PALO ALTO NETWORKS EDU 210

Lab 10: Blocking Threats Using Custom Applications

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Contents

Introduction

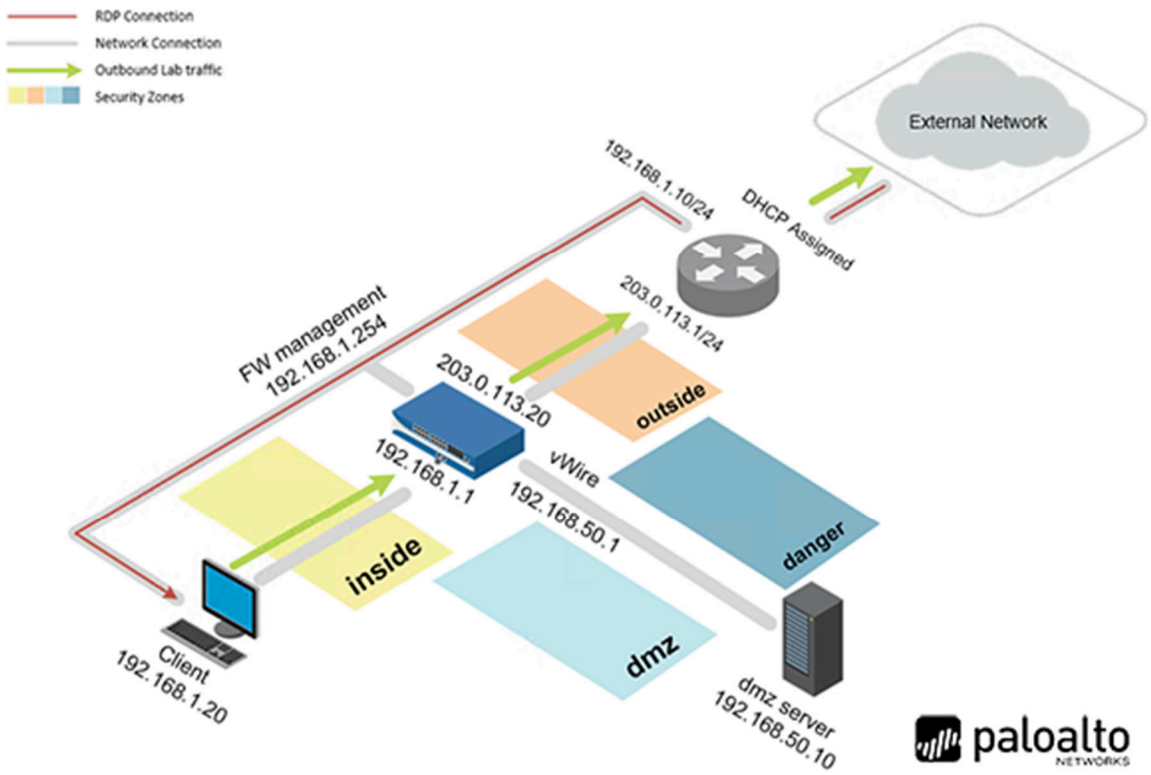
Your company uses a very old application written long ago that provides critical information to the accounting department. This application has not been upgraded yet. There are plans to have a new version developed, but no one seems to have the time to take on the task. You must isolate and secure this application so that the firewall can identify it. However, the application developer (who no longer works for the company) designed the application to run on TCP port 80 and use the HTTP protocol. Because the application is so like general web-browsing, you need to identify unique characteristics of this application traffic so that you can create a custom signature for it.

Objective

In this lab, you will perform the following tasks:

- Load a baseline configuration
- Gather custom application information
- Configure a packet capture
- Capture application traffic
- Analyze the packet capture
- Create a custom application with a signature
- Add the custom application to the security policy
- Test the custom application signature

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.

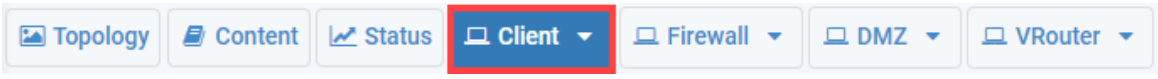
Virtual Machine	IP Address	Account (if needed)	Password (if needed)
Client	192.168.1.20	lab-user	**Pal0Alt0!**
DMZ	192.168.50.10	root	**Pal0Alt0!**
Firewall	192.168.1.254	admin	**Pal0Alt0!**
VRouter	192.168.1.10	root	**Pal0Alt0!**

1 Blocking Threats Using Custom Applications

1.1 Apply a Baseline Configuration to the Firewall

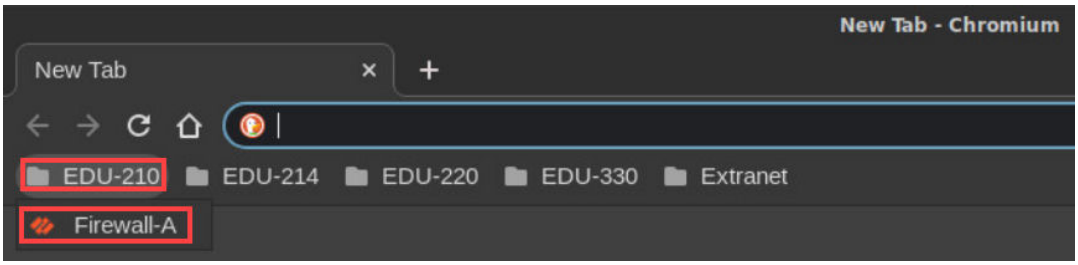
In this section, you will load the Firewall configuration file.

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

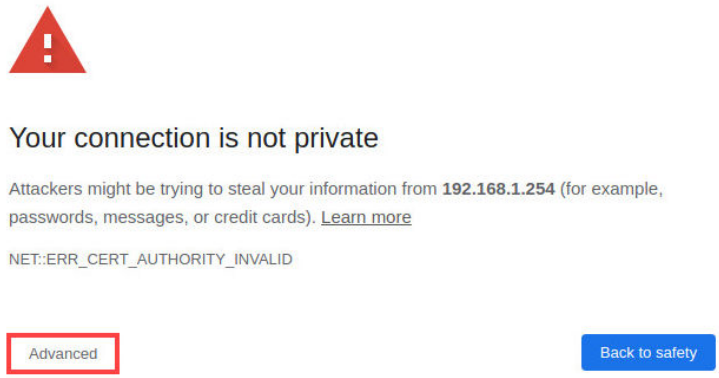


2. Double-click the **Chromium Web Browser** icon located on the desktop.

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

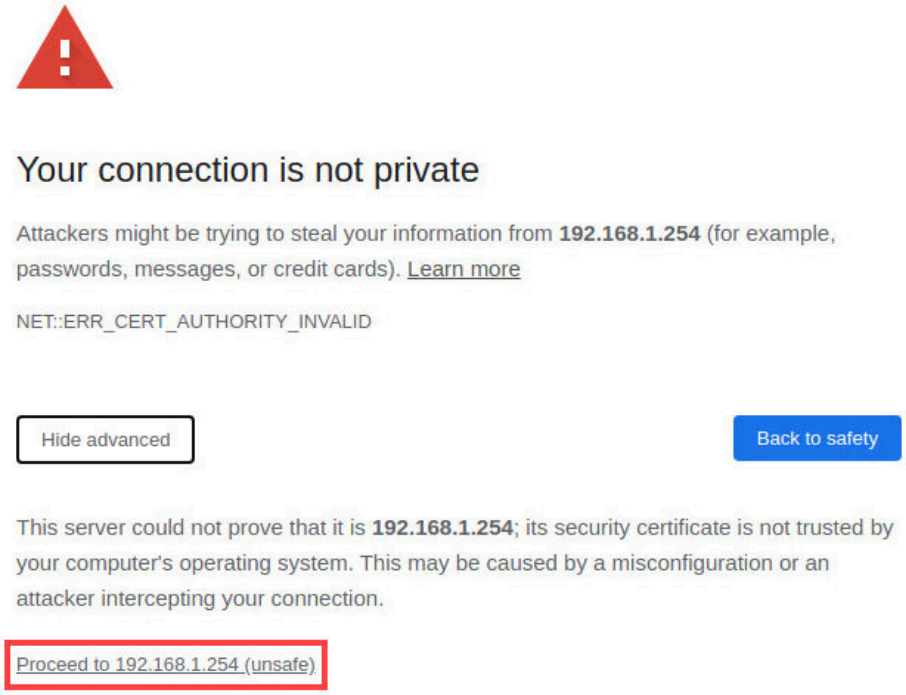


4. You will see a "*Your connection is not private*" message. Next, click on the **ADVANCED** link.



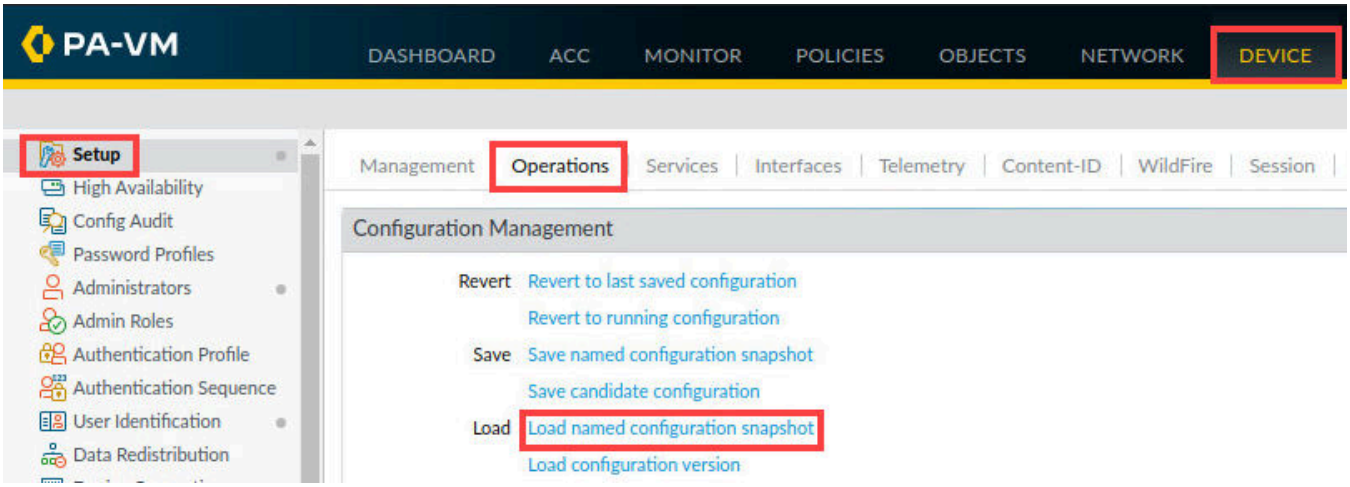
If you experience the “Unable to connect” or “502 Bad Gateway” message while attempting to connect to the specified IP above, please wait an additional 1-3 minutes for the Firewall to fully initialize. Refresh the page to continue.

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

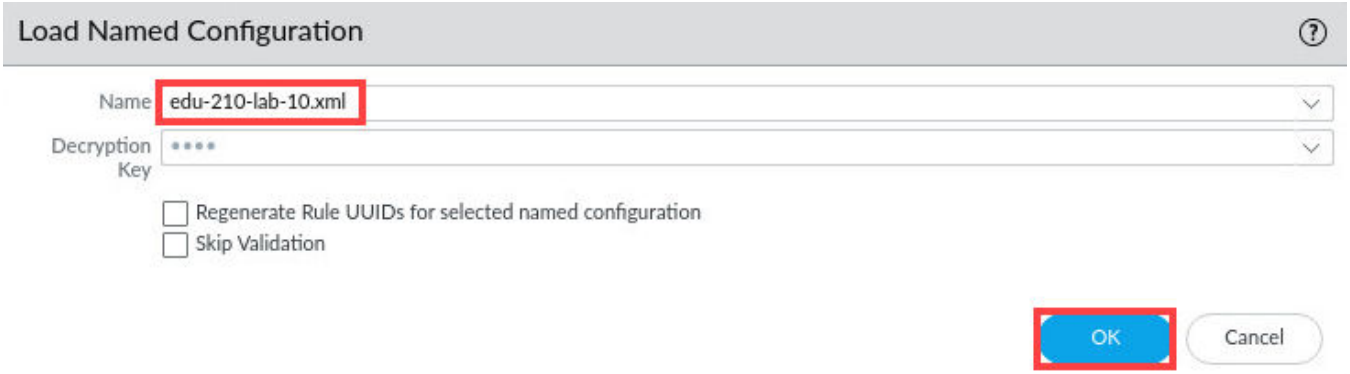


6. Log in to the firewall web interface as username **`admin`**, password **`Pal0Alt0!.`**

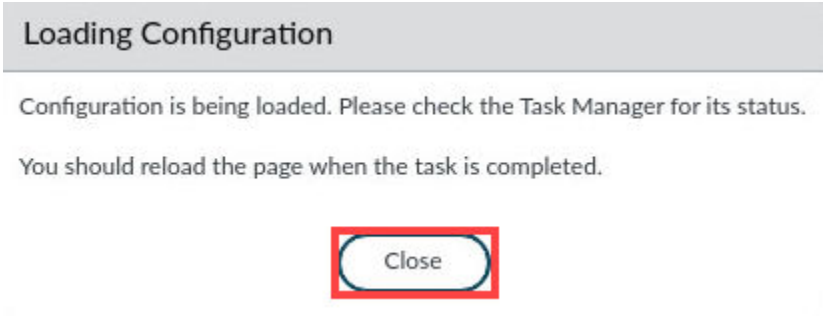
7. In the web interface, navigate to **Device > Setup > Operations** and click on **Load named configuration snapshot** underneath the *Configuration Management* section.



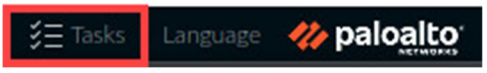
8. In the *Load Named Configuration* window, select **edu-210-lab-10.xml** from the *Name* dropdown box and click **OK**.



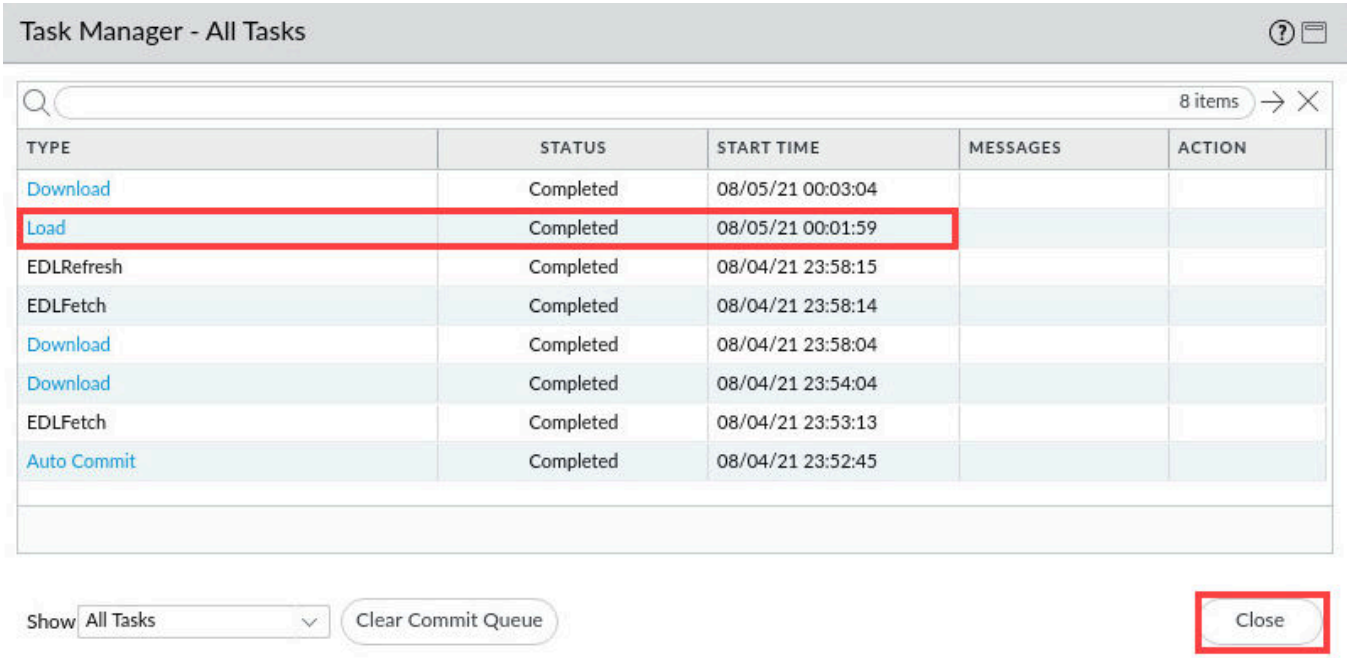
9. In the *Loading Configuration* window, a message will show *Configuration is being loaded. Please check the Task Manager for its status. You should reload the page when the task is completed.* Click **Close** to continue.



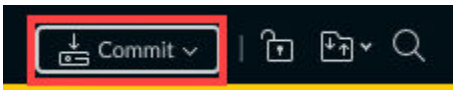
10. Click the **Tasks** icon located at the bottom-right of the web interface.



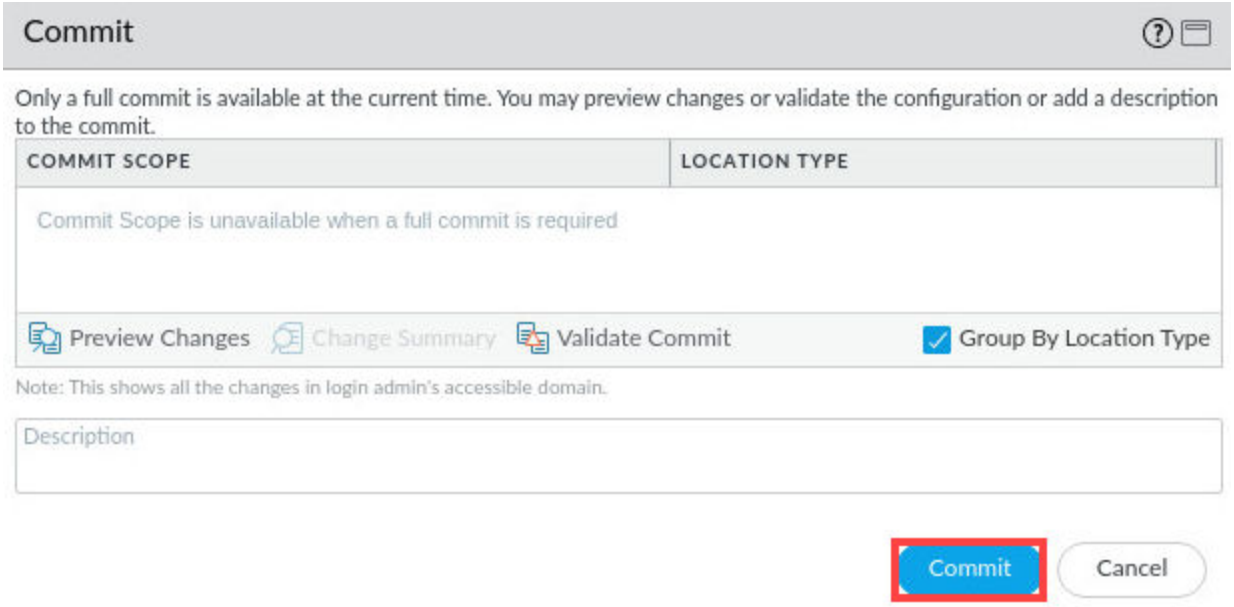
11. In the *Task Manager – All Tasks* window, verify the *Load* type has successfully completed. Click **Close**.



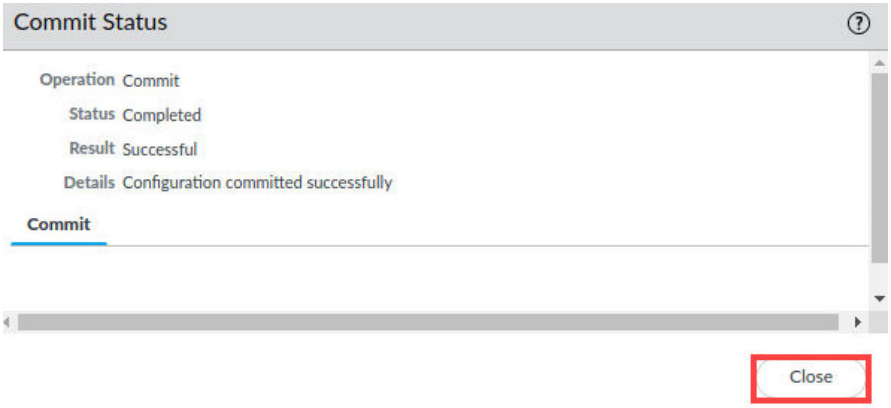
12. Click the **Commit** link located at the top-right of the web interface.



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



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



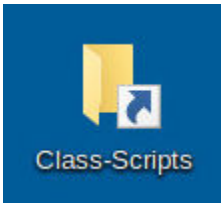
The commit process takes changes made to the firewall and copies them to the running configuration, which will activate all configuration changes since the last commit.

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

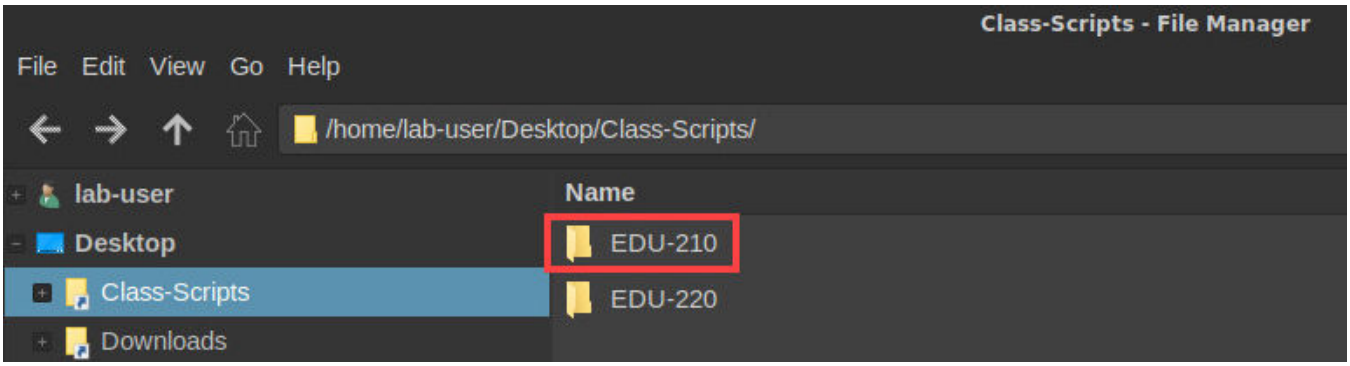
1.2 Gather Custom Application Information

You will gather information about the traffic that this application uses so that you can create a custom application signature.

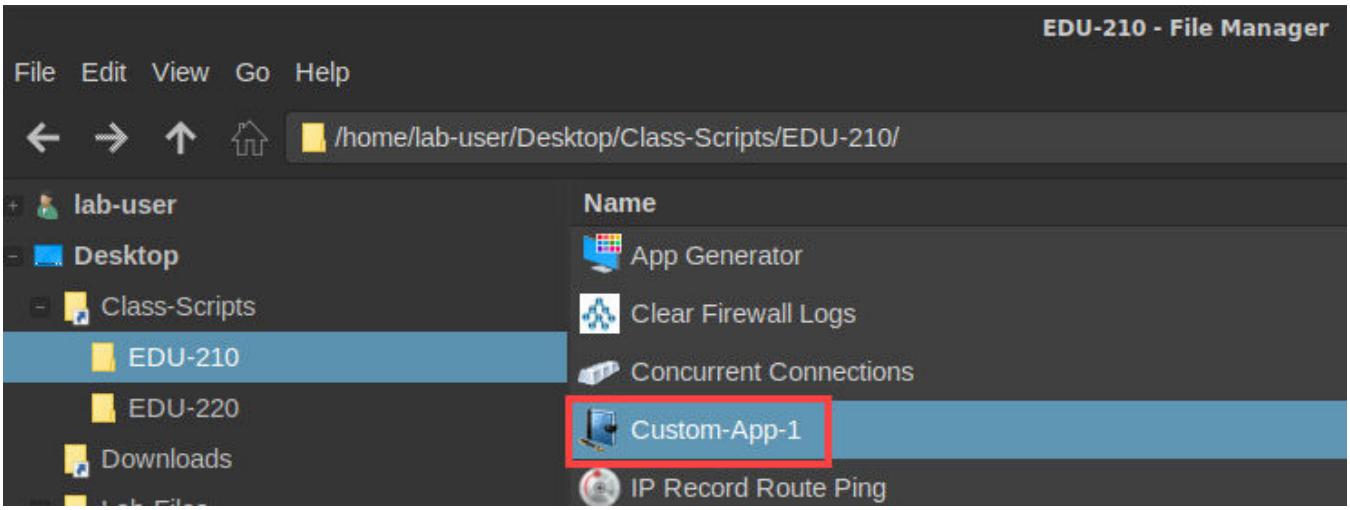
1. On the *client desktop*, double-click the folder for **Class-Scripts**.



2. Open the **EDU-210** folder.

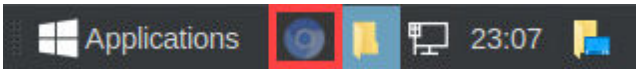


3. Double-click the icon for **Custom-App-1**.

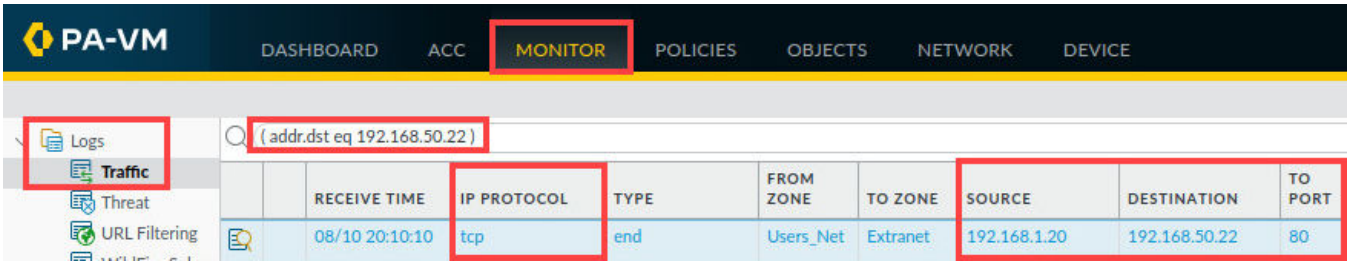


4. Press **Enter** to start the *Custom-App-1* script. Allow the script to complete. Once the *Custom-App-1* script completes, press **Enter**.

5. If you minimized the *firewall*, reopen the *firewall* interface by clicking on the **Chromium** tab in the taskbar.



6. In the web interface, select **Monitor > Logs > Traffic**. Create and apply the following new filter **`( addr.dst eq 192.168.50.22 )`** in the filter builder. Write down the *Source IP address*, Destination *IP address*, *Port number*, and the *IP protocol*. If the *IP Protocol* column is not displayed, place your mouse pointer over any column header and select **Columns > IP Protocol**.

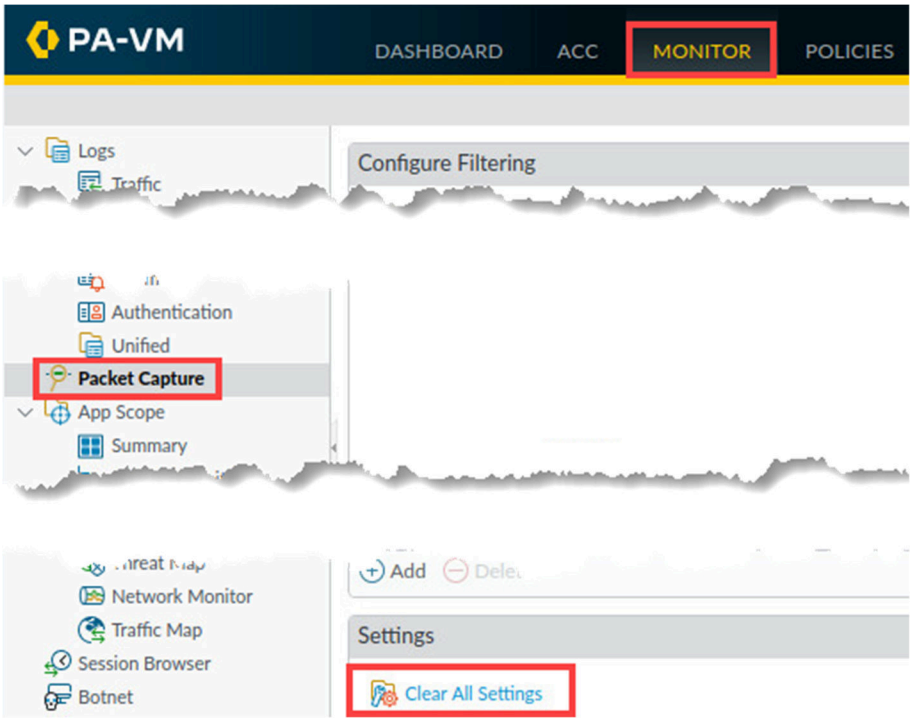


7. Leave the *Palo Alto Networks Firewall* open and continue to the next task.

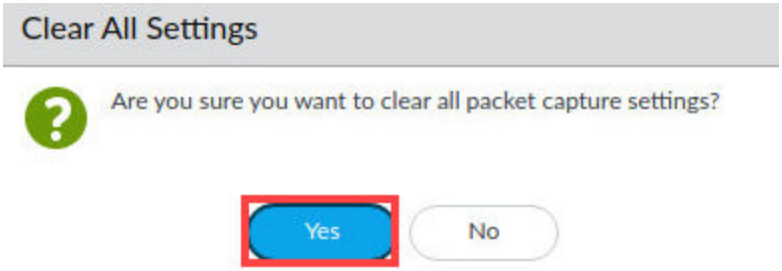
1.3 Configure a Packet Capture

In this section, you will configure a packet capture on the firewall's data plane. The goal of the packet capture is to identify a unique bit pattern that can be used to create a custom application signature.

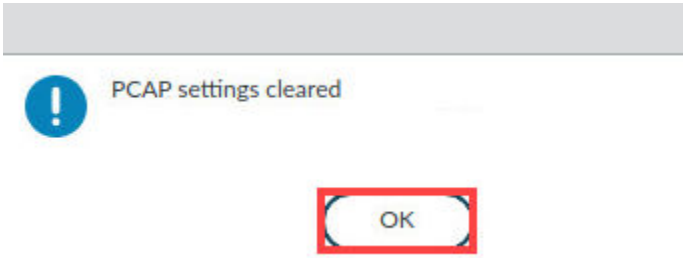
1. In the web interface, select **Monitor > Packet Capture**. Click **Clear All Settings**.



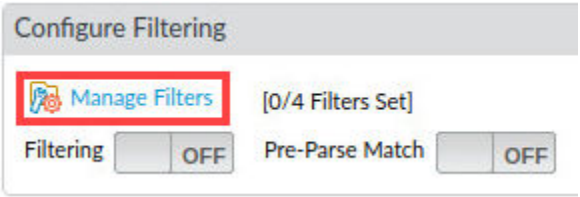
2. In the *Clear All Settings* window, click **Yes**.



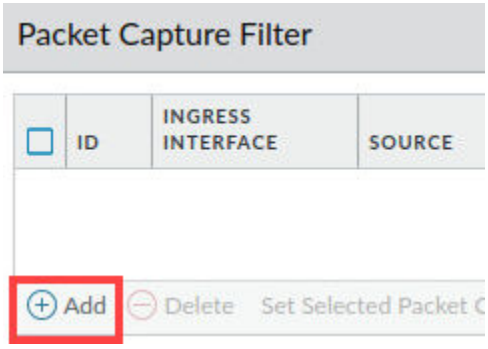
3. In the *PCAP settings cleared* window, click **OK**.



4. In the *Configure Filtering* window, click **Manage Filters**.

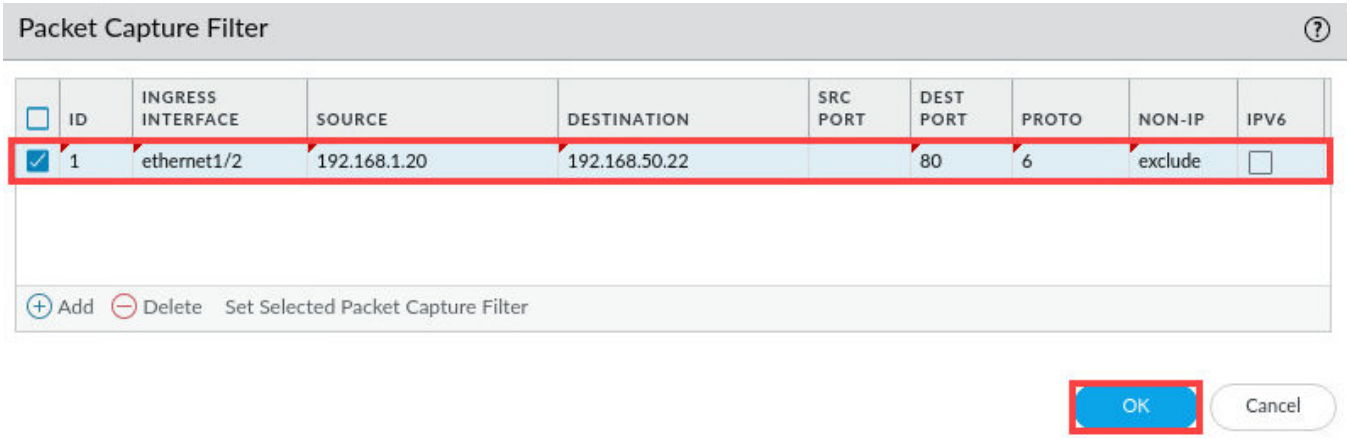


5. In the *Packet Capture Filter* window, click **Add**.



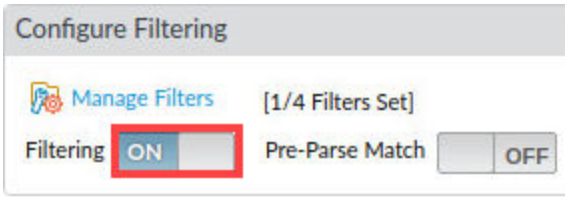
6. In the *Packet Capture Stage* window, configure the following. Click **OK**.

Parameter	Value
Id	**1**
Ingress Interface	**ethernet1/2**
Source	**192.168.1.20**
Destination	**192.168.50.22**
Dest Port	**80**
Proto	**6** (This number is assigned to TCP.)
Non-IP	**exclude**

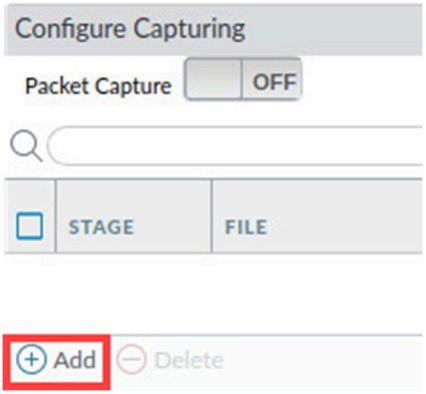


In Internet Protocol v4, there is a value called protocol to associate the next level protocol. 6 is the number assigned to TCP.

7. Toggle the *Filtering* button to **ON**.

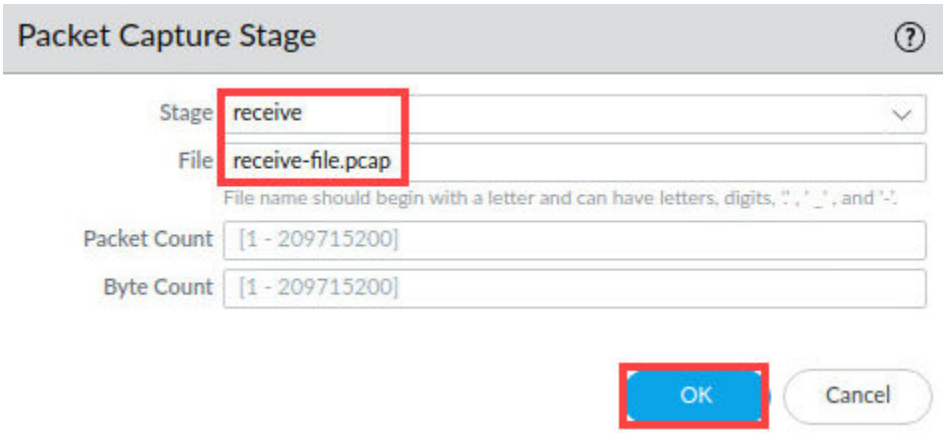


8. Under the section for *Configure Capturing*, click **Add** to configure a file for the receive stage on the firewall.



9. In the *Packet Capture Stage* window, configure the following. Click **OK**.

Parameter	Value
Stage	**receive**
File	**`receive-file.pcap`**

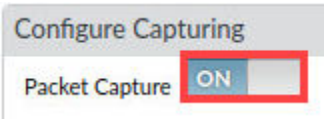


10. Leave the *Palo Alto Networks Firewall* open and continue to the next task.

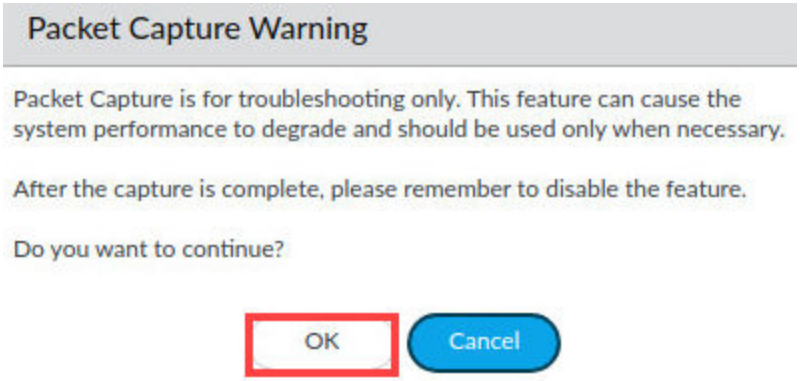
1.4 Packet Capture Application Traffic

In this section, you will take a packet capture on the firewall while using the Custom Application on the client host.

1. Ensure you are still located at **Monitor > Packet Capture**. Toggle *Packet Capture* to **ON**.



2. In the *Packet Capture Warning* window, click **OK**.

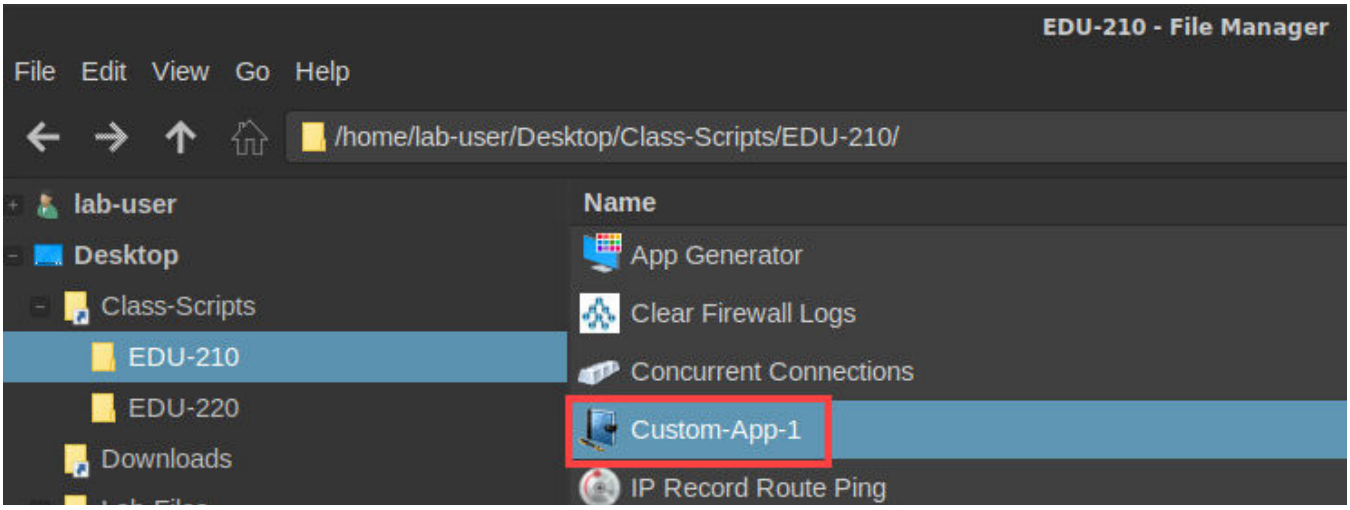


Please Note

The firewall is now actively capturing packets that match the filter you created. The packets are being stored on the firewall in the receive-file.pcap you designated.

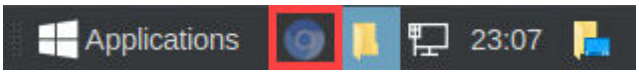
3. Minimize the *Palo Alto Networks Firewall*.

4. Open the **EDU-210** folder by clicking on the **File Manager** tab in the taskbar if necessary. Double-click the icon for **Custom-App-1**.

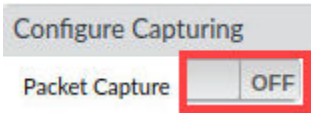


5. Press **Enter** to start the *Custom-App-1* script. Allow the script to complete. Once the *Custom-App-1* script completes, press **Enter**.

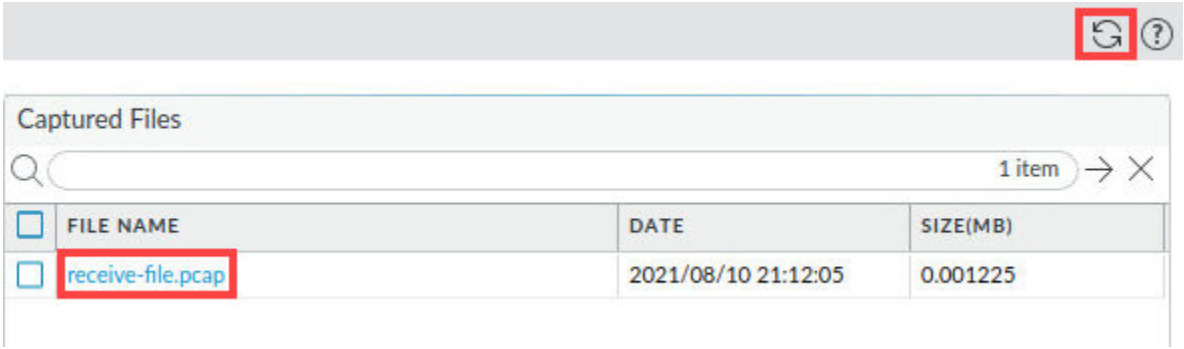
6. If you minimized the *firewall*, reopen the *firewall* interface by clicking on the **Chromium** tab in the taskbar.



7. Ensure you are still located at **Monitor > Packet Capture**. Toggle *Packet Capture* to **OFF.**



8. Refresh the web interface display to view the **receive-file** listed in the *Captured Files* panel. Click **receive-file.pcap** to open it in Wireshark and continue to the next task.



1.5 Analyze the Packet Capture

In this section, you will use Wireshark to analyze the packet capture to discover a unique bit pattern that identifies traffic to the Custom Application.

1. In the *Wireshark* window, find and highlight the first entry for **GET**.

1	0.000000	192.168.1.20	192.168.50.22	TCP	74 56904 → 80 [SYN] Seq=0 Win=2
2	0.000582	192.168.50.22	192.168.1.20	TCP	74 80 → 56904 [SYN, ACK] Seq=0
3	0.000642	192.168.1.20	192.168.50.22	TCP	66 56904 → 80 [ACK] Seq=1 Ack=1
4	0.000681	192.168.1.20	192.168.50.22	HTTP	156 GET /customapp.txt HTTP/1.1
5	0.000717	192.168.50.22	192.168.1.20	TCP	66 80 → 56904 [ACK] Seq=1 Ack=9

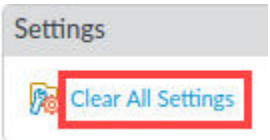
2. In the Wireshark window, click **Hypertext Transfer Protocol** to expand the display and notice that the HTTP request header included a **GET /custom-app.txt** entry and the Host **192.168.50.22**.

```
▸ Frame 4: 156 bytes on wire (1248 bits), 156 bytes captured (1248 bits)
▸ Ethernet II, Src: Vmware_99:a0:42 (00:50:56:99:a0:42), Dst: Vmware_8a:91:c4 (00:50:56:8a:91:c4)
▸ Internet Protocol Version 4, Src: 192.168.1.20, Dst: 192.168.50.22
▸ Transmission Control Protocol, Src Port: 56904, Dst Port: 80, Seq: 1, Ack: 1, Len: 90
▾ Hypertext Transfer Protocol
  ▸ GET /customapp.txt HTTP/1.1\r\n
    Host: 192.168.50.22\r\n
    User-Agent: curl/7.58.0\r\n
    Accept: */*\r\n
    \r\n
    [Full request URI: http://192.168.50.22/customapp.txt]
    [HTTP request 1/1]
    [Response in frame: 6]
```

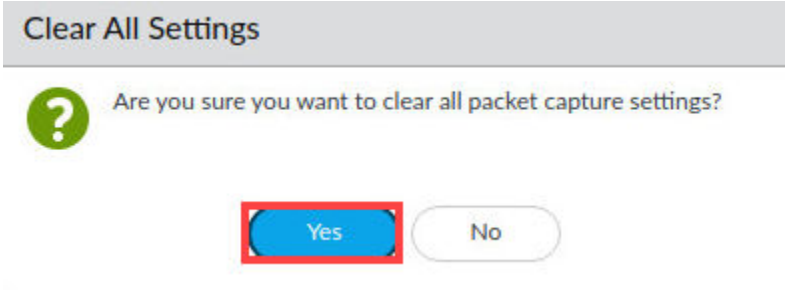
> **Please Note**
> You will use the HTTP GET method, and the URI path customapp.txt to build a custom application signature for the Custom Application

3. Close the **Wireshark** window.

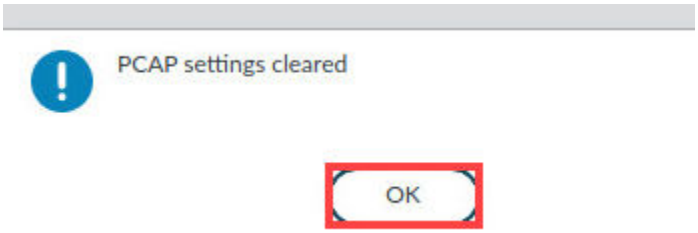
4. Ensure you are still located at **Monitor > Packet Capture**. Click **Clear All Settings**.



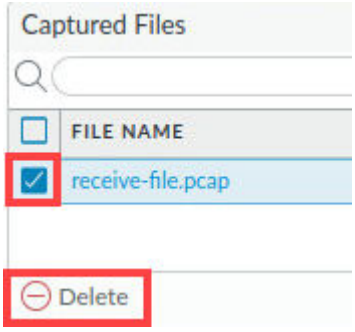
5. In the *Clear All Settings* window, click **Yes**.



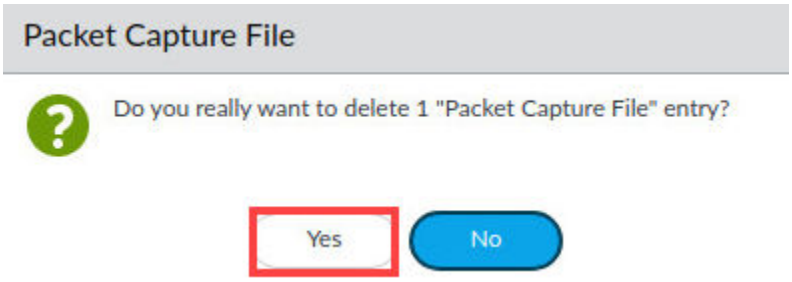
6. In the *PCAP settings clear* window, click **OK**.



7. In the *Captured Files* window, select the checkbox next to **receive-file-pcap**. Click **Delete**.



8. In the *Packet Capture File* window, click **Yes**.

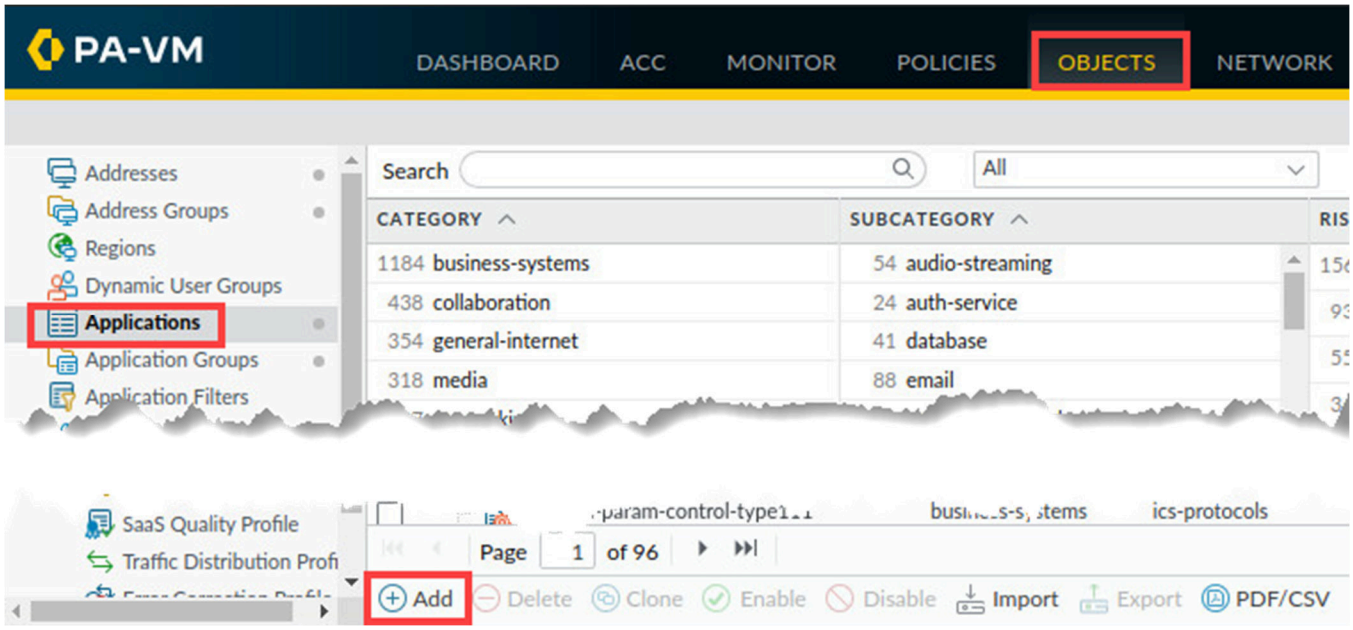


9. Leave the *Palo Alto Networks Firewall* open and continue to the next task.

1.6 Create a Custom Application with a Signature

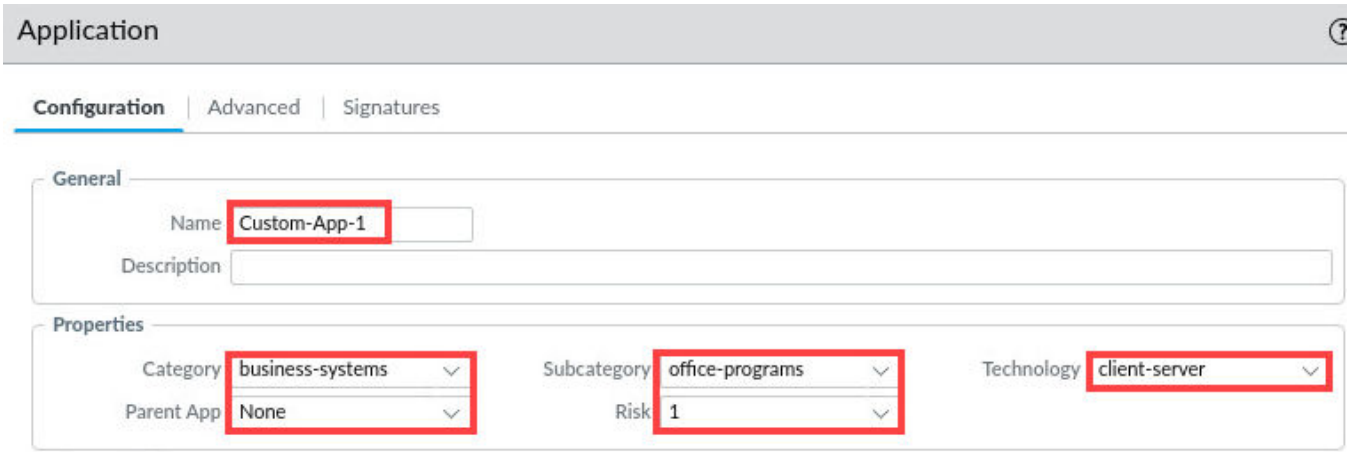
In this section, you will use the information discovered in the packet capture to create a unique signature that can identify HTTP traffic to the Internal Company Custom Application.

1. In the web interface, select **Objects > Applications**. Click **Add**.



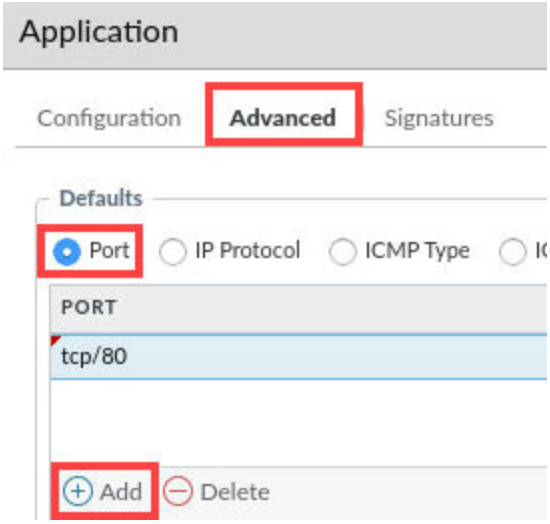
2. In the *Application* window, on the **Configuration** tab. Configure the following.

Parameter	Value
Name	**`Custom-App-1`**
Category	**business-systems**
Subcategory	**office-programs**
Technology	**client-server**
Parent App	**None**
Risk	**1**

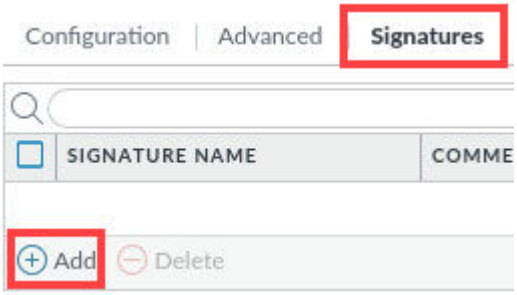


3. Click the **Advanced** tab and configure the following.

Parameter	Value
Port	Select **radio button**
Port	Click **Add** and type **`tcp/80`**

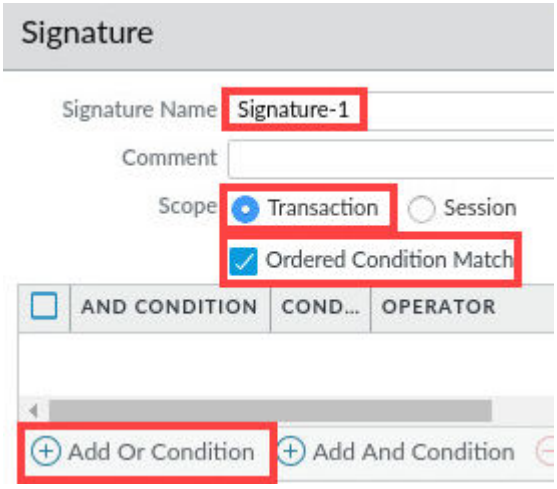


4. Click the **Signatures** tab. Click **Add**.



5. In the *Signature* window, configure the following. Click **Add or Condition**.

Parameter	Value
Signature Name	**`Signature-1`**
Scope	**Transaction**
Ordered Condition Match	**Leave selected (Neither choice affects the signature.)**

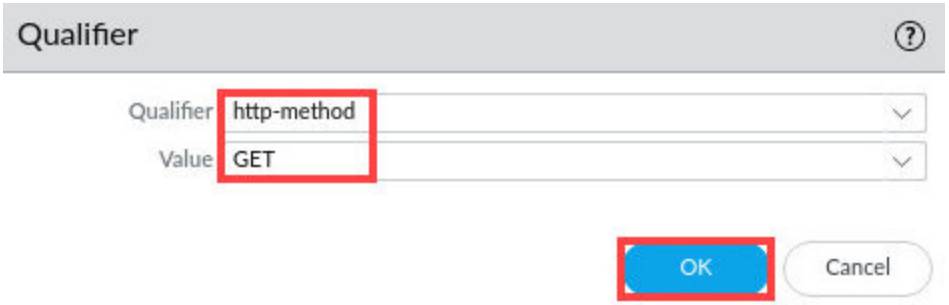


6. In the *New and Condition – Or Condition* window, configure the following. Click **Add**.

Parameter	Value custom
Operator	**Patten Match**
Context	**http-req-uri-path**
Pattern	**`customapp.txt`**

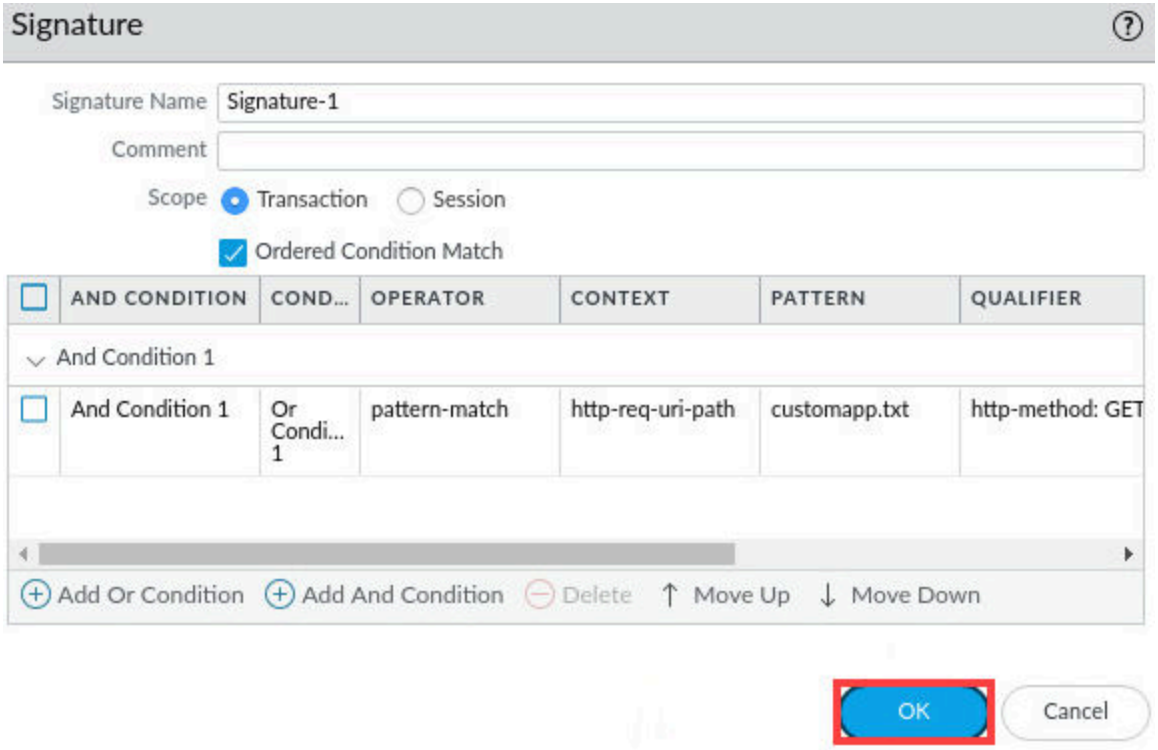
7. In the *Qualifier* window, configure the following and then click **OK**.

Parameter	Value
Qualifier	**http-method**
Value	**GET**

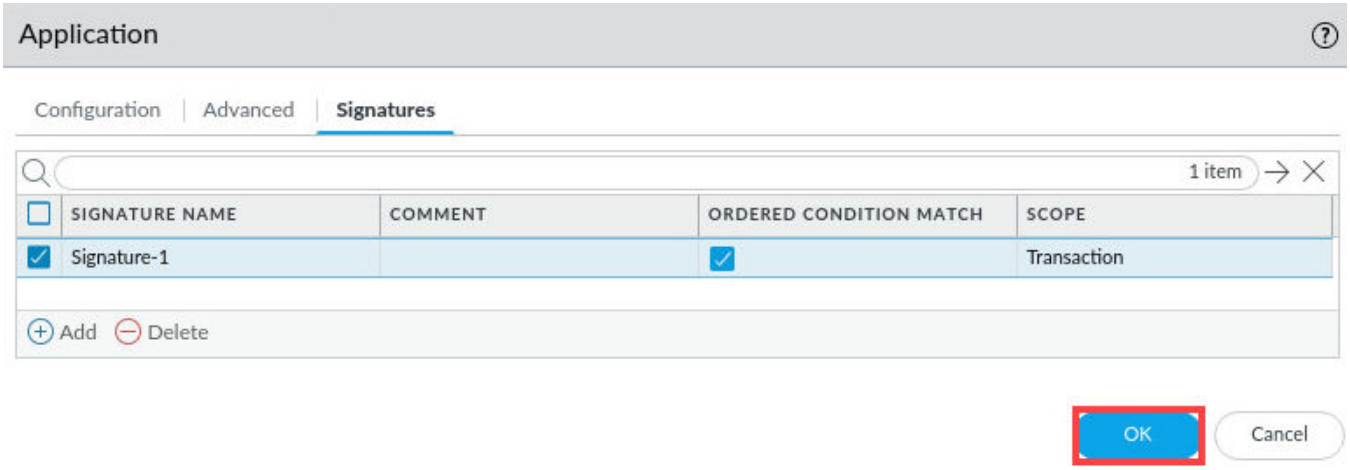


8. Click **OK** to close the *New And Condition – Or Condition* window.

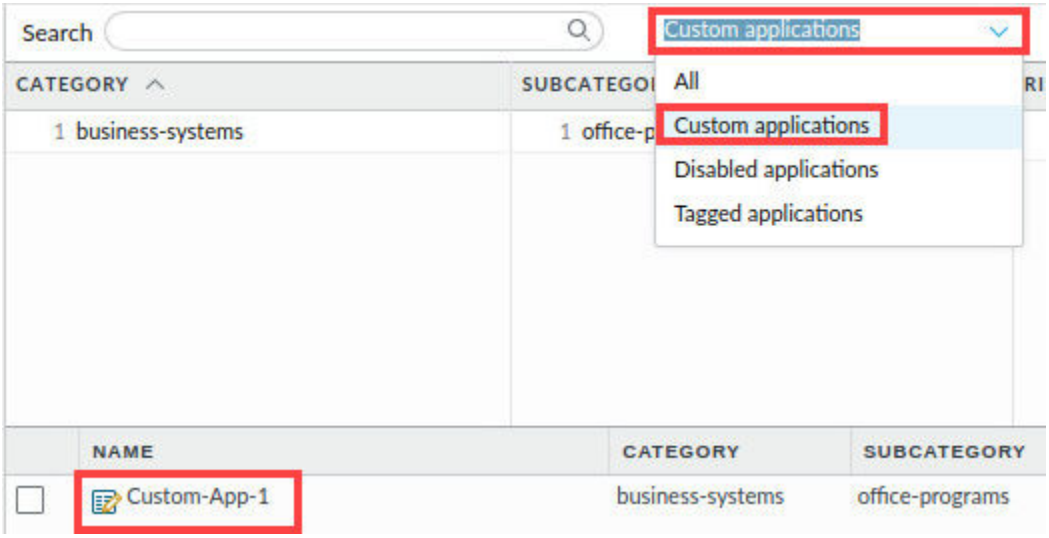
9. Click **OK** to close the *Signature* window.



10. Click **OK** to close the *Application* window.



11. To display only custom applications, select **Custom applications** on the filter dropdown menu. A new entry for **Custom-App-1** appears at the top of the *Application* list.

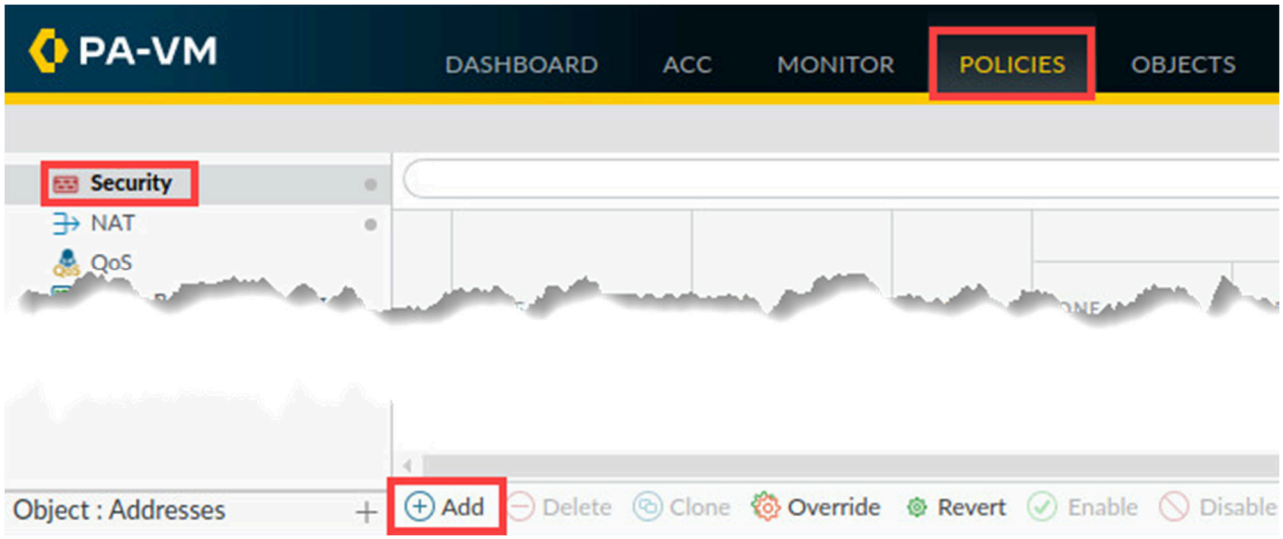


12. Leave the *Palo Alto Networks Firewall* open and continue to the next task.

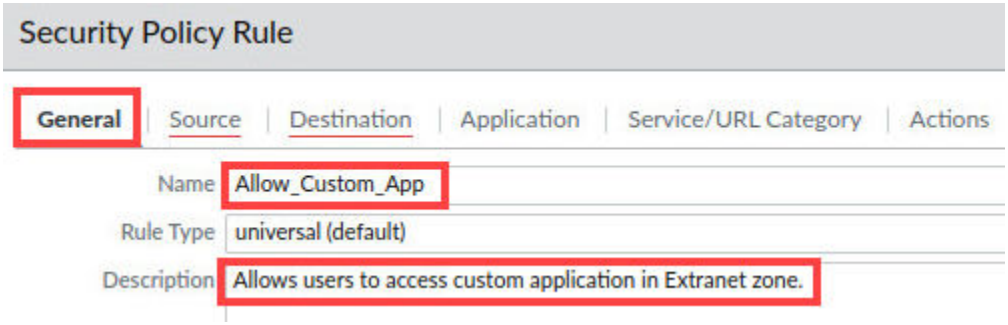
1.7 Add the Custom Application to the Security Policy

In this section, you will create a security policy rule that allows hosts in the Users_Net to access the Custom Application in the Extranet zone.

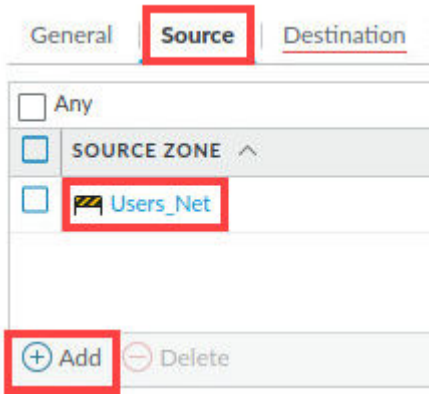
1. Select **Policies > Security**. Click **Add**.



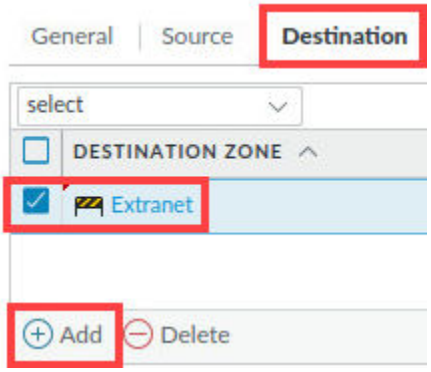
2. In the *Security Policy Rule* window, under the **General** tab, enter **`Allow_Custom_App`** for the *Name*. For *Description*, enter **`Allows users to access custom application in Extranet zone`**.



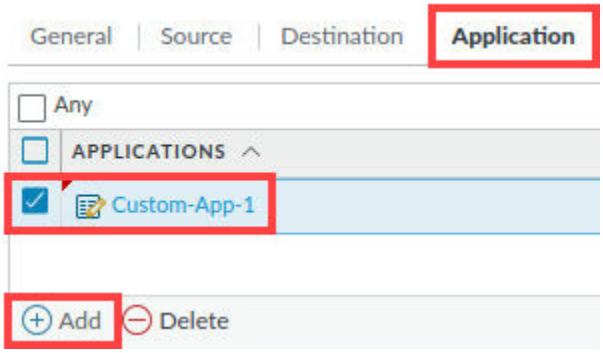
3. Select the tab for **Source,** under the *Source Zone* section**,** click **Add** and select **Users_Net**.



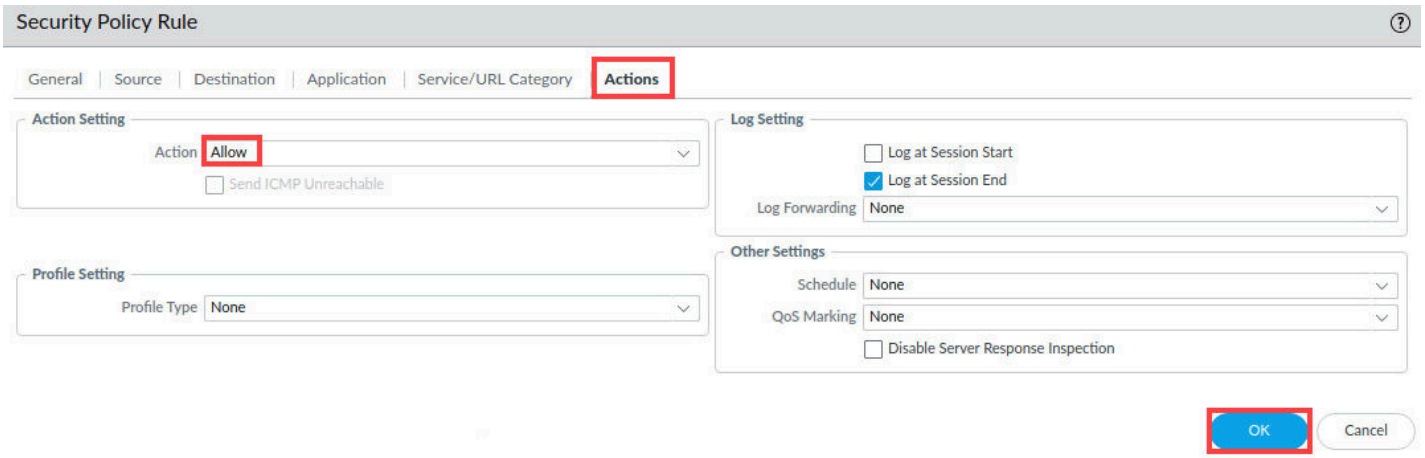
4. Select the tab for **Destination,** under the *Destination Zone* section, click **Add** and select **Extranet**.



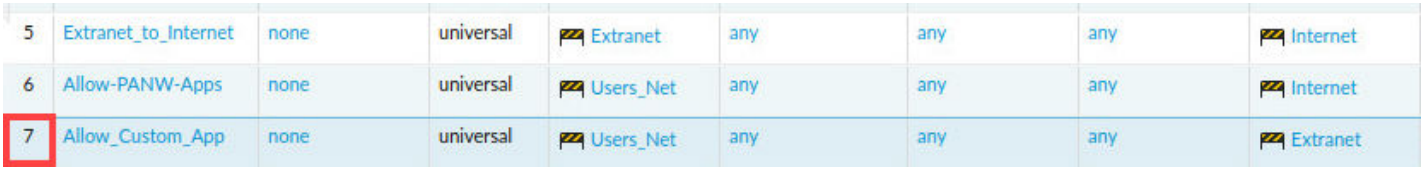
5. Select the **Application** tab, click **Add** and enter the first few letters of the **`Custom-App-1`** name to locate the entry.



6. Select the **Actions** tab and verify that the *Action Setting* is set to **Allow**. Click **OK**.

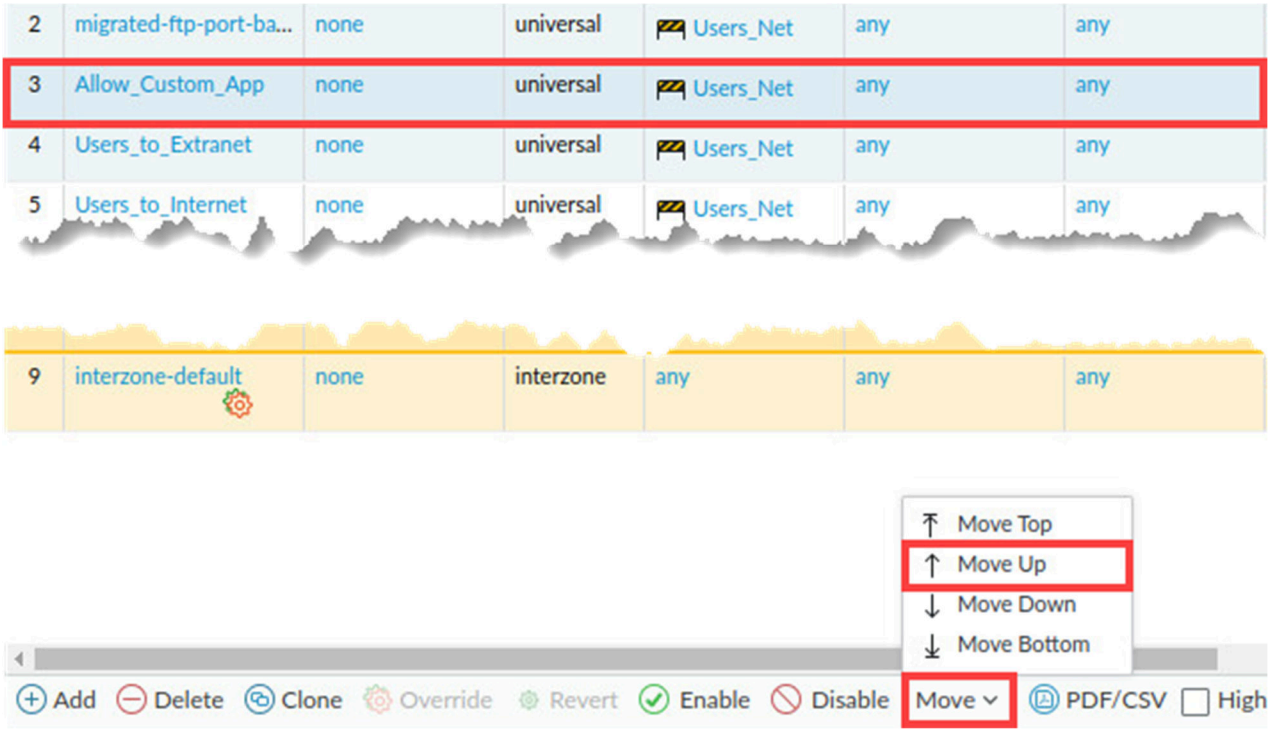


7. Highlight the **Allow_Custom_App** entry without opening it.

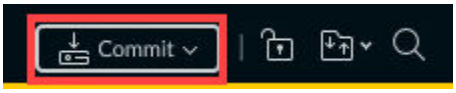


5	Extranet_to_Internet	none	universal	Extranet	any	any	any	Internet
6	Allow-PANW-Apps	none	universal	Users_Net	any	any	any	Internet
7	Allow_Custom_App	none	universal	Users_Net	any	any	any	Extranet

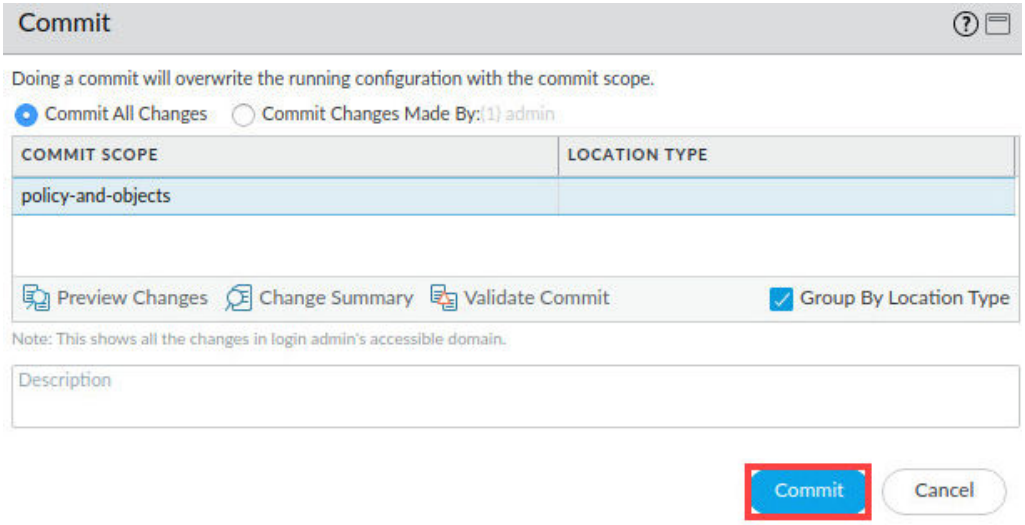
8. Use the **Move > Move up** button at the bottom of the window to relocate this rule just above **Users_to_Extranet**.



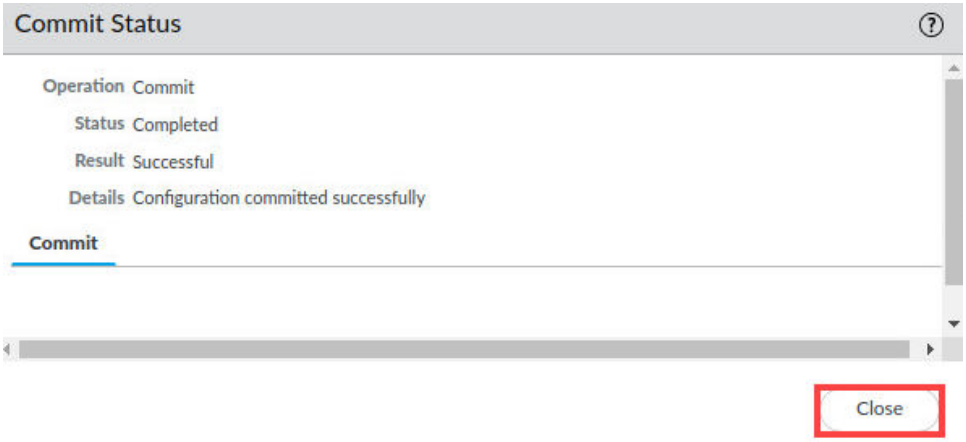
9. Click the **Commit** link located at the top-right of the web interface.



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



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

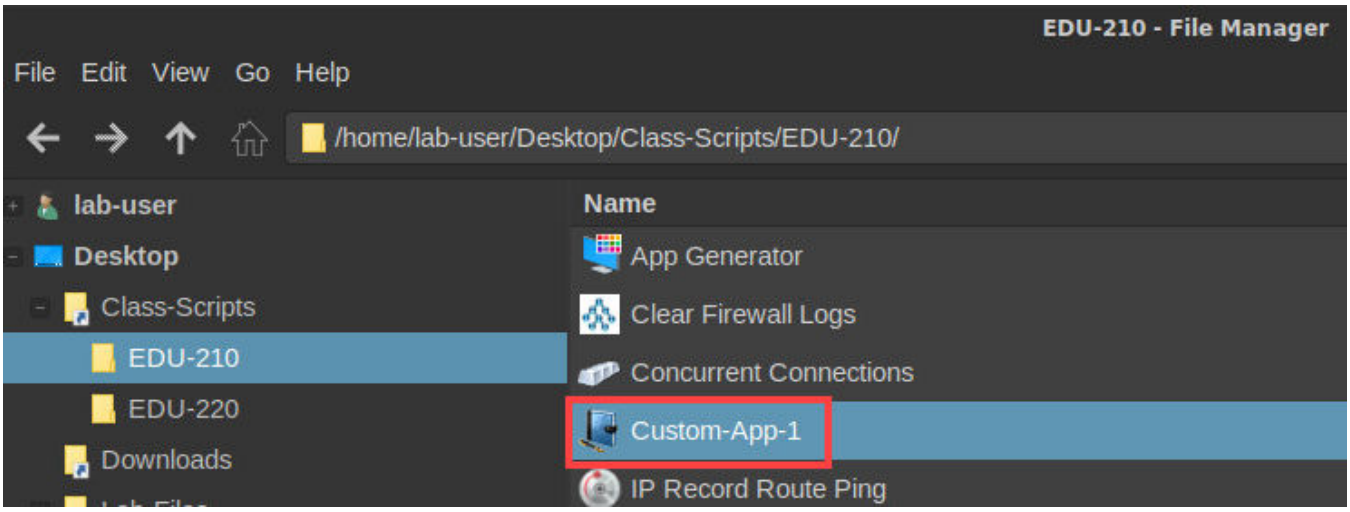


12. Minimize the *Palo Alto Networks Firewall* and continue to the next task.

1.8 Test the Custom Application

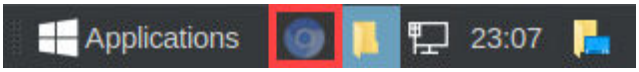
In this section, you will run the Custom Application to determine whether the firewall correctly identifies the traffic.

1. Open the **EDU-210** folder by clicking on the **File Manager** tab in the taskbar if necessary. Double-click the icon for **Custom-App-1**.

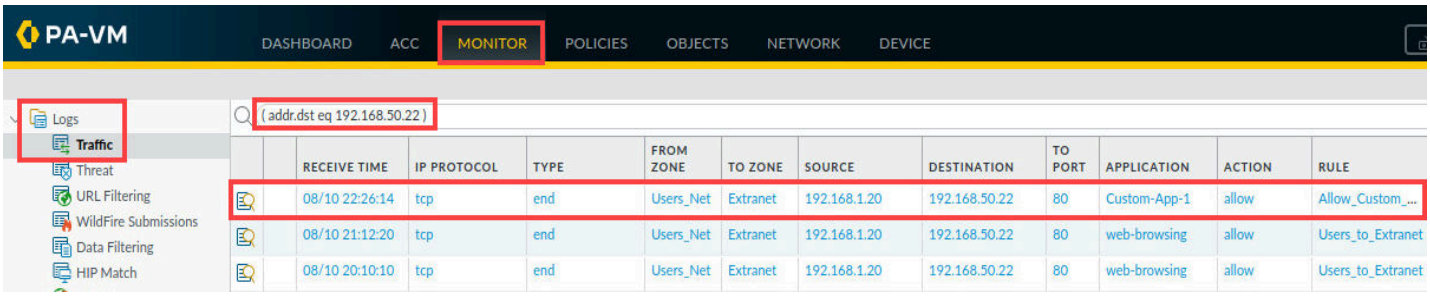


2. Press **Enter** to start the *Custom-App-1* script. Allow the script to complete. Once the *Custom-App-1* script completes, press **Enter**.

3. If you minimized the *firewall*, reopen the *firewall* interface by clicking on the **Chromium** tab in the taskbar.



4. In the web interface, select **Monitor > Logs > Traffic**. Create and apply the following new filter **`( addr.dst eq 192.168.50.22 )`** in the filter builder. Notice the *Application* label is **Custom-App-1** and how the custom application enables more granular logging of application traffic. The traffic no longer was generically identified as web-browsing



Please Note

Note that you may need to use the refresh button several times to see the new entry in the Traffic Log. The sessions must end before the firewall writes an entry to the Traffic log

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