



SECURITY OPERATIONS FUNDAMENTALS

Lab 6: Securing Endpoints using Vulnerability Profiles

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Introduction

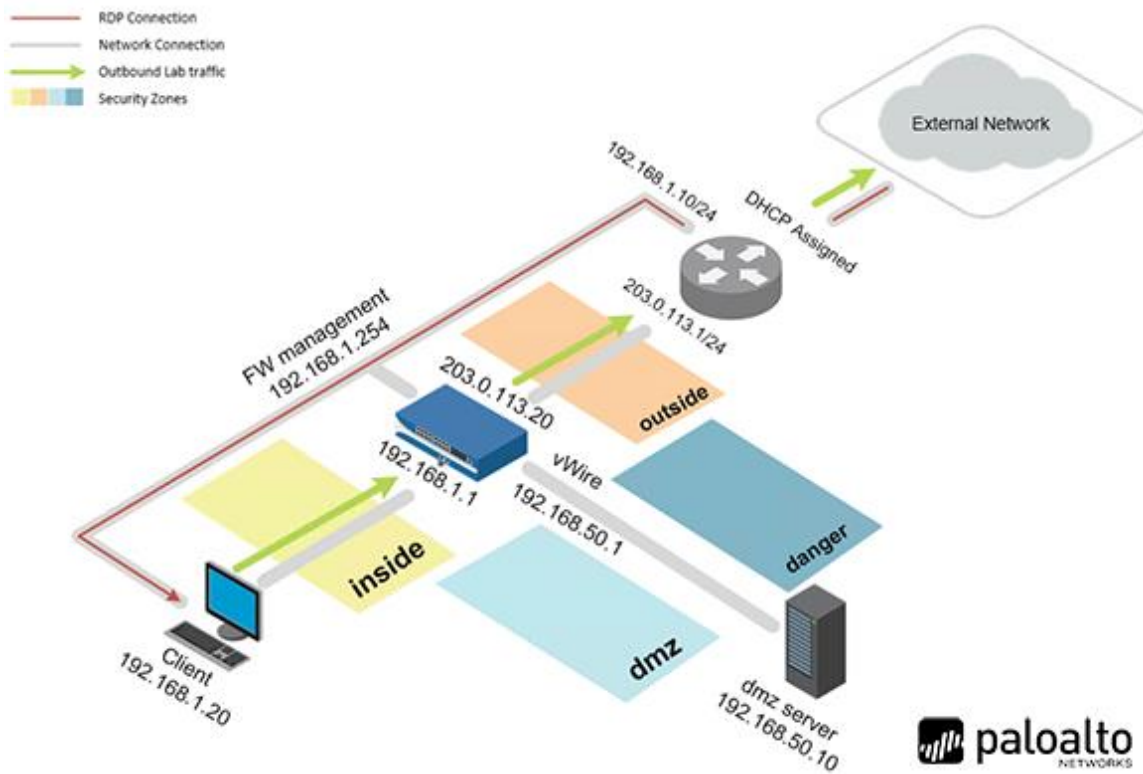
In this lab, you will secure an endpoint by blocking a PDF file with a Custom Vulnerability Object and Vulnerability Protection Profile. Palo Alto Networks Firewalls support the use of Custom Vulnerability Signatures that can be written with expression patterns to identify vulnerability exploits. Vulnerability Protection Profiles will stop any attempt to exploit system flaws so that unauthorized access cannot be gained to a targeted system.

Objective

In this lab, you will perform the following tasks:

- Install the latest Dynamic Updates of Antivirus
- Install Manual Update of Applications and Threats
- Create a Custom Vulnerability Signature
- Clone a Vulnerability Protection Profile
- Apply Custom Vulnerability Protection Profile to a Security Policy
- Commit and Test Vulnerability Protection

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.

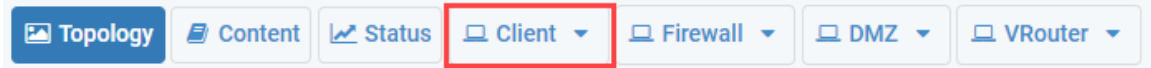
Virtual Machine	IP Address	Account (if needed)	Password (if needed)
Client	192.168.1.20	lab-user	Train1ng\$
DMZ	192.168.50.10	root	Pal0Alt0
Firewall	192.168.1.254	admin	Train1ng\$

6 Securing Endpoints Using Vulnerability Profiles

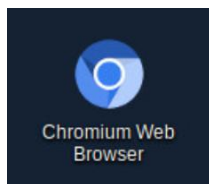
6.0 Load Lab Configuration

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

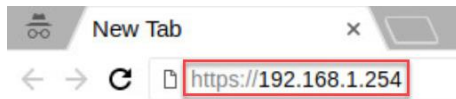
1. Click on the **Client** tab to access the client PC.



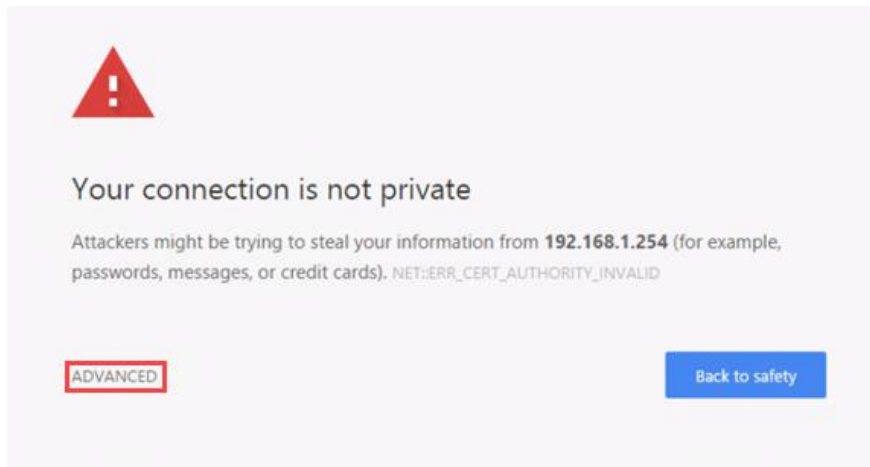
2. Log in to the client PC with username **lab-user**, password **Train1ng\$**.
3. Double-click the **Chromium Web Browser** icon located on the desktop.



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

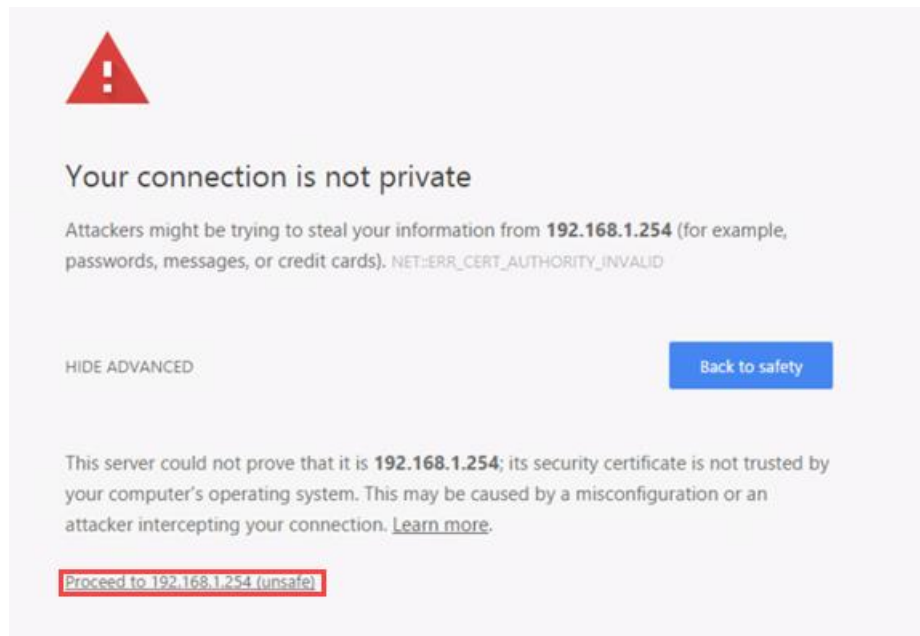


5. You will see a “Your connection is not private” message. Click on the **ADVANCED** link.



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.

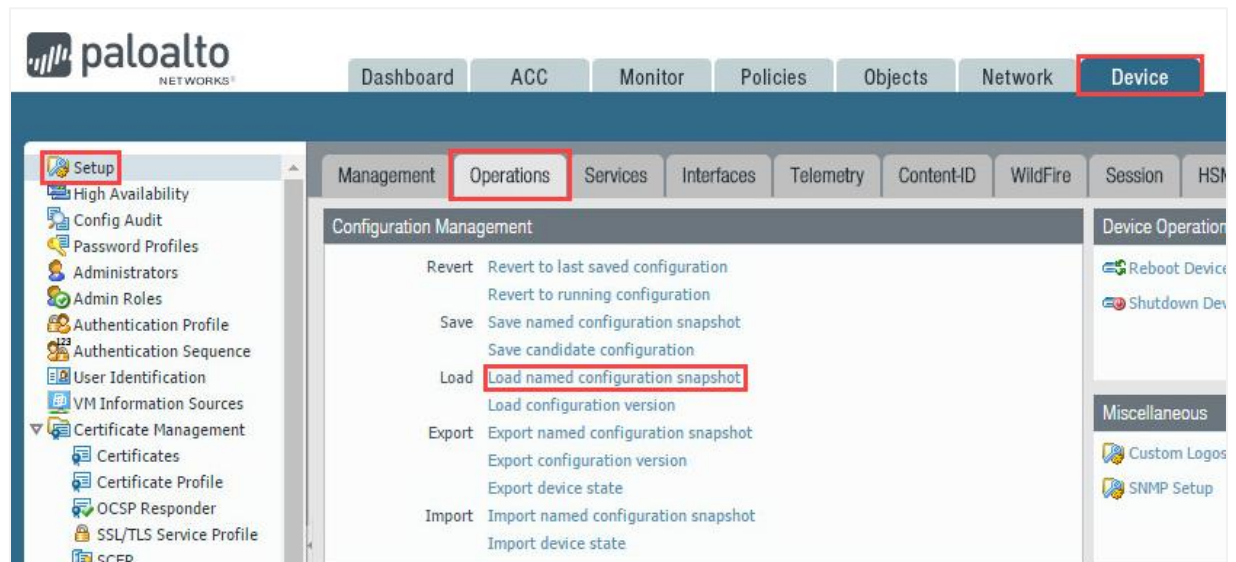
- Click on **Proceed to 192.168.1.254 (unsafe)**.



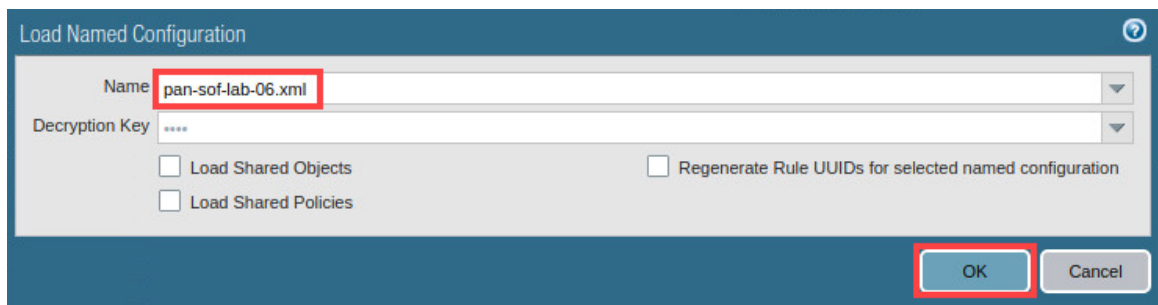
- Log in to the Firewall web interface with username **admin**, password **Train1ng\$**.



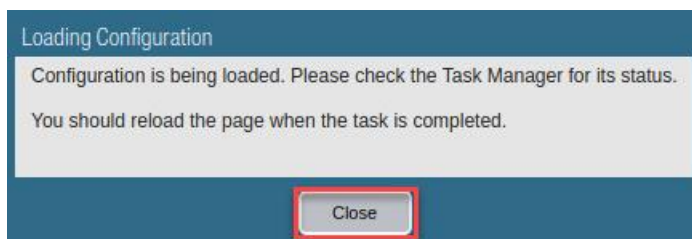
8. In the web interface, navigate to **Device > Setup > Operations** and click on **Load named configuration snapshot** underneath the *Configuration Management* section.



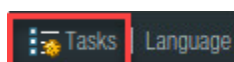
9. In the *Load Named Configuration* window, select **pan-sof-lab-06.xml** from the *Name* dropdown box and click **OK**.



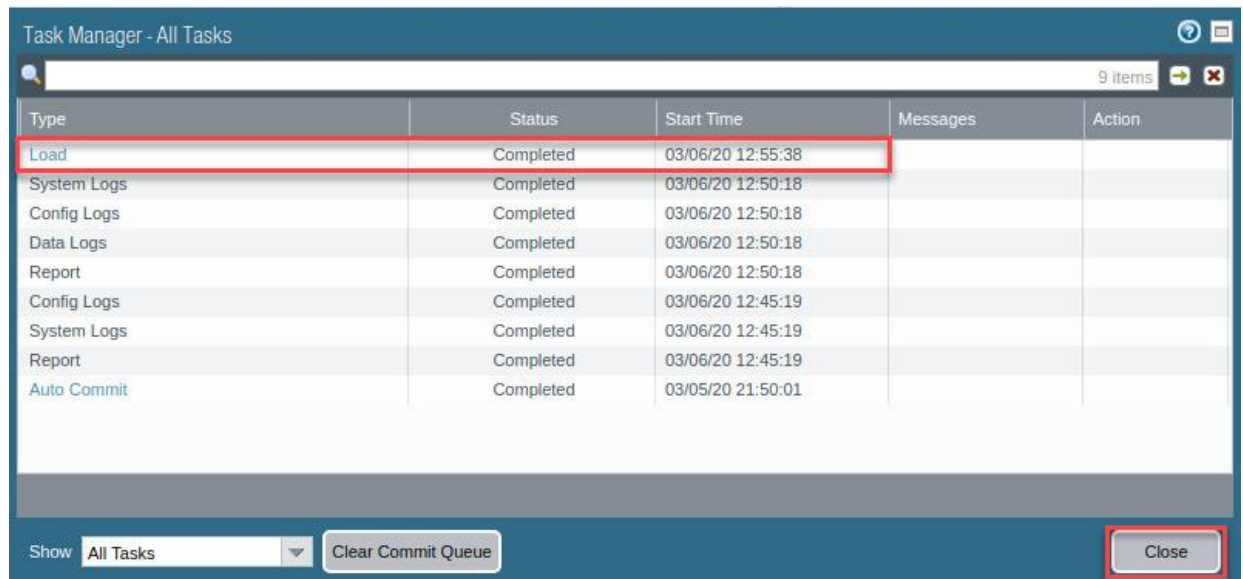
10. In the *Loading Configuration* window, a message will say *Configuration is being loaded. Please check the Task Manager for its status. You should reload the page when the task is completed.* Click **Close** to continue.



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



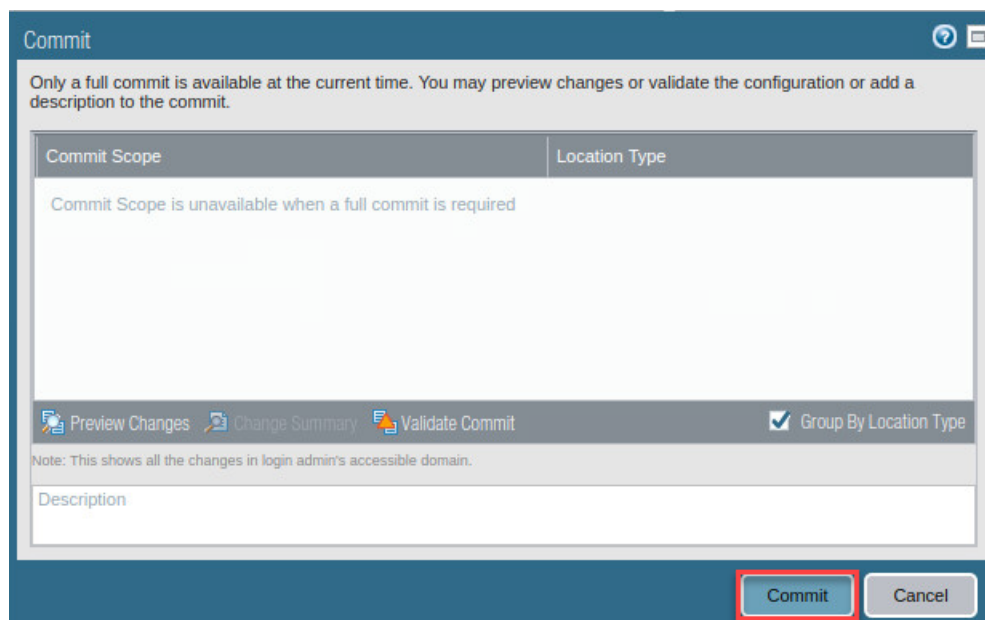
12. In the *Task Manager – All Tasks* window, verify the *Load* type has successfully completed. Click **Close**.



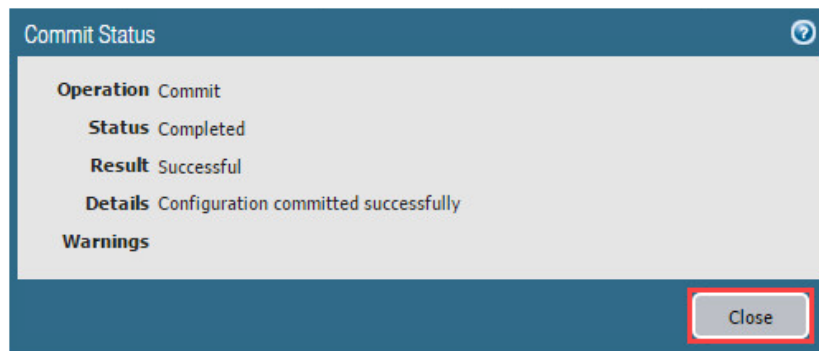
13. Click the **Commit** link located at the top-right of the web interface.



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



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

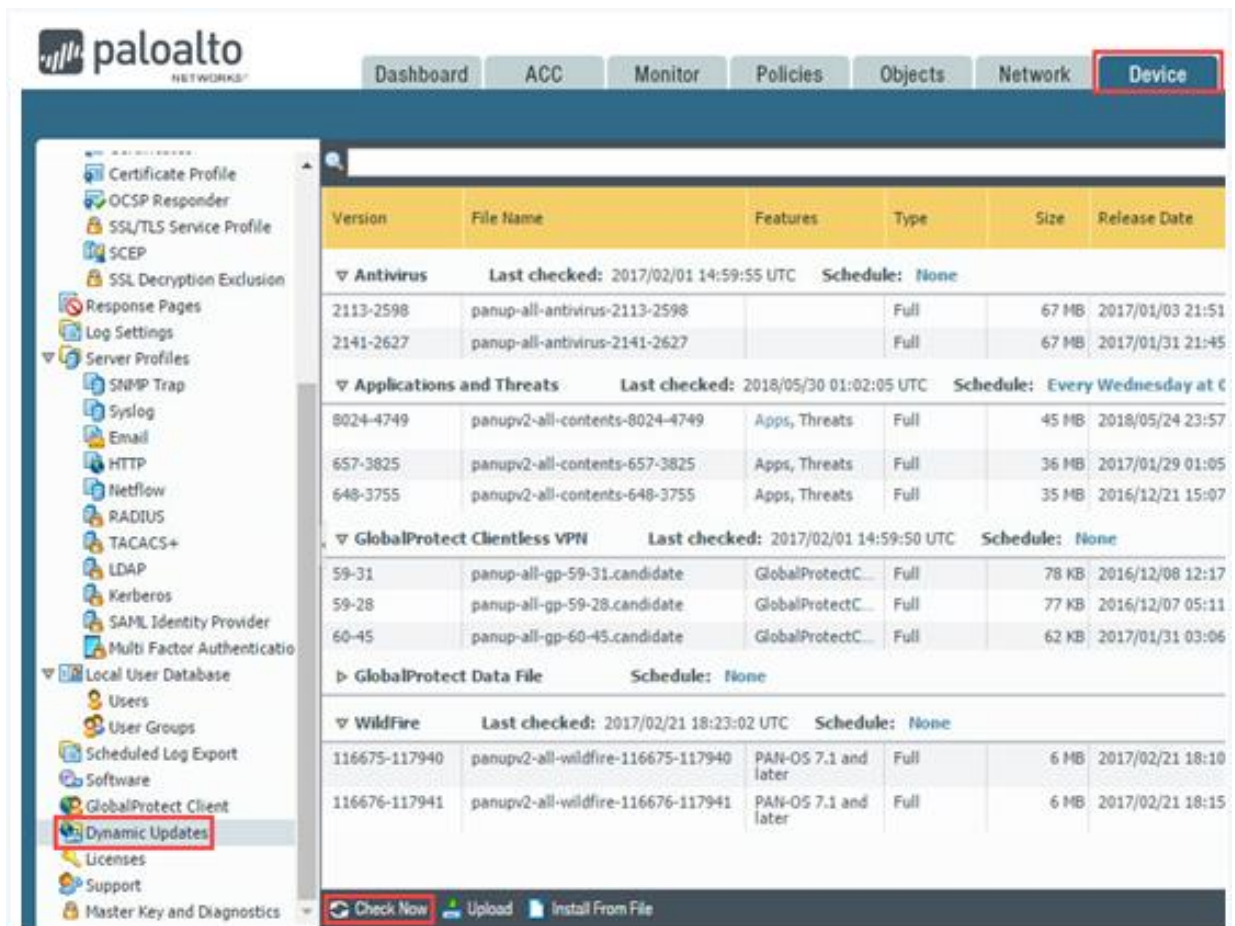


The commit process takes changes made to the Firewall and copies them to the running configuration, which will activate all configuration changes since the last commit.

6.1 Install the Latest Dynamic Updates of Antivirus

In this section, you will perform Dynamic Updates. Dynamic Updates ensure policy enforcement on a Palo Alto Networks Firewall of new threat signatures and applications.

1. Navigate to **Device > Dynamic Updates > Check Now**. You may need to scroll down in the left pane.



The screenshot shows the Palo Alto Networks management console. The 'Device' tab is selected in the top navigation bar. On the left sidebar, 'Dynamic Updates' is highlighted under the 'Server Profiles' section. The main content area displays a table of updates for Antivirus, Applications and Threats, GlobalProtect Clientless VPN, and WildFire. The 'Antivirus' section is expanded, showing a list of updates with columns for Version, File Name, Features, Type, Size, and Release Date. The 'Check Now' button is visible at the bottom of the update list.

Version	File Name	Features	Type	Size	Release Date
Antivirus Last checked: 2017/02/01 14:59:55 UTC Schedule: None					
2113-2598	panup-all-antivirus-2113-2598		Full	67 MB	2017/01/03 21:51
2141-2627	panup-all-antivirus-2141-2627		Full	67 MB	2017/01/31 21:45
Applications and Threats Last checked: 2018/05/30 01:02:05 UTC Schedule: Every Wednesday at 6					
8024-4749	panupv2-all-contents-8024-4749	Apps, Threats	Full	45 MB	2018/05/24 23:57
657-3825	panupv2-all-contents-657-3825	Apps, Threats	Full	36 MB	2017/01/29 01:05
648-3755	panupv2-all-contents-648-3755	Apps, Threats	Full	35 MB	2016/12/21 15:07
GlobalProtect Clientless VPN Last checked: 2017/02/01 14:59:50 UTC Schedule: None					
59-31	panup-all-gp-59-31.candidate	GlobalProtectC...	Full	78 KB	2016/12/08 12:17
59-28	panup-all-gp-59-28.candidate	GlobalProtectC...	Full	77 KB	2016/12/07 05:11
60-45	panup-all-gp-60-45.candidate	GlobalProtectC...	Full	62 KB	2017/01/31 03:06
GlobalProtect Data File Schedule: None					
WildFire Last checked: 2017/02/21 18:23:02 UTC Schedule: None					
116675-117940	panupv2-all-wildfire-116675-117940	PAN-OS 7.1 and later	Full	6 MB	2017/02/21 18:10
116676-117941	panupv2-all-wildfire-116676-117941	PAN-OS 7.1 and later	Full	6 MB	2017/02/21 18:15

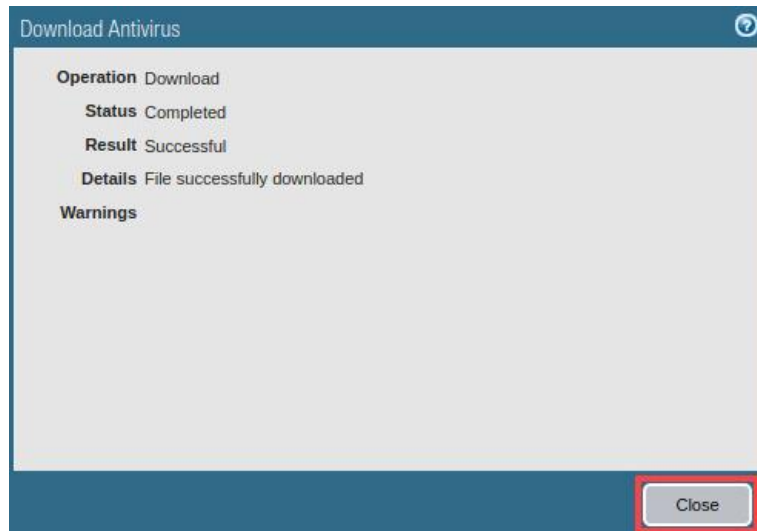
2. Under the *Antivirus* update, click **Download** on the latest update.

Antivirus						Last checked: 2021/01/18 07:29:45 UTC	Schedule: None	
3597-4108	panup-all-antivirus-3597-4108		Full	97 MB	2021/01/17 12:00:02 UTC			Download
3596-4107	panup-all-antivirus-3596-4107		Full	97 MB	2021/01/16 12:00:02 UTC			Download
3595-4106	panup-all-antivirus-3595-4106		Full	96 MB	2021/01/15 12:02:04 UTC			Download



This lab environment connects to a live update server. Therefore, screenshots are subject to change. Please select the latest update.

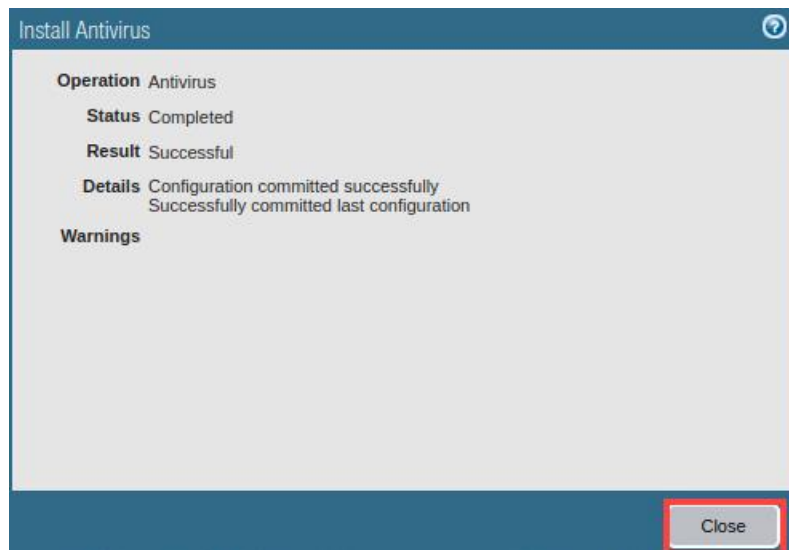
3. In the *Download Antivirus* window, after the download completes, click the **Close** button.



4. Under the *Antivirus* update, click **Install** on the latest update.

▼ Antivirus		Last checked: 2021/01/18 07:32:13 UTC		Schedule: None					
3597-4108	panup-all-antivirus-3597-4108	Full	97 MB	2021/01/17 12:00:02 UTC	✓		Install		
3596-4107	panup-all-antivirus-3596-4107	Full	97 MB	2021/01/16 12:00:02 UTC			Download		

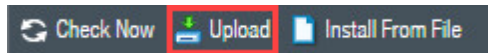
5. In the *Install Antivirus* window, after the update is successfully installed, click the **Close** button.



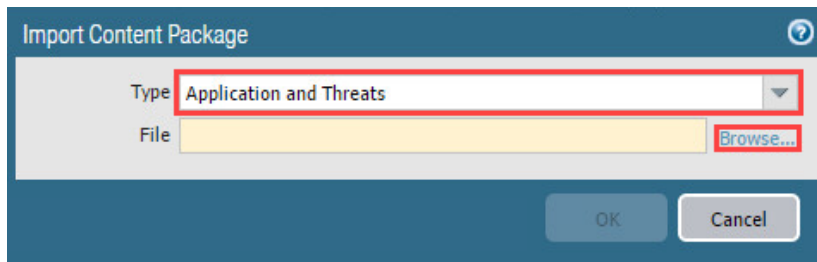
6.2 Install Manual Update of Applications and Threats

In this section, you will perform a Manual Update. There are times when the Firewall may not have Internet access to perform a Dynamic Update. Applications and Threats will be updated via a file that has been downloaded from the Palo Alto Networks Customer Support Portal.

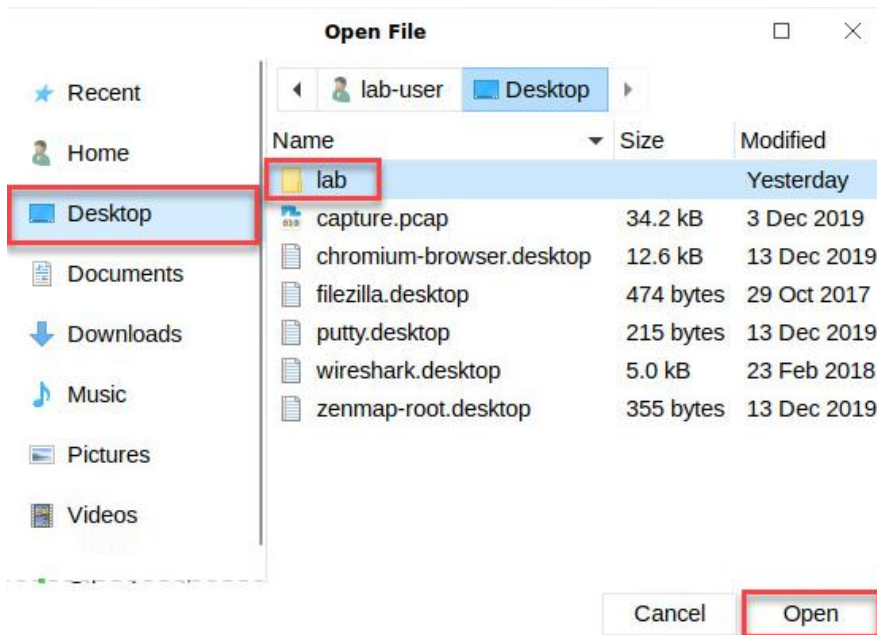
1. To upload the file from the Customer Support Portal, click on the **Upload** button at the bottom.



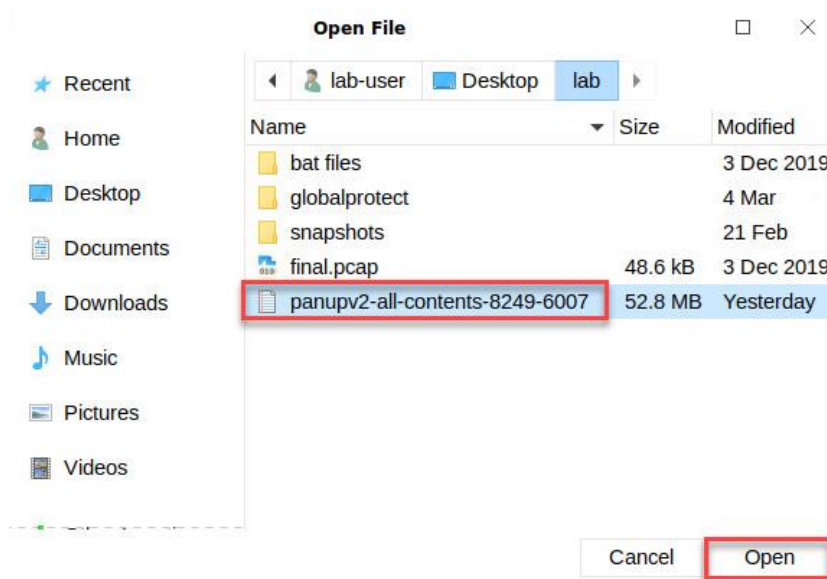
2. In the *Import Content Package* window, select **Application and Threats** from the *Type* dropdown. Then, click on **Browse...**



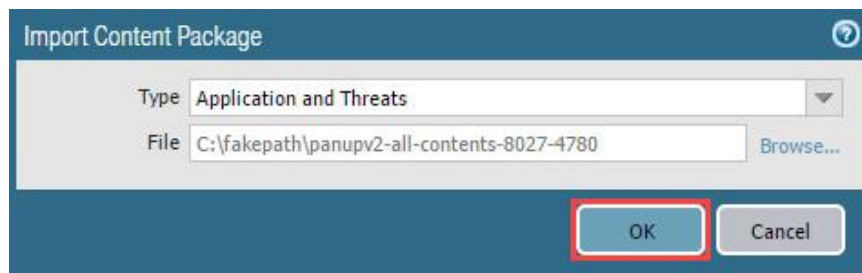
3. In the *Open File* window, select **Desktop**, and click the **lab** folder. Lastly, click **Open**.



4. Click on the **panupv2-all-contents-8249-6007** file. Lastly, click **Open**.

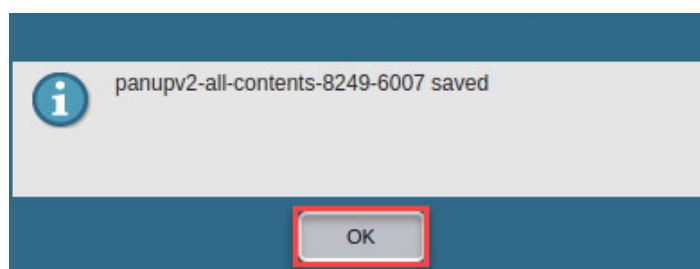


5. In the *Import Content Package* window, click on the **OK** button.

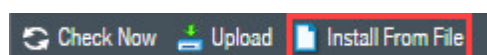


This may take several minutes to complete.

6. When completed, click on the **OK** button.



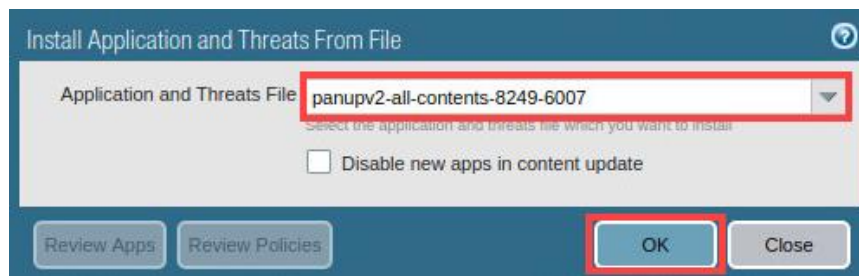
7. With the file uploaded, you can begin the install. Click on **Install From File** at the bottom.



8. In the *Select Package Type for Installation* window, select **Application and Threats** from the *Package Type* dropdown. Then, click on the **OK** button.

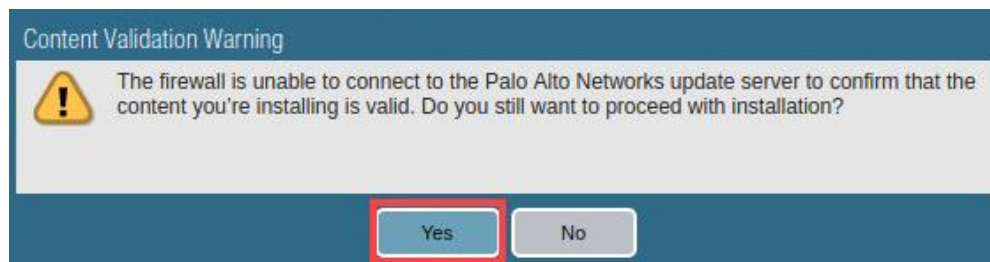


9. In the *Install Application and Threats From File* window, select **panupv2-all-contents-8249-6007** from the *Application and Threats File* dropdown. Then, click on the **OK** button.

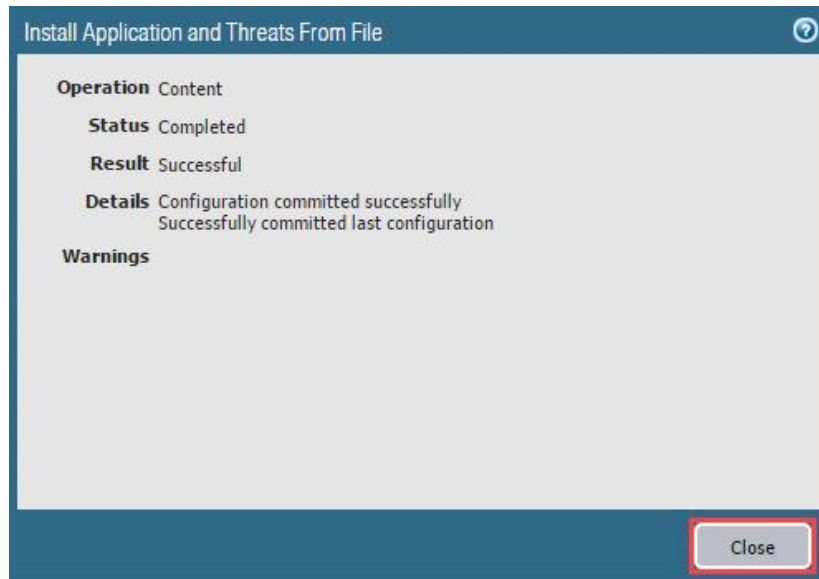


For the purpose of this lab, you will be manually installing the **Application and Threats** from a file already downloaded on the client machine. Normally you would download and install any updates from Palo Alto Networks via *Check Now*. Using *Check Now* retrieves the latest updates from Palo Alto Networks live update server.

10. If you see a *Content Validation Warning* window popup, please click the **Yes** button to proceed.



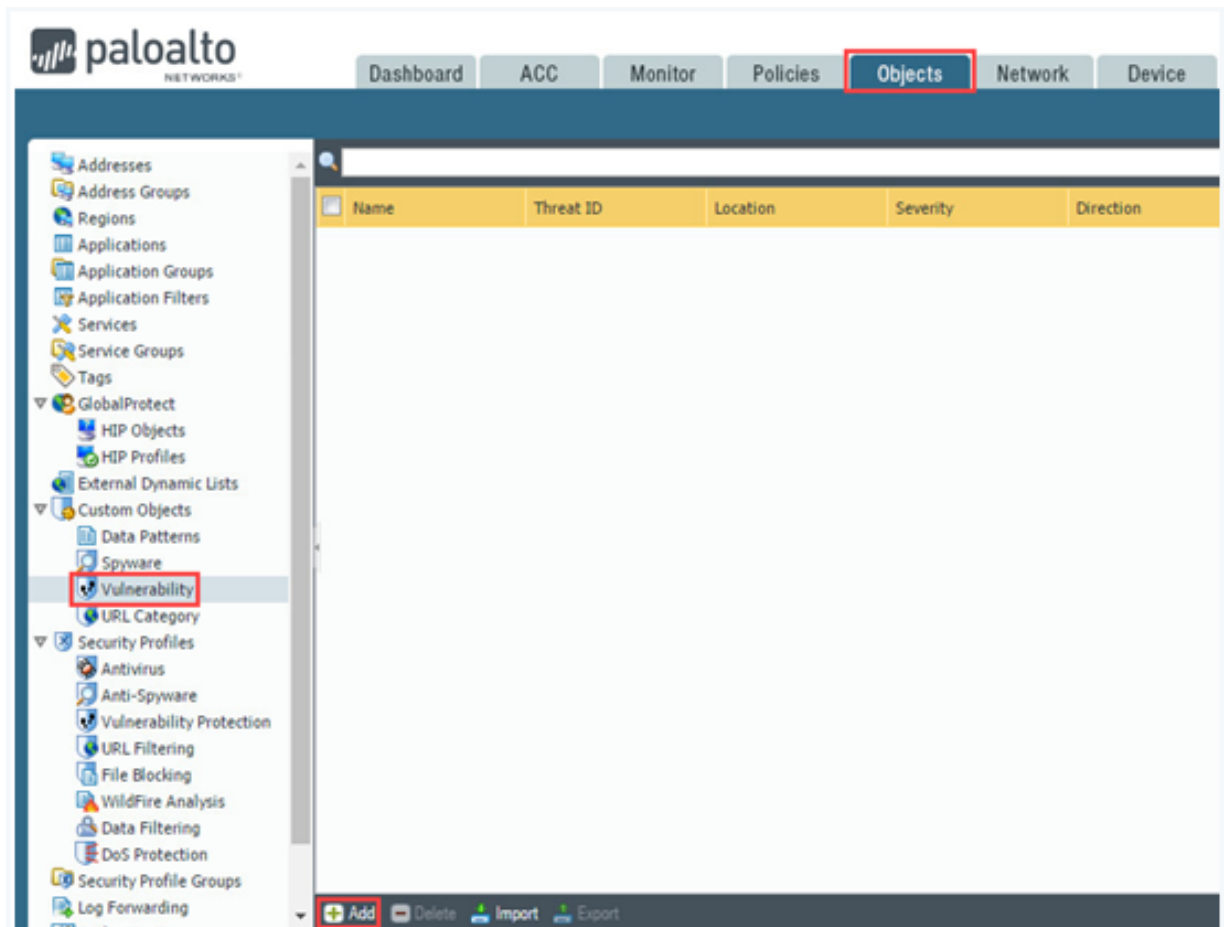
11. In the *Install Application and Threats From File* window, click on the **Close** button.



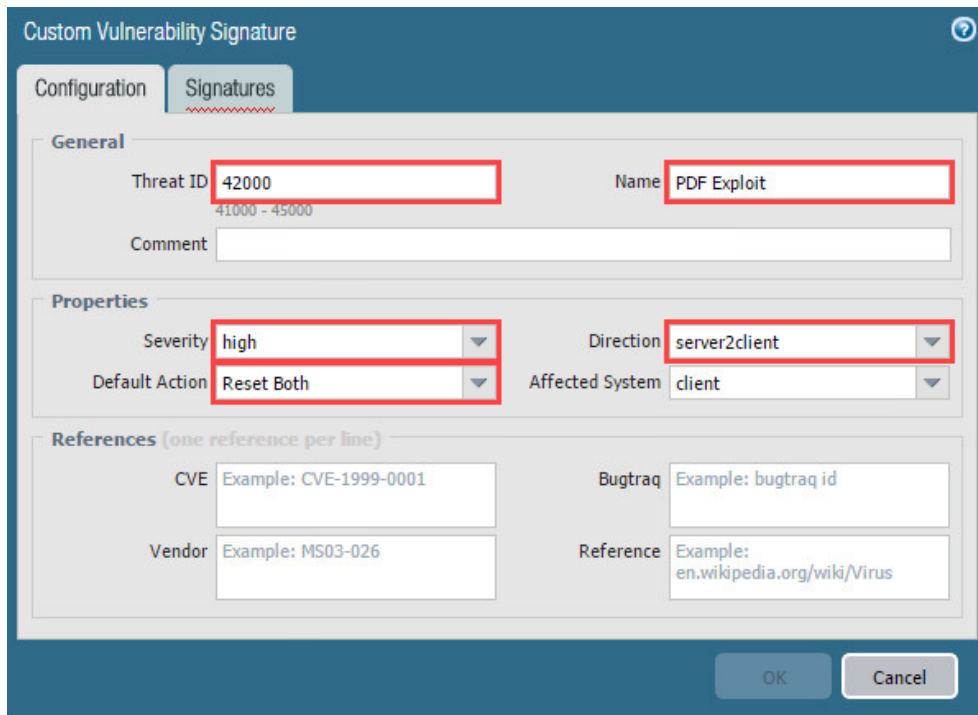
6.3 Create a Custom Vulnerability Signature

In this section, you will create a Custom Vulnerability Signature. Palo Alto Network Firewalls use Custom Vulnerability Signatures to identify vulnerability exploits by writing a custom regular expression. The Firewall then looks for the custom-defined pattern within the network traffic and takes the necessary action to identify and stop the vulnerability exploit.

1. Navigate to **Objects > Custom Objects > Vulnerability > Add**.



- In the *Custom Vulnerability Signature* window, type **42000** in the *Threat ID* field. Then, type **PDF Exploit** in the *Name* field. Next, select **high** from the *Severity* dropdown. Then, select **server2client** from the *Direction* dropdown. Finally, select **Reset Both** from the *Default Action* dropdown.



Custom Vulnerability Signature

Configuration Signatures

General

Threat ID: 42000 (41000 - 45000)

Name: PDF Exploit

Comment:

Properties

Severity: high

Direction: server2client

Default Action: Reset Both

Affected System: client

References (one reference per line)

CVE: Example: CVE-1999-0001

Bugtraq: Example: bugtraq id

Vendor: Example: MS03-026

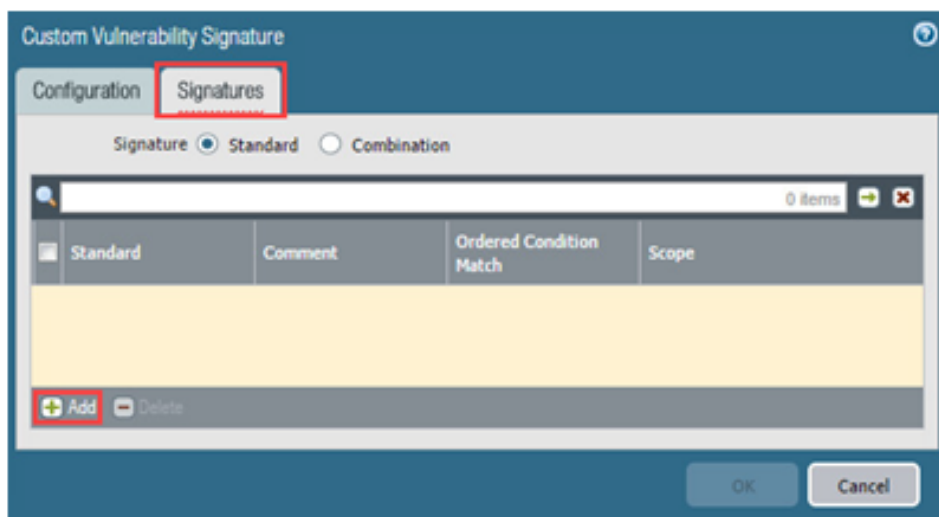
Reference: Example: en.wikipedia.org/wiki/Virus

OK Cancel



The Default Action, **Reset Both**, will be triggered when a match is detected to this Vulnerability Signature. For TCP, this will reset the connections on both the client and server ends. For UDP, the connection is dropped. This will effectively stop the traffic.

- In the *Custom Vulnerability Signature* window, click on the **Signatures** tab. Then, click the **Add** button.



Custom Vulnerability Signature

Configuration Signatures

Signature: ☒ Standard ☐ Combination

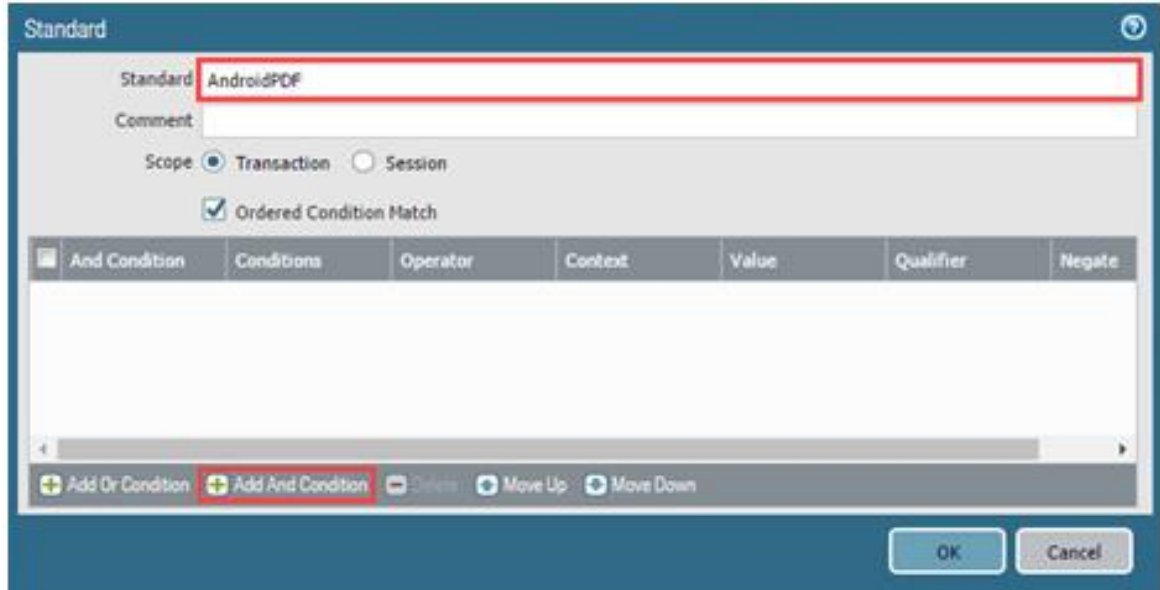
Search: 0 items

Standard	Comment	Ordered Condition Match	Scope

Add Delete

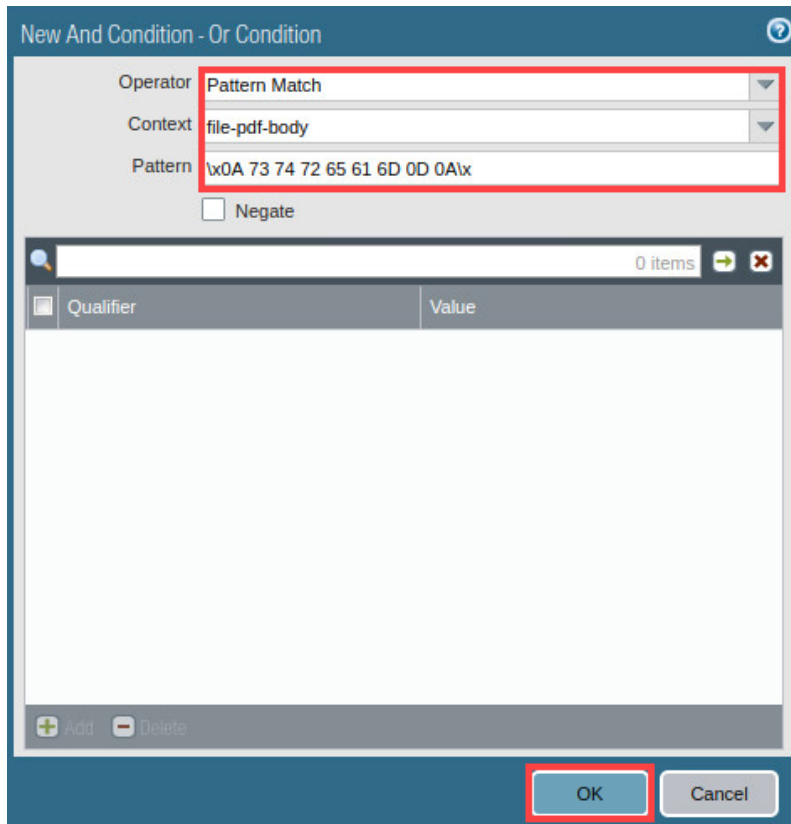
OK Cancel

4. In the *Standard* window box, type **AndroidPDF** in the *Standard* field. Then, click **Add And Condition**.



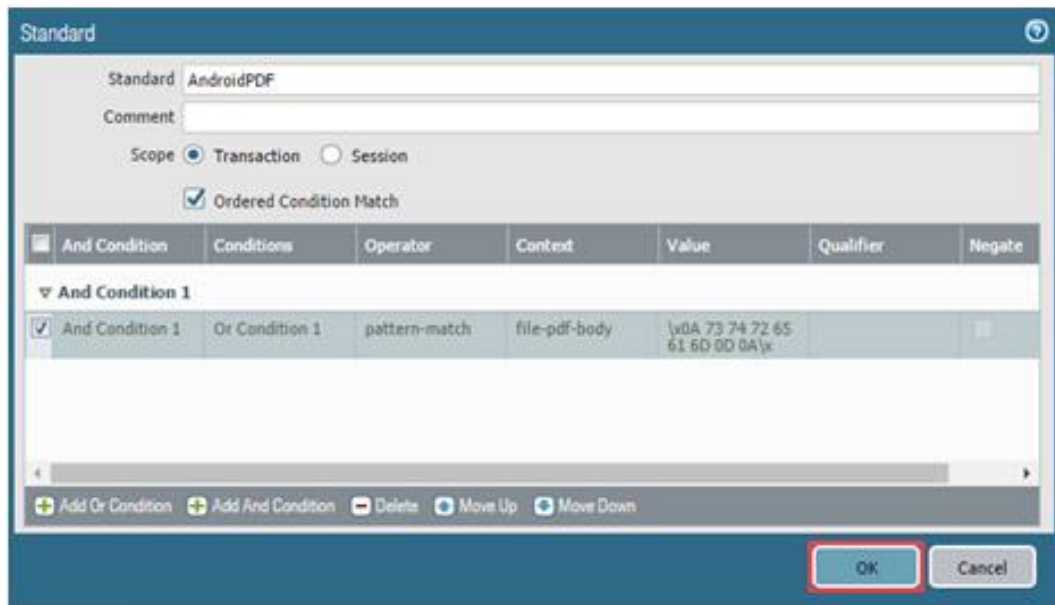
The image shows the 'Standard' window box. The 'Standard' field is highlighted with a red box and contains the text 'AndroidPDF'. Below it, the 'Comment' field is empty. The 'Scope' section has 'Transaction' selected. The 'Ordered Condition Match' checkbox is checked. Below this is a table with columns: 'And Condition', 'Conditions', 'Operator', 'Context', 'Value', 'Qualifier', and 'Negate'. The table is currently empty. At the bottom, there are buttons: 'Add Or Condition', 'Add And Condition' (highlighted with a red box), 'Delete', 'Move Up', and 'Move Down'. The 'OK' and 'Cancel' buttons are at the bottom right.

5. In the *New And Condition – Or Condition* window, select **Pattern Match** from the *Operator* dropdown. Then, select **file-pdf-body** from the *Context* dropdown. Next, type `\x0A 73 74 72 65 61 6D 0D 0A` in the *Pattern* field. Finally, click the **OK** button.



The image shows the 'New And Condition - Or Condition' window. The 'Operator' dropdown is set to 'Pattern Match' and the 'Context' dropdown is set to 'file-pdf-body'. The 'Pattern' field contains the text '\x0A 73 74 72 65 61 6D 0D 0A'. The 'Negate' checkbox is unchecked. Below this is a table with columns: 'Qualifier' and 'Value'. The table is currently empty. At the bottom, there are buttons: 'Add', 'Delete', 'OK' (highlighted with a red box), and 'Cancel'.

6. In the *Standard* window, click the **OK** button.

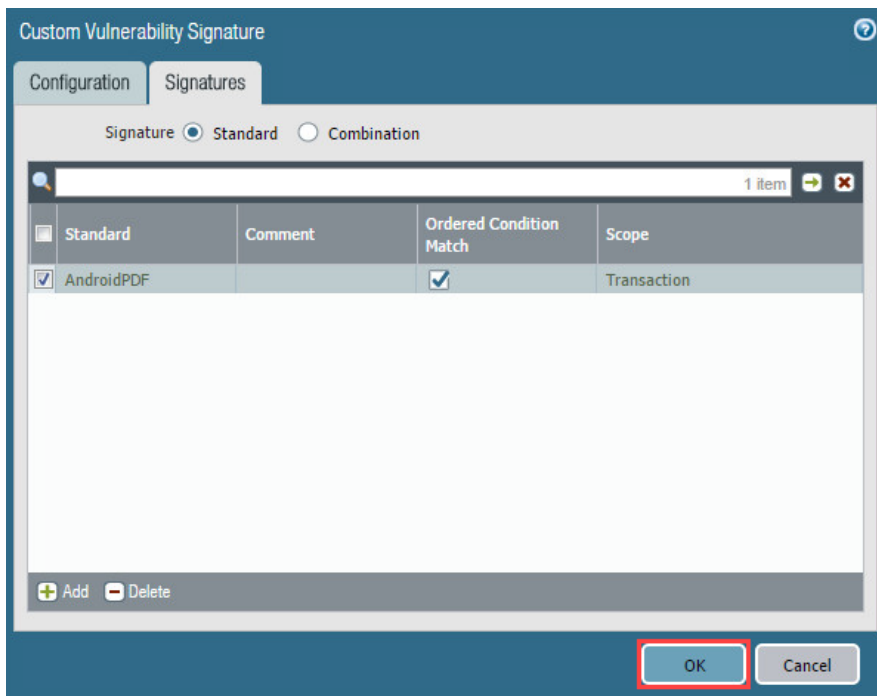


The **Standard** window is used to configure a vulnerability profile. It includes fields for **Standard** (set to **AndroidPDF**), **Comment**, and **Scope** (set to **Transaction**). The **Ordered Condition Match** checkbox is checked. Below these is a table for conditions:

And Condition	Conditions	Operator	Context	Value	Qualifier	Negate
▼ And Condition 1						
<input checked="" type="checkbox"/>	And Condition 1	Or Condition 1	pattern-match	file-pdf-body	\\x0A 73 74 72 65 61 6D 0D 0A \\x	

At the bottom, there are buttons for **Add Or Condition**, **Add And Condition**, **Delete**, **Move Up**, and **Move Down**. The **OK** button is highlighted with a red box.

7. In the *Custom Vulnerability Signature* window, click the **OK** button.



The **Custom Vulnerability Signature** window has two tabs: **Configuration** and **Signatures**. The **Signature** radio button is set to **Standard**. Below is a table showing the configured signature:

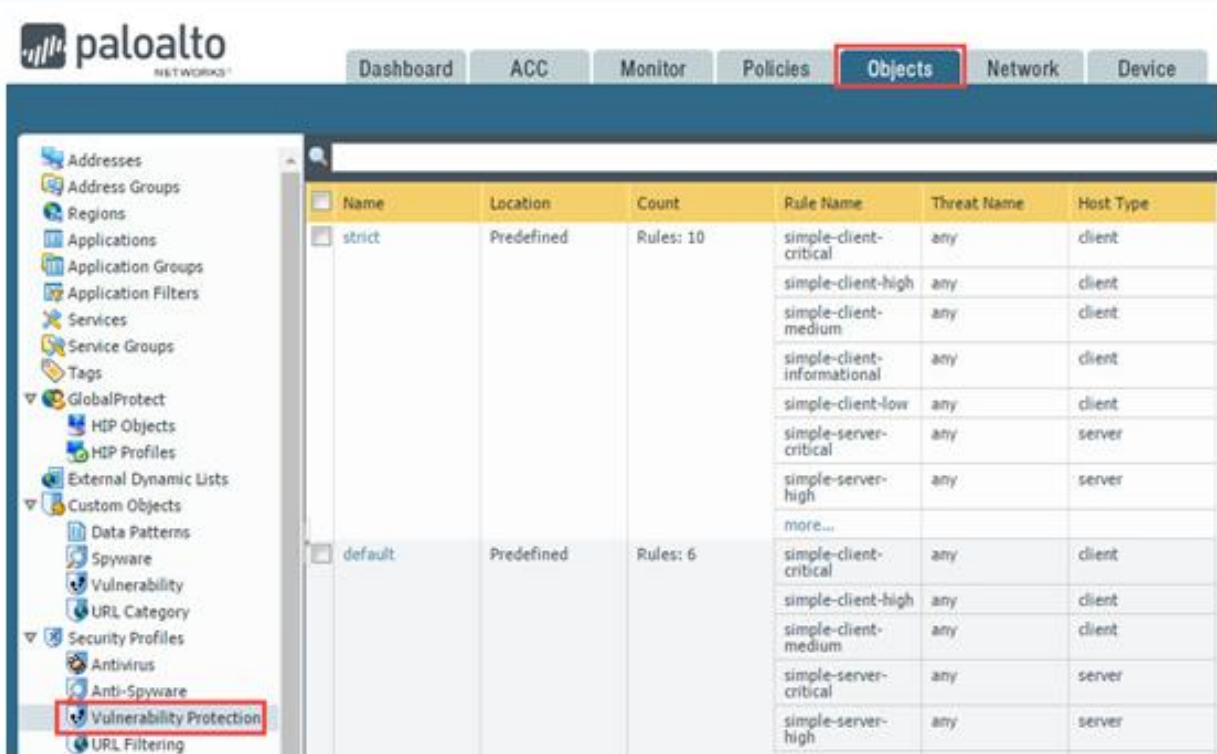
Standard	Comment	Ordered Condition Match	Scope
<input checked="" type="checkbox"/>	AndroidPDF	<input checked="" type="checkbox"/>	Transaction

At the bottom, there are buttons for **Add** and **Delete**. The **OK** button is highlighted with a red box.

6.4 Clone a Vulnerability Protection Profile

In this section, you will clone the **strict** Vulnerability Protection Profile. By creating a customized profile, you can minimize vulnerability-checking for traffic between trusted security zones, and maximize protection for traffic received from untrusted zones, such as the Internet. The **strict** profile applies the block response to all client and server critical, high, and medium severity events and uses the Default Action for low and informational vulnerability protection events.

1. Navigate to **Objects > Security Profiles > Vulnerability Protection**.



Name	Location	Count	Rule Name	Threat Name	Host Type			
strict	Predefined	Rules: 10	simple-client-critical	any	client			
			simple-client-high	any	client			
			simple-client-medium	any	client			
			simple-client-informational	any	client			
			simple-client-low	any	client			
			simple-server-critical	any	server			
			simple-server-high	any	server			
			more...					
			default	Predefined	Rules: 6	simple-client-critical	any	client
						simple-client-high	any	client
simple-client-medium	any	client						
simple-server-critical	any	server						
simple-server-high	any	server						

- Click the checkbox on the **strict** profile. Then, click the **Clone** button.

<input type="checkbox"/>	Name	Location	Count	Rule Name	Threat Name	Host Type	Severity
<input checked="" type="checkbox"/>	strict	Predefined	Rules: 10	simple-client-critical	any	client	critical
				simple-client-high	any	client	high
				simple-client-medium	any	client	medium
				simple-client-informational	any	client	informational
				simple-client-low	any	client	low
				simple-server-critical	any	server	critical
				simple-server-high	any	server	high
				more...			
<input type="checkbox"/>	default	Predefined	Rules: 6	simple-client-critical	any	client	critical
				simple-client-high	any	client	high
				simple-client-medium	any	client	medium
				simple-server-critical	any	server	critical
				simple-server-high	any	server	high
				simple-server-medium	any	server	medium

 Add  Delete  Clone

- In the *Clone* window, click the **OK** button.

Clone

Selected Objects

Name

strict

☒ Error out on first detected error in validation

OK

Cancel

4. Click on **strict-1**.

<input type="checkbox"/>	Name	Location	Count	Rule Name	Threat Name	Host Type	Severity
<input checked="" type="checkbox"/>	strict	Predefined	Rules: 10	simple-client-critical	any	client	critical
				simple-client-high	any	client	high
				simple-client-medium	any	client	medium
				simple-client-informational	any	client	informational
				simple-client-low	any	client	low
				simple-server-critical	any	server	critical
				simple-server-high	any	server	high
				more...			
<input type="checkbox"/>	default	Predefined	Rules: 6	simple-client-critical	any	client	critical
				simple-client-high	any	client	high
				simple-client-medium	any	client	medium
				simple-server-critical	any	server	critical
				simple-server-high	any	server	high
				simple-server-medium	any	server	medium
<input type="checkbox"/>	strict-1		Rules: 10	simple-client-critical	any	client	critical
				simple-client-high	any	client	high
				simple-client-medium	any	client	medium

5. In the *Vulnerability Protection Profile* window, type **PDF vulnerability Protection** in the *Name* field.

Vulnerability Protection Profile

Name: PDF Vulnerability Protection

Description:

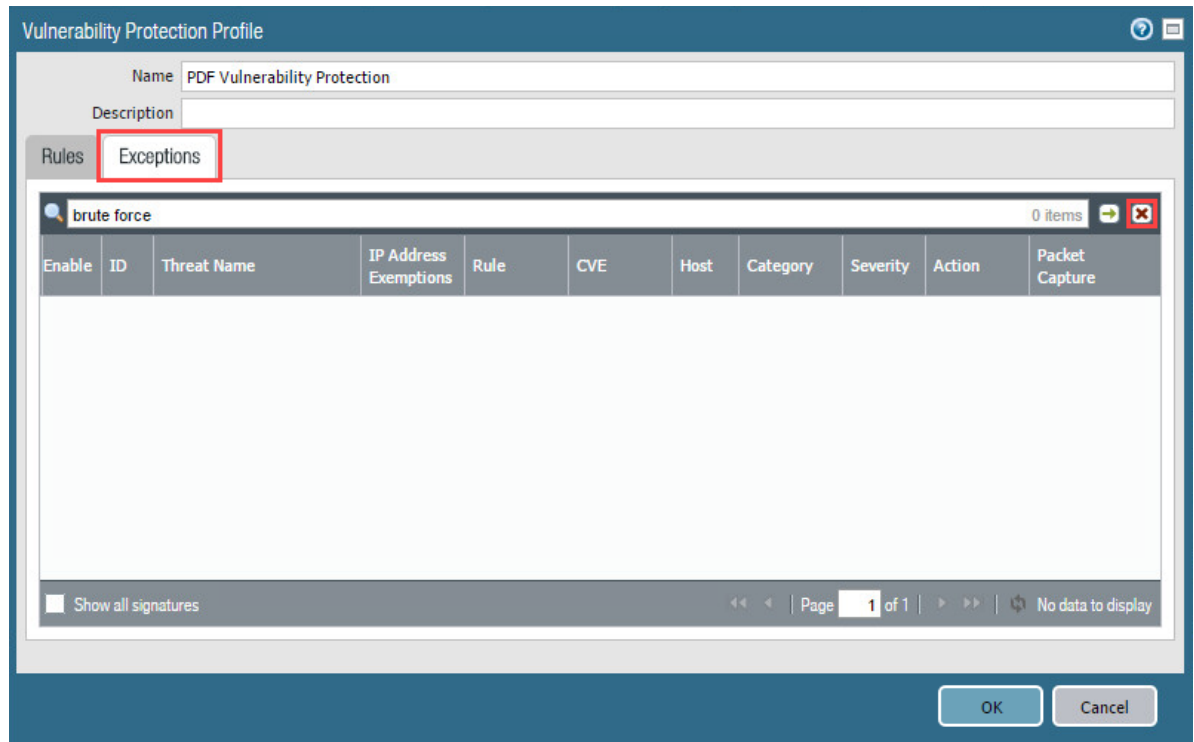
Rules Exceptions

<input type="checkbox"/>	Rule Name	Threat Name	CVE	Host Type	Severity	Action	Packet Capture
<input type="checkbox"/>	simple-client-critical	any	any	client	critical	reset-both	disable
<input type="checkbox"/>	simple-client-high	any	any	client	high	reset-both	disable
<input type="checkbox"/>	simple-client-medium	any	any	client	medium	reset-both	disable
<input type="checkbox"/>	simple-client-informational	any	any	client	informational	default	disable
<input type="checkbox"/>	simple-client-low	any	any	client	low	default	disable
<input type="checkbox"/>	simple-server-critical	any	any	server	critical	reset-both	disable
<input type="checkbox"/>	simple-server-high	any	any	server	high	reset-both	disable
<input type="checkbox"/>	simple-server-medium	any	any	server	medium	reset-both	disable

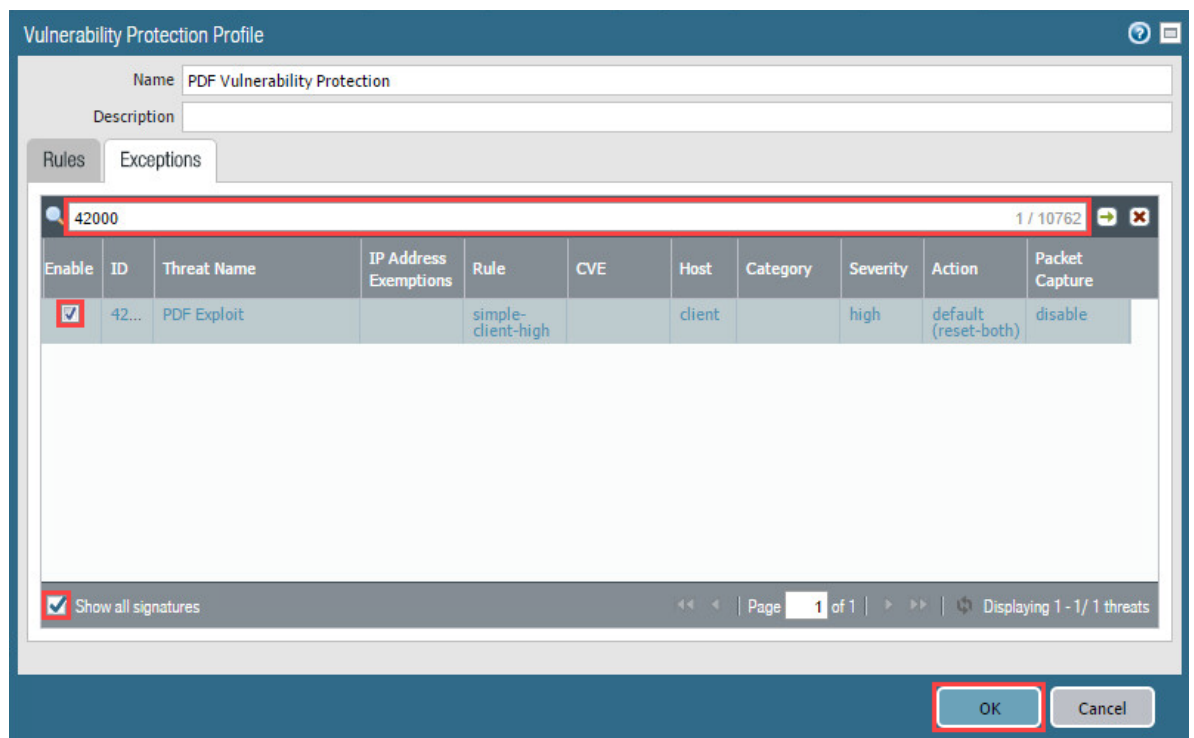
+ Add
Delete
Move Up
Move Down
Clone
Find Matching Signatures

OK Cancel

- In the *Vulnerability Protection Profile* window, click the **Exceptions** tab. Click the red **X** button to clear the search box.



- In the *Vulnerability Protection Profile* window, type **42000** in the search box. Then, click the checkbox for **Show all signatures**. Next, click the **Enable** checkbox for the **PDF Exploit** signature. Finally, click the **OK** button.



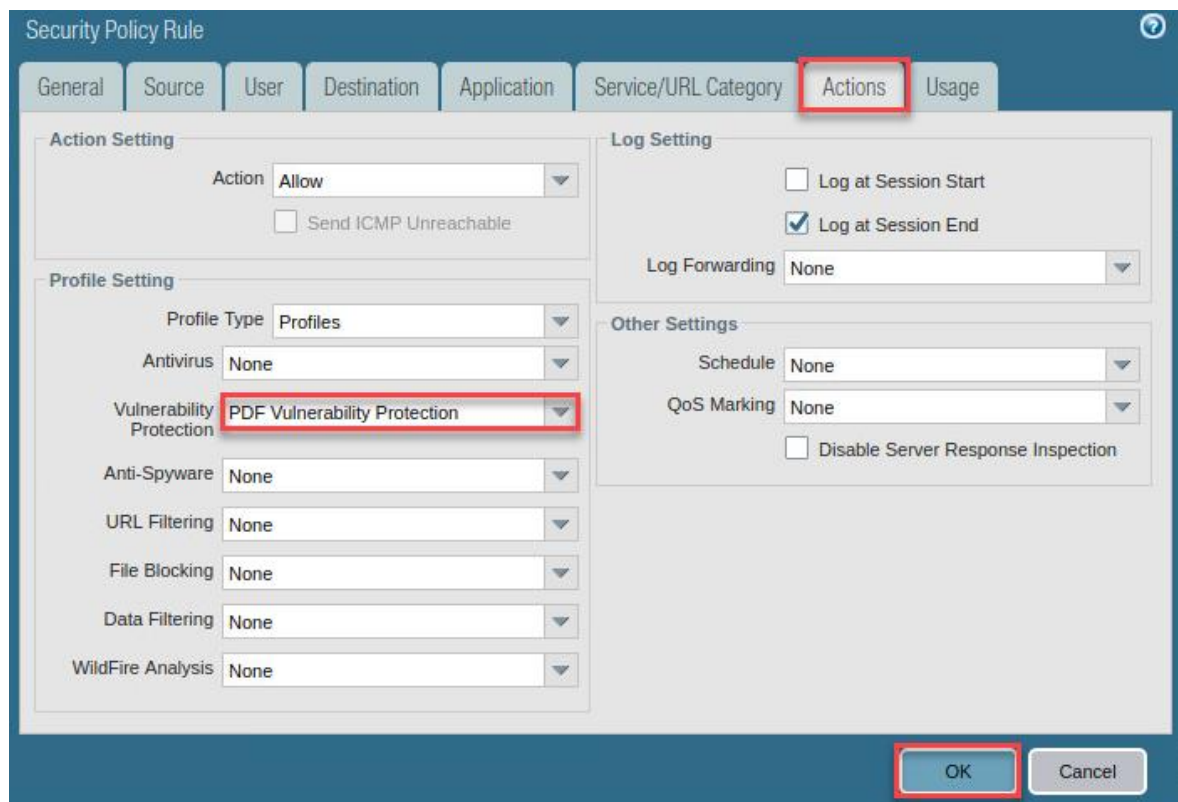
6.5 Apply Custom Vulnerability Protection Profile to a Security Policy

In this section, you will apply the Custom Vulnerability Protection Profile, **PDF Vulnerability Protection**, to the **Allow-Any** security policy for enforcement.

1. Navigate to **Policies > Security > Allow-Any**.



2. In the *Security Policy Rule* window, select the **Actions** tab. Then, select **Profiles** from the *Profile Type* dropdown. Next, select **PDF Vulnerability Protection** from the *Vulnerability Protection* dropdown. Finally, click on the **OK** button.



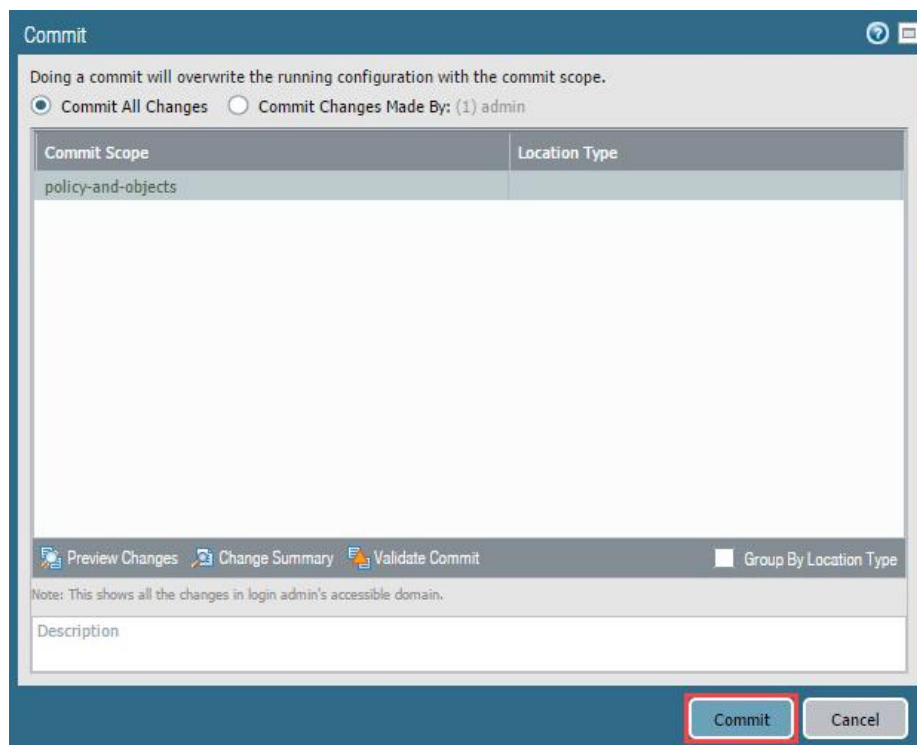
6.6 Commit and Test Vulnerability Protection

In this section, you will commit your changes to the Firewall. Then, you will attempt to download an infected PDF file and test the Vulnerability Protection. Next, you will verify it in the Threat Logs of the Palo Alto Networks Firewall.

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



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



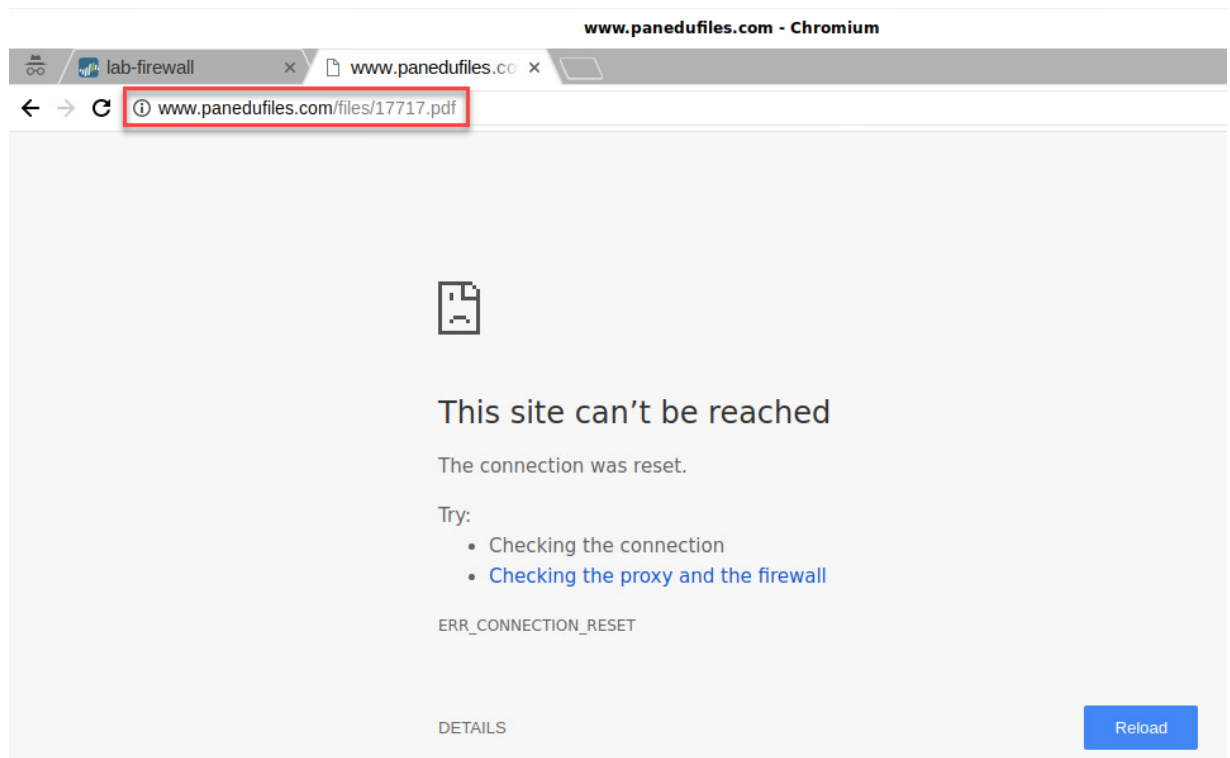
- When the commit operation successfully completes, click **Close** to continue.



- Click on the **New tab** button in the upper-left.



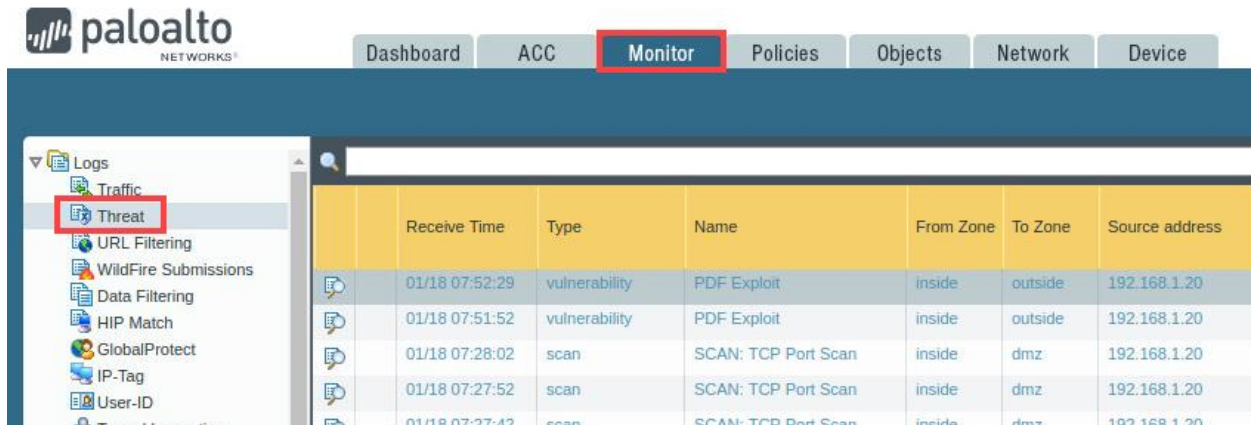
5. In the address bar, type `http://www.panedufiles.com/files/17717.pdf` and press **Enter**.








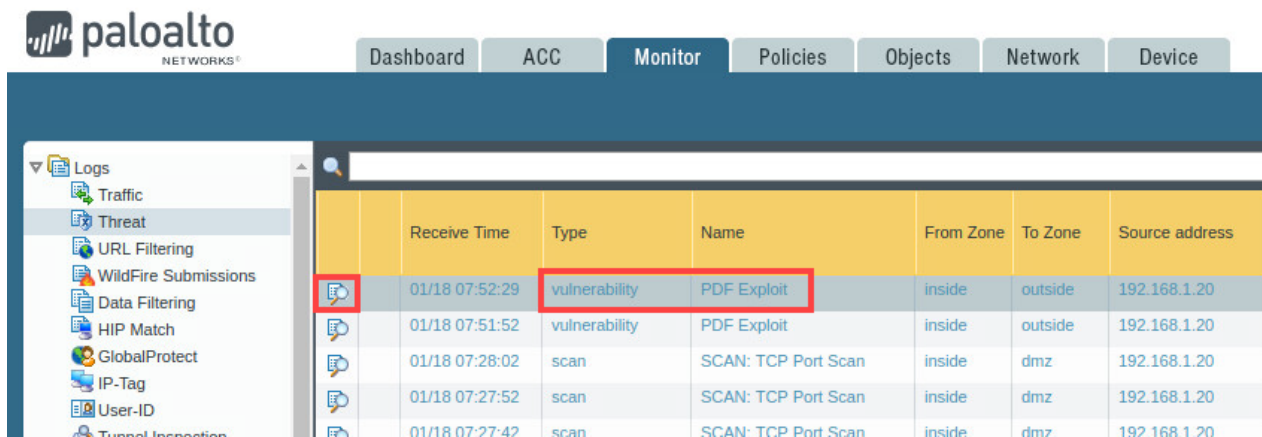
Notice the error message, *This site can't be reached*. This is because the connection was reset by the Firewall to stop the exploit.






6. Click the **X** on the `www.panedufiles.com` tab.



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


	Receive Time	Type	Name	From Zone	To Zone	Source address
	01/18 07:52:29	vulnerability	PDF Exploit	inside	outside	192.168.1.20
	01/18 07:51:52	vulnerability	PDF Exploit	inside	outside	192.168.1.20
	01/18 07:28:02	scan	SCAN: TCP Port Scan	inside	dmz	192.168.1.20
	01/18 07:27:52	scan	SCAN: TCP Port Scan	inside	dmz	192.168.1.20
	01/18 07:27:42	scan	SCAN: TCP Port Scan	inside	dmz	192.168.1.20

8. Notice the threats listed (make sure that the search filter is cleared). Click on the **Detailed Log View** button.


	Receive Time	Type	Name	From Zone	To Zone	Source address
	01/18 07:52:29	vulnerability	PDF Exploit	inside	outside	192.168.1.20
	01/18 07:51:52	vulnerability	PDF Exploit	inside	outside	192.168.1.20
	01/18 07:28:02	scan	SCAN: TCP Port Scan	inside	dmz	192.168.1.20
	01/18 07:27:52	scan	SCAN: TCP Port Scan	inside	dmz	192.168.1.20
	01/18 07:27:42	scan	SCAN: TCP Port Scan	inside	dmz	192.168.1.20

9. In the *Detailed Log View* window, analyze the threat, reviewing the information. In the *General* section, notice the *Action* taken. In the *Details* section, notice the *Threat Type*, *Threat Name*, and *ID*. At the bottom, you can see a list of all the sessions related to this log entry.

Detailed Log View

General		Source		Destination	
Session ID	1821	Source User		Destination User	
Action	reset-both	Source	192.168.1.20	Destination	67.195.197.24
Application	web-browsing	Country	192.168.0.0-192.168.255.255	Country	United States
Rule	Allow-Any	Port	36376	Port	80
Rule UUID	829a4518-7aef-48dd-918f-f2eaf09b7ecb	Zone	inside	Zone	outside
Device SN		Interface	ethernet1/2	Interface	ethernet1/1
IP Protocol	tcp	NAT IP	203.0.113.20	NAT IP	67.195.197.24
Log Action		NAT Port	19929	NAT Port	80
Generated Time	2021/01/18 07:52:29				
Receive Time	2021/01/18 07:52:29				
Tunnel Type	N/A				

Details	
Threat Type	vulnerability
Threat Name	PDF Exploit
ID	42000 (View in Threat Vault)
Category	unknown
Content Version	AppThreat-0-0
Severity	high
Repeat Count	1
File Name	17717.pdf
URL	

PCAP	Receive Time	Type	Application	Action	Rule	Rule UUID	Bytes	Severity	Category	URL Category List	Verdict	URL	File Name
	2021/01/18 07:52:29	vulnerability	web-browsing	reset-both	Allow-Any	829a4518-7...		high	any				17717.pdf
	2021/01/18 07:53:53	end	web-browsing	allow	Allow-Any	829a4518-7...	15811		any				

Close

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