



PALO ALTO NETWORKS EDU-210

Lab 12: Monitoring and Reporting

Document Version: 2017-09-29

Copyright © 2017 Network Development Group, Inc.
www.netdevgroup.com

NETLAB Academy Edition, NETLAB Professional Edition, and NETLAB+ are registered trademarks of Network Development Group, Inc.

VMware is a registered trademark of VMware, Inc. Cisco, IOS, Cisco IOS, Networking Academy, CCNA, and CCNP are registered trademarks of Cisco Systems, Inc. EMC² is a registered trademark of EMC Corporation.

Contents

Contents.....	2
Introduction	3
Objectives.....	3
Lab Topology.....	4
Lab Settings	5
12 Lab: Interface Configuration	6
12.0 Load Lab Configuration.....	6
12.1 Generate Traffic.....	7
12.2 Explore the Session Browser	9
12.3 Explore App-Scope.....	11
12.4 Explore the ACC	14
12.5 Investigate Traffic	19
12.6 User Activity Report.....	22
12.7 Create a Custom Report	23
12.8 Create a Report Group	26
12.9 Schedule Report Group Email.....	27

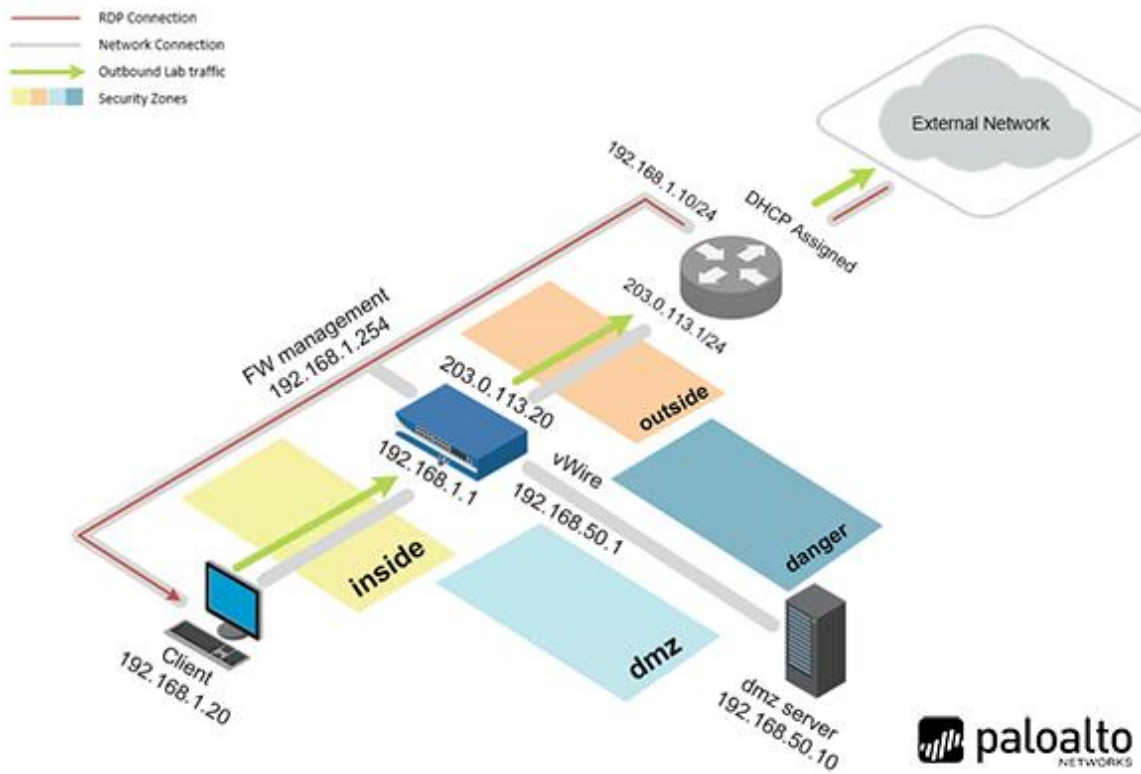
Introduction

Now that the firewalls are up and running we need to begin analyzing the data from these firewalls. The data will be coming from the different logs on the system. To effectively utilize this information we need to become familiar with the different logs and how to search that information.

Objectives

- Explore the Session Browser, App-Scope, and Application Command Center (ACC).
- Investigate traffic via the ACC and logs.
- Generate a User Activity report.
- Create a Custom report.
- Create a Report Group.
- Configure an email schedule.

Lab Topology



Lab Settings

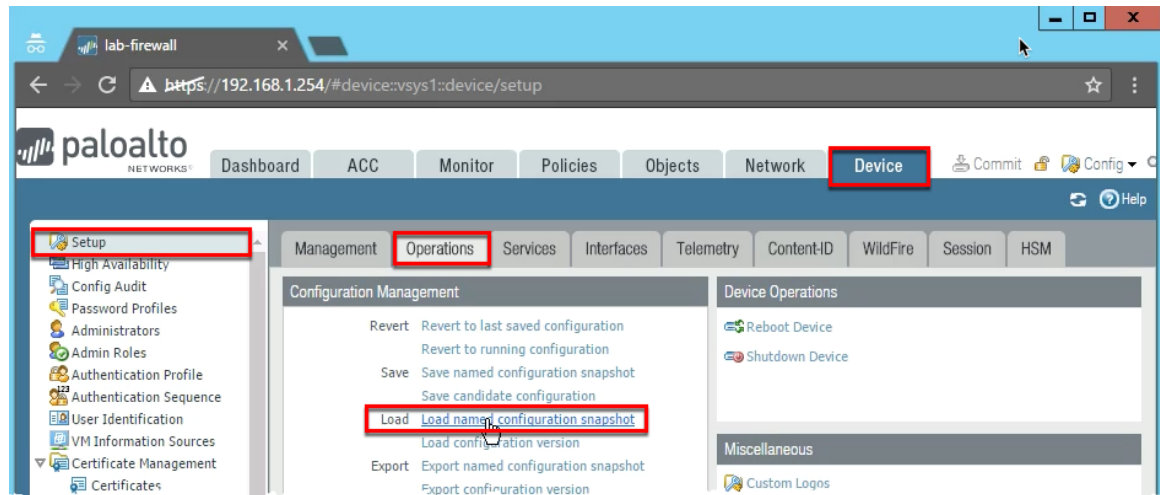
The information in the table below will be needed in order to complete the lab. The task sections below provide details on the use of this information.

Virtual Machine	IP Address	Account (if needed)	Password (if needed)
Client – Windows 2012 R2	192.168.1.20	lab-user	Pal0Alt0
Firewall – PA-VM	192.168.1.254	admin	admin

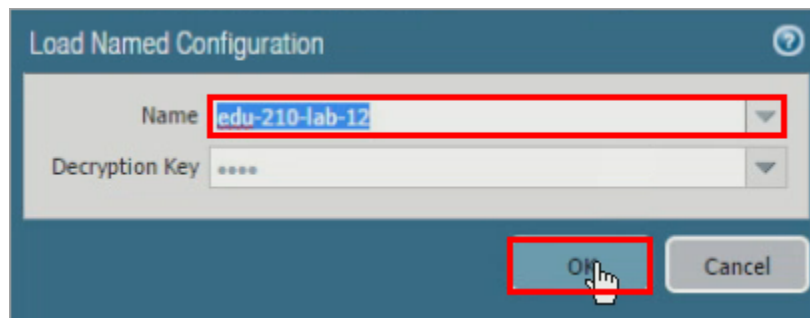
12 Lab: Interface Configuration

12.0 Load Lab Configuration

1. In the WebUI select **Device > Setup > Operations**.
2. Click **Load named configuration snapshot**:



3. Select **edu-210-lab-12** and click **OK**.



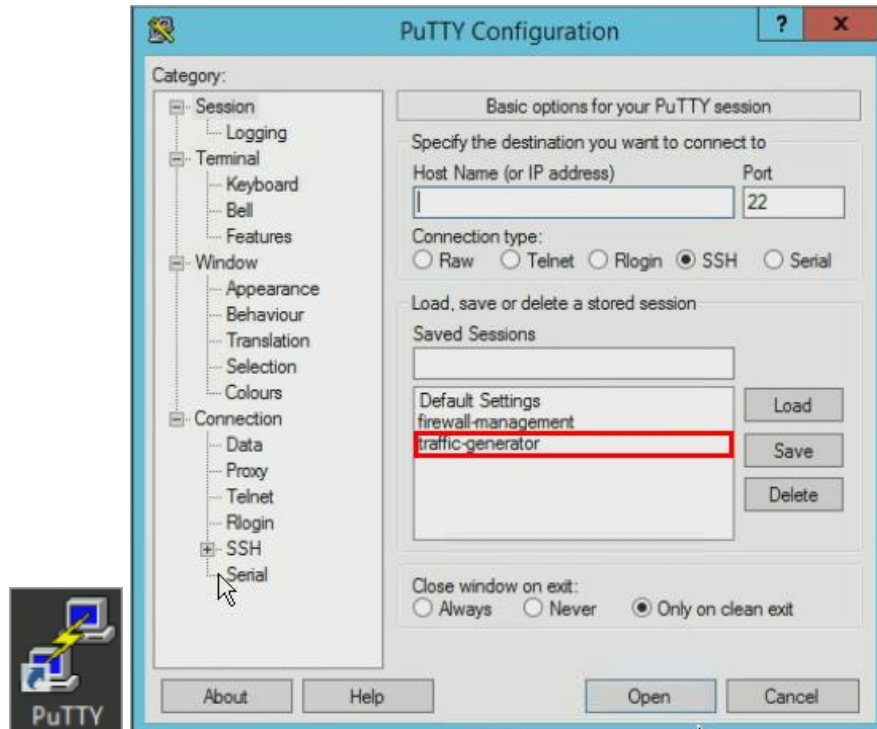
4. Click **Close**.
5. **Commit** all changes.

12.1 Generate Traffic

Pre-populate the firewall with log entries and usernames that you can observe and investigate in this lab.

The metrics displayed in the lab screenshots and the metrics displayed on your lab firewall might be different.

1. On the Windows desktop, open **PuTTY** then double-click **traffic-generator**.



2. Enter the following information when prompted.

Parameter	Value
Password	Pa10Alt0

3. While in the PuTTY window, type the command `sh /tg/traffic.sh`.

```
Using username "root".
root@192.168.50.10's password: 
Last login: Tue Feb 21 22:43:00 2017
[root@pod-dmz ~]# sh /tg/traffic.sh
```

After you execute the command, it can take up to 10 minutes to complete. Wait until it is finished before proceeding.

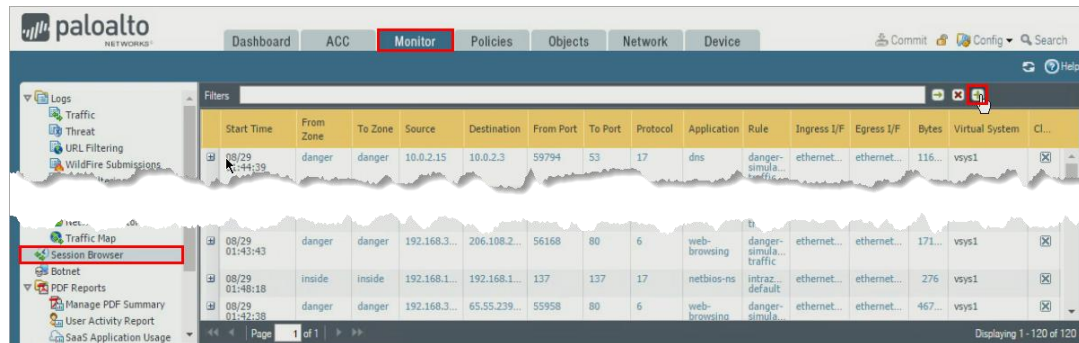
```
COMPLETE
[root@pod-dmz ~]#
```


12.2 Explore the Session Browser

The Session Browser enables you to browse and filter current running sessions on the firewall.

1. Select **Monitor > Session Browser** then click the **Plus** icon at the top-right of the window to open the **Filters** pane.

If you don't see the plus icon then the **Filters** pane may have presented itself automatically.



You might be able to see simulated sessions from the generated traffic. Notice that there is no Source User column.

2. Type `lab\jamie` in the **From User** field then click **Run**.



3. Notice that, even though there is not a Source User column, there is an ability to search for the **From User**. You can also search for **To User**.
4. Locate a **salesforce-base** entry and click the **Plus** icon on the left to expand the display.

	Start Time	From Zone	To Zone	Source	Destin...	From Port	To Port	Prot...	Applic...	Rule	Ingress I/F	Egress I/F	By...	Virtual System	C...
	08/29 01:46:45	danger	dan...	192.16...	204.14...	57245	8443	6	undec...	dan... sim... traffic	ether...	ether...	16...	vsys1	⊗
	08/29 01:46:55	danger	dan...	192.16...	204.14...	57248	8443	6	salesf... base	intr... def...	ether...	ether...	19...	vsys1	⊗
	08/29 01:46:23	danger	dan...	192.16...	208.82...	58750	80	6	undec...	dan... sim... traffic	ether...	ether...	39...	vsys1	⊗

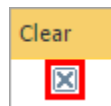
5. Notice the three sections labeled **Detail**, **Flow 1**, and **Flow 2**.

	Start Time	From Zone	To Zone	Source	Destin...	From Port	To Port	Prot...	Applic...	Rule	Ingress I/F	Egress I/F	By...	Virtual System	C...
🔍	08/29 01:46:45	danger	dan...	192.16...	204.14...	57245	8443	6	undec...	dan... sim... traffic	ether...	ether...	16...	vsys1	☒
🔍	08/29 01:46:55	danger	dan...	192.16...	204.14...	57248	8443	6	salesf... base	intr... def...	ether...	ether...	19...	vsys1	☒
Detail						Flow 1					Flow 2				
Session ID		61359				Direction		c2s			Direction		s2c		
Timeout		600				From Zone		danger			From Zone		danger		
Time To Live		600				Source		192.168.3.131			Source		204.14.234.85		
Virtual System		vsys1				Destination		204.14.234.85			Destination		192.168.3.131		
Application		salesforce-base				From Port		57248			From Port		8443		
Protocol		6				To Port		8443			To Port		57248		
Security Rule		intrazone-default				From User		lab/jamie			From User		unknown		
QoS Rule		N/A				To User		unknown			To User		lab/jamie		
QoS Class		4				State		ACTIVE			State		ACTIVE		
Created By Syn Cookie		False				Type		FLOW			Type		FLOW		
To Host Session		False													
Traverse Tunnel		False													
Captive Portal		False													
Session End Log		False													
Session In Ager		True													
Session From HA		False													

In the Detail section, you can see various items of information. Important items that can help when troubleshooting are **Session ID**, **Application**, **Security Rule**, **QoS Rule**, and **Class**.

Notice under **Flow 1** the direction **c2s** (Client to Server) and under **Flow 2** the direction **s2c** (Server to Client). These flows provide information about both the request and response traffic.

6. You can end an active session by clicking the **X** icon at the far right of a session row.



12.3 Explore App-Scope

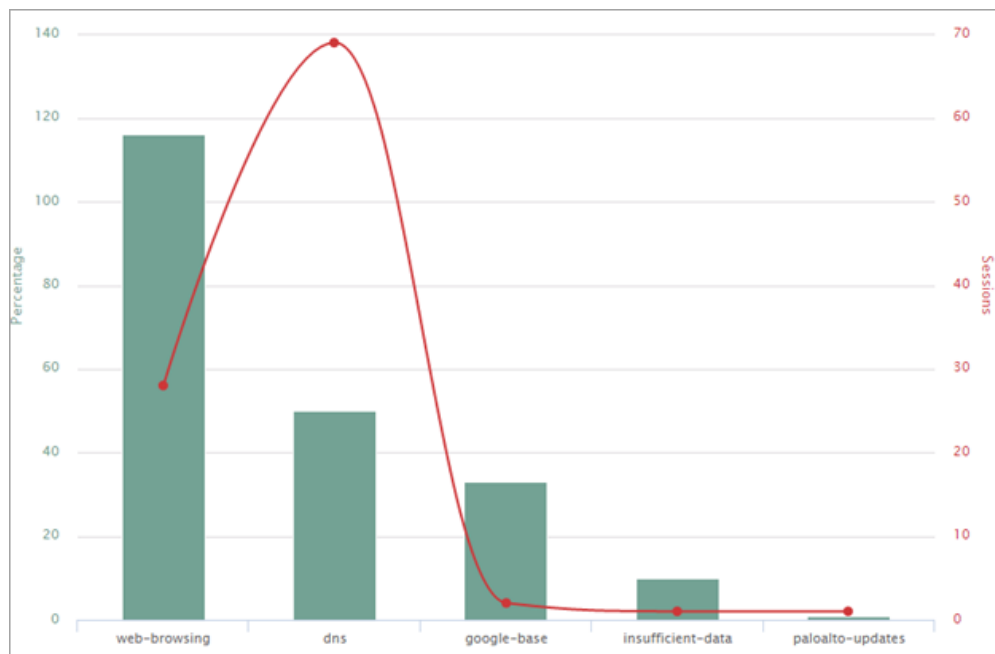
With the App-Scope reports, you can quickly see if any behavior is unusual or unexpected, which helps identify problematic behavior. Each report provides a dynamic, user-customizable window into the network. Long-term trends are difficult to represent in a lab environment. However, knowing where to look is key to finding potential issues.

1. Select **Monitor > App Scope > Summary**.

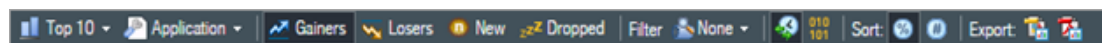
The Summary report displays charts for the top five gainers, losers, and bandwidth-consuming applications, application categories, users, and sources.

2. Select **Monitor > App Scope > Change Monitor**.

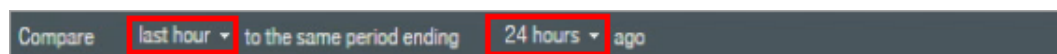
The Change Monitor report displays changes over a specified time period. For example, the following figure displays the top applications that gained in use over the last hour as compared with the last 24-hour period. The top applications are determined by session count and are sorted by percentage.



3. The type of information displayed can be controlled at the top. The displayed Graph can be exported as a PDF or PNG.

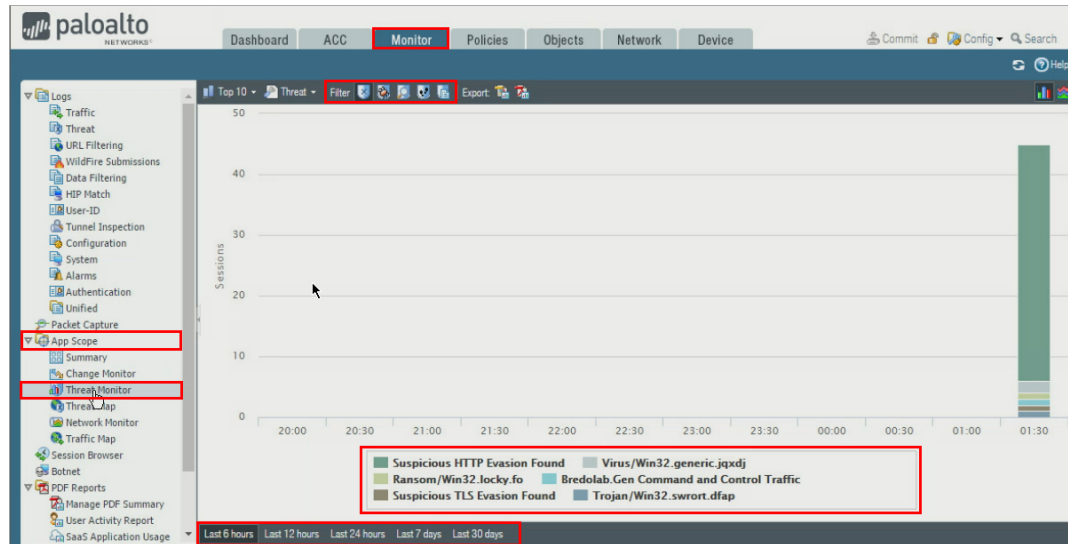


4. The **time period** also can be changed at the bottom.



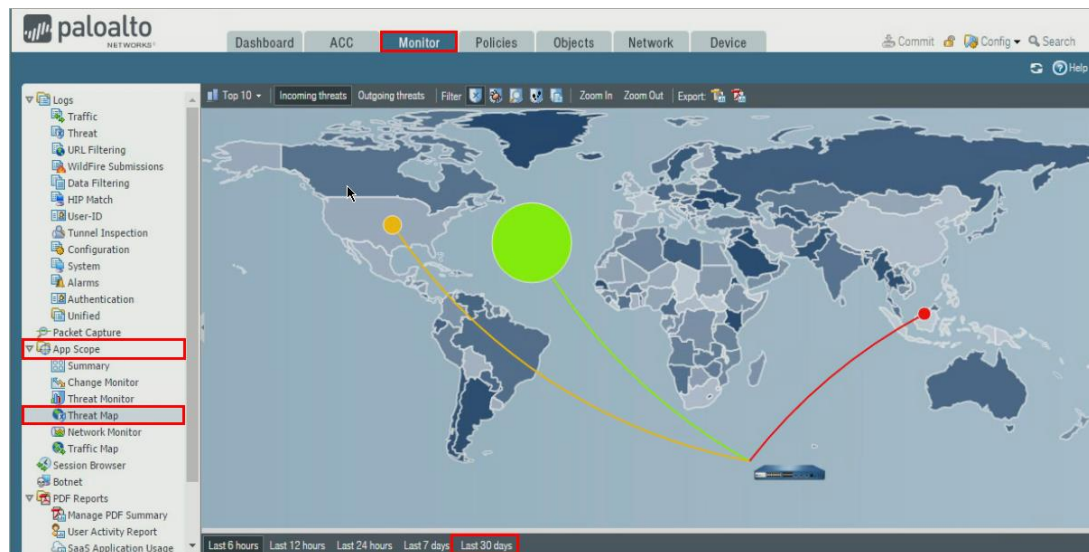
5. Select **Monitor > App Scope > Threat Monitor**.

The Threat Monitor report displays a count of the top threats over the selected time period. By default, the figure shows the top 10 threat types for the past six hours.



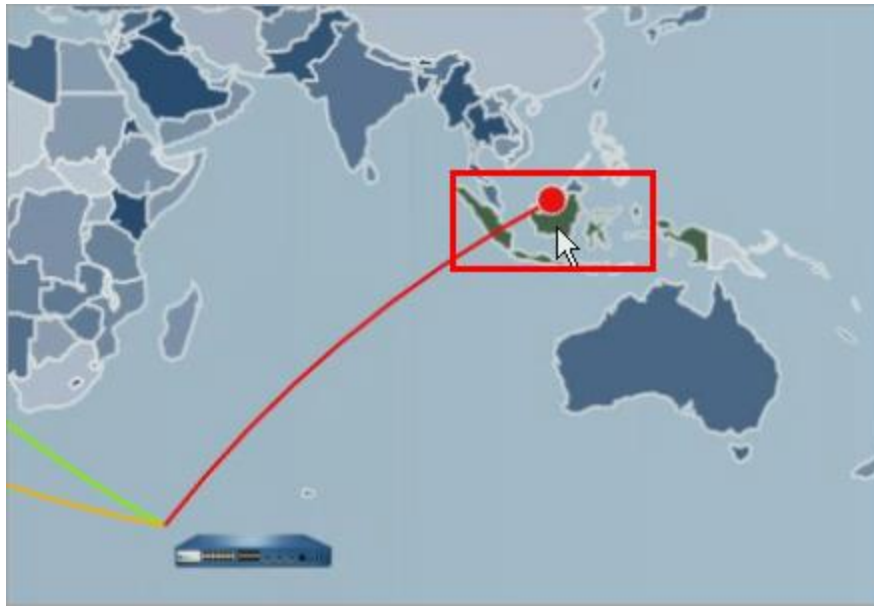
The type of threat also can be filtered at the top and the time period can be changed to the Last 6 hours, 12 hours, 24 hours, 7 days, or 30 days.

6. Select **Monitor > App Scope > Threat Map** then click **Last 30 Days**.

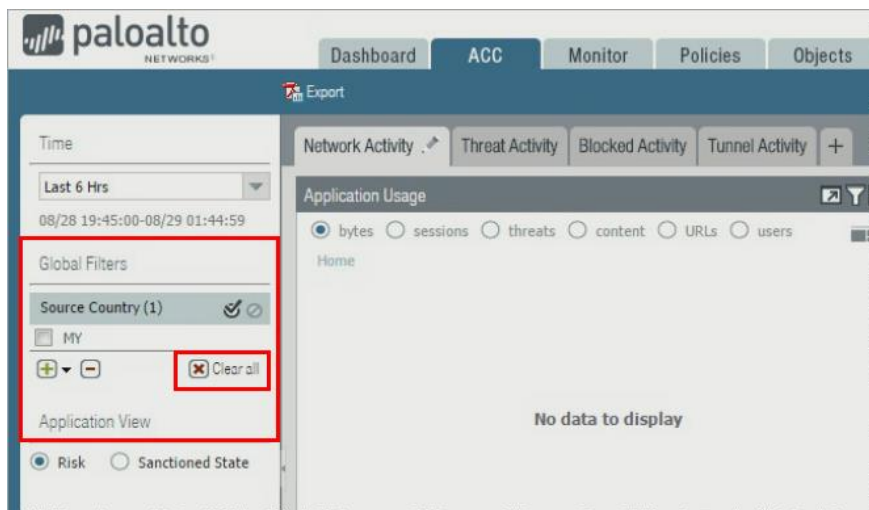


The Threat Map report shows a geographical view of threats, including severity.

7. Click **Malaysia**.



The ACC opens with a global filter referencing Malaysia (MY):

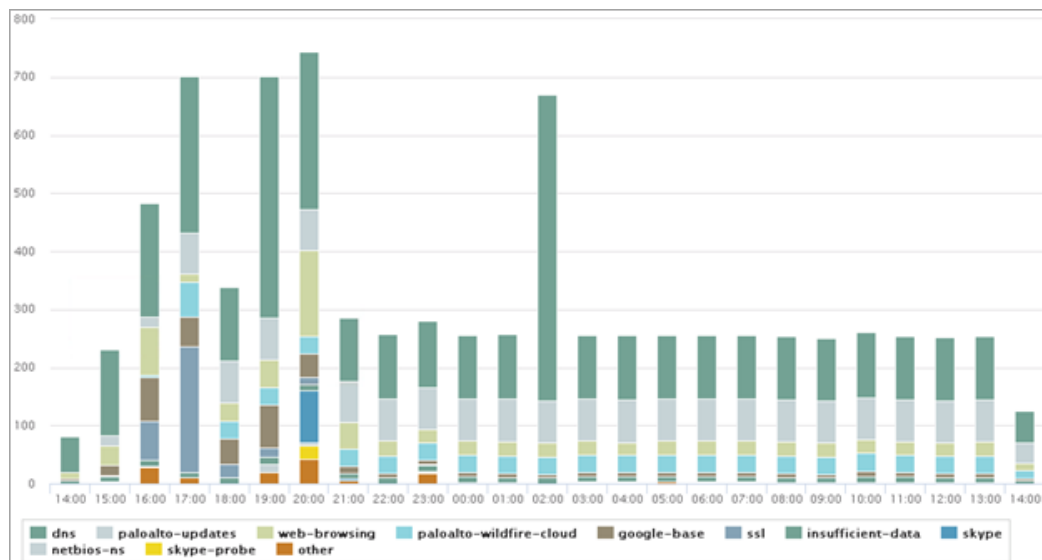


8. Click **Clear all** to clear the Global Filter.
9. Select **Monitor > App Scope > Network Monitor**.

The Network Monitor report displays the bandwidth dedicated to different network functions over the specified period of time. Each network function is color-coded, as indicated in the legend below the chart. For example, the following diagram shows application bandwidth for the past six hours based on session information.

10. Click the **Session Count** icon to display the information by Session Count and not Bytes.





As is standard in all App-Scope graph items, you can click an application color, which switches your view in the WebUI to the ACC tab.

11. Select **Monitor > App Scope > Traffic Map**. The Traffic Map report shows a geographical view of traffic flows according to sessions or flows.



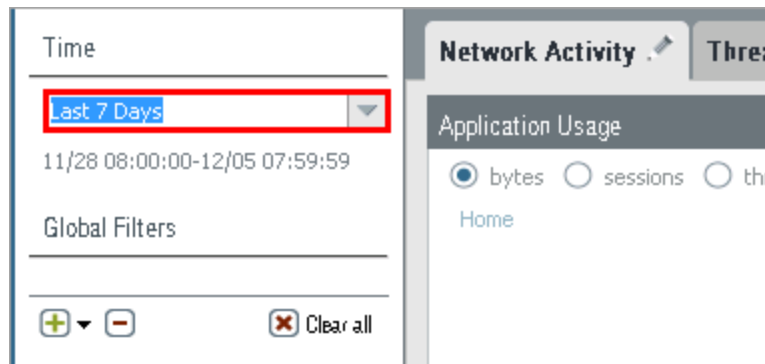
12.4 Explore the ACC

The ACC is an analytical tool that provides actionable intelligence about the activity within your network. The ACC uses the firewall logs to graphically depict traffic trends on your network.

1. Click the **ACC** tab.

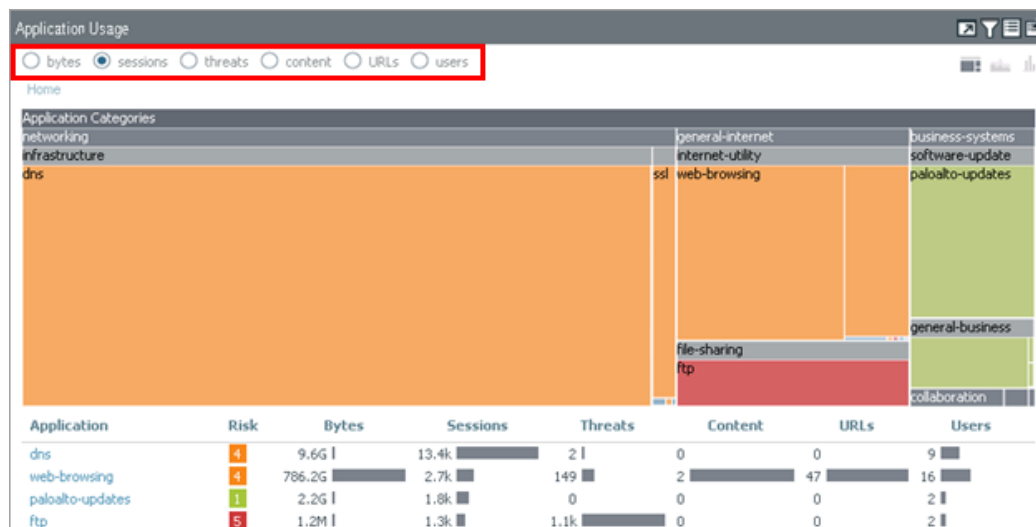


- Click the **Time** drop-down list and select **Last 7 Days**.

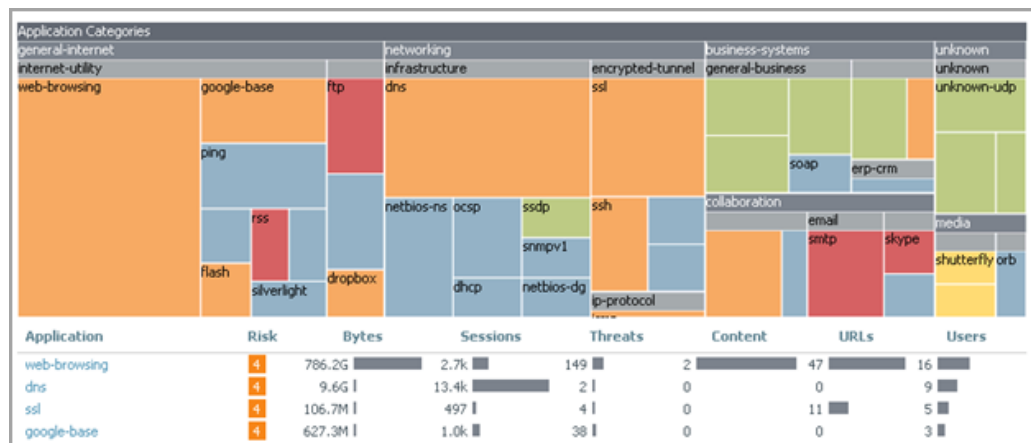


- Explore the information available on the **Network Activity** tab. This tab displays an overview of traffic and user activity on your network. It focuses on the top applications being used; the top users who generate traffic with detailed information about the bytes, content, threats, or URLs accessed by the user; and the most used security rules against which traffic matches occur.

Notice that in every pane you can display data by bytes, sessions, threats, content, URLs, and users.

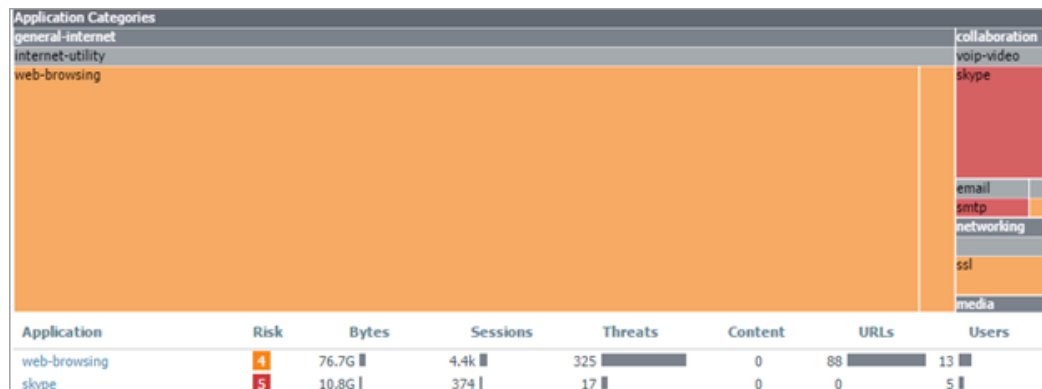


- Select the **users** option. Notice how the application use seems more consistent across all colors versus bytes.



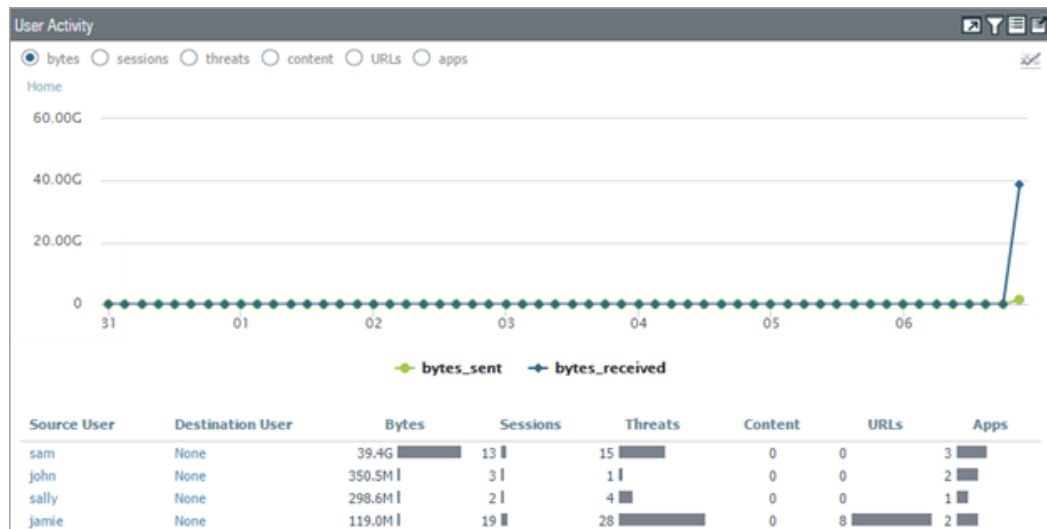
This information indicates that one application does not supersede any other application in overall use by users.

5. Select **threats** in the **Application Usage** pane.



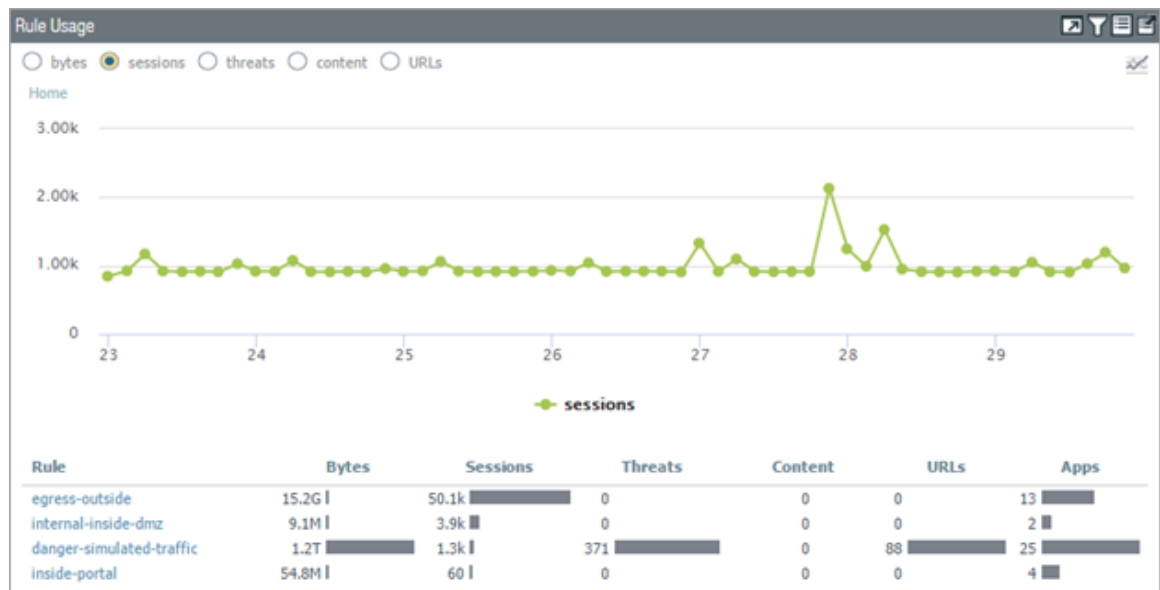
Given the displayed information you can see that web-browsing is the primary source of threats in this environment.

6. Focus your attention on the **User Activity** pane. Which user consumed the most bandwidth in the past seven days?



From the graph in the example, you can see that Jamie has consumed the most bandwidth. Your user might be different.

7. Focus your attention on the bottom-right **Rule Usage** pane.
8. Select **sessions**. Which Security policy rule has been used the most?

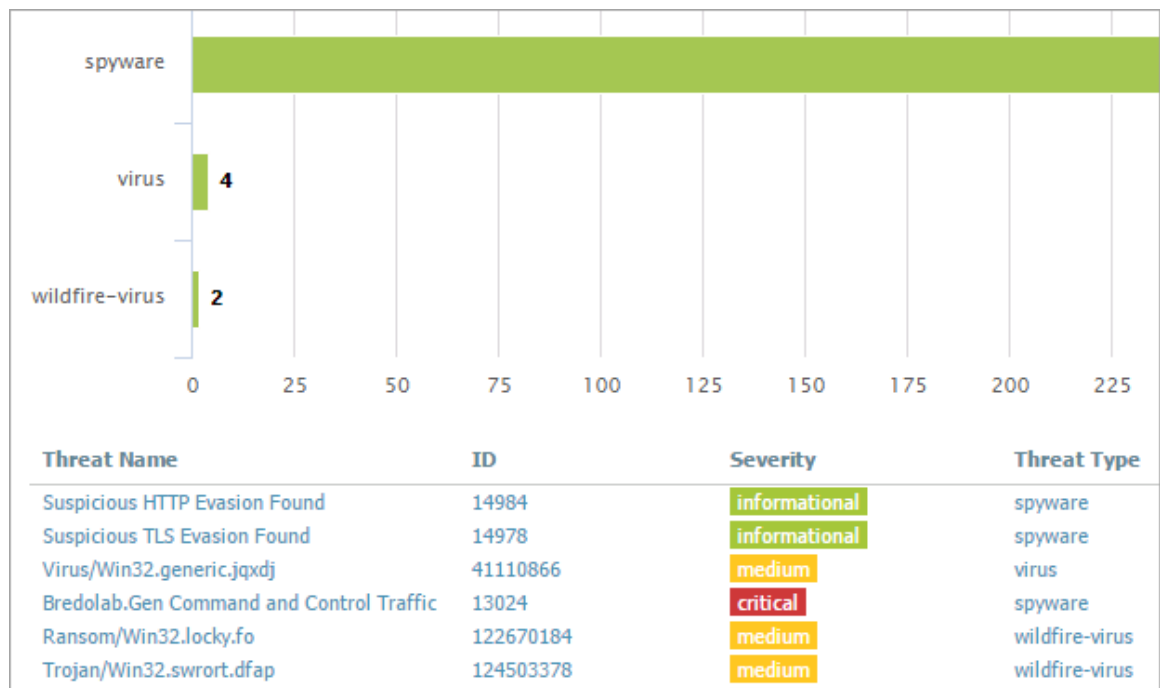


From the displayed information, you can see that the most active rule based on session count is egress-outside.

9. Click the **Threat Activity** tab:

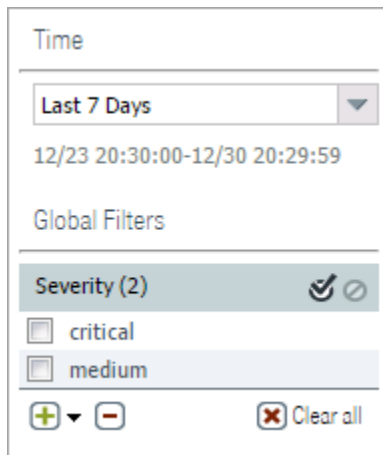


This tab displays an overview of the threats on the network. It focuses on the top threats: vulnerabilities, spyware, viruses, hosts visiting malicious domains or URLs, top WildFire submissions by file type and application, and applications that use non-standard ports.



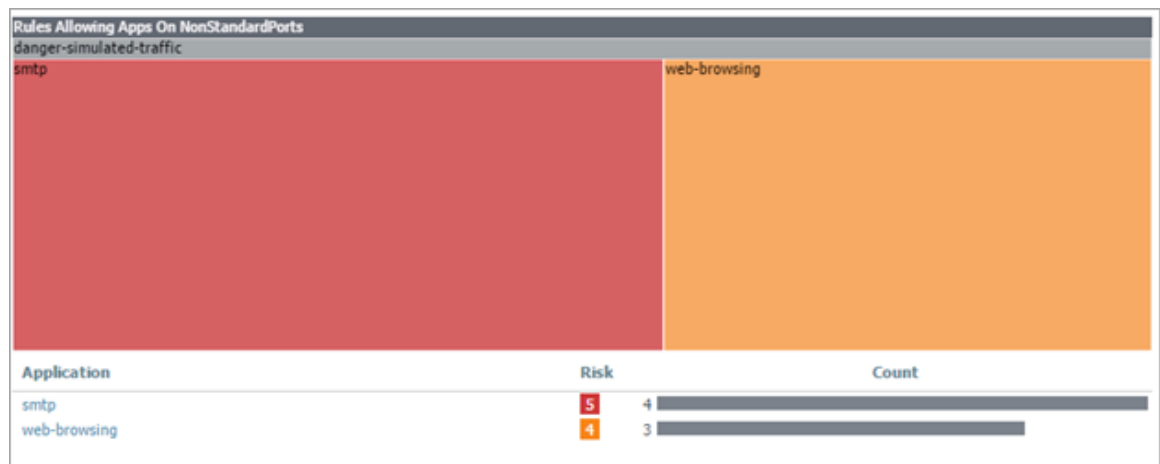
Notice that there are informational entries that might not be useful.

10. Create a global filter for only medium and critical severities.



Notice that the graph updates to display only critical and medium severities.


11. Scroll down to the bottom-right and notice the **Rules Allowing Apps On Non Standard Ports** pane.



This pane is good for identifying rules that need to enforce the application-default service setting.

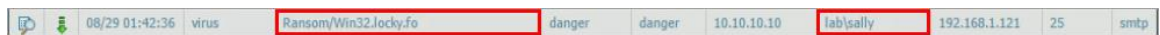
12.5 Investigate Traffic

1. In the WebUI select **Monitor > Logs > Threat** then type the filter (`severity neg informational`) into the log filter text box and press **Enter**.



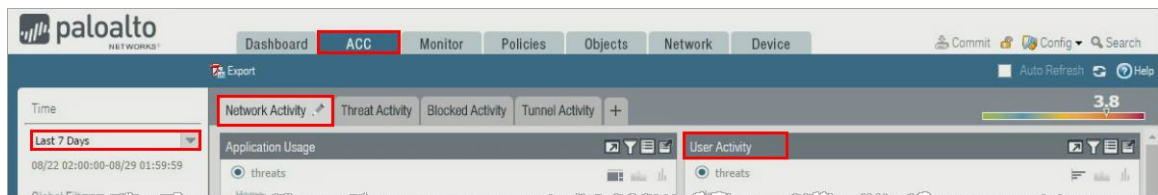
Receive Time	Type	Name	From Zone	To Zone	Attacker	Attacker Name	Victim	To Port	Applic
08/29 01:42:37	virus	Trojan/Win32.swrort.dfp	danger	danger	10.10.10.10	lab/sally	192.168.1.121	25	smtp
08/29 01:42:36	virus	Ransom/Win32.locky.fo	danger	danger	10.10.10.10	lab/sally	192.168.1.121	25	smtp
08/29 01:42:25	spyware	Bredolab.Gen Command and Control Traffic	danger	danger	112.137.162.134		192.168.0.2	1038	web-b

2. Locate the first entry referencing **locky** and notice that the user sally is associated with it



08/29 01:42:36	virus	Ransom/Win32.locky.fo	danger	danger	10.10.10.10	lab/sally	192.168.1.121	25	smtp
----------------	-------	-----------------------	--------	--------	-------------	-----------	---------------	----	------

3. Click the **ACC** tab, ensure that the **Time** drop-down list is **Last 7 Days**, the **Network Activity** tab is selected then move to the **User Activity** pane.

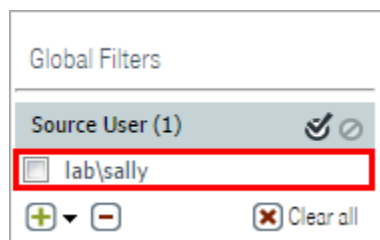


Time	Network Activity	Threat Activity	Blocked Activity	Tunnel Activity	User Activity
08/22 02:00:00-08/29 01:59:59	Application Usage	threats			threats

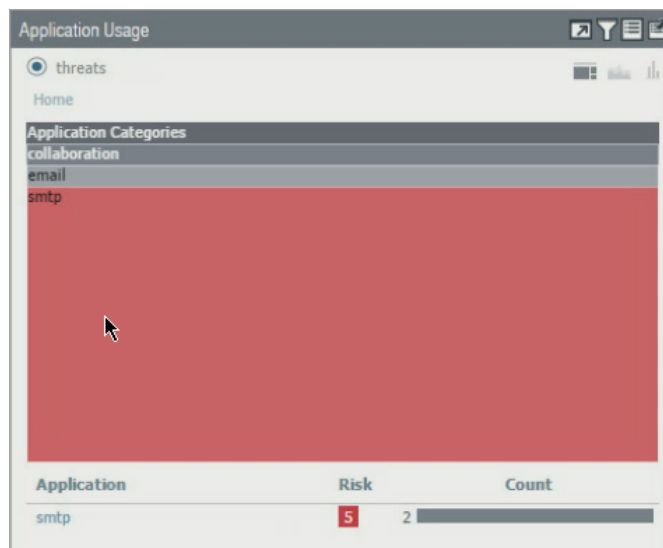
4. Use the left-arrow to promote **sally** to a Global Filter.



5. Ensure that sally was promoted to a **Global Filter**.



Notice that all window panes have updated to show only information based on sally.



From the displayed information, you can see that sally is associated only with smtp traffic, which could indicate a possible infection and lateral movement.

6. Scroll down and locate the **Destination Regions** pane.

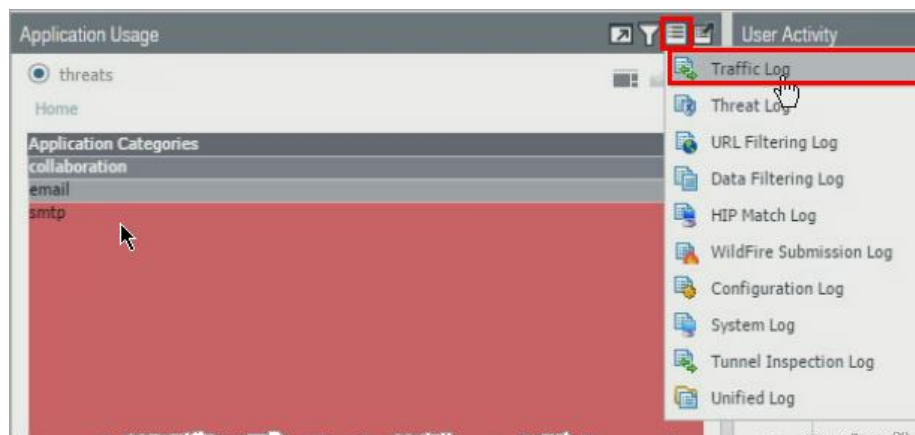
Destination Country	Bytes	Sess...	Thre...	Cont...	URLs
192.168.0.0-192.168.255.255	285.2G	2	4	0	0

Notice that this is an internal network, which could indicate that sally is using corporate e-mail and not an external source or that there might be a rogue SMTP relay.

7. Scroll down to the **Rule Usage** pane. Notice that only one rule allowed this traffic. If this were a production environment, inspection should be done to ensure that this rule is operating effectively. For example, should the rule allow SMTP? If not, is this a rogue SMTP relay?


Rule	Bytes	Sess...	Thre...	Cont...	URLs	Apps
danger-simulated-traffic	285.2G	2	4	0	0	1

8. Scroll to the top-left **Application Usage** pane.
9. Click the **Jump to Logs** icon and select **Traffic Log**:

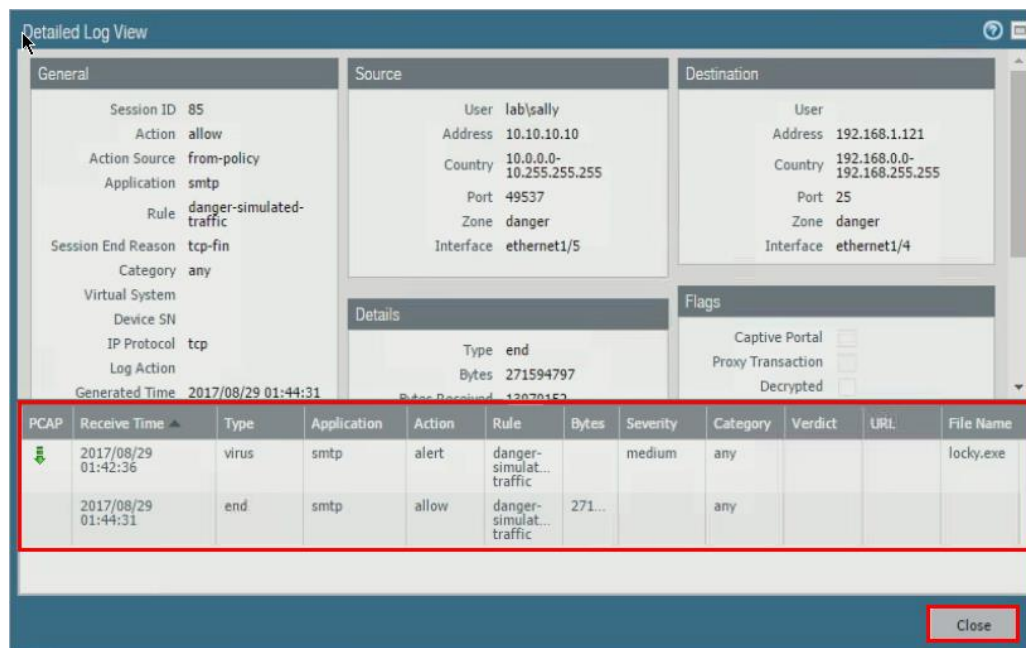


Notice that the WebUI switched views to the Traffic log with a predefined filter.

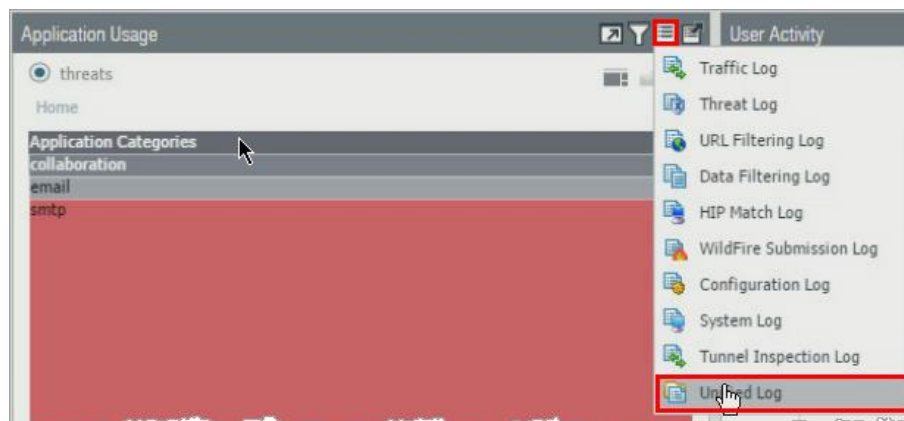
10. Select the **Detailed Log View** icon.

((receive_time geq '2017/08/22 02:00:00') AND (receive_time leq '2017/08/29 01:59:59') AND ((srcuser eq 'lab\sally'))												
	Receive Time	Type	From Zone	To Zone	Source	Source User	Destination	To Port	Application	Action	Rule	Ses
	08/29 01:44:31	end	danger	danger	10.10.10.10	lab\sally	192.168.1.121	25	smtp	allow	danger-simulated-traffic	tcp
	08/29 01:44:22	end	danger	danger	10.10.10.10	lab\sally	192.168.1.121	25	smtp	allow	danger-simulated-traffic	tcp

11. At the bottom of the **Detailed Log View** window that popped up, you can see the associated threat entries. Click **Close** when finished observing.



12. Click the **ACC** tab then ensure the **Network Activity** tab is selected.
13. Under **Application Usage** click the **Jump to Logs** icon and select the **Unified Log**.

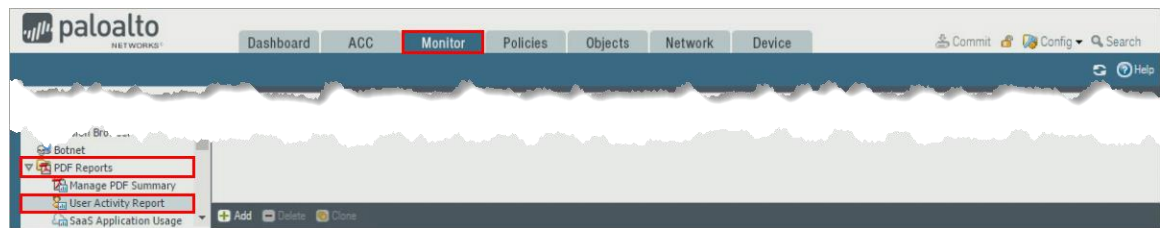


Notice that you now see both Traffic and Threat logs in one unified display, which can help with correlation.

12.6 User Activity Report

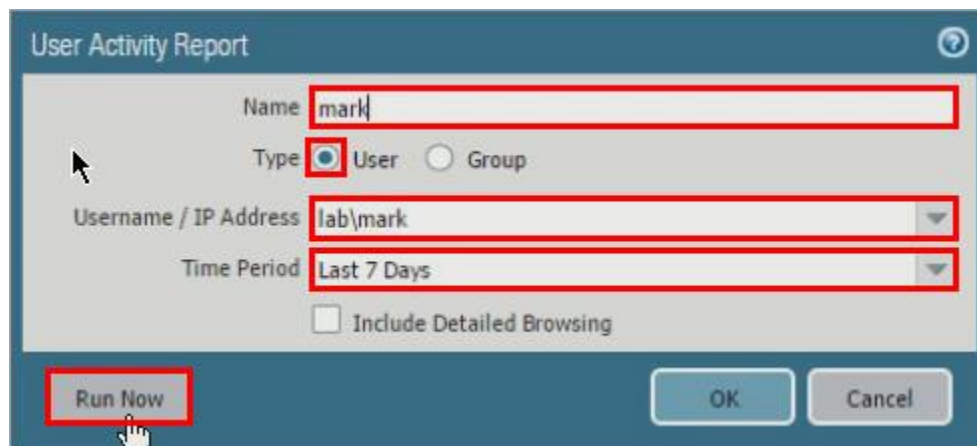
The firewall can generate reports that summarize the activity of individual users or user groups.

1. Select **Monitor > PDF Reports > User Activity Report**.

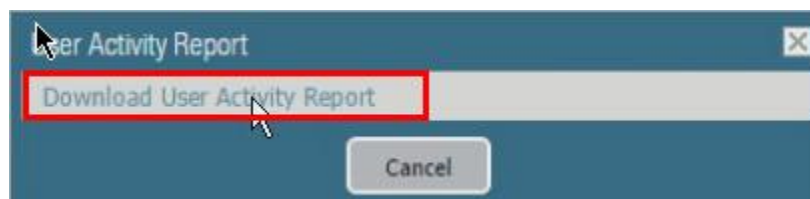


- Click **Add** to define a new user activity report:

Parameter	Value
Name	mark
Type	User
Username / IP Address	lab\mark
Time Period	Last 7 days



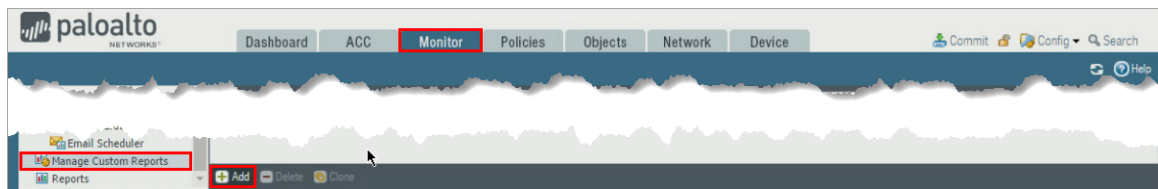
- Click **Run Now**.
- Download** and **open** the report when it finishes.



- Browse through the report to get familiar with the presented information. You can also include detailed browsing history that will include an approximate time a user spends on a website (not available when specifying a group).

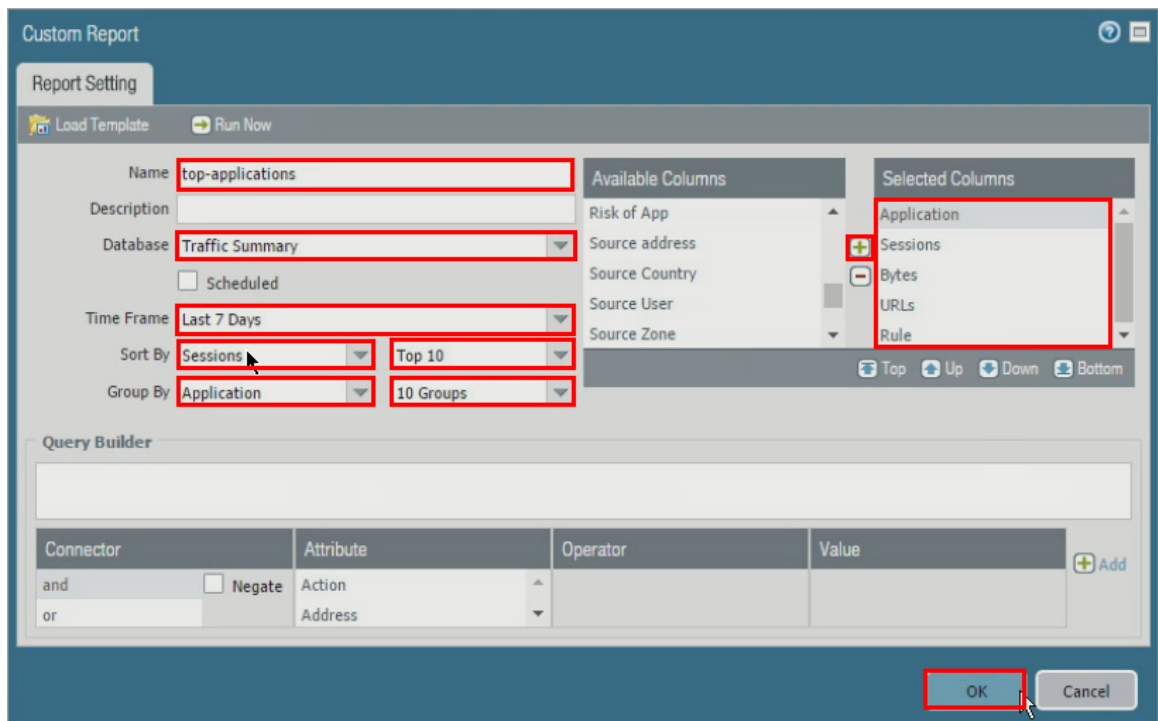
12.7 Create a Custom Report

- Select **Monitor > Manage Custom Reports** then click **Add**.



2. In the **Custom Report** window fill out the following then click **OK**.

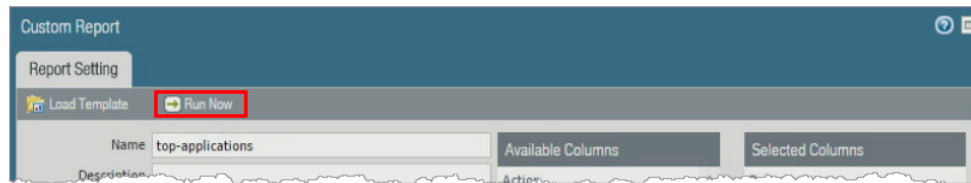
Parameter	Value
Name	top-applications
Database	Traffic Summary
Time Frame	Last 7 Days
Sort By	Sessions and Top 10
Group By	Application and 10 Groups
Selected Columns	Application Sessions Bytes URLs Rule



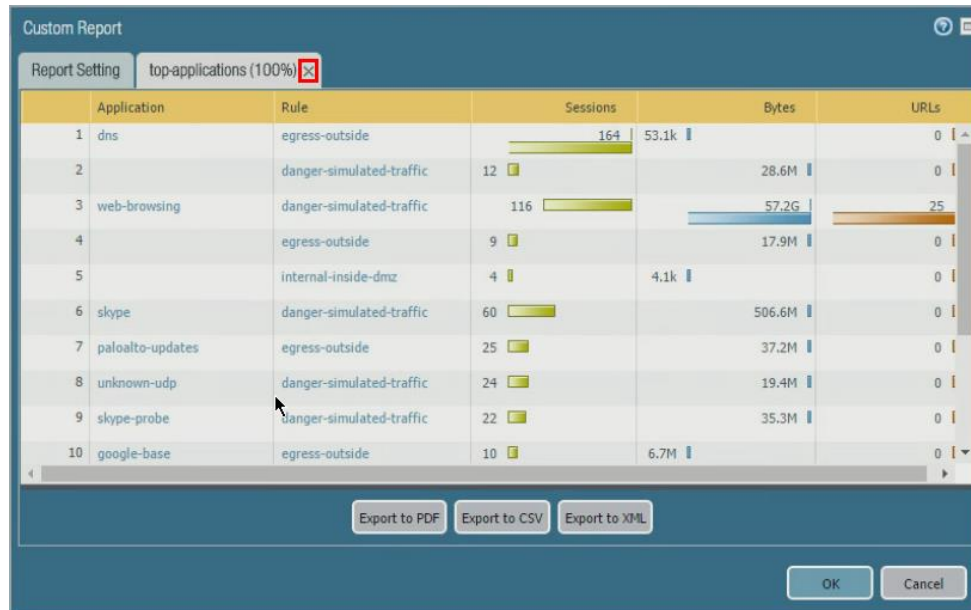
3. Click the **top-applications** report to reopen the Custom Report window.

<input type="checkbox"/>	Name	Description	Database	Time Frame	Rows	Sort By	Group By	Scheduled
<input checked="" type="checkbox"/>	top-applications		Traffic Summary	Last 7 Days	10	Sessions	app	<input type="checkbox"/>

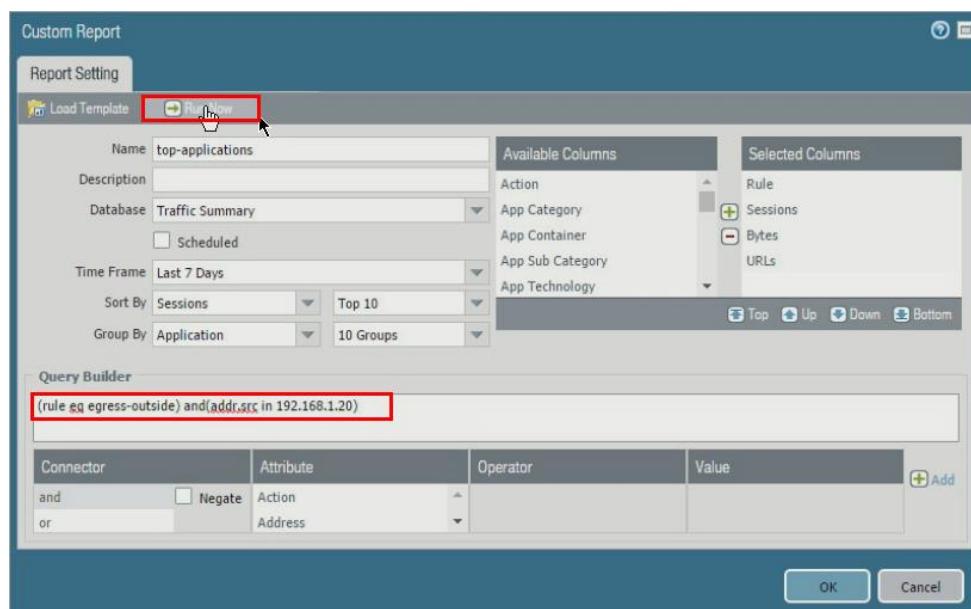
4. Click **Run Now** to generate the report. The report will appear in a new tab in the browser window.



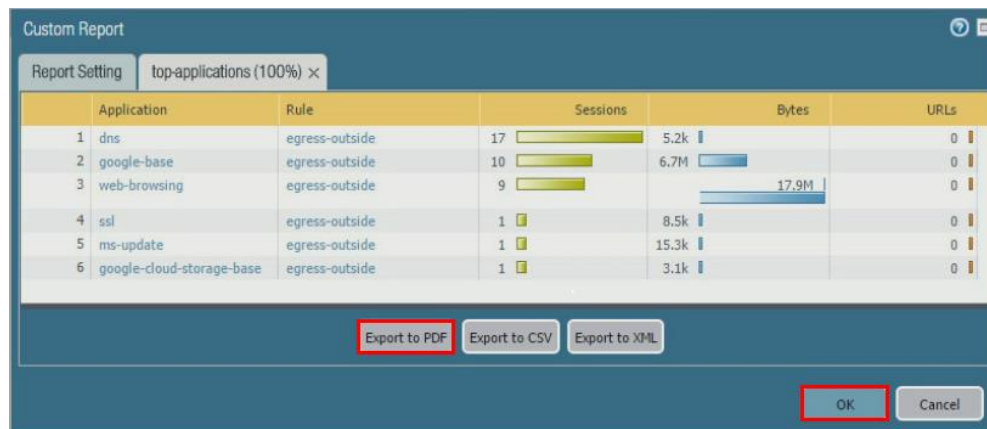
5. Close the **top-applications** tab containing the report.



6. On the **Report Setting** tab, create the following query using the Query Builder: **(rule eq egress-outside)** and **(addr.src in 192.168.1.20)** then click **Run Now** to run the report again, this time with the query.



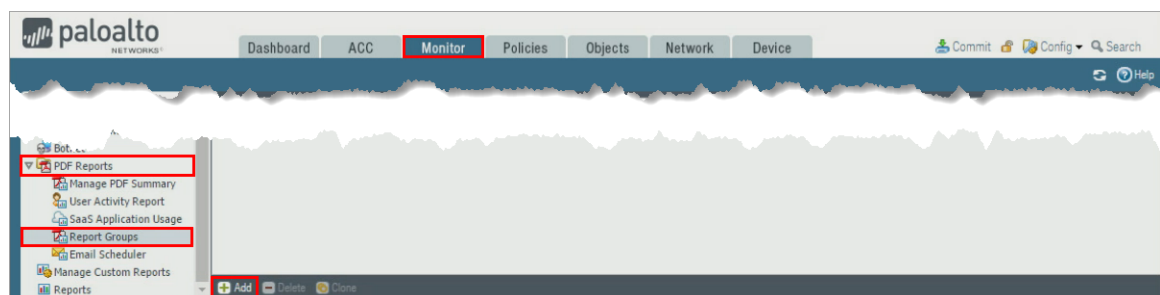
- Click **Export to PDF** to save the report as a PDF. (You might need to disable your browser's popup blocker.)



- Click **OK** to close the Custom Report window.

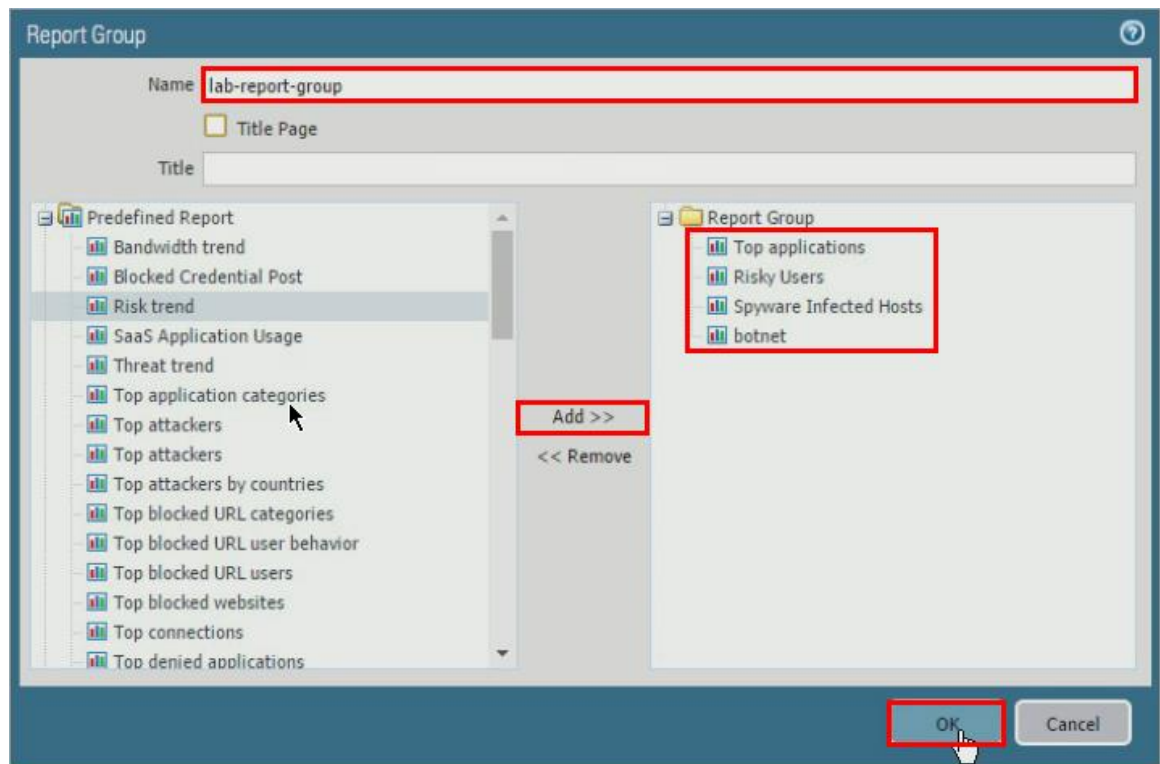
12.8 Create a Report Group

- In the WebUI select **Monitor > PDF Reports > Report Groups** then click **Add** to define a new Report Group.



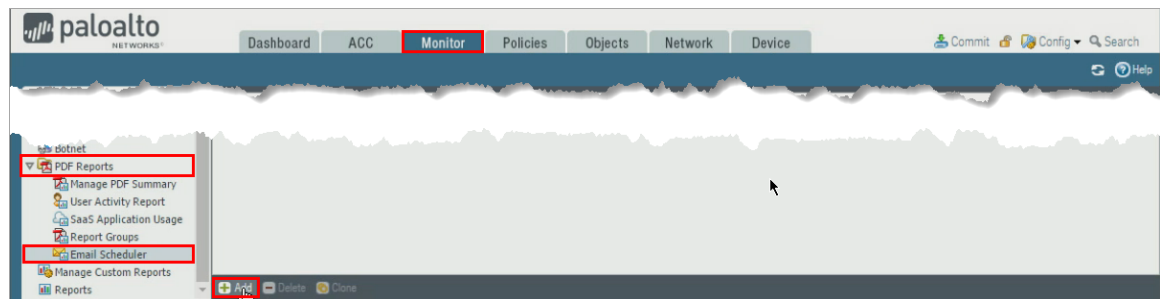
- In the **Report Group** window fill out the following then click **OK**.

Parameter	Value
Name	lab-report-group
Reports	Top applications Risky Users Spyware Infected Hosts botnet



12.9 Schedule Report Group Email

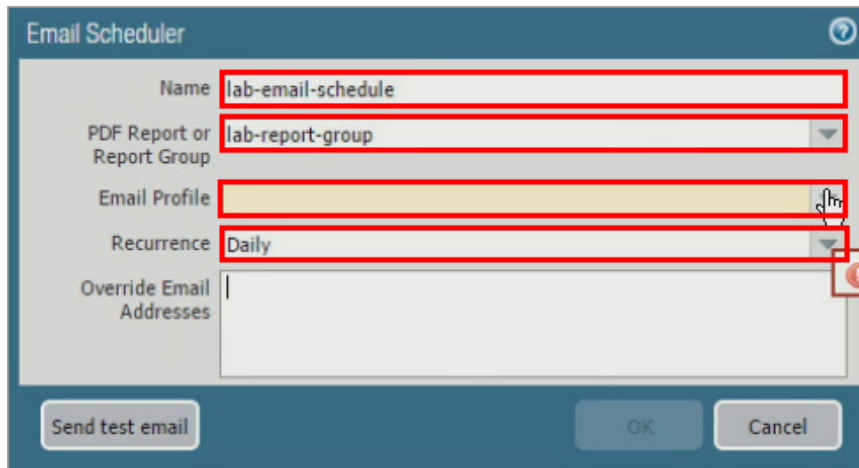
1. In the WebUI select **Monitor > PDF Reports > Email Scheduler** then click **Add**.



2. In the Email Scheduler window fill out the following.

Selecting **new** in the Email Profile dropbox will pop open the **Email Server Profile** window covered in the next step.

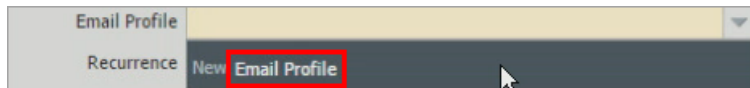
Parameter	Value
Name	lab-email-schedule
Report Group	lab-report-group
Recurrence	Daily
Email Profile	New Email Profile



The Email Scheduler window is shown with the following fields and values:

- Name: lab-email-schedule
- PDF Report or Report Group: lab-report-group
- Email Profile: (empty)
- Recurrence: Daily
- Override Email Addresses: (empty)

Buttons at the bottom: Send test email, OK, Cancel.

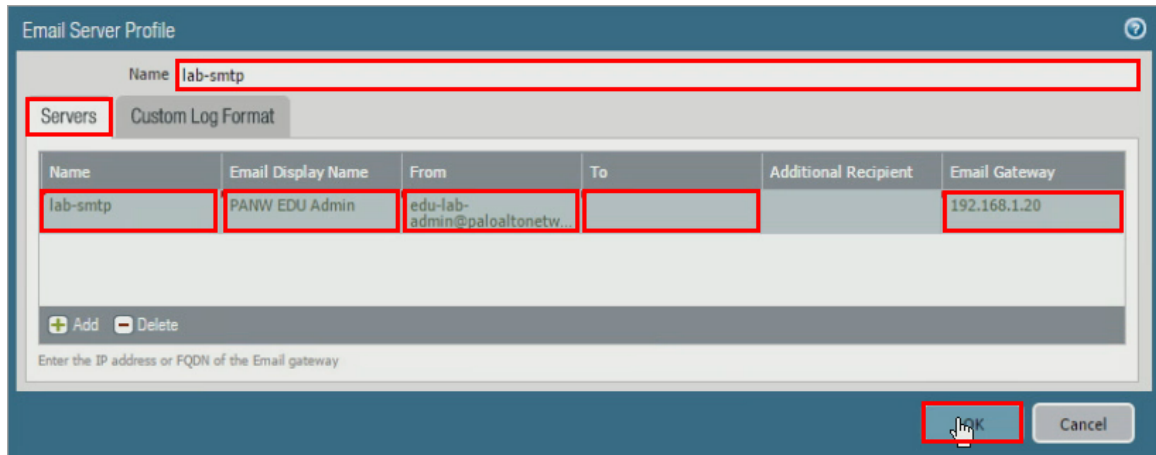


The Email Profile dropdown menu is shown with the following options:

- Email Profile
- Recurrence
- New Email Profile

- In the **Email Server Profile** window configure the following.

Parameter	Value
Name	lab-smtp
Email Display Name	PANW EDU Admin
From	edu-lab-admin@paloaltonetworks.com
To	<your_email@address>
Email Gateway	192.168.1.20

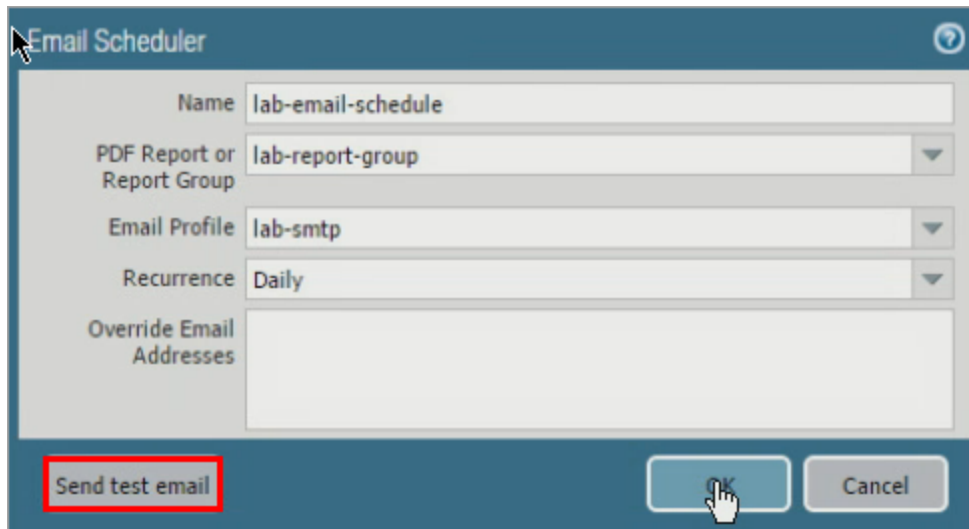


The Email Server Profile window is shown with the following fields and values:

- Name: lab-smtp
- Servers tab selected
- Table with 6 columns: Name, Email Display Name, From, To, Additional Recipient, Email Gateway
- Table content:

Name	Email Display Name	From	To	Additional Recipient	Email Gateway
lab-smtp	PANW EDU Admin	edu-lab-admin@paloaltonetw.			192.168.1.20
- Buttons: Add, Delete
- Footer: Enter the IP address or FQDN of the Email gateway
- Buttons: OK, Cancel

- Click **OK** to close the Email Server Profile window.
- Click **Send test email**. A test email will be sent to the address you provided. Wait for and confirm its arrival.



The image shows a screenshot of the 'Email Scheduler' dialog box. It has a title bar with the text 'Email Scheduler' and a help icon. The dialog contains several fields: 'Name' with the value 'lab-email-schedule', 'PDF Report or Report Group' with a dropdown menu showing 'lab-report-group', 'Email Profile' with a dropdown menu showing 'lab-smtp', and 'Recurrence' with a dropdown menu showing 'Daily'. There is also an 'Override Email Addresses' section with a text area. At the bottom, there are three buttons: 'Send test email' (highlighted with a red rectangle), 'OK' (with a mouse cursor pointing at it), and 'Cancel'.

You may need to check your SPAM folder.

6. Click **OK** to close the Email Scheduler window.

Stop. This is the end of the Monitoring and Reporting lab.