PALO ALTO NETWORKS FIREWALL 11.0 ESSENTIALS

Lab 11: Controlling Access to Network Resources with User-ID

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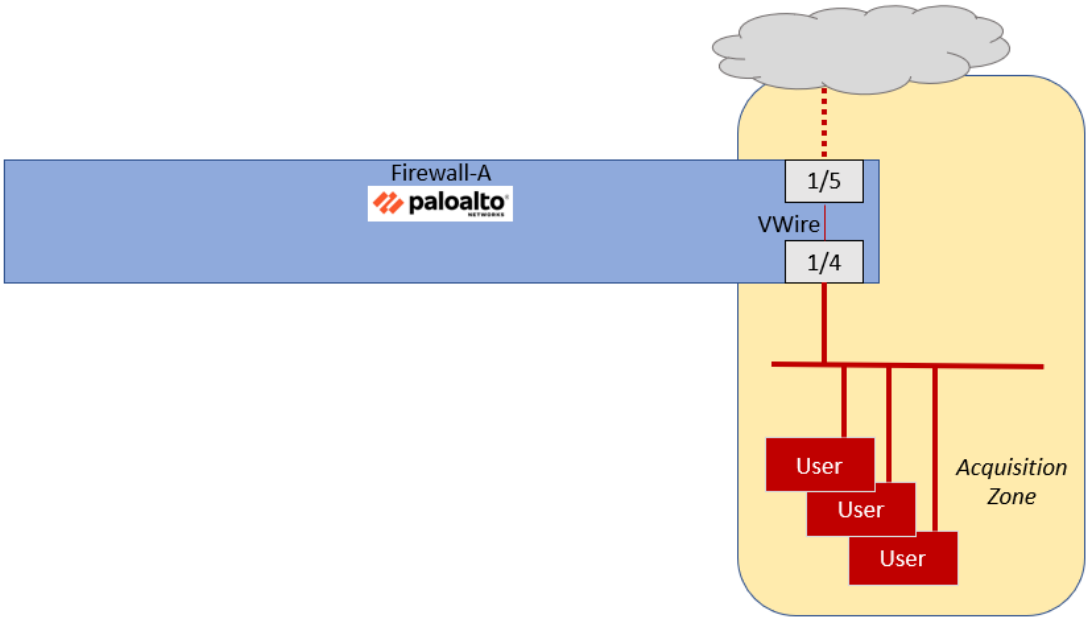
Contents

Introduction

Your organization recently acquired another company, and you have been tasked to create appropriate security Policy rules for traffic generated by these new users.

Your firewall has been configured with a virtual wire that allows traffic to the Internet from the users in the newly acquired company. The firewall also has a new security zone in place called Acquisition that contains all new users.

The firewall has an existing Security Policy rule that allows all users in the Acquisition zone to access any application on the internet. Your task is to restrict users in this new organization to approved corporate applications only.

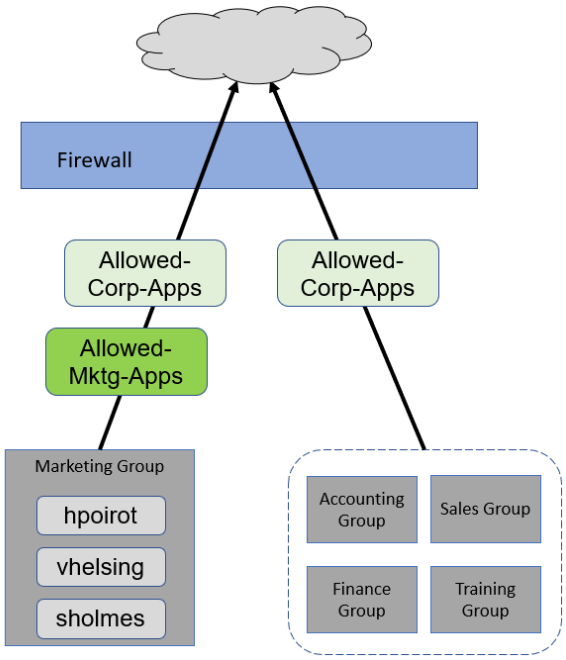


The approved corporate applications include DNS, web-browsing, and SSL.

You also need to ensure that only users in the marketing group are allowed to use social media applications such as Facebook, Instagram, and others.

Another firewall administrator has created the appropriate Application Groups for you.

The firewall receives User-ID and Group membership information about users in this new company from an XML upload sent by network authentication devices. (Note that this is simulated in this lab and outside the scope of this course).



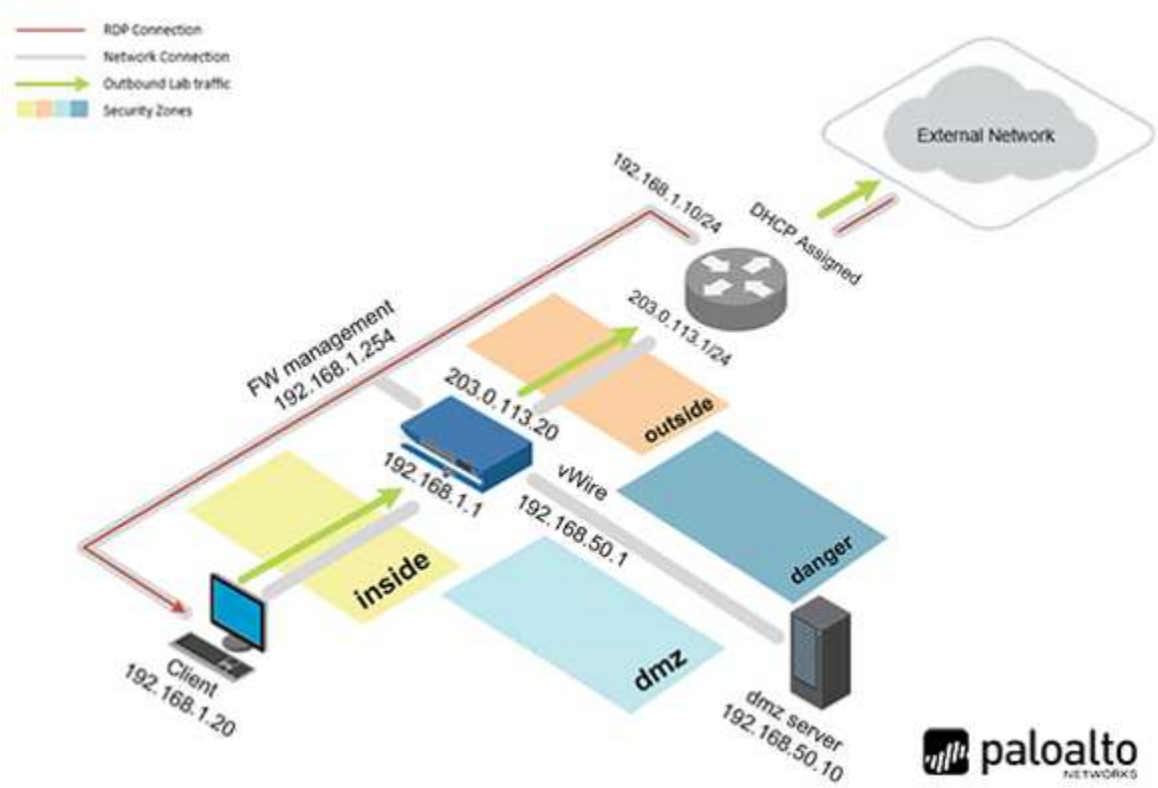
You also need to create a Security Policy rule that explicitly denies any other traffic generated by users in the Acquisition zone. Although the interzone-default rule will deny any traffic not expressly allowed, creating an explicit deny rule will allow you to examine the kinds of applications users in the Acquisition zone are attempting to access.

Objective

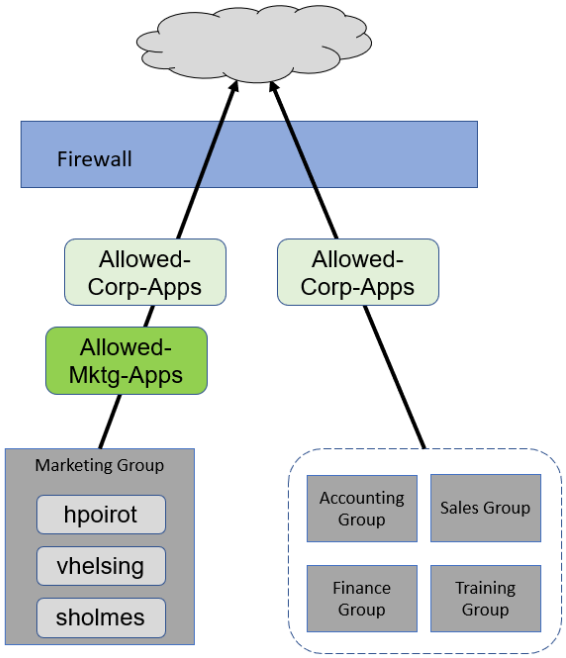
In this lab, you will perform the following tasks:

- Examine current configuration.
- Enable User-ID technology in the Acquisition zone.
- Generate traffic.
- Modify Security Policy to meet requirements.

Lab Topology



Theoretical Lab Topology



Lab Settings

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

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

Lab Guidance

There are two sections in this lab guide:

- High-Level Lab Steps
- Detailed Lab Steps

The High-Level Lab Steps section provides only general guidance and information about how to accomplish the lab objectives. This section is more challenging and is suited for students who have a working knowledge of Palo Alto Networks firewalls. If you have never worked with a Palo Alto Networks firewall, we strongly encourage you to use the Detailed Lab Steps section.

The instructions in the Detailed Lab Steps section provide guided, detailed steps and screenshots to accomplish the lab objectives.

If you decide to use the High-Level Lab Guide and get stuck, switch to the Detailed Lab Guide for guidance.

You are not required to complete both the High-Level Lab Guide and the Detailed Lab Guide for each lab. Instead, please select the appropriate section based on your familiarity with Palo Alto Networks Firewalls.

1 Controlling Access to Network Resources with User-ID – High Level Lab Steps

It is recommended to use this section if you possess significant experience in working with Palo Alto Networks firewalls. In case you require more comprehensive instructions to achieve the objectives, please utilize the Detailed-Lab Steps section in Task 2.

1.1 Apply a Baseline Configuration to the Firewall

- On the Zorin desktop, select *lab-user*, enter **Pal0Alt0!** for the password.
- For the Palo Alto Firewall, enter **admin** for the user and **Pal0Alt0!** for the password.
- Load and commit the configuration file - **edu-210-11.0a-11.xml** to the Firewall.

1.2 Examine Firewall Configuration

- Review the settings that another administrator has configured for Application Groups and Security Policy rules, and verify the following settings on the **Acquisition-Allow-All** Security Policy rule.

Parameter	Value
Source Zone	**Acquisition**
Source Address	**Any**
Destination Zone	**any**
Destination IP	**Any**
Application	**Any**
Action	**Allow**

- Clear the counters for all Security Policy rules.
- Use the information below to verify that the configuration contains two new **Application Groups**.

Name	Applications
Allowed-Corp-Apps	**dns** **web-browsing** **ssl**
Allowed-Mktg-Apps	**facebook-base** **instagram-base** **twitter-base** **myspace-base** **linkedin-base**

1.3 Generate Traffic from the Acquisition Zone

- Use **Remmina** to connect to the **Server-Extranet** host.
- Change to the appropriate directory.

cd /home/paloalto42/pcaps92019/app.pcaps <Enter>

- Run the following command to start generating traffic in the Acquisition Zone:

./Appgenerator-2.sh <Enter>

- While the script is running, examine the firewall Traffic log under **Monitor > Logs > Traffic**.
- Note that almost all traffic is hitting the **Acquisition-Allow-All Rule**.
- Add the **Source User** column to the Traffic Log.

1.4 Modify the Acquisition-Allow-All Security Policy Rule

- Change the name of the Security Policy rule **Acquisition-Allow-All** to **Allow-Corp-Apps.**
- Change the Description field to **Allows only approved apps for Acquisition users**.
- Set the Applications to use only the **Allowed-Corp-Apps** Application Group.

1.5 Create Marketing Apps Rule

- Use the information below to create a Security Policy rule to allow only Marketing users to access the Allowed-Mktg-Apps.

Parameter	Value
Name	Allow-Mktg-Apps
Description	Allows only users of marketing group to access Mktg apps
Source Zone	Acquisition
Source User	marketing
Destination Zone	any
Application	Allowed-Mktg-Apps
Dependent Applications	Add to Current Rule
Action	Allow

1.6 Create Deny Rule

- Use the information below to create a new Security Policy rule that will deny any other application traffic for users in the Acquisition zone.

Parameter	Value
Name	Deny-All-Others
Description	Denies non-approved applications for users in Acquisition zone
Source Zone	Acquisition
Source User	Any
Destination Zone	any
Application	Any
Action	Deny

- Place the **Deny-All-Others** rule at the bottom of the Security Policy.

1.7 Commit the Configuration

- Commit the changes before proceeding.

1.8 Generate Traffic from the Acquisition Zone

- Use the Extranet-Server connection in the Remmina application to run the **Appgenerator-2.sh** script again.
- While the script is running, move to the next section in which you will examine the firewall logs.

1.9 Examine User-ID Logs

- Use the firewall CLI and the web interface to examine information about User-ID.
- The firewall should have numerous entries with username-to-ip-address mappings in the User-ID log.
- Use the Remmina application to connect to the CLI of **Firewall-A.**
- Use the following command to display entries for User-ID:

show user ip-user-mapping all **<Enter>**

- Close the firewall SSH connection.

1.10 Examine Firewall Traffic Log

- Create and apply filters in the Traffic log to answer the questions in this section.
    - Which rule does the firewall use when it encounters youtube-base traffic?
    - Which rule does the firewall use when it encounters dns traffic?
    - Which rule does the firewall use when it encounters facebook-base?
    - Which users are allowed access to facebook-base?
    - Is the user sholmes allowed to access instagram-base?
    - Is the user bbart allowed to access instagram-base?

1.11 Clean Up the Desktop

- In the Traffic log window on the firewall, clear any filters you have in place.
- In the Remmina application window, close the SSH connections to the firewall and the Server-Extranet.
- Close the main Remmina application window.

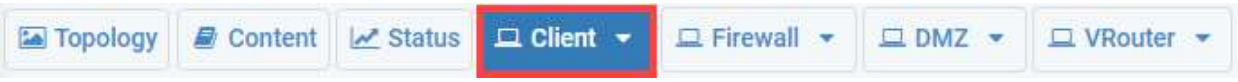
2 Controlling Access to Network Resources with User-ID – Detailed Lab Steps

It is recommended to use this section if you prefer detailed guidance to complete the objectives for this lab. It is strongly recommended that you use this section if you do not have extensive experience working with Palo Alto Networks firewalls.

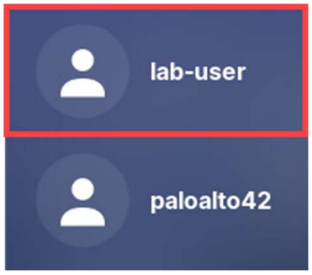
2.1 Apply a Baseline Configuration to the Firewall

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

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



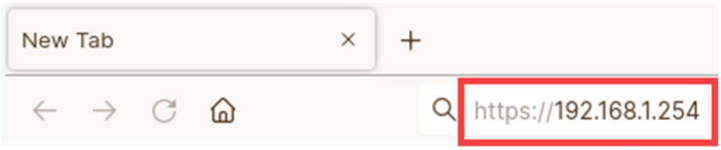
2. On the *Zorin* desktop, click **lab-user.**



3. For the *lab-user* password, enter **Pal0Alt0!** and press **Enter**.

4. Double-click the **Firefox Web Browser** icon located on the *Desktop*.

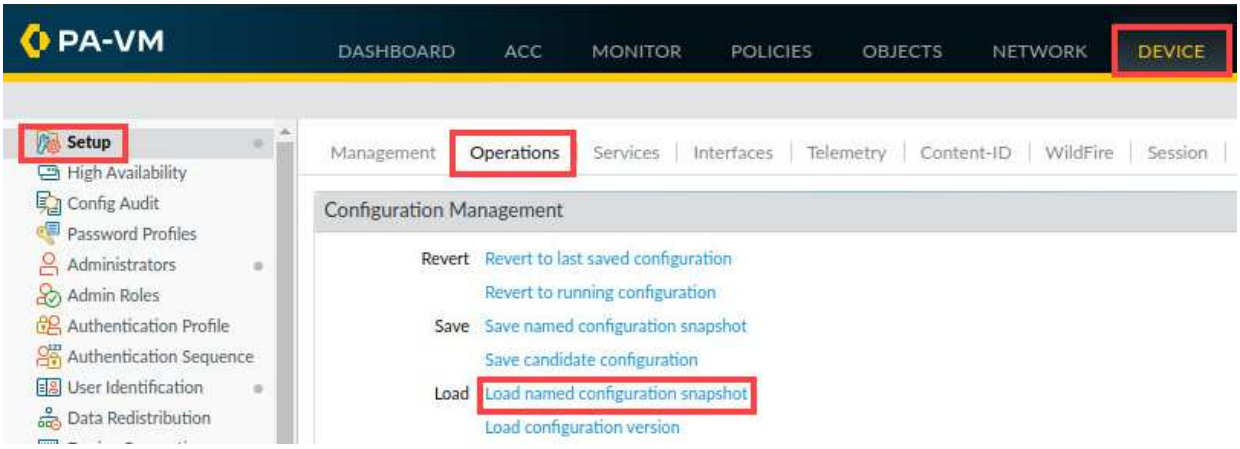
5. In the *Firefox* address field, type **`https://192.168.1.254`** and press **Enter**.



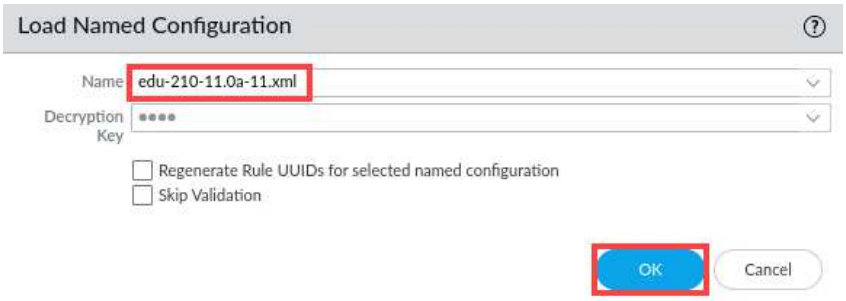
6. Log in to the Firewall web interface as username **`admin`**, password **`Pal0Alt0!.`**

If you do not immediately see the login page, please wait an additional 1-3 minutes for the *Firewall* to fully initialize. If needed, refresh the page.

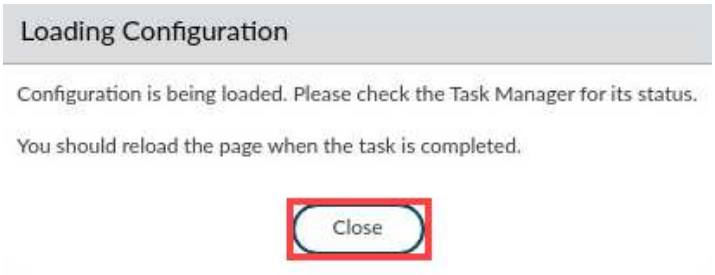
7. Navigate to **Device > Setup > Operations** in the web interface and click on **Load named configuration snapshot** underneath the *Configuration Management* section.



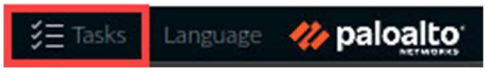
8. In the *Load Named Configuration* window, select **edu-210-11.0a-11.xml** from the *Name* drop-down box and click **OK**.



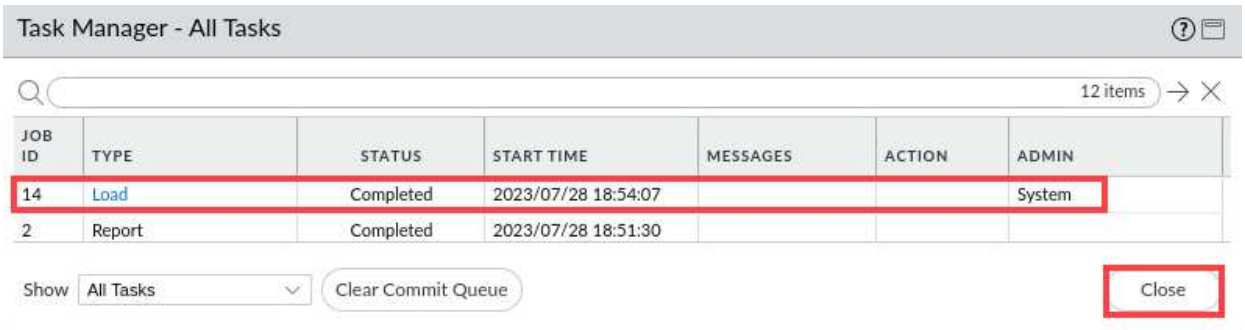
9. In the *Loading Configuration* window, a message will show *Configuration is being loaded*. *Please check the Task Manager for its status. You should reload the page when the task is completed.* Click **Close** to continue.



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

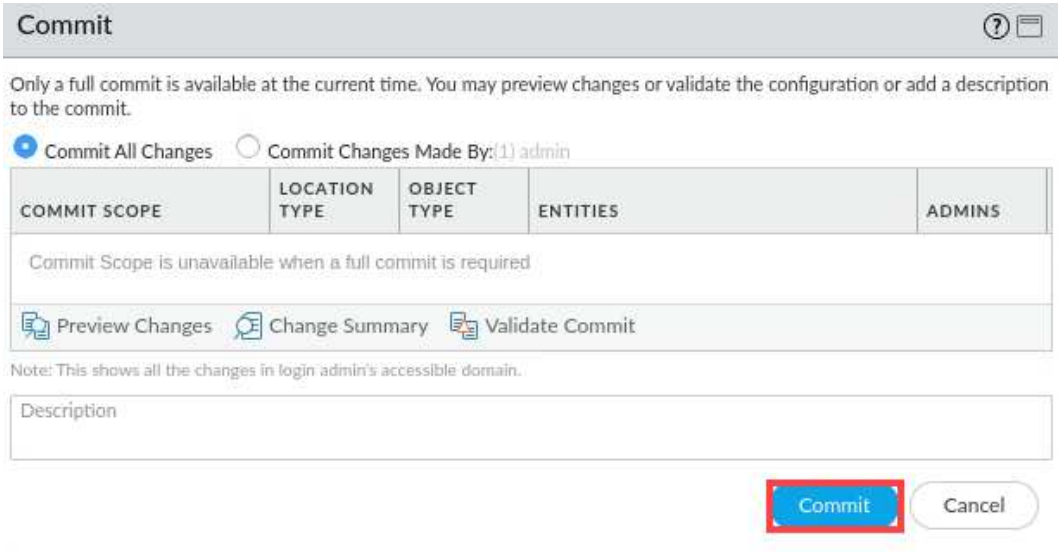


11. In the *Task Manager – All Tasks* window, verify the *Load* type has been completed. Click **Close**

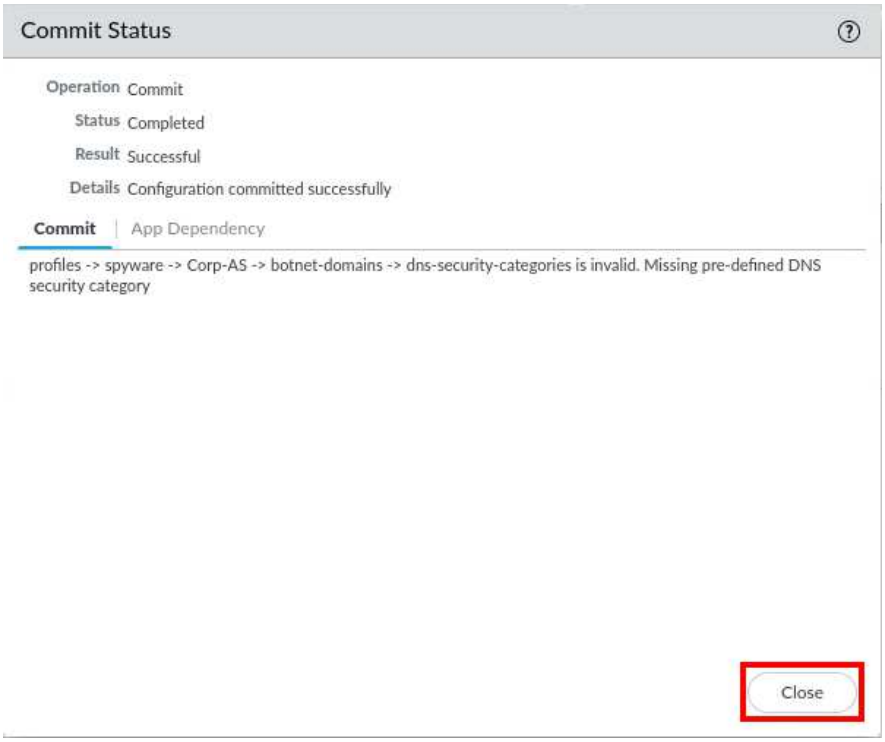


12. Click the **Commit** link located at the top-right of the web interface.

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



14. When the commit operation is complete, click **Close** to continue.



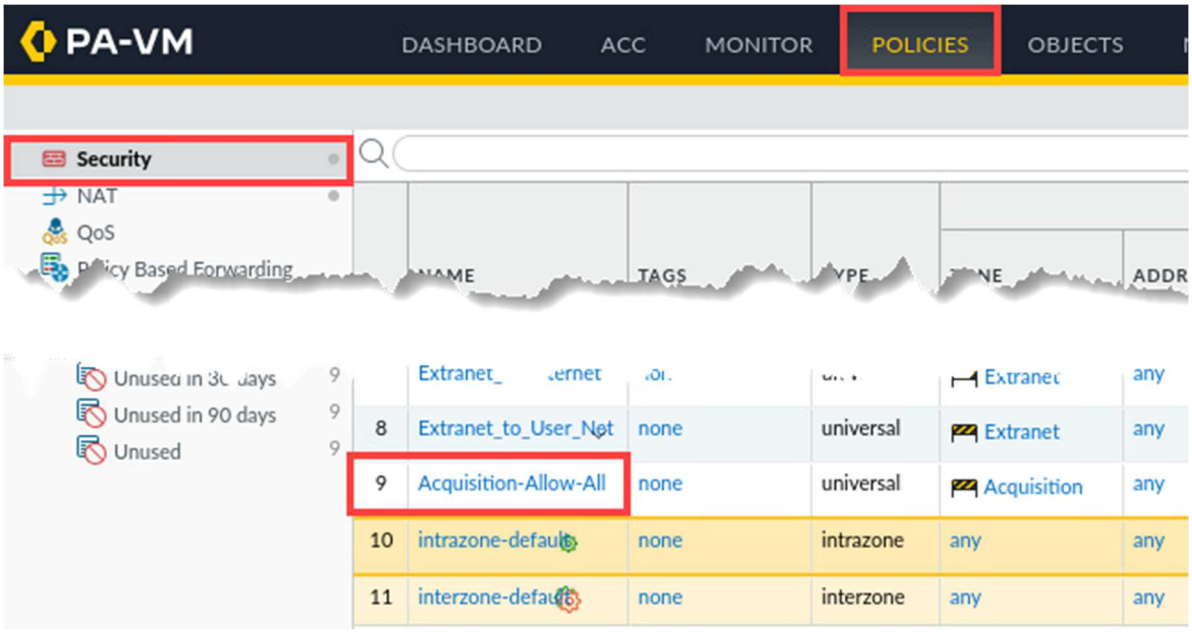
The commit process takes changes made to the Firewall and copies them to the running configuration, which will activate all configuration changes since the last commit.

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

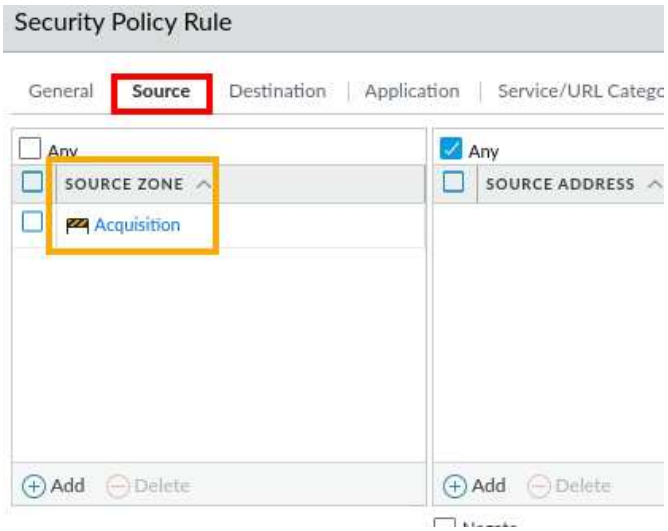
2.2 Examine Firewall Configuration

In this section, you will review the settings that another administrator has configured for Application Groups and Security policy rules.

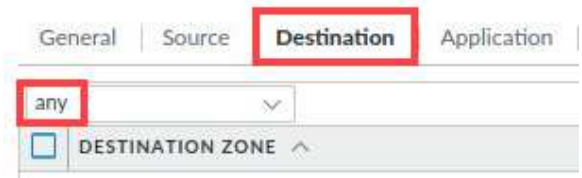
1. Select **Policies > Security**. Scroll down and click the **Acquisition-Allow-All** policy.



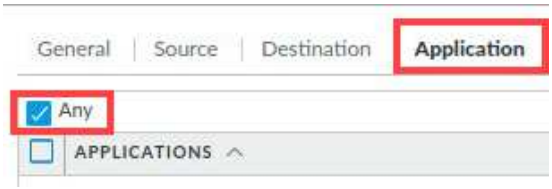
2. In the *Security Policy Rule*, select the **Source** tab. Note that the *Source Zone* is set to **Acquisition**.



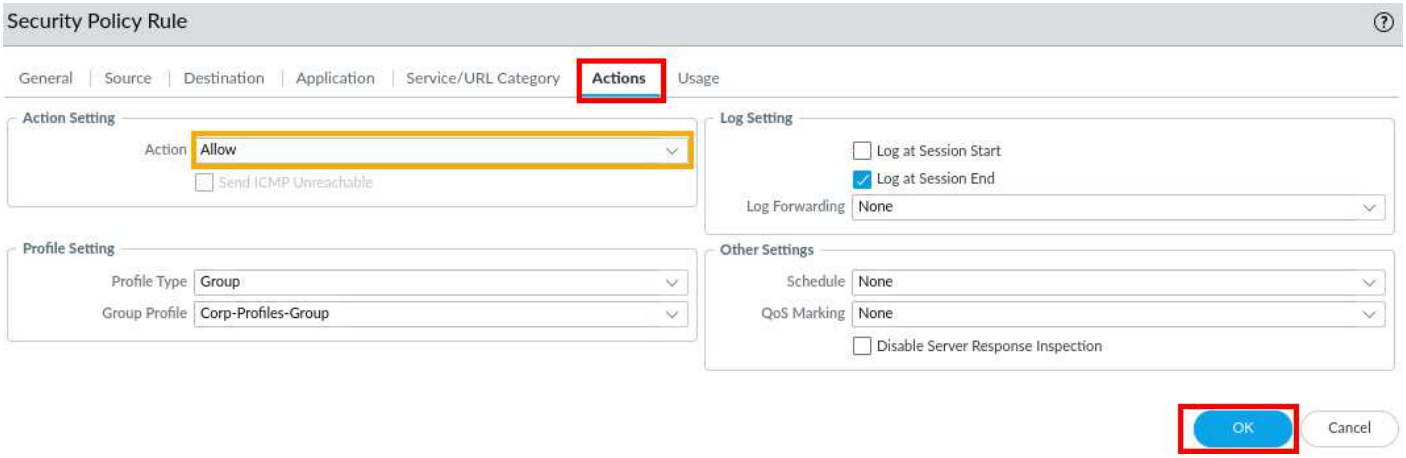
3. Select the **Destination** tab. Note that the *Destination Zone* is set to **any**.



4. Select the **Application** tab. Note that the *Application* is set to **Any**.



5. Select the **Actions** tab. Note that the **Action** is set to **Allow**. Click **OK**.

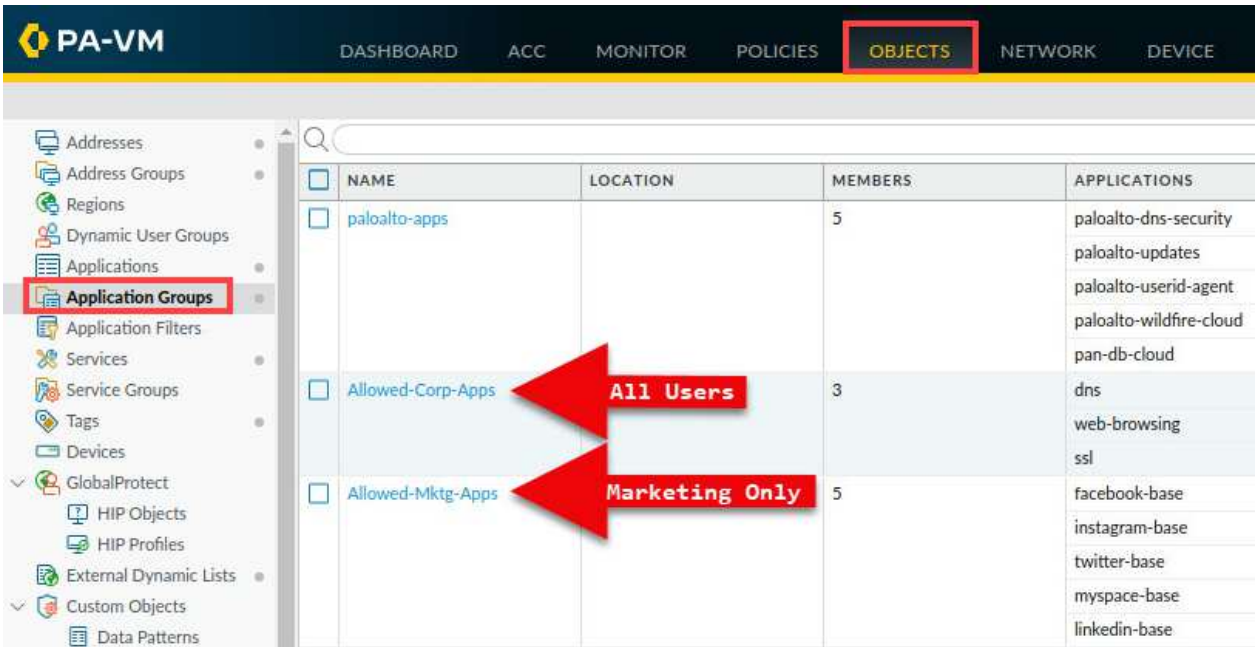


Please Note This Security policy rule allows any host in the Acquisition security zone to access any application anywhere.

6. Clear the counters for all Security policy rules by clicking **Reset Rule Hit Counter > All rules** at the bottom of the window.

7. In the *Reset* window, click **Yes**.

8. Select **Objects > Application Groups** and note the two new **Application Groups.**



Please Note

You will configure the firewall to allow all users in the Acquisition zone to use the Allowed-Corp-Apps. However, only users in the Marketing group will be able to use applications in the Allowed-Mktg-Apps group.

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

2.3 Generate Traffic from the Acquisition Zone

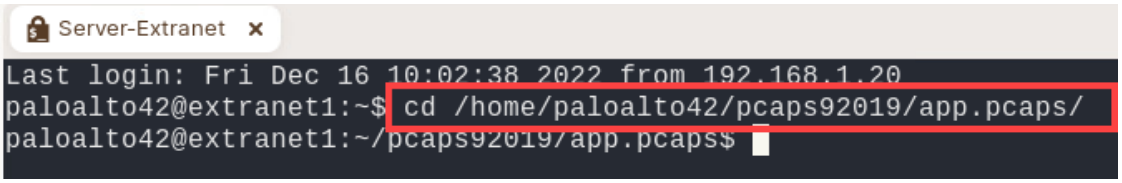
In this section, you will configure a packet capture on the firewall's data plane. The goal of the packet capture is to identify a unique bit pattern that can be used to create a custom application signature.

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

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

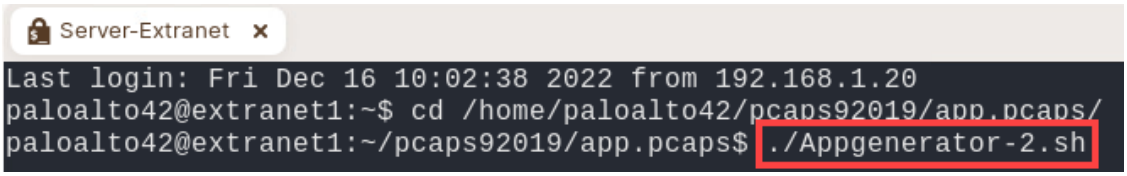
3. In the CLI connection enter the following command.

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

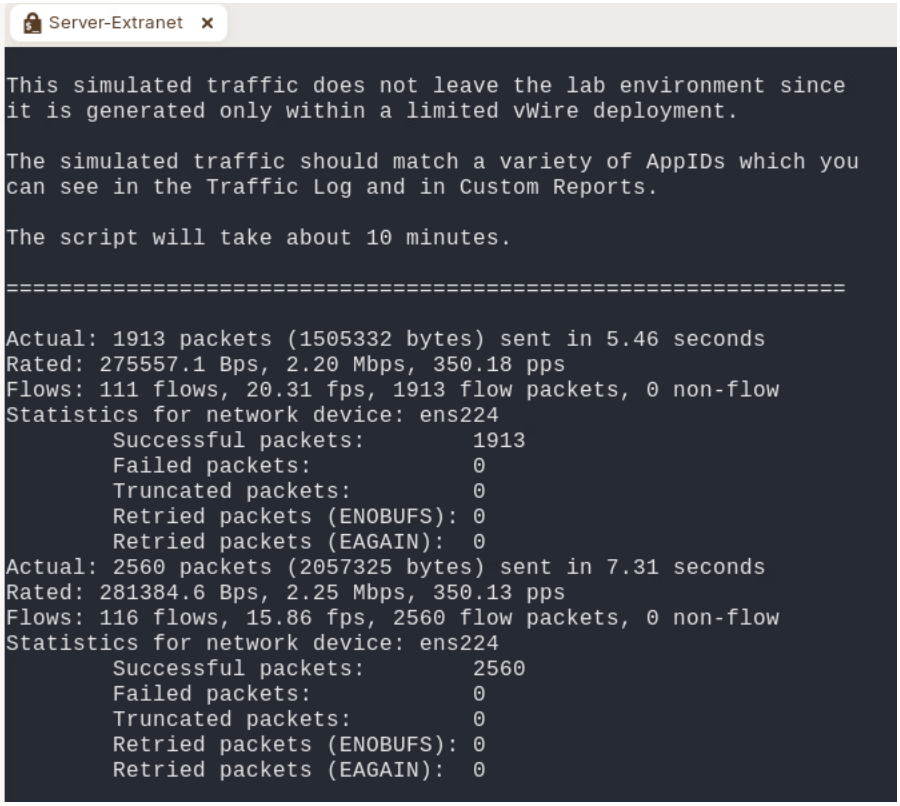


4. In the CLI connection enter the following command.

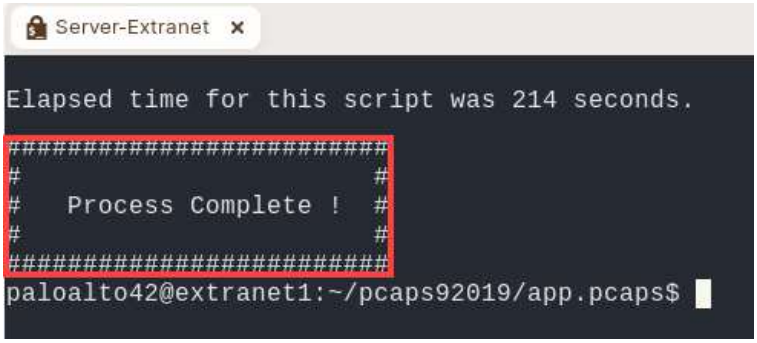
```
paloalto42@extranet1:~/pcaps92019/app.pcaps$ ./Appgenerator-2.sh <Enter>
```



5. Verify the **Appgenerator-2** script is running.

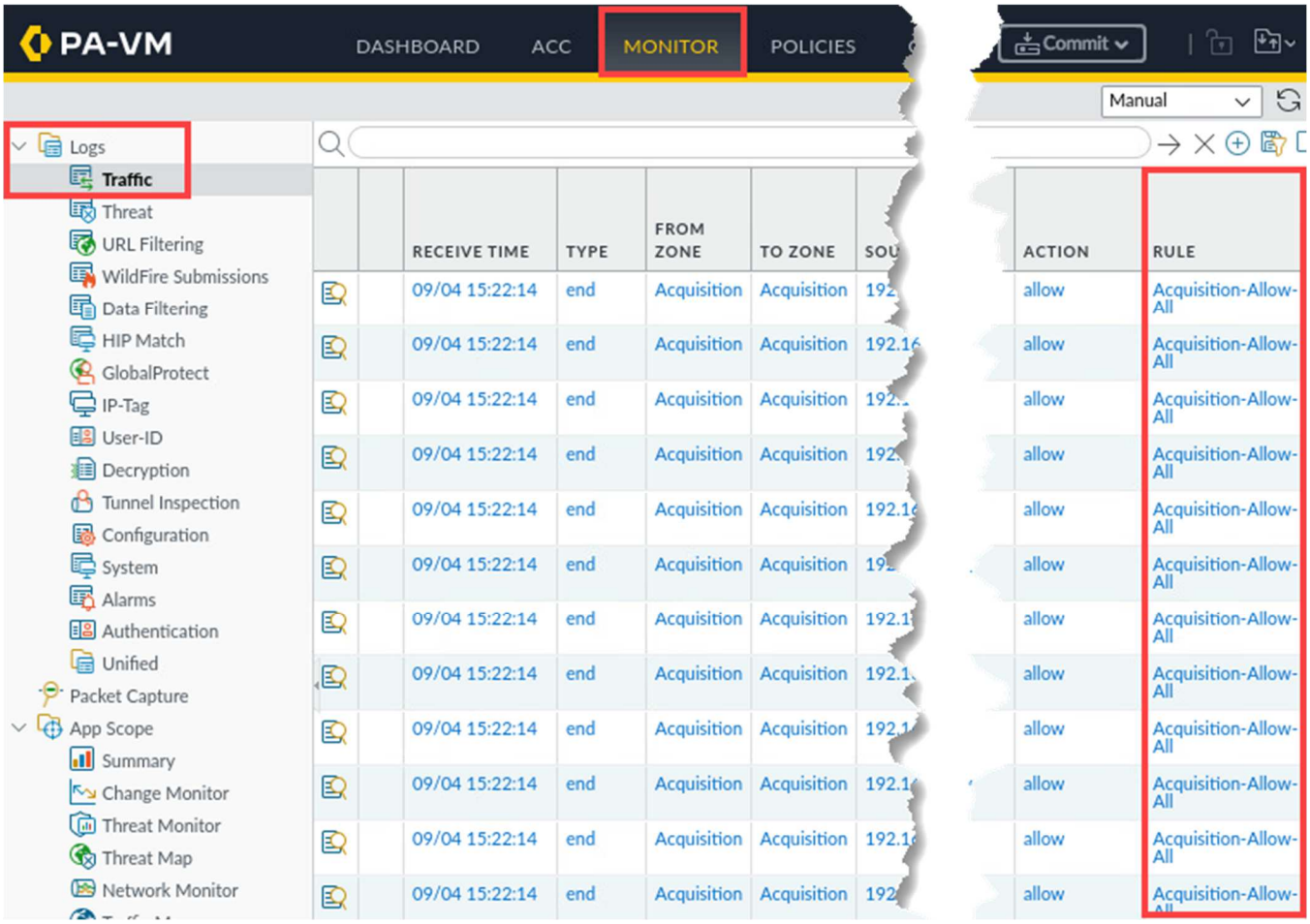


Allow the *Appgenerator-2* script to complete before continuing to the next step.



6. Re-open the *PA-VM firewall* web interface by clicking on the **Firefox** icon in the task bar.

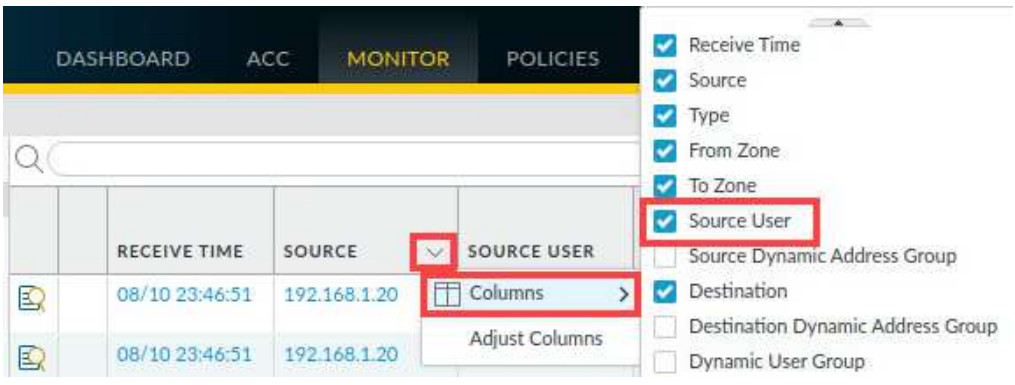
7. Select **Monitor > Logs > Traffic**. Clear any filters in place. Note that almost all traffic is hitting the **Acquisition-Allow-All r**ule. Please allow the Firewall 3 to 6 minutes for the traffic logs to update.



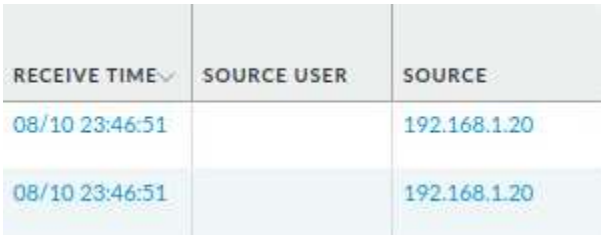
Please Note

Some columns have been hidden to show what is presented in the above screen shot. You may hide and show columns as needed for the duration of this lab.

8. Add the **Source User** column if necessary to the table by clicking the small triangle in any header and choosing **Columns > Source User**.



9. Drag and drop the **Source User** column between the **Receive Time** and **Source** columns.



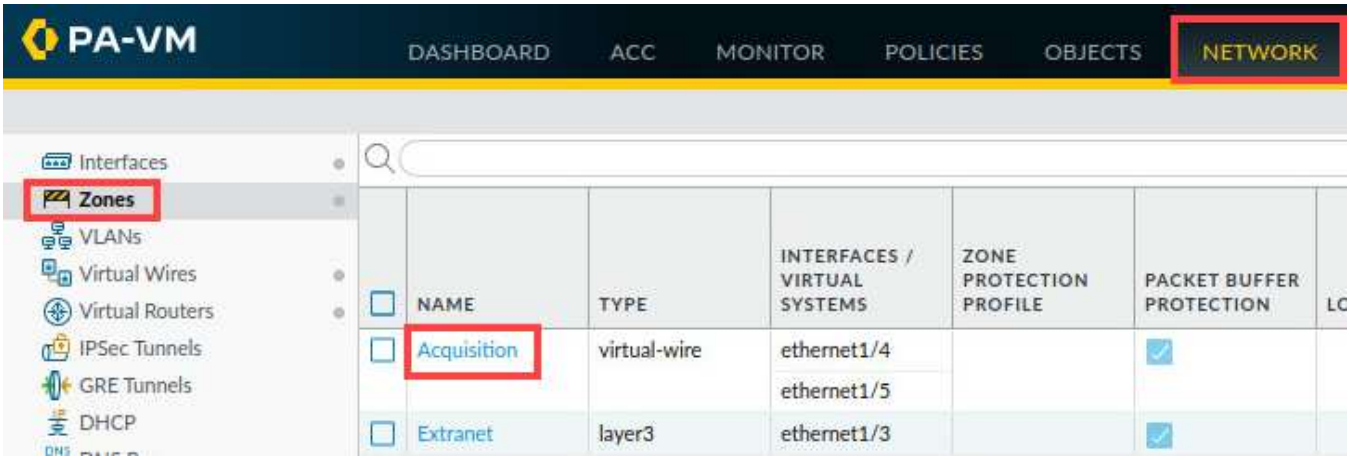
> **Please Note** This action will make it easier for you to locate Source User information later in this lab.

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

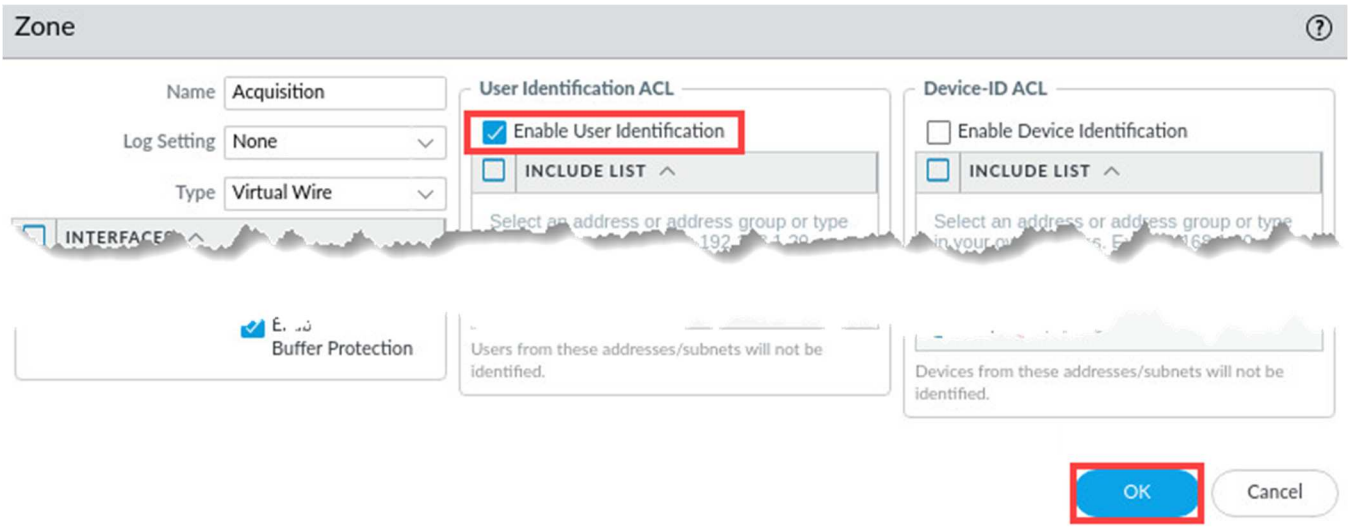
2.4 Enable User-ID on the Acquisition Zone

In this section you will enable User-ID on the Acquisition security zone as part of the process of enabling User-ID on a firewall.

1. Select **Network > Zones**. Click **Acquisition** to open the zone.



2. In the Zone window, select the **Enable User Identification** check box. Click **OK**.

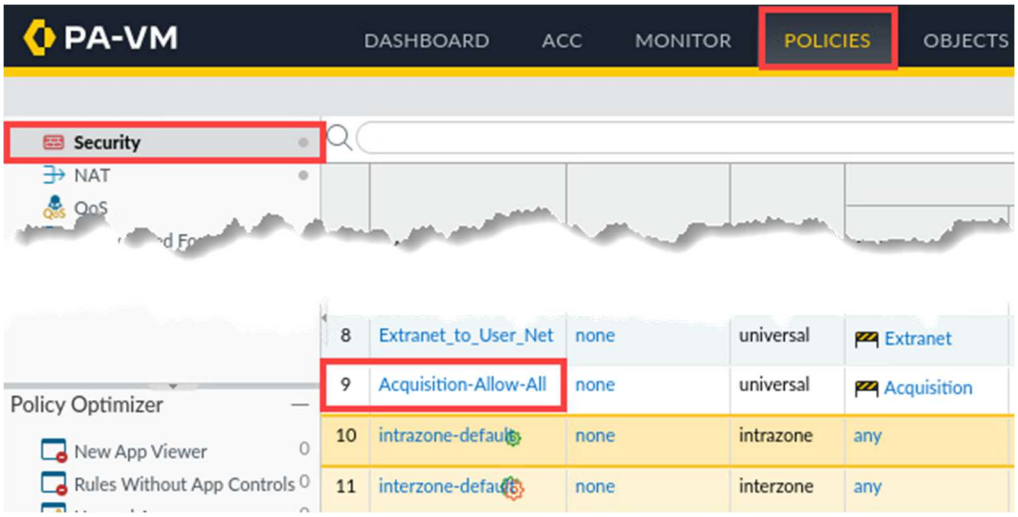


3. Leave the *Palo Alto Networks Firewall* open and continue to the next task.

2.5 Modify the Acquisition-Allow-All- Zone

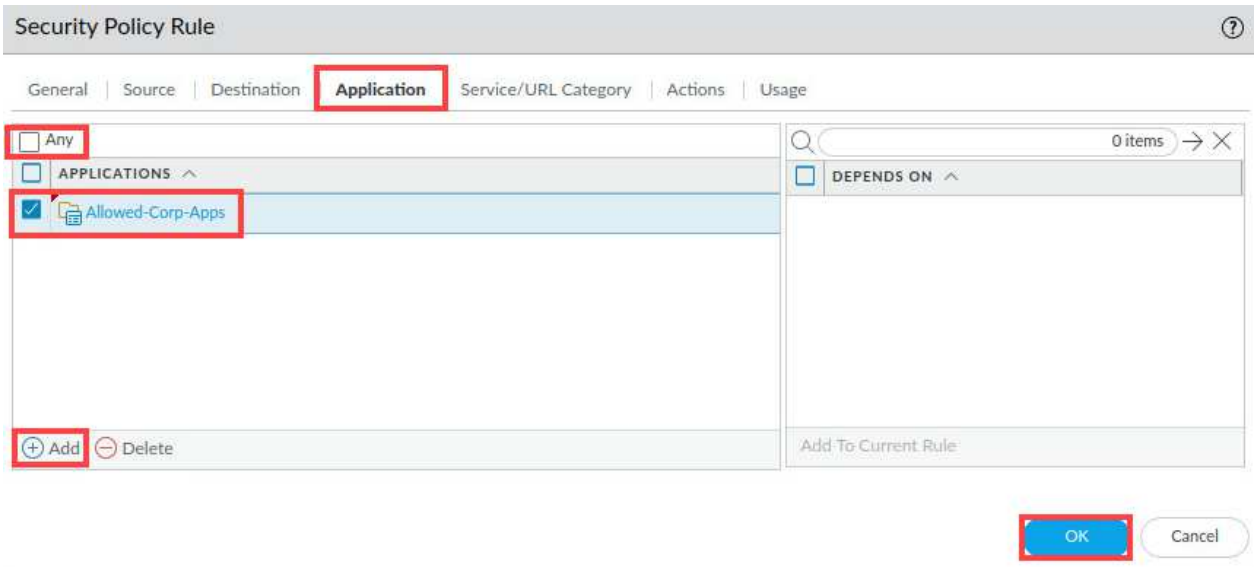
In this section, you will now change the set of applications that Acquisition users are allowed to access by modifying the existing *Acquisition-Allow-All* rule.

1. Select **Policies > Security**. Scroll down and click **Acquisition-Allow-All**.



2. In the *Security Policy Rule* window, under the *General* tab, change the name of this rule to **`Allow-Corp-Apps`**. For *Description*, type **Allows only approved apps for Acquisition users**.

3. Select the **Application** tab, uncheck the option for *Any*. Click **Add** and enter the first few letters of the **Allowed-Corp-Apps** to display the *Application Groups* available. Click **OK**.

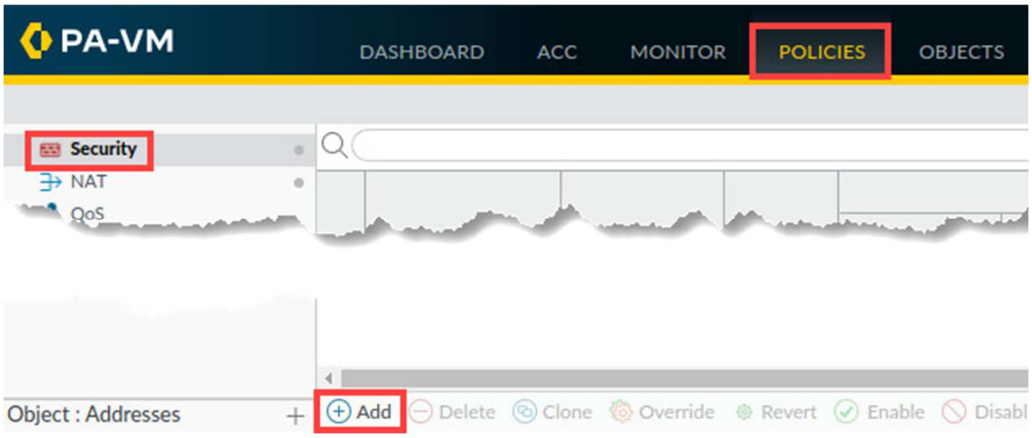


4. Leave the *Palo Alto Networks Firewall* open and continue to the next task.

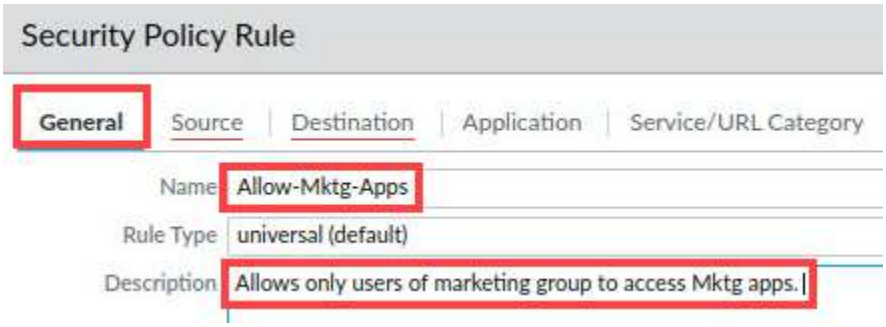
2.6 Create Marketing Apps Rule

In this section, you will create a new Security policy rule to allow only Marketing users to access the Allowed-Mktg-Apps.

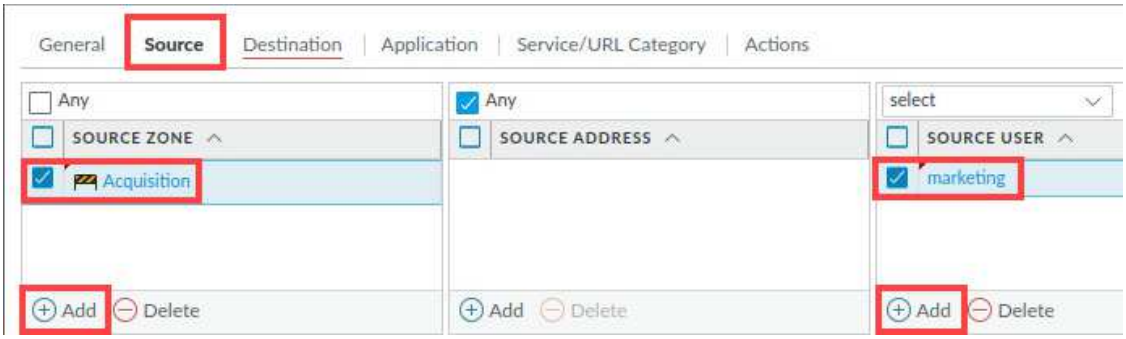
1. Select **Policies > Security**. Click **Add**.



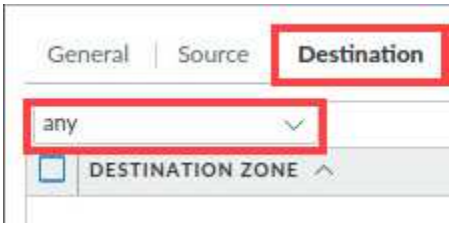
2. In the *Security Policy Rule* window, under the *General* tab, enter **`Allow-Mktg-Apps`** for the *Name*. For *Description*, enter `Allows only users of marketing group to access Mktg apps`.



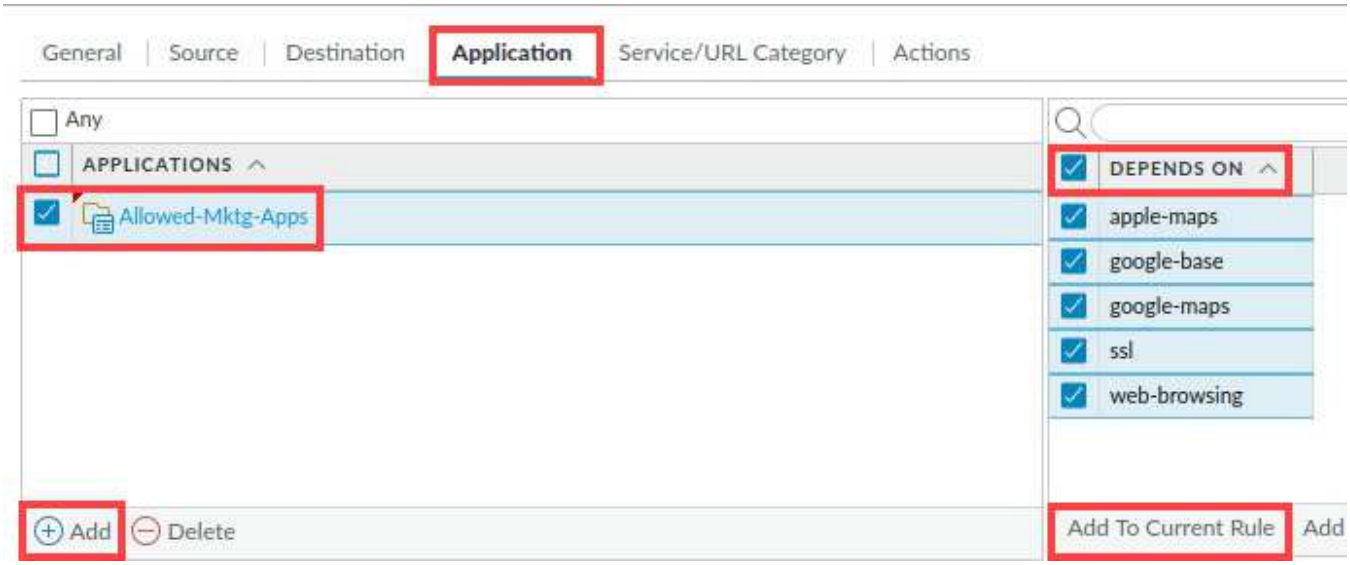
3. Select the **Source** tab, under *Source Zone*, click **Add.** Select **Acquisition**. Under the *Source User* column, click **Add** and enter **marketing**.



4. Select the **Destination** tab. Use the drop-down list at the top to select **any** in the *Destination Zone*.



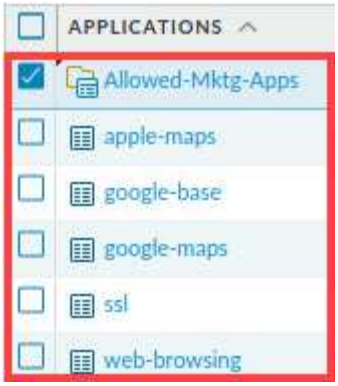
5. Select the **Application** tab and *uncheck* the option for **Any**. Click **Add** and enter the first few letters of the **Allowed-Mktg-App**s to display the *Application Groups* available. Select **Allowed-Mktg-Apps**. In the right side of the *Application* window, place a **check** box beside **DEPENDS ON.** Click **Add to Current Rule**.



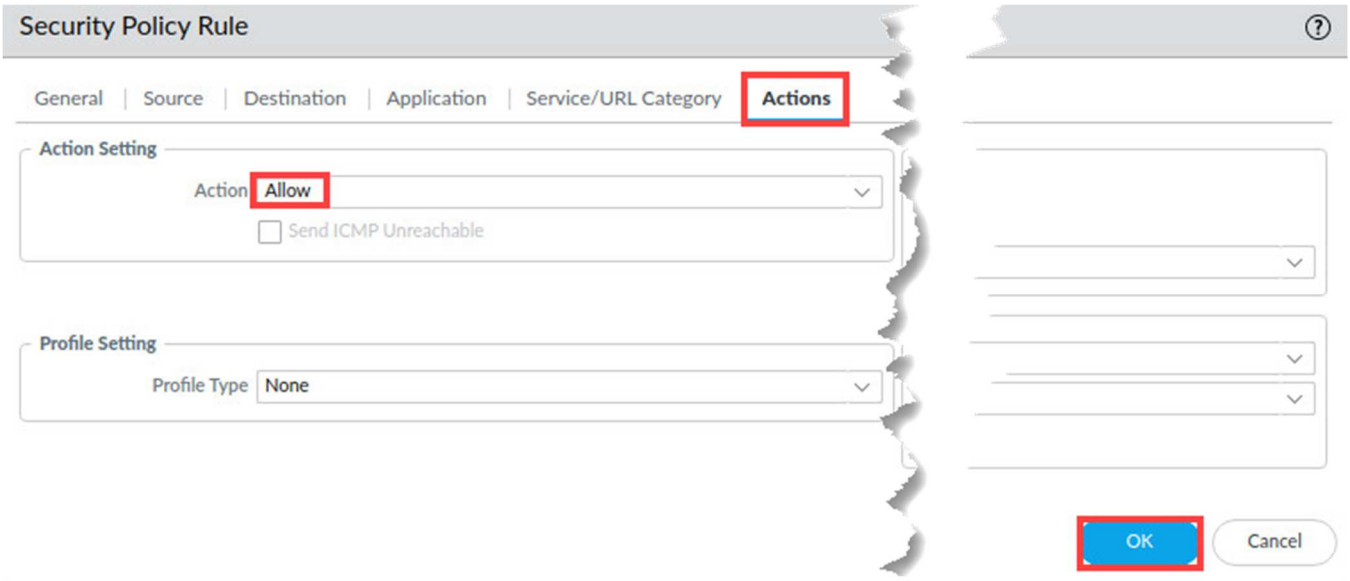
Please Note

This action will select all the individual applications under the DEPENDS ON column. Note that the list of applications in the Depends On column may differ from the example here.

6. Notice the *applications* have now been added to the *Applications* window.



7. Select the **Actions** tab and verify the *Action* is set to **Allow**. Click **OK**.



Please Note

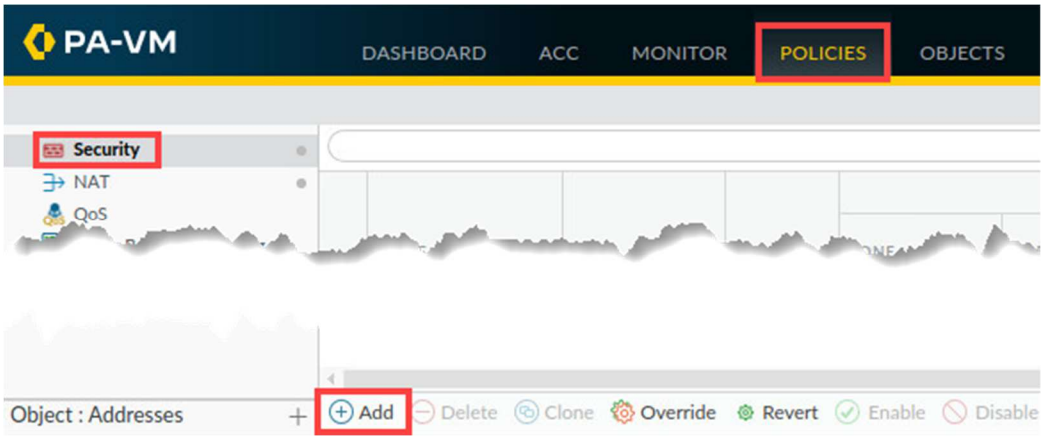
When you create a new Security policy rule, the default setting for Action is Allow. However, it is always a good practice to verify this setting before closing the window.

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

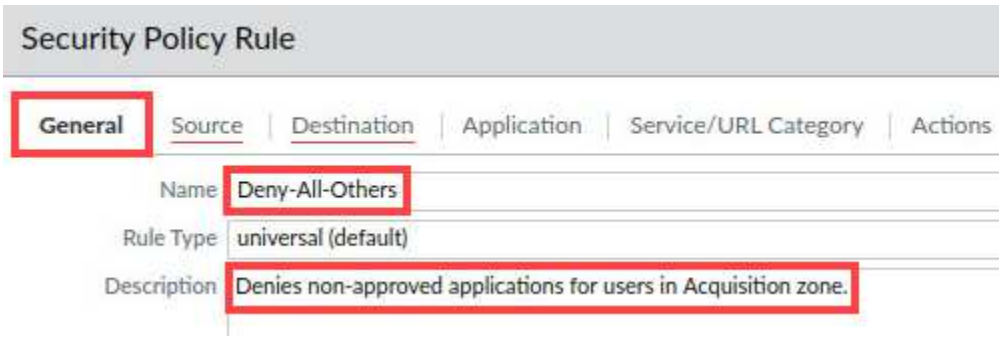
2.7 Create Deny Rule

In this section, you will create a new Security Policy rule that will deny any other application traffic for users in the Acquisition zone.

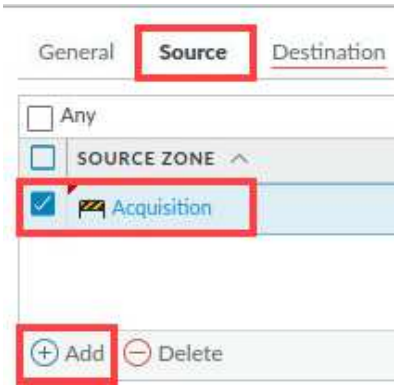
1. Select **Policies > Security**. Click **Add**.



2. In the *Security Policy Rule* window, under the *General* tab, enter **`Deny-All-Others`** for the *Name*. For *Description*, enter **`Denies non-approved applications for users in Acquisition zone`**.

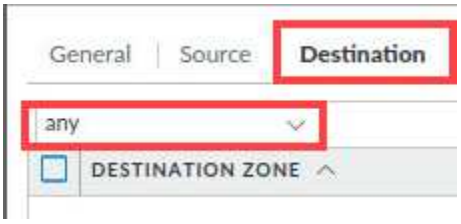


3. Select the tab for **Source,** click **Add** and select **Acquisition**.

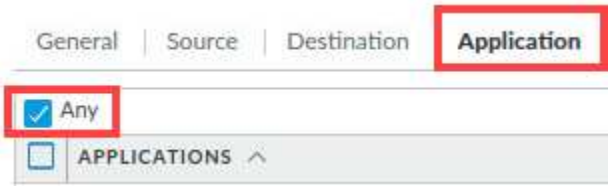


Note that you do not need to specify any users or user groups under the Source User column. Because the drop-down list is set to any, this rule will deny traffic to any user, regardless of group membership.

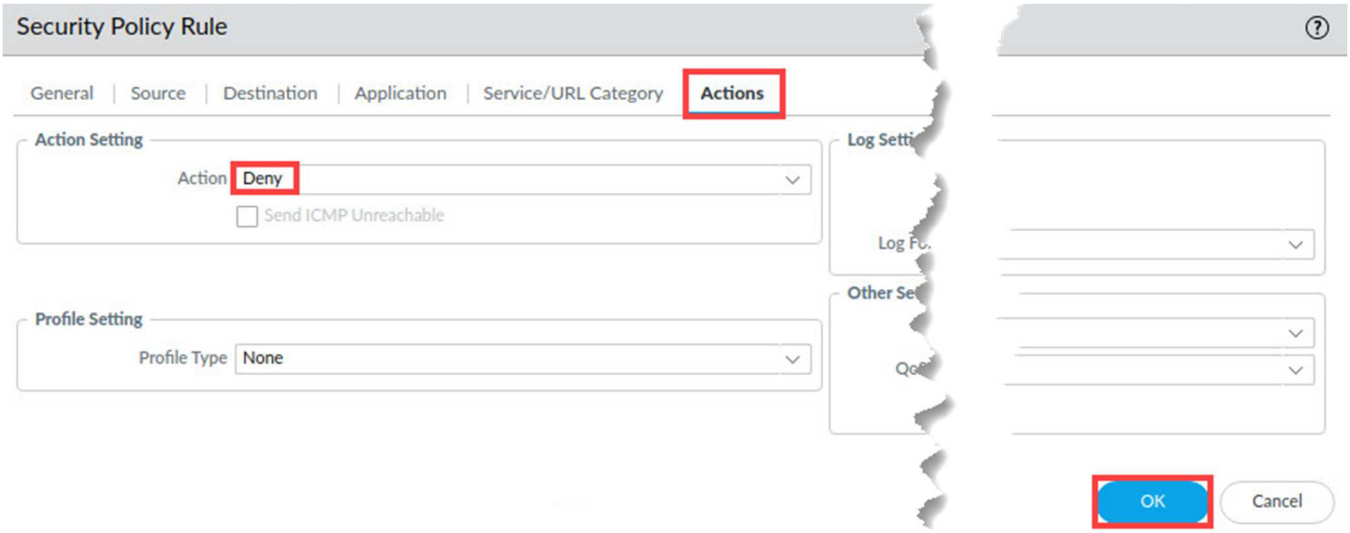
4. Select the tab for **Destination,** use the drop-down list at the top to select **any**.



5. Select the tab for **Application** and verify that **Any** is checked.



6. Select the **Actions** tab and change the **Action Setting** to **Deny**. Click **OK**.

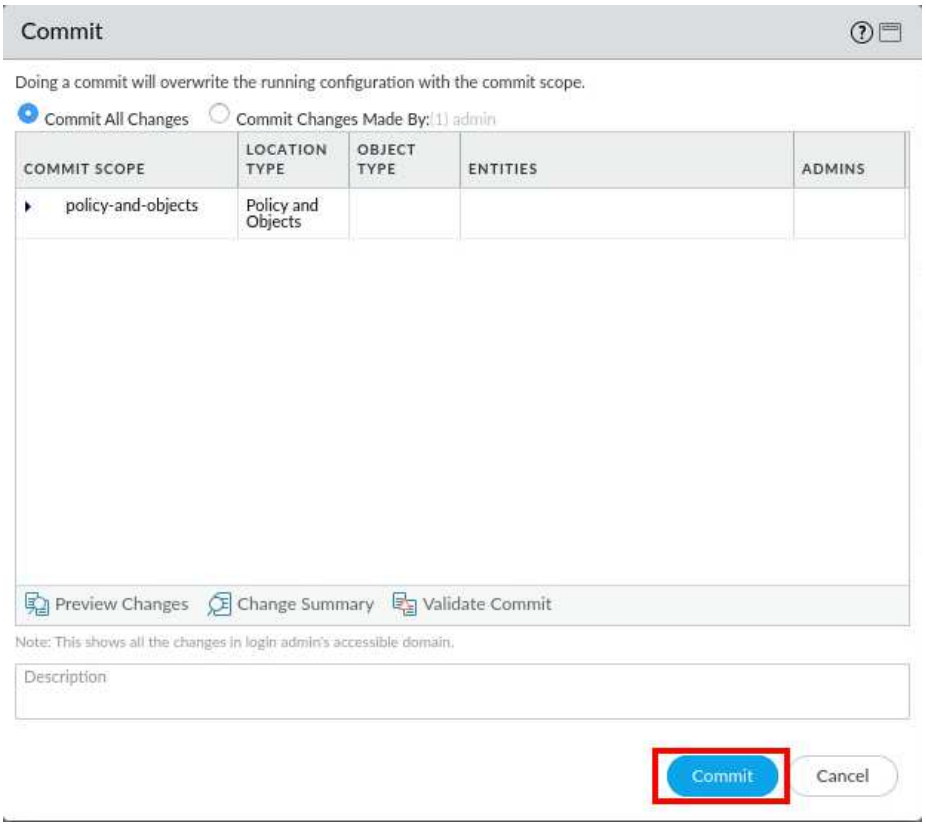


7. Verify that the **Deny-All-Others** rule appears at the bottom of the Security policy.

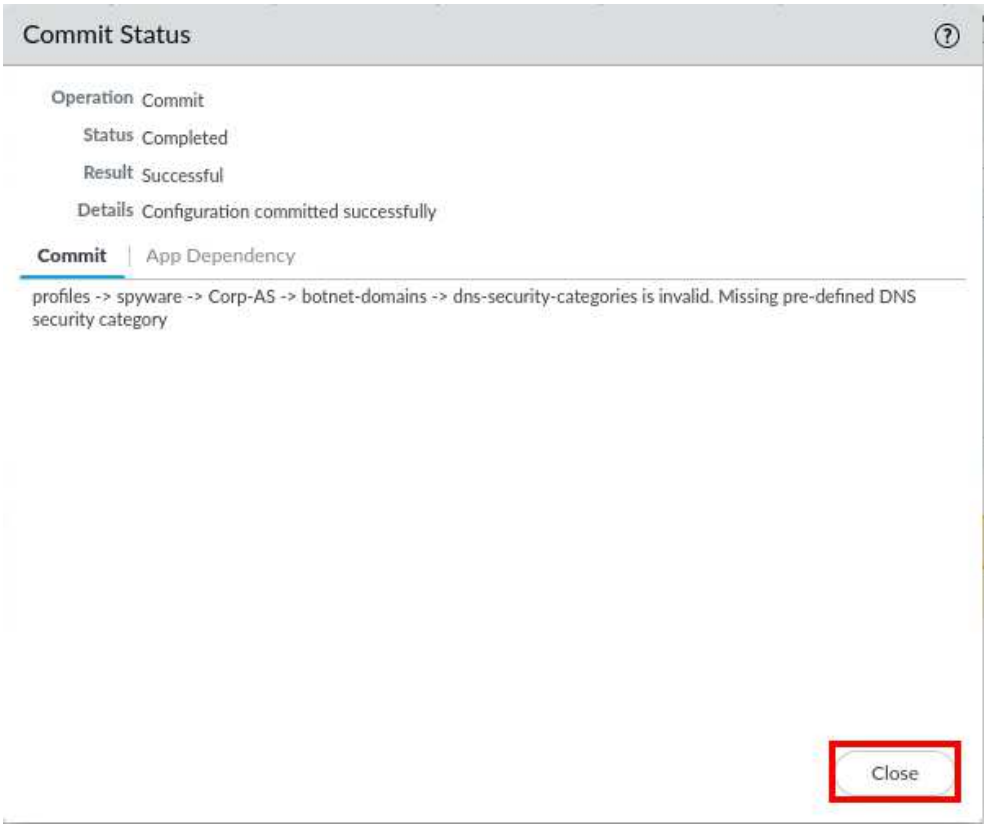
If the "Deny-All-Others" rule does not appear at the bottom of the ruleset, use the Move Down button to place the rule just above the "intrazone-default" rule.

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

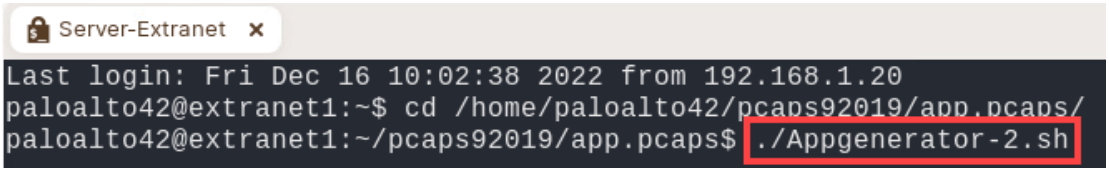
2.8 Generate Traffic from the Acquisition Zone

In this section, you will generate traffic from the Acquisition zone using the Extranet-Server.

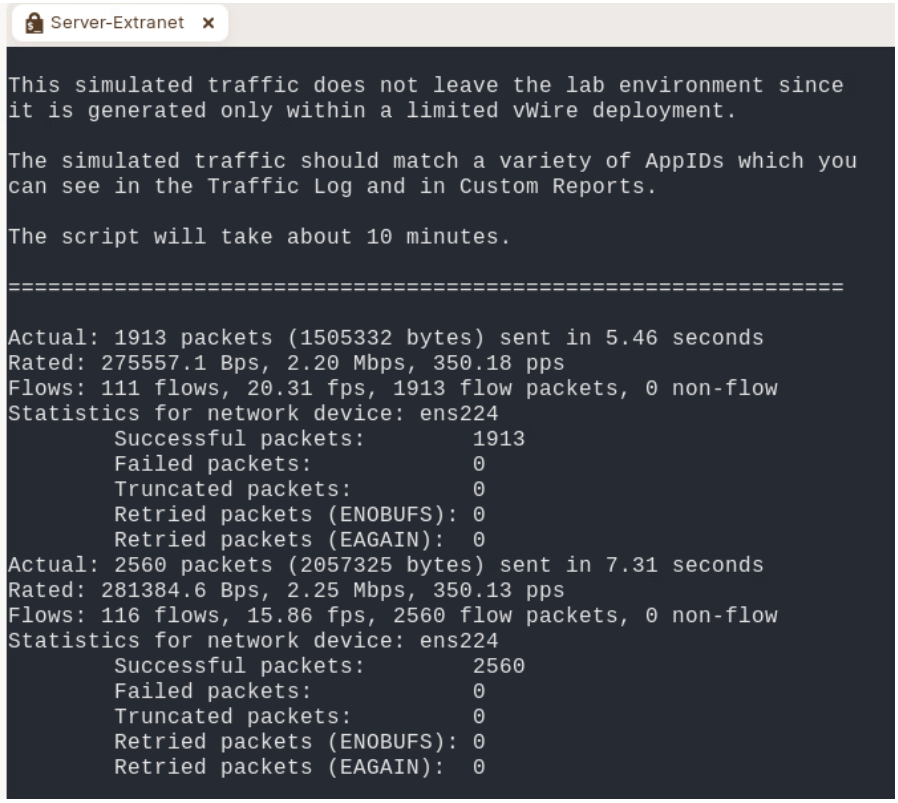
1. Open the **Remmina** application by clicking on the **Server-Extranet** tab in the *task bar*.

2. Ensure you are still in the **app.pcaps** directory. In the CLI connection enter the following command.

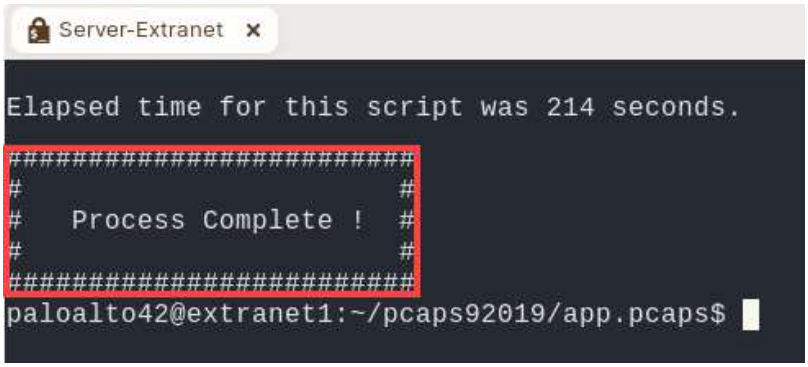
```
paloalto42@extranet1:~/pcaps92019/app.pcaps$ ./Appgenerator-2.sh
```



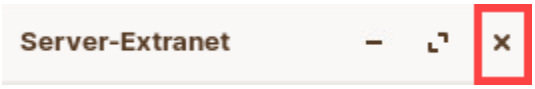
3. Verify the **Appgenerator-2** script is running.



Allow the *Appgenerator-2* script to complete before continuing to the next task.



4. Close the **Server-Extranet** connection by clicking the **X** icon.



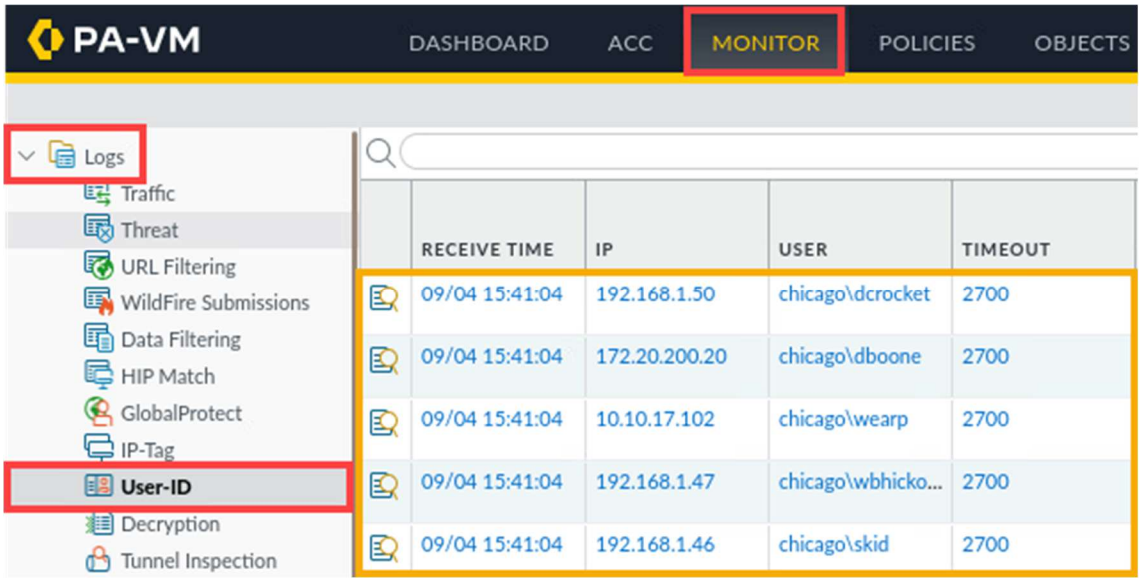
5. Re-open the *PA-VM firewall* web interface by clicking on the **Firefox** icon in the task bar.

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

2.9 Exam User-ID Logs

You can see information about User-ID through the firewall CLI or in the web interface. In this section, you will use both tools to examine User-ID entries.

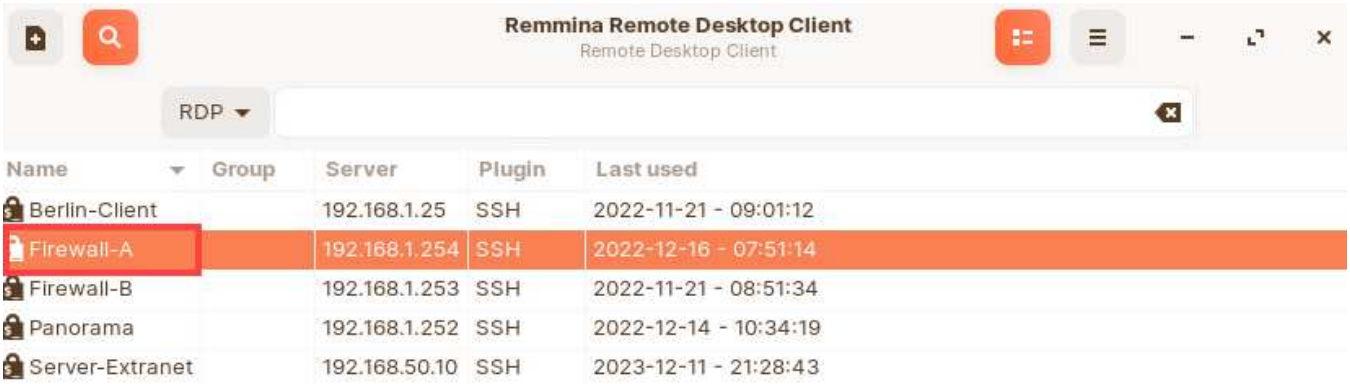
1. Select **Monitor > Logs > User-ID**. The firewall should have numerous entries with *username-to-ip-address* mappings. If the *User* mappings are not showing, repeat **Task 2.8**.



2. Minimize the PA-VM firewall by clicking minimize in the upper right of the web interface and continue to the next task.

3. On the *client* desktop, in the *task bar*, re-open the **Remmina** application.

4. Double-click the entry for **Firewall-A**.

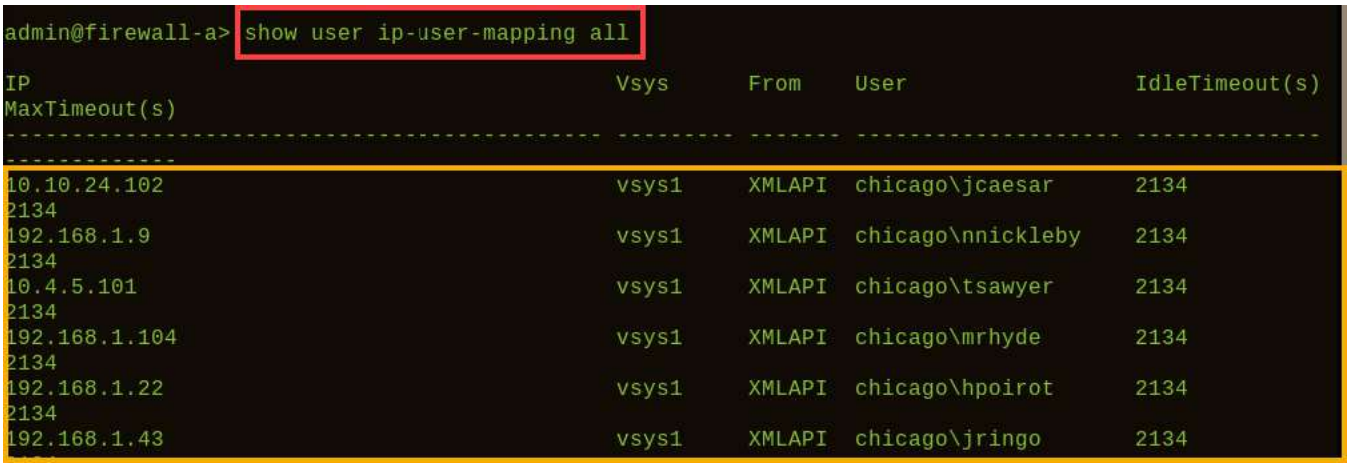


Please Note

The Firewall-A connection in Remmina has been pre-configured to provide login credentials to the firewall so that you do not have to log in each time. This is for convenience in the lab only.

5. In the firewall CLI, enter the following command to display entries for *User-ID*. Examine the *User-ID* information.

```
admin@firewall-a> show user ip-user-mapping all <Enter>
```



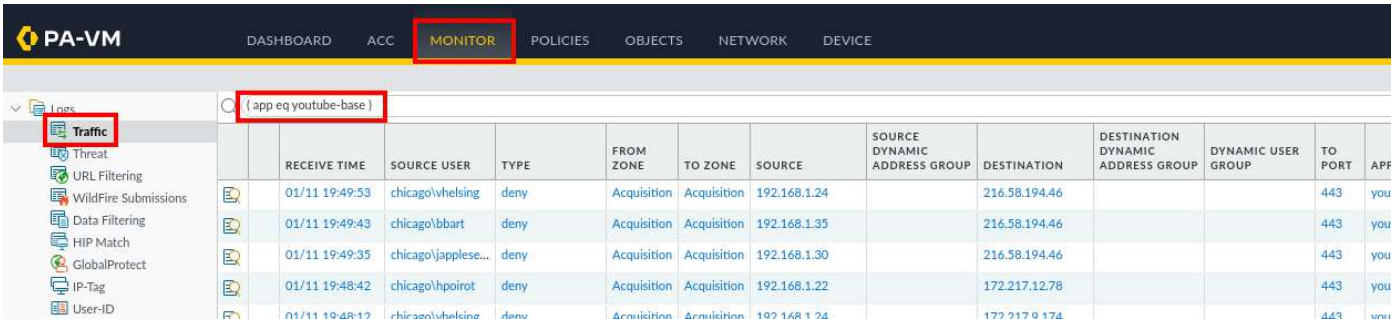
6. Close the *Firewall-A* window by clicking the **close** icon.

7. Re-open the *PA-VM firewall* web interface by clicking on the **firewall-a – Mozilla Firefox** icon in the task bar and continue to the next task.

2.10 Examine Firewall Traffic Log

Create and apply filters to view rules and users.

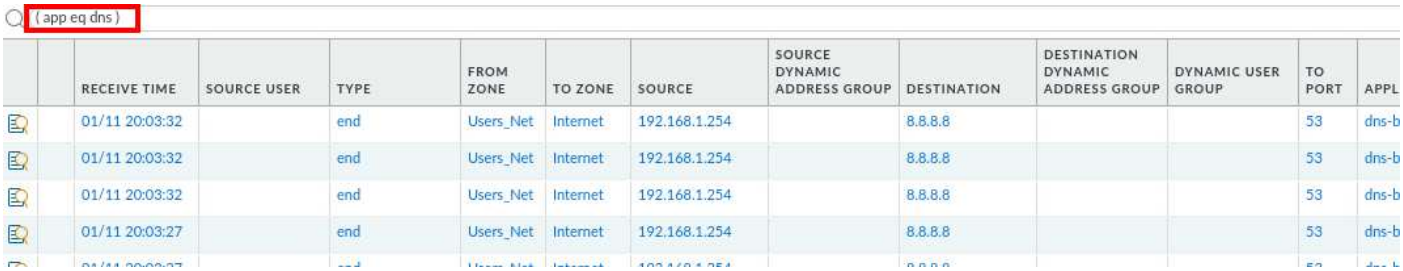
1. Select **Monitor > Logs > Traffic.** In the filter builder, type **(app eq youtube-base).** Click **Apply Filter**.



Q1. Which security policy does the firewall use when it encounters youtube-base traffic?

a. Allow-Corp-Apps
b. Allow-PANW-Apps
c. Block-from-Known Sources
d. Deny-All-Others

2. Clear the filter and in the filter builder, type **(app eq dns).** Click **Apply Filter**.



Q2. Which security policy does the firewall use when it encounters dns traffic?

a. Allow-Corp-Apps
b. Users_to_Internet
c. Block-from-Known Sources
d. Deny-All-Others

3. Clear the filter and in the filter builder, type **(app eq facebook-base).** Click **Apply Filter**.

Q3. Which security policy does the firewall use when it encounters facebook-base traffic? Choose all that apply.

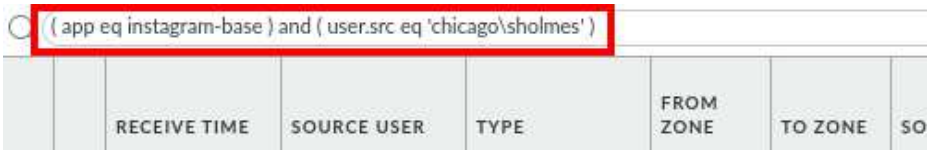
a. Allow-Corp-Apps
b. Allow-PANW-Apps

c. Allow-Mktg-Apps
d. Deny-All-Others

4. In the filter builder, type **(app eq facebook-base) and (action eq allow).** Click **Apply Filter**.

Q4. Which users are allowed access to facebook-base?
a. No Users are allowed to access Facebook.
b. chicago\hpoirot
c. chicago\sholmes
d. chicago\vhelsing

5. Clear the filter and in the filter builder, type **(app eq instagram-base) and (user.src eq 'chicago\sholmes').** Click **Apply Filter**.



Q5. Is the user sholmes allowed to access instagram-base?
a. Yes
b. No

6. Clear the filter and in the filter builder, type **(app eq instagram-base) and (user.src eq 'chicago\bbart').** Click **Apply Filter**.

Q6. Is the user bbart allowed to access instagram-base?
a. Yes
b. No

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