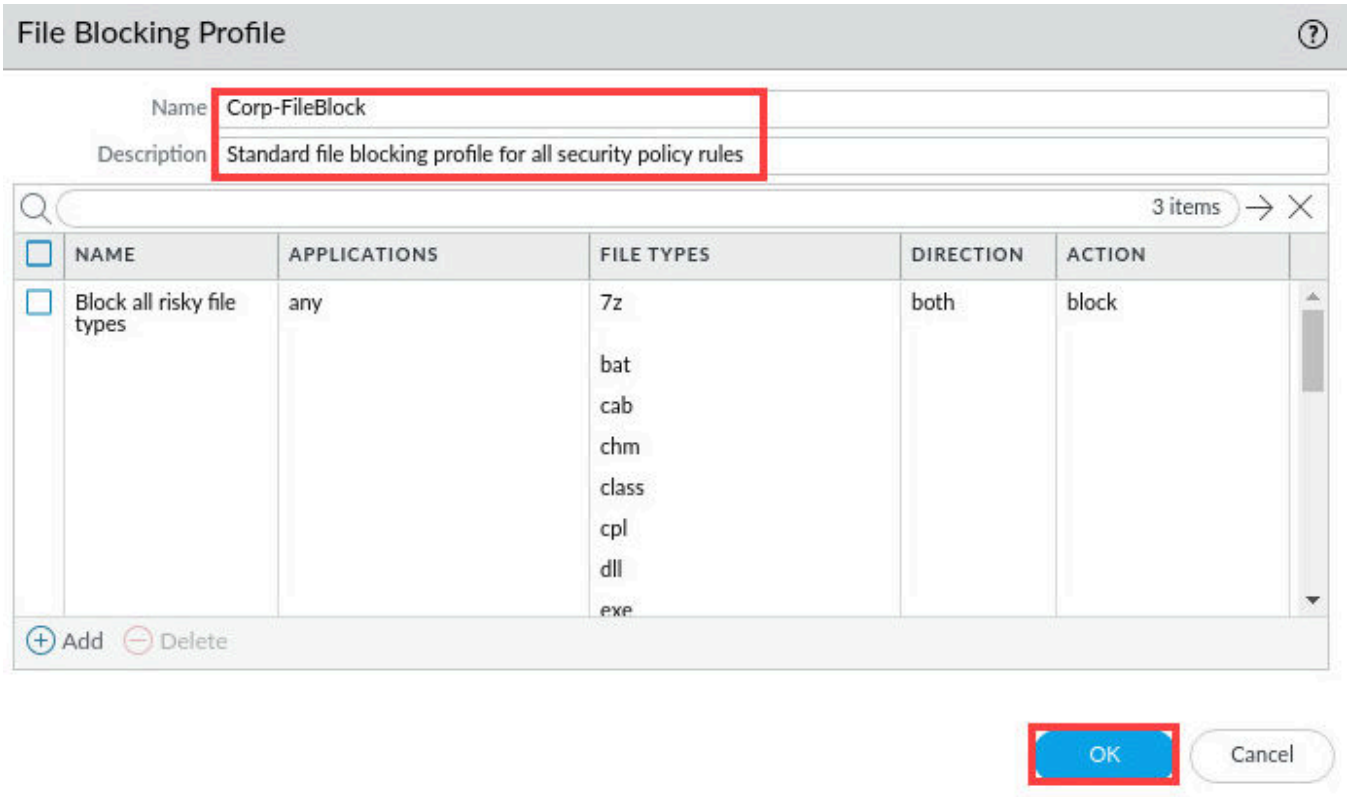
2. In the *Clone* window, click **OK**.



3. Click the entry for **strict file blocking-1** to open it.



4. Change the *Name* to **`Corp-FileBlock`**. For *Description*, enter **`Standard file blocking profile for all security policy rules`**. Click **OK**.

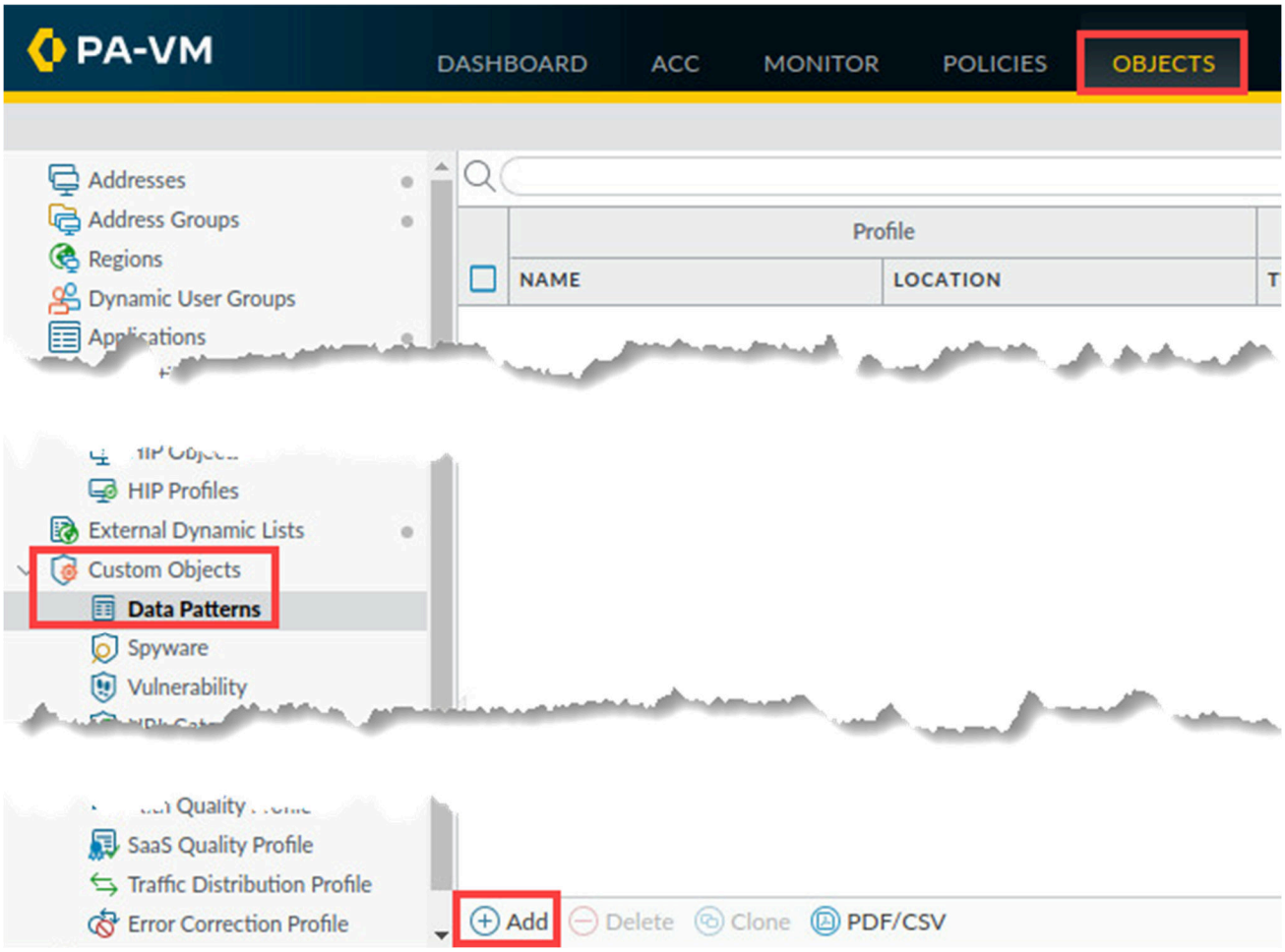


5. Leave the *Palo Alto Networks Firewall* open and continue to the next task.

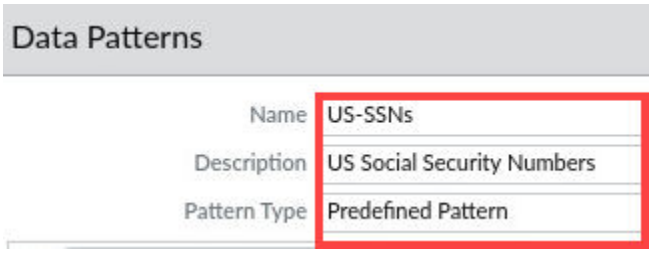
1.6 Create Data Filtering Profiles

Create a data filtering profile to detect and block the transfer of files that contain more than three US social security numbers. Data Filtering Profiles are based on one or more Data Patterns, so you will need to first configure a Data Pattern that matches variations of US social security numbers.

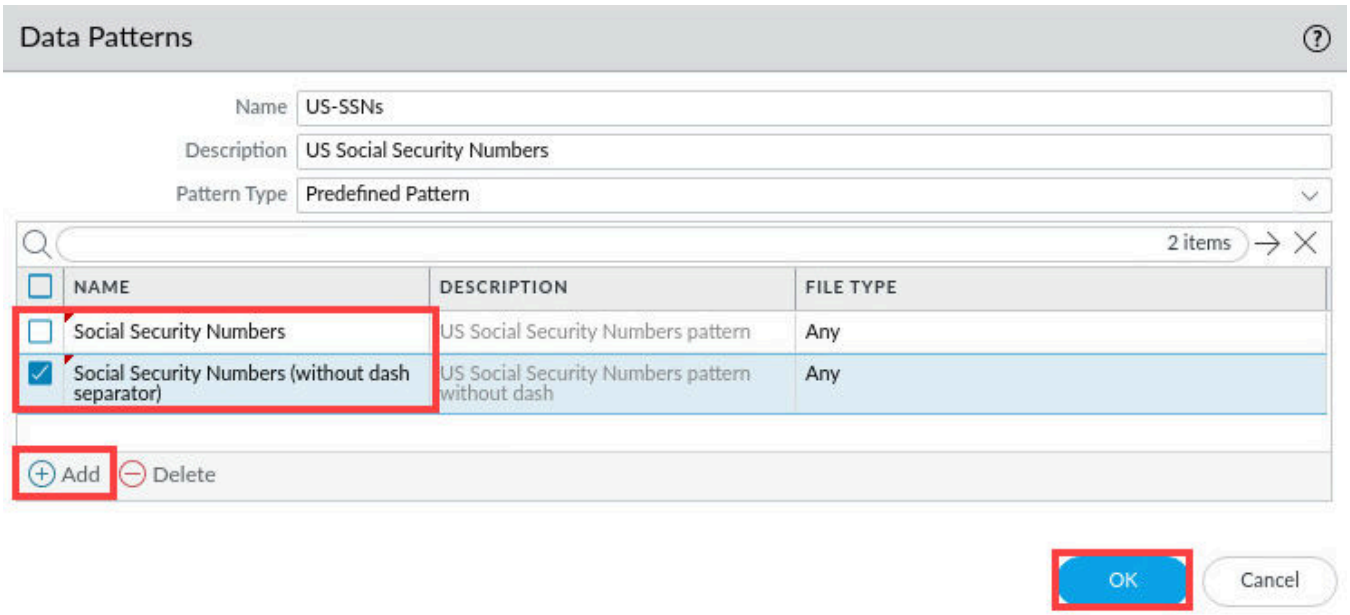
1. Select **Objects > Custom Objects > Data Patterns**. Click **Add**.



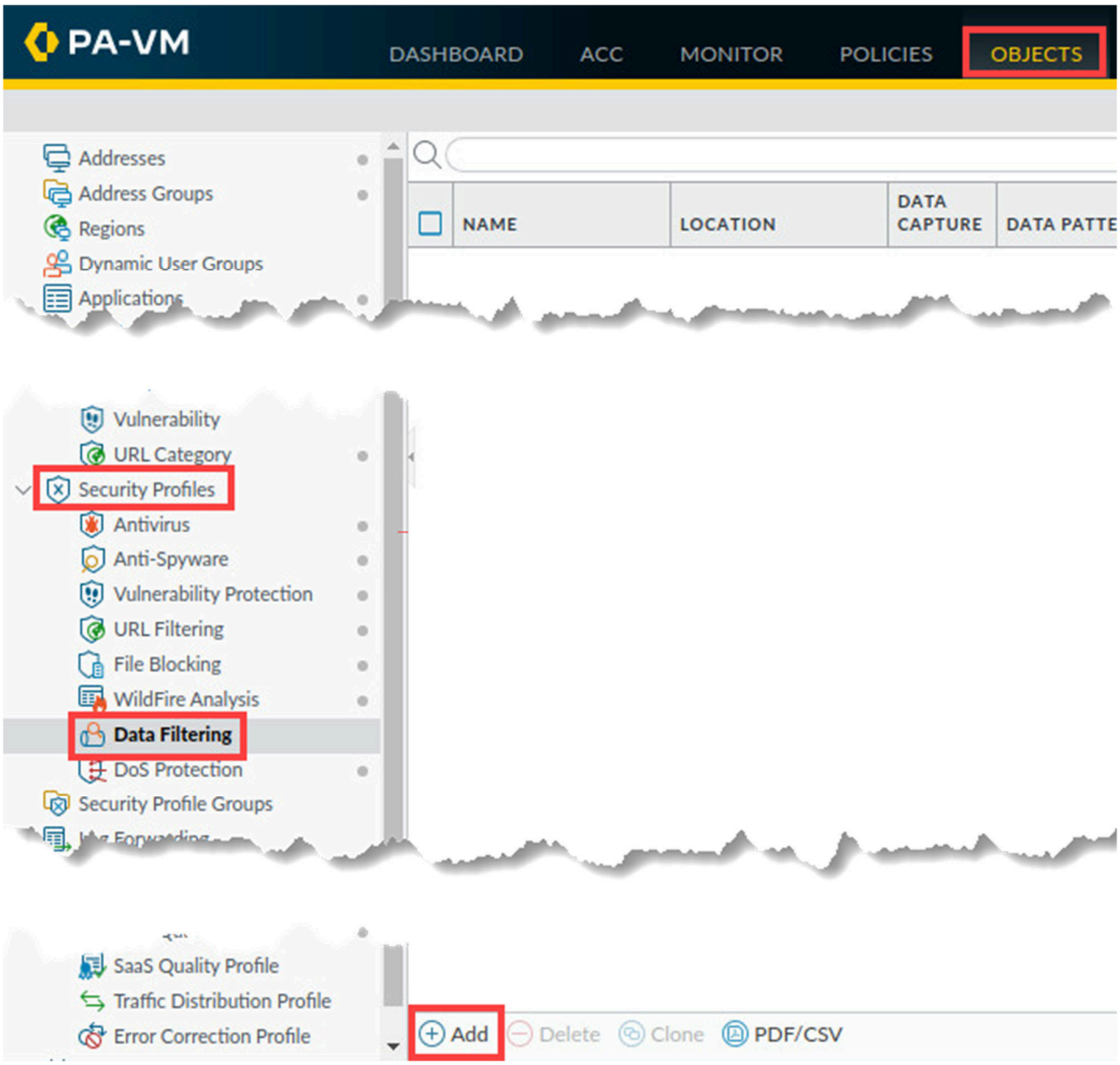
2. In the *Data Patterns* window, for *Name*, enter **US-SSNs**. For *Description*, enter **US Social Security Numbers.** Change the *Pattern Type* to **Predefined Pattern**.



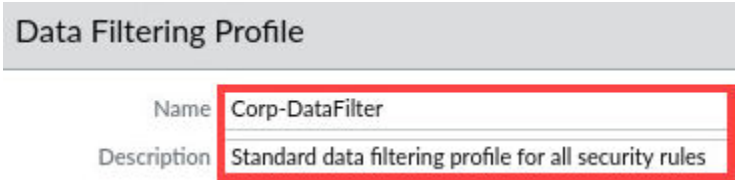
3. Click **Add** and scroll down the available list and select **Social Security Numbers**. Click **Add** again and select **Social Security Numbers (without dash separator)**. Click **OK**.



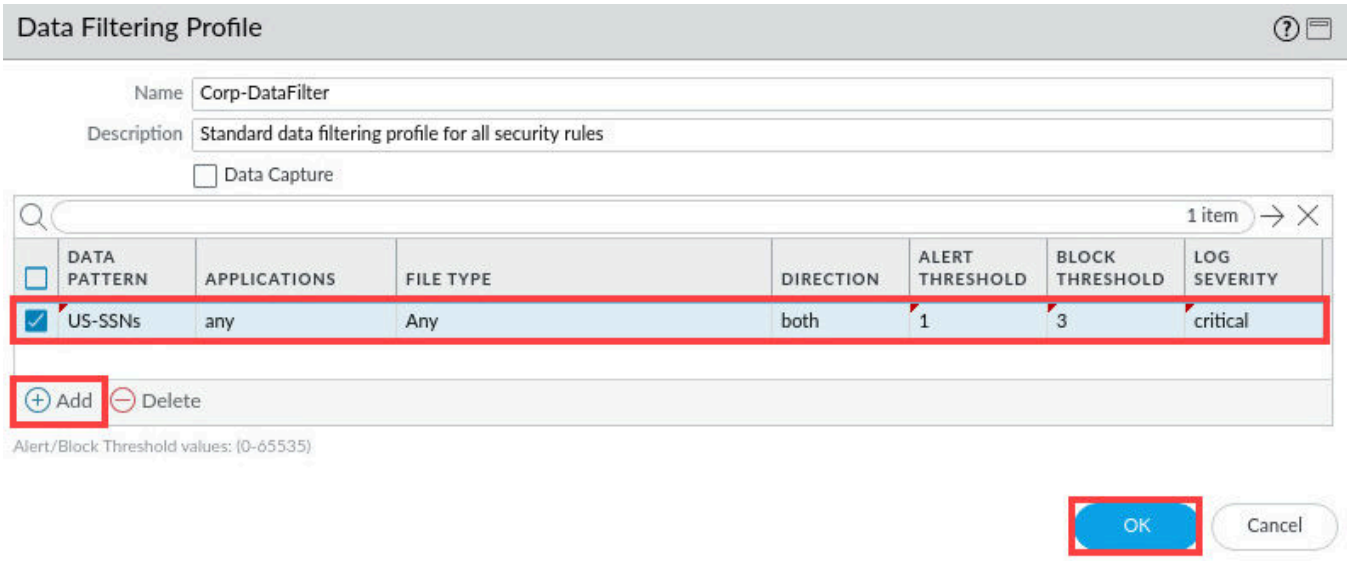
4. Select **Objects > Security Profiles > Data Filtering**. Click **Add**.



5. In the *Data Filtering Profiles* window, for *Name*, enter **`Corp-DataFilter`**. For *Description*, enter **`Standard data filtering profile for all security rules.`**



6. Click **Add** and select the **US-SSNs** data pattern that you defined. Click in the **Alert Threshold** field and change the value to **1.** Click in the **Block Threshold** field and change the value to **3.** Change the **Log Severity** to **critical.** Click **OK.**



7. Leave the *Palo Alto Networks Firewall* open and continue to the next task.

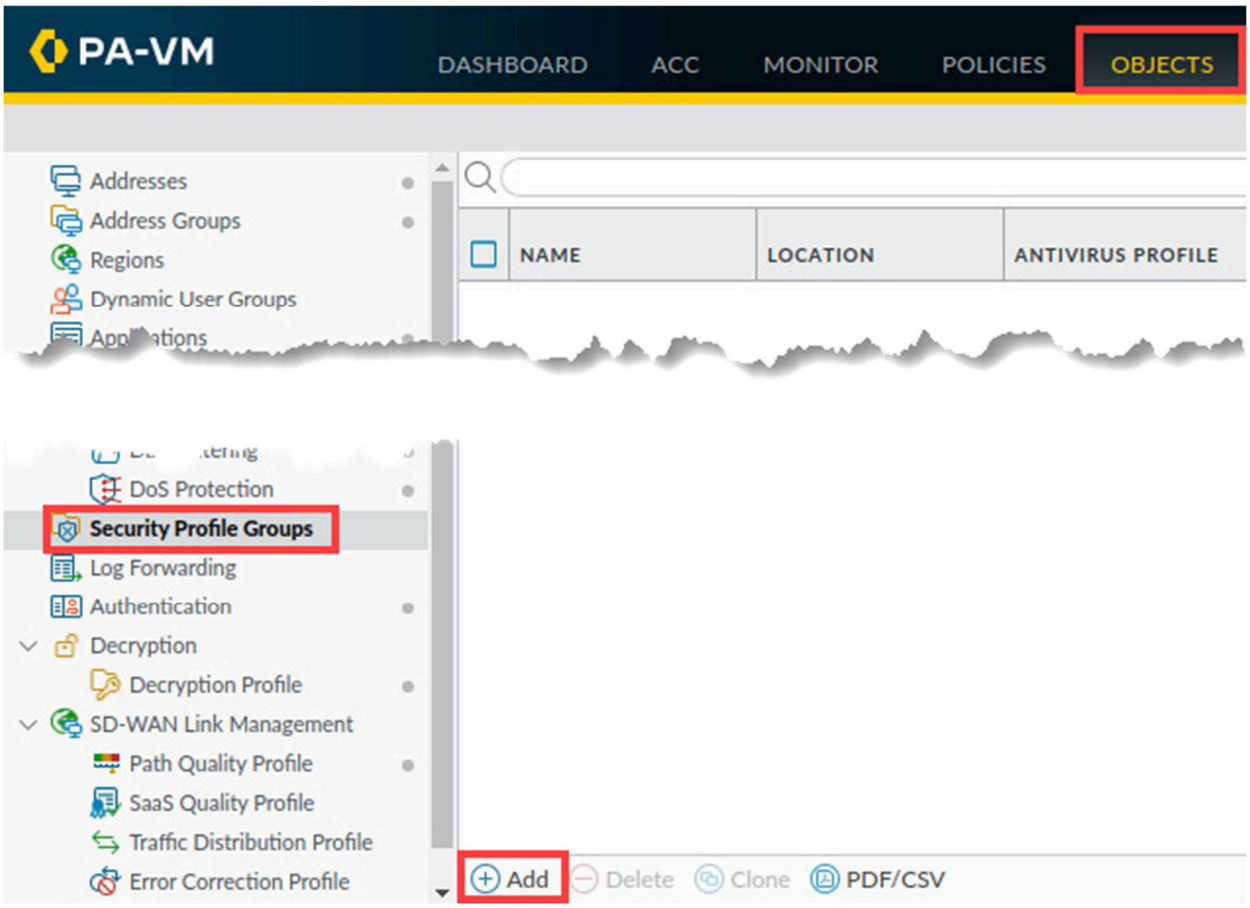
1.7 Create a Security Profile Group

To simplify the process of applying Security Profiles to Security policy rules, you can create a Security Profile Group which contains individual Security Profiles.

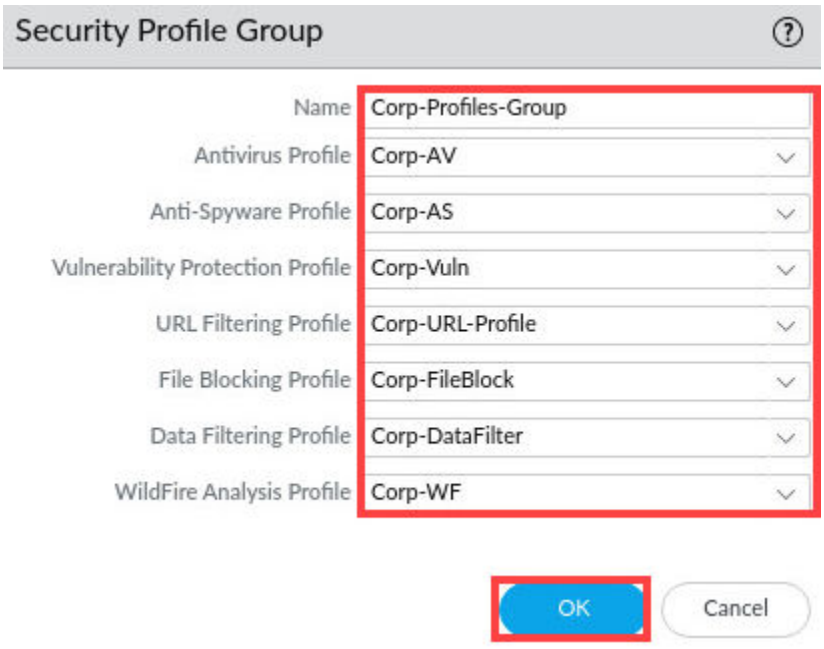
You can then apply the Security Profile Group to a Security policy rule, rather than individually selecting each profile for each rule.

In this section, you will create a Security Profile Group called Corp-Profiles-Group. You will add each of your Corp-* Security Profiles to the group.

1. Select **Objects > Security Profile Groups.** Click **Add.**



2. In the *Security Profile Group* window, enter **`Corp-Profiles-Group`** for the *Name*. For each of the available **Profiles**, use the dropdown list to select the **Corp-*** entry you have created. Click **OK**.

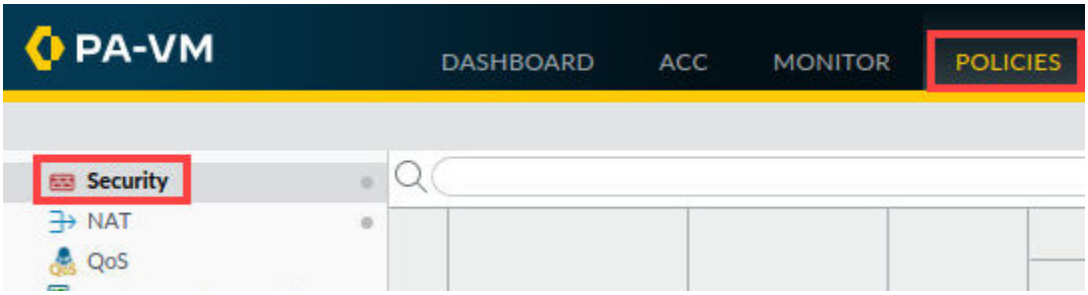


3. Leave the *Palo Alto Networks Firewall* open and continue to the next task.

1.8 Apply the Corp-Profiles-Group to a Security Policy

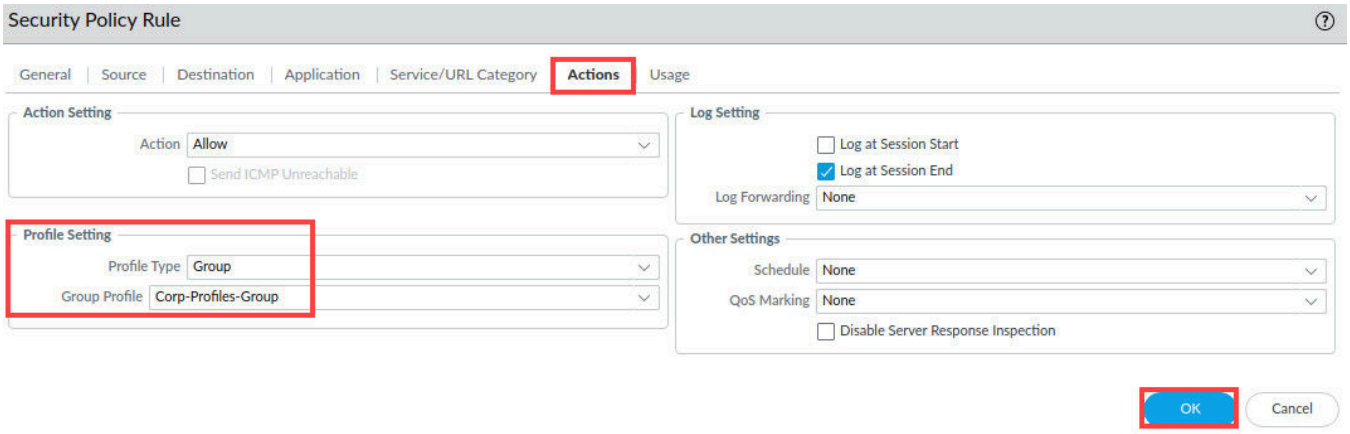
In this section, you will apply the Corp-Profiles-Group to a security policy. With the Security Profiles in place, you can modify your security policy rules to use these protections.

1. Select **Policies > Security**.

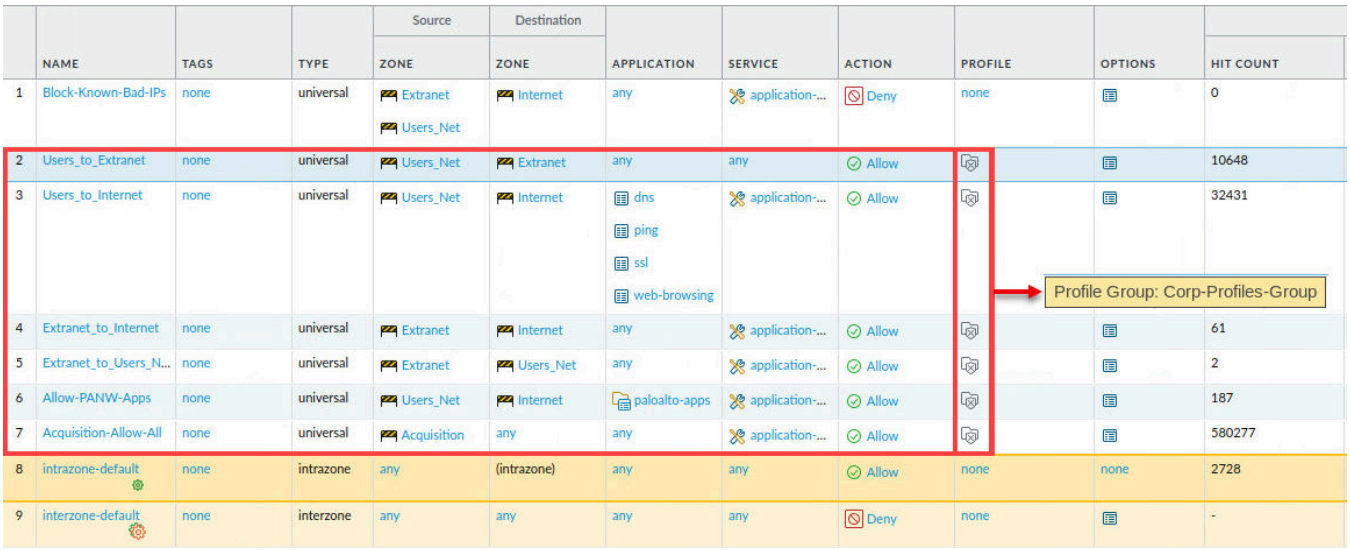


2. Individually edit each security policy rule which allows traffic and change the **Profile Setting** under the **Action** tab to use the **Corp-Profiles-Group**. Be sure to edit and modify each of these rules.

   - **Users_to_Extranet –** Click **OK.**
   - **Users_to_Internet –** Click **OK**
   - **Extranet_to_Internet –** Click **OK**
   - **Extranet_to_Users_Net –** Click **OK**
   - **Allow-PANW-Apps –** Click **OK**
   - **Acquisition-Allow-All –** Click **OK**

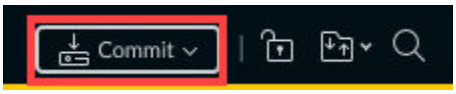


3. Verify each of the rules you modified is showing the *Corp-Profiles-Group* by hovering over the **Profile** icon for each rule.

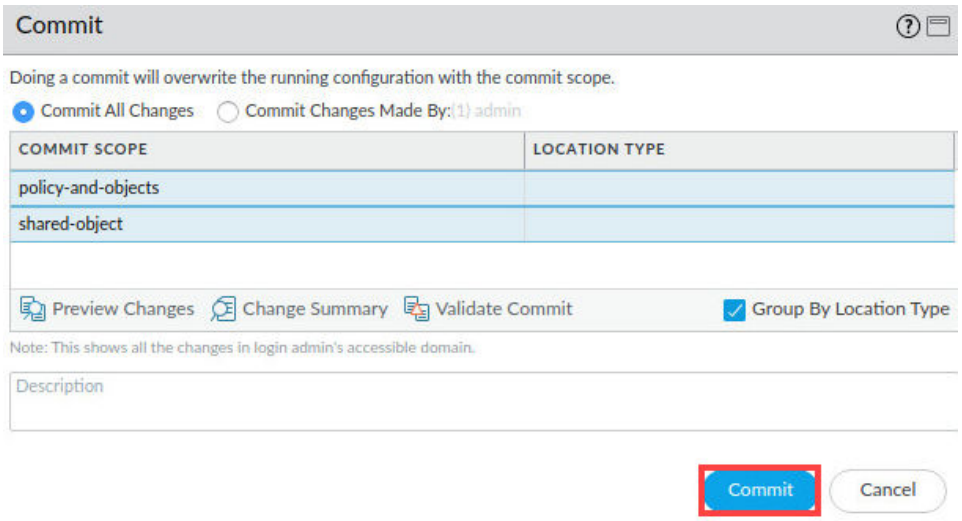


	NAME	TAGS	TYPE	Source ZONE	Destination ZONE	APPLICATION	SERVICE	ACTION	PROFILE	OPTIONS	HIT COUNT
1	Block-Known-Bad-IPs	none	universal	Extranet, Users_Net	Internet	any	application-...	Deny	none		0
2	Users_to_Extranet	none	universal	Users_Net	Extranet	any	any	Allow			10648
3	Users_to_Internet	none	universal	Users_Net	Internet	dns, ping, ssl, web-browsing	application-...	Allow			32431
4	Extranet_to_Internet	none	universal	Extranet	Internet	any	application-...	Allow			61
5	Extranet_to_Users_N...	none	universal	Extranet	Users_Net	any	application-...	Allow			2
6	Allow-PANW-Apps	none	universal	Users_Net	Internet	paloalto-apps	application-...	Allow			187
7	Acquisition-Allow-All	none	universal	Acquisition	any	any	application-...	Allow			580277
8	intrazone-default	none	intrazone	any	(intrazone)	any	any	Allow	none	none	2728
9	interzone-default	none	interzone	any	any	any	any	Deny	none		-

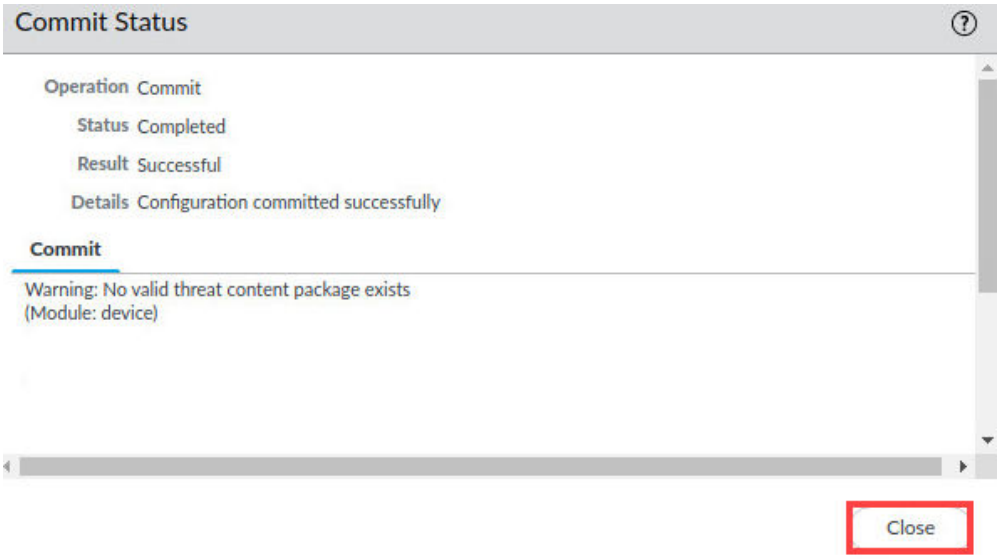
4. Click the **Commit** link located at the top-right of the web interface.



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



6. When the *Commit* operation successfully completes, click **Close** to continue.

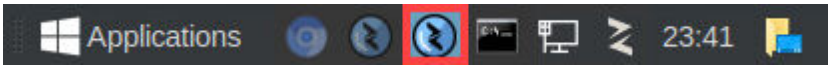


7. Minimize the *Palo Alto Networks Firewall* and continue to the next task.

1.9 Generate Attack Traffic with Security Profiles

In this section, you will generate attack traffic with security policies.

1. Reopen the **Remmina** application by clicking the icon in the taskbar.



2. In the CLI connection, enter the following command to change the working directory. If you are already in the *attack.pcaps* directory, please proceed to the next step.

```
paloalto42@extranet1:~$ cd pcaps92019/attack.pcap/ <Enter>
```

3. In the CLI connection, enter the following command to run the simulated attacks.

```
paloalto42@extranet1:~/pcaps92019/attack.pcaps$ ./malwareattacks.sh <Enter>
```

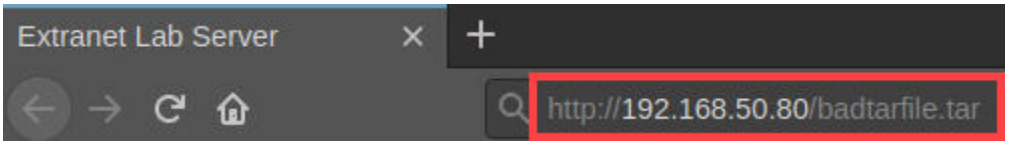
Please Note

This script takes about 6 minutes to complete. Allow the **malwareattacks** script to run uninterrupted.

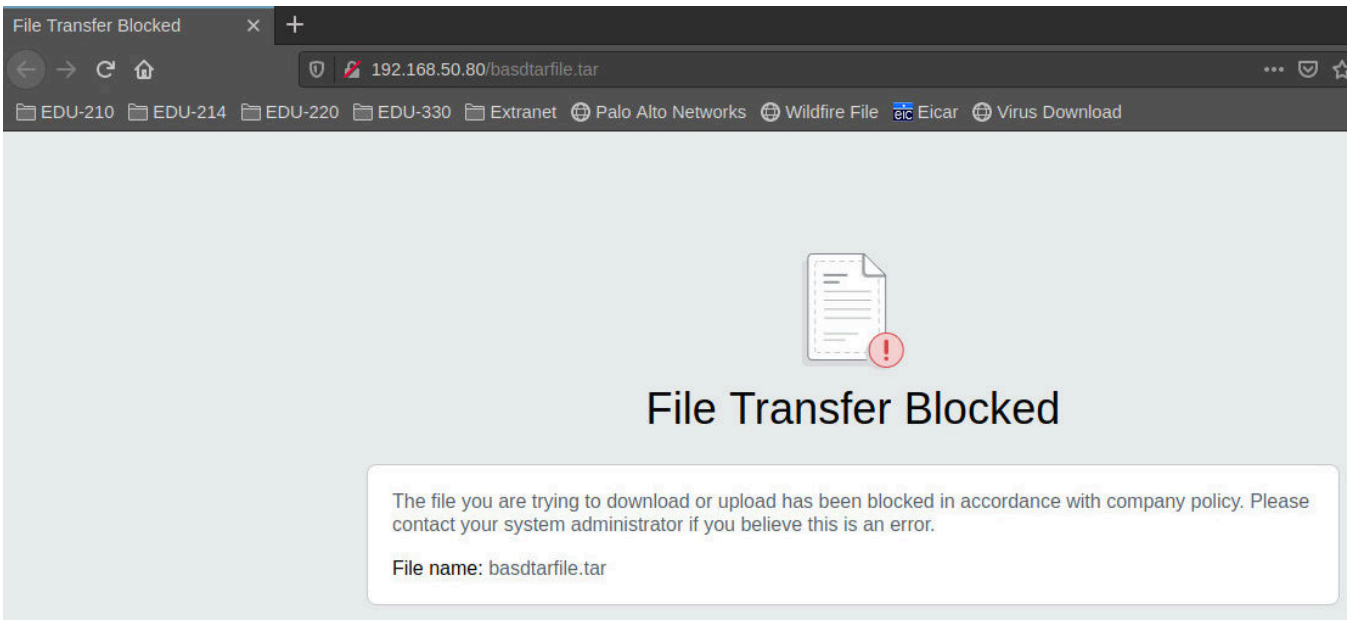
4. Minimize the *Remmina* connection window.

5. On the *client desktop*, open the **Firefox Web Browser** application.

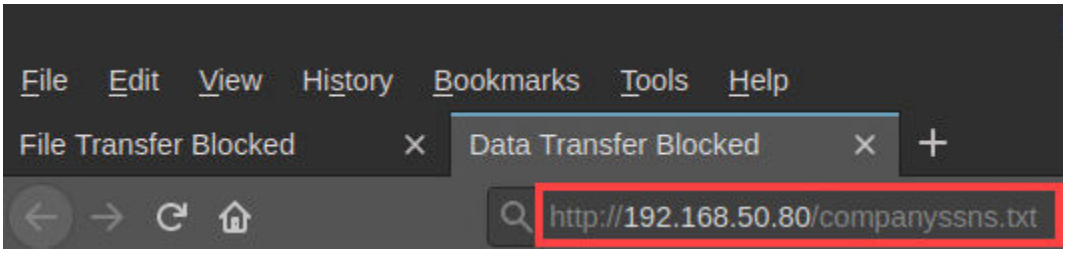
6. Type **`http://192.168.50.80/badtarfile.tar`** and press **Enter**.



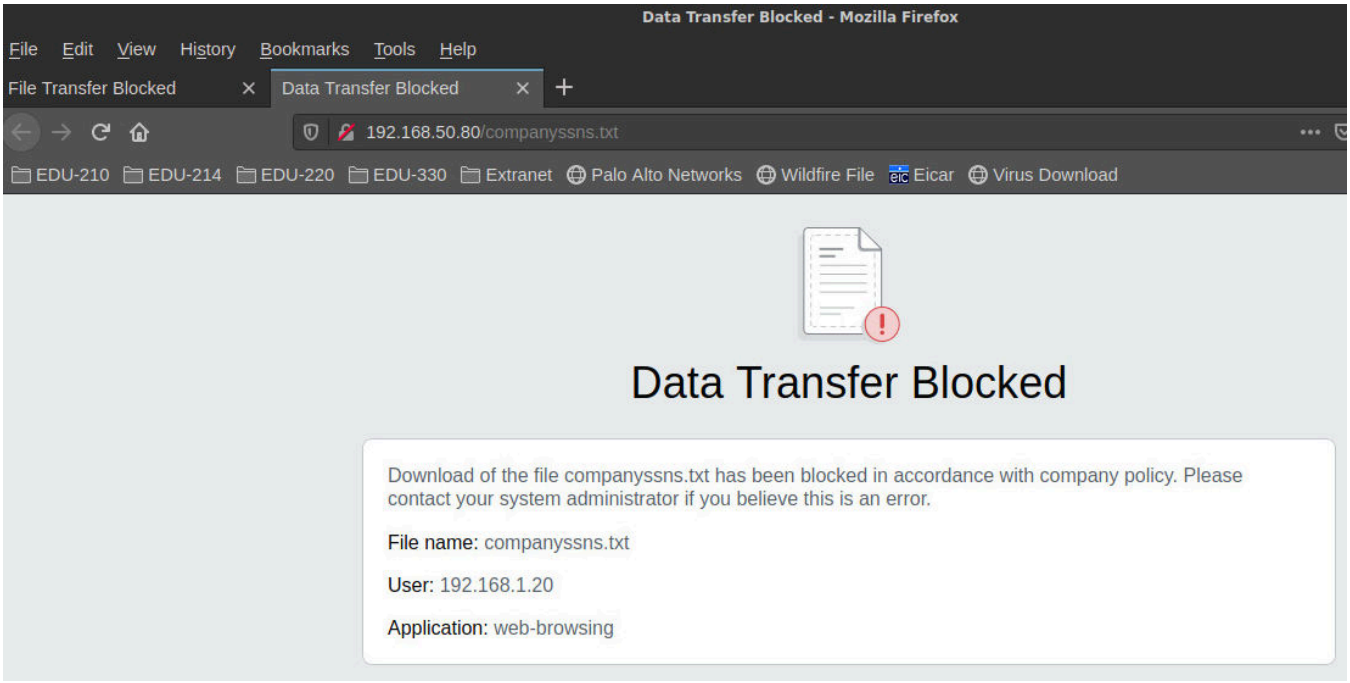
7. You should receive a **File Transfer Blocked** page from the firewall.



8. In *Firefox*, open a new tab. Type **`http://192.168.50.80/companyssns.txt`** and press **Enter.**



9. You should receive a **Data Transfer Blocked** page from the firewall.



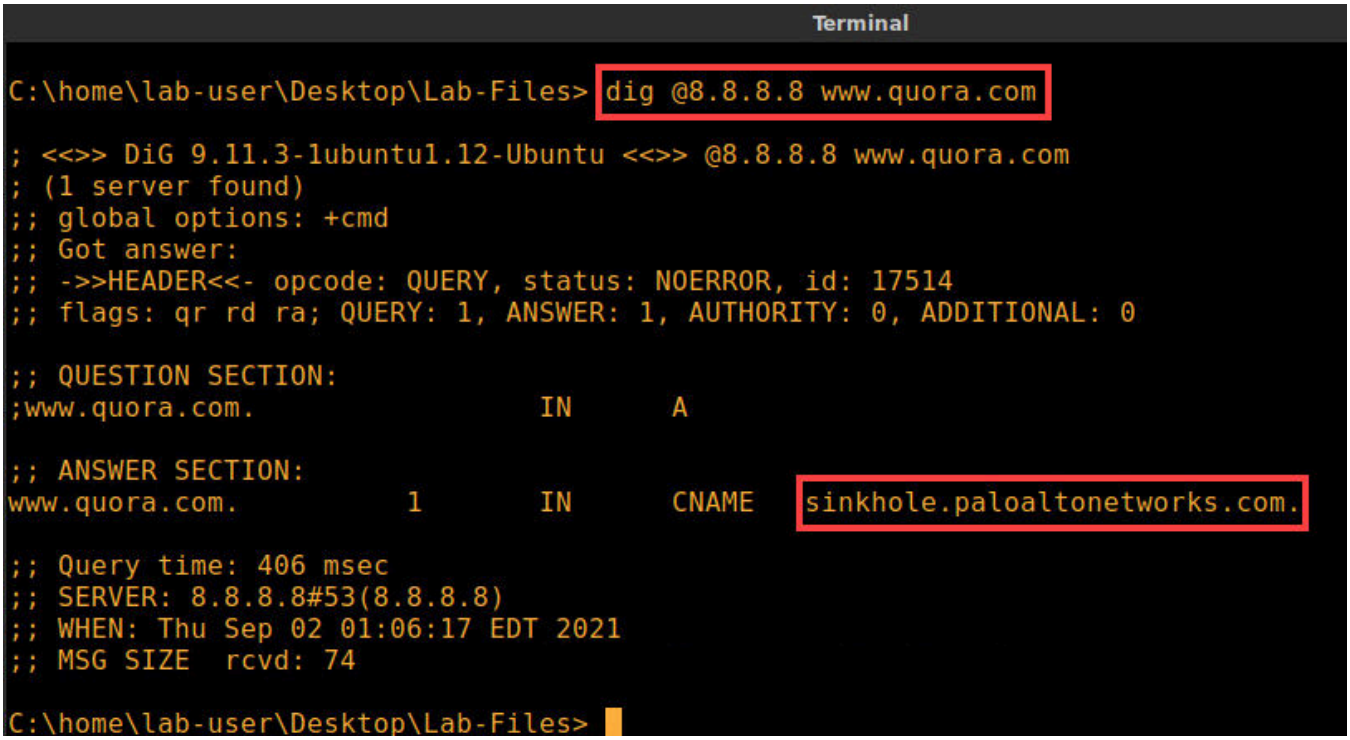
Please Note This page indicates that the firewall has blocked the transfer using the Data Filtering Profile and Data Pattern you defined for Social Security Numbers.

10. Close the *Firefox Web Browser* by clicking the **close** icon.

11. On the client workstation, locate the open Terminal Emulator window you used earlier in this lab. You can maximize by clicking the **Terminal** icon in the taskbar.

12. Enter the following command to generate a DNS query using **dig** to resolve a URL to an IP address. The command returns a public IP address, indicating that the URL is accessible. It will now show the **www.quora.com** *DNS query* is now in the **sinkhole.paloaltonetworks.com**.

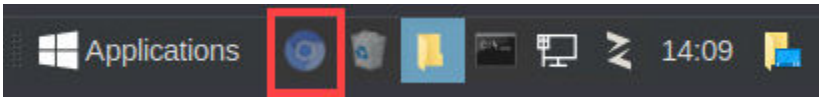
```
C:\home\lab-user\Desktop\Lab-Files> dig @8.8.8.8 www.quora.com
```



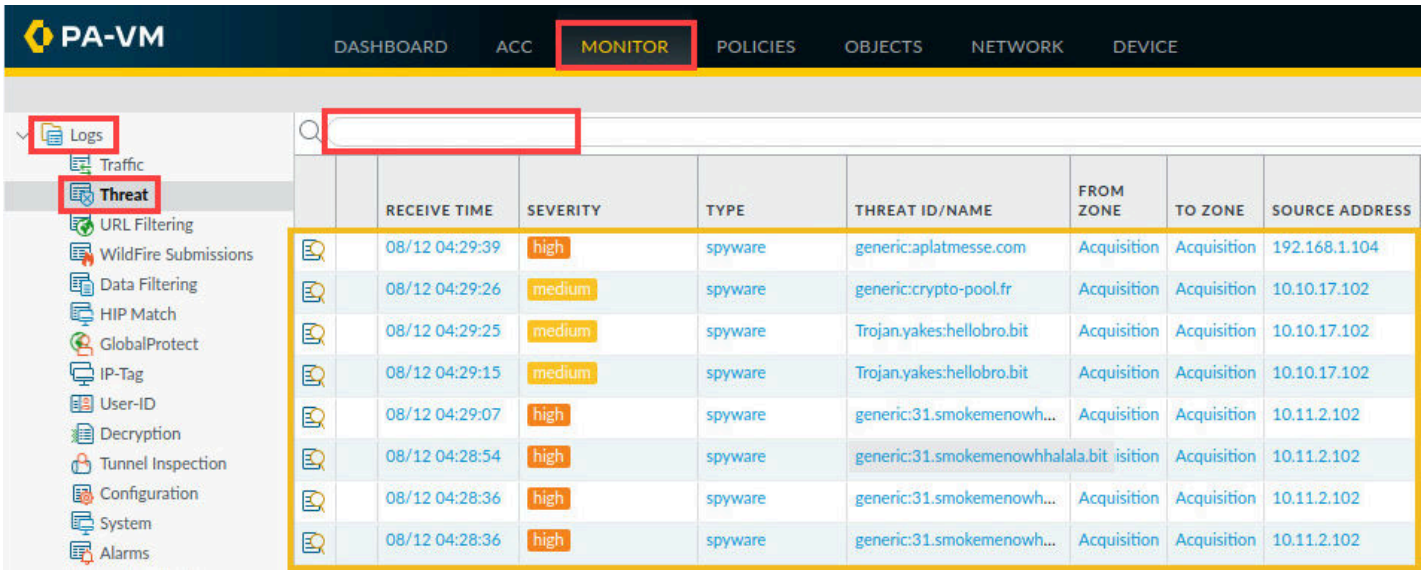
Please Note

This indicates that the firewall has intercepted and sinkholed the DNS query using the DNS Sinkholing function in your Anti-Spyware profile.

13. Reopen the *PA-VM firewall* by clicking on the **Chromium** icon in the *taskbar*.



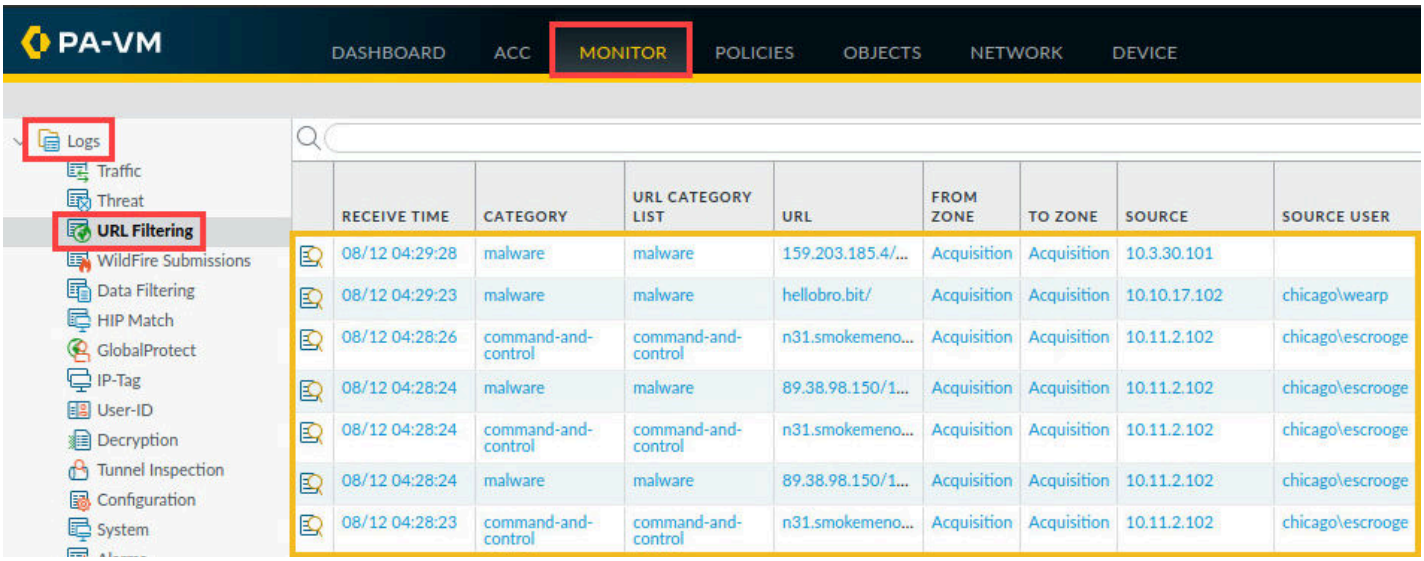
14. In the firewall web interface, select **Monitor > Logs > Threat**. Clear any filters in place and press **Enter**. The Threat Log should contain numerous entries for *Spyware* and *Vulnerabilities*.



Please Note

These entries indicate that the firewall has blocked malicious traffic using the Vulnerability and Anti-Spyware profiles that you defined. Note that the entries you see in the Threat Log may differ from the example shown here. The table may not contain very many entries until the malwareattacks script is finished. Use the refresh button periodically to update the table. Also, several Threat Log columns have been hidden in this example.

15. Select **Monitor > Logs > URL Filtering**. Note the numerous entries for blocked URLs.



Please Note

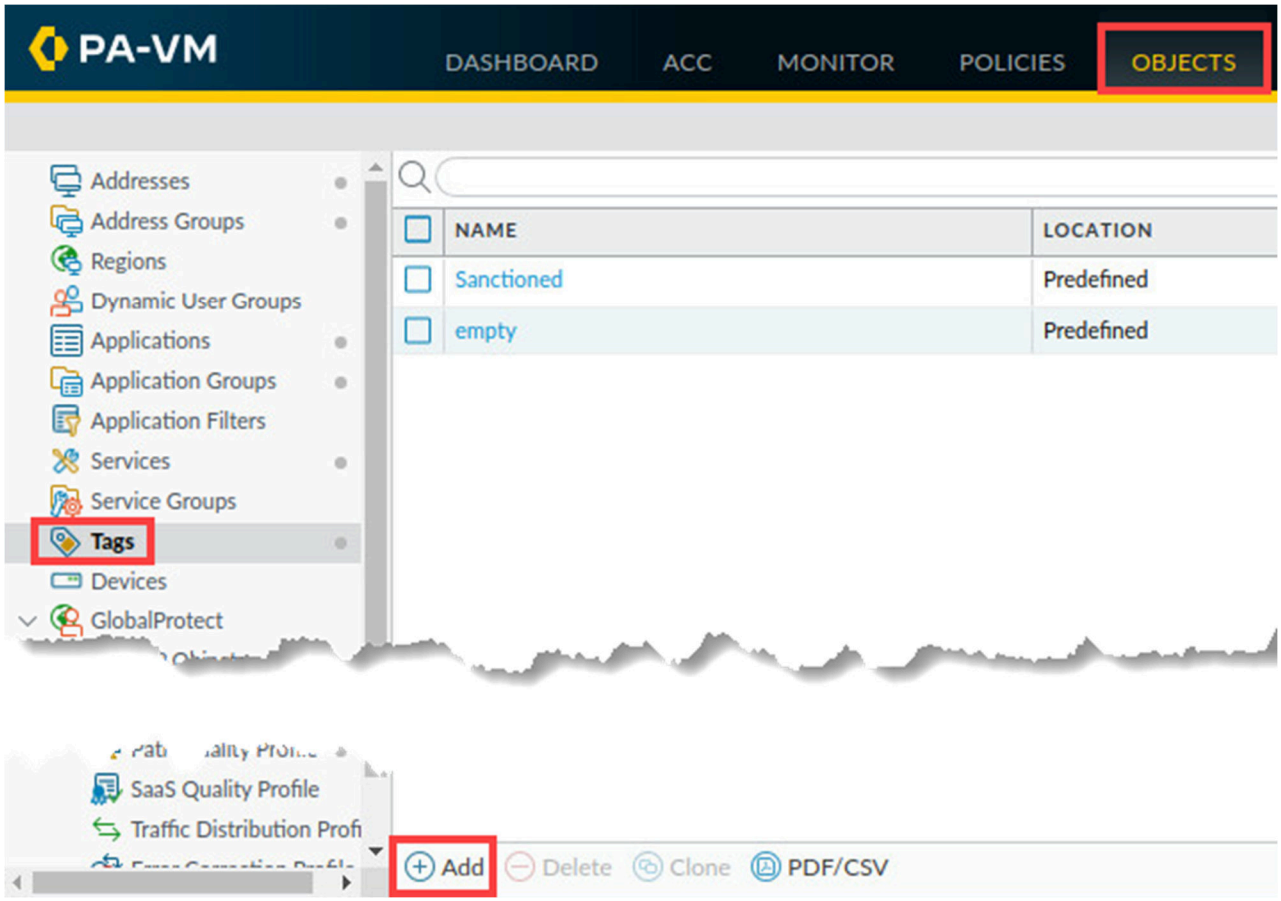
These entries indicate that the firewall has blocked access to dangerous URL categories using the URL Filtering profile you defined. Note that several default columns have been hidden in this example.

16. Leave the *Palo Alto Networks Firewall* open and continue to the next task.

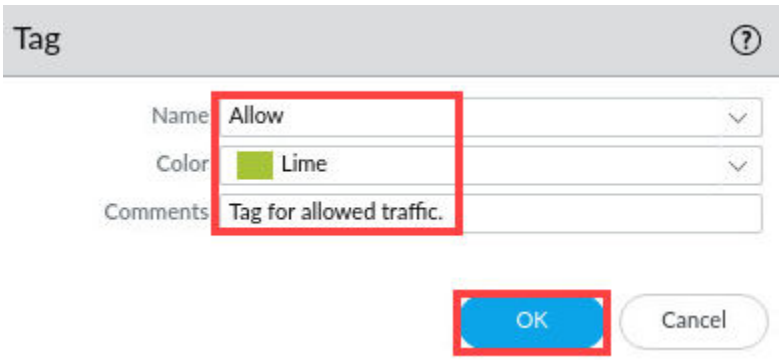
1.10 Create Tags

You can create color-coded labels for use in various places within the firewall web configuration. These labels can be visual aids that help you more quickly locate information. In this section, you will create Tags to use with your security policy rules.

1. Select **Objects > Tags.** Click **Add.**

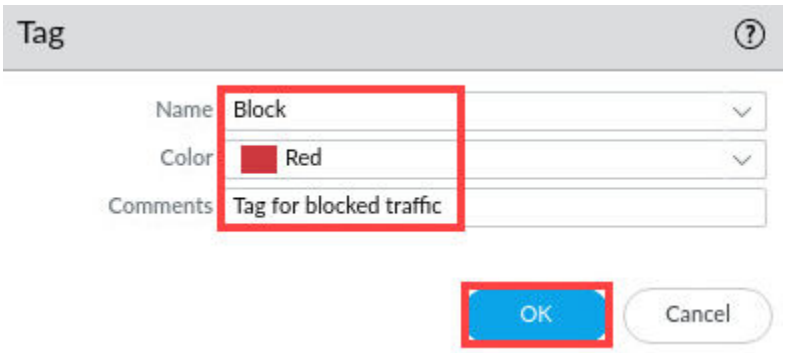


2. In the *Tag* window, Enter **`Allow`** for the *Name*. For *Color*, select **Lime**. For *comments,* type **`Tag for allowed traffic`**. Click **OK**.



3. In the *Tags* window, click **Add** again.

4. In the *Tag* window, Enter **Block** for the Name. For *Color*, select **Red**. For *Comments,* type **`Tag for blocked traffic`**. Click **OK**.

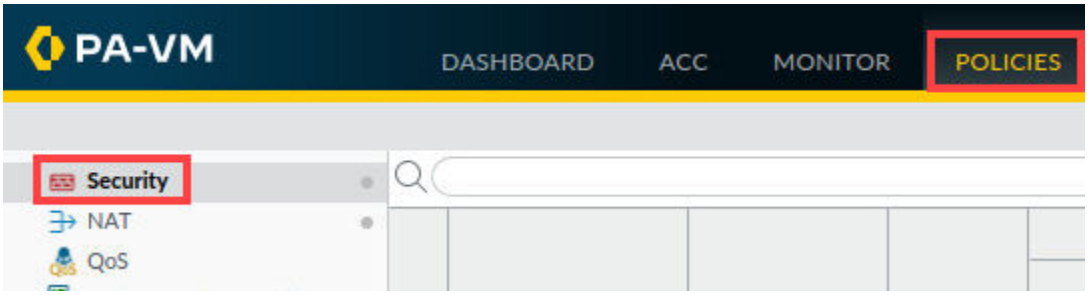


5. Leave the *Palo Alto Networks Firewall* open and continue to the next task.

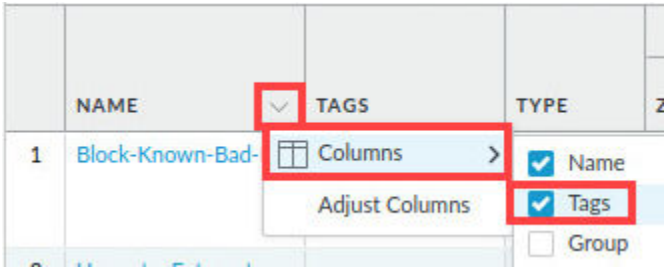
1.11 Apply Tags to Security Policy Rule

With the Tags defined, you can assign them to your security rules. You will assign the Allow tag to all rules which have an action of Allow. You will assign the Blocked tag to all rules which have an action of Deny.

1. In the firewall web browser, select **Policies > Security**.

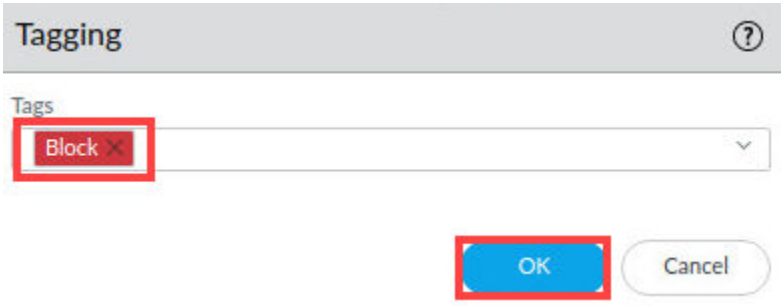


2. If the *Tags* column is not showing, add the **Tags** column to the display. Click the small triangle in the column header for *Name*. Select **Columns** and **check** the box for **Tags**.



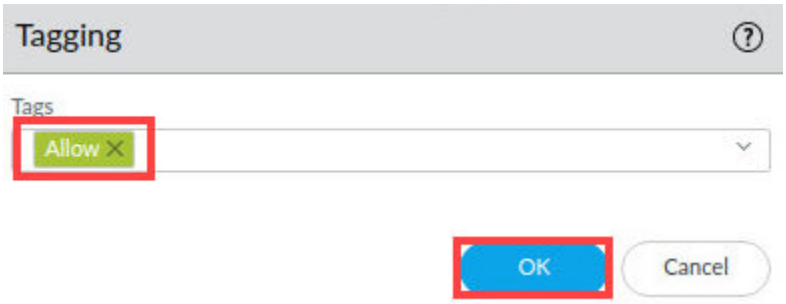
> **Please Note** Note that if you have already displayed the Tags column in the Security Policy Rule table, you can drag and drop it beside the Name column.

3. In the row for *Block-Known-Bad-IPs*, click the link for **none** under the *Tags* column. In the *Tagging window*, select **Block** from the dropdown box. Click **OK**.



4. Repeat this process for each remaining rule in the list, applying the appropriate **Allow** or **Blocked** tag, depending on the rule action.

   - **Users_to_Extranet –** Click **OK.**
   - **Users_to_Internet –** Click **OK**
   - **Extranet_to_Internet –** Click **OK**
   - **Extranet_to_Users_Net –** Click **OK**
   - **Allow-PANW-Apps –** Click **OK**
   - **Acquisition-Allow-All –** Click **OK**



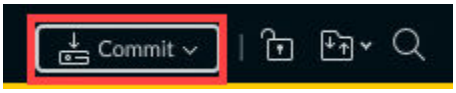
5. When complete, your rules should match the following example.

	NAME	TAGS	TYPE
1	Block-Known-Bad-IPs	Block	universal
2	Users_to_Extranet	Allow	universal
3	Users_to_Internet	Allow	universal
4	Extranet_to_Internet	Allow	universal
5	Extranet_to_Users_N...	Allow	universal
6	Allow-PANW-Apps	Allow	universal
7	Acquisition-Allow-All	Allow	universal

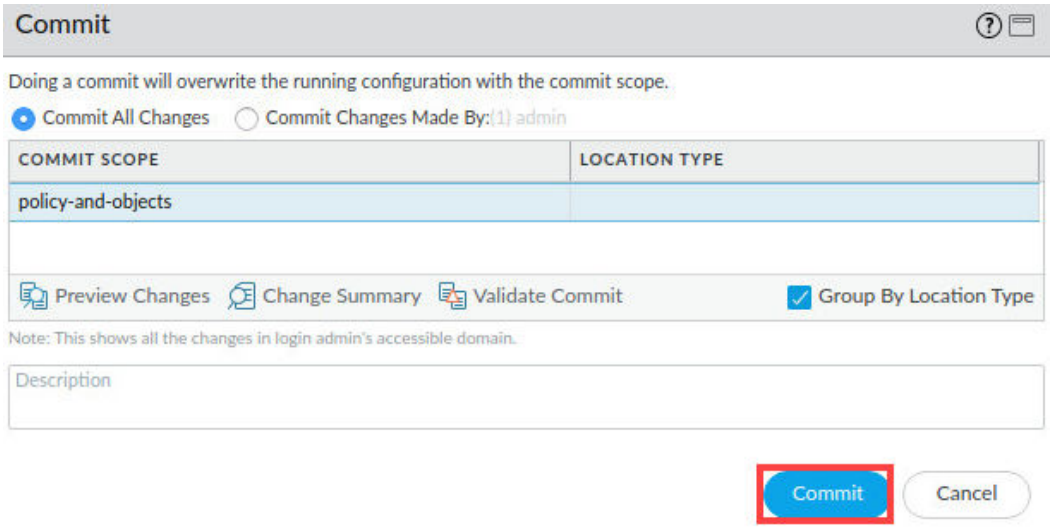
Please Note

Note that this is a simple illustration of how to create and apply Tags to your security policy rules. You can also apply more than one Tag to your rules.

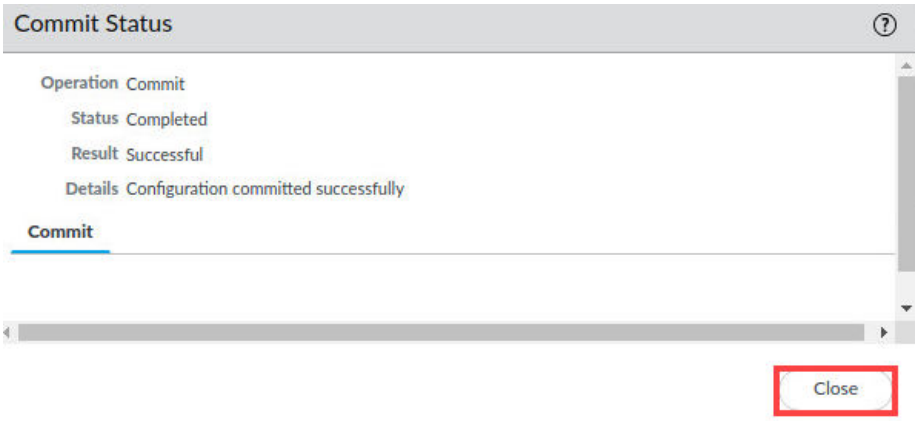
6. Click the **Commit** link located at the top-right of the web interface.



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



8. When the *Commit* operation successfully completes, click **Close** to continue.

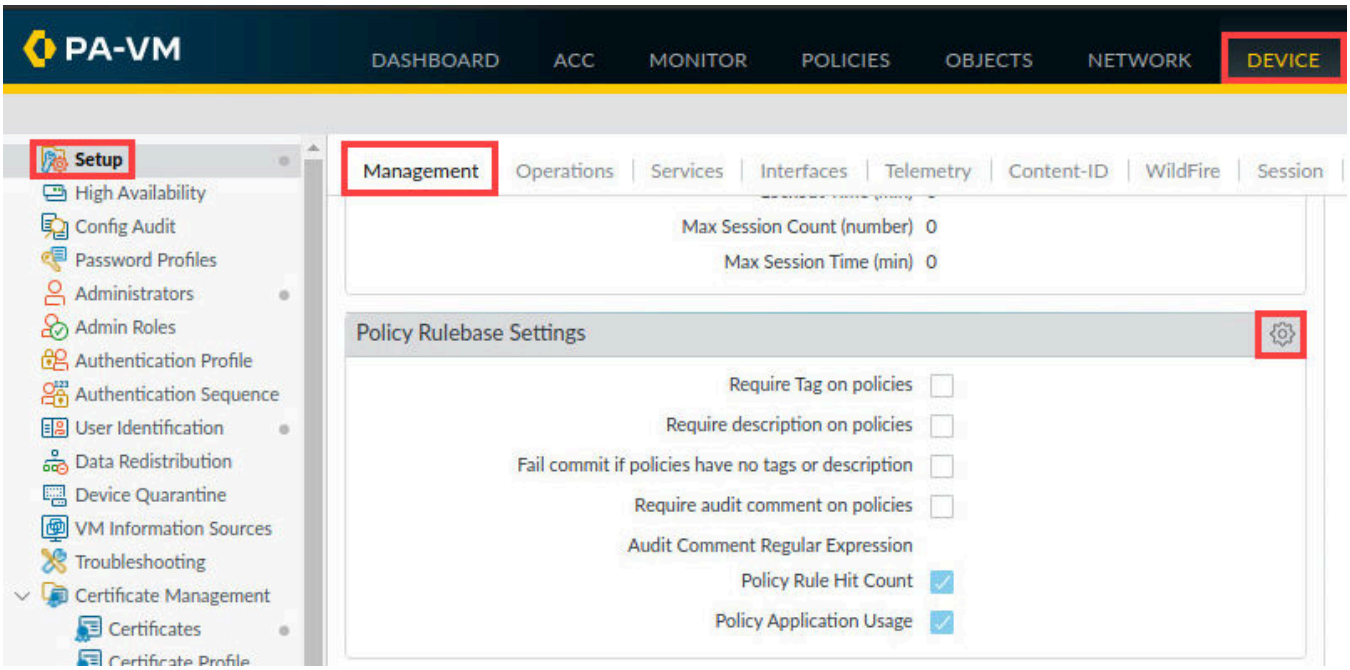


9. Leave the *Palo Alto Networks Firewall* open and continue to the next task.

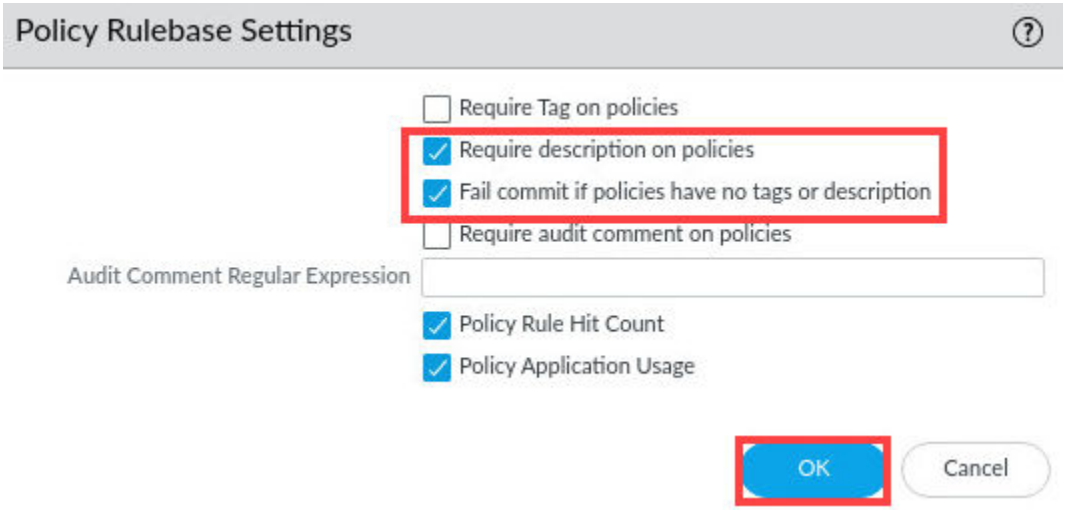
1.12 Enforce Rule Tags and Description Requirements

You can force firewall administrators to supply information in the *Description* field of security policy rules and to apply a **Tag** as well. This additional information can help you determine why a rule has been created and what it was meant to accomplish.

1. Select **Device > Setup > Management**. Scroll down and locate the section for *Policy Rulebase Settings***.** Click the **gear** icon to edit these settings.

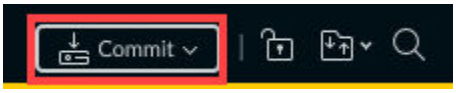


2. In the *Policy Rulebase Settings* window, check the boxes for **Require description on policies** and **Fail commit if policies have no tags or description**. Click **OK**.

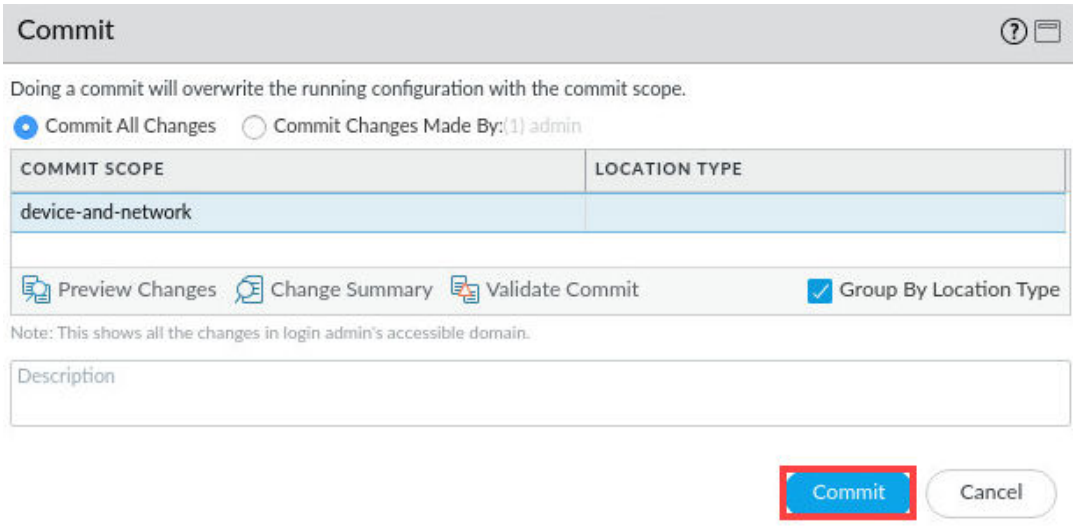


Please Note If you check the option for Require Tag on policies, you will need to modify your NAT Policy rules and assign a Tag to each of them.

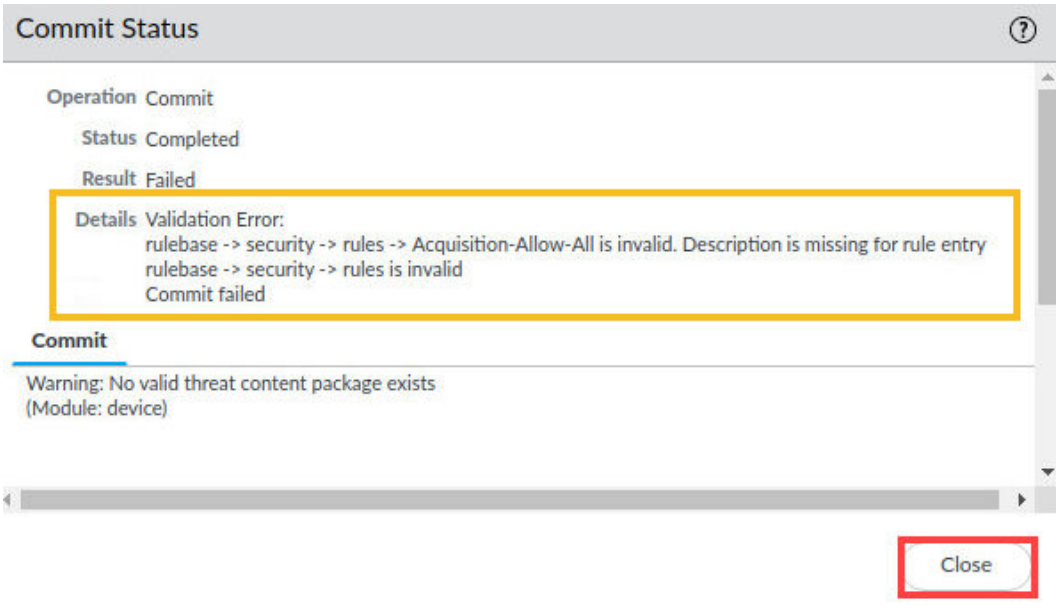
3. Click the **Commit** link located at the top-right of the web interface.



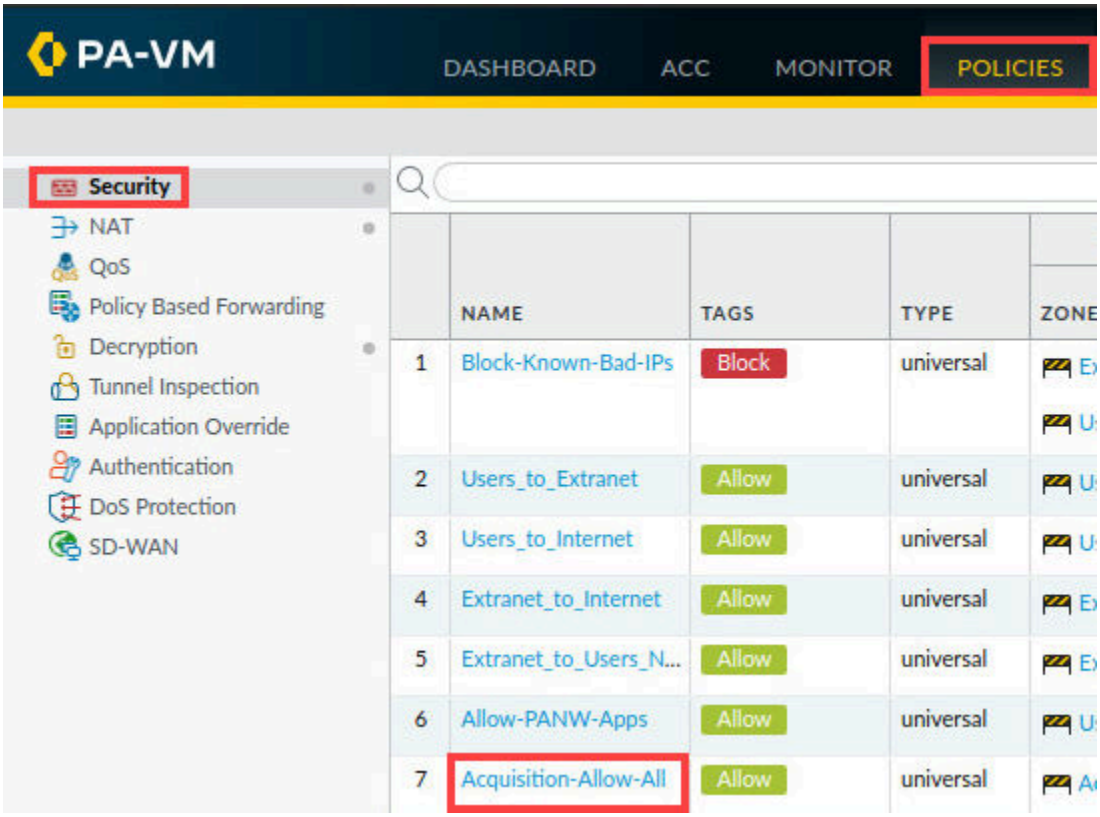
4. In the *Commit* window, click **Commit** to proceed with committing the changes.



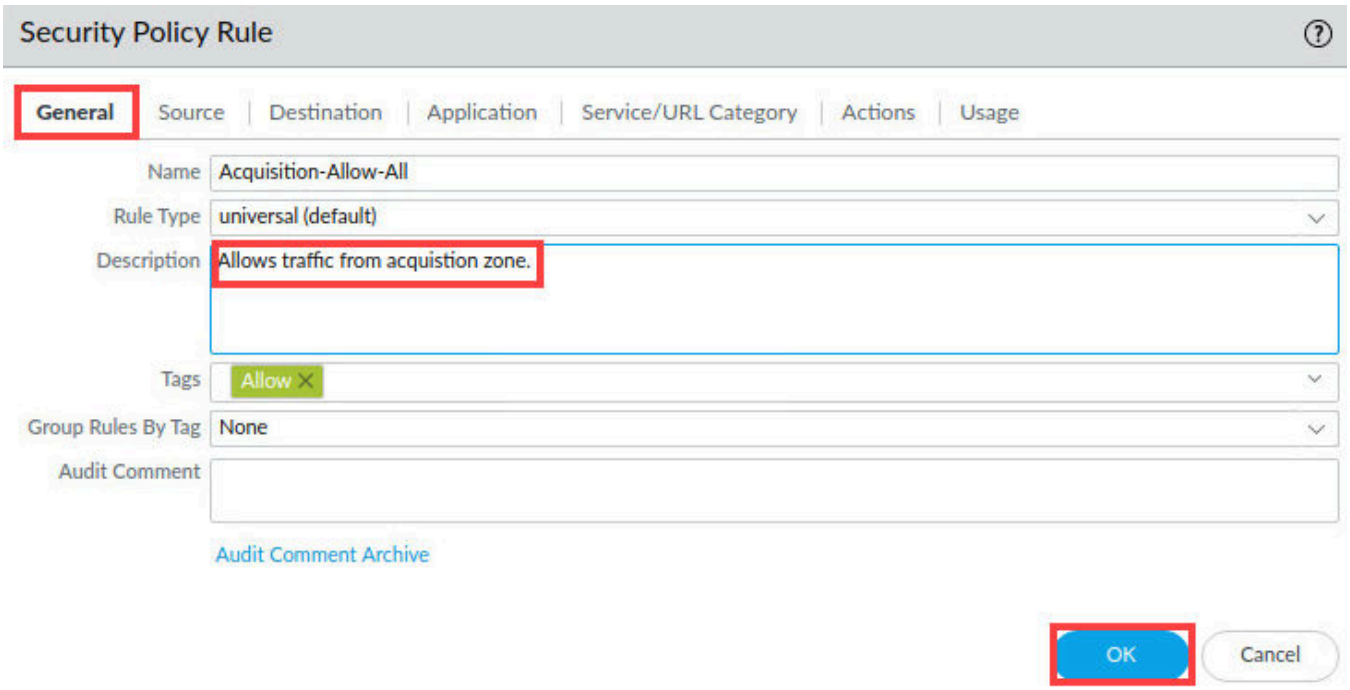
5. You should see a message indicating that one of the rules does not have a **Description**. When the commit operation successfully completes, click **Close** to continue.



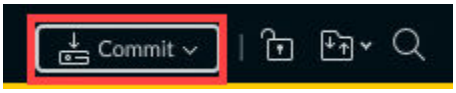
6. Select **Policies > Security**. Click the **Acquisition-Allow-All** rule to open it.



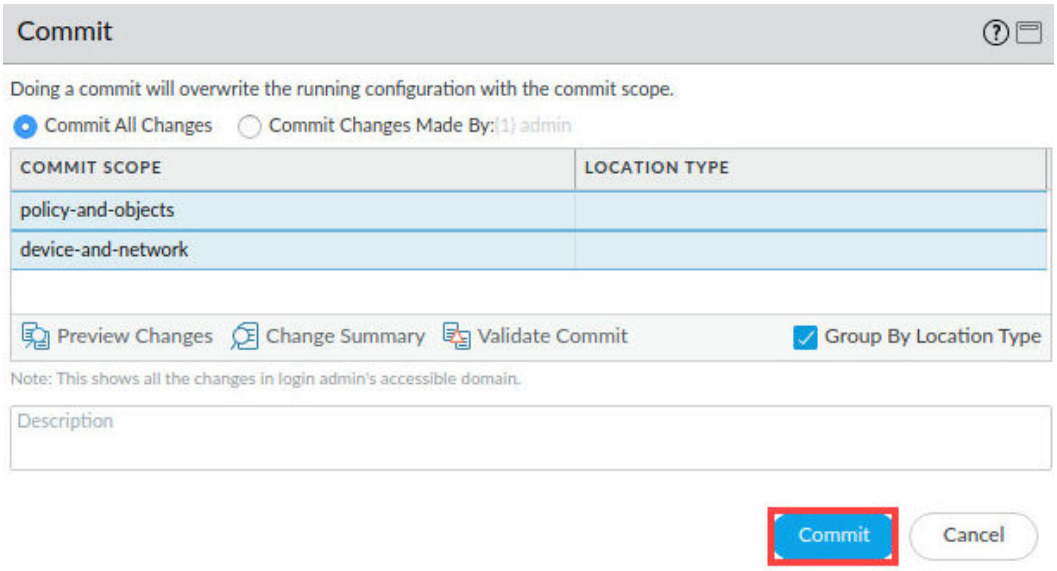
7. In the *Security Policy Rule* window, on the *General* tab, enter **Allows traffic from acquisition zone** for the *Description*. Click **OK**.



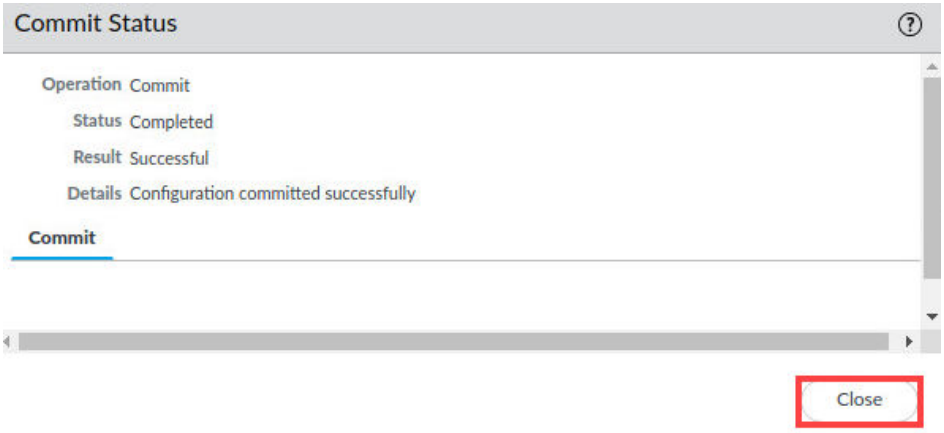
8. Click the **Commit** link located at the top-right of the web interface.



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



10. When the *Commit* operation successfully completes, click **Close** to continue.

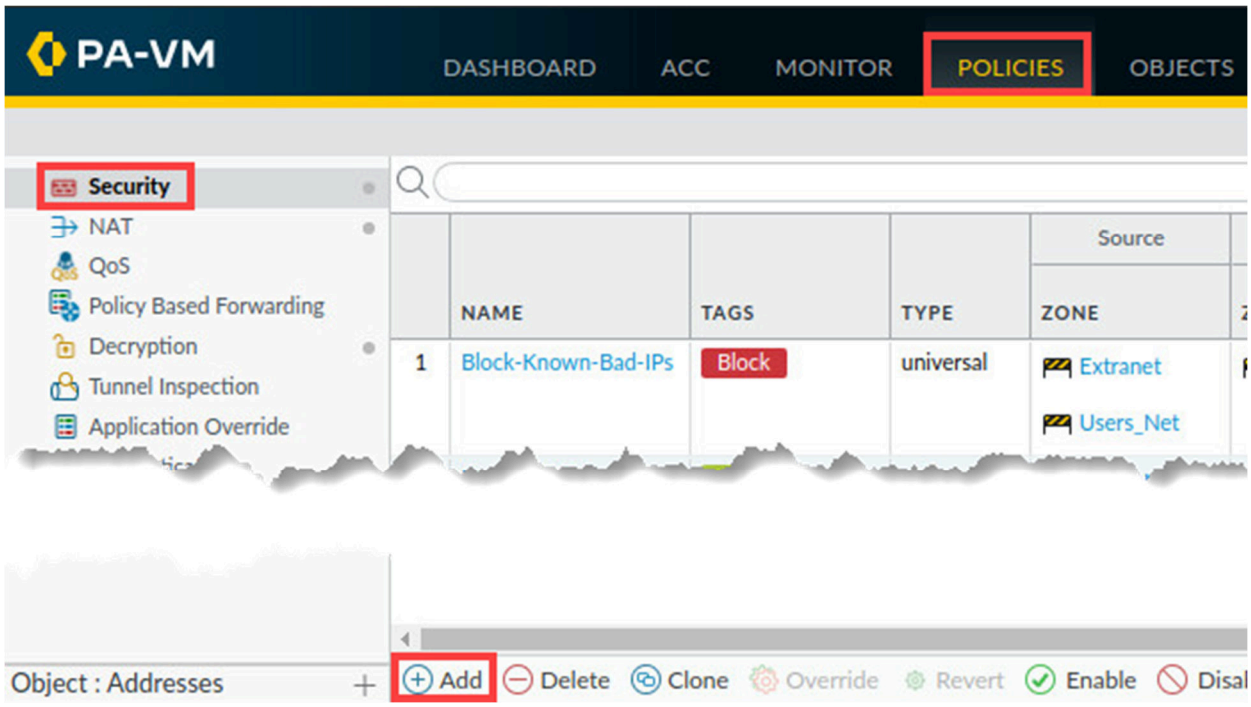


11. Leave the *Palo Alto Networks Firewall* open and continue to the next task.

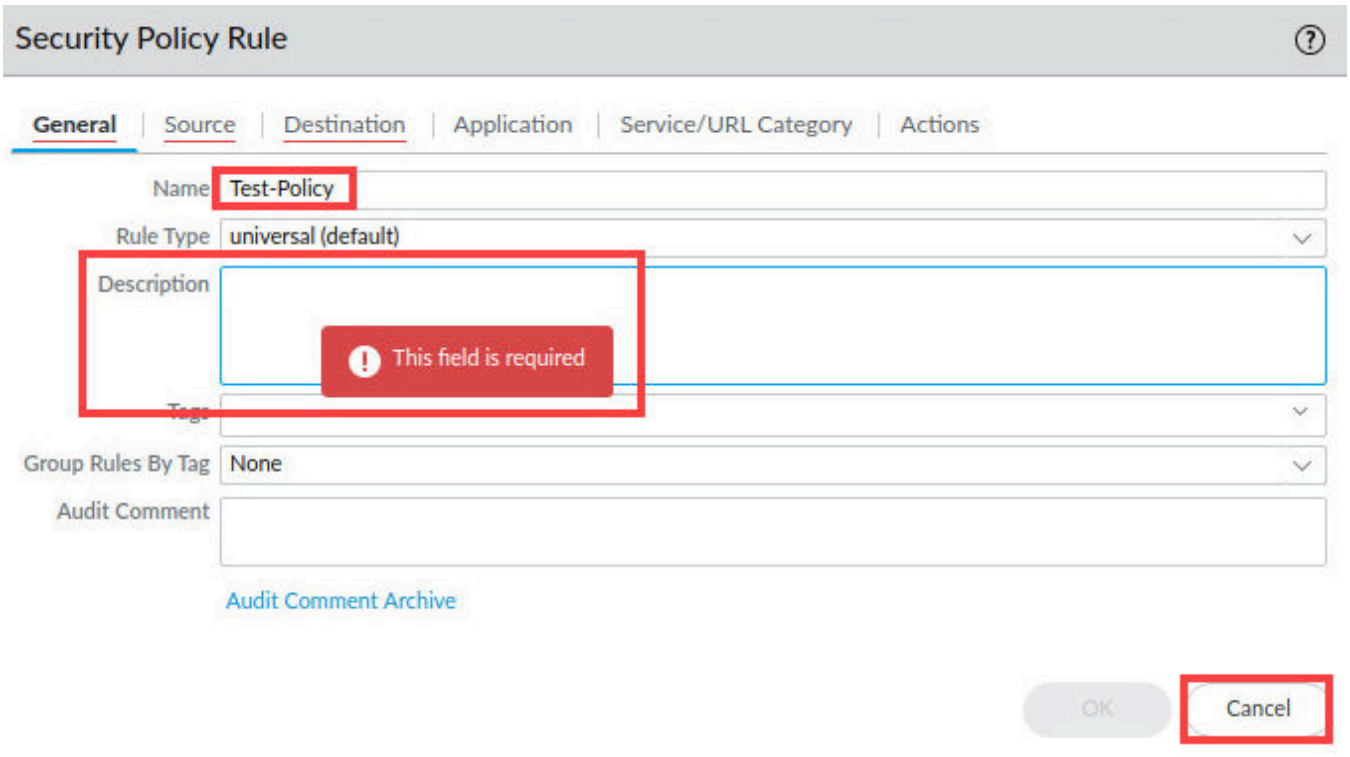
1.13 Test Rule Requirements

In this section, you will create a new security policy rule and attempt to leave out the description. This will let you see what happens when an administrator does not provide adequate information when creating a rule.

1. Ensure you are at **Policies > Security**. Click **Add**.



2. In the *Security Policy Rule* window, enter **`Test-Policy`** for the *Name*. Click inside the **Description** field and note the pop-up indicator. Click **Cancel**.



3. The lab is now complete; you may end your reservation.