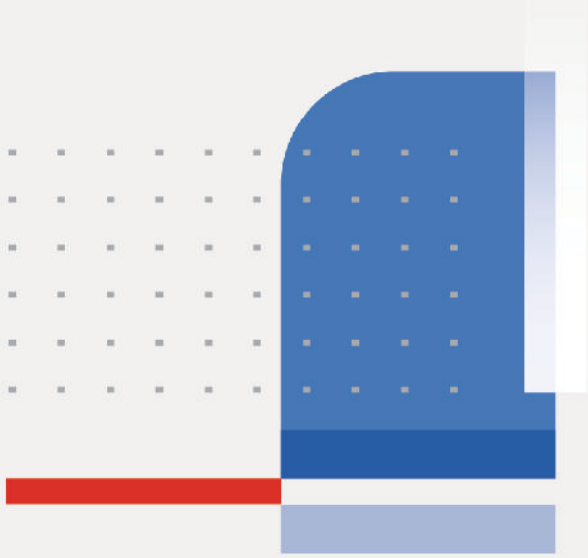
FORTINET CERTIFIED PROFESSIONAL Network Security

FortiClient EMS Administrator Lab Guide

FortiClient EMS 7.4



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3/14/2025

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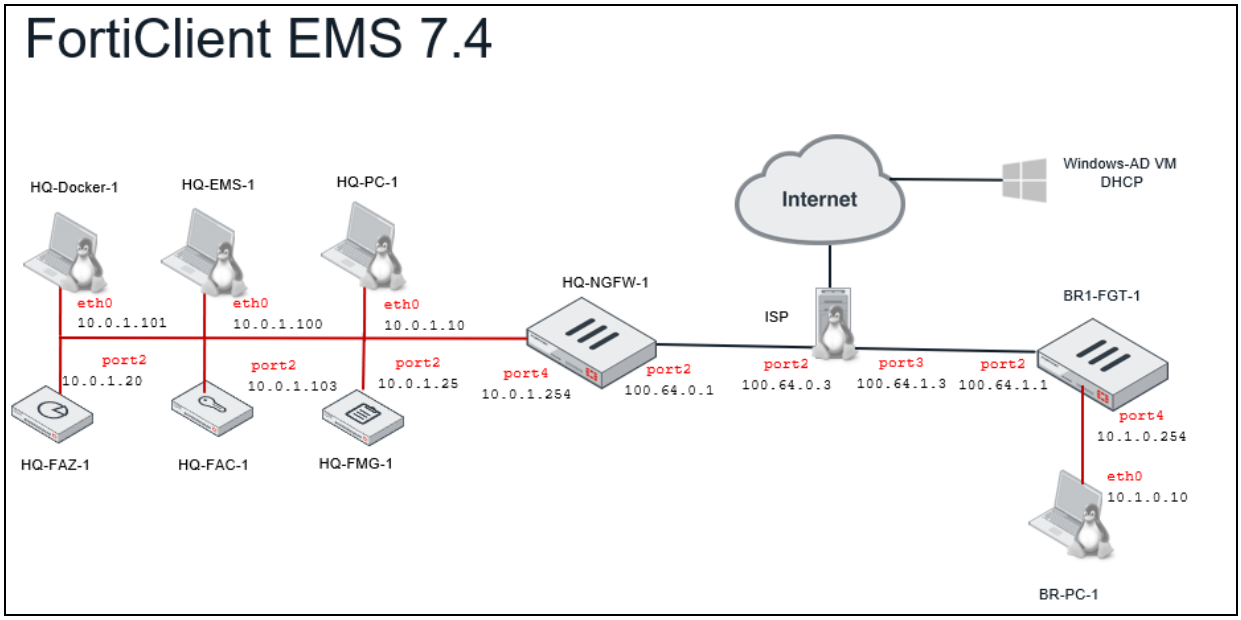
Change Log

This table includes updates to the *FortiClient EMS 7.4 Lab Guide* dated 1/27/2025 to the updated document version dated 3/14/2025.

Change	Location
Added self-paced pre-requisites	"Prerequisites (Self-Paced Only)" on page 58
Added self-paced pre-requisites	"Prerequisites (Self-Paced Only)" on page 133

Network Topology



Lab 1: FortiClient EMS Installation

In this lab, you will create a FortiClient EMS administrator and apply the FortiClient EMS license.

Objectives

- Create FortiClient EMS administrator
- Apply a FortiClient EMS license

Time to Complete

Estimated: 20 minutes

Exercise 1: Accessing the FortiClient EMS GUI

In this exercise, you will access the FortiClient EMS GUI, create an administrator account, and then install the FortiClient EMS license.

In this environment, FortiClient EMS has already been installed with PostgreSQL in Docker.

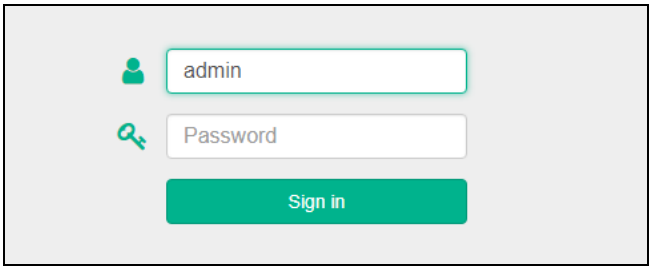
Access the FortiClient EMS GUI and Install the License

You will access the FortiClient EMS GUI, create an administrator user and password, and install the license.

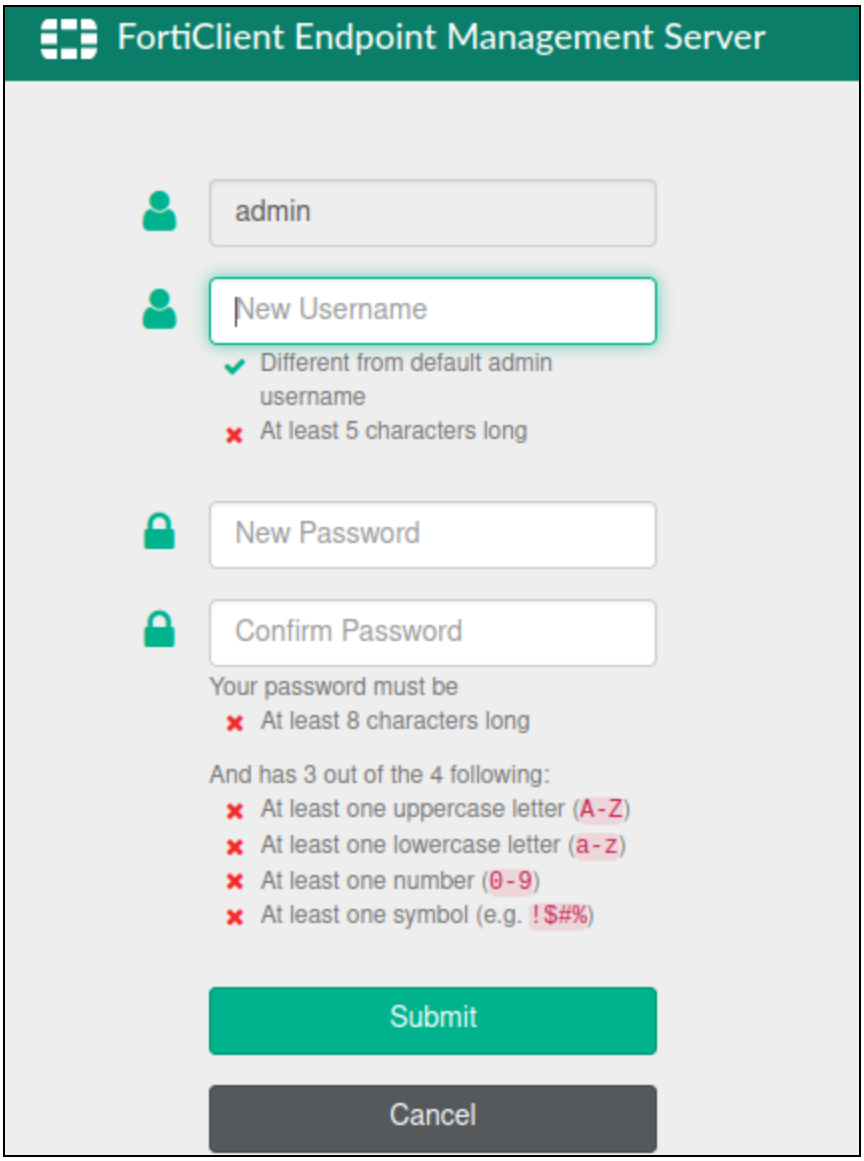
To access the FortiClient EMS GUI and create an administrator password

1. On the HQ-EMS-1 VM, open Google Chrome, and then enter `https://localhost` to access the FortiClient EMS GUI.

   A certificate warning appears.
2. Accept the self-signed certificate to access the FortiClient EMS server.
3. In the username field, type `admin`, leave the password field empty, and then click **Sign in**.



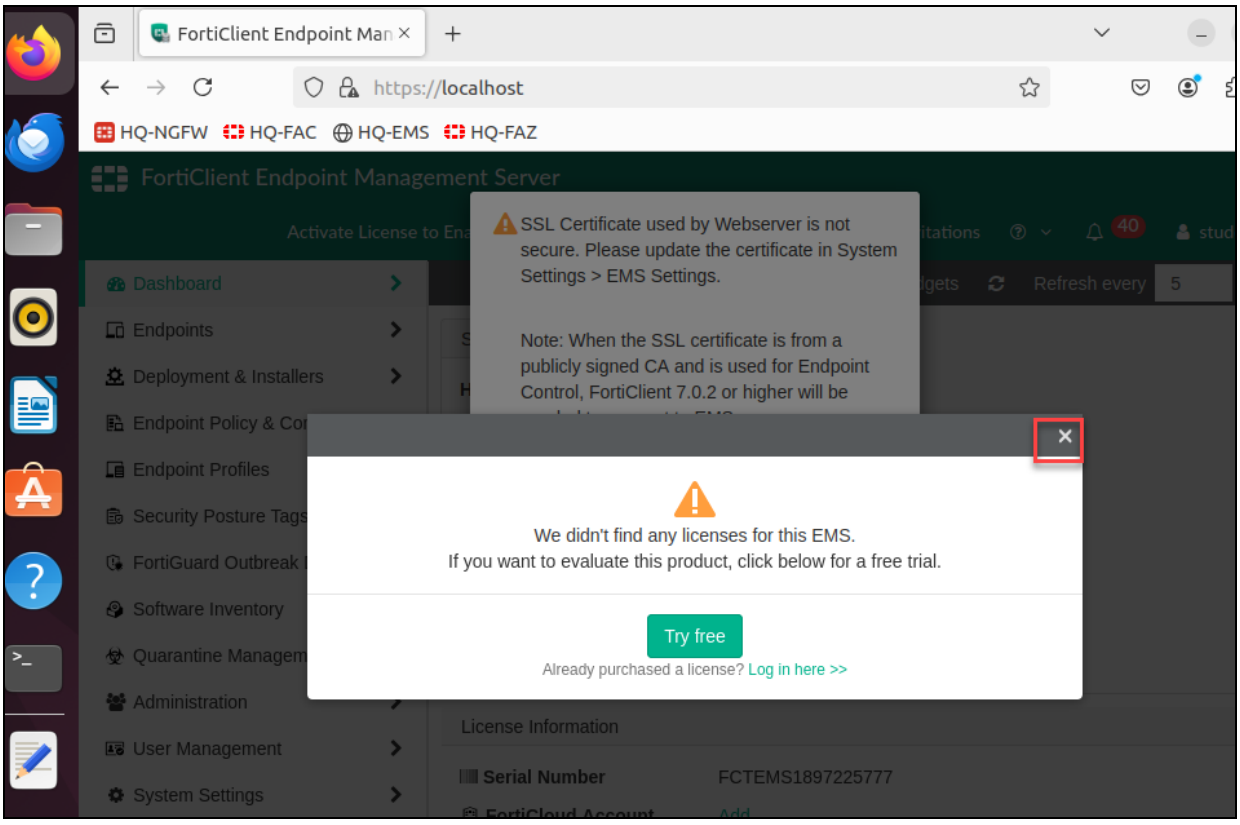
FortiClient EMS prompts you to configure a new administrator and password.



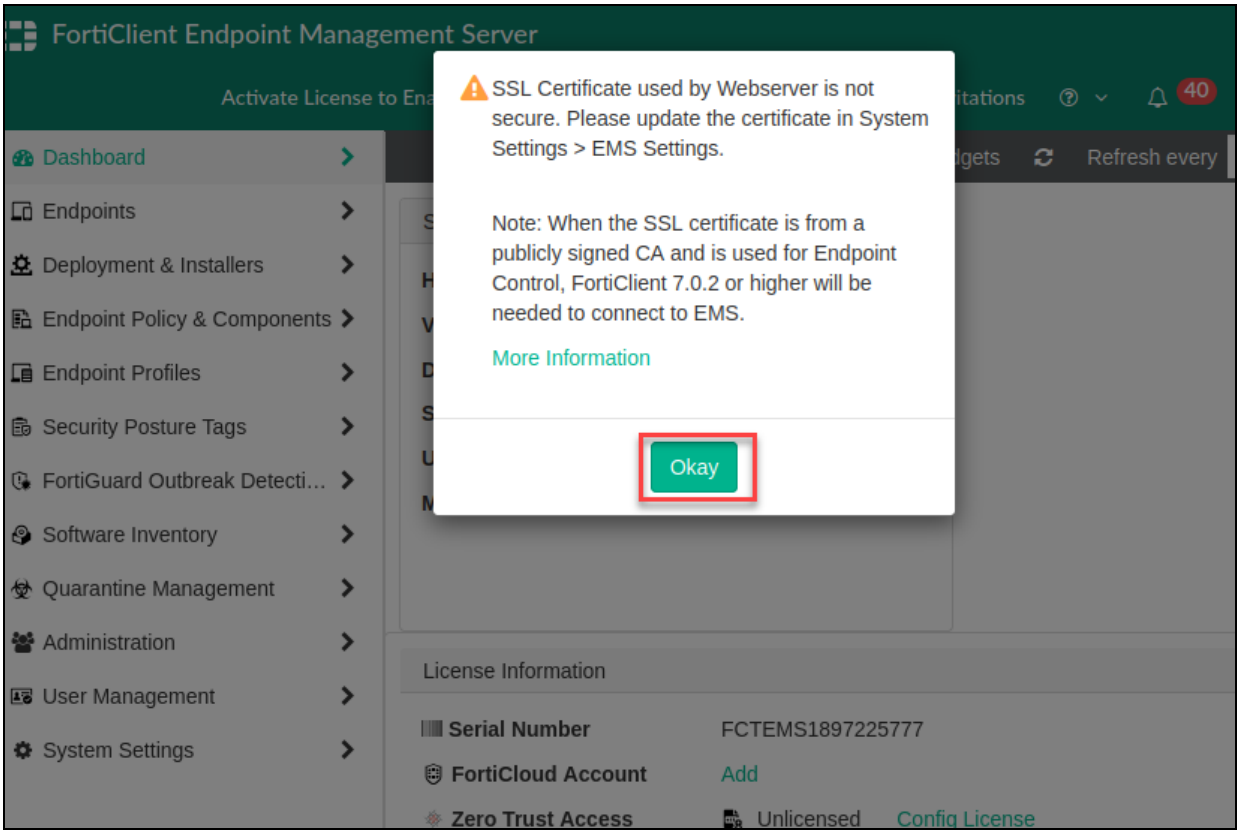
4. In the **New Username** field, type `student1`.
5. In the **New Password** and **Confirm Password** fields, type `Password1!` to meet the password requirements, and then click **Submit** to save the password.

To install the FortiClient EMS license

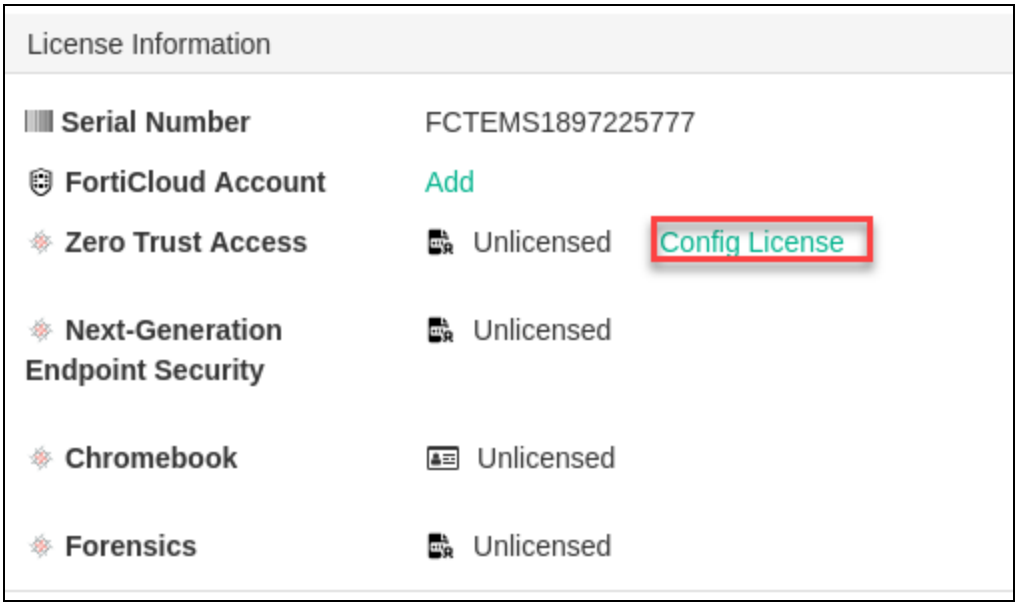
1. Log in to the FortiClient EMS GUI with the following credentials:
   - Username: `student1`
   - Password: `Password1!`
2. Click **X** to close the EMS license warning window.



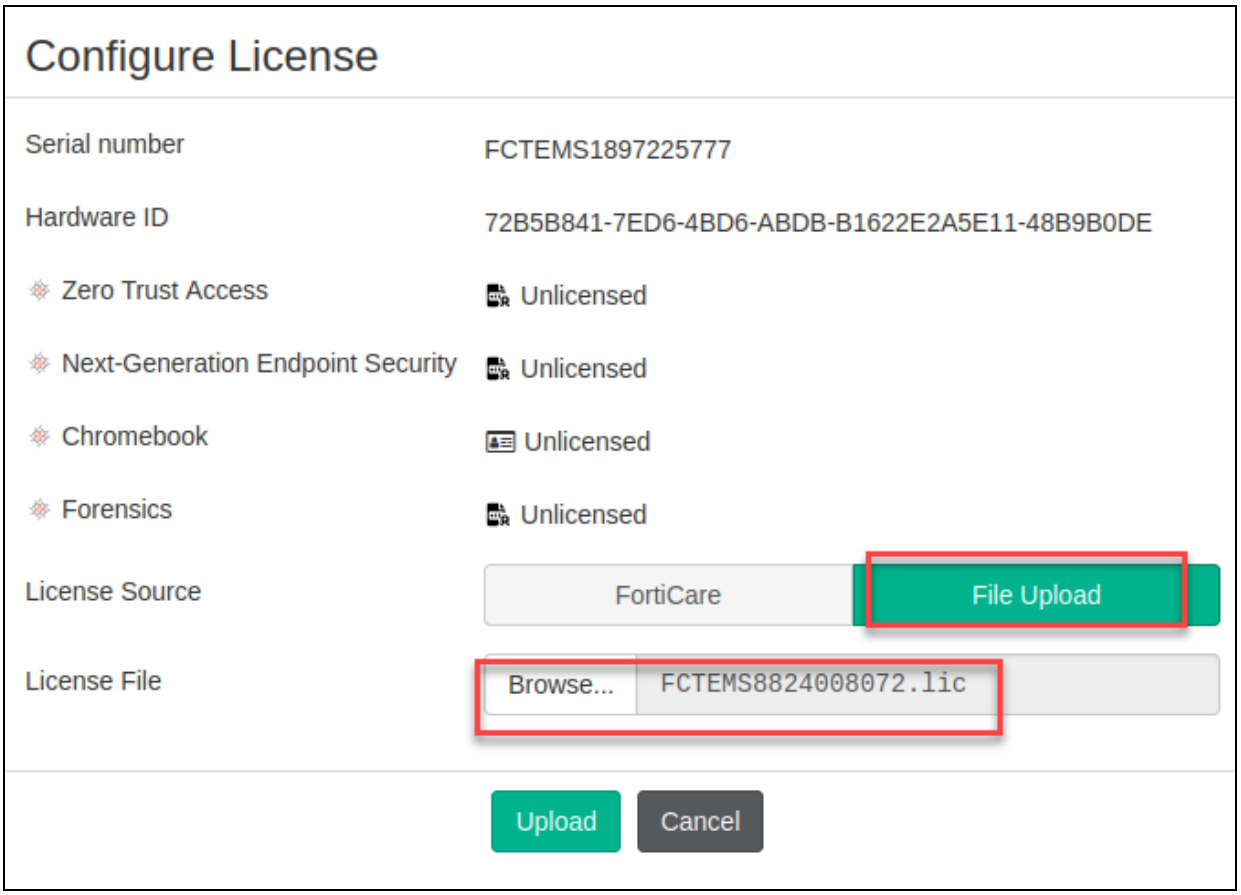
3. Click **Okay** to close the SSL certificate warning window.



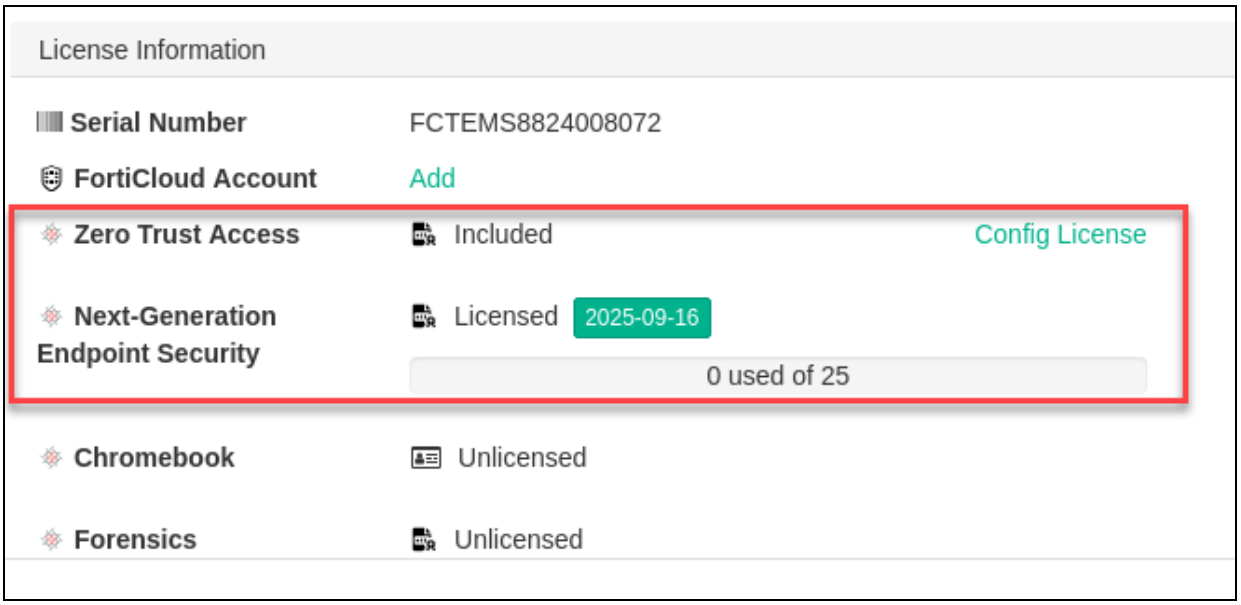
4. In the **Dashboard** > **Status** > **License Information** widget, click **Config License**.



5. In the **License Source** field, select **File Upload**, click **Browse**, navigate to the **Desktop** > **Resources** folder, and then select the license file.



6. Click **Upload** to activate the new license.
7. Refresh the FortiClient EMS GUI page.
   A certificate warning appears.
8. Accept the self-signed certificate to access the FortiClient EMS server.
9. Click **Okay** to close the SSL certificate warning window.
10. On the FortiClient EMS GUI, click **Dashboard** > **Status** to see the license information.



Lab 2: System Administration

In this lab, you will examine the configuration of the FortiClient EMS system settings.

Objectives

- Configure system settings
- Enable SSO authentication for FortiClient EMS administrator login

Time to Complete

Estimated: 35 minutes

Exercise 1: Configuring FortiClient EMS System Settings

In this exercise, you will configure the following FortiClient EMS system settings:

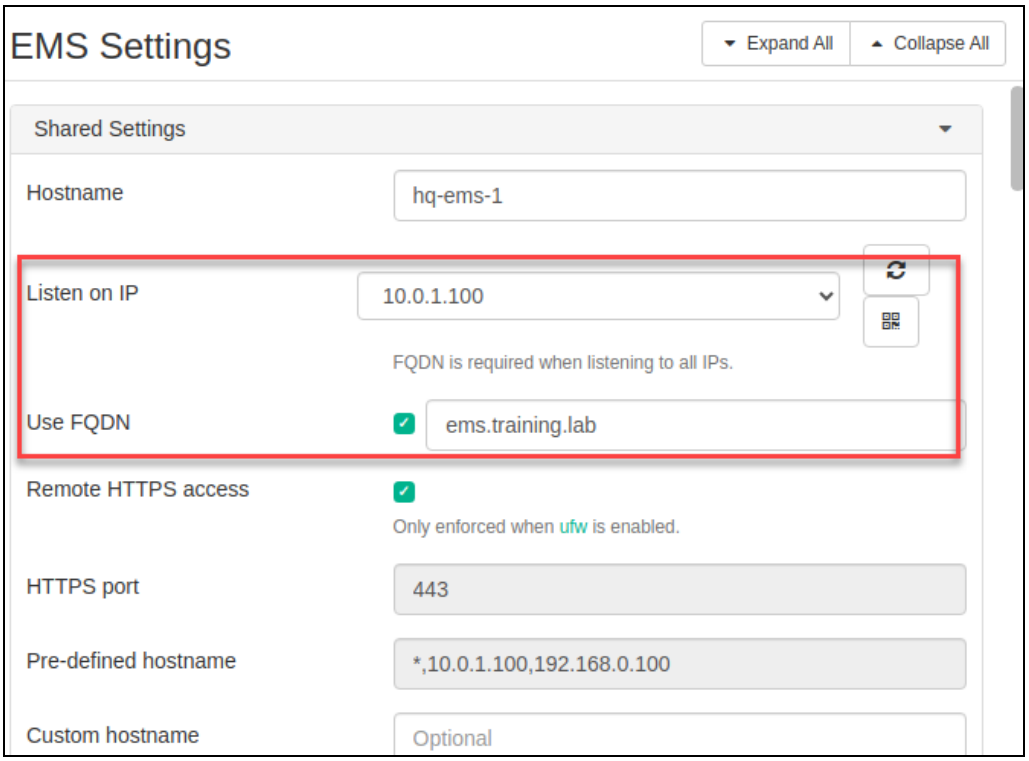
- Server settings
- Log settings
- Login banner settings

Configure Server Settings

On the **EMS Settings** page, you can configure settings, such as the host name and FQDN. You will configure the FQDN to access the FortiClient EMS server, using the configured FQDN. You will also upload the SSL certificate for web server access and endpoint control.

To configure the FQDN on FortiClient EMS

1. On the HQ-EMS-1 VM, open Google Chrome, and then log in to the FortiClient EMS GUI with the following credentials:
   - Username: `student1`
   - Password: `Password1!`
2. Click **Okay** to close the SSL certificate warning window.
3. Click **System Settings** > **EMS Settings**.
4. In the **Shared Settings** section, in the **Listen on IP** field, ensure that the value is **10.0.1.100**.
5. In the **Use FQDN** field, select the checkbox, and then type `ems.training.lab`.

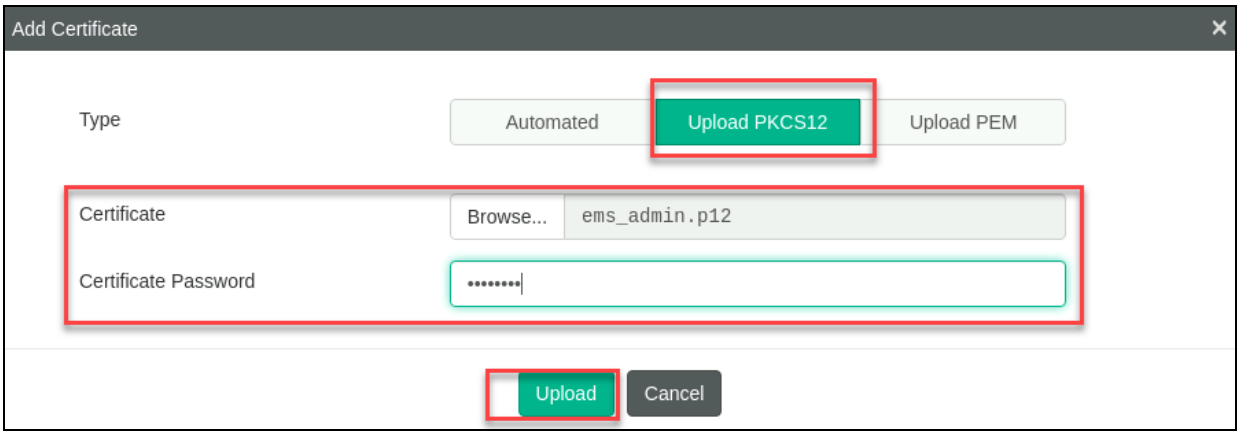


6. In the **EMS Settings** section, in the **FortiClient download URL** field, ensure that the value is **10.0.1.100**.
7. Click **Save** to apply the changes.
8. Click **Yes** to restart the server.
9. Restart Chrome, enter `https://ems.training.lab`, and then accept the self-signed certificate to access the FortiClient EMS server.
10. Log in with the following credentials:
    - Username: `student1`
    - Password: `Password1!`
11. Click **Okay** to close the SSL certificate warning window.

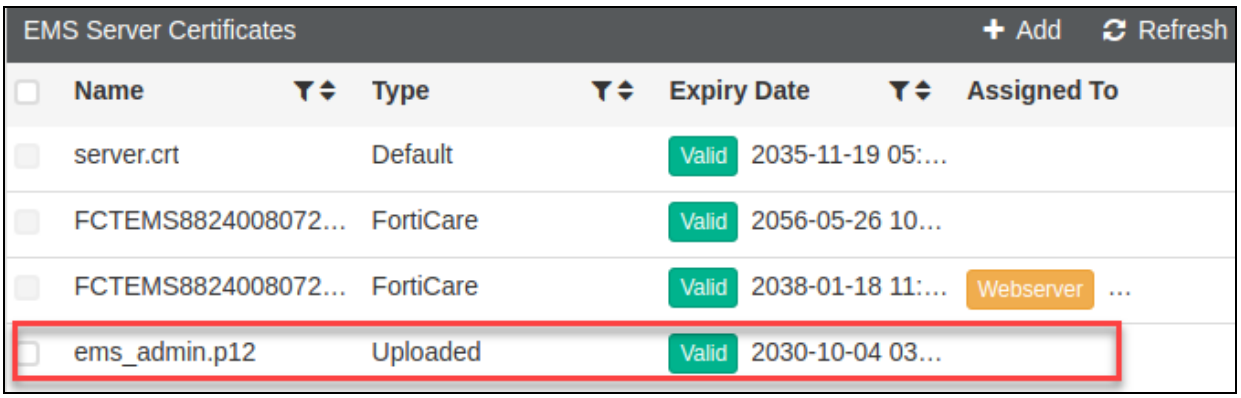
The HQ-EMS-1 VM host file has been modified to make `ems.training.lab` accessible.

To upload the SSL certificate

1. Continuing on the FortiClient EMS GUI, click **System Settings** > **EMS Server Certificates**.
2. Click **Add**, and then in the **Add Certificate** window, select **Upload PKCS12**.
3. In the **Certificate** field, click **Browse**, on the desktop, click **Resources**, and then select the `ems_admin.p12` certificate.
4. In the **Certificate Password** field, type `fortinet`.

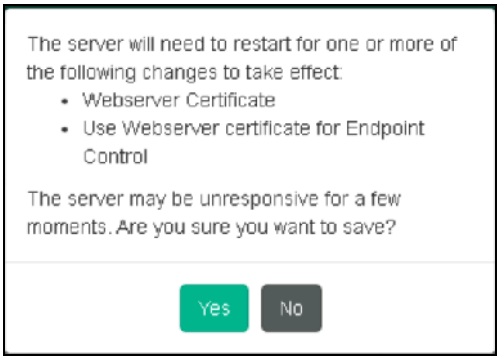


5. Click **Upload**.
   On the **EMS Server Certificates** page, the value in the **Type** column for the certificate should be **Uploaded**.



To select the newly uploaded certificate for web server and endpoint control

1. Continuing on the FortiClient EMS GUI, click **System Settings** > **EMS Settings**.
2. In the **Shared Settings** section, in the **Webserver Certificate** field, select **ems_admin.p12**.
3. Select the **Use Webserver certificate for Endpoint Control** checkbox.
4. Click **Save**, and then in the window warning you about a server restart, click **Yes**.



5. Click **Okay**.
6. Refresh the FortiClient EMS GUI page.

Configure Log Settings

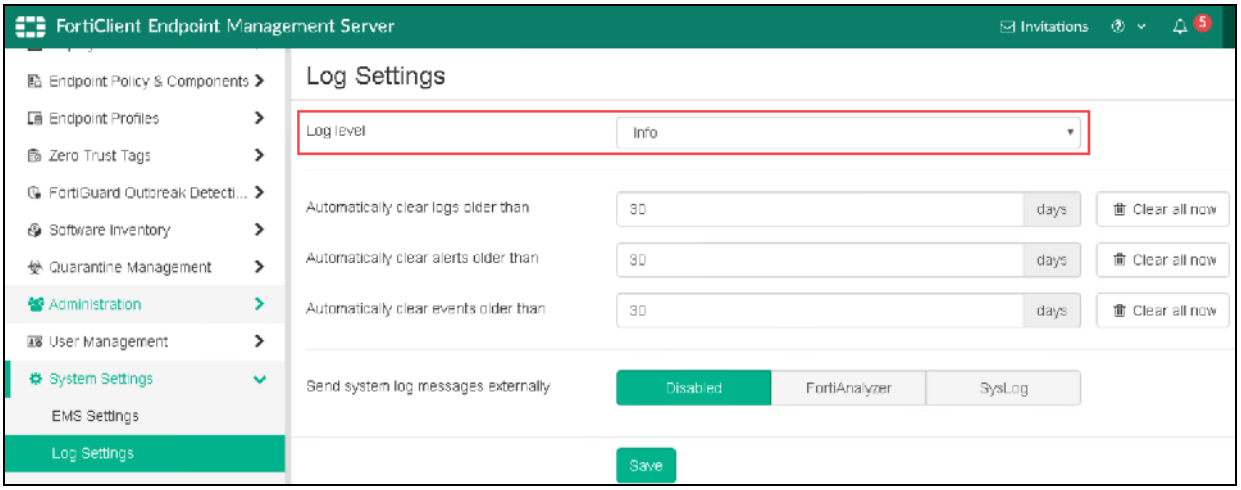
On the **Log Settings** page, you can configure the log level, and the number of days that you want to keep logs, events, and alerts before they are cleared. You will change the **Log level** setting.

To configure log settings

1. On the FortiClient EMS GUI, click **System Settings** > **Log Settings**.

You may need to log out and log in again to load the **Log Settings** page.

2. In the **Log level** field, ensure that the value is **Info**.



3. Click **Administration** > **Log Viewer** to view the logs.

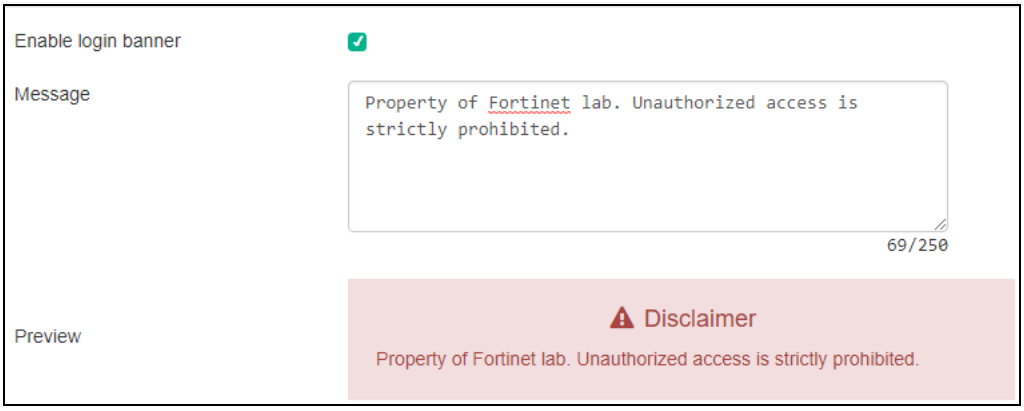
Date	Level	Source	Message	Occurrences
2024-10-14 01:2...	Warning	Console	Session has expired or does not exist.	1 time sinc...
2024-10-14 01:2...	Info	Console	student1 changed Server Settings.	1 time sinc...
2024-10-14 01:2...	Info	Console	student1 uploaded a certificate: ems_...	1 time sinc...
2024-10-14 01:1...	Info	Console	student1 has logged in from 10.0.1.100.	1 time sinc...
2024-10-14 01:1...	Warning	Console	Session has expired or does not exist.	2 times sin...
2024-10-14 01:1...	Info	Console	student1 changed Server Settings.	1 time sinc...
2024-10-14 01:0...	Warning	Console	Session has expired or does not exist.	4 times sin...
2024-10-14 01:0...	Info	Console	student1 uploaded License with serial...	1 time sinc...
2024-10-14 01:0...	Info	Console	student1 has logged in from ::1.	1 time sinc...
2024-10-14 01:0...	Info	EMS Service	Tags cleared for all endpoints	6 times sin...
2024-10-14 01:0...	Info	Console	admin changed password	1 time sinc...

Configure Login Banner Settings

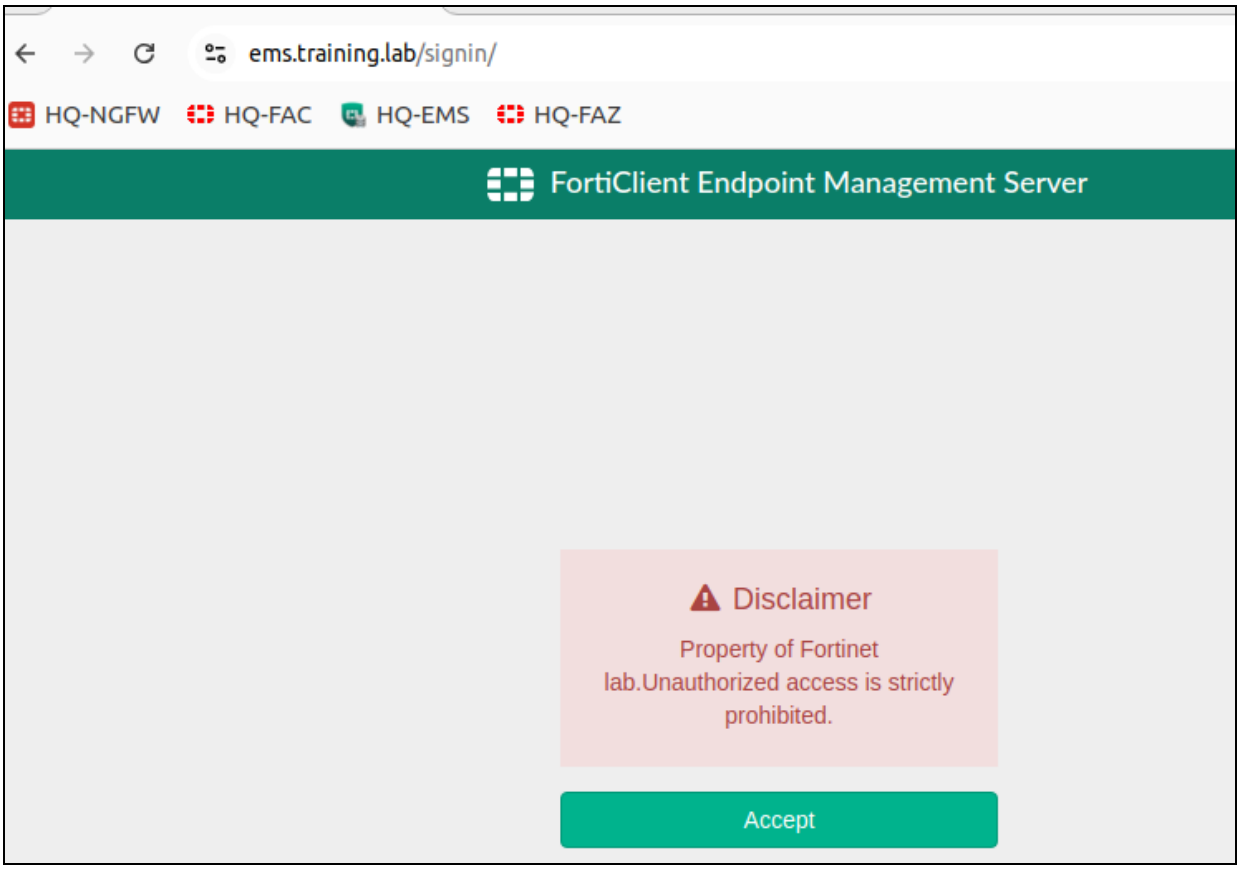
On the **EMS Settings** page, you will configure a disclaimer message that appears before a user logs in to FortiClient EMS.

To configure login banner settings

1. Continuing on the FortiClient EMS GUI, click **System Settings** > **EMS Settings**.
2. Select the **Enable login banner** checkbox, and then in the **Message** field, type the following message:
   `Property of Fortinet lab. Unauthorized access is strictly prohibited.`



3. Click **Save** to apply the changes.
4. Log out of the FortiClient EMS GUI as **student1**.
   A **Disclaimer** appears.



5. Click **Accept** to go to the login page.

Exercise 2: Configuring SAML SSO for FortiClient EMS Administrator Login

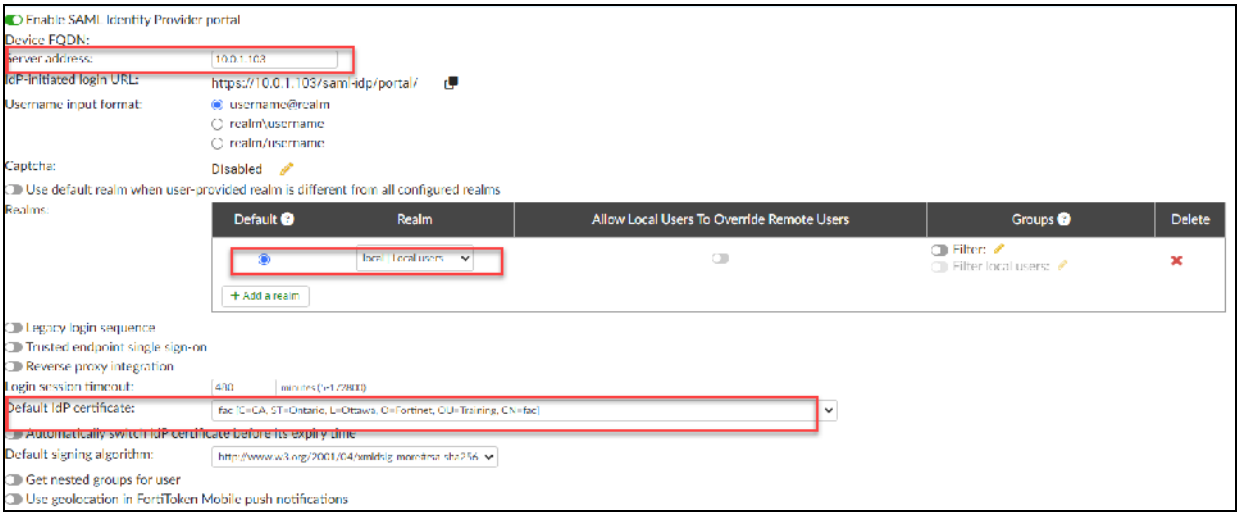
In this exercise, you will configure FortiAuthenticator as an IdP server, with FortiClient EMS as an SP.

Verify IdP Settings on FortiAuthenticator

You will verify FortiAuthenticator IdP settings.

To verify FortiAuthenticator IdP settings

1. On the HQ-EMS-1 VM, open Chrome, and then in **Bookmarks**, select the **HQ-FAC** login page bookmark.
2. Log in to the FortiAuthenticator GUI with the following credentials:
   - Username: `admin`
   - Password: `Fortinet1!`
3. Click **Authentication** > **SAML IdP** > **General**.
4. In the **Server address** field, ensure that the value is **10.0.1.103**.
5. In the **Realms** section, in the **Realm** column of the table, ensure that **local | Local users** is selected.
6. In the **Default IdP certificate** field, ensure that the value is **fac [C=CA, ST=Ontario, L=Ottawa, O=Fortinet, OU=Training, CN=fac]**.

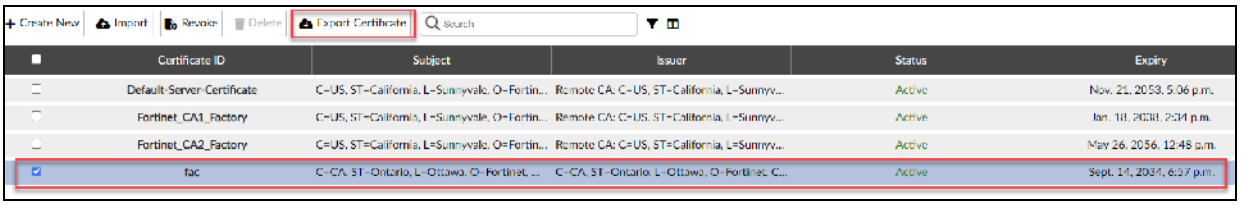


Configure FortiClient EMS as an SP for Administrator SSO Login

You will download an IdP certificate from FortiAuthenticator and import it into FortiClient EMS. You will also configure FortiClient EMS as an SP for administrator SSO login and securely identify the IdP.

To download an IdP server certificate from FortiAuthenticator

1. Continuing on the FortiAuthenticator GUI, click **Certificate Management** > **End Entities** > **Local Services**.
2. Select the checkbox for the **fac** certificate, and then click **Export Certificate**.

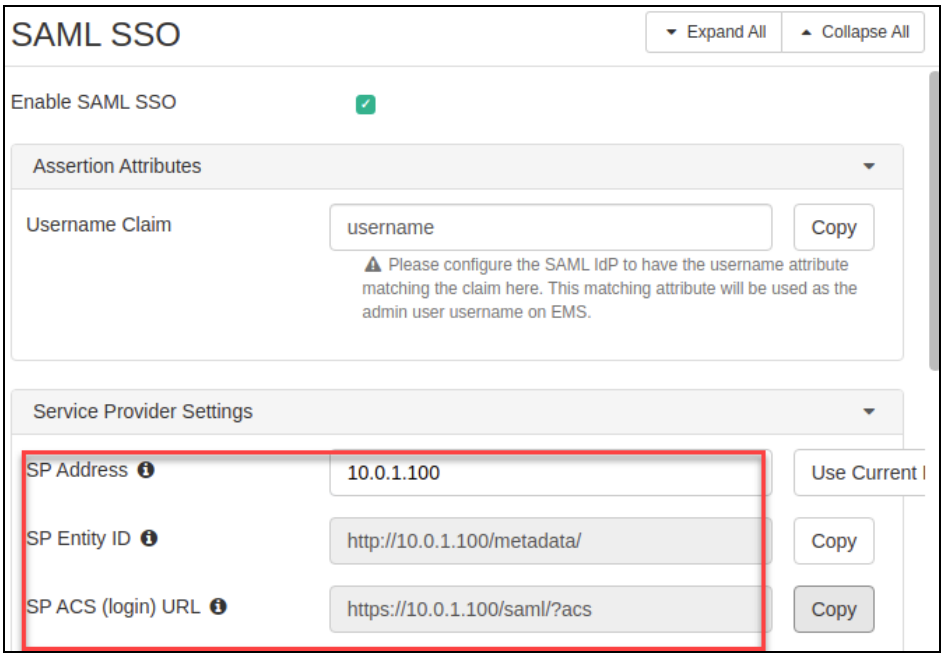


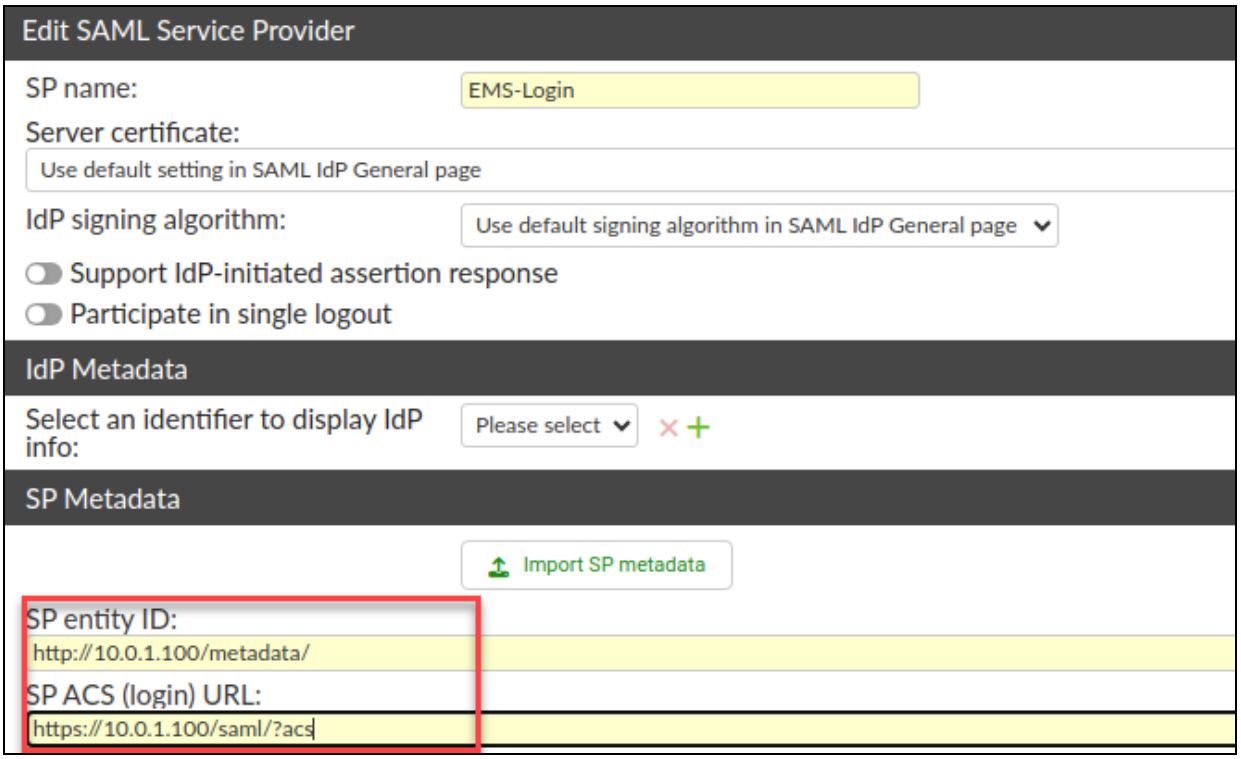
The certificate is exported to the **Downloads** folder.

To configure FortiClient EMS As an SP

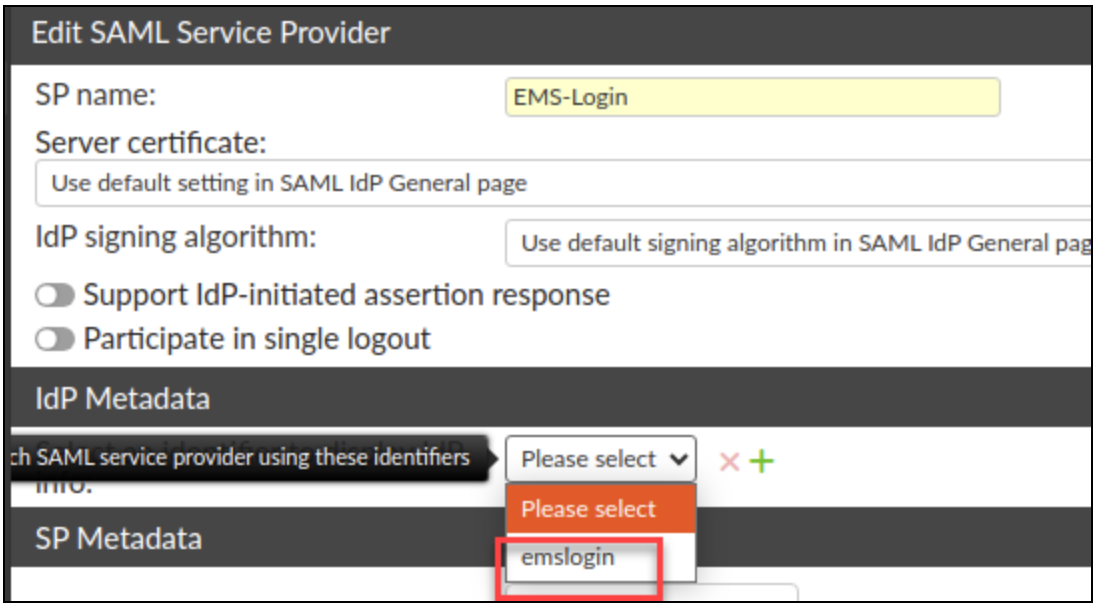
1. Log in to the FortiClient EMS GUI with the following credentials:
   - Username: `student1`
   - Password: `Password1!`
2. Click **Administration** > **SAML SSO**.
3. On the **SAML SSO** page, select the **Enable SAML SSO** checkbox.

4. Return to the FortiAuthenticator GUI, and then click **Authentication** > **SAML IdP** > **Service Providers**.
5. Select the **EMS-Login** SP name, click **Edit**, and then leave the page open.
6. Return to the FortiClient EMS GUI, and then in the **Service Provider Settings** section, in the **SP Address** field, type `10.0.1.100`.
7. In the **SP Entity ID** field, copy the value, and then on the FortiAuthenticator GUI, in the **SP Metadata** section, paste it in the **SP entity ID** field.
8. Return to the FortiClient EMS GUI, in the **SP ACS (login) URL** field, copy the value, and then on the FortiAuthenticator GUI, paste it in the **SP ACS (login) URL** field.

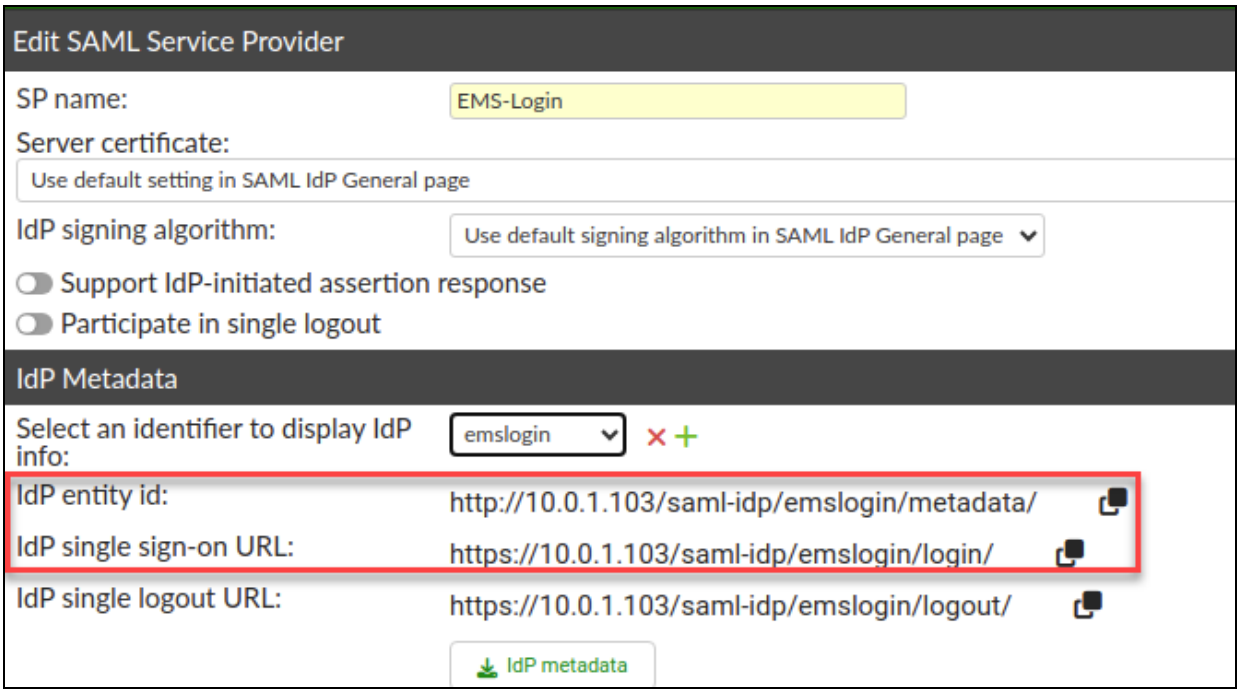


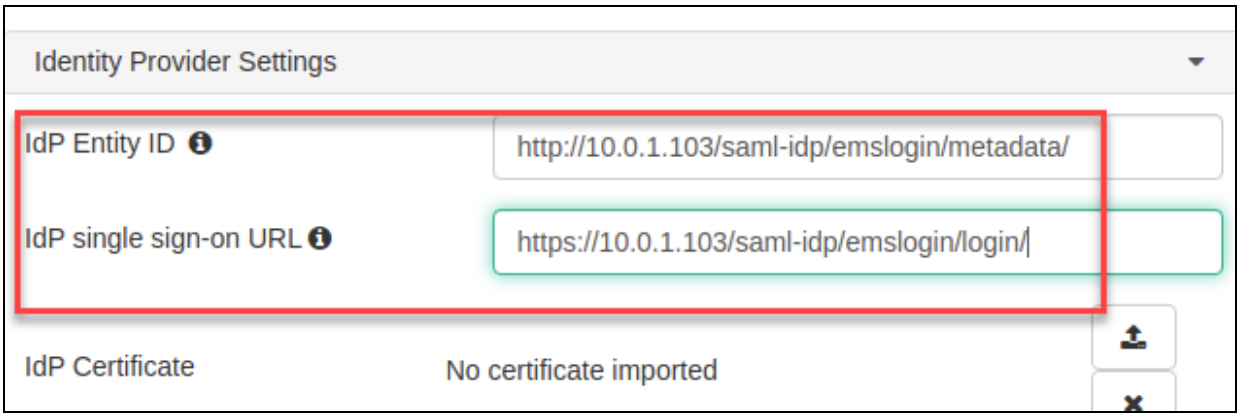


9. Click **Save**.
10. Select the **EMS-Login** SP name, click **Edit**, and then in the **IdP Metadata** section, select **emslogin**.



11. In the **IdP entity id** field, copy the value, and then on the FortiClient GUI EMS, paste it in the **IdP Entity ID** field.
12. Return to the FortiAuthenticator GUI, in the **IdP single sign-on URL** field, copy the value, and then on the FortiClient EMS GUI, paste it in the **IdP single sign-on URL** field.





13. In the **IdP Certificate** field, click  to upload the FortiAuthenticator IdP certificate.
14. In the **Certificate** field, click **Browse**, click **Downloads**, and then select the `fac.cer` certificate.
15. Click **Test**.

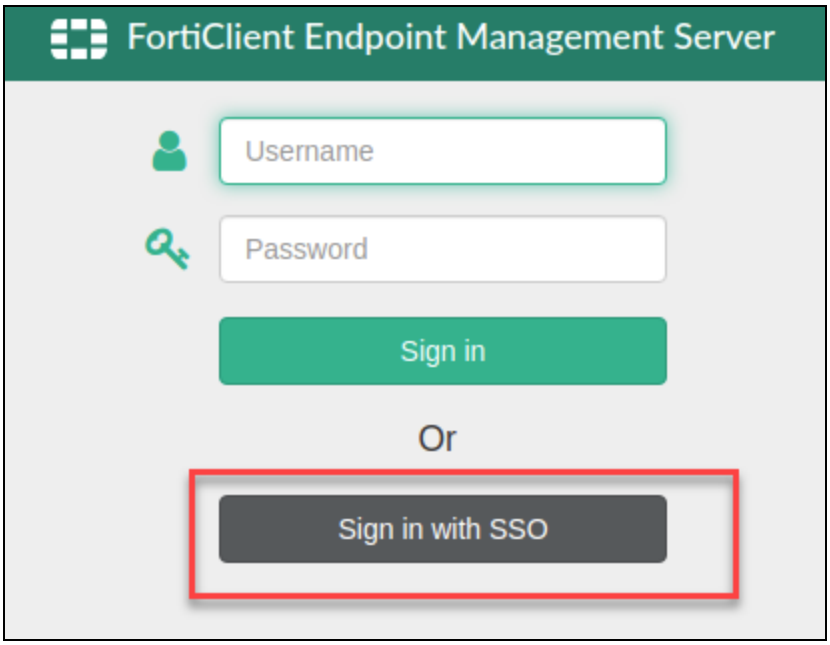
16. Click **Save**.

Test SAML SSO Authentication for FortiClient EMS Login

You will test the SSO SAML server integration on FortiClient EMS. You will log in to FortiClient EMS using an SSO SAML account.

To test SAML SSO authentication for FortiClient EMS login

1. Open a Chrome incognito window, and then in **Bookmarks**, select the **HQ-EMS** login page bookmark.
2. Click **Accept**.
3. Click **Sign in with SSO**.



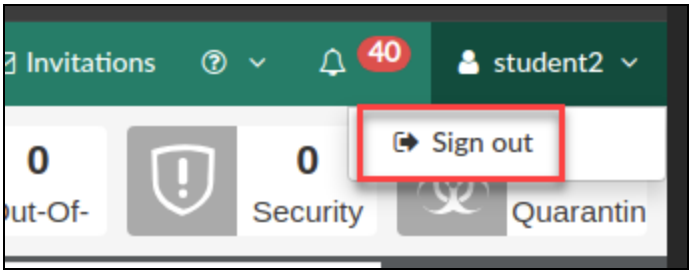
4. In the **Username** field, type `student2`, and then click **Next**.
5. In the **Password** field, type `Password2!`, and then click **Login**.

The **student2** user is already configured on FortiAuthenticator as a local user.

The **student2** user is assigned a restricted administrator role, which has no permissions enabled.

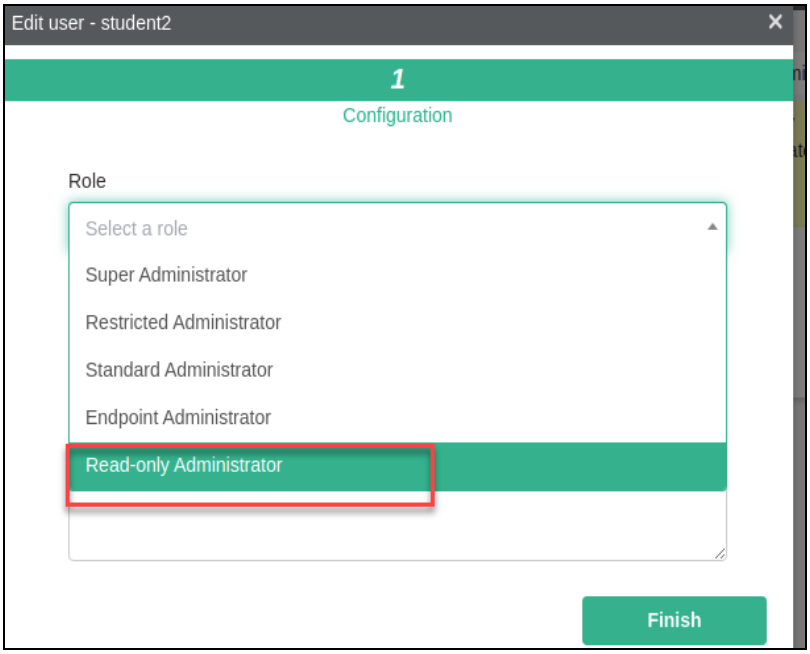
IdP administrators will have a restricted administrator role, and that cannot be changed through the SAML attributes on FortiClient EMS.

6. In the upper-right corner, click the **student2** icon, and then select **Sign out**.



7. Return to the FortiClient EMS session in the main Chrome browser, and then click **Administration** > **Admin Users**.
   There is an entry with the **student2** name and **Restricted administrator** role.

8. Select **student2**, and then click **Edit**.
9. In the **Role** field, select **Read-only Administrator** to change the role.



10. Click **Finish**.
11. Return to the Chrome incognito window, and then click **Accept**.
12. Click **Sign in with SSO**.
13. Click **System Settings** > **EMS Server Certificates**.
    The **Add** option is not available because this is a read-only profile.
14. Close Chrome.

Lab 3: FortiClient Deployment

In this lab, you will learn about the deployment of FortiClient on endpoints.

Objectives

- Create a FortiClient installer
- Create an invitation code
- Install FortiClient on a Linux endpoint
- Import endpoints to FortiClient EMS from Windows AD
- Install FortiClient on AD endpoints
- Register FortiClient on FortiClient EMS using an invitation code

Time to Complete

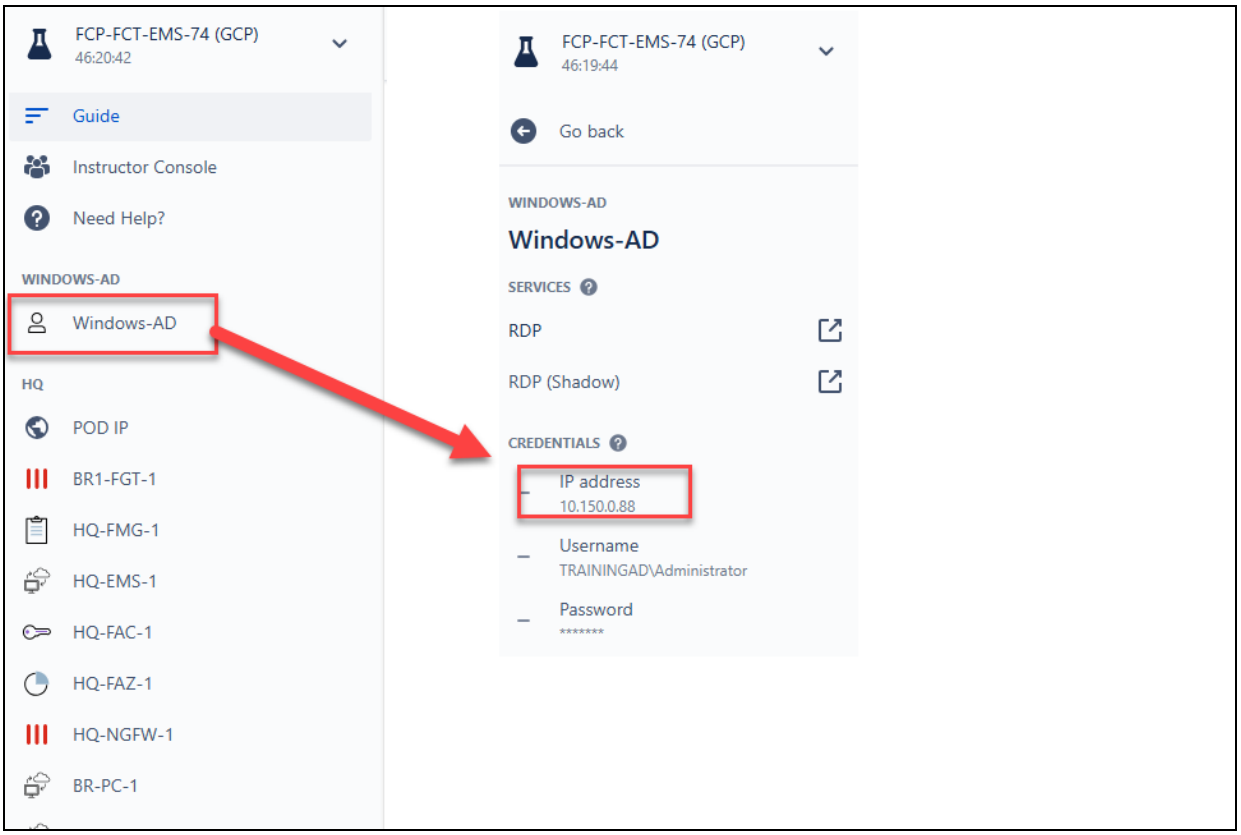
Estimated: 40 minutes

Prerequisites

Before you begin this lab, you must identify the IP address of the Windows-AD VM.

To identify the IP address of the Windows-AD VM

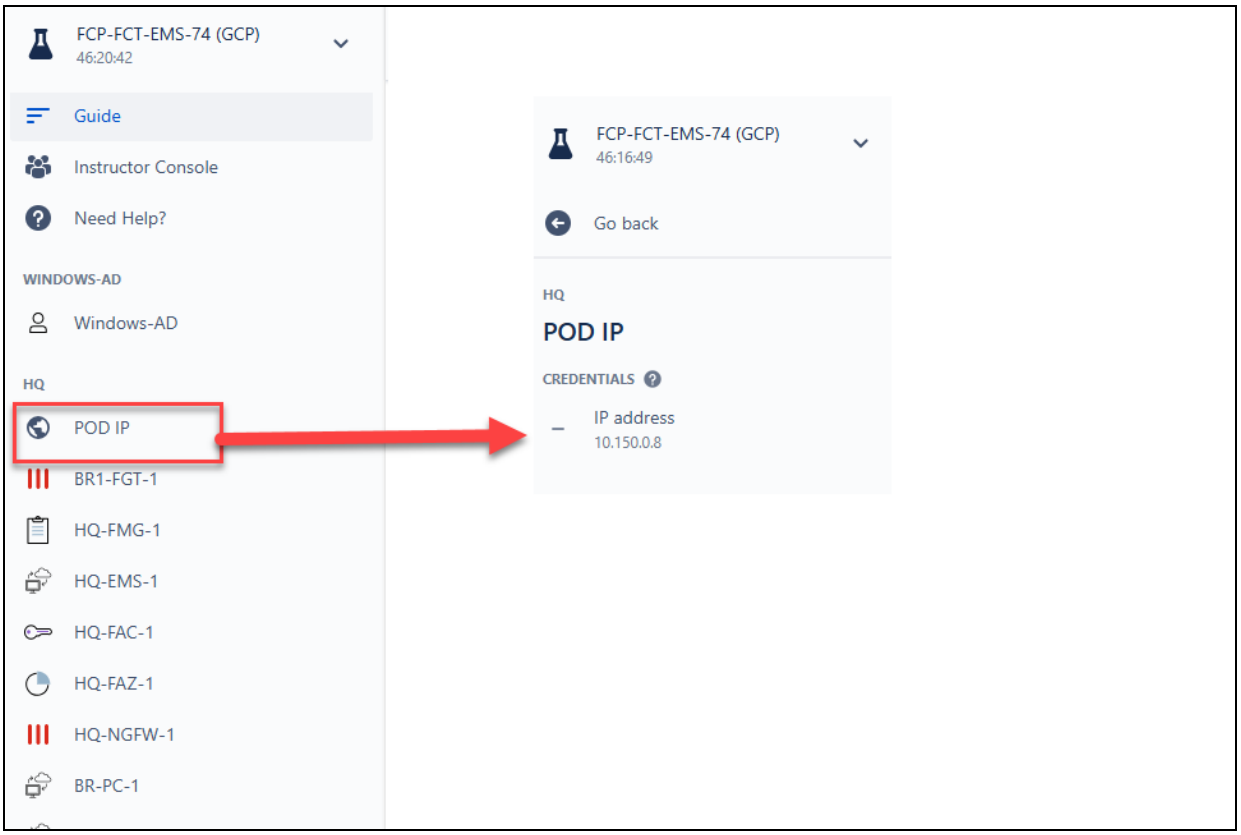
1. On the Fortinet Training Institute side bar, click **Windows-AD**.
2. In the **CREDENTIALS** section, under **IP address**, locate and make a note of the IP address. You will use this address where the lab asks for <Windows-AD IP address>.



Before you begin this lab, you must identify the IP address of the FortiClient EMS.

To identify the IP address of the FortiClient EMS

1. On the Fortinet Training Institute side bar, click **POD IP**.
2. In the **CREDENTIALS** section, under **IP address**, locate and make a note of the IP address. You will use this address where the lab asks for <FortiClient EMS IP address>.

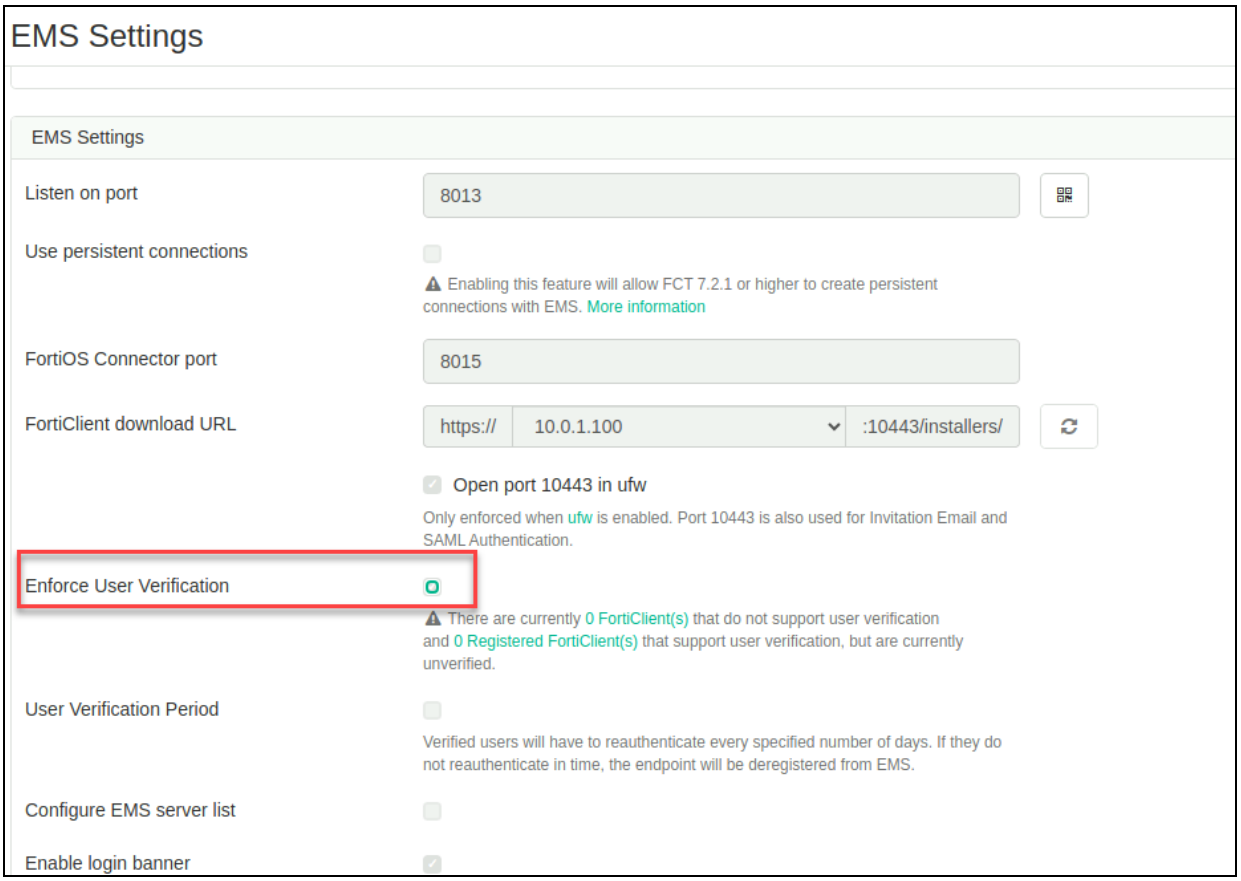


Exercise 1: Creating a FortiClient Installer and an Invitation

In this exercise, you will create an installer for deploying FortiClient on endpoints and an invitation code.

To create an installer

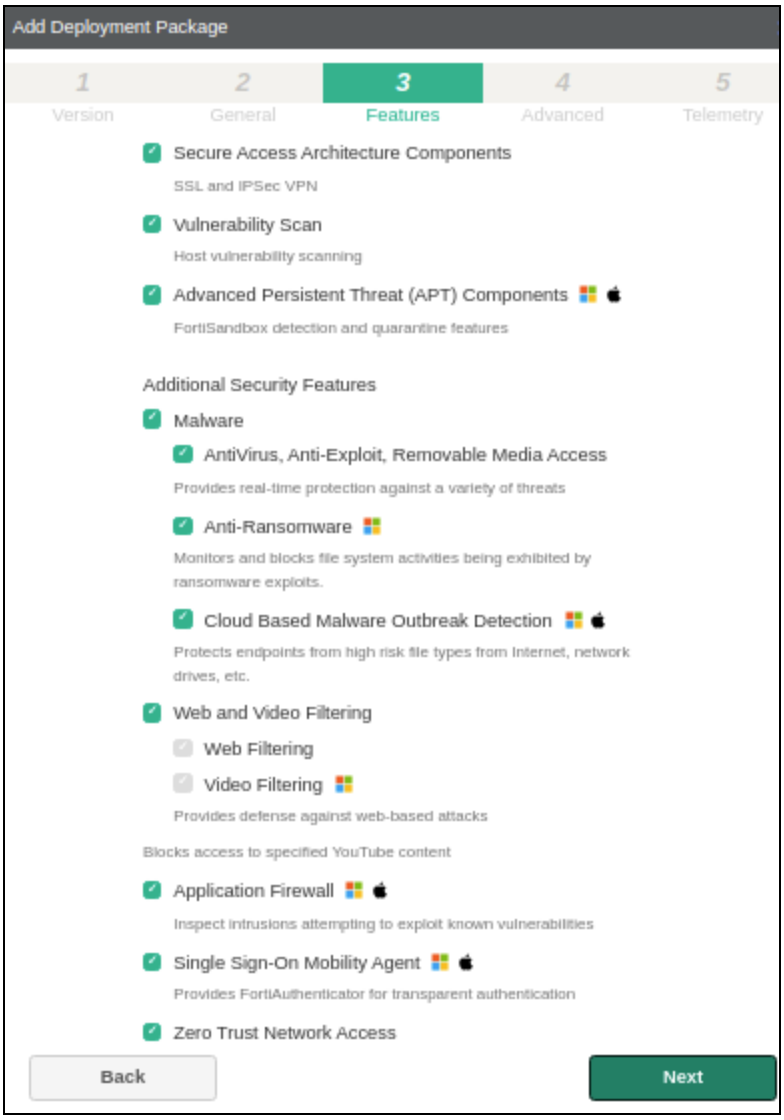
1. On the HQ-EMS-1 VM, log in to the FortiClient EMS GUI.
2. Click **System Settings** > **EMS Settings**, clear the **Enforce User Verification** checkbox, and then click **Save**.



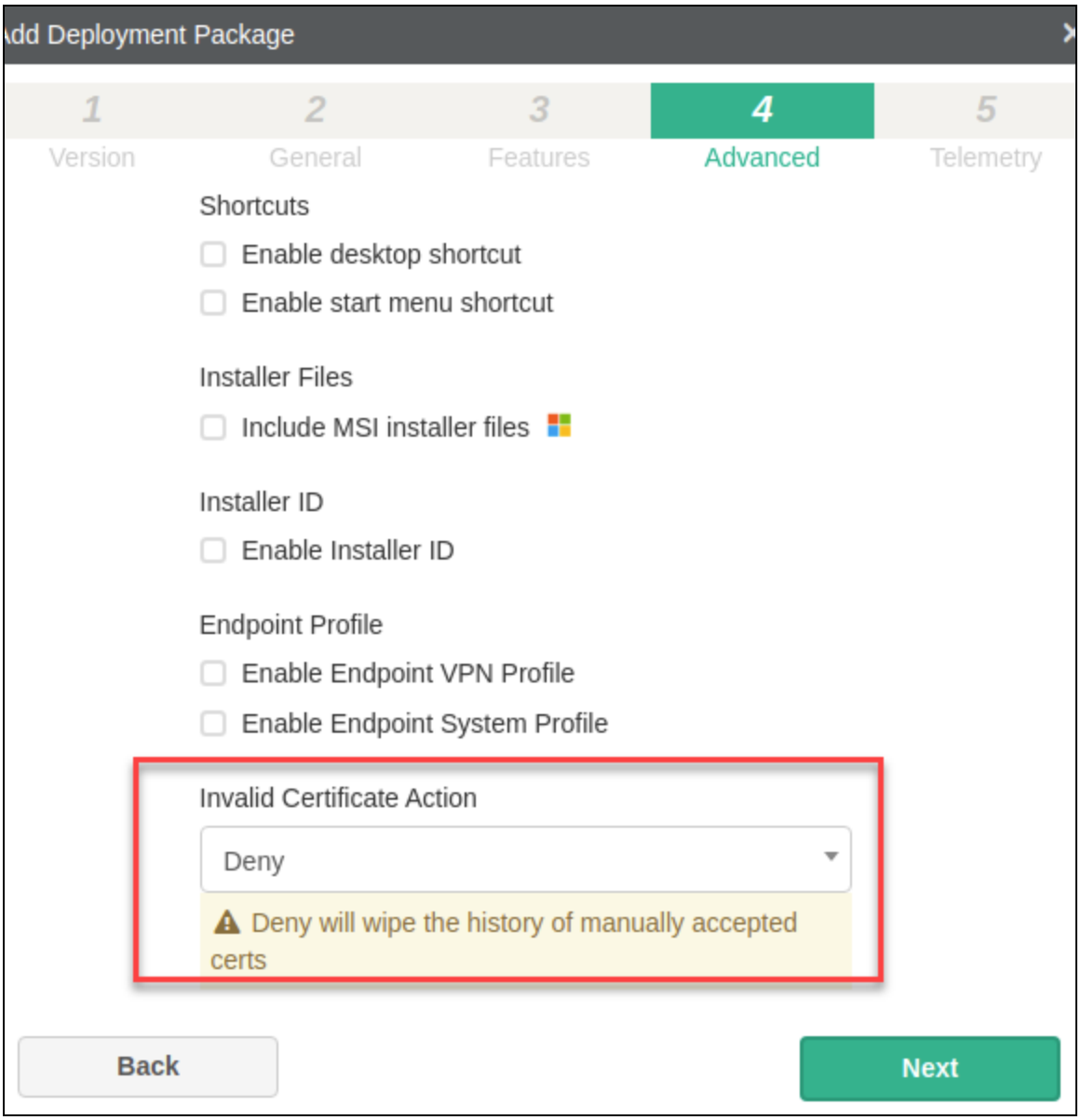
In a real-world environment, you should enable the **Enforce User Verification** setting for an additional layer of security. In this lab environment, you are disabling it so FortiClient can connect without an invitation code.

3. Click **Deployment & Installers** > **FortiClient Installer**, and then click **Add** to open a new window.
4. On the **Version** tab, keep the default settings for **Installer Type** and **Release**, in the **Patch** field, select **7.4.0**, and then click **Next**.
5. On the **General** tab, in the **Name** field, type `fctinstaller`, and then click **Next**.
6. On the **Features** tab, in the **Basic Security Features** section, ensure that the **Secure Access Architecture Components**, **Vulnerability Scan**, and **Advanced Persistent Threat (APT) Components** checkboxes are selected.

7. In the **Additional Security Features** section, ensure that the **Malware**, **Web and Video Filtering**, **Application Firewall**, **Single Sign-On Mobility Agent**, and **Zero Trust Network Access** checkboxes are selected.



8. Click **Next**.
9. On the **Advanced** tab, in the **Invalid Certificate Action** field, select **Deny**, and then keep the default values for the other settings.



10. Click **Next**.
11. On the **Telemetry** tab, notice that it shows that FortiClient will be managed by <EMS host name and FQDN address>.
12. Click **Finish** to add the deployment package to FortiClient EMS.

It takes a few minutes for the FortiClient installer to be created because the cloud controller service generates FortiClient installers for Windows, macOS, and Linux operating systems.

To create an invitation

1. Continuing on the FortiClient EMS GUI, click **User Management** > **Invitations**, and then click **Add** to open a new window.

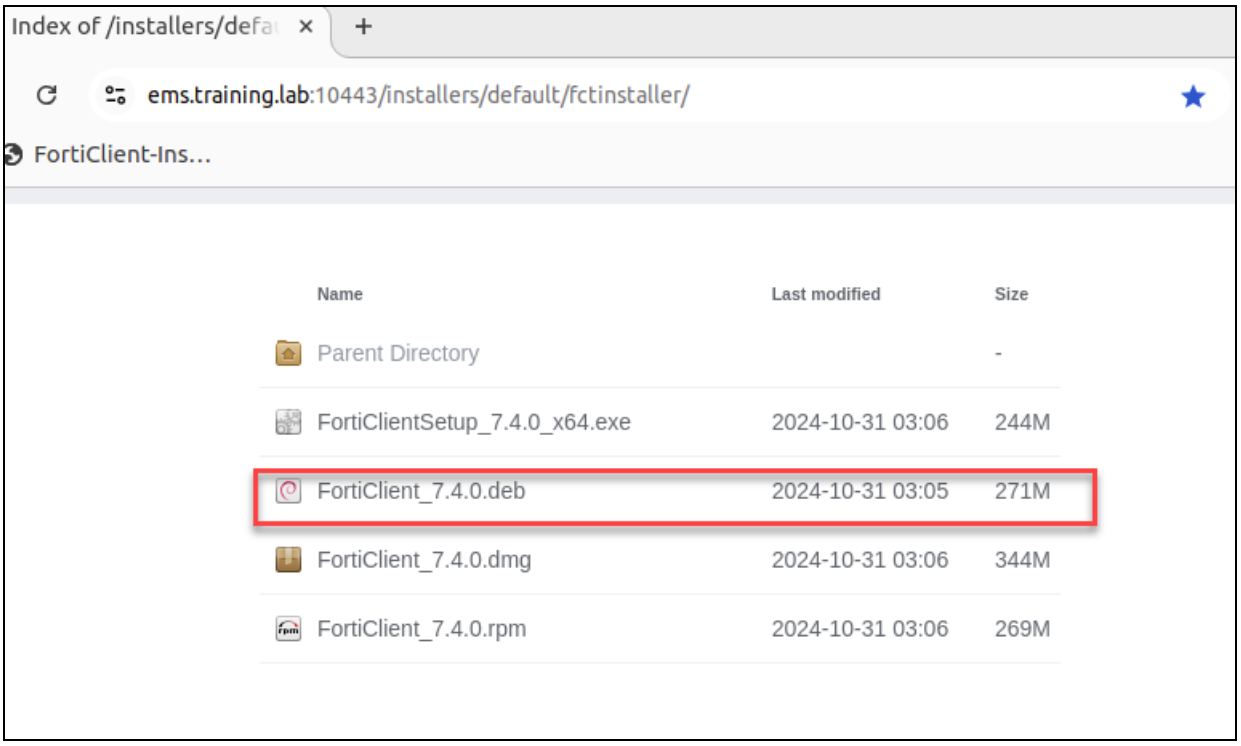
2. In the **Name** field, type `FortiClient Invitation`.
3. In the **EMS Listen Address field**, select **ems.training.lab:8013**.
4. Click **Save** to save the invitation.

Exercise 2: Installing FortiClient on Ubuntu Linux Endpoints

In this exercise, you will use the installer link to download the installation file and install FortiClient on the HQ-PC-1 VM.

To install FortiClient

1. On the HQ-PC-1 VM, open Google Chrome.
2. On the bookmarks bar, click **FortiClient-Installer** to access the FortiClient installer download page.
3. Click `FortiClient_7.4.0.deb` to download the file.

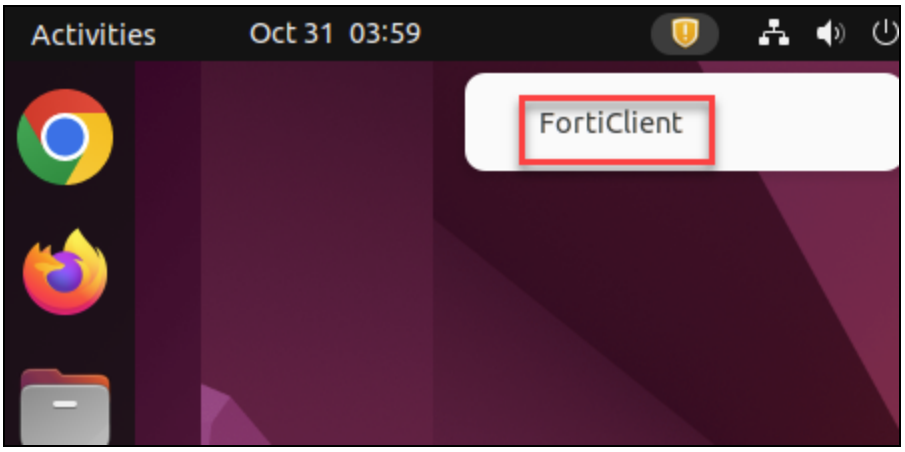


4. Once the download completes, close the browser.
5. Click the **Terminal** icon to open the terminal window.
6. Enter the following command:
   ```
   sudo apt-get install /home/admin/Downloads/FortiClient_7.4.0.deb -y
   ```
7. Enter the following sudo password:
   ```
   Fortinet1!
   ```

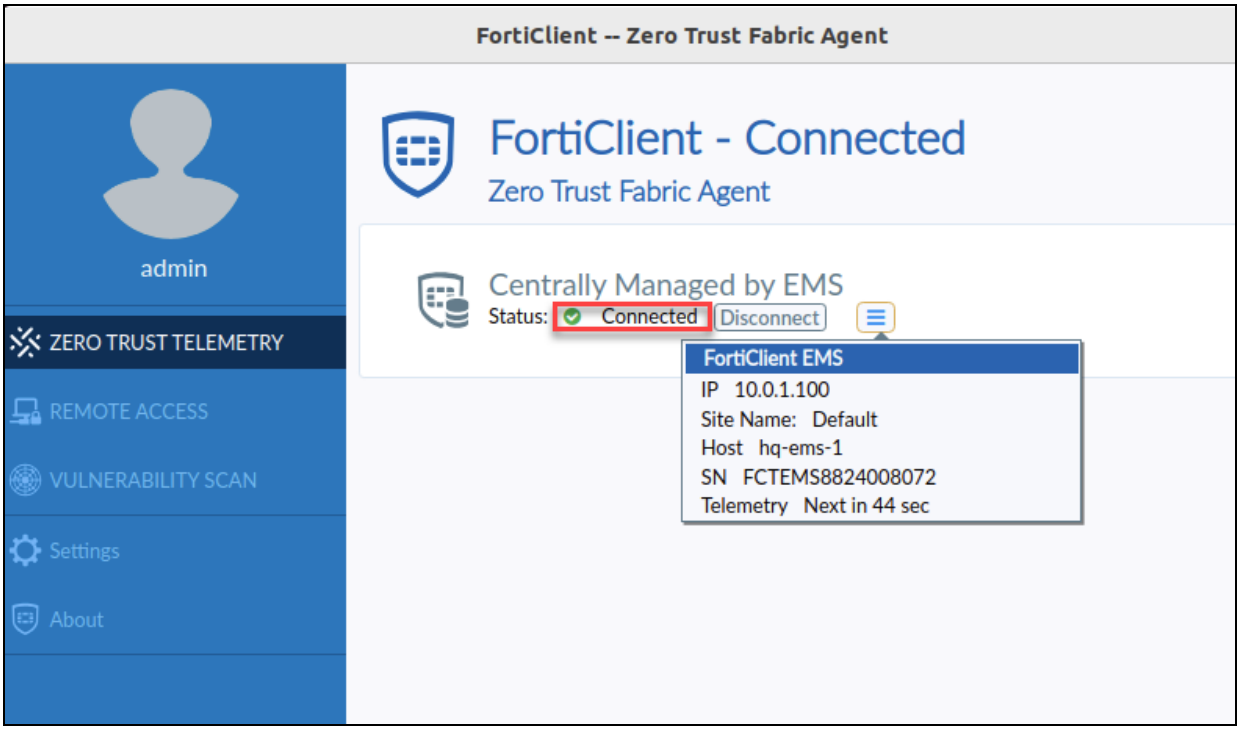
This command installs FortiClient on the Ubuntu Linux endpoint.

A permission denied error message appears at the end of the installation—you can ignore this error message.

8. Click the FortiClient icon, and then click **FortiClient** to open the FortiClient console.



FortiClient is autoregistered to FortiClient EMS.



In this lab environment, you use FortiAuthenticator as the local CA server and the root certificate is preinstalled on the Ubuntu VMs.

Exercise 3: Importing Endpoints to FortiClient EMS

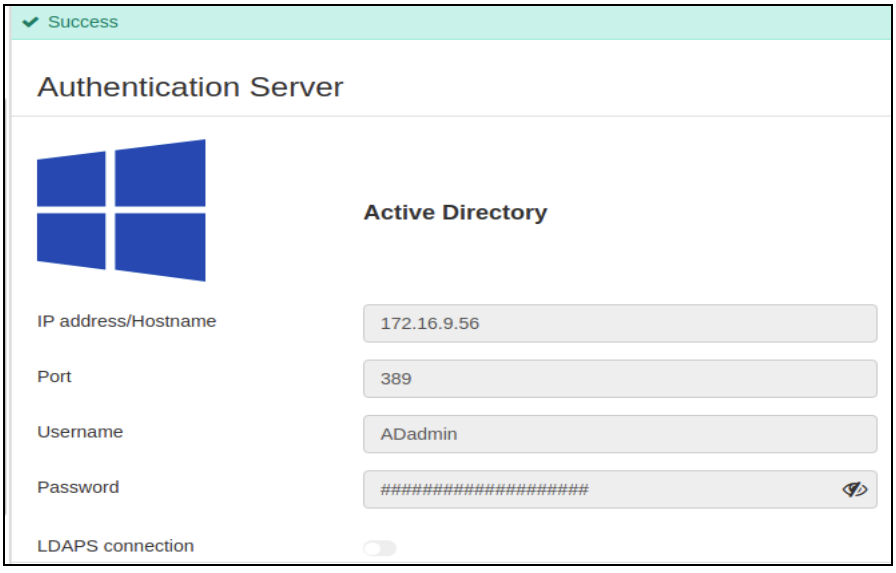
In this exercise, you will manually import endpoints from an AD server into the FortiClient EMS server. You will import and synchronize information about computer accounts with an LDAP or LDAPS service. You will also add endpoints by identifying the endpoints that are part of an AD domain server.

To add an authentication server on FortiClient EMS

1. On the HQ-EMS-1 VM, log in to the FortiClient EMS GUI.
2. Click **Administration** > **Authentication Servers**, click **Add** > **ADDS** to open the **Authentication Server** window, and then configure the following settings:

Field	Value
IP address/Hostname	<Windows-AD IP address> This is the IP address of the Windows-AD VM. For more information, see the prerequisites at the beginning of this lab.
Port	389
Username	ADadmin
Password	Fortinet1!
LDAPS connection	Disable this setting. In a real-world environment, you should use secure LDAP (LDAPS) instead of LDAP. LDAPS allows for the encryption of LDAP data in transit when a directory bind is being established, which protects against credential theft.

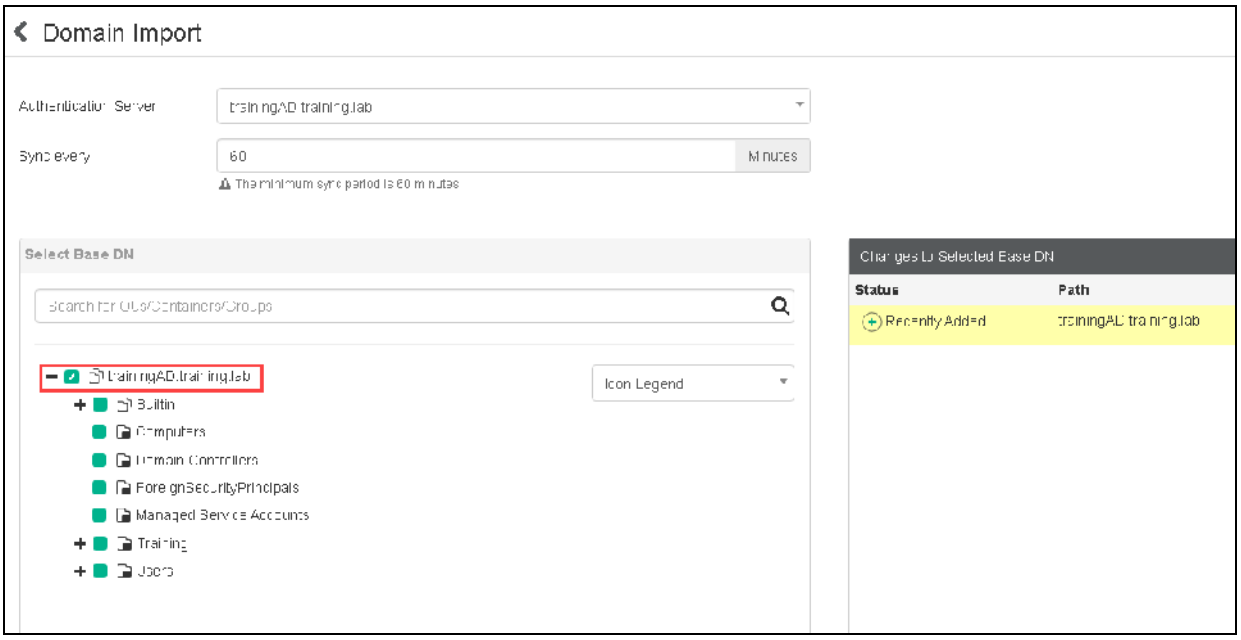
3. Click **Test** to check the connectivity.



4. Click **Save** to save the authentication server.

To add endpoints using an AD domain server

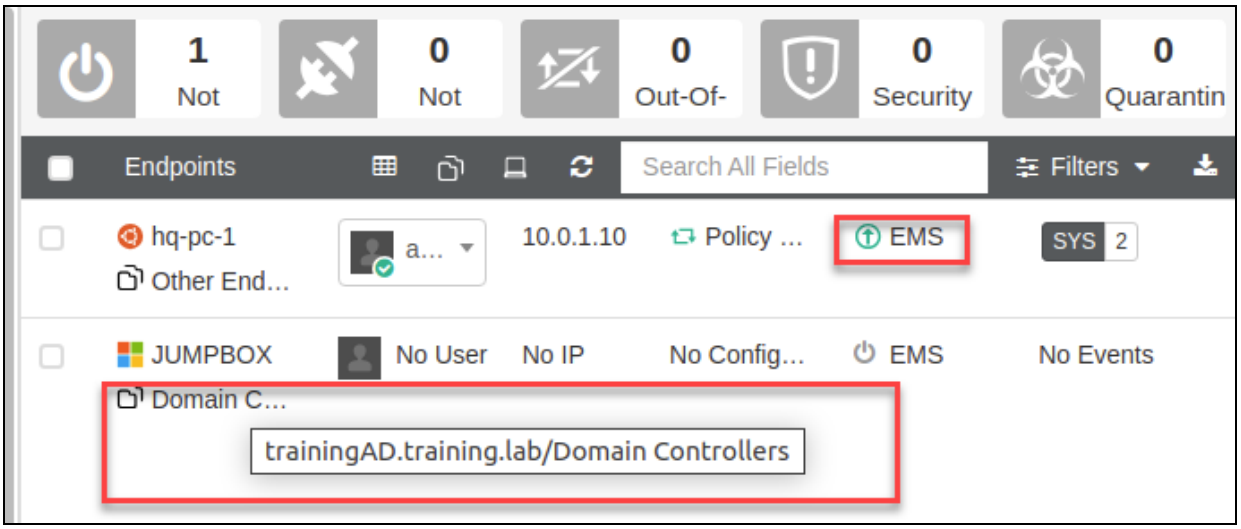
1. Continuing on the FortiClient EMS GUI, click **Endpoints** > **Manage Domains**, and then click **Add** > **ADDS** to open the **Domain Import** window.
2. In the **Authentication Server** field, select **trainingAD.training.lab**.
   This populates the domain user and computer groups.
3. In the **Select Base DN** section, select the **trainingAD.training.lab** checkbox to add all the groups.



4. Click **Save** to import all the endpoints and users.

You can add the entire domain or an organizational unit (OU) from the domain. After you import endpoints from an AD server, you can edit the endpoints. These changes are not synchronized with the AD server.

5. Click **Endpoints** > **All Endpoints**.
   There are two endpoints. The **hq-pc-1** Linux endpoint is managed by FortiClient EMS, which was configured earlier in this lab. The **JUMPBOX** Windows endpoint was imported into FortiClient EMS through AD integration and belongs to the **trainingAD.training.lab/Domain Controllers** OU.

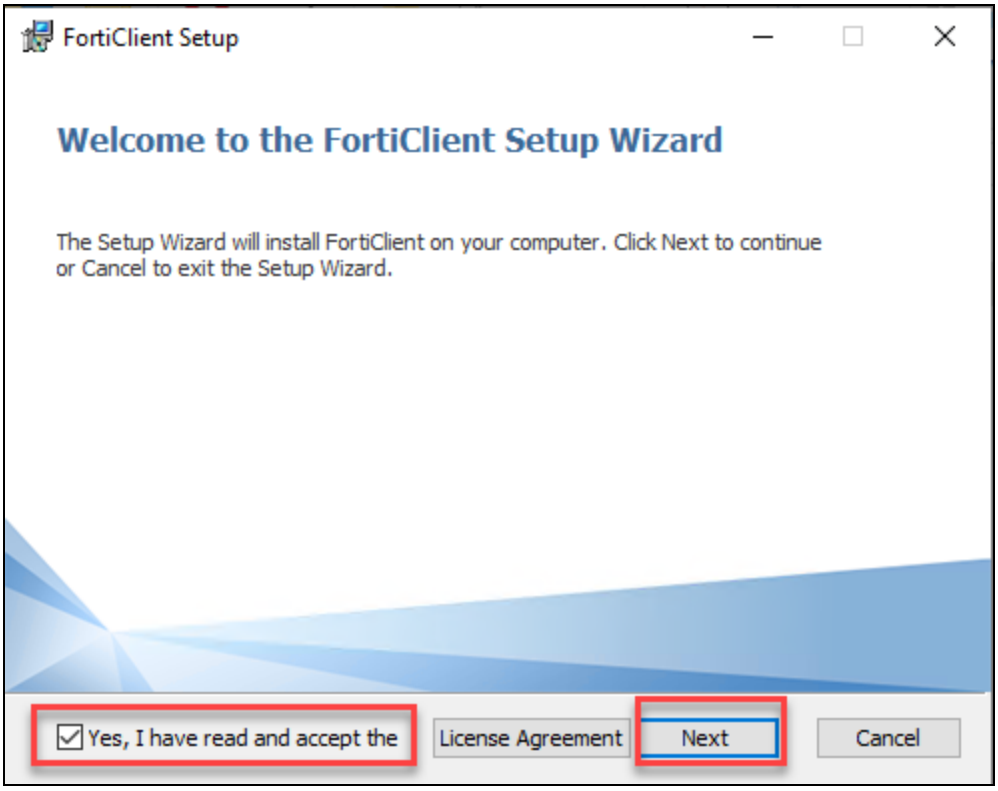


Exercise 4: Installing FortiClient on AD Endpoints

In this exercise, you will install FortiClient on the AD endpoint that was added from the AD domain server. FortiClient EMS no longer supports initial FortiClient installations to AD domain-joined endpoints. You will install FortiClient using the installation file that is provided.

To install FortiClient

1. On the Windows-AD VM, on the desktop, open the **Resources** folder.
2. Double-click the `FortiClient.msi` file.
3. In the **FortiClient Setup** window, select the checkbox to accept the license agreement, and then click **Next** to start the installation.

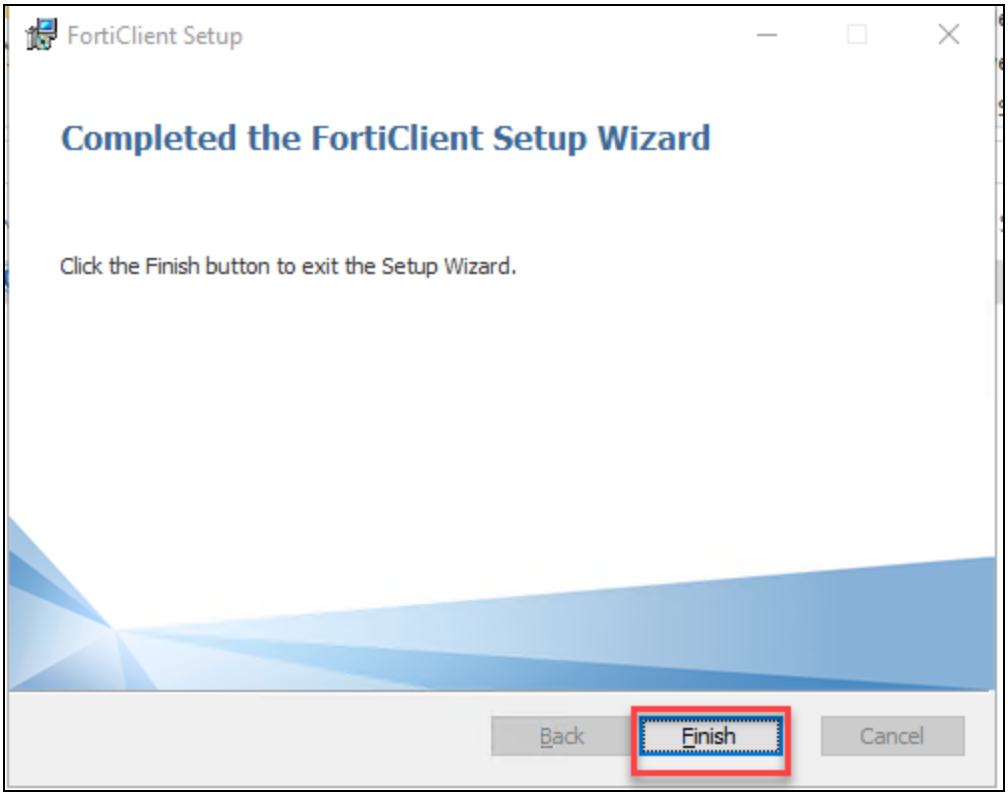


4. In the **Choose Setup Type** window, ensure that the **Secure Remote Access**, **Vulnerability Scan**, **Advanced Persistent Threat (APT) Components**, **Sandbox detection**, **Cloud Scan**, and **ZTNA** checkboxes are selected.
5. Click **Next** to continue.
6. In the **Additional Security Features** window, select **Antivirus**, **Web Filtering**, and **Anti-Ransomware** checkboxes.
7. Click **Next** to continue.

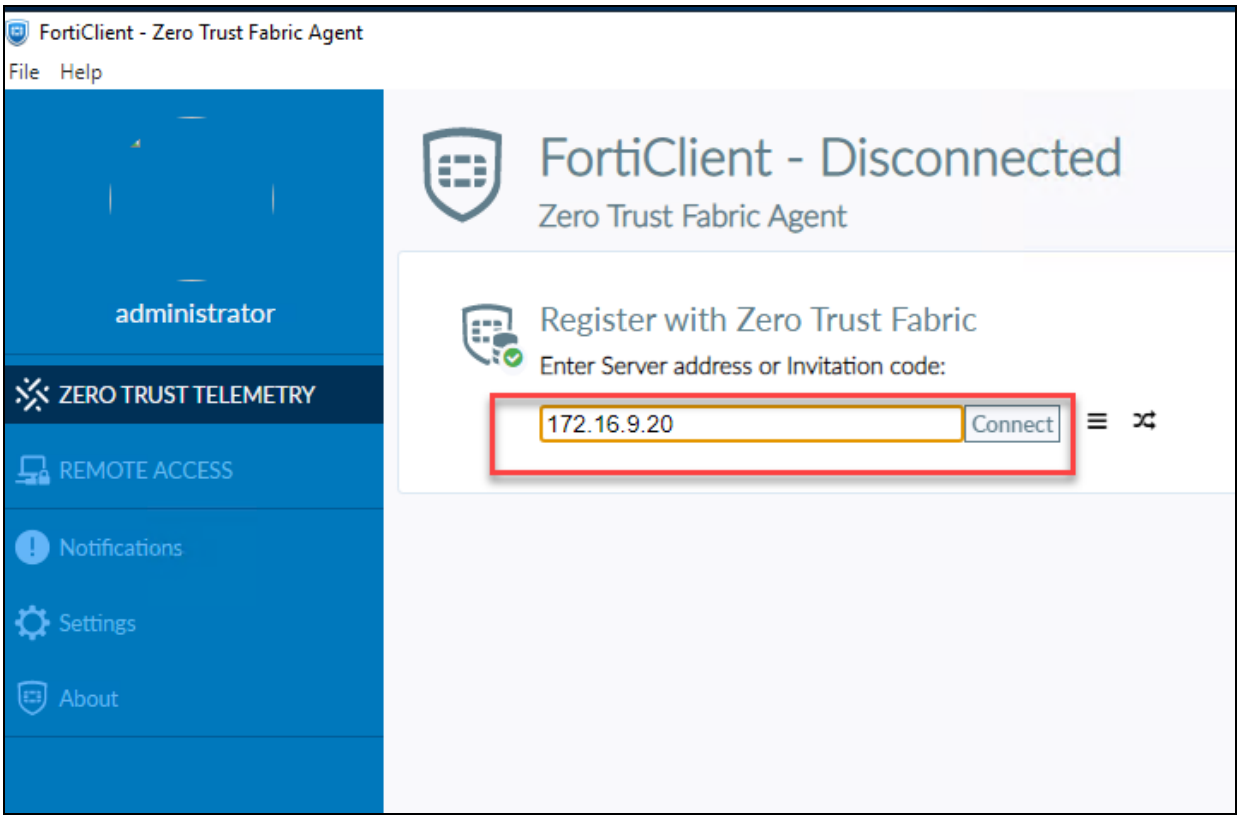
   By default, the FortiClient files are installed in the following location: **C:\Program Files\Fortinet\FortiClient**.
8. Click **Next** to continue.
9. Click **Install** to continue.

   The setup wizard installs FortiClient on the Windows-AD VM.

10. After the FortiClient installation is complete, click **Finish**.



11. Open the FortiClient console.
12. In the **Enter Server address or Invitation code** field, type the <FortiClient EMS IP address> (located in the lab prerequisites).



13. Click **Connect**.
14. In the **Invalid certificate detected** window, click **Accept**.

In a real-world environment, the certificate that the FortiClient EMS uses will be signed with an FQDN or a static IP address. The certificates should be imported into the endpoint to avoid the certificate trust errors. In this lab environment, a dynamic IP address is used instead of an FQDN or a static IP address, which is causing the certificate trust error.

FortiClient is registered to FortiClient EMS using the IP address of FortiClient EMS.

In a real-world environment, the FortiClient EMS administrator has the following options to distribute the FortiClient installer:

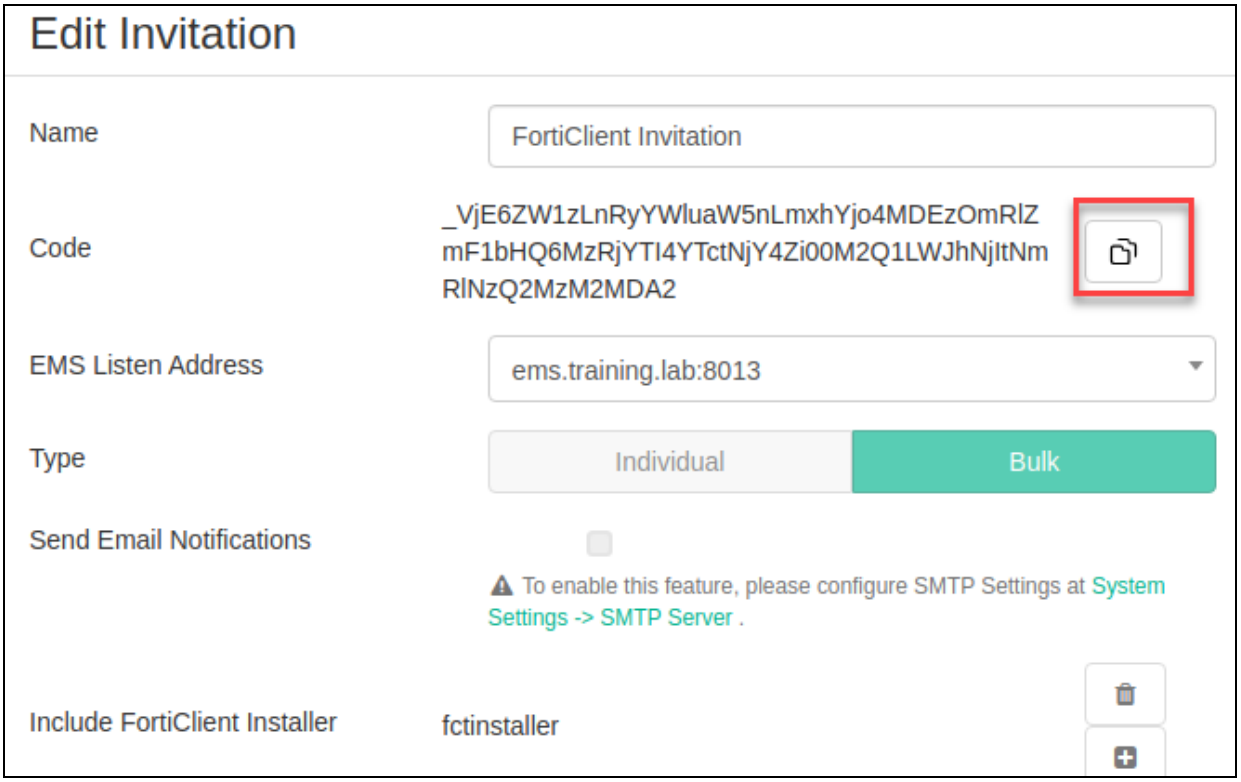
- Download the preconfigured installer with the included invitation code, and install FortiClient on endpoints using third-party tools such as Intune or MDM.
- Send an email that contains the FortiClient installer and invitation code.
- Download the unconfigured installer with no invitation code, install FortiClient manually or using third-party tools, and provide the invitation code.

Exercise 5: Registering FortiClient on FortiClient EMS Using an Invitation Code

You will register a Linux endpoint on FortiClient EMS using an invitation code.

To copy the invitation code

1. On the BR-PC-1 VM, open Chrome.
2. On the bookmarks bar, click **HQ-EMS-1** to access the FortiClient EMS GUI.
3. Click **Accept**.
4. Log in to the FortiClient EMS GUI with the following credentials:
   - Username: `student1`
   - Password: `Password1!`
5. Click **User Management** > **Invitations**.
6. In the **FortiClient Invitation**, click **Edit**.
7. In the **Code** field, click the icon to copy the code.



To register FortiClient

1. Continuing on the BR-PC-1 VM, open the FortiClient console.
2. In the **Enter Server address or Invitation code** section, paste the code you copied in the previous procedure.
3. Click **Connect**.

FortiClient is registered to FortiClient EMS using the invitation code of FortiClient EMS.

4. Return to the FortiClient EMS GUI, and then click **Endpoints** > **All Endpoints**.
   You can see that there are three endpoints registered and managed by FortiClient EMS.
5. Close Chrome.

Lab 4: Endpoint Policy Provisioning

In this lab, you will learn about provisioning FortiClient endpoint policies on FortiClient endpoints.

Objectives

- Create an endpoint group and assign it to endpoints using group assignment rules
- Create an endpoint policy and assign it to a workgroup
- Configure on-fabric detection rules

Time to Complete

Estimated: 20 minutes

Exercise 1: Creating an Endpoint Group, a Group Assignment Rule, and an Endpoint Policy

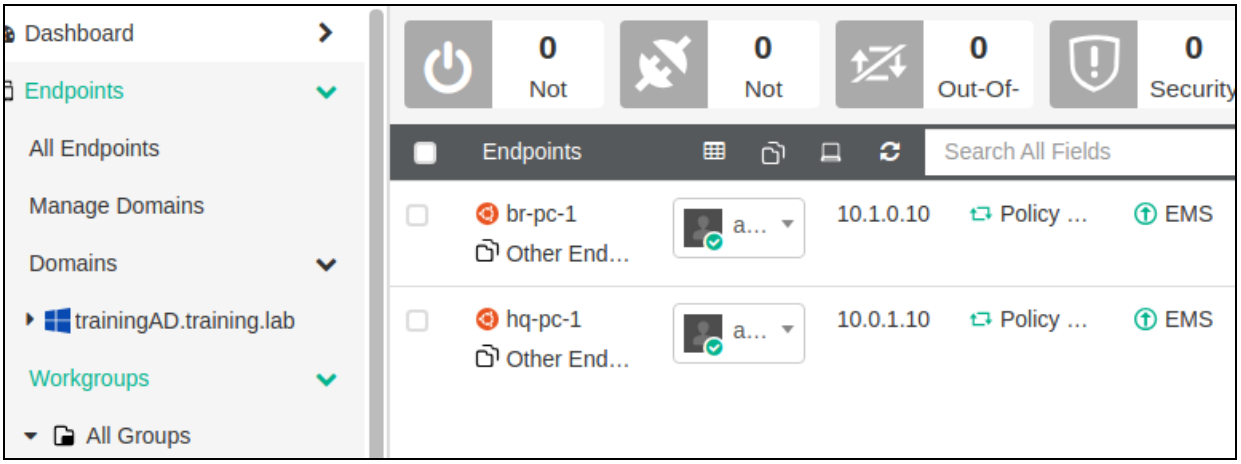
In this exercise, you will create an endpoint group and a group assignment rule, and assign the new endpoint workgroup to an endpoint policy.

Create an Endpoint Group for a Linux Workgroup

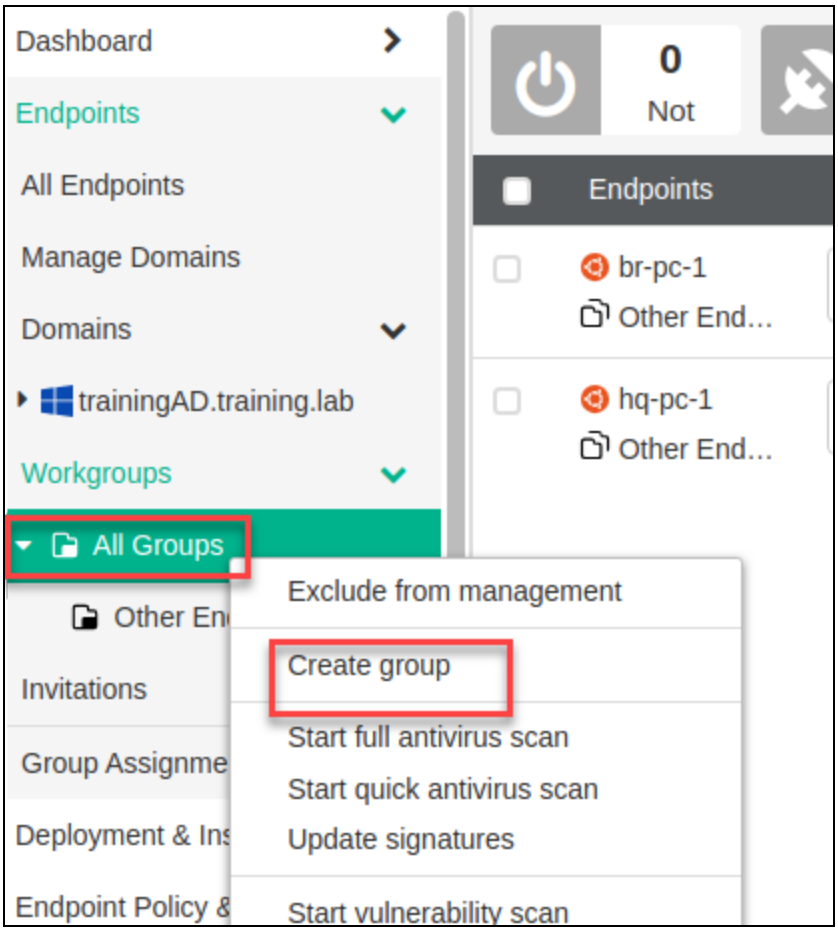
You will create an endpoint group for Linux workgroup endpoints on FortiClient EMS.

To create a group for a Linux workgroup

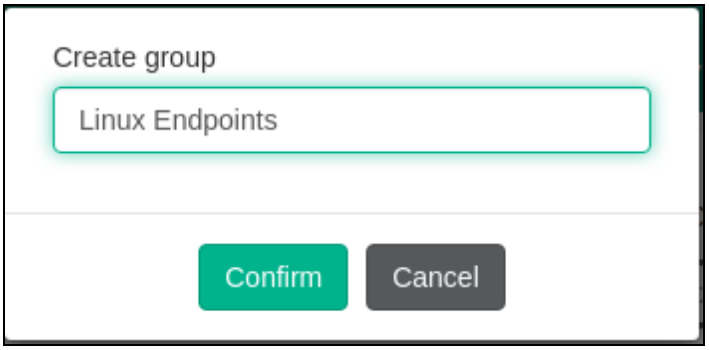
1. On the HQ-EMS-1 VM, log in to the FortiClient EMS GUI.
2. Click **Endpoints** > **Workgroups**.
   By default, all the non-AD workgroup endpoints are in the **Other Endpoints** group.
3. Click **All Groups** > **Other Endpoints** to view the registered endpoints.



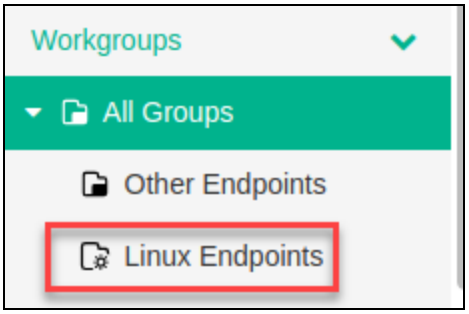
4. In the **Workgroups** drop-down list, right-click **All Groups**, and then click **Create group**.



5. In the **Create group** field, type `Linux Endpoints`.



6. Click **Confirm** to create the group.



Create a Group Assignment Rule for Linux Endpoints

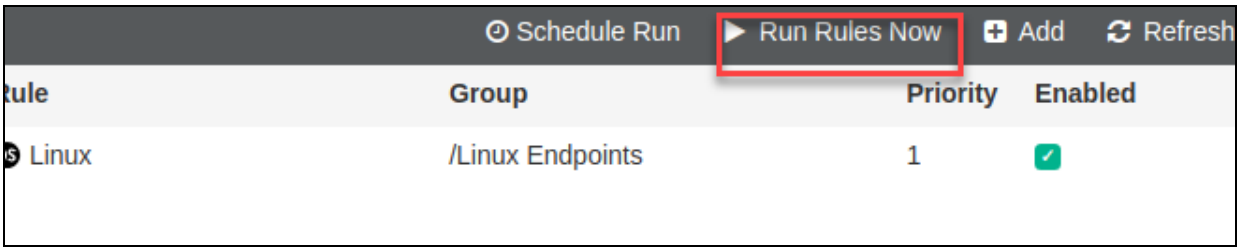
FortiClient EMS can use group assignment rules to automatically place endpoints into custom groups, based on the installer ID, IP address, OS, or AD group of the endpoints. You will create a group assignment rule based on an OS.

To create a group assignment rule

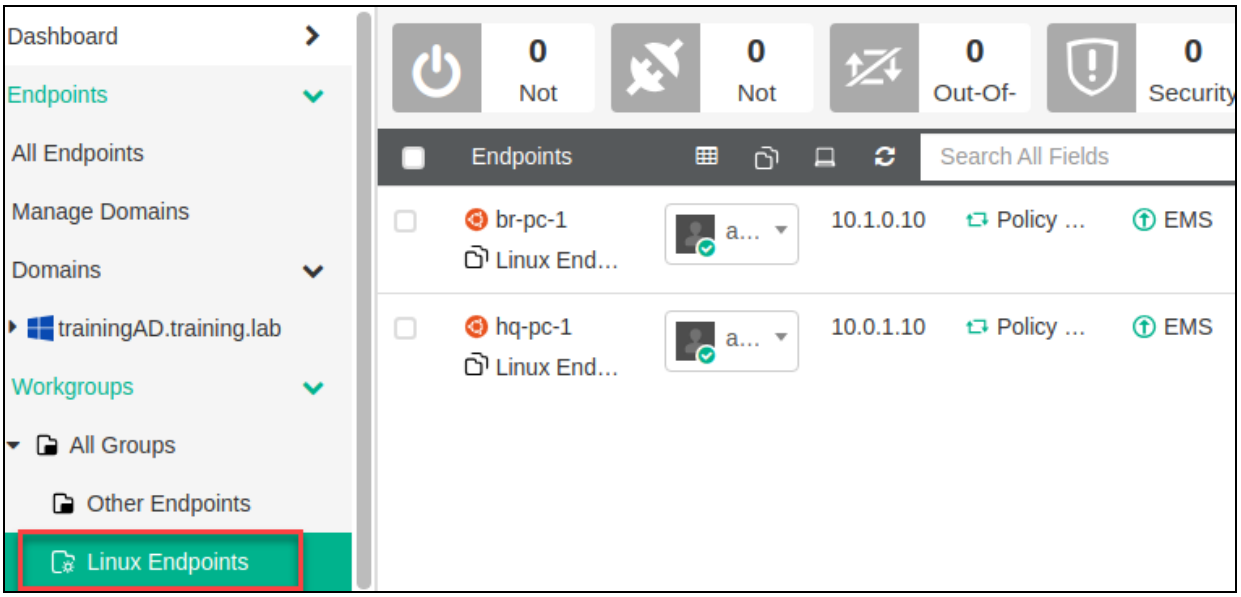
1. On the FortiClient EMS GUI, click **Endpoints** > **Group Assignment Rules**.
2. In the section on the right, click **Add** to create a new rule.
3. In the **Group Assignment Rule** window, configure the following settings:

Field	Value
Type	OS
OS	Linux (*L* must be uppercase or this configuration will not work.)
Group	Linux Endpoints
Enable Rule	Enabled

4. Click **Save** to add a new group assignment rule.
5. In the section on the right, click **Run Rules Now** to add Linux endpoints to the new group.



br-pc-1 and **hq-pc-1** are moved to the **Linux Endpoints** workgroup.



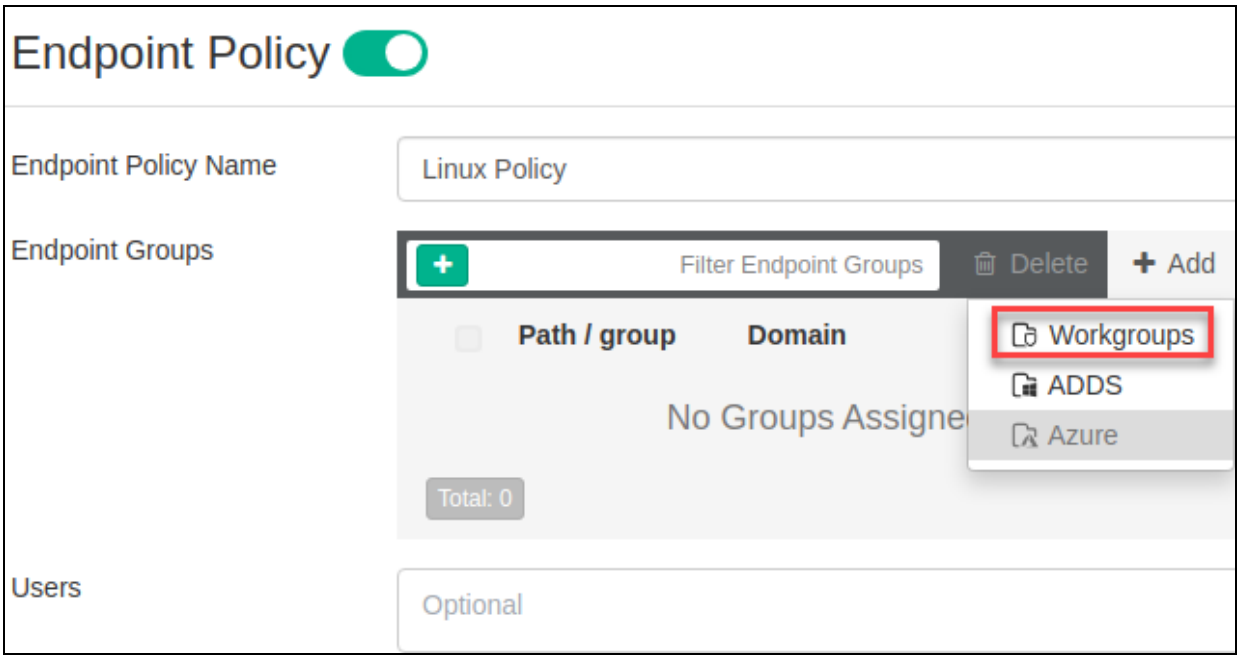
FortiClient EMS automatically places endpoints that do not apply to a group assignment rule into the **Other Endpoints** group.

Create and Assign an Endpoint Policy to a Workgroup

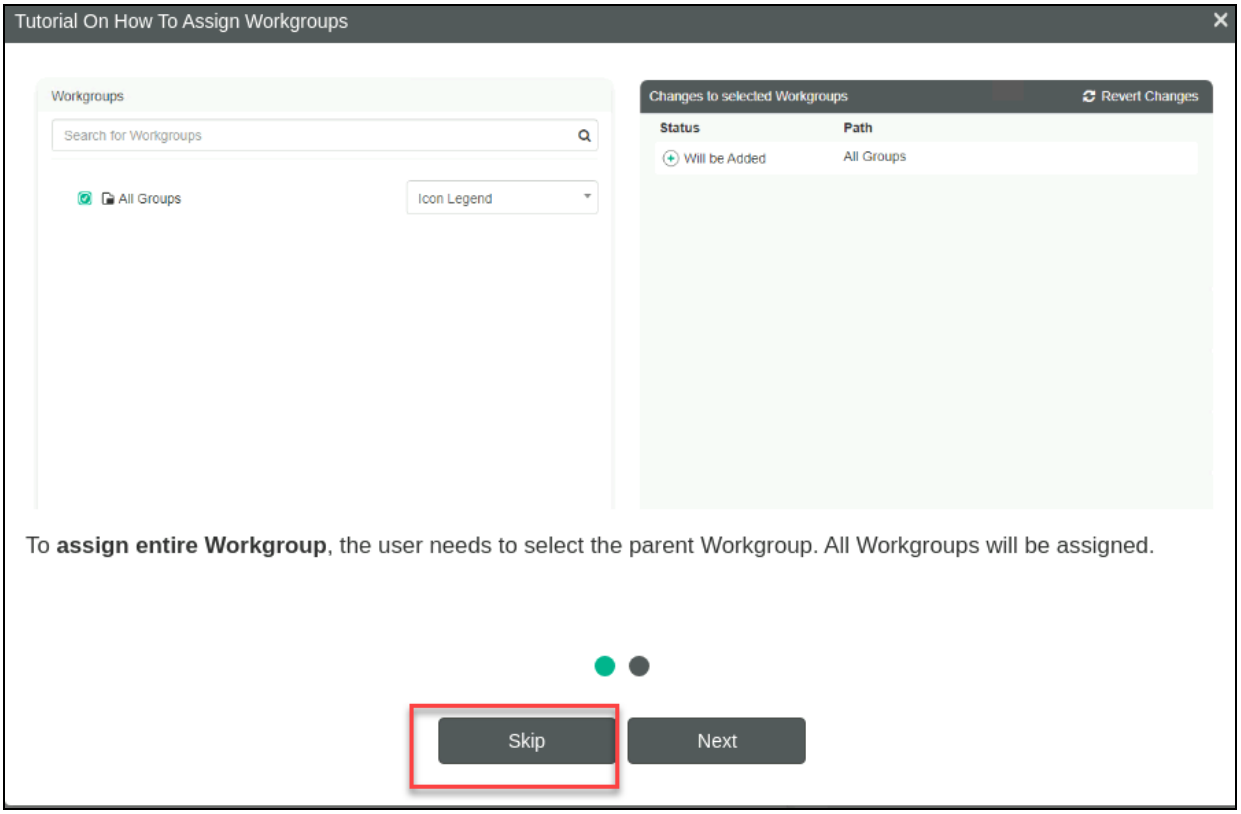
FortiClient EMS endpoint management can assign endpoint policies to endpoint device groups of Windows, macOS, and Linux endpoints.

To create an endpoint policy

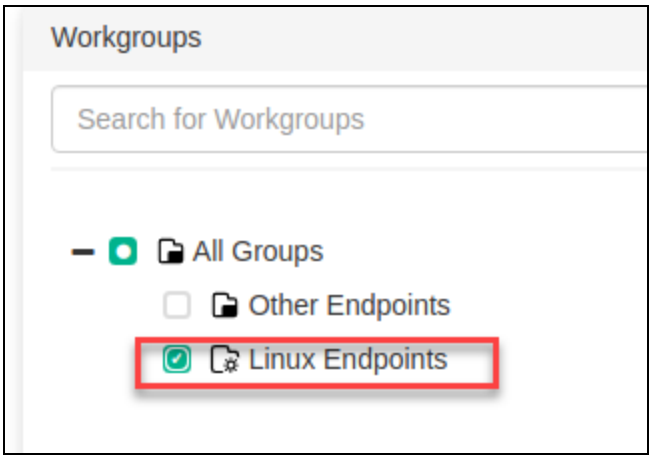
1. Continuing on the FortiClient EMS GUI, click **Endpoint Policy & Components** > **Manage Policies**.
2. Click **Add**.
3. In the **Endpoint Policy Name** field, type `Linux Policy`.
4. In the **Endpoint Groups** field, click **Add** > **Workgroups**.



5. Click **Skip**.

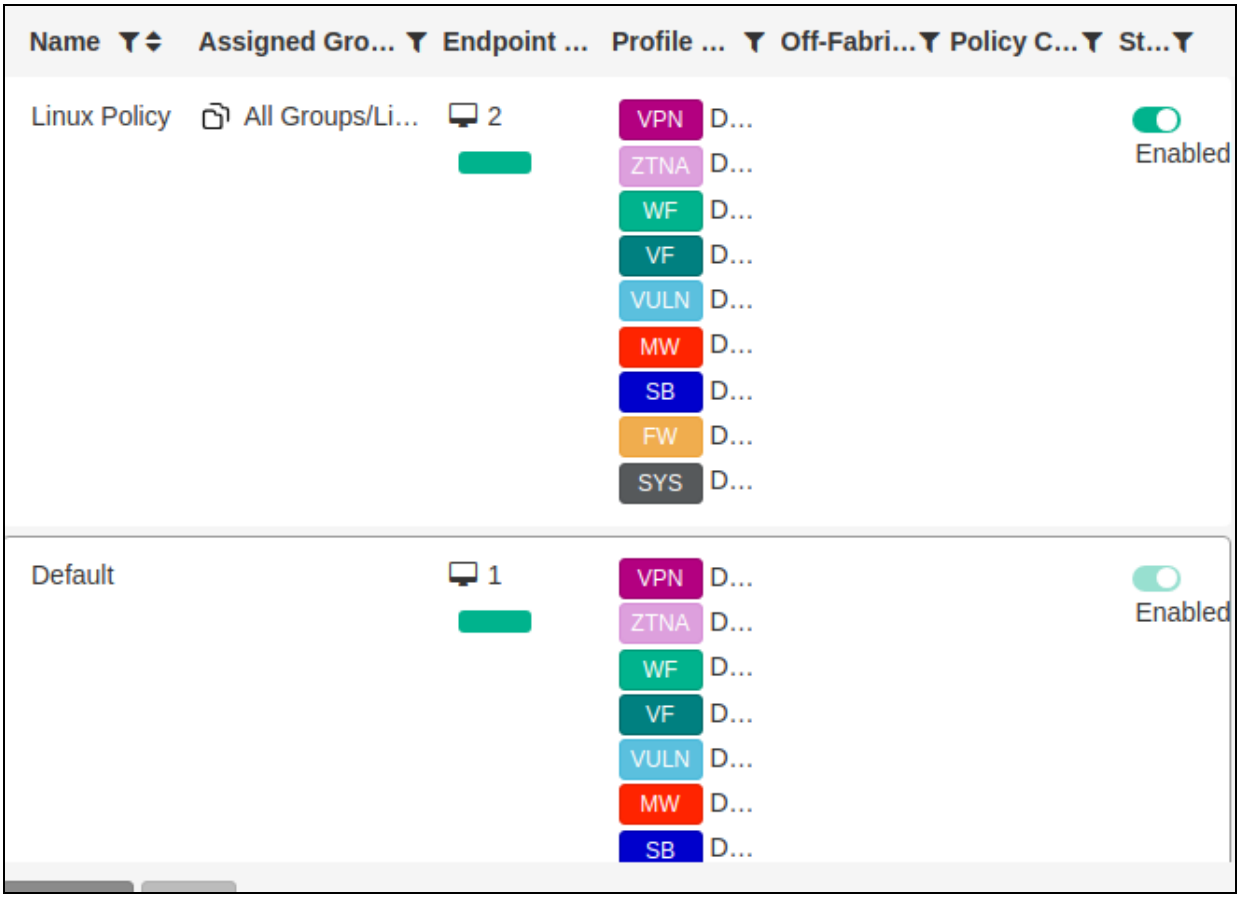


6. Select the **Linux Endpoints** checkbox, and then click **Save**.



7. Click **Save**.

The **Linux Endpoints** workgroup is managed by the **Linux Policy** endpoint policy, while the Windows AD endpoint is still managed by the **Default** endpoint policy.



FortiClient EMS automatically manages endpoints using the **Default** policy if they are not assigned to specific endpoint policies.

Exercise 2: Configuring On-Fabric Detection Rules

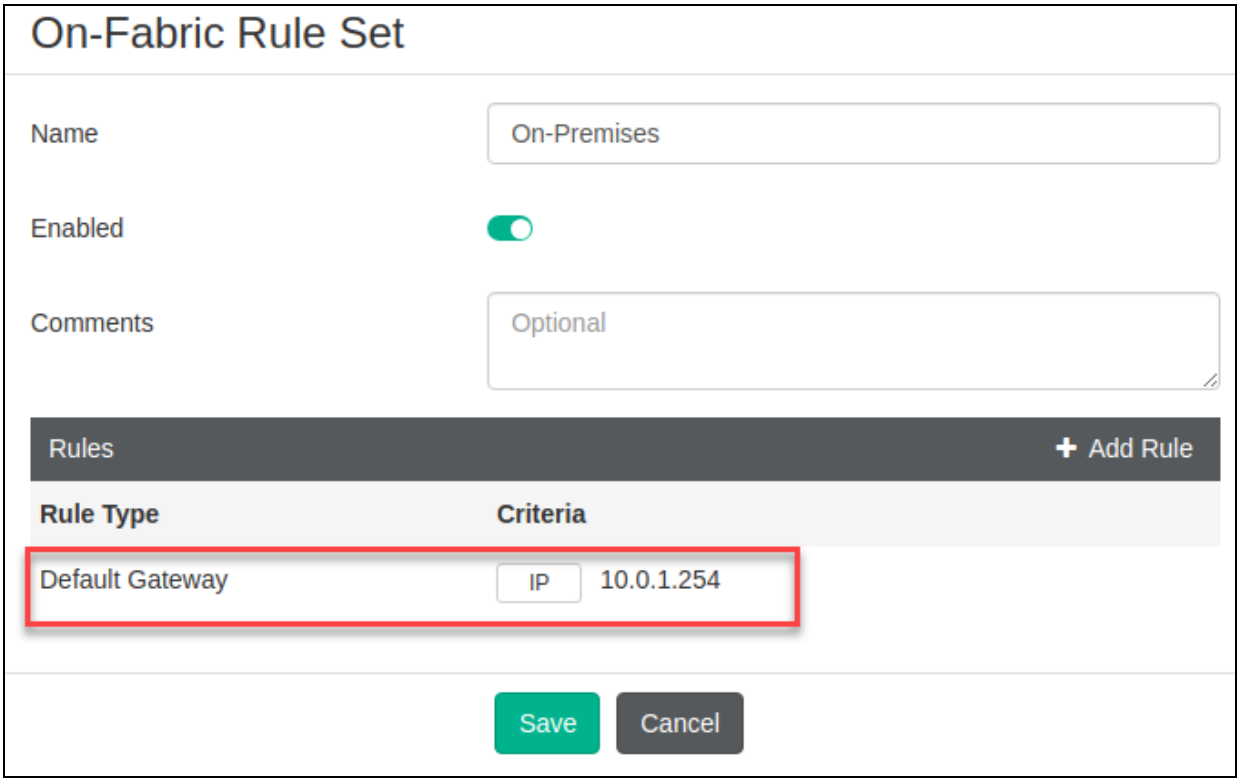
In this exercise, you will configure on-fabric rules on FortiClient EMS to determine the fabric status of the endpoint.

Configure On-Fabric Detection Rules

FortiClient EMS uses on-fabric detection rules to determine if a registered FortiClient endpoint is on-fabric or off-fabric. You will configure on-fabric detection rules.

To configure on-fabric detection rules

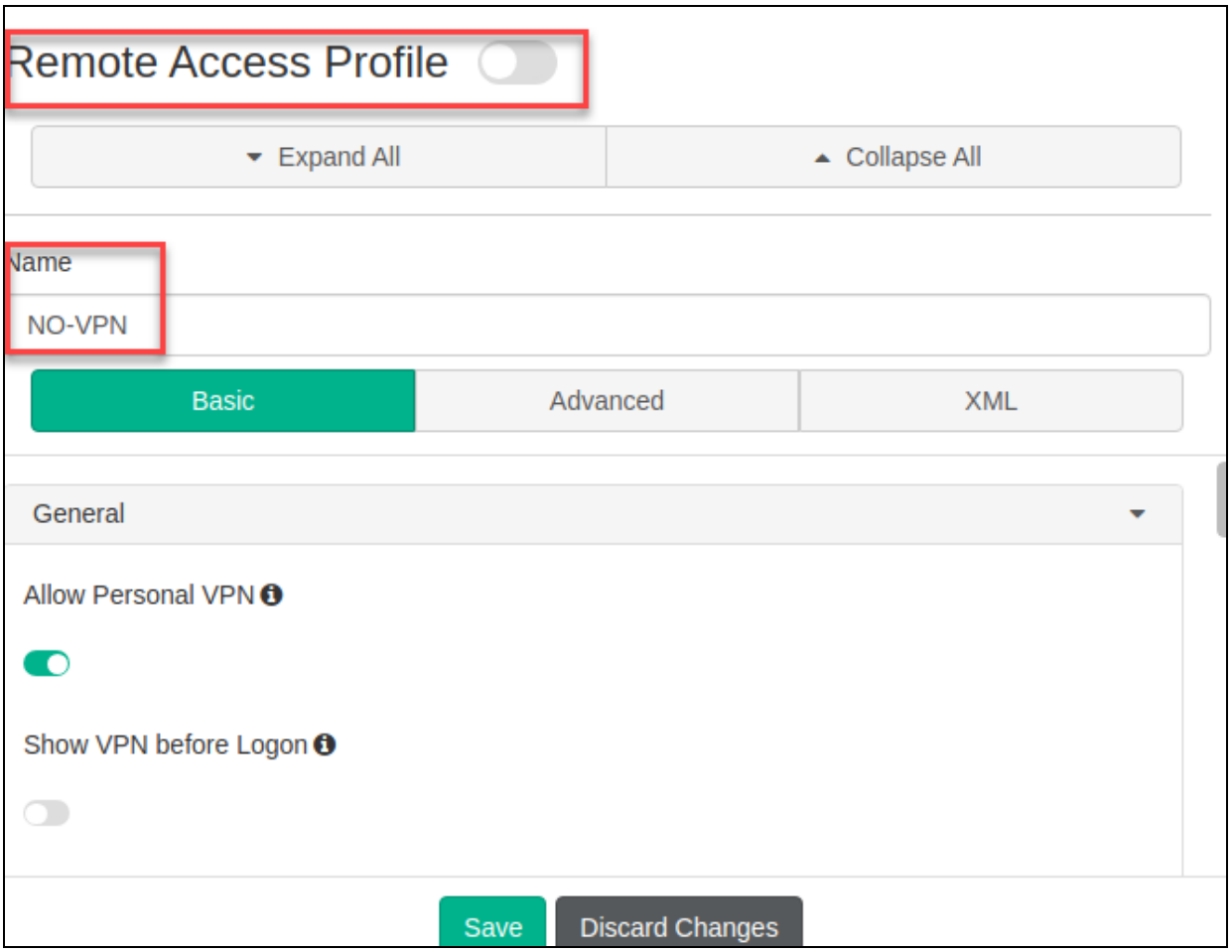
1. On the HQ-EMS-1 VM, log in to the FortiClient EMS GUI.
2. Click **Endpoint Policy & Components** > **On-fabric Detection Rules**.
3. Click **Add**.
4. In the **Name** field, type `On-Premises`.
5. In the **Rules** section, click **Add Rule**.
6. In the **Detection Type** field, select **Default Gateway**.
7. In the **IP Address** field, type `10.0.1.254`.
8. Click **Add Rule**.



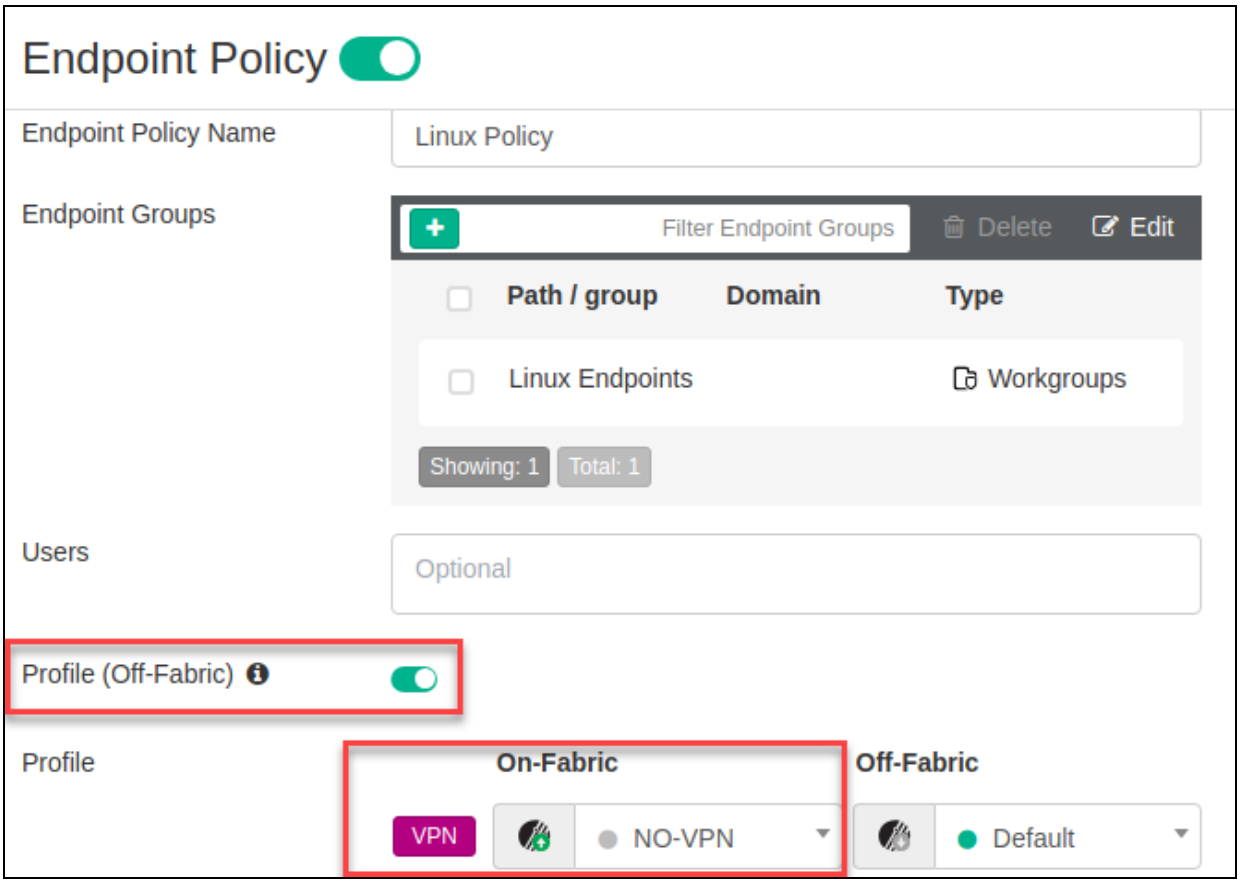
9. Click **Save**.

The default gateway you specified in the on-fabric rule is the IP address of the HQ-NGFW FortiGate. The HQ-PC-1 VM uses this gateway.

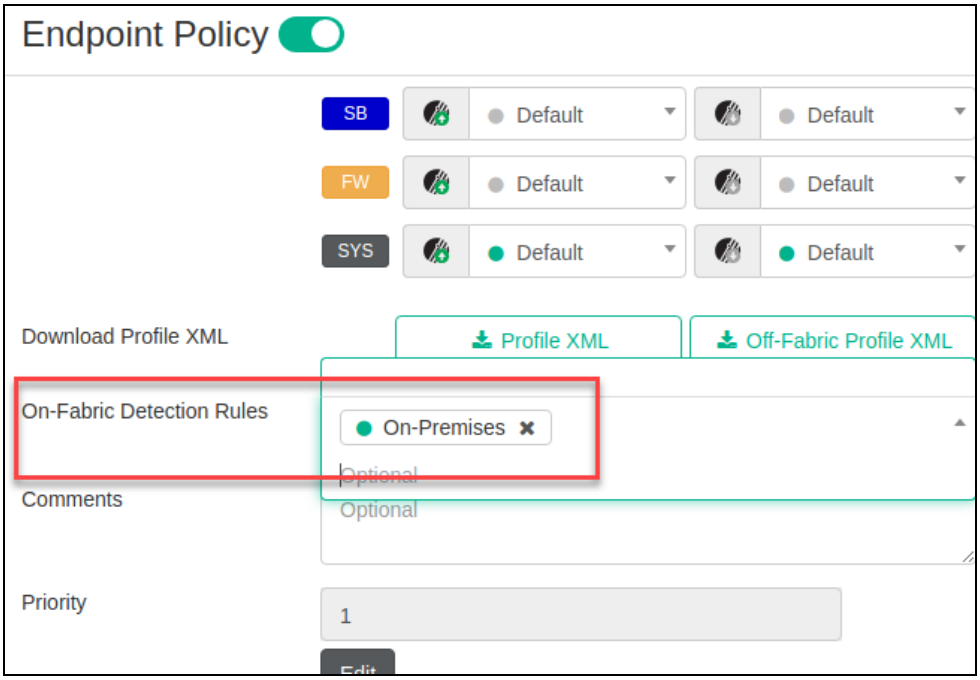
10. Click **Endpoint Profiles** > **Remote Access**.
11. Click **Add**.
12. In the **Name** field, type `NO-VPN`.
13. Disable **Remote Access Profile**.



14. Click **Save**.
15. Click **Endpoint Policy & Components** > **Manage Policies**.
16. Select the **Linux Policy** policy, and then click **Edit**.
17. Enable **Profile (Off-Fabric)**.
    There are two profile columns. The one on the right is the **Off-Fabric** profile.
18. In the **On-Fabric** profile, in the **VPN** field, select **NO-VPN**.



19. In the **On-Fabric Detection Rules** field, select **On-Premises**.



20. Click **Save**.

When an endpoint matches the conditions specified in the on-fabric rule, it is classified as **On-Fabric**. Different endpoint profiles can be assigned based on the fabric status.

Verify On-Fabric Detection Rules

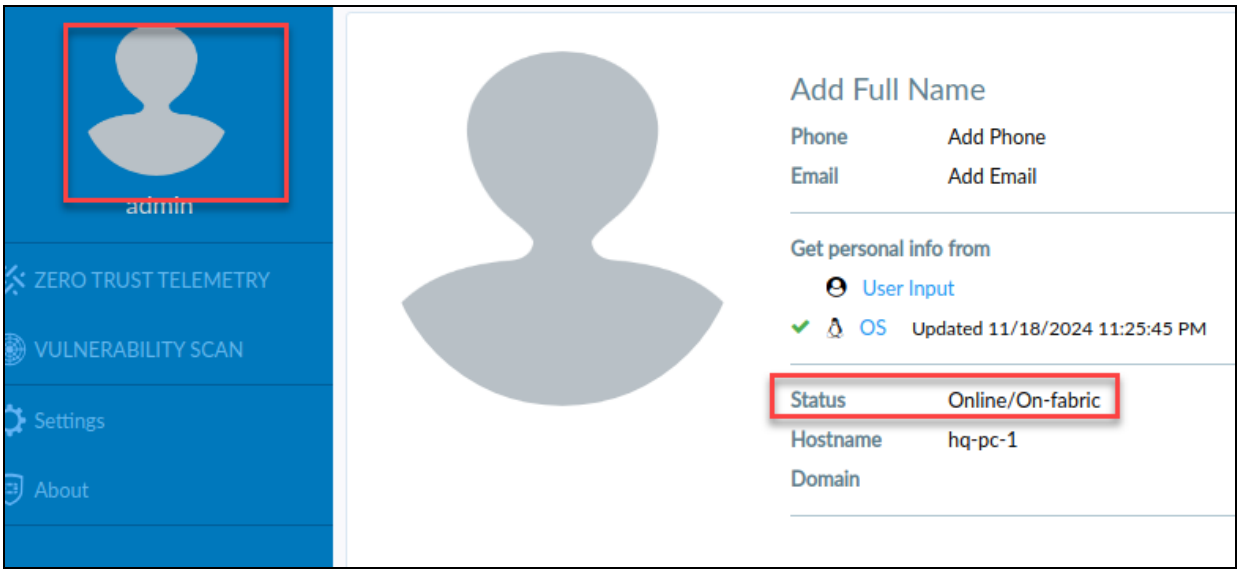
You will verify the on-fabric detection rules.

To verify on-fabric detection rules

1. On the HQ-PC-1 VM, open a terminal window, enter the `ip route show` command, and then make a note of your default gateway.

```
admin@hq-pc-1:~$ ip route show
default via 10.0.1.254 dev ens3 proto static metric 100
10.0.1.0/24 dev ens3 proto kernel scope link src 10.0.1.10 metric 100
169.254.0.0/16 dev ens3 scope link metric 1000
192.168.0.0/24 dev ens4 proto kernel scope link src 192.168.0.10 metric 101
```

2. Open the FortiClient console, and then click the user avatar.
   The fabric status is **On-fabric** and a remote access profile is not available.

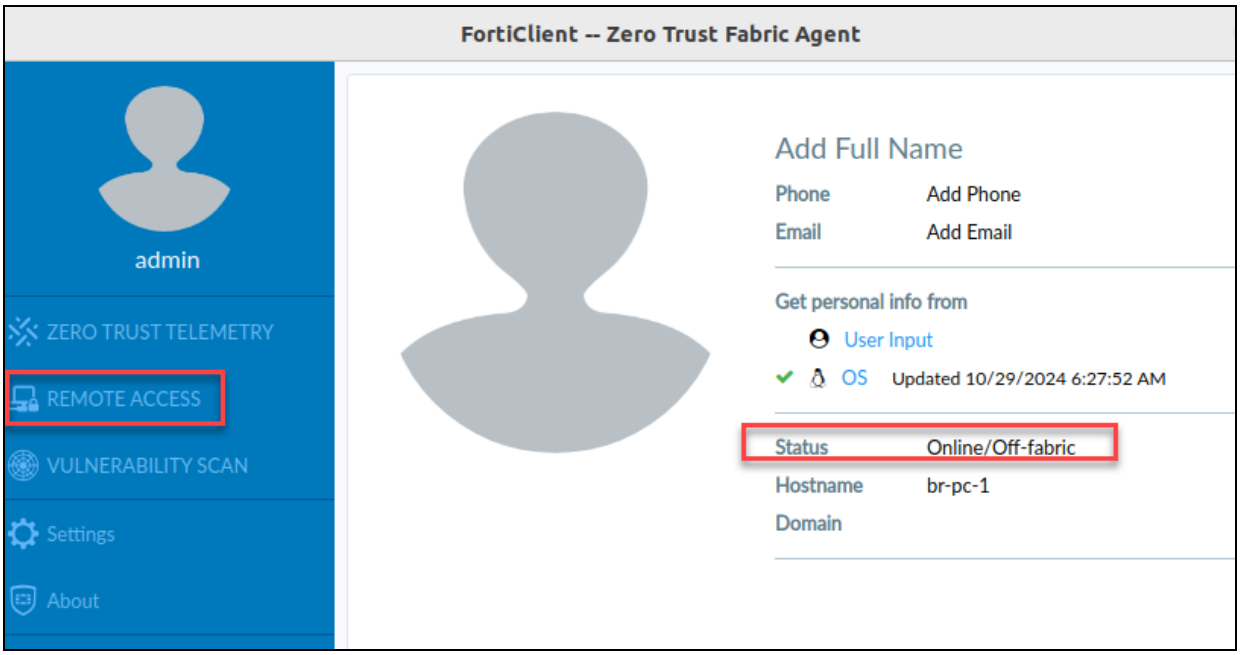


The default gateway on the HQ-PC-1 VM matches the IP address specified in the on-fabric rule. The endpoint was classified as on-fabric and the endpoint policy removed the remote access profile.

3. On the BR-PC-1 VM, open a terminal window, enter the `ip route show` command, and then make a note of your default gateway.

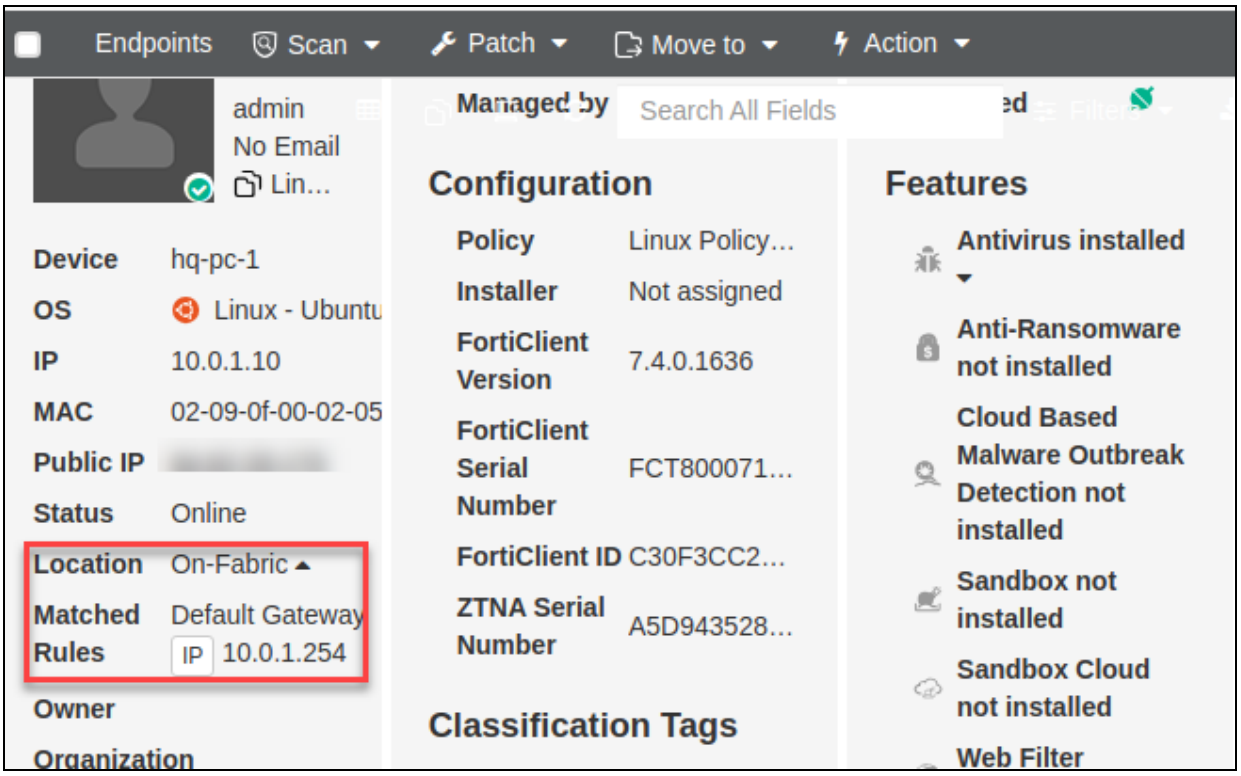
The gateway is **10.1.0.254** and does not match the on-fabric rules that have been configured.

4. Open the FortiClient console, and then click the user avatar.
   The fabric status is **Off-fabric** and a remote access profile is also available.



The off-fabric and on-fabric endpoints have different endpoint profiles assigned based on their fabric status.

5. Return to the FortiClient EMS GUI, and then click **Endpoints** > **All Endpoints**.
6. Click **hq-pc-1**.
   The **Location** of the endpoint is classified as **On-Fabric** and matches the rule you configured earlier for on-fabric detection.



Lab 5: Endpoint Profiles

In this lab, you will learn about endpoint profiles and provision them on FortiClient endpoints using FortiClient EMS.

Objectives

- Enable the web filter, vulnerability scan, and antivirus features
- Create a policy to assign a new endpoint profile to an endpoint policy
- Test the security features on FortiClient endpoints

Time to Complete

Estimated: 35 minutes

Prerequisites (Self-Paced Only)

Before you begin this lab, you must identify the IP address of the FortiClient EMS, Windows-AD VM, and install FortiClient on Windows endpoint.

Do *not* perform these steps if you are taking an instructor-led class. These steps are required only if you are performing the self-paced labs.

To identify the IP address of the FortiClient EMS

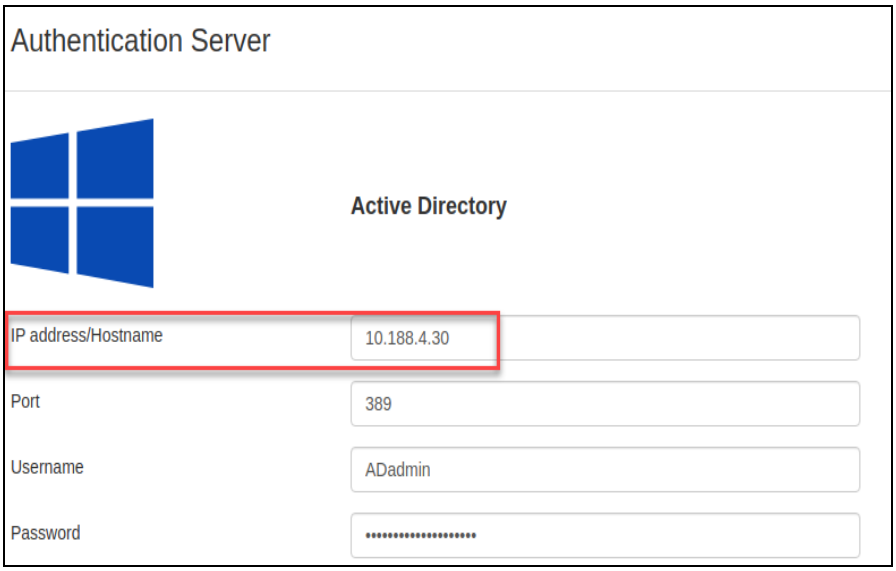
1. On the Fortinet Training Institute side bar, click **POD IP**.
2. In the **CREDENTIALS** section, under **IP address**, locate and make a note of the IP address.
   You will use this address where the lab asks for <FortiClient EMS IP address>.

To identify the IP address of the Windows-AD VM

1. On the Fortinet Training Institute side bar, click **Windows-AD**.
2. In the **CREDENTIALS** section, under **IP address**, locate and make a note of the IP address.
   You will use this address where the lab asks for <Windows-AD IP address>.

To update the IP address of the Windows-AD VM

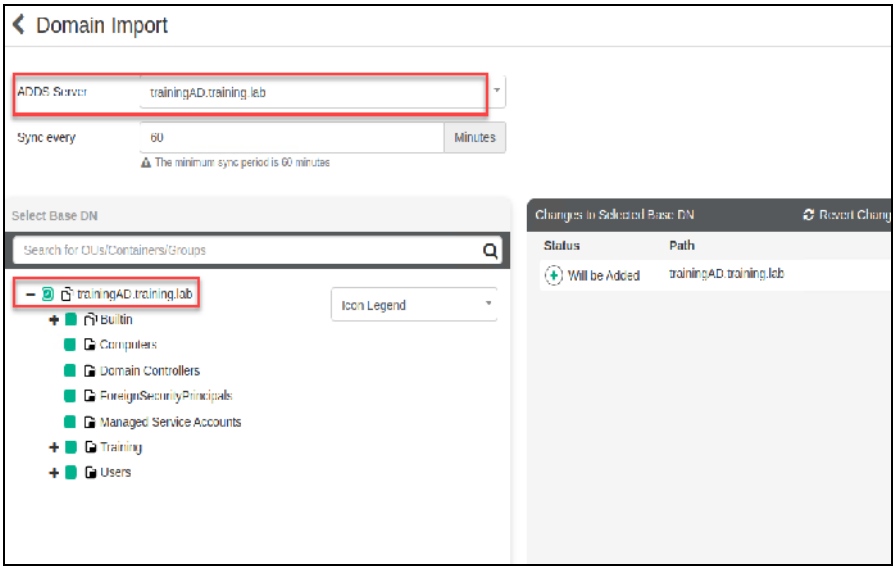
1. On the HQ-EMS-1 VM, log in to the FortiClient EMS GUI.
2. Click **Administration** > **Authentication Servers**, and edit the existing **Active Directory**entry.
3. Update the **IP address/Hostname**field to match the Windows-AD VM IP address.



4. Click **Test** to check the connectivity.
5. Click **Save** to save the authentication server.

To update the Domain Windows-AD VM

1. Continuing on the FortiClient EMS GUI, click **Endpoints** > **Manage Domains**, and delete the existing entry.
2. Click **Yes**.
3. Click **Add** > **ADDS** to open the **Domain Import** window.
4. In the **ADDS Server** field, select **trainingAD.training.lab**.
5. In the **Select Base DN** section, select the **trainingAD.training.lab** checkbox to add all the groups.



6. Click **Save** to import all the endpoints and users.

Install FortiClient on AD Endpoint

1. On the Windows-AD VM, on the desktop, open the **Resources** folder.
2. Double-click the `FortiClient.msi` file.
3. In the **FortiClient Setup** window, select the checkbox to accept the license agreement, and then click **Next** to start the installation.
4. In the **Choose Setup Type** window, ensure that the **Secure Remote Access**, **Vulnerability Scan**, **Advanced Persistent Threat (APT) Components**, **Sandbox detection**, **Cloud Scan**, and **ZTNA** checkboxes are selected.
5. Click **Next** to continue.
6. In the **Additional Security Features** window, select **Antivirus**, **Web Filtering**, and **Anti-Ransomware** checkboxes.
7. Click **Next** to continue.
8. Click **Next** to continue.
9. Click **Install** to continue.
10. After the FortiClient installation is complete, click **Finish**.
11. Open the FortiClient console.
12. In the **Enter Server address or Invitation code** field, type the <FortiClient EMS IP address>.
13. Click **Connect**.
14. In the **Invalid certificate detected** window, click **Accept**.

Exercise 1: Assigning an Endpoint Profile for Deployment

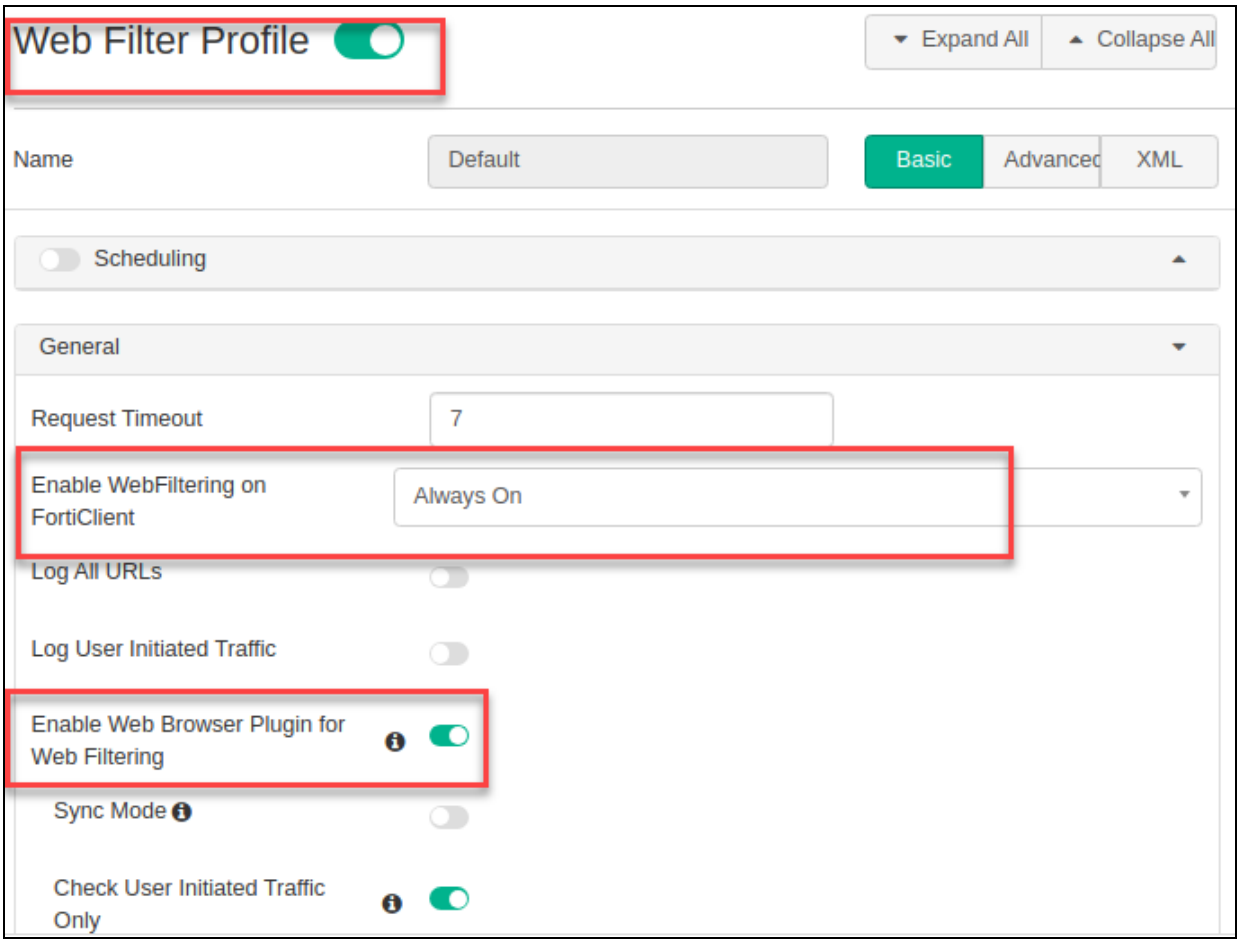
In this exercise, you will configure security profiles in the endpoint profile. After you complete provisioning, FortiClient EMS pushes the configuration to FortiClient endpoints.

Enable the Security Features in the Endpoint Profile

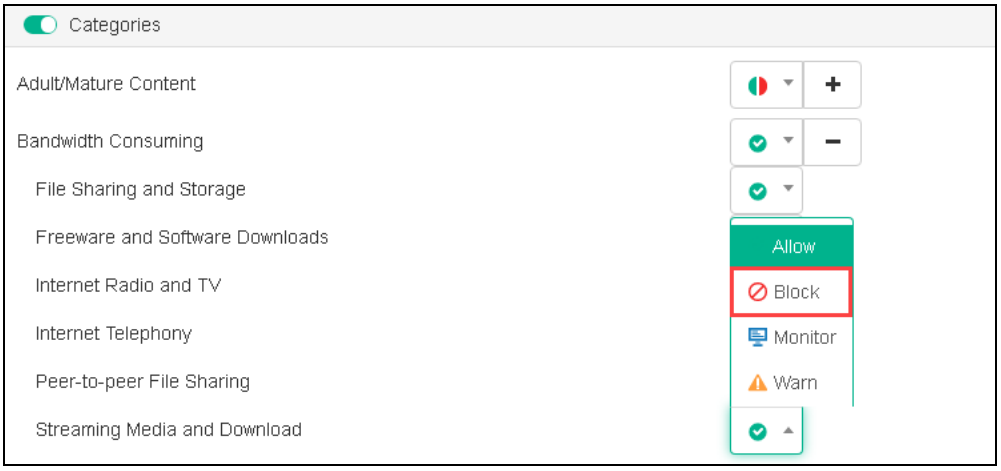
You can enable and disable security features, such as web filter, malware (antivirus), and vulnerability scan, in endpoint profiles.

To enable the web filter feature in the endpoint profile

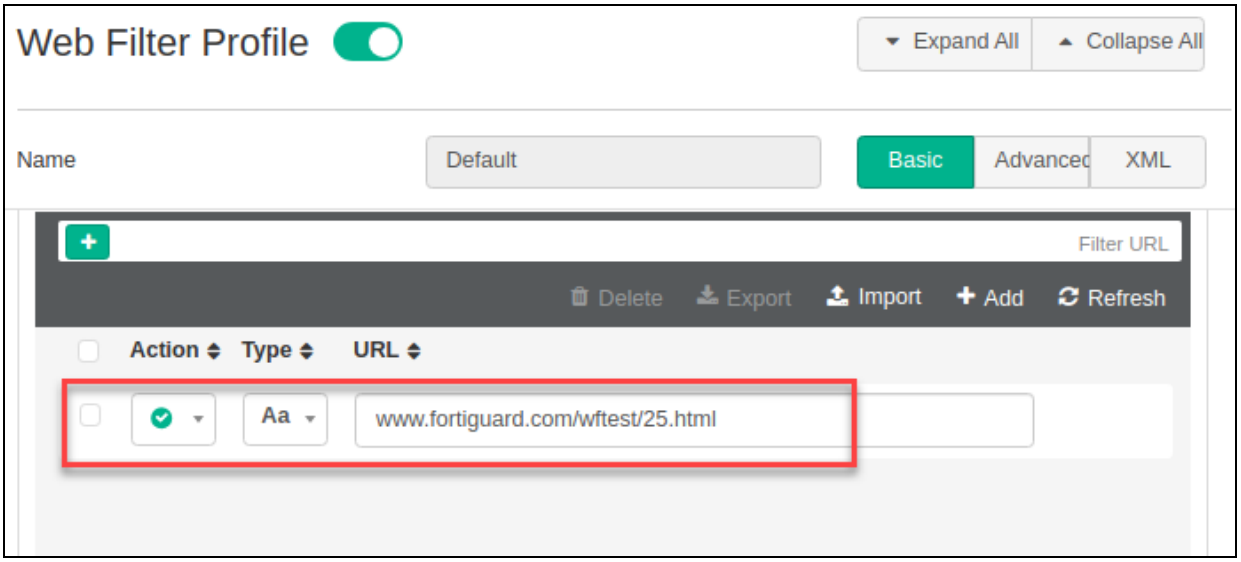
1. On the FortiClient EMS GUI, click **Endpoint Profiles** > **Web Filter**, select **Default**, and then click **Edit**.
2. On the **Web Filter Profile** page, enable **Web Filter Profile**, and then ensure that the value in the **Enable WebFiltering on FortiClient** field is **Always On**.
3. Enable **Enable Web Browser Plugin for Web Filtering**.



4. In the **Categories** section, in the **Bandwidth Consuming** field, click **+** to expand the list.
5. In the **Streaming Media and Download** field, select **Block**.



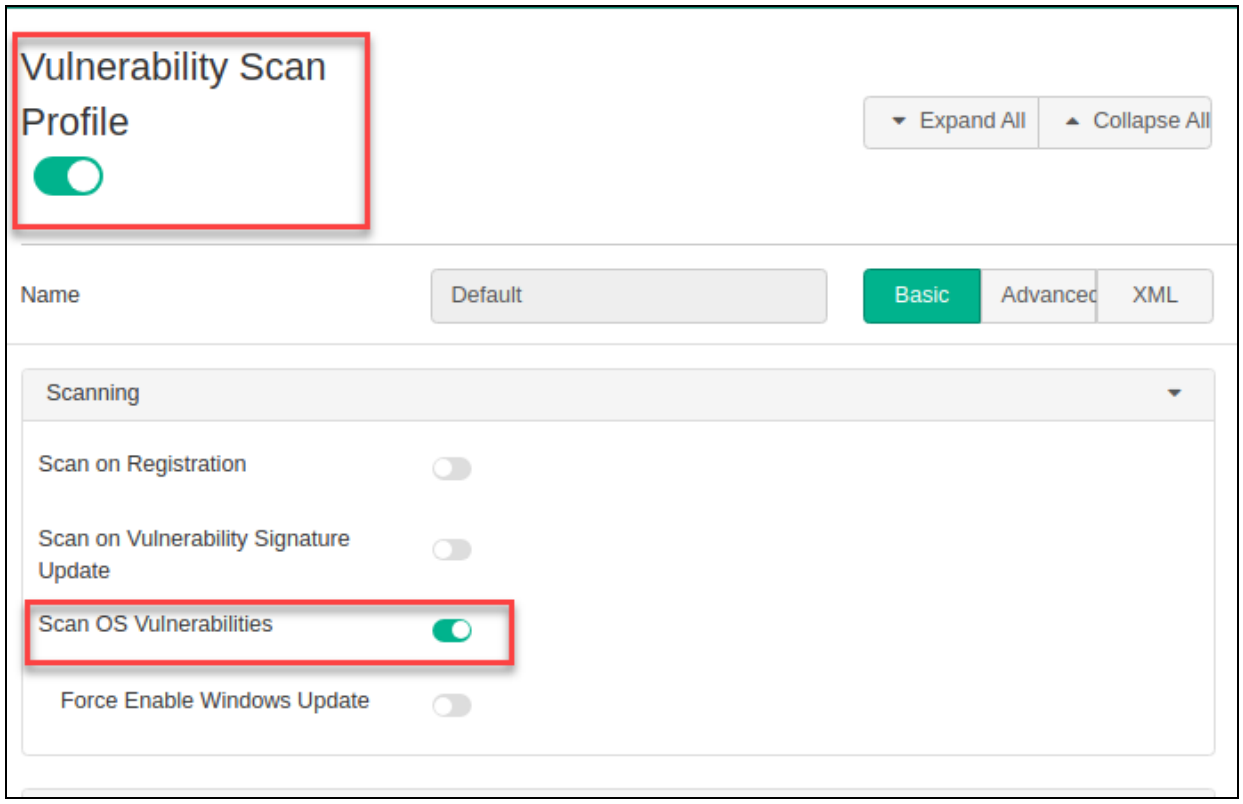
6. In the **Exclusion List** section, click **Add**, change the action to **Allow**, type `www.fortiguard.com/wftest/25.html`, and then leave the other settings at the default values.



7. Click **Save** to apply the web filter profile.

To verify the vulnerability scan configuration in the endpoint profile

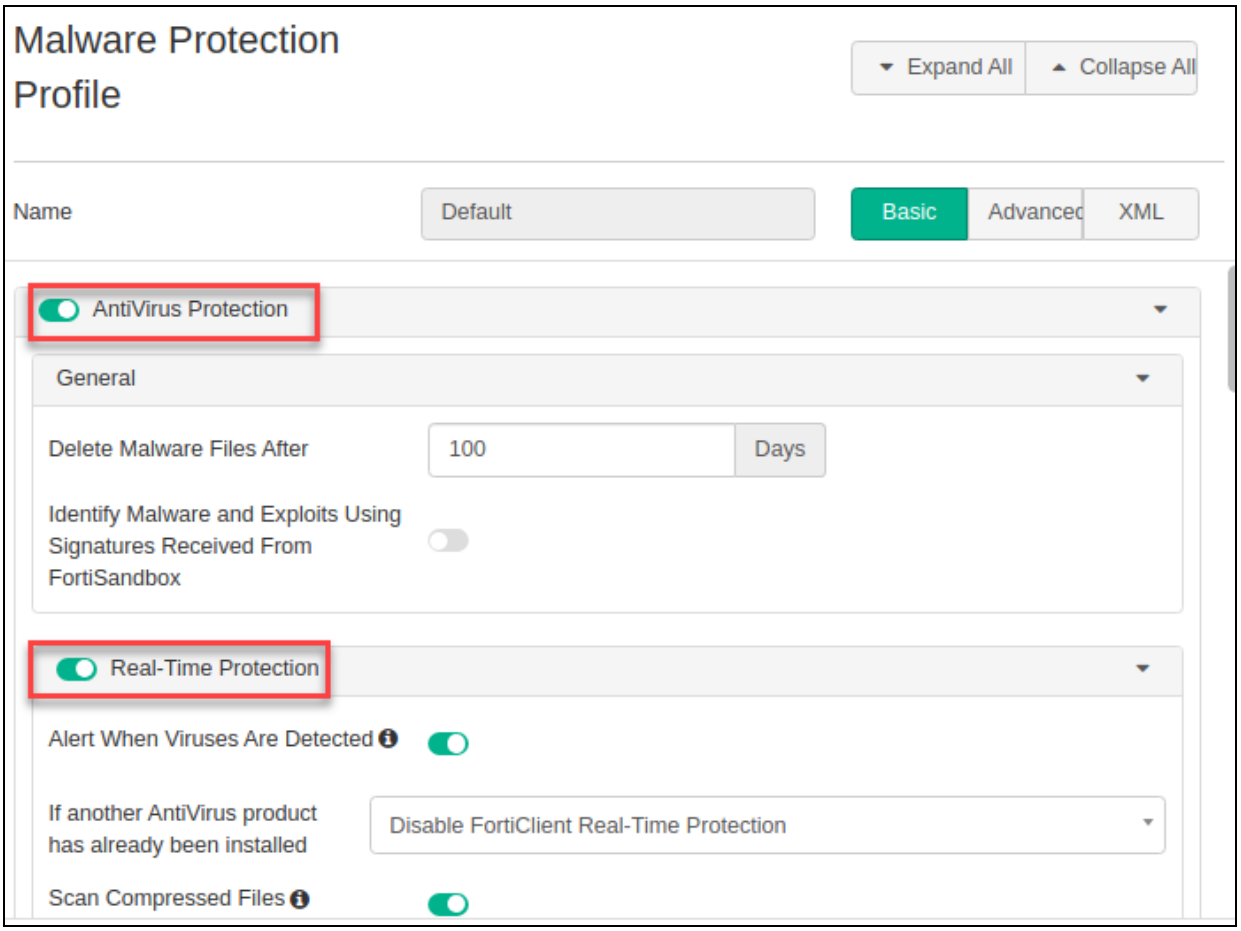
1. Continuing on the **Endpoint Profiles** page, click **Vulnerability Scan**.
2. Click **Default**, and then click **Edit**.
3. On the **Vulnerability Scan Profile** page, ensure **Vulnerability Scan Profile** is enabled, and then in the **Scanning** section, ensure **Scan OS Vulnerabilities** is enabled.



4. Click **Save** to apply the changes.

To enable the antivirus feature in the endpoint profile

1. Continuing on the **Endpoint Profiles** page, click **Malware Protection**.
2. Click **Default**, and then click **Edit**.
3. Enable **AntiVirus Protection**, ensure that **Real-Time Protection** is enabled, and then leave all other settings at the default values.



4. Click **Save** to apply the changes.

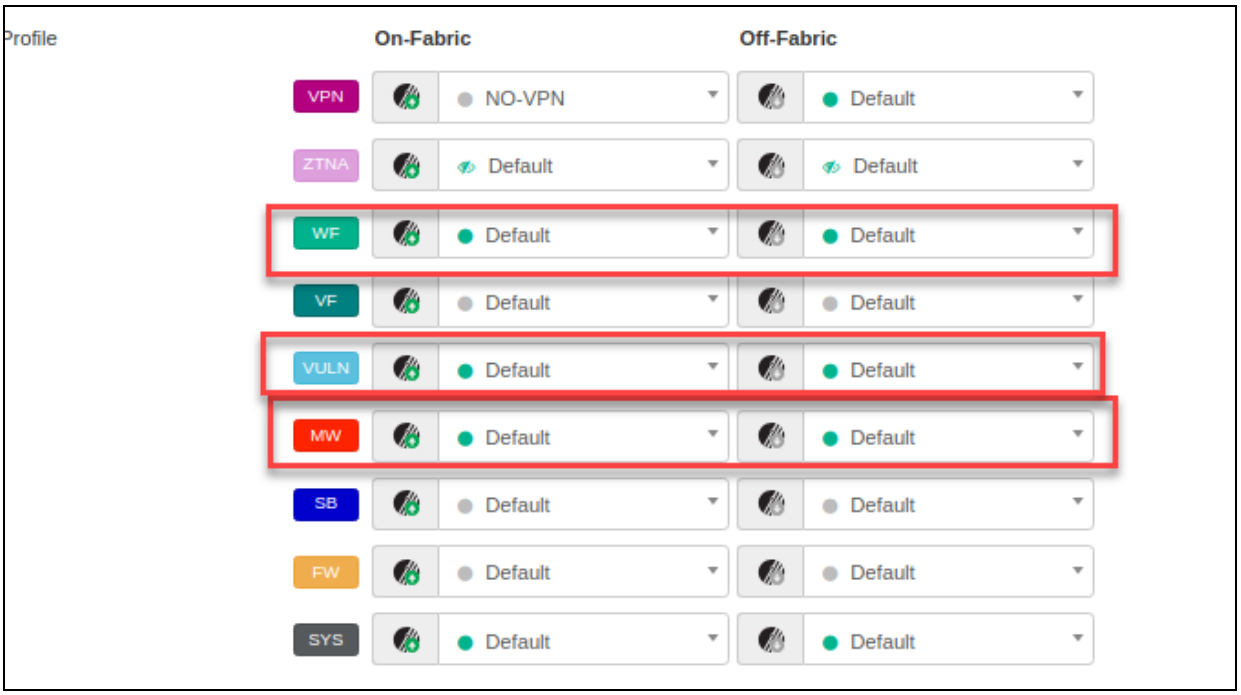
In this exercise, you are using the **Default** profile for the security profiles. In a production environment, you can create custom profiles and assign them to endpoint groups or domains.

Assign Endpoint Profiles to an Endpoint Policy

After you enable the endpoint profiles, you must assign the endpoint profiles to an endpoint policy. When you create this endpoint policy, the profile settings are automatically pushed to the endpoints in the domain or workgroup.

To assign endpoint profiles to an endpoint policy

1. Click **Endpoint Policy & Components** > **Manage Policies**, click **Linux Policy**, and then click **Edit**.
2. Ensure that the **Default** profiles are applied and enabled for **WF**, **VULN**, and **MW**.



3. Click **Save** to apply the changes.
4. Repeat steps 2-3 for the **Default** endpoint policy.

Exercise 2: Testing Antivirus Protection

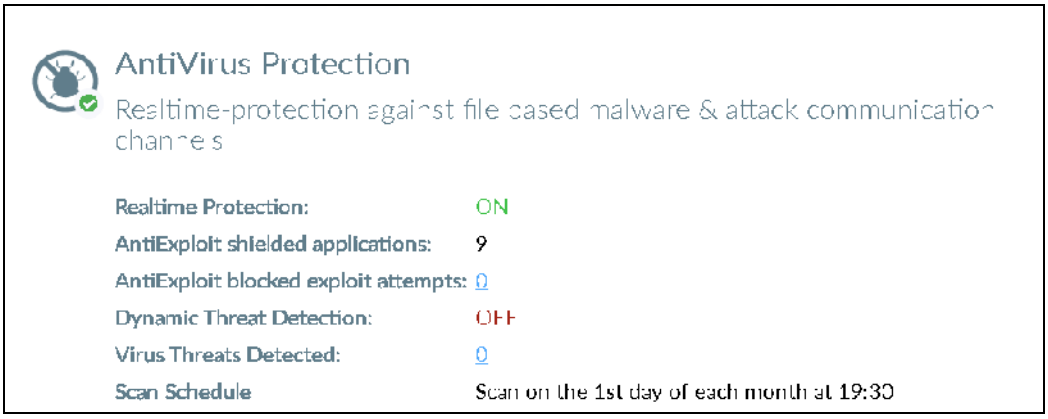
In this exercise, you will test the FortiClient malware protection features that you configured in the first exercise. You will test antivirus protection to understand how FortiClient performs real-time protection.

Verify AntiVirus Protection Settings

You will verify antivirus settings on FortiClient, which you configured in the FortiClient EMS endpoint profile, and it was then pushed to FortiClient.

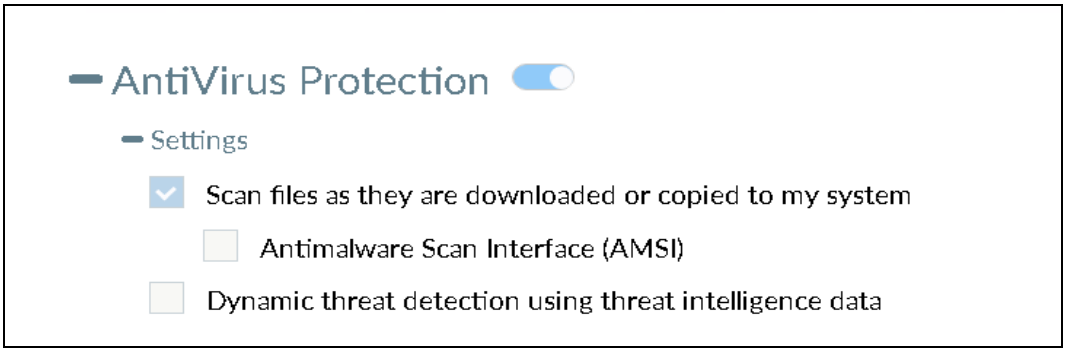
To view and verify current FortiClient antivirus protection settings

1. On the Windows-AD VM, open the FortiClient console, click **MALWARE PROTECTION**, and then in the **AntiVirus Protection** section, ensure that the value in the **Realtime Protection** field is **ON**.



If an antivirus scan is already in progress, stop the scan, and then click **X** to close the scan window.

2. Click the settings icon, and then verify that the **Scan files as they are downloaded or copied to my system** checkbox is selected.

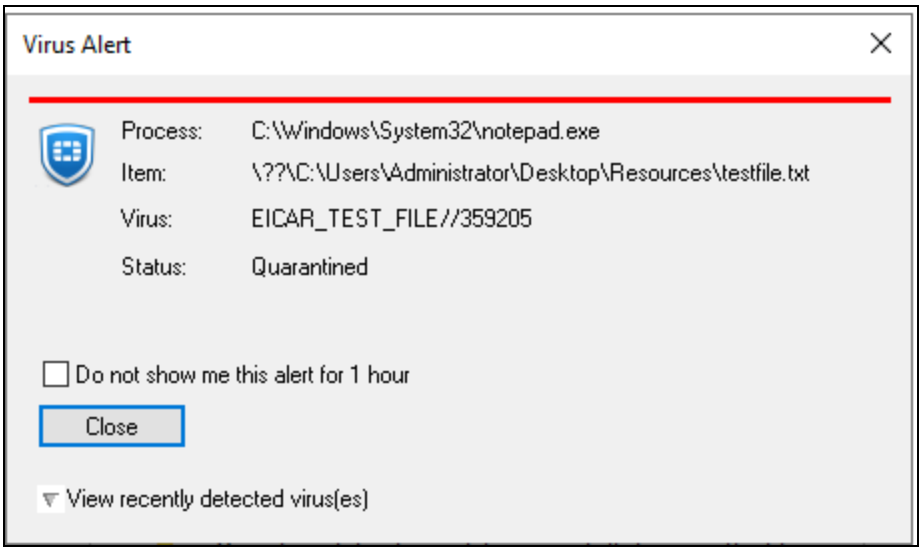


Test the Antivirus Real-Time Configuration

You will open a file that contains the EICAR virus hash on your Windows-AD VM. The EICAR test file is an industry-standard virus that is used to test antivirus detection without causing damage.

To test the antivirus configuration

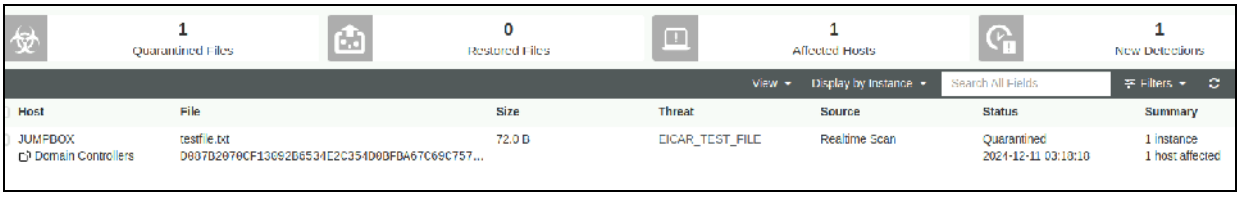
1. On the Windows-AD VM, on the desktop, open the **Resources** folder.
2. Double-click the `testfile.txt` file.
   The file is quarantined because it contains the EICAR virus hash.



3. Click **Close**.
4. Click **OK**.
   Why did the file fail to open?

> **Stop and think!**
>
> Because the file is quarantined, a FortiClient EMS administrator must add it to the allowlist and restore it to view the content.

5. Return to the FortiClient EMS GUI, and then click **Quarantine Management** > **Files**.
   It takes a few minutes for quarantined file to be displayed on FortiClient EMS.



The FortiClient EMS administrator can review the quarantined file. If the file is safe, the FortiClient EMS administrator can add the file to the allowlist and restore the quarantined files. This releases the files from

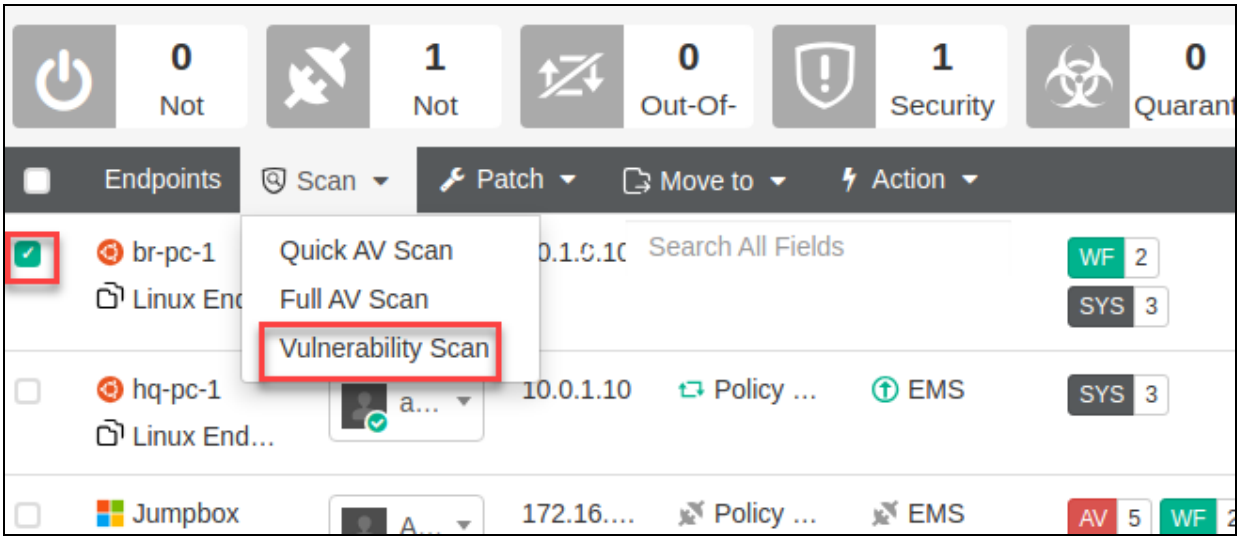
quarantine and makes them accessible on the endpoint with the next telemetry communication between FortiClient EMS and FortiClient.

Exercise 3: Performing Vulnerability Scans

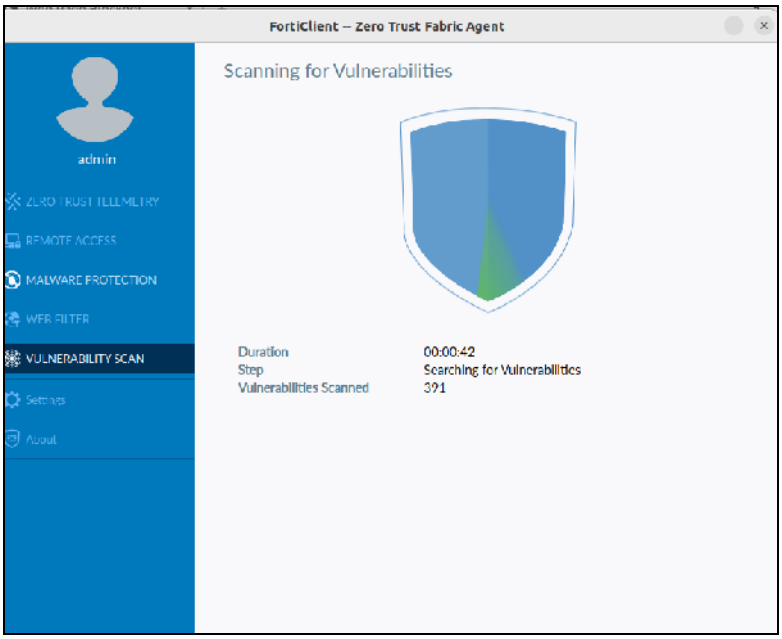
In this exercise, you will learn how a vulnerability scan helps detect and patch application vulnerabilities that can be exploited by known and unknown threats. You will run a vulnerability scan from FortiClient EMS to a registered FortiClient endpoint. You already enabled the vulnerability endpoint profile in the first exercise, and it was then pushed to FortiClient.

To run a vulnerability scan from FortiClient EMS

1. On the FortiClient EMS GUI, click **Endpoints** > **All Endpoints**, and then select the **br-pc-1** checkbox.
2. Click **Scan**, and then select **Vulnerability Scan** to perform a vulnerability scan on the selected endpoint.

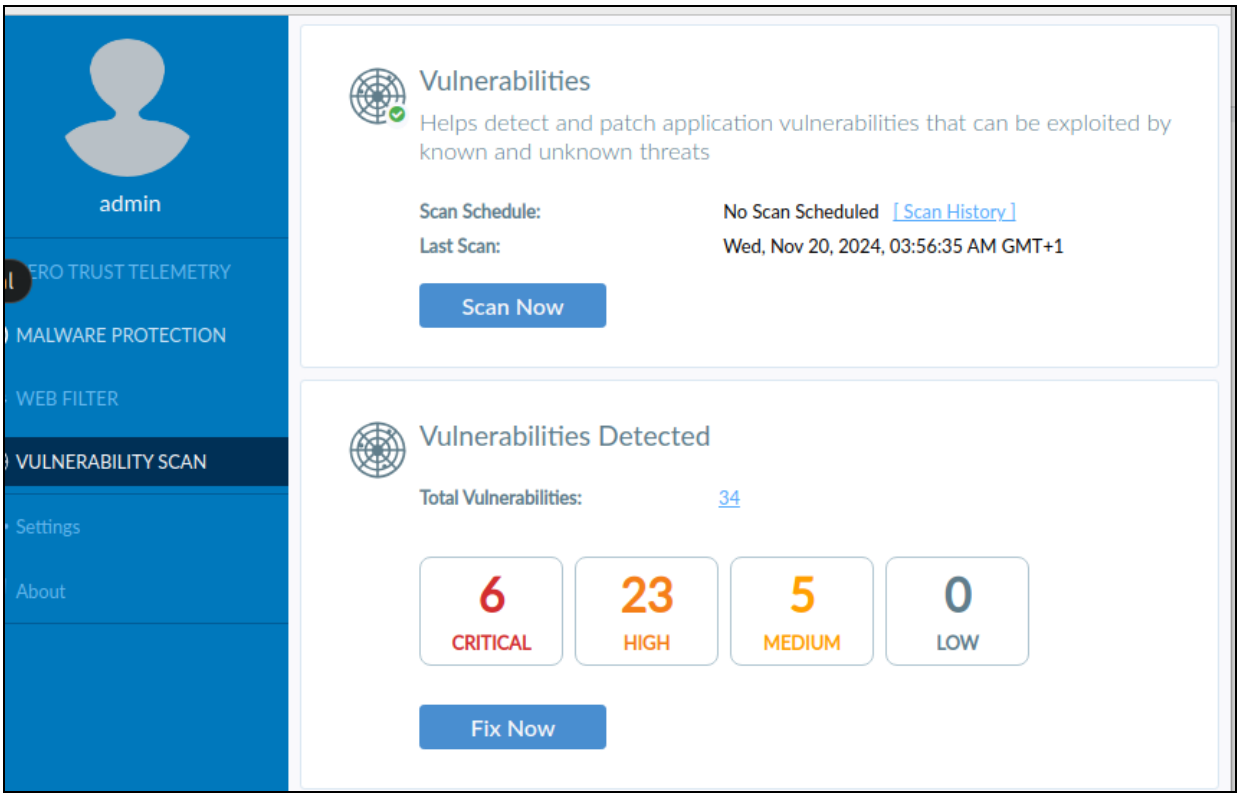


3. On the BR-PC-1 VM, open the FortiClient console, and then click **VULNERABILITY SCAN** to view the scan progress.
   It will take a few minutes for the vulnerability scan to complete.

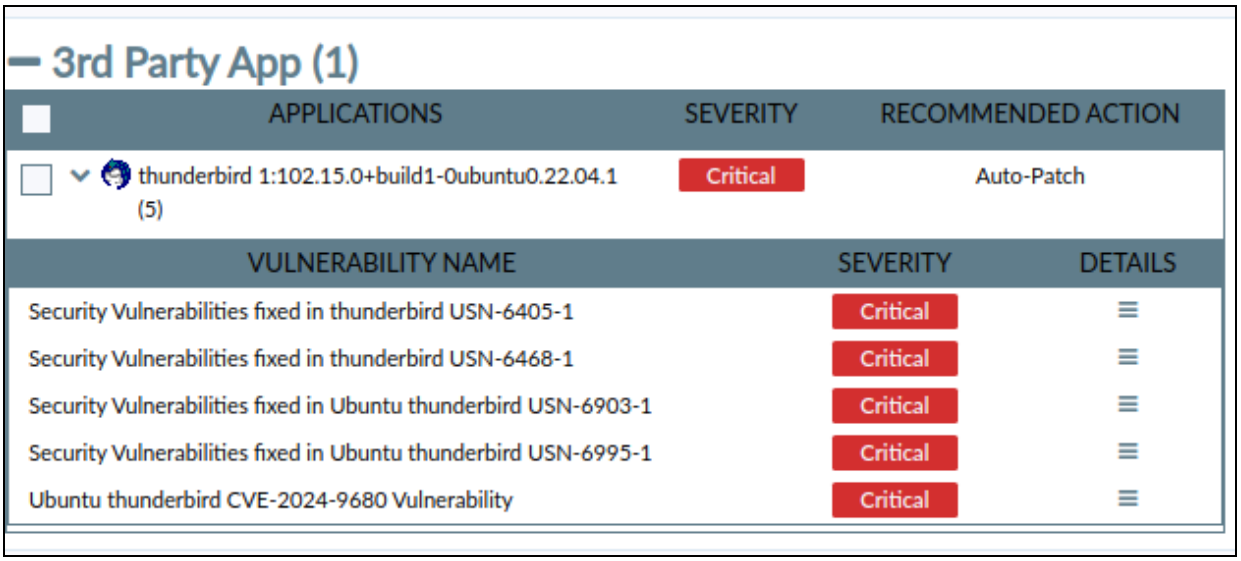


To review the vulnerability scan results

1. After the scan is finished, close the scan window.
   Vulnerability information appears on the FortiClient console, similar to the following example:

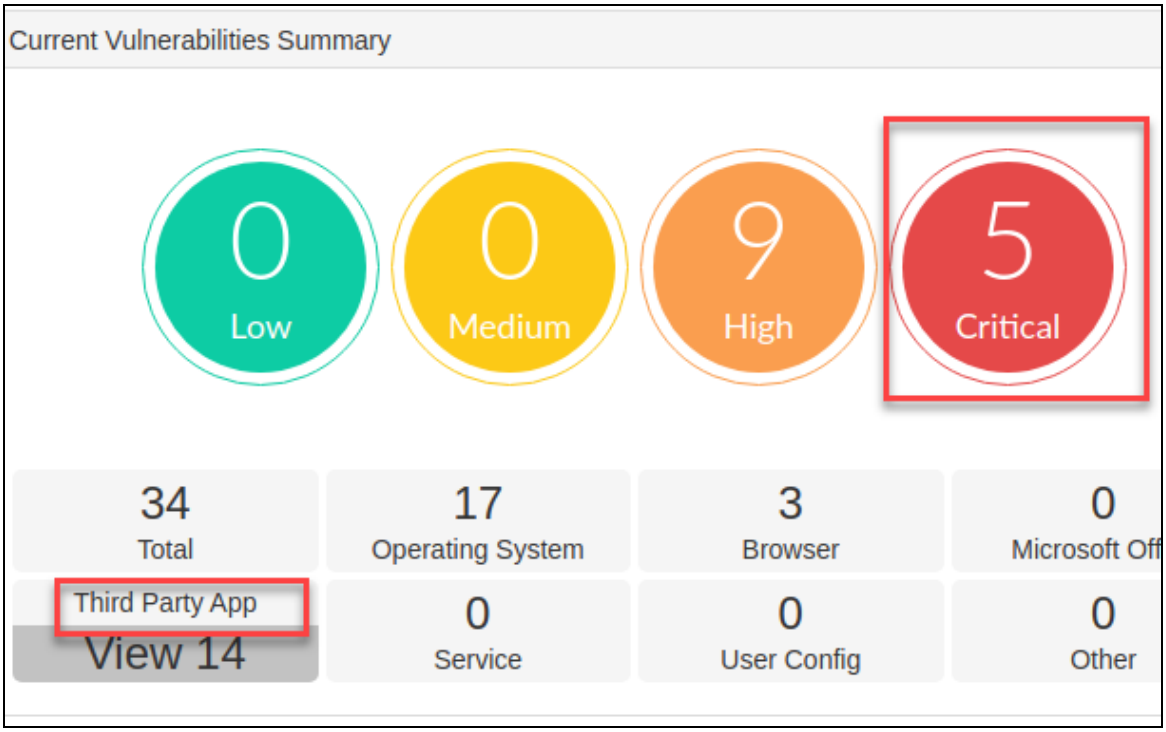


2. To review the vulnerability details, click **CRITICAL**, and then expand **3rd Party App**.



In this case, FortiClient can install the software patch because the recommended action is **Auto-Patch**.

3. Close all the windows.
4. Return to the FortiClient EMS GUI, and then click **Dashboard** > **Vulnerability Scan**.
5. In the **Current Vulnerabilities Summary** widget, click **Third Party App**, and then click **Critical** to view the critical vulnerabilities on the affected endpoint.



In this case, the FortiClient EMS administrator has the option to patch the endpoint for these specific vulnerabilities.

Security Vulnerabilities fixed in thunderbird USN-...	77285	CVE-2023-57...	1	Patch
Security Vulnerabilities fixed in Ubuntu thunderbi...	80548	CVE-2024-66...	1	Patch
Security Vulnerabilities fixed in Ubuntu thunderbi...	81065	CVE-2024-75...	1	Patch
Ubuntu thunderbird CVE-2024-9680 Vulnerability	81681	CVE-2024-9680	1	Patch

6. In the **Affected Endpoints** column, for any vulnerability, click the number.

Critical Severity Application Vulnerabilities

Vulnerability Name	Forti...	CVE...	Affecte...	Patch...
Security Vulnerabilities fixed in thun...	76686	CVE-202...	1	Patch
Security Vulnerabilities fixed in thun...	77285	CVE-202...	1	Patch
Security Vulnerabilities fixed in Ubu...	80548	CVE-202...	1	Patch
Security Vulnerabilities fixed in Ubu...	81065	CVE-202...	1	Patch
Ubuntu thunderbird CVE-2024-968...	81681	CVE-202...	1	Patch

The FortiClient EMS administrator can view which endpoints are impacted by vulnerabilities.

In a production environment, you should install the patches for affected applications.

Exercise 4: Testing the FortiGuard Web Filter

In this exercise, you will test the configuration (web filter profile) that you defined in a previous exercise. First, you will examine the FortiClient web filter, based on FortiGuard categories, by making sure that FortiClient can contact the FortiGuard servers. Next, you will review a category-based web filter security profile on FortiClient and inspect the web traffic.

Verify FortiGuard Connectivity

You will verify connectivity to FortiGuard Distribution Servers (FDS) from the FortiClient host VM. FDS is required because it handles URL categorization. FortiClient takes action to allow or block websites based on category.

To verify FortiGuard connectivity

1. On the BR-PC-1 VM, open the CLI, and then enter the following command:
   `ping -c 4 fgd1.fortigate.com`
   If FortiClient can contact FortiGuard, you should see the following output:

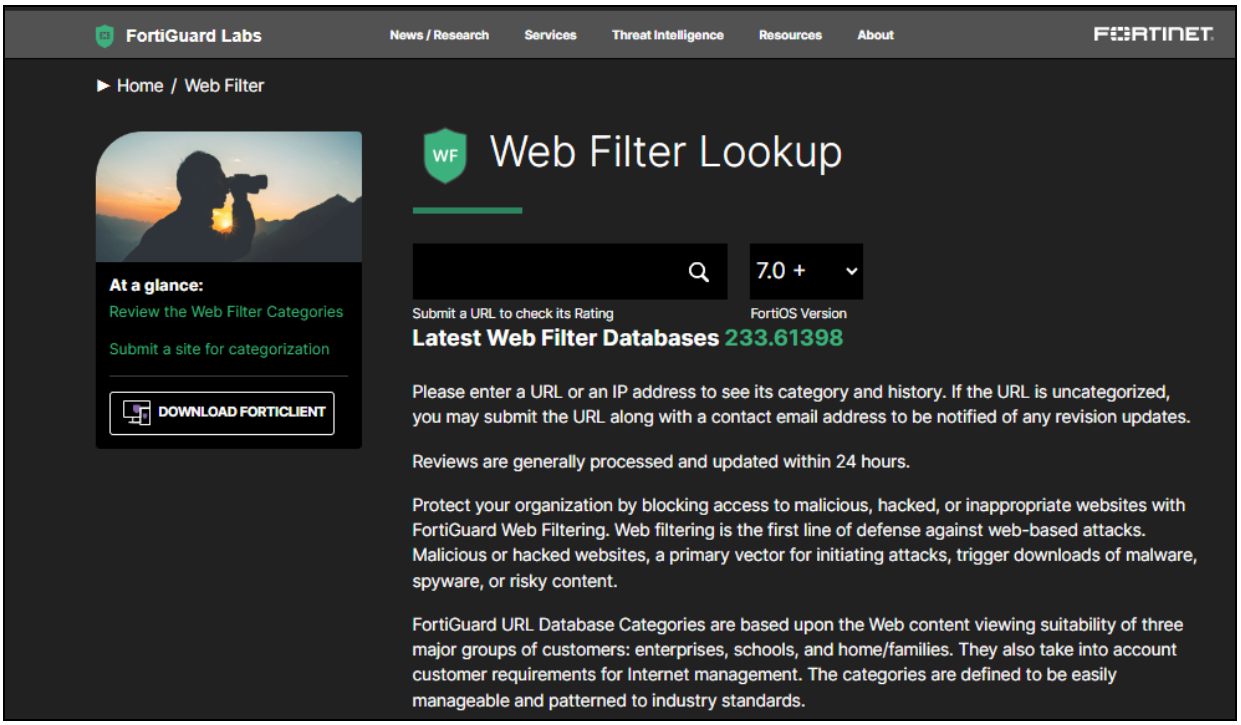
```
admin@br-pc-1:~$ ping -c 4 fgd1.fortigate.com
PING guard.fortinet.net (173.243.138.91) 56(84) bytes of data.
64 bytes from 173.243.138.91 (173.243.138.91): icmp_seq=1 ttl=55 time=63.5 ms
64 bytes from 173.243.138.91 (173.243.138.91): icmp_seq=2 ttl=55 time=60.9 ms
64 bytes from 173.243.138.91 (173.243.138.91): icmp_seq=3 ttl=55 time=60.6 ms
64 bytes from 173.243.138.91 (173.243.138.91): icmp_seq=4 ttl=55 time=63.8 ms

--- guard.fortinet.net ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3005ms
rtt min/avg/max/mdev = 60.564/62.201/63.775/1.458 ms
```

Identify Web Filter Categories

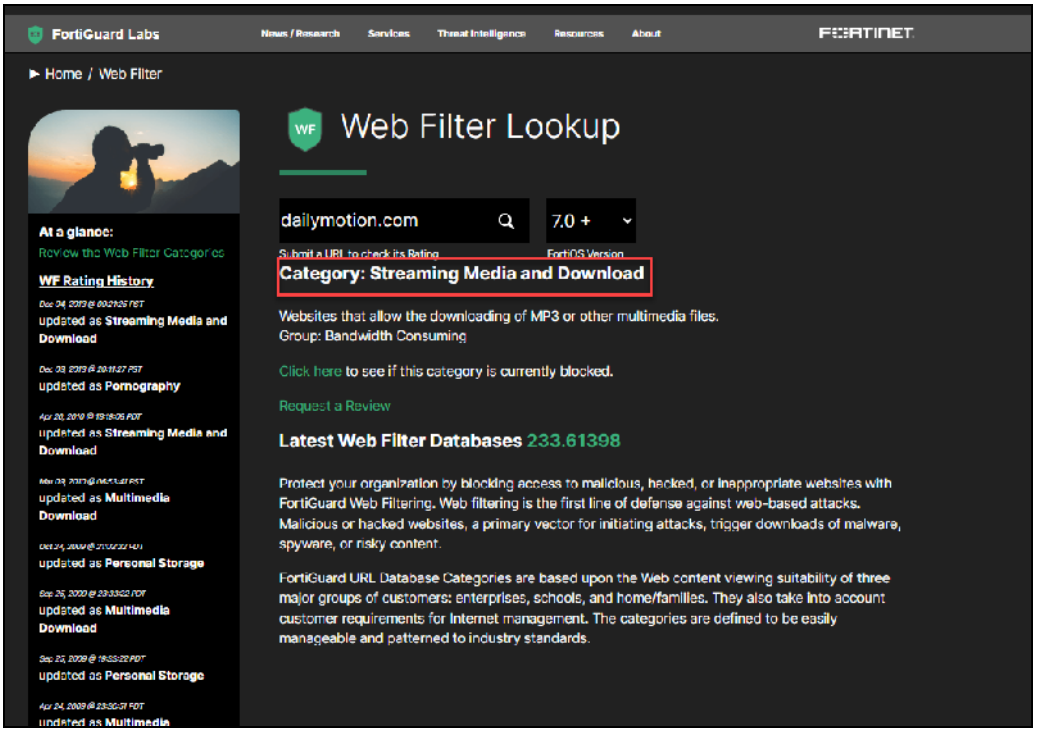
To understand how websites are categorized on FortiGuard, you must first identify how the FortiGuard service categorizes specific websites.

To identify web filter categories

1. Continuing on the BR-PC-1 VM, open a new browser tab, and then visit https://www.fortiguard.com/webfilter.



2. Use the **Web Filter Lookup** tool to search for the following URL:
`www.dailymotion.com`



Dailymotion is listed in the **Streaming Media and Download** category.

3. Use the **Web Filter Lookup** tool again to find the web filter categories for the following website:
`www.fortiguard.com/wftest/25.html`

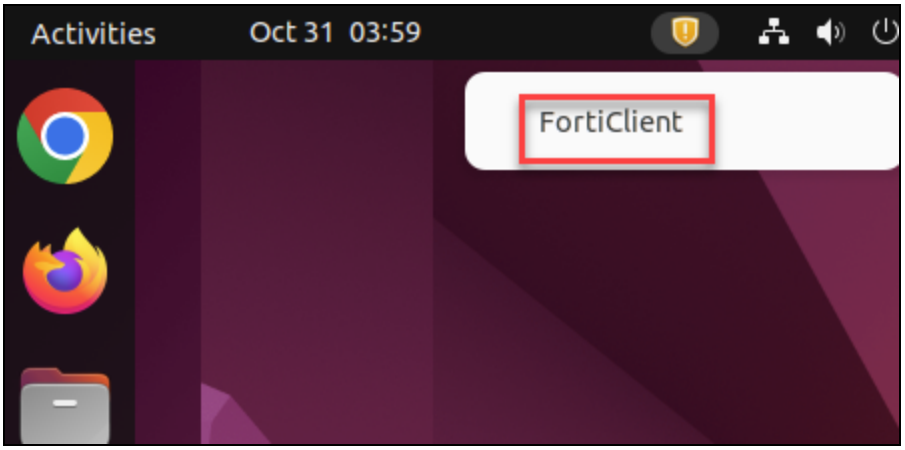
You will test your web filter using these websites.

Review a FortiGuard Category-Based Web Filter

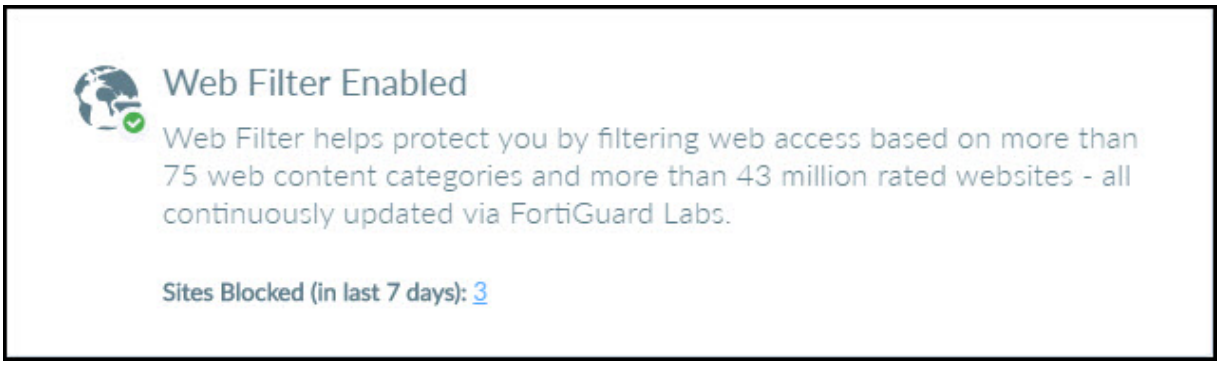
You will review the web filter profile and configuration of the FortiGuard category-based filter. These are the web filter settings that you configured in a previous exercise on endpoint profiles, which EMS then pushed to the endpoints.

To review the web filter profile

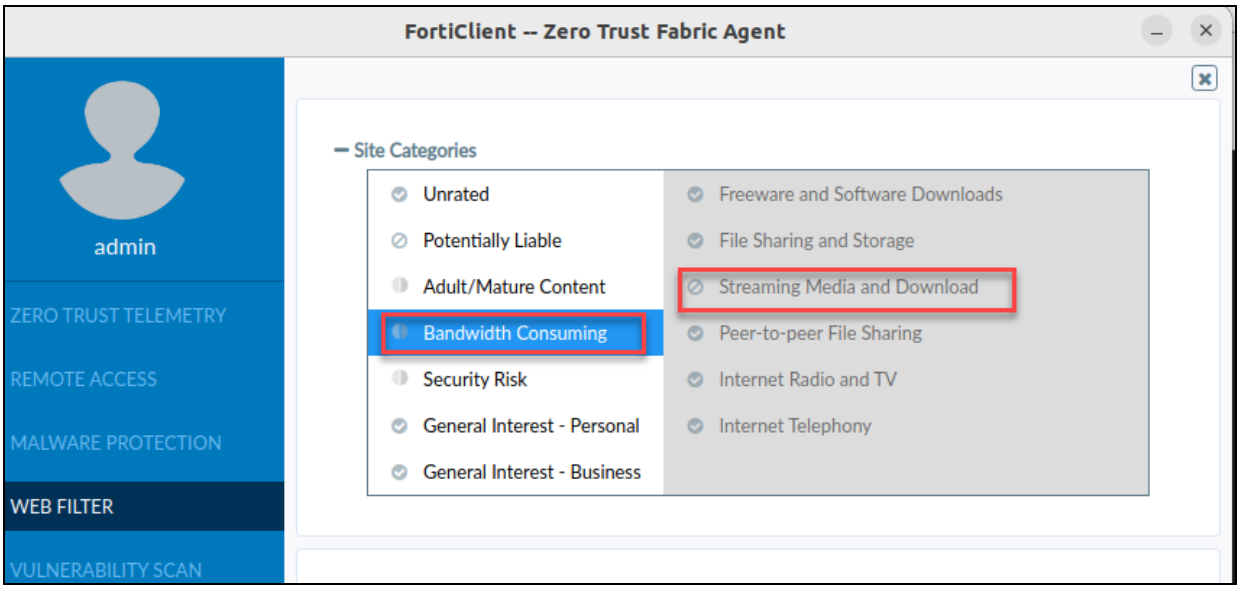
1. On the BR-PC-1 VM, click the FortiClient icon, and then click **FortiClient** to open the FortiClient GUI.



2. Click **WEB FILTER**, and then verify that **FortiGuard category based filter** is enabled.



3. In the upper-right corner, click the settings icon  .
4. Click **Bandwidth Consuming** to expand it and view the subcategories.



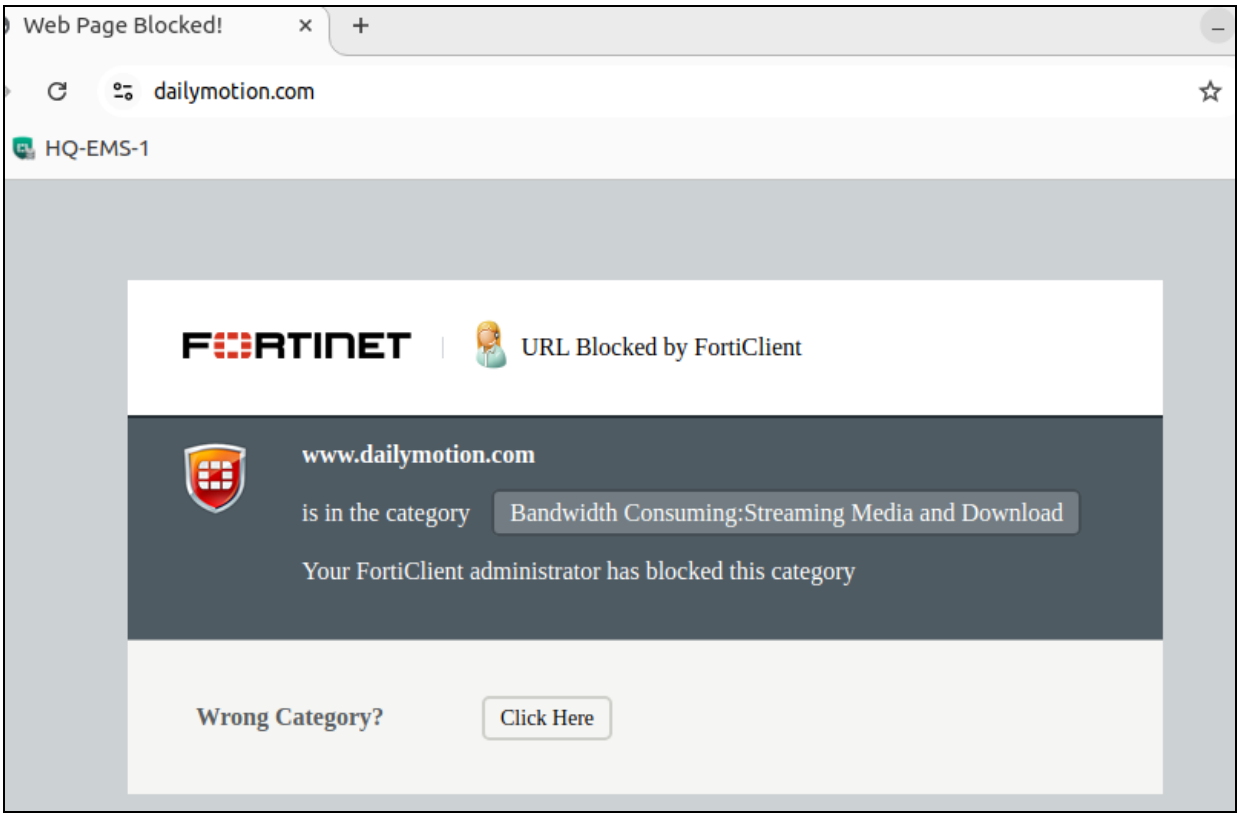
5. Verify that **Streaming Media and Download** is set to **Block**.

Test the Web Filter

You will test the web filter security profile for the configured category. You will also verify that the `www.fortiguard.com/wftest/25.html` URL is included in the exclusion list and test the web exclusion list.

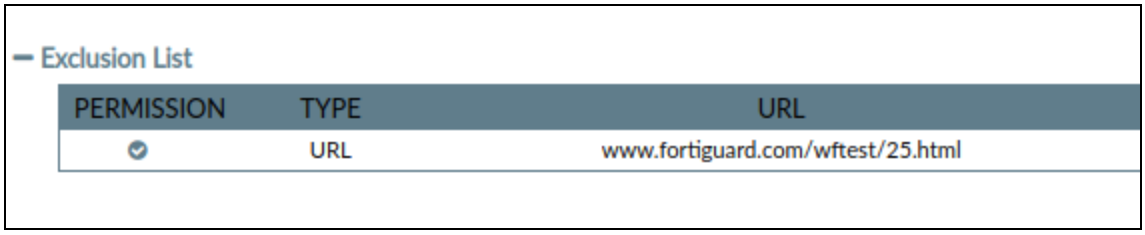
To test the web filter

1. Continuing on the BR-PC-1 VM, open a new browser tab, and then visit `www.dailymotion.com`.
   A blocked page message is displayed because of the predefined action for this website category.



To verify a URL is included in the exclusion list

1. On the BR-PC-1 VM, open the FortiClient console, and then select **WEBFILTER**.
2. In the upper-right corner, click the settings icon  .
3. Expand **Exclusion List**.

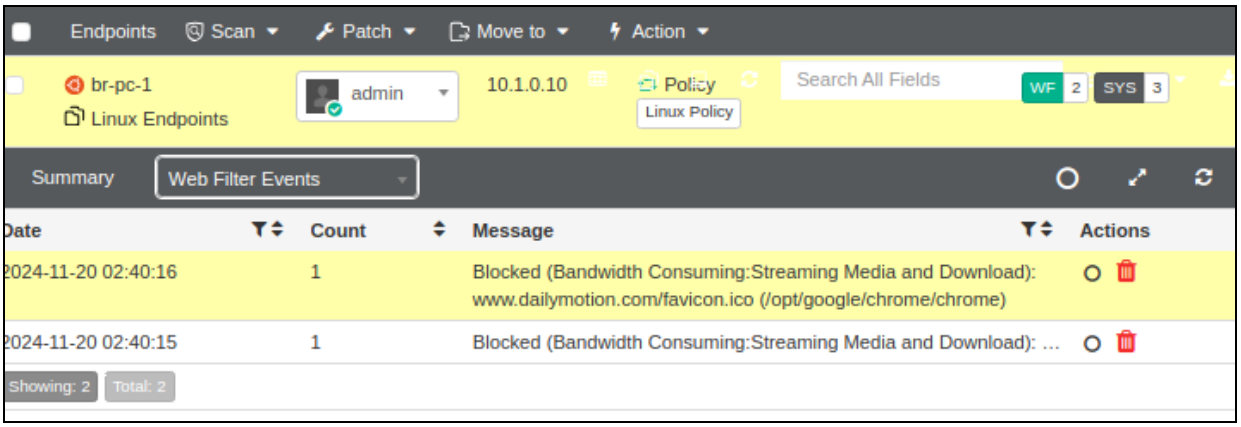


To test the web exclusion list

1. Continuing on the BR-PC-1 VM, open a new browser tab, and then try to access the website `www.fortiguard.com/wftest/25.html`.
   This website is allowed because it matches an exclusion list to bypass the FortiGuard block category.

To review the web filter profile events for the category-based filter

1. Return to the FortiClient EMS GUI, click **Endpoints** > **All Endpoints**, and then click **br-pc-1**.
2. Click **Web Filter Events**.



According to the events, `www.dailymotion.com` was blocked because the URL belonged to a denied category—**Bandwidth Consuming: Streaming Media and Download**.

Lab 6: ZTNA

There is no lab associated with Lesson 6 at this time. You will configure ZTNA after Lesson 7.

Lab 7: Zero Trust Network Access

In this lab, you will learn about the use of a zero trust network access (ZTNA) proxy for remote access to specific applications. You will configure the required configuration on FortiClient EMS, FortiGate, and FortiClient.

Objectives

- Add FortiClient EMS to the Security Fabric
- Verify the FortiGate and FortiClient EMS connection
- Configure security posture tagging rules
- Enable the ZTNA feature on FortiGate and verify security posture tags
- Configure a basic HTTPS access proxy with SSL certificate-based authentication
- Configure a TCP forwarding access proxy SSH
- Configure ZTNA for SaaS application access

Time to Complete

Estimated: 60 minutes

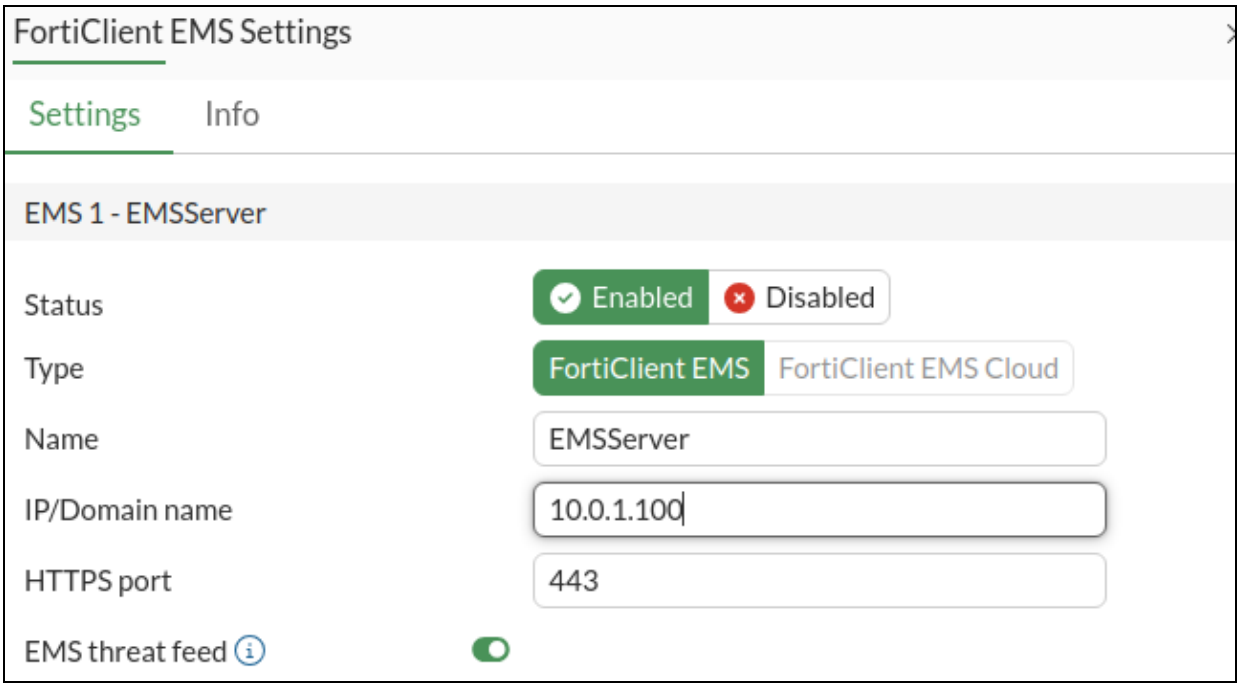
Exercise 1: Adding FortiClient EMS to the Security Fabric

In this exercise, you will add FortiClient EMS to the Security Fabric.

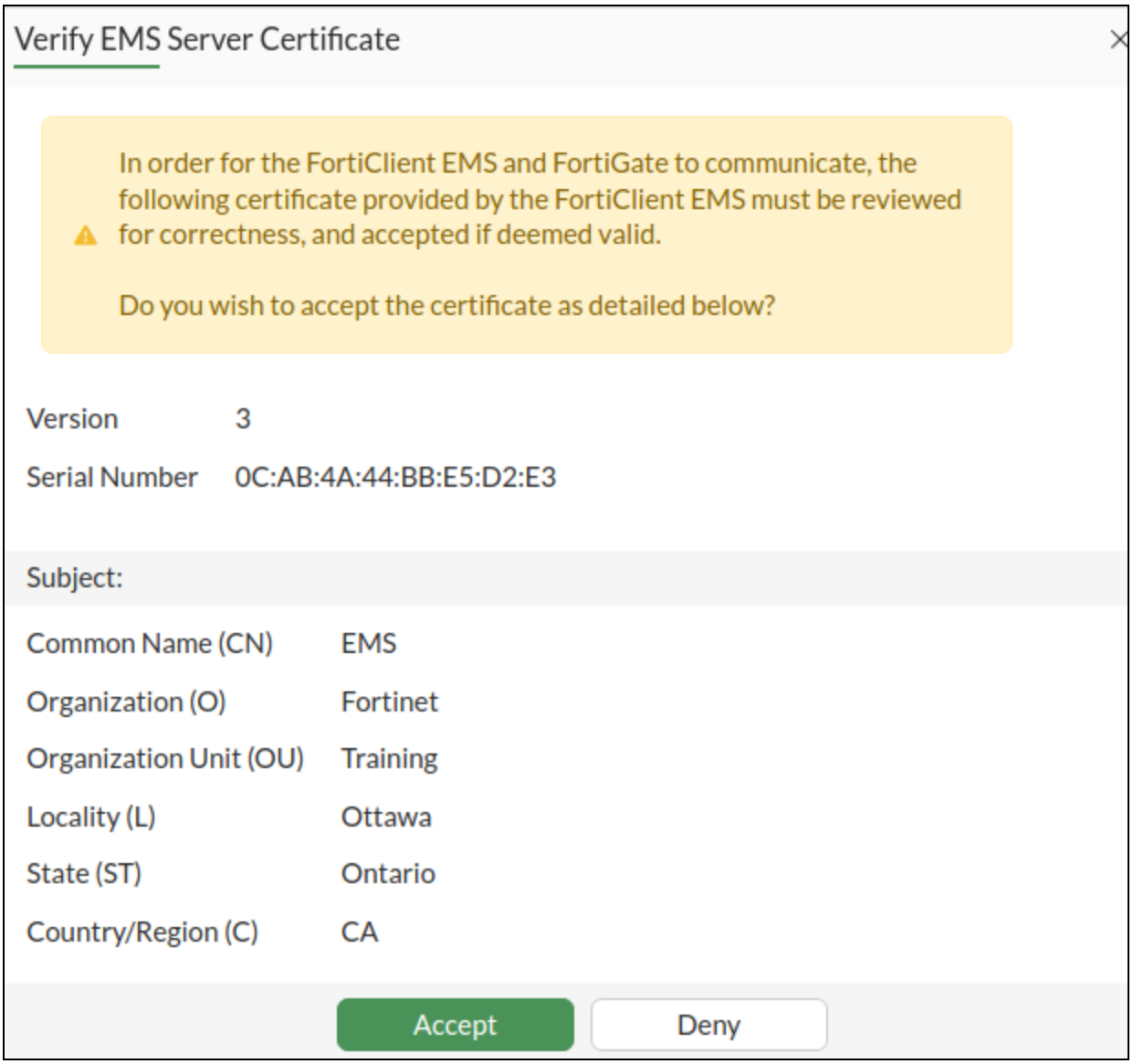
To integrate FortiClient EMS with FortiGate

1. On the HQ-EMS-1 VM, open Google Chrome, and then in **Bookmarks**, select the **HQ-NGFW** login page bookmark.
2. Log in to the FortiGate GUI with the following credentials:
   - Username: `admin`
   - Password: `Fortinet1!`
3. Click **Security Fabric** > **Fabric Connectors**.
4. In the list, select **FortiClient EMS**, and then click **Edit**.
5. In the **FortiClient EMS Settings** window, select **EMS 1**, click **Enabled**, and then configure the following settings:

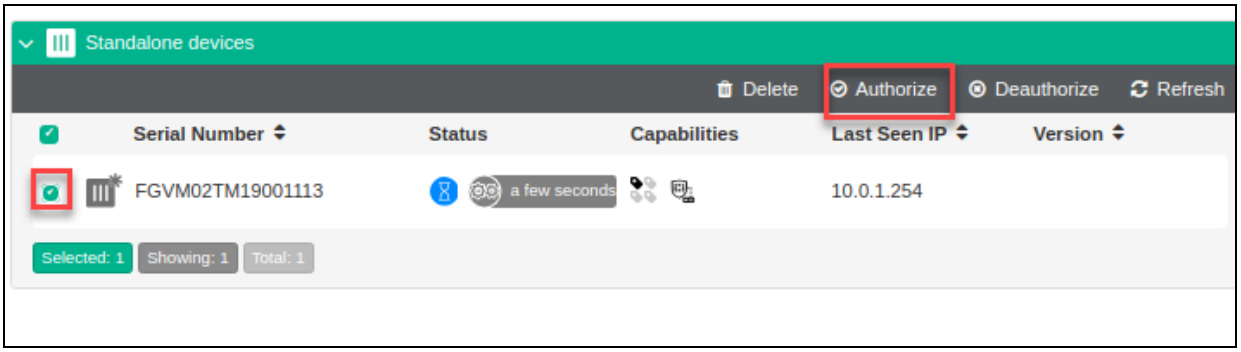
Field	Value
Name	EMSServer
IP/Domain name	10.0.1.100



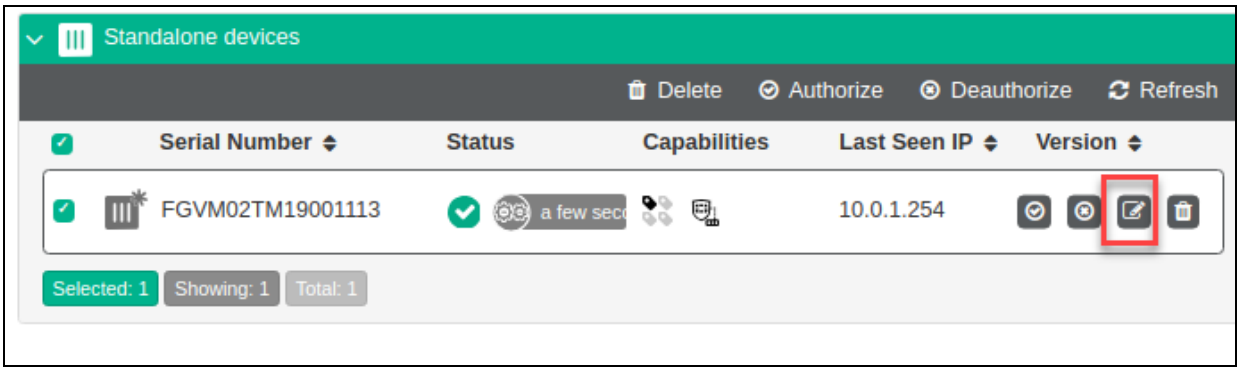
6. Click **OK**, and then click **Accept** to accept the certificate and save the settings.



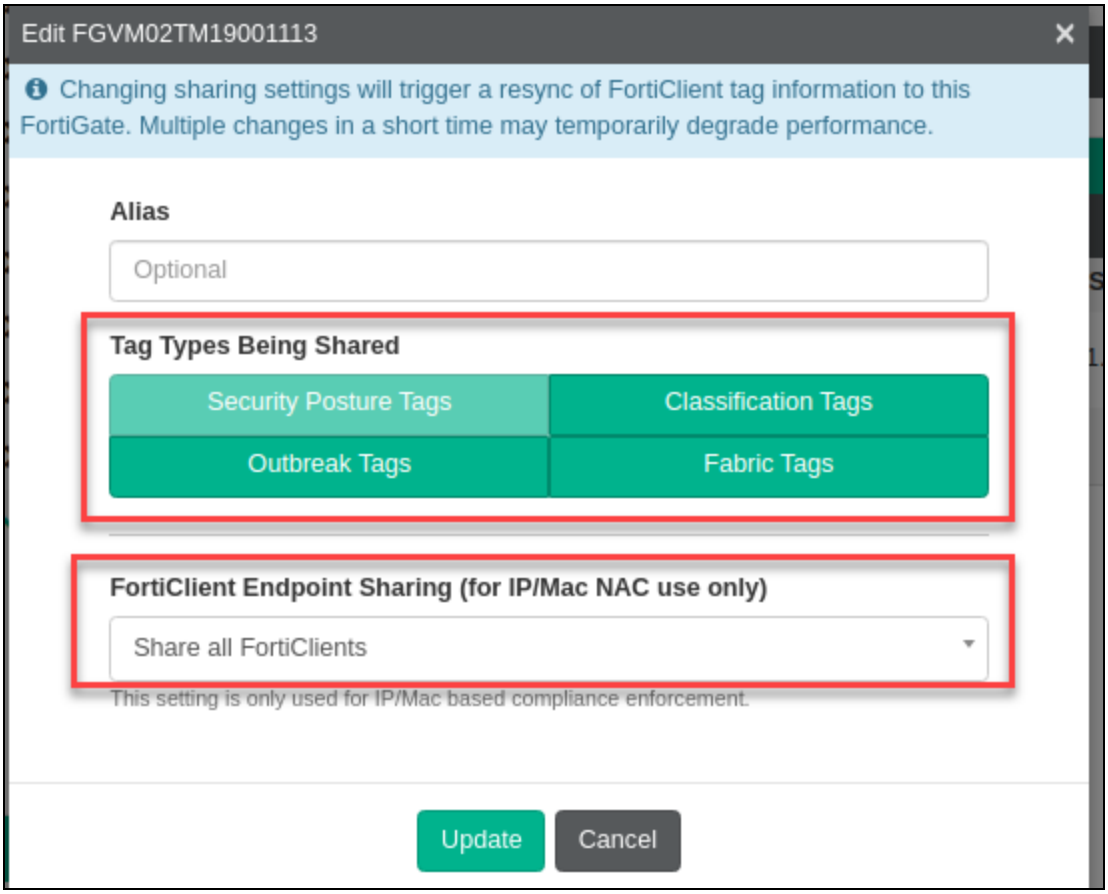
7. Click **Close** to close the **FortiClient EMS Status** warning window.
8. On the FortiClient EMS GUI, click **Administration** > **Fabric Devices**.
9. Select the checkbox for the FortiGate, and then click **Authorize**.



10. Select the checkbox for the FortiGate again, and then click the edit icon  .



11. In the **Tag Types Being Shared** field, select all tag types.
12. In the **FortiClient Endpoint Sharing (for IP/Mac NAC user only)** field, select **Share all FortiClients**.
13. Click **Update** to apply the changes.



Exercise 2: Configuring Security Posture Tags, Tagging Rules, and Features

In this exercise, you will verify the connection between FortiClient, FortiClient EMS, and FortiGate. You will also configure security posture tags and tagging rules, and then verify if the tags are synchronized on FortiClient and FortiGate. These tags will be used in the next exercises to authorize user traffic based on security posture tagging rules configured on FortiClient EMS.

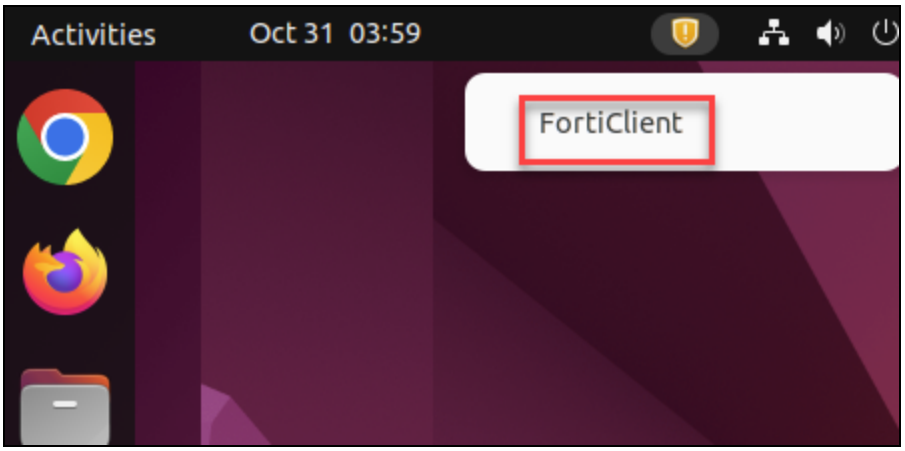
Verify the Connection Between FortiClient, FortiClient EMS, and FortiGate

Establishing device identity and device trust between FortiClient, FortiClient EMS, and FortiGate is integral to ZTNA setup. All of these devices must have a stable connection in order to exchange the information required for ZTNA tagging to work correctly.

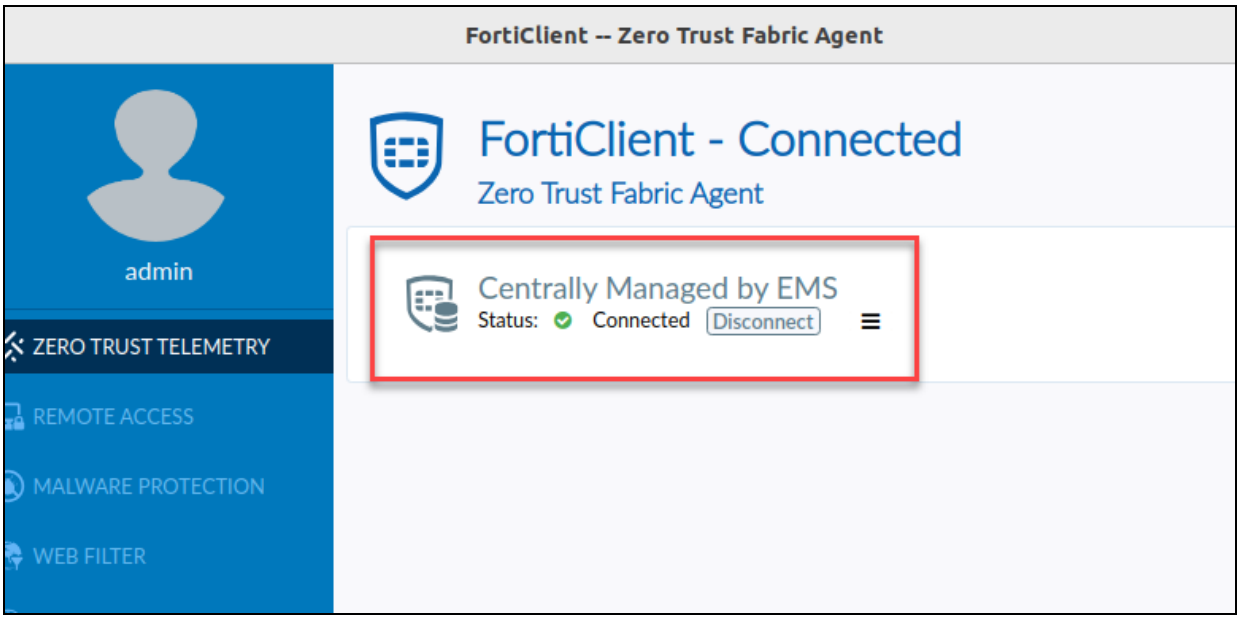
You will verify the status of telemetry connections on the FortiClient console and FortiGate Fabric connector.

To verify the FortiClient to FortiClient EMS connection

1. On the BR-PC-1 VM, click the FortiClient icon, and then click **FortiClient** to open the FortiClient GUI.

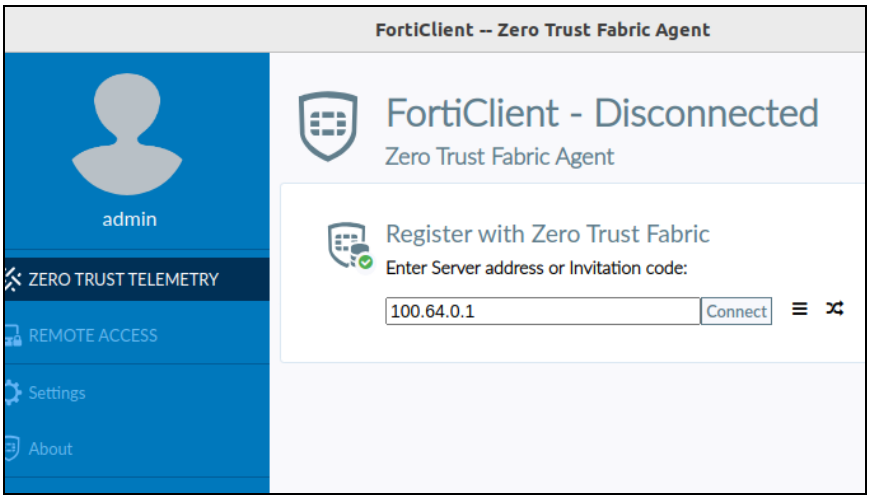


2. In the **ZERO TRUST TELEMETRY** section, ensure that the status of **Centrally Managed by EMS** is **Connected**.



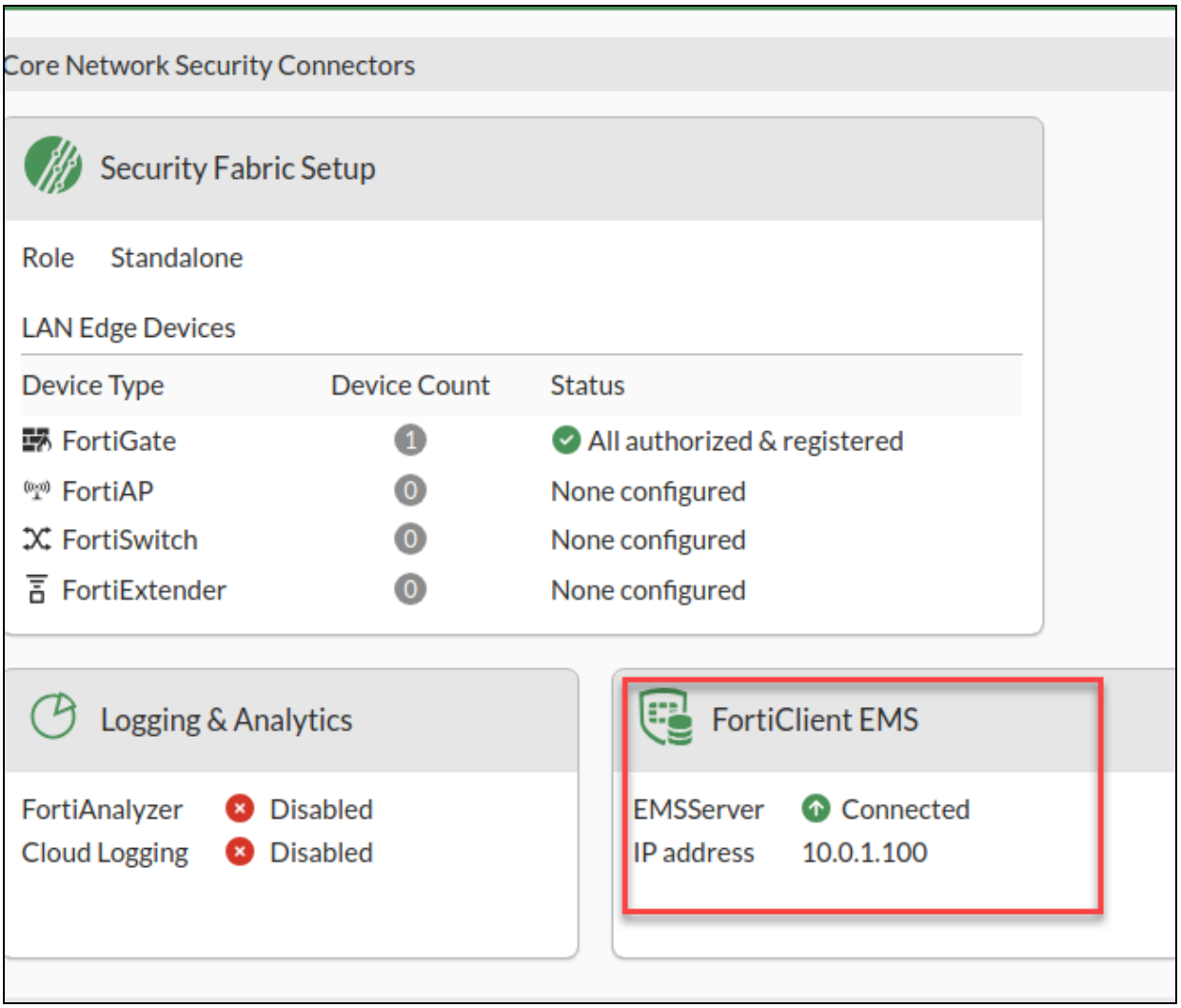
If the status is **Not reachable**, you must reconnect the endpoint.

1. In the **ZERO TRUST TELEMETRY** section, click **Disconnect**.
2. In the **Enter Server address or Invitation code** field, type `100.64.0.1`, and then click **Connect** to reconnect the BR-PC-1 VM to FortiClient EMS.



To verify FortiClient EMS as the Fabric Connector

1. On the HQ-EMS-1 VM, open Chrome, and then log in to the HQ-NGFW FortiGate GUI.
2. Click **Security Fabric** > **Fabric Connectors**.
3. In the **FortiClient EMS** section, in the **EMSServer** field, see the connector status.
   The up arrow should be green.



You can also verify the status by entering the following command on the FortiGate CLI:

```
diagnose endpoint fctems test-connectivity <fctems ID>
```

```
HQ-NGFW-1 # diagnose endpoint fctems test-connectivity 1
Connection test was successful.
```

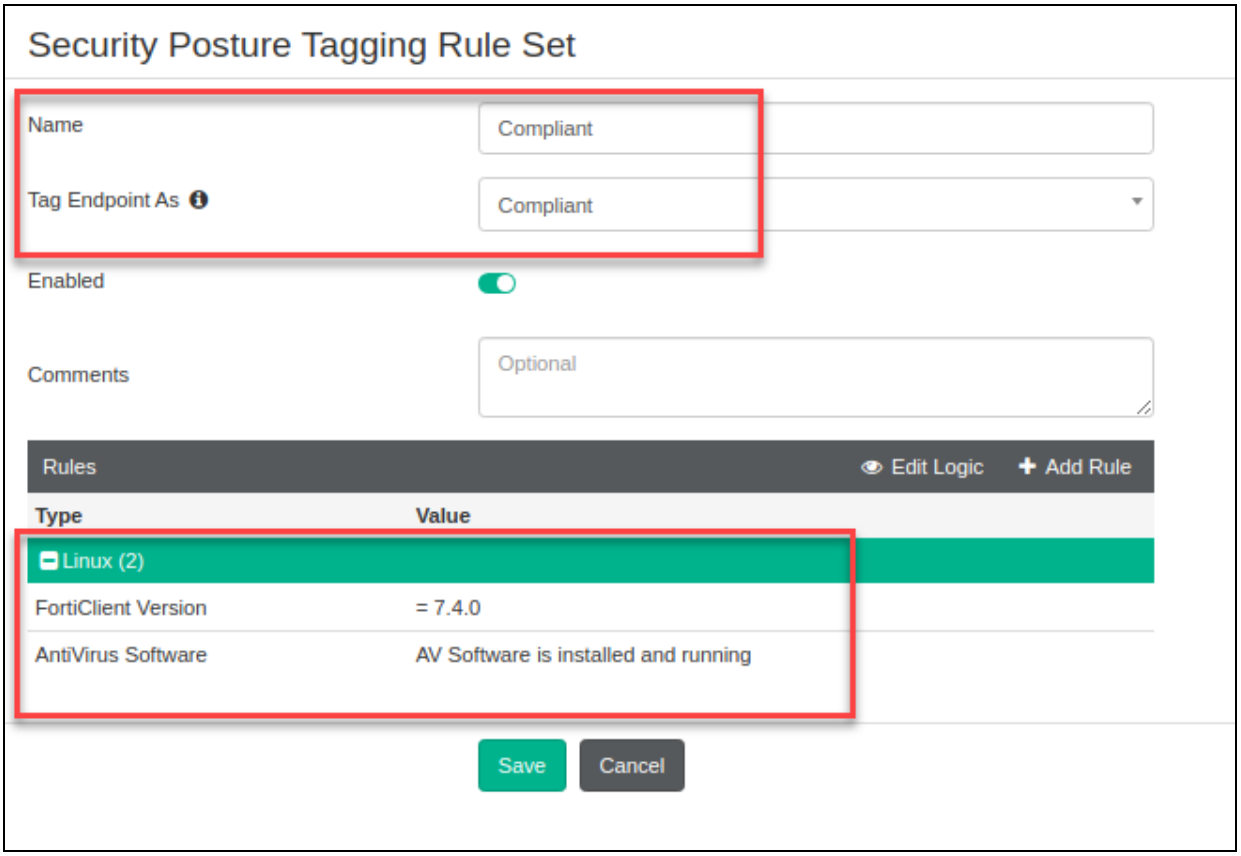
Configure FortiClient EMS Security Posture Tagging Rules

FortiClient EMS uses security posture tagging rules to tag endpoints based on the information that it has on each endpoint. The tags are shared with FortiGate, which then uses them to assign authorization to user traffic.

You will configure security posture tagging rules on the FortiClient EMS server.

To configure the FortiClient EMS security posture tagging rule for compliant endpoints

1. On the FortiClient EMS GUI, click **Security Posture Tags** > **Security Posture Tagging Rules**.
2. Click **Add**.
3. In the **Name** field, type `Compliant`.
4. In the **Tag Endpoint As** field, type `Compliant`, and then press `Enter`.
5. In the **Rules** section, click **Add Rule**, and then in the **OS** field, select **Linux**.
6. In the **Rule Type** field, select **FortiClient Version**.
7. In the **FortiClient Version** field, type `7.4.0`, and then click **Save**.
8. Click **Add Rule** again to create a second rule.
9. In the **OS** field, select **Linux**.
10. In the **Rule Type** field, select **AntiVirus Software**.
11. In the **AV Software** field, select **AntiVirus Software is installed and running**, and then click **Save**.

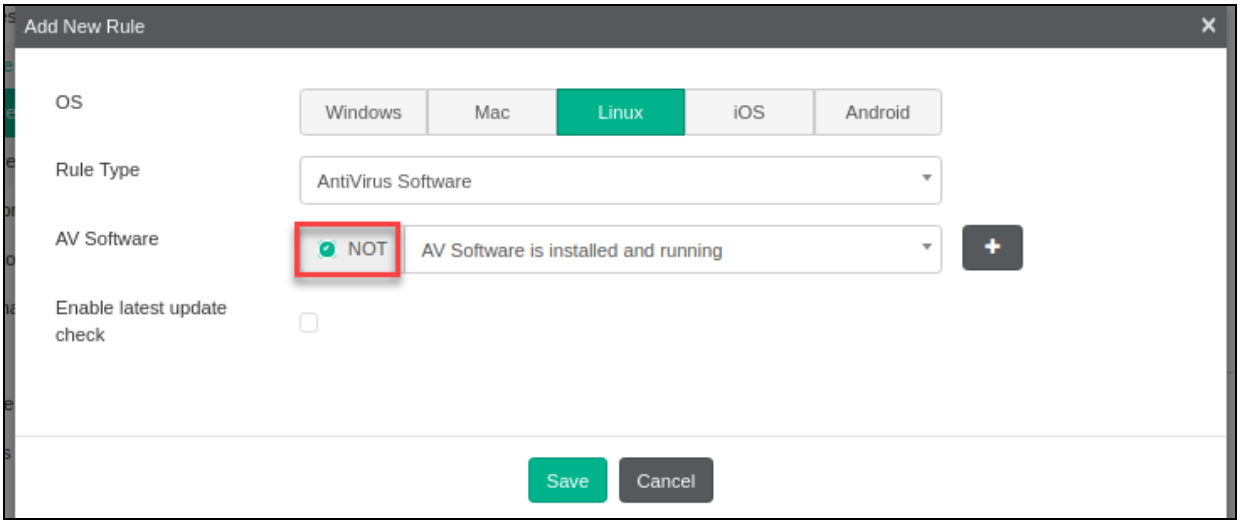


12. Click **Save** to save this security posture tagging rule set.

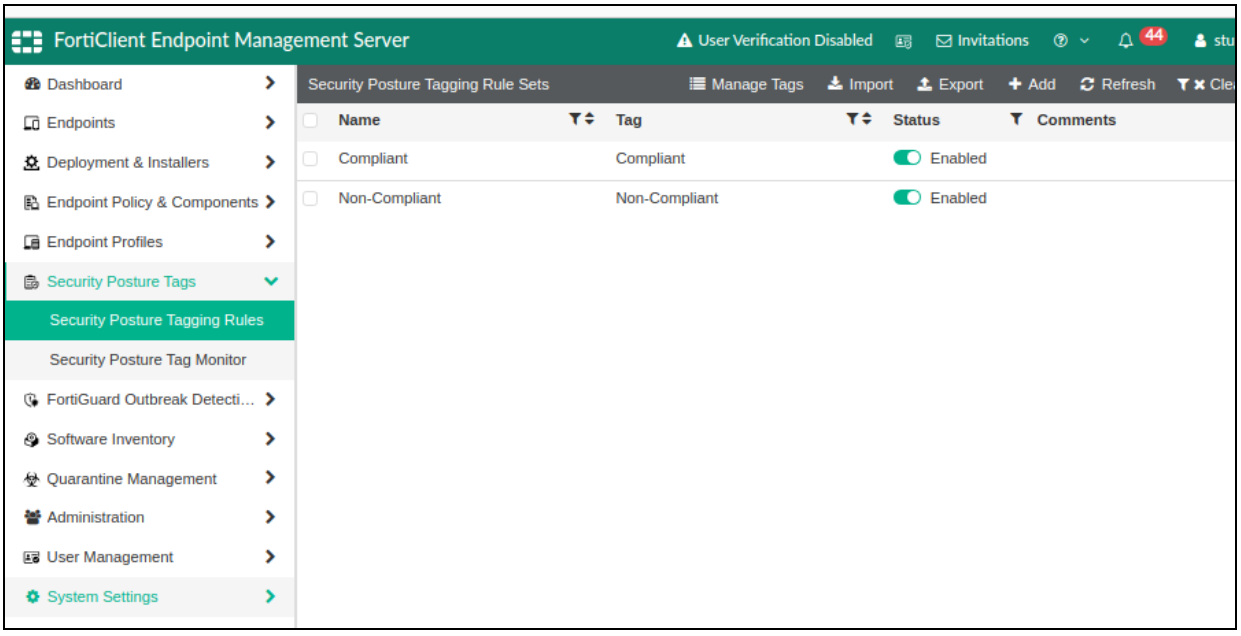
To configure the FortiClient EMS security posture tagging rule for detecting non-compliant endpoints

1. Click **Security Posture Tags** > **Security Posture Tagging Rules**.
2. Click **Add**.
3. In the **Name** field, type `Non-Compliant`.
4. In the **Tag Endpoint As** field, type `Non-Compliant`, and then press `Enter`.
5. Click **Add Rule** to create a rule.

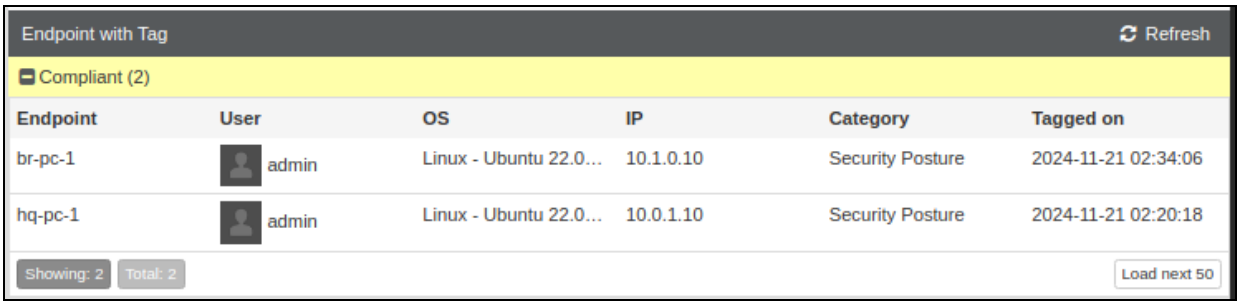
6. In the **OS** field, select **Linux**.
7. In the **Rule Type** field, select **AntiVirus Software**.
8. In the **AV Software** field, select **AntiVirus Software is installed and running**, and then select the **NOT** checkbox.



9. Click **Save**.
10. Click **Save** to save this security posture tagging rule.
    Both rules appear in the **Security Posture Tagging Rule Sets** section.

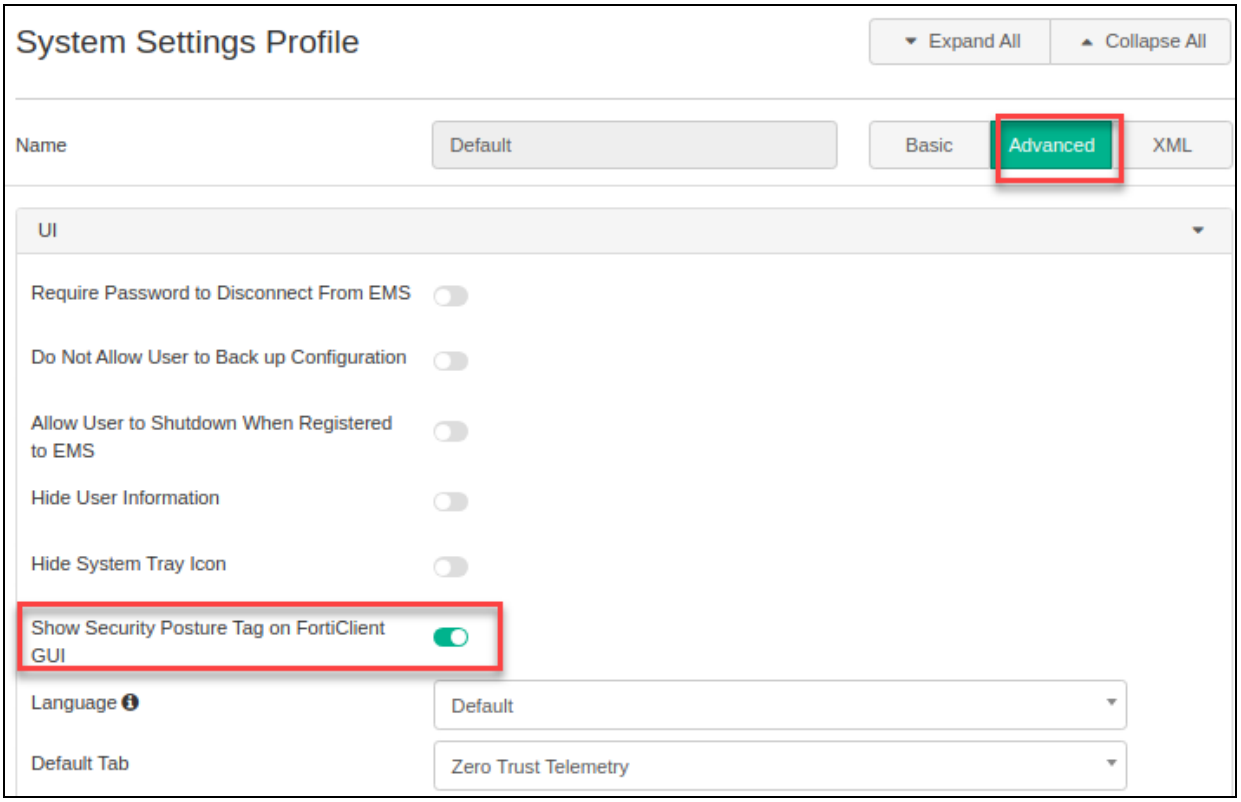


11. Click **Security Posture Tags** > **Security Posture Tag Monitor**.
    br-pc-1 and **hq-pc-1** are tagged as **Compliant**. If this does not appear immediately, in the upper-right corner, click **Refresh**.

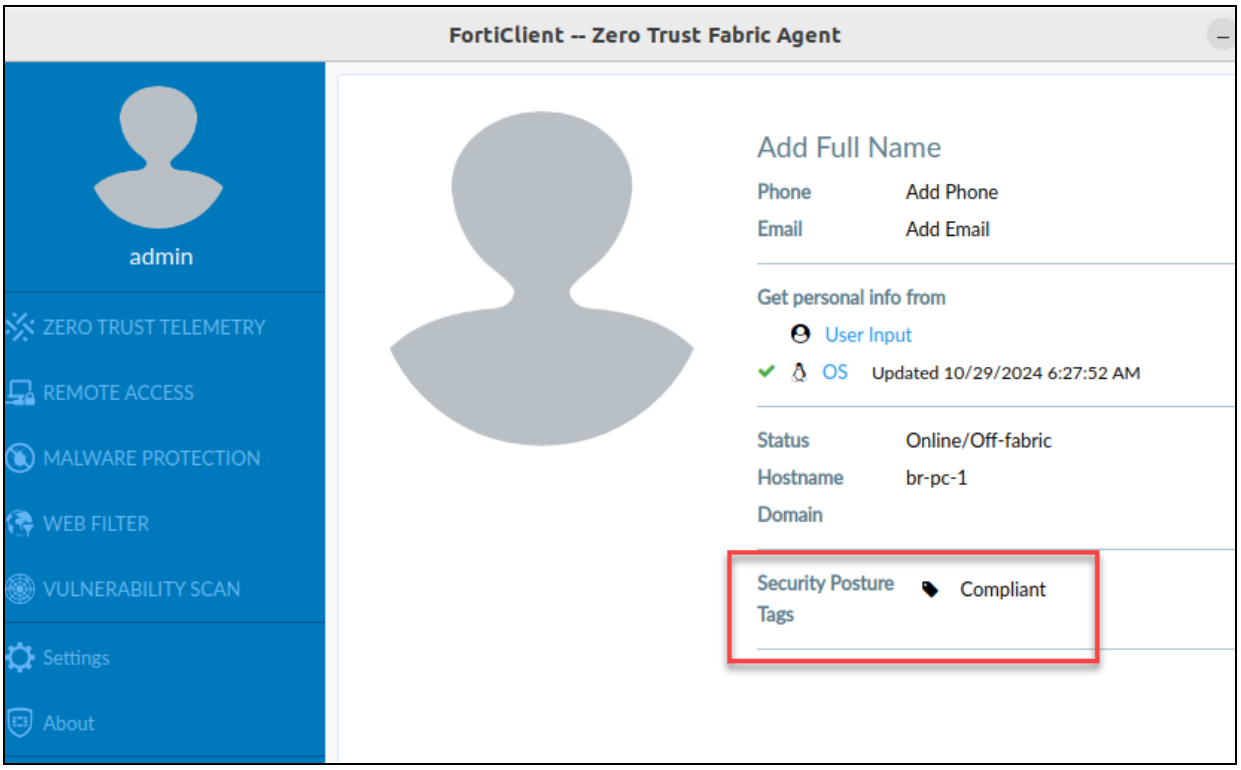


To configure the security posture tag to display on FortiClient

1. Continuing on the FortiClient EMS GUI, click **Endpoint Profiles** > **System Settings**.
2. Select the **Default** profile, click **Edit**, and then click **Advanced**.
3. On the **System Settings Profile** page, in the **UI** section, enable **Show Security Posture Tag on FortiClient GUI**.



4. Click **Save** to apply the changes.
5. On the BR-PC-1 VM, on the FortiClient GUI, click the user avatar.
   The **Security Posture Tags** field shows the currently detected tags.



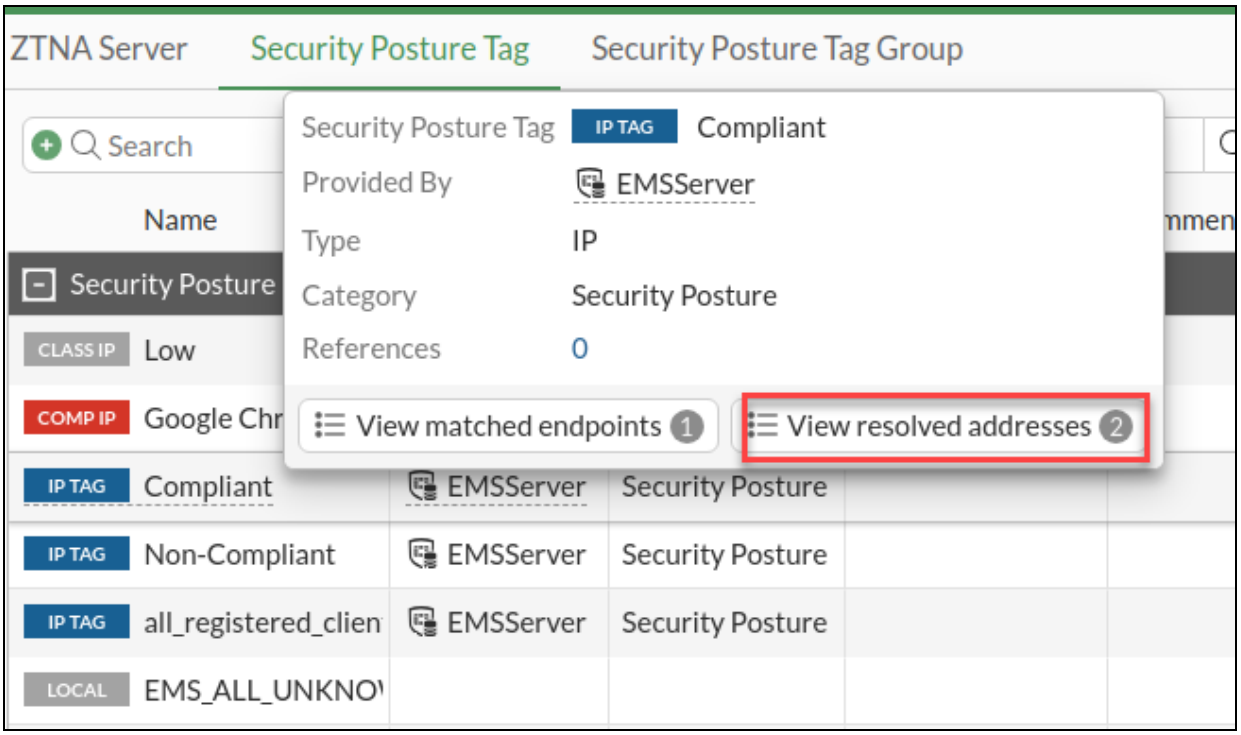
You may need to wait until the next FortiClient synchronization cycle with FortiClient EMS before the tags appear on the FortiClient console.

Enable the ZTNA Feature and Verify That ZTNA Tags Are Synchronized

You will enable the ZTNA feature on FortiGate, and then verify that the tags are synchronized between FortiClient EMS and FortiGate.

To enable the ZTNA feature and verify that ZTNA tags are synchronized on FortiGate

1. Return to the FortiGate GUI, click **System** > **Feature Visibility**, enable **Zero Trust Network Access**, and then click **Apply**.
2. Click **Policy & Objects** > **ZTNA**, and then click the **Security Posture Tag** tab.
3. Expand **Security Posture IP Tag**.
   Security posture tags should be displayed.
4. Hover over the **Compliant** tag, and then click **View resolved addresses** to see the IP addresses of the endpoints.



Exercise 3: Configuring an HTTPS Access Proxy With Certificate Authentication and Security Posture Tags

In this exercise, you will configure a basic HTTPS access proxy with SSL certificate-based authentication. A client certificate is obtained when an endpoint registers with FortiClient EMS. FortiClient automatically submits a CSR request and FortiClient EMS signs and returns the client certificate. The endpoint information is synchronized between FortiGate and FortiClient EMS. You will also configure ZTNA policies to apply security posture checks using security posture tags.

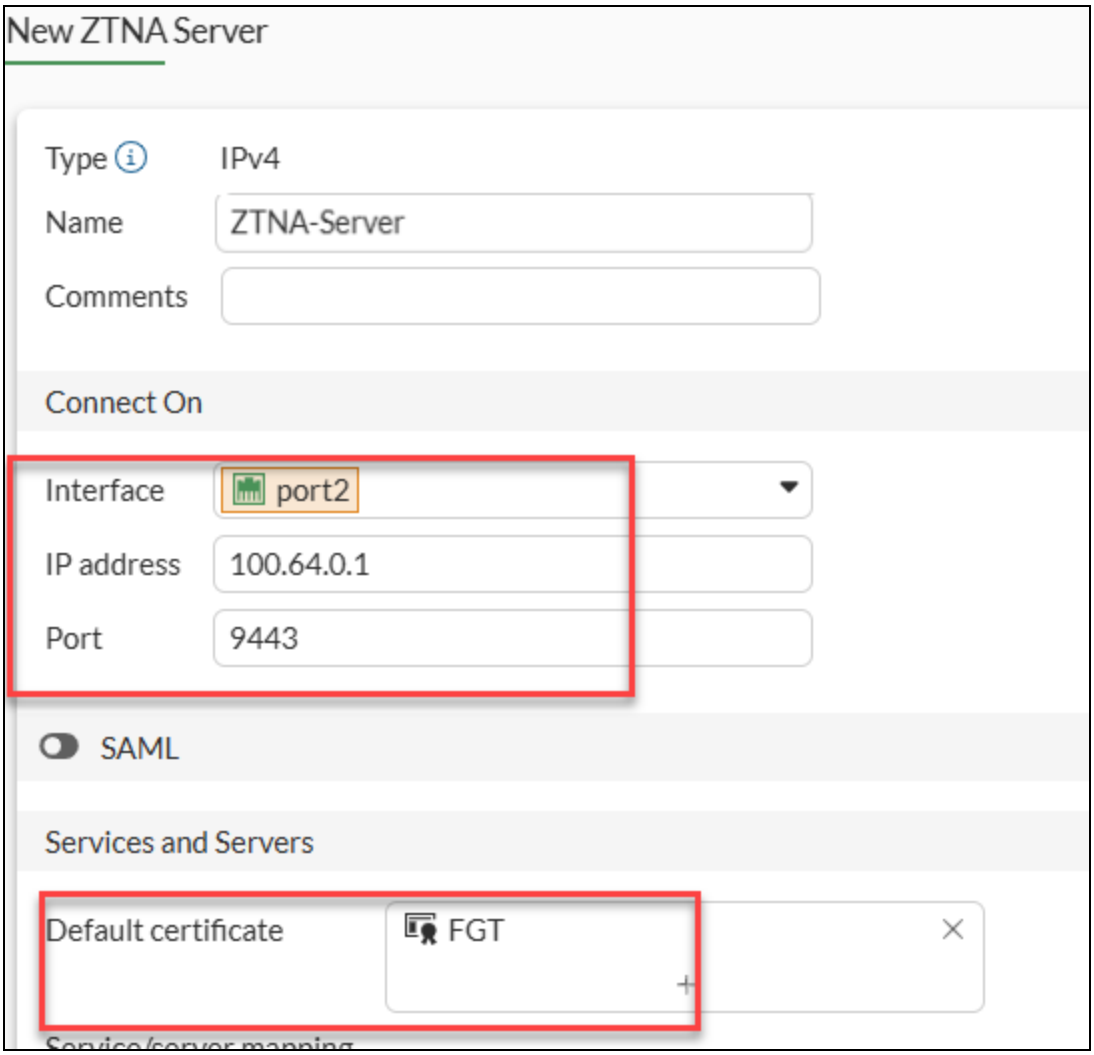
Configure a Basic HTTPS Access Proxy With Certificate-Based Authentication and Security Posture Tags

You will create a ZTNA server, real server, and ZTNA rule on FortiGate, which are all required by the HTTPS access proxy setup.

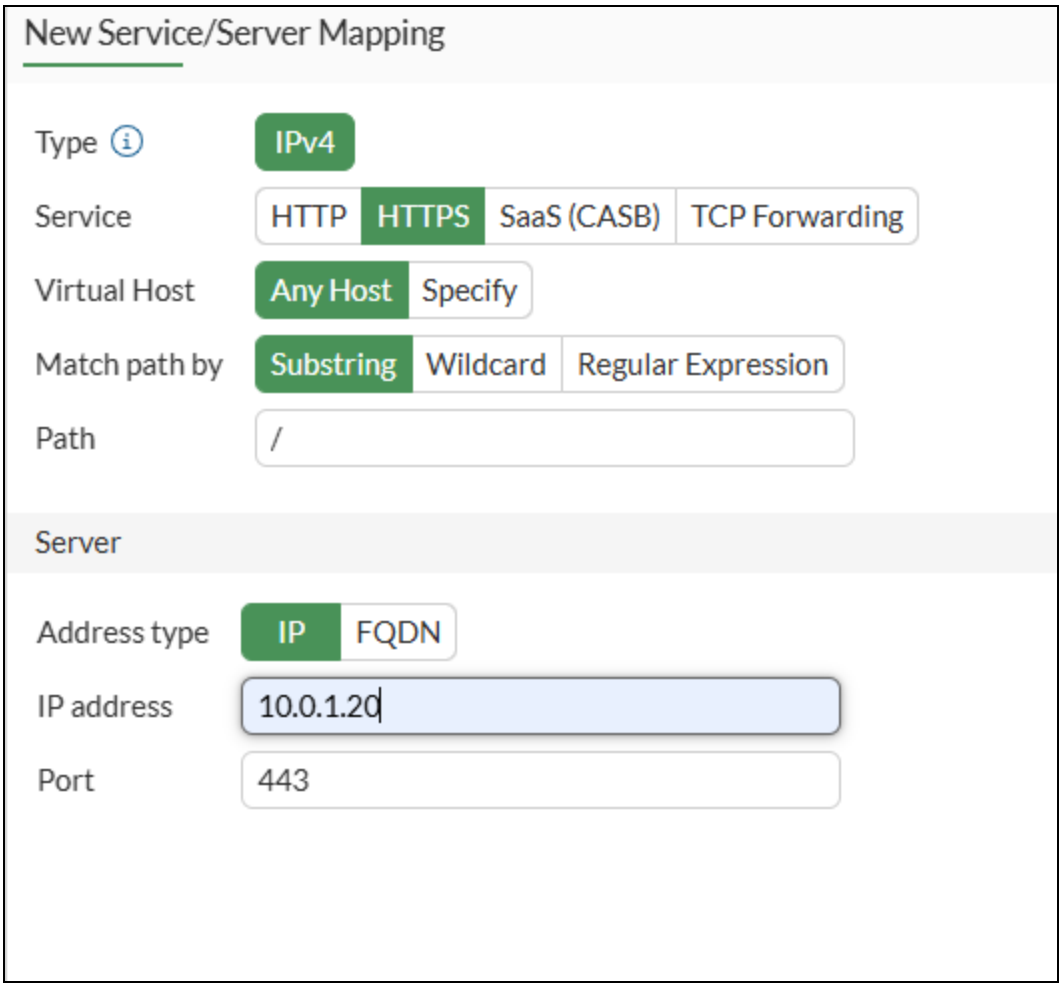
To configure the ZTNA server or HTTPS access proxy VIP

1. On the HQ-EMS-1 VM, open Chrome, and then in **Bookmarks**, select the **HQ-NGFW** login page bookmark.
2. Log in to the FortiGate GUI with the following credentials:
   - Username: `admin`
   - Password: `Fortinet1!`
3. Click **Policy & Objects** > **ZTNA**, and then click the **ZTNA Server** tab.
4. Click **Create New** to create a new server, and then configure the following settings:

Field	Value
Name	ZTNA-Server
Interface	Select **port2**.
IP address	100.64.0.1
Port	9443
Default certificate	Select **FGT**.



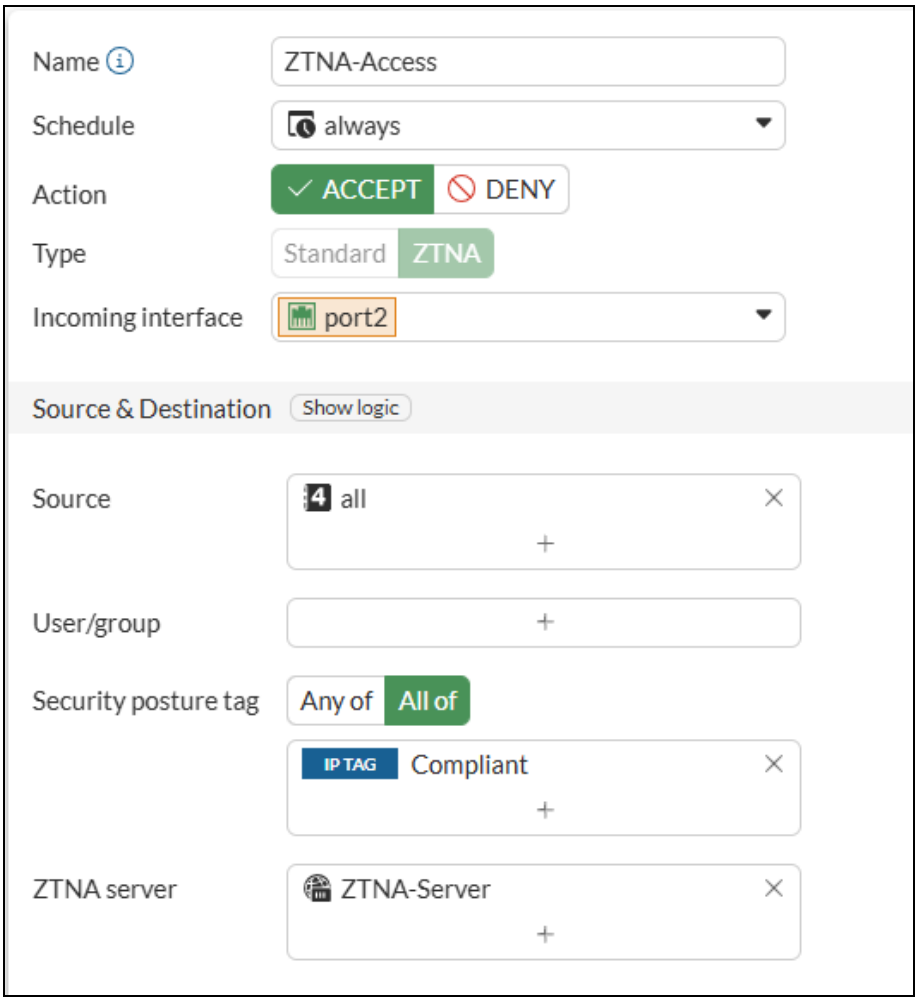
5. In the **Service/server mapping** section, click **Create New**.
6. In the **Service** field, ensure that **HTTPS** is selected.
7. In the **Virtual Host** field, ensure that **Any Host** is selected.
8. In the **Match path by** field, ensure that **Substring** is selected.
9. Leave the **Path** field at the default value of `/`.
10. In the **Server** section, in the **IP address** field, type `10.0.1.20`, in the **Port** field, type `443`, and then click **OK**.



11. Click **OK** to save the **Service/server mapping** settings.
12. Click **OK** to complete the ZTNA server setup.

To configure a ZTNA policy

1. Click **Policy & Objects** > **Firewall Policy**.
2. Click **Create New** to create a new rule.
3. In the **Name** field, type `ZTNA-Access`.
4. In the **Schedule** field, ensure that **always** is selected.
5. In the **Action** field, select **ACCEPT**.
6. In the **Type** field, select **ZTNA**.
7. In the **Incoming interface** field, select **port2**.
8. In the **Source** field, select **all**.
9. In the **Security posture tag** field, select **All of**, and then add **IP TAG Compliant**.
10. In the **ZTNA server** field, select **ZTNA-Server**.
11. In the **Logging Options** section, ensure that the **Log Allowed Traffic** field is set to **All Sessions**.
12. Ensure that **Enable this policy** is enabled.



13. Click **OK** to save the settings.

To create a deny policy for compliance failure

1. Click **Policy & Objects** > **Firewall Policy**, and then click **Create New**.
2. In the **Create New Policy** window, configure the following settings:

Field	Value
Name	ZTNA-Compliance-Failure
Schedule	always
Action	DENY
Type	ZTNA
Incoming interface	port2
Source	all

Field	Value
Security posture tag	All of IP TAG Non-Compliant
ZTNA server	ZTNA-Server
Log violation traffic	Enabled
Enable this policy	Enabled

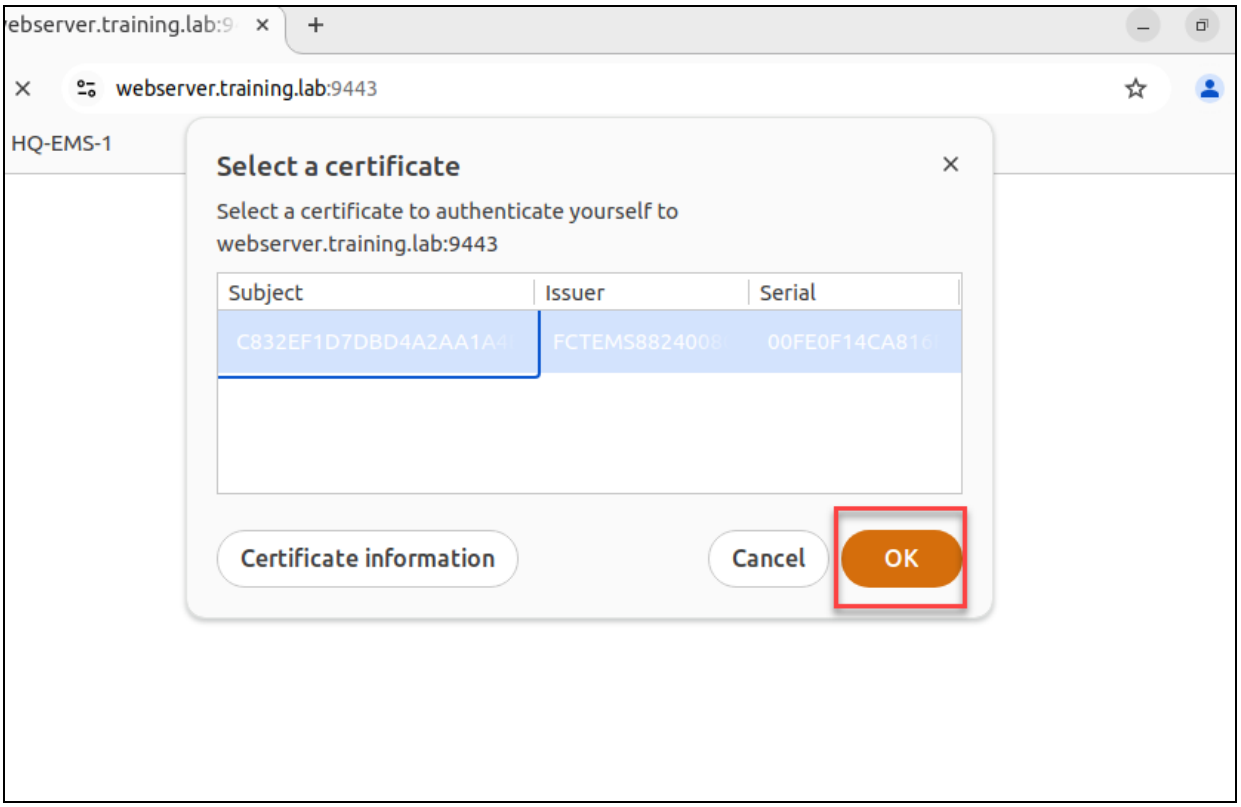
3. Click **OK** to save the new rule.
4. Move this policy above the **ZTNA-Access** policy.

Test Remote Access to the HTTPS Access Proxy

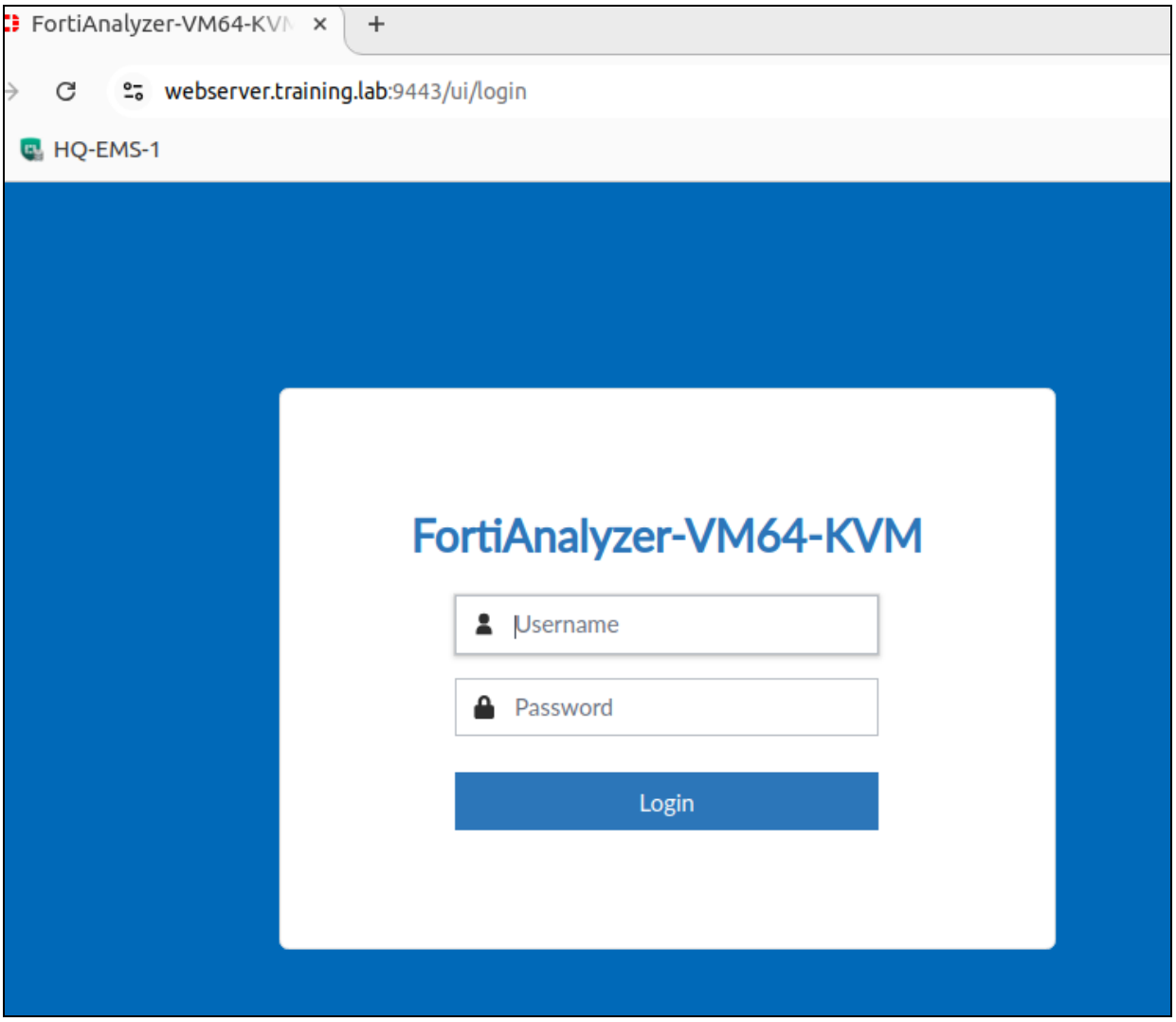
You will test the HTTPS access proxy connection for authorized users.

To test the connection for authorized users

1. On the BR-PC-1 VM, open a terminal window.
2. Enter `ping -c 4 webserver.training.lab`, and then verify that it resolves to `100.64.0.1`.
3. Open Chrome, and then enter `webserver.training.lab:9443`.
   The browser prompts you for the client certificate to use.
4. Select the EMS signed certificate, and then click **OK**.



Access to the web server should be allowed. This exercise uses the FortiAnalyzer login page to demonstrate the web page.

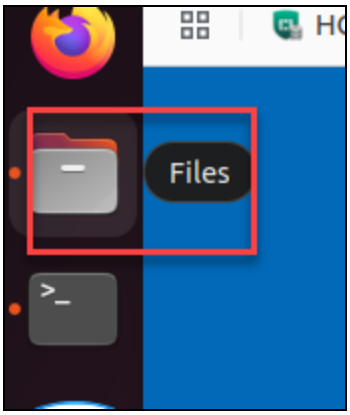


5. Close Chrome.

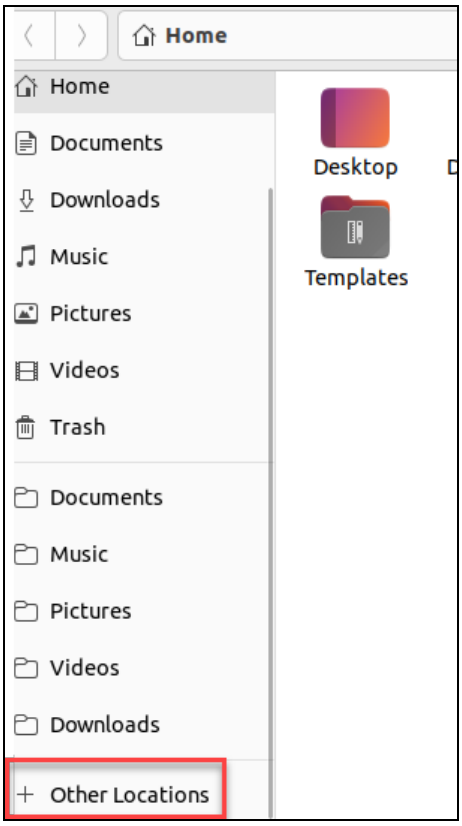
By default, client certificate authentication is enabled on the access proxy, so when the HTTPS request is received, the FortiGate WAD process challenges the client to identify itself with its certificate.

To locate the certificate on the endpoint and match it on FortiClient EMS and FortiGate

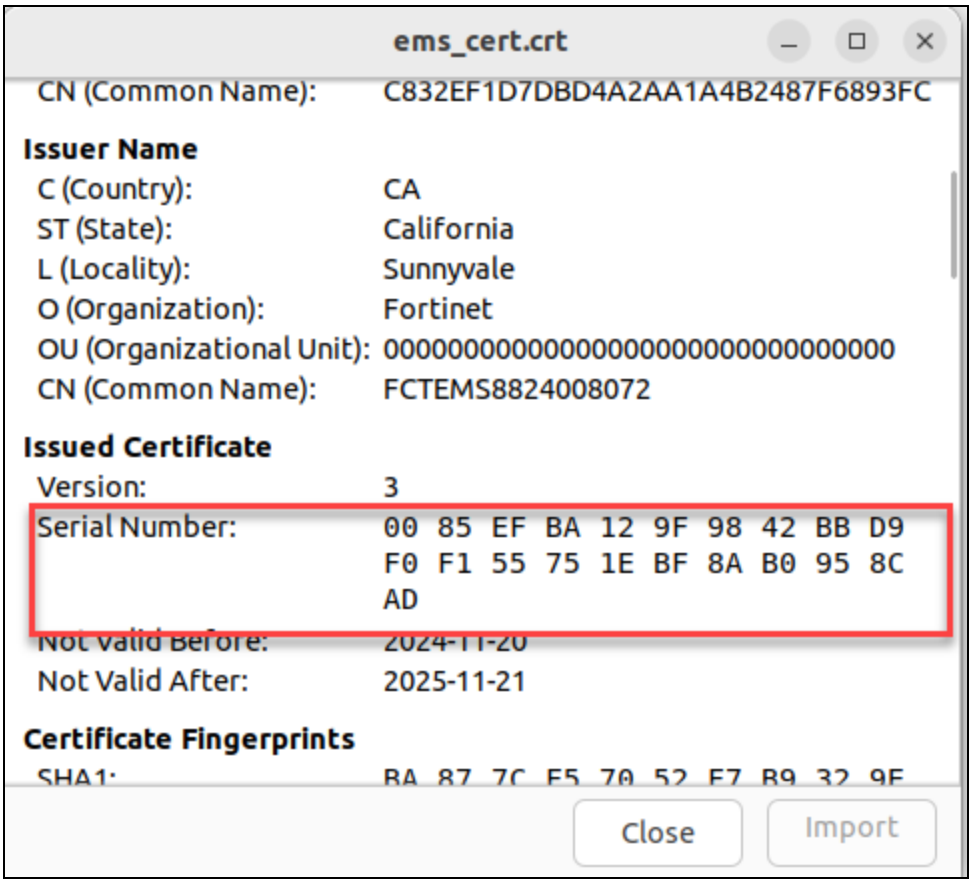
1. Continuing on the BR-PC-1 VM, click the **Files** icon.



2. Click **Other Locations**.

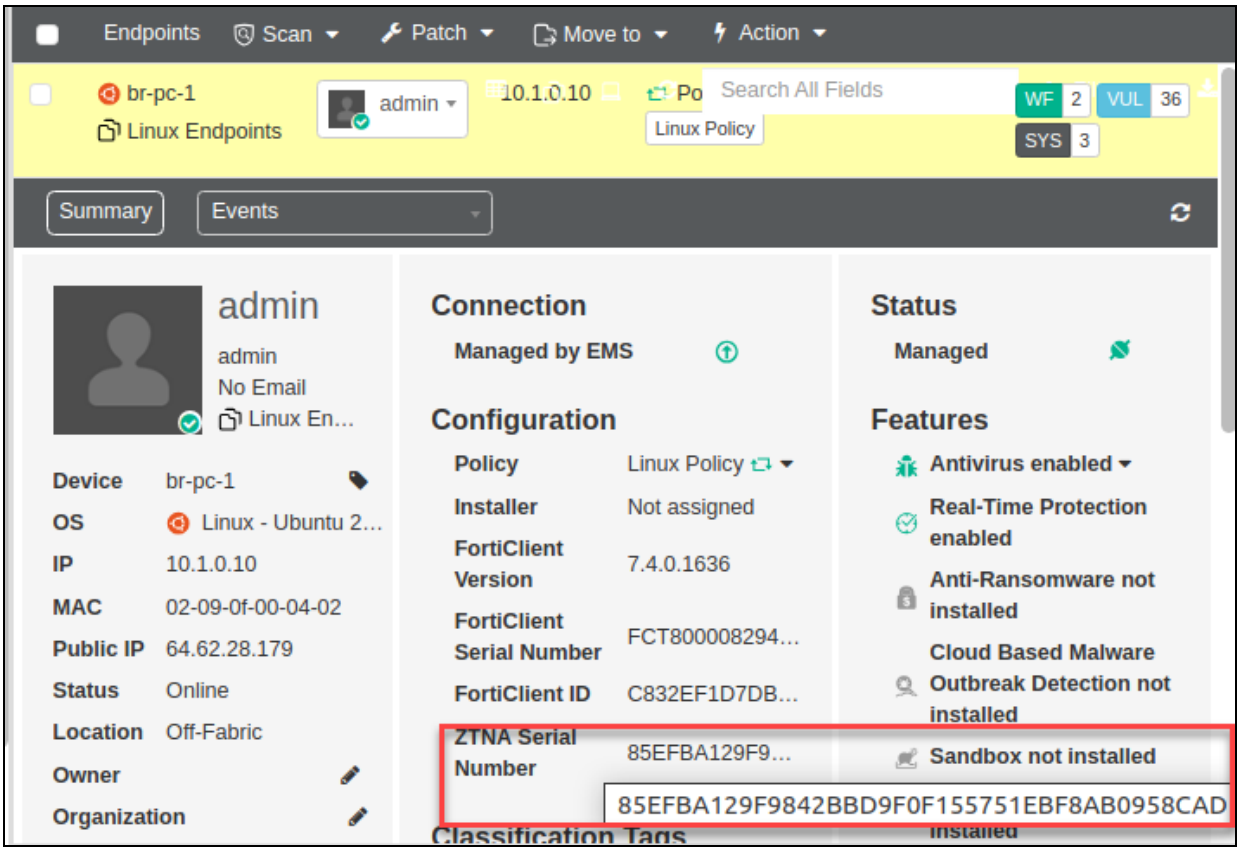


3. Double-click **Computer** > **opt** > **forticlient**.
4. Double-click **ems_cert.crt** to view the certificate.
5. Click **Details**, and then find the serial number of the certificate.



Your certificate might not match what is shown in this example.

6. Return to the FortiClient EMS GUI, and then click **Endpoints** > **All Endpoints**.
7. In the list, click **br-pc-1**, and then in the **Configuration** section, check the **FortiClient ID** and **ZTNA Serial Number** fields to match the information.



Your FortiClient ID and certificate serial number might not match what is shown in this example.

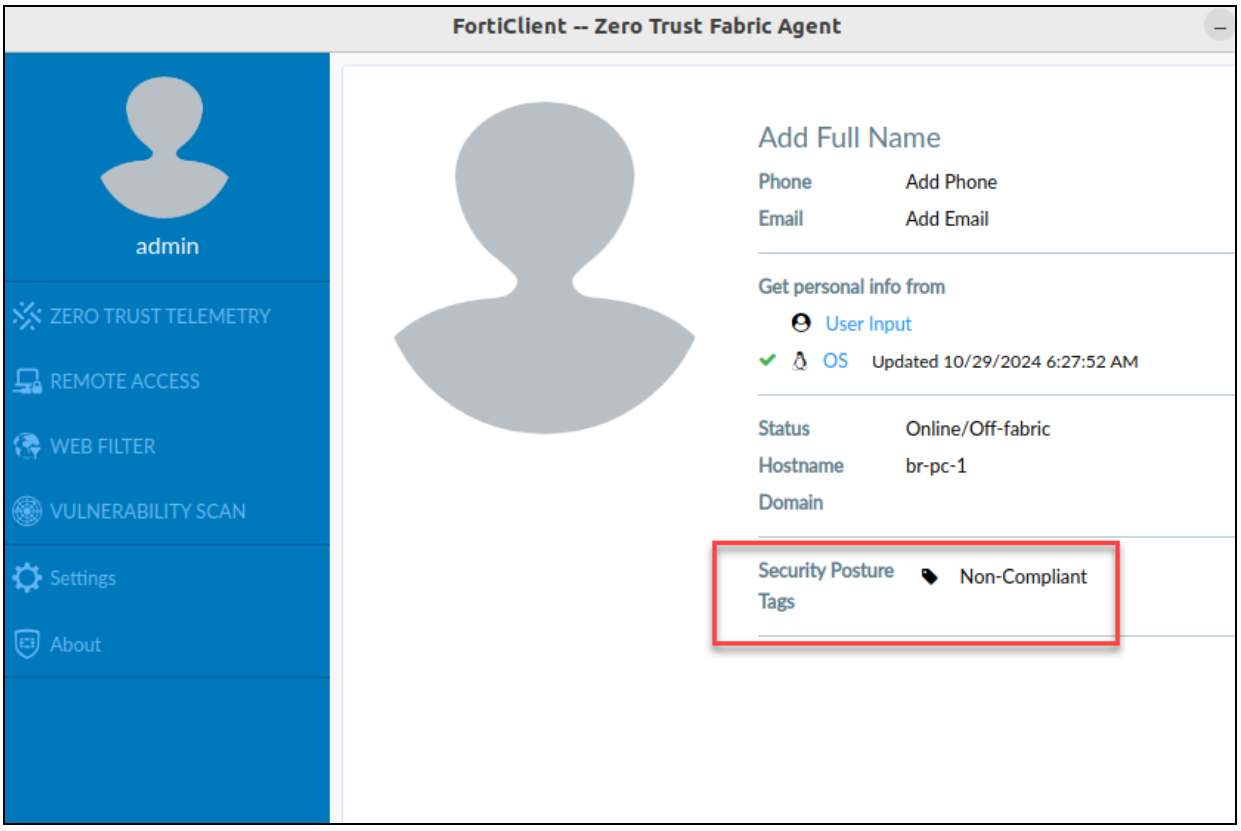
Verify the Behavior When the Security Posture Changes on the Endpoint

You will test a scenario where the endpoint security posture changes because no antivirus software is installed on the endpoint. You will disable malware protection in the endpoint profile to trigger security posture tag detection, which you configured in a previous exercise.

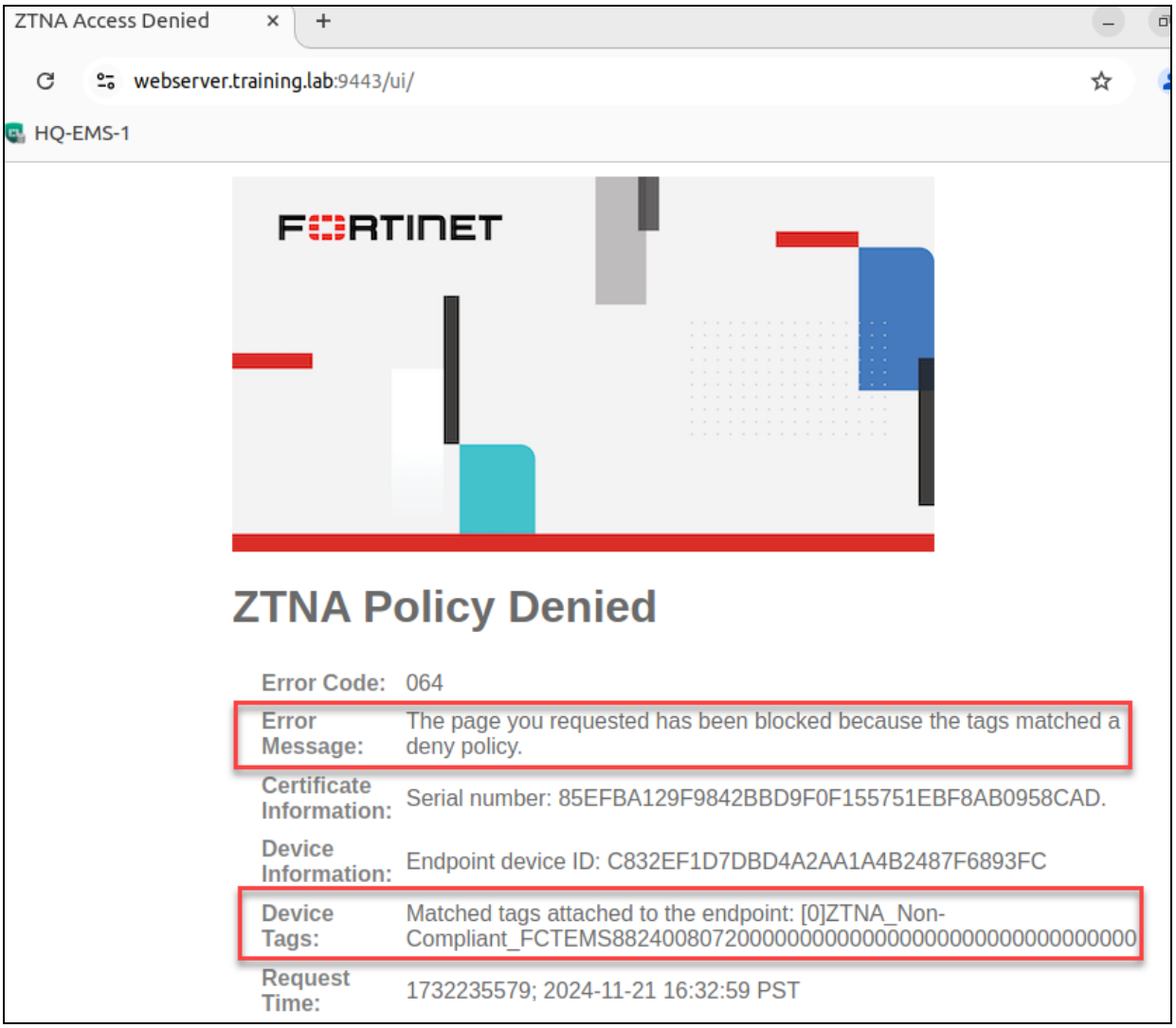
To disable antivirus and tag an endpoint

1. On the FortiClient EMS GUI, click **Endpoint Profiles** > **Malware Protection**.
2. Click **Default**, and then click **Edit**.
3. Disable **AntiVirus Protection**.

4. Click **Save**.
5. On the BR-PC-1 VM, open the FortiClient console, and then click the avatar to view the detected tags. It may take a minute for the updated tags to appear.



6. On the desktop, open Chrome, and then enter `webserver.training.lab:9443` to access the web server.
7. Select the EMS signed certificate, and then click **OK**.



8. Return to the FortiClient EMS GUI, and then click **Endpoint Profiles** > **Malware Protection**.
9. Click **Default**, and then click **Edit**.
10. Enable **AntiVirus Protection**.
11. Click **Save**.

Exercise 4: Configuring a TCP Forwarding Access Proxy for SSH

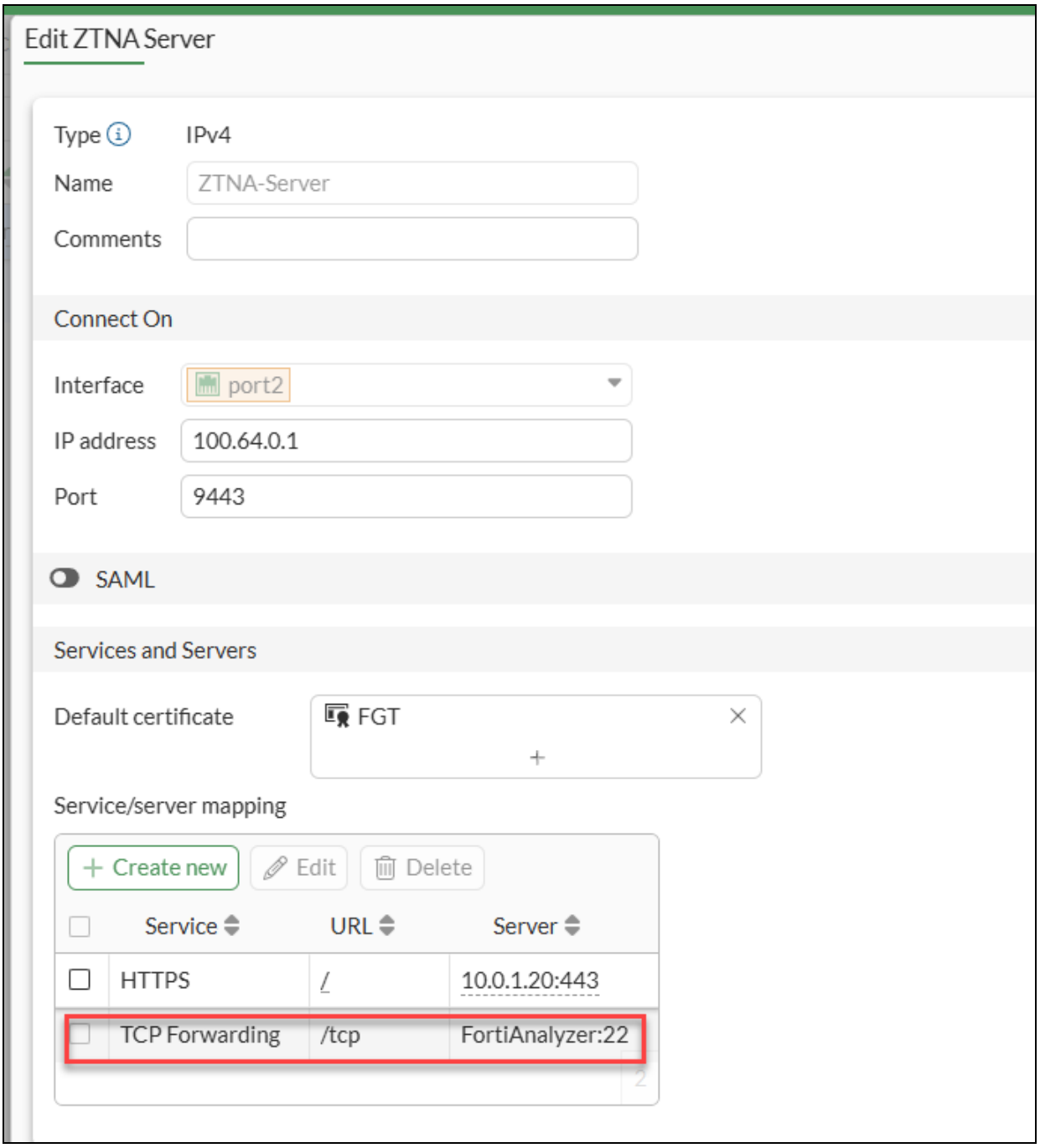
In this exercise, you will configure TCP forwarding on FortiGate and the corresponding ZTNA destination on FortiClient to proxy the connections to the access proxy. A TCP forwarding access proxy is very similar to an HTTPS access proxy. A TCP forwarding access proxy works as a special type of HTTPS reverse proxy. TCP traffic is tunneled between the client and the access proxy over HTTPS, and forwarded to the protected resource over TCP using the original upper layer protocol.

Configure a TCP Access Proxy for Private Applications

The TCP access proxy setup requires a ZTNA server, real server, and ZTNA rule on FortiGate. You also require ZTNA destinations on FortiClient.

To add a new server mapping to an existing ZTNA server for a TCP access proxy

1. On the HQ-EMS-1 VM, open Chrome, and then in **Bookmarks**, select the **HQ-NGFW** login page bookmark.
2. Log in to the FortiGate GUI with the following credentials:
   - Username: `admin`
   - Password: `Fortinet1!`
3. Click **Policy & Objects** > **ZTNA**, and then click the **ZTNA Server** tab.
4. Click **ZTNA-Server**, and then click **Edit**.
5. In the **Service/server mapping** section, click **Create New**.
6. In the **Service** field, select **TCP Forwarding**.
7. In the **Servers** section, in the **Address** field, click **+**, and then click **Address**.
8. In the **Name** field, type `FortiAnalyzer`.
9. In the **IP/Netmask** field, type `10.0.1.20/32`.
10. Click **OK**.
11. Click **OK** to select the new entry.
12. In the **Ports** field, type `22`.
13. Click **OK**.

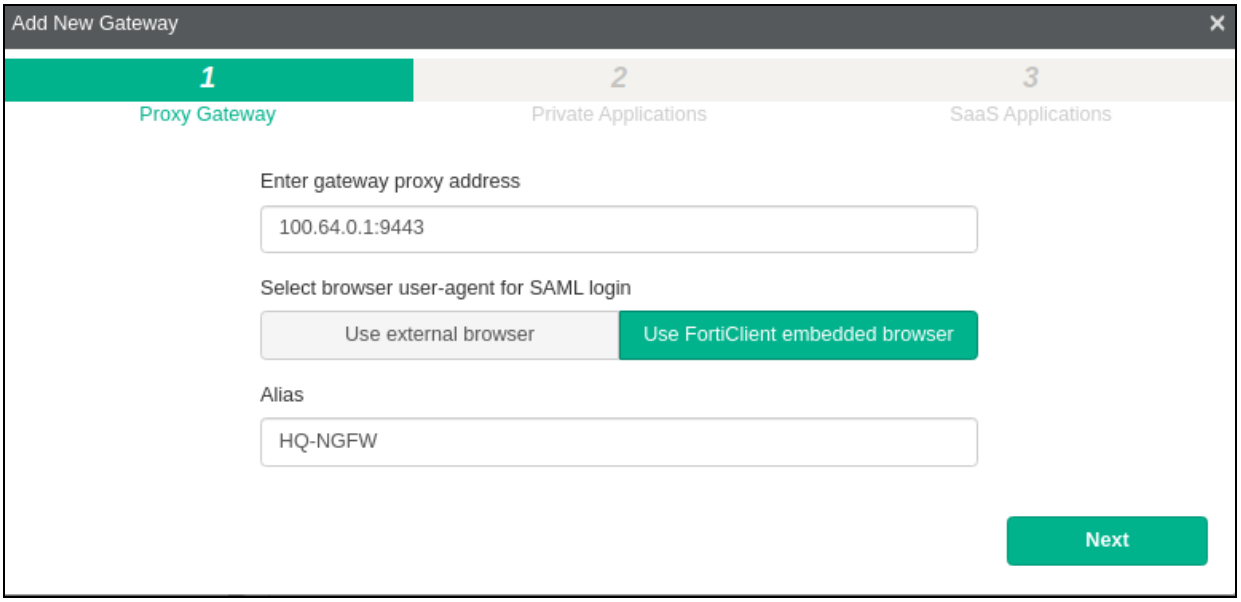


14. Click **OK**.
    You already configured the ZTNA policy in the previous exercise, with security posture tags for the same ZTNA server.

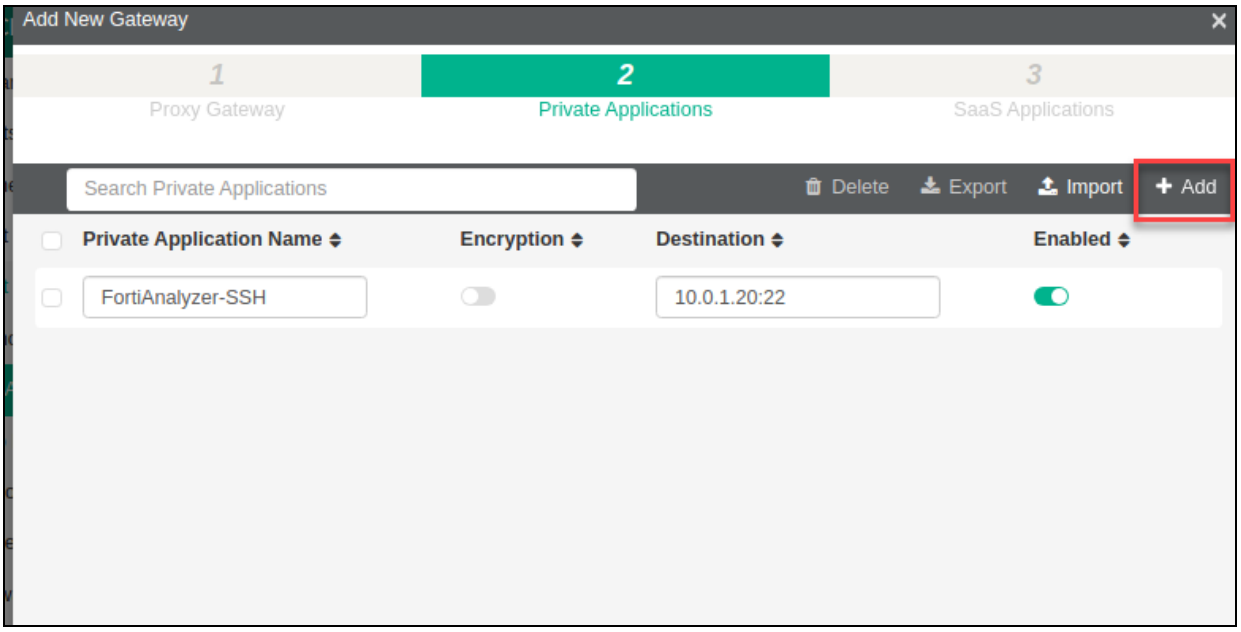
To configure the ZTNA destinations on FortiClient

1. On the FortiClient EMS GUI, click **Endpoint Profiles** > **ZTNA Destinations**, select **Default**, and then click **Edit**.
2. Click the  icon to enable visibility of the feature on FortiClient.

3. In the **Destinations** section, click **Add**.
4. In the **Enter gateway proxy address** field, type `100.64.0.1:9443`.
5. In the **Alias** field, type `HQ-NGFW`.



6. Click **Next**.
7. In the **Private Applications** window, click **Add**.
8. In the **Private Application Name** field, type `FortiAnalyzer-SSH`.
9. In the **Destination** field, type `10.0.1.20:22`.



10. Click **Next**.
11. Click **Finish**.
12. Click **Save**.

To verify the ZTNA destinations on FortiClient

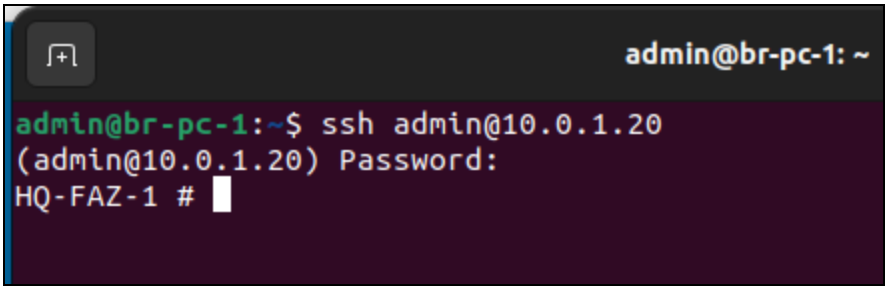
1. On the BR-PC-1 VM, open the FortiClient console, and then click **ZTNA DESTINATION**.
   It may take a minute for the ZTNA destinations to appear.

Test the Connection for Users

Now that you configured FortiGate and FortiClient, you will test the TCP proxy connection.

To test remote access to the TCP forwarding access proxy for SSH to FortiAnalyzer

1. Continuing on the BR-PC-1 VM, open a terminal window.
2. Enter `ssh admin@10.0.1.20`.
3. If you are prompted to verify the RSA key fingerprint, type `yes` to continue connecting.
4. Enter the following password:
   `Fortinet1!`



   You are connected to FortiAnalyzer using the SSH TCP-forwarding proxy.

5. Close the terminal window.

Exercise 5: Configuring ZTNA for SaaS Application Access

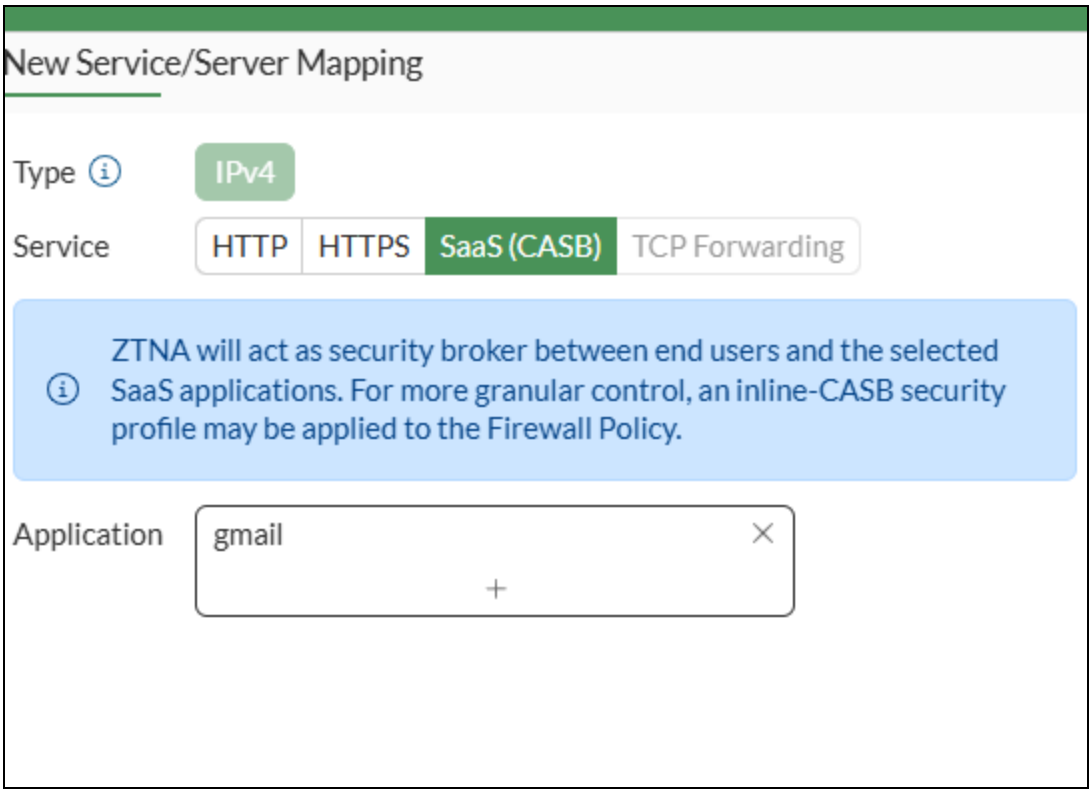
In this exercise, you will configure FortiGate as a ZTNA application gateway. You can configure a ZTNA application gateway to provide access control to software-as-a-service (SaaS) traffic. A FortiGate ZTNA TCP forwarding access proxy configuration specifies SaaS application destinations using application names that are defined in the FortiGuard Inline CASB Database (ICDB).

Configure a TCP Access Proxy for SaaS Applications

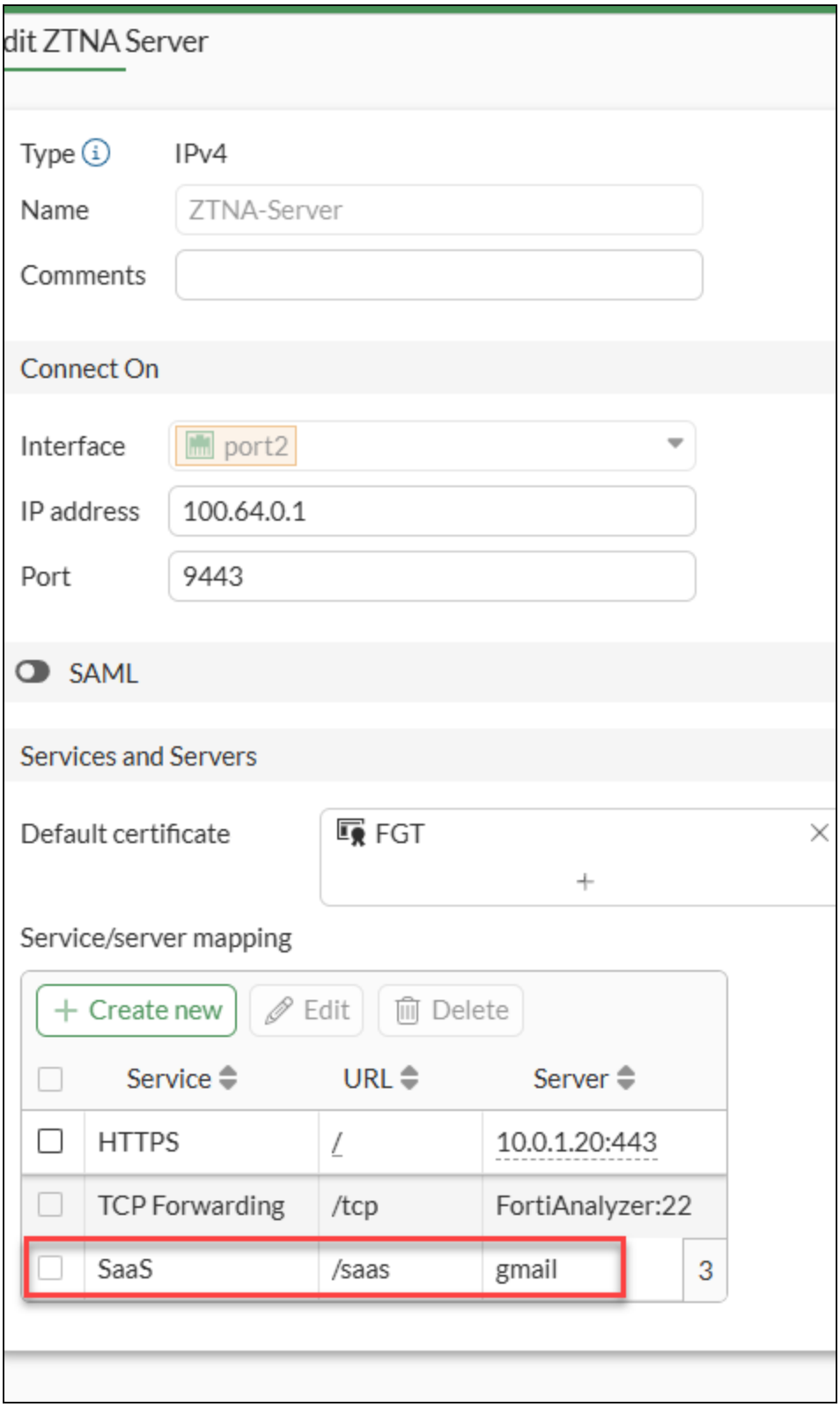
The TCP access proxy setup requires a ZTNA server, real server, and ZTNA policy on FortiGate. You also require ZTNA destinations on FortiClient.

To add a new server mapping to an existing ZTNA server for SaaS applications

1. On the HQ-EMS-1 VM, open Chrome, and then in **Bookmarks**, select the **HQ-NGFW** login page bookmark.
2. Log in to the FortiGate GUI with the following credentials:
   - Username: `admin`
   - Password: `Fortinet1!`
3. Click **Policy & Objects** > **ZTNA**, and then click the **ZTNA Server** tab.
4. Click **ZTNA-Server**, and then click **Edit**.
5. In the **Service/server mapping** section, click **Create New**.
6. In the **Service** field, select **SaaS (CASB)**.
7. In the **Application** field, click **+**, and then click **gmail**.



8. Click **OK**.

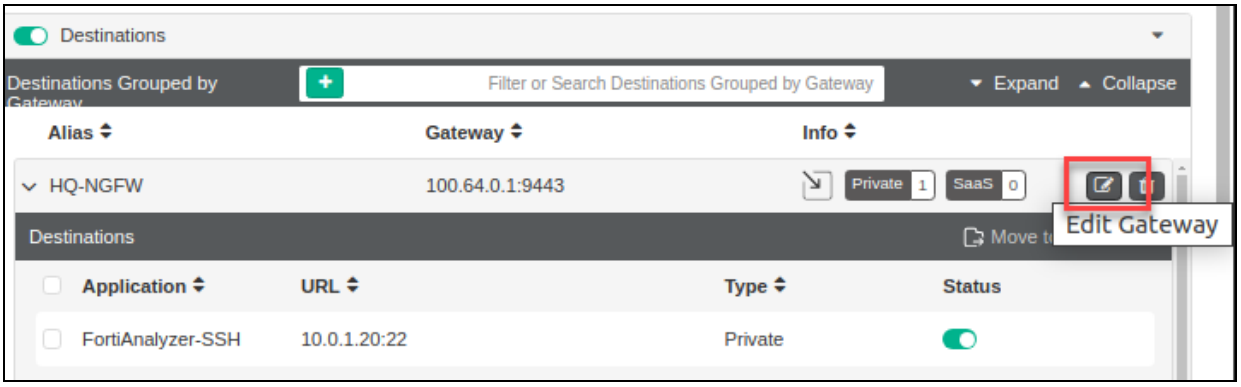


9. Click **OK**.

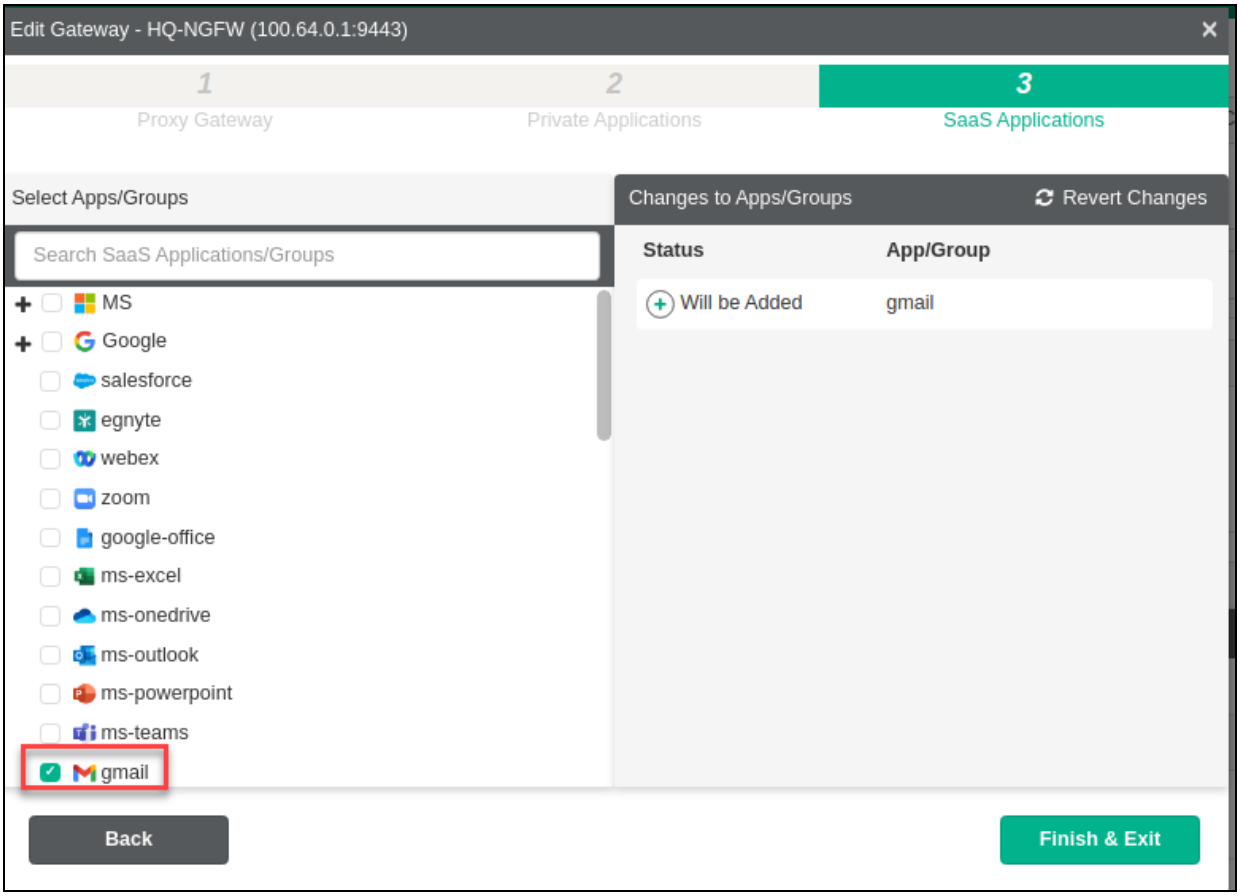
You already configured the ZTNA policy in the first exercise, with security posture tags for the same ZTNA server.

To configure the ZTNA destinations on FortiClient

1. On the FortiClient EMS GUI, click **Endpoint Profiles** > **ZTNA Destinations**, select **Default**, and then click **Edit**.
2. In the **Destinations** section, click the edit icon to edit the **HQ-NGFW** gateway.



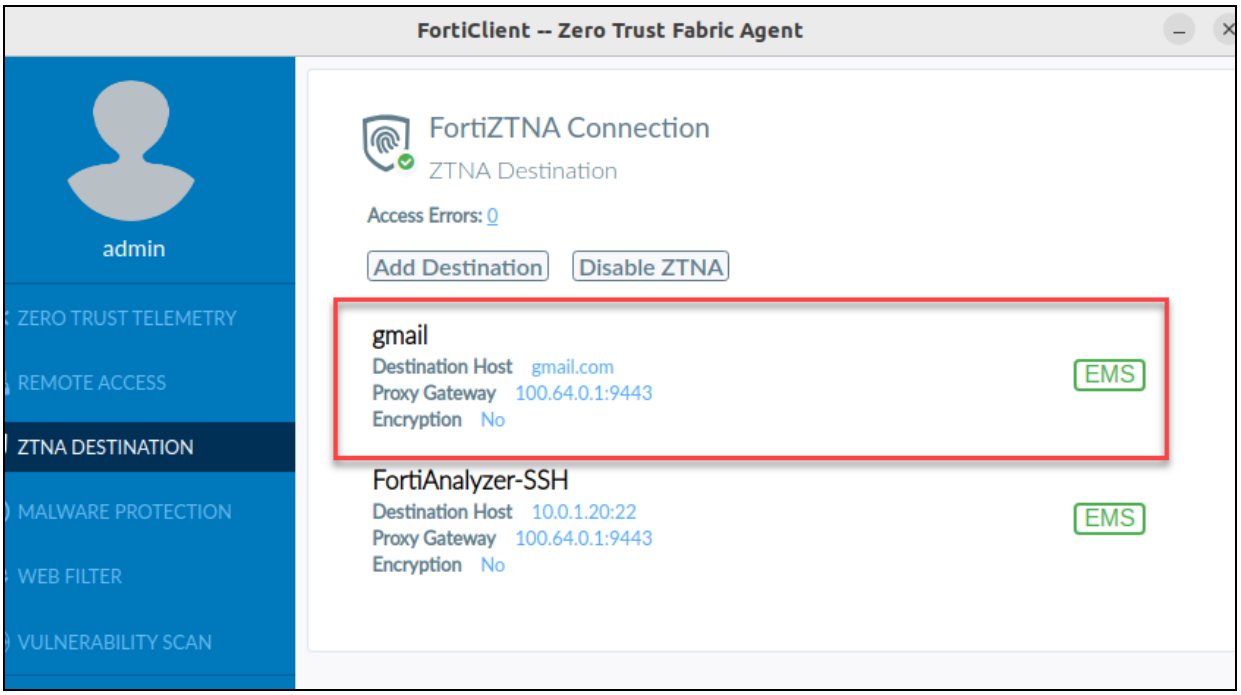
3. Click **Next**.
4. Click **Next**.
5. In the **Select Apps/Groups** section, select the **gmail** checkbox.



6. Click **Finish & Exit**.
7. Click **Save**.

To verify the ZTNA destinations on FortiClient

1. On the BR-PC-1 VM, open the FortiClient console, and then click **ZTNA DESTINATION**.
   It may take a minute for the ZTNA destinations to appear.

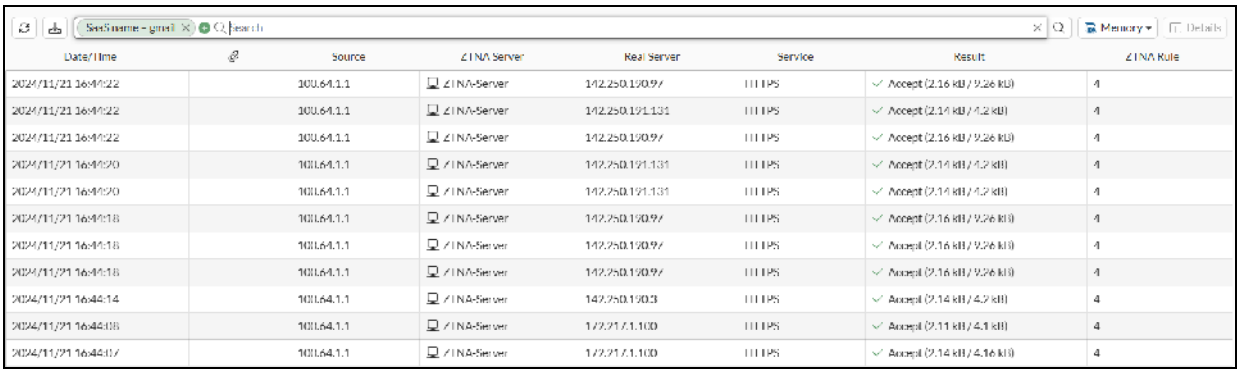


Test the Connection for Users

Now that you configured FortiGate and FortiClient, you will test the TCP proxy connection.

To test remote access to the TCP forwarding access proxy for SSH to FortiAnalyzer

1. Continuing on the BR-PC-1 VM, open Chrome.
2. Enter `gmail.com` to access Gmail.
3. Return to the HQ-NGFW GUI, and then click **Log & Report** > **ZTNA Traffic**.
4. Review the logs with **SaaS name= gmail**.



Date/Time		Source	ZTNA Server	Real Server	Service	Result	ZTNA Rule
2024/11/21 16:44:22		100.64.1.1	ZTNA-Server	142.250.190.97	HTTPS	Accept (2.16 kB / 9.26 kB)	4
2024/11/21 16:44:22		100.64.1.1	ZTNA-Server	142.250.191.131	HTTPS	Accept (2.14 kB / 4.2 kB)	4
2024/11/21 16:44:22		100.64.1.1	ZTNA-Server	142.250.190.97	HTTPS	Accept (2.16 kB / 9.26 kB)	4
2024/11/21 16:44:20		100.64.1.1	ZTNA-Server	142.250.191.131	HTTPS	Accept (2.14 kB / 4.2 kB)	4
2024/11/21 16:44:20		100.64.1.1	ZTNA-Server	142.250.191.131	HTTPS	Accept (2.14 kB / 4.2 kB)	4
2024/11/21 16:44:18		100.64.1.1	ZTNA-Server	142.250.190.97	HTTPS	Accept (2.16 kB / 9.26 kB)	4
2024/11/21 16:44:18		100.64.1.1	ZTNA-Server	142.250.190.97	HTTPS	Accept (2.16 kB / 9.26 kB)	4
2024/11/21 16:44:18		100.64.1.1	ZTNA-Server	142.250.190.97	HTTPS	Accept (2.16 kB / 9.26 kB)	4
2024/11/21 16:44:14		100.64.1.1	ZTNA-Server	142.250.190.3	HTTPS	Accept (2.14 kB / 4.2 kB)	4
2024/11/21 16:44:08		100.64.1.1	ZTNA-Server	172.217.1.100	HTTPS	Accept (2.11 kB / 4.1 kB)	4
2024/11/21 16:44:07		100.64.1.1	ZTNA-Server	172.217.1.100	HTTPS	Accept (2.14 kB / 4.16 kB)	4

The logs indicate that Gmail is connected using the TCP-forwarding proxy that is configured on FortiGate.

In a production environment, you can configure the FortiGate ZTNA application gateway to act as an inline cloud access security broker (CASB) by providing access control to SaaS traffic using ZTNA access control rules and an inline CASB profile. A CASB is located between users and their cloud service to enforce security policies as they access cloud-based resources.

5. Return to the FortiClient EMS GUI, and then click **Endpoint Profiles** > **ZTNA Destinations**.
6. Click **Default**, and then click **Edit**.
7. Disable **ZTNA Destination Profile**.
8. Click **Save**.

Lab 8: Security Incident Response

In this lab, you will configure different incident response solutions.

Objectives

- Upload FortiClient logs to FortiAnalyzer
- Promote a FortiGate to serve as the root device in the Fortinet Security Fabric
- Configure automation stitches on FortiGate
- Quarantine a FortiClient endpoint using an automation stitch
- Configure FortiAnalyzer playbooks to tag FortiClient endpoints

Time to Complete

Estimated: 45 minutes

Exercise 1: Enabling the Security Fabric to Trigger Automatic Quarantine

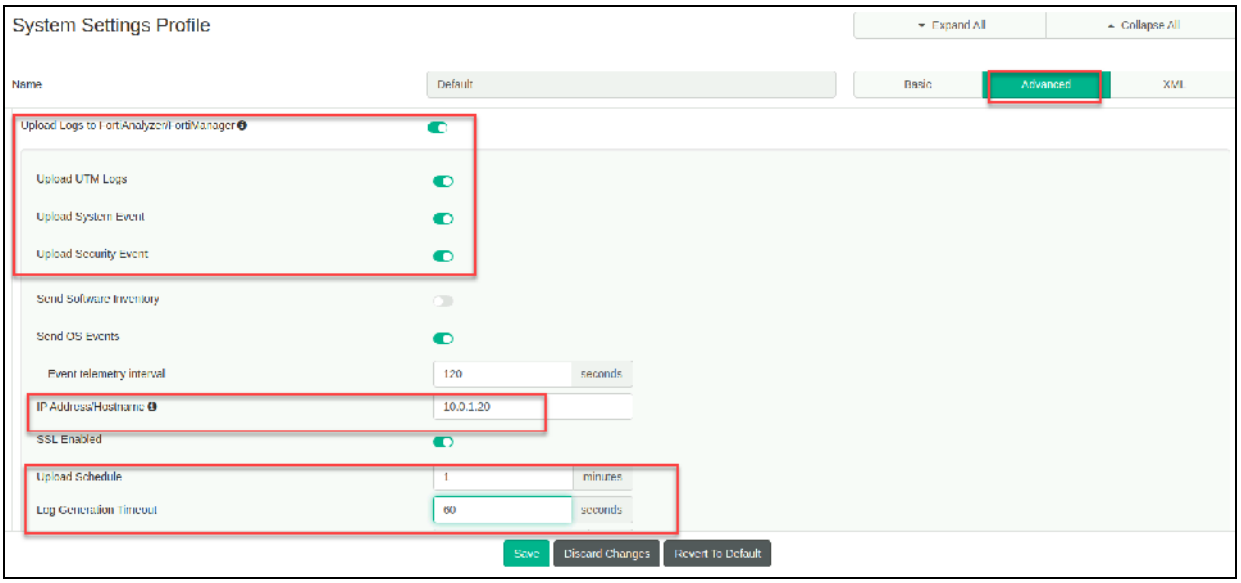
In this exercise, you will enable the Fortinet Security Fabric to trigger automatic quarantine, based on indicators of compromise (IOC) on FortiAnalyzer.

Configure FortiClient Log Settings

To identify compromised hosts, FortiClient must send logs to FortiAnalyzer. You will configure FortiClient log settings.

To configure FortiClient log settings

1. On the HQ-EMS-1 VM, log in to the FortiClient EMS GUI.
2. Click **Endpoint Profiles** > **System Settings**, select **Default**, and then click **Edit**.
3. Click **Advanced**.
4. In the **Log** section, enable **Upload Logs to FortiAnalyzer/FortiManager**, **Upload UTM Logs**, **Upload System Event**, and **Upload Security Event**.
5. In the **IP Address/Hostname** field, type `10.0.1.20`.
6. In the **Upload Schedule** field, type `1` minute.
7. In the **Log Generation Timeout** field, type `60` seconds.



8. Click **Save**.

Enable the Security Fabric on the FortiGate

You will configure the Security Fabric and enable telemetry on the FortiGate internal interface.

To configure the Security Fabric and enable telemetry on the FortiGate

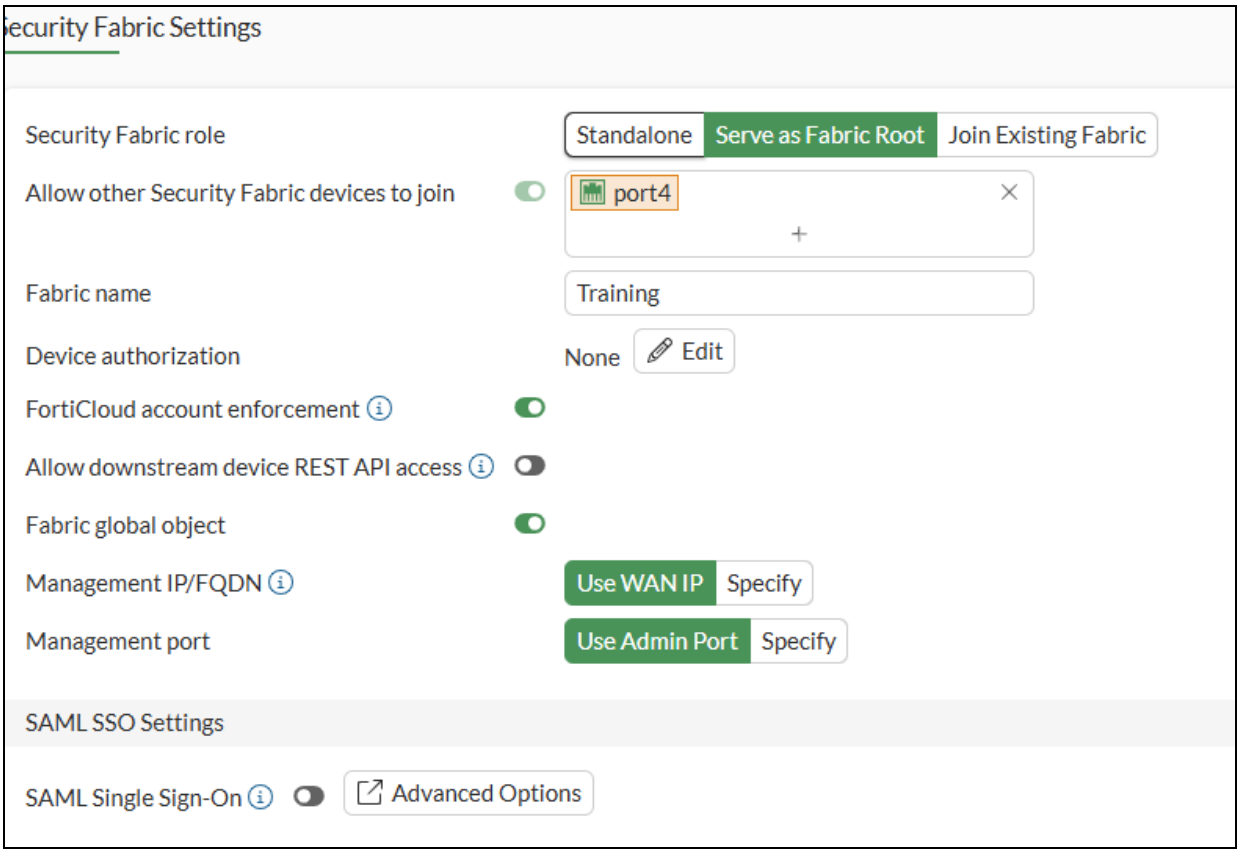
1. Continuing on the HQ-EMS-1 VM, open a new Chrome tab, and then in **Bookmarks**, select the **HQ-NGFW** login page bookmark.
2. Log in to the FortiGate GUI with the following credentials:
   - Username: `admin`
   - Password: `Fortinet1!`
3. On the FortiGate GUI, click **Security Fabric** > **Fabric Connectors**.
4. Select **Security Fabric Setup**, and then click **Edit**.
5. In the **Security Fabric Settings** section, in the **Security Fabric role** field, click **Serve as Fabric Root**.
   A new window opens.
6. In the **FortiAnalyzer Settings** section, in the **Status** field, select **Enabled**, and then configure the following settings:

Field	Value
IP address	10.0.1.20
Upload option	Real Time

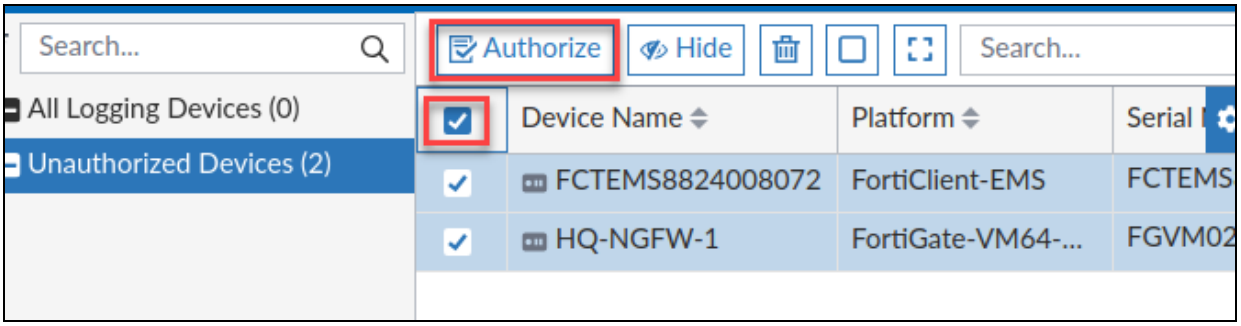
7. Click **OK**.
8. When the **Verify FortiAnalyzer Serial Number** warning appears, click **Accept**.
9. Configure the following settings:

Field	Value
Allow other Security Fabric devices to join	port4
Fabric name	Training
Management port	Use Admin Port

Your configuration should look like the following example:

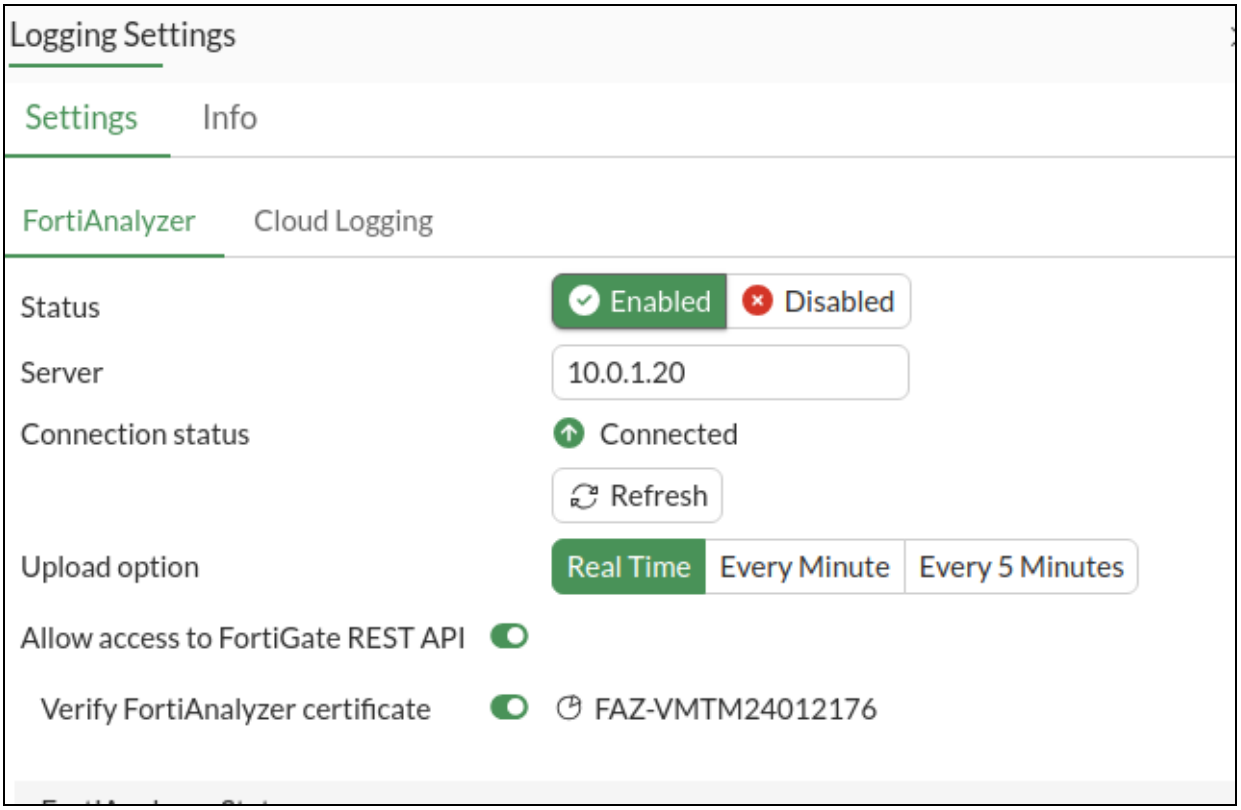


10. Click **OK**.
11. Continuing on the HQ-EMS-1 VM, open a new Chrome tab, and then in **Bookmarks**, select the **HQ-FAZ** login page bookmark.
12. Log in to the FortiAnalyzer GUI with the following credentials:
    - Username: `admin`
    - Password: `Fortinet1!`
13. Click the **root** ADOM.
14. Click **Device Manager** > **Unauthorized Devices**.
15. Select the checkbox beside **Device Name**, click **Authorize**, and then click **OK** to complete the authorization.



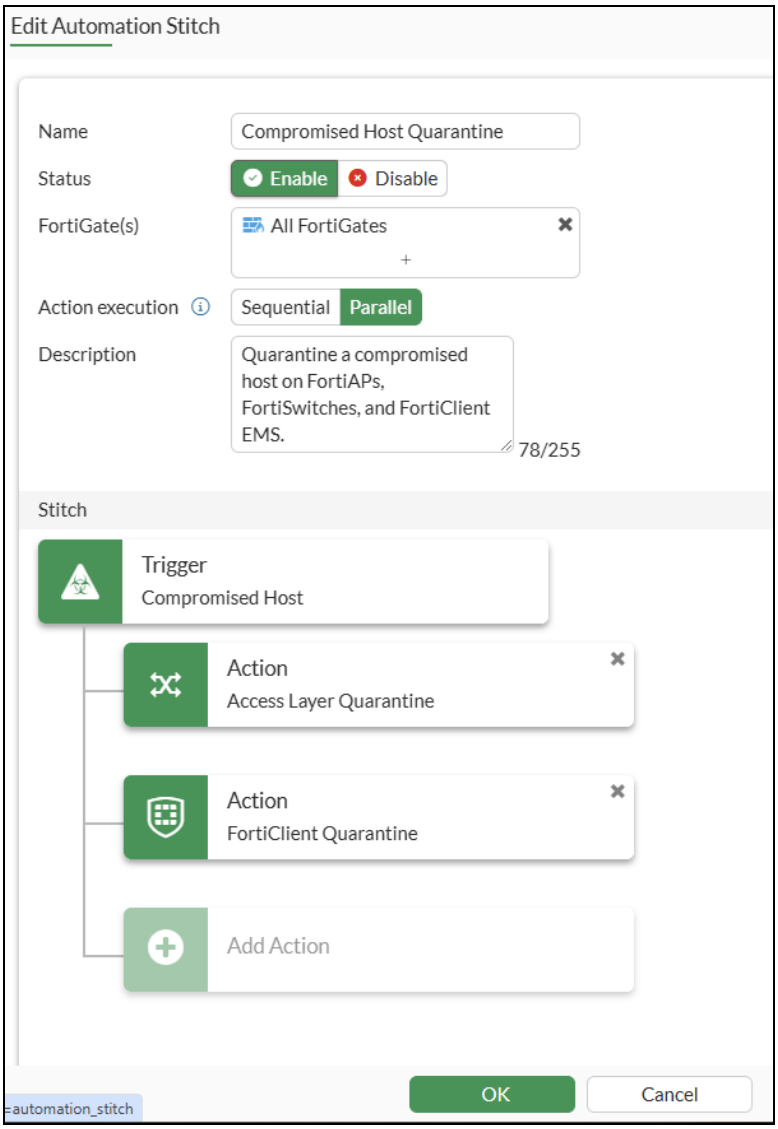
16. Click **Close**.
17. Return to the HQ-NGFW-1 GUI, click **Security Fabric** > **Fabric Connectors**.
18. Click **Logging & Analytics**, and then click **Edit**.

In the **FortiAnalyzer** section, the value in the **Connection status** field is **Connected**.



To enable Security Fabric automation and create a new stitch

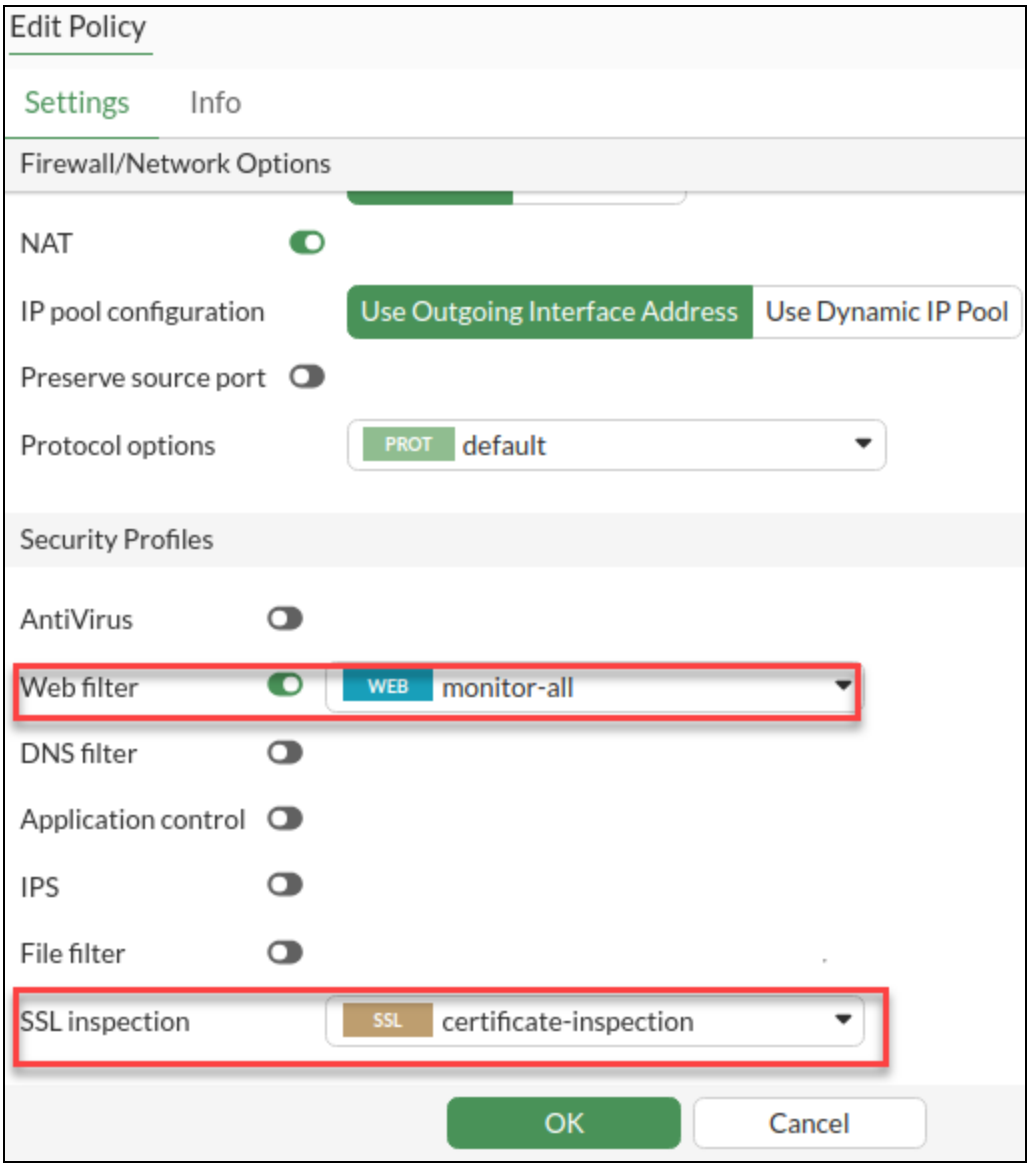
1. Continuing on the FortiGate GUI, click **Security Fabric** > **Automation**.
2. Select the predefined default stitch **Compromised Host Quarantine**, and then click **Edit**.
3. In the **Edit Automation Stitch** window, in the **Status** field, select **Enable**, and then leave the other settings at the default values.



4. Click **OK** to save the settings.
   The stitch, trigger, and action are enabled for a compromised host.

To configure firewall policies on FortiGate

1. Continuing on the HQ-NGFW-1 FortiGate GUI, click **Policy & Objects** > **Firewall Policy**.
2. Select the **Internet Traffic** policy, and then click **Edit**.
3. In the **Security Profiles** section, enable **Web filter**, and then select **monitor-all**.
4. In the **SSL inspection** field, select **certificate-inspection**.

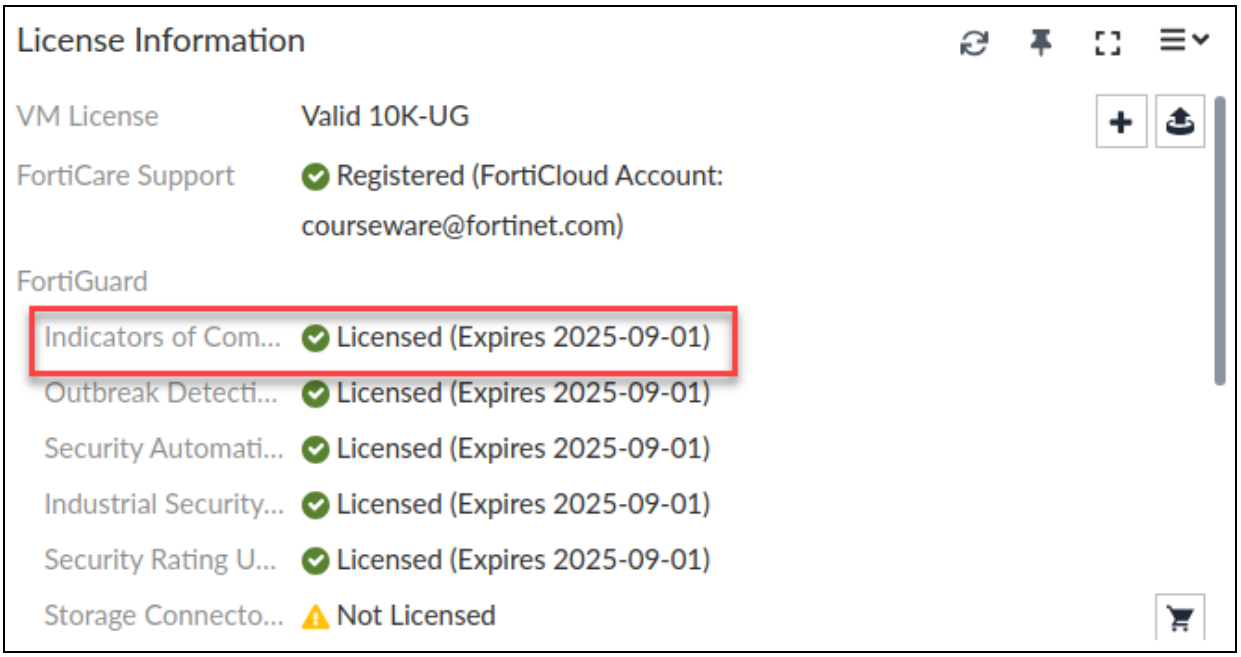


FortiAnalyzer uses web filter, traffic, and security logs from FortiGate to analyze traffic for IOC events.

5. Click **OK** to save the settings.

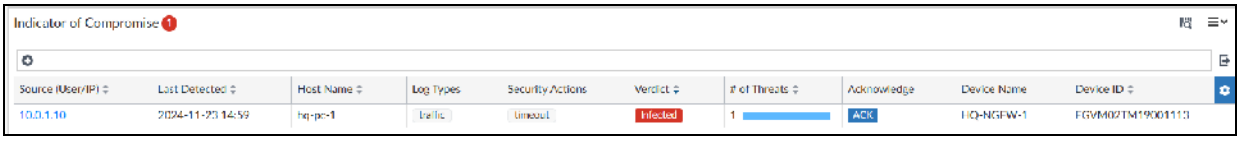
To verify that the FortiAnalyzer license includes the IOC service

1. Return to the FortiAnalyzer GUI, click **Dashboards** > **Status**, and then in the **License Information** widget, in the **FortiGuard** section, check the status of the **Indicators of Compromise Service** license.

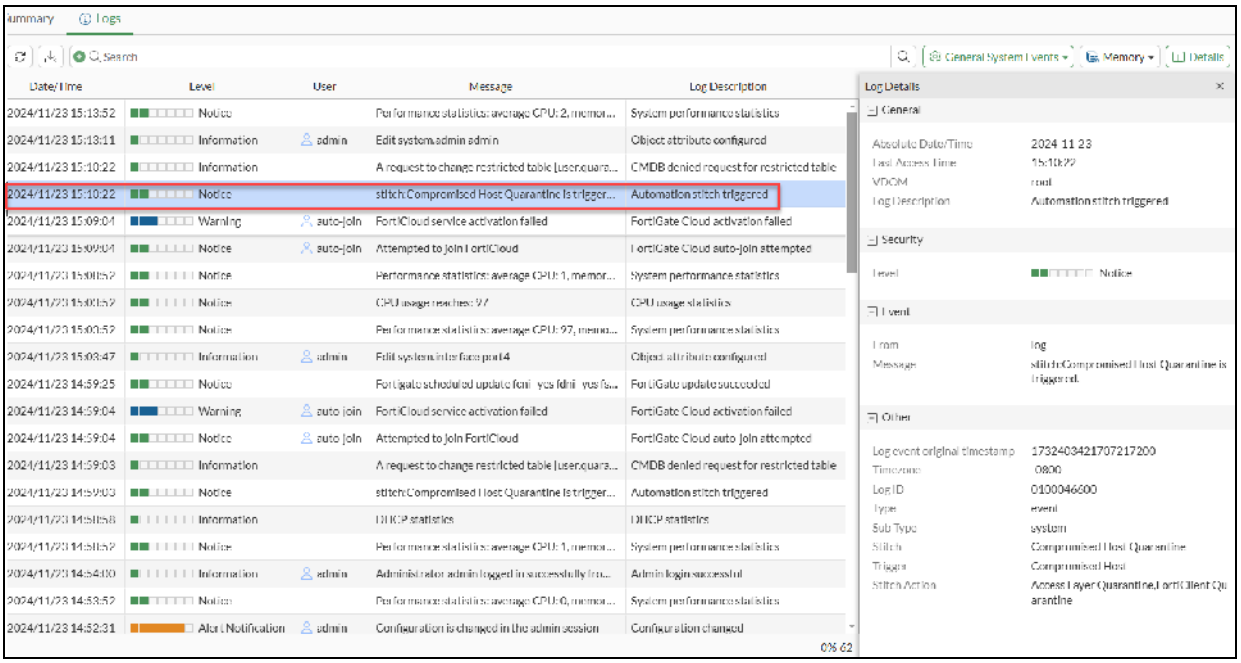


To test the automatic quarantine that IOC detection triggered

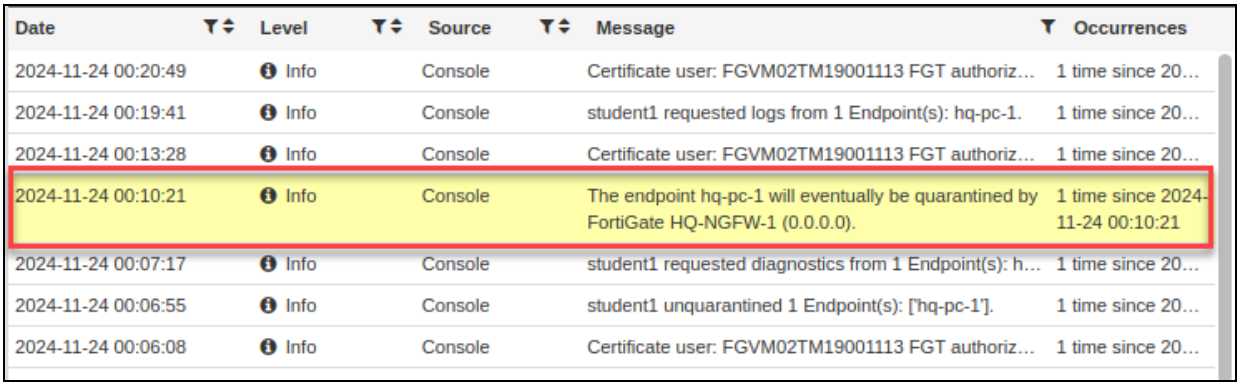
1. On the HQ-PC-1 VM, open Chrome, and then enter the URL `www.google.com`
2. Open a new browser tab, and then enter `http://195.22.28.198`.
   The connection to the website will time out, and when FortiClient is quarantined, you may not be able to access the HQ-PC-1 VM using RDP.
3. Return to the FortiAnalyzer GUI, and then click **FortiView** > **Threats** > **Indicator of Compromise**.
   The compromised endpoint appears in the window after a couple of minutes.



4. Return to the HQ-NGFW-1 GUI, click **Log & Report** > **System Events** > **General System Events** to view the logs.



5. Return to the FortiClient EMS GUI, and then click **Administration** > **Log Viewer** to see the quarantine logs.



Exercise 2: Configuring FortiAnalyzer Playbooks to Add Fabric Tags to FortiClient Endpoints

In this exercise, you will configure playbooks on FortiAnalyzer to tag FortiClient endpoints.

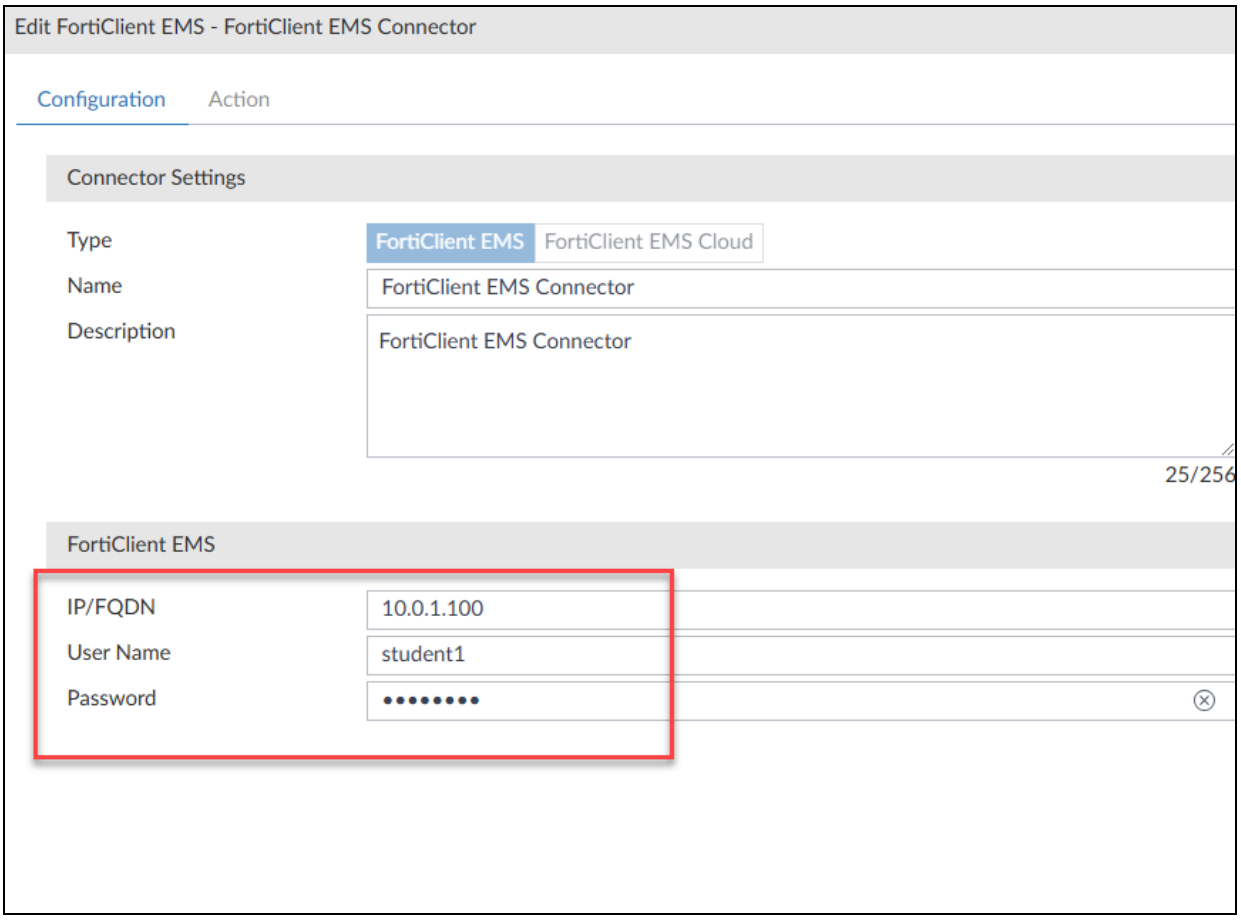
Enable the EMS Connector on FortiAnalyzer

You will enable the EMS connector on FortiAnalyzer.

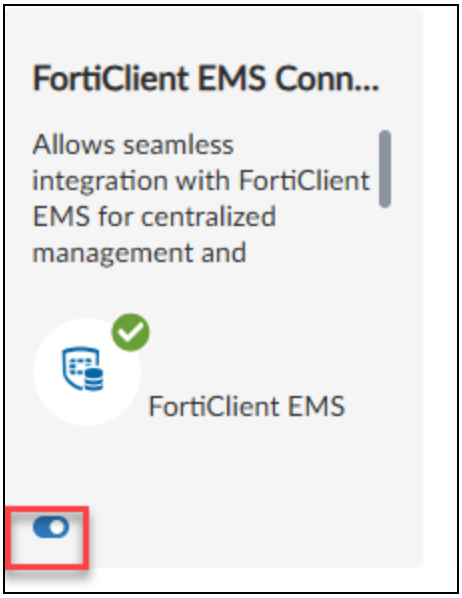
To enable the EMS connector on FortiAnalyzer

1. On the HQ-EMS-1 VM, log in to the FortiAnalyzer GUI.
2. Click **Dashboards** > **Status**, and then in the **License Information** widget, in the **FortiGuard** section, check the status of the **Security Automation** license.
3. Click **Incidents & Events** > **Automation**, and then click **Active Connectors**.
4. Click **FortiClient EMS Connector**, and then click **Edit**.
   A new window opens.
5. In the **FortiClient EMS** section, configure the following settings:

Field	Value
IP /FQDN	10.0.1.100
User Name	student1
Password	Password1!



6. Click **OK** to save the configuration.
   This configuration gives the FortiAnalyzer API access to FortiClient EMS. FortiAnalyzer can send different actions to FortiClient EMS using playbooks to gather information and for quarantine management.
7. Enable the connector.



It takes a few minutes for the connector to establish the connection with FortiClient EMS.

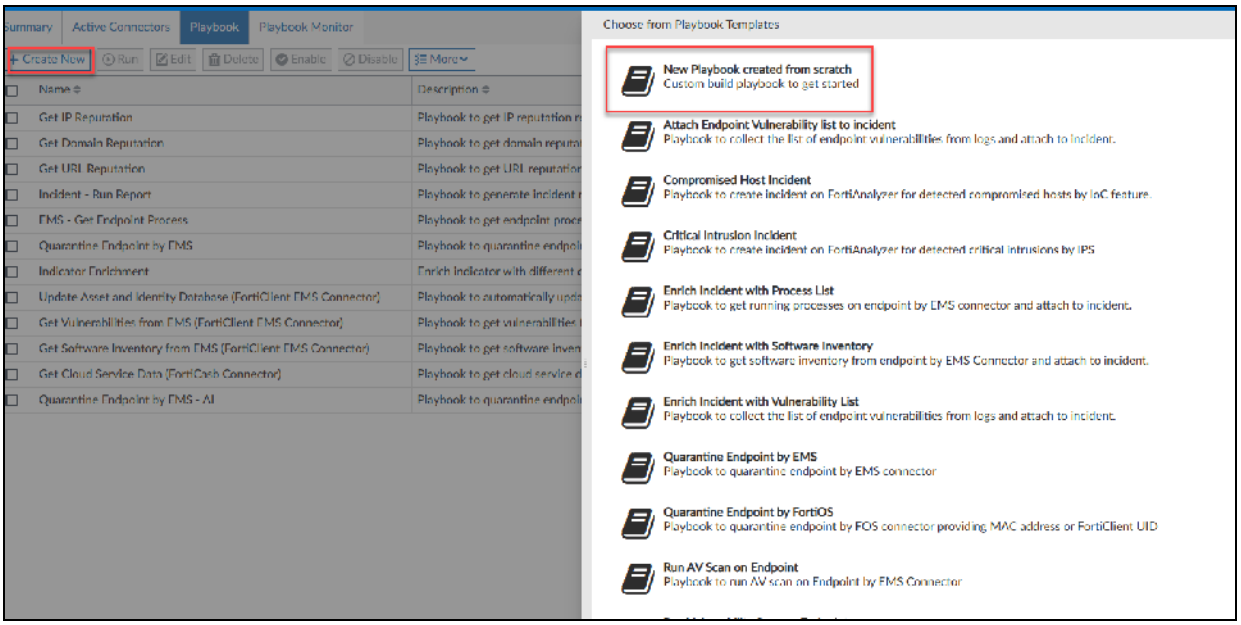
8. Refresh the FortiAnalyzer page to see the green check mark status.

Configure Playbooks on FortiAnalyzer

You will configure an on-demand playbook.

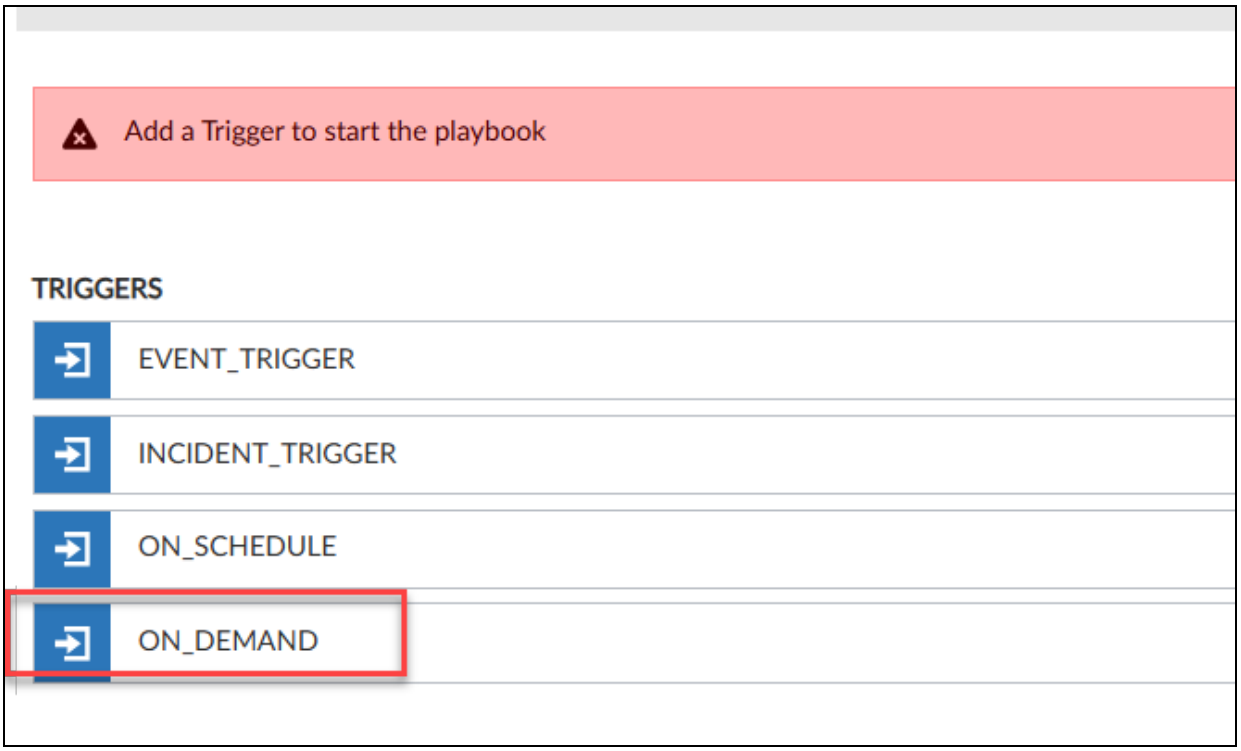
To configure a playbook with an on-demand trigger

1. Continuing on the FortiAnalyzer GUI, click **Incidents & Events** > **Automation**, and then click **Playbook**.
2. Click **Create New** to create a new playbook.
3. In the **Choose from Playbook Templates** window, select **New Playbook created from scratch**.

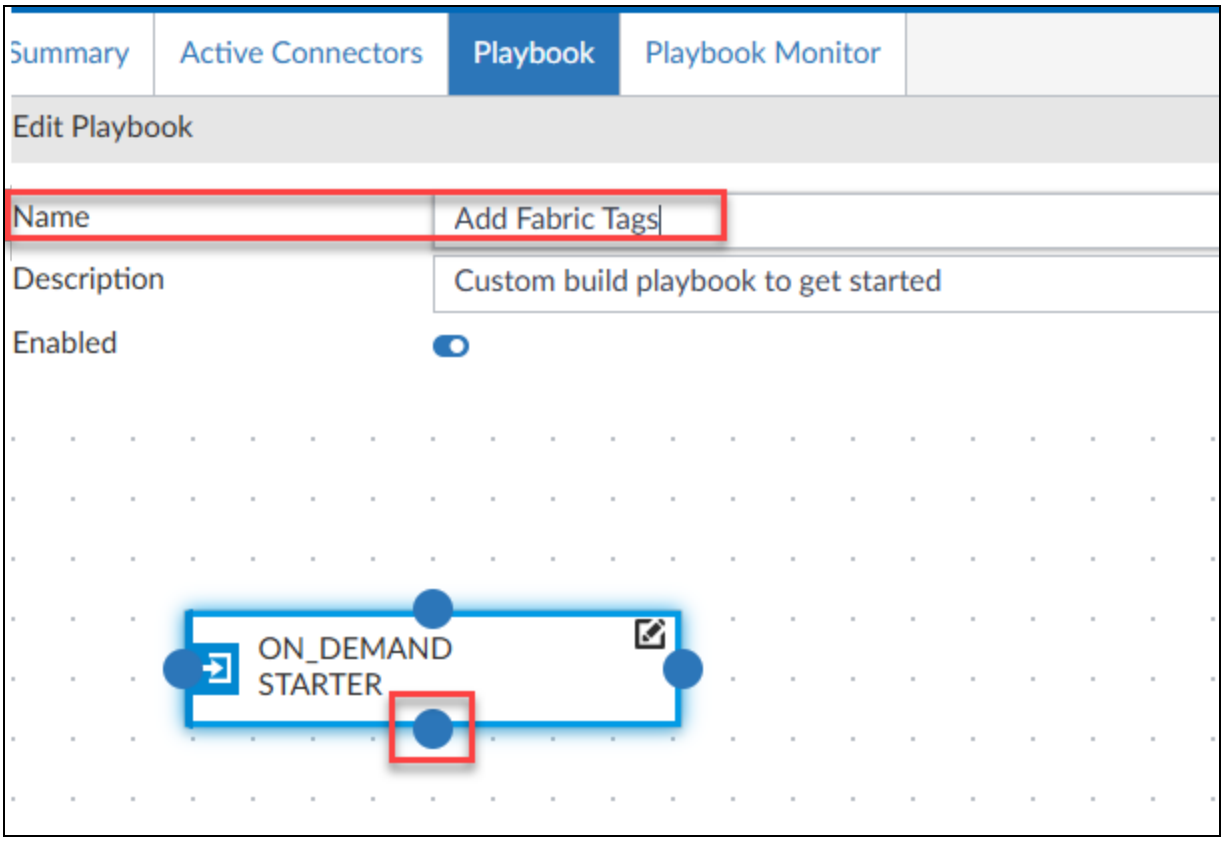


A new window opens.

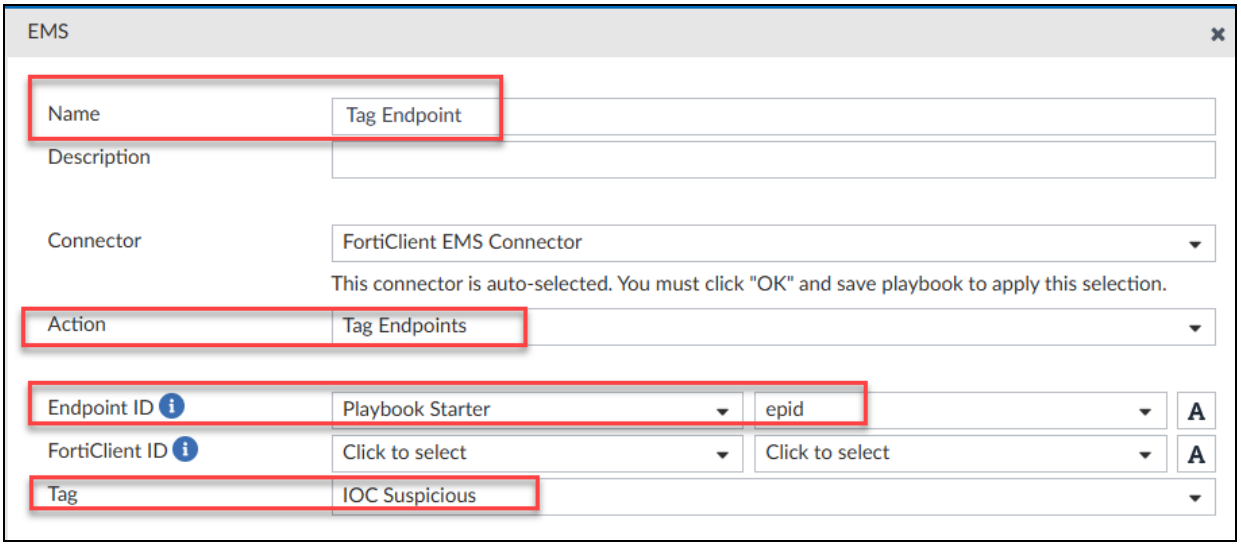
4. In the **TRIGGERS** section, select **ON_DEMAND**.



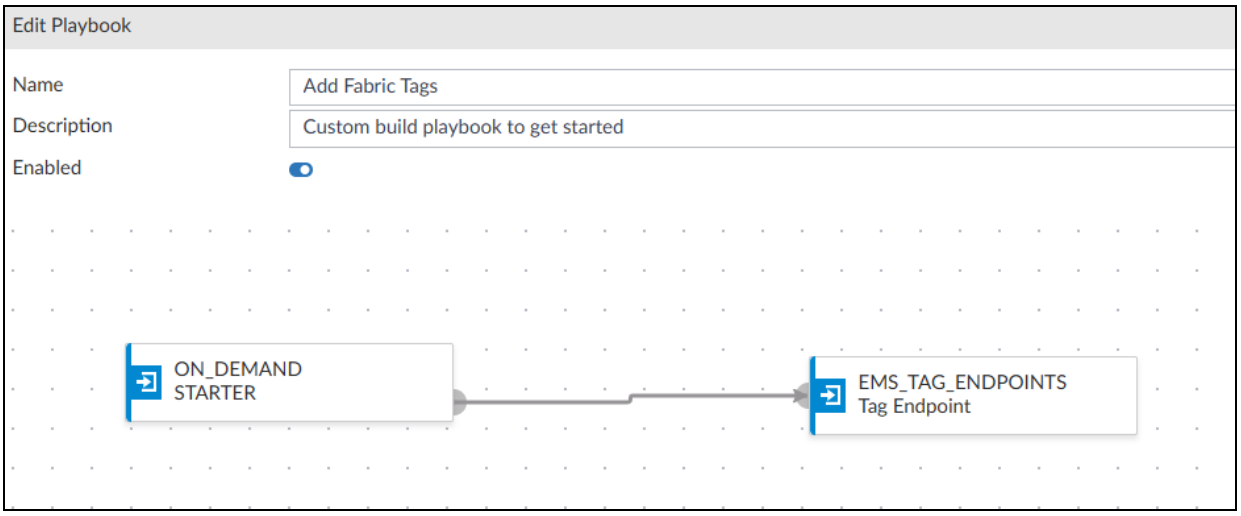
5. Click **Save**.
6. In the **Name** field, type `Add Fabric Tags`.
7. Drag and drop any highlighted connector points to add a new task.



8. In the **CONNECTORS** window, select **EMS**.
9. In the **Name** field, type `Tag Endpoint`.
10. In the **Action** field, select **Tag Endpoints**.
11. In the **Endpoint ID** field, select **Playbook Starter** and **epid**.
12. In the **Tag** field, select **IOC Suspicious**.



13. Click **OK** to save the task.



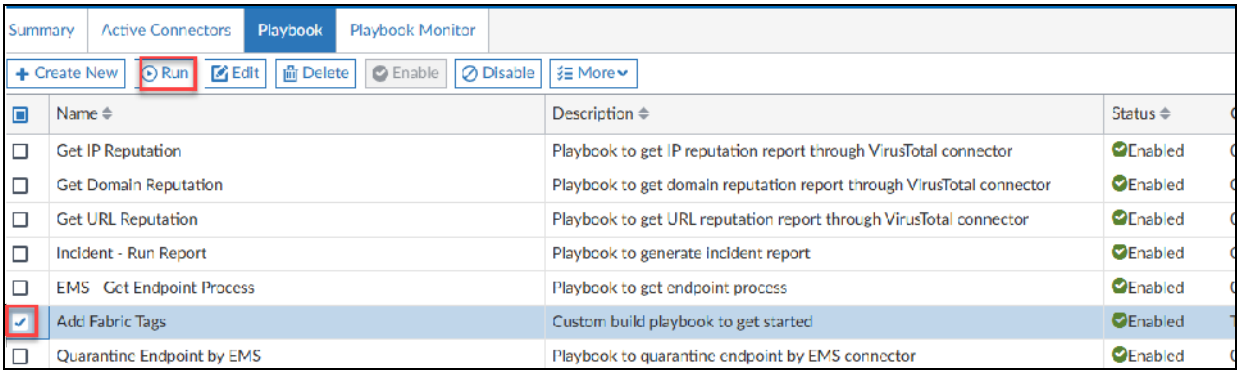
14. Click **Save Playbook** to save the playbook configuration.

Run the FortiAnalyzer Playbook

You will run the playbook you configured in the previous task.

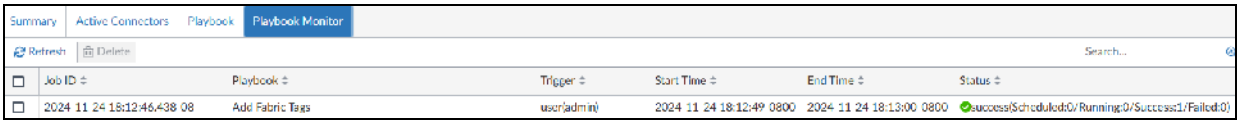
To run the on-demand playbook

1. Continuing on the FortiAnalyzer GUI, click **Incidents & Events** > **Automation**, and then click **Playbook**.
2. Select the **Add Fabric Tags** checkbox, and then click **Run**.



3. In the **Endpoint** field, select **hq-pc-1**.

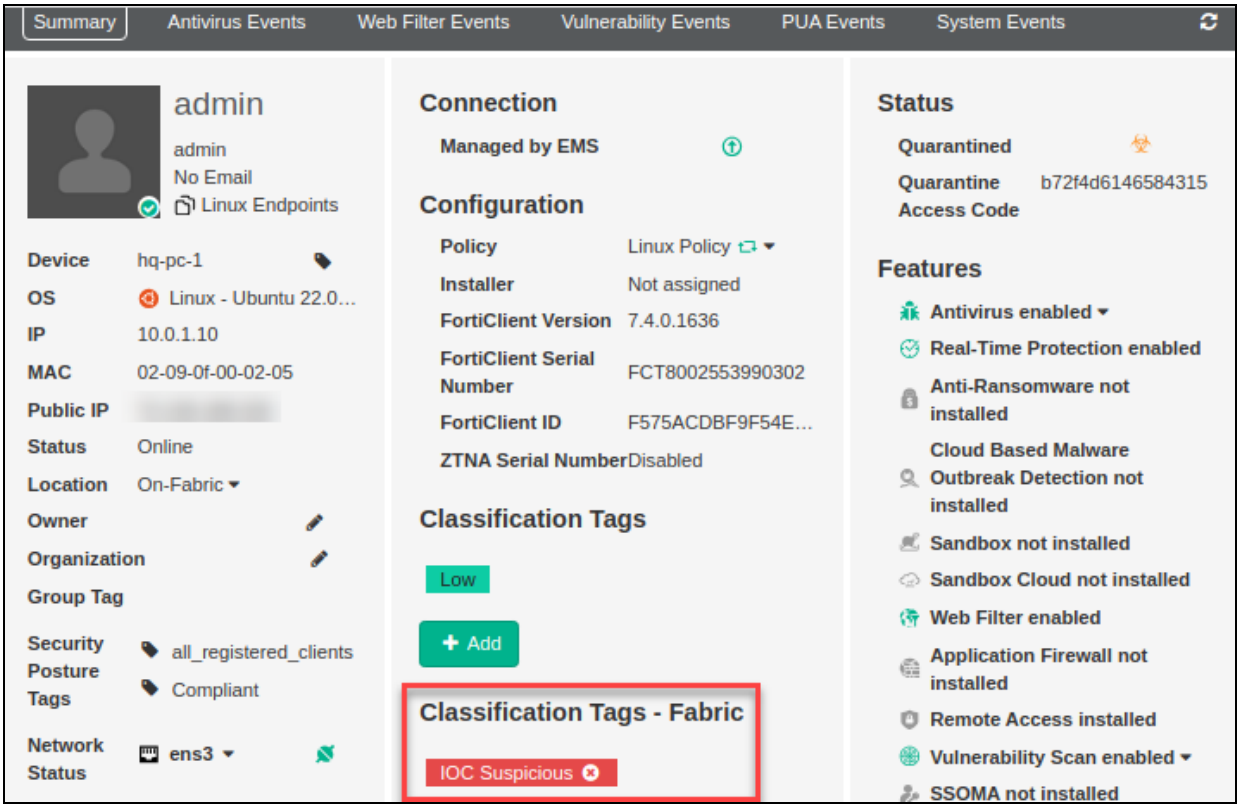
4. Click **OK**.
   It takes a couple of minutes for the playbook to execute.
5. Click **Incidents & Events** > **Automation**, and then click **Playbook Monitor**.



   You can see that the **Add Fabric Tags** playbook ran successfully.
6. Continuing on the HQ-EMS-1 VM, log in to the FortiClient EMS GUI.
7. Click **Administration** > **Log Viewer** to see the FortiAnalyzer API request.

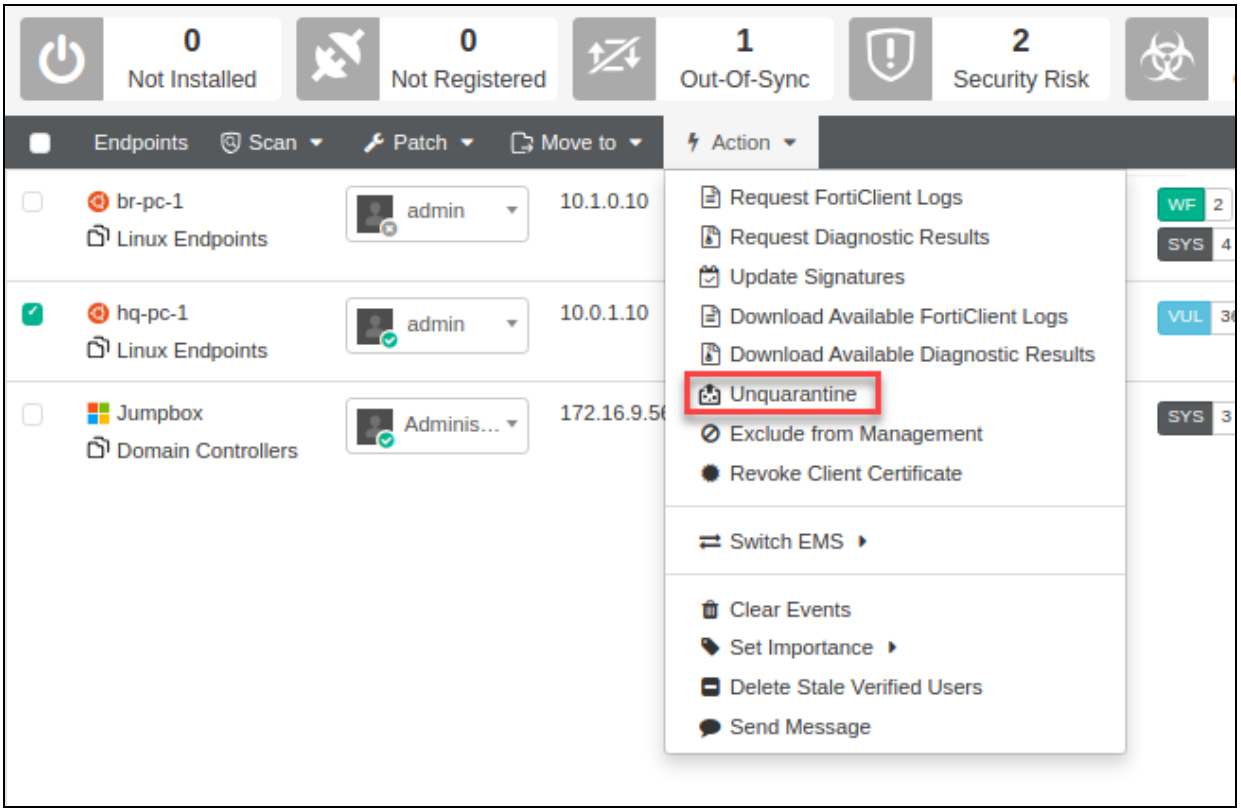
Date	Level	Source	Message	Occurrences
2024-11-25 03:17:58	Info	Console	student1 has logged in from 10.0.1.100.	1 time since 20...
2024-11-25 03:15:30	Info	Console	Certificate user: FGVM02TM19001113 FGT authoriz...	1 time since 20...
2024-11-25 03:12:55	Info	Console	student1 has logged out from 10.0.1.20.	1 time since 20...
2024-11-25 03:12:55	Info	Console	FAZ tagged hq-pc-1 as [IOC Suspicious].	1 time since 2024-11-25 03:12:55
2024-11-25 03:12:55	Info	Console	student1 has logged in from 10.0.1.20.	1 time since 20...

   The IP address of the FortiAnalyzer is **10.0.1.20** and it is performing the actions configured in the playbook.
8. Click **Endpoints** > **All Endpoints**, and then click **hq-pc-1**.
   The endpoint is tagged as **IOC Suspicious**. The **Classification Tags-Fabric** value can also be shared with fabric FortiGate devices and can be applied to firewall policies to restrict access.



The SOC team and the FortiClient EMS administrator can investigate the logs of the infected endpoint manually or configure the playbooks to attach the events to the playbook, and then take the necessary remediation actions.

9. Click **Endpoints** > **All Endpoints**, select **hq-pc-1**, click **Action**, and then click **Unquarantine** to allow internet access to the endpoint.



10. Return to the HQ-PC-1 VM.
11. Close Chrome.
12. Try to ping FortiGate, the FortiClient EMS server, and `google.com`.
    Your traffic should now be allowed.

Lab 9: Troubleshooting and Diagnostics

In this lab, you will troubleshoot connectivity issues from FortiClient to FortiClient EMS. You will also learn how to reset the local built-in administrator password on FortiClient EMS.

Objectives

- Determine why FortiClient cannot establish a telemetry connection with FortiClient EMS
- Reset the FortiClient EMS local built-in administrator password

Time to Complete

Estimated: 25 minutes

Prerequisites

Before you begin this lab, you must identify the FortiClient EMS IP address.

To identify the FortiClient EMS IP address

1. On the Fortinet Training Institute side bar, click **POD IP**.
2. In the **CREDENTIALS** section, under **IP address**, locate and make a note of the IP address.
   You will use this address where the lab asks for <FortiClient EMS IP>.

   Before you begin this lab, you must run a script to break the communication from the FortiClient to the FortiClient EMS.
3. On the Windows-AD VM desktop, open the **Resources** folder, and then double-click the `firewallon.bat` script.

Prerequisites (Self-Paced Only)

Before you begin this lab, you must identify the IP address of the FortiClient EMS, Windows-AD VM, and install FortiClient on Windows endpoint.

Do *not* perform these steps if you are taking an instructor-led class. These steps are required only if you are performing the self-paced labs.

To identify the IP address of the FortiClient EMS

1. On the Fortinet Training Institute side bar, click **POD IP**.
2. In the **CREDENTIALS** section, under **IP address**, locate and make a note of the IP address.
   You will use this address where the lab asks for <FortiClient EMS IP address>.

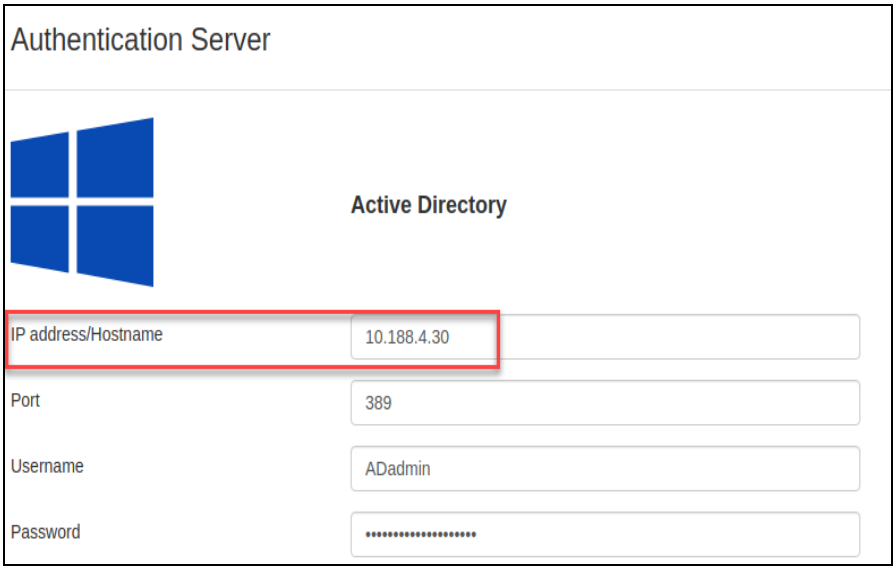
To identify the IP address of the Windows-AD VM

1. On the Fortinet Training Institute side bar, click **Windows-AD**.
2. In the **CREDENTIALS** section, under **IP address**, locate and make a note of the IP address.

You will use this address where the lab asks for <Windows-AD IP address>.

To update the IP address of the Windows-AD VM

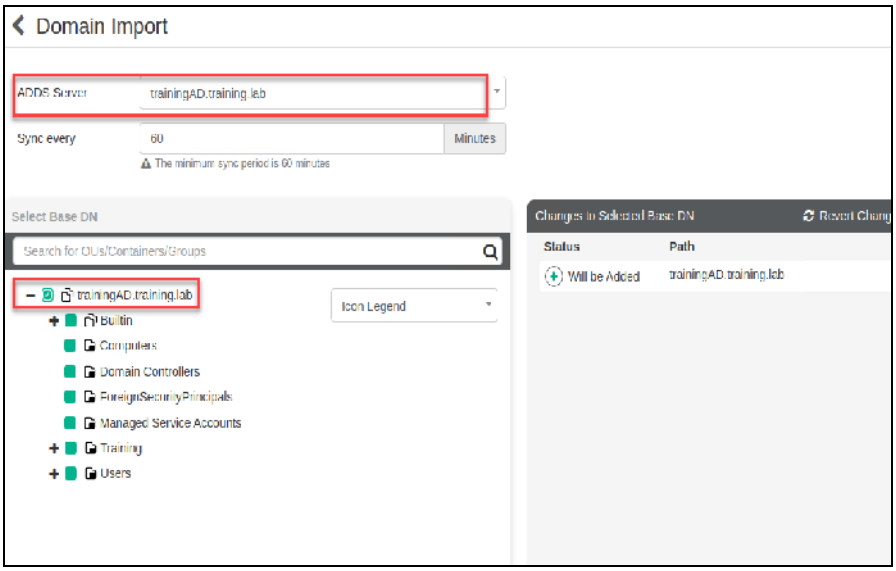
1. On the HQ-EMS-1 VM, log in to the FortiClient EMS GUI.
2. Click **Administration** > **Authentication Servers**, and edit the existing **Active Directory**entry.
3. Update the **IP address/Hostname**field to match the Windows-AD VM IP address.



4. Click **Test** to check the connectivity.
5. Click **Save** to save the authentication server.

To update the Domain Windows-AD VM

1. Continuing on the FortiClient EMS GUI, click **Endpoints** > **Manage Domains**, and delete the existing entry.
2. Click **Yes**.
3. Click **Add** > **ADDS** to open the **Domain Import** window.
4. In the **ADDS Server** field, select **trainingAD.training.lab**.
5. In the **Select Base DN** section, select the **trainingAD.training.lab** checkbox to add all the groups.



6. Click **Save** to import all the endpoints and users.

Install FortiClient on AD Endpoint

1. On the Windows-AD VM, on the desktop, open the **Resources** folder.
2. Double-click the `FortiClient.msi` file.
3. In the **FortiClient Setup** window, select the checkbox to accept the license agreement, and then click **Next** to start the installation.
4. In the **Choose Setup Type** window, ensure that the **Secure Remote Access**, **Vulnerability Scan**, **Advanced Persistent Threat (APT) Components**, **Sandbox detection**, **Cloud Scan**, and **ZTNA** checkboxes are selected.
5. Click **Next** to continue.
6. In the **Additional Security Features** window, select **Antivirus**, **Web Filtering**, and **Anti-Ransomware** checkboxes.
7. Click **Next** to continue.
8. Click **Next** to continue.
9. Click **Install** to continue.
10. After the FortiClient installation is complete, click **Finish**.
11. Open the FortiClient console.
12. In the **Enter Server address or Invitation code** field, type the <FortiClient EMS IP address>.
13. Click **Connect**.
14. In the **Invalid certificate detected** window, click **Accept**.

Prerequisites (Self-Paced Only)

Before you begin this lab, you must identify the IP address of the FortiClient EMS, Windows-AD VM, and install FortiClient on Windows endpoint.

Do *not* perform these steps if you are taking an instructor-led class. These steps are required only if you are performing the self-paced labs.

To identify the IP address of the FortiClient EMS

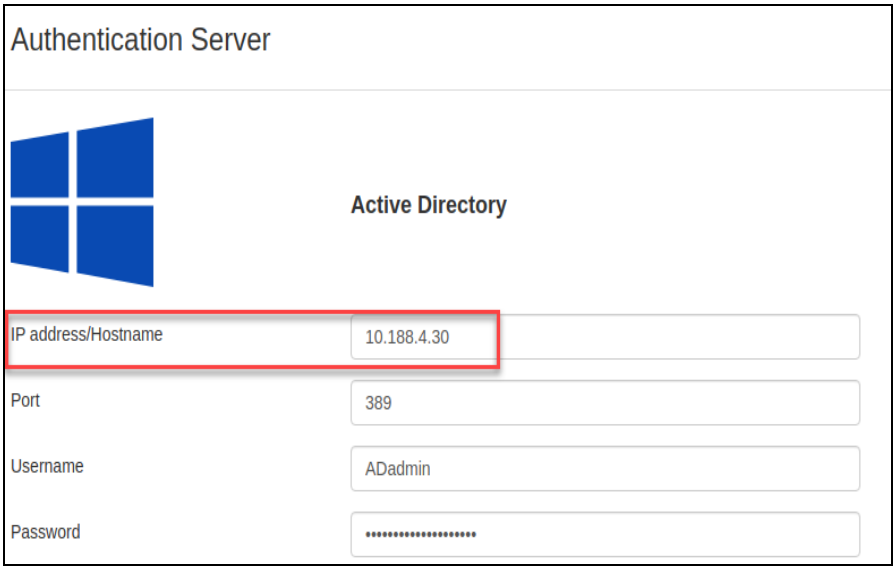
1. On the Fortinet Training Institute side bar, click **POD IP**.
2. In the **CREDENTIALS** section, under **IP address**, locate and make a note of the IP address.
   You will use this address where the lab asks for <FortiClient EMS IP address>.

To identify the IP address of the Windows-AD VM

1. On the Fortinet Training Institute side bar, click **Windows-AD**.
2. In the **CREDENTIALS** section, under **IP address**, locate and make a note of the IP address.
   You will use this address where the lab asks for <Windows-AD IP address>.

To update the IP address of the Windows-AD VM

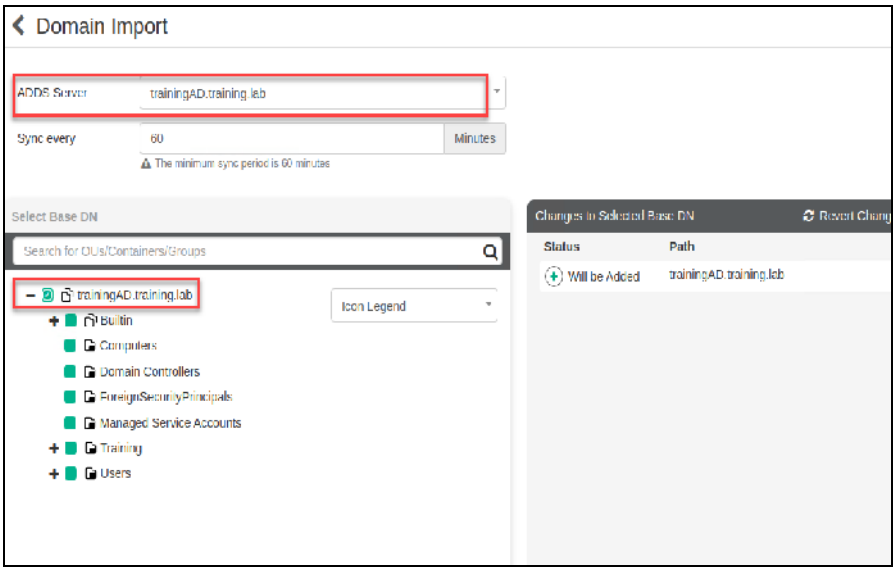
1. On the HQ-EMS-1 VM, log in to the FortiClient EMS GUI.
2. Click **Administration** > **Authentication Servers**, and edit the existing **Active Directory**entry.
3. Update the **IP address/Hostname**field to match the Windows-AD VM IP address.



4. Click **Test** to check the connectivity.
5. Click **Save** to save the authentication server.

To update the Domain Windows-AD VM

1. Continuing on the FortiClient EMS GUI, click **Endpoints** > **Manage Domains**, and delete the existing entry.
2. Click **Yes**.
3. Click **Add** > **ADDS** to open the **Domain Import** window.
4. In the **ADDS Server** field, select **trainingAD.training.lab**.
5. In the **Select Base DN** section, select the **trainingAD.training.lab** checkbox to add all the groups.



6. Click **Save** to import all the endpoints and users.

Install FortiClient on AD Endpoint

1. On the Windows-AD VM, on the desktop, open the **Resources** folder.
2. Double-click the `FortiClient.msi` file.
3. In the **FortiClient Setup** window, select the checkbox to accept the license agreement, and then click **Next** to start the installation.
4. In the **Choose Setup Type** window, ensure that the **Secure Remote Access**, **Vulnerability Scan**, **Advanced Persistent Threat (APT) Components**, **Sandbox detection**, **Cloud Scan**, and **ZTNA** checkboxes are selected.
5. Click **Next** to continue.
6. In the **Additional Security Features** window, select **Antivirus**, **Web Filtering**, and **Anti-Ransomware** checkboxes.
7. Click **Next** to continue.
8. Click **Next** to continue.
9. Click **Install** to continue.
10. After the FortiClient installation is complete, click **Finish**.
11. Open the FortiClient console.
12. In the **Enter Server address or Invitation code** field, type the <FortiClient EMS IP address>.
13. Click **Connect**.
14. In the **Invalid certificate detected** window, click **Accept**.

Exercise 1: Troubleshooting FortiClient Connectivity to FortiClient EMS

In this exercise, you will troubleshoot a telemetry connectivity issue between FortiClient and FortiClient EMS.

The steps in this exercise only work if you executed the script as instructed in the *Prerequisites* section of this lab.

Review the FortiClient Telemetry Connectivity Status

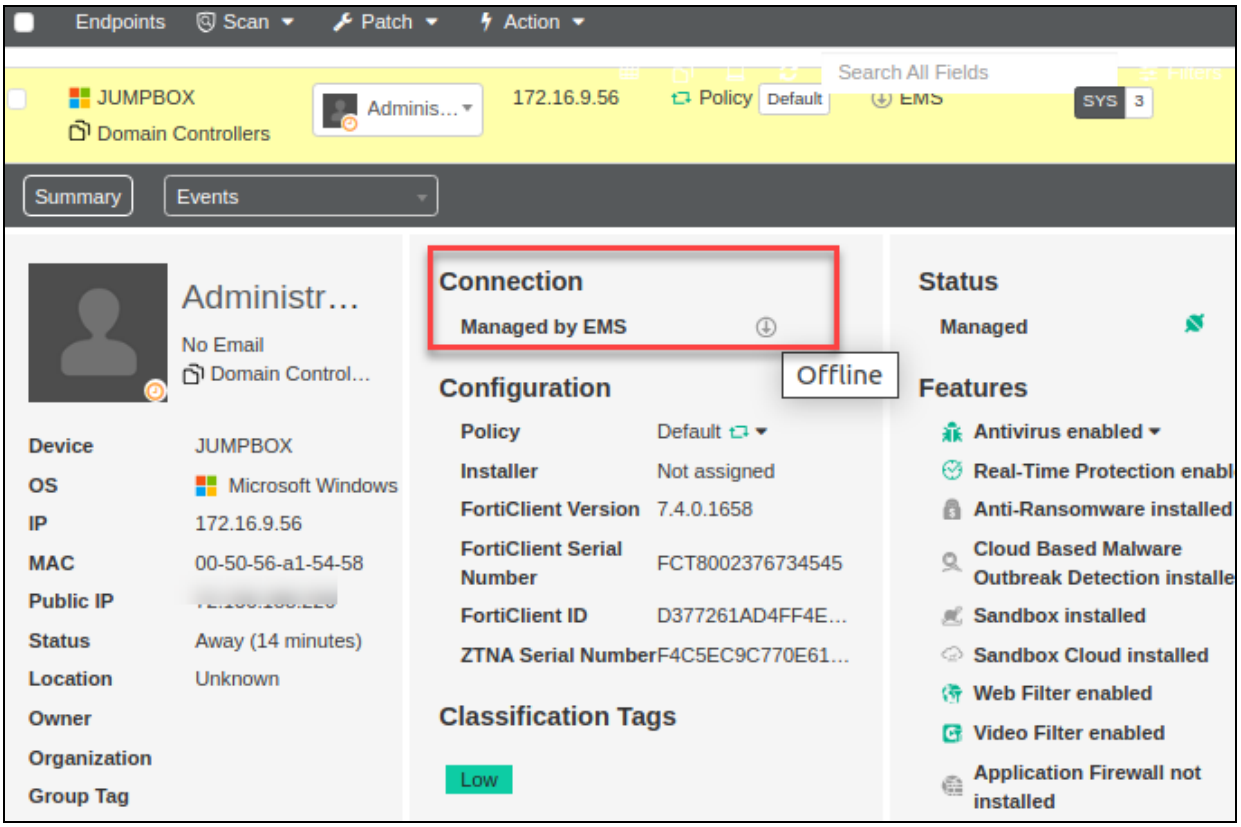
You will review the FortiClient telemetry status on FortiClient EMS.

To review the FortiClient telemetry connectivity status

1. On the HQ-EMS-1 VM, log in to the FortiClient EMS GUI.
2. Click **Endpoints** > **All Endpoints**, and then click **JUMPBOX**.

It will take a few minutes for the endpoint to be marked as offline. The default keep-alive interval is 60 seconds and it takes 5 missed keep-alives for an endpoint to be marked as offline.

In the **Connection** section, the value in the **Managed by EMS** field is **Offline**.



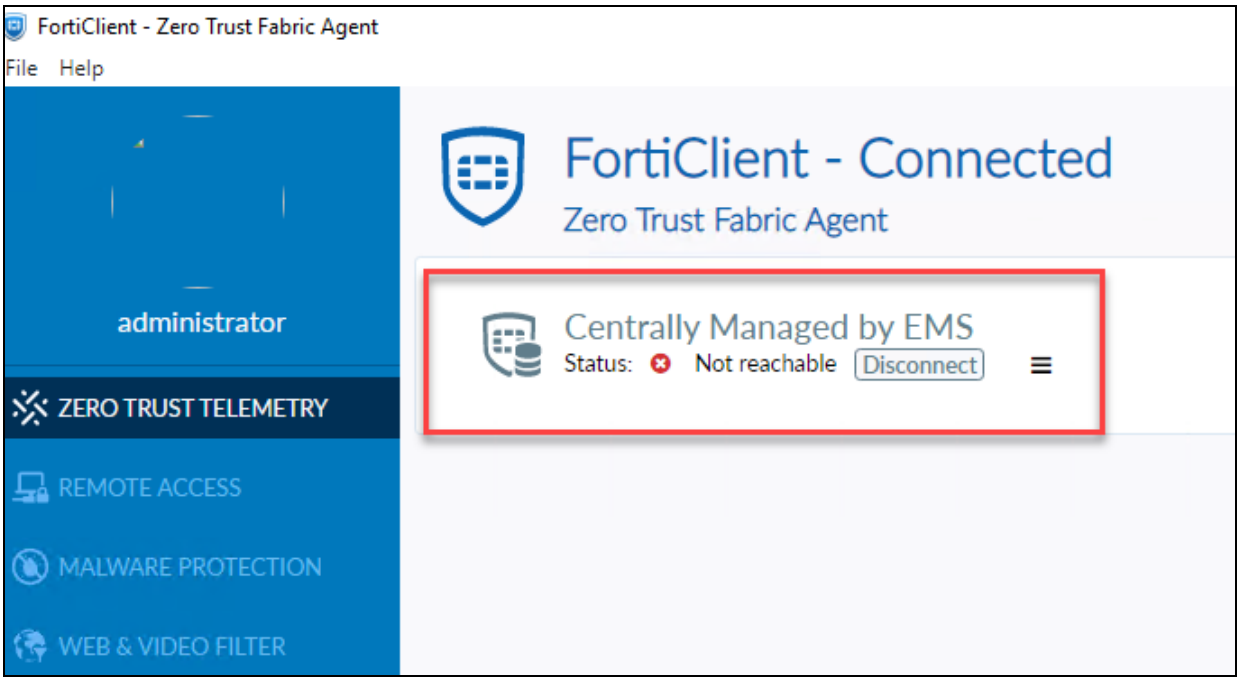
A status of **Offline** means that FortiClient cannot establish a telemetry connection to FortiClient EMS.

Troubleshoot the FortiClient Telemetry Connectivity Issue

You will troubleshoot the FortiClient telemetry connectivity issue on the Windows FortiClient endpoint.

To troubleshoot the Windows-AD VM

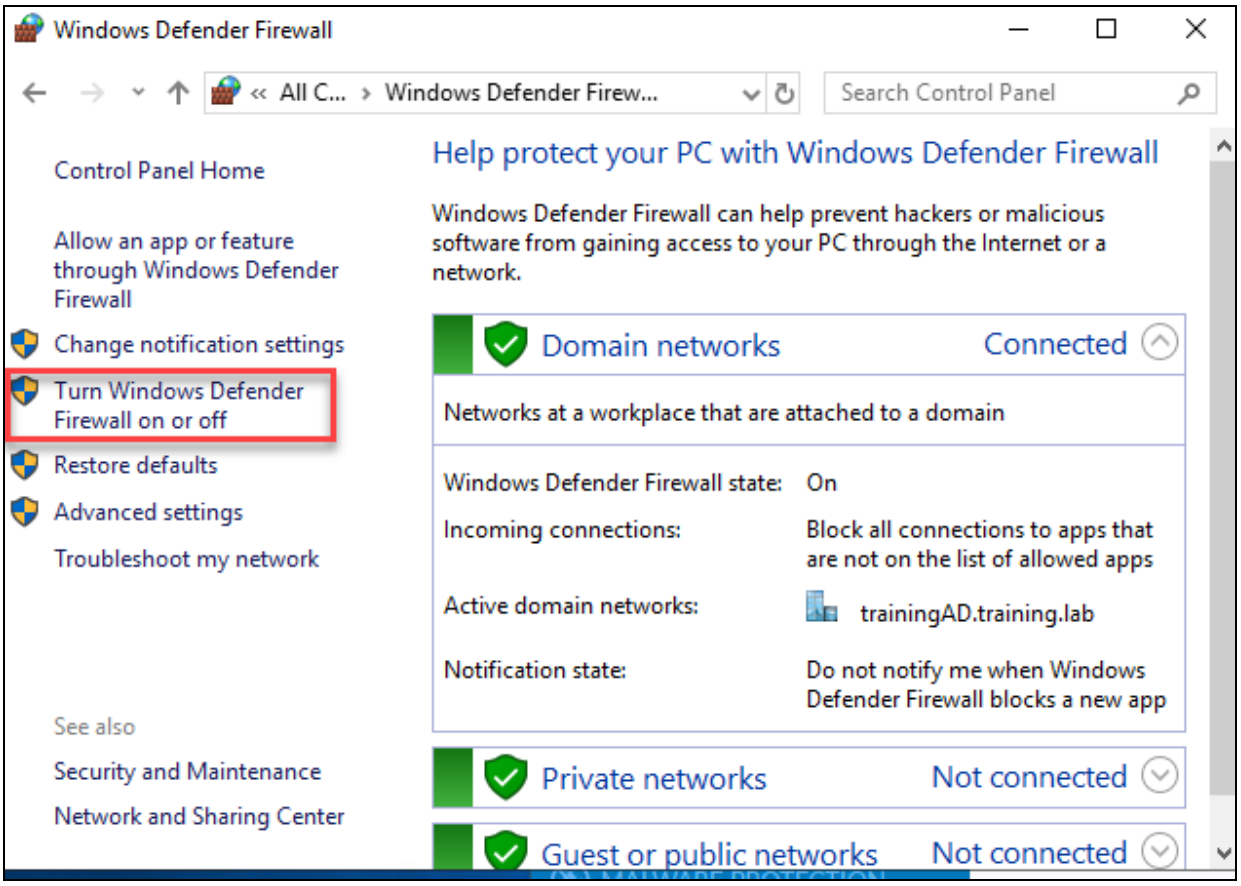
1. On the Windows-AD VM, open the FortiClient console, in the **ZERO TRUST TELEMETRY** section, ensure that the status of **Centrally Managed by EMS** is **Not reachable**.



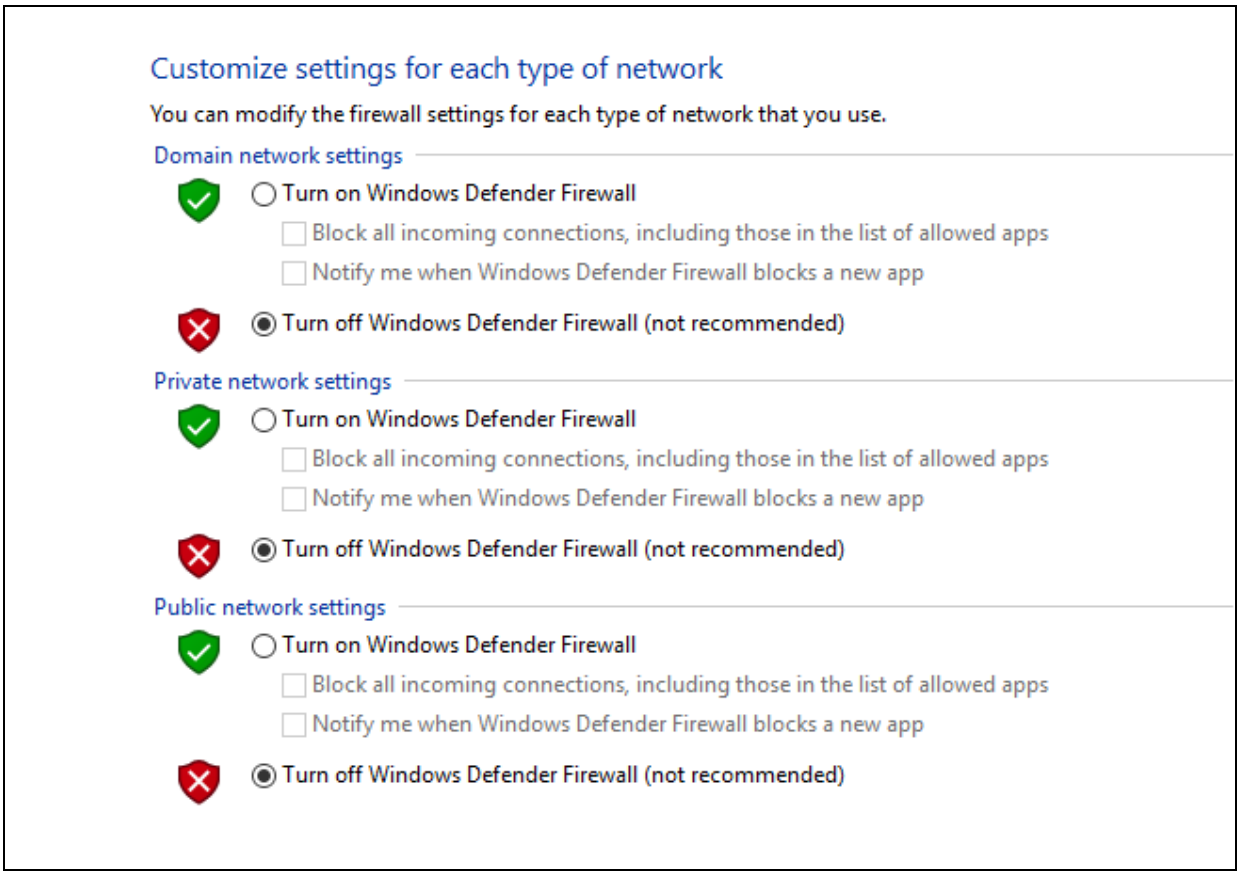
2. Open the command prompt, and then ping the <FortiClient EMS IP>.
   You made a note of this IP address when you completed the lab prerequisites.
3. If you can ping the server, enter `telnet <FortiClient EMS IP> 8013` to test the telemetry connection to the FortiClient EMS.

```
C:\Users\Administrator>ping 172.16.9.20

Pinging 172.16.9.20 with 32 bytes of data:
Reply from 172.16.9.20: bytes=32 time<1ms TTL=64
Reply from 172.16.9.20: bytes=32 time<1ms TTL=64
Reply from 172.16.9.20: bytes=32 time<1ms TTL=64
Reply from 172.16.9.20: bytes=32 time<1ms TTL=64

Ping statistics for 172.16.9.20:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\Administrator>telnet 172.16.9.20 8013
Connecting To 172.16.9.20...Could not open connection to the host, on port 8013: Connect failed
```

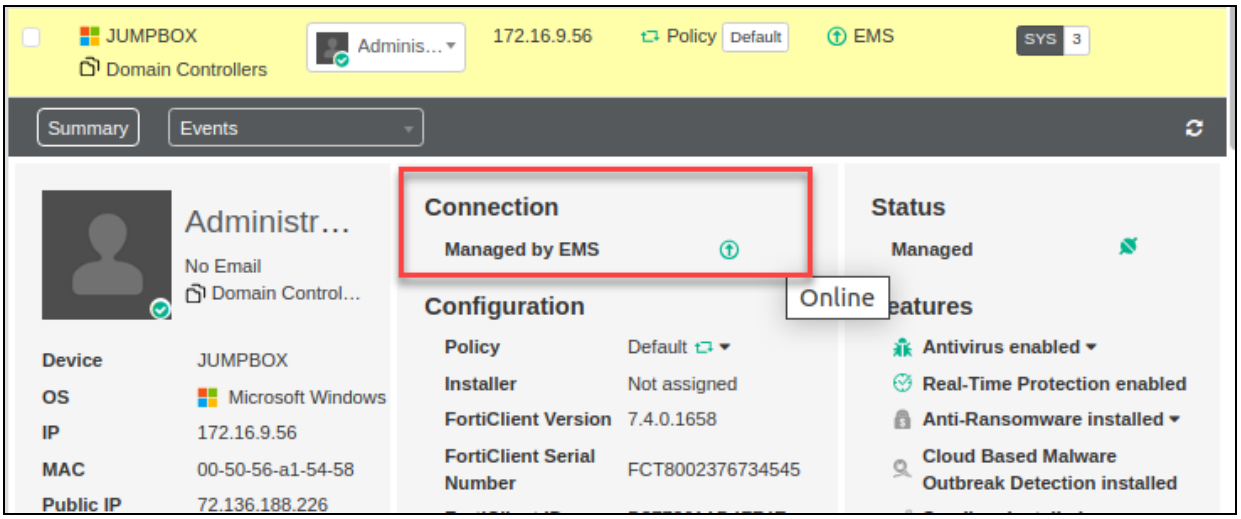
   The connection fails because Windows Firewall is active.
4. Click **Start** > **Control Panel**, click **System and Security**, and then click **Windows Defender Firewall**.
5. Click **Turn Windows Defender Firewall on or off**.



6. For each type of network, select **Turn off Windows Defender Firewall**.



7. Click **OK** to save the settings.
8. Return to the command prompt, and then enter `telnet <FortiClient EMS IP> 8013` to test connectivity.
   There should be an empty command prompt window. This means the connection was successful.
9. Return to the FortiClient console, and then in the **ZERO TRUST TELEMETRY** section, ensure that the status of **Centrally Managed by EMS** is **Connected**.
   It may take a minute to see the updated status.
10. Return to the FortiClient EMS GUI, click **Endpoints** > **All Endpoints**, and then click **JUMPBOX**.
    In the **Connection** section, the value in the **Managed by EMS** field is **Online**.



Exercise 2: Using the Password Recovery Tool to Reset the Built-In Administrator Password

In this exercise, you will reset the password for the FortiClient EMS built-in administrator using the password recovery tool. You will run the password recovery tool on the HQ-EMS-1 VM to generate a temporary password for the built-in administrator.

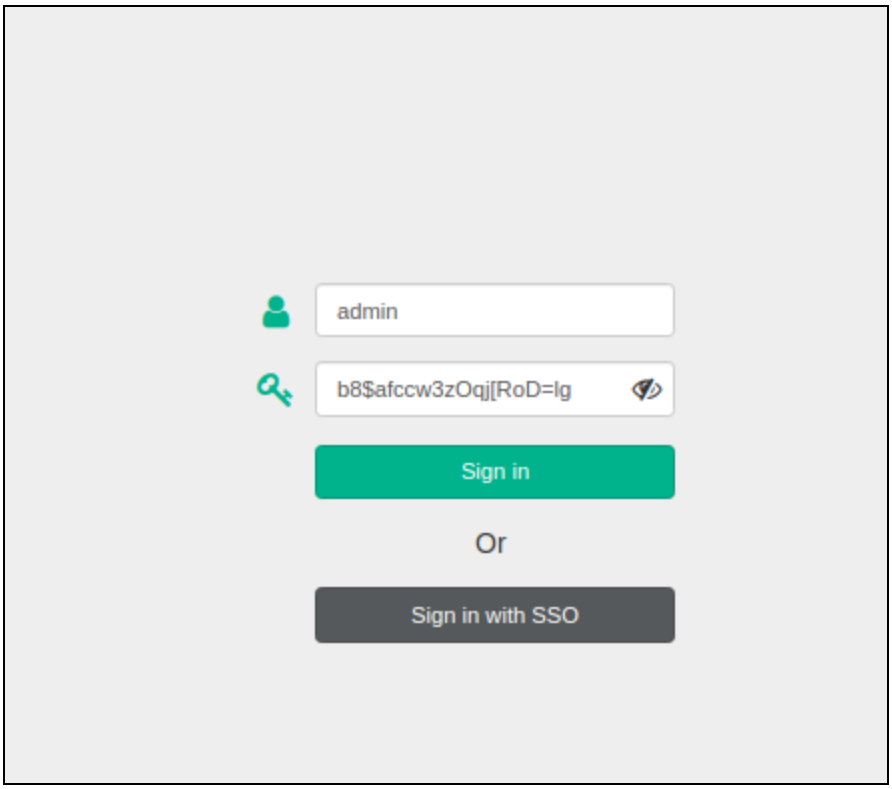
You must have execute permissions to run the password recovery tool.

To run the password recovery tool

1. On the HQ-EMS-1 VM, click the **Terminal** icon to open the terminal window.
2. Enter `sudo -i`, and then if prompted, enter the following password:
   `Fortinet1!`
3. Enter the following command:
   `cd /opt/forticlientems/bin/`
4. Enter the following command:
   `./PasswordRecovery`
5. Enter `yes`.
6. In the `Temporary password` field, copy the value.

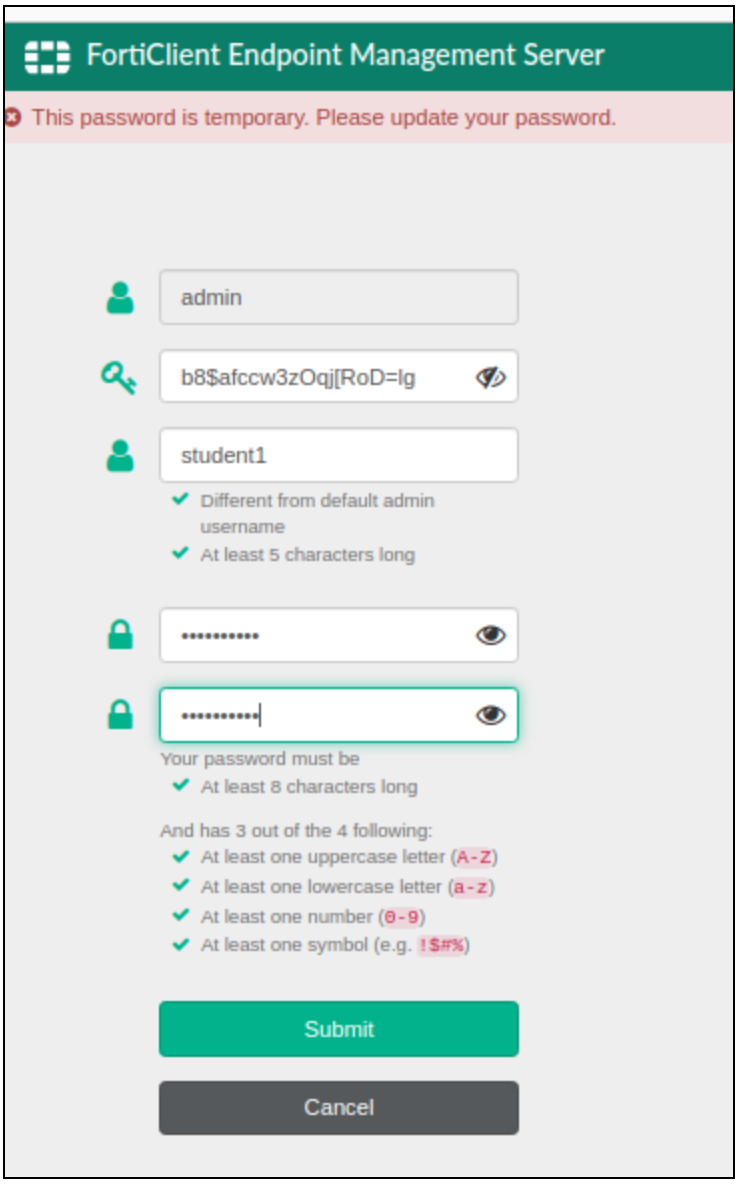
```
root@hq-ems-1:/opt/forticlientems/bin# ./PasswordRecovery
Resetting "admin"s password
Please type 'yes' if you are sure to proceed: yes
Username has been reset to 'admin' and password has been updated.

Temporary password:
b8$afccw3zOqj[RoD=lg
```

7. Open a Chrome window, and then in **Bookmarks**, select the **HQ-EMS** login page bookmark.
8. Click **Accept**.
9. In the username field, type `admin`, in the password field, paste the temporary password, and then click **Sign in**.



FortiClient EMS prompts you to configure a new administrator and password.

10. In the **New Username** field, type `student1`.
11. In the **New Password** and **Confirm Password** fields, type `Password2!` to meet the password requirements, and then click **Submit** to save the password.



Lab 10: FortiClient Cloud

There is no lab associated with Lesson 10 at this time.

FORTINET