# FortiAuthenticator - Cookbook

Version 6.2.0

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FORTINET®

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FortiAuthenticator 6.2.0 Cookbook
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# Change Log

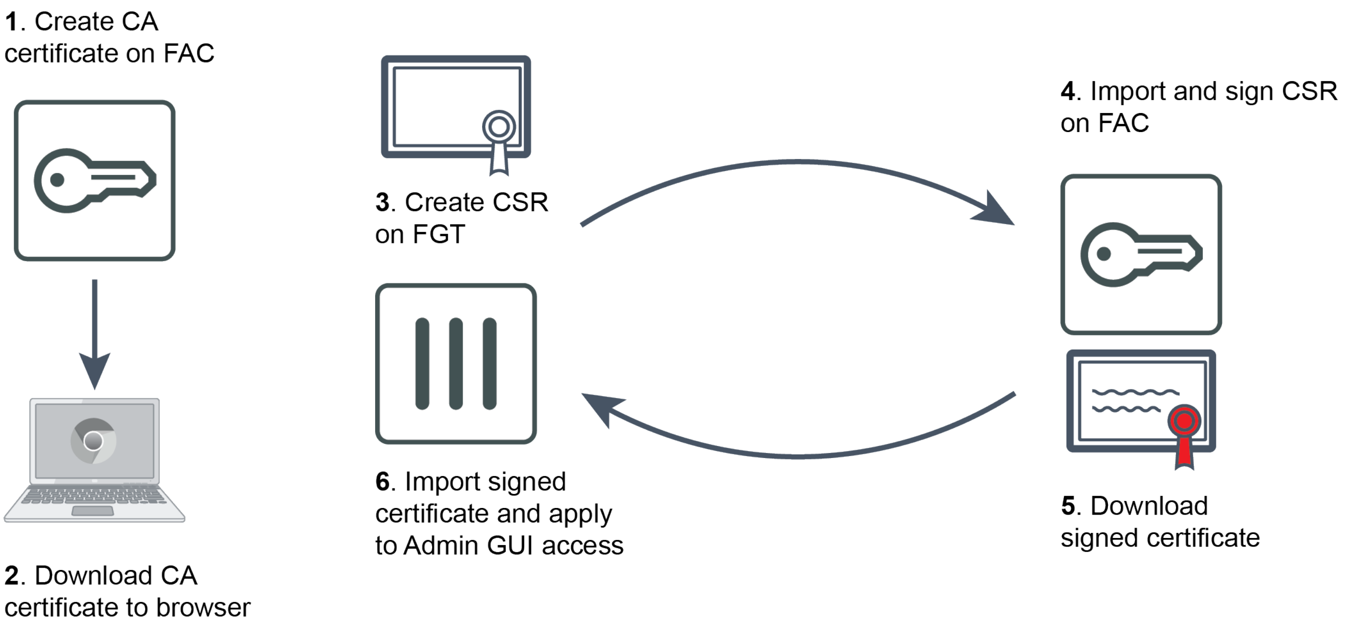
| Date | Change Description |
|---|---|
| 2020-09-16 | Initial release. |
| 2020-11-18 | Added Computer authentication using FortiAuthenticator with MS AD Root CA on page 202. |
| 2020-12-07 | Added WiFi onboarding using FortiAuthenticator Smart Connect on page 216. |
| 2020-12-16 | Updated Configuring the remote SAML server on page 157 in SAML IdP Proxy for G Suite. |
| 2021-01-06 | Added FortiGate SSL VPN with FortiAuthenticator as the IdP proxy for Azure on page 190. |
| 2021-06-07 | Updated Configuring FortiAuthenticator on page 194. |
| 2023-08-21 | Updated Configuring RADIUS client on FortiAuthenticator on page 110. |
| | |

# Certificate management

This section describes managing certificates with the FortiAuthenticator device.

FortiAuthenticator can act as a certificate authority (CA) for the creation and signing of X.509 certificates, such as server certificates for HTTPS and SSH, and client certificates for HTTPS, SSL, and IPsec VPN.

## FortiAuthenticator as a Certificate Authority


**1**. Create CA certificate on FAC
**2**. Download CA certificate to browser
**3**. Create CSR on FGT
**4**. Import and sign CSR on FAC
**5**. Download signed certificate
**6**. Import signed certificate and apply to Admin GUI access

For this recipe, you will configure the FortiAuthenticator as a Certificate Authority (CA). This will allow the FortiAuthenticator to sign certificates that the FortiGate will use to secure administrator GUI access.

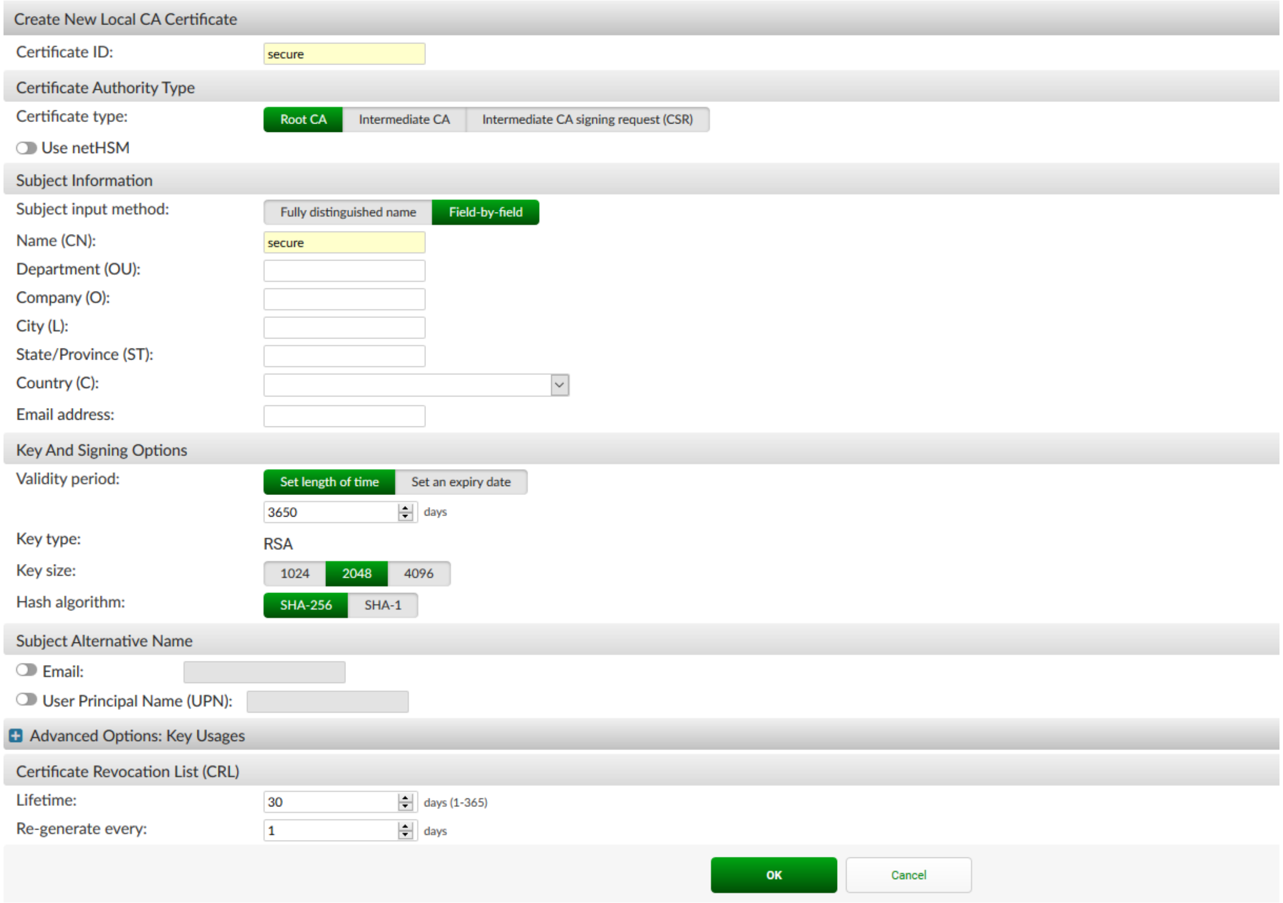
This scenario includes creating a certificate request on the FortiGate, downloading the certificate to the network's computers, and then importing it to the FortiAuthenticator. You will sign the certificate with the FortiAuthenticator's own certificate, then download and import the signed certificate back to the FortiGate.

The process of downloading the certificate to the network's computers will depend on which web browser you use. Internet Explorer and Chrome use one certificate store, while Firefox uses another. This configuration includes both methods.

### Creating a new CA on the FortiAuthenticator

**To create a new CA:**

1. On the FortiAuthenticator, go to *Certificate Management* > *Certificate Authorities* > *Local CAs* and create a new CA. Enter a *Certificate ID*, select *Root CA certificate*, and configure the key options as shown in the example.



Create New Local CA Certificate

| | |
|---|---|
| Certificate ID: | secure |

Certificate Authority Type

| | |
|---|---|
| Certificate type: | [✓ Root CA] Intermediate CA Intermediate CA signing request (CSR) |
| ○ Use netHSM | |

Subject Information

| | |
|---|---|
| Subject input method: | Fully distinguished name [✓ Field-by-field] |
| Name (CN): | secure |
| Department (OU): | |
| Company (O): | |
| City (L): | |
| State/Province (ST): | |
| Country (C): | |
| Email address: | |

Key And Signing Options

| | |
|---|---|
| Validity period: | [✓ Set length of time] Set an expiry date |
| | 3650 days |
| Key type: | RSA |
| Key size: | 1024 [✓ 2048] 4096 |
| Hash algorithm: | [✓ SHA-256] SHA-1 |

Subject Alternative Name

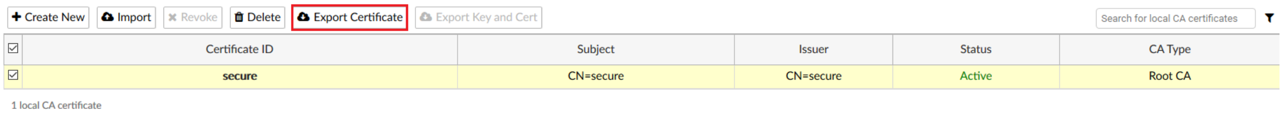
| | |
|---|---|
| ○ Email: | |
| ○ User Principal Name (UPN): | |

⊞ Advanced Options: Key Usages

Certificate Revocation List (CRL)

| | |
|---|---|
| Lifetime: | 30 days (1-365) |
| Re-generate every: | 1 days |

2. Once created, highlight the certificate and select *Export Certificate*.



| ☑ | Certificate ID | Subject | Issuer | Status | CA Type |
|---|---|---|---|---|---|
| ☑ | secure | CN=secure | CN=secure | Active | Root CA |

1 local CA certificate

This will save a *.crt* file to your local drive.

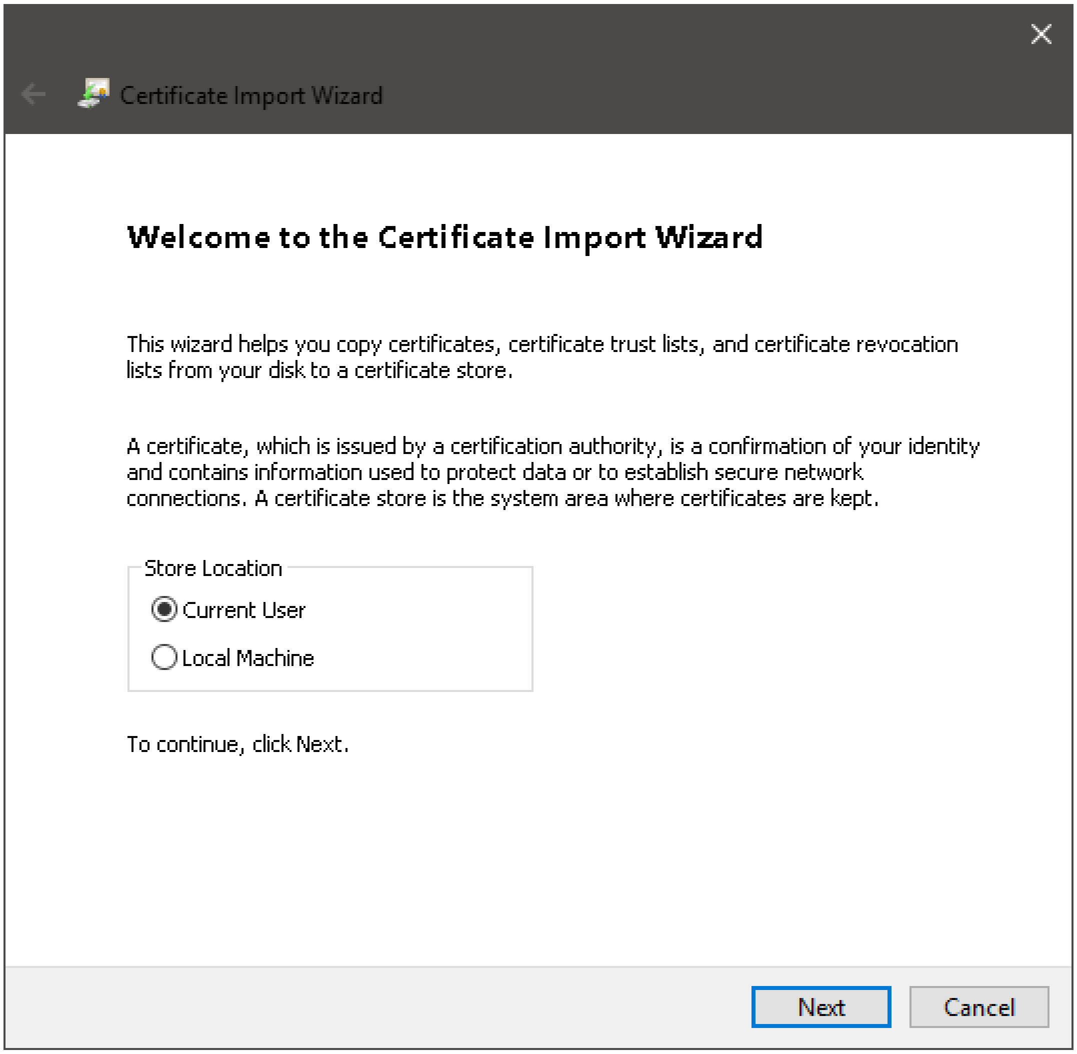
secure.crt

# Installing the CA on the network

The certificate must now be installed on the computers in your network as a trusted root CA. The steps below show different methods of installing the certificate, depending on your browser.

## Internet Explorer and Chrome

1. In Windows Explorer, right-click on the certificate and select *Install Certificate*. Open the certificate and follow the *Certificate Import Wizard*.



Welcome to the Certificate Import Wizard

This wizard helps you copy certificates, certificate trust lists, and certificate revocation lists from your disk to a certificate store.

A certificate, which is issued by a certification authority, is a confirmation of your identity and contains information used to protect data or to establish secure network connections. A certificate store is the system area where certificates are kept.

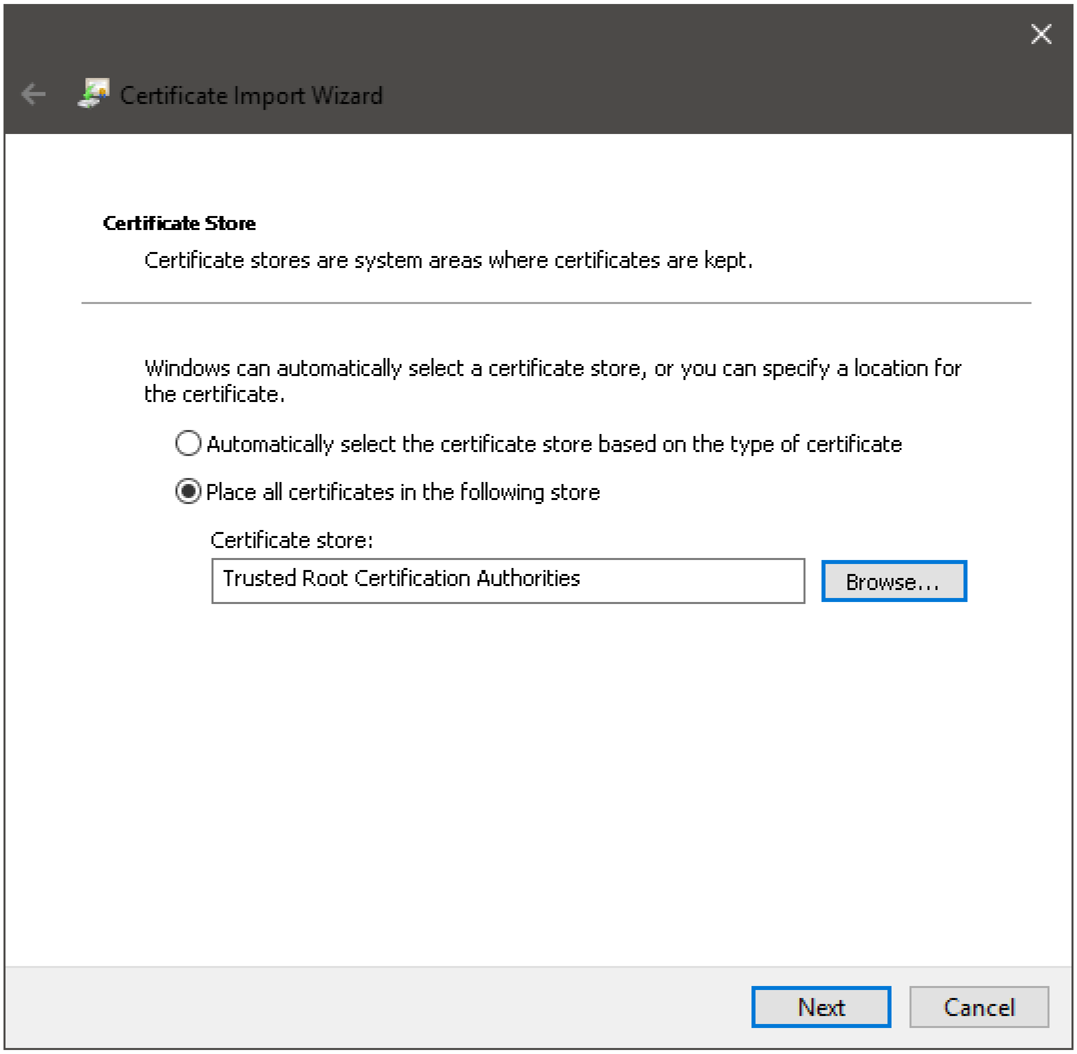
Store Location

● Current User

○ Local Machine

To continue, click Next.

2. Make sure to place the certificate in the *Trusted Root Certification Authorities* store.



Certificate Import Wizard

**Certificate Store**

Certificate stores are system areas where certificates are kept.

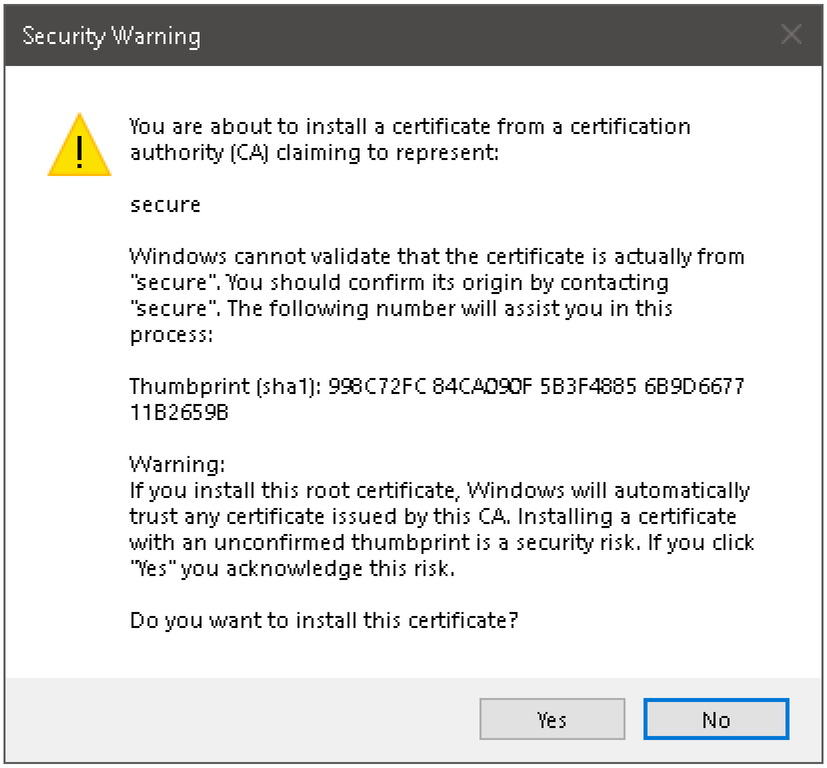
Windows can automatically select a certificate store, or you can specify a location for the certificate.

○ Automatically select the certificate store based on the type of certificate

● Place all certificates in the following store

Certificate store: Trusted Root Certification Authorities

3. Finish the Wizard and select *Yes* to confirm and install the certificate.



Security Warning

You are about to install a certificate from a certification authority (CA) claiming to represent:

secure

Windows cannot validate that the certificate is actually from "secure". You should confirm its origin by contacting "secure". The following number will assist you in this process:

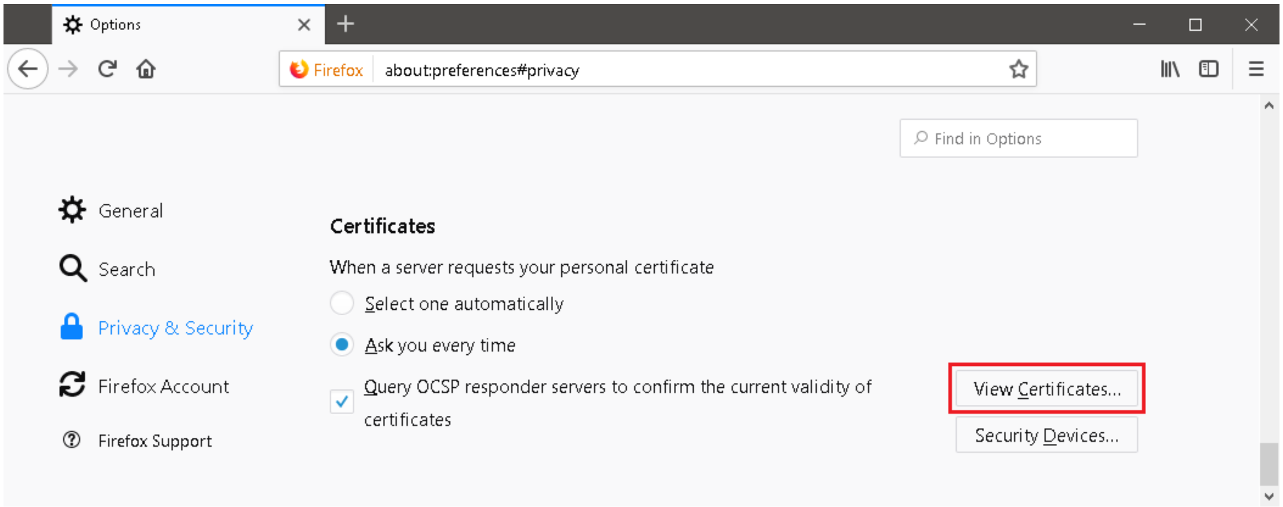
Thumbprint (sha1): 998C72FC 84CA090F 5B3F4885 6B9D6677 11B2659B

Warning:
If you install this root certificate, Windows will automatically trust any certificate issued by this CA. Installing a certificate with an unconfirmed thumbprint is a security risk. If you click "Yes" you acknowledge this risk.

Do you want to install this certificate?

## Firefox

1. In the web browser, go to *Options* > *Privacy & Security* > *Certificates*, and select *View Certificates*.



Certificates

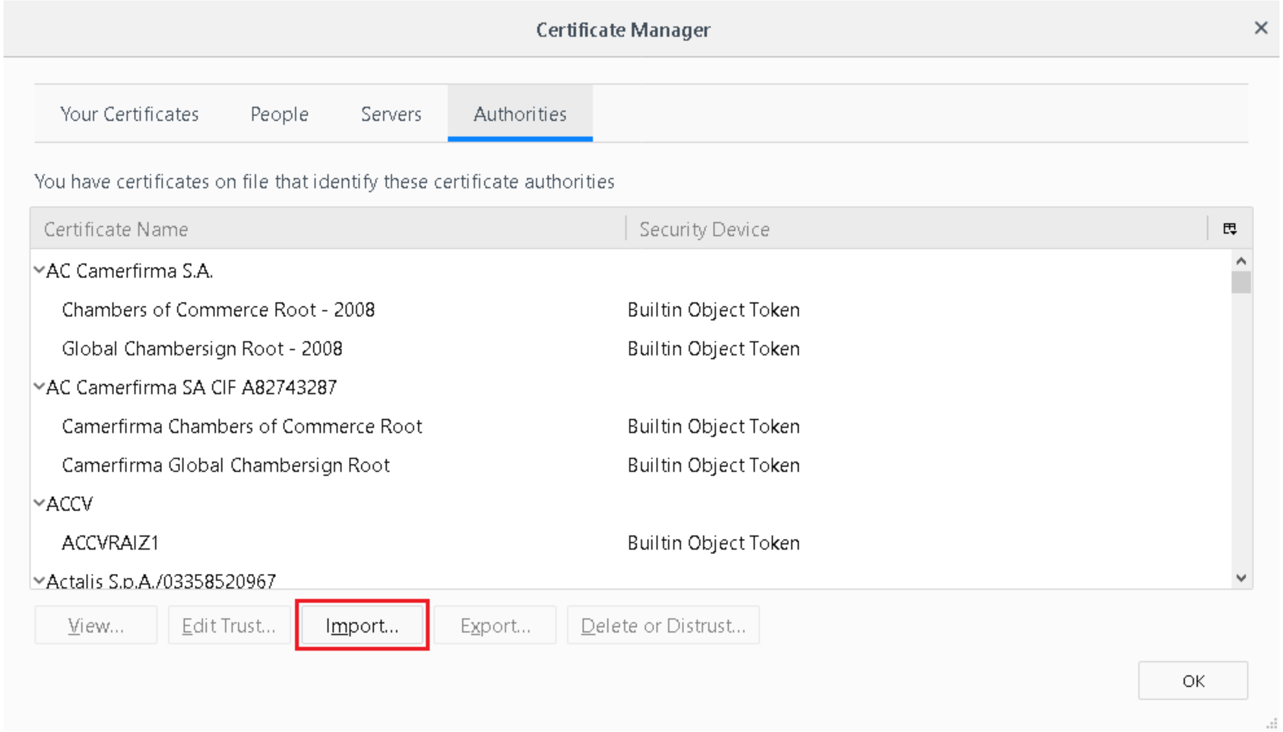
When a server requests your personal certificate

○ Select one automatically

● Ask you every time

☑ Query OCSP responder servers to confirm the current validity of certificates

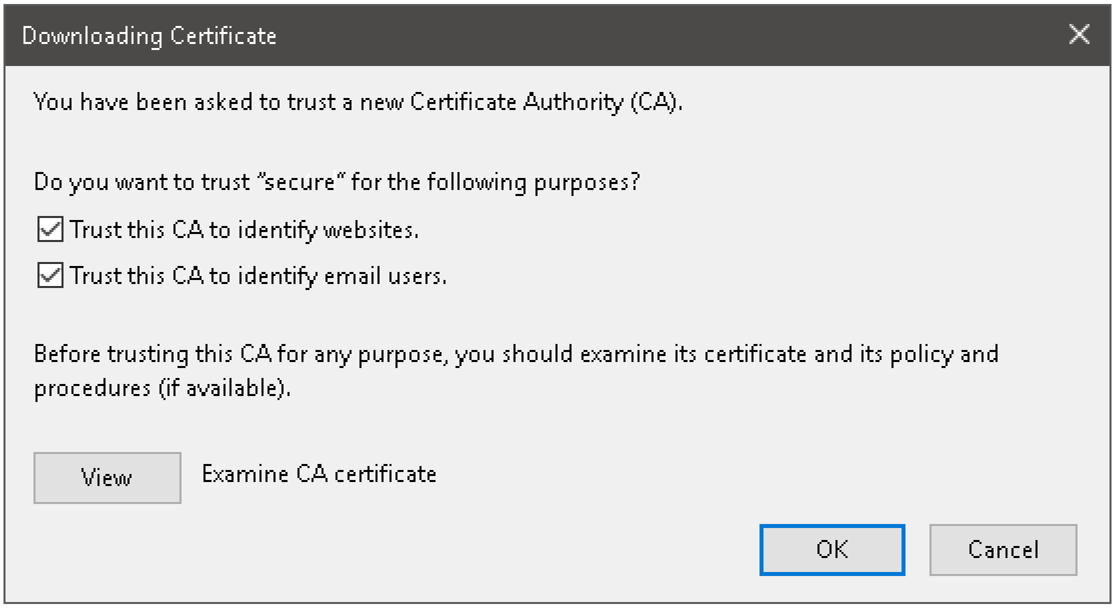
2. In the *Authorities* tab, select *Import*.



You have certificates on file that identify these certificate authorities

| Certificate Name | Security Device |
|---|---|
| AC Camerfirma S.A. | |
| Chambers of Commerce Root - 2008 | Builtin Object Token |
| Global Chambersign Root - 2008 | Builtin Object Token |
| AC Camerfirma SA CIF A82743287 | |
| Camerfirma Chambers of Commerce Root | Builtin Object Token |
| Camerfirma Global Chambersign Root | Builtin Object Token |
| ACCV | |
| ACCVRAIZ1 | Builtin Object Token |
| Actalis S.p.A./03358520967 | |

3. Find and open the root certificate.
   You will be asked what purposes the certificate will be trusted to identify. Select all options and select *OK*.



You have been asked to trust a new Certificate Authority (CA).

Do you want to trust "secure" for the following purposes?

☑ Trust this CA to identify websites.

☑ Trust this CA to identify email users.

Before trusting this CA for any purpose, you should examine its certificate and its policy and procedures (if available).

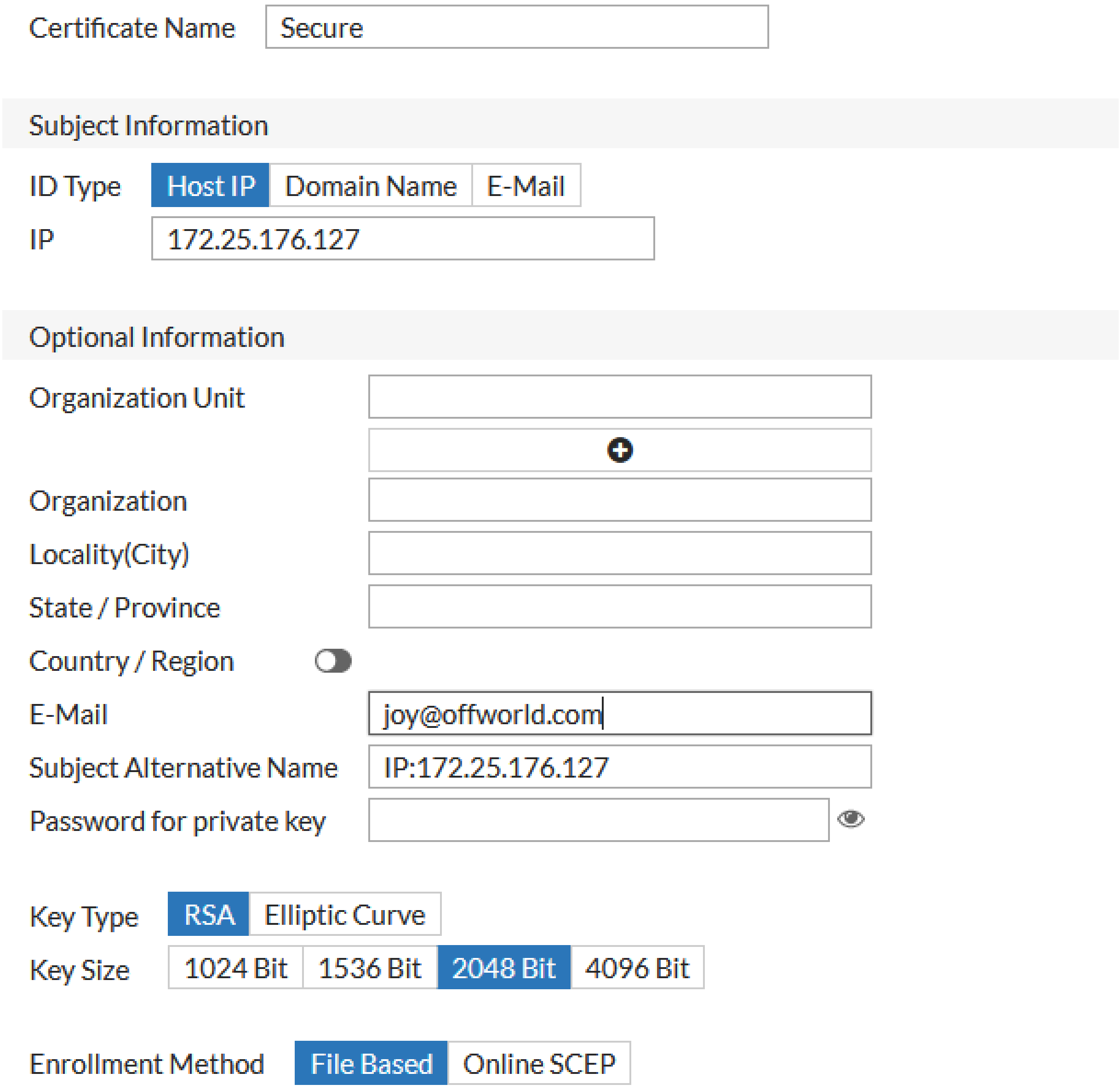
Examine CA certificate

## Creating a CSR on the FortiGate

**To create a CSR:**

1. On the FortiGate, go to *System* > *Certificates* and select *Generate* to create a new certificate signing request (CSR). Enter a *Certificate Name*, the Internet facing IP address of the FortiGate, and a valid email address, then configure the key options as shown in the example.

   The *Subject Alternative Name* field must be configured with the internet facing IP address or FQDN in the following format: `IP:x.x.x.x` or `DNS:hostname.example.com`.

   Certificate Name: Secure

   Subject Information

   ID Type: [✓ Host IP] Domain Name E-Mail

   IP: 172.25.176.127

   Optional Information

   Organization Unit:

   Organization:

   Locality(City):

   State / Province:

   Country / Region:

   E-Mail: joy@offworld.com

   Subject Alternative Name: IP:172.25.176.127

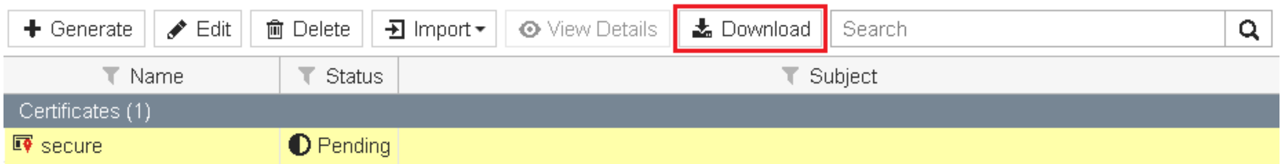
   Password for private key:

   Key Type: [✓ RSA] Elliptic Curve

   Key Size: 1024 Bit 1536 Bit [✓ 2048 Bit] 4096 Bit

   Enrollment Method: [✓ File Based] Online SCEP

2. Once created, the certificate will show a *Status* of *Pending*. Highlight the certificate and select *Download*.



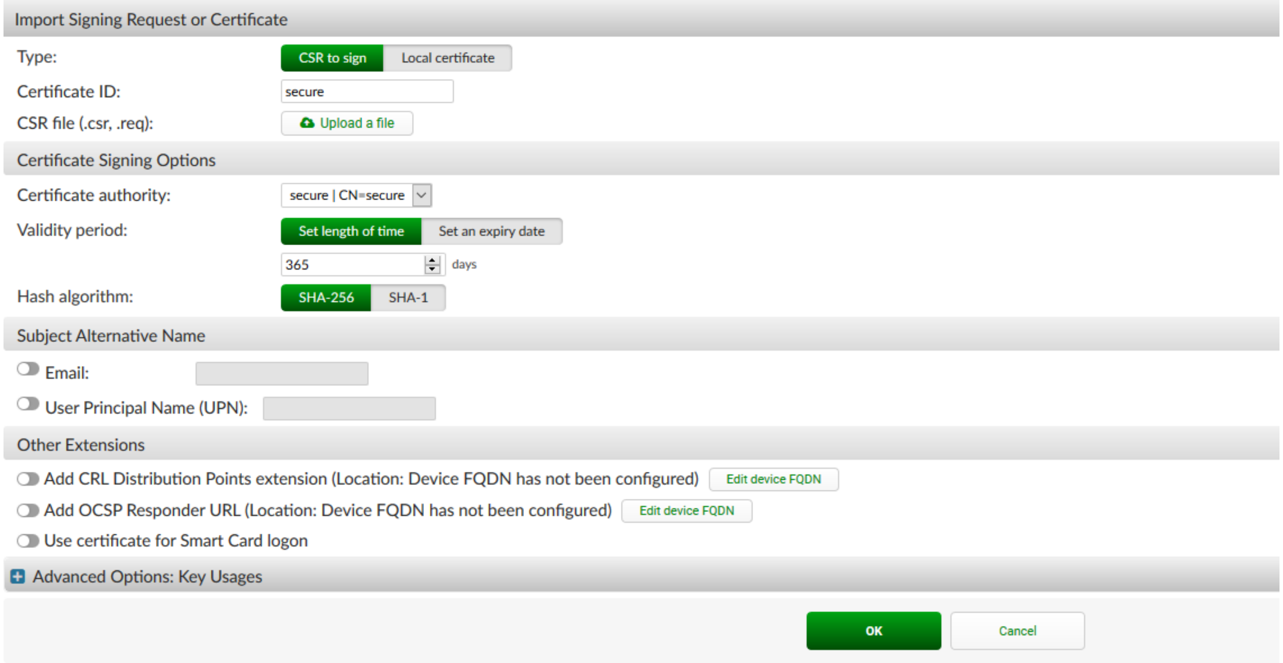
| Name | Status | Subject |
|---|---|---|
| Certificates (1) | | |
| secure | Pending | |

This will save a **.csr** file to your local drive.

## Importing and signing the CSR on the FortiAuthenticator

### To import and sign the CSR:

1. Back on the FortiAuthenticator, go to *Certificate Management* > *End Entities* > *Users* and import the *.csr* certificate created earlier.
   Make sure to select the *Certificate authority* from the dropdown menu, and set the *Hash algorithm* to *SHA-256*, as configured earlier.



Import Signing Request or Certificate

Type: [✓ CSR to sign] Local certificate

Certificate ID: secure

CSR file (.csr, .req): Upload a file

Certificate Signing Options

Certificate authority: secure | CN=secure

Validity period: [✓ Set length of time] Set an expiry date

365 days

Hash algorithm: [✓ SHA-256] SHA-1

Subject Alternative Name

○ Email:

○ User Principal Name (UPN):

Other Extensions

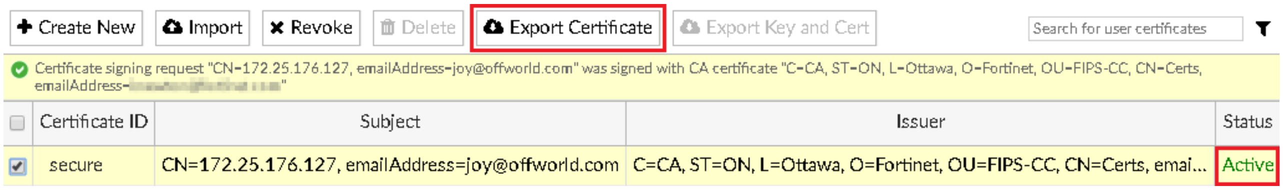
○ Add CRL Distribution Points extension (Location: Device FQDN has not been configured) Edit device FQDN

○ Add OCSP Responder URL (Location: Device FQDN has not been configured) Edit device FQDN

○ Use certificate for Smart Card logon

Advanced Options: Key Usages

2. Once imported, you should see that the certificate has been signed by the FortiAuthenticator, with a *Status* of *Active*. Highlight the certificate and select *Export Certificate*.



Certificate signing request "CN=172.25.176.127, emailAddress=joy@offworld.com" was signed with CA certificate "C=CA, ST=ON, L=Ottawa, O=Fortinet, OU=FIPS-CC, CN=Certs, emailAddress=[redacted]"

| ☐ | Certificate ID | Subject | Issuer | Status |
|---|---|---|---|---|
| ☑ | secure | CN=172.25.176.127, emailAddress=joy@offworld.com | C=CA, ST=ON, L=Ottawa, O=Fortinet, OU=FIPS-CC, CN=Certs, emai... | Active |

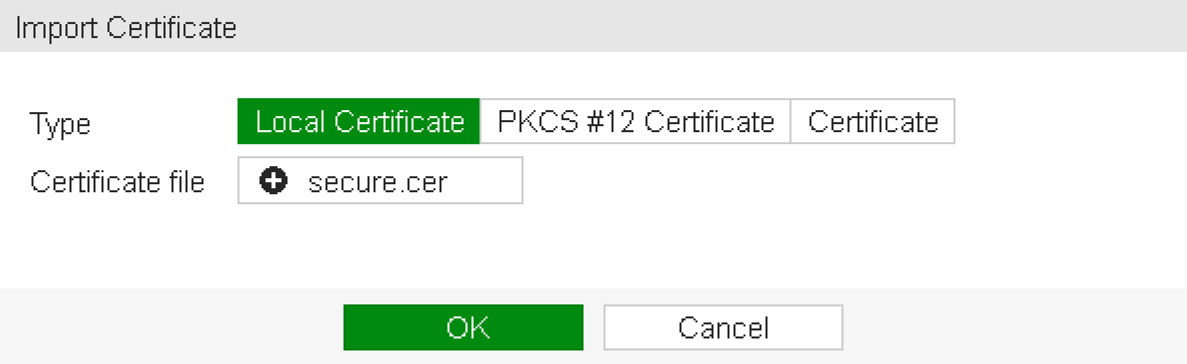
This will save a **.cer** file to your local drive.

secure.cer

## Importing the local certificate to the FortiGate

**To import the local certificate:**

1. Back on the FortiGate, go to *System* > *Certificates*, and select *Local Certificate* from the *Import* dropdown menu. Browse to the *.cer* certificate, and select *OK*.

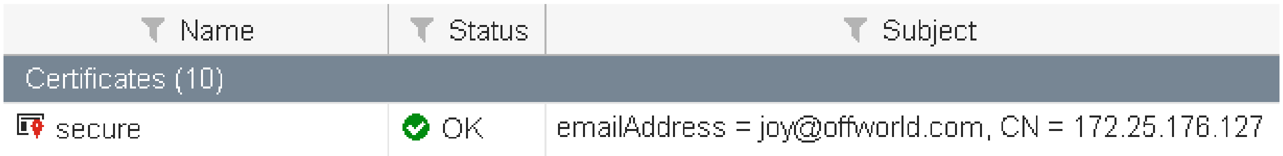


Import Certificate

Type: Local Certificate | PKCS #12 Certificate | Certificate

Certificate file: secure.cer

You should now see that the certificate's *Status* has changed from *Pending* to *OK*. You may have to refresh your page to see the status change.



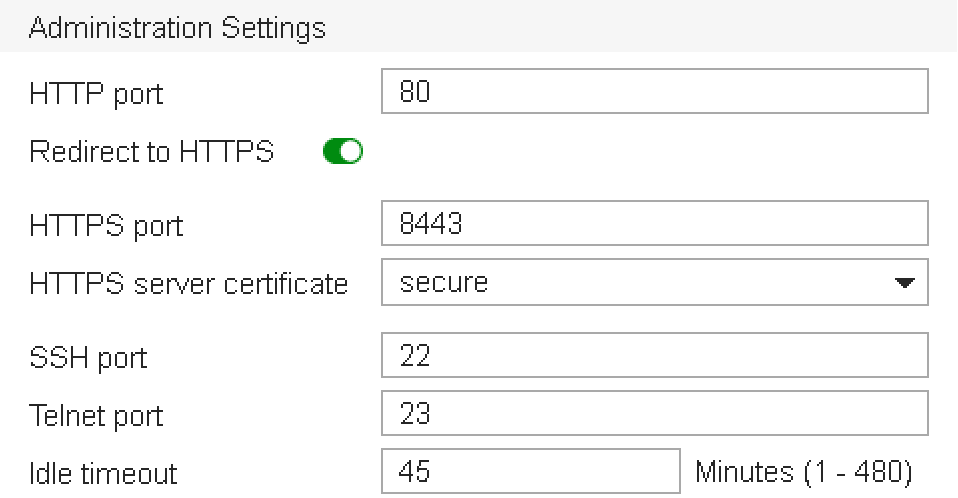
| Name | Status | Subject |
|---|---|---|
| Certificates (10) | | |
| secure | ✓ OK | emailAddress = joy@offworld.com, CN = 172.25.176.127 |

## Configuring the certificate for the GUI

**To configure the certificate:**

1. On the FortiGate, go to *System* > *Settings*.
Under *Administration Settings*, set *HTTPS server certificate* to the certificate created/signed earlier, then select

*Apply*.

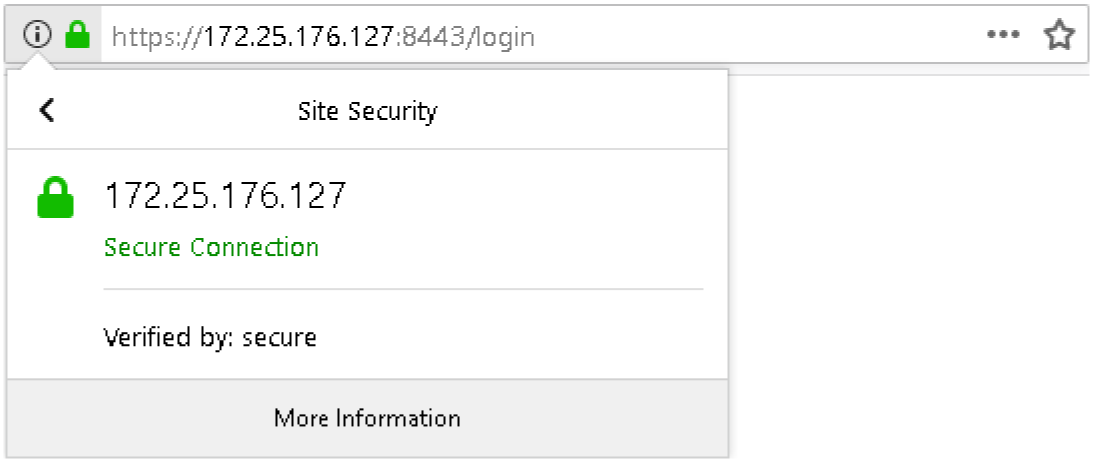


Administration Settings

| | |
|---|---|
| HTTP port | 80 |
| Redirect to HTTPS | ● |
| HTTPS port | 8443 |
| HTTPS server certificate | secure |
| SSH port | 22 |
| Telnet port | 23 |
| Idle timeout | 45 Minutes (1 - 480) |

## Results

Close and reopen your browser, and go to the FortiGate admin login page. If you click on the lock icon next to the address bar, you should see that the certificate has been signed and verified by the FortiAuthenticator. As a result, no certificate errors will appear.



https://172.25.176.127:8443/login

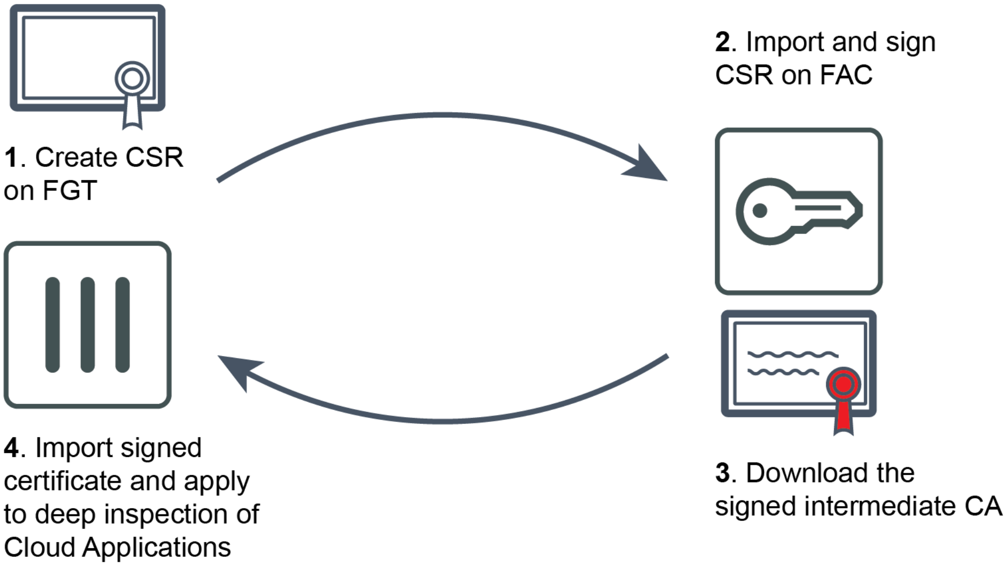
Site Security

172.25.176.127

Secure Connection

Verified by: secure

# FortiAuthenticator certificate with SSL inspection


1. Create CSR on FGT
2. Import and sign CSR on FAC
3. Download the signed intermediate CA
4. Import signed certificate and apply to deep inspection of Cloud Applications

For this recipe, you will create a certificate on the FortiGate, have it signed on the FortiAuthenticator, and configure the FortiGate so that the certificate can be used for SSL deep inspection of HTTPS traffic.

Note that, for this configuration to work correctly, the FortiAuthenticator must be configured as a certificate authority (CA), otherwise the certificate created in this recipe will not be trusted. For more information on how to do this, see FortiAuthenticator as a Certificate Authority.

This scenario includes creating a certificate signing request (CSR), signing the certificate on the FortiAuthenticator, and downloading the signed certificate back to the FortiGate. You will then create an *SSL/SSH Inspection* profile for full SSL inspection, add the certificate created to the profile, and apply the profile to the policy allowing Internet access.

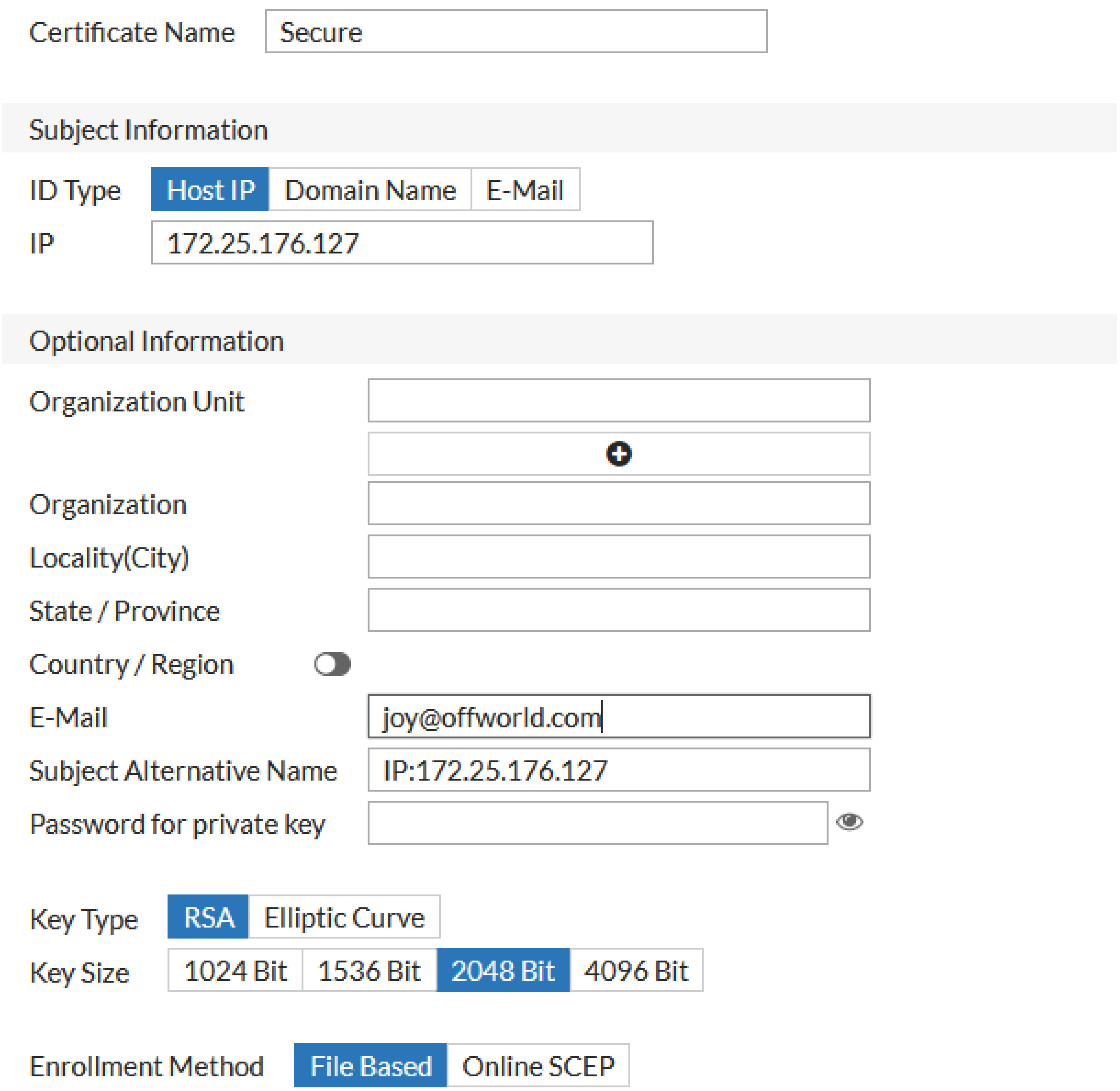
As an example, you will also have *Application Control* with *Deep Inspection of Cloud Applications* enabled. This will apply inspection to HTTPS traffic. Note that you may use another security profile instead of *Application Control*.

## Creating a CSR on the FortiGate

**To create a CSR:**

1. On the FortiGate, go to *System* > *Certificates* and select *Generate* to create a new certificate signing request (CSR). Enter a *Certificate Name*, the Internet facing IP address of the FortiGate, and a valid email address, then configure the key options as shown in the example.

   The *Subject Alternative Name* field must be configured with the internet facing IP address or FQDN in the following format: `IP:x.x.x.x` or `DNS:hostname.example.com`.



Certificate Name: Secure

Subject Information

ID Type: Host IP | Domain Name | E-Mail (Host IP selected)

IP: 172.25.176.127

Optional Information

Organization Unit:

Organization:

Locality(City):

State / Province:

Country / Region: ○

E-Mail: joy@offworld.com

Subject Alternative Name: IP:172.25.176.127

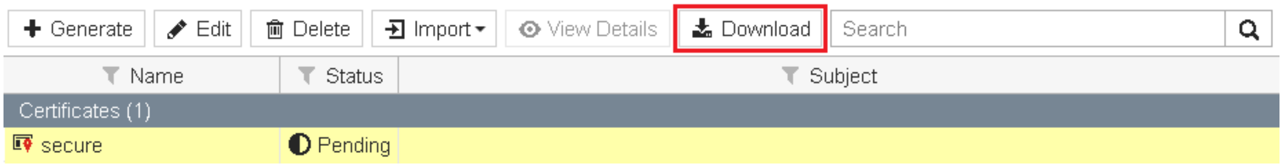
Password for private key:

Key Type: RSA | Elliptic Curve (RSA selected)

Key Size: 1024 Bit | 1536 Bit | 2048 Bit | 4096 Bit (2048 Bit selected)

Enrollment Method: File Based | Online SCEP (File Based selected)

2. Once created, the certificate will show a *Status* of *Pending*. Highlight the certificate and select *Download*.



| Name | Status | Subject |
|---|---|---|
| Certificates (1) | | |
| secure | Pending | |

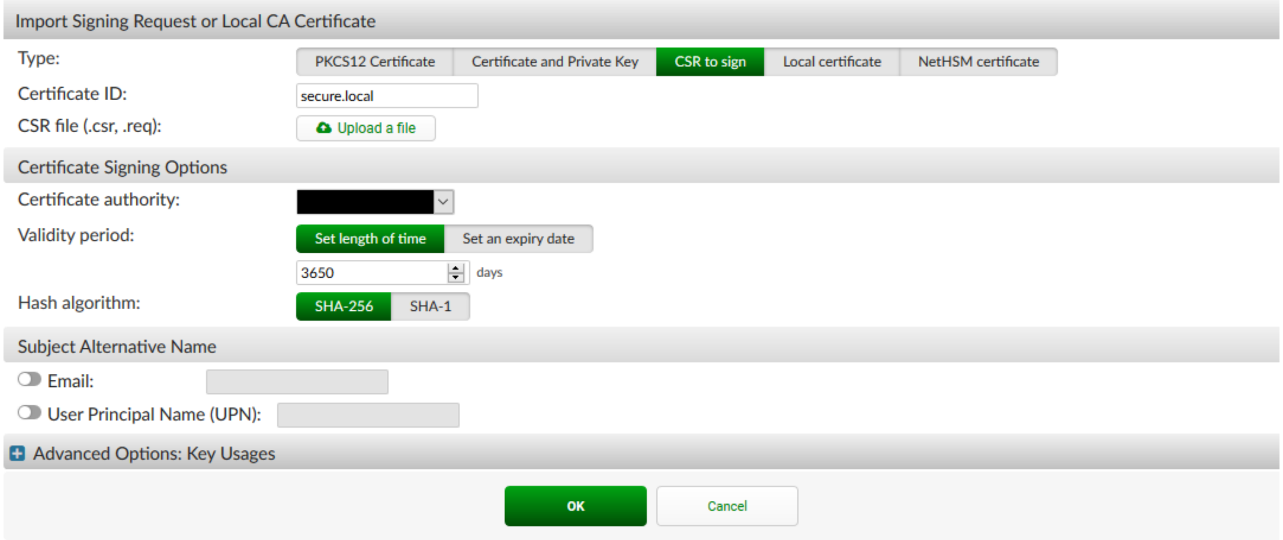
This will save a **.csr** file to your local drive.

secure.csr

## Creating an Intermediate CA on the FortiAuthenticator

### To create an Intermediate CA:

1. On the FortiAuthenticator, go to *Certificate Management* > *Certificate Authorities* > *Local CAs* and select *Import*. Set *Type* to *CSR to sign*, enter a *Certificate ID*, and import the CSR file. Make sure to select the *Certificate authority* from the dropdown menu, and set the *Hash algorithm* to *SHA-256*.



Import Signing Request or Local CA Certificate

Type: PKCS12 Certificate | Certificate and Private Key | [✓ CSR to sign] | Local certificate | NetHSM certificate

Certificate ID: secure.local

CSR file (.csr, .req): Upload a file

Certificate Signing Options

Certificate authority: [redacted]

Validity period: [✓ Set length of time] | Set an expiry date

3650 days

Hash algorithm: [✓ SHA-256] | SHA-1

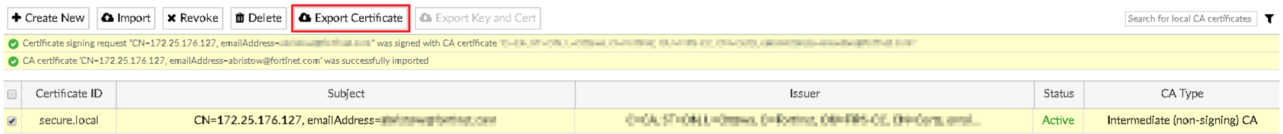
Subject Alternative Name

Email:

User Principal Name (UPN):

Advanced Options: Key Usages

2. Once imported, you should see that the certificate has been signed by the FortiAuthenticator, showing a *Status* of *Active*, and with the *CA Type* of *Intermediate (non-signing) CA*. Highlight the certificate and select *Export Certificate*.



Certificate signing request "CN=172.25.176.127, emailAddress=[redacted]" was signed with CA certificate [redacted]

CA certificate 'CN=172.25.176.127, emailAddress=abristow@fortinet.com' was successfully imported

| ☐ | Certificate ID | Subject | Issuer | Status | CA Type |
|---|---|---|---|---|---|
| ☑ | secure.local | CN=172.25.176.127, emailAddress=[redacted] | [redacted] | Active | Intermediate (non-signing) CA |

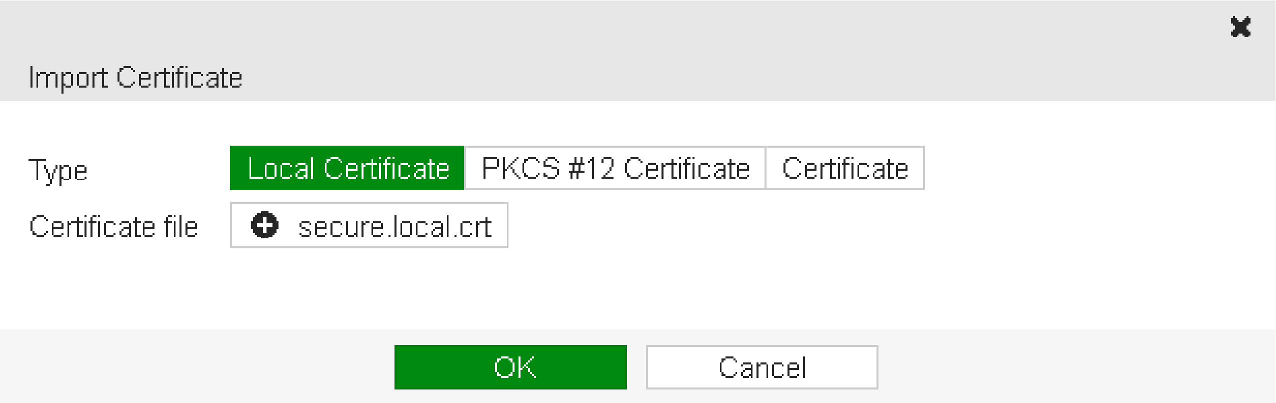
This will save a *.crt* file to your local drive.

secure.local.crt

## Importing the signed certificate on the FortiGate

### To import the signed certificate:

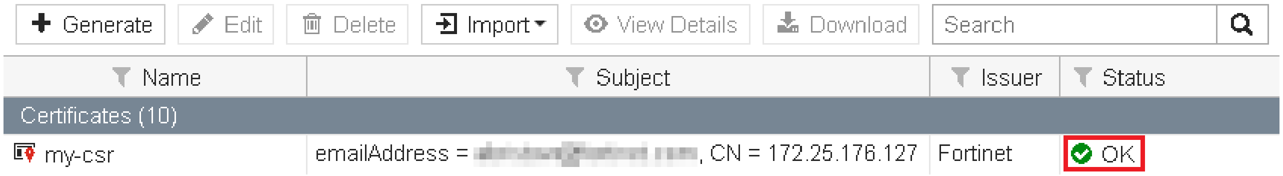
1. Back on the FortiGate, go to *System* > *Certificates*, and select *Import* > *Local Certificate*. Browse to the CRT file and select *OK*.



Import Certificate

| | |
|---|---|
| Type | [✓ Local Certificate] PKCS #12 Certificate Certificate |
| Certificate file | secure.local.crt |

2. You should now see that the certificate has a *Status* of *OK*.

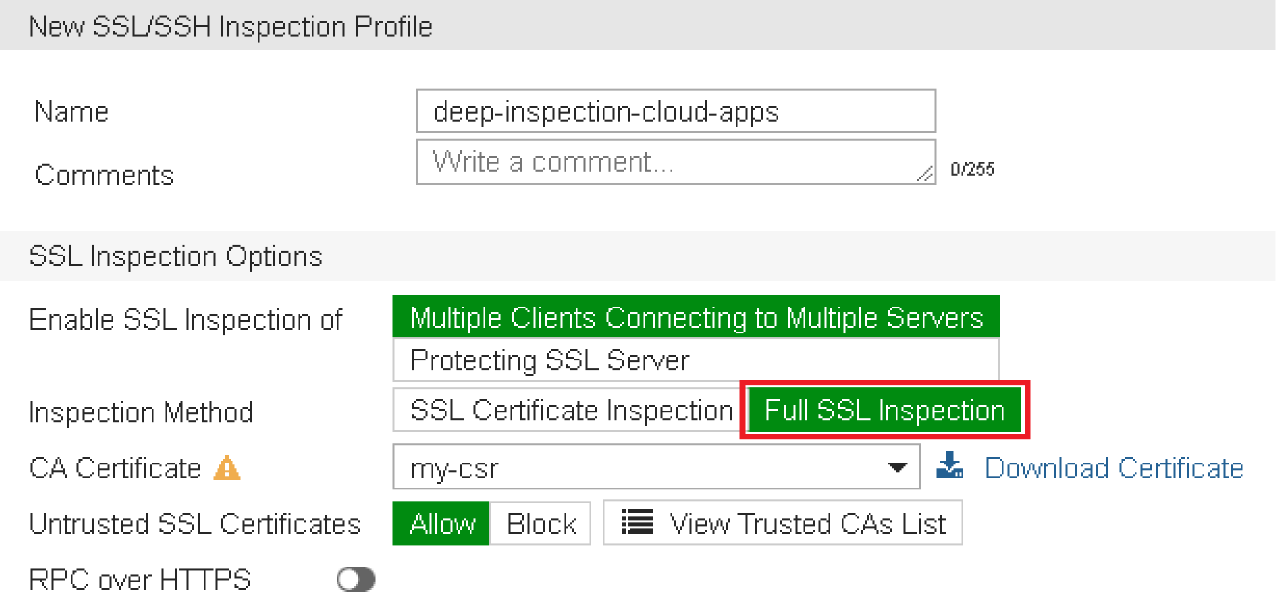


| Name | Subject | Issuer | Status |
|---|---|---|---|
| Certificates (10) | | | |
| my-csr | emailAddress = [redacted], CN = 172.25.176.127 | Fortinet | ✓ OK |

## Configuring full SSL inspection

**To configure full SSL inspection:**

1. Go to *Security Profiles > SSL/SSH Inspection*, and create a new profile.
Enter a *Name*, select the certificate from the *CA Certificate* dropdown menu, and make sure *Inspection Method* is set to *Full SSL Inspection*.



New SSL/SSH Inspection Profile

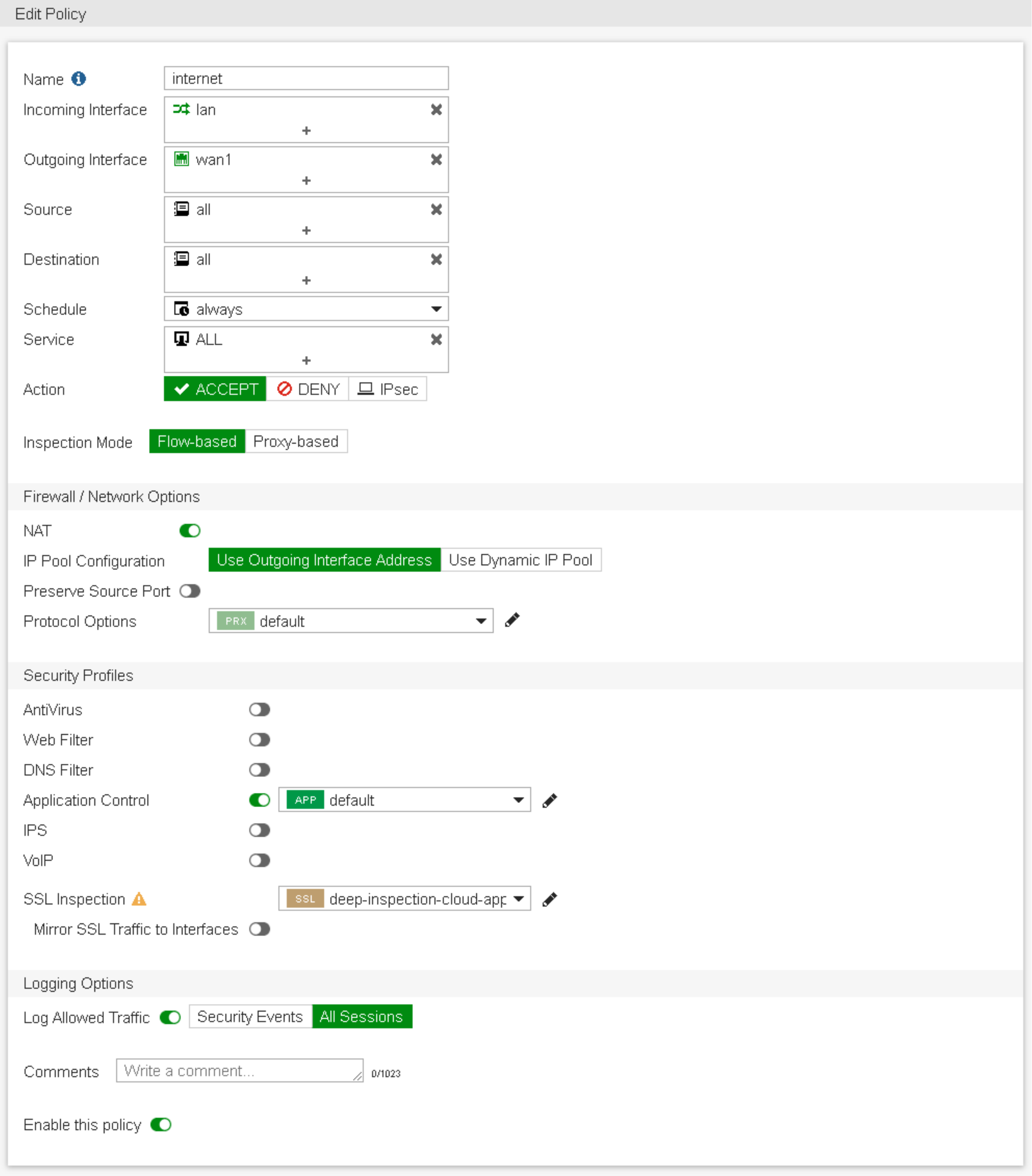
| | |
|---|---|
| Name | deep-inspection-cloud-apps |
| Comments | Write a comment... 0/255 |

SSL Inspection Options

| | |
|---|---|
| Enable SSL Inspection of | [✓ Multiple Clients Connecting to Multiple Servers] Protecting SSL Server |
| Inspection Method | SSL Certificate Inspection [✓ Full SSL Inspection] |
| CA Certificate ⚠ | my-csr |
| Untrusted SSL Certificates | [✓ Allow] Block |
| RPC over HTTPS | ○ |

2. Add the certificate to your web browser's list of trusted certificates. End users will likely see certificate warnings unless the certificate is installed in their browser.

3. Next go to *Policy & Objects* > *IPv4 Policy* and edit the policy that allows Internet access.
   Under *Security Profiles*, enable *SSL/SSH Inspection* and select the custom profile created earlier.
   Enable *Application Control* and set it to *default*.



Edit Policy

Name: internet
Incoming Interface: lan
Outgoing Interface: wan1
Source: all
Destination: all
Schedule: always
Service: ALL
Action: [✓ ACCEPT] DENY IPsec

Inspection Mode: [✓ Flow-based] Proxy-based

Firewall / Network Options

NAT: ●
IP Pool Configuration: [✓ Use Outgoing Interface Address] Use Dynamic IP Pool
Preserve Source Port: ○
Protocol Options: PRX default

Security Profiles

AntiVirus: ○
Web Filter: ○
DNS Filter: ○
Application Control: ● APP default
IPS: ○
VoIP: ○

SSL Inspection ⚠: SSL deep-inspection-cloud-app
Mirror SSL Traffic to Interfaces: ○

Logging Options

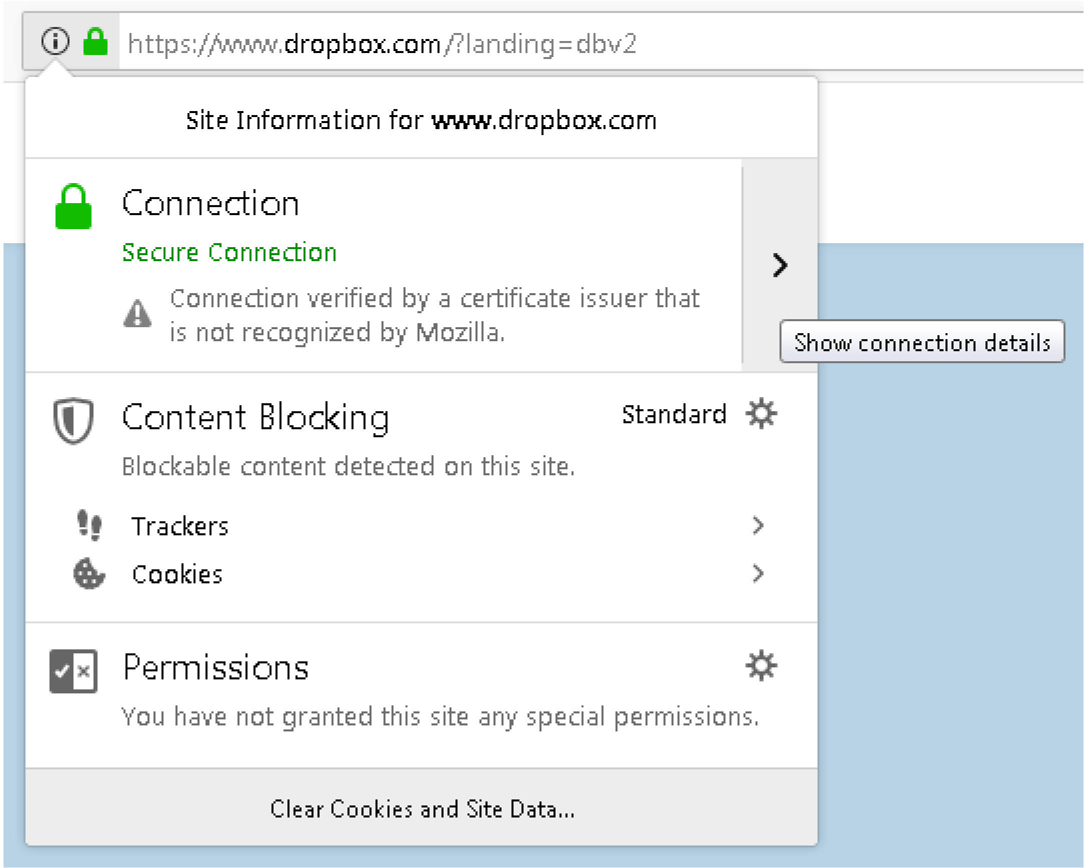
Log Allowed Traffic: ● Security Events [✓ All Sessions]

Comments: Write a comment... 0/1023

Enable this policy: ●

## Results

1. To test the certificate, open your web browser and attempt to navigate to an HTTPS website (in the example, `https://www.dropbox.com`).
   Click on the lock icon next to the address bar and click *Show connection details*.



https://www.dropbox.com/?landing=dbv2

Site Information for www.dropbox.com

Connection

Secure Connection

Connection verified by a certificate issuer that is not recognized by Mozilla.

Show connection details

Content Blocking — Standard

Blockable content detected on this site.

Trackers

Cookies

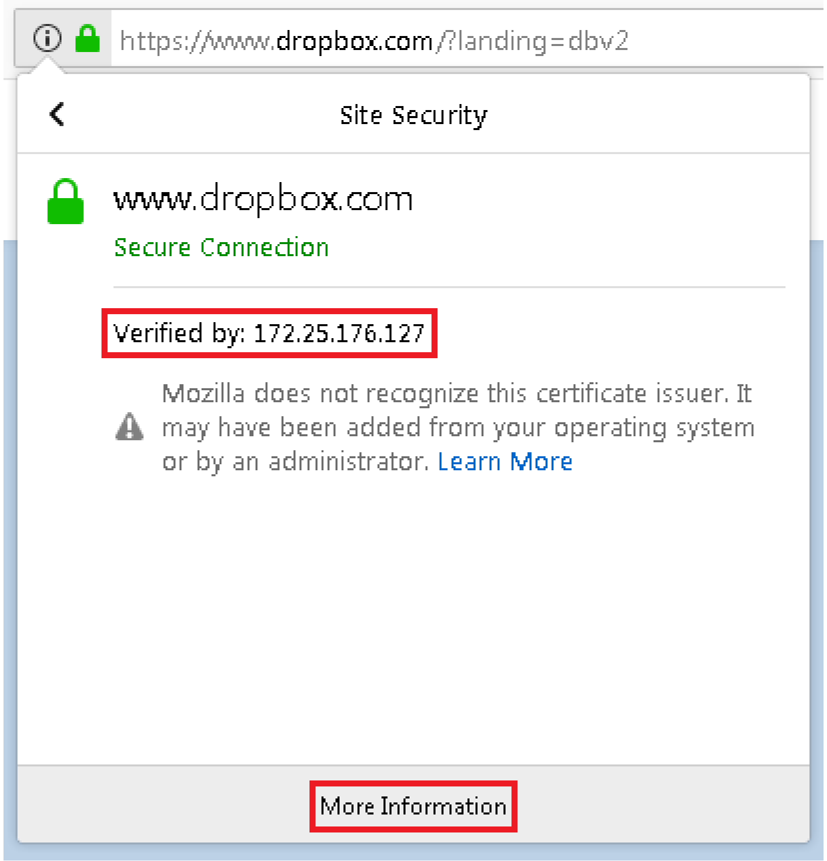
Permissions

You have not granted this site any special permissions.

Clear Cookies and Site Data...

2. You should now see that the certificate from the FortiGate (`172.25.176.127`) has signed and verified access to the site. As a result, no certificate errors will appear.

Optionally select *More Information*.



https://www.dropbox.com/?landing=dbv2

Site Security

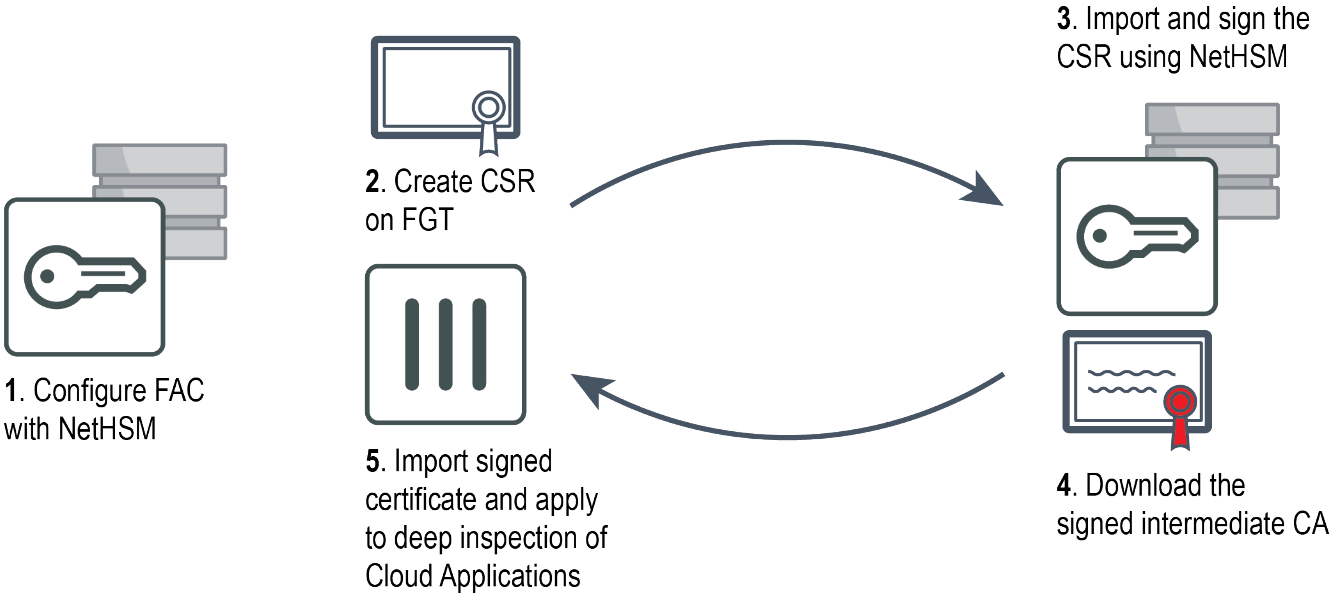
www.dropbox.com

Secure Connection

Verified by: 172.25.176.127

Mozilla does not recognize this certificate issuer. It may have been added from your operating system or by an administrator. Learn More

## FortiAuthenticator certificate with SSL inspection using an HSM



**1**. Configure FAC with NetHSM

**2**. Create CSR on FGT

**3**. Import and sign the CSR using NetHSM

**4**. Download the signed intermediate CA

**5**. Import signed certificate and apply to deep inspection of Cloud Applications

For this recipe, you will create a certificate on the FortiGate, have it signed on a FortiAuthenticator with a configured HSM server, and configure the FortiGate so that the certificate can be used for SSL deep inspection of HTTPS traffic. This example uses the Safenet Luna V7 HSM.

**To set up the certificate with SSL inspection using an HSM:**

1. Configuring the NetHSM profile on FortiAuthenticator on page 25
2. Creating a local CA certificate using an HSM server on page 26
3. Creating a CSR on the FortiGate on page 27
4. Creating an Intermediate CA on the FortiAuthenticator on page 28
5. Importing the signed certificate on the FortiGate on page 29
6. Configuring full SSL inspection on page 29
7. Results on page 32

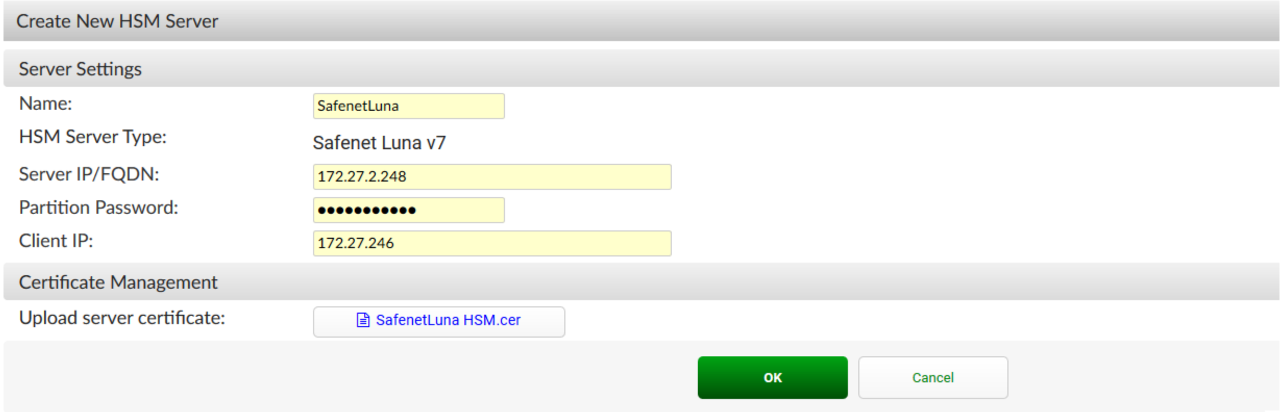
In order for this configuration to work correctly, the FortiAuthenticator must be configured as a certificate authority (CA), otherwise the certificate created in this recipe will not be trusted. For more information on how to do this, see Creating a local CA certificate using an HSM server on page 26 and FortiAuthenticator as a Certificate Authority.

As an example, you will also have *Application Control* with *Deep Inspection of Cloud Applications* enabled. This will apply inspection to HTTPS traffic. Note that you may use another security profile instead of *Application Control*.

## Configuring the NetHSM profile on FortiAuthenticator

**To configure a new the Safenet Luna HSM server:**

1. In FortiAuthenticator, go to *System* > *Administration* > *NetHSMs*, and click *Create New*.
2. In the *Create New HSM Server* window, configure the following:



Create New HSM Server

Server Settings

| | |
|---|---|
| Name: | SafenetLuna |
| HSM Server Type: | Safenet Luna v7 |
| Server IP/FQDN: | 172.27.2.248 |
| Partition Password: | ●●●●●●●●●●● |
| Client IP: | 172.27.246 |

Certificate Management

| | |
|---|---|
| Upload server certificate: | SafenetLuna HSM.cer |

| | |
|---|---|
| **Name** | Enter a name for the HSM server. |
| **Server IP/FQDN** | Enter the IP address or FQDN of the HSM server to which the FortiAuthenticator will connect. |
| **Partition Password** | Enter the key partition password from the HSM server. |
| **Client IP** | Enter the address of the FortiAuthenticator interface that the HSM will see. |
| **Upload server certificate** | Click *Upload server certificate* to select the certificate from your HSM. |

3. Click *OK* to complete the setup.

**To authorize FortiAuthenticator as a Safenet Luna HSM client:**

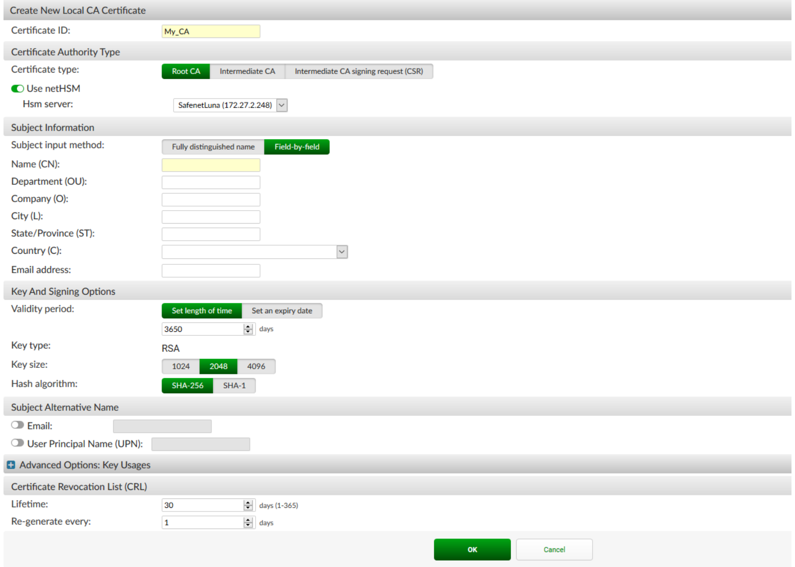
1. Make sure the FortiAuthenticator client certificate uses the `<FAC IP>.pem` naming convention. For example: `172.16.68.47.pem`
2. Upload the FortiAuthenticator client certificate to Safenet Luna HSM using SCP transfer.
   ```
   scp [certificate filename] admin@[HSM address]:
   ```
3. Use SSH to connect to the HSM, then register your FortiAuthenticator, and associate it with a partition.
   ```
   ssh -l admin [HSM address]
   client register -c [client name] -ip [client address]
   client assignpartition -c [client name] -p [partition name]
   ```
4. Confirm the status of the NetHSM client. For example:
   ```
   client show -c my_fac
      ClientID: my_fac
      IPAddress: 172.16.68.47
      Partitions: my_partition
   ```

## Creating a local CA certificate using an HSM server

Once you have configured the HSM server on FortiAuthenticator, you can create a local CA certificate using the HSM server to sign requests. For more information on setting up a certificate authority, see FortiAuthenticator as a Certificate Authority on page 8.

**To create a new local CA certificate using HSM:**

1. On FortiAuthenticator, go to *Certificate Management* > *Certificate Authorities* > *Local CAs*, and click *Create New*.



Create New Local CA Certificate

| | |
|---|---|
| Certificate ID: | My_CA |

Certificate Authority Type

| | |
|---|---|
| Certificate type: | [✓ Root CA] Intermediate CA Intermediate CA signing request (CSR) |
| ● Use netHSM | |
| Hsm server: | SafenetLuna (172.27.2.248) |

Subject Information

| | |
|---|---|
| Subject input method: | Fully distinguished name [✓ Field-by-field] |
| Name (CN): | |
| Department (OU): | |
| Company (O): | |
| City (L): | |
| State/Province (ST): | |
| Country (C): | |
| Email address: | |

Key And Signing Options

| | |
|---|---|
| Validity period: | [✓ Set length of time] Set an expiry date |
| | 3650 days |
| Key type: | RSA |
| Key size: | 1024 [✓ 2048] 4096 |
| Hash algorithm: | [✓ SHA-256] SHA-1 |

Subject Alternative Name

| | |
|---|---|
| ○ Email: | |
| ○ User Principal Name (UPN): | |

Advanced Options: Key Usages

Certificate Revocation List (CRL)

| | |
|---|---|
| Lifetime: | 30 days (1-365) |
| Re-generate every: | 1 days |

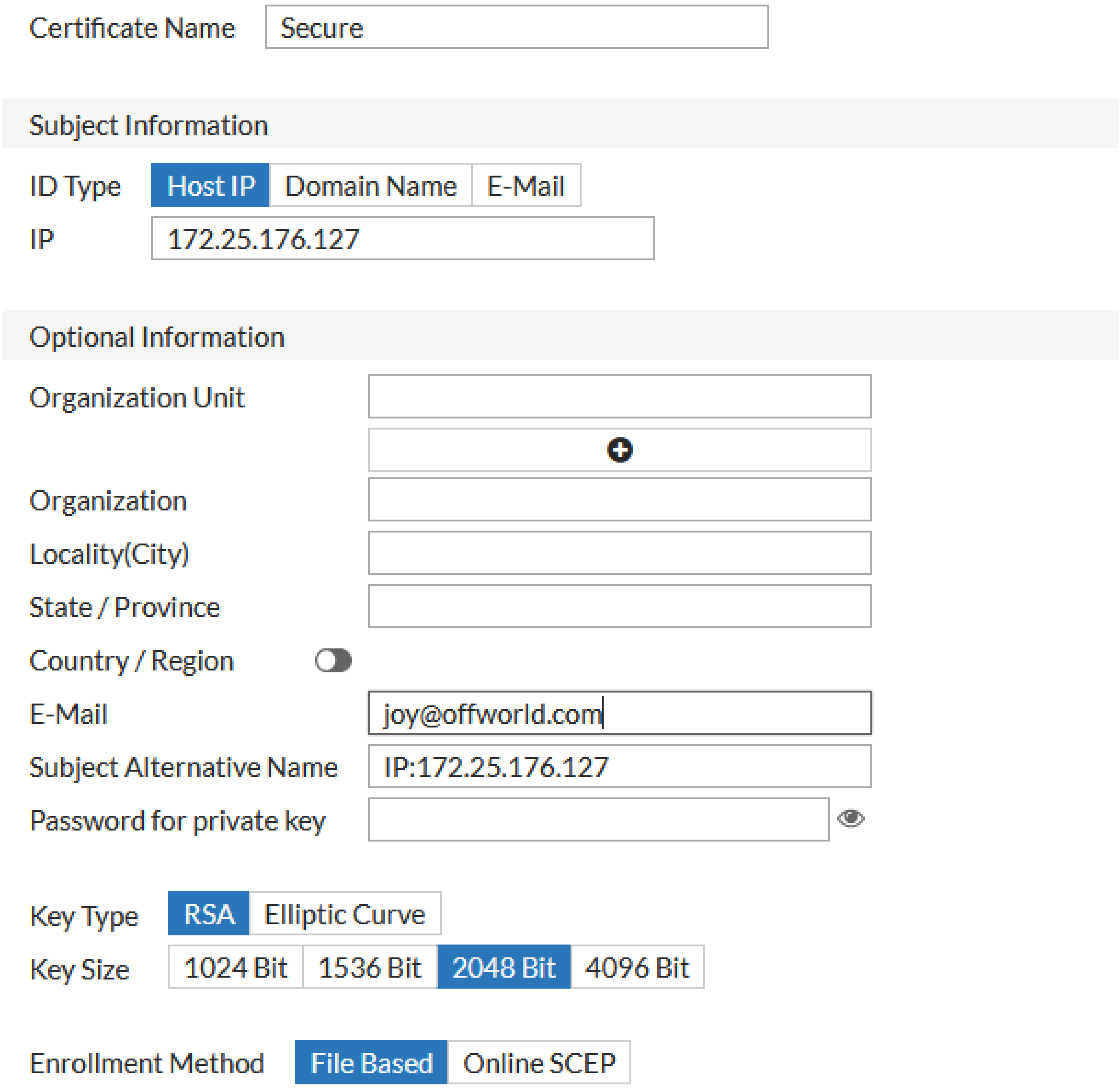
2. Enter a name for the CA certificate, for example *My_CA*.
3. Select *Root CA* as the *Certificate type*.
4. Enable *Use NetHSM*, and choose an HSM server from the dropdown menu.
5. Configure the remaining settings as desired, and click *OK* to save your changes.
   Once your CA certificate has been created, it can be exported and installed on your network. For more information on setting up a certificate authority, see FortiAuthenticator as a Certificate Authority on page 8.

## Creating a CSR on the FortiGate

**To create a CSR:**

1. On the FortiGate, go to *System* > *Certificates* and select *Generate* to create a new certificate signing request (CSR). Enter a *Certificate Name*, the Internet facing IP address of the FortiGate, and a valid email address, then configure the key options as shown in the example.

   The *Subject Alternative Name* field must be configured with the internet facing IP address or FQDN in the following format: `IP:x.x.x.x` or `DNS:hostname.example.com`.



Certificate Name: Secure

Subject Information

ID Type: [✓ Host IP] Domain Name E-Mail

IP: 172.25.176.127

Optional Information

Organization Unit:

Organization:

Locality(City):

State / Province:

Country / Region:

E-Mail: joy@offworld.com

Subject Alternative Name: IP:172.25.176.127

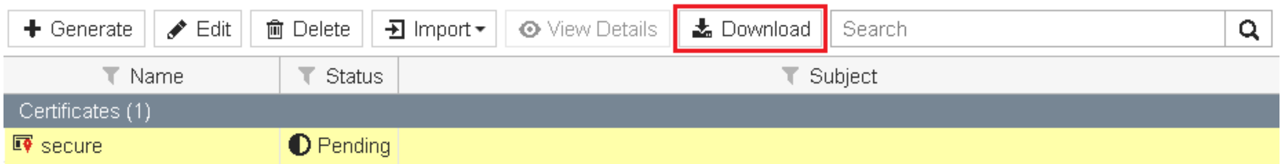
Password for private key:

Key Type: [✓ RSA] Elliptic Curve

Key Size: 1024 Bit 1536 Bit [✓ 2048 Bit] 4096 Bit

Enrollment Method: [✓ File Based] Online SCEP

2. Once created, the certificate will show a *Status* of *Pending*. Highlight the certificate and select *Download*.



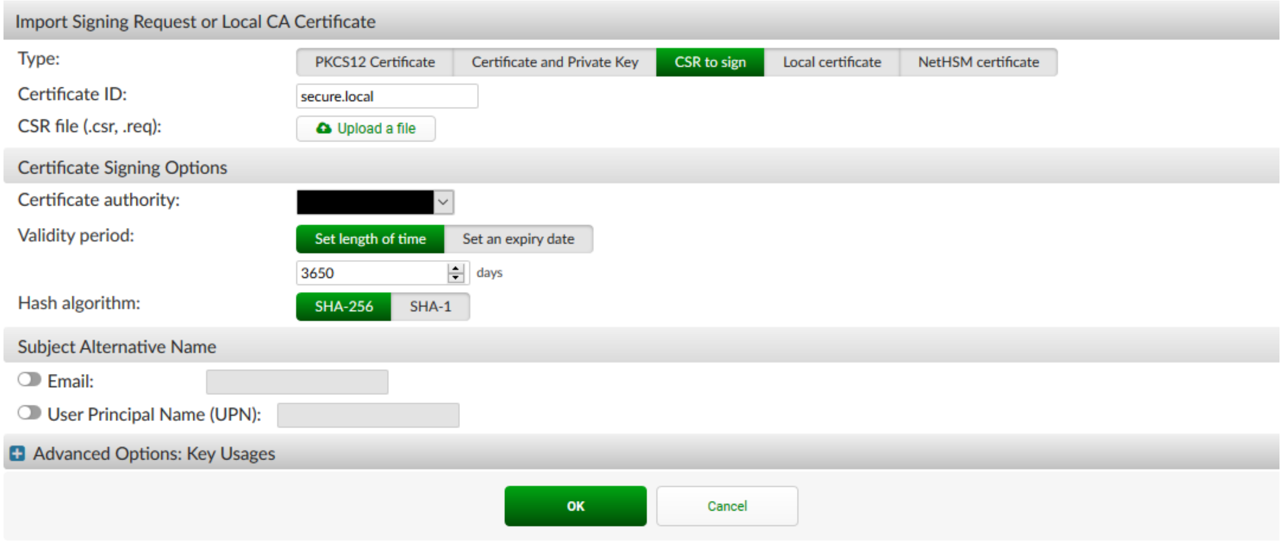
| Name | Status | Subject |
|---|---|---|
| Certificates (1) | | |
| secure | Pending | |

This will save a **.csr** file to your local drive.

## Creating an Intermediate CA on the FortiAuthenticator

### To create an Intermediate CA:

1. On the FortiAuthenticator, go to *Certificate Management* > *Certificate Authorities* > *Local CAs* and select *Import*. Set *Type* to *CSR to sign*, enter a *Certificate ID*, and import the CSR file.
2. Select the *Certificate authority* configured with the HSM from the dropdown menu, and set the *Hash algorithm* to *SHA-256*. Click *OK*.



Import Signing Request or Local CA Certificate

Type: PKCS12 Certificate | Certificate and Private Key | **CSR to sign** | Local certificate | NetHSM certificate

Certificate ID: secure.local

CSR file (.csr, .req): Upload a file

Certificate Signing Options

Certificate authority: [redacted]

Validity period: **Set length of time** | Set an expiry date

3650 days

Hash algorithm: **SHA-256** | SHA-1

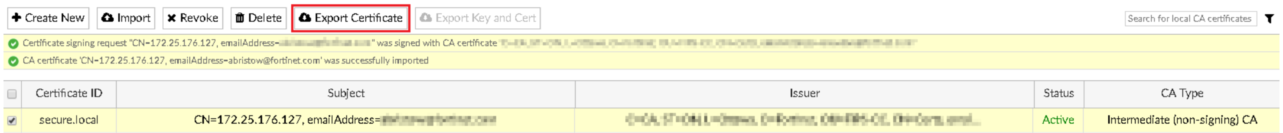
Subject Alternative Name

Email:

User Principal Name (UPN):

Advanced Options: Key Usages

3. Once imported, you should see that the certificate has been signed by the FortiAuthenticator, showing a *Status* of *Active*, and with the *CA Type* of *Intermediate (non-signing) CA*.
4. Highlight the certificate and select *Export Certificate*.



Certificate signing request "CN=172.25.176.127, emailAddress=[redacted]" was signed with CA certificate [redacted]

CA certificate 'CN=172.25.176.127, emailAddress=abristow@fortinet.com' was successfully imported

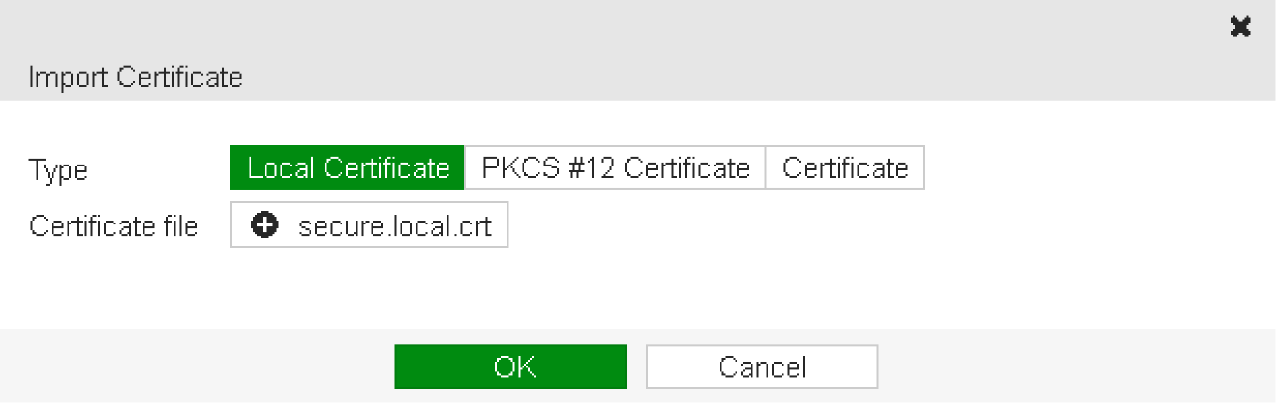
| ☐ | Certificate ID | Subject | Issuer | Status | CA Type |
|---|---|---|---|---|---|
| ☑ | secure.local | CN=172.25.176.127, emailAddress=[redacted] | [redacted] | Active | Intermediate (non-signing) CA |

This will save a *.crt* file to your local drive.

## Importing the signed certificate on the FortiGate

**To import the signed certificate:**

1. Back on the FortiGate, go to *System* > *Certificates* and select *Import* > *Local Certificate*.
   Browse to the *.crt* file, and select *OK*.

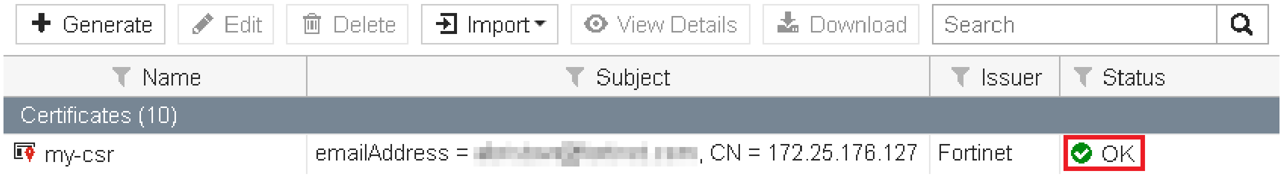


Import Certificate

Type: Local Certificate | PKCS #12 Certificate | Certificate

Certificate file: secure.local.crt

2. You should now see that the certificate has a *Status* of *OK*.

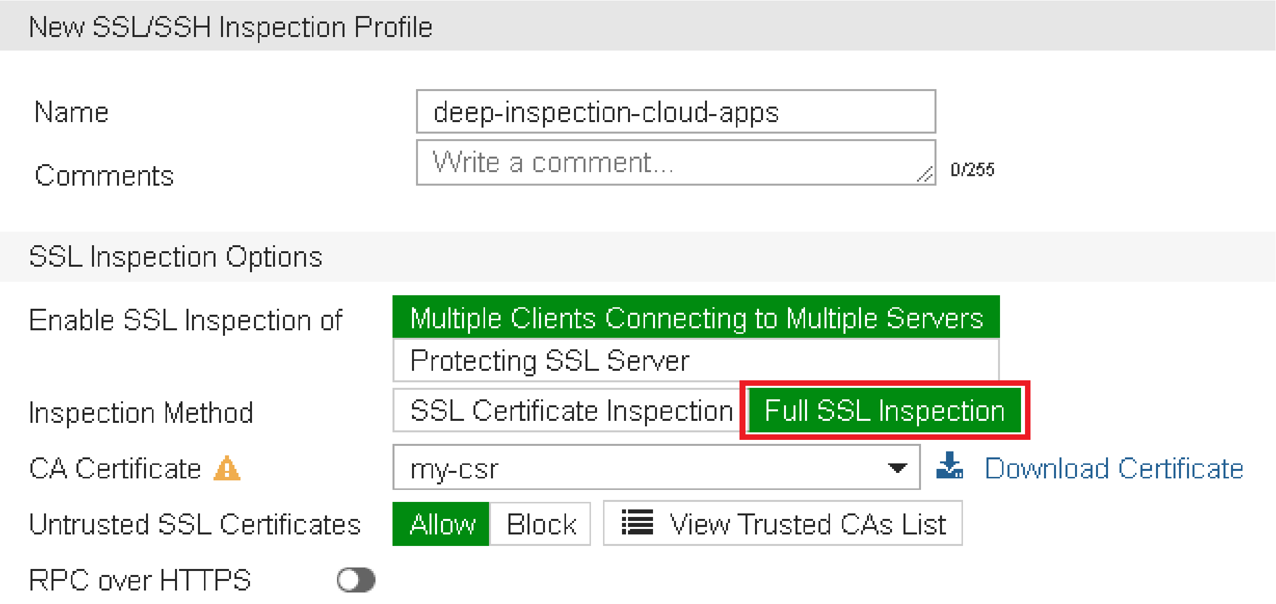


| Name | Subject | Issuer | Status |
|---|---|---|---|
| Certificates (10) | | | |
| my-csr | emailAddress = [redacted], CN = 172.25.176.127 | Fortinet | ✓ OK |

## Configuring full SSL inspection

**To configure full SSL inspection:**

1. On the FortiGate, go to *Security Profiles* > *SSL/SSH Inspection*, and create a new profile.
   Enter a *Name*, select the certificate from the *CA Certificate* dropdown menu, and make sure *Inspection Method* is set to *Full SSL Inspection*.



New SSL/SSH Inspection Profile

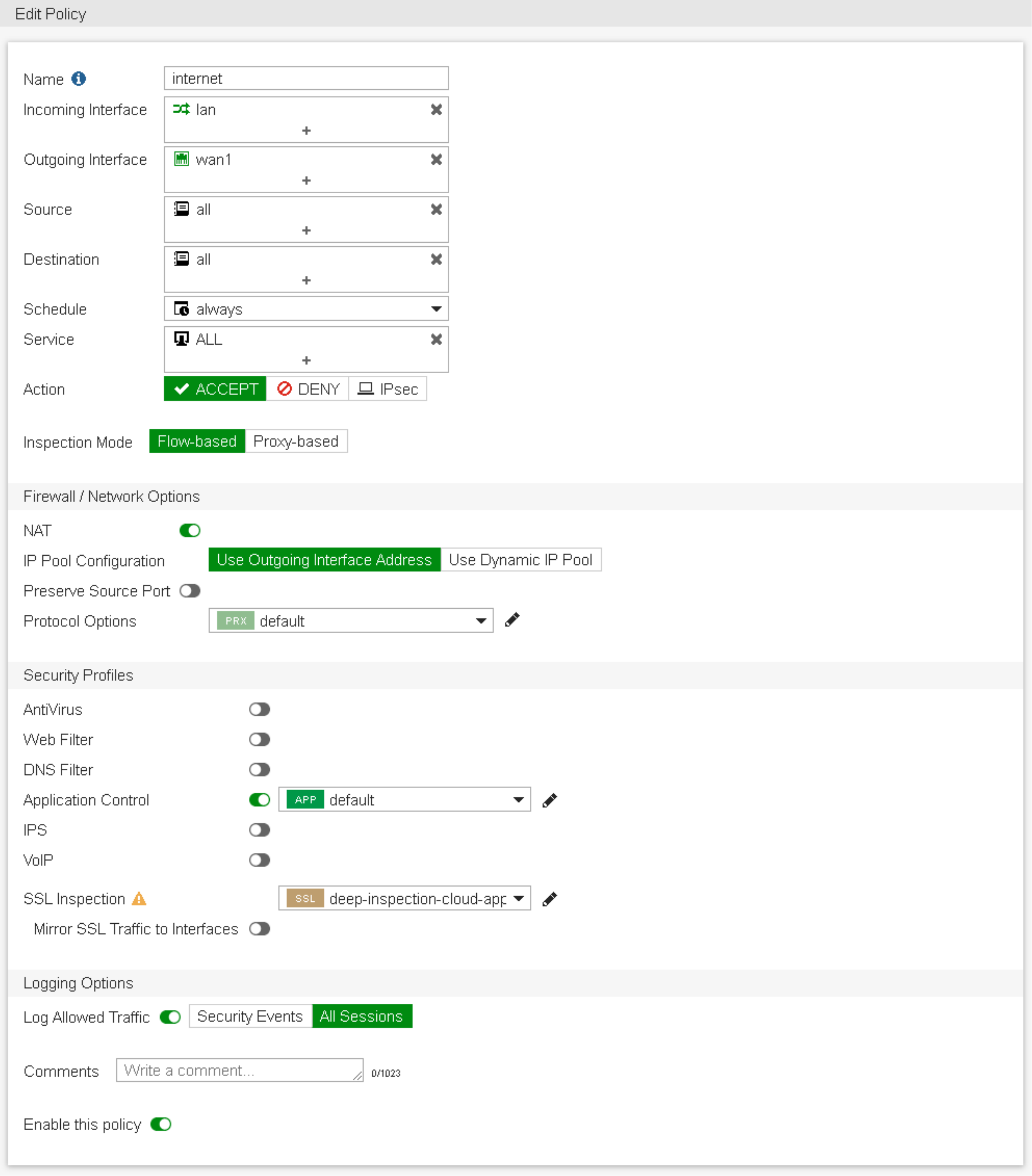
| | |
|---|---|
| Name | deep-inspection-cloud-apps |
| Comments | Write a comment... 0/255 |

SSL Inspection Options

| | |
|---|---|
| Enable SSL Inspection of | Multiple Clients Connecting to Multiple Servers<br>Protecting SSL Server |
| Inspection Method | SSL Certificate Inspection \| Full SSL Inspection |
| CA Certificate ⚠ | my-csr ▾ Download Certificate |
| Untrusted SSL Certificates | Allow \| Block \| View Trusted CAs List |
| RPC over HTTPS | ○ |

2. Add the certificate to your web browser's list of trusted certificates. End users will likely see certificate warnings unless the certificate is installed in their browser.

3. Next go to *Policy & Objects* > *IPv4 Policy* and edit the policy that allows Internet access.



Edit Policy

Name: internet

Incoming Interface: lan

Outgoing Interface: wan1

Source: all

Destination: all

Schedule: always

Service: ALL

Action: [✓ ACCEPT] DENY IPsec

Inspection Mode: [✓ Flow-based] Proxy-based

Firewall / Network Options

NAT: ●

IP Pool Configuration: [✓ Use Outgoing Interface Address] Use Dynamic IP Pool

Preserve Source Port: ○

Protocol Options: PRX default

Security Profiles

AntiVirus: ○

Web Filter: ○

DNS Filter: ○

Application Control: ● APP default

IPS: ○

VoIP: ○

SSL Inspection: SSL deep-inspection-cloud-app

Mirror SSL Traffic to Interfaces: ○

Logging Options

Log Allowed Traffic: ● Security Events [✓ All Sessions]

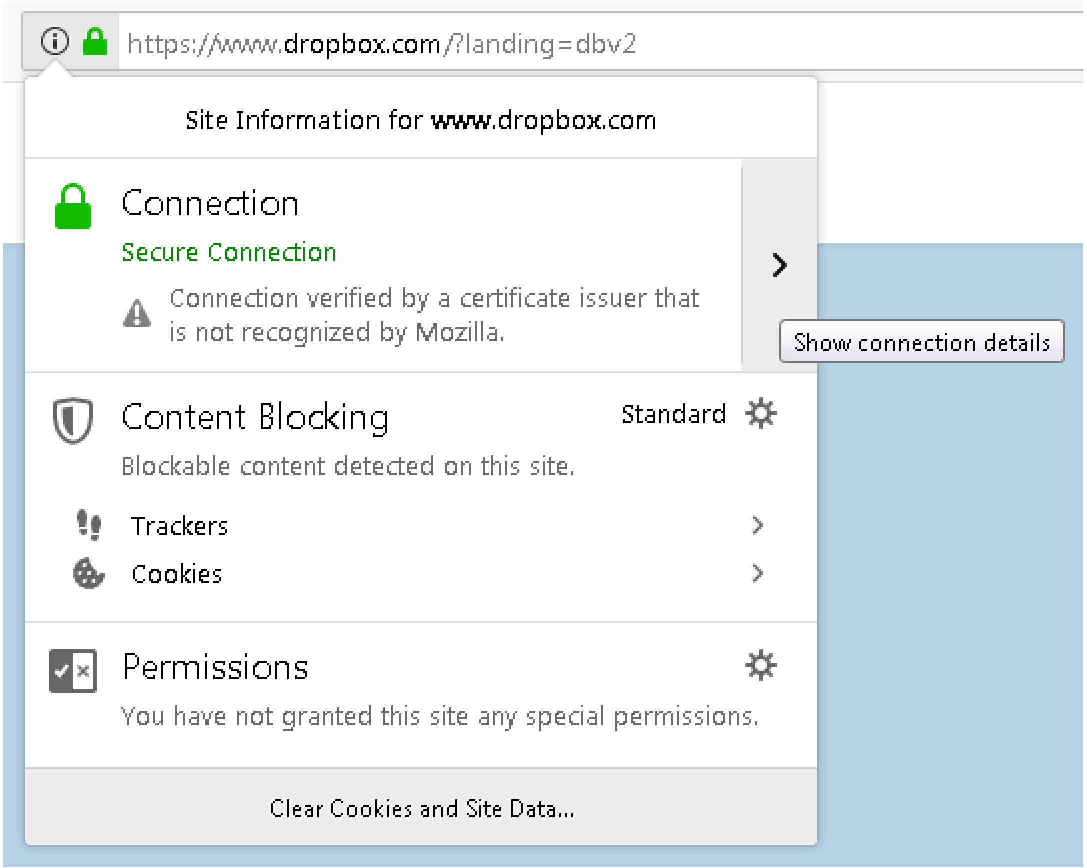
Comments: Write a comment... 0/1023

Enable this policy: ●

4. Under *Security Profiles*, enable *SSL/SSH Inspection* and select the custom profile created earlier.
5. Enable *Application Control* and set it to *default*.

## Results

1. To test the certificate, open your web browser and attempt to navigate to an HTTPS website (in the example, `https://www.dropbox.com`).
Click on the lock icon next to the address bar, and click *Show connection details*.



https://www.dropbox.com/?landing=dbv2

Site Information for www.dropbox.com

Connection

Secure Connection

Connection verified by a certificate issuer that is not recognized by Mozilla.

Show connection details

Content Blocking — Standard

Blockable content detected on this site.

Trackers

Cookies

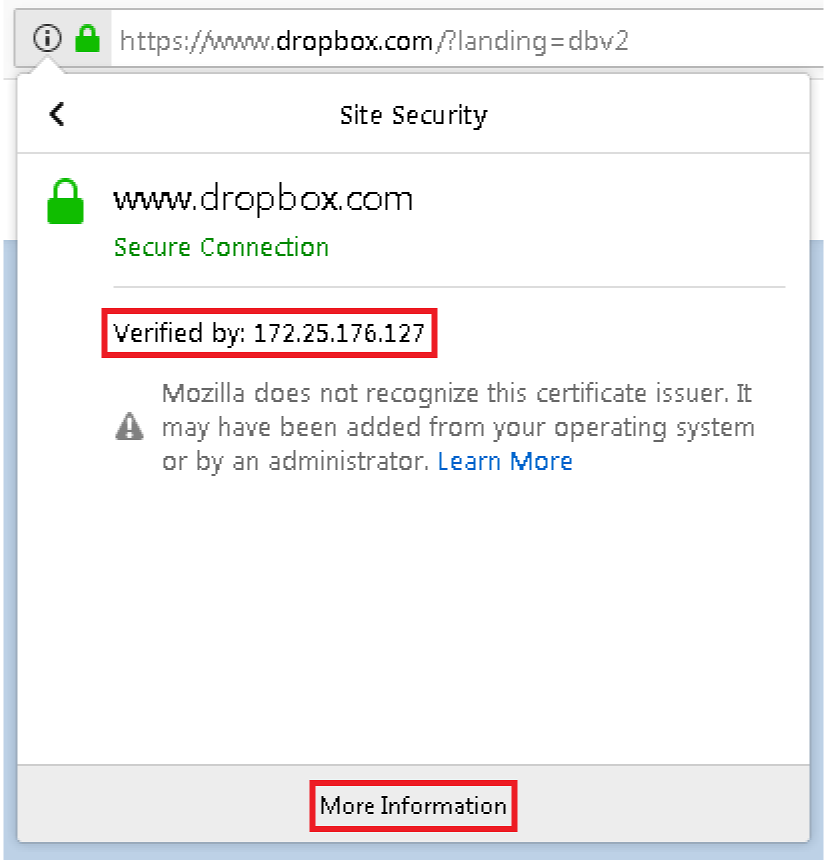
Permissions

You have not granted this site any special permissions.

Clear Cookies and Site Data...

2. You should now see that the certificate from the FortiGate has signed and verified access to the site. As a result, no certificate errors will appear.

Optionally select *More Information*.



https://www.dropbox.com/?landing=dbv2

Site Security

www.dropbox.com

Secure Connection

Verified by: 172.25.176.127

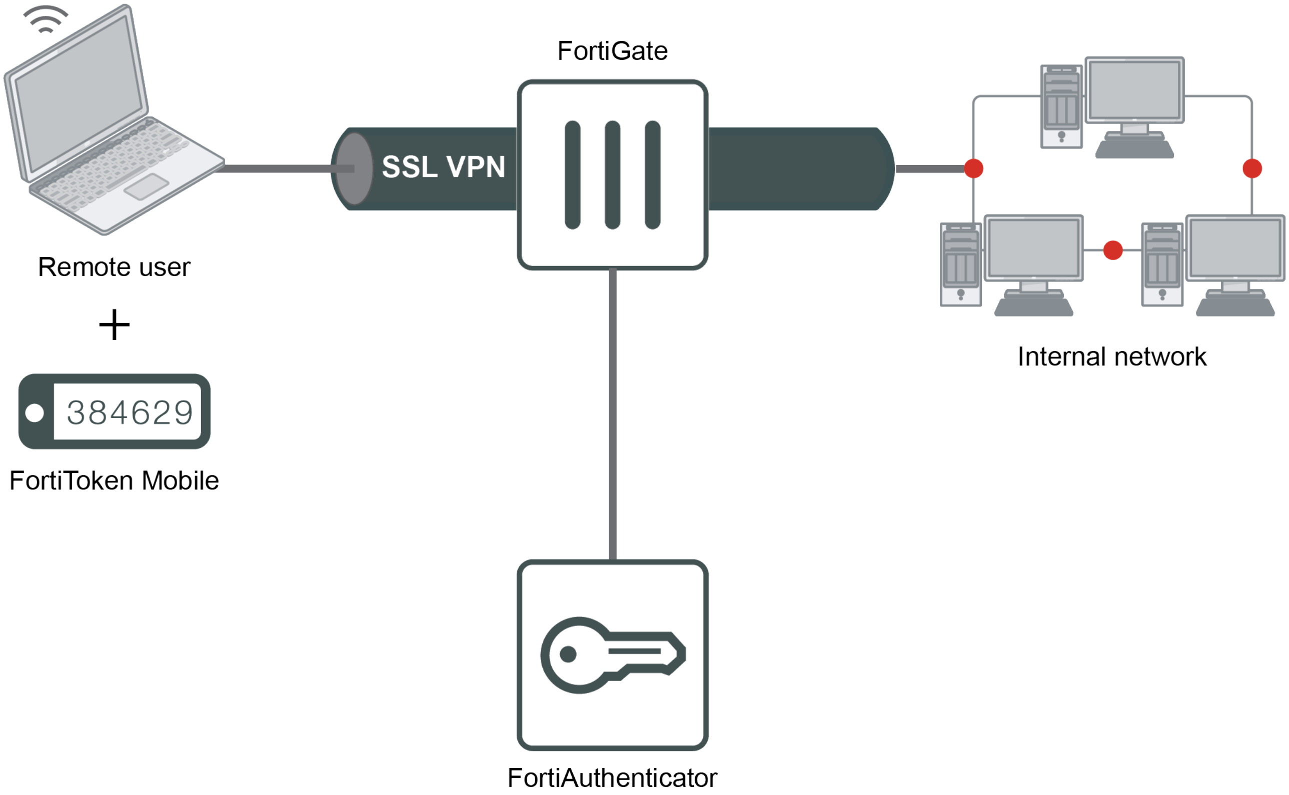
Mozilla does not recognize this certificate issuer. It may have been added from your operating system or by an administrator. Learn More

# FortiToken and FortiToken Mobile

This section describes various authentication scenarios involving FortiToken, a disconnected one-time password (OTP) generator that's either a physical device or a mobile token. Time-based token passcodes require that the FortiAuthenticator clock is accurate. If possible, configure the system time to be synchronized with a network time protocol (NTP) server.

To perform token-based authentication, the user must enter the token passcode. If the user’s username and password are also required, this is called two-factor authentication.

## FortiToken Mobile Push for SSL VPN



In this recipe, you set up FortiAuthenticator to function as a RADIUS server to authenticate SSL VPN users using FortiToken Mobile Push two-factor authentication. With Push notifications enabled, the user can easily accept or deny the authentication request.

For this configuration, you:

- Create a user on the FortiAuthenticator.
- Assign a FortiToken Mobile license to the user.
- Create the RADIUS client (FortiGate) on the FortiAuthenticator, and enable FortiToken Mobile Push notifications.

- Connect the FortiGate to the RADIUS server (FortiAuthenticator).
- Create an SSL VPN on the FortiGate, allowing internal access for remote users.

The following names and IP addresses are used:

- Username: gthreepwood
- User group: RemoteFTMGroup
- RADIUS server: OfficeRADIUS
- RADIUS client: OfficeServer
- SSL VPN user group: SSLVPNGroup
- FortiAuthenticator: 172.25.176.141
- FortiGate: 172.25.176.92

For the purposes of this recipe, a FortiToken Mobile free trial token is used. This recipe also assumes that the user has already installed the FortiToken Mobile application on their smartphone. You can install the application for Android and iOS. For details, see:

- FortiToken Mobile for Android
- FortiToken Mobile for iOS

## Adding a FortiToken to the FortiAuthenticator

Before push notifications can be enabled, a *Public IP/FQDN for FortiToken Mobile* must be configured in *System > Administration > System Access*.

If the FortiAuthenticator is behind a firewall, the public IP/FQDN will be an IP/port forwarding rule directed to one of the FortiAuthenticator interfaces.

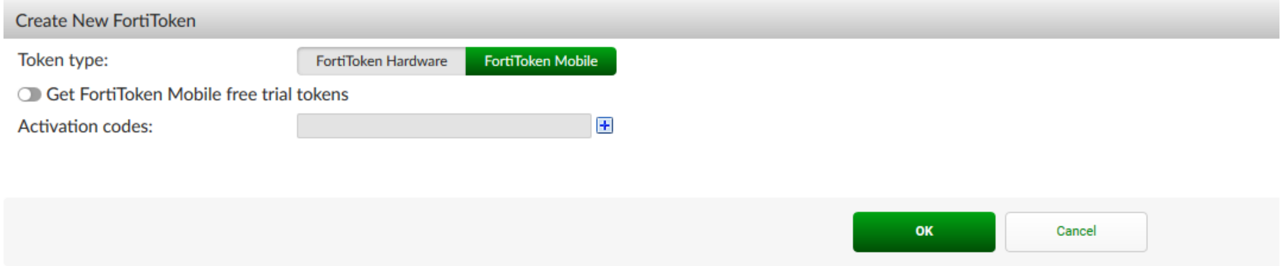
The interface that receives the approve/deny FTM push responses must have the *FortiToken Mobile API* service enabled.

If FortiAuthenticator is not accessible to the Internet, you must create a VIP and policy on FortiGate in order for mobile push to work. The VIP must point from an external port to FortiAuthenticator at port 443.

Once configured, you can add your FortiToken.

### To add a FortiToken:

1. On the FortiAuthenticator, go to *Authentication > User Management > FortiTokens*, and select *Create New*.
2. Set *Token type* to *FortiToken Mobile*, and enter the FortiToken *Activation codes* in the field provided.



Create New FortiToken

Token type: FortiToken Hardware | FortiToken Mobile

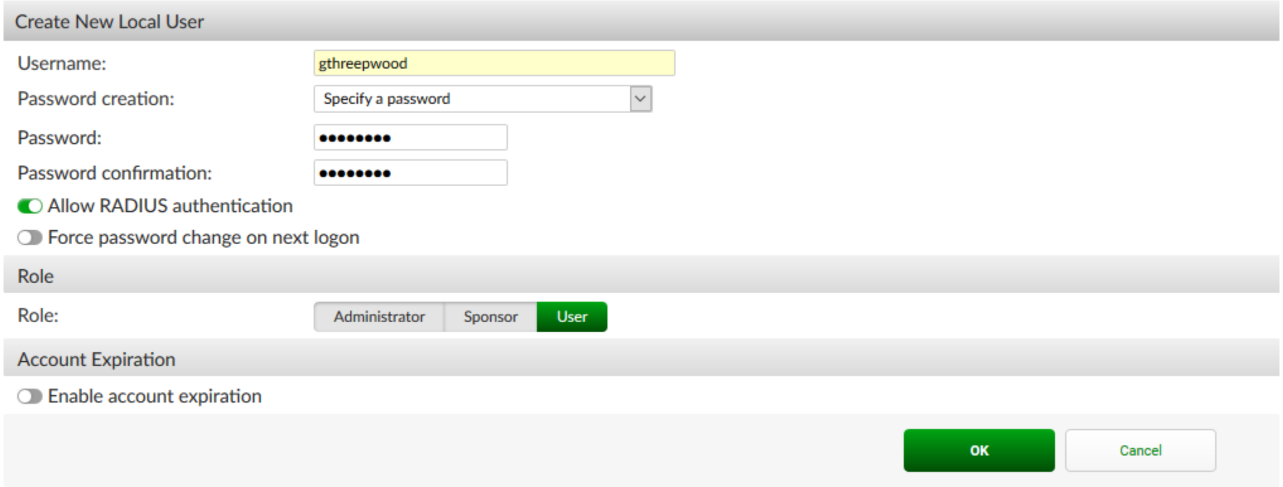
○ Get FortiToken Mobile free trial tokens

Activation codes:

## Adding the user to the FortiAuthenticator

**To add a user to FortiAuthenticator:**

1. On the FortiAuthenticator, go to *Authentication* > *User Management* > *Local Users*, and select *Create New*. Enter a *Username* (`gthreepwood`) and enter and confirm the user password.
   Enable *Allow RADIUS authentication*, and select *OK* to access additional settings.



Create New Local User

Username: gthreepwood

Password creation: Specify a password

Password: ••••••••

Password confirmation: ••••••••

● Allow RADIUS authentication

○ Force password change on next logon

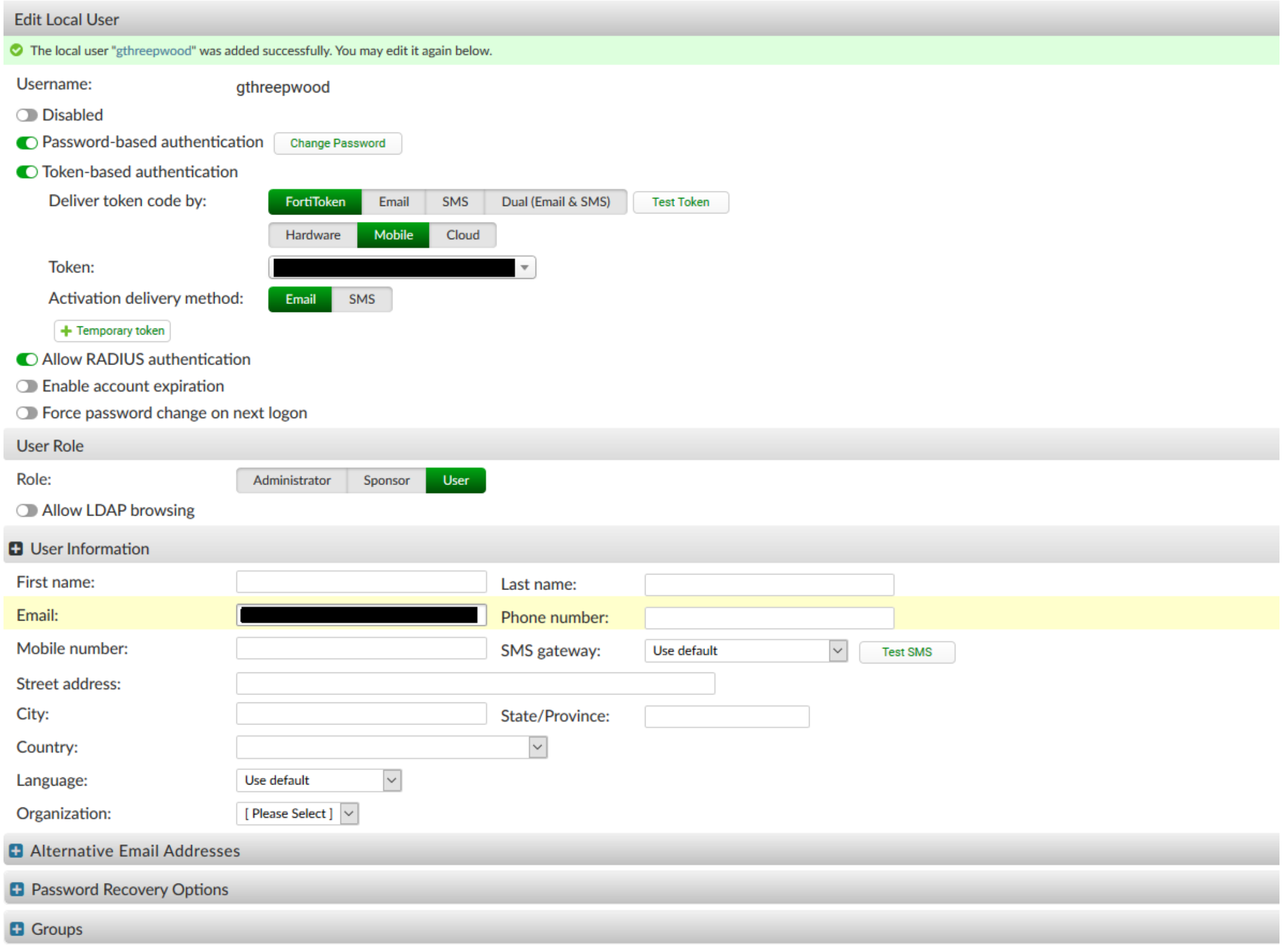
Role

Role: Administrator | Sponsor | [✓ User]

Account Expiration

○ Enable account expiration

2. Enable *Token-based authentication* and select to deliver the token code by *FortiToken*. Select the FortiToken added earlier from the *FortiToken Mobile* drop-down menu.
   Set *Delivery method* to *Email*. This will automatically open the *User Information* section where you can enter the user email address in the field provided.



Edit Local User

The local user "gthreepwood" was added successfully. You may edit it again below.

Username: gthreepwood

- Disabled: off
- Password-based authentication: on (Change Password)
- Token-based authentication: on
  - Deliver token code by: FortiToken (selected) | Email | SMS | Dual (Email & SMS) — Test Token
  - Hardware | Mobile (selected) | Cloud
  - Token: [redacted]
  - Activation delivery method: Email (selected) | SMS
  - + Temporary token
- Allow RADIUS authentication: on
- Enable account expiration: off
- Force password change on next logon: off

User Role

Role: Administrator | Sponsor | User (selected)

- Allow LDAP browsing: off

User Information

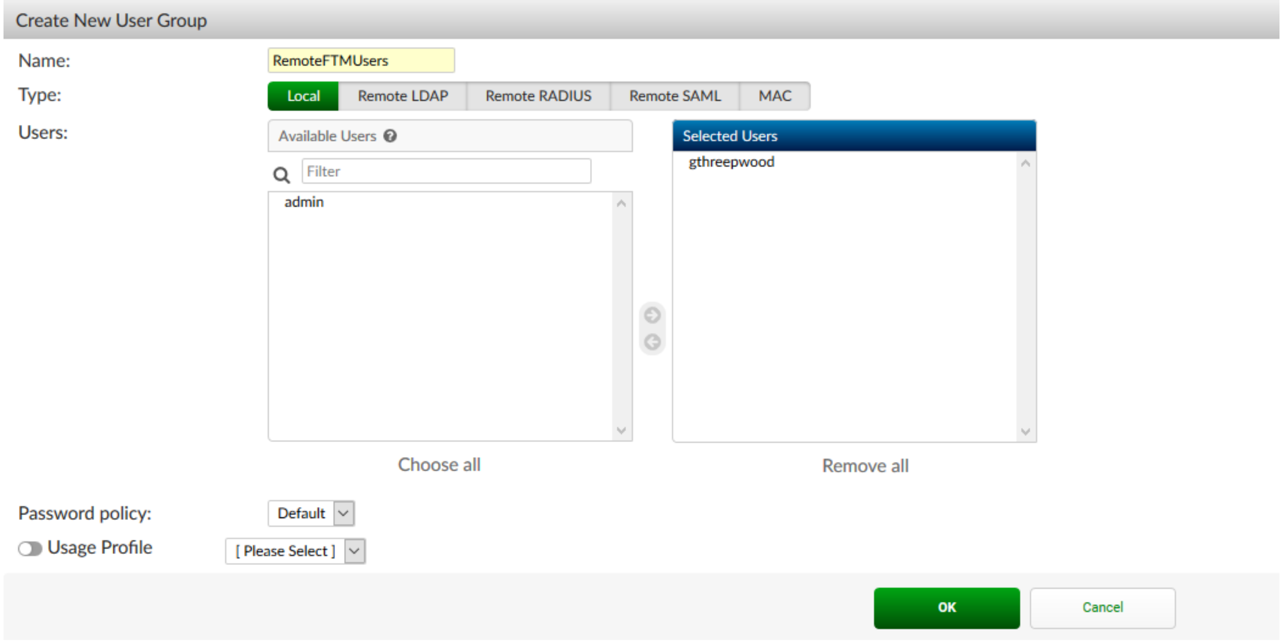
| | | | |
|---|---|---|---|
| First name: | | Last name: | |
| Email: | [redacted] | Phone number: | |
| Mobile number: | | SMS gateway: | Use default (Test SMS) |
| Street address: | | | |
| City: | | State/Province: | |
| Country: | | | |
| Language: | Use default | | |
| Organization: | [ Please Select ] | | |

Alternative Email Addresses

Password Recovery Options

Groups

3. Next, go to *Authentication* > *User Management* > *User Groups*, and select *Create New*.
   Enter a *Name* (`RemoteFTMUsers`) and add gthreepwood to the group by moving the user from *Available users* to *Selected users*.



Create New User Group

Name: RemoteFTMUsers

Type: Local (selected) | Remote LDAP | Remote RADIUS | Remote SAML | MAC

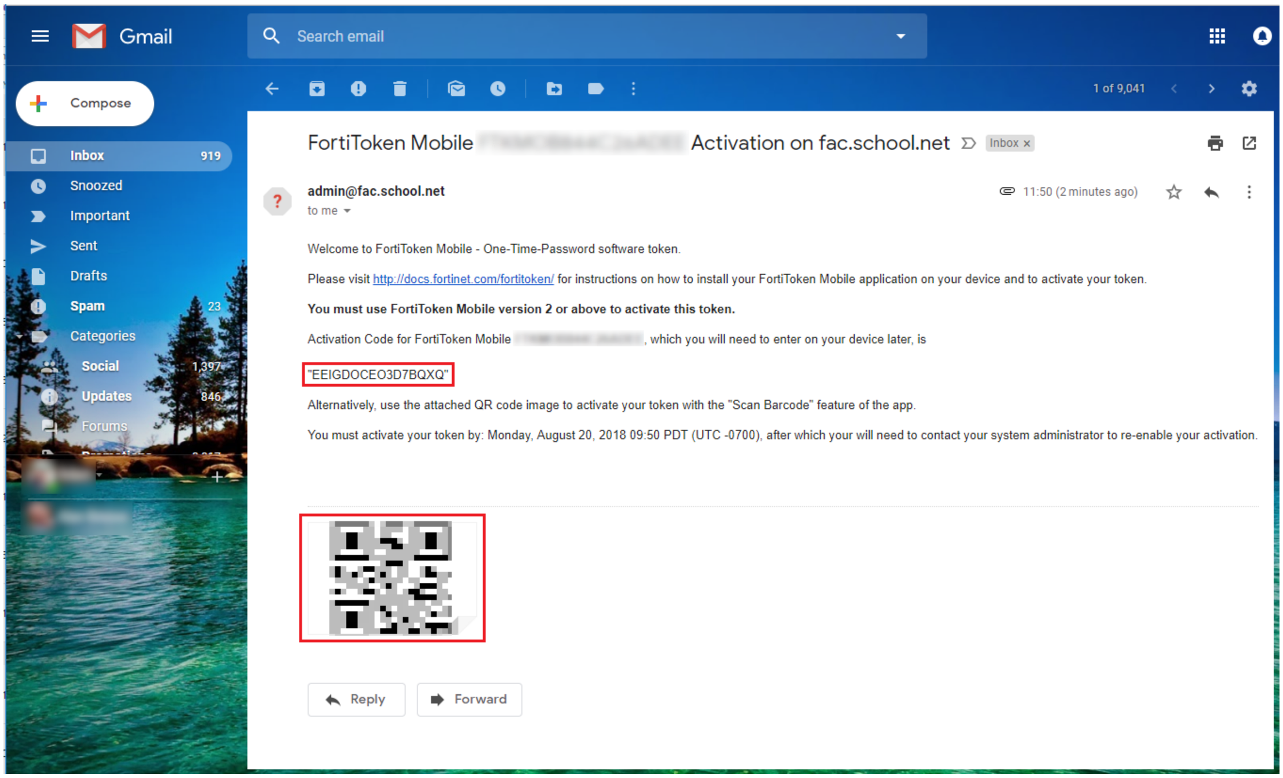
Users:

| Available Users | Selected Users |
|---|---|
| admin | gthreepwood |
| Choose all | Remove all |

Password policy: Default

Usage Profile: off — [ Please Select ]

4. The FortiAuthenticator sends the FortiToken Mobile activation to the user's email address. If the email does not appear in the inbox, check the spam folder.
   The user activates their FortiToken Mobile through the FortiToken Mobile application by either entering the activation code provided or by scanning the QR code attached.



FortiToken Mobile [redacted] Activation on fac.school.net

admin@fac.school.net
to me
11:50 (2 minutes ago)

Welcome to FortiToken Mobile - One-Time-Password software token.

Please visit http://docs.fortinet.com/fortitoken/ for instructions on how to install your FortiToken Mobile application on your device and to activate your token.

**You must use FortiToken Mobile version 2 or above to activate this token.**

Activation Code for FortiToken Mobile [redacted], which you will need to enter on your device later, is

"EEIGDOCEO3D7BQXQ"

Alternatively, use the attached QR code image to activate your token with the "Scan Barcode" feature of the app.

You must activate your token by: Monday, August 20, 2018 09:50 PDT (UTC -0700), after which your will need to contact your system administrator to re-enable your activation.

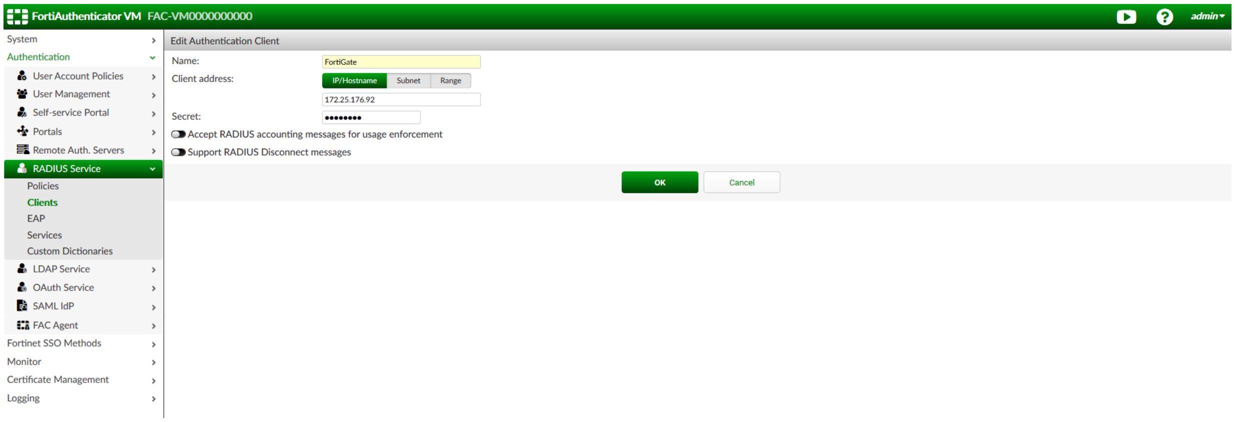
For more information, see the FortiToken Mobile user instructions.

## Creating the RADIUS client and policy on the FortiAuthenticator

### To create the RADIUS client:

1. On the FortiAuthenticator, go to *Authentication* > *RADIUS Service* > *Clients*, and select *Create New* to add the FortiGate as a RADIUS client.
2. Enter a *Name* (*OfficeServer*), the IP address of the FortiGate, and set a *Secret*.
   The secret is a pre-shared secure password that the FortiGate will use to authenticate to the FortiAuthenticator.

3. Click *OK*.



Edit Authentication Client

Name: FortiGate

Client address: IP/Hostname | Subnet | Range

172.25.176.92

Secret: ••••••••

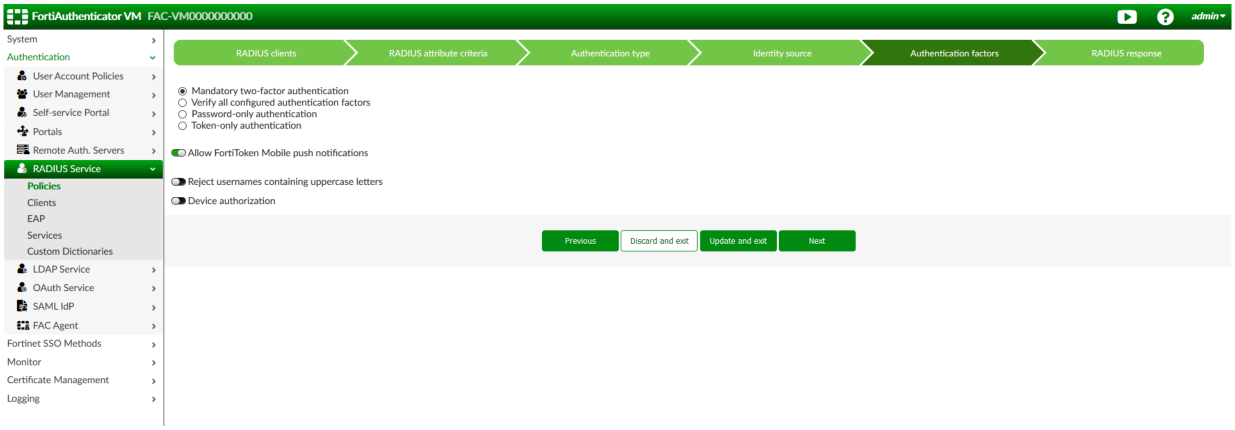
Accept RADIUS accounting messages for usage enforcement

Support RADIUS Disconnect messages

OK Cancel

### To create the RADIUS policy:

1. Go to *Authentication* > *RADIUS Service* > *Policies*, and select *Create New*.
2. Enter the RADIUS policy name, description, and select the FortiGate RADIUS client.
3. Optionally, configure RADIUS attribute criteria.
4. Choose *Password/OTP* authentication as the authentication type.
5. Choose a username format (in this example: `username@realm`), and select the *Local* realm.
6. Set the authentication method to *Mandatory two-factor authentication*, and enable the *Allow FortiToken Mobile push notifications* option.
7. Click *Save and Exit*.



● Mandatory two-factor authentication
○ Verify all configured authentication factors
○ Password-only authentication
○ Token-only authentication

Allow FortiToken Mobile push notifications

Reject usernames containing uppercase letters

Device authorization

Previous | Discard and exit | Update and exit | Next

Note the *Username input format*. This is the format that the user must use to enter their username in the web portal, made up of their username and realm. In this example, the full username for gthreepwood is `gthreepwood@local`.

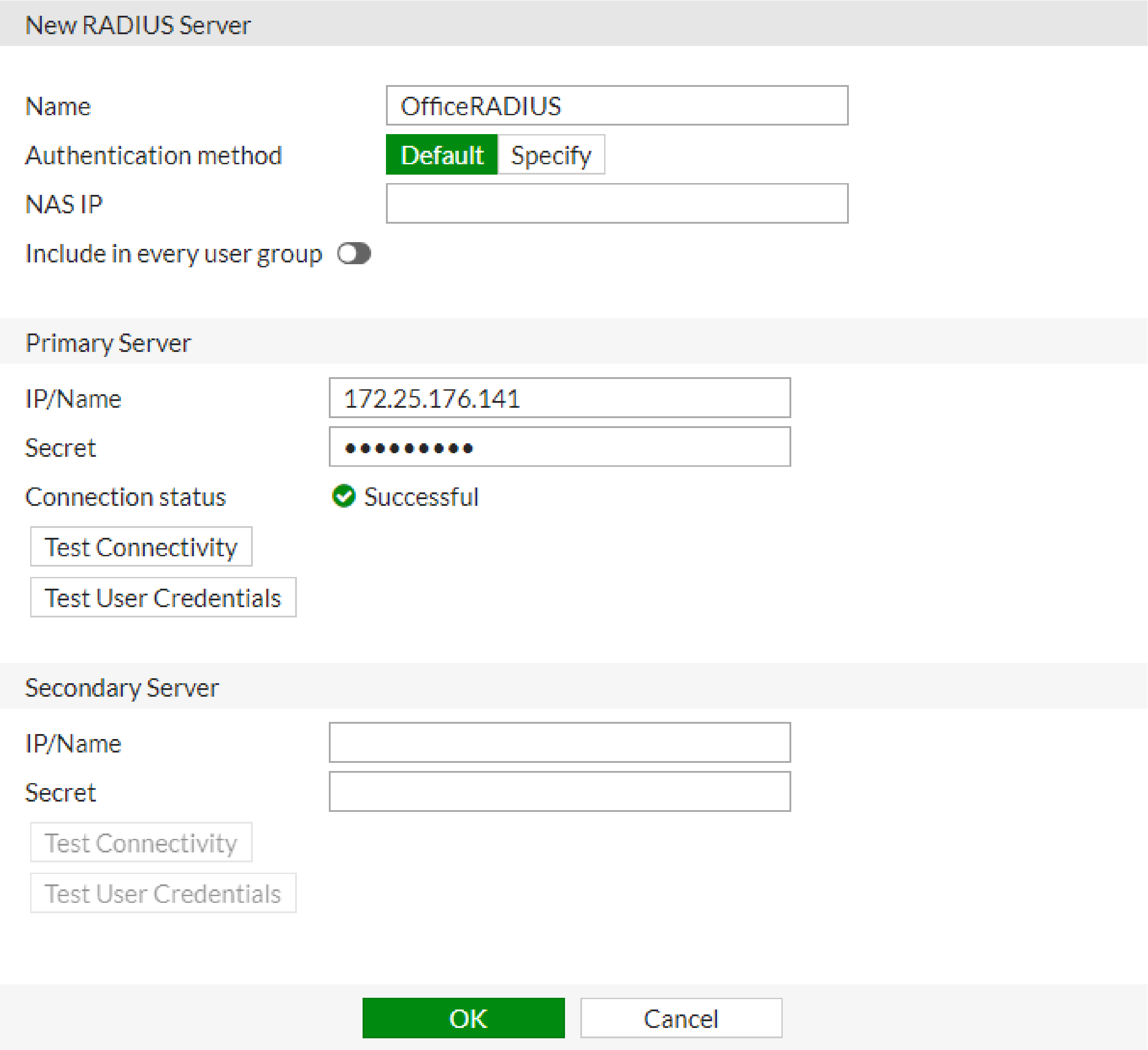
## Connecting the FortiGate to the RADIUS server

### To connect the FortiGate to the RADIUS server:

1. On the FortiGate, go to *User & Device* > *RADIUS Servers*, and select *Create New* to connect to the RADIUS server (FortiAuthenticator).

Enter a *Name* (*OfficeRADIUS*), the IP address of the FortiAuthenticator, and enter the *Secret* created before.

Select *Test Connectivity* to be sure you can connect to the RADIUS server. Then select *Test User Credentials* and enter the credentials for *gthreepwood*.



New RADIUS Server

| | |
|---|---|
| Name | OfficeRADIUS |
| Authentication method | Default (selected) / Specify |
| NAS IP | |
| Include in every user group | ○ |

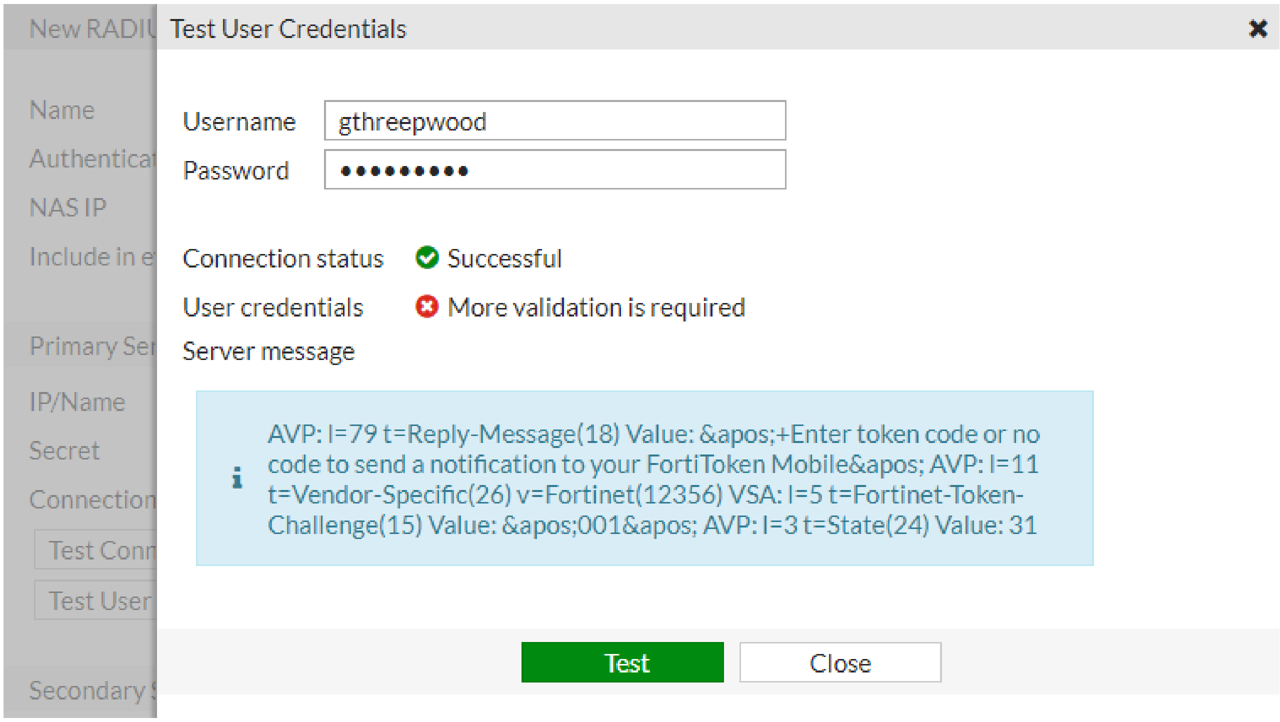
Primary Server

| | |
|---|---|
| IP/Name | 172.25.176.141 |
| Secret | •••••••••• |
| Connection status | ✓ Successful |

Secondary Server

| | |
|---|---|
| IP/Name | |
| Secret | |

Because the user has been assigned a FortiToken, the test should return stating that *More validation is required*.



Test User Credentials

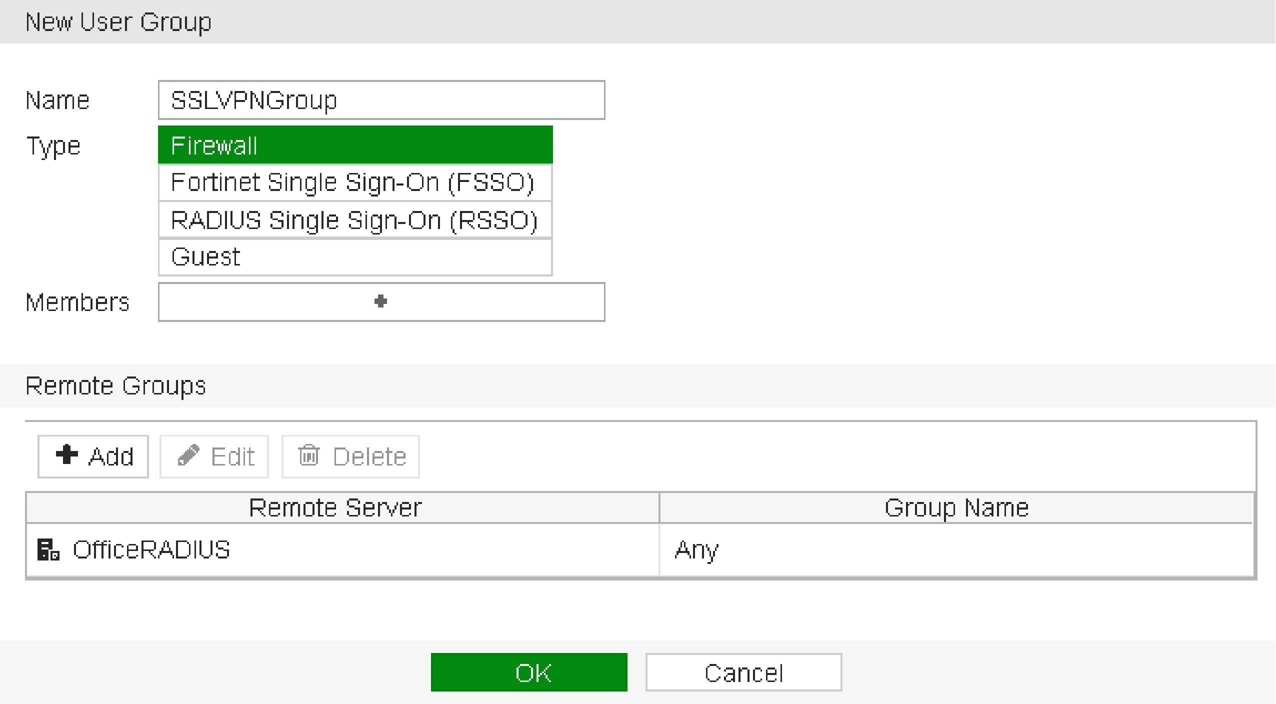
Username: gthreepwood
Password: ●●●●●●●●●

Connection status: ✓ Successful
User credentials: ✖ More validation is required
Server message

```
AVP: l=79 t=Reply-Message(18) Value: &apos;+Enter token code or no code to send a notification to your FortiToken Mobile&apos; AVP: l=11 t=Vendor-Specific(26) v=Fortinet(12356) VSA: l=5 t=Fortinet-Token-Challenge(15) Value: &apos;001&apos; AVP: l=3 t=State(24) Value: 31
```

The FortiGate can now connect to the FortiAuthenticator as the RADIUS client configured earlier.

2. Then go to *User & Device* > *User Groups*, and select *Create New* to map authenticated remote users to a user group on the FortiGate.
   Enter a *Name* (*SSLVPNGroup*) and select *Add* under *Remote Groups*.
   Select *OfficeRADIUS* under the *Remote Server* drop-down menu, and leave the *Groups* field blank.



New User Group

Name: SSLVPNGroup
Type: Firewall (selected) | Fortinet Single Sign-On (FSSO) | RADIUS Single Sign-On (RSSO) | Guest
Members

Remote Groups

| Remote Server | Group Name |
|---|---|
| OfficeRADIUS | Any |

3. In the FortiGate CLI, increase the remote authentication timeout to 60 seconds.

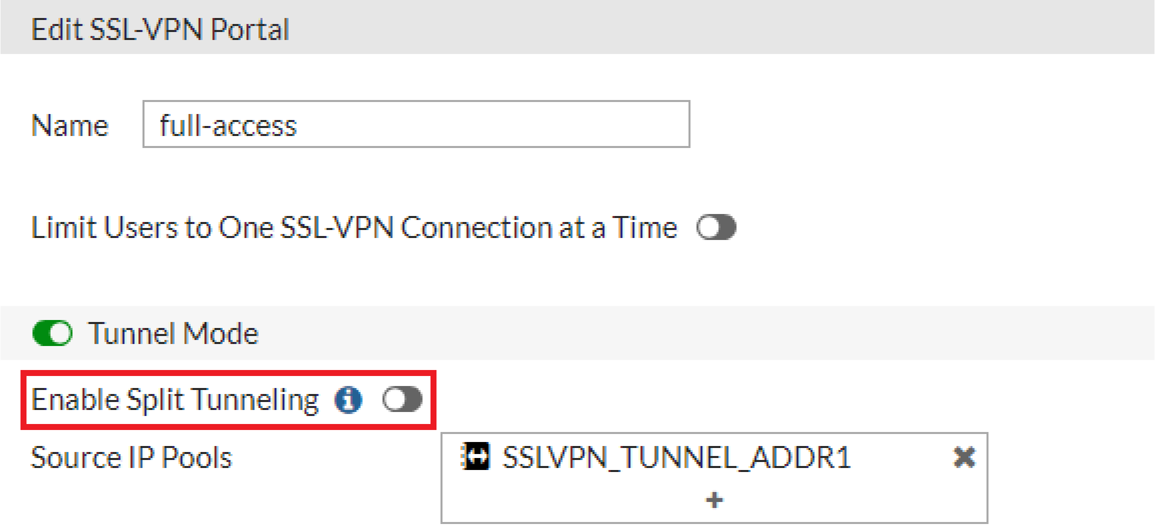
```
#config system global
```

```
   #set remoteauthtimeout 60
#end
```

## Configuring the SSL-VPN

**To configure the SSL-VPN:**

1. On the FortiGate, go to *VPN > SSL-VPN Portals*, and edit the *full-access* portal.
   Toggle *Enable Split Tunneling* so that it is disabled.



Edit SSL-VPN Portal

Name: full-access

Limit Users to One SSL-VPN Connection at a Time ○

● Tunnel Mode

Enable Split Tunneling ○

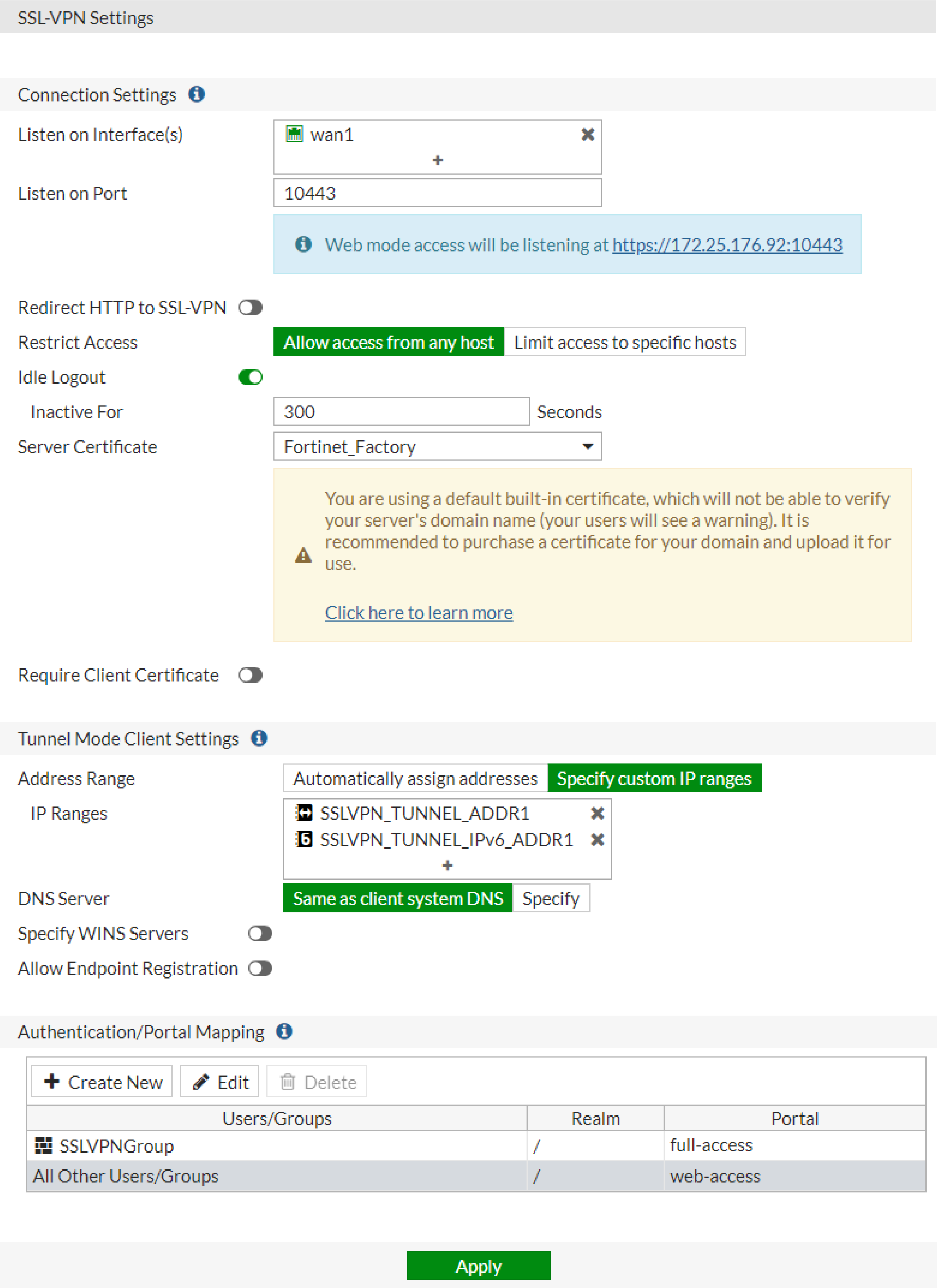
Source IP Pools: SSLVPN_TUNNEL_ADDR1

2. Go to *VPN > SSL-VPN Settings*.
   Under *Connection Settings* set *Listen on Interface(s)* to *wan1* and *Listen on Port* to `10443`.

   Under *Tunnel Mode Client Settings*, select *Specify custom IP ranges*. The *IP Ranges* should be set to *SSLVPN_TUNNEL_ADDR1* and the IPv6 version by default.

   Under *Authentication/Portal Mapping*, select *Create New*.

   Set the *SSLVPNGroup* user group to the *full-access* portal, and assign *All Other Users/Groups* to *web-access* — this will grant all other users access to the web portal *only*.



SSL-VPN Settings

Connection Settings

Listen on Interface(s): wan1

Listen on Port: 10443

Web mode access will be listening at https://172.25.176.92:10443

Redirect HTTP to SSL-VPN: ○

Restrict Access: [✓ Allow access from any host] Limit access to specific hosts

Idle Logout: ●

Inactive For: 300 Seconds

Server Certificate: Fortinet_Factory

You are using a default built-in certificate, which will not be able to verify your server's domain name (your users will see a warning). It is recommended to purchase a certificate for your domain and upload it for use.

Click here to learn more

Require Client Certificate: ○

Tunnel Mode Client Settings

Address Range: Automatically assign addresses [✓ Specify custom IP ranges]

IP Ranges: SSLVPN_TUNNEL_ADDR1<br>SSLVPN_TUNNEL_IPv6_ADDR1

DNS Server: [✓ Same as client system DNS] Specify

Specify WINS Servers: ○

Allow Endpoint Registration: ○

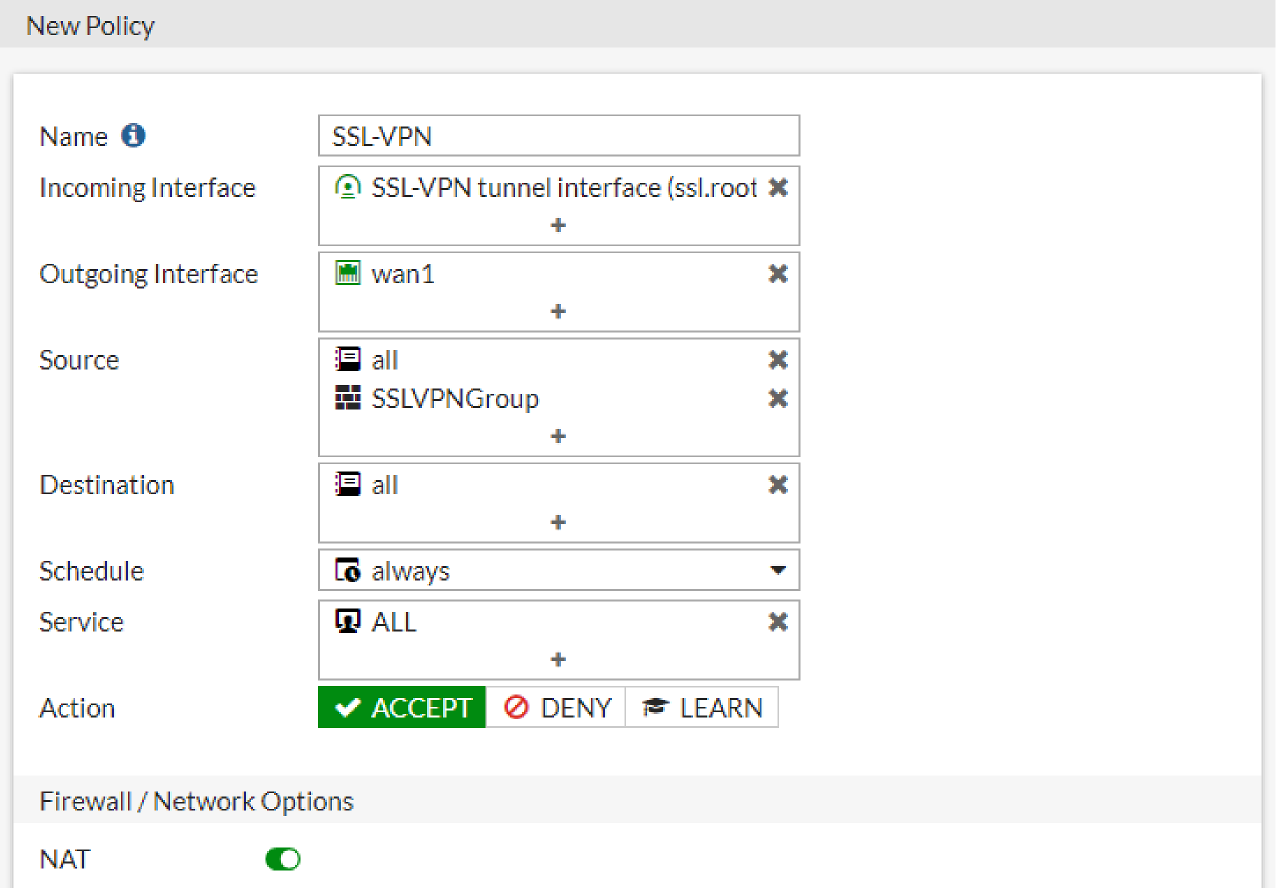
Authentication/Portal Mapping

| Users/Groups | Realm | Portal |
|---|---|---|
| SSLVPNGroup | / | full-access |
| All Other Users/Groups | / | web-access |

3. Then go to *Policy & Objects* > *IPv4 Policy* and create a new SSL VPN policy.
   Set *Incoming Interface* to the *SSL-VPN tunnel interface* and set *Outgoing Interface* to the Internet-facing interface (in this case, *wan1*).

   Set *Source* to the *SSLVPNGroup* user group and the *all* address.

   Set *Destination* to *all*, *Schedule* to *always*, *Service* to *ALL*, and enable *NAT*.



New Policy

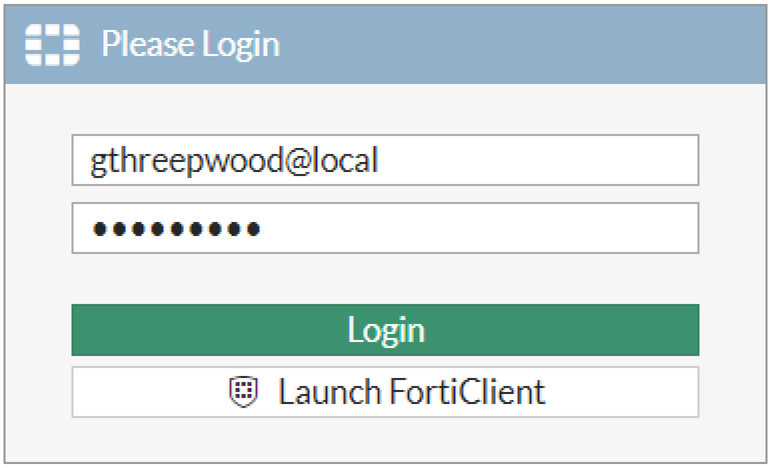
| | |
|---|---|
| Name | SSL-VPN |
| Incoming Interface | SSL-VPN tunnel interface (ssl.root |
| Outgoing Interface | wan1 |
| Source | all<br>SSLVPNGroup |
| Destination | all |
| Schedule | always |
| Service | ALL |
| Action | ✓ ACCEPT |

Firewall / Network Options

| | |
|---|---|
| NAT | ● |

## Results

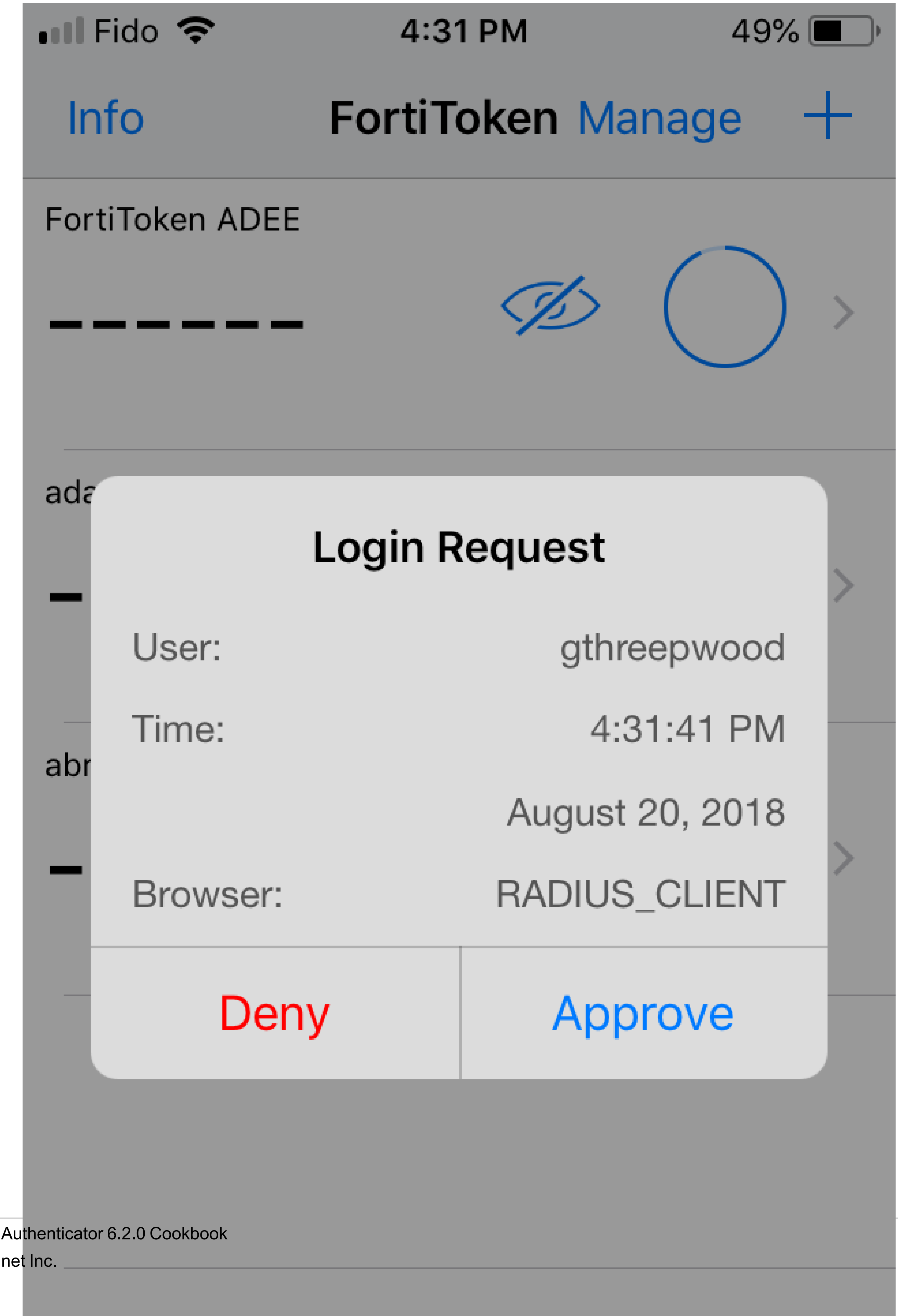
1. From a remote device, open a web browser and navigate to the SSL VPN web portal *(https://<fortigate-ip>:10443*).
2. Enter *gthreepwood's* credentials and select *Login*. Use the correct format (in this case, *username@realm*), as per the client configuration on the FortiAuthenticator.



gthreepwood@local

••••••••••

3. The FortiAuthenticator will then push a login request notification through the FortiToken Mobile application. Select *Approve*.



Login Request

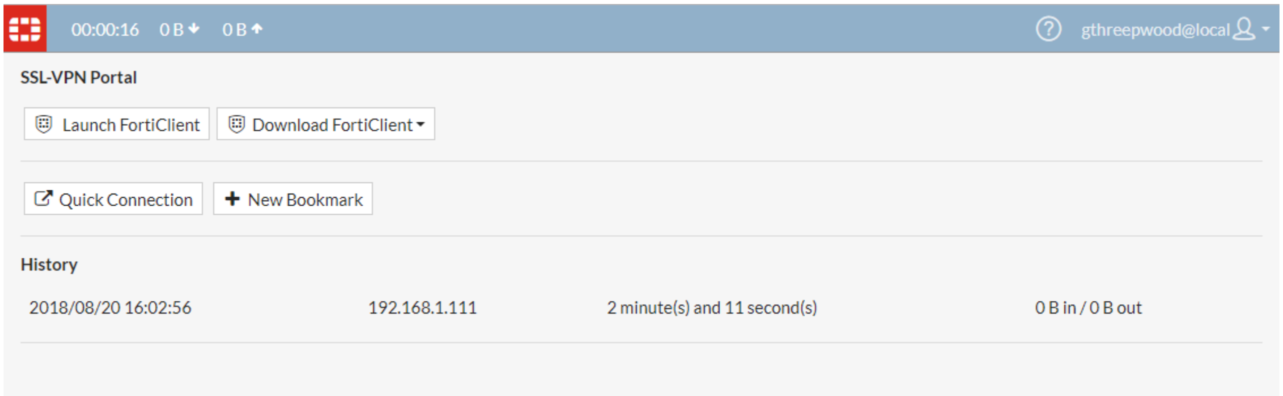
User: gthreepwood

Time: 4:31:41 PM

August 20, 2018

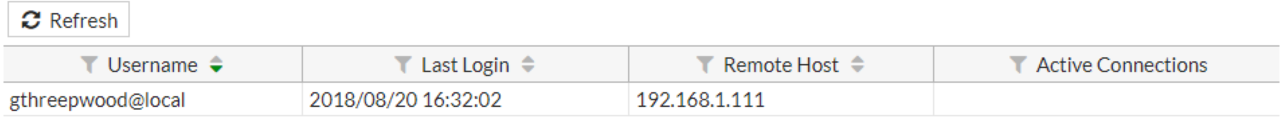
Browser: RADIUS_CLIENT

Upon approving the authentication, *gthreepwood* is successfully logged into the SSL VPN portal.



2018/08/20 16:02:56 192.168.1.111 2 minute(s) and 11 second(s) 0 B in / 0 B out

4. On the FortiGate, go to *Monitor* > *SSL-VPN Monitor* to confirm the user's connection.

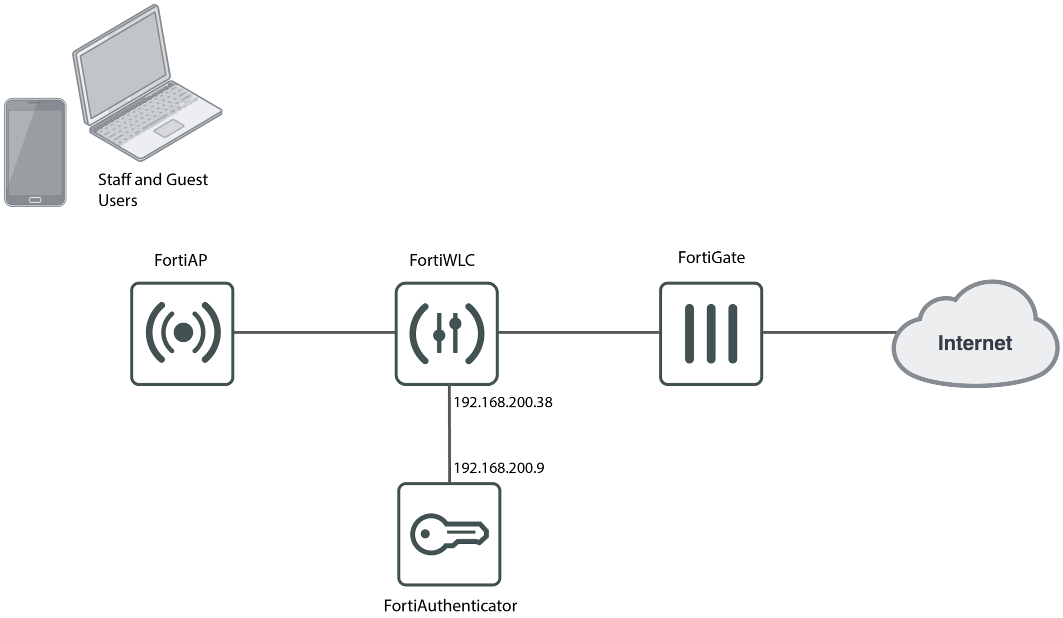


| Username | Last Login | Remote Host | Active Connections |
|---|---|---|---|
| gthreepwood@local | 2018/08/20 16:32:02 | 192.168.1.111 | |

# Guest Portals

This section contains information about creating and using guest portals.

## FortiAuthenticator as Guest Portal for FortiWLC

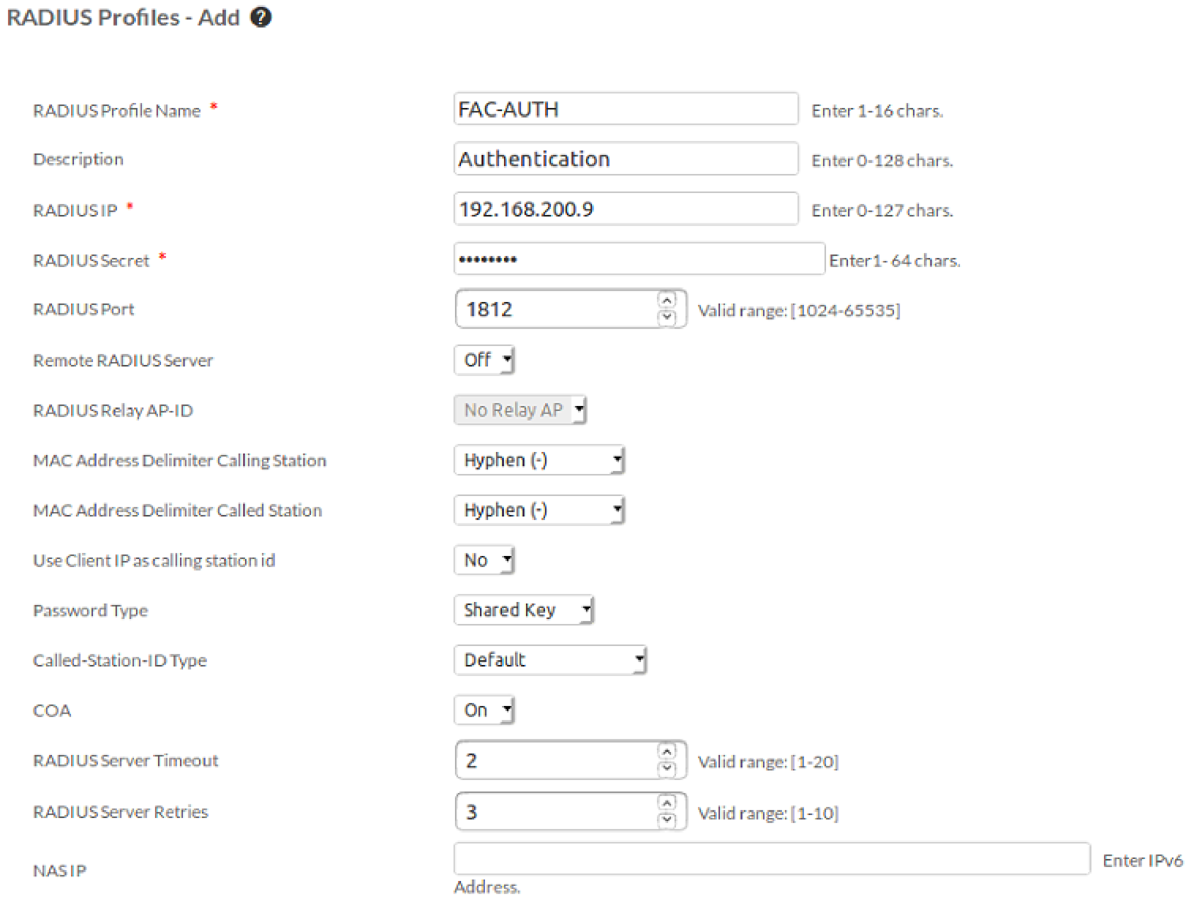


In this recipe we will use FortiAuthenticator as Guest Portal for users getting wireless connection provided by FortiWLC.

### Creating the FortiAuthenticator as RADIUS server on the FortiWLC

1. On the FortiWLC, go to *Configuration* > *Security* > *RADIUS* and select *ADD* and create two profiles. One to be used for *Authentication* and one to be used for *Accounting*.
   - *RADIUS Profile name*: Enter a name for the profile. Use a name that will indicate if the profile is used for *Authentication* or *Accounting*.
   - *RADIUS IP*: IP address of the FortiAuthenticator.
   - *RADIUS Secret*: Shared secret between WLC and FortiAuthenticator.

- *RADIUS Port*: Use *1812* for *Authentication* profile and *1813* when creating an *Accounting* profile.



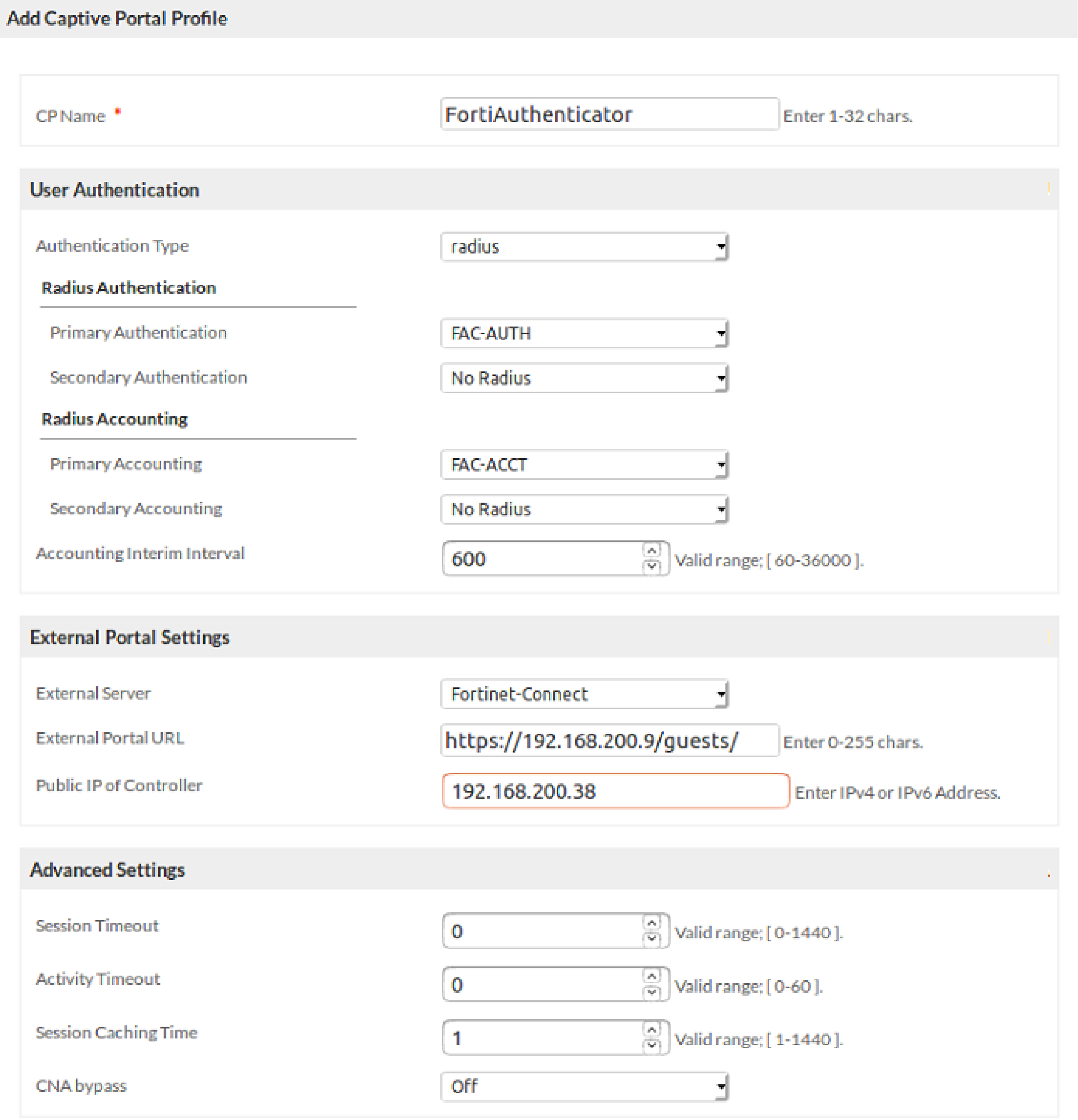
RADIUS Profiles - Add

| | | |
|---|---|---|
| RADIUS Profile Name * | FAC-AUTH | Enter 1-16 chars. |
| Description | Authentication | Enter 0-128 chars. |
| RADIUS IP * | 192.168.200.9 | Enter 0-127 chars. |
| RADIUS Secret * | •••••••• | Enter 1- 64 chars. |
| RADIUS Port | 1812 | Valid range: [1024-65535] |
| Remote RADIUS Server | Off | |
| RADIUS Relay AP-ID | No Relay AP | |
| MAC Address Delimiter Calling Station | Hyphen (-) | |
| MAC Address Delimiter Called Station | Hyphen (-) | |
| Use Client IP as calling station id | No | |
| Password Type | Shared Key | |
| Called-Station-ID Type | Default | |
| COA | On | |
| RADIUS Server Timeout | 2 | Valid range: [1-20] |
| RADIUS Server Retries | 3 | Valid range: [1-10] |
| NAS IP | | Enter IPv6 Address. |

## Creating the Captive Portal profile on the FortiWLC

1. On the FortiWLC, go to *Configuration* > *Security* > *Captive Portal*, select the *Captive Portal Profiles* tab, and *ADD* a new profile.
    - *CP Name*: Enter a name for the profile.
    - *Authentication Type*: *RADIUS*
    - *Primary Authentication*:Your Authentication profile.
    - *Primary Accounting*: Your Accounting profile.
    - *External Server*: Fortinet-Connect
    - *External Portal*: https://<fortiauthenticator-ip>/guests

- *Public IP of Controller*: IP address that the FortiAuthenticator can use to communicate with the FortiWLC.



**Add Captive Portal Profile**

| | | |
|---|---|---|
| CP Name * | FortiAuthenticator | Enter 1-32 chars. |

**User Authentication**

| | | |
|---|---|---|
| Authentication Type | radius | |
| **Radius Authentication** | | |
| Primary Authentication | FAC-AUTH | |
| Secondary Authentication | No Radius | |
| **Radius Accounting** | | |
| Primary Accounting | FAC-ACCT | |
| Secondary Accounting | No Radius | |
| Accounting Interim Interval | 600 | Valid range: [ 60-36000 ]. |

**External Portal Settings**

| | | |
|---|---|---|
| External Server | Fortinet-Connect | |
| External Portal URL | https://192.168.200.9/guests/ | Enter 0-255 chars. |
| Public IP of Controller | 192.168.200.38 | Enter IPv4 or IPv6 Address. |

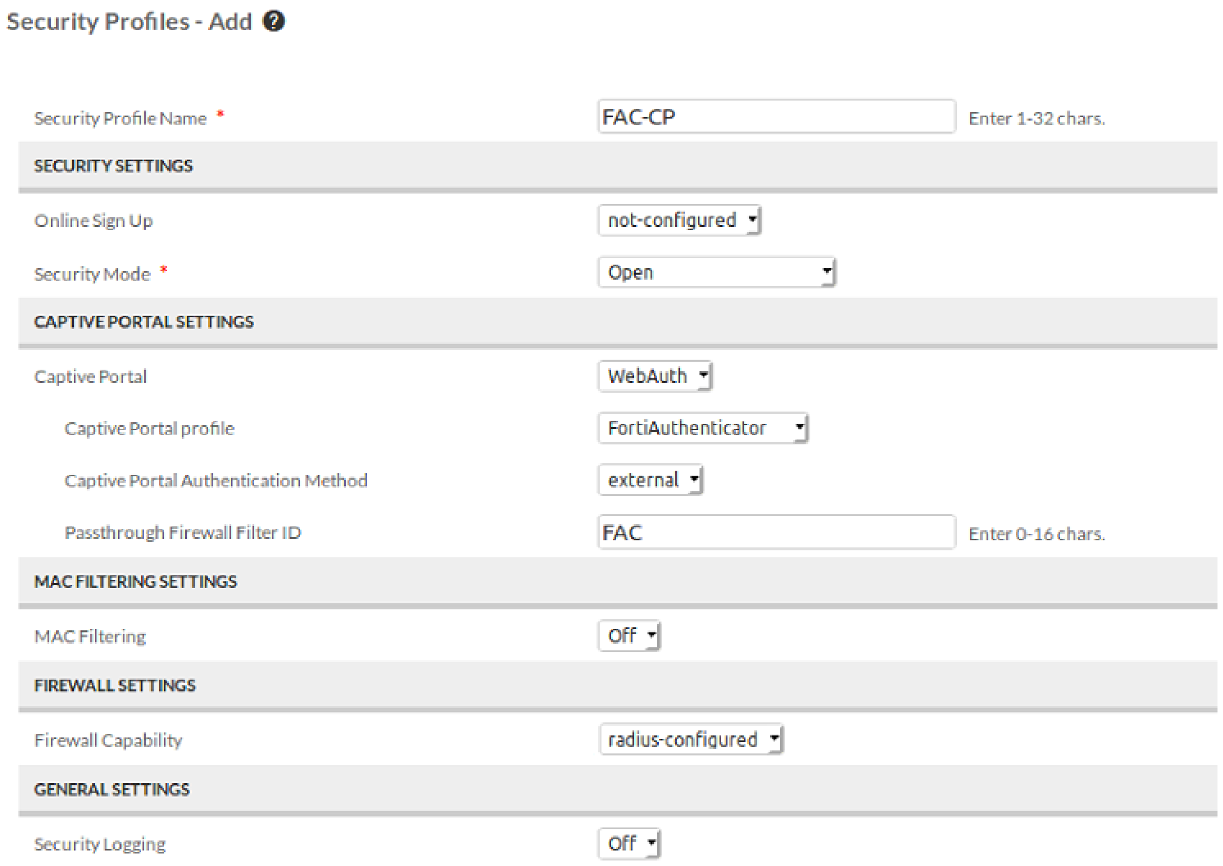
**Advanced Settings**

| | | |
|---|---|---|
| Session Timeout | 0 | Valid range: [ 0-1440 ]. |
| Activity Timeout | 0 | Valid range: [ 0-60 ]. |
| Session Caching Time | 1 | Valid range: [ 1-1440 ]. |
| CNA bypass | Off | |

## Creating the security profile on the FortiWLC

1. On the FortiWLC, go to *Configuration* > *Security* > *Profile* and *ADD* a new profile.
   - *Profile Name*: Enter a name for the profile.
   - *Security Mode*: *Open*
   - *Captive Portal*: *WebAuth*
   - *Captive Portal Profile*: Select the profile created earlier.
   - *Captive Portal Authentication Method*: *external*

- *Passthrough Firewall Filter ID*: An ID used to allow access to the portal before authentication using QoS rules.



Security Profiles - Add

| | | |
|---|---|---|
| Security Profile Name * | FAC-CP | Enter 1-32 chars. |
| **SECURITY SETTINGS** | | |
| Online Sign Up | not-configured | |
| Security Mode * | Open | |
| **CAPTIVE PORTAL SETTINGS** | | |
| Captive Portal | WebAuth | |
| Captive Portal profile | FortiAuthenticator | |
| Captive Portal Authentication Method | external | |
| Passthrough Firewall Filter ID | FAC | Enter 0-16 chars. |
| **MAC FILTERING SETTINGS** | | |
| MAC Filtering | Off | |
| **FIREWALL SETTINGS** | | |
| Firewall Capability | radius-configured | |
| **GENERAL SETTINGS** | | |
| Security Logging | Off | |

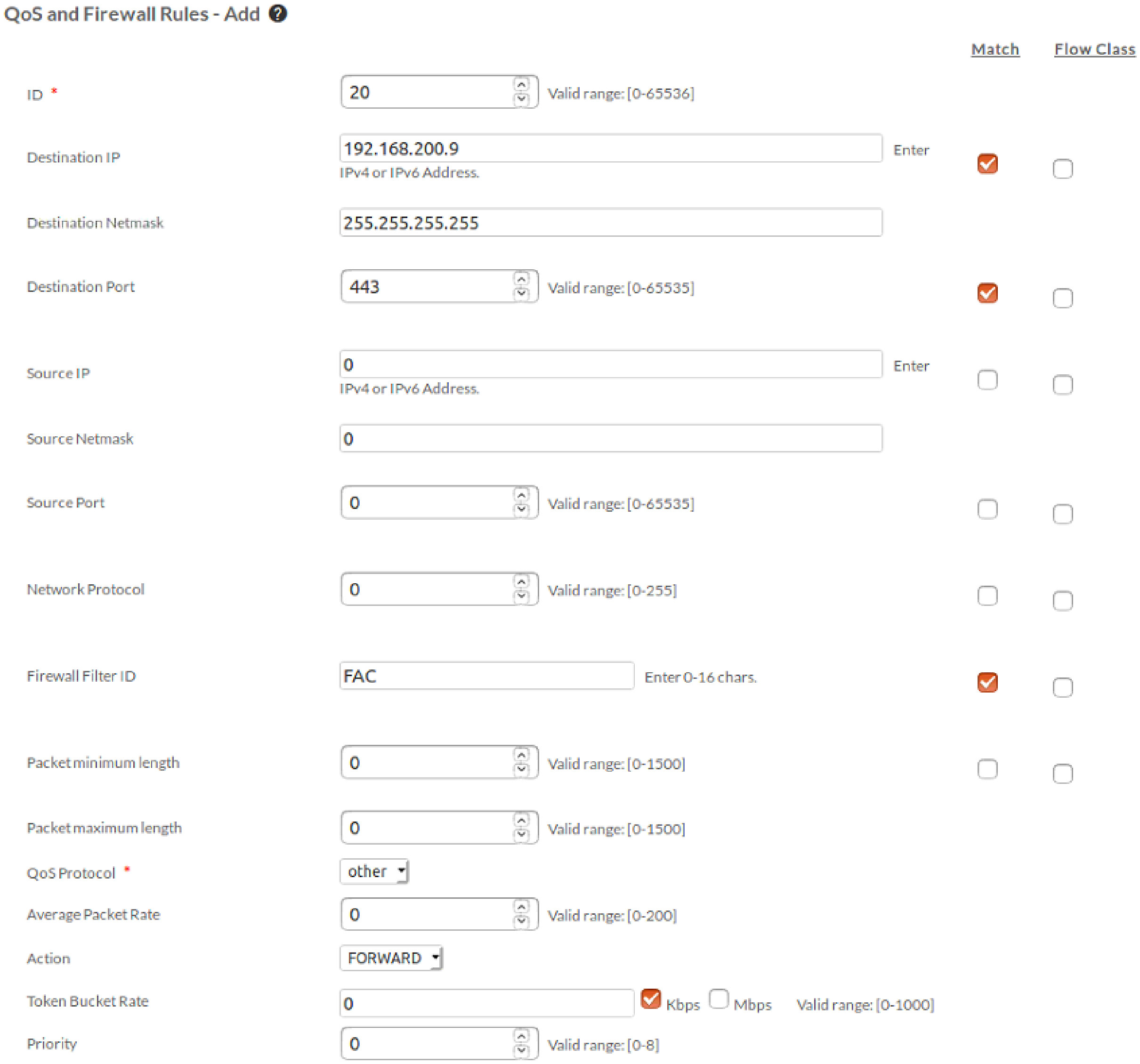
## Creating the QoS rule on the FortiWLC

1. On the FortiWLC, go to *Configuration* > *Policies* > *QoS* and select the *QoS and Firewall Rules* tab. Select *ADD* to create two profiles.

   For the first rule, allow the wireless client to access the FortiAuthenticator guest portal.

   - *ID*: Rule number (in the example, *20*).
   - *Destination IP*: IP address of the FortiAuthenticator, and enable *Match*.
   - *Destination Netmask*: *255.255.255.255*
   - *Destination Port*: *443*, and enable *Match*.
   - *Network Protocol*: *6*, and enable *Match*.
   - *Firewall Filter ID*: String from the security profile, and enable *Match*.

- *QoS Protocol*: Other.

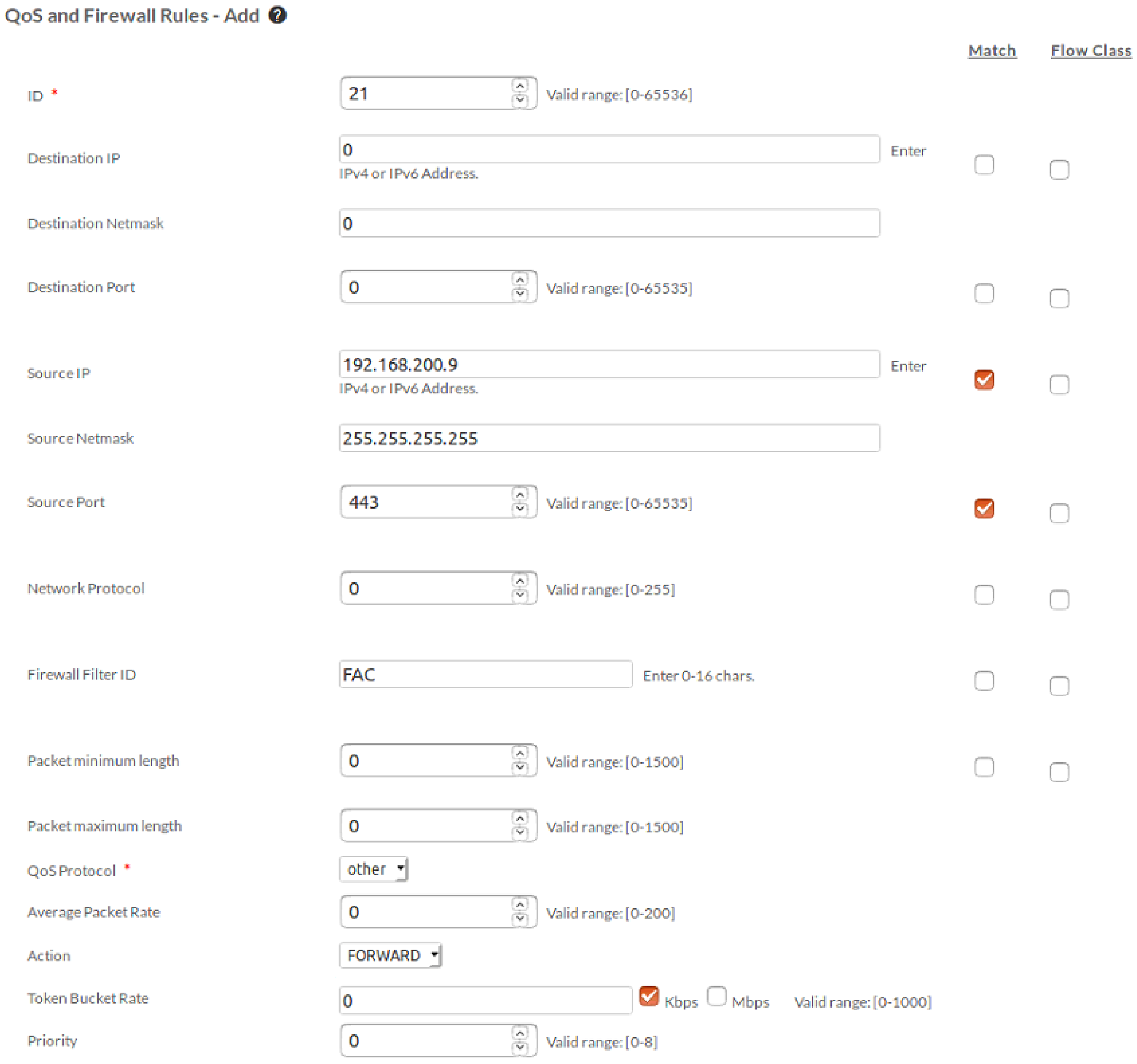


QoS and Firewall Rules - Add

| | | | Match | Flow Class |
|---|---|---|---|---|
| ID * | 20 | Valid range: [0-65536] | | |
| Destination IP | 192.168.200.9<br>IPv4 or IPv6 Address. | Enter | ☑ | ☐ |
| Destination Netmask | 255.255.255.255 | | | |
| Destination Port | 443 | Valid range: [0-65535] | ☑ | ☐ |
| Source IP | 0<br>IPv4 or IPv6 Address. | Enter | ☐ | ☐ |
| Source Netmask | 0 | | | |
| Source Port | 0 | Valid range: [0-65535] | ☐ | ☐ |
| Network Protocol | 0 | Valid range: [0-255] | ☐ | ☐ |
| Firewall Filter ID | FAC | Enter 0-16 chars. | ☑ | ☐ |
| Packet minimum length | 0 | Valid range: [0-1500] | ☐ | ☐ |
| Packet maximum length | 0 | Valid range: [0-1500] | | |
| QoS Protocol * | other | | | |
| Average Packet Rate | 0 | Valid range: [0-200] | | |
| Action | FORWARD | | | |
| Token Bucket Rate | 0 | ☑ Kbps ☐ Mbps Valid range: [0-1000] | | |
| Priority | 0 | Valid range: [0-8] | | |

2. For the second rule, allow FortiAuthenticator to reach the clients.
   - *ID*: Rule number (in the example, *21*).
   - *Source IP*: IP address of the FortiAuthenticator, and enable *Match*.
   - *Source Netmask*: *255.255.255.255*
   - *Source Port*: *443*, and enable *Match*.
   - *Network Protocol*: *6*, and enable *Match*.
   - *Firewall Filter ID*: Use the *Passthrough Firewall Filter ID* string from the security profile, and enable *Match*.

- *QoS Protocol*: Other.



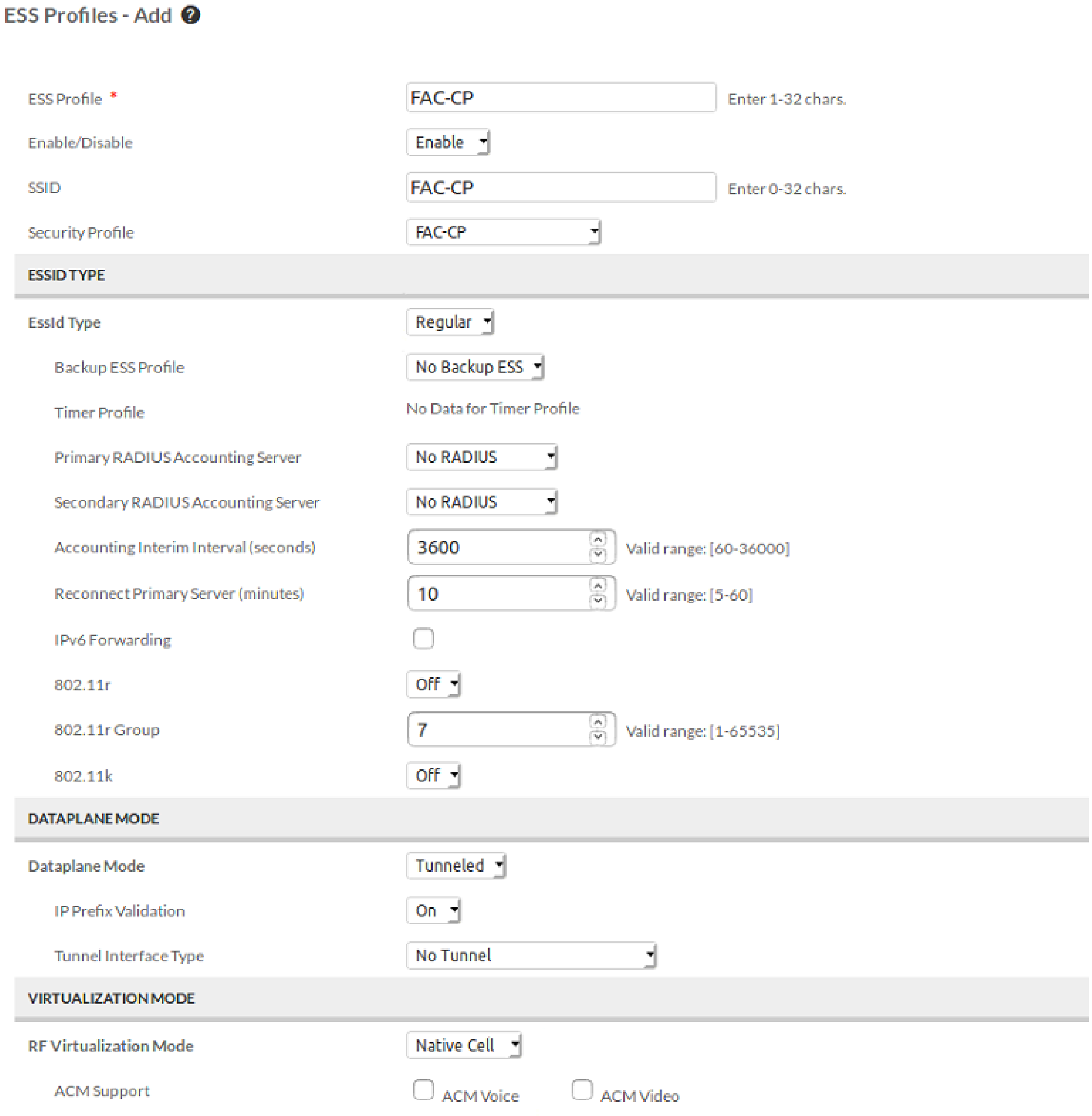
QoS and Firewall Rules - Add

| | | | Match | Flow Class |
|---|---|---|---|---|
| ID * | 21 | Valid range: [0-65536] | | |
| Destination IP | 0<br>IPv4 or IPv6 Address. | Enter | ☐ | ☐ |
| Destination Netmask | 0 | | | |
| Destination Port | 0 | Valid range: [0-65535] | ☐ | ☐ |
| Source IP | 192.168.200.9<br>IPv4 or IPv6 Address. | Enter | ☑ | ☐ |
| Source Netmask | 255.255.255.255 | | | |
| Source Port | 443 | Valid range: [0-65535] | ☑ | ☐ |
| Network Protocol | 0 | Valid range: [0-255] | ☐ | ☐ |
| Firewall Filter ID | FAC | Enter 0-16 chars. | ☐ | ☐ |
| Packet minimum length | 0 | Valid range: [0-1500] | ☐ | ☐ |
| Packet maximum length | 0 | Valid range: [0-1500] | | |
| QoS Protocol * | other | | | |
| Average Packet Rate | 0 | Valid range: [0-200] | | |
| Action | FORWARD | | | |
| Token Bucket Rate | 0 | ☑ Kbps ☐ Mbps Valid range: [0-1000] | | |
| Priority | 0 | Valid range: [0-8] | | |

## Creating the ESS Profile on the FortiWLC

1. On the FortiWLC, go to *Configuration* > *Wireless* > *ESS* and *ADD* an ESS profile.
   Configure the profile with an appropriate *ESS Profile* and *SSID*. Then select the *Security Profile* that contains the

Captive Portal settings.



ESS Profiles - Add

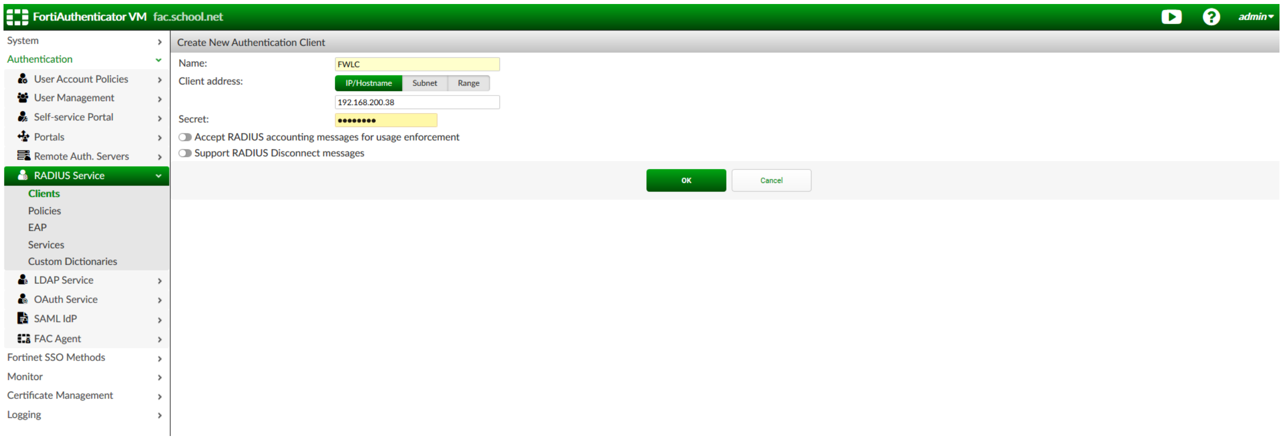
| | | |
|---|---|---|
| ESS Profile * | FAC-CP | Enter 1-32 chars. |
| Enable/Disable | Enable | |
| SSID | FAC-CP | Enter 0-32 chars. |
| Security Profile | FAC-CP | |
| **ESSID TYPE** | | |
| EssId Type | Regular | |
| Backup ESS Profile | No Backup ESS | |
| Timer Profile | No Data for Timer Profile | |
| Primary RADIUS Accounting Server | No RADIUS | |
| Secondary RADIUS Accounting Server | No RADIUS | |
| Accounting Interim Interval (seconds) | 3600 | Valid range: [60-36000] |
| Reconnect Primary Server (minutes) | 10 | Valid range: [5-60] |
| IPv6 Forwarding | □ | |
| 802.11r | Off | |
| 802.11r Group | 7 | Valid range: [1-65535] |
| 802.11k | Off | |
| **DATAPLANE MODE** | | |
| Dataplane Mode | Tunneled | |
| IP Prefix Validation | On | |
| Tunnel Interface Type | No Tunnel | |
| **VIRTUALIZATION MODE** | | |
| RF Virtualization Mode | Native Cell | |
| ACM Support | □ ACM Voice | □ ACM Video |

## Creating FortiWLC as RADIUS client on the FortiAuthenticator

### To create a RADIUS client:

1. On the FortiAuthenticator, go to *Authentication* > *RADIUS Service* > *Clients* and create a new client.
   Set *Client address* to *IP/Hostname* and enter the IP address the FortiWLC will send its RADIUS requests from.

Set the same *Secret* that was entered during the RADIUS configuration on the FortiWLC.



Create New Authentication Client

Name: FWLC

Client address: IP/Hostname | Subnet | Range

192.168.200.38

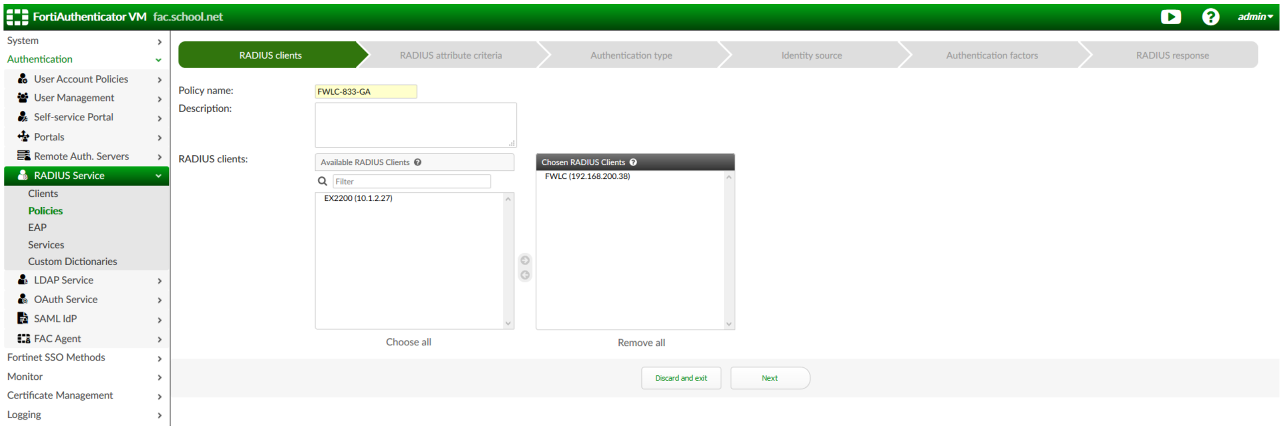
Secret: ••••••••

Accept RADIUS accounting messages for usage enforcement

Support RADIUS Disconnect messages

### To create the RADIUS policy:

1. Go to *Authentication* > *RADIUS Service* > *Policies*, and create a new policy.



Policy name: FWLC-833-GA

Description:

RADIUS clients:

Available RADIUS Clients: EX2200 (10.1.2.27)

Chosen RADIUS Clients: FWLC (192.168.200.38)

2. In *RADIUS clients*, select the FWLC client previously created.
3. In *RADIUS attribute criteria*, click *Next*. No RADIUS attribute criteria need to be specified in this configuration.
4. In *Authentication type*, select *Password/OTP authentication*. If EAP is being used for wireless authentication, enable *Accept EAP*, along with the desired EAP types.
5. In *Identity source*, select the realm for which user authentication is needed.
6. In *Authentication factors*, select *Verify all configured authentication factors*.
7. Review the *RADIUS response*, and save the policy.

## Creating the portal and access point on FortiAuthenticator

### To create a portal:

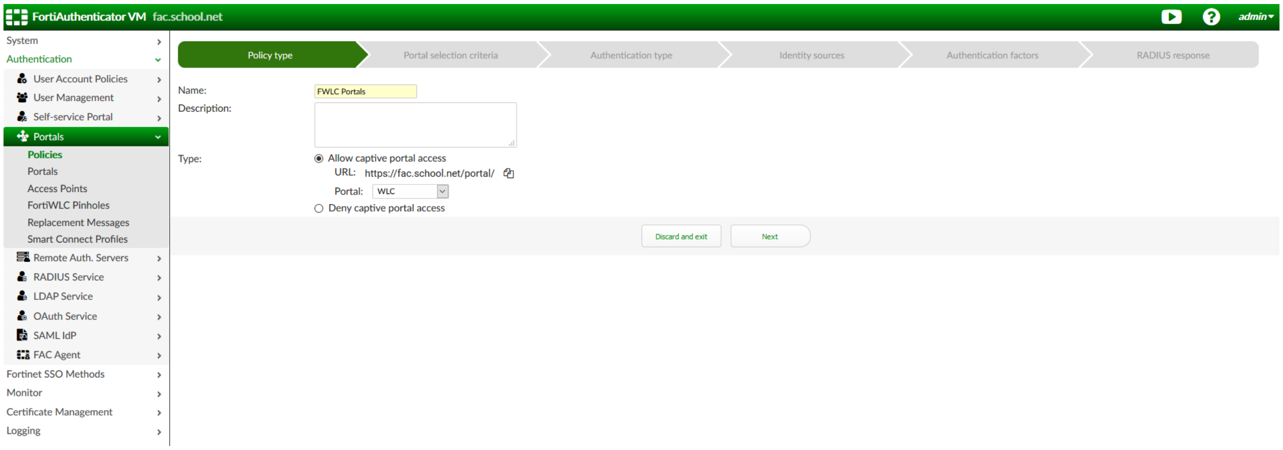
1. On the FortiAuthenticator, go to *Authentication* > *Portals* > *Portals*, and create a new portal.
2. Enter a name for the portal, and click *OK*.

**To create an access point:**

1. On FortiAuthenticator, go to *Authentication* > *Portals* > *Access Points*, and create a new access point.
2. Enter a name for the access point, and provide the client IP/Hostname from the FortiAP, and click *OK*.

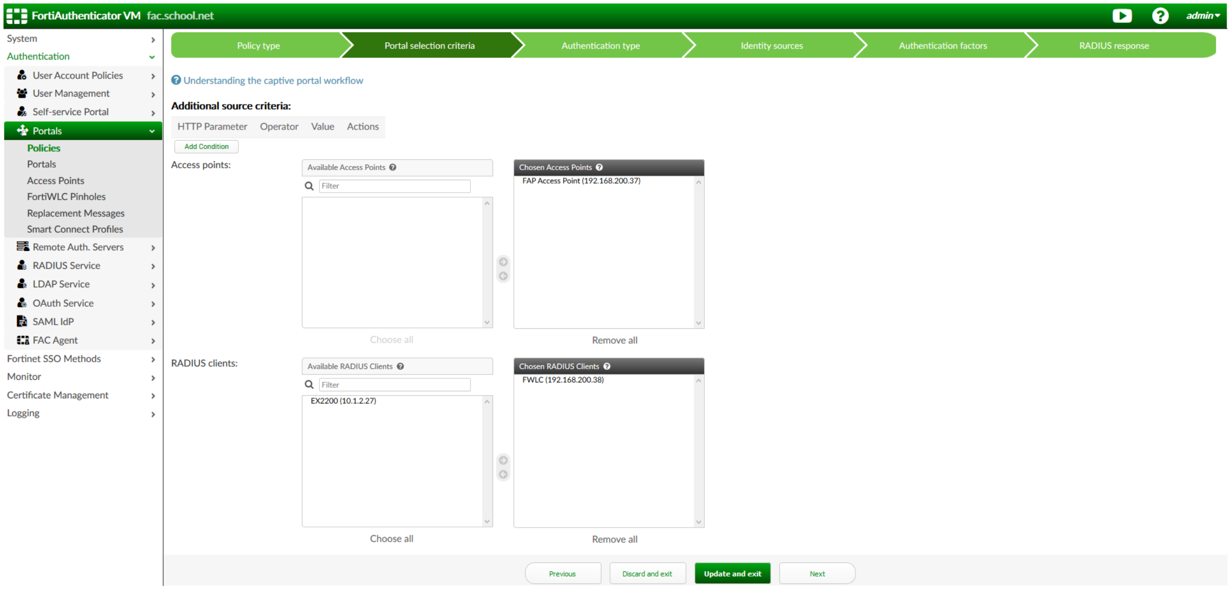
## Creating the portal policy on FortiAuthenticator

1. On the FortiAuthenticator, go to *Authentication* > *Portals* > *Policies*, and create a new policy.
   Enter a name for the policy, select *Allow captive portal access*, and choose the previously configured FortiWLC Portal.



Name: FWLC Portals
Description:
Type: ● Allow captive portal access
URL: https://fac.school.net/portal/
Portal: WLC
○ Deny captive portal access

2. In Portal selection criteria, configure the following:
   a. *Access points*: Select the previously configured FortiAP access point.
   b. *RADIUS clients*: Select the previously configured FortiWLC RADIUS client.



Additional source criteria:

| HTTP Parameter | Operator | Value | Actions |
|---|---|---|---|

Access points:
Available Access Points
Chosen Access Points: FAP Access Point (192.168.200.37)

RADIUS clients:
Available RADIUS Clients: EX2200 (10.1.2.27)
Chosen RADIUS Clients: FWLC (192.168.200.38)

3. In *Authentication type*, select *Password/OTP authentication* and *Local/remote user*.
4. In *Identity sources*, select the realm for which the user authentication is needed.
5. In *Authentication factors*, select *Verify all configured authentication factors*.
6. Review the RADIUS response and save your changes.

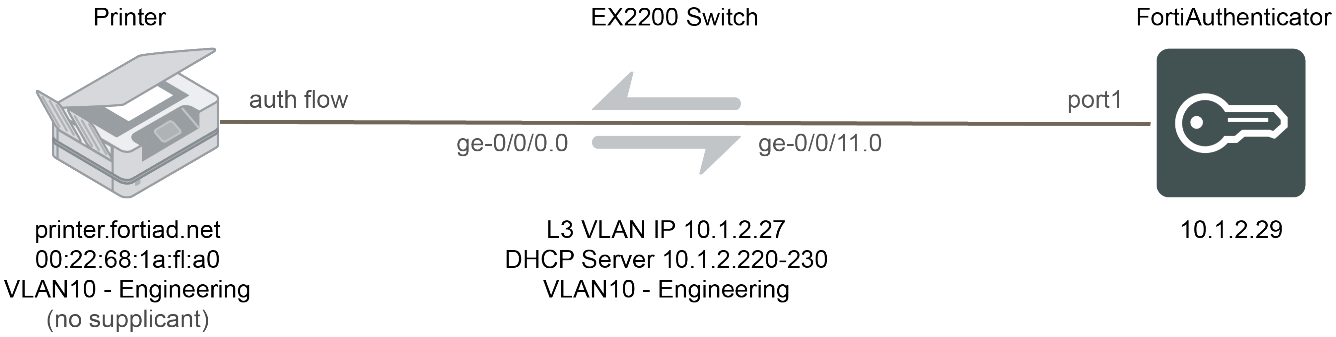
## Results

1. Connect a client to the SSID created on the FortiWLC, then log in to the portal with the correct username and password.
   On the FortiAuthenticator, you can go to *Authentication* > *User Management* > *Local Users* to create local user accounts.
2. To confirm the successful log in, on FortiAuthenticator, go to *Logging* > *Log Access* > *Logs*.
3. To confirm the successful log in, on FortiWLC, go to *Monitor* > *Devices* > *All Stations* and find the device showing the authenticated user.

# MAC authentication bypass

This section describes configuring MAC address bypass with FortiAuthenticator.

## MAC authentication bypass with dynamic VLAN assignment

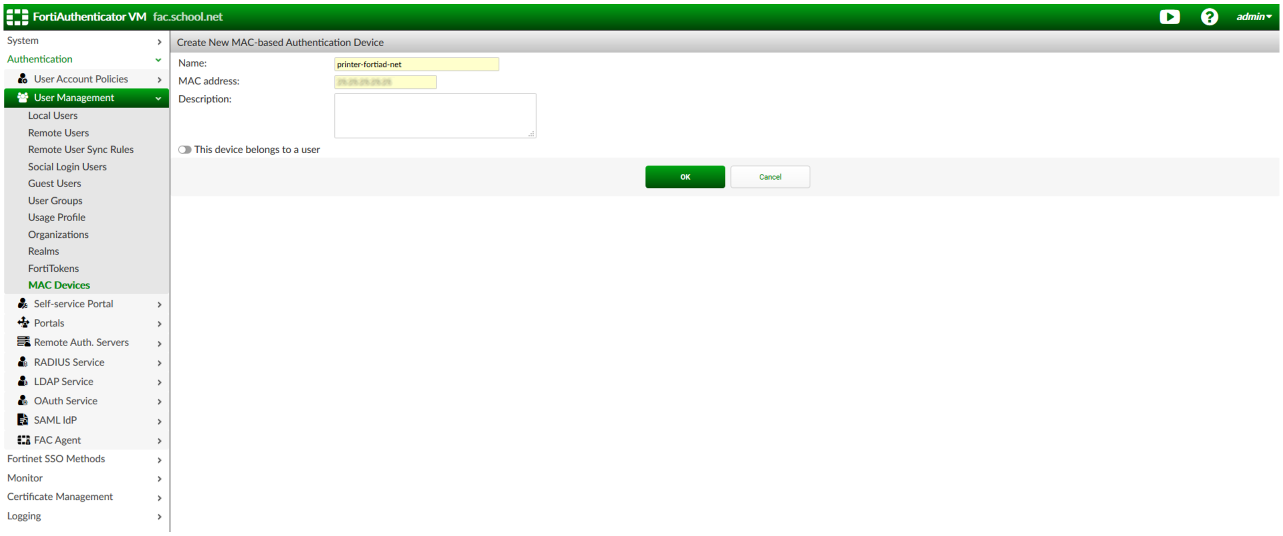


In this recipe, you will configure MAC authentication bypass (MAB) in a wired network with dynamic VLAN assignment.

The purpose of this recipe is to configure and demonstrate MAB with FortiAuthenticator, using a 3rd-party switch (EX2200) to confirm cross-vendor interoperability. The recipe also demonstrates dynamic VLAN allocation without a supplicant.

### Configuring MAC authentication bypass on the FortiAuthenticator

1. Go to *Authentication* > *User Management* > *MAC Devices* and create a new MAC-based device.
   Enter a name for the device along with the device's MAC address.
   Alternatively, you can use the *Import* option to import this information from a CSV file.



Create New MAC-based Authentication Device

Name: printer-fortiad-net

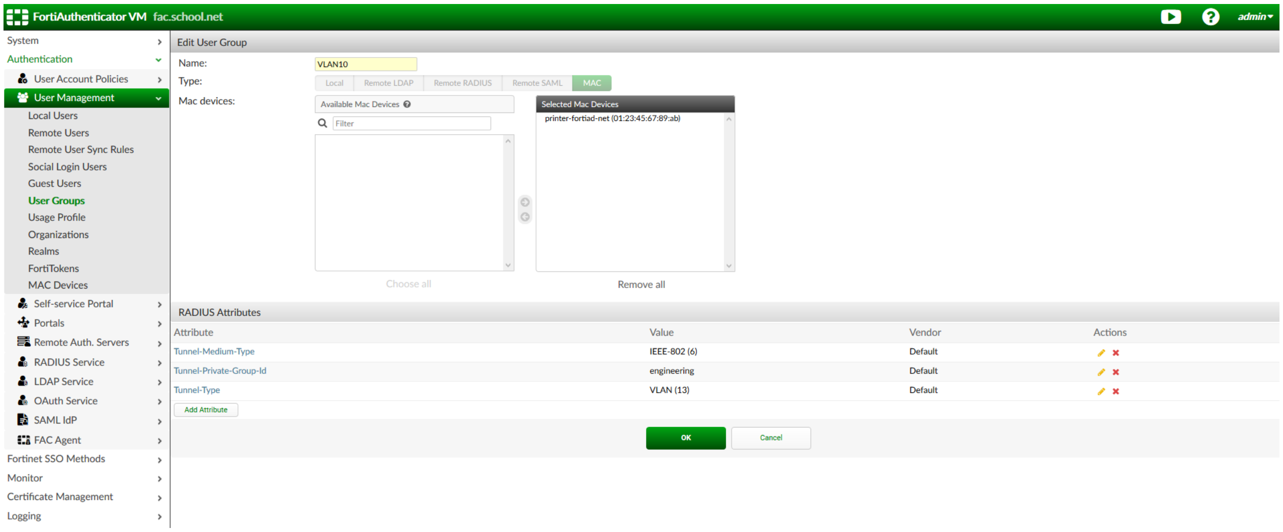
MAC address: [redacted]

Description:

○ This device belongs to a user

## Configuring the user group

1. Go to *Authentication* > *User Management* > *User Groups* and create a new user group. Select *MAC* as the type, and add the newly created MAC device. Click *OK*.
2. Enter the *RADIUS Attributes* as shown in the image below.



Edit User Group

Name: VLAN10

Type: Local | Remote LDAP | Remote RADIUS | Remote SAML | MAC

Mac devices:

Selected Mac Devices: printer-fortiad-net (01:23:45:67:89:ab)

RADIUS Attributes

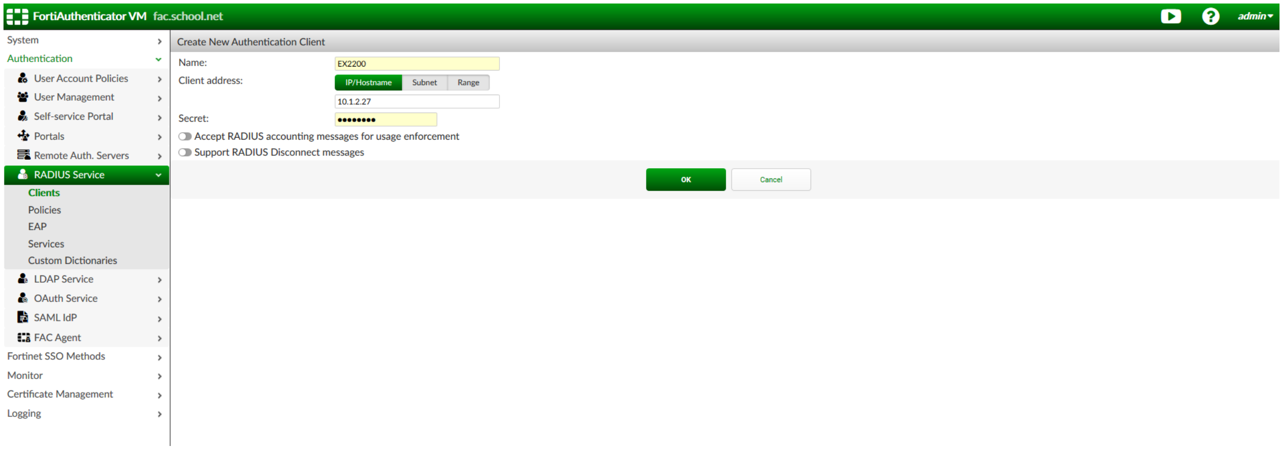
| Attribute | Value | Vendor | Actions |
|---|---|---|---|
| Tunnel-Medium-Type | IEEE-802 (6) | Default | ✎ ✖ |
| Tunnel-Private-Group-Id | engineering | Default | ✎ ✖ |
| Tunnel-Type | VLAN (13) | Default | ✎ ✖ |

RADIUS attributes can only be added after the group has been created.

## Configuring RADIUS settings on FortiAuthenticator

### To create the RADIUS client:

1. Go to *Authentication* > *RADIUS Service* > *Clients* and create a new RADIUS client. Configure the IP and shared secret from your switch, and click *OK*.



Create New Authentication Client

Name: EX2200

Client address: IP/Hostname | Subnet | Range

10.1.2.27

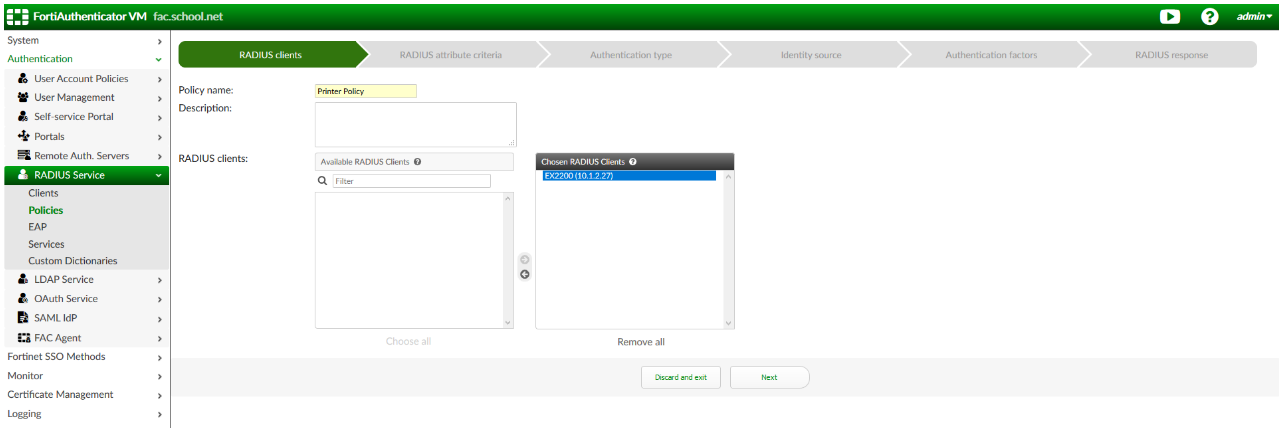
Secret: ••••••••

○ Accept RADIUS accounting messages for usage enforcement

○ Support RADIUS Disconnect messages

### To create the RADIUS policy:

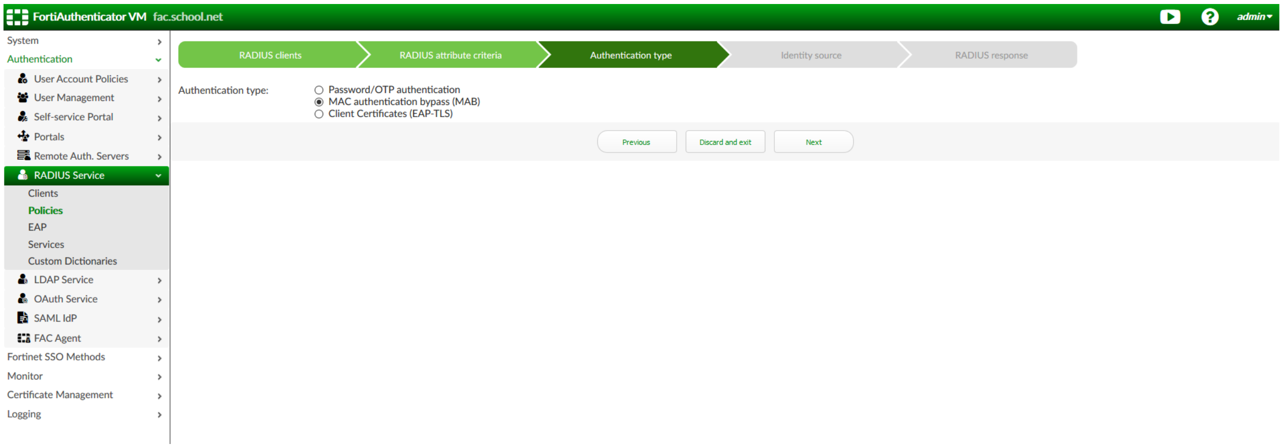
1. Go to *Authentication > RADIUS Service > Policies* and create a new RADIUS policy.
   In *RADIUS clients*, enter a policy name, and add the previously configured RADIUS client.



Policy name: Printer Policy
Description:
RADIUS clients: EX2200 (10.1.2.27)

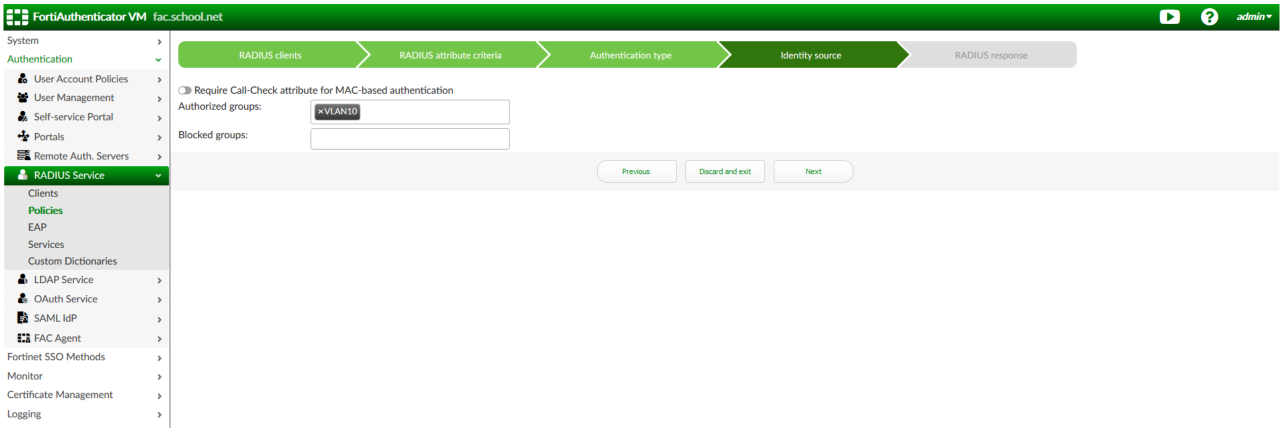
   *RADIUS attribute criteria* can be left blank.

2. In *Authentication type*, select *MAC authentication bypass (MAB)*.



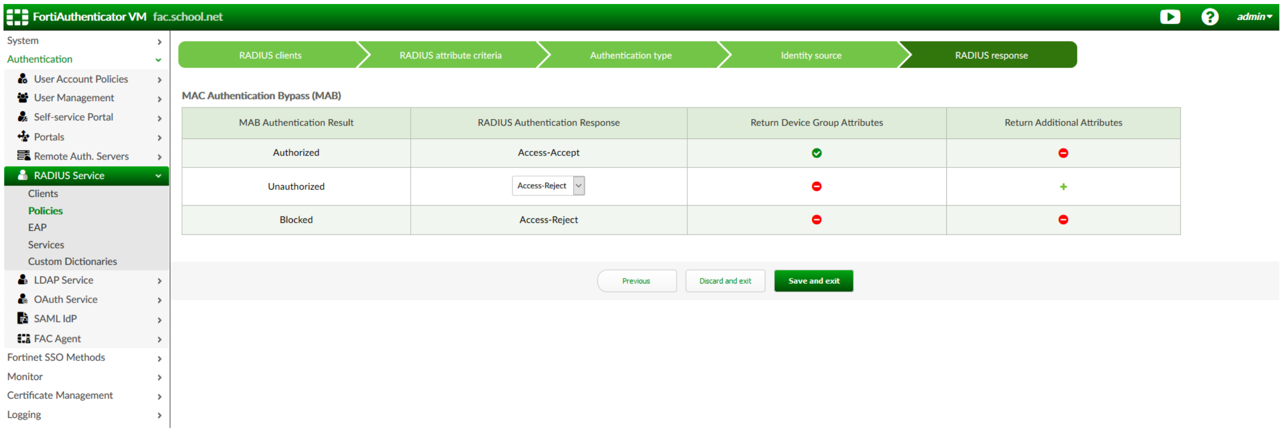
Authentication type:
○ Password/OTP authentication
● MAC authentication bypass (MAB)
○ Client Certificates (EAP-TLS)

3. In *Identity source*, add the previously configured MAC group to *Authorized groups*.



○ Require Call-Check attribute for MAC-based authentication
Authorized groups: ×VLAN10
Blocked groups:

4. Configure the RADIUS response to reject unauthorized requests, and click *Save and exit*.



MAC Authentication Bypass (MAB)

| MAB Authentication Result | RADIUS Authentication Response | Return Device Group Attributes | Return Additional Attributes |
|---|---|---|---|
| Authorized | Access-Accept | ✓ | ⊖ |
| Unauthorized | Access-Reject | ⊖ | + |
| Blocked | Access-Reject | ⊖ | ⊖ |

## Configuring the 3rd-party switch

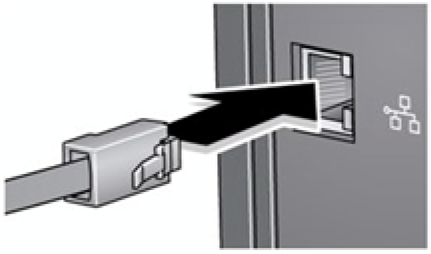
The switch configuration provided below is intended for demonstration only. Your switch configuration is likely to differ significantly.

```
set system services dhcp pool 10.1.2.0/24 address-range low 10.1.2.220
set system services dhcp pool 10.1.2.0/24 address-range high 10.1.2.230
set system services dhcp pool 10.1.2.0/24 domain-name fortiad.net
set system services dhcp pool 10.1.2.0/24 name-server 10.1.2.122
set system services dhcp pool 10.1.2.0/24 router 10.1.2.1
set system services dhcp pool 10.1.2.0/24 server-identifier 10.1.2.27
set interfaces ge-0/0/0 unit 0 family ethernet-switching #no vlan assigned to printer
     port, this will be allocated based on Group attributes
set interfaces ge-0/0/11 unit 0 family ethernet-switching vlan members engineering
     #interface used to communicate with FortiAuthenticator
set interfaces vlan unit 10 family inet address 10.1.2.27/24
set protocols dot1x authenticator authentication-profile-name profile1
set protocols dot1x authenticator interface ge-0/0/0.0 mac-radius restrict #forces mac
     address as username over RADIUS
set access radius-server 10.1.2.29 secret "$9$kmfzIRSlvLhSLNVYZGk.Pf39"
set access profile profile1 authentication-order radius
set access profile profile1 radius authentication-server 10.1.2.29
set vlans engineering vlan-id 10
set vlans engineering l3-interface vlan.10
```

No configuration is required on the endpoint.

## Results

1. Connect the wired device (in this case, the printer).



2. Using `tcpdump`, FortiAuthenticator shows receipt of an incoming authentication request (`execute tcpdump host 10.1.2.27 -nnvvXS`):

```
tcpdump: listening on port1, link-type EN10MB (Ethernet), capture size 262144 bytes
17:36:19.110399 IP (tos 0x0, ttl 64, id 18417, offset 0, flags [none], proto UDP (17),
     length 185)
   10.1.2.27.60114 > 10.1.2.29.1812: [udp sum ok] RADIUS, length: 157
      Access-Request (1), id: 0x08, Authenticator: b77fe0657747891fc8d53ae0ad2b0e7a
         User-Name Attribute (1), length: 14, Value: 0022681af1a0 #Switch forces username
               to be endpoint MAC address, no configuration needed on endpoint
            0x0000: 3030 3232 3638 3161 6631 6130
         NAS-Port Attribute (5), length: 6, Value: 70
            0x0000: 0000 0046
         EAP-Message Attribute (79), length: 19, Value: .
            0x0000: 0200 0011 0130 3032 3236 3831 6166 3161
            0x0010: 30
         Message-Authenticator Attribute (80), length: 18, Value: .y{.j.%..9|es.'x
            0x0000: a679 7b82 6344 2593 f639 7c65 73eb 2778
         Acct-Session-Id Attribute (44), length: 24, value: 802.1x81fa002500078442
            0x0000: 384f 322e 3178 3831 6661 3030 3235 3030
            0x0010: 3037 3834 3432
         NAS-Port-rd Attribute (87), length: 12, Value: ge-0/0/0.0
            0x0000: 6765 2430 2f30 2f30 2e30
         Calling-Station-Id Attribute (31), length: 19, value: 00-22-68-1a-fl-a0
            0x0000: 3030 2032 3220 3638 2031 6120 6631 2461
            0x0010: 30
         Called-Station-Id Attribute (30), length: 19, Value: a8-40-e5-b0-21-80
            0x0000: 6138 2464 3024 6535 2d62 302d 3231 2d38
            0x0010: 30
         NAS-Port-Type Attribute (61), length: 6, value: Ethernet
            0x0000: 0000 000f
```

3. On the FortiAuthenticator, go to *Logging* > *Log Access* > *Logs* to verify the device authentication.
   The Debug Log (at `https://<fac-ip>/debug/radius`) should also confirm successful authentication.

4. Continuing with the `tcpdump`, authentication is accepted from FortiAuthenticator and authorization attributes returned to the switch:

```
17:36:19.115264 IP (tos Ox0, ttl 64, id 49111, offset 0, flags [none], proto UDP (17),
     length 73)
   10.1.2.29.1812 > 10.1.2.27.60114: (bad udp cksum 0x1880 -> 0x5ccel] RADIUS, length: 45
      Access-Accept (2), id: 0x08, Authenticator: b5c7b1bb5a316fb483a622eaae58ccc2
         Tunnel-Type Attribute (64), length: 6, Value: Tag[Unused] #13
            0x0000: 0000 000d
         Tunnel-Medium-Type Attribute (65), length: 6, Value: Tag[Unused] 802
            0x0000: 0000 0006
         Tunnel-Private-Group-ID Attribute (81), length: 13, Value: engineering
```

```
          0x0000: 656e 6769 6e65 6572 696e 67
     0x0000: 4500 0049 bfd7 0000 4011 a293 0a01 021d E..I....@ .......
     0x0010: 0a01 021b 0714 ead2 0035 1880 0208 002d 5
     0x0020: b5c7 blbb 5a31 6fb4 83a6 22ea ae58 ccc2 ....21o..."..X..
     0x0030: 4006 0000 0000 4106 0000 0006 510d 656e @ A Q en
     0x0040: 6769 6e65 6572 696e 67 gineering
```

5. **Post-authentication DHCP transaction is picked up by FortiAuthenticator**

   The Switch CLI shows a successful dot1x session:

   ```
   root# run show dotlx interface ge-0/0/0.0
   802.1X Information:
   Interface Role State MAC address User
   ge-0/0/0.0 Authenticator Authenticated 00:22:68:1A:F1:A0 0022681af1a0
   ```

   The MAC address interface has been dynamically placed into correct VLAN:

   ```
   root# run show vlans engineering
   Name Tag Interfaces
   engineering 10
        ge-0/0/0.0*, ge-0/0/11.0*
   ```

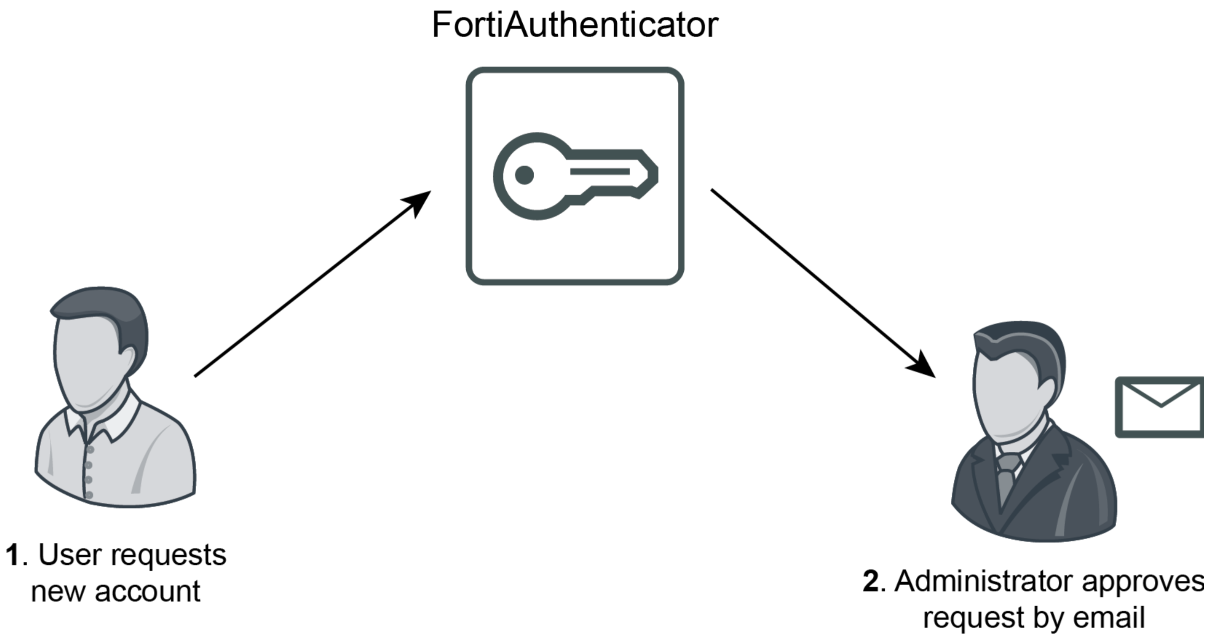
   Additionally, the printer shows as available on the network:

   ```
   root# run show arp interface vlan.10
   MAC Address Address Name Interface Flags
   00:0c:29:5b:90:68 10.1.2.29 10.1.2.29 vlan.10 none
   6c:70:9f:d6:ae:al 10.1.2.220 10.1.2.220 vlan.10 none
   b8:53:ac:4a:d5:f5 10.1.2.221 10.1.2.221 vlan.10 none
   00:22:68:1a:fl:a0 10.1.2.224 10.1.2.224 vlan.10 none
   a4:c3:61:24:b9:07 10.1.2.228 10.1.2.228 vlan.10 none
   Total entries: 5

   {master:0}[edit]
   root* run ping 10.1.2.224
   PING 10.1.2.224 (10.1.2.224): 56 data bytes
   64 bytes from 10.1.2.224: icmp_seq=0 tt1=128 time=2.068 ms
   64 bytes from 10.1.2.224: icmp_seq=1 tt1=128 time=2.236 ms
   64 bytes from 10.1.2.224: icmp_seq=2 tt1=128 time=2.699 ms

   --- 10.1.2.224 ping statistics ---
   3 packets transmitted, 3 packets received, 0% packet loss
   round-trip min/avg/max/stddev = 2.068/2.334/2.699/0.267 ms
   ```

# Self-service Portal

Configure general self-service portal options, including access control settings, self-registration options, replacement messages, and device self-enrollment settings.

## FortiAuthenticator user self-registration


FortiAuthenticator
1. User requests new account
2. Administrator approves request by email

For this recipe, you will configure the FortiAuthenticator self-service portal to allow users to add their own account and create their own passwords.

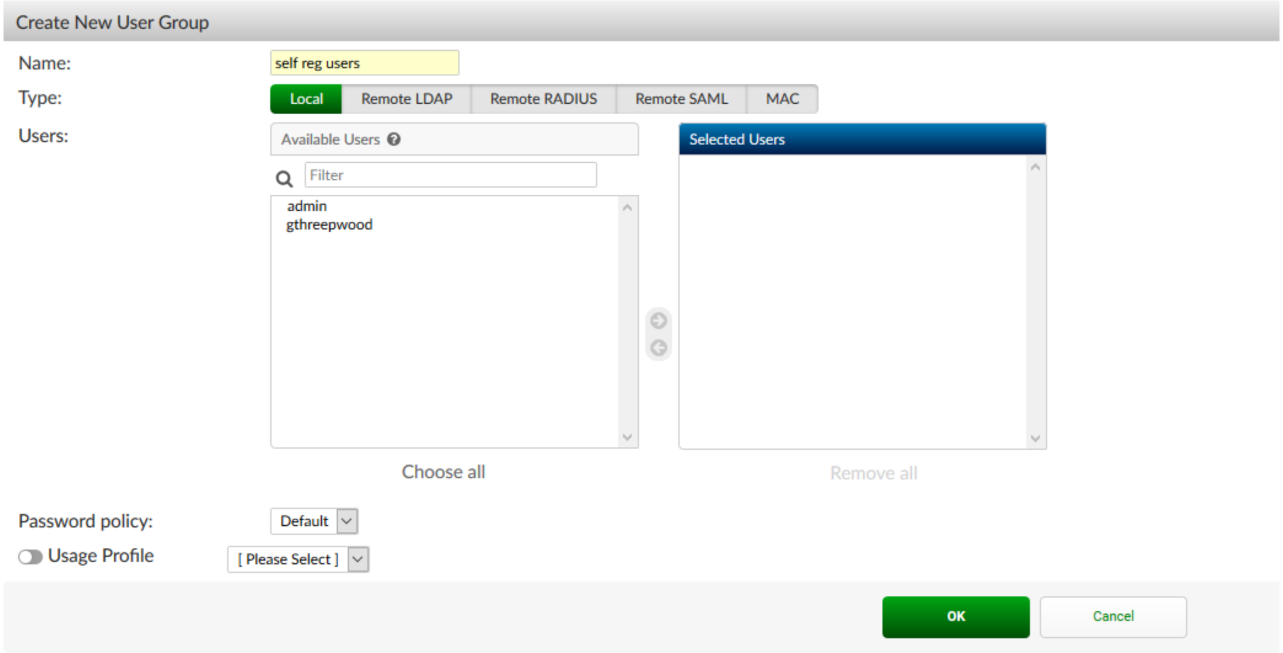
Note that enabling and using administrator approval requires the use of an email server, or SMTP server. Since administrators will approve requests by email, this recipe describes how to add an email server to your FortiAuthenticator. You will create and use a new server instead of the unit's default server.

### Creating a self-registration user group

**To create a self-registration user group:**

1. Go to *Authentication* > *User Management* > *User Groups* and create a new user group for self-registering users. Enter a *Name* and select *OK*. Users will be added to this group once they register through the self-registration

portal.



Create New User Group

Name: self reg users

Type: Local | Remote LDAP | Remote RADIUS | Remote SAML | MAC

Users: Available Users

Filter

admin
gthreepwood

Selected Users

Choose all

Remove all

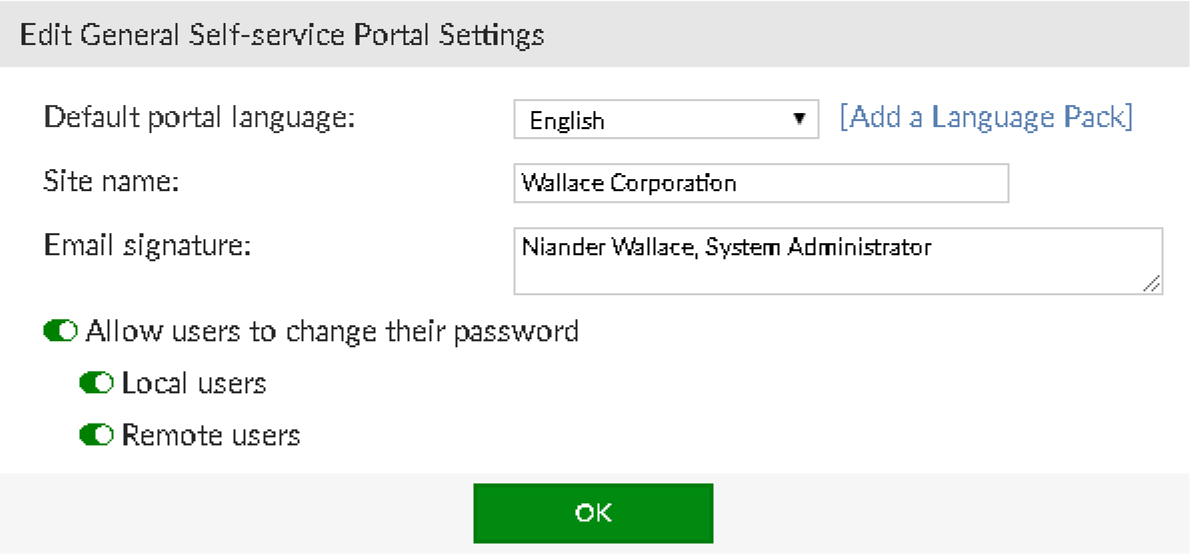
Password policy: Default

Usage Profile [ Please Select ]

## Enabling self-registration

**To enable self-registration:**

1. Go to *Authentication* > *Self service Portal* > *General*.
   Enter a *Site name*, add an *Email signature* that you would like appended to the end of outgoing emails, and select *OK*.



Edit General Self-service Portal Settings

Default portal language: English [Add a Language Pack]

Site name: Wallace Corporation

Email signature: Niander Wallace, System Administrator

Allow users to change their password

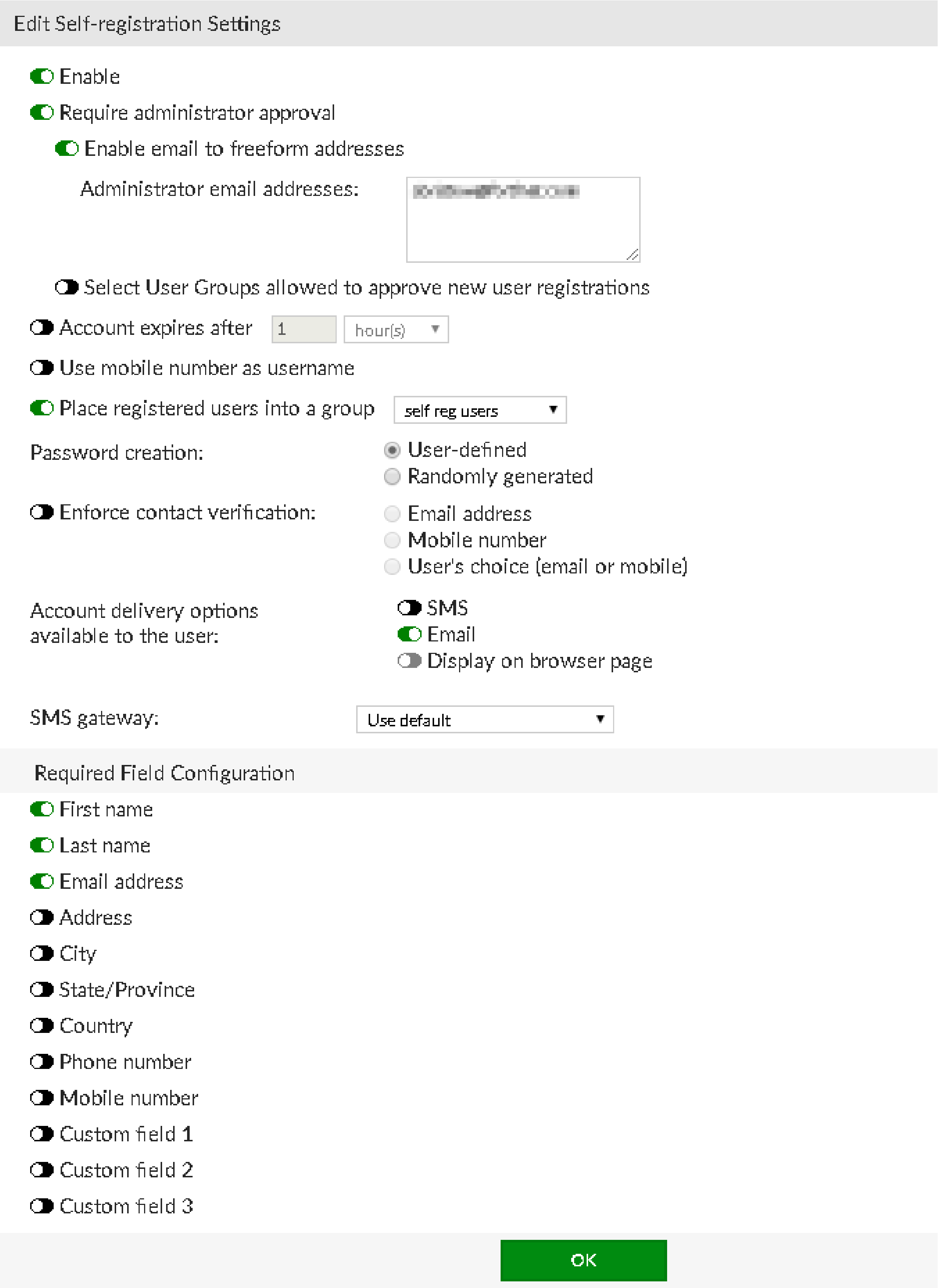
Local users

Remote users

2. Then go to *Authentication* > *Self-service Portal* > *Self-registration* and select *Enable*.
   Enable *Require administrator approval* and *Enable email to freeform addresses*, and enter the administrator's email address in the field provided.

Enable *Place registered users into a group*, select the user group created earlier, and configure basic account information to be sent to the user by *Email*.

Open the *Required Field Configuration* dropdown and enable *First name*, *Last name*, and *Email address*.



Edit Self-registration Settings

☑ Enable

☑ Require administrator approval

☑ Enable email to freeform addresses

Administrator email addresses: [redacted]

☐ Select User Groups allowed to approve new user registrations

☐ Account expires after 1 hour(s)

☐ Use mobile number as username

☑ Place registered users into a group: self reg users

Password creation:
● User-defined
○ Randomly generated

☐ Enforce contact verification:
○ Email address
○ Mobile number
○ User's choice (email or mobile)

Account delivery options available to the user:
☐ SMS
☑ Email
☐ Display on browser page

SMS gateway: Use default

Required Field Configuration

☑ First name

☑ Last name

☑ Email address

☐ Address

☐ City

☐ State/Province

☐ Country

☐ Phone number

☐ Mobile number

☐ Custom field 1

☐ Custom field 2

☐ Custom field 3

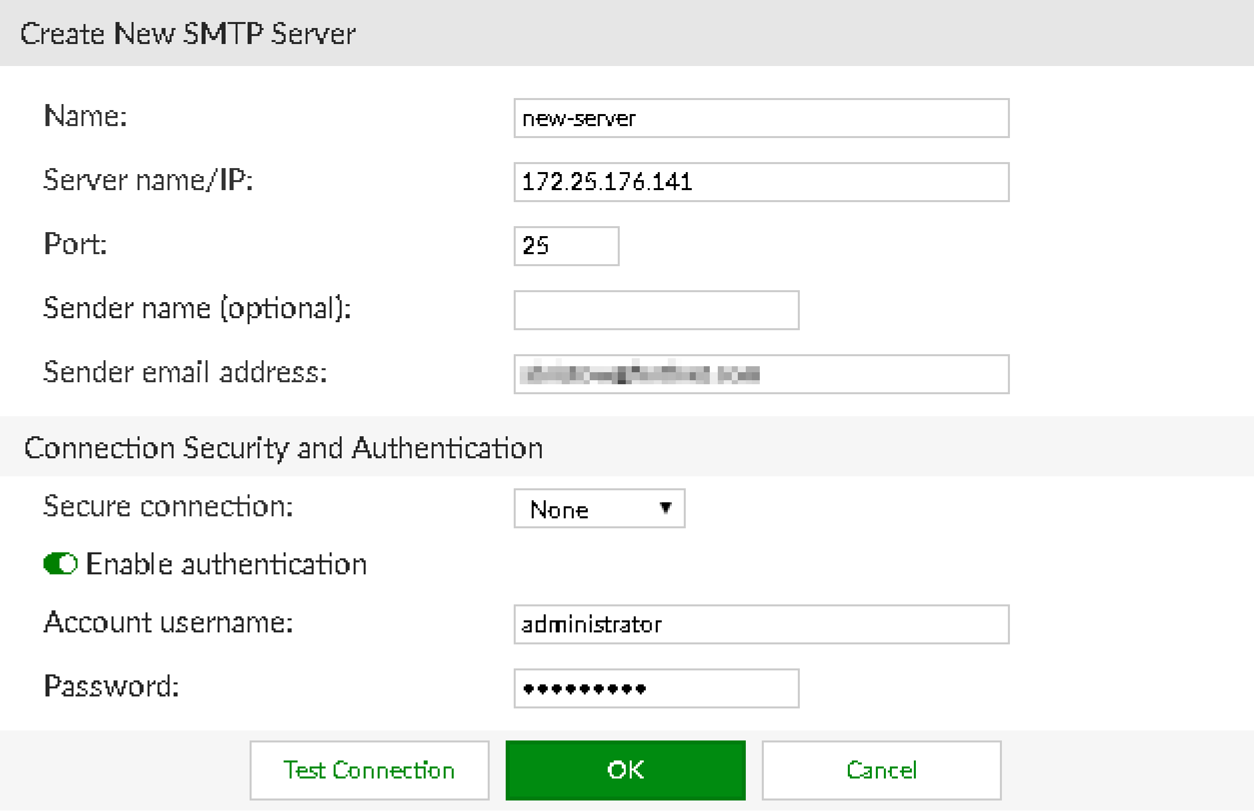
## Creating a new SMTP server

**To create a new SMTP server:**

1. Go to *System* > *Messaging* > *SMTP Servers* and create a new email server for your users.
   Enter a *Name*, the IP address of the FortiAuthenticator, and leave the default port value (`25`).

   Enter the administrator's email address, *Account username*, and *Password*.

   Note that, for the purpose of this recipe, *Secure connection* will not be set to *STARTTLS* as a signed CA certificate would be required.



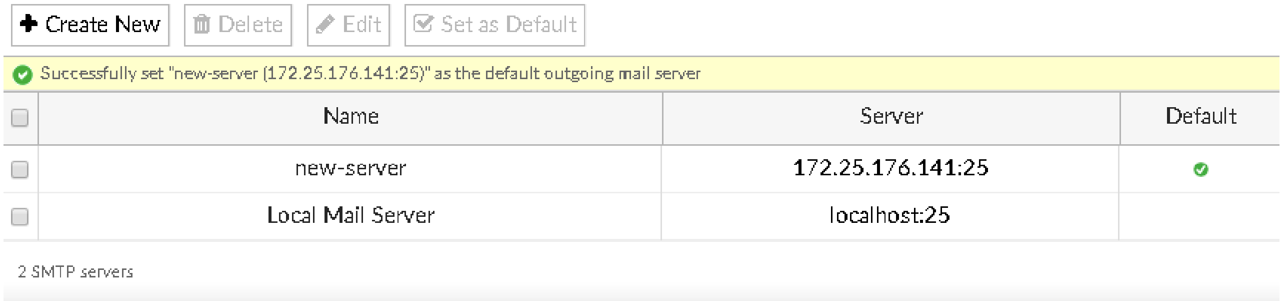
Create New SMTP Server

| | |
|---|---|
| Name: | new-server |
| Server name/IP: | 172.25.176.141 |
| Port: | 25 |
| Sender name (optional): | |
| Sender email address: | [redacted] |

Connection Security and Authentication

| | |
|---|---|
| Secure connection: | None ▼ |
| Enable authentication | ● |
| Account username: | administrator |
| Password: | •••••••••• |

2. Once created, highlight the new server and select *Set as Default*.
   The new SMTP server will now be used for future user registration.



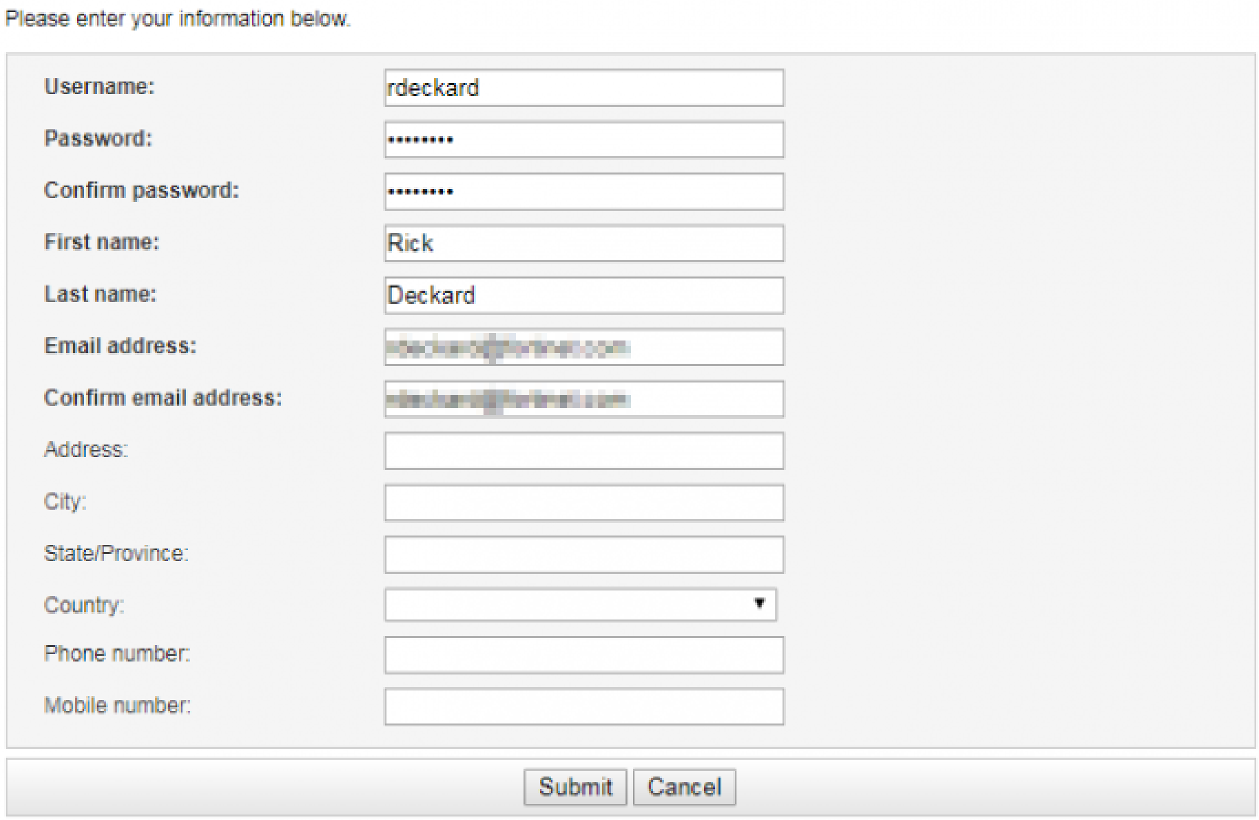
✓ Successfully set "new-server (172.25.176.141:25)" as the default outgoing mail server

| □ | Name | Server | Default |
|---|---|---|---|
| □ | new-server | 172.25.176.141:25 | ✓ |
| □ | Local Mail Server | localhost:25 | |

2 SMTP servers

## Results - Self-registration

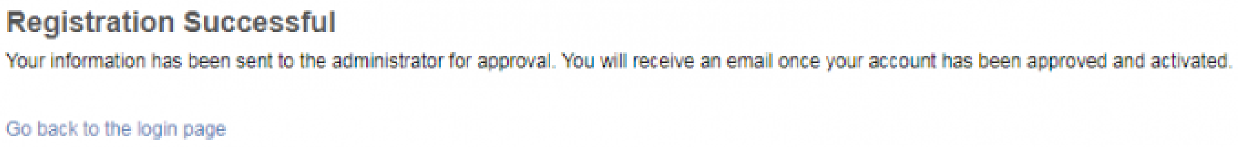
1. When the user visits the login page, *https://<FortiAuthenticator-IP>/auth/register/*, they can click the *Register* button, where they will be prompted to enter their information.
   They will need to enter and confirm a *Username*, *Password*, *First name*, *Last name*, and *Email address*. These are the only required fields, as configured in the FortiAuthenticator earlier.
   Select *Submit*.



Please enter your information below.

| | |
|---|---|
| **Username:** | rdeckard |
| **Password:** | •••••••• |
| **Confirm password:** | •••••••• |
| **First name:** | Rick |
| **Last name:** | Deckard |
| **Email address:** | [redacted] |
| **Confirm email address:** | [redacted] |
| Address: | |
| City: | |
| State/Province: | |
| Country: | ▾ |
| Phone number: | |
| Mobile number: | |

2. The user's registration is successful, and their information has been sent to the administrator for approval.

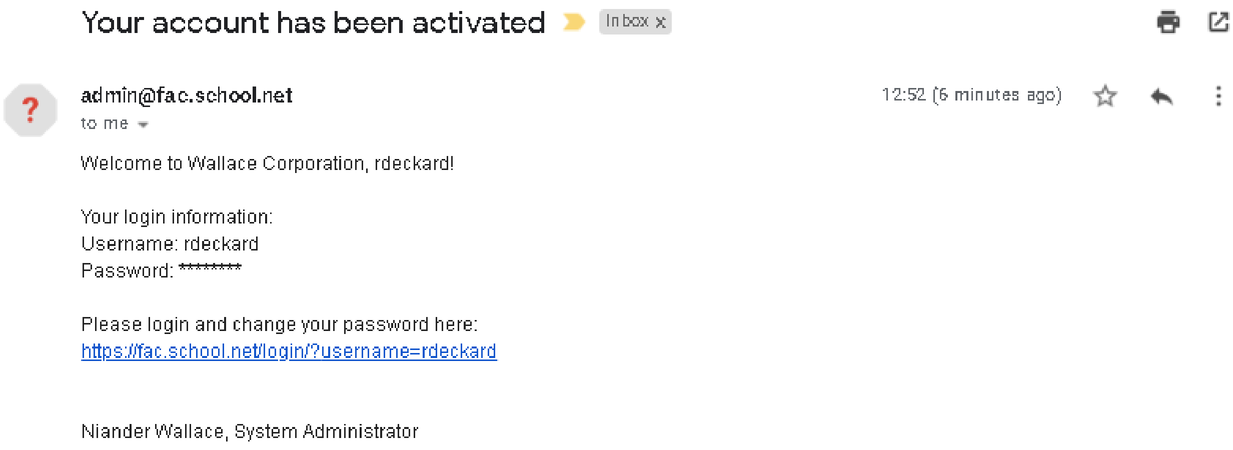


**Registration Successful**

Your information has been sent to the administrator for approval. You will receive an email once your account has been approved and activated.

Go back to the login page

3. When the administrator has enabled the user’s account, the user will receive an activation welcome email. The user's login information will be listed.



Your account has been activated

admin@fac.school.net

to me

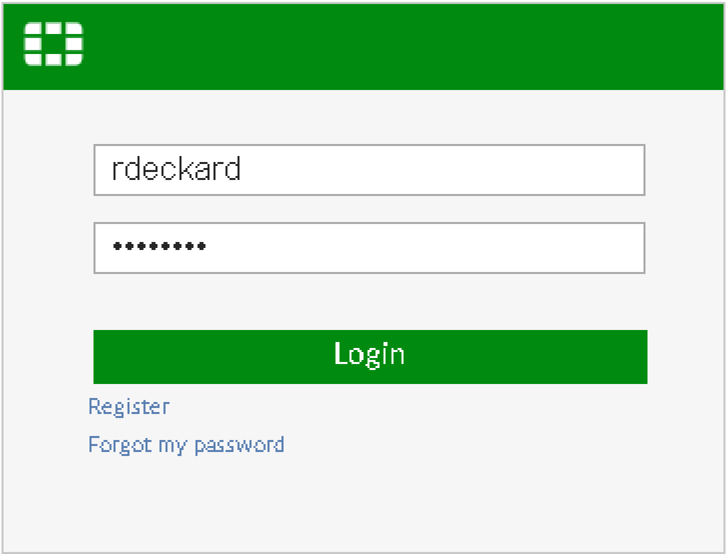
Welcome to Wallace Corporation, rdeckard!

Your login information:
Username: rdeckard
Password: ********

Please login and change your password here:
https://fac.school.net/login/?username=rdeckard

Niander Wallace, System Administrator

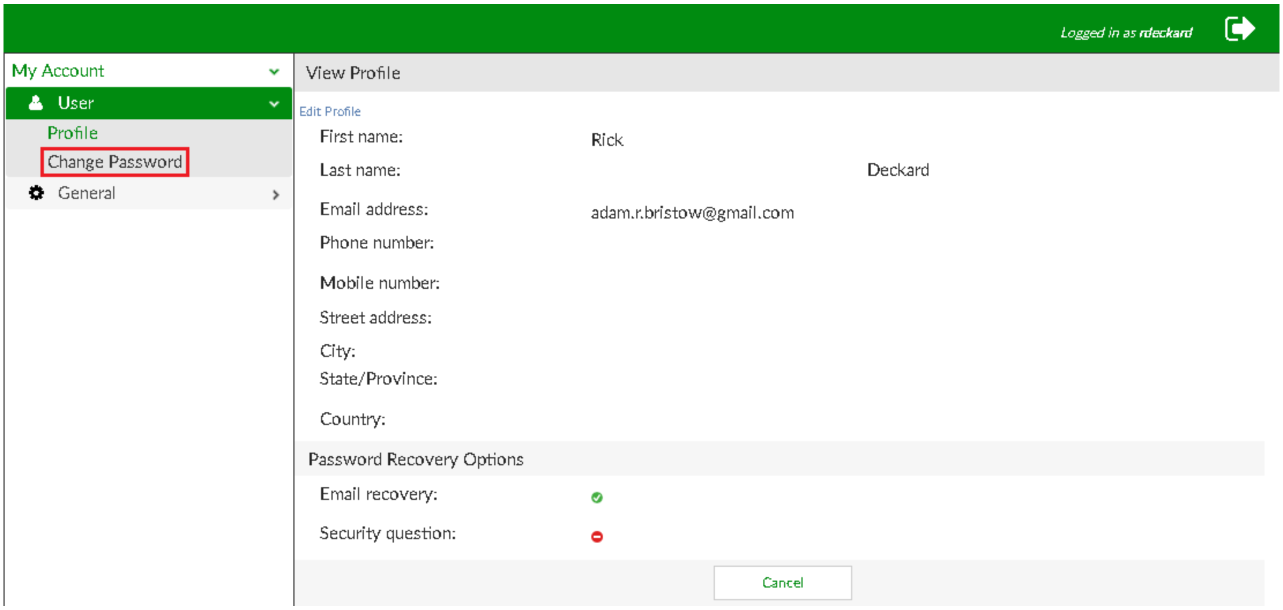
4. Select the link and log in to the user's portal.



rdeckard

•••••••••

5. The user is now logged into their account where they can review their information.
   As recommended in the user’s welcome email, the user may change their password. However, this is optional.



View Profile

Edit Profile

First name: Rick

Last name: Deckard

Email address: adam.r.bristow@gmail.com

Phone number:

Mobile number:

Street address:

City:

State/Province:

Country:

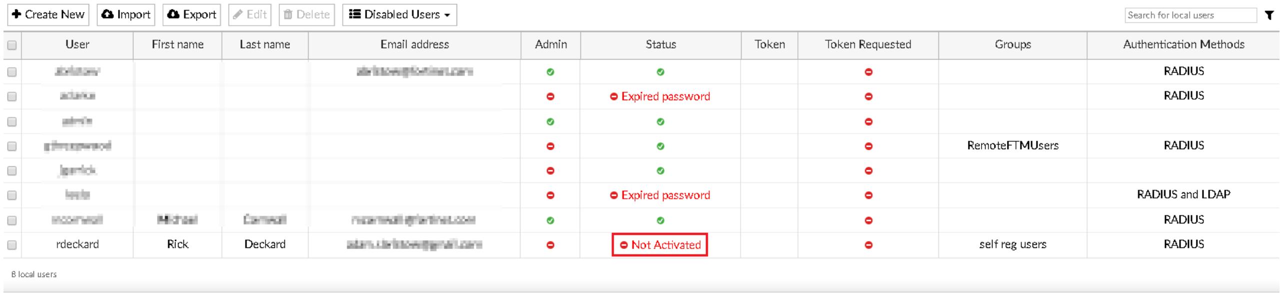
Password Recovery Options

Email recovery: ✓

Security question: ⊖

## Results - Administrator approval

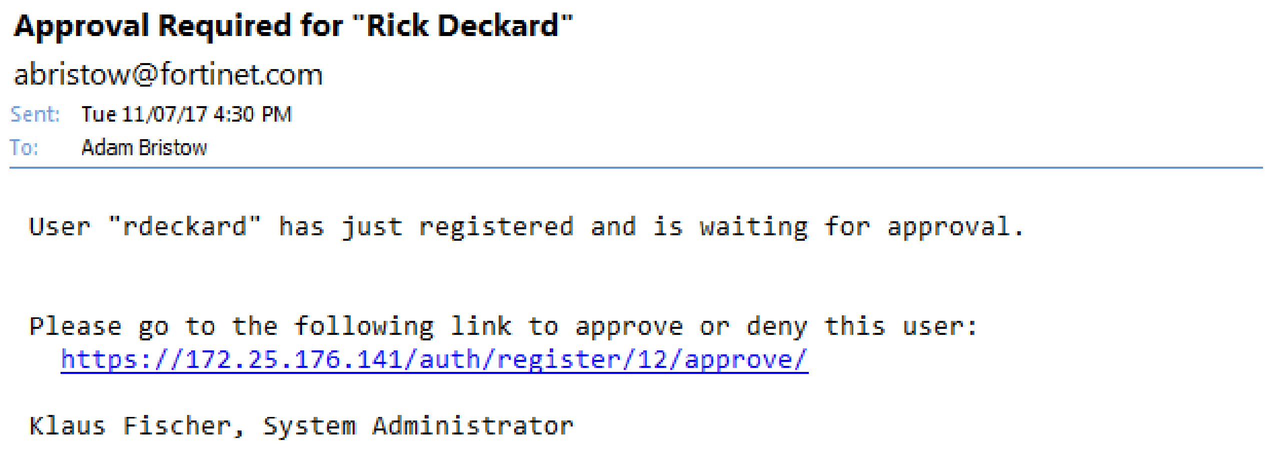
1. After receiving the user's registration request, in the FortiAuthenticator as the administrator, go to *Authentication > User Management > Local Users*. The user has been added, but their *Status* is listed as *Not Activated*.



| □ | User | First name | Last name | Email address | Admin | Status | Token | Token Requested | Groups | Authentication Methods |
|---|---|---|---|---|---|---|---|---|---|---|
| □ | [redacted] | | | [redacted] | ✓ | ✓ | | ⊖ | | RADIUS |
| □ | [redacted] | | | | ⊖ | ⊖ Expired password | | ⊖ | | RADIUS |
| □ | [redacted] | | | | ✓ | ✓ | | ⊖ | | |
| □ | [redacted] | | | | ⊖ | ✓ | | ⊖ | RemoteFTMUsers | RADIUS |
| □ | [redacted] | | | | ⊖ | ✓ | | ⊖ | | |
| □ | [redacted] | | | | ⊖ | ⊖ Expired password | | ⊖ | | RADIUS and LDAP |
| □ | [redacted] | [redacted] | [redacted] | [redacted] | ✓ | ✓ | | ⊖ | | RADIUS |
| □ | rdeckard | Rick | Deckard | [redacted] | ⊖ | ⊖ Not Activated | | ⊖ | self reg users | RADIUS |

8 local users

2. In the administrator's email account, open the user's *Approval Required* email. The user's full name will appear in the email's subject, along with their username in the email's body.
Select the link to approve or deny the user.



**Approval Required for "Rick Deckard"**

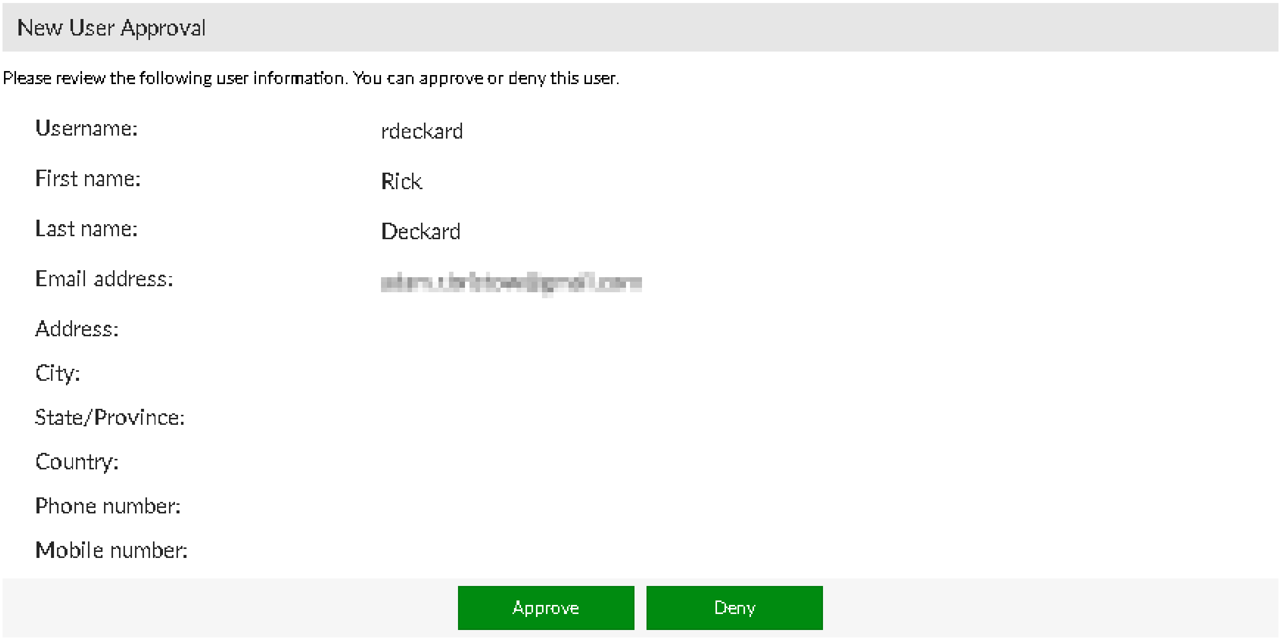
abristow@fortinet.com

Sent: Tue 11/07/17 4:30 PM

To: Adam Bristow

```
User "rdeckard" has just registered and is waiting for approval.


Please go to the following link to approve or deny this user:
  https://172.25.176.141/auth/register/12/approve/

Klaus Fischer, System Administrator
```

3. The link will take you to the *New User Approval* page, where you can review the user's information and either approve or deny the user's full registration.
   Select *Approve*.

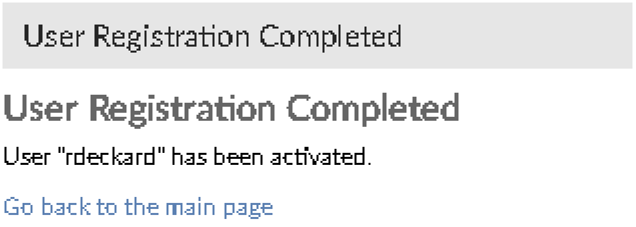


New User Approval

Please review the following user information. You can approve or deny this user.

| | |
|---|---|
| Username: | rdeckard |
| First name: | Rick |
| Last name: | Deckard |
| Email address: | [redacted] |
| Address: | |
| City: | |
| State/Province: | |
| Country: | |
| Phone number: | |
| Mobile number: | |

4. The user has now been approved and activated by the administrator.

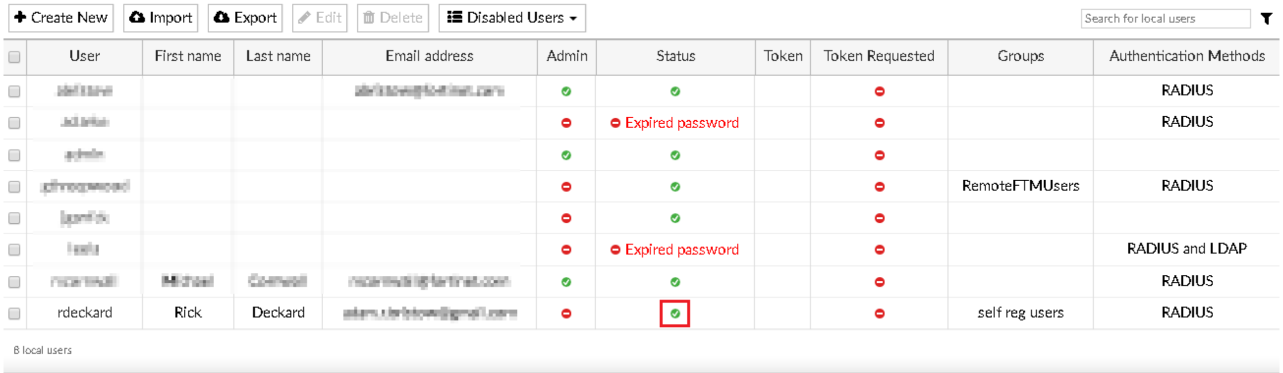


User Registration Completed

User Registration Completed

User "rdeckard" has been activated.

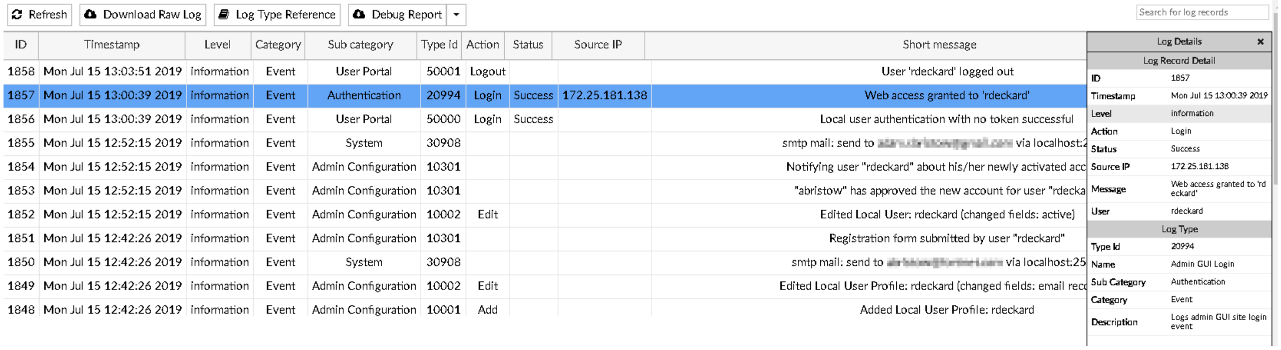
This can be confirmed by going back to *Authentication* > *User Management* > *Local Users*. The user's **Status** has changed to **Enabled**.



| □ | User | First name | Last name | Email address | Admin | Status | Token | Token Requested | Groups | Authentication Methods |
|---|---|---|---|---|---|---|---|---|---|---|
| □ | [redacted] | | | [redacted] | ✓ | ✓ | | ⊖ | | RADIUS |
| □ | [redacted] | | | | ⊖ | ⊖ Expired password | | ⊖ | | RADIUS |
| □ | [redacted] | | | | ✓ | ✓ | | ⊖ | | |
| □ | [redacted] | | | | ⊖ | ✓ | | ⊖ | RemoteFTMUsers | RADIUS |
| □ | [redacted] | | | | ⊖ | ✓ | | ⊖ | | |
| □ | [redacted] | | | | ⊖ | ⊖ Expired password | | ⊖ | | RADIUS and LDAP |
| □ | [redacted] | [redacted] | [redacted] | [redacted] | ✓ | ✓ | | ⊖ | | RADIUS |
| □ | rdeckard | Rick | Deckard | [redacted] | ⊖ | ✓ | | ⊖ | self reg users | RADIUS |

8 local users

5. You can also go to *Logging* > *Log Access* > *Logs* to view the successful login of the user and more information.



| ID | Timestamp | Level | Category | Sub category | Type id | Action | Status | Source IP | Short message |
|---|---|---|---|---|---|---|---|---|---|
| 1858 | Mon Jul 15 13:03:51 2019 | information | Event | User Portal | 50001 | Logout | | | User 'rdeckard' logged out |
| 1857 | Mon Jul 15 13:00:39 2019 | information | Event | Authentication | 20994 | Login | Success | 172.25.181.138 | Web access granted to 'rdeckard' |
| 1856 | Mon Jul 15 13:00:39 2019 | information | Event | User Portal | 50000 | Login | Success | | Local user authentication with no token successful |
| 1855 | Mon Jul 15 12:52:15 2019 | information | Event | System | 30908 | | | | smtp mail: send to [redacted] via localhost:2 |
| 1854 | Mon Jul 15 12:52:15 2019 | information | Event | Admin Configuration | 10301 | | | | Notifying user "rdeckard" about his/her newly activated acc |
| 1853 | Mon Jul 15 12:52:15 2019 | information | Event | Admin Configuration | 10301 | | | | "abristow" has approved the new account for user "rdecka |
| 1852 | Mon Jul 15 12:52:15 2019 | information | Event | Admin Configuration | 10002 | Edit | | | Edited Local User: rdeckard (changed fields: active) |
| 1851 | Mon Jul 15 12:42:26 2019 | information | Event | Admin Configuration | 10301 | | | | Registration form submitted by user "rdeckard" |
| 1850 | Mon Jul 15 12:42:26 2019 | information | Event | System | 30908 | | | | smtp mail: send to [redacted] via localhost:25 |
| 1849 | Mon Jul 15 12:42:26 2019 | information | Event | Admin Configuration | 10002 | Edit | | | Edited Local User Profile: rdeckard (changed fields: email rec |
| 1848 | Mon Jul 15 12:42:26 2019 | information | Event | Admin Configuration | 10001 | Add | | | Added Local User Profile: rdeckard |

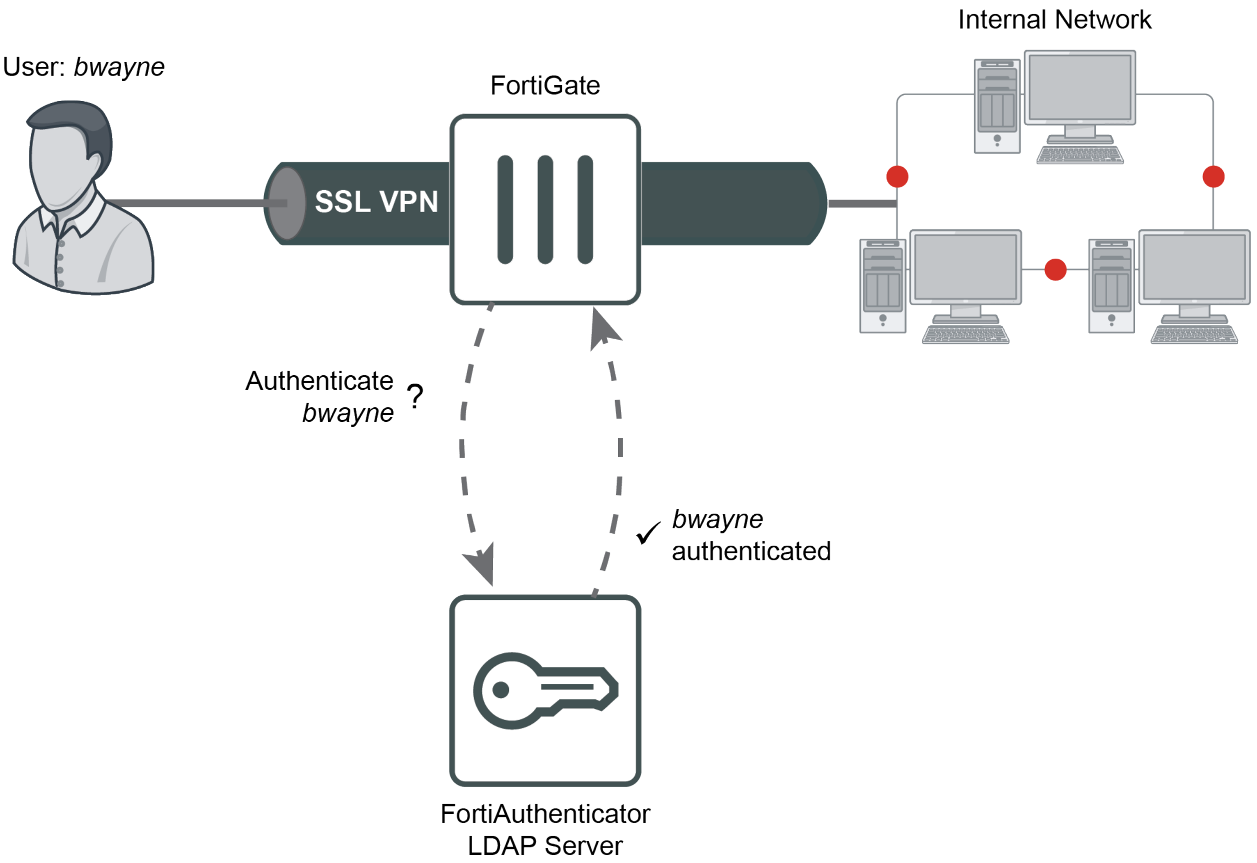
Log Details

| Log Record Detail | |
|---|---|
| ID | 1857 |
| Timestamp | Mon Jul 15 13:00:39 2019 |
| Level | information |
| Action | Login |
| Status | Success |
| Source IP | 172.25.181.138 |
| Message | Web access granted to 'rdeckard' |
| User | rdeckard |
| **Log Type** | |
| Type Id | 20994 |
| Name | Admin GUI Login |
| Sub Category | Authentication |
| Category | Event |
| Description | Logs admin GUI site login event |

# VPNs

This section contains information about creating and using a virtual private network (VPN).

## LDAP authentication for SSL VPN with FortiAuthenticator



This recipe describes how to set up FortiAuthenticator to function as an LDAP server for FortiGate SSL VPN authentication. It involves adding users to FortiAuthenticator, setting up the LDAP server on the FortiAuthenticator, and then configuring the FortiGate to use the FortiAuthenticator as an LDAP server.

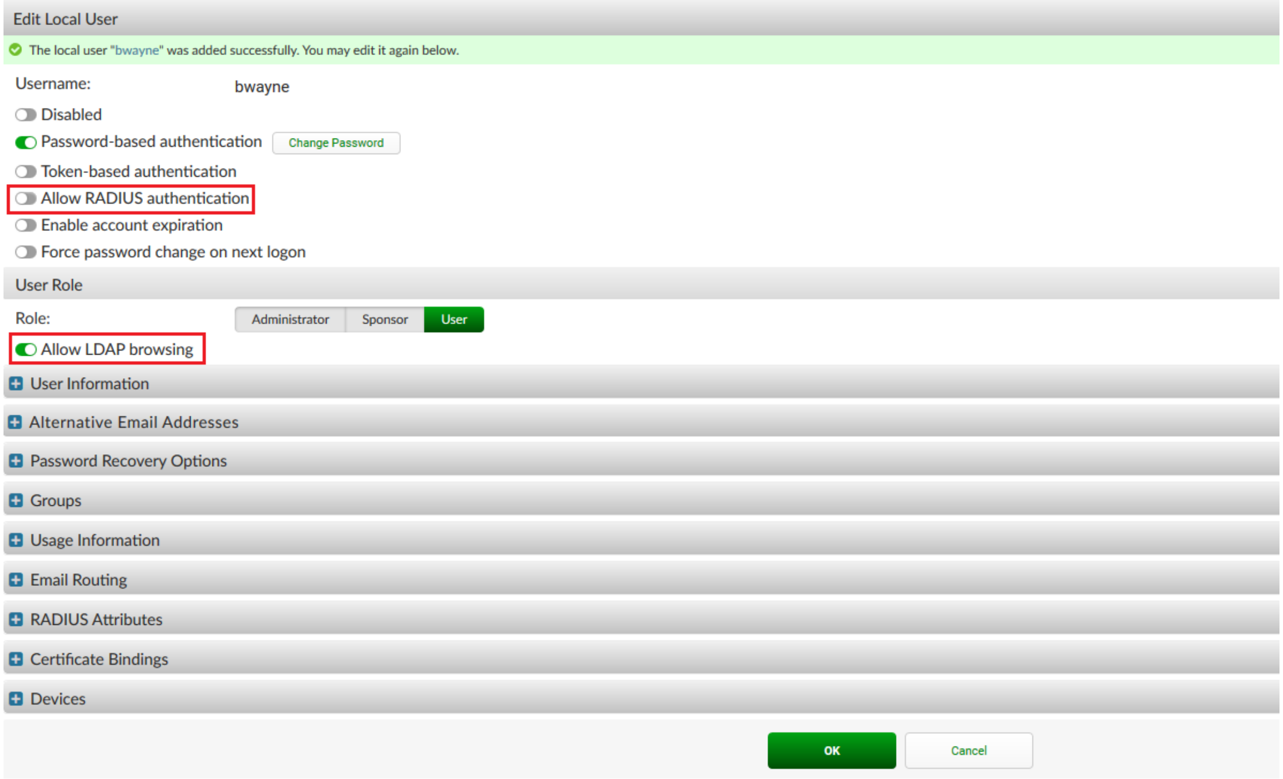
### Creating the user and user group on the FortiAuthenticator

**To create the user and user group:**

1. On the FortiAuthenticator, go to *Authentication* > *User Management* > *Local Users* and select *Create New*. Enter a name for the user, enter and confirm a password, and be sure to disable *Allow RADIUS authentication* — RADIUS authentication is not required for this recipe.

   Set *Role* as *User*, and select *OK*. New options will appear.

Make sure to enable *Allow LDAP browsing* — the user will not be able to connect to the FortiGate otherwise.



Edit Local User

The local user "bwayne" was added successfully. You may edit it again below.

Username: bwayne

○ Disabled

● Password-based authentication [Change Password]

○ Token-based authentication

○ Allow RADIUS authentication

○ Enable account expiration

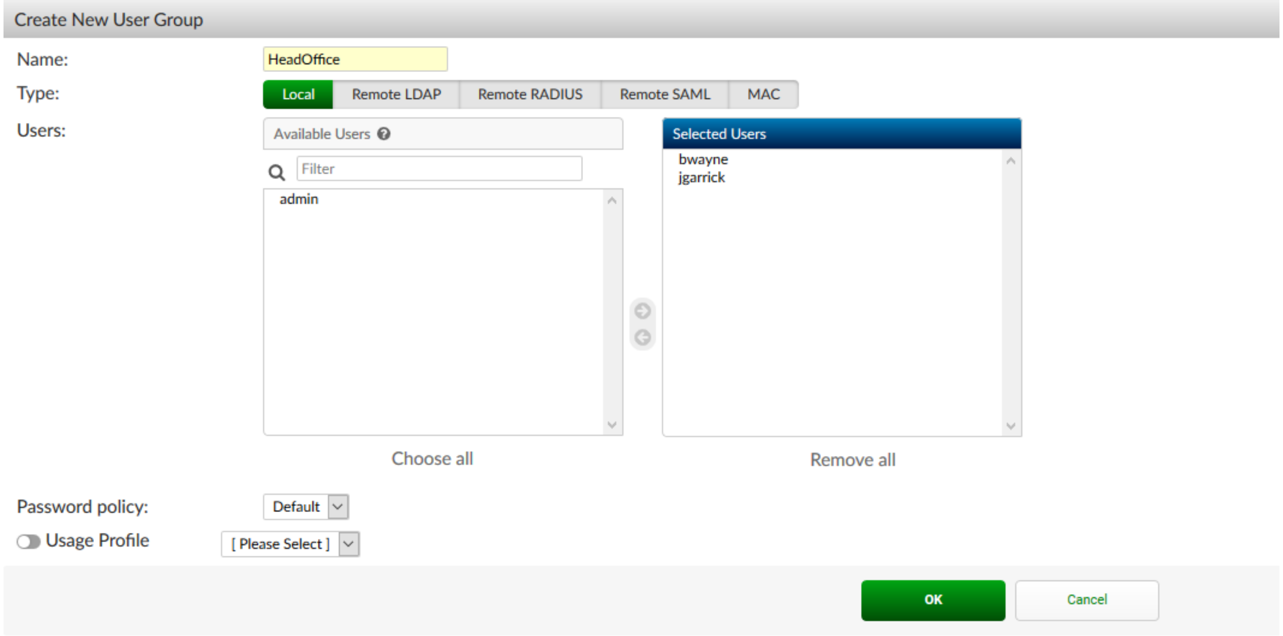
○ Force password change on next logon

User Role

Role: Administrator | Sponsor | [✓ User]

● Allow LDAP browsing

2. Create another user with the same settings. Later, you will use `jgarrick` on the FortiGate to query the LDAP directory tree on FortiAuthenticator, and you will use `bwayne` credentials to connect to the VPN tunnel.
3. Next go to *Authentication* > *User Management* > *User Groups*, and create a user group for the FortiGate users. Add the desired users to the group.



Create New User Group

Name: HeadOffice

Type: [✓ Local] | Remote LDAP | Remote RADIUS | Remote SAML | MAC

Users:

Available Users: admin

Selected Users: bwayne, jgarrick

Password policy: Default

○ Usage Profile [ Please Select ]

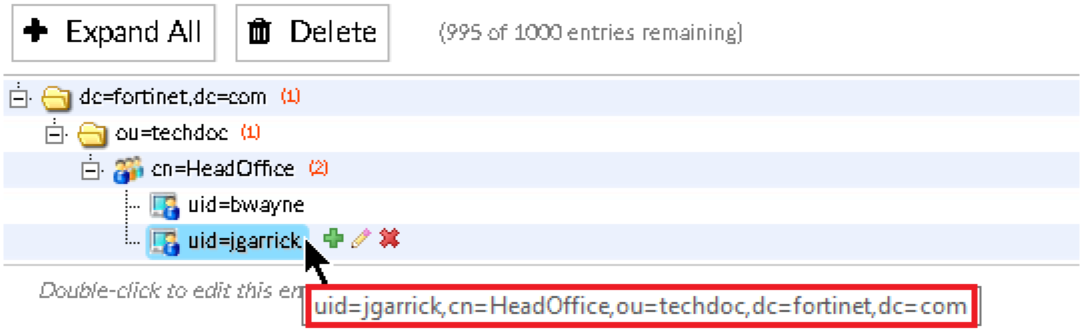
## Creating the LDAP directory tree on the FortiAuthenticator

**To create the LDAP directory tree:**

1. Go to *Authentication* > *LDAP Service* > *Directory Tree*, and create a Distinguished Name (DN). A DN is made up of Domain Components (DC).
   Both the users and user group created earlier are the User ID (UID) and the Common Name (CN) in the LDAP Directory Tree.

   Create an Organizational Unit (OU), and a Common Name (CN). Under the *cn=HeadOffice* entry, add UIDs for the users.

   If you mouse over a user, you will see the full DN of the LDAP server.


✚ Expand All
🗑 Delete
(995 of 1000 entries remaining)
dc=fortinet,dc=com (1)
ou=techdoc (1)
cn=HeadOffice (2)
uid=bwayne
uid=jgarrick
Double-click to edit this en
uid=jgarrick,cn=HeadOffice,ou=techdoc,dc=fortinet,dc=com

   Later, you will use `jgarrick` on the FortiGate to query the LDAP directory tree on FortiAuthenticator, and you will use `bwayne` credentials to connect to the VPN tunnel.

## Connecting the FortiGate to the LDAP server

**To connect the FortiGate to the LDAP server:**

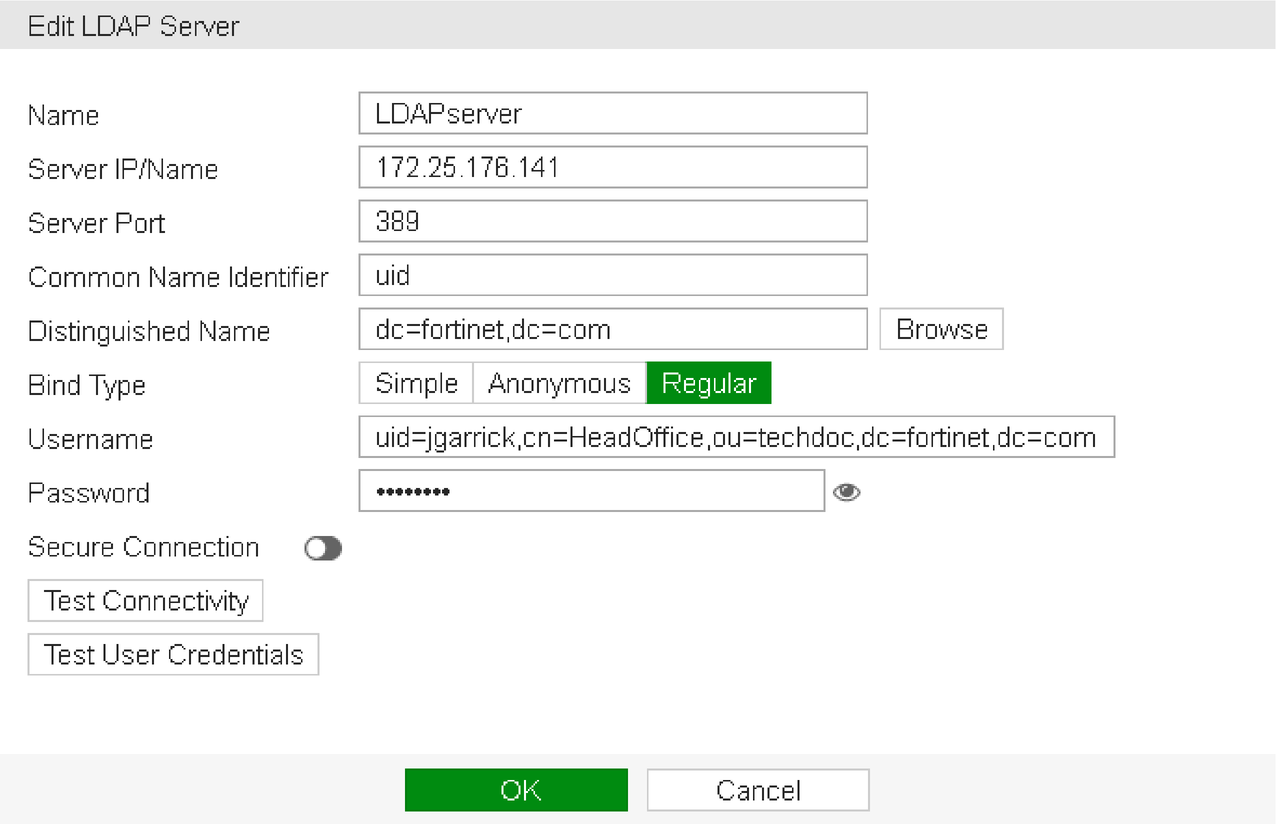
1. On the FortiGate, go to *User & Device* > *LDAP Servers*, and select *Create New*.
   Enter a name for the LDAP server connection.

   Set *Server IP/Name* to the IP of the FortiAuthenticator, and set the *Common Name Identifier* to *uid*.

   Set *Distinguished Name* to `dc=fortinet,dc=com`, and set the *Bind Type* to *Regular*.

   Enter the user DN for jgarrick of the LDAP server, and enter the user's *Password*.

   The DN is an account that the FortiGate uses to query the LDAP server.



Edit LDAP Server

Name: LDAPserver

Server IP/Name: 172.25.176.141

Server Port: 389

Common Name Identifier: uid

Distinguished Name: dc=fortinet,dc=com

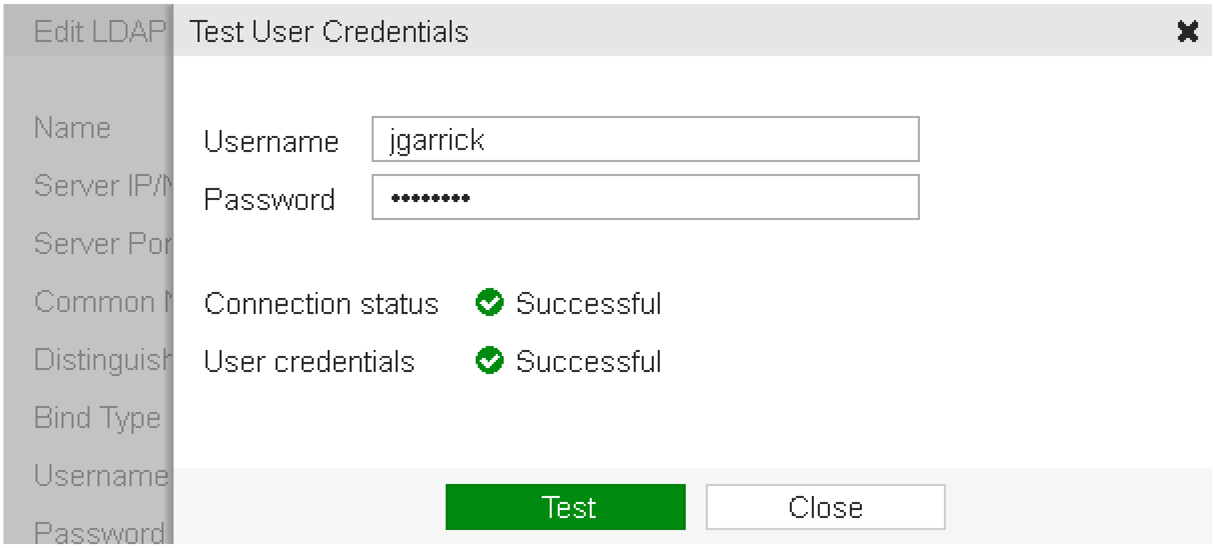
Bind Type: Simple | Anonymous | Regular

Username: uid=jgarrick,cn=HeadOffice,ou=techdoc,dc=fortinet,dc=com

Password: •••••••••

Secure Connection

2. Select *Test Connectivity* to determine a successful connection.
   Then select *Test User Credentials* to query the LDAP directory using jgarrick's credentials. The query is successful.



Test User Credentials

Username: jgarrick

Password: •••••••••

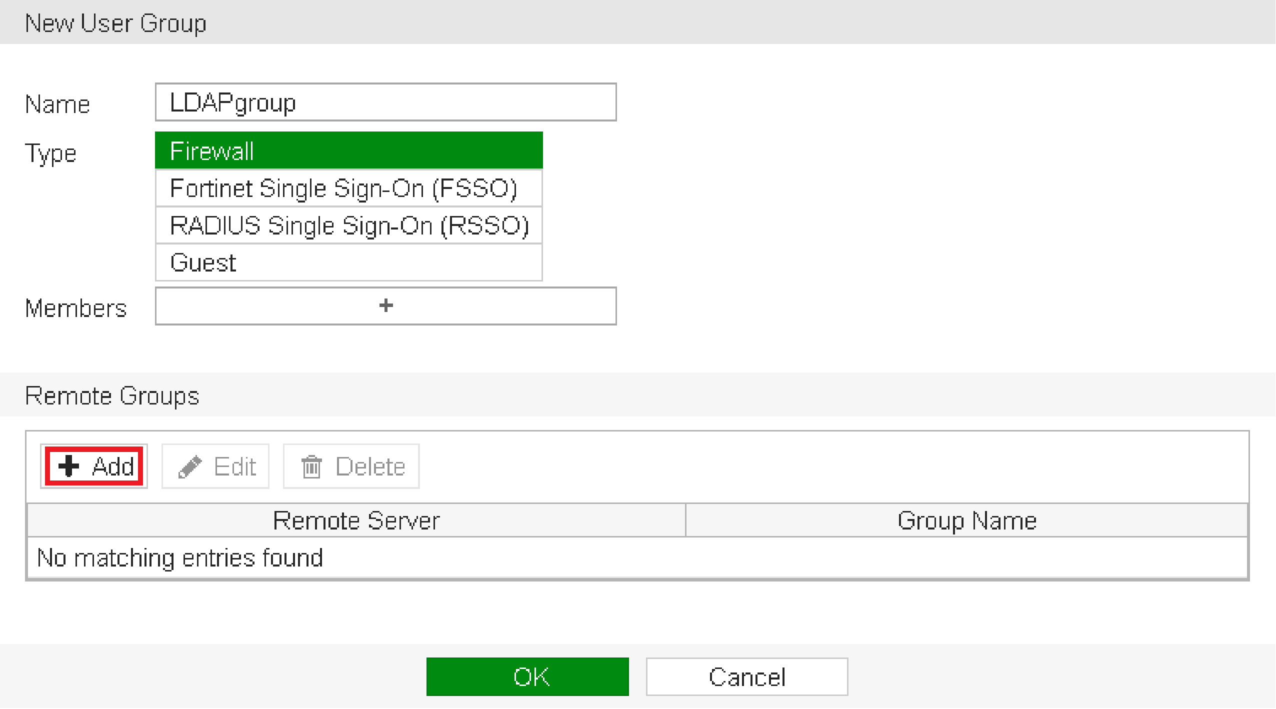
Connection status: ✓ Successful

User credentials: ✓ Successful

## Creating the LDAP user group on the FortiGate

**To create the LDAP user group:**

1. Go to *User & Device* > *User Groups*, and select *Create New*.
   Enter a name for the user group. Under *Remote Groups* select *Add*.



New User Group

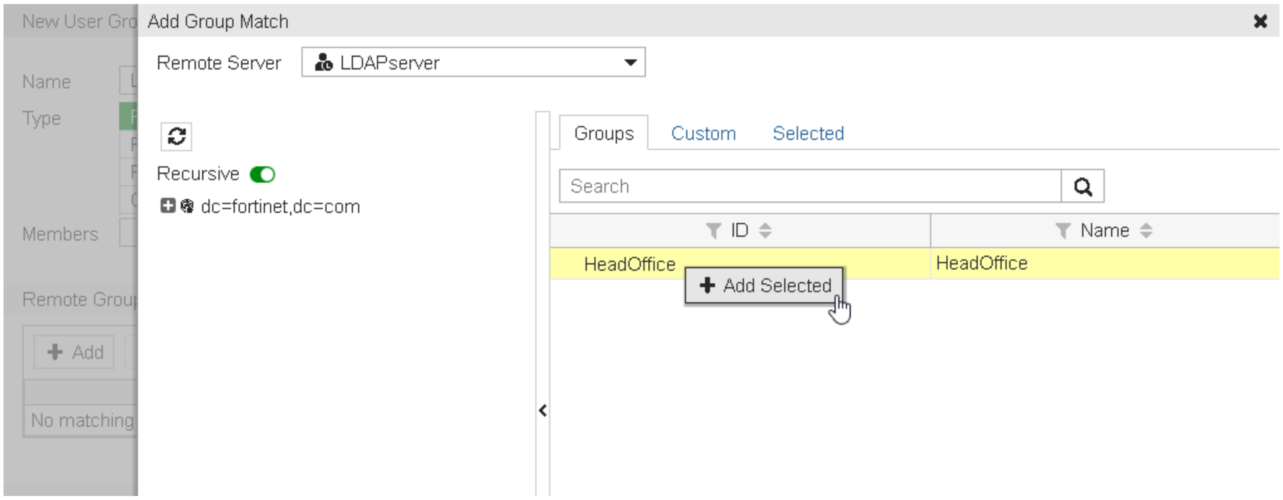
Name: LDAPgroup

Type: Firewall

Remote Groups

| Remote Server | Group Name |
|---|---|
| No matching entries found | |

2. Select *LDAPserver* under the *Remote Server* dropdown.
   In the new *Add Group Match* window, right-click *HeadOffice* under the *Groups* tab, and select *Add Selected*. The group will be added to the *Selected* tab. Select *OK*.



Add Group Match

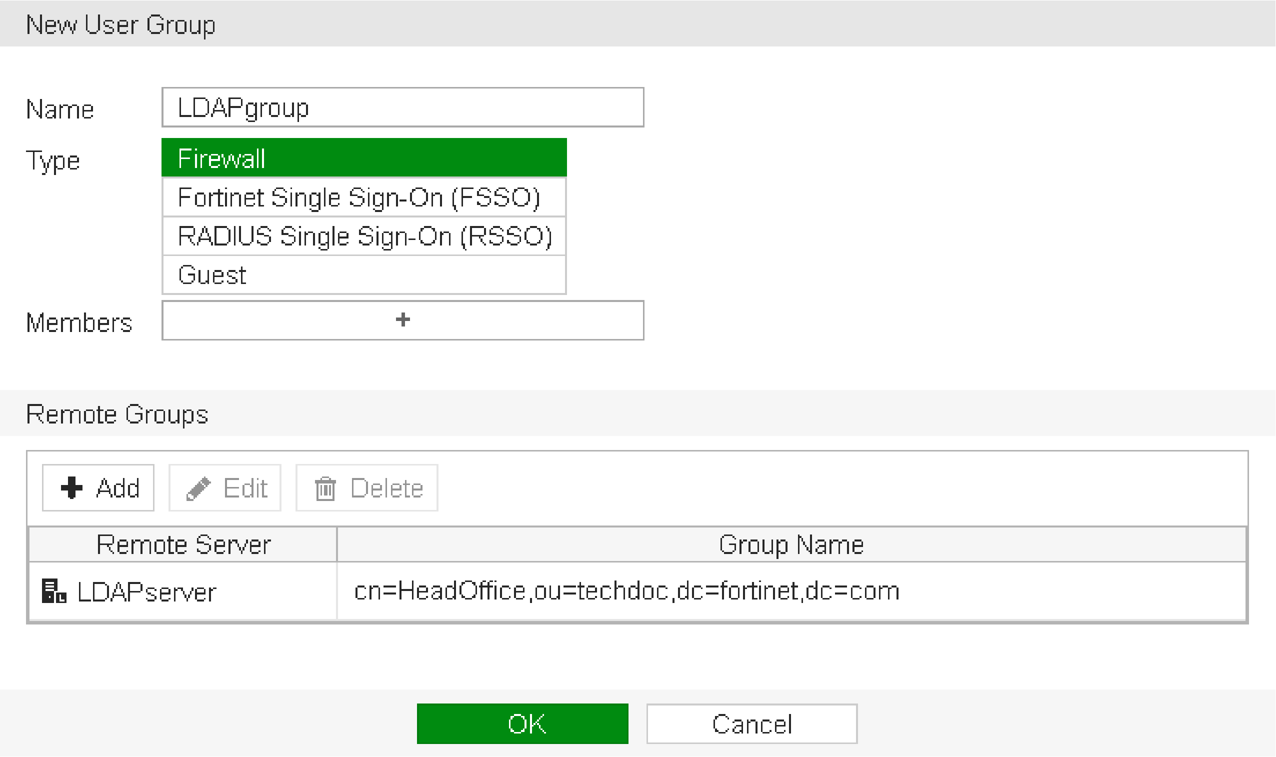
Remote Server: LDAPserver

Recursive

dc=fortinet,dc=com

| ID | Name |
|---|---|
| HeadOffice | HeadOffice |

3. *LDAPserver* has been added to the LDAP group. Select *OK*.



New User Group

|  |  |
|---|---|
| Name | LDAPgroup |
| Type | Firewall<br>Fortinet Single Sign-On (FSSO)<br>RADIUS Single Sign-On (RSSO)<br>Guest |
| Members | + |

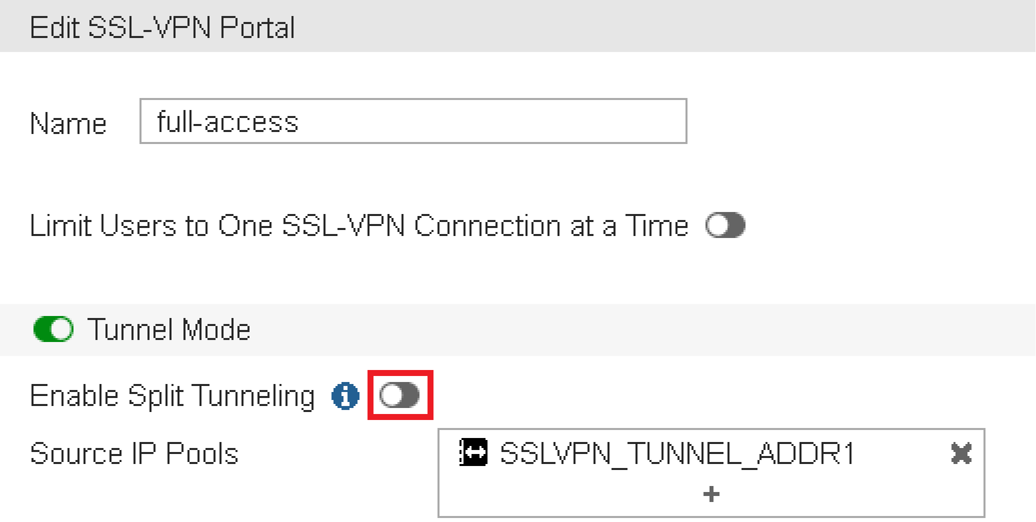
Remote Groups

| Remote Server | Group Name |
|---|---|
| LDAPserver | cn=HeadOffice,ou=techdoc,dc=fortinet,dc=com |

## Configuring the SSL-VPN

**To configure the SSL-VPN:**

1. On the FortiGate, go to *VPN > SSL-VPN Portals*, and edit the full-access portal. Disable *Split Tunneling*.



Edit SSL-VPN Portal

Name: full-access

Limit Users to One SSL-VPN Connection at a Time ○

● Tunnel Mode

Enable Split Tunneling ○

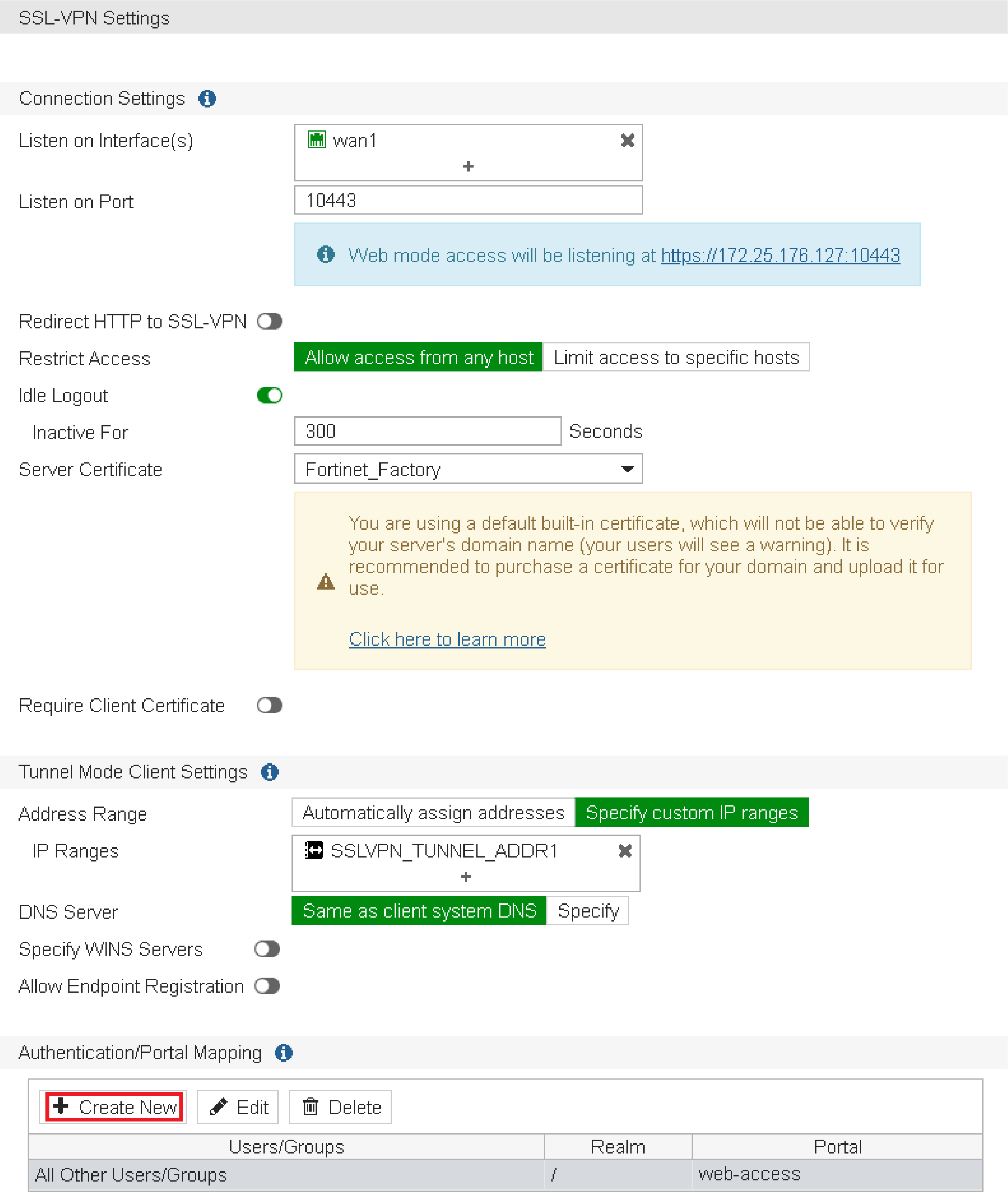
Source IP Pools: SSLVPN_TUNNEL_ADDR1

2. Go to *VPN > SSL-VPN Settings*.

Under *Connection Settings* set *Listen on Port* to `10443`.

Under *Tunnel Mode Client Settings*, select *Specify custom IP ranges* and set it to *SSLVPN_TUNNEL_ADDR1*.

Under *Authentication/Portal Mapping*, select *Create New*.



SSL-VPN Settings

Connection Settings

Listen on Interface(s): wan1

Listen on Port: 10443

Web mode access will be listening at https://172.25.176.127:10443

Redirect HTTP to SSL-VPN: off

Restrict Access: [✓ Allow access from any host] Limit access to specific hosts

Idle Logout: on

Inactive For: 300 Seconds

Server Certificate: Fortinet_Factory

You are using a default built-in certificate, which will not be able to verify your server's domain name (your users will see a warning). It is recommended to purchase a certificate for your domain and upload it for use.

Click here to learn more

Require Client Certificate: off

Tunnel Mode Client Settings

Address Range: Automatically assign addresses [✓ Specify custom IP ranges]

IP Ranges: SSLVPN_TUNNEL_ADDR1

DNS Server: [✓ Same as client system DNS] Specify

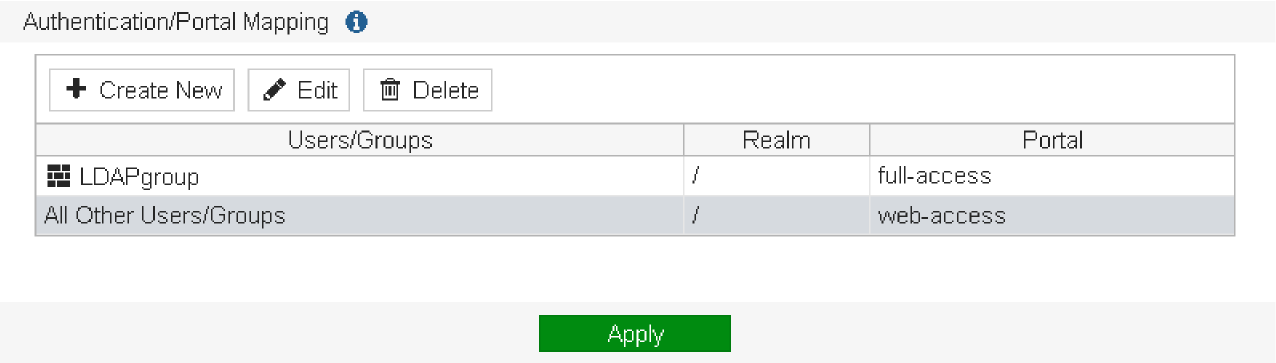
Specify WINS Servers: off

Allow Endpoint Registration: off

Authentication/Portal Mapping

| Users/Groups | Realm | Portal |
|---|---|---|
| All Other Users/Groups | / | web-access |

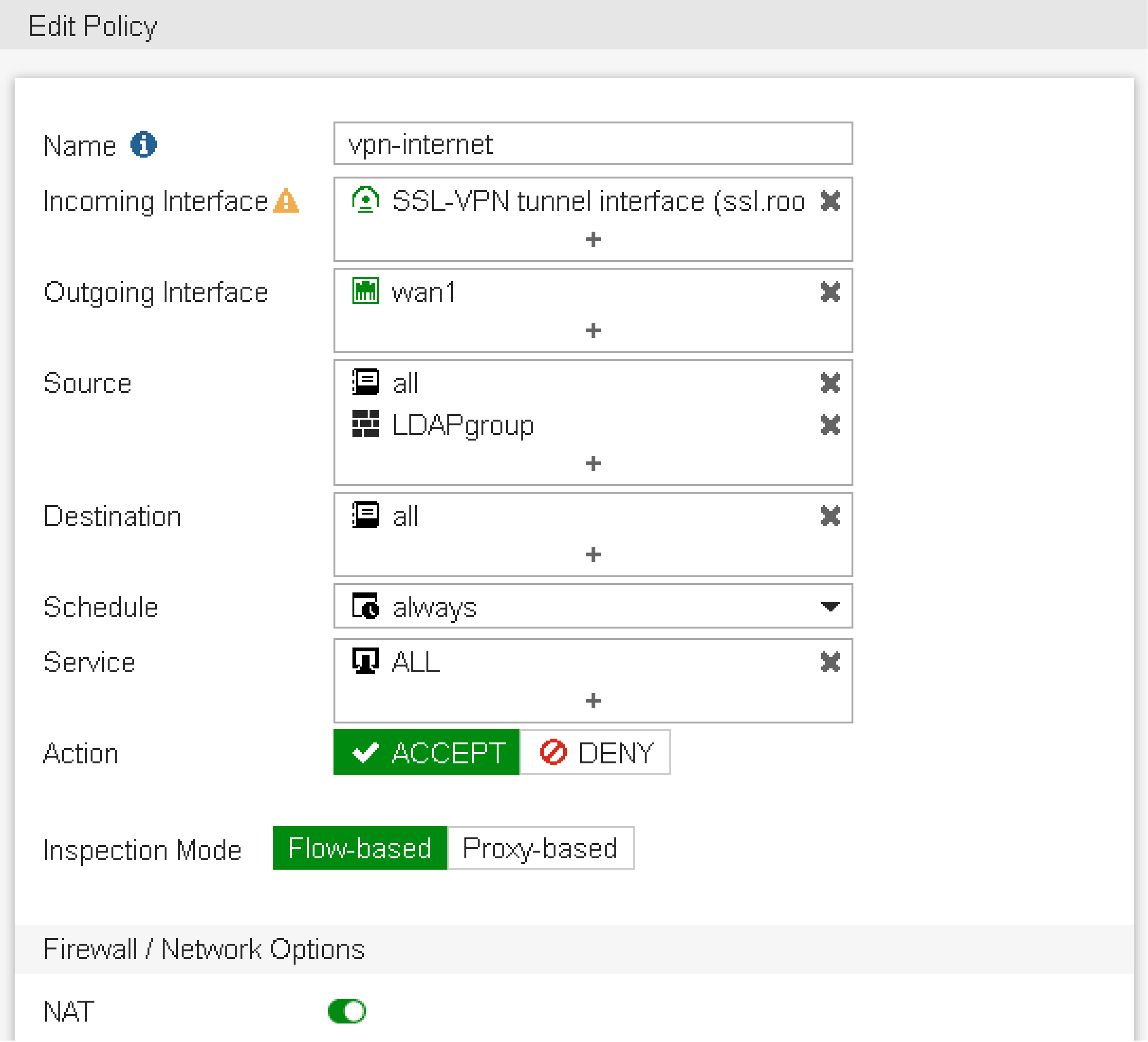
3. Assign the *LDAPgroup* user group to the *full-access* portal, and assign *All Other Users/Groups* to the desired portal. Select *Apply*.



Authentication/Portal Mapping

| Users/Groups | Realm | Portal |
|---|---|---|
| LDAPgroup | / | full-access |
| All Other Users/Groups | / | web-access |

4. Select the prompt at the top of the screen to create a new SSL-VPN policy, including the *LDAPgroup*, as shown.



Edit Policy

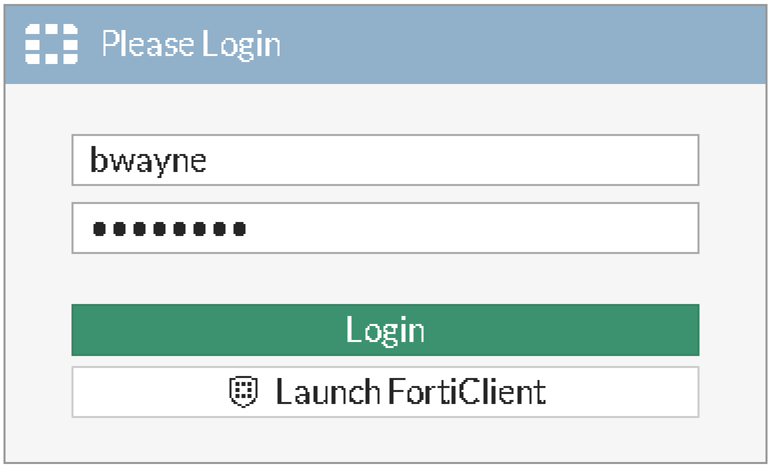
| | |
|---|---|
| Name | vpn-internet |
| Incoming Interface | SSL-VPN tunnel interface (ssl.roo |
| Outgoing Interface | wan1 |
| Source | all<br>LDAPgroup |
| Destination | all |
| Schedule | always |
| Service | ALL |
| Action | ACCEPT |
| Inspection Mode | Flow-based |

Firewall / Network Options

NAT

## Results

1. From a remote device, access the SSL VPN Web Portal.
   Enter valid LDAP credentials (in the example, bwayne).



Please Login

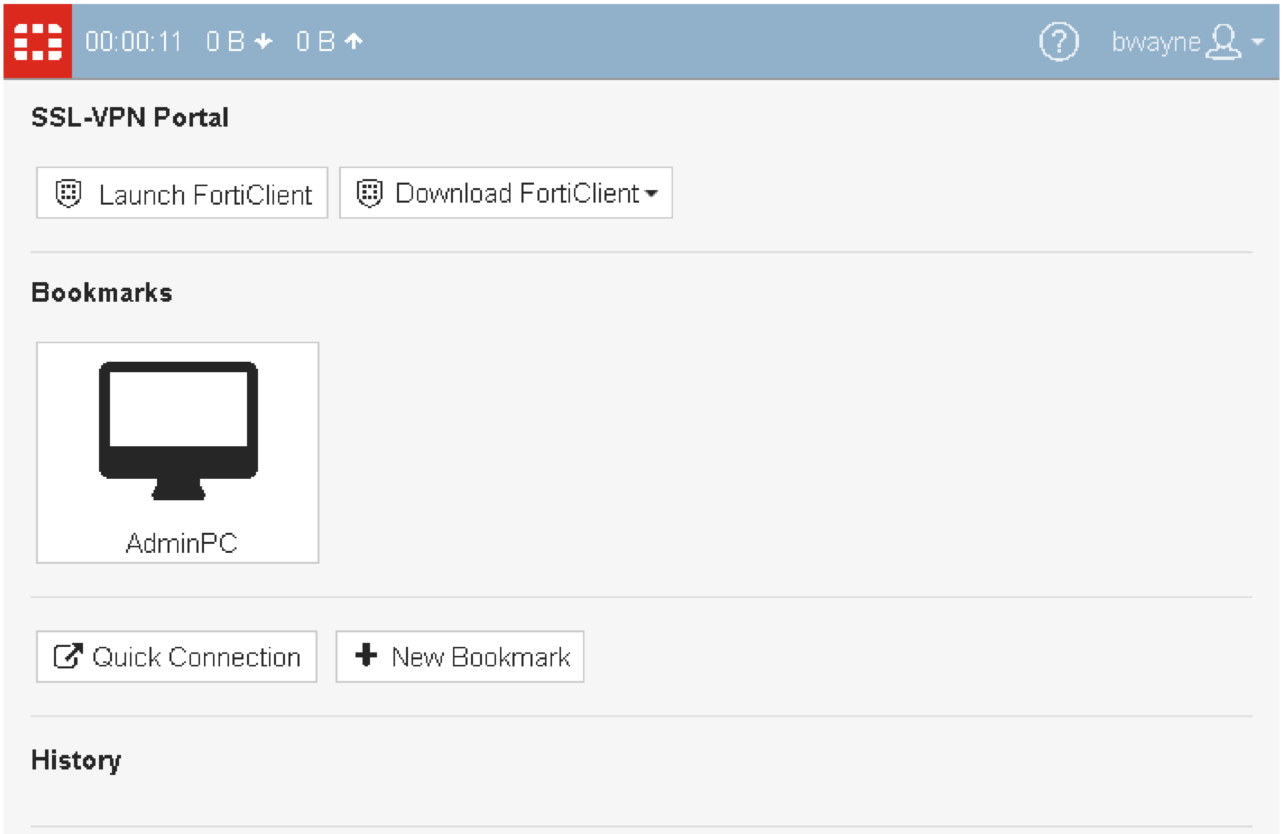
bwayne

●●●●●●●●●

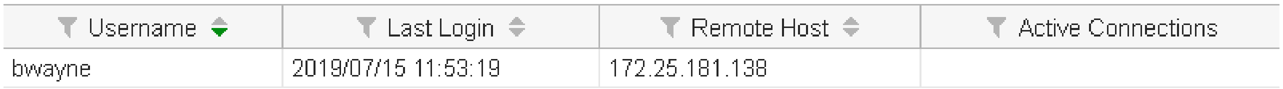
Login

Launch FortiClient

2. The user is now successfully logged into the SSL VPN Portal.

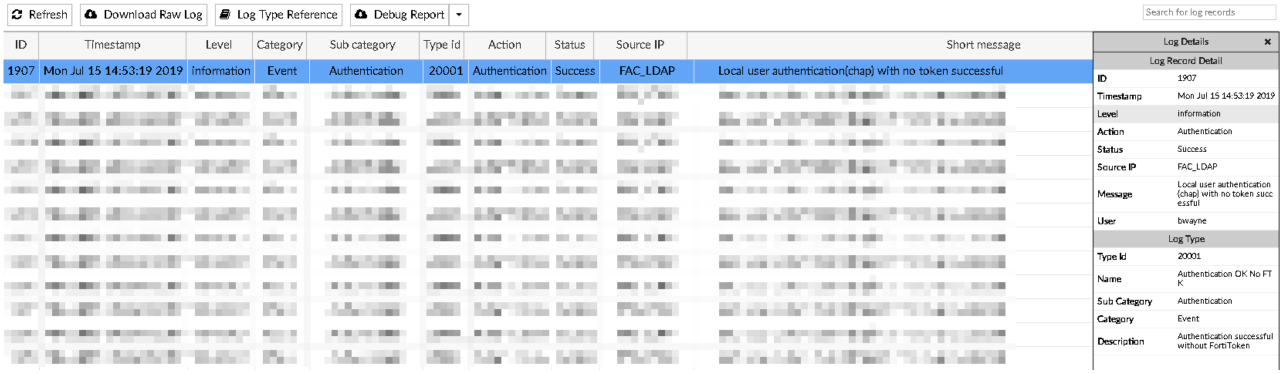


3. On the FortiGate, go to *Monitor* > *SSL-VPN Monitor* to confirm the connection.



| Username | Last Login | Remote Host | Active Connections |
|---|---|---|---|
| bwayne | 2019/07/15 11:53:19 | 172.25.181.138 | |

4. On the FortiAuthenticator, go to *Logging* > *Log Access* > *Logs* and confirm the connection.

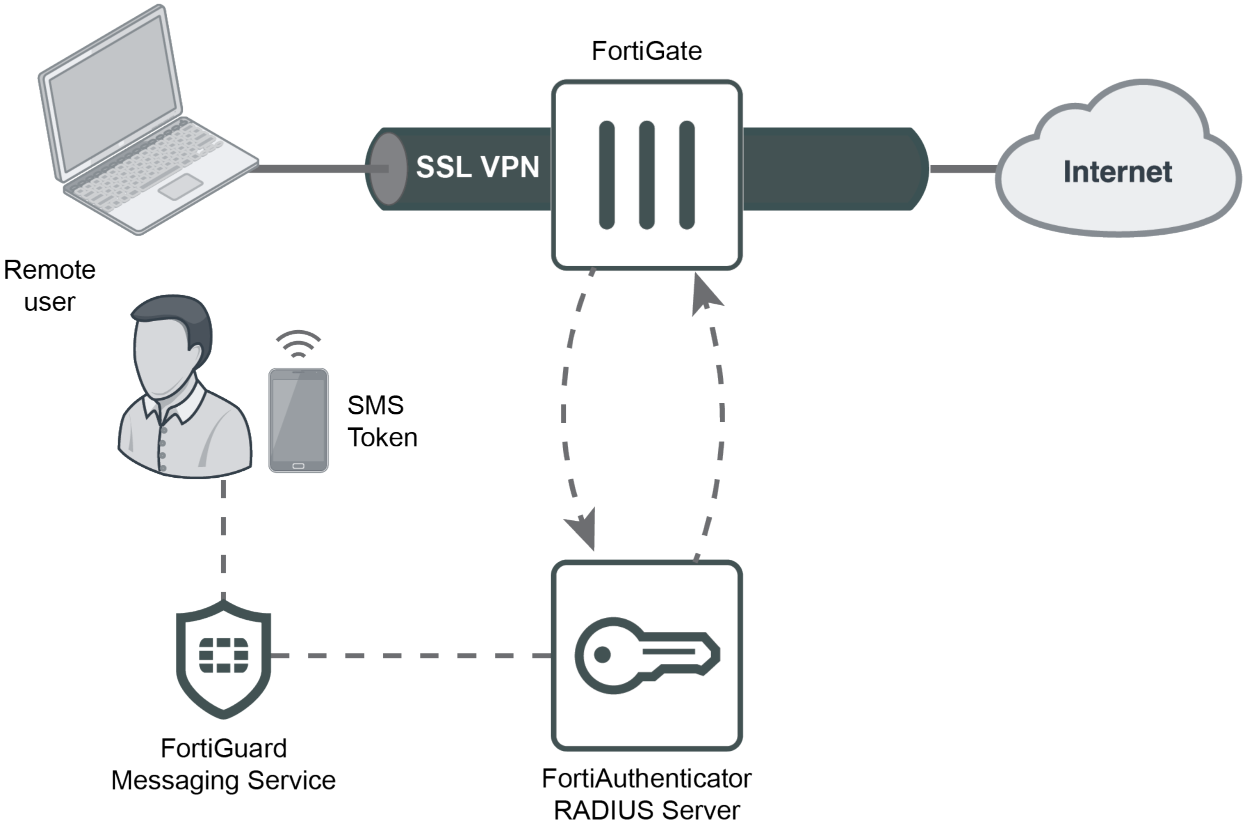


| ID | Timestamp | Level | Category | Sub category | Type Id | Action | Status | Source IP | Short message |
|---|---|---|---|---|---|---|---|---|---|
| 1907 | Mon Jul 15 14:53:19 2019 | Information | Event | Authentication | 20001 | Authentication | Success | FAC_LDAP | Local user authentication(chap) with no token successful |

[redacted]

| Log Details | |
|---|---|
| Log Record Detail | |
| ID | 1907 |
| Timestamp | Mon Jul 15 14:53:19 2019 |
| Level | information |
| Action | Authentication |
| Status | Success |
| Source IP | FAC_LDAP |
| Message | Local user authentication (chap) with no token succ essful |
| User | bwayne |
| Log Type | |
| Type Id | 20001 |
| Name | Authentication OK No FT K |
| Sub Category | Authentication |
| Category | Event |
| Description | Authentication successful without FortiToken |

# SMS two-factor authentication for SSL VPN



FortiGate
SSL VPN
Internet
Remote user
SMS Token
FortiGuard Messaging Service
FortiAuthenticator RADIUS Server

In this recipe, you will create an SSL VPN with two-factor authentication consisting of a username, password, and an SMS token.

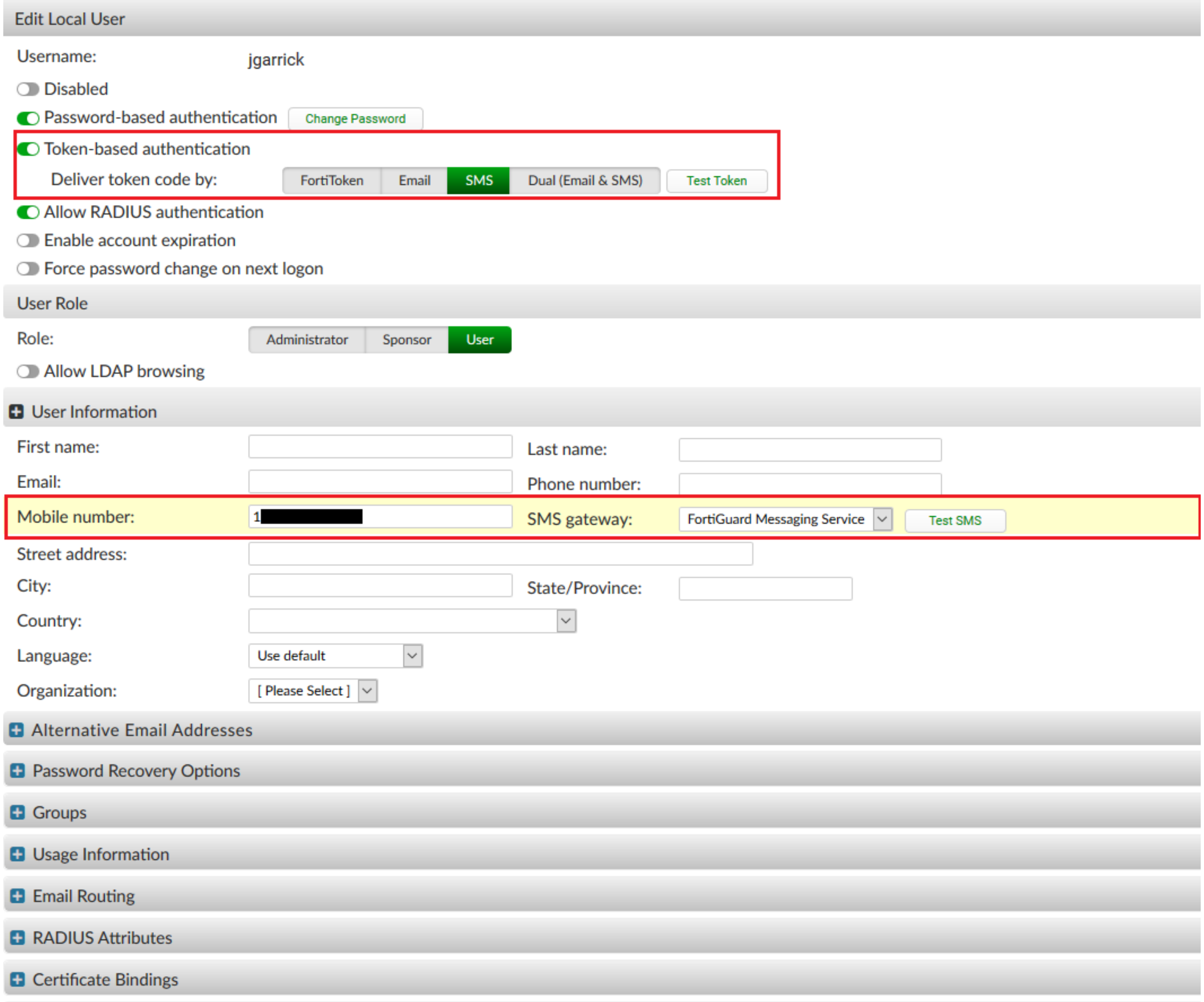
When a user attempts to connect to this SSL VPN, they are prompted to enter their username and password. After successfully entering their credentials, they receive an SMS message on their mobile phone containing a 6-digit number (called the FortiToken code). They must also enter this number to get access to the internal network and the Internet.

Although this recipe uses the FortiGuard Messaging Service, it will also work with any compatible SMS service you configure as an SMS Gateway.

## Creating an SMS user and user group on the FortiAuthenticator

### To create an SMS user and user group:

1. On the FortiAuthenticator, go to *Authentication > User Management > Local Users* and add/modify a user to include *SMS Token-based authentication* and a *Mobile number* using the preferred *SMS gateway* as shown.
   The *Mobile number* must be in the following format:
   `+[international-number]`
   Enable *Allow RADIUS authentication*.



Edit Local User

Username: jgarrick

○ Disabled

● Password-based authentication  Change Password

● Token-based authentication

Deliver token code by: FortiToken | Email | [✓ SMS] | Dual (Email & SMS)  Test Token

● Allow RADIUS authentication

○ Enable account expiration

○ Force password change on next logon

User Role

Role: Administrator | Sponsor | [✓ User]

○ Allow LDAP browsing

User Information

| | | | |
|---|---|---|---|
| First name: | | Last name: | |
| Email: | | Phone number: | |
| Mobile number: | 1[redacted] | SMS gateway: | FortiGuard Messaging Service  Test SMS |
| Street address: | | | |
| City: | | State/Province: | |
| Country: | | | |
| Language: | Use default | | |
| Organization: | [ Please Select ] | | |

Alternative Email Addresses

Password Recovery Options

Groups

Usage Information

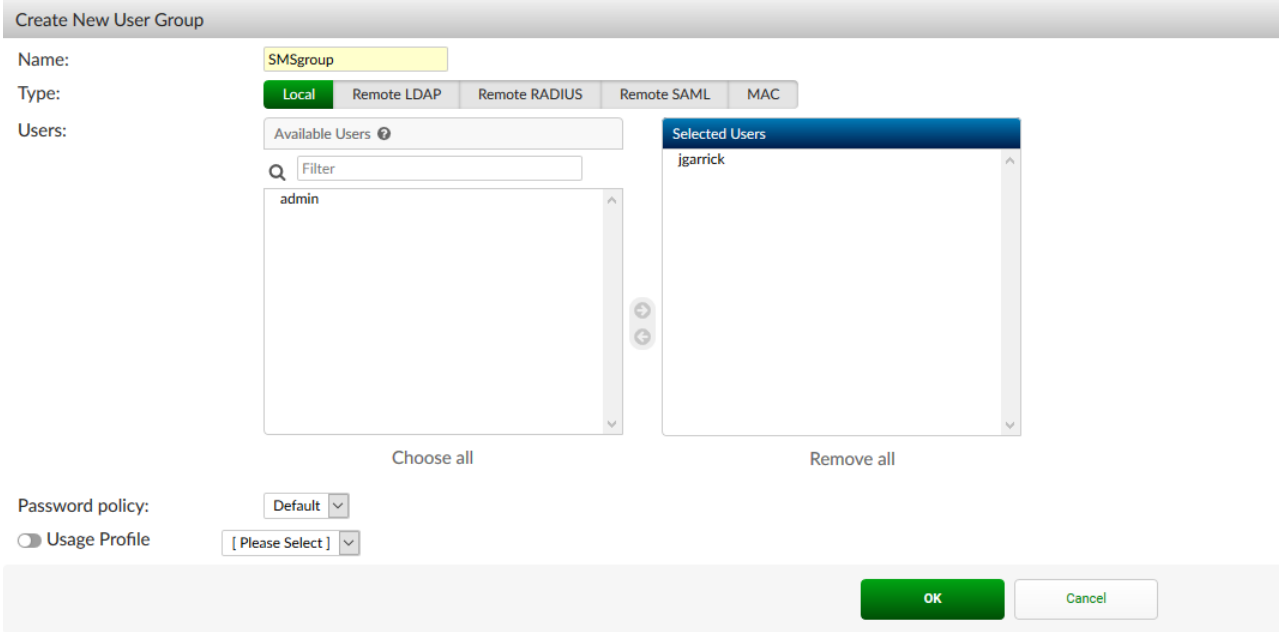
Email Routing

RADIUS Attributes

Certificate Bindings

2. Go to *Authentication > User Management > User Groups* and add the above user to a new SMS user group (in the

example, *SMSgroup*).



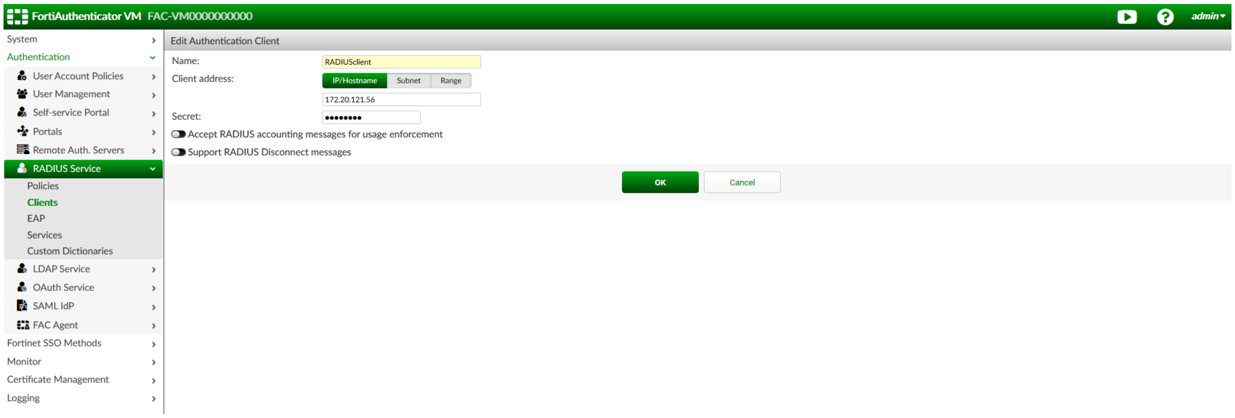
Create New User Group

| | |
|---|---|
| Name: | SMSgroup |
| Type: | Local |
| Users: | Selected Users: jgarrick |
| Password policy: | Default |
| ○ Usage Profile | [ Please Select ] |

## Configuring the FortiAuthenticator RADIUS client

### To create the RADIUS client:

1. On the FortiAuthenticator, go to *Authentication* > *RADIUS Service* > *Clients*, and select *Create New*.
2. Enter a *Name*, the IP address of the FortiGate, and set a *Secret*.
   The secret is a pre-shared secure password that the FortiGate will use to authenticate to the FortiAuthenticator.
3. Click *OK*.



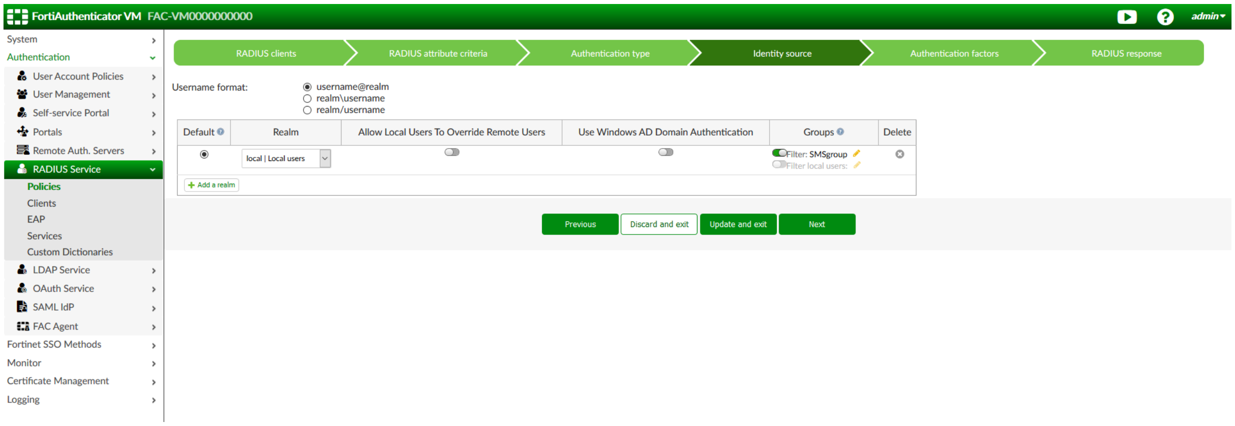
Edit Authentication Client

| | |
|---|---|
| Name: | RADIUSclient |
| Client address: | IP/Hostname |
| | 172.20.121.56 |
| Secret: | ••••••••• |
| ○ Accept RADIUS accounting messages for usage enforcement | |
| ○ Support RADIUS Disconnect messages | |

### To create the RADIUS policy:

1. Go to *Authentication* > *RADIUS Service* > *Policies*, and select *Create New*.
2. Enter the RADIUS policy name, description, and select the FortiGate RADIUS client.
3. Optionally, configure RADIUS attribute criteria.
4. Choose *Password/OTP* authentication as the authentication type.

5. Choose a username format (in this example: *username@realm*), select the *Local* realm, and add the *SMSgroup* as a filter.



Username format:
● username@realm
○ realm\username
○ realm/username

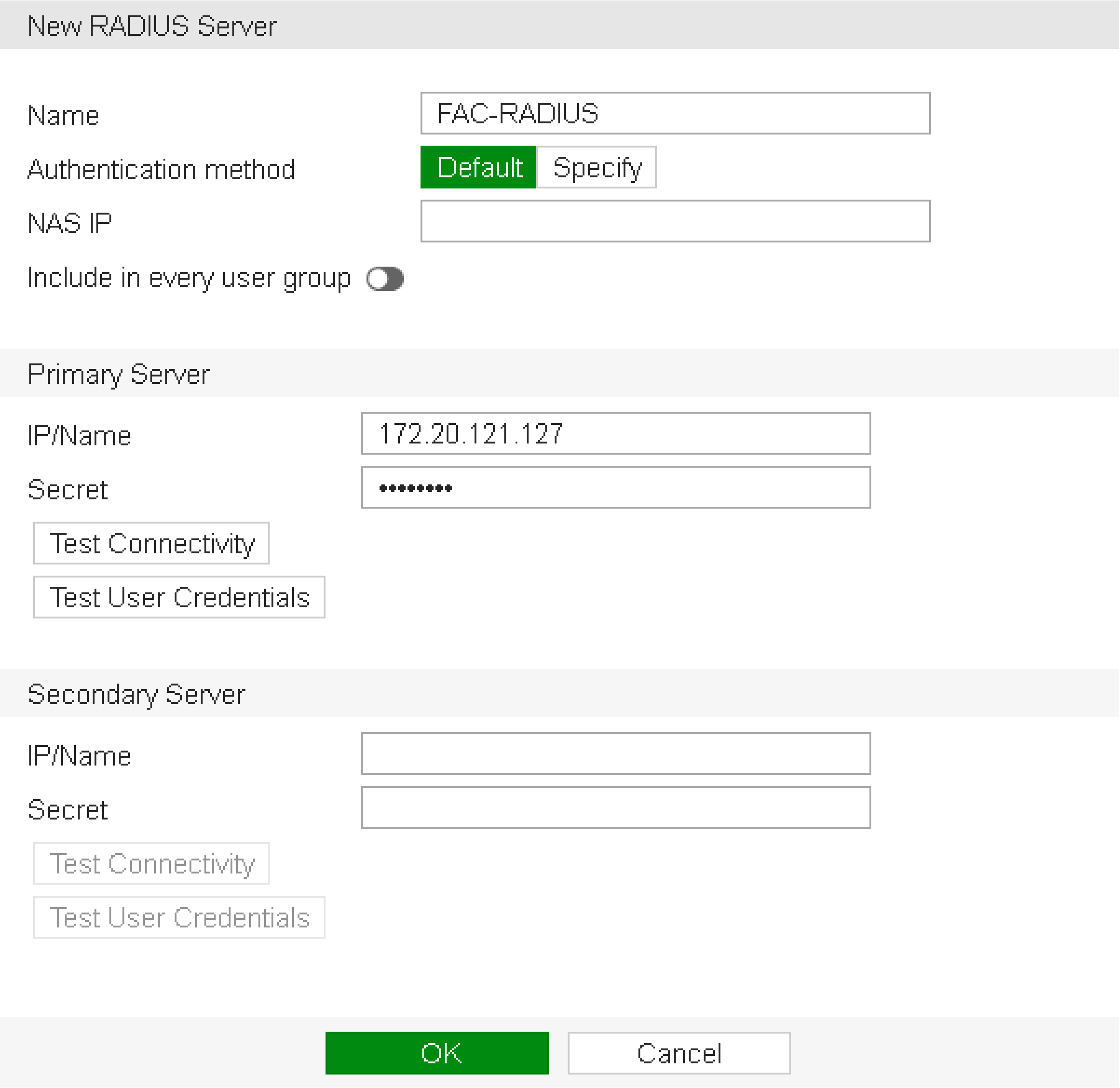
| Default | Realm | Allow Local Users To Override Remote Users | Use Windows AD Domain Authentication | Groups | Delete |
|---|---|---|---|---|---|
| ● | local \| Local users | | | Filter: SMSgroup<br>Filter local users: | |

6. Set the authentication method to *Mandatory two-factor authentication*.
7. Click *Save and Exit*.

## Configuring the FortiGate authentication settings

### To configure the FortiGate authentication settings:

1. On the FortiGate, go to *User & Device* > *RADIUS Servers* and create the connection to the FortiAuthenticator RADIUS server, using its IP address and pre-shared secret.
   Use *Test Connectivity* to make sure that the FortiGate can communicate with the FortiAuthenticator.



New RADIUS Server

| | |
|---|---|
| Name | FAC-RADIUS |
| Authentication method | Default Specify |
| NAS IP | |
| Include in every user group | |

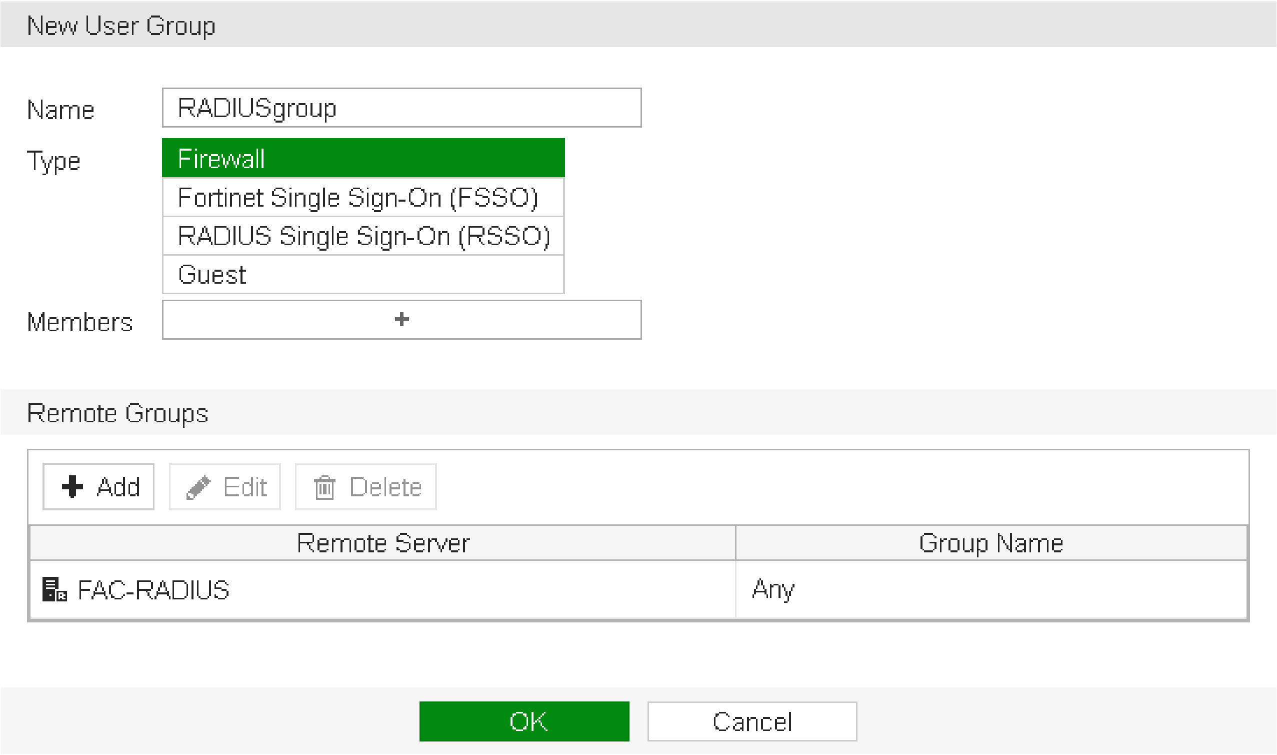
Primary Server

| | |
|---|---|
| IP/Name | 172.20.121.127 |
| Secret | ••••••••• |

Secondary Server

| | |
|---|---|
| IP/Name | |
| Secret | |

2. Next, go to *User & Device* > *User Groups* and create a RADIUS user group called *RADIUSgroup*. Set the *Type* to *Firewall* and add the RADIUS server to the *Remote groups* table.



New User Group

Name: RADIUSgroup

Type: Firewall

Fortinet Single Sign-On (FSSO)

RADIUS Single Sign-On (RSSO)

Guest

Members: +

Remote Groups

| Remote Server | Group Name |
|---|---|
| FAC-RADIUS | Any |

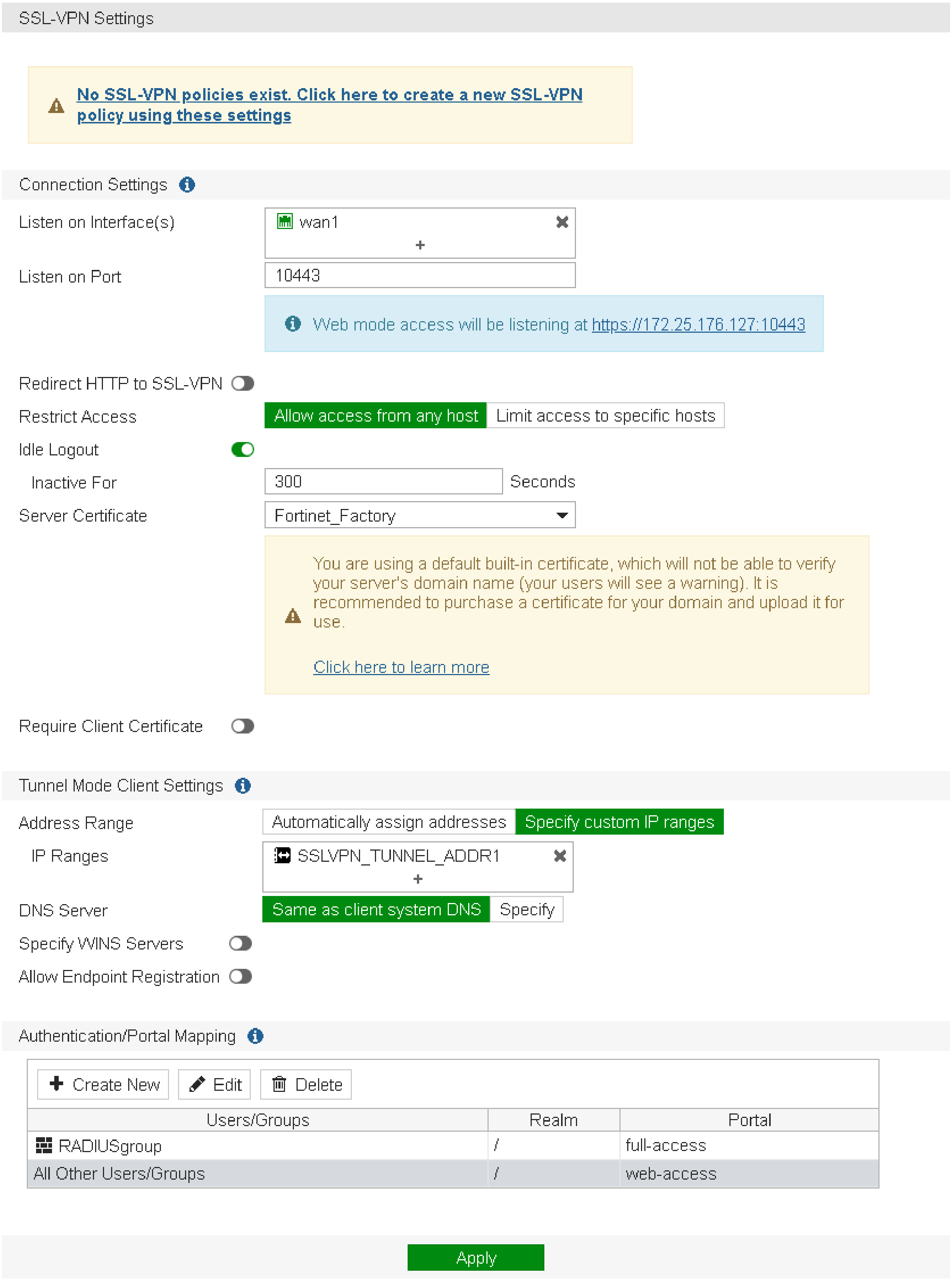
## Configuring the SSL-VPN

**Configure the SSL-VPN settings:**

1. Go to *VPN > SSL-VPN Settings*.
   Under *Connection Settings*, set *Listen on Port* to `10443`. Under *Tunnel Mode Client Settings*, select *Specify custom IP ranges* and set *IP Ranges* to the SSL VPN tunnel address range.

   Under *Authentication/Portal Mapping*, select *Create New*.

   Assign the *RADIUSgroup* user group to the *full-access* portal, and assign *All Other Users/Groups* to the desired portal.



SSL-VPN Settings

⚠ No SSL-VPN policies exist. Click here to create a new SSL-VPN policy using these settings

Connection Settings ⓘ

Listen on Interface(s): wan1 ✖ +

Listen on Port: 10443

ⓘ Web mode access will be listening at https://172.25.176.127:10443

Redirect HTTP to SSL-VPN: ○ (off)

Restrict Access: [✓ Allow access from any host] Limit access to specific hosts

Idle Logout: ● (on)

Inactive For: 300 Seconds

Server Certificate: Fortinet_Factory ▾

⚠ You are using a default built-in certificate, which will not be able to verify your server's domain name (your users will see a warning). It is recommended to purchase a certificate for your domain and upload it for use.

Click here to learn more

Require Client Certificate: ○ (off)

Tunnel Mode Client Settings ⓘ

Address Range: Automatically assign addresses [✓ Specify custom IP ranges]

IP Ranges: SSLVPN_TUNNEL_ADDR1 ✖ +

DNS Server: [✓ Same as client system DNS] Specify

Specify WINS Servers: ○ (off)

Allow Endpoint Registration: ○ (off)

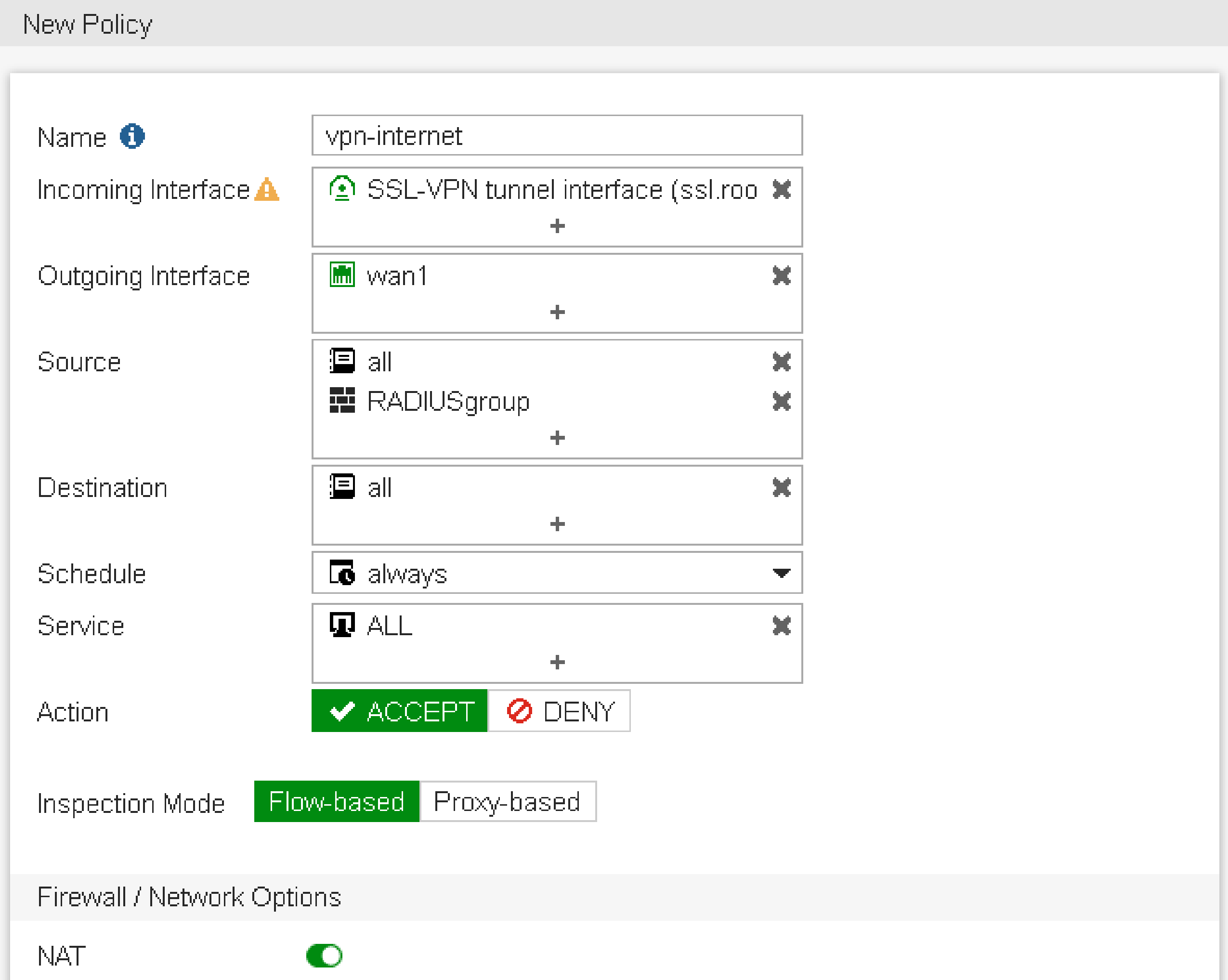
Authentication/Portal Mapping ⓘ

| Users/Groups | Realm | Portal |
|---|---|---|
| RADIUSgroup | / | full-access |
| All Other Users/Groups | / | web-access |

## Creating the security policy for VPN access to the Internet

**To create the security profile:**

1. Go to *Policy & Objects* > *IPv4 Policy* and create a new SSL-VPN policy, including the *RADIUSgroup*, as shown.



New Policy

|  |  |
|---|---|
| Name | vpn-internet |
| Incoming Interface | SSL-VPN tunnel interface (ssl.roo |
| Outgoing Interface | wan1 |
| Source | all<br>RADIUSgroup |
| Destination | all |
| Schedule | always |
| Service | ALL |
| Action | ✓ ACCEPT / DENY |
| Inspection Mode | Flow-based / Proxy-based |

Firewall / Network Options

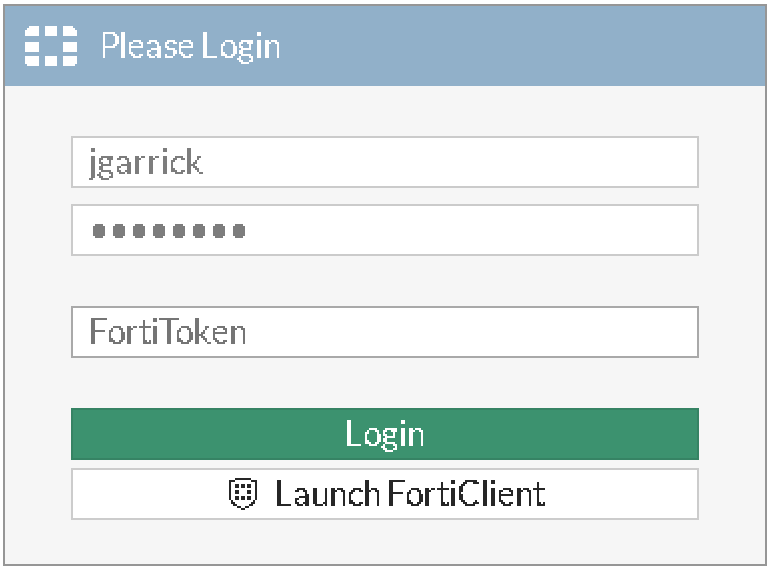
NAT ●

## Results

In this example, we will use the web portal to access the SSL VPN and test the two-factor authentication.

**To test two-factor authentication:**

1. Open a browser and navigate to the SSL VPN web portal, in this case *https://172.25.176.127:10443*.
   Enter a valid username and password and select *Login*. You should be prompted to enter a *FortiToken Code*.



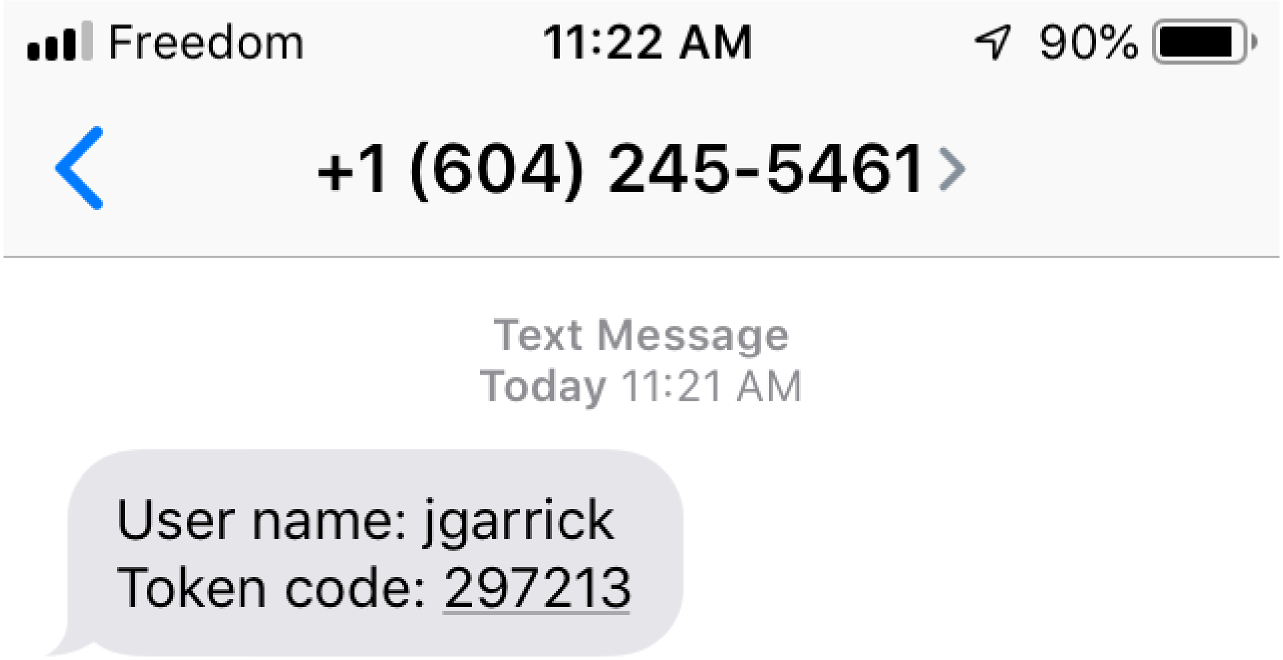
Please Login

jgarrick

●●●●●●●●●

FortiToken

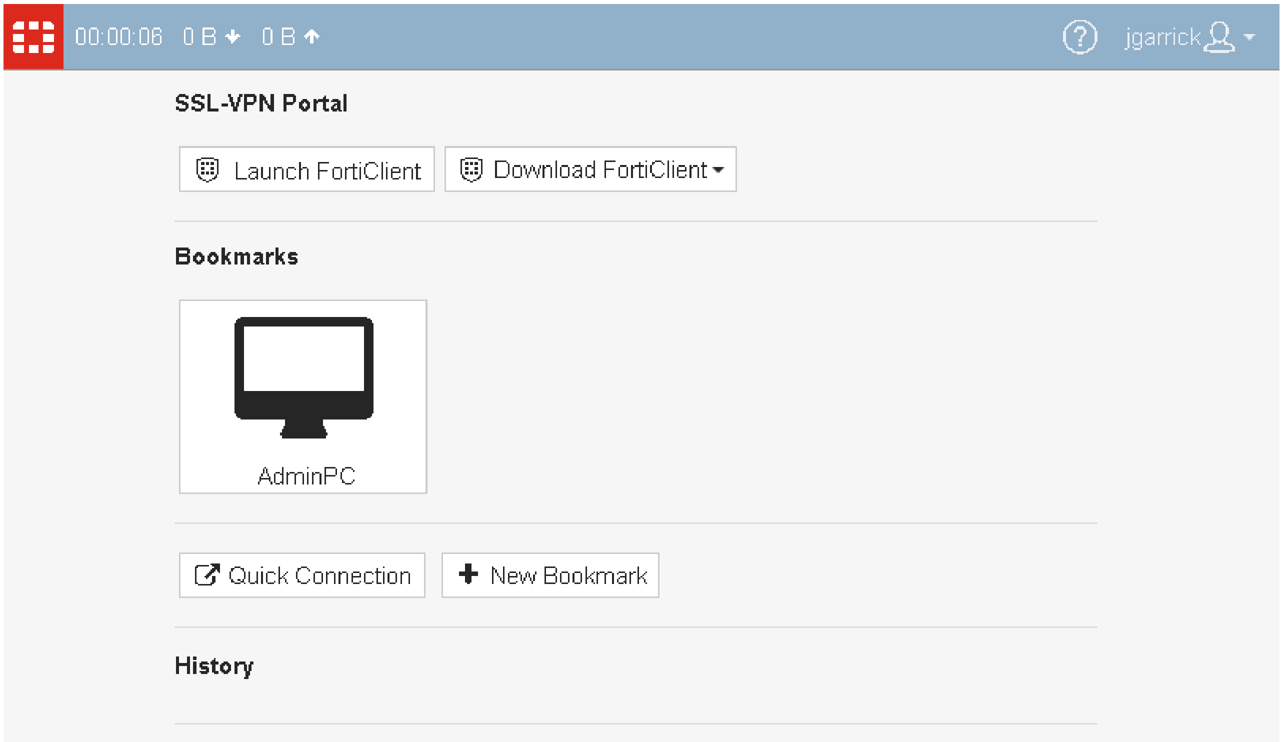
2. The *FortiToken Code* should have been sent to your mobile phone as a text message containing a 6-digit number. Enter the number into the SSL VPN login portal and select *Login*.



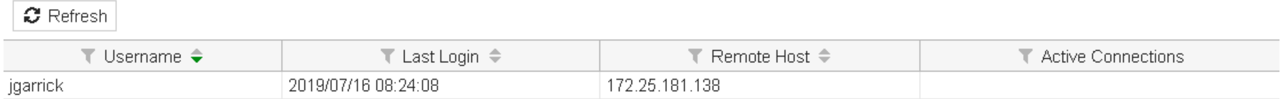
Text Message
Today 11:21 AM

User name: jgarrick
Token code: 297213

3. You should now have access to the SSL VPN tunnel.

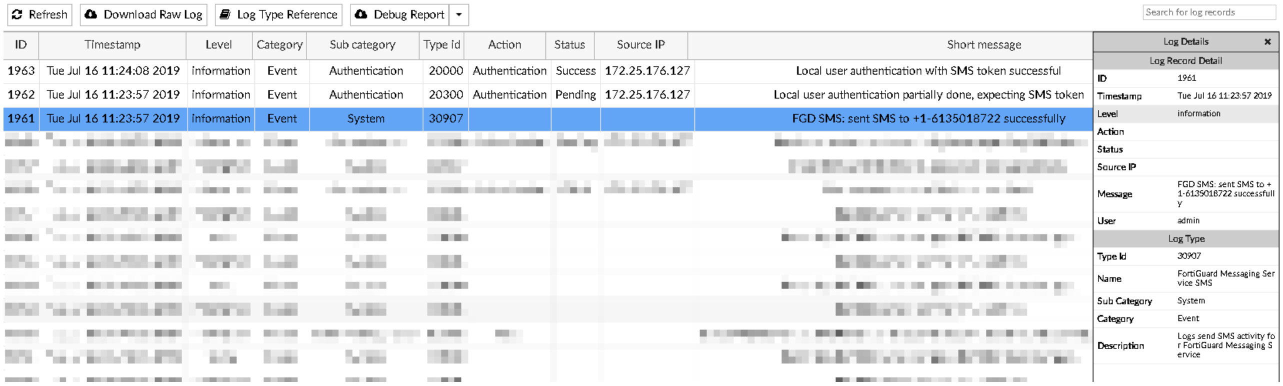


4. To verify that the user has connected to the tunnel, on the FortiGate, go to *Monitor* > *SSL-VPN Monitor*.



| Username | Last Login | Remote Host | Active Connections |
|---|---|---|---|
| jgarrick | 2019/07/16 08:24:08 | 172.25.181.138 | |

5. On the FortiAuthenticator, go to *Logging* > *Log Access* > *Logs* to confirm the user's connection.



| ID | Timestamp | Level | Category | Sub category | Type id | Action | Status | Source IP | Short message |
|---|---|---|---|---|---|---|---|---|---|
| 1963 | Tue Jul 16 11:24:08 2019 | information | Event | Authentication | 20000 | Authentication | Success | 172.25.176.127 | Local user authentication with SMS token successful |
| 1962 | Tue Jul 16 11:23:57 2019 | information | Event | Authentication | 20300 | Authentication | Pending | 172.25.176.127 | Local user authentication partially done, expecting SMS token |
| 1961 | Tue Jul 16 11:23:57 2019 | information | Event | System | 30907 | | | | FGD SMS: sent SMS to +1-6135018722 successfully |

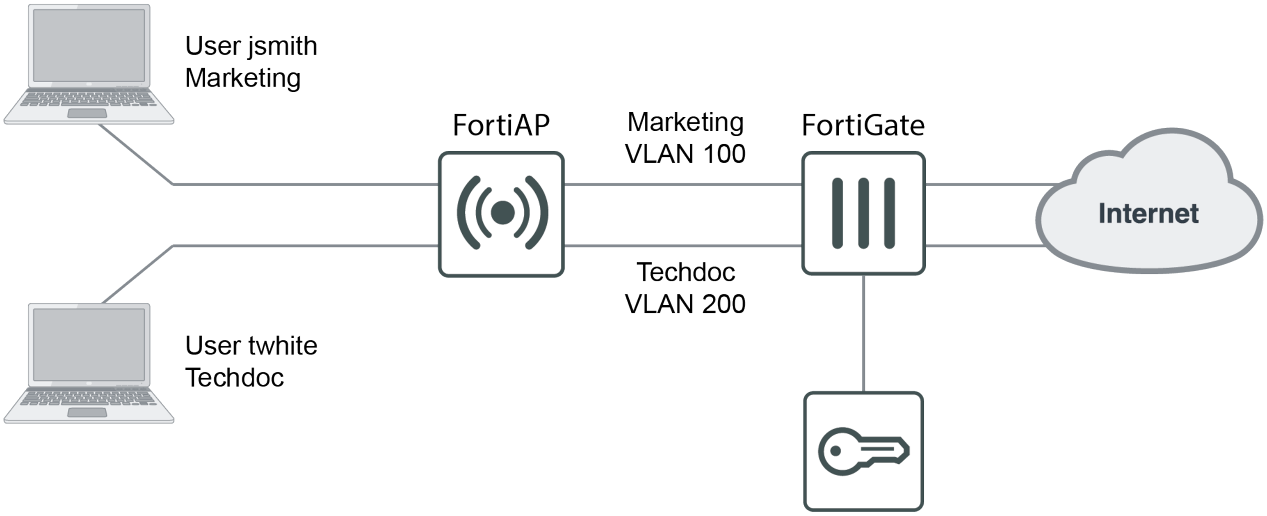
Log Details

| Log Record Detail | |
|---|---|
| ID | 1961 |
| Timestamp | Tue Jul 16 11:23:57 2019 |
| Level | information |
| Action | |
| Status | |
| Source IP | |
| Message | FGD SMS: sent SMS to +1-6135018722 successfully |
| User | admin |
| **Log Type** | |
| Type Id | 30907 |
| Name | FortiGuard Messaging Service SMS |
| Sub Category | System |
| Category | Event |
| Description | Logs send SMS activity for FortiGuard Messaging Service |

# WiFi authentication

This section describes configuring WiFi authentication with FortiAuthenticator.

## Assigning WiFi users to VLANs dynamically



Virtual LANs (VLANs) are used to assign wireless users to different networks without requiring the use of multiple SSIDs. Each user's VLAN assignment is stored in the user database of the RADIUS server that authenticates the users.

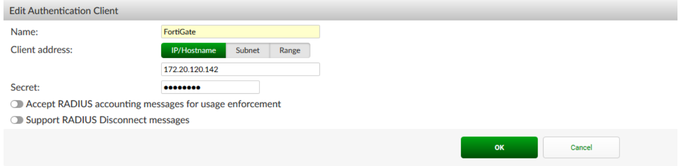
This example creates dynamic VLANs for the Techdoc and Marketing departments. The RADIUS server is a FortiAuthenticator. It is assumed a user group on the FortiAuthenticator has already been created (in this example, *employees*).

```
config certificate ca
    edit {name}
    # CA certificate.
        set name {string}   Name. size[79]
        set ca {string}   CA certificate as a PEM file.
        set range {global | vdom}   Either global or VDOM IP address range for the CA
certificate.
                global  Global range.
                vdom    VDOM IP address range.
        set source {factory | user | bundle}   CA certificate source type.
                factory  Factory installed certificate.
                user     User generated certificate.
                bundle   Bundle file certificate.
        set trusted {enable | disable}   Enable/disable as a trusted CA.
        set scep-url {string}   URL of the SCEP server. size[255]
        set auto-update-days {integer}   Number of days to wait before requesting an updated
CA certificate (0 - 4294967295, 0 = disabled). range[0-4294967295]
```

## Configuring the FortiAuthenticator

### To create the RADIUS client:

1. On the FortiAuthenticator, go to *Authentication* > *RADIUS Service* > *Clients*, and select *Create New*.
2. Enter a *Name*, the IP address of the FortiGate, and set a *Secret*.
   The secret is a pre-shared secure password that the FortiGate will use to authenticate to the FortiAuthenticator.



Edit Authentication Client

Name: FortiGate

Client address: IP/Hostname | Subnet | Range

172.20.120.142

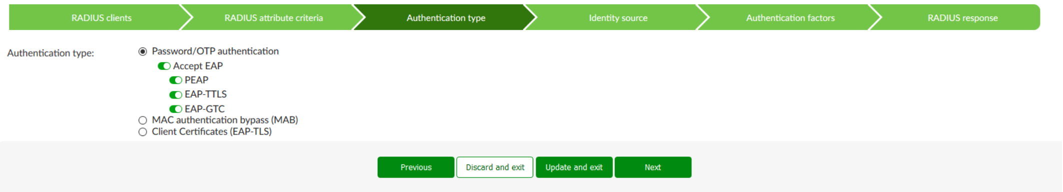
Secret: ••••••••

Accept RADIUS accounting messages for usage enforcement

Support RADIUS Disconnect messages

### To create the RADIUS policy:

1. Go to *Authentication* > *RADIUS Service* > *Policies*, and select *Create New*.
2. Enter the RADIUS policy name, description, and select the FortiGate RADIUS client.
3. Do not configure RADIUS attribute criteria.
4. Choose *Password/OTP* authentication as the authentication type and enable all *EAP* types.

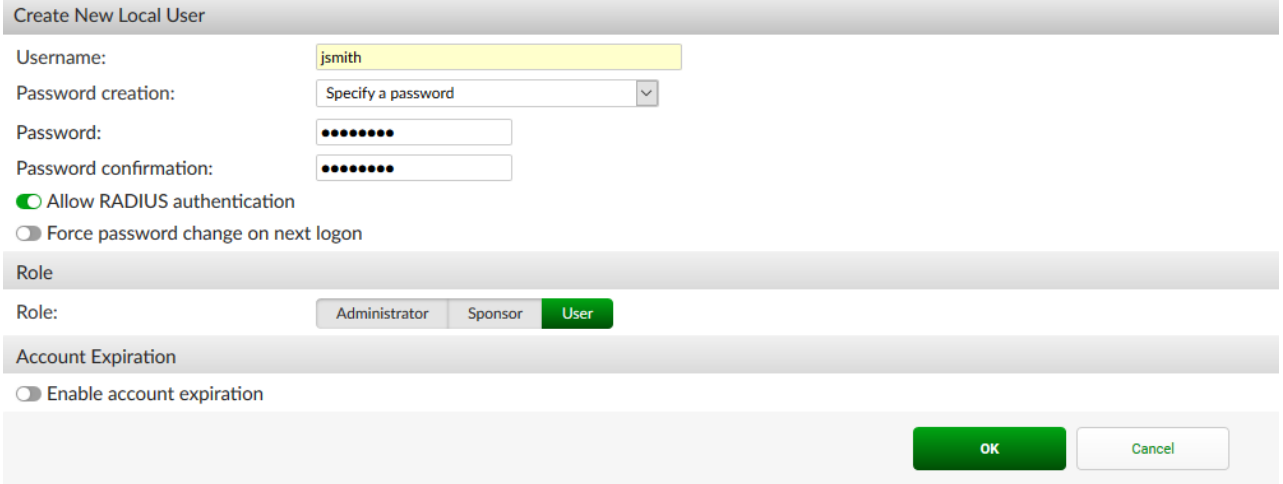


Authentication type:
- ● Password/OTP authentication
  - Accept EAP
    - PEAP
    - EAP-TTLS
    - EAP-GTC
- ○ MAC authentication bypass (MAB)
- ○ Client Certificates (EAP-TLS)

5. Choose a username format (in this example: *username@realm*), select the *Local* realm.
   Add the *employees* user group as a filter.
6. Set the authentication method to *Password only authentication*.
7. Review the RADIUS response, and click *Save and Exit*.

### To create the local user accounts:

1. Next go to *Authentication* > *User Management* > *Local Users* and create local user accounts as needed.



Create New Local User

Username: jsmith

Password creation: Specify a password

Password: ••••••••

Password confirmation: ••••••••

Allow RADIUS authentication

Force password change on next logon

Role

Role: Administrator | Sponsor | User

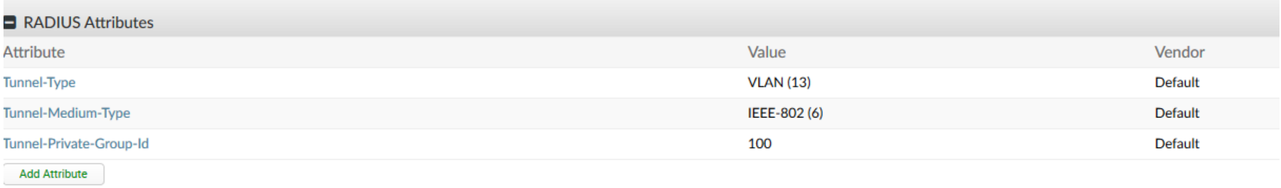
Account Expiration

Enable account expiration

2. For each user, add the following RADIUS attributes which specify the VLAN information to be sent to the FortiGate.

The *Tunnel-Private-Group-Id* attribute specifies the VLAN ID.

In this example, jsmith is assigned VLAN *100* and twhite is assigned VLAN *200*.



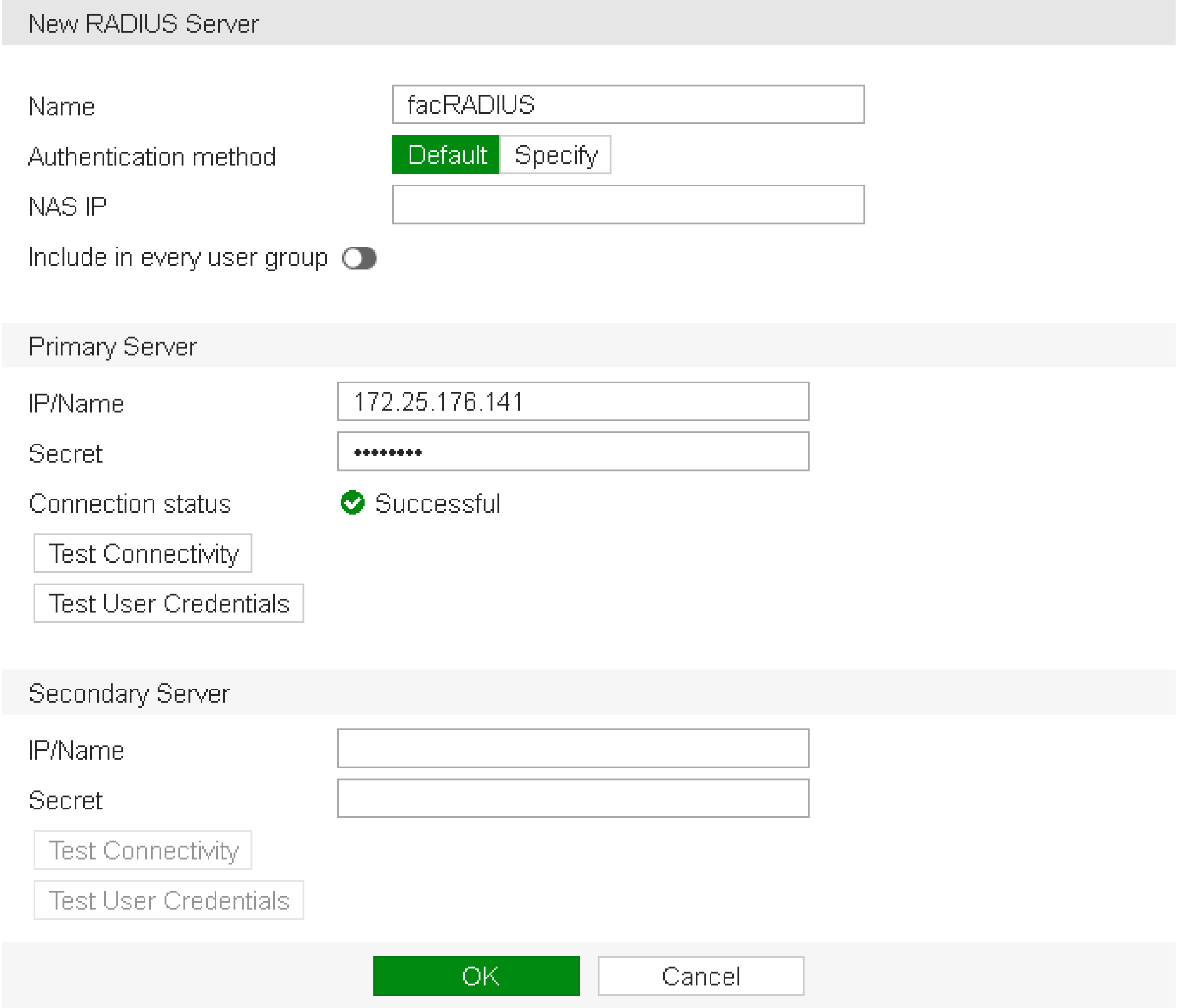
RADIUS Attributes

| Attribute | Value | Vendor |
|---|---|---|
| Tunnel-Type | VLAN (13) | Default |
| Tunnel-Medium-Type | IEEE-802 (6) | Default |
| Tunnel-Private-Group-Id | 100 | Default |

## Adding the RADIUS server to the FortiGate

### To add the RADIUS server to the FortiGate:

1. On the FortiGate, go to *User & Device > RADIUS Servers* and select *Create New*.
   Enter the FortiAuthenticator IP address and the server *Secret* entered on the FortiAuthenticator earlier.
   Select *Test Connectivity* to confirm the successful connection.



New RADIUS Server

| | |
|---|---|
| Name | facRADIUS |
| Authentication method | Default (selected) / Specify |
| NAS IP | |
| Include in every user group | Off |

Primary Server

| | |
|---|---|
| IP/Name | 172.25.176.141 |
| Secret | •••••••• |
| Connection status | ✓ Successful |

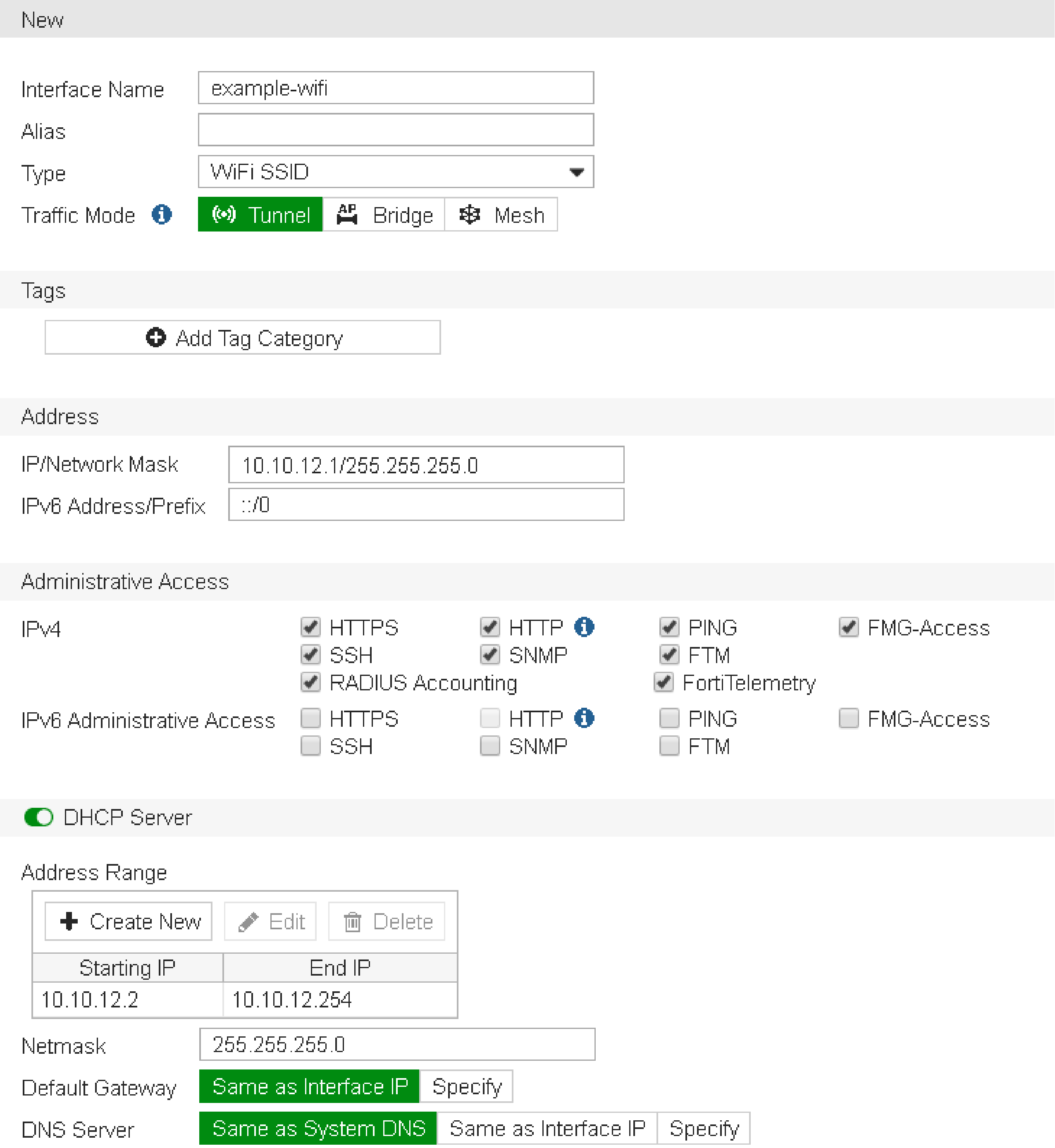
Secondary Server

| | |
|---|---|
| IP/Name | |
| Secret | |

## Creating an SSID with dynamic VLAN assignment

**To create an SSID with dynamic VLAN assignment:**

1. On the FortiGate, go to *WiFi & Switch Controller > SSID* and create a new SSID.
   Set up DHCP service.



New

Interface Name: example-wifi
Alias:
Type: WiFi SSID
Traffic Mode: [✓ Tunnel] Bridge Mesh

Tags

Add Tag Category

Address

IP/Network Mask: 10.10.12.1/255.255.255.0
IPv6 Address/Prefix: ::/0

Administrative Access

IPv4: ☑ HTTPS ☑ HTTP ☑ PING ☑ FMG-Access ☑ SSH ☑ SNMP ☑ FTM ☑ RADIUS Accounting ☑ FortiTelemetry

IPv6 Administrative Access: □ HTTPS □ HTTP □ PING □ FMG-Access □ SSH □ SNMP □ FTM

● DHCP Server

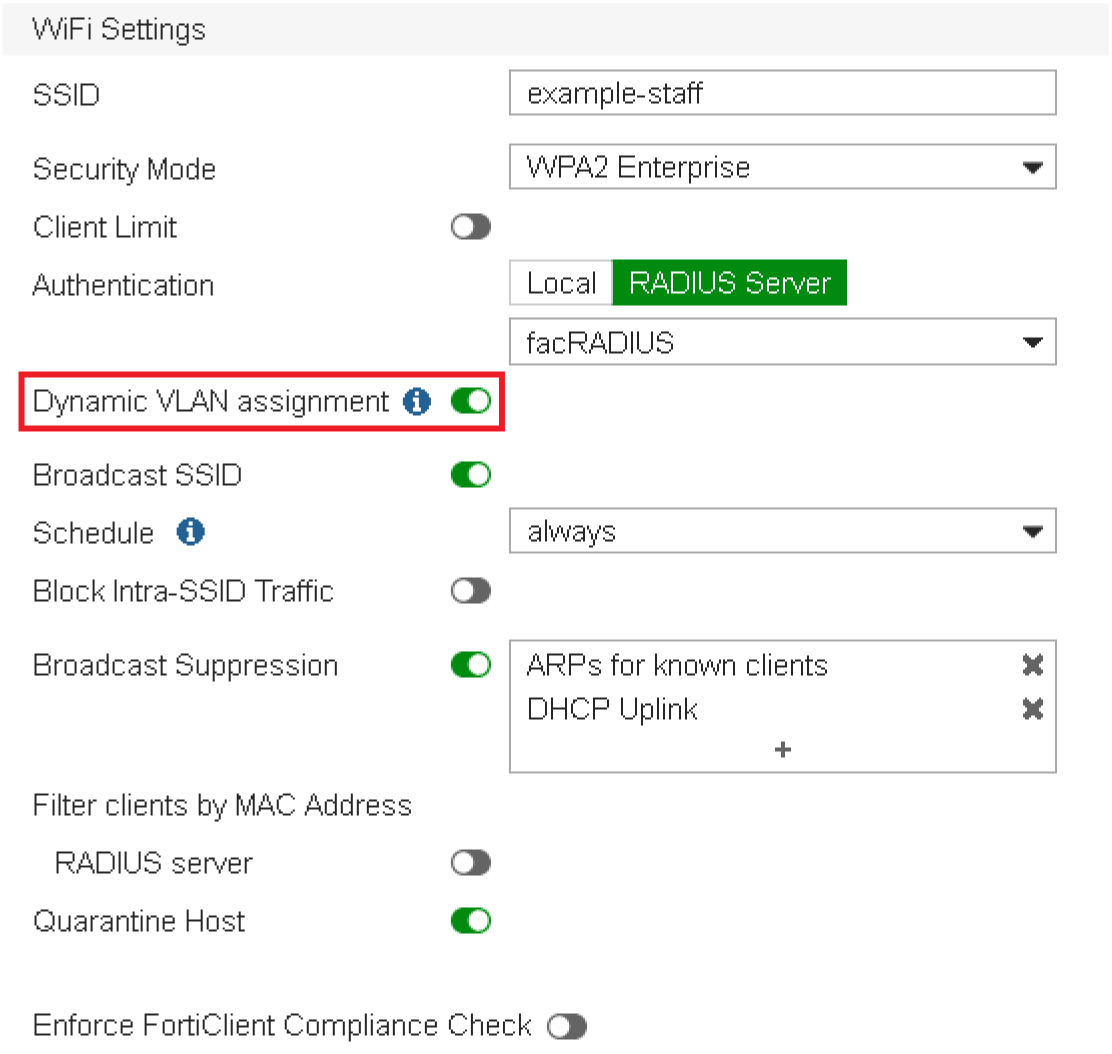
Address Range

Create New | Edit | Delete

| Starting IP | End IP |
|---|---|
| 10.10.12.2 | 10.10.12.254 |

Netmask: 255.255.255.0
Default Gateway: [✓ Same as Interface IP] Specify
DNS Server: [✓ Same as System DNS] Same as Interface IP Specify

2. Select *WPA2 Enterprise* security and select your RADIUS server for authentication.
   Enable *Dynamic VLAN Assignment*.



WiFi Settings

SSID: example-staff

Security Mode: WPA2 Enterprise

Client Limit ○

Authentication: Local [✓ RADIUS Server]

facRADIUS

Dynamic VLAN assignment ●

Broadcast SSID ●

Schedule: always

Block Intra-SSID Traffic ○

Broadcast Suppression ●
- ARPs for known clients
- DHCP Uplink

Filter clients by MAC Address

RADIUS server ○

Quarantine Host ●

Enforce FortiClient Compliance Check ○

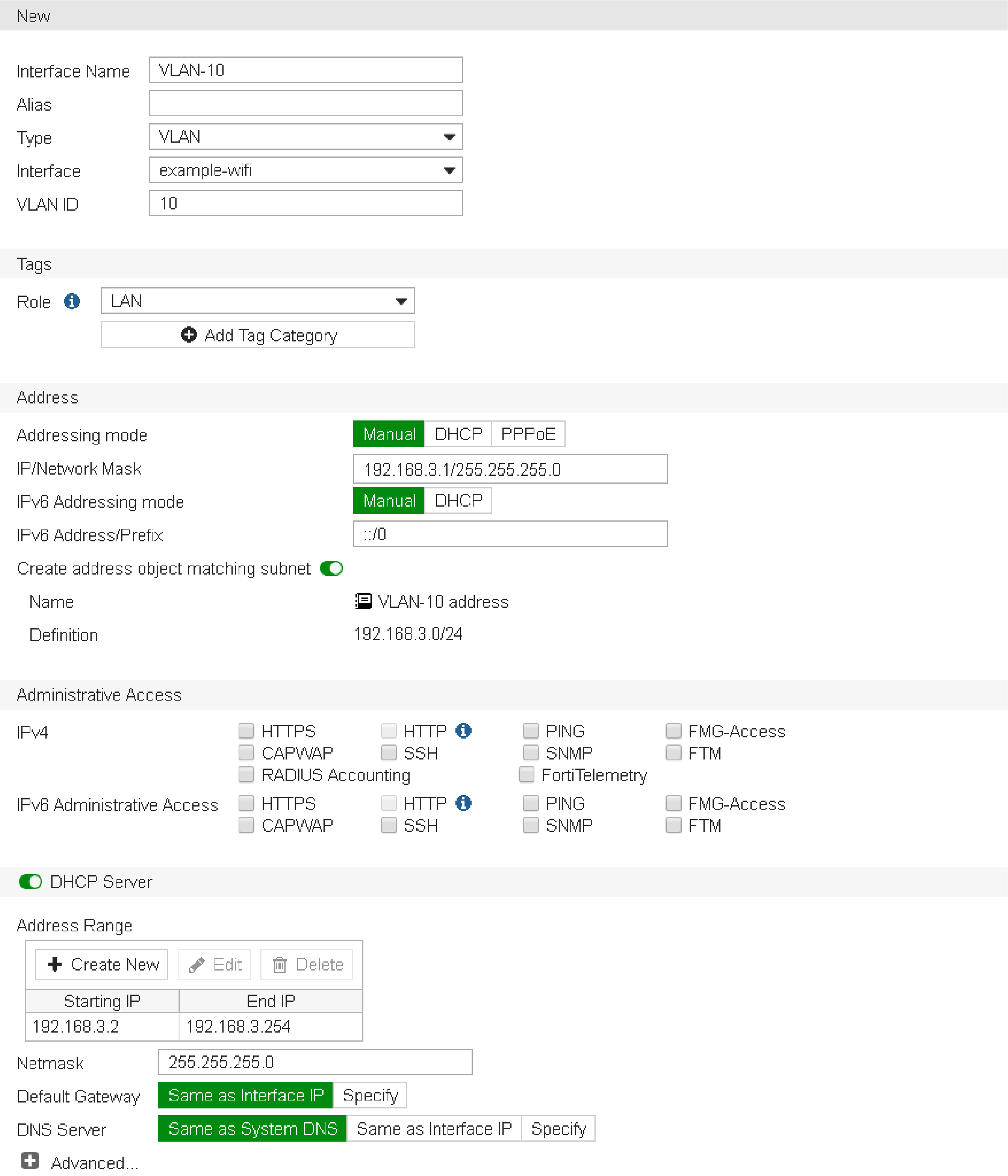
3. Then open the *CLI Console* and enter the following command to assignment and set the VLAN ID to `10`. This VLAN is used when RADIUS does not assign a VLAN:

```
config wireless-controller vap
   edit example-wifi
      set vlanid 10
   next
end
```

## Creating the VLAN interfaces

**To create the VLAN interfaces:**

1. Go to *Network > Interfaces*.
   Create the VLAN interface for default *VLAN-10* and set up DHCP service.



New

| | |
|---|---|
| Interface Name | VLAN-10 |
| Alias | |
| Type | VLAN |
| Interface | example-wifi |
| VLAN ID | 10 |

Tags

| | |
|---|---|
| Role | LAN |

Address

| | |
|---|---|
| Addressing mode | [✓ Manual] DHCP PPPoE |
| IP/Network Mask | 192.168.3.1/255.255.255.0 |
| IPv6 Addressing mode | [✓ Manual] DHCP |
| IPv6 Address/Prefix | ::/0 |
| Create address object matching subnet | ● |
| Name | VLAN-10 address |
| Definition | 192.168.3.0/24 |

Administrative Access

IPv4: □ HTTPS □ HTTP □ PING □ FMG-Access □ CAPWAP □ SSH □ SNMP □ FTM □ RADIUS Accounting □ FortiTelemetry

IPv6 Administrative Access: □ HTTPS □ HTTP □ PING □ FMG-Access □ CAPWAP □ SSH □ SNMP □ FTM

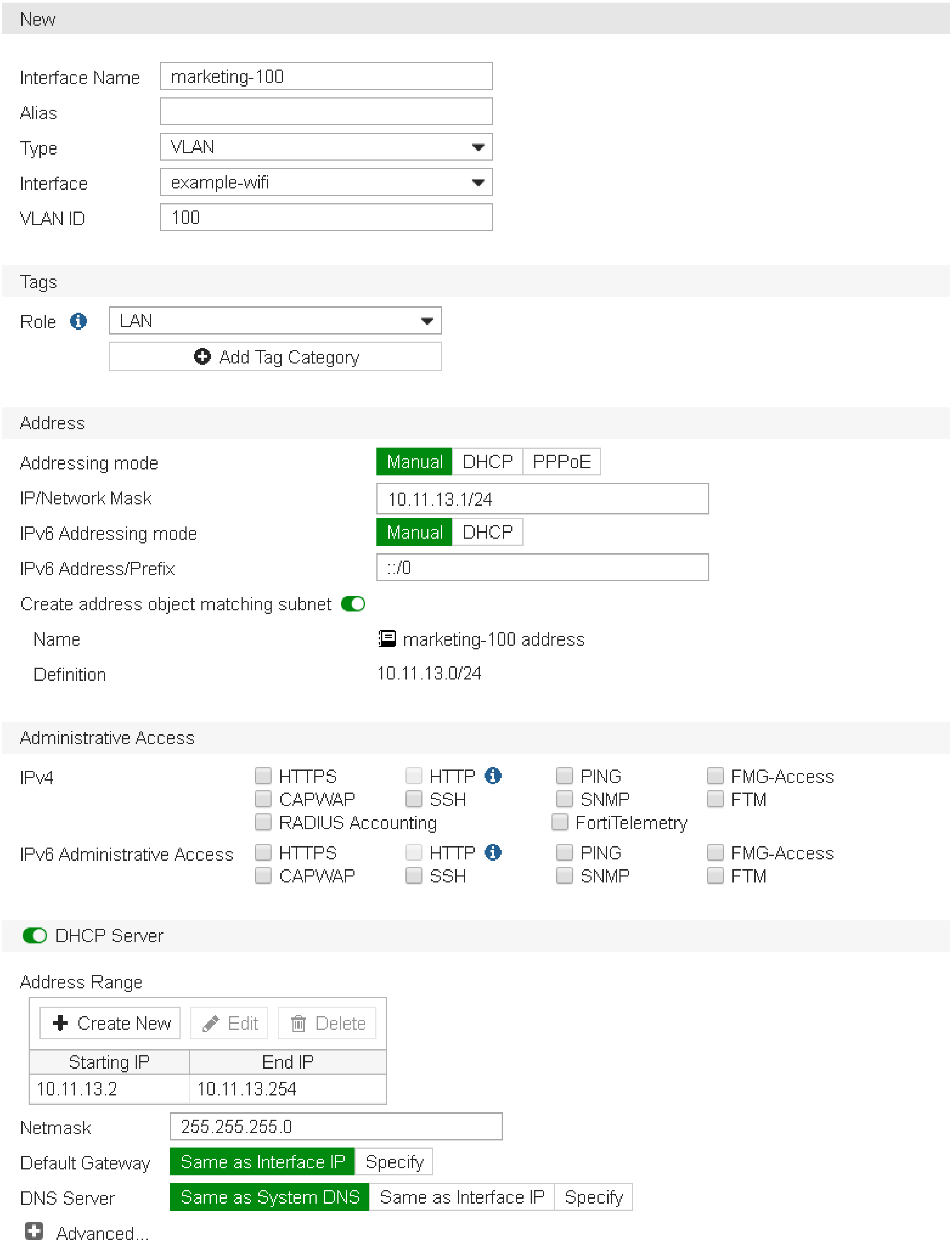
● DHCP Server

Address Range

| Starting IP | End IP |
|---|---|
| 192.168.3.2 | 192.168.3.254 |

| | |
|---|---|
| Netmask | 255.255.255.0 |
| Default Gateway | [✓ Same as Interface IP] Specify |
| DNS Server | [✓ Same as System DNS] Same as Interface IP Specify |

2. Then create two more VLAN interfaces: one for *marketing-100* and another for *techdoc-200*, both with DHCP service.



New

| | |
|---|---|
| Interface Name | marketing-100 |
| Alias | |
| Type | VLAN |
| Interface | example-wifi |
| VLAN ID | 100 |

Tags

Role: LAN

Add Tag Category

Address

| | |
|---|---|
| Addressing mode | [✓ Manual] DHCP PPPoE |
| IP/Network Mask | 10.11.13.1/24 |
| IPv6 Addressing mode | [✓ Manual] DHCP |
| IPv6 Address/Prefix | ::/0 |
| Create address object matching subnet | ● |
| Name | marketing-100 address |
| Definition | 10.11.13.0/24 |

Administrative Access

IPv4: □ HTTPS □ HTTP □ PING □ FMG-Access □ CAPWAP □ SSH □ SNMP □ FTM □ RADIUS Accounting □ FortiTelemetry

IPv6 Administrative Access: □ HTTPS □ HTTP □ PING □ FMG-Access □ CAPWAP □ SSH □ SNMP □ FTM

● DHCP Server

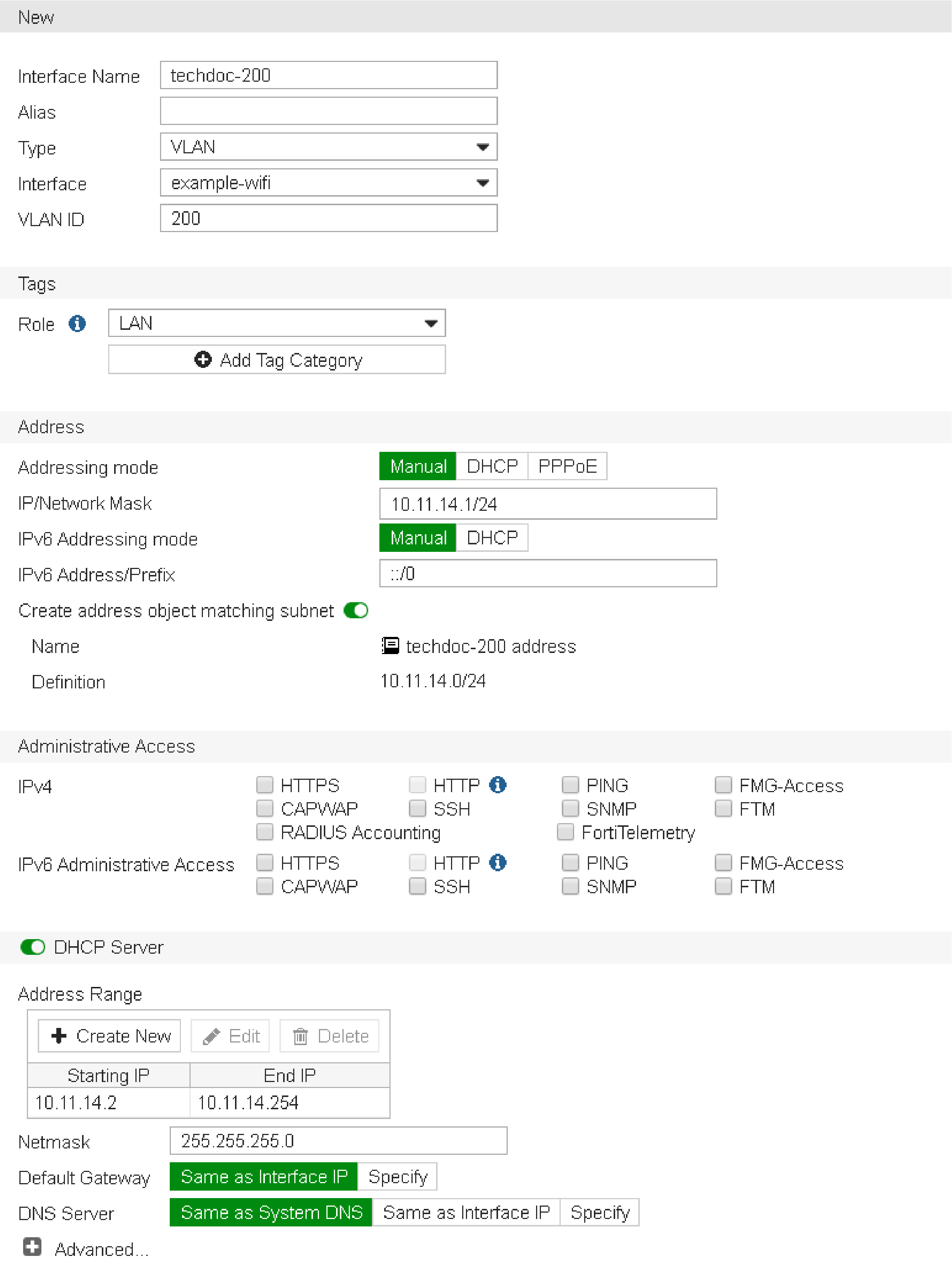
Address Range

Create New | Edit | Delete

| Starting IP | End IP |
|---|---|
| 10.11.13.2 | 10.11.13.254 |

| | |
|---|---|
| Netmask | 255.255.255.0 |
| Default Gateway | [✓ Same as Interface IP] Specify |
| DNS Server | [✓ Same as System DNS] Same as Interface IP Specify |

Advanced...



New

| | |
|---|---|
| Interface Name | techdoc-200 |
| Alias | |
| Type | VLAN ▾ |
| Interface | example-wifi ▾ |
| VLAN ID | 200 |

Tags

| | |
|---|---|
| Role ℹ | LAN ▾ |
| | ⊕ Add Tag Category |

Address

| | |
|---|---|
| Addressing mode | [✓ Manual] DHCP PPPoE |
| IP/Network Mask | 10.11.14.1/24 |
| IPv6 Addressing mode | [✓ Manual] DHCP |
| IPv6 Address/Prefix | ::/0 |
| Create address object matching subnet | ● |
| Name | techdoc-200 address |
| Definition | 10.11.14.0/24 |

Administrative Access

IPv4: □ HTTPS □ HTTP ℹ □ PING □ FMG-Access □ CAPWAP □ SSH □ SNMP □ FTM □ RADIUS Accounting □ FortiTelemetry

IPv6 Administrative Access: □ HTTPS □ HTTP ℹ □ PING □ FMG-Access □ CAPWAP □ SSH □ SNMP □ FTM

● DHCP Server

Address Range

| Starting IP | End IP |
|---|---|
| 10.11.14.2 | 10.11.14.254 |

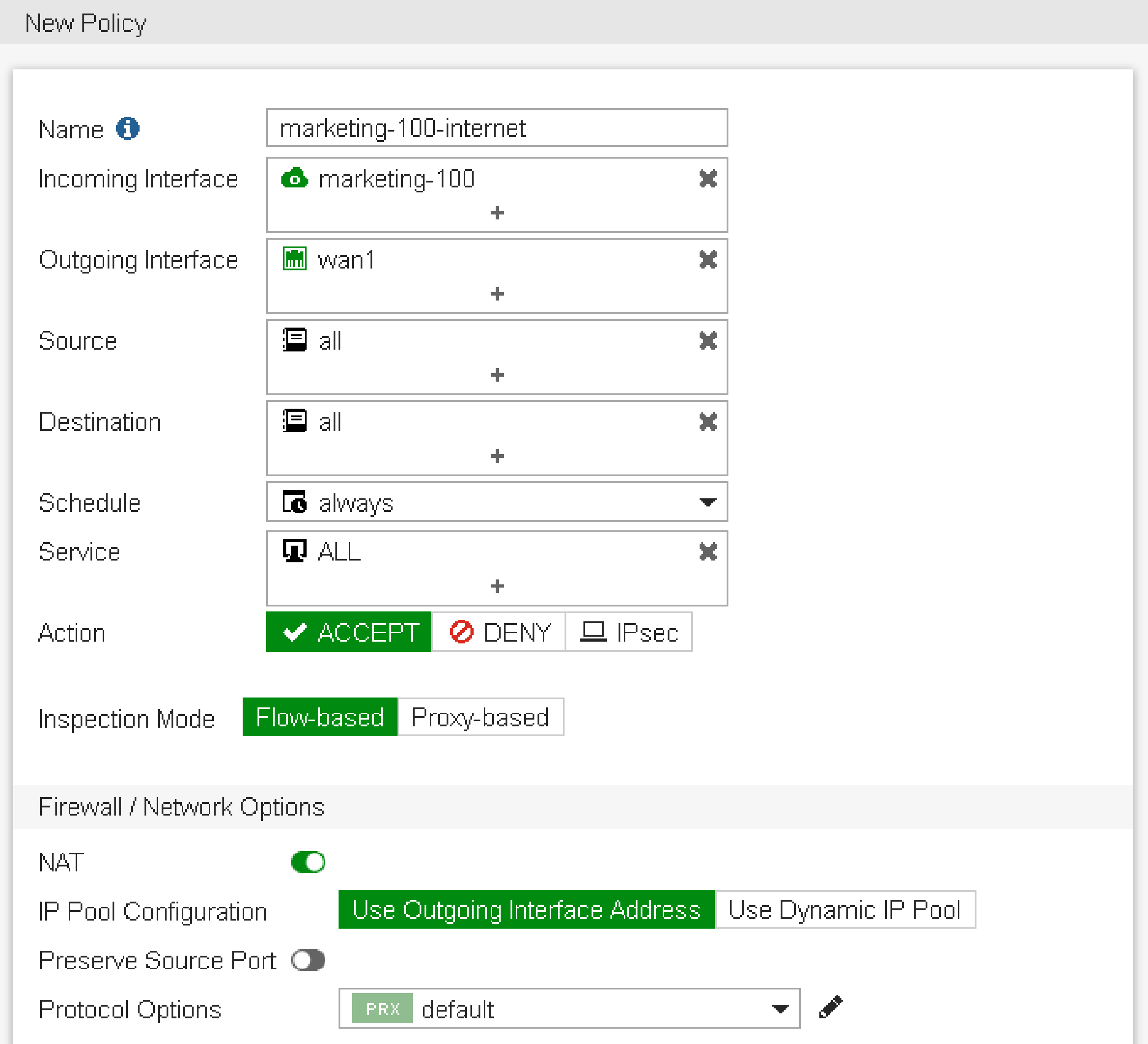
| | |
|---|---|
| Netmask | 255.255.255.0 |
| Default Gateway | [✓ Same as Interface IP] Specify |
| DNS Server | [✓ Same as System DNS] Same as Interface IP Specify |

⊞ Advanced...

## Creating security policies

**To create the security policies:**

1. Go to *Policy & Objects > IPv4 Policy*.
   Create a policy that allows outbound traffic from *marketing-100* to the Internet.



New Policy

Name: marketing-100-internet

Incoming Interface: marketing-100

Outgoing Interface: wan1

Source: all

Destination: all

Schedule: always

Service: ALL

Action: ✓ ACCEPT | DENY | IPsec

Inspection Mode: Flow-based | Proxy-based

Firewall / Network Options

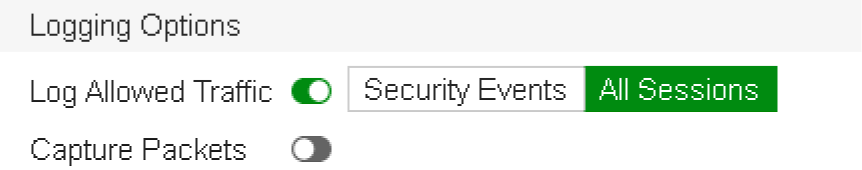
NAT: ●

IP Pool Configuration: Use Outgoing Interface Address | Use Dynamic IP Pool

Preserve Source Port: ○

Protocol Options: PRX default

2. Under *Logging Options*, enable logging for *All Sessions*.



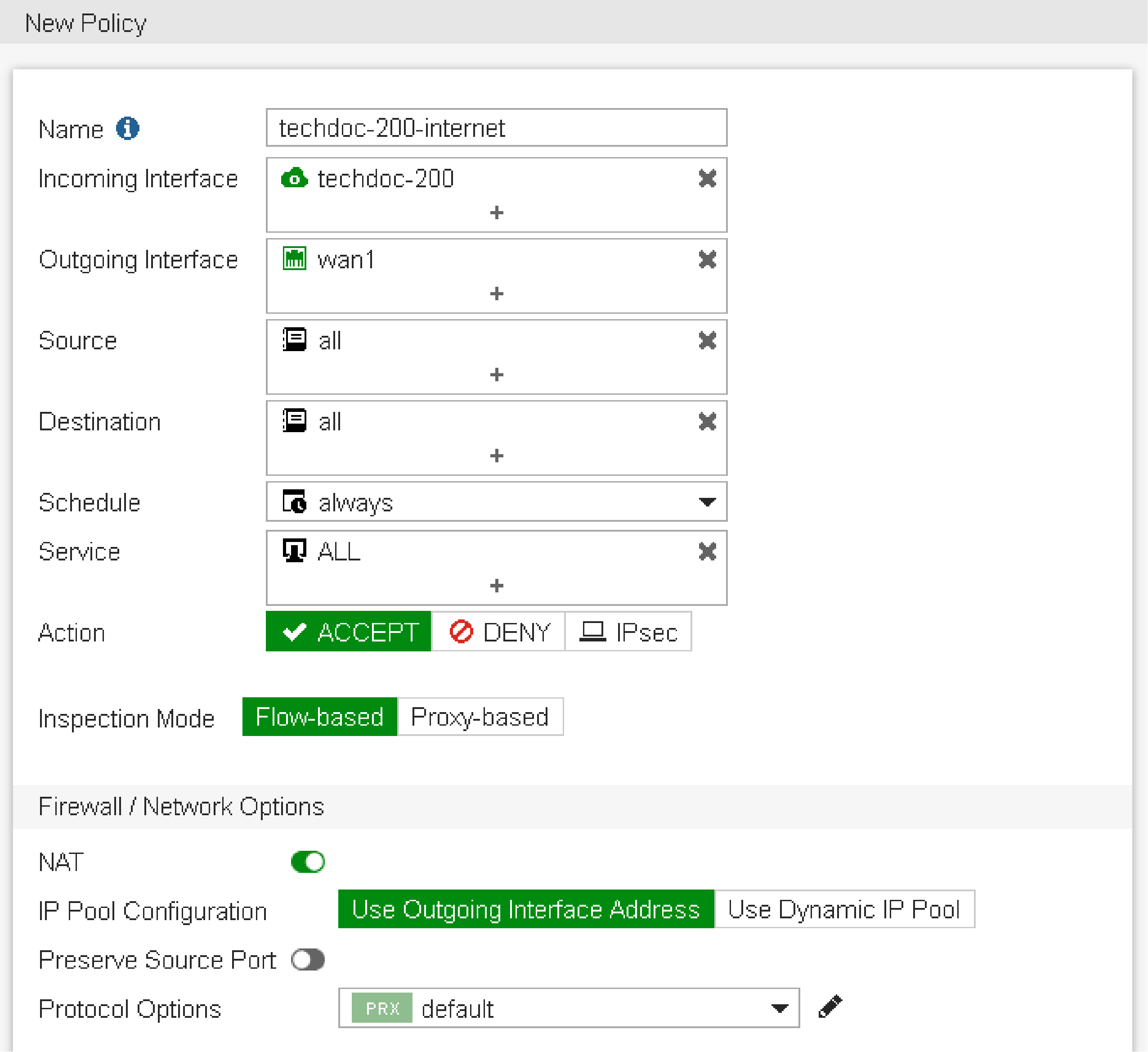
Logging Options

Log Allowed Traffic: ● Security Events | All Sessions

Capture Packets: ○

3. Create another policy that allows outbound traffic from *techdoc-200* to the Internet.

For this policy too, under *Logging Options*, enable logging for *All Sessions*.



New Policy

Name: techdoc-200-internet

Incoming Interface: techdoc-200

Outgoing Interface: wan1

Source: all

Destination: all

Schedule: always

Service: ALL

Action: [✓ ACCEPT] DENY IPsec

Inspection Mode: [✓ Flow-based] Proxy-based

Firewall / Network Options

NAT: ●

IP Pool Configuration: [✓ Use Outgoing Interface Address] Use Dynamic IP Pool

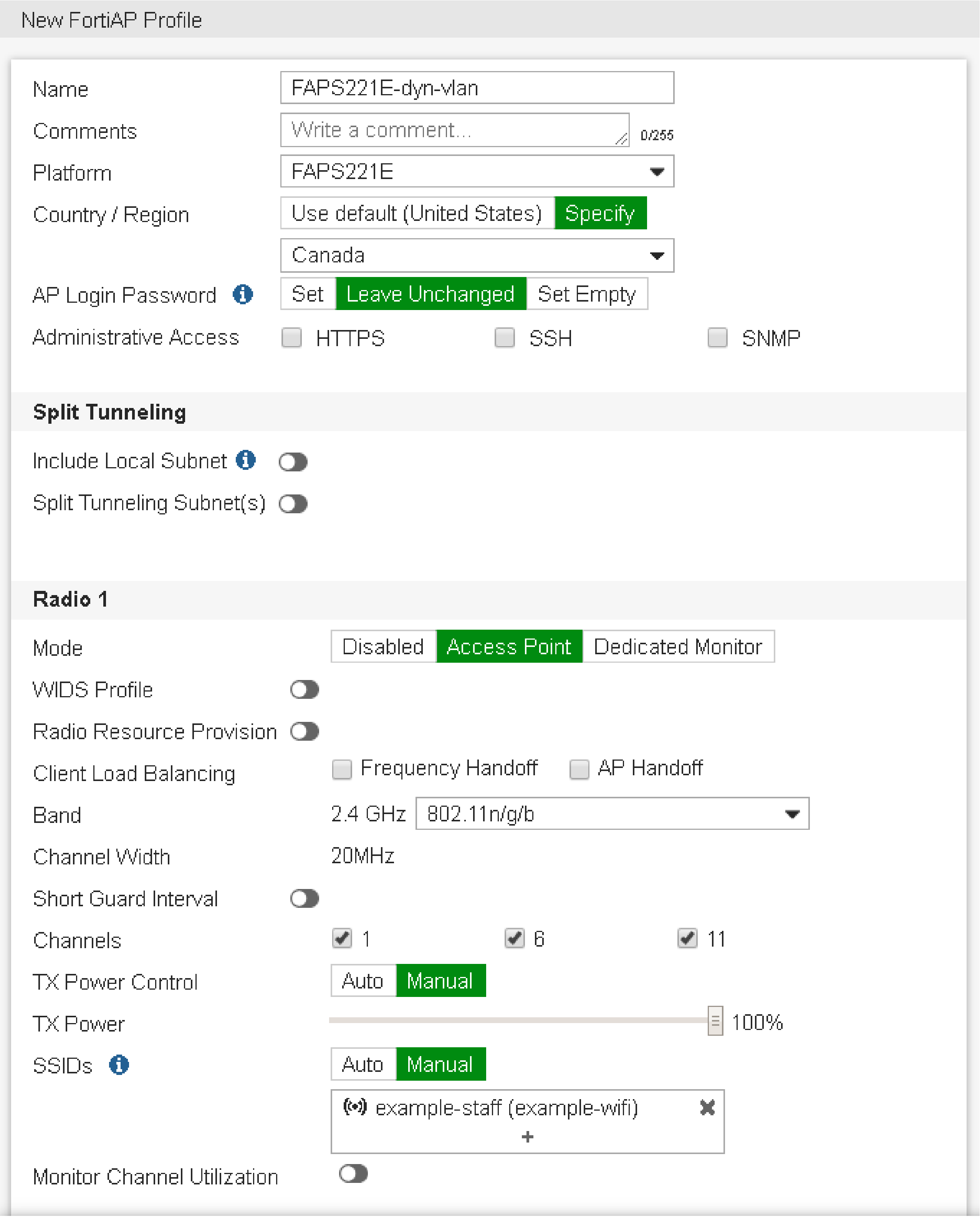
Preserve Source Port: ○

Protocol Options: PRX default

## Creating the FortiAP profile

**To create the FortiAP profile:**

1. Go to *WiFi & Switch Controller* > *FortiAP Profiles*.
   Create a new profile for your FortiAP model and select the new SSID for both *Radio 1* and *Radio 2*.



New FortiAP Profile

| | |
|---|---|
| Name | FAPS221E-dyn-vlan |
| Comments | Write a comment... 0/255 |
| Platform | FAPS221E |
| Country / Region | Use default (United States) [✓ Specify]<br>Canada |
| AP Login Password | Set [✓ Leave Unchanged] Set Empty |
| Administrative Access | □ HTTPS □ SSH □ SNMP |

**Split Tunneling**

| | |
|---|---|
| Include Local Subnet | ○ |
| Split Tunneling Subnet(s) | ○ |

**Radio 1**

| | |
|---|---|
| Mode | Disabled [✓ Access Point] Dedicated Monitor |
| WIDS Profile | ○ |
| Radio Resource Provision | ○ |
| Client Load Balancing | □ Frequency Handoff □ AP Handoff |
| Band | 2.4 GHz 802.11n/g/b |
| Channel Width | 20MHz |
| Short Guard Interval | ○ |
| Channels | ☑ 1 ☑ 6 ☑ 11 |
| TX Power Control | Auto [✓ Manual] |
| TX Power | 100% |
| SSIDs | Auto [✓ Manual]<br>example-staff (example-wifi) ✖<br>+ |
| Monitor Channel Utilization | ○ |

## Connecting and authorizing the FortiAP

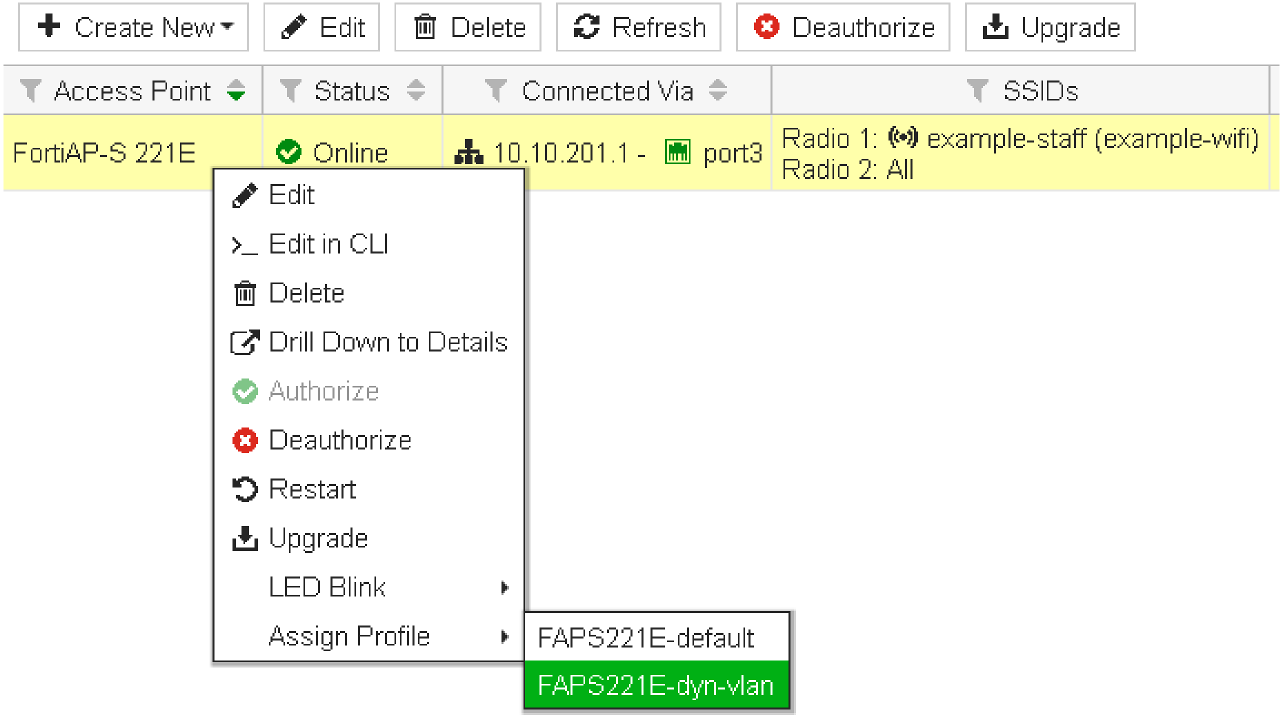
**To connect and authorize the FortiAP:**

1. Go to *Network* > *Interfaces* and edit an unused interface.
   Set an *IP/Network Mask* and enable *CAPWAP* under *Administrative Access* > *IPv4*.

   Enable *DHCP Server*.

   Now connect the FortiAP unit to the this interface and apply power.
2. Go to *WiFi & Switch Controller* > *Managed FortiAPs*.
   Right-click on the FortiAP unit and select *Authorize*.

   Once authorized, right-click on the FortiAP unit again and select *Assign Profile* and select the FortiAP profile created earlier.



| Access Point | Status | Connected Via | SSIDs |
|---|---|---|---|
| FortiAP-S 221E | Online | 10.10.201.1 - port3 | Radio 1: example-staff (example-wifi)<br>Radio 2: All |

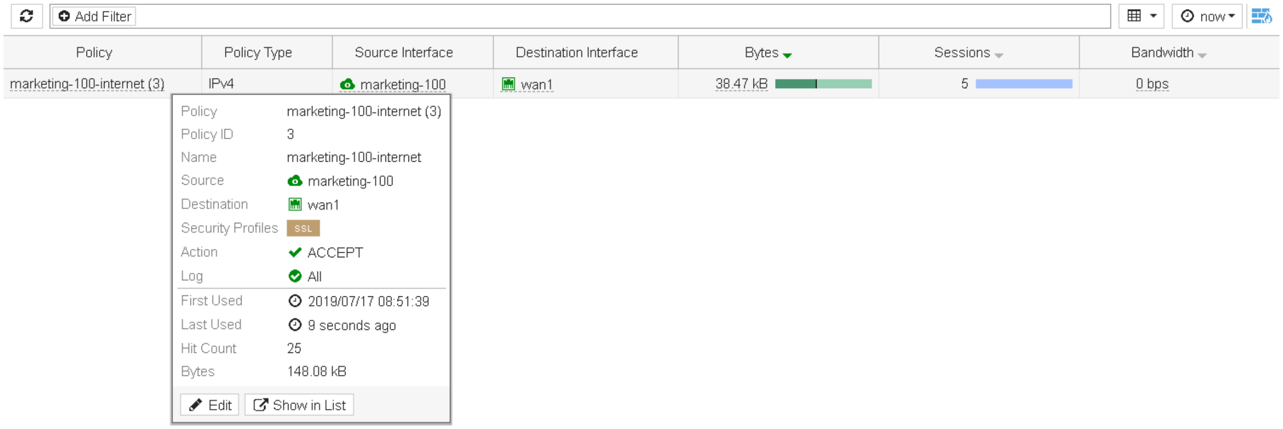
## Results

The SSID will appear in the list of available wireless networks on the users’ devices.

Both twhite and jsmith can connect to the SSID with their credentials and access the Internet.

If a certificate warning message appears, accept the certificate.

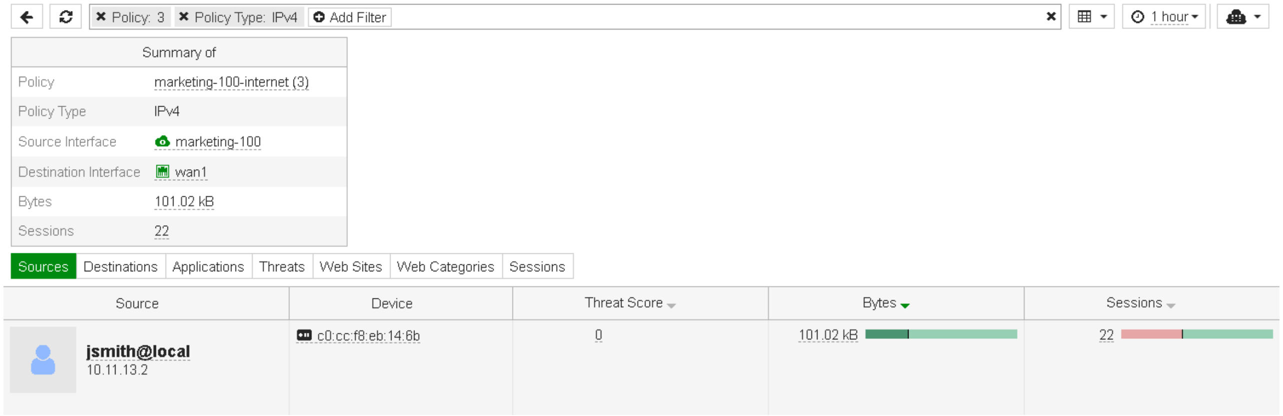
1. Go to *FortiView* > *Policies*.
   Note that traffic for jsmith and twhite will pass through different policies. In this example, the *marketing-100-internet* policy is displayed, indicating that jsmith has connected to the WiFi.



| Policy | Policy Type | Source Interface | Destination Interface | Bytes | Sessions | Bandwidth |
|---|---|---|---|---|---|---|
| marketing-100-internet (3) | IPv4 | marketing-100 | wan1 | 38.47 kB | 5 | 0 bps |

| | |
|---|---|
| Policy | marketing-100-internet (3) |
| Policy ID | 3 |
| Name | marketing-100-internet |
| Source | marketing-100 |
| Destination | wan1 |
| Security Profiles | SSL |
| Action | ✓ ACCEPT |
| Log | ✓ All |
| First Used | 2019/07/17 08:51:39 |
| Last Used | 9 seconds ago |
| Hit Count | 25 |
| Bytes | 148.08 kB |

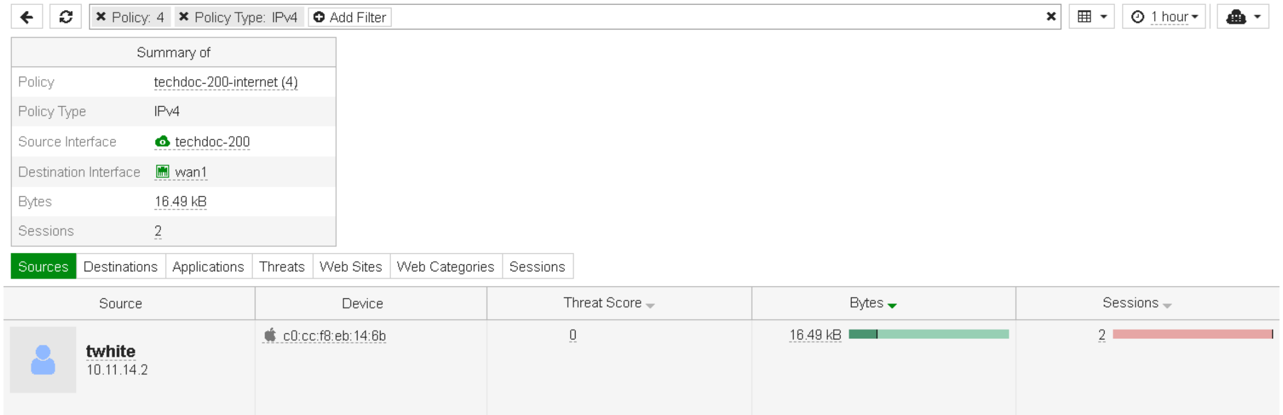
2. Double-click to drill-down, where the user's identity (including username, source IP, and device address) is confirmed.



| Summary of | |
|---|---|
| Policy | marketing-100-internet (3) |
| Policy Type | IPv4 |
| Source Interface | marketing-100 |
| Destination Interface | wan1 |
| Bytes | 101.02 kB |
| Sessions | 22 |

| Source | Device | Threat Score | Bytes | Sessions |
|---|---|---|---|---|
| jsmith@local<br>10.11.13.2 | c0:cc:f8:eb:14:6b | 0 | 101.02 kB | 22 |

3. When twhite has connected to the WiFi network, go to *FortiView* > *Policies* and drill-down. The user, and *techdoc-200-internet* policy, is confirmed.



| Summary of | |
|---|---|
| Policy | techdoc-200-internet (4) |
| Policy Type | IPv4 |
| Source Interface | techdoc-200 |
| Destination Interface | wan1 |
| Bytes | 16.49 kB |
| Sessions | 2 |

| Source | Device | Threat Score | Bytes | Sessions |
|---|---|---|---|---|
| twhite<br>10.11.14.2 | c0:cc:f8:eb:14:6b | 0 | 16.49 kB | 2 |

# WiFi using FortiAuthenticator RADIUS with certificates

This recipe will walk you through the configuration of FortiAuthenticator as the RADIUS server for a FortiGate wireless controller. WPA2-Enterprise with 802.1X authentication can be used to authenticate wireless users with FortiAuthenticator. 802.1X utilizes the Extensible Authentication Protocol (EAP) to establish a secure tunnel between participants involved in an authentication exchange.

EAP-TLS is the most secure form of wireless authentication because it replaces the client username/password with a client certificate. Every end user, including the authentication server, that participates in EAP-TLS must possess at least two certificates:

1. A client certificate signed by the certificate authority (CA)
2. A copy of the CA root certificate.

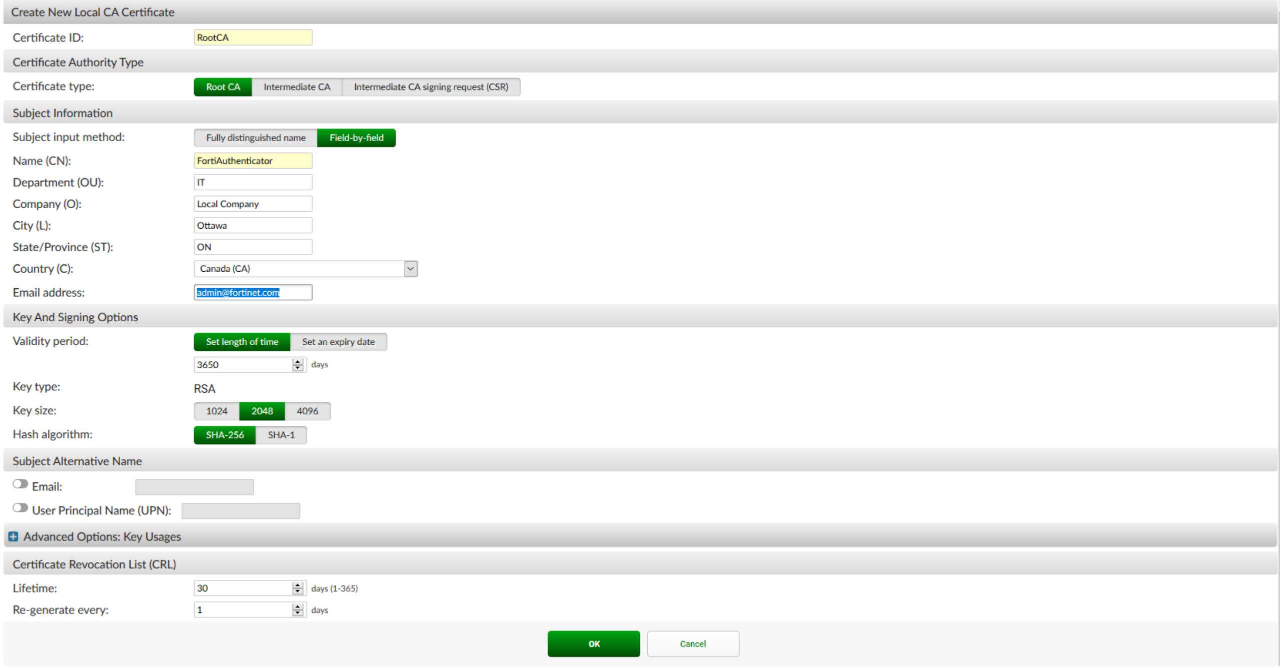
This recipe specifically focuses on the configuration of the FortiAuthenticator, FortiGate, and Windows 10 computer.

## Creating a local CA on FortiAuthenticator

The FortiAuthenticator will act as the certificate authority for all certificates authenticated for client access. To enable this functionality, a self-signed root CA certificate must be generated.

### To create the local CA:

1. On the FortiAuthenticator, go to *Certificate Management* > *Certificate Authorities* > *Local CAs* and select *Create New*.
   Configure the fields as required.



Create New Local CA Certificate

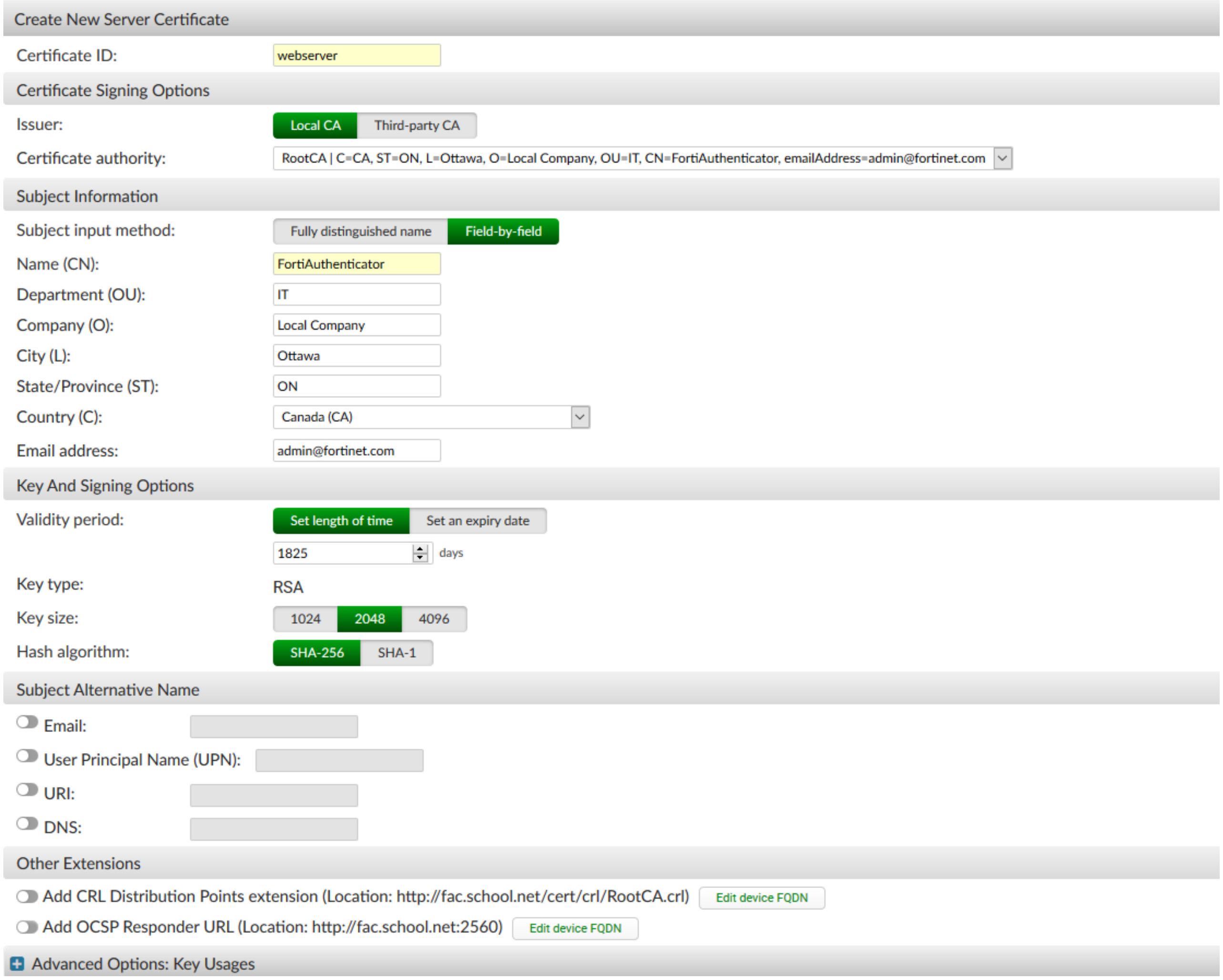
| | |
|---|---|
| Certificate ID: | RootCA |
| **Certificate Authority Type** | |
| Certificate type: | [✓ Root CA] Intermediate CA Intermediate CA signing request (CSR) |
| **Subject Information** | |
| Subject input method: | Fully distinguished name [✓ Field-by-field] |
| Name (CN): | FortiAuthenticator |
| Department (OU): | IT |
| Company (O): | Local Company |
| City (L): | Ottawa |
| State/Province (ST): | ON |
| Country (C): | Canada (CA) |
| Email address: | admin@fortinet.com |
| **Key And Signing Options** | |
| Validity period: | [✓ Set length of time] Set an expiry date |
| | 3650 days |
| Key type: | RSA |
| Key size: | 1024 [✓ 2048] 4096 |
| Hash algorithm: | [✓ SHA-256] SHA-1 |
| **Subject Alternative Name** | |
| ○ Email: | |
| ○ User Principal Name (UPN): | |
| **Advanced Options: Key Usages** | |
| **Certificate Revocation List (CRL)** | |
| Lifetime: | 30 days (1-365) |
| Re-generate every: | 1 days |

## Creating a local service certificate on FortiAuthenticator

In order for the FortiAuthenticator to use a certificate in mutual authentication (supported by EAP-TLS), a local services certificate has to be created on behalf of the FortiAuthenticator.

**To create the local service certificate:**

1. Go to *Certificate Management > End Entities > Local Services* and select *Create New*. Complete the information in the fields pertaining to your organization.



Create New Server Certificate

| | |
|---|---|
| Certificate ID: | webserver |
| **Certificate Signing Options** | |
| Issuer: | [✓ Local CA] Third-party CA |
| Certificate authority: | RootCA \| C=CA, ST=ON, L=Ottawa, O=Local Company, OU=IT, CN=FortiAuthenticator, emailAddress=admin@fortinet.com |
| **Subject Information** | |
| Subject input method: | Fully distinguished name [✓ Field-by-field] |
| Name (CN): | FortiAuthenticator |
| Department (OU): | IT |
| Company (O): | Local Company |
| City (L): | Ottawa |
| State/Province (ST): | ON |
| Country (C): | Canada (CA) |
| Email address: | admin@fortinet.com |
| **Key And Signing Options** | |
| Validity period: | [✓ Set length of time] Set an expiry date<br>1825 days |
| Key type: | RSA |
| Key size: | 1024 [✓ 2048] 4096 |
| Hash algorithm: | [✓ SHA-256] SHA-1 |
| **Subject Alternative Name** | |
| ○ Email: | |
| ○ User Principal Name (UPN): | |
| ○ URI: | |
| ○ DNS: | |
| **Other Extensions** | |
| ○ Add CRL Distribution Points extension (Location: http://fac.school.net/cert/crl/RootCA.crl) | Edit device FQDN |
| ○ Add OCSP Responder URL (Location: http://fac.school.net:2560) | Edit device FQDN |

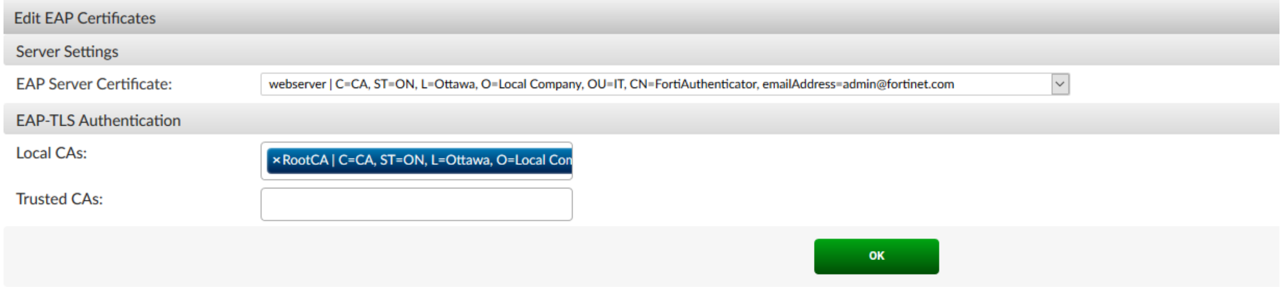
⊞ Advanced Options: Key Usages

## Configuring RADIUS EAP on FortiAuthenticator

In order for the FortiAuthenticator to present the newly created Local Services certificate as its authentication to the WiFi client, the RADIUS-EAP must be configured to use this certificate.

### To configure RADIUS EAP on FortiAuthenticator:

1. Go to *Authentication* > *RADIUS Service* > *EAP,* and select *Create New*.
2. Select the corresponding Local Services certificate in the EAP Server Certificate section.
3. Choose the Local CA certificate previous configured in the Local CAs section.



Edit EAP Certificates

Server Settings

EAP Server Certificate: webserver | C=CA, ST=ON, L=Ottawa, O=Local Company, OU=IT, CN=FortiAuthenticator, emailAddress=admin@fortinet.com

EAP-TLS Authentication

Local CAs: ×RootCA | C=CA, ST=ON, L=Ottawa, O=Local Con

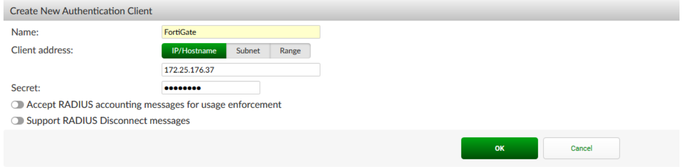
Trusted CAs:

## Configuring RADIUS client on FortiAuthenticator

The FortiAuthenticator has to be configured to allow RADIUS clients to make authorization requests to it.

### To create the RADIUS client:

1. On the FortiAuthenticator, go to *Authentication* > *RADIUS Service* > *Clients*, and select *Create New*.
2. Enter a *Name*, the IP address of the FortiGate, and set a *Secret*.
   The secret is a pre-shared secure password that the FortiGate will use to authenticate to the FortiAuthenticator.



Create New Authentication Client

Name: FortiGate

Client address: IP/Hostname

172.25.176.37

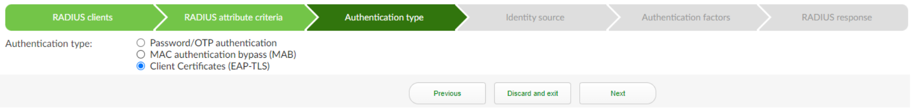
Secret: •••••••••

Accept RADIUS accounting messages for usage enforcement

Support RADIUS Disconnect messages

### To create the RADIUS policy:

1. Go to *Authentication* > *RADIUS Service* > *Policies*, and select *Create New*.
2. Enter the RADIUS policy name, description, and select the FortiGate RADIUS client.
3. Do not configure RADIUS attribute criteria.
4. Set the authentication type as *Client Certificates (EAP-TLS)*.



Authentication type:
○ Password/OTP authentication
○ MAC authentication bypass (MAB)
● Client Certificates (EAP-TLS)

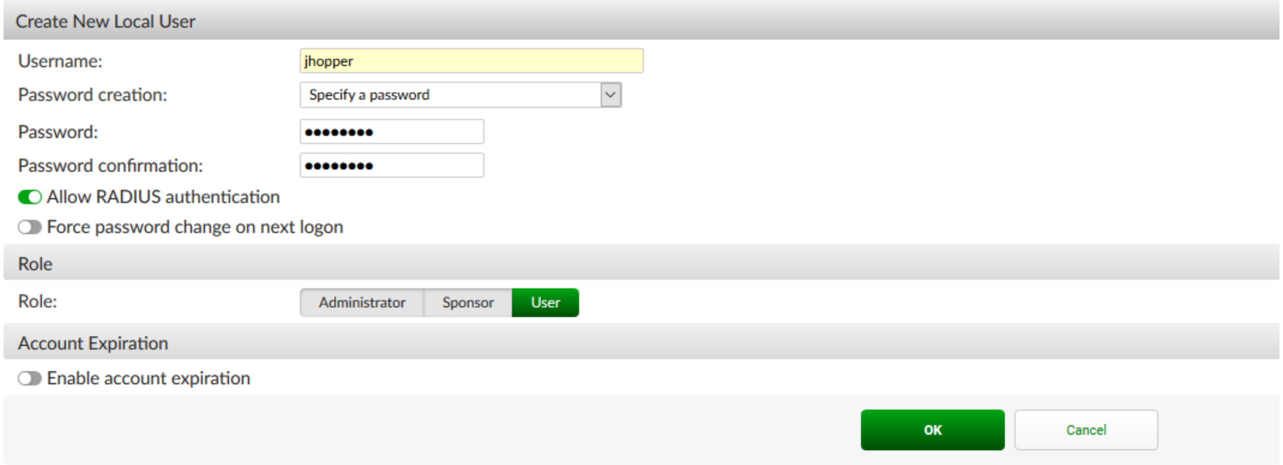
5. Choose a username format (in this example: *username@realm*), select the *Local* realm.
6. Set the authentication method to *Password only authentication*.
7. Review the RADIUS response, and click *Save and Exit*.

## Configuring local user on FortiAuthenticator

The authentication of the WiFi client will be tied to a user account on the FortiAuthenticator. In this scenario, a local user will be configured but remote users associated with LDAP can be configured as well.

**To configure a local user:**

1. Go to *Authentication* > *User Management* > *Local Users* and select *Create New*.
   Fill out applicable user information.



Create New Local User

Username: jhopper

Password creation: Specify a password

Password: ••••••••

Password confirmation: ••••••••

● Allow RADIUS authentication

○ Force password change on next logon

Role

Role: Administrator | Sponsor | User

Account Expiration

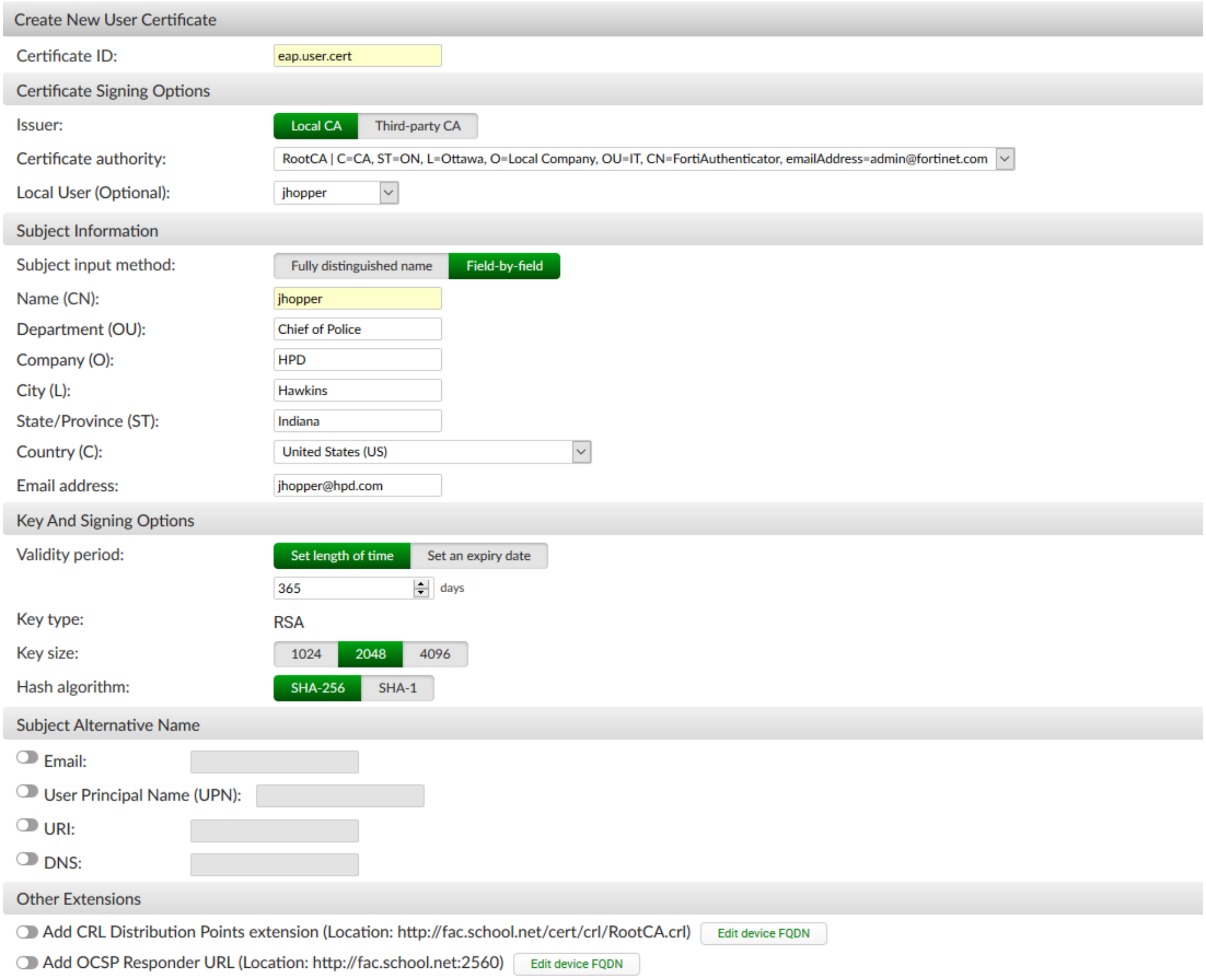
○ Enable account expiration

## Configuring local user certificate on FortiAuthenticator

The certificate created locally on the FortiAuthenticator will be associated with the local user. It is important to note that the *Name (CN)* must match the username exactly of the user that is registered in the FortiAuthenticator (in the example, *eap-user*).

**To configure the local user certificate:**

1. Go to *Certificate Management* > *End Entities* > *Users* and select *Create New*.
   Fill out applicable user information to map the certificate to the correct user.



Create New User Certificate

Certificate ID: eap.user.cert

Certificate Signing Options

Issuer: [✓ Local CA] Third-party CA

Certificate authority: RootCA | C=CA, ST=ON, L=Ottawa, O=Local Company, OU=IT, CN=FortiAuthenticator, emailAddress=admin@fortinet.com

Local User (Optional): jhopper

Subject Information

Subject input method: Fully distinguished name [✓ Field-by-field]

Name (CN): jhopper

Department (OU): Chief of Police

Company (O): HPD

City (L): Hawkins

State/Province (ST): Indiana

Country (C): United States (US)

Email address: jhopper@hpd.com

Key And Signing Options

Validity period: [✓ Set length of time] Set an expiry date

365 days

Key type: RSA

Key size: 1024 [✓ 2048] 4096

Hash algorithm: [✓ SHA-256] SHA-1

Subject Alternative Name

○ Email:

○ User Principal Name (UPN):

○ URI:

○ DNS:

Other Extensions

○ Add CRL Distribution Points extension (Location: http://fac.school.net/cert/crl/RootCA.crl) Edit device FQDN

○ Add OCSP Responder URL (Location: http://fac.school.net:2560) Edit device FQDN

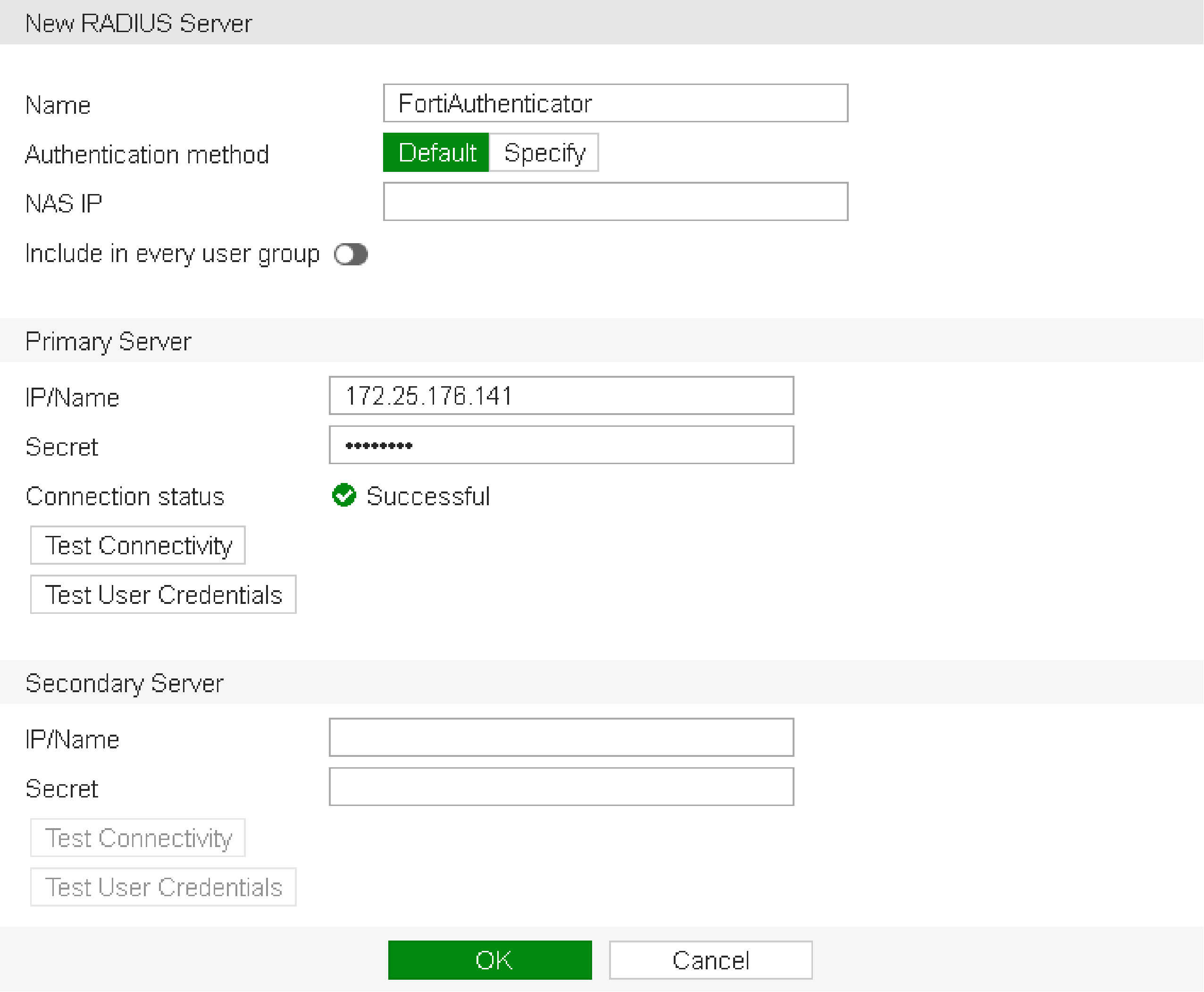
## Creating RADIUS server on FortiGate

In order to proxy the authentication request from the wireless client, the FortiGate will need to have a RADIUS server to submit the authentication request to.

### To create the RADIUS server on FortiGate:

1. On the FortiGate, go to *User & Device* > *RADIUS Servers* and select *Create New*. Enter a *Name*, the FortiAuthenticator's IP address, and the same *Secret* set on the FortiAuthenticator.

Select *Test Connectivity* to confirm the successful connection.



New RADIUS Server

| | |
|---|---|
| Name | FortiAuthenticator |
| Authentication method | [✓ Default] Specify |
| NAS IP | |
| Include in every user group | ○ |

Primary Server

| | |
|---|---|
| IP/Name | 172.25.176.141 |
| Secret | ••••••••• |
| Connection status | ✓ Successful |

Secondary Server

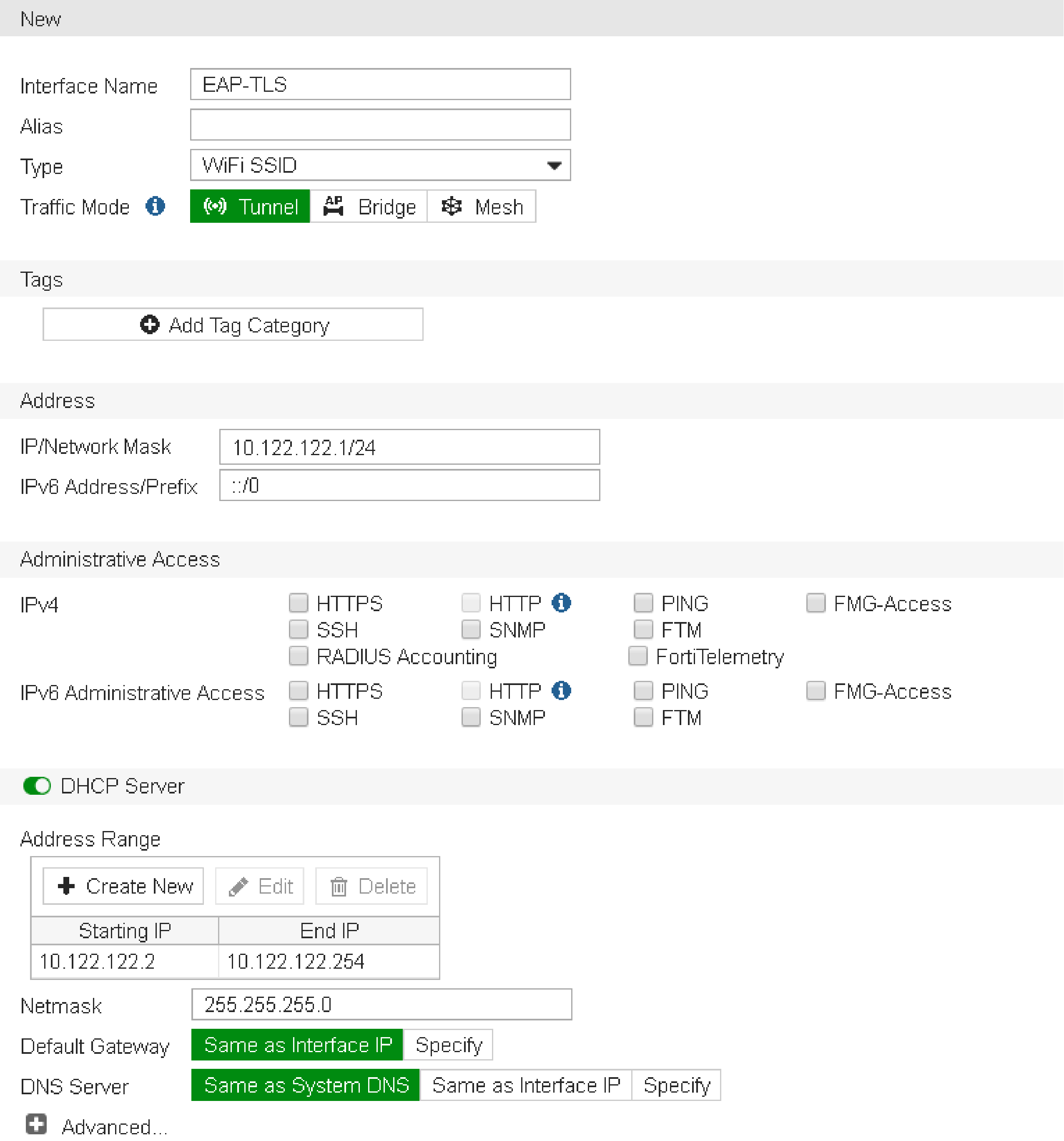
| | |
|---|---|
| IP/Name | |
| Secret | |

## Creating WiFi SSID on FortiGate

In order for the WiFi client to connect using its certificate a SSID has to be configured on the FortiGate to accept this type of authentication.

### To create the WiFi SSID:

1. Go to *WiFi & Switch Controller* > *SSID* and create an SSID with DHCP for clients.



New

| | |
|---|---|
| Interface Name | EAP-TLS |
| Alias | |
| Type | WiFi SSID |
| Traffic Mode | [✓ Tunnel] Bridge Mesh |

Tags

Add Tag Category

Address

| | |
|---|---|
| IP/Network Mask | 10.122.122.1/24 |
| IPv6 Address/Prefix | ::/0 |

Administrative Access

IPv4: □ HTTPS □ HTTP □ PING □ FMG-Access □ SSH □ SNMP □ FTM □ RADIUS Accounting □ FortiTelemetry

IPv6 Administrative Access: □ HTTPS □ HTTP □ PING □ FMG-Access □ SSH □ SNMP □ FTM

DHCP Server (enabled)

Address Range

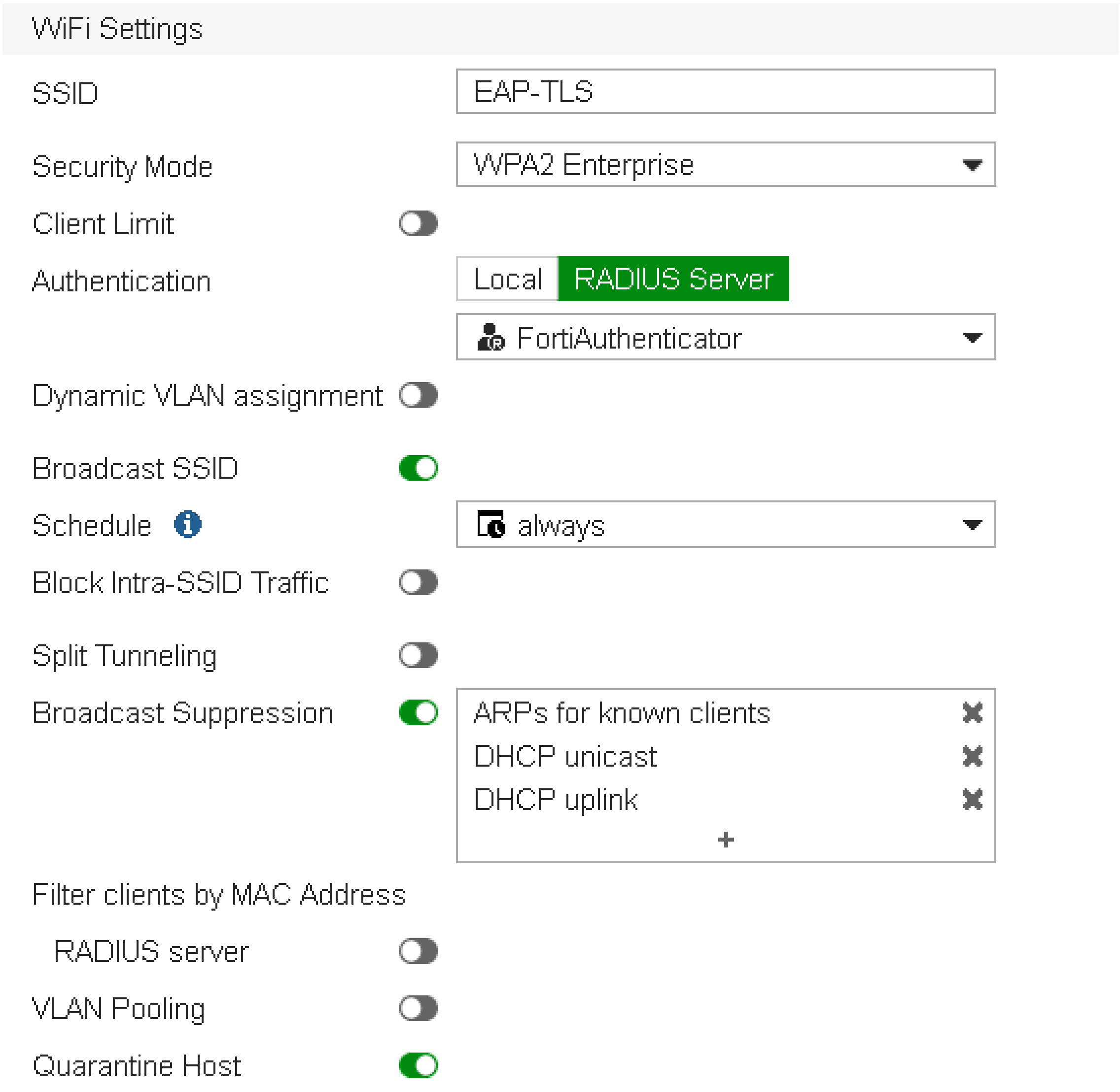
Create New | Edit | Delete

| Starting IP | End IP |
|---|---|
| 10.122.122.2 | 10.122.122.254 |

| | |
|---|---|
| Netmask | 255.255.255.0 |
| Default Gateway | [✓ Same as Interface IP] Specify |
| DNS Server | [✓ Same as System DNS] Same as Interface IP Specify |

Advanced...

2. Set the following *WiFi Settings*, assigning the *RADIUS Server* configured earlier.



WiFi Settings

SSID: EAP-TLS

Security Mode: WPA2 Enterprise

Client Limit ○

Authentication: Local [✓ RADIUS Server]

FortiAuthenticator

Dynamic VLAN assignment ○

Broadcast SSID ●

Schedule: always

Block Intra-SSID Traffic ○

Split Tunneling ○

Broadcast Suppression ●: ARPs for known clients, DHCP unicast, DHCP uplink

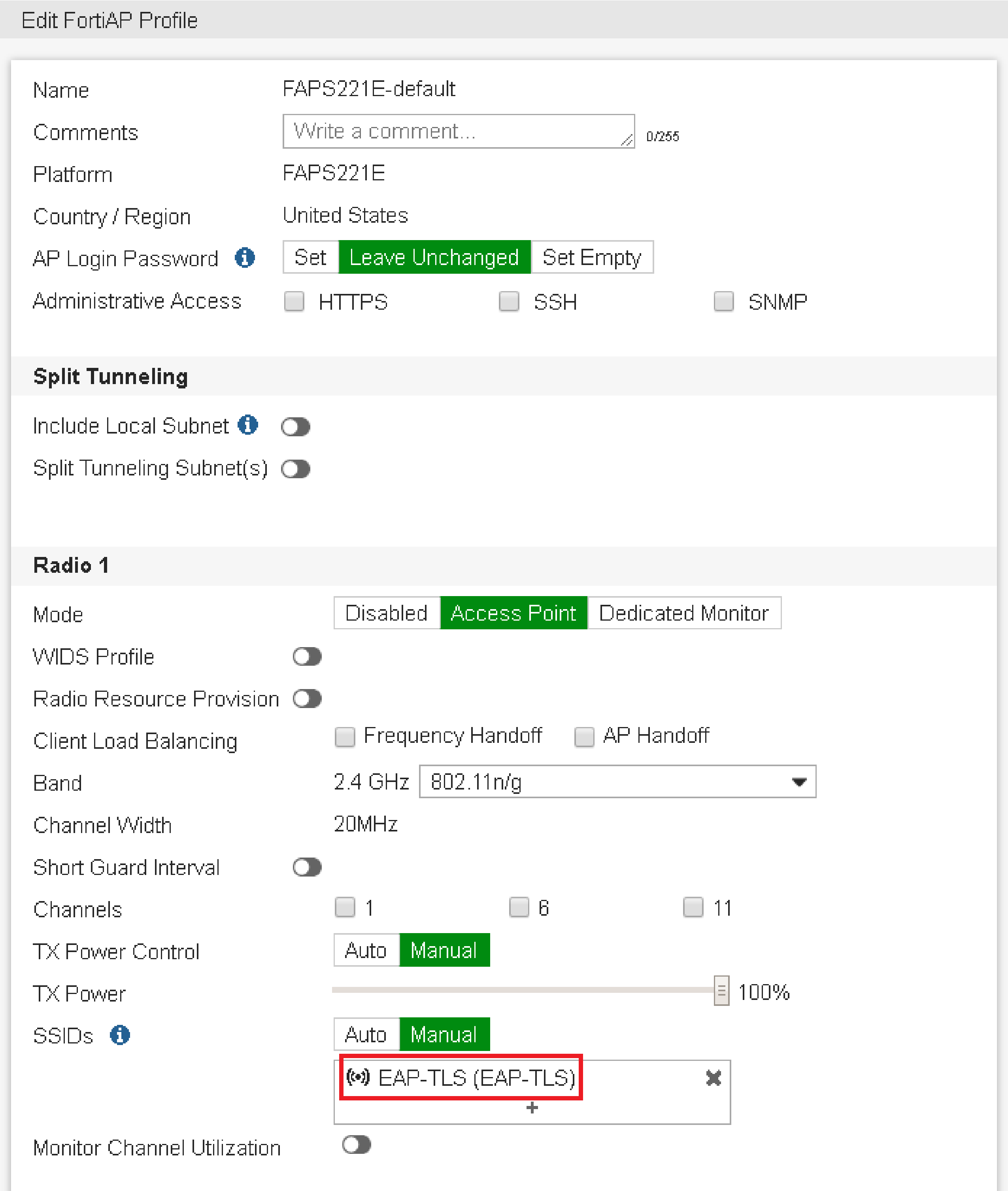
Filter clients by MAC Address

RADIUS server ○

VLAN Pooling ○

Quarantine Host ●

3. Then go to *WiFi & Switch Controller* > *FortiAP Profiles* and edit your FortiAP default profile. Select the new SSID for both *Radio 1* and *Radio 2*.



Edit FortiAP Profile

Name FAPS221E-default

Comments Write a comment... 0/255

Platform FAPS221E

Country / Region United States

AP Login Password Set [✓ Leave Unchanged] Set Empty

Administrative Access □ HTTPS □ SSH □ SNMP

**Split Tunneling**

Include Local Subnet ○

Split Tunneling Subnet(s) ○

**Radio 1**

Mode Disabled [✓ Access Point] Dedicated Monitor

WIDS Profile ○

Radio Resource Provision ○

Client Load Balancing □ Frequency Handoff □ AP Handoff

Band 2.4 GHz 802.11n/g

Channel Width 20MHz

Short Guard Interval ○

Channels □ 1 □ 6 □ 11

TX Power Control Auto [✓ Manual]

TX Power 100%

SSIDs Auto [✓ Manual]

EAP-TLS (EAP-TLS)

Monitor Channel Utilization ○

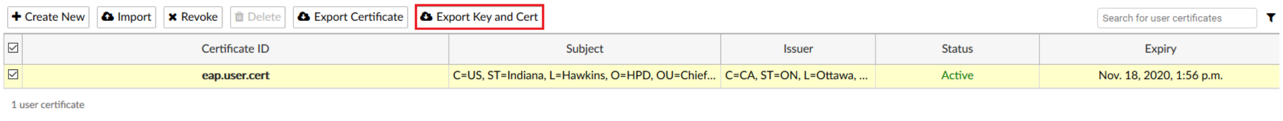
4. Then go to *Policy & Objects* > *IPv4 Policy* and create a policy that allows outbound traffic from the *EAP-TLS* wireless interface to the Internet.

## Exporting user certificate from FortiAuthenticator

In order for the WiFi client to authenticate with the RADIUS server, the user certificate created in the FortiAuthenticator must first be exported.

### To export the FortiAuthenticator user certificate:

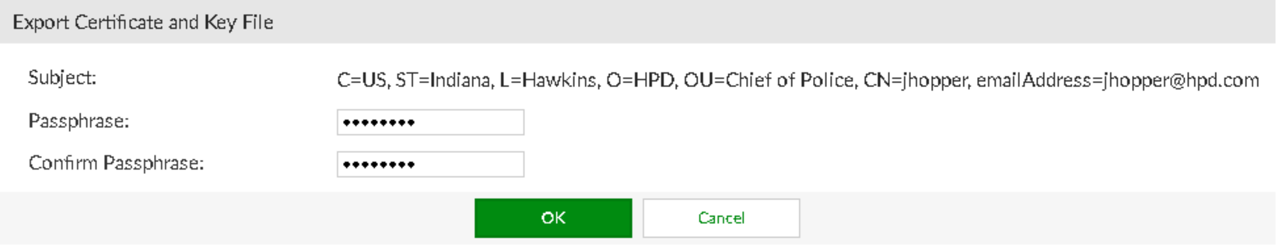
1. On the FortiAuthenticator, go to *Certificate Management* > *End Entities* > *Users*. Select the certificate and select *Export Key and Cert*.



| ☑ | Certificate ID | Subject | Issuer | Status | Expiry |
|---|---|---|---|---|---|
| ☑ | eap.user.cert | C=US, ST=Indiana, L=Hawkins, O=HPD, OU=Chief... | C=CA, ST=ON, L=Ottawa, ... | Active | Nov. 18, 2020, 1:56 p.m. |

1 user certificate

2. In the *Export User Certificate and Key File* dialog, enter and confirm a *Passphrase*. This password will be used when importing the certificate into a Windows 10 computer. Select *OK*.



Export Certificate and Key File

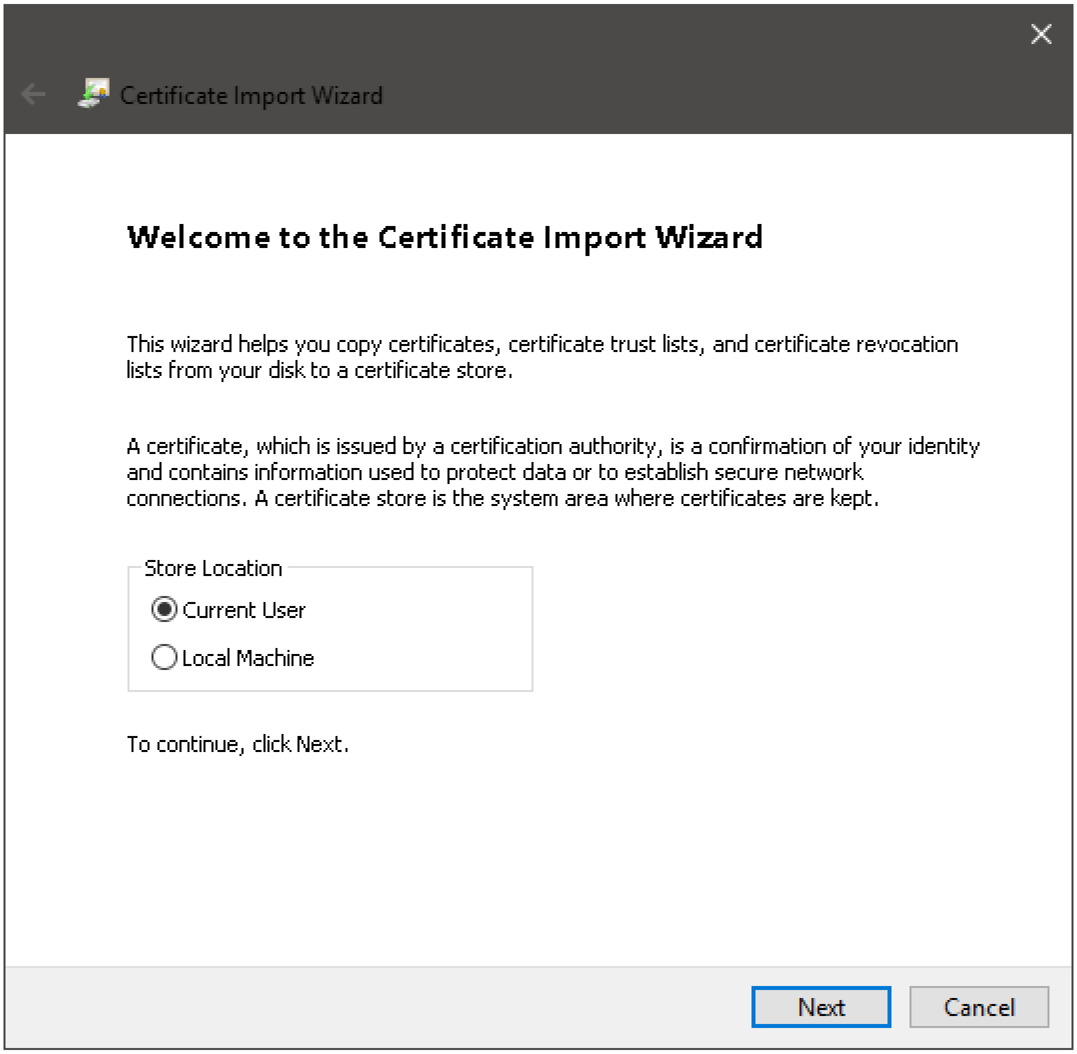
| | |
|---|---|
| Subject: | C=US, ST=Indiana, L=Hawkins, O=HPD, OU=Chief of Police, CN=jhopper, emailAddress=jhopper@hpd.com |
| Passphrase: | •••••••• |
| Confirm Passphrase: | •••••••• |

3. Select *Download PKCS#12 file* to pull this certificate to the Widows 10 computer. Select *Finish*.

## Importing user certificate into Windows 10

### To import the user certificate:

1. On the Windows 10 computer, double-click the downloaded certificate file from the FortiAuthenticator. This will launch the *Certificate Import Wizard*. Select *Next*.



Certificate Import Wizard

**Welcome to the Certificate Import Wizard**

This wizard helps you copy certificates, certificate trust lists, and certificate revocation lists from your disk to a certificate store.

A certificate, which is issued by a certification authority, is a confirmation of your identity and contains information used to protect data or to establish secure network connections. A certificate store is the system area where certificates are kept.

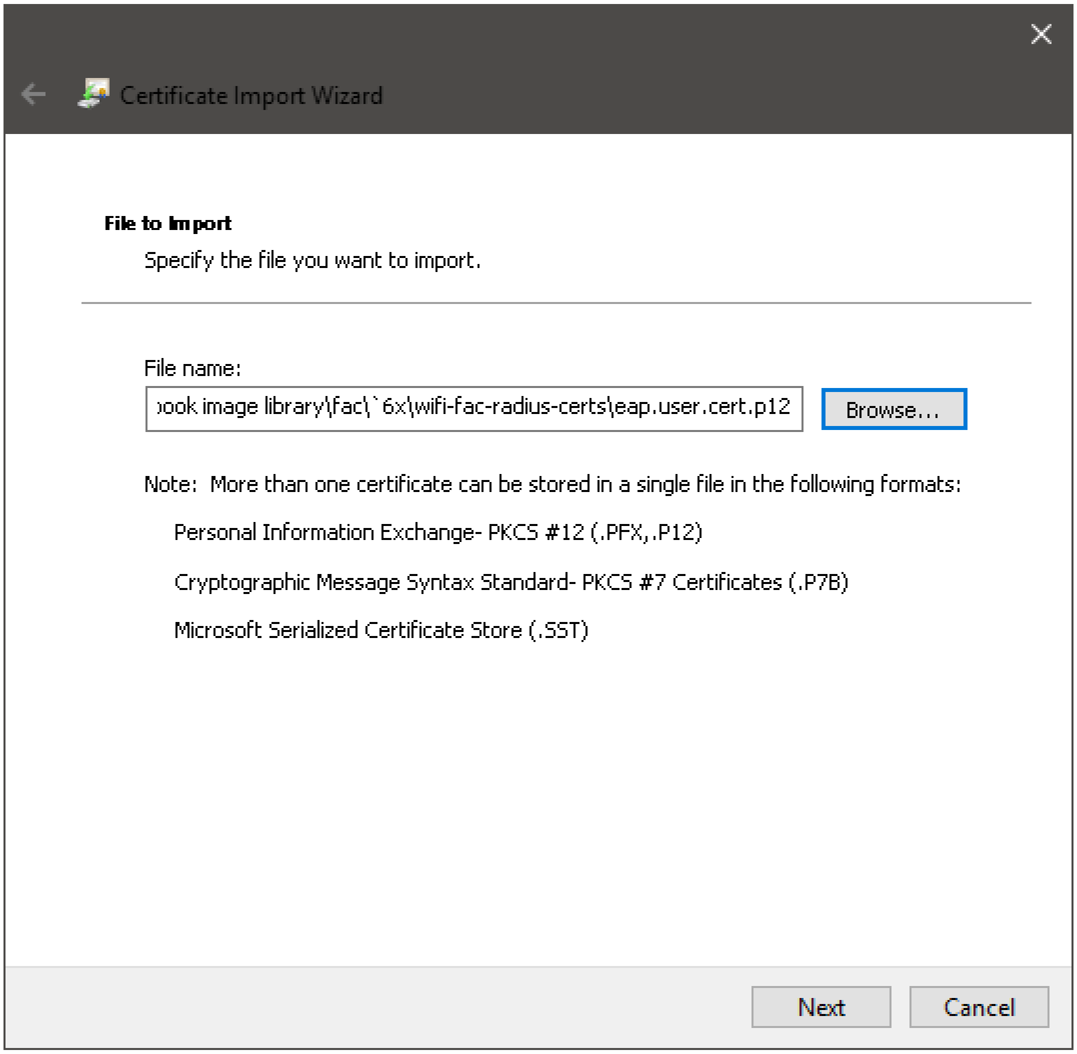
Store Location

● Current User

○ Local Machine

To continue, click Next.

2. Make sure the correct certificate is shown in the *File name* section in the *File to Import* window. Select *Next*.



Certificate Import Wizard

**File to Import**

Specify the file you want to import.

File name:

›ook image library\fac\`6x\wifi-fac-radius-certs\eap.user.cert.p12

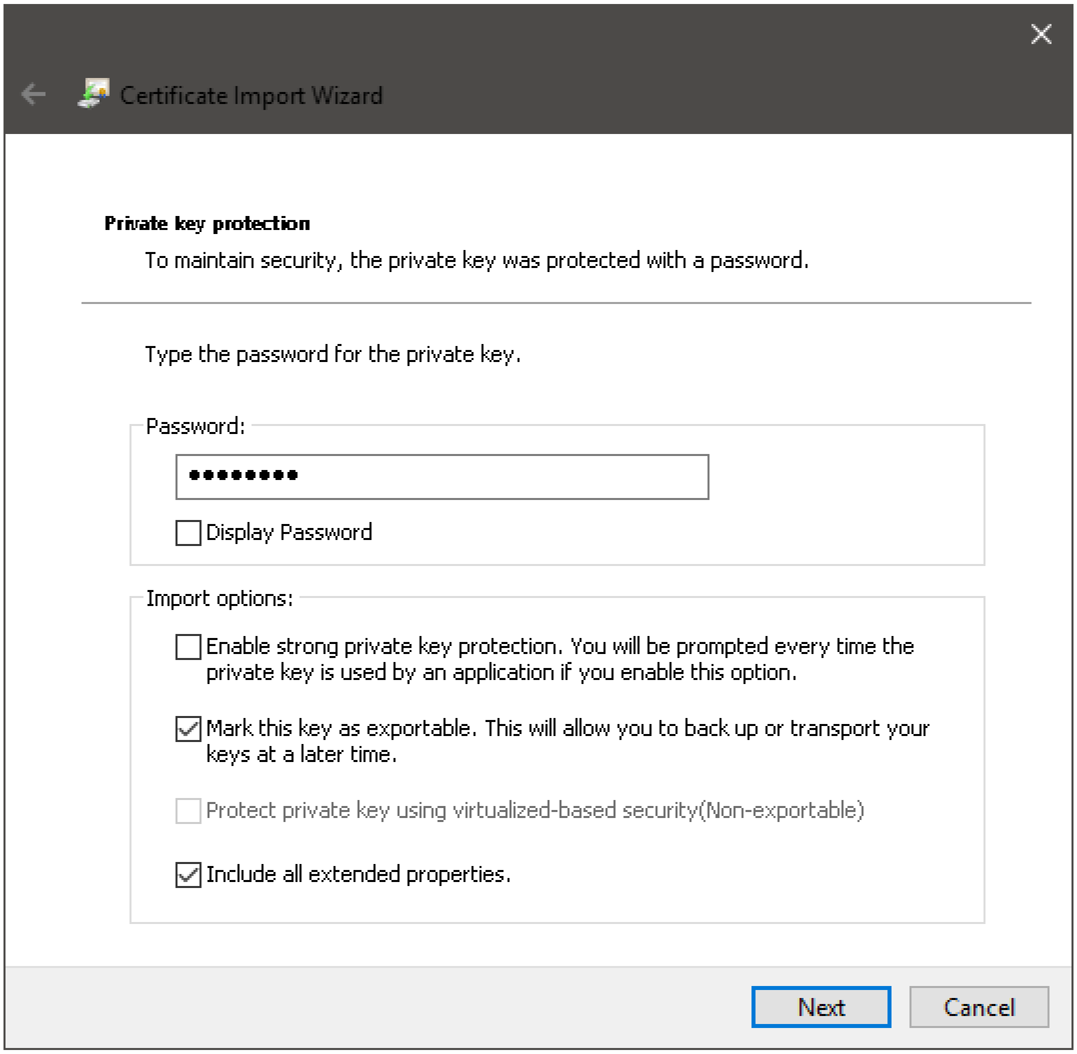
Note: More than one certificate can be stored in a single file in the following formats:

Personal Information Exchange- PKCS #12 (.PFX,.P12)

Cryptographic Message Syntax Standard- PKCS #7 Certificates (.P7B)

Microsoft Serialized Certificate Store (.SST)

3. Enter the *Password* created on the FortiAuthenticator during the export of the certificate. Select *Mark this key as exportable* and leave the remaining options to default. Select *Next*.



Certificate Import Wizard

**Private key protection**

To maintain security, the private key was protected with a password.

Type the password for the private key.

Password:

●●●●●●●●●

☐ Display Password

Import options:

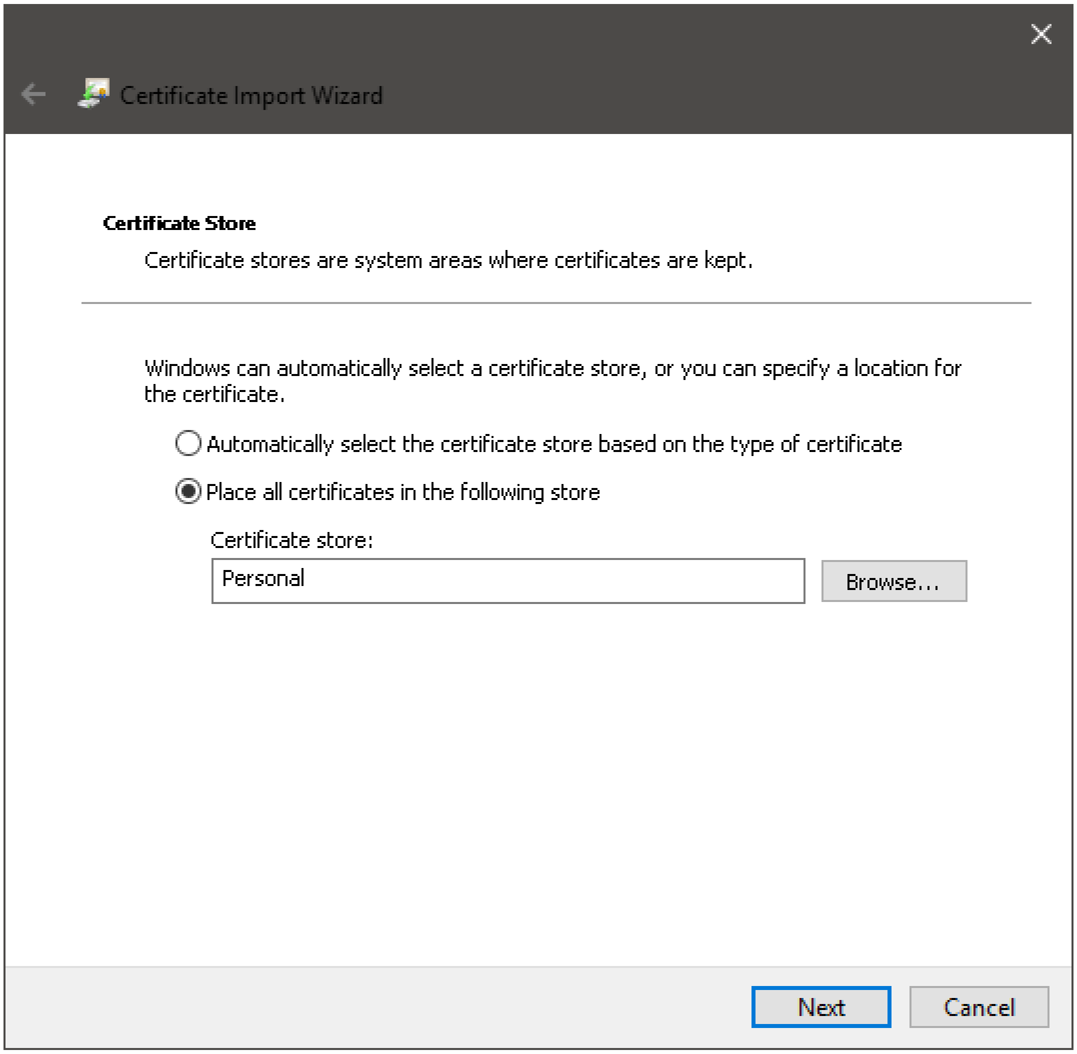
☐ Enable strong private key protection. You will be prompted every time the private key is used by an application if you enable this option.

☑ Mark this key as exportable. This will allow you to back up or transport your keys at a later time.

☐ Protect private key using virtualized-based security(Non-exportable)

☑ Include all extended properties.

4. In the *Certificate Store*, choose the *Place all certificates in the following store*. Select *Browse* and choose *Personal*. Select *Next*, and then *Finish*.
A dialog box will show up confirming the certificate was imported successfully.



**Certificate Store**

Certificate stores are system areas where certificates are kept.

Windows can automatically select a certificate store, or you can specify a location for the certificate.

○ Automatically select the certificate store based on the type of certificate

● Place all certificates in the following store

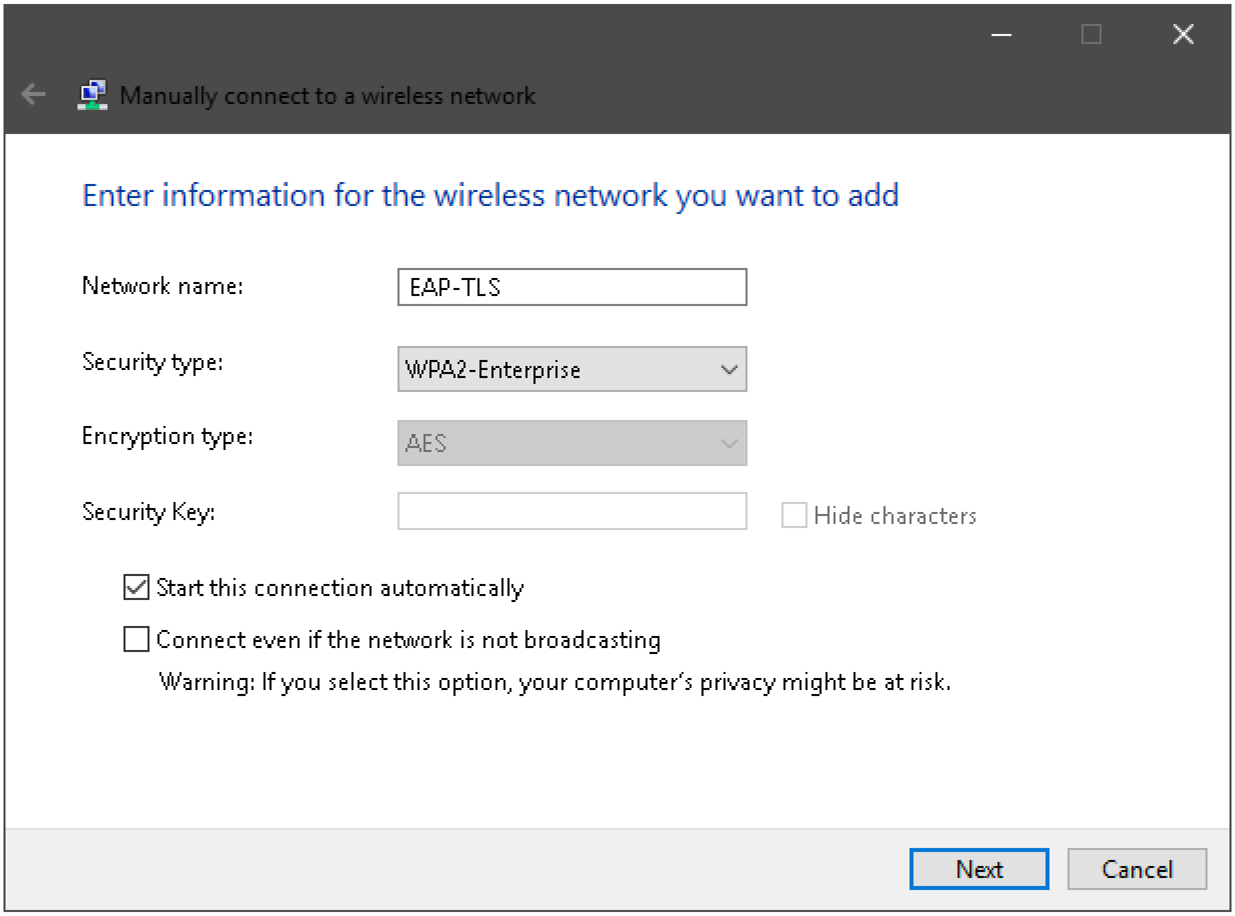
Certificate store: Personal

## Configuring Windows 10 wireless profile to use certificate

Create a new wireless SSID for this secure connection, in this case EAP-TLS.

**To create a wireless SSID:**

1. On Windows 10, got to *Control Panel* > *Network and Sharing Center* > *Set up a new connection or network* > *Manually connect to a wireless network*. Enter a *Network name* and set *Security type* to *WPA2-Enterprise*. The *Encryption type* is set to *AES*.



Manually connect to a wireless network

Enter information for the wireless network you want to add

Network name: EAP-TLS

Security type: WPA2-Enterprise

Encryption type: AES

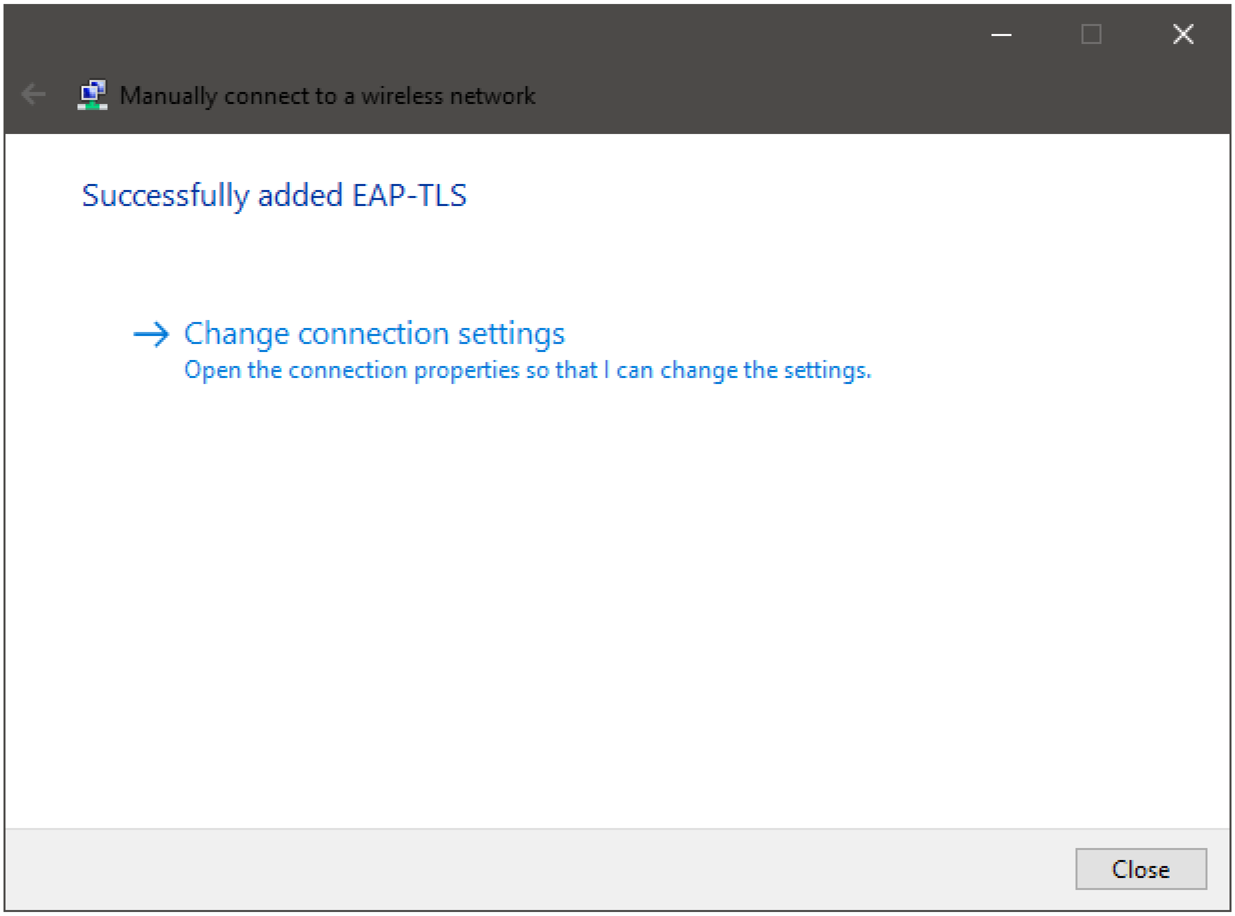
Security Key: □ Hide characters

☑ Start this connection automatically

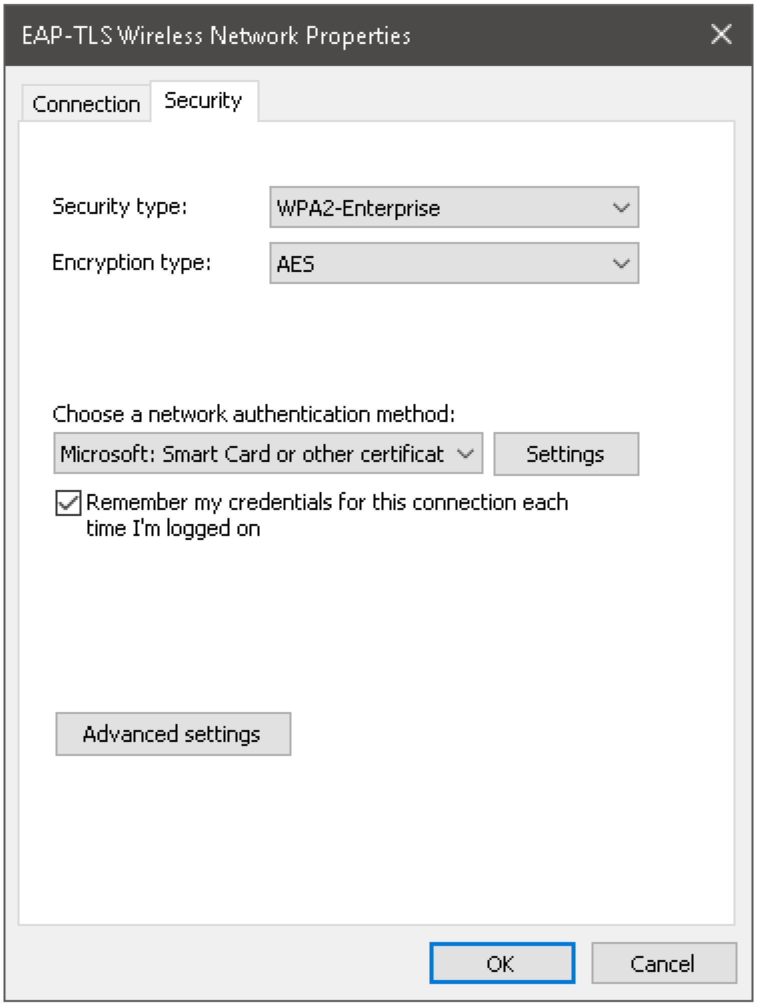
□ Connect even if the network is not broadcasting

Warning: If you select this option, your computer's privacy might be at risk.

2. Once created, you have the option to modify the wireless connection. Select *Change connection settings*.


Manually connect to a wireless network
Successfully added EAP-TLS
→ Change connection settings
Open the connection properties so that I can change the settings.
Close

3. In the *Security* tab, set *Choose a network authentication method* to *Microsoft: Smart card or other certificates*, and select *Settings*.



EAP-TLS Wireless Network Properties

Security type: WPA2-Enterprise

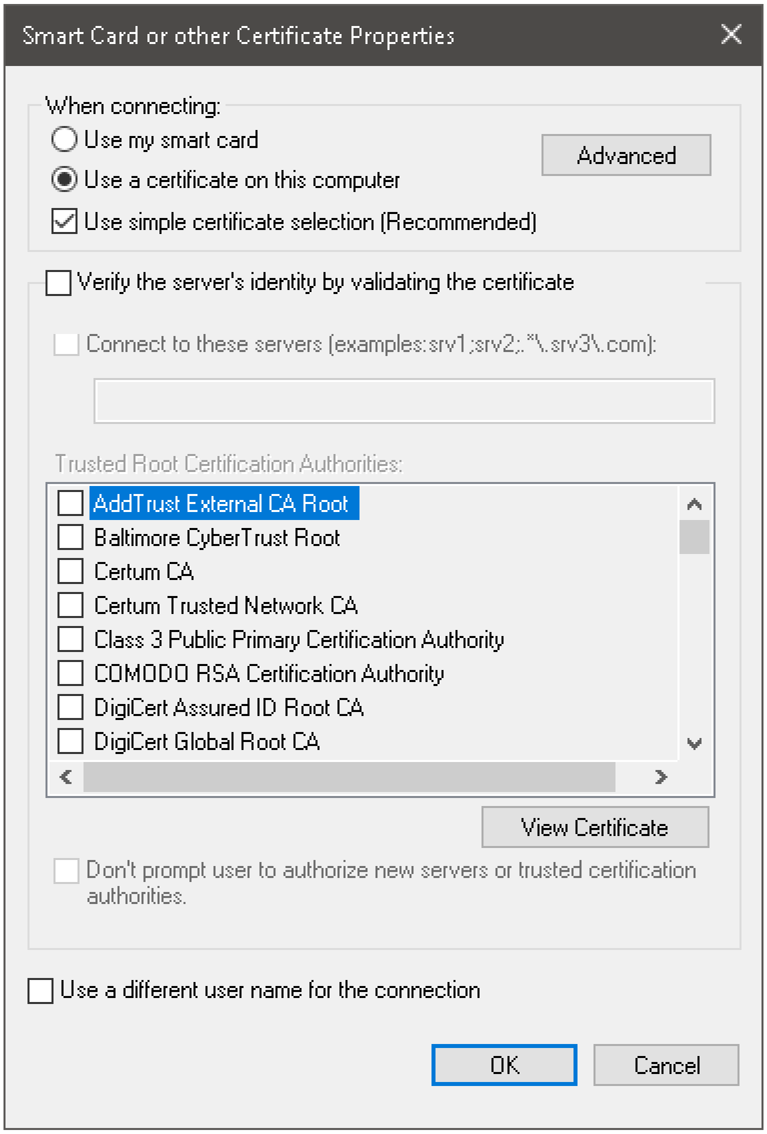
Encryption type: AES

Choose a network authentication method: Microsoft: Smart Card or other certificat

☑ Remember my credentials for this connection each time I'm logged on

4. Enable both *Use a certificate on this computer* and *Use simple certificate selection*.
   Note that, for simplification purposes, *Verify the server's identity by validating the certificate* has been disabled. However EAP--TLS allows the client to validate the server as well as the server validate the client. To enable this, you will need to import the CA from the FortiAuthenticator to the Windows 10 computer and make sure that it is enabled as a Trusted Root Certification Authority.

   Select *OK* for all dialog windows to confirm all settings. The configuration for the Windows 10 computer has been completed and the user should be able to authenticate to WiFi via the certificate without using their username and password.



Smart Card or other Certificate Properties

When connecting:

○ Use my smart card

● Use a certificate on this computer

☑ Use simple certificate selection (Recommended)

□ Verify the server's identity by validating the certificate

□ Connect to these servers (examples:srv1;srv2;.*\.srv3\.com):

Trusted Root Certification Authorities:

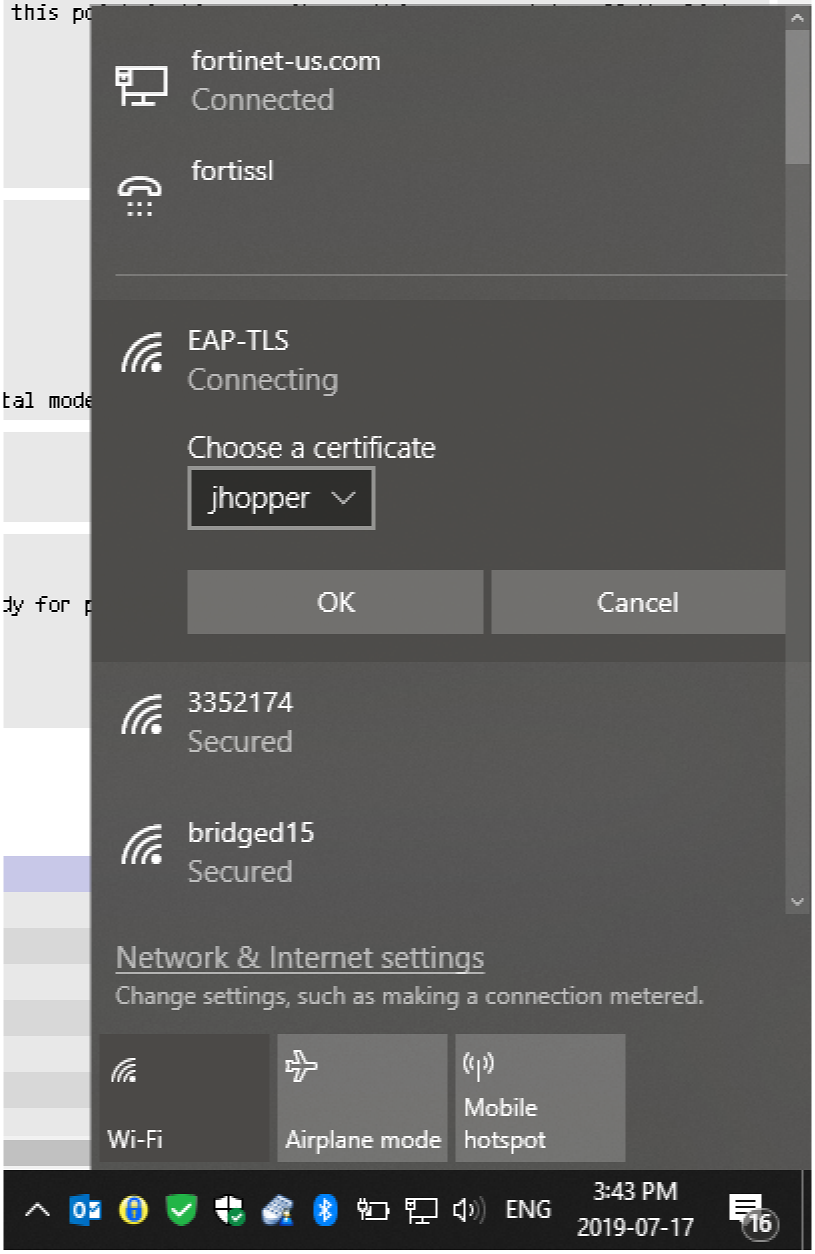
□ AddTrust External CA Root
□ Baltimore CyberTrust Root
□ Certum CA
□ Certum Trusted Network CA
□ Class 3 Public Primary Certification Authority
□ COMODO RSA Certification Authority
□ DigiCert Assured ID Root CA
□ DigiCert Global Root CA

□ Don't prompt user to authorize new servers or trusted certification authorities.

□ Use a different user name for the connection

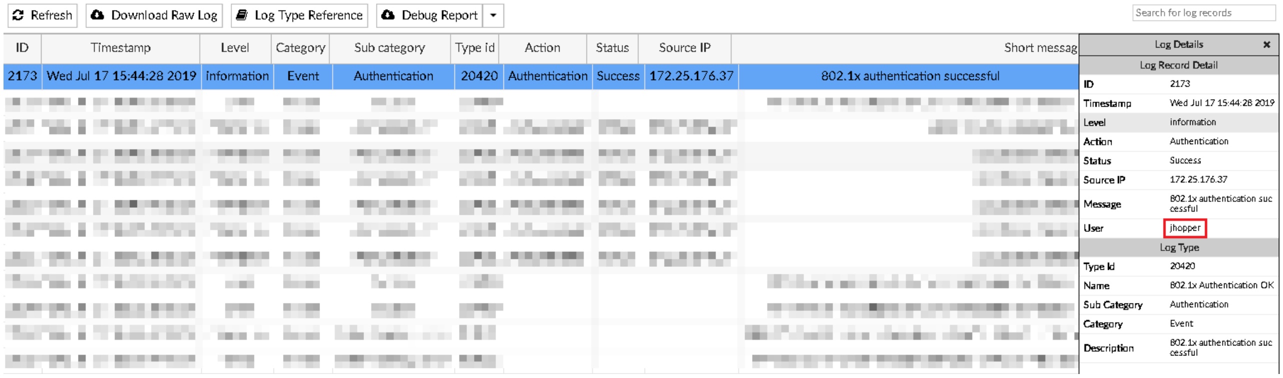
## Results

1. On the user's device, attempt to connect to the WiFi. Select the user's certificate and select *OK*.



Choose a certificate
jhopper

2. On the FortiAuthenticator, go to *Logging > Log Access > Logs* to confirm the successful authentication.

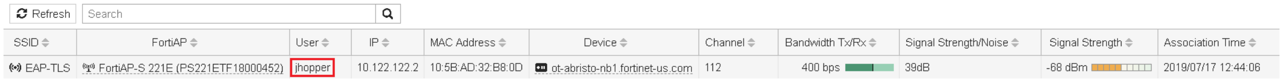


| ID | Timestamp | Level | Category | Sub category | Type Id | Action | Status | Source IP | Short messag |
|---|---|---|---|---|---|---|---|---|---|
| 2173 | Wed Jul 17 15:44:28 2019 | Information | Event | Authentication | 20420 | Authentication | Success | 172.25.176.37 | 802.1x authentication successful |

[redacted]

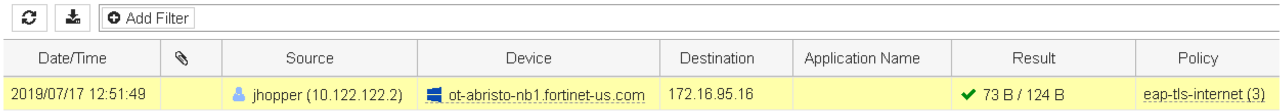
| Log Details | |
|---|---|
| **Log Record Detail** | |
| ID | 2173 |
| Timestamp | Wed Jul 17 15:44:28 2019 |
| Level | information |
| Action | Authentication |
| Status | Success |
| Source IP | 172.25.176.37 |
| Message | 802.1x authentication suc cessful |
| User | jhopper |
| **Log Type** | |
| Type Id | 20420 |
| Name | 802.1x Authentication OK |
| Sub Category | Authentication |
| Category | Event |
| Description | 802.1x authentication suc cessful |

3. On the FortiGate, go to **Monitor > WiFi Client Monitor** to view various information about the client.

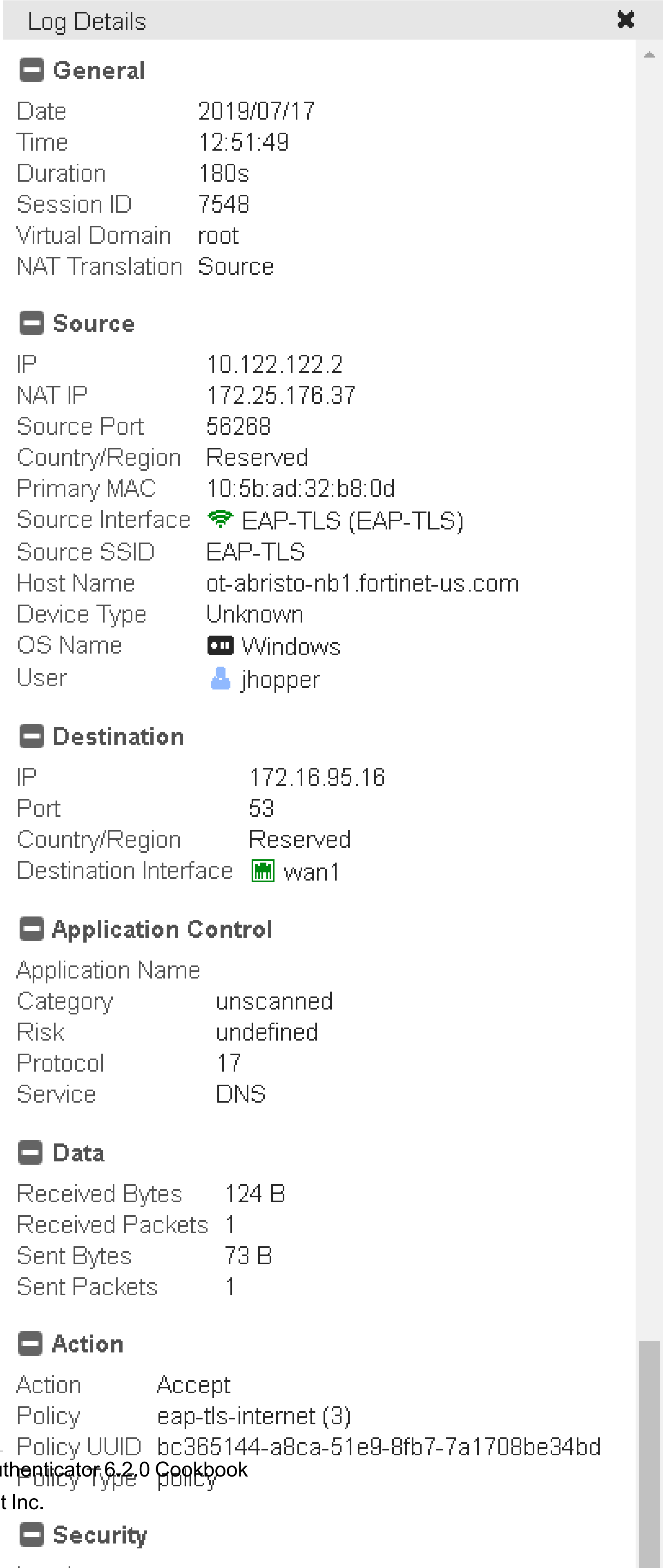


| SSID | FortiAP | User | IP | MAC Address | Device | Channel | Bandwidth Tx/Rx | Signal Strength/Noise | Signal Strength | Association Time |
|---|---|---|---|---|---|---|---|---|---|---|
| EAP-TLS | FortiAP-S 221E (PS221ETF18000452) | jhopper | 10.122.122.2 | 10:5B:AD:32:B8:0D | ot-abristo-nb1.fortinet-us.com | 112 | 400 bps | 39dB | -68 dBm | 2019/07/17 12:44:06 |

You can also go to *Log & Report > Forward Traffic* to view more log details.



| Date/Time | | Source | Device | Destination | Application Name | Result | Policy |
|---|---|---|---|---|---|---|---|
| 2019/07/17 12:51:49 | | jhopper (10.122.122.2) | ot-abristo-nb1.fortinet-us.com | 172.16.95.16 | | ✓ 73 B / 124 B | eap-tls-internet (3) |



Log Details

**General**

| | |
|---|---|
| Date | 2019/07/17 |
| Time | 12:51:49 |
| Duration | 180s |
| Session ID | 7548 |
| Virtual Domain | root |
| NAT Translation | Source |

**Source**

| | |
|---|---|
| IP | 10.122.122.2 |
| NAT IP | 172.25.176.37 |
| Source Port | 56268 |
| Country/Region | Reserved |
| Primary MAC | 10:5b:ad:32:b8:0d |
| Source Interface | EAP-TLS (EAP-TLS) |
| Source SSID | EAP-TLS |
| Host Name | ot-abristo-nb1.fortinet-us.com |
| Device Type | Unknown |
| OS Name | Windows |
| User | jhopper |

**Destination**

| | |
|---|---|
| IP | 172.16.95.16 |
| Port | 53 |
| Country/Region | Reserved |
| Destination Interface | wan1 |

**Application Control**

| | |
|---|---|
| Application Name | |
| Category | unscanned |
| Risk | undefined |
| Protocol | 17 |
| Service | DNS |

**Data**

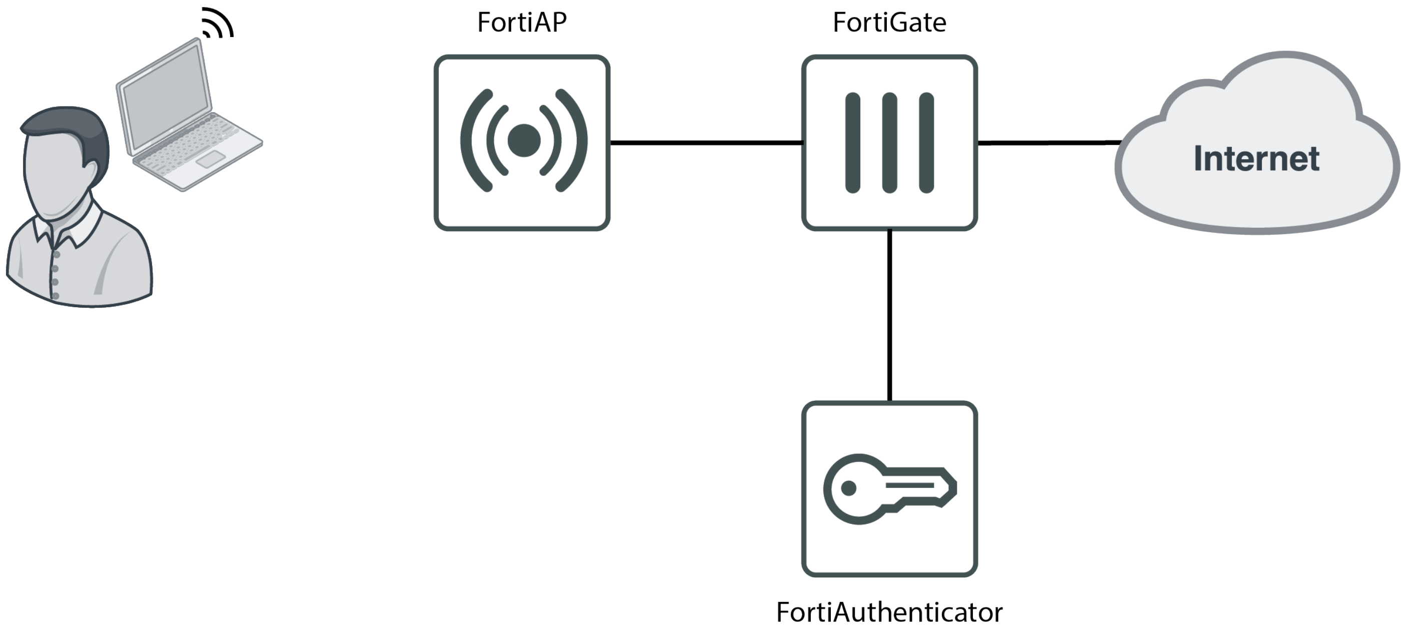
| | |
|---|---|
| Received Bytes | 124 B |
| Received Packets | 1 |
| Sent Bytes | 73 B |
| Sent Packets | 1 |

**Action**

| | |
|---|---|
| Action | Accept |
| Policy | eap-tls-internet (3) |
| Policy UUID | bc365144-a8ca-51e9-8fb7-7a1708be34bd |
| Policy Type | policy |

**Security**

# WiFi RADIUS authentication with FortiAuthenticator



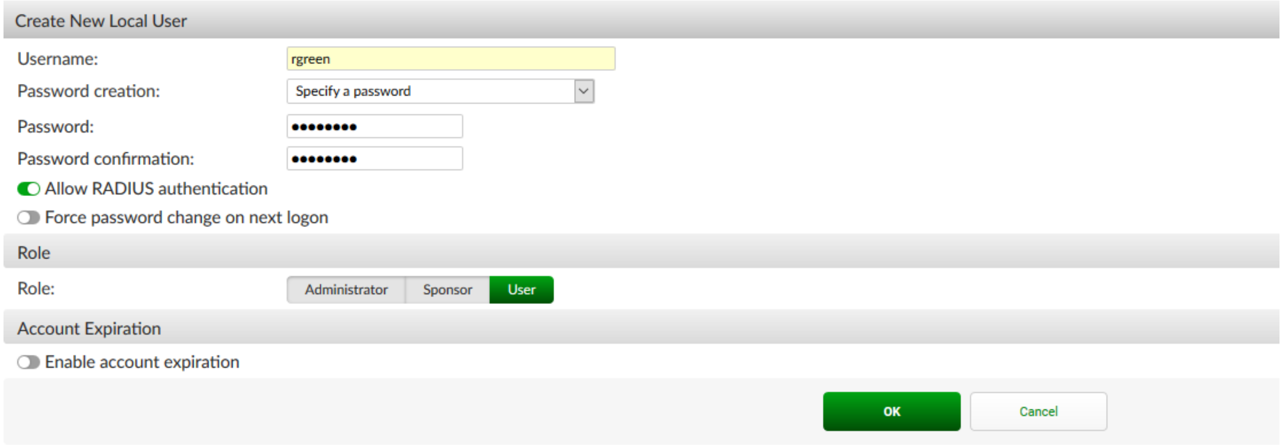
In this example, you use a RADIUS server to authenticate your WiFi clients.

The RADIUS server is a FortiAuthenticator that is used authenticate users who belong to the employees user group.

## Creating users and user groups on the FortiAuthenticator

**To create users and user groups:**

1. Go to *Authentication* > *User Management* > *Local Users* and create a user account.



Create New Local User

Username: rgreen

Password creation: Specify a password

Password: ••••••••

Password confirmation: ••••••••

● Allow RADIUS authentication

○ Force password change on next logon

Role

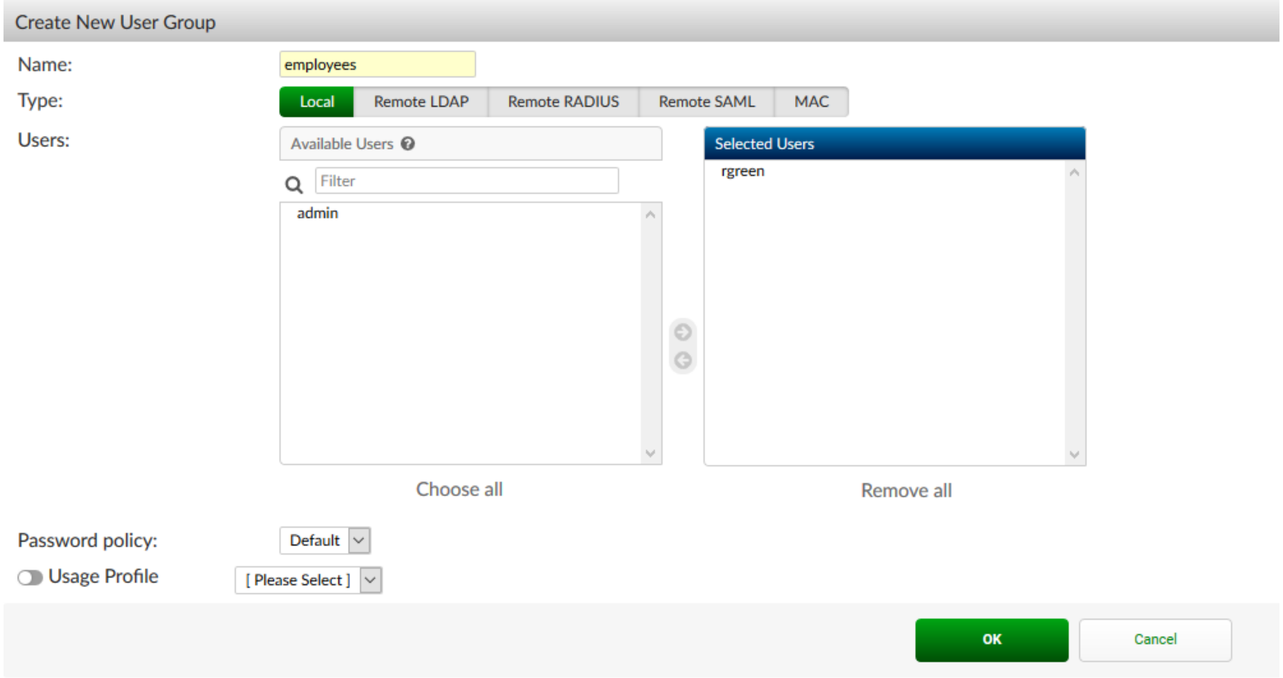
Role: Administrator | Sponsor | **User**

Account Expiration

○ Enable account expiration

2. Then go to *Authentication* > *User Management* > *User Groups* and create a local user group (employees), adding

the newly created user.


Create New User Group

Name: employees

Type: Local

Users: Selected Users: rgreen

Available Users: admin

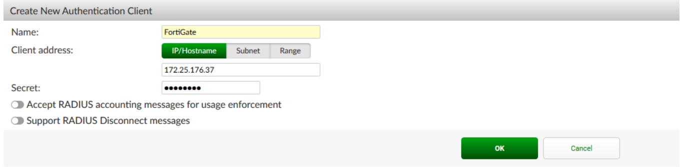
Password policy: Default

Usage Profile: [ Please Select ]

## Registering the FortiGate as a RADIUS client on the FortiAuthenticator

### To create the RADIUS client:

1. On the FortiAuthenticator, go to *Authentication > RADIUS Service > Clients*, and select *Create New*.
2. Enter a *Name*, the IP address of the FortiGate, and set a *Secret*.
   The secret is a pre-shared secure password that the FortiGate will use to authenticate to the FortiAuthenticator.


Create New Authentication Client

Name: FortiGate

Client address: IP/Hostname

172.25.176.37

Secret: •••••••••

Accept RADIUS accounting messages for usage enforcement

Support RADIUS Disconnect messages

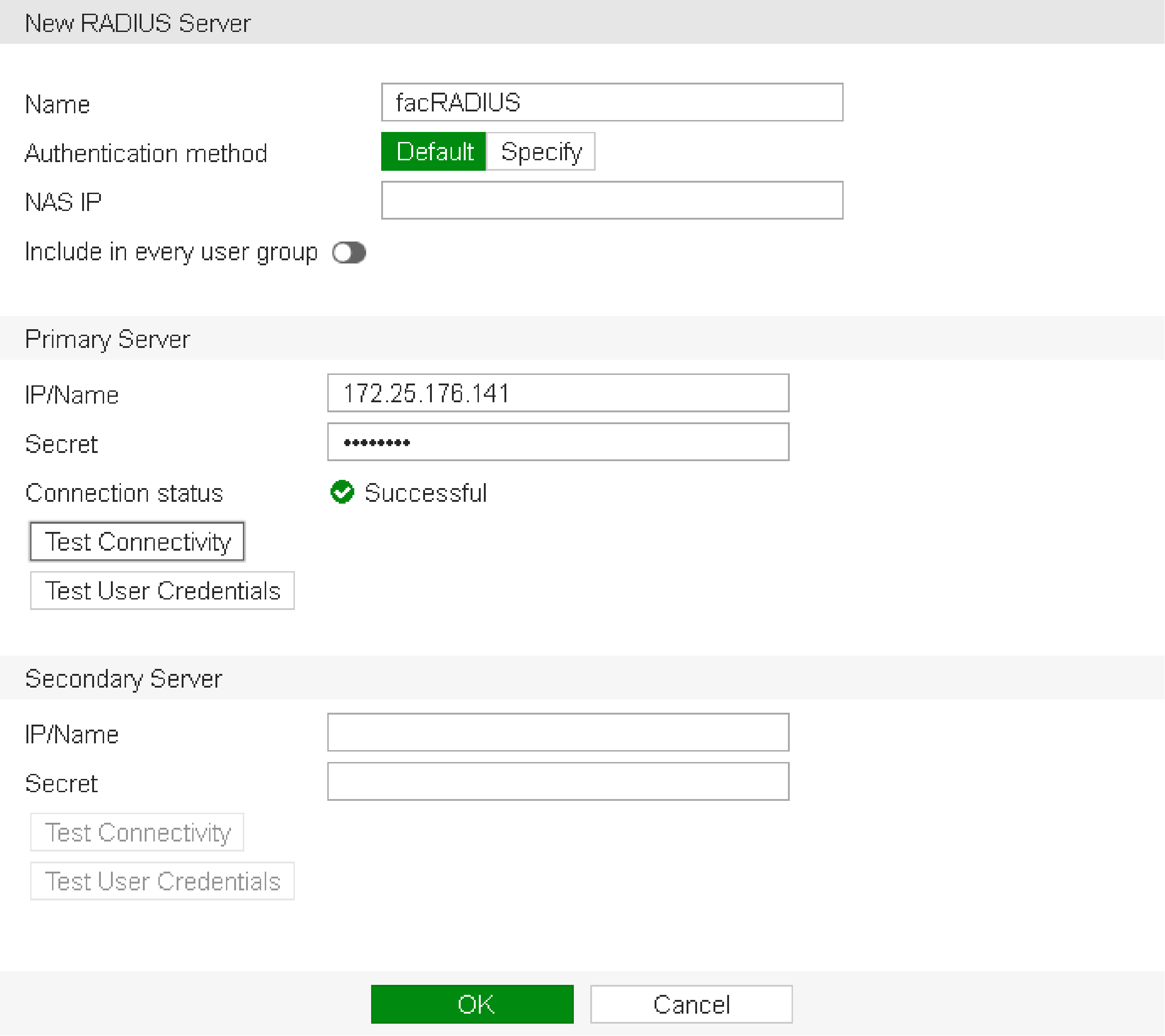
### To create the RADIUS policy:

1. Go to *Authentication > RADIUS Service > Policies*, and select *Create New*.
2. Enter the RADIUS policy name, description, and select the FortiGate RADIUS client.
3. Do not configure RADIUS attribute criteria.
4. Set the authentication type as *Password/OTP authentication*, and enable all *EAP* types.
5. Choose a username format (in this example: *username@realm*), select the *Local* realm.
   Add the user group *employees* as a filter.
6. Review the remaining configurations, and click *Save and Exit*.

## Configuring FortiGate to use the RADIUS server

**To configure FortiGate to use the RADIUS server:**

1. Go to *User & Device > RADIUS Servers* and add the FortiAuthenticator as a RADIUS server.
   Select *Test Connectivity* to confirm the successful connection.



New RADIUS Server

Name: facRADIUS

Authentication method: [✓ Default] Specify

NAS IP:

Include in every user group: ○

Primary Server

IP/Name: 172.25.176.141

Secret: •••••••••

Connection status: ✓ Successful

Secondary Server

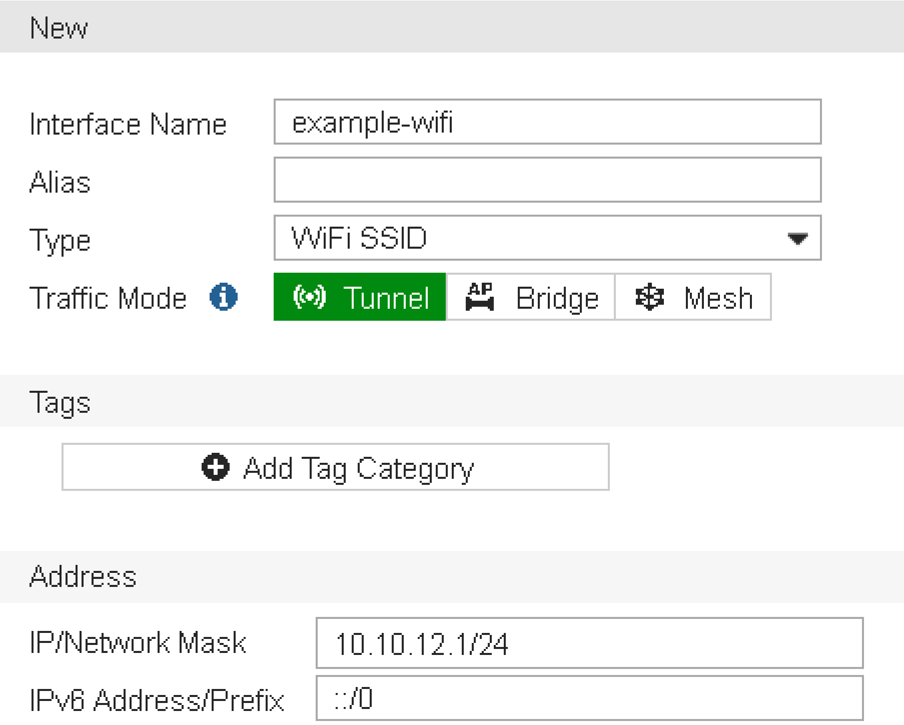
IP/Name:

Secret:

## Creating SSID and set up authentication

**To create an SSID and set up authentication:**

1. Go to *WiFi & Switch Controller* > *SSID* and define your wireless network.



New

| | |
|---|---|
| Interface Name | example-wifi |
| Alias | |
| Type | WiFi SSID |
| Traffic Mode | Tunnel |

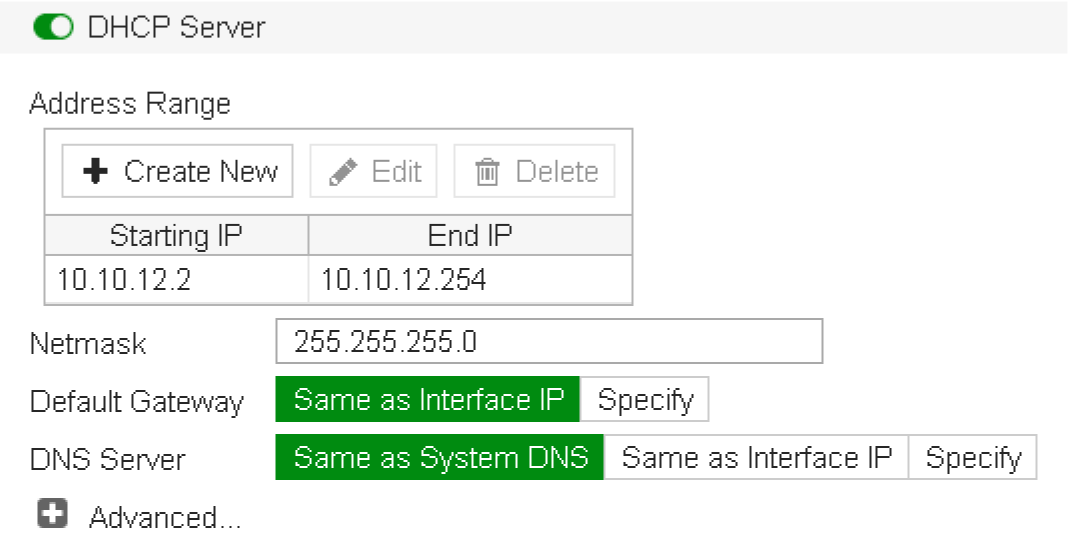
Tags

Add Tag Category

Address

| | |
|---|---|
| IP/Network Mask | 10.10.12.1/24 |
| IPv6 Address/Prefix | ::/0 |

2. Set up DHCP for your clients.



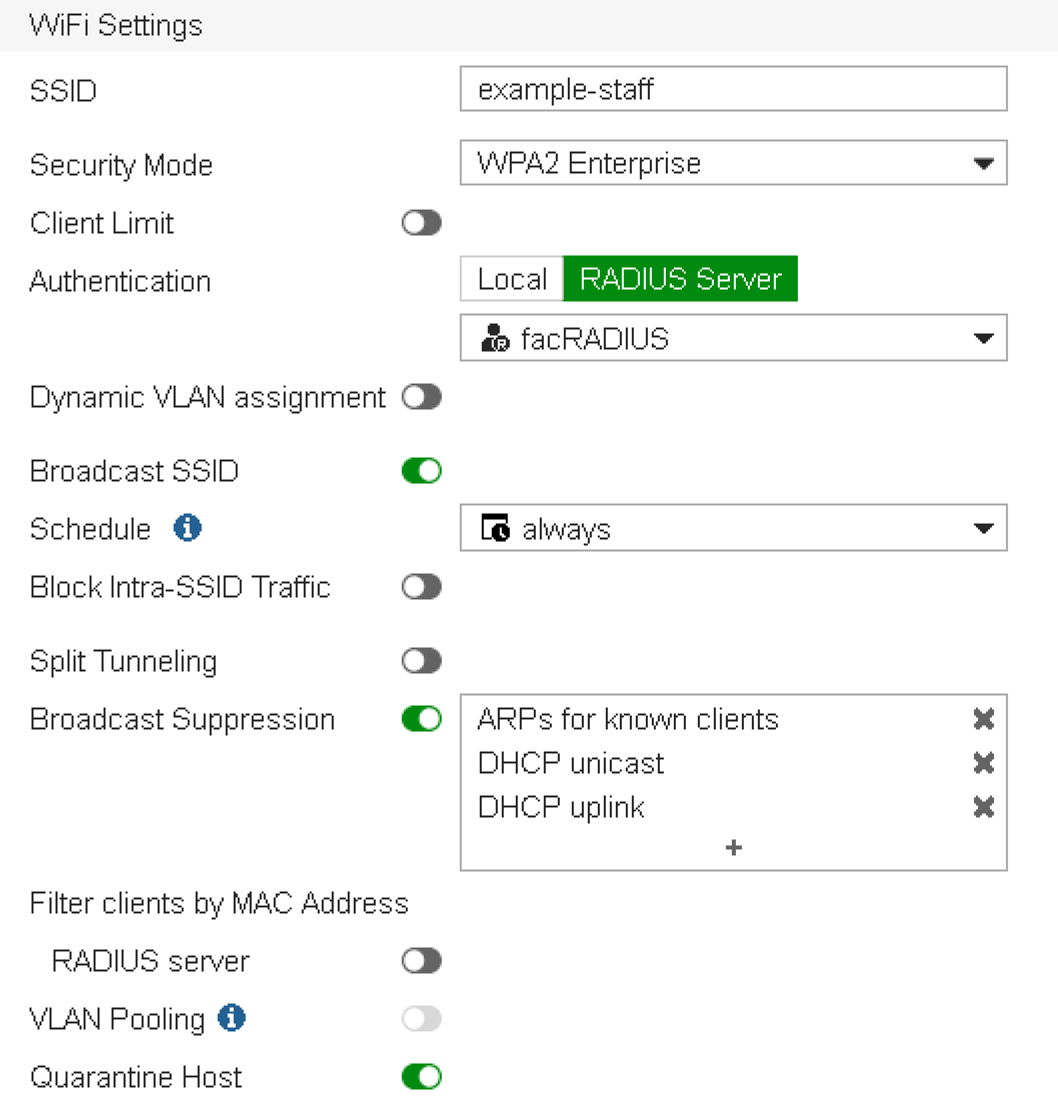
DHCP Server

Address Range

| Starting IP | End IP |
|---|---|
| 10.10.12.2 | 10.10.12.254 |

| | |
|---|---|
| Netmask | 255.255.255.0 |
| Default Gateway | Same as Interface IP |
| DNS Server | Same as System DNS |

3. Configure WPA2 Enterprise security that uses the RADIUS server.



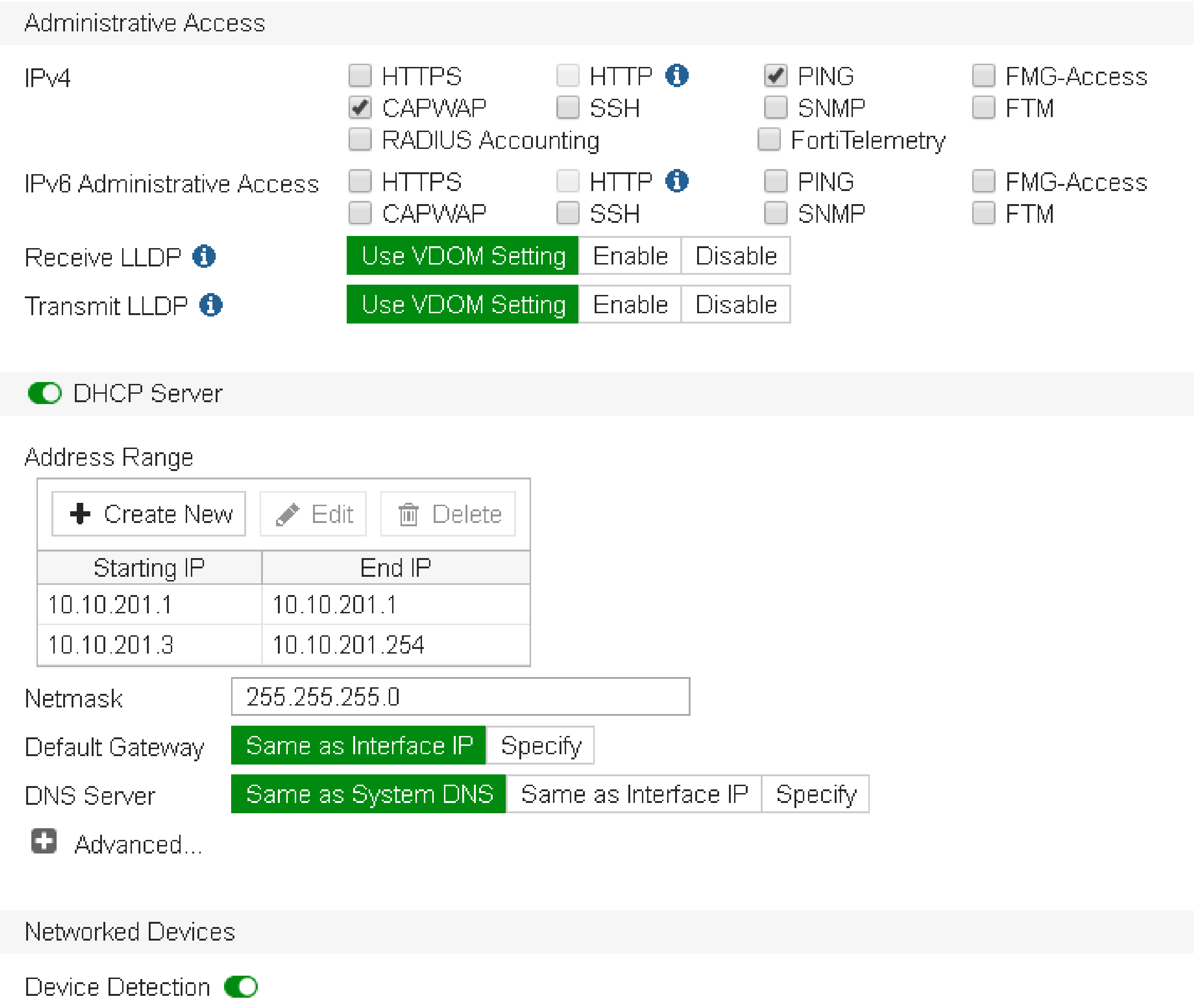
WiFi Settings

| | | |
|---|---|---|
| SSID | | example-staff |
| Security Mode | | WPA2 Enterprise |
| Client Limit | ○ | |
| Authentication | | Local [✓ RADIUS Server]<br>facRADIUS |
| Dynamic VLAN assignment | ○ | |
| Broadcast SSID | ● | |
| Schedule | | always |
| Block Intra-SSID Traffic | ○ | |
| Split Tunneling | ○ | |
| Broadcast Suppression | ● | ARPs for known clients<br>DHCP unicast<br>DHCP uplink |
| Filter clients by MAC Address | | |
| RADIUS server | ○ | |
| VLAN Pooling | ○ | |
| Quarantine Host | ● | |

## Connecting and authorizing the FortiAP

**To connect and authorize the FortiAP:**

1. Go to *Network* > *Interfaces* and configure a dedicated interface for the FortiAP.
Under *Administrative Access*, enable *PING* and *CAPWAP*, and enable *DHCP Server*.
Under *Networked Devices*, enable *Device Detection*.



Administrative Access

IPv4: □ HTTPS □ HTTP ☑ PING □ FMG-Access ☑ CAPWAP □ SSH □ SNMP □ FTM □ RADIUS Accounting □ FortiTelemetry

IPv6 Administrative Access: □ HTTPS □ HTTP □ PING □ FMG-Access □ CAPWAP □ SSH □ SNMP □ FTM

Receive LLDP: [✓ Use VDOM Setting] Enable Disable

Transmit LLDP: [✓ Use VDOM Setting] Enable Disable

DHCP Server (enabled)

Address Range

| Starting IP | End IP |
|---|---|
| 10.10.201.1 | 10.10.201.1 |
| 10.10.201.3 | 10.10.201.254 |

Netmask: 255.255.255.0

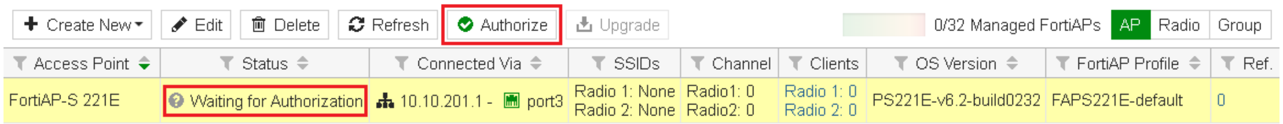
Default Gateway: [✓ Same as Interface IP] Specify

DNS Server: [✓ Same as System DNS] Same as Interface IP Specify

Networked Devices

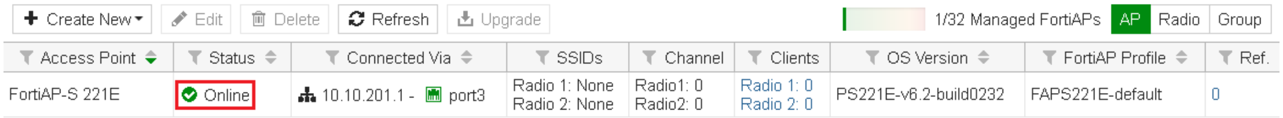
Device Detection (enabled)

2. Connect the FortiAP unit to the interface. Then go to *WiFi & Switch Controller* > *Managed FortiAPs*. Notice the *Status* is showing *Waiting for Authorization*.
   When the FortiAP is listed, select and *Authorize* it.



| Access Point | Status | Connected Via | SSIDs | Channel | Clients | OS Version | FortiAP Profile | Ref. |
|---|---|---|---|---|---|---|---|---|
| FortiAP-S 221E | Waiting for Authorization | 10.10.201.1 - port3 | Radio 1: None<br>Radio 2: None | Radio1: 0<br>Radio2: 0 | Radio 1: 0<br>Radio 2: 0 | PS221E-v6.2-build0232 | FAPS221E-default | 0 |

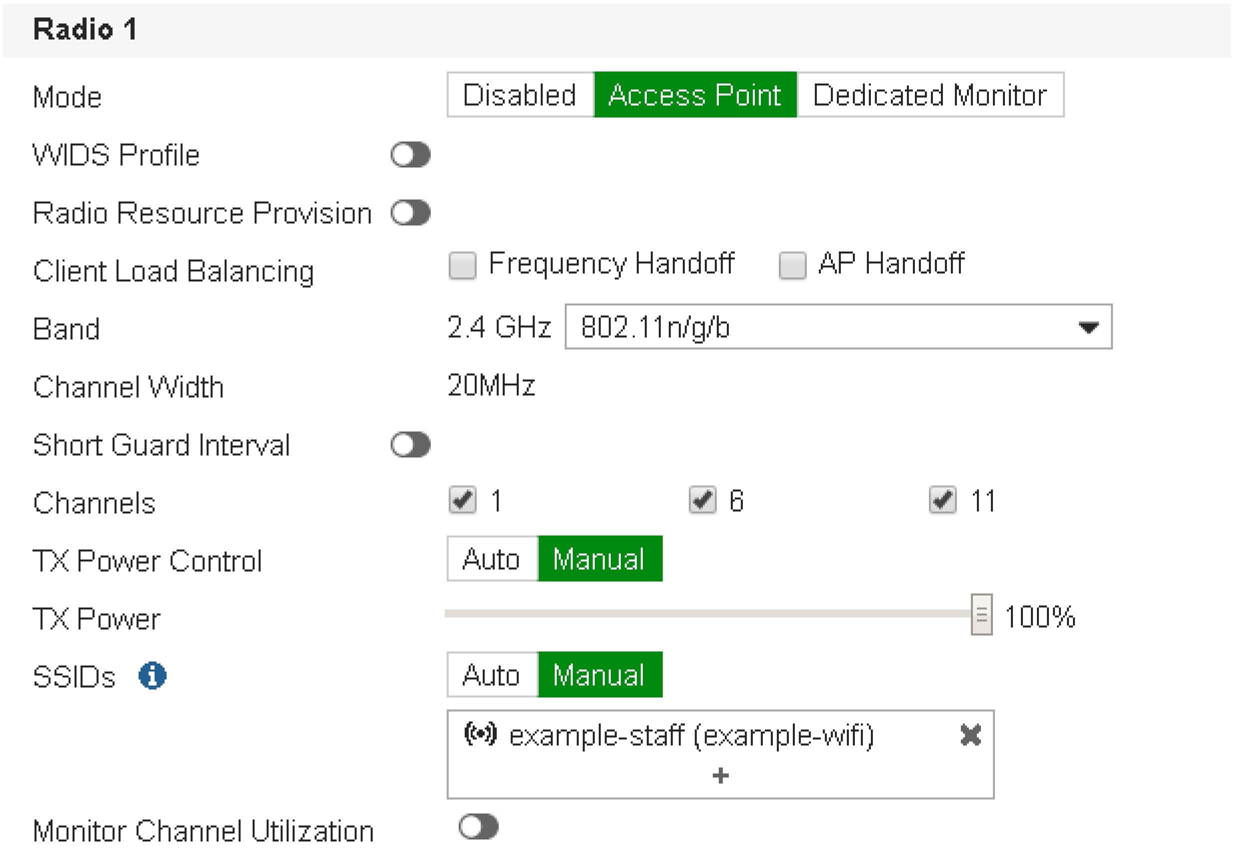
3. The FortiAP is now *Online*. The *Status* may take a few minutes to update.



| Access Point | Status | Connected Via | SSIDs | Channel | Clients | OS Version | FortiAP Profile | Ref. |
|---|---|---|---|---|---|---|---|---|
| FortiAP-S 221E | Online | 10.10.201.1 - port3 | Radio 1: None<br>Radio 2: None | Radio1: 0<br>Radio2: 0 | Radio 1: 0<br>Radio 2: 0 | PS221E-v6.2-build0232 | FAPS221E-default | 0 |

4. Go to *WiFi & Switch Controller* > *FortiAP Profiles* and edit the profile.
   This example uses a FortiAP-S 221E, so the *FAPS221E-default* profile applies.

   For each radio, make sure to select your *SSID*.



**Radio 1**

Mode: Disabled [✓ Access Point] Dedicated Monitor

WIDS Profile ○

Radio Resource Provision ○

Client Load Balancing: □ Frequency Handoff □ AP Handoff

Band: 2.4 GHz 802.11n/g/b

Channel Width: 20MHz

Short Guard Interval ○

Channels: ☑ 1 ☑ 6 ☑ 11

TX Power Control: Auto [✓ Manual]

TX Power: 100%

SSIDs: Auto [✓ Manual]

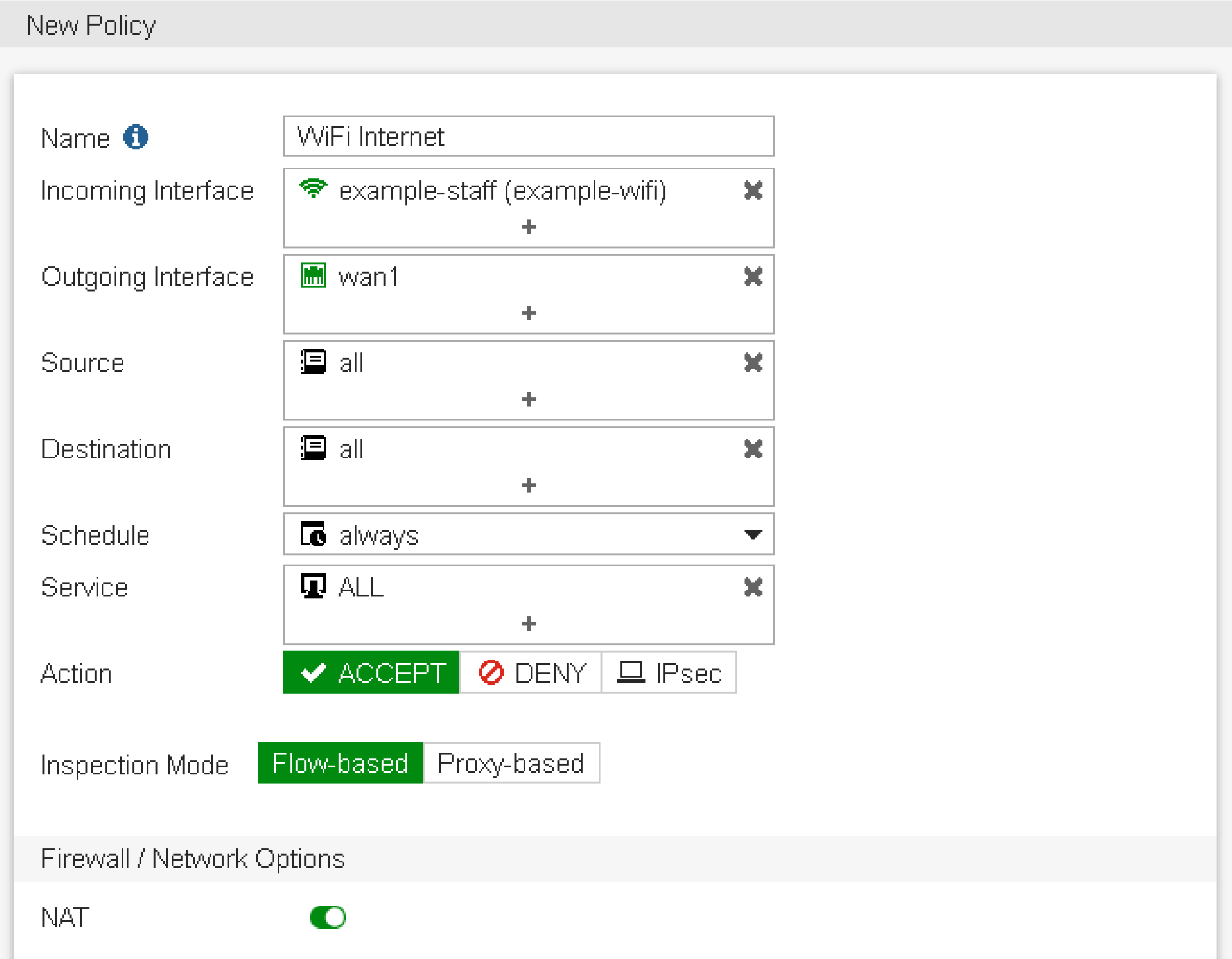
example-staff (example-wifi)

Monitor Channel Utilization ○

## Creating the security policy

**To create the security policy:**

1. Go to *Policy & Objects > IPv4 Policy* and add a policy that allows WiFi users to access the Internet.



New Policy

Name: WiFi Internet

Incoming Interface: example-staff (example-wifi)

Outgoing Interface: wan1

Source: all

Destination: all

Schedule: always

Service: ALL

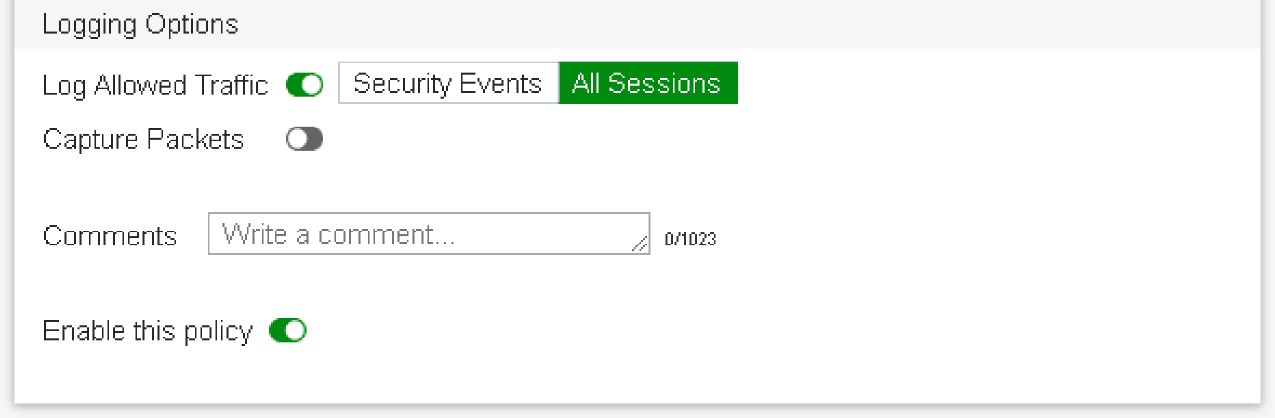
Action: [✓ ACCEPT] DENY IPsec

Inspection Mode: [✓ Flow-based] Proxy-based

Firewall / Network Options

NAT: ●

2. Under *Logging Options*, enable *Log Allowed Traffic* and *All Sessions*.



Logging Options

Log Allowed Traffic: ● Security Events [✓ All Sessions]

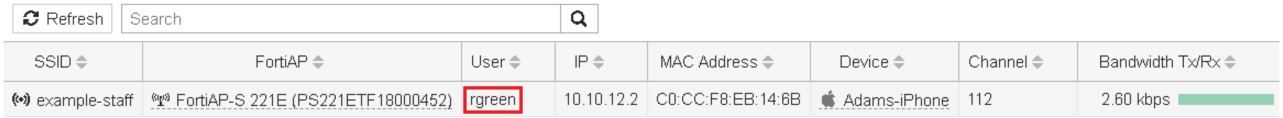
Capture Packets: ○

Comments: Write a comment... 0/1023

Enable this policy: ●

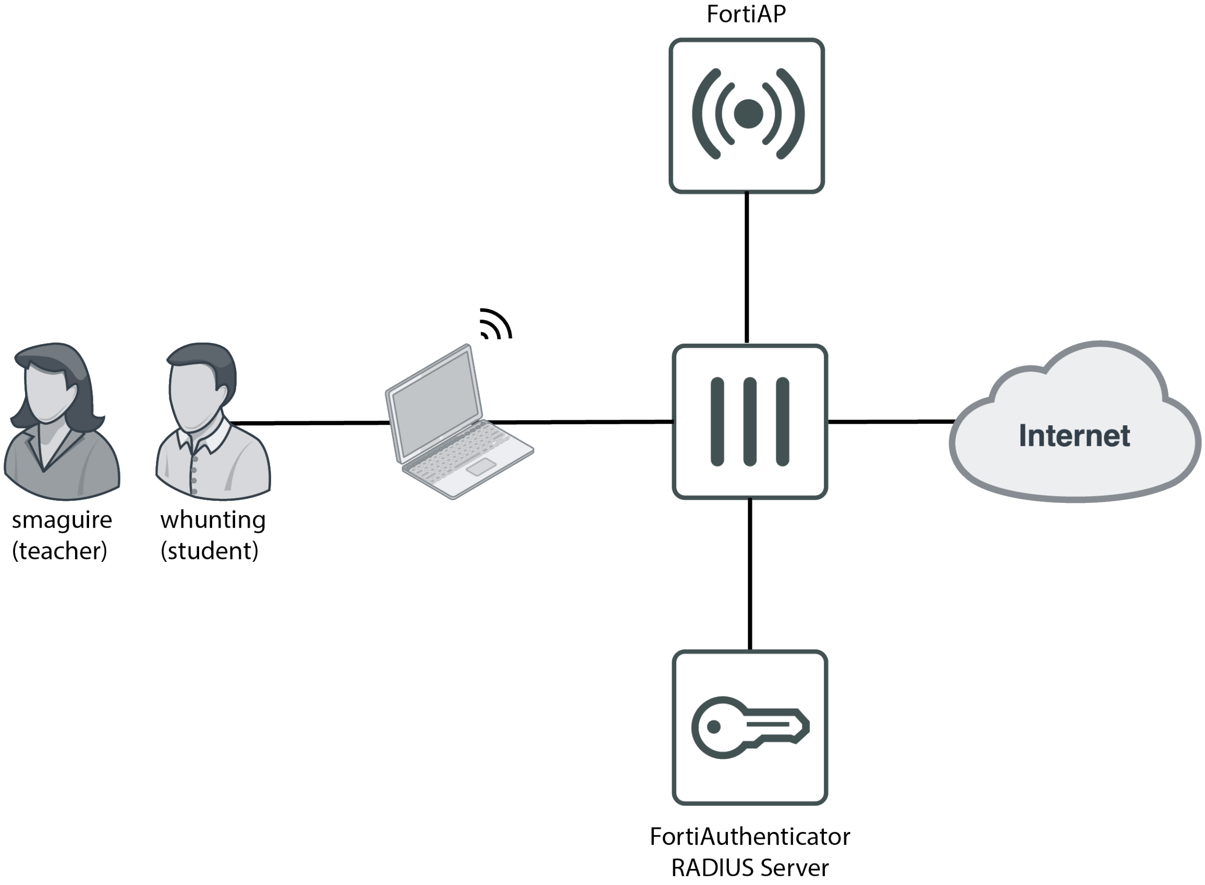
## Results

1. Connect to the *example-staff* network and browse Internet sites.
   On the FortiGate, go to *Monitor* > *WiFi Client Monitor* to see that clients connect and authenticate.



| SSID | FortiAP | User | IP | MAC Address | Device | Channel | Bandwidth Tx/Rx |
|---|---|---|---|---|---|---|---|
| example-staff | FortiAP-S 221E (PS221ETF18000452) | rgreen | 10.10.12.2 | C0:CC:F8:EB:14:6B | Adams-iPhone | 112 | 2.60 kbps |

# WiFi with WSSO using FortiAuthenticator RADIUS and Attributes



This is an example of wireless single sign-on (WSSO) with a FortiGate and FortiAuthenticator. The WiFi users are teachers and students at a school. These users each belong to a user group, either *teachers* (*smaguire*) or *students* (*whunting*). The FortiAuthenticator performs user authentication and passes the user group name to the FortiGate so that the appropriate security policy is applied.

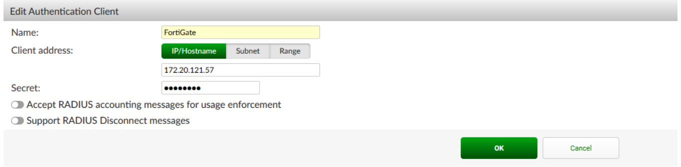
This recipe assumes that an SSID and a FortiAP are configured on the FortiGate unit. In this configuration, you will be changing the existing SSID's WiFi settings so authentication is provided by the RADIUS server.

For this example, the student security policy applies a more restrictive web filter.

## Registering the FortiGate as a RADIUS client on the FortiAuthenticator

### To create the RADIUS client:

1. On the FortiAuthenticator, go to *Authentication* > *RADIUS Service* > *Clients*, and select *Create New*.
2. Enter a *Name*, the IP address of the FortiGate, and set a *Secret*.
   The secret is a pre-shared secure password that the FortiGate will use to authenticate to the FortiAuthenticator.



Edit Authentication Client

Name: FortiGate

Client address: [✓ IP/Hostname] Subnet Range

172.20.121.57

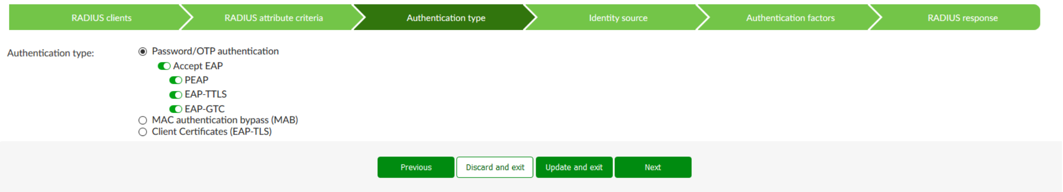
Secret: ••••••••

Accept RADIUS accounting messages for usage enforcement

Support RADIUS Disconnect messages

### To create the RADIUS policy:

1. Go to *Authentication* > *RADIUS Service* > *Policies*, and select *Create New*.
2. Enter the RADIUS policy name, description, and select the FortiGate RADIUS client.
3. Do not configure RADIUS attribute criteria.
4. Set the authentication type as *Password/OTP authentication*, and enable all *EAP* types.



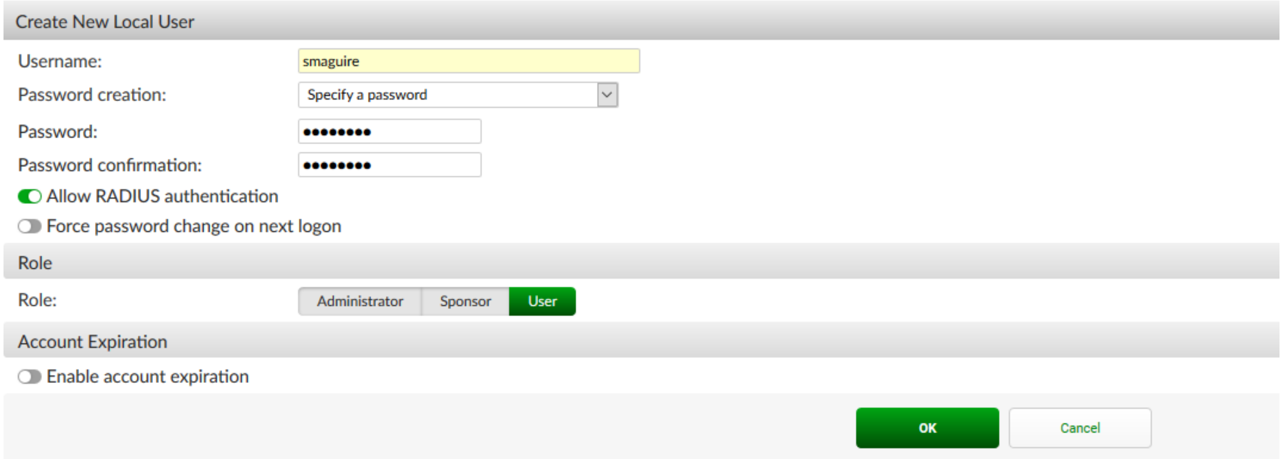
Authentication type:
● Password/OTP authentication
Accept EAP
PEAP
EAP-TTLS
EAP-GTC
○ MAC authentication bypass (MAB)
○ Client Certificates (EAP-TLS)

5. Choose a username format (in this example: *username@realm*), select the *Local* realm.
6. Review the remaining configurations, and click *Save and Exit*.

## Creating users on the FortiAuthenticator

### To create users:

1. Go to *Authentication* > *User Management* > *Local Users* and select *Create New*.
   Create one teacher user (*smaguire*) and another student user (*whunting*).



Create New Local User

Username: smaguire

Password creation: Specify a password

Password: ••••••••

Password confirmation: ••••••••

Allow RADIUS authentication

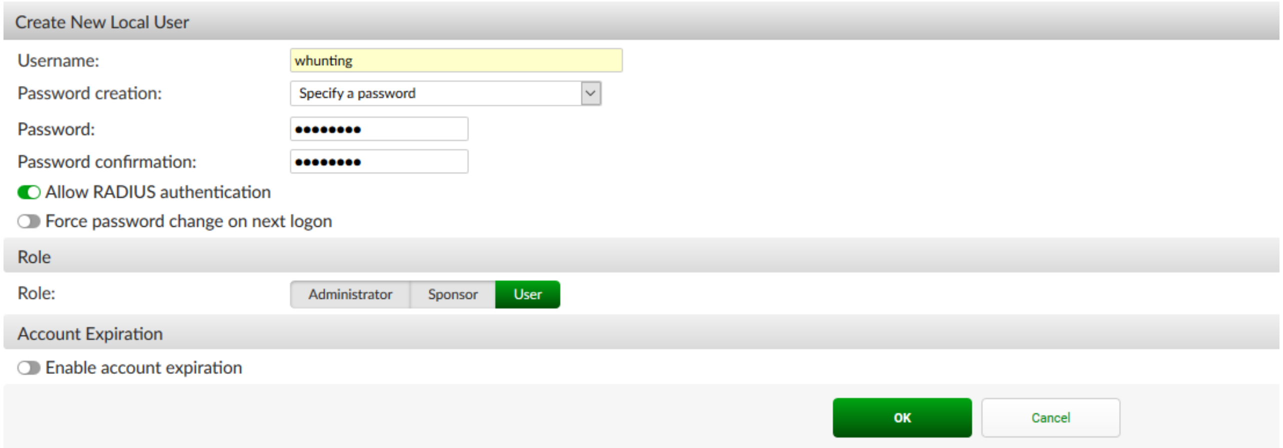
Force password change on next logon

Role

Role: Administrator Sponsor [✓ User]

Account Expiration

Enable account expiration



Create New Local User

Username: whunting

Password creation: Specify a password

Password: ••••••••

Password confirmation: ••••••••

● Allow RADIUS authentication

○ Force password change on next logon

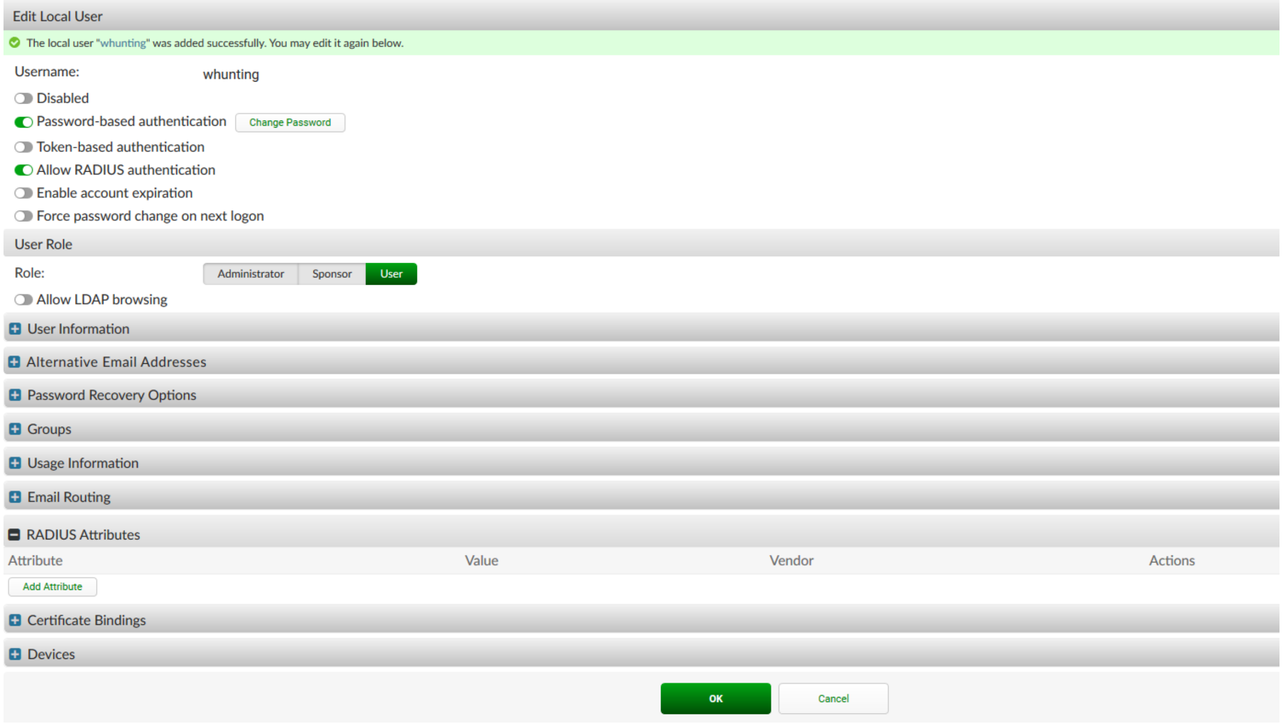
Role

Role: Administrator | Sponsor | [✓ User]

Account Expiration

○ Enable account expiration

2. Note that, after you create the users, *RADIUS Attributes* appears as an option.
   If your configuration involves multiple users, it is more efficient to add RADIUS attributes in their respective user groups, in the next step.



Edit Local User

The local user "whunting" was added successfully. You may edit it again below.

Username: whunting

○ Disabled

● Password-based authentication

○ Token-based authentication

● Allow RADIUS authentication

○ Enable account expiration

○ Force password change on next logon

User Role

Role: Administrator | Sponsor | [✓ User]

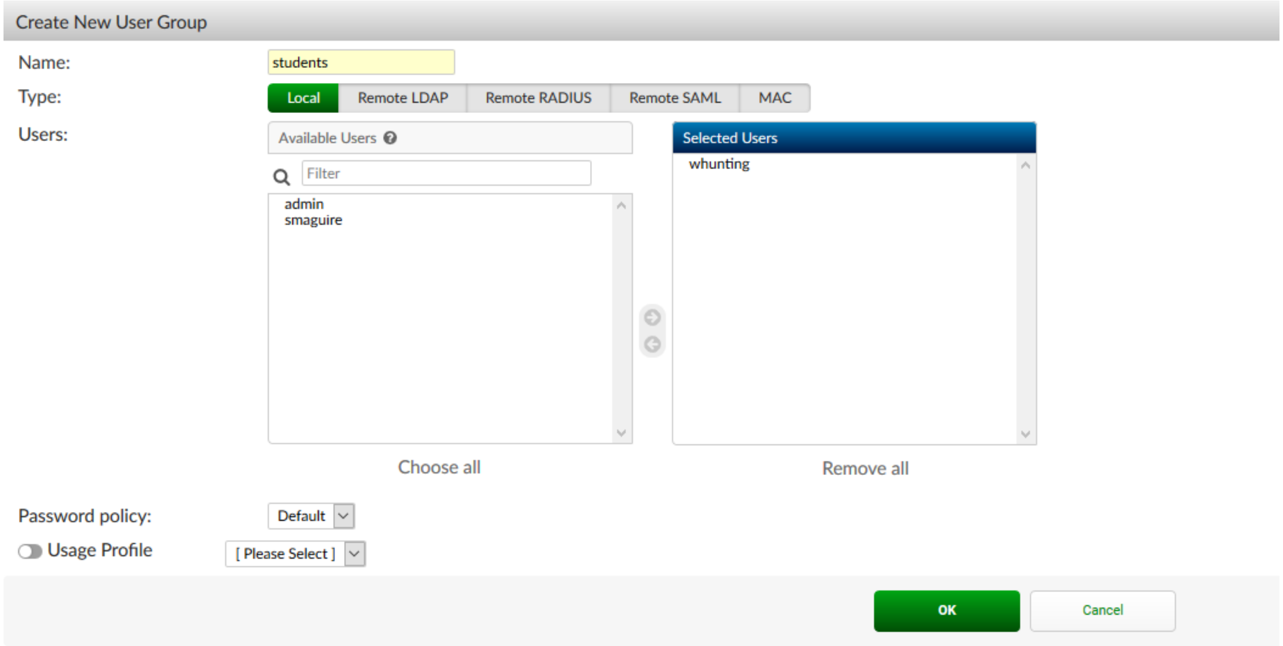
○ Allow LDAP browsing

| Attribute | Value | Vendor | Actions |
|---|---|---|---|

## Creating user groups on the FortiAuthenticator

### To create user groups:

1. Go to *Authentication* > *User Management* > *User Groups* and create two user groups: *teachers* and *students*.
   Add the users to their respective groups.



Create New User Group

Name: students

Type: Local

Users:

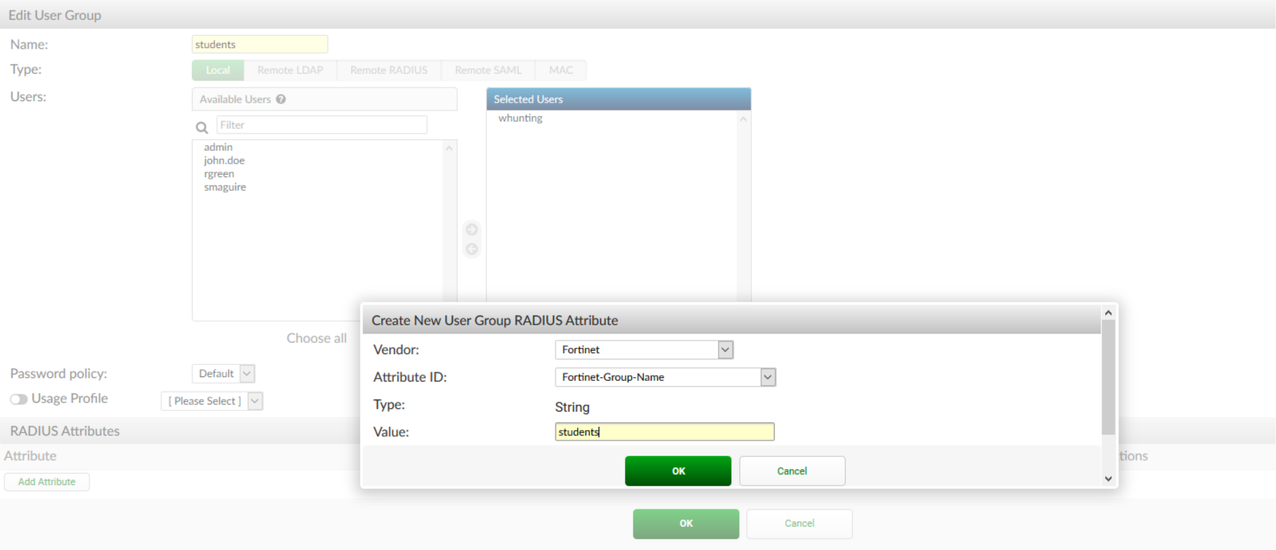
Available Users: admin, smaguire

Selected Users: whunting

Password policy: Default

Usage Profile: [ Please Select ]

2. Once created, edit both user groups and select *Add Attribute*.
3. Add the *Fortinet-Group-Name* RADIUS attribute to each group, which specifies the user group name to be sent to the FortiGate.



Edit User Group

Name: students

Type: Local

Users:

Available Users: admin, john.doe, rgreen, smaguire

Selected Users: whunting

Password policy: Default

Usage Profile: [ Please Select ]

Create New User Group RADIUS Attribute

Vendor: Fortinet

Attribute ID: Fortinet-Group-Name

Type: String

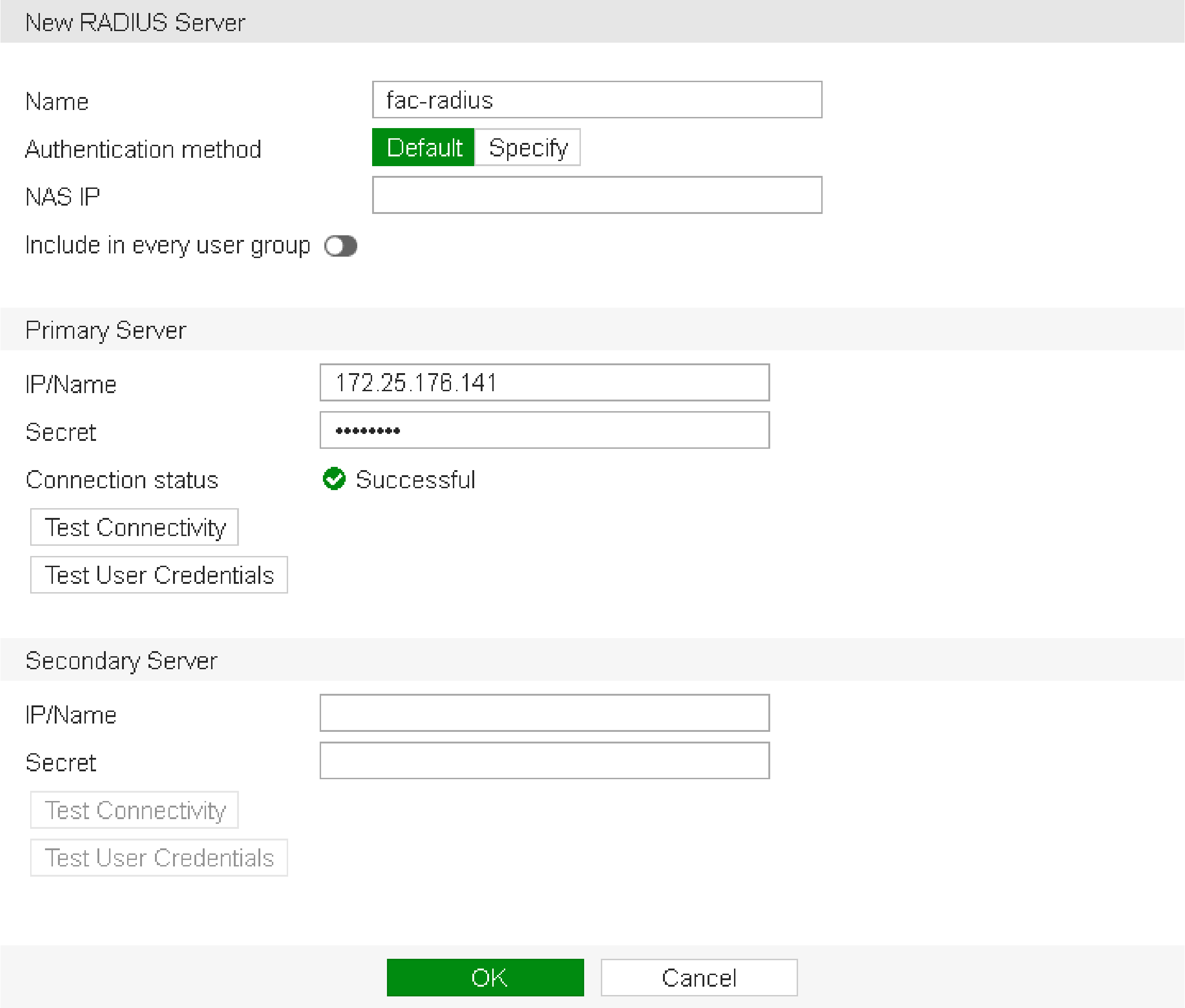
Value: students

## Configuring the FortiGate to use the FortiAuthenticator as the RADIUS server

### To configure the FortiGate to use the FortiAuthenticator RADIUS server:

1. On the FortiGate, go to *User & Device* > *RADIUS Servers* and select *Create New*.
   Enter a *Name*, the Internet-facing IP address of the FortiAuthenticator, and enter the same *Primary Server Secret* entered on the FortiAuthenticator.

Select *Test Connectivity* to confirm the successful connection.



New RADIUS Server

Name: fac-radius

Authentication method: Default | Specify

NAS IP:

Include in every user group

Primary Server

IP/Name: 172.25.176.141

Secret: •••••••••

Connection status: ✓ Successful

Secondary Server

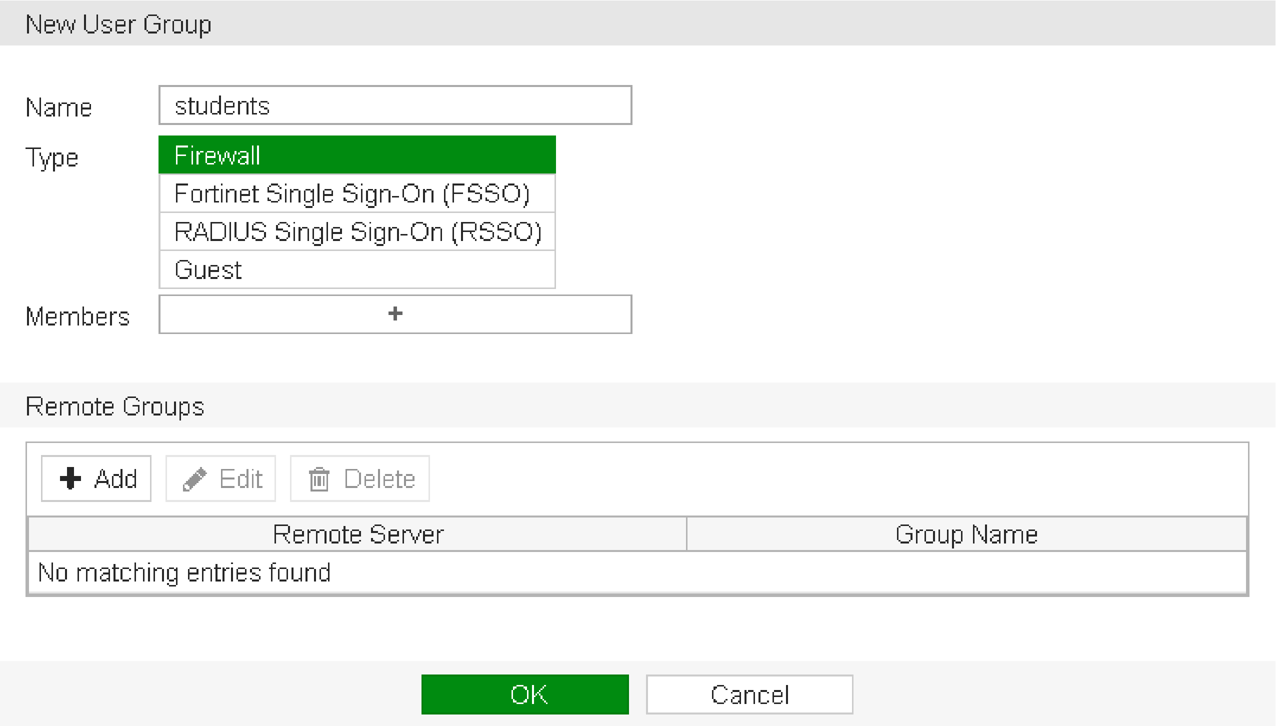
IP/Name:

Secret:

## Configuring user groups on the FortiGate

**To configure user groups on the FortiGate:**

1. Go to *User & Device* > *User Groups* and create two groups named the same as the ones created on the FortiAuthenticator.



New User Group

Name: students

Type: Firewall

Members: +

Remote Groups

| Remote Server | Group Name |
|---|---|
| No matching entries found | |

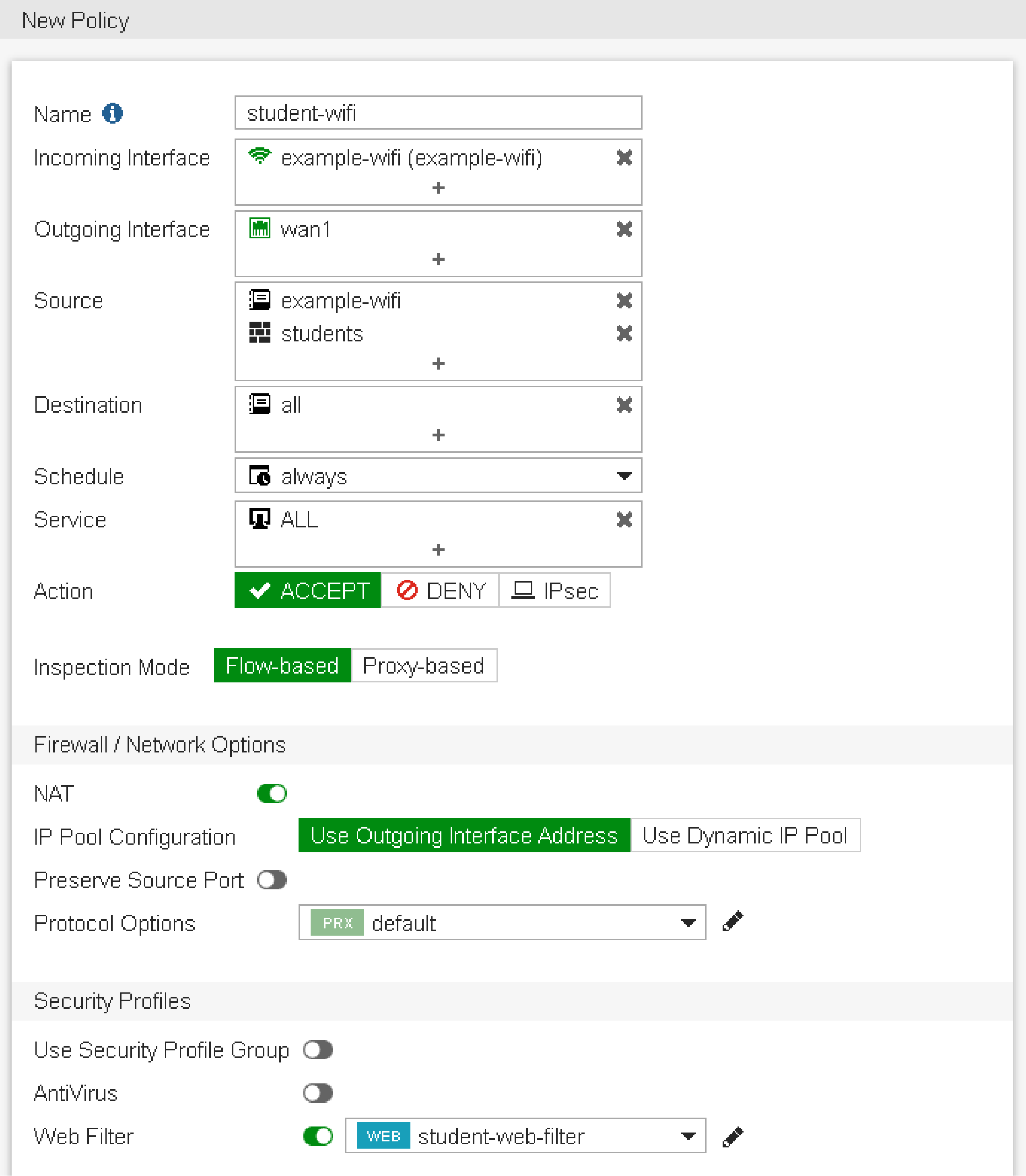
Do not add any members to either group.

## Creating security policies

**To create a security policy:**

1. Go to *Policy & Objects* > *IPv4 Policy* and select *Create New*.
   Create two policies (*student-wifi* and *teacher-wifi*) with WiFi-to-Internet access: one policy with *Source* set to the *students* user group, and the other set to *teachers*. Make sure to add the SSID address (*example-wifi*) to both policies also.

The student policy has a more restrictive *Web Filter* profile enabled.



New Policy

| | |
|---|---|
| Name | student-wifi |
| Incoming Interface | example-wifi (example-wifi) |
| Outgoing Interface | wan1 |
| Source | example-wifi<br>students |
| Destination | all |
| Schedule | always |
| Service | ALL |
| Action | [✓ ACCEPT] DENY IPsec |
| Inspection Mode | [✓ Flow-based] Proxy-based |

Firewall / Network Options

| | |
|---|---|
| NAT | ● |
| IP Pool Configuration | [✓ Use Outgoing Interface Address] Use Dynamic IP Pool |
| Preserve Source Port | ○ |
| Protocol Options | PRX default |

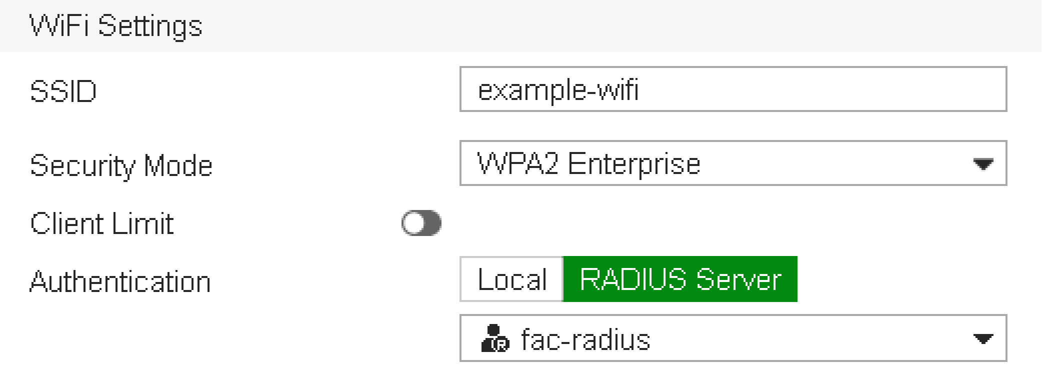
Security Profiles

| | |
|---|---|
| Use Security Profile Group | ○ |
| AntiVirus | ○ |
| Web Filter | ● WEB student-web-filter |

## Configuring the SSID to RADIUS authentication

**To configure the SSID to RADIUS authentication:**

1. Go to *WiFi & Switch Controller > SSID* and edit your pre-existing SSID interface.
   Under *WiFi Settings*, set *Security Mode* to *WPA2 Enterprise*, set *Authentication* to *RADIUS Server*, and add the RADIUS server configured on the FortiGate earlier from the dropdown menu.



WiFi Settings

SSID: example-wifi

Security Mode: WPA2 Enterprise

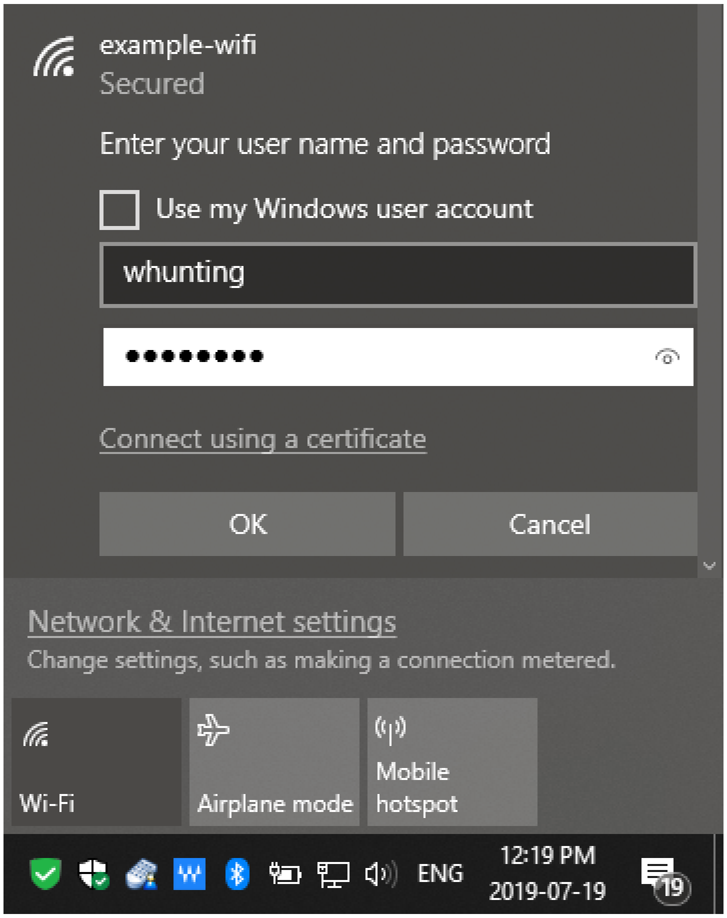
Client Limit: ○

Authentication: Local [✓ RADIUS Server]

fac-radius

## Results

1. Connect to the WiFi network as a student.



example-wifi
Secured

Enter your user name and password

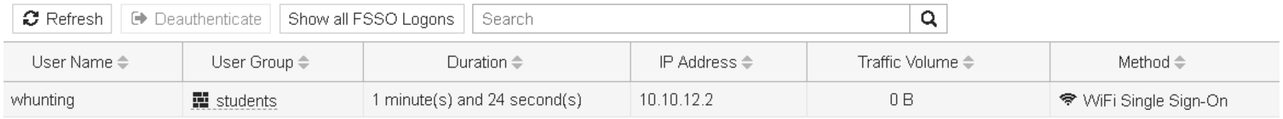
□ Use my Windows user account

whunting

●●●●●●●●●

Connect using a certificate
OK
Cancel
Network & Internet settings
Change settings, such as making a connection metered.
Wi-Fi
Airplane mode
Mobile hotspot
ENG
12:19 PM
2019-07-19
19

2. Then on the FortiGate go to *Monitor* > *Firewall User Monitor*. From here you can verify the user, the user group, and that the WSSO authentication method was used.



| User Name | User Group | Duration | IP Address | Traffic Volume | Method |
|---|---|---|---|---|---|
| whunting | students | 1 minute(s) and 24 second(s) | 10.10.12.2 | 0 B | WiFi Single Sign-On |

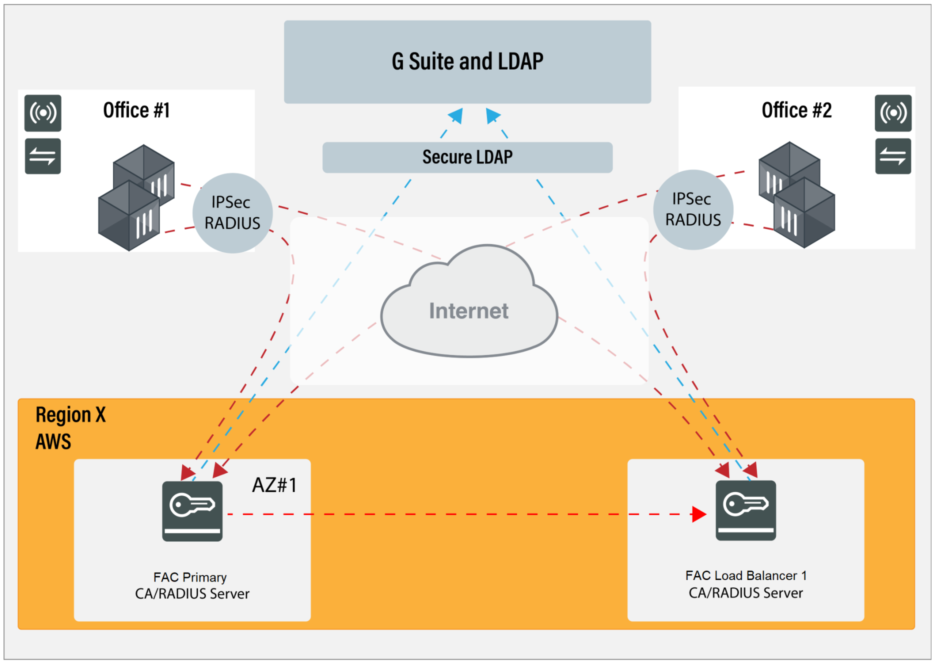
# LDAP Authentication

This section describes configuring LDAP authentication.

## G Suite integration using LDAP

This article explains how to integrate the FortiAuthenticator with G Suite Secure LDAP using client authentication through a certificate. You will use the LDAP in Google DB to authenticate end users for 802.1X and VPN.

1. Generating the G Suite certificate on page 146
2. Importing the certificate to FortiAuthenticator on page 148
3. Configuring LDAP on the FortiAuthenticator on page 148
4. Troubleshooting on page 150



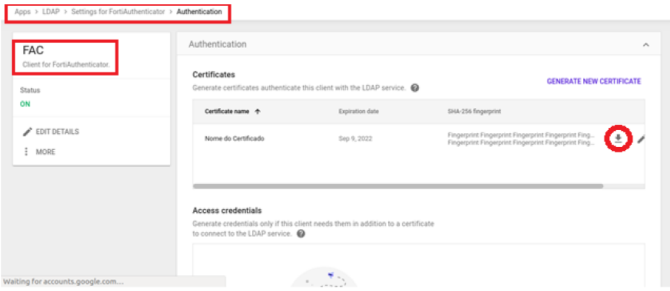
### Generating the G Suite certificate

You must first generate certificates to authenticate the LDAP client with Secure LDAP service.

**To generate certificate authentication:**

1. From the Google Admin console, go to *Apps* > *LDAP*.
2. Select one of the clients in the list.
3. Click the *Authentication* card.
4. Click *GENERATE NEW CERTIFICATE*, then click the download icon to download the certificate.

5. Upload the certificate to your client, and configure the application.
   Depending on the type of LDAP client, configuration may require LDAP access credentials. See Generate access credentials.



Apps > LDAP > Settings for FortiAuthenticator > Authentication

FAC
Client for FortiAuthenticator

Status
ON

Authentication

Certificates
Generate certificates authenticate this client with the LDAP service.

| Certificate name | Expiration date | SHA-256 fingerprint |
|---|---|---|
| Nome do Certificado | Sep 9, 2022 | Fingerprint Fingerprint Fingerprint Fingerprint Fing...<br>Fingerprint Fingerprint Fingerprint Fingerprint Fing... |

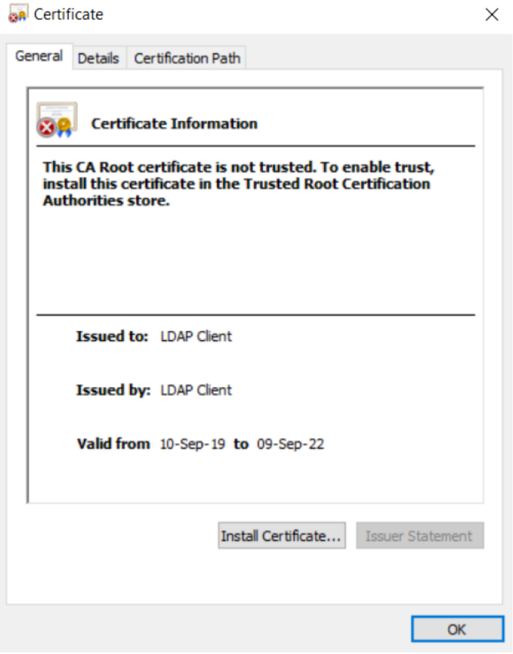
Access credentials
Generate credentials only if this client needs them in addition to a certificate to connect to the LDAP service.

Waiting for accounts.google.com...

Once you have uploaded the certificate to your client, G Suite will generate a client certificate and key.

Example:

- Cert: `Google_2022_09_09_72372.crt`
- Key: `Google_2022_09_09_72372.key`



Certificate

**Certificate Information**

**This CA Root certificate is not trusted. To enable trust, install this certificate in the Trusted Root Certification Authorities store.**

**Issued to:** LDAP Client

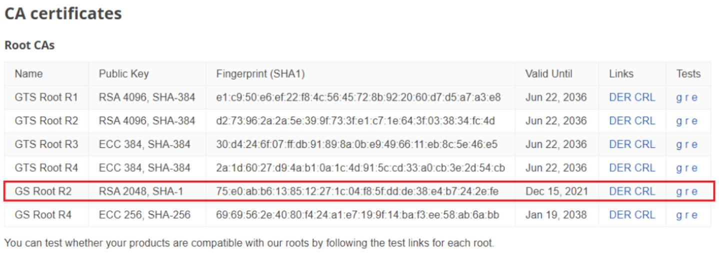
**Issued by:** LDAP Client

**Valid from** 10-Sep-19 **to** 09-Sep-22

Store the certificate and key in a safe place.

By default, FortiAuthenticator will not trust the certificate issued by Google. You must install a Google Trusted CA to match the chain group, which can be downloaded at https://pki.goog/.

- `GS Root R2`



CA certificates

Root CAs

| Name | Public Key | Fingerprint (SHA1) | Valid Until | Links | Tests |
|---|---|---|---|---|---|
| GTS Root R1 | RSA 4096, SHA-384 | e1:c9:50:e6:ef:22:f8:4c:56:45:72:8b:92:20:60:d7:d5:a7:a3:e8 | Jun 22, 2036 | DER CRL | g r e |
| GTS Root R2 | RSA 4096, SHA-384 | d2:73:96:2a:2a:5e:39:9f:73:3f:e1:c7:1e:64:3f:03:38:34:fc:4d | Jun 22, 2036 | DER CRL | g r e |
| GTS Root R3 | ECC 384, SHA-384 | 30:d4:24:6f:07:ff:db:91:89:8a:0b:e9:49:66:11:eb:8c:5e:46:e5 | Jun 22, 2036 | DER CRL | g r e |
| GTS Root R4 | ECC 384, SHA-384 | 2a:1d:60:27:d9:4a:b1:0a:1c:4d:91:5c:cd:33:a0:cb:3e:2d:54:cb | Jun 22, 2036 | DER CRL | g r e |
| GS Root R2 | RSA 2048, SHA-1 | 75:e0:ab:b6:13:85:12:27:1c:04:f8:5f:dd:de:38:e4:b7:24:2e:fe | Dec 15, 2021 | DER CRL | g r e |
| GS Root R4 | ECC 256, SHA-256 | 69:69:56:2e:40:80:f4:24:a1:e7:19:9f:14:ba:f3:ee:58:ab:6a:bb | Jan 19, 2038 | DER CRL | g r e |

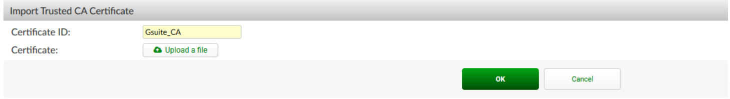
You can test whether your products are compatible with our roots by following the test links for each root.

## Importing the certificate to FortiAuthenticator

This series of steps can be performed on the primary FortiAuthenticator.

### To import the trusted CA certificate:

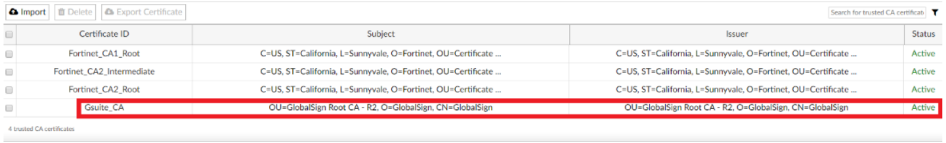
1. Go to *Certificate Management > Certificate Authorities > Trusted CAs > Import*.
2. Enter a Certificate ID, upload a file, and click *OK*.



Import Trusted CA Certificate

| | |
|---|---|
| Certificate ID: | Gsuite_CA |
| Certificate: | Upload a file |

Results:



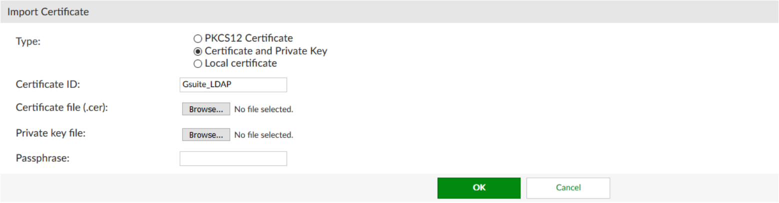
| ☐ | Certificate ID | Subject | Issuer | Status |
|---|---|---|---|---|
| ☐ | Fortinet_CA1_Root | C=US, ST=California, L=Sunnyvale, O=Fortinet, OU=Certificate ... | C=US, ST=California, L=Sunnyvale, O=Fortinet, OU=Certificate ... | Active |
| ☐ | Fortinet_CA2_Intermediate | C=US, ST=California, L=Sunnyvale, O=Fortinet, OU=Certificate ... | C=US, ST=California, L=Sunnyvale, O=Fortinet, OU=Certificate ... | Active |
| ☐ | Fortinet_CA2_Root | C=US, ST=California, L=Sunnyvale, O=Fortinet, OU=Certificate ... | C=US, ST=California, L=Sunnyvale, O=Fortinet, OU=Certificate ... | Active |
| ☐ | Gsuite_CA | OU=GlobalSign Root CA - R2, O=GlobalSign, CN=GlobalSign | OU=GlobalSign Root CA - R2, O=GlobalSign, CN=GlobalSign | Active |

4 trusted CA certificates

You can now import the LDAP certificate generated by G Suite.

### To import the client authentication certificate:

1. Go to *Certificate Management > End Entities > Local Services > Import*.
2. Select *Certificate and Private Key* as the *Type*.
3. Enter the Certificate ID, choose the files for the previously saved certificate and private key files, and select *OK*.

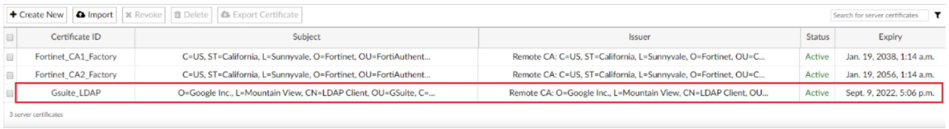


Import Certificate

| | |
|---|---|
| Type: | ○ PKCS12 Certificate<br>● Certificate and Private Key<br>○ Local certificate |
| Certificate ID: | Gsuite_LDAP |
| Certificate file (.cer): | Browse... No file selected. |
| Private key file: | Browse... No file selected. |
| Passphrase: | |

4.

Results:



| ☐ | Certificate ID | Subject | Issuer | Status | Expiry |
|---|---|---|---|---|---|
| ☐ | Fortinet_CA1_Factory | C=US, ST=California, L=Sunnyvale, O=Fortinet, OU=FortiAuthent... | Remote CA: C=US, ST=California, L=Sunnyvale, O=Fortinet, OU=C... | Active | Jan. 19, 2038, 1:14 a.m. |
| ☐ | Fortinet_CA2_Factory | C=US, ST=California, L=Sunnyvale, O=Fortinet, OU=FortiAuthent... | Remote CA: C=US, ST=California, L=Sunnyvale, O=Fortinet, OU=C... | Active | Jan. 19, 2056, 1:14 a.m. |
| ☐ | Gsuite_LDAP | O=Google Inc., L=Mountain View, CN=LDAP Client, OU=GSuite, C=... | Remote CA: O=Google Inc., L=Mountain View, CN=LDAP Client, OU... | Active | Sept. 9, 2022, 5:06 p.m. |

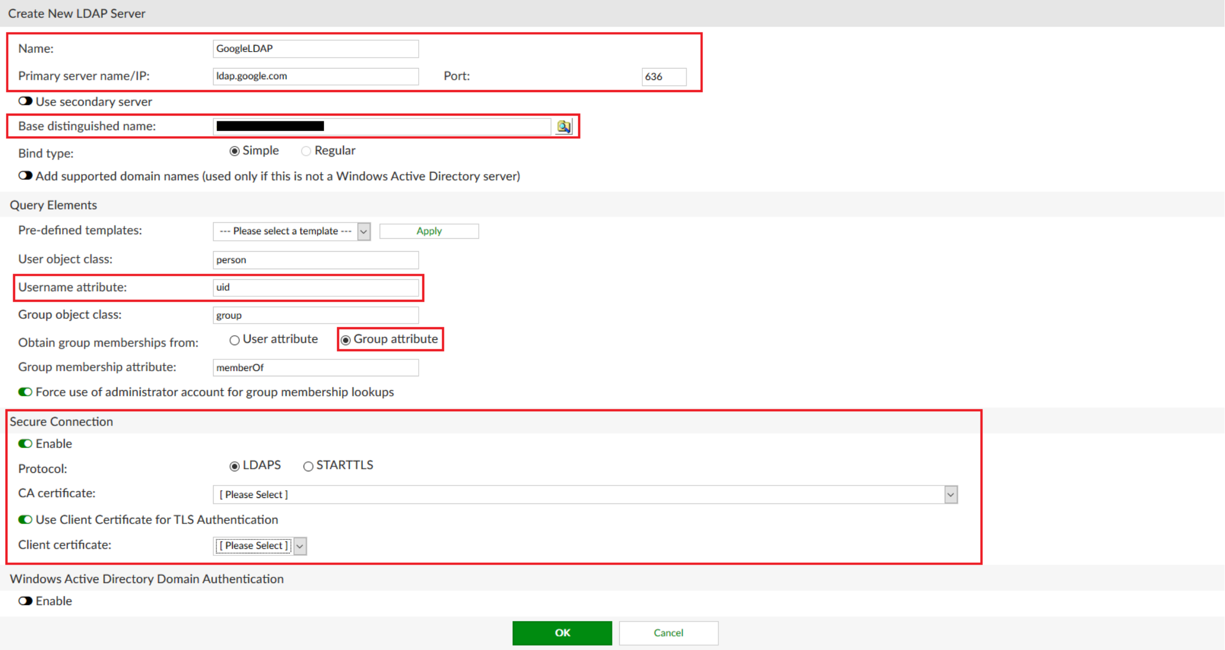
3 server certificates

## Configuring LDAP on the FortiAuthenticator

Now you can finish the LDAPS configuration using client authentication through certificate.

1. Go to *Authentication > Remote Auth. Servers > LDAP > Create New*, and enter the following information:
   a. Enter a name.
   b. For *Primary server name/IP* enter `ldap.google.com`, and set the port to `636`.
   c. Enter the base distinguished name.
   d. For the Username attribute, enter `uid`.
   e. Select the option to obtain group memberships from *Group attribute*.
   f. Enable *Secure Connection* and select either *LDAPS* or *STARTTLS* as the Protocol, and select the Google CA certificate.

g. Enable *Use Client Certificate for TLS Authentication,* and select the LDAP certificate.



Create New LDAP Server

Name: GoogleLDAP

Primary server name/IP: ldap.google.com Port: 636

Use secondary server

Base distinguished name: [redacted]

Bind type: ● Simple ○ Regular

Add supported domain names (used only if this is not a Windows Active Directory server)

Query Elements

Pre-defined templates: --- Please select a template --- Apply

User object class: person

Username attribute: uid

Group object class: group

Obtain group memberships from: ○ User attribute ● Group attribute

Group membership attribute: memberOf

Force use of administrator account for group membership lookups

Secure Connection

Enable

Protocol: ● LDAPS ○ STARTTLS

CA certificate: [ Please Select ]

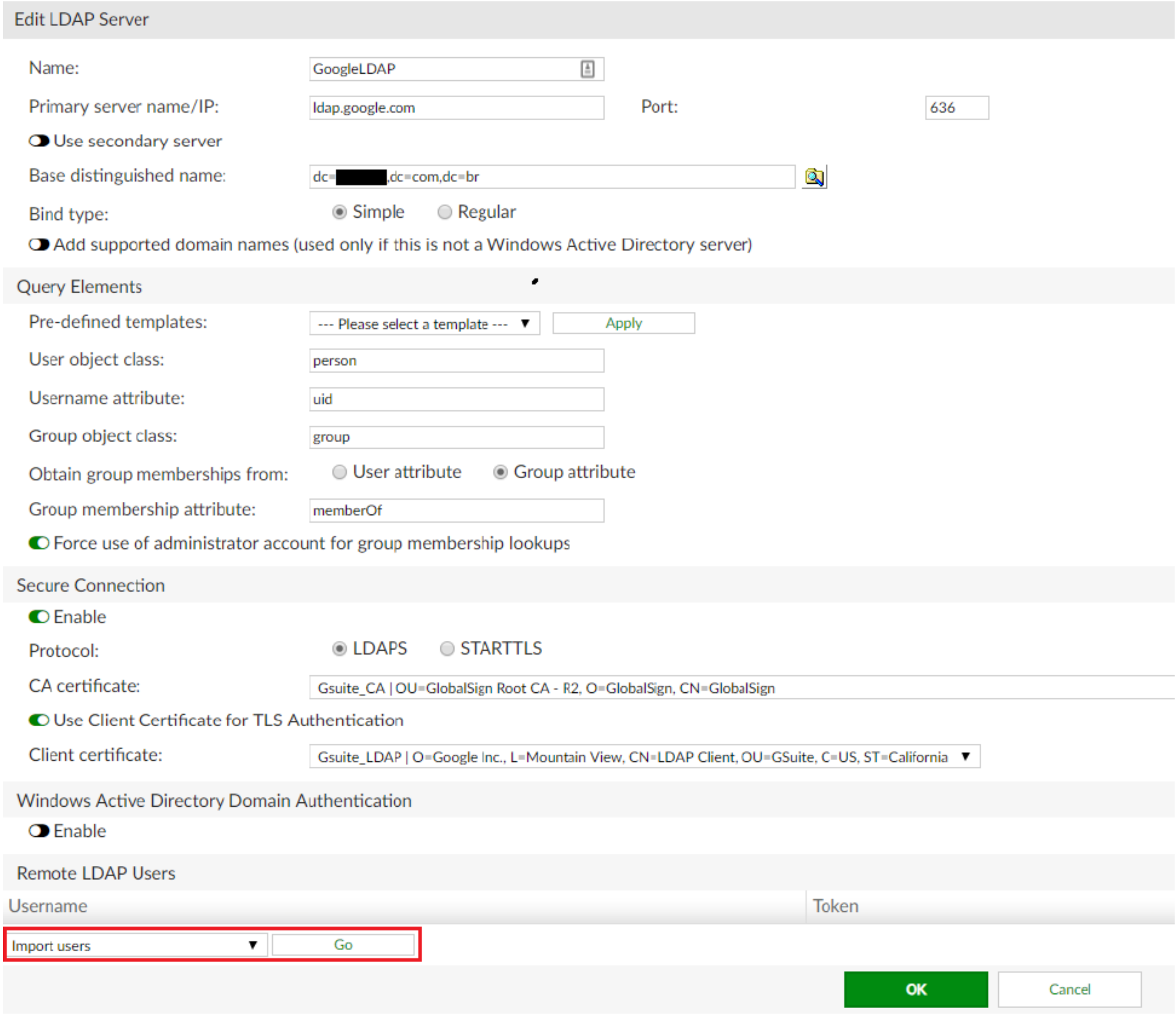
Use Client Certificate for TLS Authentication

Client certificate: [ Please Select ]

Windows Active Directory Domain Authentication

Enable

2. Select *OK*.
If required, you can now import users by clicking the *Go* button next to the *Import users* dropdown. This is not a required step, but can be done in cases where you want to include additional information to their accounts or assign FortiTokens.



Edit LDAP Server

Name: GoogleLDAP

Primary server name/IP: ldap.google.com  Port: 636

○ Use secondary server

Base distinguished name: dc=[redacted],dc=com,dc=br

Bind type: ● Simple ○ Regular

○ Add supported domain names (used only if this is not a Windows Active Directory server)

Query Elements

Pre-defined templates: --- Please select a template --- ▼ Apply

User object class: person

Username attribute: uid

Group object class: group

Obtain group memberships from: ○ User attribute ● Group attribute

Group membership attribute: memberOf

● Force use of administrator account for group membership lookups

Secure Connection

● Enable

Protocol: ● LDAPS ○ STARTTLS

CA certificate: Gsuite_CA | OU=GlobalSign Root CA - R2, O=GlobalSign, CN=GlobalSign

● Use Client Certificate for TLS Authentication

Client certificate: Gsuite_LDAP | O=Google Inc., L=Mountain View, CN=LDAP Client, OU=GSuite, C=US, ST=California ▼

Windows Active Directory Domain Authentication

○ Enable

Remote LDAP Users

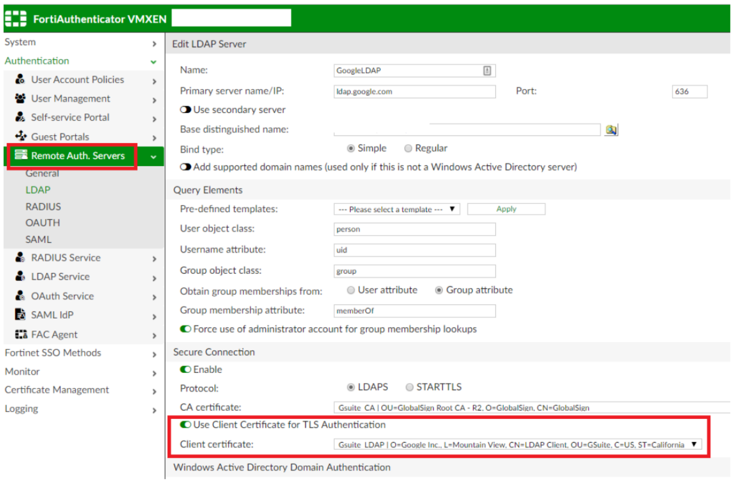
| Username | Token |
|---|---|

Import users ▼ Go

# Troubleshooting

## Missing option to use client certificate for TLS authentication

*Use Client Certificate for TLS Authentication* is only supported in FortiAuthenticator 6.0.1 and higher.



Edit LDAP Server

Name: GoogleLDAP

Primary server name/IP: ldap.google.com Port: 636

Use secondary server

Base distinguished name:

Bind type: ● Simple ○ Regular

Add supported domain names (used only if this is not a Windows Active Directory server)

Query Elements

Pre-defined templates: --- Please select a template --- ▼ Apply

User object class: person

Username attribute: uid

Group object class: group

Obtain group memberships from: ○ User attribute ● Group attribute

Group membership attribute: memberOf

Force use of administrator account for group membership lookups

Secure Connection

Enable

Protocol: ● LDAPS ○ STARTTLS

CA certificate: Gsuite CA | OU=GlobalSign Root CA - R2, O=GlobalSign, CN=GlobalSign

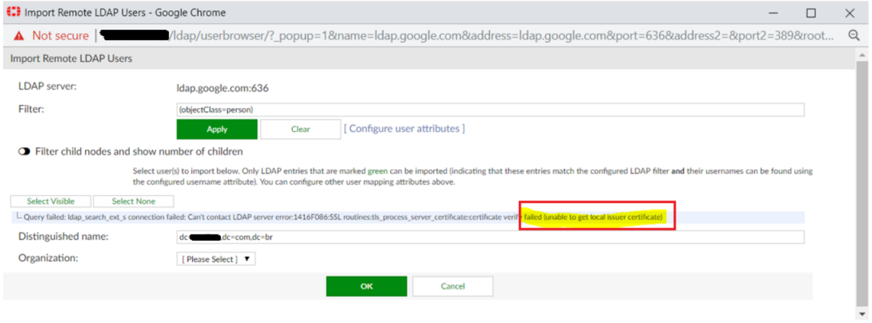
Use Client Certificate for TLS Authentication

Client certificate: Gsuite LDAP | O=Google Inc., L=Mountain View, CN=LDAP Client, OU=GSuite, C=US, ST=California ▼

Windows Active Directory Domain Authentication

## Certificate error messages

The following is an example of an incorrect Trusted CA certificate entry. Please verify that you have followed the steps included in Generating the G Suite certificate on page 146.



Import Remote LDAP Users - Google Chrome

Not secure | [redacted]/ldap/userbrowser/?_popup=1&name=ldap.google.com&address=ldap.google.com&port=636&address2=&port2=389&root...

Import Remote LDAP Users

LDAP server: ldap.google.com:636

Filter: (objectClass=person)

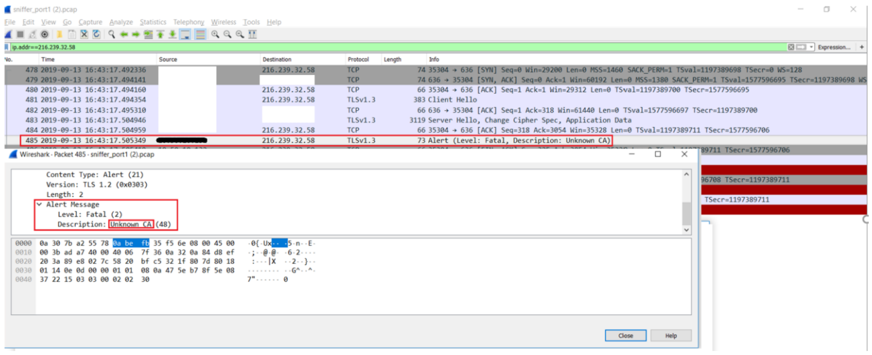
Filter child nodes and show number of children

Select user(s) to import below. Only LDAP entries that are marked green can be imported (indicating that these entries match the configured LDAP filter **and** their usernames can be found using the configured username attribute). You can configure other user mapping attributes above.

```
Query failed: ldap_search_ext_s connection failed: Can't contact LDAP server error:1416F086:SSL routines:tls_process_server_certificate:certificate verify failed (unable to get local issuer certificate)
```

Distinguished name: dc [redacted].dc=com,dc=br

Organization: [ Please Select ] ▼



sniffer_port1 (2).pcap
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Expression...

```
ip.addr==216.239.32.58

No.  Time                        Source         Destination     Protocol  Length Info
478 2019-09-13 16:43:17.492336                  216.239.32.58   TCP       74 35304 → 636 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=1197389698 TSecr=0 WS=128
479 2019-09-13 16:43:17.494141                                  TCP       74 636 → 35304 [SYN, ACK] Seq=0 Ack=1 Win=60192 Len=0 MSS=1380 SACK_PERM=1 TSval=1577596695 TSecr=1197389698 WS
480 2019-09-13 16:43:17.494160                  216.239.32.58   TCP       66 35304 → 636 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=1197389700 TSecr=1577596695
481 2019-09-13 16:43:17.494354                  216.239.32.58   TLSv1.3   383 Client Hello
482 2019-09-13 16:43:17.495310                                  TCP       66 636 → 35304 [ACK] Seq=1 Ack=318 Win=61440 Len=0 TSval=1577596697 TSecr=1197389700
483 2019-09-13 16:43:17.504946                                  TLSv1.3   3119 Server Hello, Change Cipher Spec, Application Data
484 2019-09-13 16:43:17.504959                  216.239.32.58   TCP       66 35304 → 636 [ACK] Seq=318 Ack=3054 Win=35328 Len=0 TSval=1197389711 TSecr=1577596706
485 2019-09-13 16:43:17.505349  [redacted]      216.239.32.58   TLSv1.3   73 Alert (Level: Fatal, Description: Unknown CA)
                                                                             89711 TSecr=1577596706
                                                                             96708 TSecr=1197389711
                                                                             TSecr=1197389711
```

Wireshark · Packet 485 · sniffer_port1 (2).pcap

```
    Content Type: Alert (21)
    Version: TLS 1.2 (0x0303)
    Length: 2
  ˅ Alert Message
      Level: Fatal (2)
      Description: Unknown CA (48)

0000  0a 30 7b a2 55 78 0a be  fb 35 f5 6e 08 00 45 00   ·0{·Ux·· ·5·n··E·
0010  00 3b ad a7 40 00 40 06  7f 36 0a 32 0a 84 d8 ef   ·;··@·@· ·6·2····
0020  20 3a 89 e8 02 7c 58 20  bf c5 32 1f 80 7d 80 18    :···|X  ··2··}··
0030  01 14 0e 0d 00 00 01 01  08 0a 47 5e b7 8f 5e 08   ········ ··G^··^·
0040  37 22 15 03 03 00 02 02  30                        7"······ 0
```

# SAML Authentication

This section describes configuring SAML authentication.

## SAML IdP proxy for Azure

This recipe describes how to set up FortiAuthenticator as a SAML IdP proxy for Microsoft Azure.

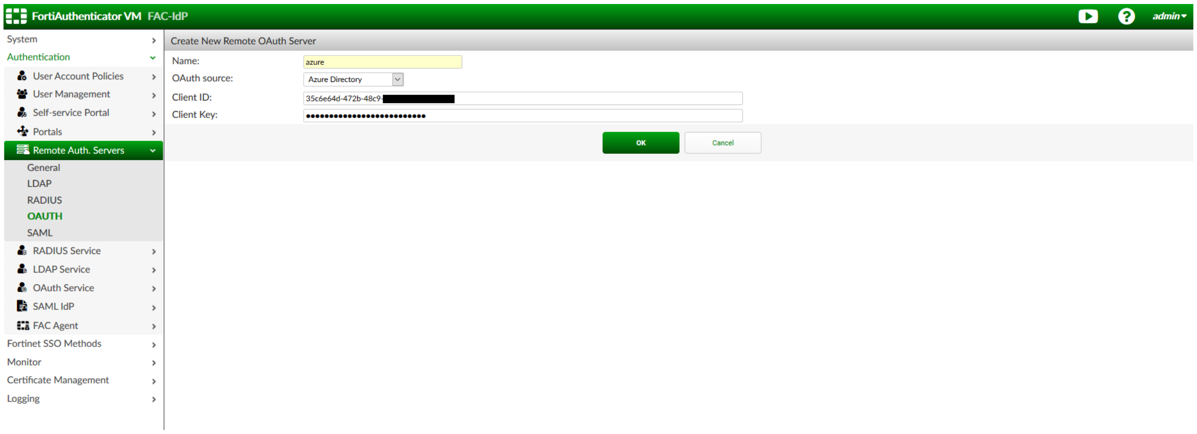
**To configure FortiAuthenticator as a SAML IdP proxy for Azure:**

1. Configuring OAuth settings on page 152
2. Configuring the remote SAML server on page 153
3. Enabling the SAML SP FSSO Portal on page 153
4. Configuring an Azure realm on page 154
5. Configuring SAML IdP settings on page 154
6. Configuring the login page replacement message on page 155
7. Results on page 156

### Configuring OAuth settings

**To configure remote OAuth settings:**

1. On FortiAuthenticator, go to *Remote Auth. Servers* > *OAUTH*, and click *Create New*.
2. Provide a name for the server and select *Azure Directory* as the OAuth source.
3. Enter the client ID and client key from the SAML application on your Azure account.



Create New Remote OAuth Server

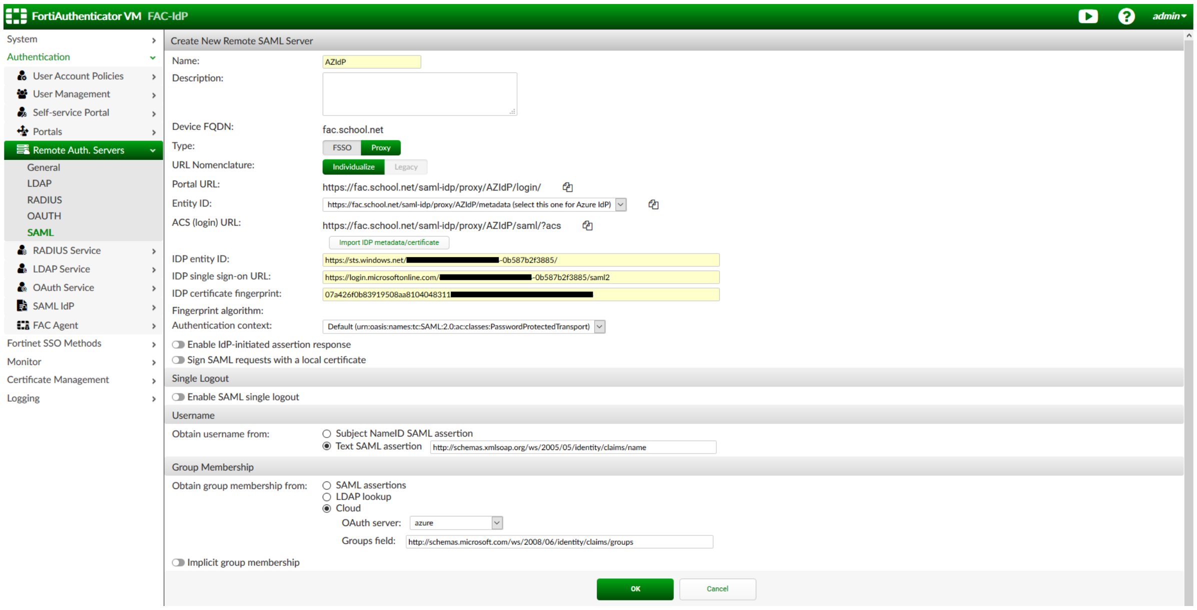
Name: azure
OAuth source: Azure Directory
Client ID: 35c6e64d-472b-48c9-[redacted]
Client Key: ••••••••••••••••••••••••••

4. Click *OK* to save your changes.

## Configuring the remote SAML server

### To configure the remote SAML server:

1. Go to *Remote Auth. Servers* > *SAML*, and click *Create New*.
   The server name must match the one created in https://portal.azure.com/. For example, if the name in Azure is set as AZIdP, the SAML server should also use AZIdP (case sensitive).
2. For the *Entity ID*, click the dropdown menu and select the Azure IdP option.
3. Import the IdP metadata from Azure. To download and import the Azure federation metadata:
   a. In Azure, go to *Azure Active Directory* > *App Registrations* and select the application being used for SAML authentications for your FortiAuthenticator.
   b. In *Endpoints*, select the federation metadata document, enter the URL into the browser, and save it as an XML file.
   c. Click *Import IDP metadata/certificate*, and upload the federation metadata file.
4. In Group Membership, select *Cloud* and choose the previously created Azure OAuth server.
5. At the top of the page, select *Proxy* as the Type, and copy the *Portal URL* to be used later when customizing the replacement message.



Create New Remote SAML Server

Name: AZIdP
Description:
Device FQDN: fac.school.net
Type: FSSO [✓ Proxy]
URL Nomenclature: [✓ Individualize] Legacy
Portal URL: https://fac.school.net/saml-idp/proxy/AZIdP/login/
Entity ID: https://fac.school.net/saml-idp/proxy/AZIdP/metadata (select this one for Azure IdP)
ACS (login) URL: https://fac.school.net/saml-idp/proxy/AZIdP/saml/?acs
IDP entity ID: https://sts.windows.net/[redacted]-0b587b2f3885/
IDP single sign-on URL: https://login.microsoftonline.com/[redacted]-0b587b2f3885/saml2
IDP certificate fingerprint: 07a426f0b83919508aa8104048311[redacted]
Fingerprint algorithm:
Authentication context: Default (urn:oasis:names:tc:SAML:2.0:ac:classes:PasswordProtectedTransport)
Enable IdP-initiated assertion response
Sign SAML requests with a local certificate

Single Logout
Enable SAML single logout

Username
Obtain username from: ○ Subject NameID SAML assertion
● Text SAML assertion http://schemas.xmlsoap.org/ws/2005/05/identity/claims/name

Group Membership
Obtain group membership from: ○ SAML assertions
○ LDAP lookup
● Cloud
OAuth server: azure
Groups field: http://schemas.microsoft.com/ws/2008/06/identity/claims/groups
Implicit group membership

6. Click *OK* to save your changes.

## Enabling the SAML SP FSSO Portal

### To enable the SAML SP FSSO Portal:

1. Go to *Fortinet FSSO Methods* > *SSO* > *Portal Services* and enable the SAML portal.
2. Go to *Fortinet FSSO Methods* > *SSO* > *SAML Authentication* and create a new SAML server.
   Select the previously created remote SAML server and click *OK*.

## Configuring an Azure realm

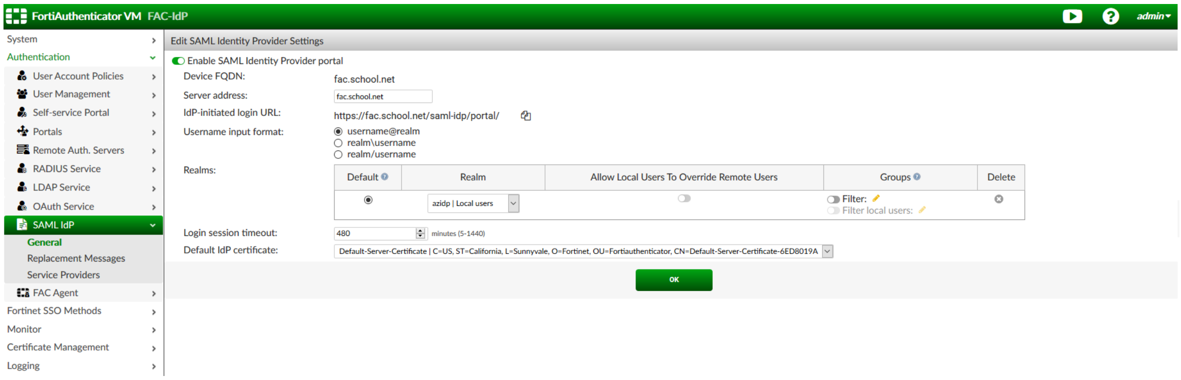
### To create an Azure realm and add it to the IdP:

1. Go to *Authentication* > *User Management* > *Realms*
2. Click *Create New*.
3. Add the details of the Azure realm, and click *OK*.

## Configuring SAML IdP settings

### To configure general settings:

1. Go to *Authentication* > *SAML IdP* > *General.*
2. Enable the SAML identity provider portal and enter the following:
   a. **Server address**: Enter the FortiAuthenticator FQDN.
   b. **Realms**: Add the realm associated with the remote server for Azure IdP.
   c. **Default IdP certificate**: Select a default certificate to use.



Edit SAML Identity Provider Settings

Enable SAML Identity Provider portal

Device FQDN: fac.school.net

Server address: fac.school.net

IdP-initiated login URL: https://fac.school.net/saml-idp/portal/

Username input format:
● username@realm
○ realm\username
○ realm/username

Realms:

| Default | Realm | Allow Local Users To Override Remote Users | Groups | Delete |
|---|---|---|---|---|
| ● | azidp \| Local users | | Filter:<br>Filter local users: | |

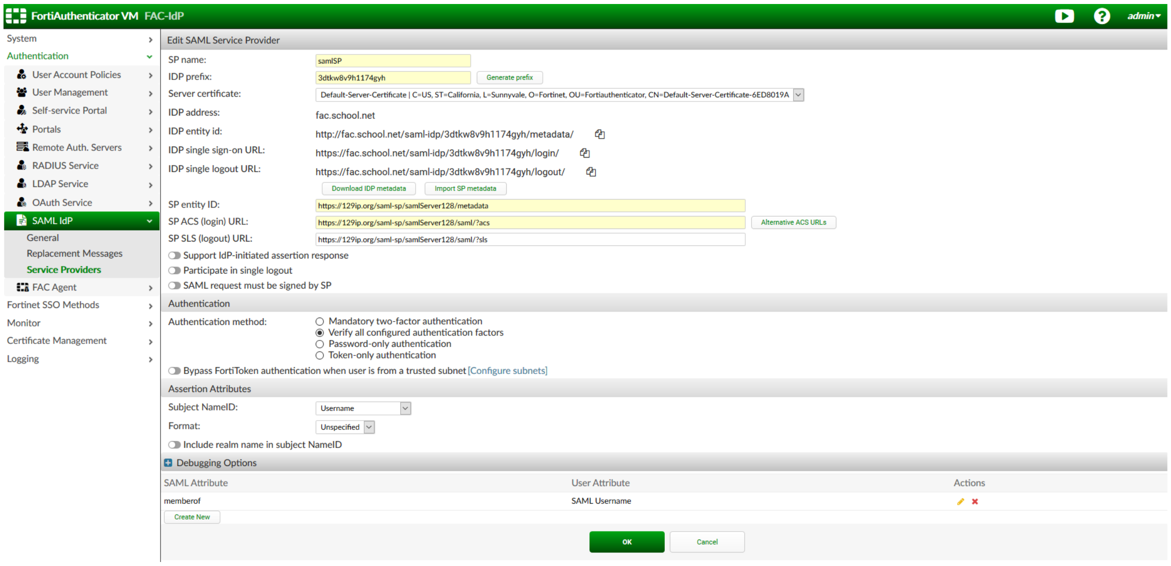
Login session timeout: 480 minutes (5-1440)

Default IdP certificate: Default-Server-Certificate | C=US, ST=California, L=Sunnyvale, O=Fortinet, OU=Fortiauthenticator, CN=Default-Server-Certificate-6ED8019A

3. Click *OK* to save your changes.

### To configure service provider settings:

1. Go to *Authentication* > *SAML IdP* > *Service Providers* and create a new reference for the service provider that you will be using as your SAML client.
   The name can be anything you want.
2. Enter the SP information from the client you will be using as the SAML service provider.
3. Download the IdP metadata.
   This can be used to set up the SAML IdP configuration in your SAML SP client (if allowed by your client).
4. Under *SAML Attribute* click *Create New*, and enter a *SAML Attribute* name that your SAML SP is expecting to identify the user. Select a *User Attribute* for this selection. If you're unsure of which attribute to pick, select *SAML Username*.



Edit SAML Service Provider

| | |
|---|---|
| SP name: | samlSP |
| IDP prefix: | 3dtkw8v9h1174gyh (Generate prefix) |
| Server certificate: | Default-Server-Certificate \| C=US, ST=California, L=Sunnyvale, O=Fortinet, OU=Fortiauthenticator, CN=Default-Server-Certificate-6ED8019A |
| IDP address: | fac.school.net |
| IDP entity id: | http://fac.school.net/saml-idp/3dtkw8v9h1174gyh/metadata/ |
| IDP single sign-on URL: | https://fac.school.net/saml-idp/3dtkw8v9h1174gyh/login/ |
| IDP single logout URL: | https://fac.school.net/saml-idp/3dtkw8v9h1174gyh/logout/ |
| | Download IDP metadata / Import SP metadata |
| SP entity ID: | https://129ip.org/saml-sp/samlServer128/metadata |
| SP ACS (login) URL: | https://129ip.org/saml-sp/samlServer128/saml/?acs (Alternative ACS URLs) |
| SP SLS (logout) URL: | https://129ip.org/saml-sp/samlServer128/saml/?sls |

Support IdP-initiated assertion response
Participate in single logout
SAML request must be signed by SP

Authentication

Authentication method:
○ Mandatory two-factor authentication
● Verify all configured authentication factors
○ Password-only authentication
○ Token-only authentication

Bypass FortiToken authentication when user is from a trusted subnet [Configure subnets]

Assertion Attributes

Subject NameID: Username
Format: Unspecified
Include realm name in subject NameID

Debugging Options

| SAML Attribute | User Attribute | Actions |
|---|---|---|
| memberof | SAML Username | ✎ ✖ |

Create New

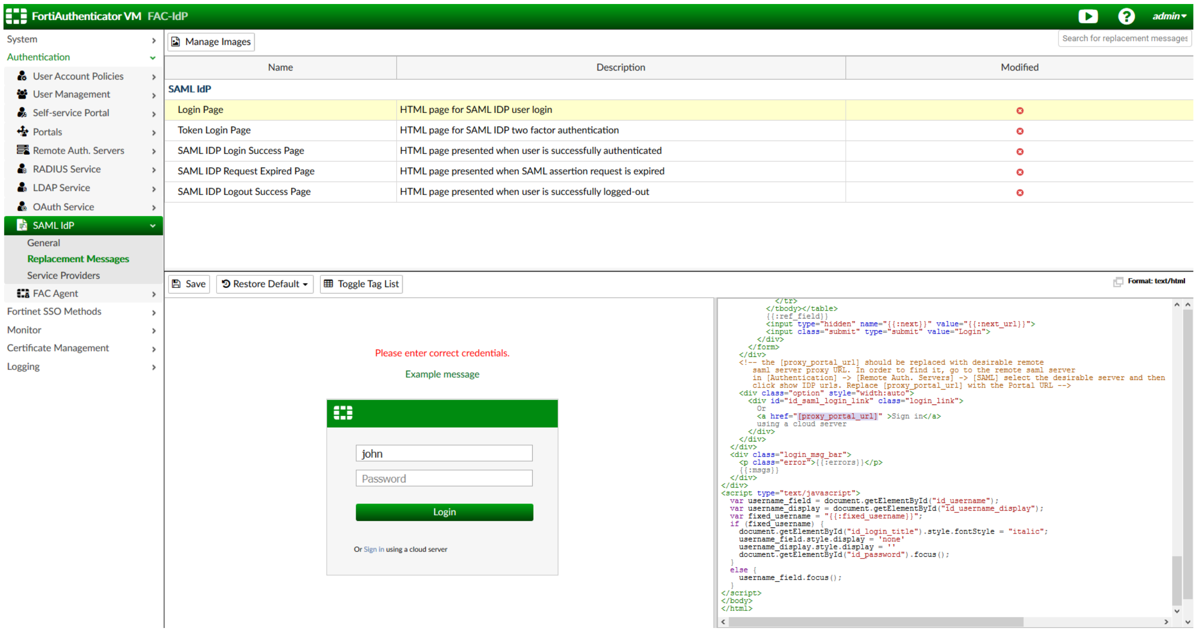
OK Cancel

5. Click *OK* to save your changes.

## Configuring the login page replacement message

### To configure the login page replacement message:

1. Go to *Authentication > SAML IdP > Replacement Messages*.
2. On the *Login Page* replacement message, click the *Restore Defaults* dropdown and choose *idp-server-and-proxy*.
3. In the text/html editor, scroll down until you see the `[proxy_portal_url]` placeholder and replace it with the previously saved proxy portal URL.



| Name | Description | Modified |
|---|---|---|
| **SAML IdP** | | |
| Login Page | HTML page for SAML IDP user login | ⊗ |
| Token Login Page | HTML page for SAML IDP two factor authentication | ⊗ |
| SAML IDP Login Success Page | HTML page presented when user is successfully authenticated | ⊗ |
| SAML IDP Request Expired Page | HTML page presented when SAML assertion request is expired | ⊗ |
| SAML IDP Logout Success Page | HTML page presented when user is successfully logged-out | ⊗ |

```
          </tr>
        </tbody></table>
        {{:ref_field}}
        <input type="hidden" name="{{:next}}" value="{{:next_url}}">
        <input class="submit" type="submit" value="Login">
      </div>
    </form>
  </div>
  <!-- the [proxy_portal_url] should be replaced with desirable remote
     saml server proxy URL. In order to find it, go to the remote saml server
     in [Authentication] -> [Remote Auth. Servers] -> [SAML] select the desirable server and then
     click show IDP urls. Replace [proxy_portal_url] with the Portal URL -->
  <div class="option" style="width:auto">
    <div id="id_saml_login_link" class="login_link">
      Or
      <a href="[proxy_portal_url]" >Sign in</a>
      using a cloud server
    </div>
  </div>
 </div>
 <div class="login_msg_bar">
  <p class="error">{{:errors}}</p>
  {{:msgs}}
 </div>
</div>
<script type="text/javascript">
 var username_field = document.getElementById("id_username");
 var username_display = document.getElementById("id_username_display");
 var fixed_username = "{{:fixed_username}}";
 if (fixed_username) {
  document.getElementById("id_login_title").style.fontStyle = "italic";
  username_field.style.display = 'none'
  username_display.style.display = ''
  document.getElementById("id_password").focus();
 }
 else {
  username_field.focus();
 }
</script>
</body>
</html>
```

4. Click *Save*.

## Results

**To test Azure login through the SP:**

1. Enter in the portal login URL from the service provider in a new browser.
   You are redirect you to the FAC's IdP-server and proxy page.
2. Click on the link below the login options to be redirected to Microsoft's login page.

# SAML IdP proxy for G Suite

This recipe describes how to set up FortiAuthenticator as a SAML IdP proxy for Google G Suite.

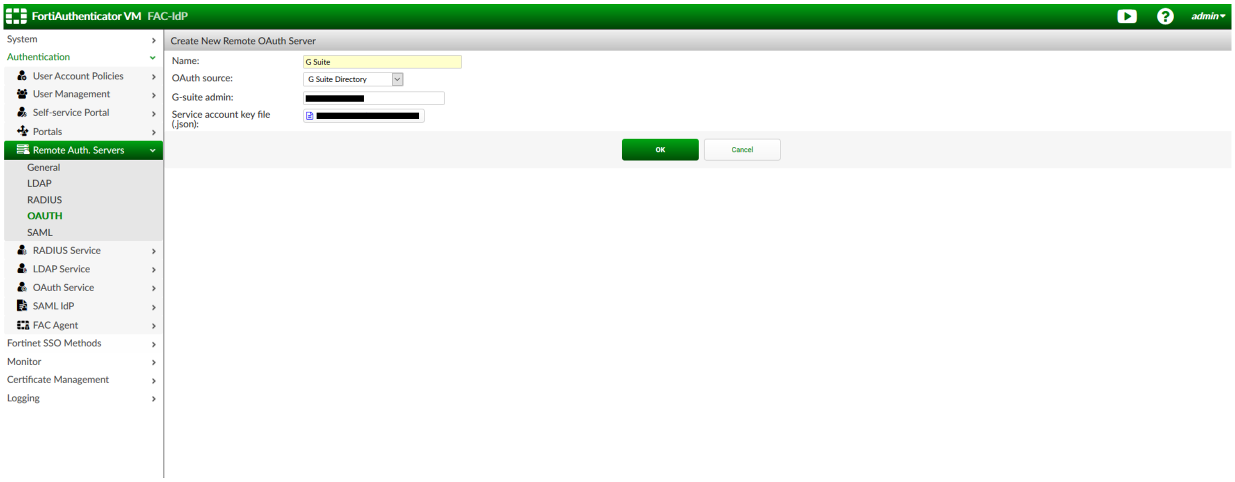
**To configure FortiAuthenticator as a SAML IdP proxy for G Suite:**

1. Configuring OAuth settings on page 156
2. Configuring the remote SAML server on page 157
3. Enabling the SAML SP FSSO Portal on page 157
4. Configuring a G Suite Realm on page 158
5. Configuring IdP settings on page 158
6. Configuring the login page replacement message on page 159
7. Results on page 160

## Configuring OAuth settings

**To configure remote OAuth settings:**

1. On FortiAuthenticator, go to *Remote Auth. Servers* > *OAUTH*, and click *Create New*.
2. Provide a name for the server and select *G Suite Directory* as the OAuth source.
3. Enter the *G-suite admin*, and upload the *Service account key file* from the SAML application on your G Suite account.
4. Click *OK* to save your changes.



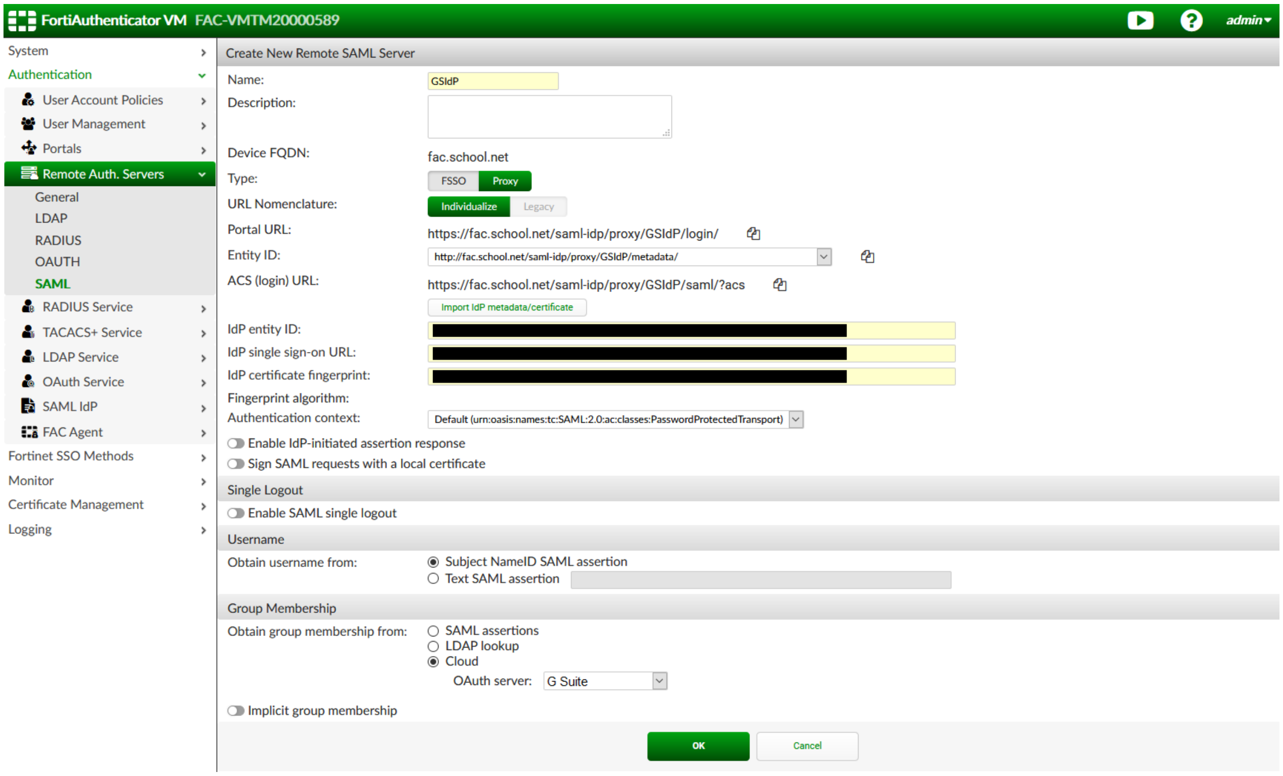
Create New Remote OAuth Server

Name: G Suite
OAuth source: G Suite Directory
G-suite admin: [redacted]
Service account key file (.json): [redacted]

## Configuring the remote SAML server

### To configure the remote SAML server:

1. Go to *Remote Auth. Servers* > *SAML*, and click *Create New*.
   The server name must match the one created in G Suite. For example, if the name in G Suite is set as GSIdP, the SAML server should also use GSIdP (case sensitive).
2. Import the IdP metadata obtained from the SAML app on G Suite.
3. In *Username*, select *Subject NameID SAML assertion*.
4. In *Group Membership*, select *Cloud* and choose the previously created G Suite OAuth server.
5. At the top of the page, select *Proxy* as the Type, and copy the *Portal URL* to be used later when customizing the replacement message.



Create New Remote SAML Server

Name: GSIdP

Description:

Device FQDN: fac.school.net

Type: FSSO [✓ Proxy]

URL Nomenclature: [✓ Individualize] Legacy

Portal URL: https://fac.school.net/saml-idp/proxy/GSIdP/login/

Entity ID: http://fac.school.net/saml-idp/proxy/GSIdP/metadata/

ACS (login) URL: https://fac.school.net/saml-idp/proxy/GSIdP/saml/?acs

IdP entity ID: [redacted]

IdP single sign-on URL: [redacted]

IdP certificate fingerprint: [redacted]

Fingerprint algorithm:

Authentication context: Default (urn:oasis:names:tc:SAML:2.0:ac:classes:PasswordProtectedTransport)

Enable IdP-initiated assertion response

Sign SAML requests with a local certificate

Single Logout

Enable SAML single logout

Username

Obtain username from: ● Subject NameID SAML assertion ○ Text SAML assertion

Group Membership

Obtain group membership from: ○ SAML assertions ○ LDAP lookup ● Cloud

OAuth server: G Suite

Implicit group membership

6. Click *OK* to save your changes.

## Enabling the SAML SP FSSO Portal

### To enable the SAML SP FSSO Portal:

1. Go to *Fortinet FSSO Methods* > *SSO* > *Portal Services* and enable the SAML portal.
2. Go to *Fortinet FSSO Methods* > *SSO* > *SAML Authentication* and create a new SAML server.
   Select the previously created remote SAML server and click *OK*.

## Configuring a G Suite Realm

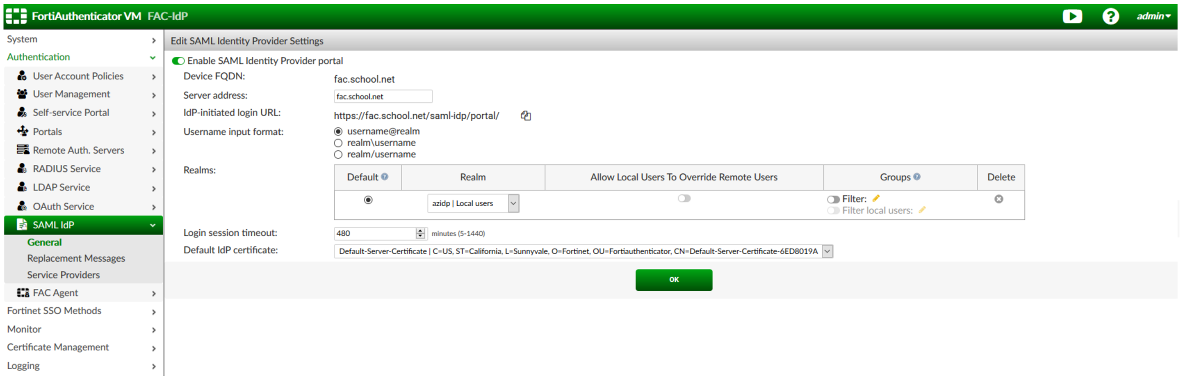
### To create a G Suite Realm and add it to the IdP:

1. Go to *Authentication* > *User Management* > *Realms.*
2. Click *Create New*.
3. Add the details of the G Suite realm, and click *OK*.

## Configuring IdP settings

### To configure general settings:

1. Go to *Authentication* > *SAML IdP* > *General.*
2. Enable the SAML identity provider portal and enter the following:
   a. **Server address**: Enter the FortiAuthenticator FQDN.
   b. **Realms**: Add the realm associated with the remote server for G Suite.
   c. **Default IdP certificate**: Select a default certificate to use.



Edit SAML Identity Provider Settings

Enable SAML Identity Provider portal

Device FQDN: fac.school.net

Server address: fac.school.net

IdP-initiated login URL: https://fac.school.net/saml-idp/portal/

Username input format: ● username@realm ○ realm\username ○ realm/username

Realms:

| Default | Realm | Allow Local Users To Override Remote Users | Groups | Delete |
|---|---|---|---|---|
| ● | azidp \| Local users | | Filter:<br>Filter local users: | |

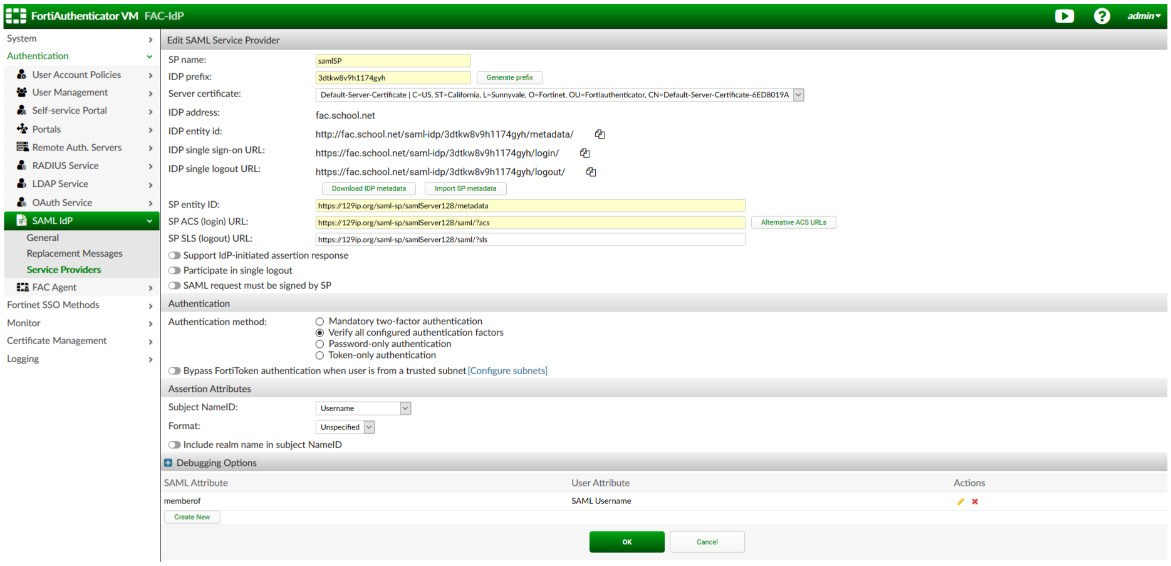
Login session timeout: 480 minutes (5-1440)

Default IdP certificate: Default-Server-Certificate | C=US, ST=California, L=Sunnyvale, O=Fortinet, OU=Fortiauthenticator, CN=Default-Server-Certificate-6ED8019A

3. Click *OK* to save your changes.

### To configure service provider settings:

1. Go to *Authentication* > *SAML IdP* > *Service Providers* and create a new reference for the service provider that you will be using as your SAML client.
   The name can be anything you want.
2. Enter the SP information from the client you will be using as the SAML service provider.
3. Download the IdP metadata.
   This can be used to set up the SAML IdP configuration in your SAML SP client (if allowed by your client).
4. Under *SAML Attribute* click *Create New*, and enter a *SAML Attribute* name that your SAML SP is expecting to identify the user. Select a *User Attribute* for this selection. If you're unsure of which attribute to pick, select *SAML Username*.



Edit SAML Service Provider

SP name: samlSP

IDP prefix: 3dtkw8v9h1174gyh

Server certificate: Default-Server-Certificate | C=US, ST=California, L=Sunnyvale, O=Fortinet, OU=Fortiauthenticator, CN=Default-Server-Certificate-6ED8019A

IDP address: fac.school.net

IDP entity id: http://fac.school.net/saml-idp/3dtkw8v9h1174gyh/metadata/

IDP single sign-on URL: https://fac.school.net/saml-idp/3dtkw8v9h1174gyh/login/

IDP single logout URL: https://fac.school.net/saml-idp/3dtkw8v9h1174gyh/logout/

SP entity ID: https://129ip.org/saml-sp/samlServer128/metadata

SP ACS (login) URL: https://129ip.org/saml-sp/samlServer128/saml/?acs

SP SLS (logout) URL: https://129ip.org/saml-sp/samlServer128/saml/?sls

Support IdP-initiated assertion response

Participate in single logout

SAML request must be signed by SP

Authentication

Authentication method:
○ Mandatory two-factor authentication
● Verify all configured authentication factors
○ Password-only authentication
○ Token-only authentication

Bypass FortiToken authentication when user is from a trusted subnet [Configure subnets]

Assertion Attributes

Subject NameID: Username

Format: Unspecified

Include realm name in subject NameID

Debugging Options

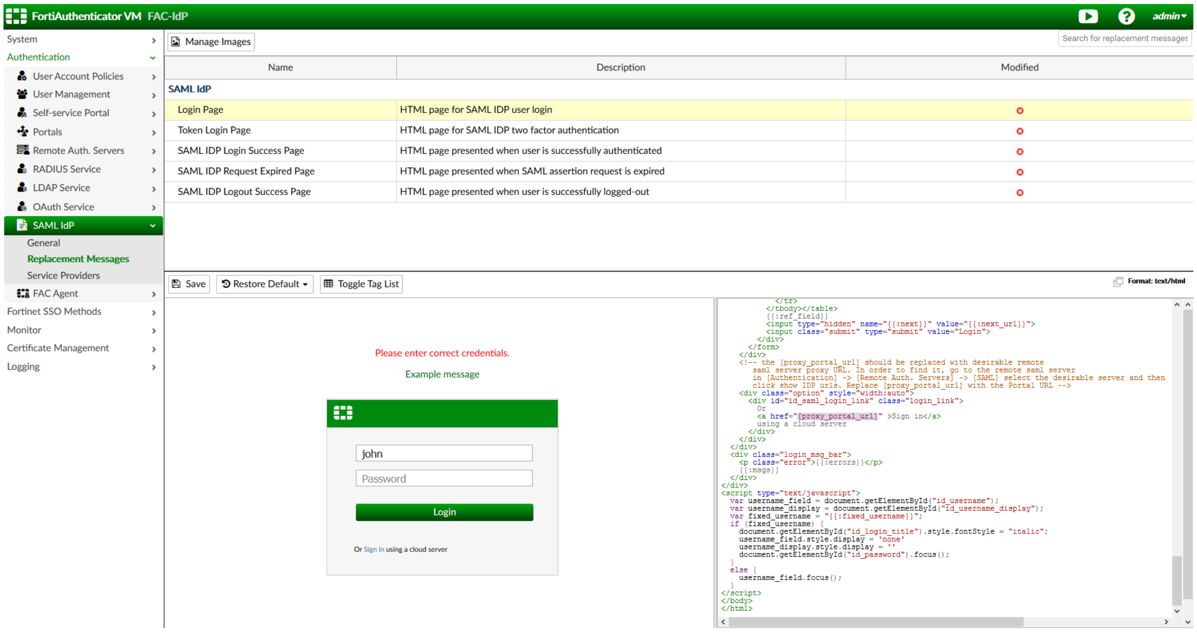
| SAML Attribute | User Attribute | Actions |
|---|---|---|
| memberof | SAML Username | ✎ ✖ |

5. Click *OK* to save your changes.

## Configuring the login page replacement message

### To configure the login page replacement message:

1. Go to *Authentication* > *SAML IdP* > *Replacement Messages*.
2. On the *Login Page* replacement message, click the *Restore Defaults* dropdown and choose *idp-server-and-proxy*.
3. In the text/html editor, scroll down until you see the `[proxy_portal_url]` placeholder and replace it with the previously saved proxy portal URL.



| Name | Description | Modified |
|---|---|---|
| SAML IdP | | |
| Login Page | HTML page for SAML IDP user login | ✖ |
| Token Login Page | HTML page for SAML IDP two factor authentication | ✖ |
| SAML IDP Login Success Page | HTML page presented when user is successfully authenticated | ✖ |
| SAML IDP Request Expired Page | HTML page presented when SAML assertion request is expired | ✖ |
| SAML IDP Logout Success Page | HTML page presented when user is successfully logged-out | ✖ |

Please enter correct credentials.

Example message

Or Sign in using a cloud server

```
          </tr>
         </tbody></table>
         {{:ref_field}}
         <input type="hidden" name="{{:next}}" value="{{:next_url}}">
         <input class="submit" type="submit" value="Login">
        </div>
      </form>
    </div>
    <!-- the [proxy_portal_url] should be replaced with desirable remote
       saml server proxy URL. In order to find it, go to the remote saml server
       in [Authentication] -> [Remote Auth. Servers] -> [SAML] select the desirable server and then
       click show IDP urls. Replace [proxy_portal_url] with the Portal URL -->
    <div class="option" style="width:auto">
      <div id="id_saml_login_link" class="login_link">
        Or
        <a href="[proxy_portal_url]" >Sign in</a>
        using a cloud server
      </div>
    </div>
  </div>
  <div class="login_msg_bar">
    <p class="error">{{:errors}}</p>
    {{:msgs}}
  </div>
</div>
<script type="text/javascript">
  var username_field = document.getElementById("id_username");
  var username_display = document.getElementById("id_username_display");
  var fixed_username = "{{:fixed_username}}";
  if (fixed_username) {
    document.getElementById("id_login_title").style.fontStyle = "italic";
    username_field.style.display = 'none'
    username_display.style.display = ''
    document.getElementById("id_password").focus();
  }
  else {
    username_field.focus();
  }
</script>
</body>
</html>
```

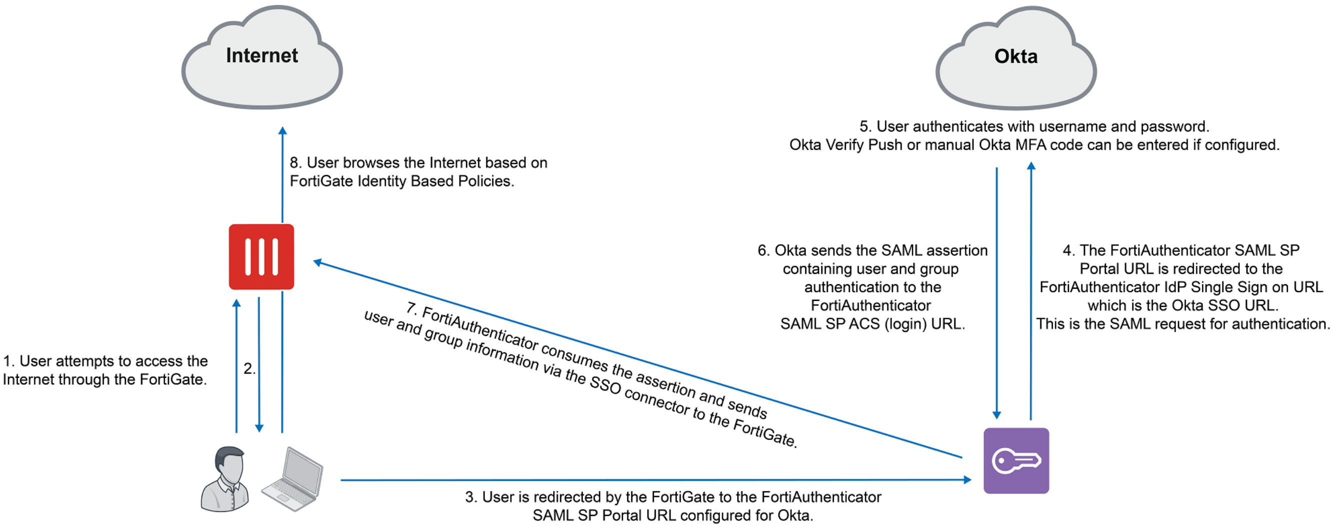
4. Click *Save*.

## Results

**To test G Suite login through the SP:**

1. Enter in the portal login URL from the service provider in a new browser.
   You are redirect you to the FAC's IdP-server and proxy page.
2. Click on the link below the login options to be redirected to Google's login page.

# SAML FSSO with FortiAuthenticator and Okta


Internet
Okta
5. User authenticates with username and password.
Okta Verify Push or manual Okta MFA code can be entered if configured.
8. User browses the Internet based on
FortiGate Identity Based Policies.
6. Okta sends the SAML assertion
containing user and group
authentication to the
FortiAuthenticator
SAML SP ACS (login) URL.
4. The FortiAuthenticator SAML SP
Portal URL is redirected to the
FortiAuthenticator IdP Single Sign on URL
which is the Okta SSO URL.
This is the SAML request for authentication.
7. FortiAuthenticator consumes the assertion and sends
user and group information via the SSO connector to the FortiGate.
1. User attempts to access the
Internet through the FortiGate.
2.
3. User is redirected by the FortiGate to the FortiAuthenticator
SAML SP Portal URL configured for Okta.

In this example, you will provide a Security Assertion Markup Language (SAML) FSSO cloud authentication solution using FortiAuthenticator as the service provider (SP) and Okta, a cloud-based user directory, as the identity provider (IdP).

Okta is a secure authentication and identity-access management service that offer secure SSO solutions. Okta can be implemented with a variety of technologies and services including Office 365, G Suite, Dropbox, AWS, and more.

A user will start by attempting to make an unauthenticated web request. The FortiGate's captive portal will offload the authentication request to the FortiAuthenticator's SAML SP portal, which in turn redirects that client/browser to the SAML IdP login page. Assuming the user successfully logs into the portal, a positive SAML assertion will be sent back to the FortiAuthenticator, converting the user's credentials into those of an FSSO user.

In this example configuration, the FortiGate has a DMZ IP address of `192.168.50.1`, and the FortiAuthenticator has the Port1 IP address of `192.168.50.100`. Note that, for testing purposes, the FortiAuthenticator's IP and FQDN have been added to the host's file of trusted host names; this is not necessary for a typical network.

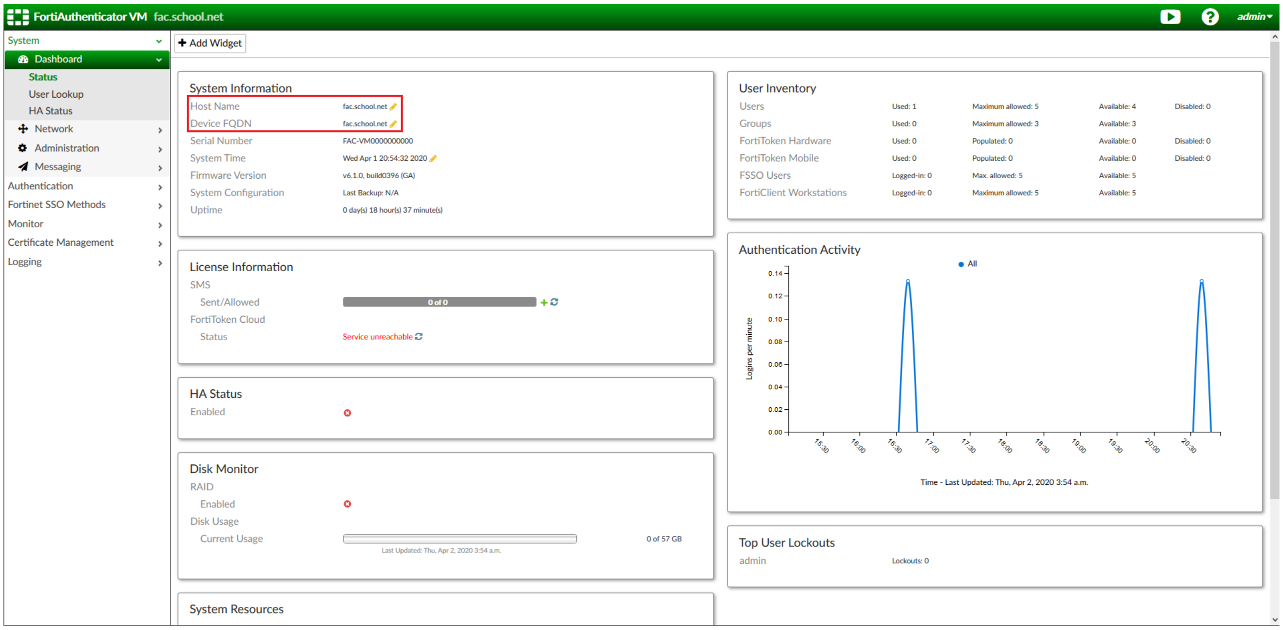
This configuration assumes that you have already created an Okta developer account.

## Configuring DNS and FortiAuthenticator's FQDN

1. On FortiAuthenticator, go to *System* > *Dashboard* > *Status*. In the *System Information* widget, select the edit icon next to *Device FQDN*.
   Enter a domain name (in this example, `fac.school.net`). This will help identify where the FortiAuthenticator is

located in the DNS hierarchy.

2. Enter the same name for the *Host Name*. This is so you can add the unit to the FortiGate's DNS list so that the local DNS lookup of this FQDN can be resolved.



System Information

| | |
|---|---|
| Host Name | fac.school.net |
| Device FQDN | fac.school.net |
| Serial Number | FAC-VM0000000000 |
| System Time | Wed Apr 1 20:54:32 2020 |
| Firmware Version | v6.1.0, build0396 (GA) |
| System Configuration | Last Backup: N/A |
| Uptime | 0 day(s) 18 hour(s) 37 minute(s) |

License Information

| | |
|---|---|
| SMS | |
| Sent/Allowed | 0 of 0 |
| FortiToken Cloud | |
| Status | Service unreachable |

HA Status

| | |
|---|---|
| Enabled | ☒ |

Disk Monitor

| | | |
|---|---|---|
| RAID | | |
| Enabled | ☒ | |
| Disk Usage | | |
| Current Usage | Last Updated: Thu, Apr 2, 2020 3:54 a.m. | 0 of 57 GB |

System Resources

User Inventory

| | | | | |
|---|---|---|---|---|
| Users | Used: 1 | Maximum allowed: 5 | Available: 4 | Disabled: 0 |
| Groups | Used: 0 | Maximum allowed: 3 | Available: 3 | |
| FortiToken Hardware | Used: 0 | Populated: 0 | Available: 0 | Disabled: 0 |
| FortiToken Mobile | Used: 0 | Populated: 0 | Available: 0 | Disabled: 0 |
| FSSO Users | Logged-in: 0 | Max. allowed: 5 | Available: 5 | |
| FortiClient Workstations | Logged-in: 0 | Maximum allowed: 5 | Available: 5 | |

Authentication Activity

Top User Lockouts

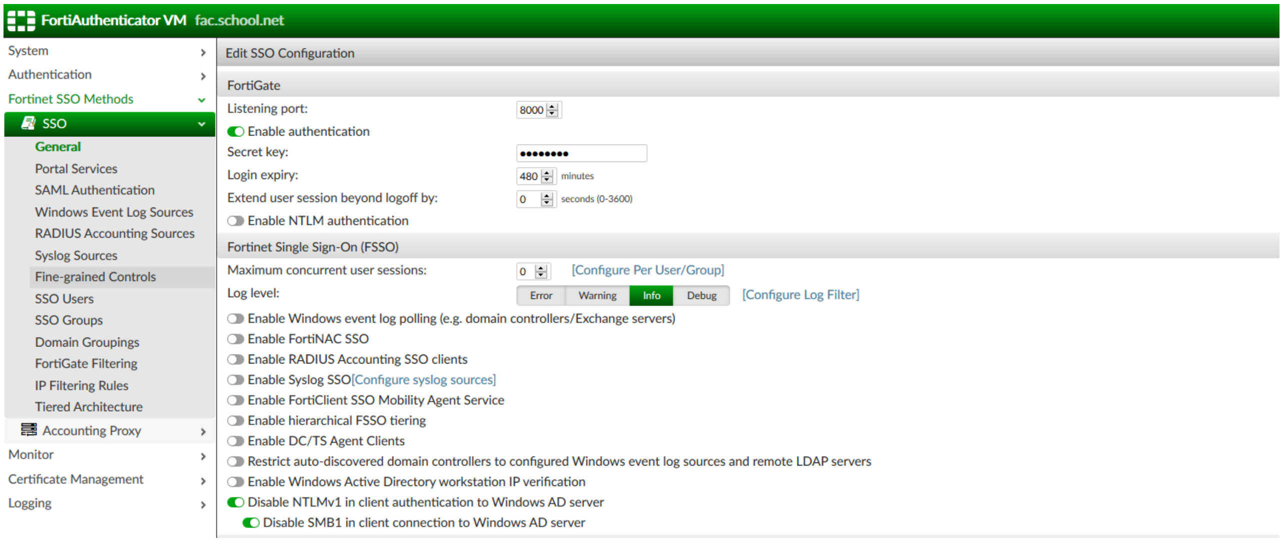
| | |
|---|---|
| admin | Lockouts: 0 |

3. On FortiGate, open the CLI Console and enter the following command using the FortiAuthenticator host name and internet-facing IP address.

```
config system dns-database
   edit school.net
      config dns-entry
         edit 1
            set hostname fac.school.net
            set ip 192.168.50.100
         next
      end
      set domain school.net
   next
```

## Enabling FSSO and SAML on FortiAuthenticator

1. On FortiAuthenticator, go to *Fortinet SSO Methods* > *SSO* > *General* and set FortiGate SSO options. Make sure to *Enable authentication*.
   Enter a *Secret key* and select *OK* to apply your changes. This key will be used on FortiGate to add the FortiAuthenticator as the FSSO server.



Edit SSO Configuration

FortiGate

Listening port: 8000

● Enable authentication

Secret key: ••••••••

Login expiry: 480 minutes

Extend user session beyond logoff by: 0 seconds (0-3600)

○ Enable NTLM authentication

Fortinet Single Sign-On (FSSO)

Maximum concurrent user sessions: 0 [Configure Per User/Group]

Log level: Error | Warning | **Info** | Debug [Configure Log Filter]

○ Enable Windows event log polling (e.g. domain controllers/Exchange servers)

○ Enable FortiNAC SSO

○ Enable RADIUS Accounting SSO clients

○ Enable Syslog SSO[Configure syslog sources]

○ Enable FortiClient SSO Mobility Agent Service

○ Enable hierarchical FSSO tiering

○ Enable DC/TS Agent Clients

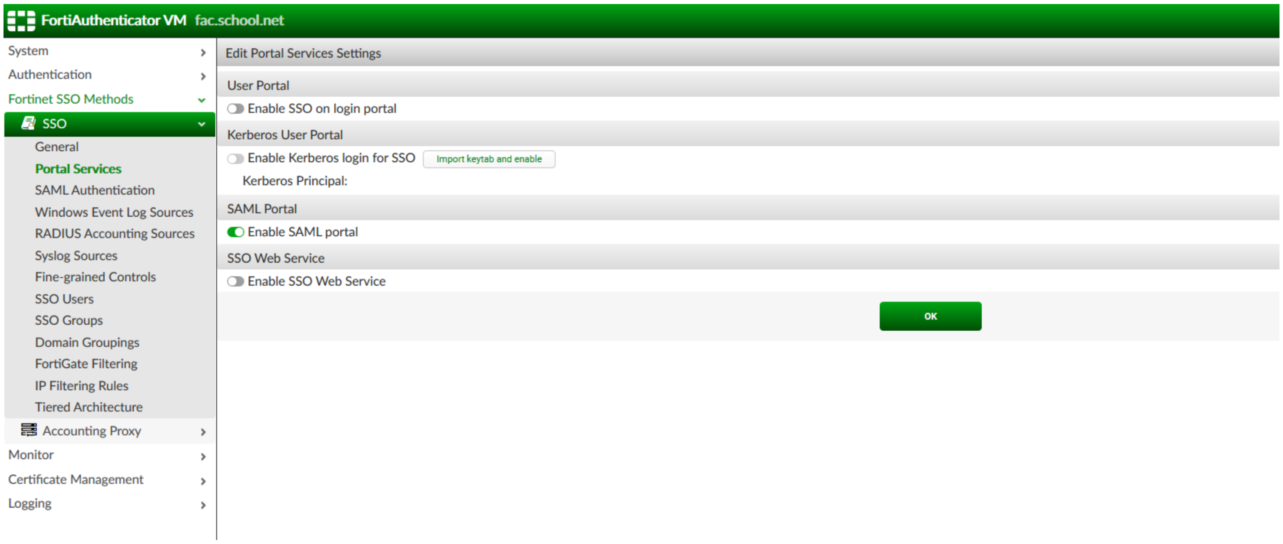
○ Restrict auto-discovered domain controllers to configured Windows event log sources and remote LDAP servers

○ Enable Windows Active Directory workstation IP verification

● Disable NTLMv1 in client authentication to Windows AD server

● Disable SMB1 in client connection to Windows AD server

2. Go to *Fortinet SSO Methods* > *SSO* > *Portal Services* and select *Enable SAML portal*.



Edit Portal Services Settings

User Portal

○ Enable SSO on login portal

Kerberos User Portal

○ Enable Kerberos login for SSO

Kerberos Principal:

SAML Portal

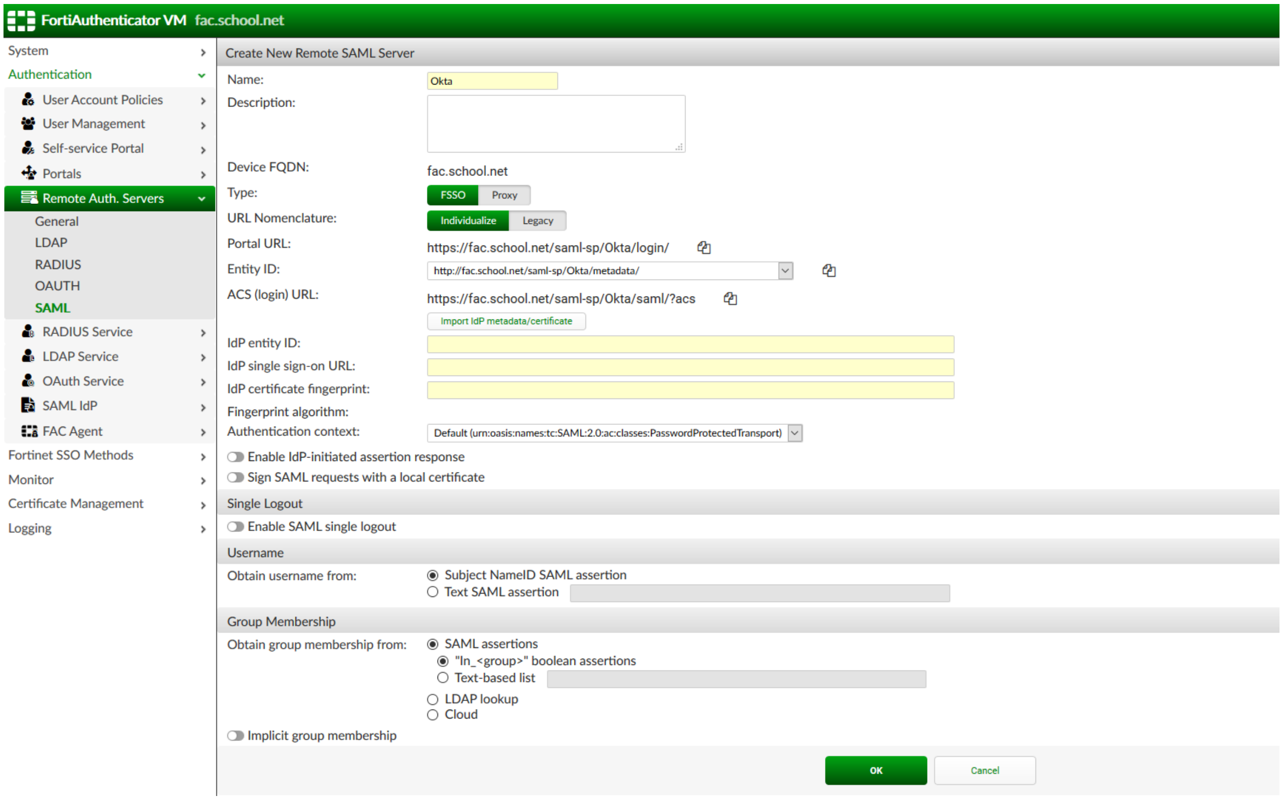
● Enable SAML portal

SSO Web Service

○ Enable SSO Web Service

3. Next, go to *Authentication* > *Remote Auth. Servers* > *SAML*, and click *Create New*. Enter Okta as the name.

You will not yet be able to save these settings, as the IdP information - *IdP entity ID*, *IdP single sign-on URL*, and *IdP certificate fingerprint* - must be entered. These fields will be filled out later once the IdP application configuration is complete Okta.



Create New Remote SAML Server

Name: Okta

Description:

Device FQDN: fac.school.net

Type: [✓ FSSO] Proxy

URL Nomenclature: [✓ Individualize] Legacy

Portal URL: https://fac.school.net/saml-sp/Okta/login/

Entity ID: http://fac.school.net/saml-sp/Okta/metadata/

ACS (login) URL: https://fac.school.net/saml-sp/Okta/saml/?acs

IdP entity ID:

IdP single sign-on URL:

IdP certificate fingerprint:

Fingerprint algorithm:

Authentication context: Default (urn:oasis:names:tc:SAML:2.0:ac:classes:PasswordProtectedTransport)

Enable IdP-initiated assertion response

Sign SAML requests with a local certificate

Single Logout

Enable SAML single logout

Username

Obtain username from:
● Subject NameID SAML assertion
○ Text SAML assertion

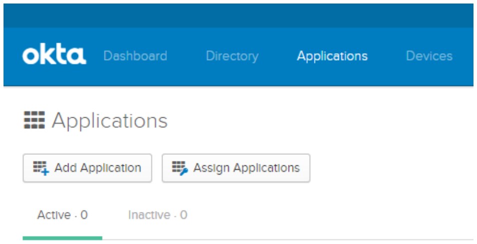
Group Membership

Obtain group membership from:
● SAML assertions
● "In_<group>" boolean assertions
○ Text-based list
○ LDAP lookup
○ Cloud

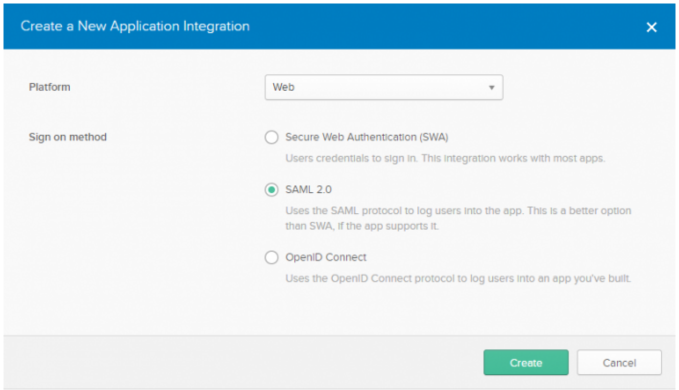
Implicit group membership

## Configuring the Okta developer account IdP application

1. Open a browser, go to the *Applications* tab and select *Add Application*.



2. Select *Create New App* and create a new application using the SAML 2.0 sign on method.



Create a New Application Integration

Platform: Web

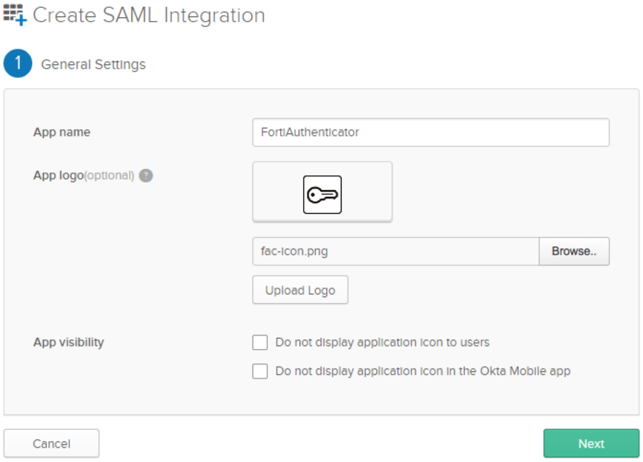
Sign on method:

○ Secure Web Authentication (SWA)
Users credentials to sign in. This integration works with most apps.

● SAML 2.0
Uses the SAML protocol to log users into the app. This is a better option than SWA, if the app supports it.

○ OpenID Connect
Uses the OpenID Connect protocol to log users into an app you've built.

3. Enter a custom app name, and select *Next*. You may upload an app logo if you wish.
   The name entered here is the name of the portal that users will log into.

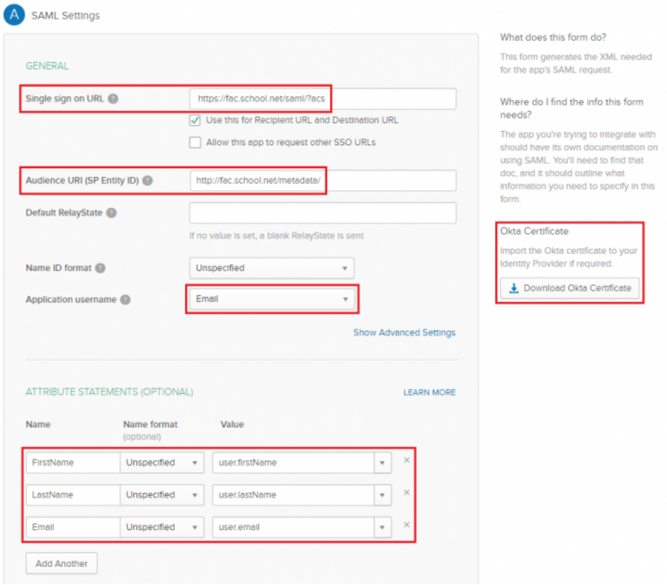


Create SAML Integration

1 General Settings

| | |
|---|---|
| App name | FortiAuthenticator |
| App logo(optional) | fac-icon.png |
| App visibility | □ Do not display application icon to users<br>□ Do not display application icon in the Okta Mobile app |

4. Under *A - SAML Settings*, set *Single sign on URL* and *Audience URL (SP Entity ID)* to the *ACS* and *Entity URLs* (respectively) from FortiAuthenticator.
   Users will be required to provide their email address as their username, and their first and last names (as seen in the example).
   Before continuing, select *Download Okta Certificate*. This will be imported to the FortiAuthenticator later.



A SAML Settings

GENERAL

| | |
|---|---|
| Single sign on URL | https://fac.school.net/saml/?acs |
| | ☑ Use this for Recipient URL and Destination URL<br>□ Allow this app to request other SSO URLs |
| Audience URI (SP Entity ID) | http://fac.school.net/metadata/ |
| Default RelayState | |
| | If no value is set, a blank RelayState is sent |
| Name ID format | Unspecified |
| Application username | Email |

ATTRIBUTE STATEMENTS (OPTIONAL)

| Name | Name format (optional) | Value |
|---|---|---|
| FirstName | Unspecified | user.firstName |
| LastName | Unspecified | user.lastName |
| Email | Unspecified | user.email |

What does this form do?

This form generates the XML needed for the app's SAML request.

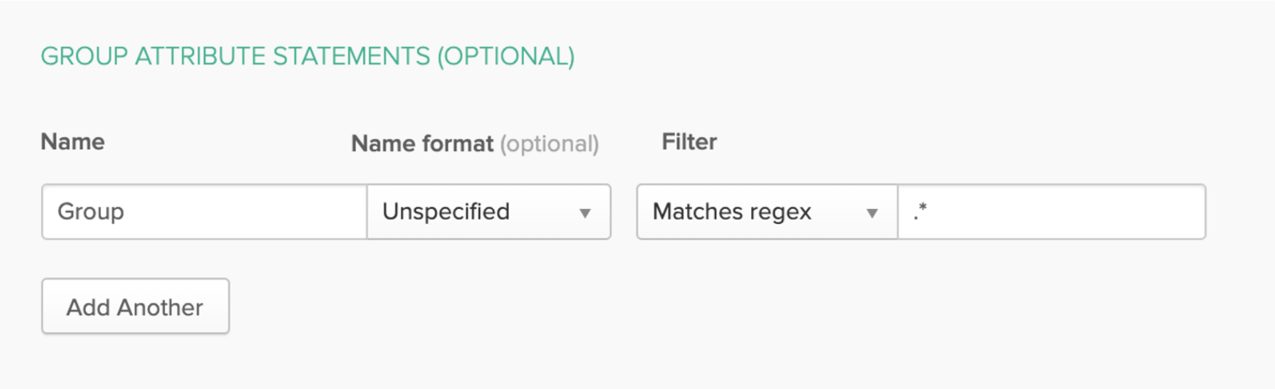
Where do I find the info this form needs?

The app you're trying to integrate with should have its own documentation on using SAML. You'll need to find that doc, and it should outline what information you need to specify in this form.

Okta Certificate

Import the Okta certificate to your Identity Provider if required.

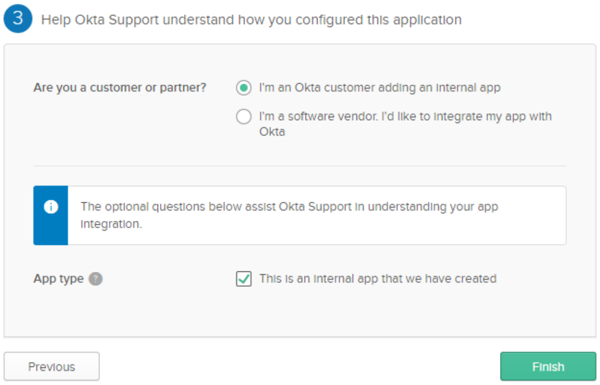
In the section below, configure a *Group* attribute to match on FortiAuthenticator. The word *Group* (case-sensitive) must be entered in *Text-based list* under *Obtain Group Membership from: SAML assertions* inside the remote SAML setup configuration on FortiAuthenticator. Regex matching is the most flexible option for group matching. The below example matches all groups of a single user.



GROUP ATTRIBUTE STATEMENTS (OPTIONAL)

| Name | Name format (optional) | Filter | |
|---|---|---|---|
| Group | Unspecified ▾ | Matches regex ▾ | .* |

5. In the last step, confirm that you are an Okta customer, and set the *App type* to an internal app. Select *Finish*.



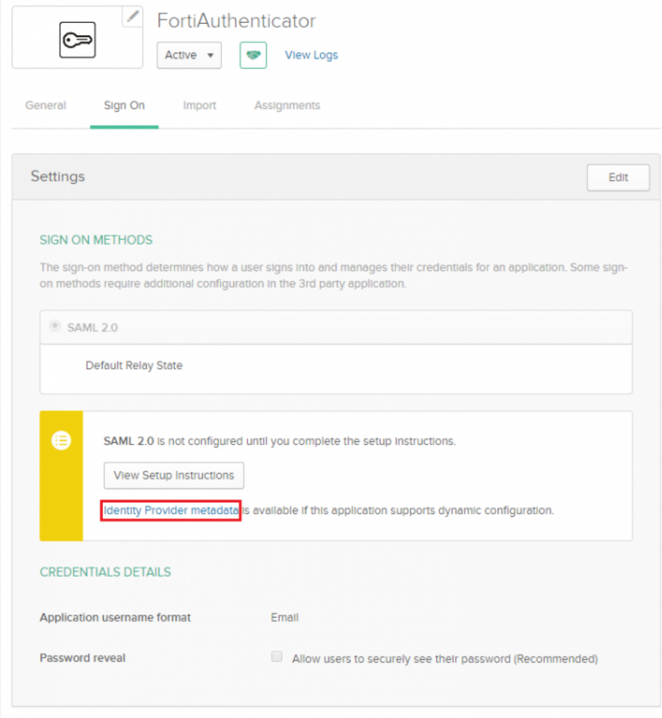
3 Help Okta Support understand how you configured this application

Are you a customer or partner?
● I'm an Okta customer adding an internal app
○ I'm a software vendor. I'd like to integrate my app with Okta

The optional questions below assist Okta Support in understanding your app integration.

App type ☑ This is an internal app that we have created

6. Once created, open the *Sign On* tab and download the *Identity Provider metadata*.



FortiAuthenticator

SIGN ON METHODS

The sign-on method determines how a user signs into and manages their credentials for an application. Some sign-on methods require additional configuration in the 3rd party application.

● SAML 2.0

Default Relay State

SAML 2.0 is not configured until you complete the setup instructions.

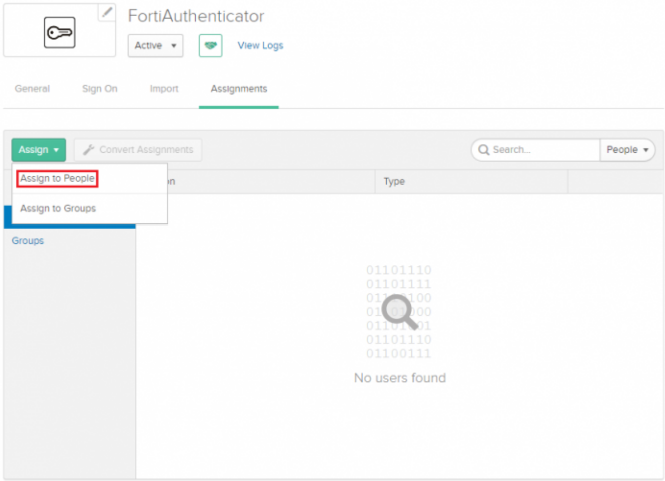
Identity Provider metadata is available if this application supports dynamic configuration.

CREDENTIALS DETAILS

| | |
|---|---|
| Application username format | Email |
| Password reveal | □ Allow users to securely see their password (Recommended) |

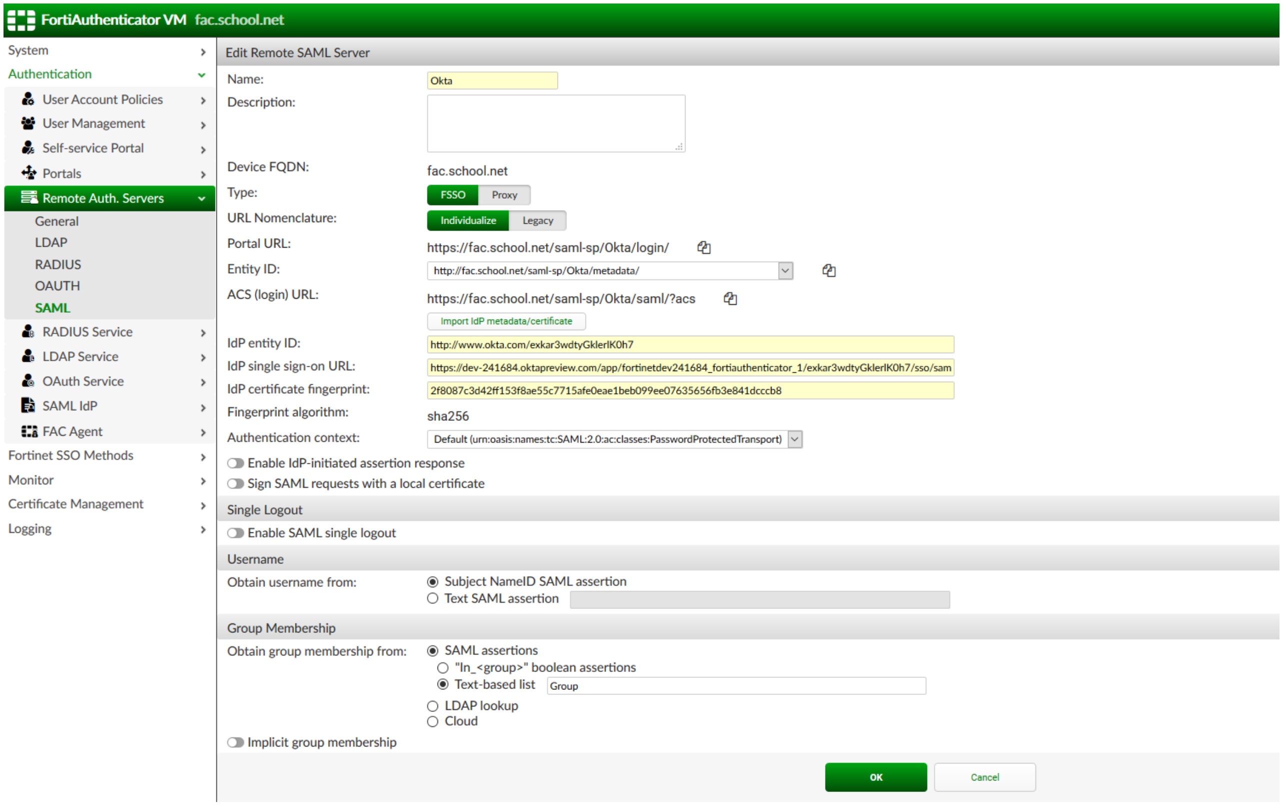
7. Finally, open the *Assignments tab* and select *Assign* > *Assign to people*.
Assign the users you wish to add to the application. This will permit the user to log in to the application's portal. Save

your changes, and select *Done*.



## Importing the IdP certificate and metadata on FortiAuthenticator

1. On FortiAuthenticator, go to *Authentication* > *Remote Auth. Servers* > *SAML*, and import the IdP metadata and certificate downloaded from Okta.
   This will automatically fill in the IdP fields. Select *OK* to save your changes.



Edit Remote SAML Server

Name: Okta

Description:

Device FQDN: fac.school.net

Type: FSSO | Proxy

URL Nomenclature: Individualize | Legacy

Portal URL: https://fac.school.net/saml-sp/Okta/login/

Entity ID: http://fac.school.net/saml-sp/Okta/metadata/

ACS (login) URL: https://fac.school.net/saml-sp/Okta/saml/?acs

IdP entity ID: http://www.okta.com/exkar3wdtyGklerlK0h7

IdP single sign-on URL: https://dev-241684.oktapreview.com/app/fortinetdev241684_fortiauthenticator_1/exkar3wdtyGklerlK0h7/sso/sam

IdP certificate fingerprint: 2f8087c3d42ff153f8ae55c7715afe0eae1beb099ee07635656fb3e841dcccb8

Fingerprint algorithm: sha256

Authentication context: Default (urn:oasis:names:tc:SAML:2.0:ac:classes:PasswordProtectedTransport)

Enable IdP-initiated assertion response

Sign SAML requests with a local certificate

Single Logout

Enable SAML single logout

Username

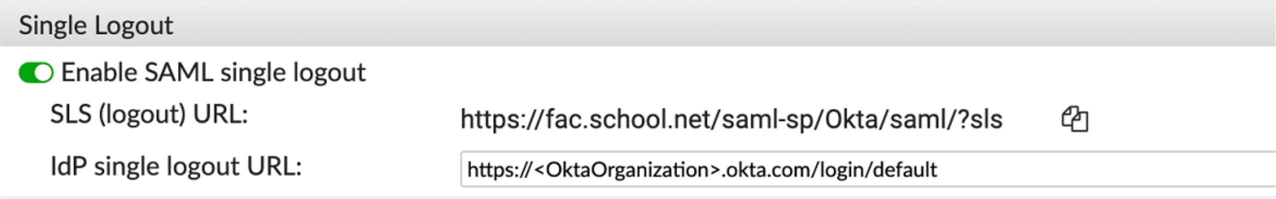
Obtain username from: ● Subject NameID SAML assertion ○ Text SAML assertion

Group Membership

Obtain group membership from: ● SAML assertions
○ "In_<group>" boolean assertions
● Text-based list Group
○ LDAP lookup
○ Cloud

Implicit group membership

2. Enable SAML single logout and add the *IdP single logout URL* under the *Single Logout* section of the Okta Remote SAML Server.
   For example, if your Okta organization is "facschool" then the *IdP single logout URL*: entry would be `https://facschool.okta.com/login/default`.



Single Logout

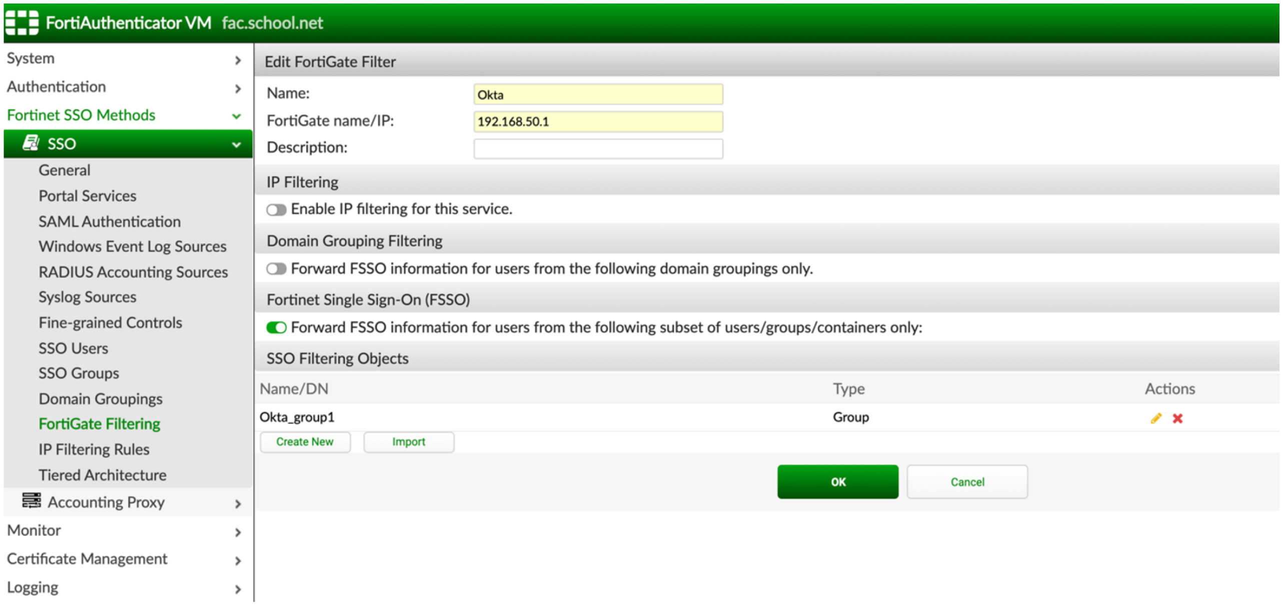
Enable SAML single logout

SLS (logout) URL: https://fac.school.net/saml-sp/Okta/saml/?sls

IdP single logout URL: https://<OktaOrganization>.okta.com/login/default

3. Go to *Fortinet SSO Methods* > *SSO* > *FortiGate Filtering*, and create a new FortiGate filter.
   Enter a name and the FortiGate's DMZ-interface IP address, and click *OK*.
   Once created, enable *Forward FSSO information for users from the following subset of users/groups/containers only*. Select *Create New* to create SSO group filtering objects that match each group inside Okta, and select *OK* to

apply all changes.



Edit FortiGate Filter

Name: Okta

FortiGate name/IP: 192.168.50.1

Description:

IP Filtering

Enable IP filtering for this service.

Domain Grouping Filtering

Forward FSSO information for users from the following domain groupings only.

Fortinet Single Sign-On (FSSO)

Forward FSSO information for users from the following subset of users/groups/containers only:

SSO Filtering Objects

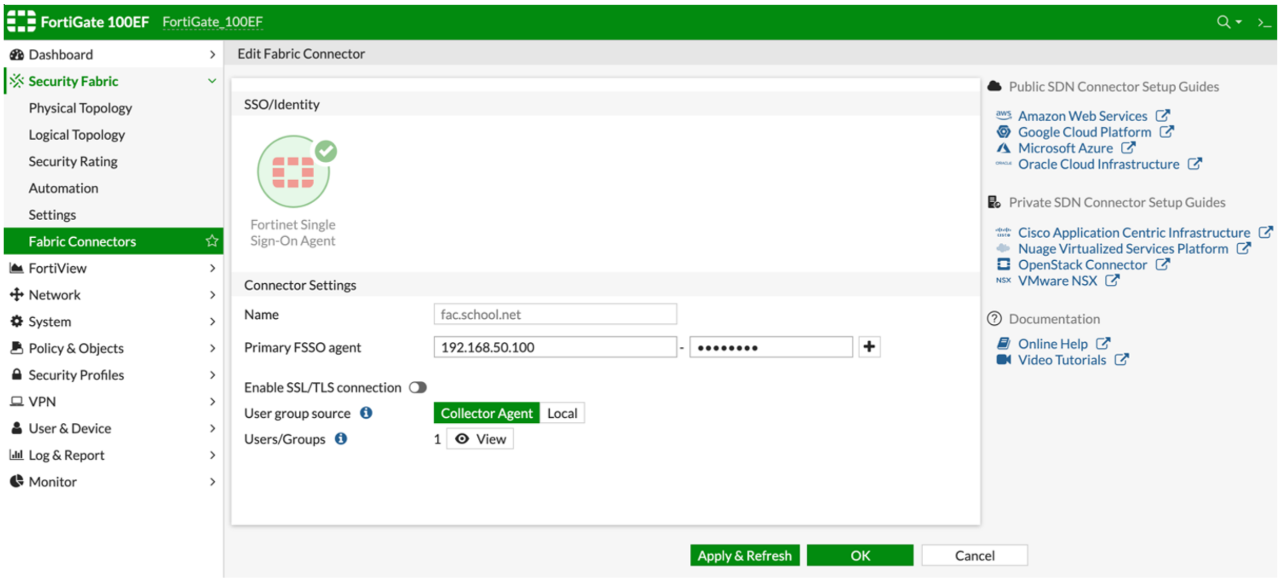
| Name/DN | Type | Actions |
|---|---|---|
| Okta_group1 | Group | ✎ ✖ |

The names entered for the filter must be the same as the group names created in Okta. Failing to enter the exact same names will result in the SSO information not being pushed to FortiGate.

## Configuring FSSO on FortiGate

### To configure FSSO on FortiGate:

1. On FortiGate, go to *Security Fabric > Fabric Connectors*.
   Create a new FSSO agent connector to the FortiAuthenticator.
2. Select *Apply & Refresh*. The SAML user groups name has been successfully pushed to FortiGate from FortiAuthenticator, appearing when you select *View*.



Edit Fabric Connector

SSO/Identity

Connector Settings

Name: fac.school.net

Primary FSSO agent: 192.168.50.100 - ••••••••

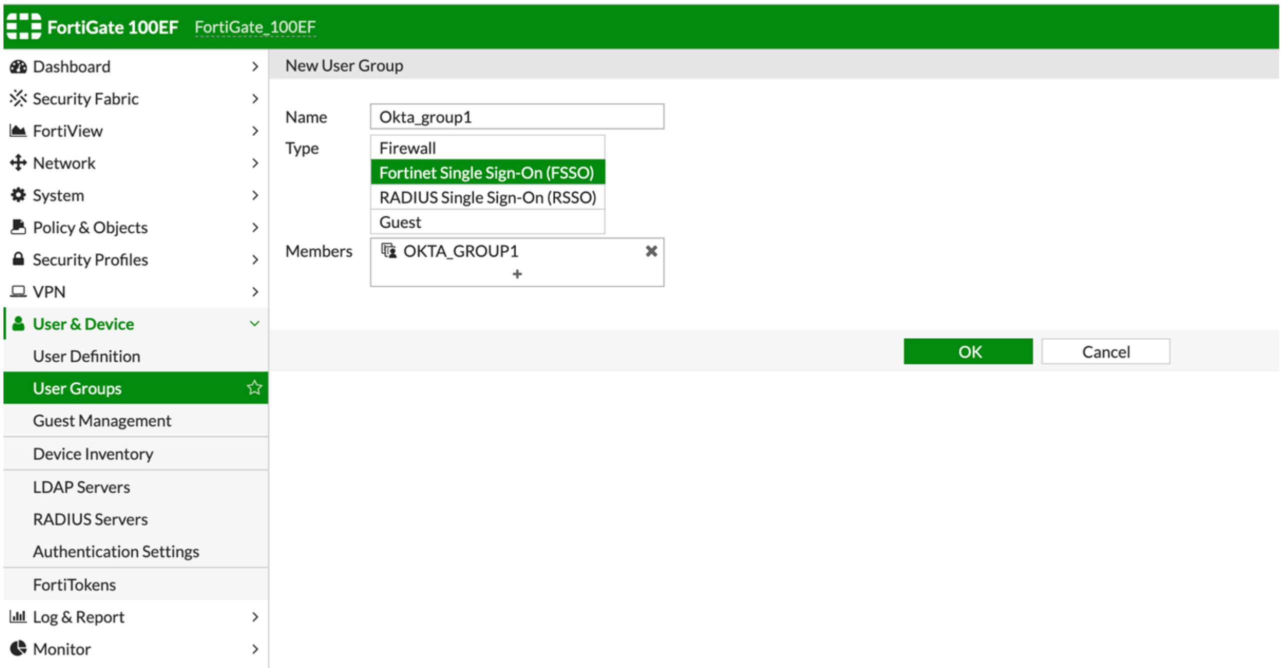
Enable SSL/TLS connection

User group source: Collector Agent | Local

Users/Groups: 1 View

Select *View* and make sure that the FSSO group has been pushed to FortiGate.

3. Go to *User & Device* > *User Groups* and create a new user group.
Enter a name, set *Type* to *Fortinet Single Sign-On (FSSO),* and add the FSSO group as a *Member.*



New User Group

Name: Okta_group1

Type: Fortinet Single Sign-On (FSSO)

Members: OKTA_GROUP1

## Configure automatic redirect

### To configure automatic redirect on FortiGate:

In order to automatically redirect the user to the initial website after authentication, erase the existing HTML code and replace it with the following HTML code on the FortiGate in *System > Replacement Messages > Authentication > Login Page.*

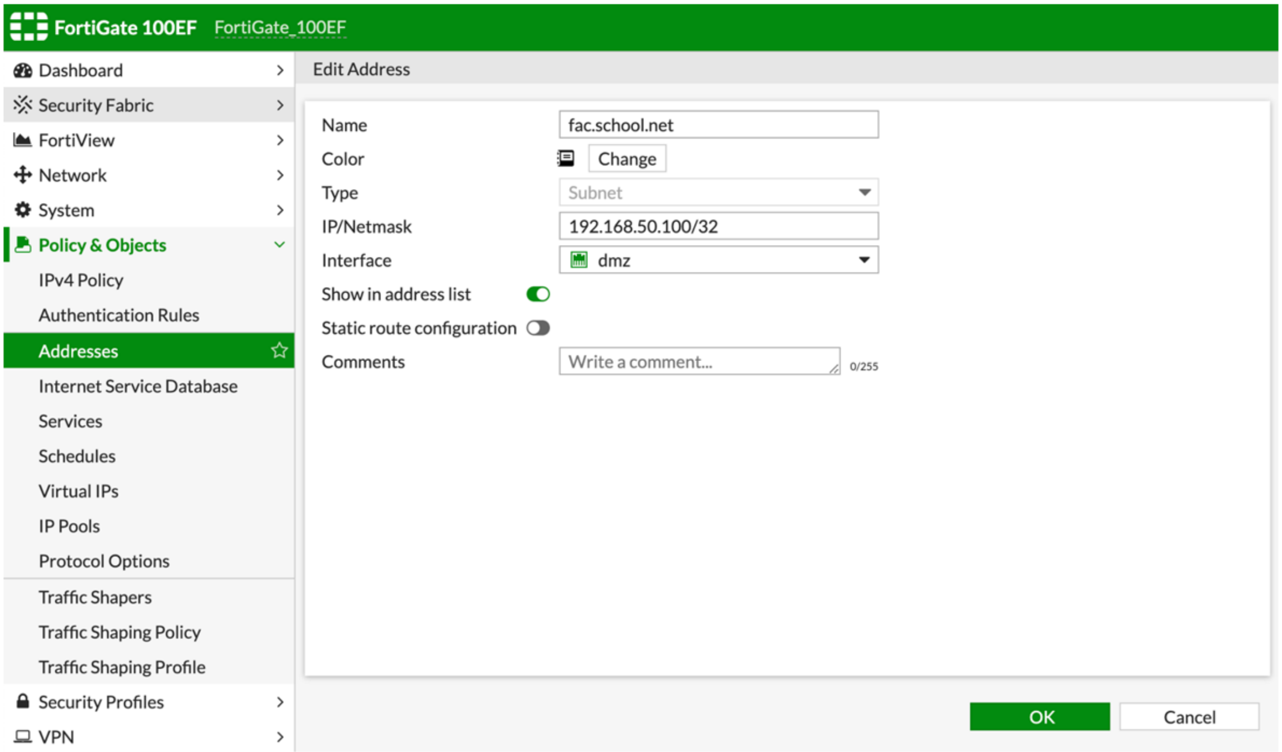
Replace **`<FortiAuthenticator-FQDN>`** with the DNS name of the FortiAuthenticator.

```
<html>

  <head>

    <meta charset="UTF-8">

    <meta http-equiv="refresh" content="1;url=https://<FortiAuthenticator-FQDN>/saml-
sp/Okta/login/?user_continue_url=%%PROTURI%%&userip=%%USER_IP%%">

    <script type="text/javascript">
      window.location.href="https://<FortiAuthenticator-FQDN>/saml-sp/Okta/login/?user_
continue_url=%%PROTURI%%&userip=%%USER_IP%%"
    </script>

    <title>
      Page Redirection
      <title>

        <head>

          <body>
            If you are not redirected automatically,
            <a href="https://<FortiAuthenticator-FQDN>/saml-sp/Okta/login/?user_continue_
url=%%PROTURI%%&userip=%%USER_IP%%">
              login
            </a>

            <body>

              <html>
```

## Configure address objects and policies

### To configure addresses objects and policies on FortiGate:

1. Go to *Policy & Objects* > *Addresses* and add the FortiAuthenticator as an address object.

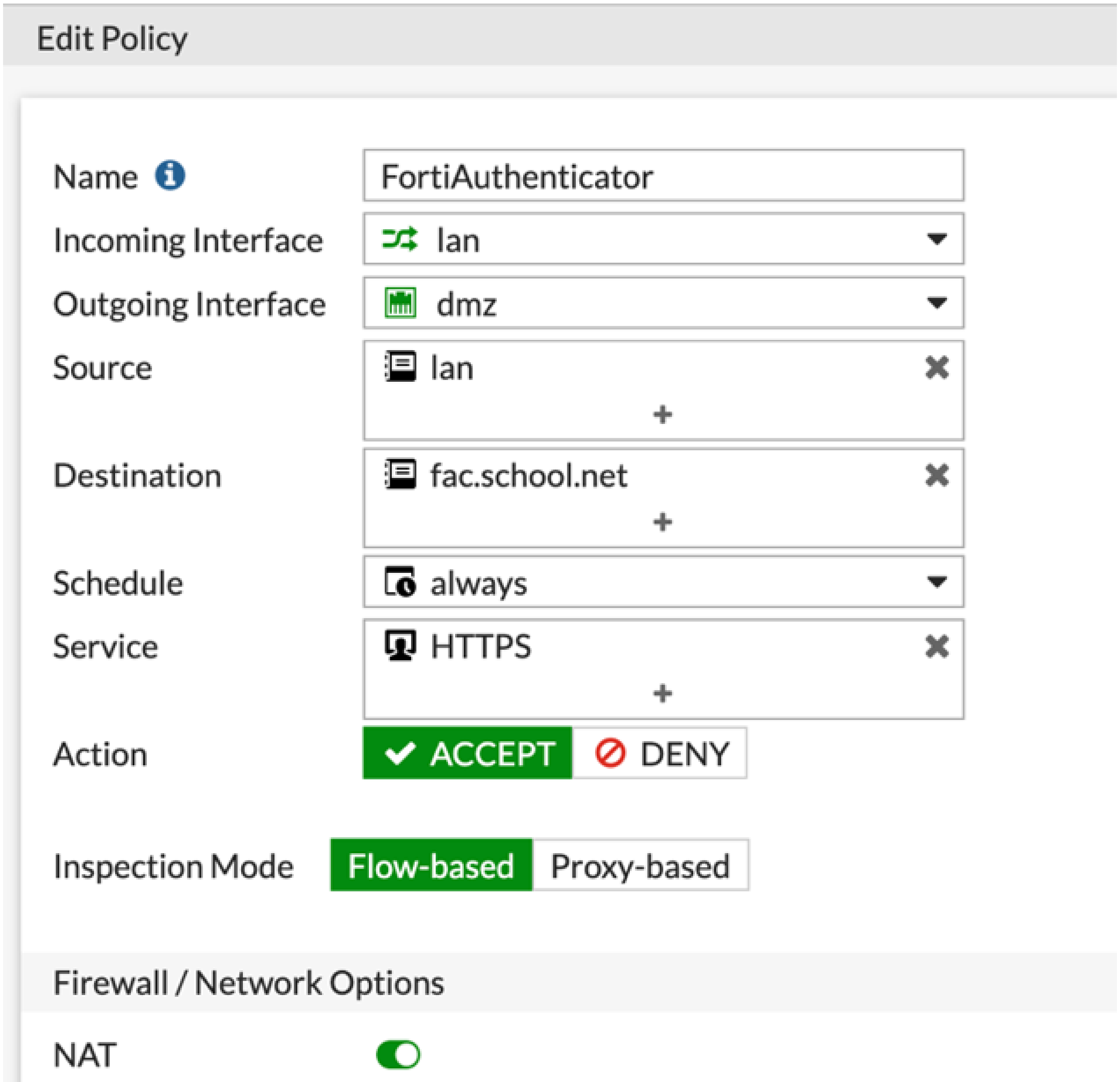


Edit Address

| | |
|---|---|
| Name | fac.school.net |
| Color | Change |
| Type | Subnet |
| IP/Netmask | 192.168.50.100/32 |
| Interface | dmz |
| Show in address list | ● |
| Static route configuration | ○ |
| Comments | Write a comment... 0/255 |

2. Create the FQDN objects below.
   - *.okta.com
   - *.mtls.okta.com
   - *.oktapreview.com
   - *.mtls.oktapreview.com
   - *.oktacdn.com
   - *.okta-emea.com
   - *.mtls.okta-emea.com
   - *.kerberos.okta.com
   - *.kerberos.okta-emea.com
   - *.kerberos.oktapreview.com

   As these are FQDNs, make sure to set *Type* to *FQDN*.
3. Create an *Address group* and name it *Okta Bypass* and add the FQDNs you created above into the Okta Bypass address group.
4. Go to *Policy & Objects* > *IPv4 Policy* and create all policies shown in the examples below: a policy for DNS, for access to the FortiAuthenticator, for Okta bypass, and for FSSO including the SAML user group.
   Allow access to the FortiAuthenticator on the DMZ from the LAN:



Edit Policy

Name: FortiAuthenticator

Incoming Interface: lan

Outgoing Interface: dmz

Source: lan

Destination: fac.school.net

Schedule: always

Service: HTTPS

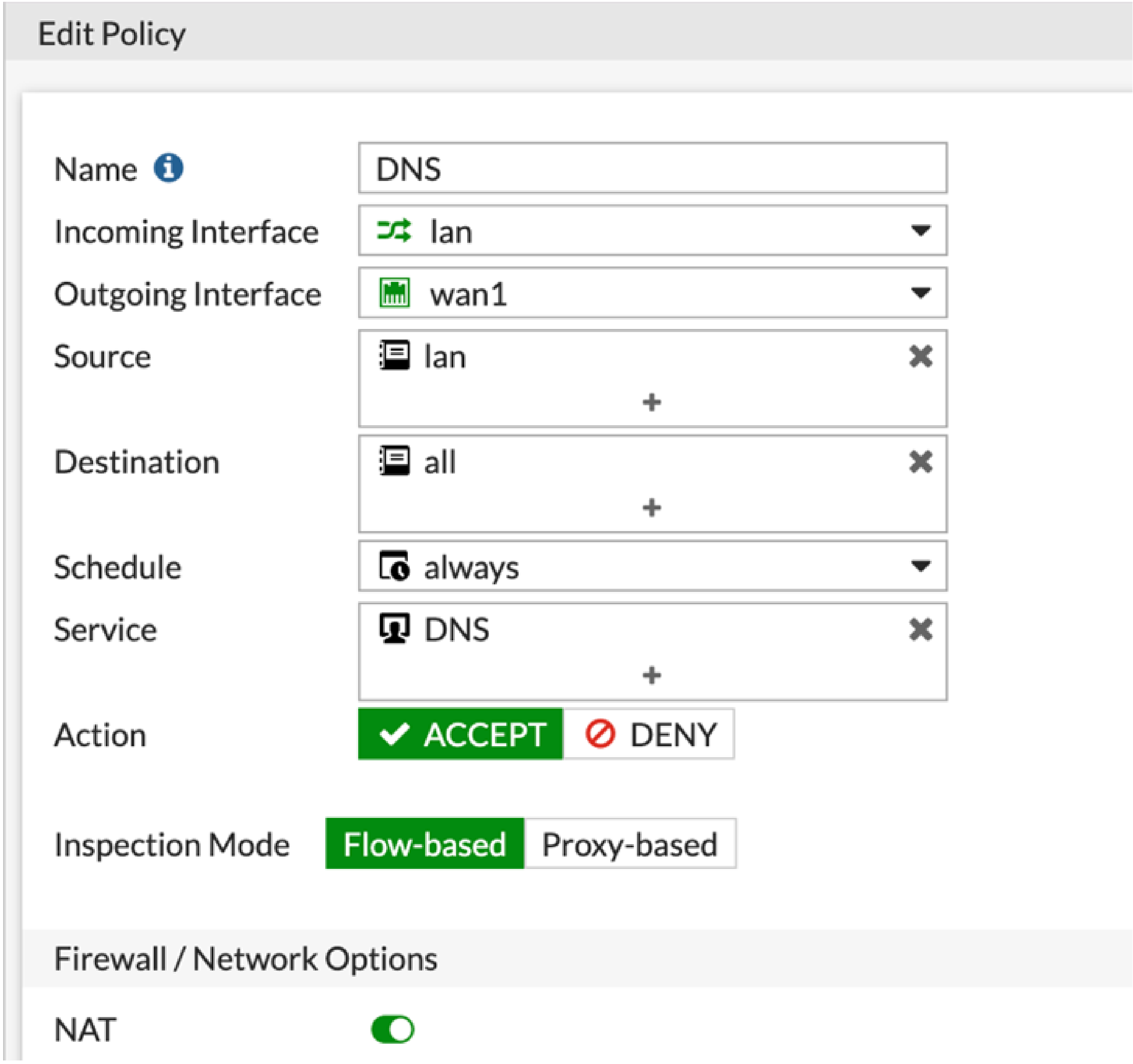
Action: ✓ ACCEPT

Inspection Mode: Flow-based

Firewall / Network Options

NAT: ●

Add the following three policies in order:

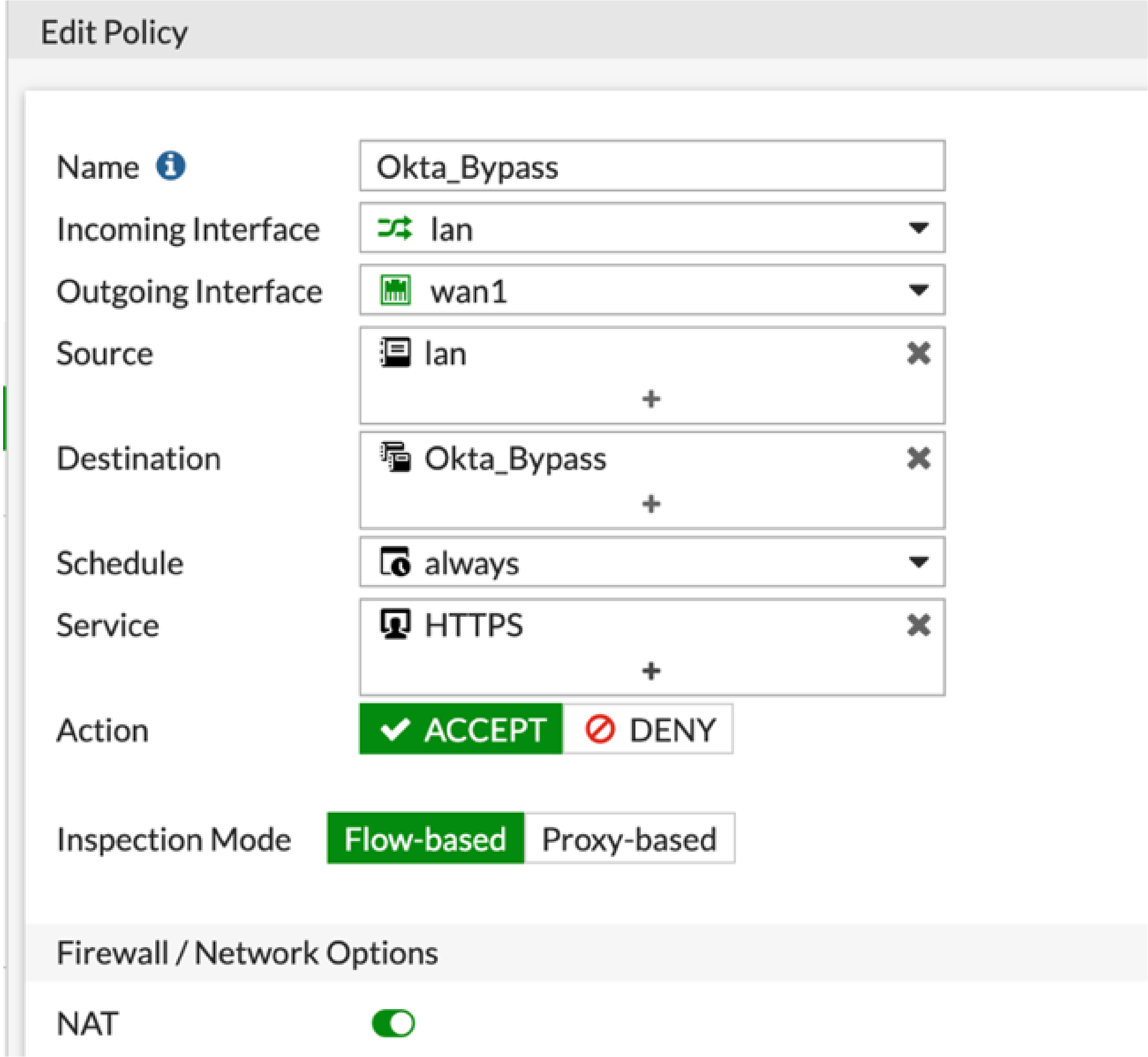


Edit Policy

| | |
|---|---|
| Name | DNS |
| Incoming Interface | lan |
| Outgoing Interface | wan1 |
| Source | lan |
| Destination | all |
| Schedule | always |
| Service | DNS |
| Action | [✓ ACCEPT] DENY |
| Inspection Mode | [✓ Flow-based] Proxy-based |

Firewall / Network Options

NAT ●



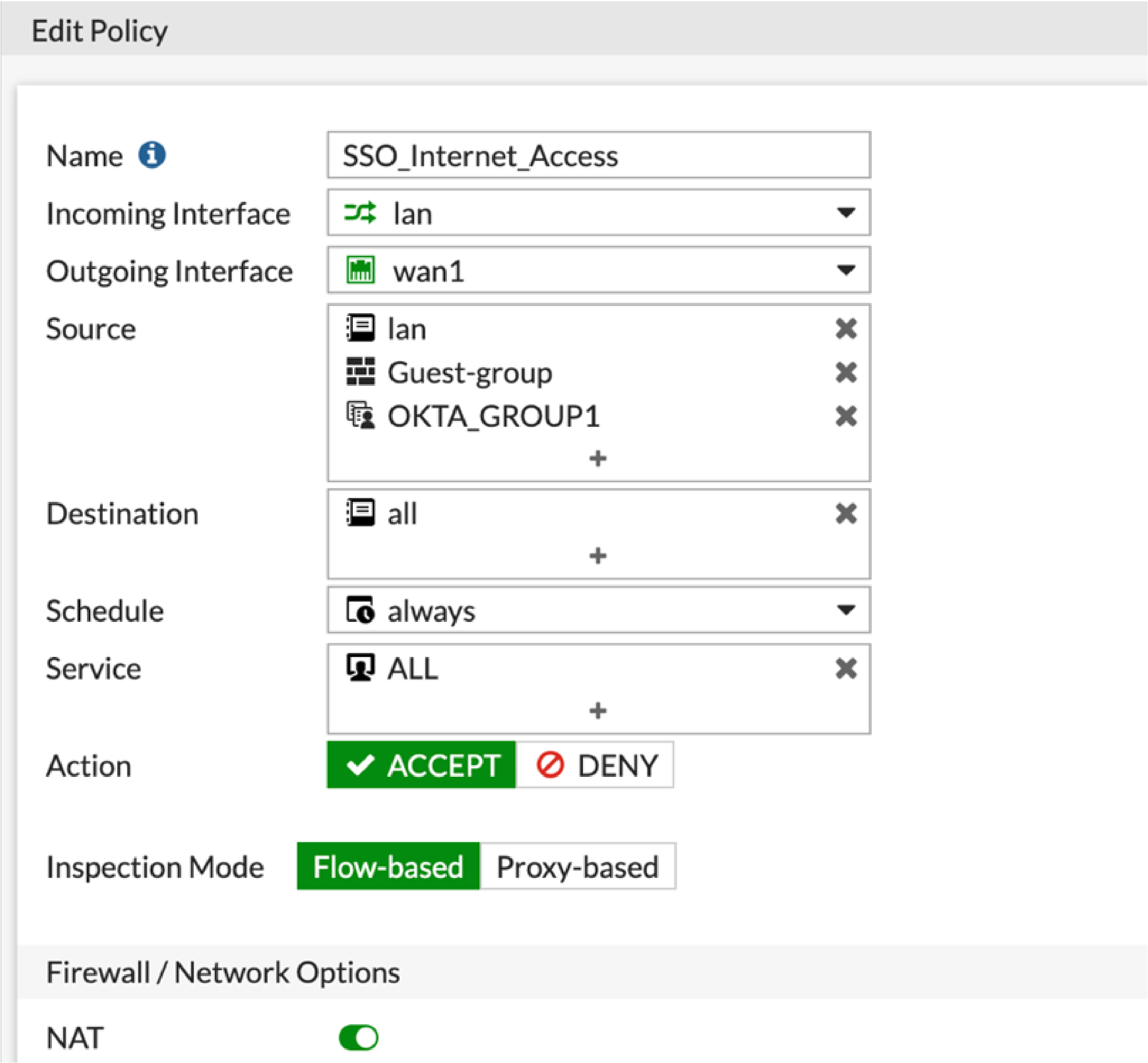
Edit Policy

| | |
|---|---|
| Name | Okta_Bypass |
| Incoming Interface | lan |
| Outgoing Interface | wan1 |
| Source | lan |
| Destination | Okta_Bypass |
| Schedule | always |
| Service | HTTPS |
| Action | ✓ ACCEPT / DENY |
| Inspection Mode | Flow-based / Proxy-based |

Firewall / Network Options

| | |
|---|---|
| NAT | ● |

In the *SSO_Internet_Access* policy, add the Firewall *Guest-group* and the Okta FSSO group that is received from FortiAuthenticator. The Guest-group redirects the initial Internet access request from the browser to Okta. Once the user is authenticated the browser will automatically redirect to the website from the initial HTTP/HTTPS request matching the Okta SSO group.



Edit Policy

| | |
|---|---|
| Name | SSO_Internet_Access |
| Incoming Interface | lan |
| Outgoing Interface | wan1 |
| Source | lan<br>Guest-group<br>OKTA_GROUP1 |
| Destination | all |
| Schedule | always |
| Service | ALL |
| Action | [✓ ACCEPT] DENY |
| Inspection Mode | [✓ Flow-based] Proxy-based |

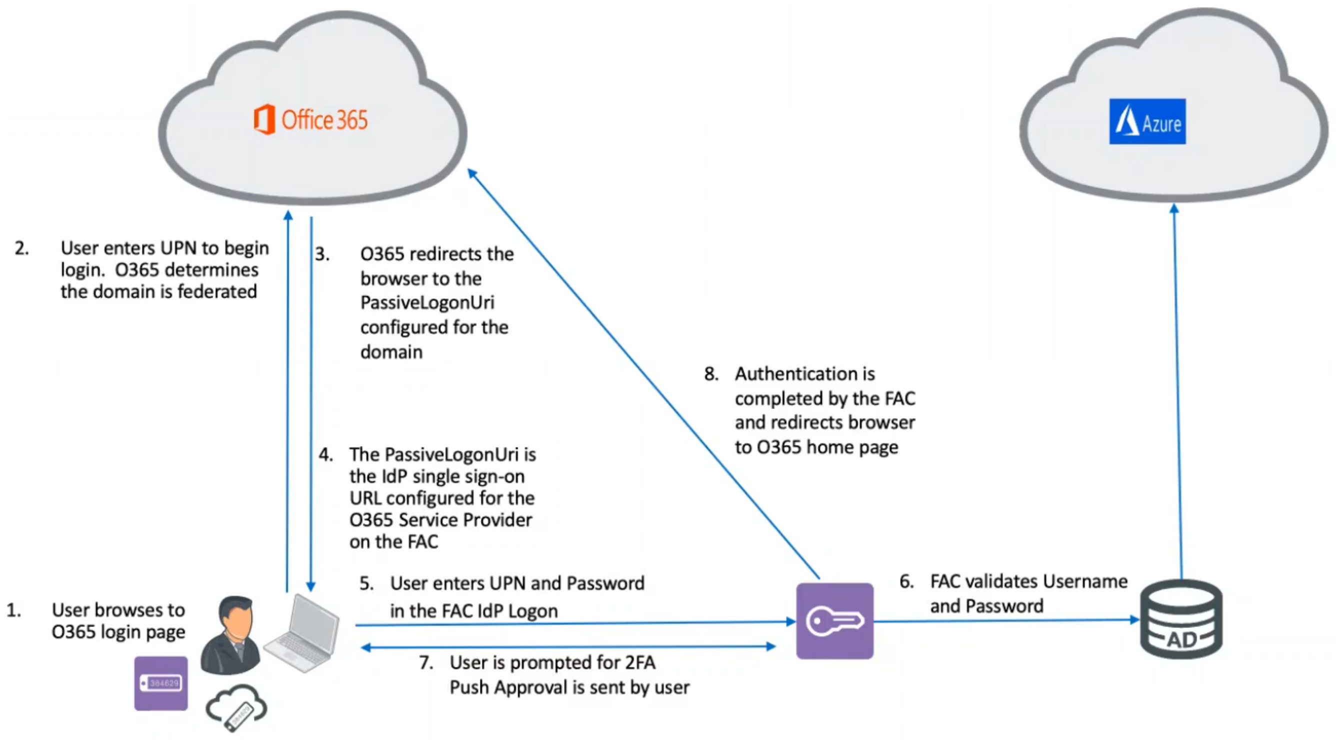
Firewall / Network Options

| | |
|---|---|
| NAT | ● |

# Office 365 SAML authentication using FortiAuthenticator with 2FA

FortiAuthenticator can act as the SAML IdP for an Office 365 SP using FortiToken served directly by FortiAuthenticator or from FortiToken Cloud for two-factor authentication.

The configuration outlined in this guide assumes that you have already configured your FortiAuthenticator with FortiToken Cloud. For more information on how to do this, please see the FortiAuthenticator Administration Guide.


Office 365
Azure
2. User enters UPN to begin login. O365 determines the domain is federated
3. O365 redirects the browser to the PassiveLogonUri configured for the domain
4. The PassiveLogonUri is the IdP single sign-on URL configured for the O365 Service Provider on the FAC
8. Authentication is completed by the FAC and redirects browser to O365 home page
1. User browses to O365 login page
5. User enters UPN and Password in the FAC IdP Logon
6. FAC validates Username and Password
7. User is prompted for 2FA Push Approval is sent by user
AD

**To configure Office 365 SAML authentication using FortiAuthenticator with two-factor authentication:**

1. Configure the remote LDAP server on FortiAuthenticator on page 176
2. Configure SAML settings on FortiAuthenticator on page 177
3. Configure two-factor authentication on FortiAuthenticator on page 178
4. Configure the domain and SAML SP in Microsoft Azure AD PowerShell on page 179
5. Configure Microsoft Azure AD Connect on page 181

## Configure the remote LDAP server on FortiAuthenticator

**To configure the LDAP server:**

1. Go to *Authentication* > *Remote Auth. Servers* > *LDAP* and click *Create New*.
2. Configure the following settings:
   a. **Name**: Provide a name for the remote LDAP server.
   b. **Primary server name/IP**: Enter the IP address for the AD (Active Directory) source.
   c. **Base distinguished name**: Configure the based distinguished name for your AD source.
   d. **Bind type**: Select *Regular*.
   e. **Username/Password**: Enter the username and password for your AD source.
   The remaining settings can be left in their default state.
3. Click *OK* to save your changes.

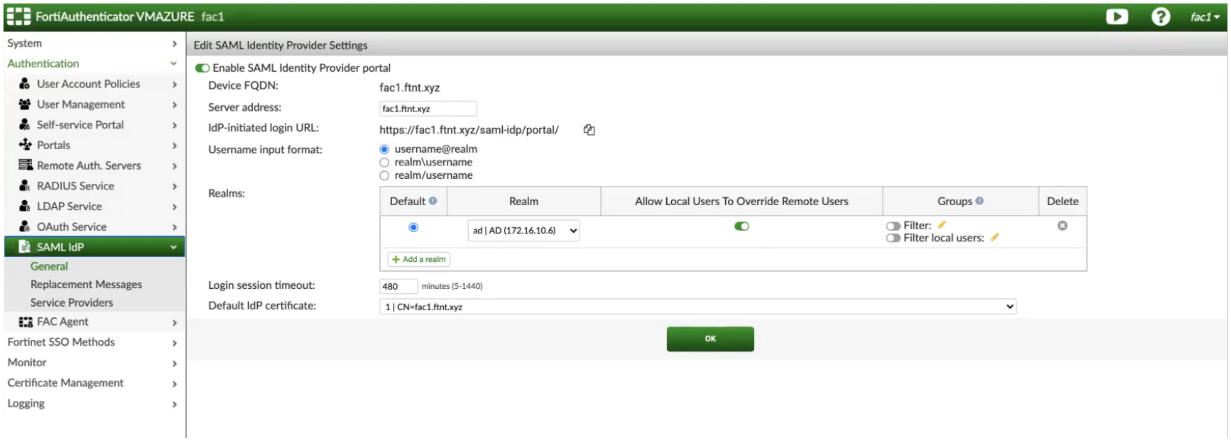
#### To configure the Active Directory realm:

1. Go to *Authentication* > *User Management* > *Realms* and click *Create New*.
2. Configure a name for the realm and select your LDAP server as the *User source*.
3. Click *OK* to save your changes.

## Configure SAML settings on FortiAuthenticator

#### To configure FortiAuthenticator IdP settings:

1. Go to *Authentication* > *SAML IdP* > *General* and click *Enable SAML Identity Provider portal*.
2. Configure the following settings:
   a. **Server address**: The IP address or FQDN of the FortiAuthenticator.
   b. **Realms**: Select the previously created LDAP realm.
   c. **Default IdP certificate**: Choose a certificate. The default can be used if desired.
   The remaining settings can be left in their default state.



Edit SAML Identity Provider Settings

Enable SAML Identity Provider portal

Device FQDN: fac1.ftnt.xyz

Server address: fac1.ftnt.xyz

IdP-initiated login URL: https://fac1.ftnt.xyz/saml-idp/portal/

Username input format: ● username@realm ○ realm\username ○ realm/username

Realms:

| Default | Realm | Allow Local Users To Override Remote Users | Groups | Delete |
|---|---|---|---|---|
| ● | ad \| AD (172.16.10.6) | ● | Filter:<br>Filter local users: | ⊗ |

+ Add a realm

Login session timeout: 480 minutes (5-1440)

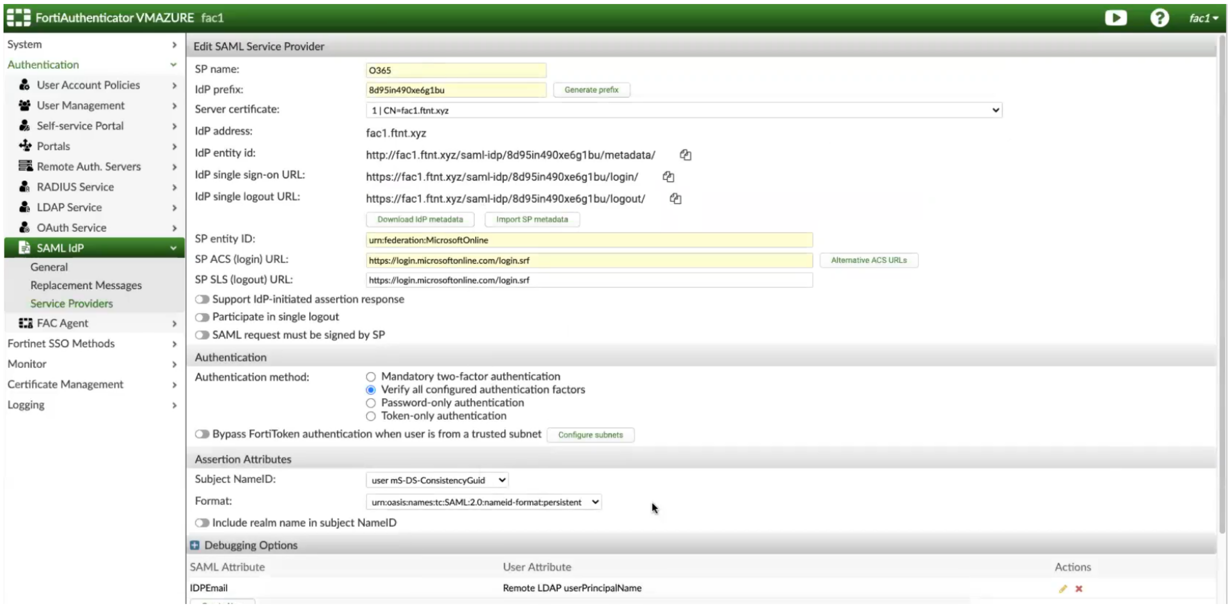
Default IdP certificate: 1 | CN=fac1.ftnt.xyz

3. Click *OK* to save your changes.

#### To configure the service provider settings on FortiAuthenticator:

1. Go to *Authentication* > *SAML IdP* > *Service Providers* and click *Create New*.
2. Configure the following settings:
   a. **SP Name**: enter a name for your service provider.
   b. **IdP Prefix**: Click *Generate prefix* to create a new IdP prefix.
   c. **Server certificate**: Select the certificate to be used in your configuration or choose *Use default setting in SAML IdP General page*.
   d. **SP entity ID**: Enter `urn:federation:MicrosoftOnline`.
   e. **SP ACS (login) URL**: Enter `https://login.microsoftonline.com/login.srf`.
   f. **SP SLS (logout) URL**: Enter `https://login.microsoftonline.com/login.srf`.
   g. **Participate in single logout**: Can be enabled if you wish this SP to participate in SAML single logout.
3. In the *Assertion Attributes* section, configure the following settings:
   a. **Subject NameID**: Select *user mS-DS-Consistency Guid*.
   b. **Format**: Select *urn:oasis:names:tc:SAML:2.0:nameid-format:persistent*.
   Press `Enter` and then SAML attributes can be created.

4. In the *Debugging Options* section click *Create New* to create a SAML attribute with the following settings:
   a. **SAML attribute**: Enter `IDPEmail`.
   b. **User attribute**: In the dropdown, select *userPrincipalName* under *Remote LDAP server*.



Edit SAML Service Provider

SP name: O365
IdP prefix: 8d95in490xe6g1bu
Server certificate: 1 | CN=fac1.ftnt.xyz
IdP address: fac1.ftnt.xyz
IdP entity id: http://fac1.ftnt.xyz/saml-idp/8d95in490xe6g1bu/metadata/
IdP single sign-on URL: https://fac1.ftnt.xyz/saml-idp/8d95in490xe6g1bu/login/
IdP single logout URL: https://fac1.ftnt.xyz/saml-idp/8d95in490xe6g1bu/logout/
SP entity ID: urn:federation:MicrosoftOnline
SP ACS (login) URL: https://login.microsoftonline.com/login.srf
SP SLS (logout) URL: https://login.microsoftonline.com/login.srf
Support IdP-initiated assertion response
Participate in single logout
SAML request must be signed by SP

Authentication

Authentication method:
○ Mandatory two-factor authentication
● Verify all configured authentication factors
○ Password-only authentication
○ Token-only authentication

Bypass FortiToken authentication when user is from a trusted subnet

Assertion Attributes

Subject NameID: user mS-DS-ConsistencyGuid
Format: urn:oasis:names:tc:SAML:2.0:nameid-format:persistent
Include realm name in subject NameID

Debugging Options

| SAML Attribute | User Attribute | Actions |
|---|---|---|
| IDPEmail | Remote LDAP userPrincipalName | |

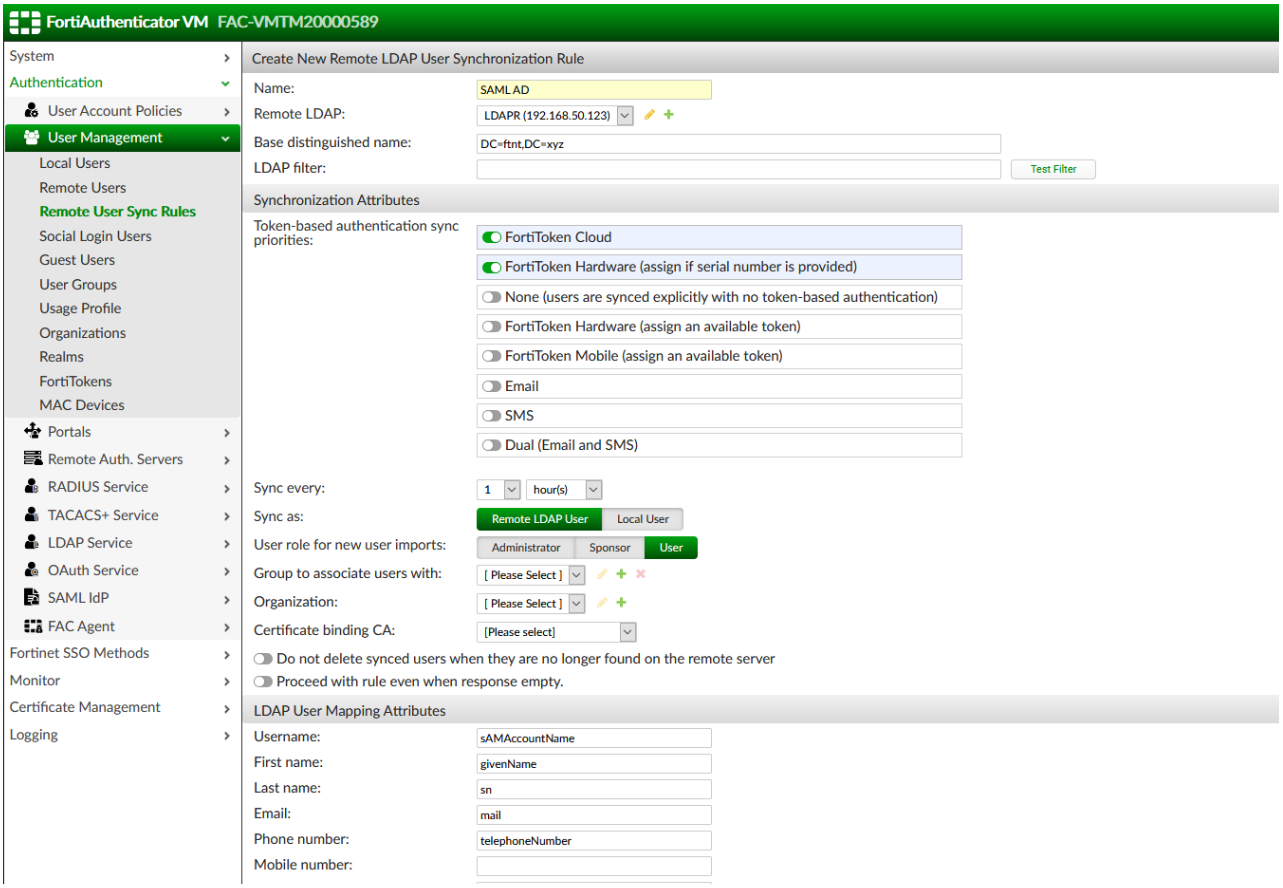
5. Click *OK* to save your changes.

## Configure two-factor authentication on FortiAuthenticator

### To configure a remote user sync rule:

1. Go to *Authentication* > *User Management* > *Remote User Sync Rules*, and click *Create New*.
2. Configure the following settings:
   a. **Name**: Enter a name for the sync rule (e.g. AD).
   b. **Remote LDAP**: Select your remote LDAP server.
3. Configure the token-based sync priority settings under *Synchronization Attributes* by enabling and ordering the authentication sync priorities.

   This example scenario uses FortiToken Cloud for two-factor authentication, so the priority is *FortiToken Cloud* followed by *None (users are synced explicitly with no token-based authentication)*.



Create New Remote LDAP User Synchronization Rule

Name: SAML AD

Remote LDAP: LDAPR (192.168.50.123)

Base distinguished name: DC=ftnt,DC=xyz

LDAP filter:

Synchronization Attributes

Token-based authentication sync priorities:

- ● FortiToken Cloud
- ● FortiToken Hardware (assign if serial number is provided)
- ○ None (users are synced explicitly with no token-based authentication)
- ○ FortiToken Hardware (assign an available token)
- ○ FortiToken Mobile (assign an available token)
- ○ Email
- ○ SMS
- ○ Dual (Email and SMS)

Sync every: 1 hour(s)

Sync as: [✓ Remote LDAP User] Local User

User role for new user imports: Administrator Sponsor [✓ User]

Group to associate users with: [ Please Select ]

Organization: [ Please Select ]

Certificate binding CA: [Please select]

○ Do not delete synced users when they are no longer found on the remote server

○ Proceed with rule even when response empty.

LDAP User Mapping Attributes

Username: sAMAccountName

First name: givenName

Last name: sn

Email: mail

Phone number: telephoneNumber

Mobile number:

4. Select or create a user group to associate users with from the dropdown menu.
5. The remaining settings can be configured to your preference or left in their default state.
6. Click *OK* to save your changes when completed.

### To configure remote users with two-factor authentication:

1. Go to *Authentication* > *User Management* > *Remote Users* and *Import* users from your Active Directory account.
2. Edit a user and enable *Token-based authentication*, and select *FortiToken* > *Cloud* as the delivery method.
3. Click *OK* to save your changes.

## Configure the domain and SAML SP in Microsoft Azure AD PowerShell

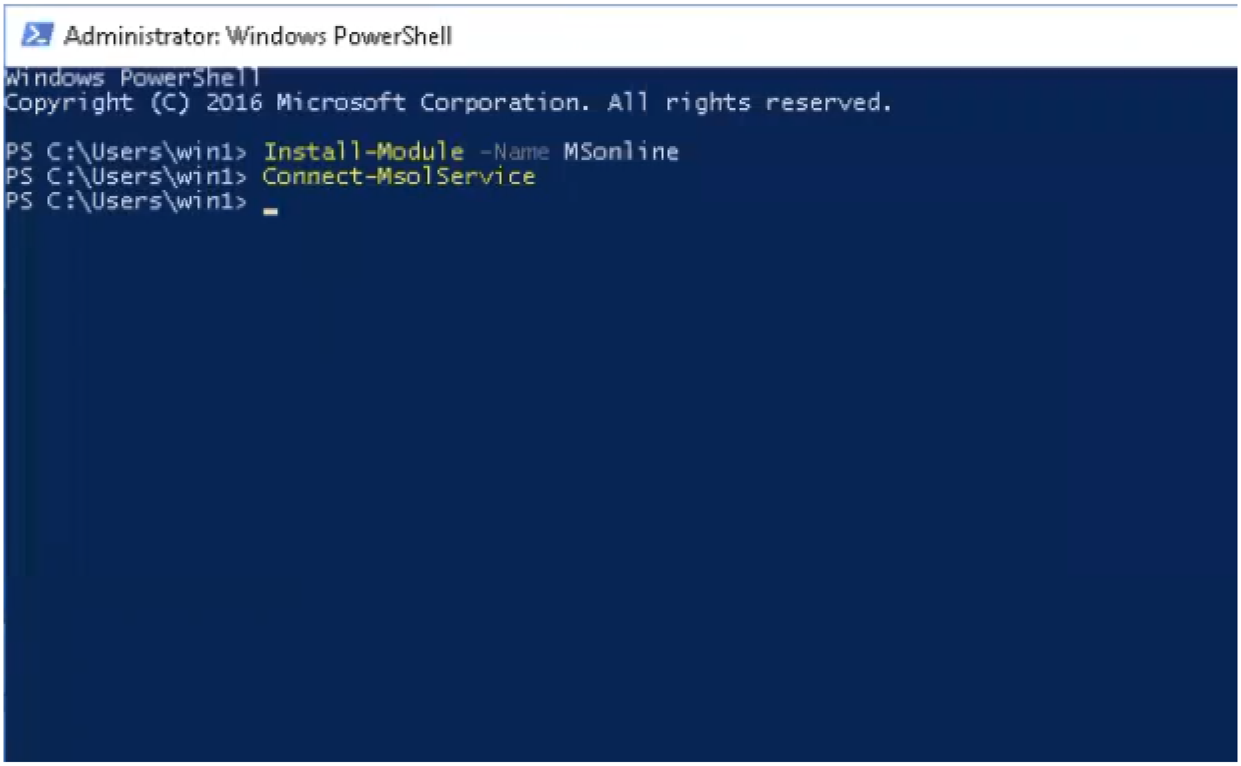
FortiAuthenticator currently supports use with Microsoft Azure Active Directory Module for Windows PowerShell.

### To configure the domain and SAML SP using Microsoft Azure AD PowerShell:

1. Launch the Microsoft Azure Active Directory Module for Windows PowerShell.
2. Enter the following command in PowerShell:
   ```
   Install-Module -Name MSonline.
   ```
   Accept the next two default ("Y") prompts for installing the NuGet Provider and installing from PSGallery.

1. If you are using Windows 2016 or earlier, you must first enable TLS 1.2 enforcement for Azure AD Connect. For instructions on enabling TLS 1.2 eforcement, see Azure AD Connect: TLS 1.2 enforcement for Azure Active Directory Connect.

3. Enter the following command:
   `Connect-MsolService .`

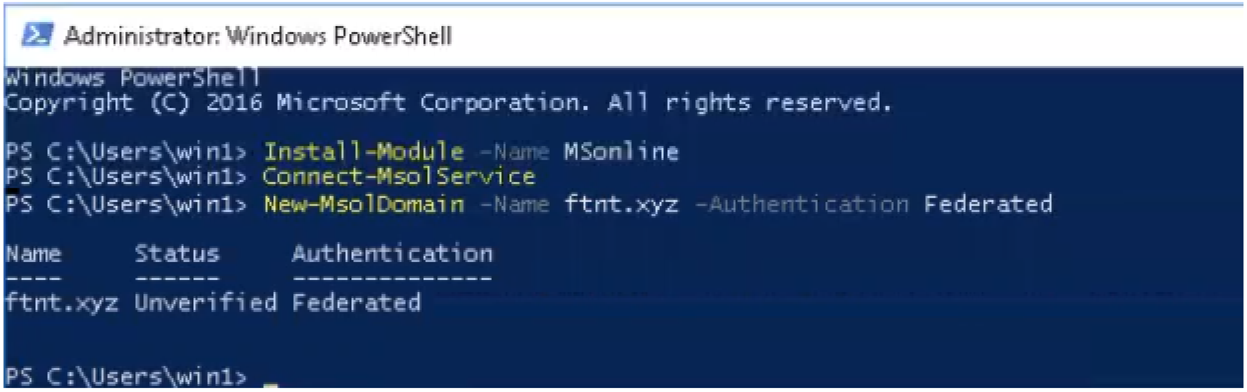


Administrator: Windows PowerShell

```
Windows PowerShell
Copyright (C) 2016 Microsoft Corporation. All rights reserved.

PS C:\Users\win1> Install-Module -Name MSonline
PS C:\Users\win1> Connect-MsolService
PS C:\Users\win1> _
```

   The Microsoft Sign in window opens. Login with your Azure ID.

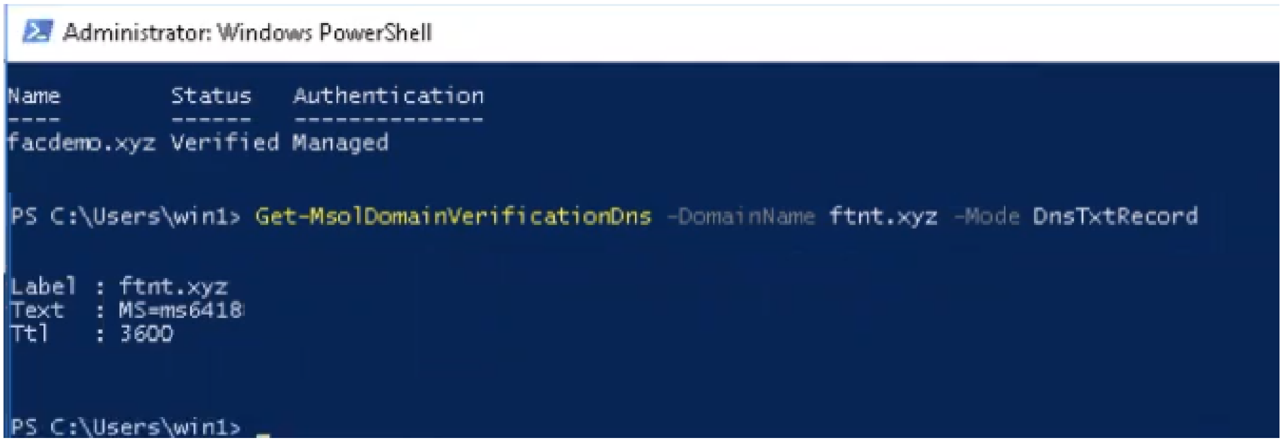
4. Add a federated domain by entering the following command.
   `New-MsolDomain -Name <your domain> -Authentication Federated`



Administrator: Windows PowerShell

```
Windows PowerShell
Copyright (C) 2016 Microsoft Corporation. All rights reserved.

PS C:\Users\win1> Install-Module -Name MSonline
PS C:\Users\win1> Connect-MsolService
PS C:\Users\win1> New-MsolDomain -Name ftnt.xyz -Authentication Federated

Name     Status     Authentication
----     ------     --------------
ftnt.xyz Unverified Federated


PS C:\Users\win1> _
```

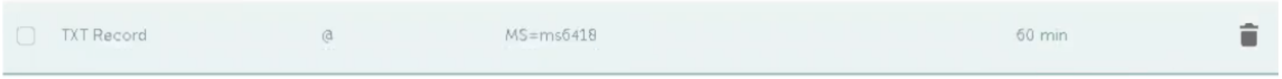
5. Obtain the DNS record and create a new text record in your domain provider to allow the domain to be verified. To obtain the DNS record, use the following command:
   `Get-MsolDomainVerificationDns -DomainName ftnt.xyz -Mode DnsTxtRecord`



Administrator: Windows PowerShell

```
Name         Status   Authentication
----         ------   --------------
facdemo.xyz Verified Managed


PS C:\Users\win1> Get-MsolDomainVerificationDns -DomainName ftnt.xyz -Mode DnsTxtRecord


Label : ftnt.xyz
Text  : MS=ms6418
Ttl   : 3600


PS C:\Users\win1> _
```

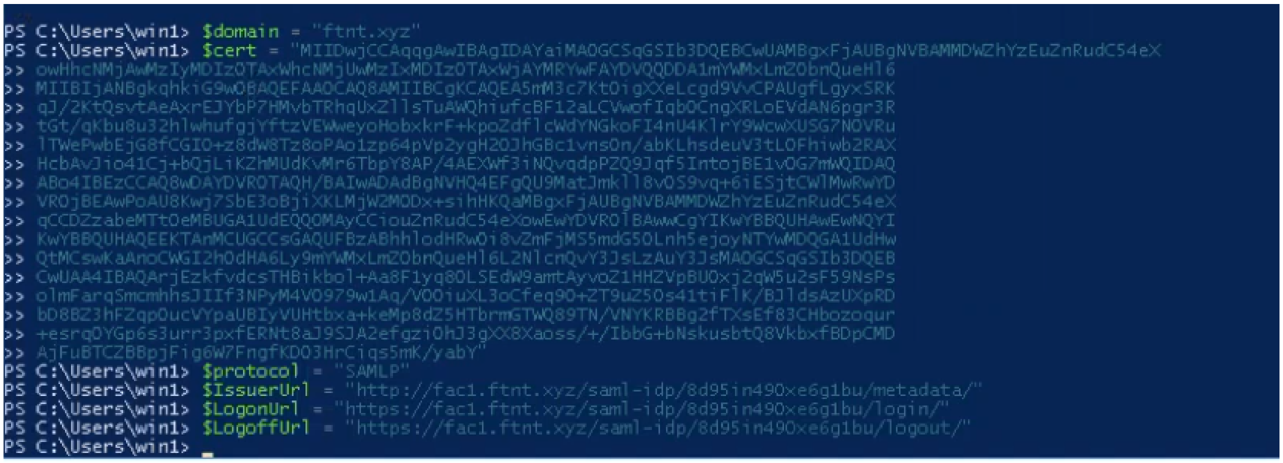
From the output, copy the *Text* field results and create a new text record in your domain with a 60 minute interval.



| | | | | |
|---|---|---|---|---|
| □ TXT Record | @ | MS=ms6418 | 60 min | 🗑 |

6. Configure the domain as a SAML service provider.
   You can create these variables inside a text editor and then copy and paste them into a PowerShell window.

```
$domain = "<your domain>"
$cert = "<your certificate. This can be obtained by downloading your certificate
from FortiAuthenticator and opening it with a text editor.>"
$protocol = "SAMLP"
$IssuerUrl = "<The IdP entity ID from FortiAuthenticator>"
$LogonUrl = "<The IdP single sign-on URL from FortiAuthenticator>"
$LogoffUrl = "<The IdP single logout URL from FortiAuthenticator>"
```



```
PS C:\Users\win1> $domain = "ftnt.xyz"
PS C:\Users\win1> $cert = "MIIDwjCCAqqgAwIBAgIDAYaiMAOGCSqGSIb3DQEBCwUAMBgxFjAUBgNVBAMMDWZhYzEuZnRudC54eX
>> owHhcNMjAwMzIyMDIzOTAxWhcNMjUwMzIxMDIzOTAxWjAYMRYwFAYDVQQDDA1mYWMxLmZ0bnQueHl6
>> MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEA5mM3c7KtOigXXeLcgd9VvCPAUgfLgyxSRK
>> qJ/2KtQsvtAeAxrEJYbP7HMvbTRhqUxZllsTuAWQhiufcBF12aLCVwofIqbOCngXRLoEVdAN6pgr3R
>> tGt/qKbu8u32hlwhufgjYftzVEWweyoHobxkrF+kpoZdflcWdYNGkoFI4nU4KlrY9WcwXUSG7NOVRu
>> lTWePwbEjG8fCGIO+z8dW8Tz8oPAo1zp64pVp2ygH2OJhGBc1vnsOn/abKLhsdeuV3tLOFhiwb2RAX
>> HcbAvJio41Cj+bQjLiKZhMUdKvMr6TbpY8AP/4AEXWf3iNQvqdpPZQ9Jqf5IntojBE1vOG7mWQIDAQ
>> ABo4IBEzCCAQ8wDAYDVROTAQH/BAIwADAdBgNVHQ4EFgQU9MatJmkll8vOS9vq+6iESjtCWlMwRwYD
>> VROjBEAwPoAU8Kwj7SbE3oBjiXKLMjW2MODx+sihHKQaMBgxFjAUBgNVBAMMDWZhYzEuZnRudC54eX
>> qCCDZzabeMTtOeMBUGA1UdEQQOMAyCCiouZnRudC54eXowEwYDVROlBAwwCgYIKwYBBQUHAwEwNQYI
>> KwYBBQUHAQEEKTAnMCUGCCsGAQUFBzABhhlodHRwOi8vZmFjMS5mdG5OLnh5ejoyNTYwMDQGA1UdHw
>> QtMCswKaAnoCWGI2hOdHA6Ly9mYWMxLmZObnQueHl6L2NlcnQvY3JsLzAuY3JsMAOGCSqGSIb3DQEB
>> CwUAA4IBAQArjEzkfvdcsTHBikbol+Aa8F1yq8OLSEdW9amtAyvoZ1HHZVpBUOxj2qW5u2sF59NsPs
>> olmFarqSmcmhhsJIIf3NPyM4VO979w1Aq/VOOiuXL3oCfeq9O+ZT9uZ5Os41tiFlK/BJldsAzUXpRD
>> bD8BZ3hFZqpOucVYpaUBIyVUHtbxa+keMp8dZ5HTbrmGTWQ89TN/VNYKRBBg2fTXsEf83CHbozoqur
>> +esrqOYGp6s3urr3pxfERNt8aJ9SJA2efgziOhJ3gXX8Xaoss/+/IbbG+bNskusbtQ8VkbxfBDpCMD
>> AjFuBTCZBBpjFig6W7FngfKDO3HrCiqs5mK/yabY"
PS C:\Users\win1> $protocol = "SAMLP"
PS C:\Users\win1> $IssuerUrl = "http://fac1.ftnt.xyz/saml-idp/8d95in490xe6g1bu/metadata/"
PS C:\Users\win1> $LogonUrl = "https://fac1.ftnt.xyz/saml-idp/8d95in490xe6g1bu/login/"
PS C:\Users\win1> $LogoffUrl = "https://fac1.ftnt.xyz/saml-idp/8d95in490xe6g1bu/logout/"
PS C:\Users\win1> _
```

Once completed, enter the following command into PowerShell to verify the domain:

```
Confirm-MsolDomain -DomainName $domain -SigningCertificate $cert -
PreferredAuthenticationProtocol $protocol -IssuerUri $IssuerUrl -PassiveLogOnUri
$LogonURL -LogOffUri $LogOffUrl
```

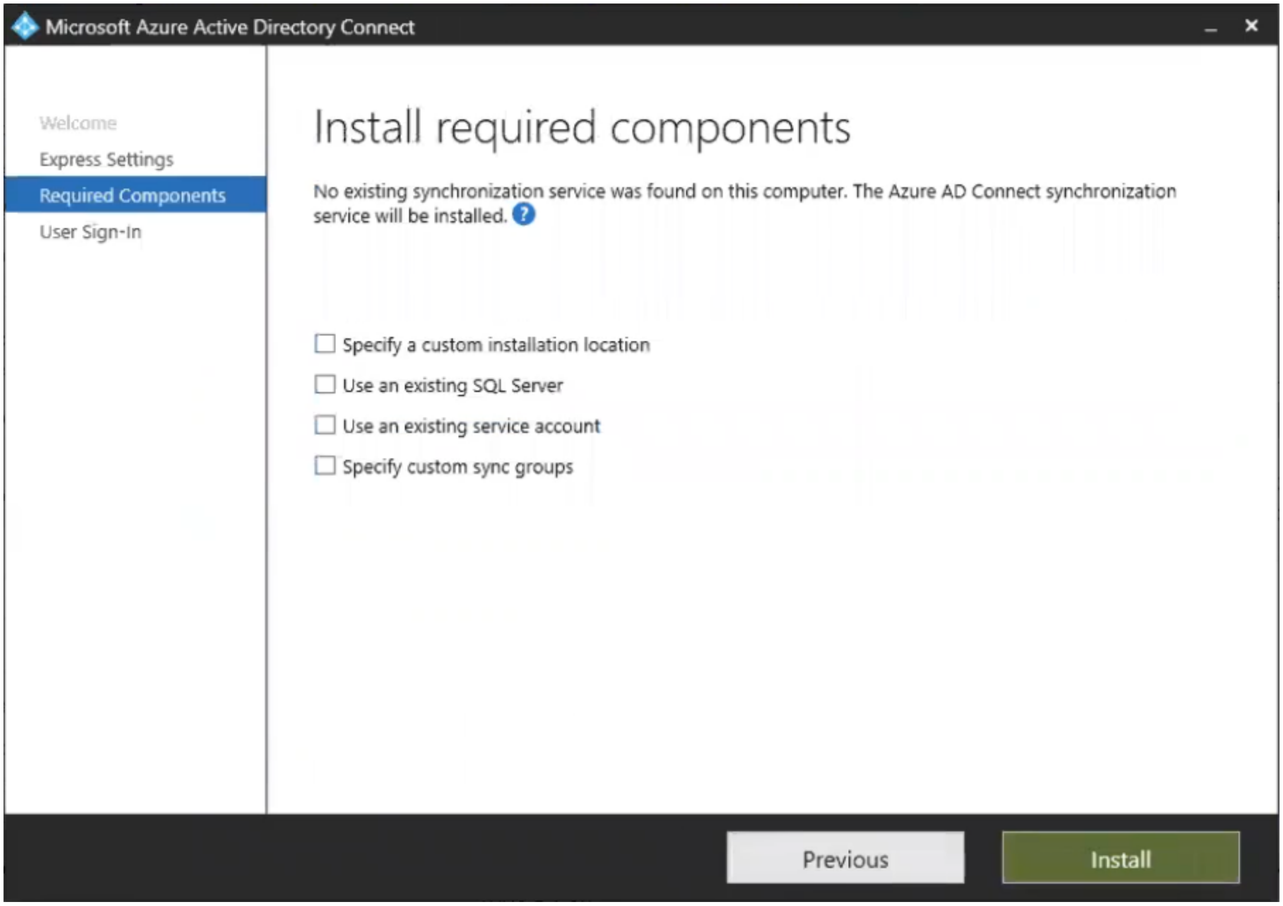
The return text from the above command should read "AvailableImmediately The domain has been successfully verified for your account."

## Configure Microsoft Azure AD Connect

You will first need to download Azure AD Connect from Microsoft on your Active Directory Domain Controller.

**To configure Microsoft Azure AD Connect:**

1. Launch Microsoft Azure Active Directory Connect to create a synchronization service to sync attributes from Active Directory to Office365.
2. Select *Customize* to begin a customized installation, and click *Install*.

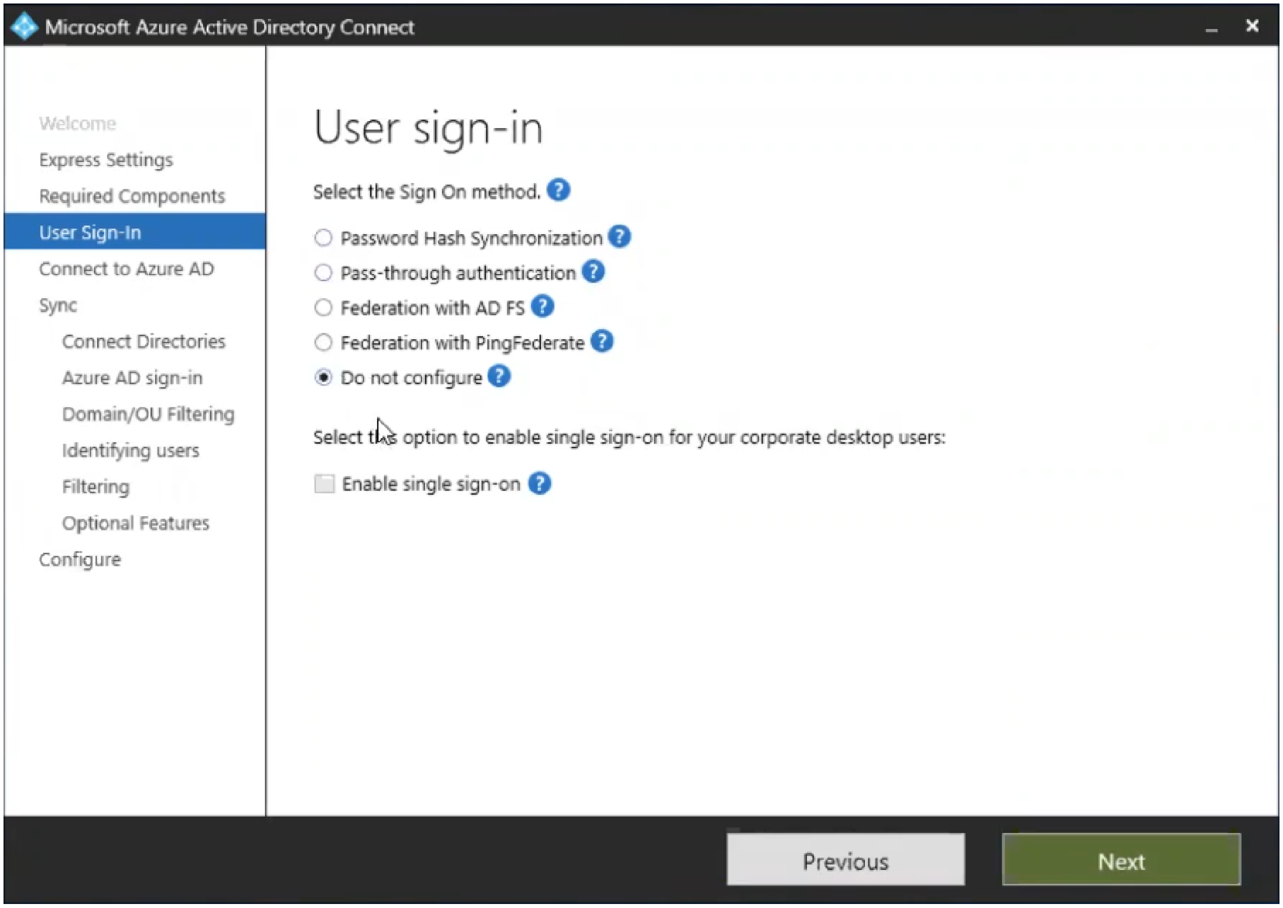


Install required components

No existing synchronization service was found on this computer. The Azure AD Connect synchronization service will be installed.

☐ Specify a custom installation location
☐ Use an existing SQL Server
☐ Use an existing service account
☐ Specify custom sync groups

3. On the *User sign-in* page, select *Do not configure*, and click *Next*.



User sign-in

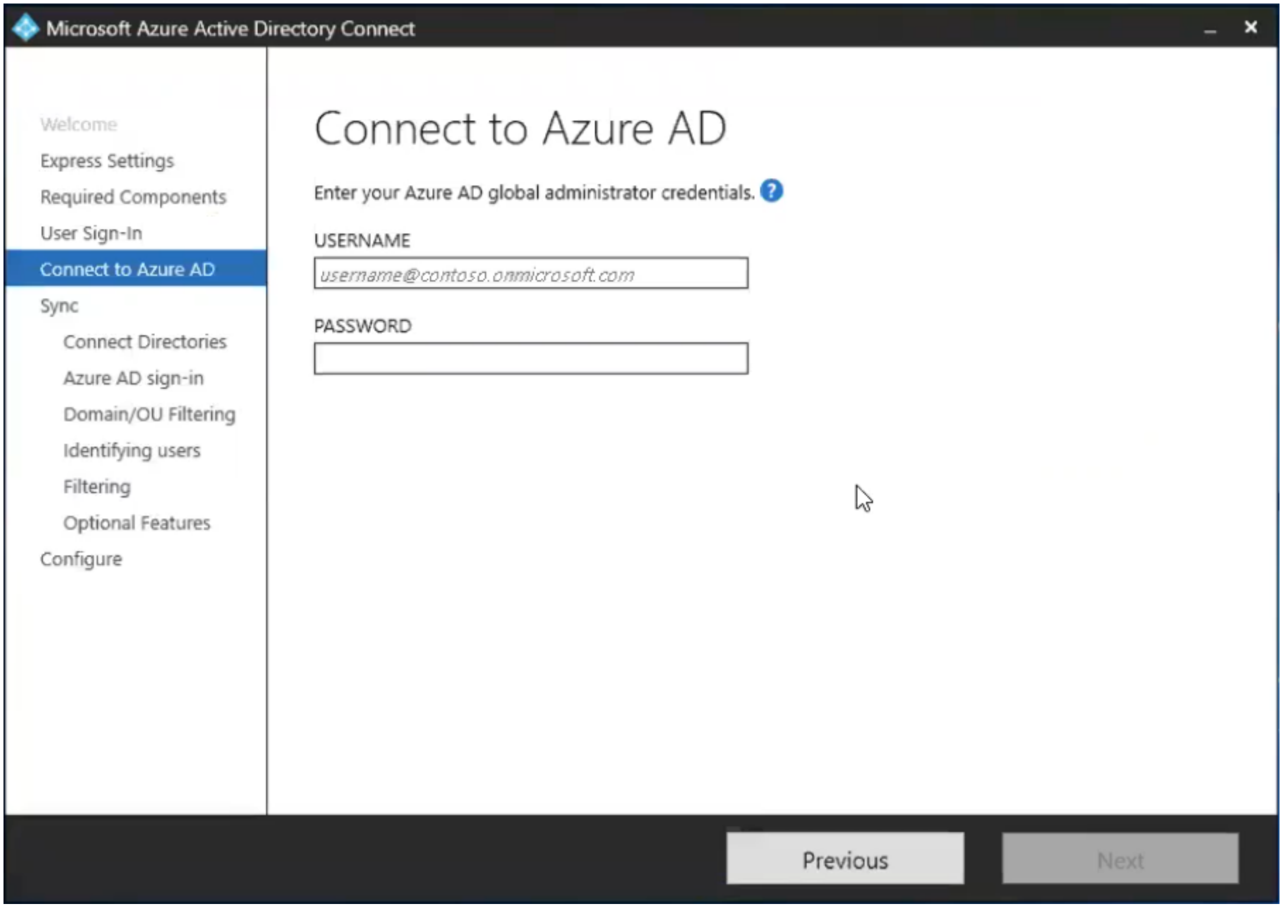
Select the Sign On method.

○ Password Hash Synchronization
○ Pass-through authentication
○ Federation with AD FS
○ Federation with PingFederate
● Do not configure

Select this option to enable single sign-on for your corporate desktop users:

□ Enable single sign-on

4. On the *Connect to Azure AD* page, enter your Azure AD global administrator credentials, and click *Next*.



Connect to Azure AD

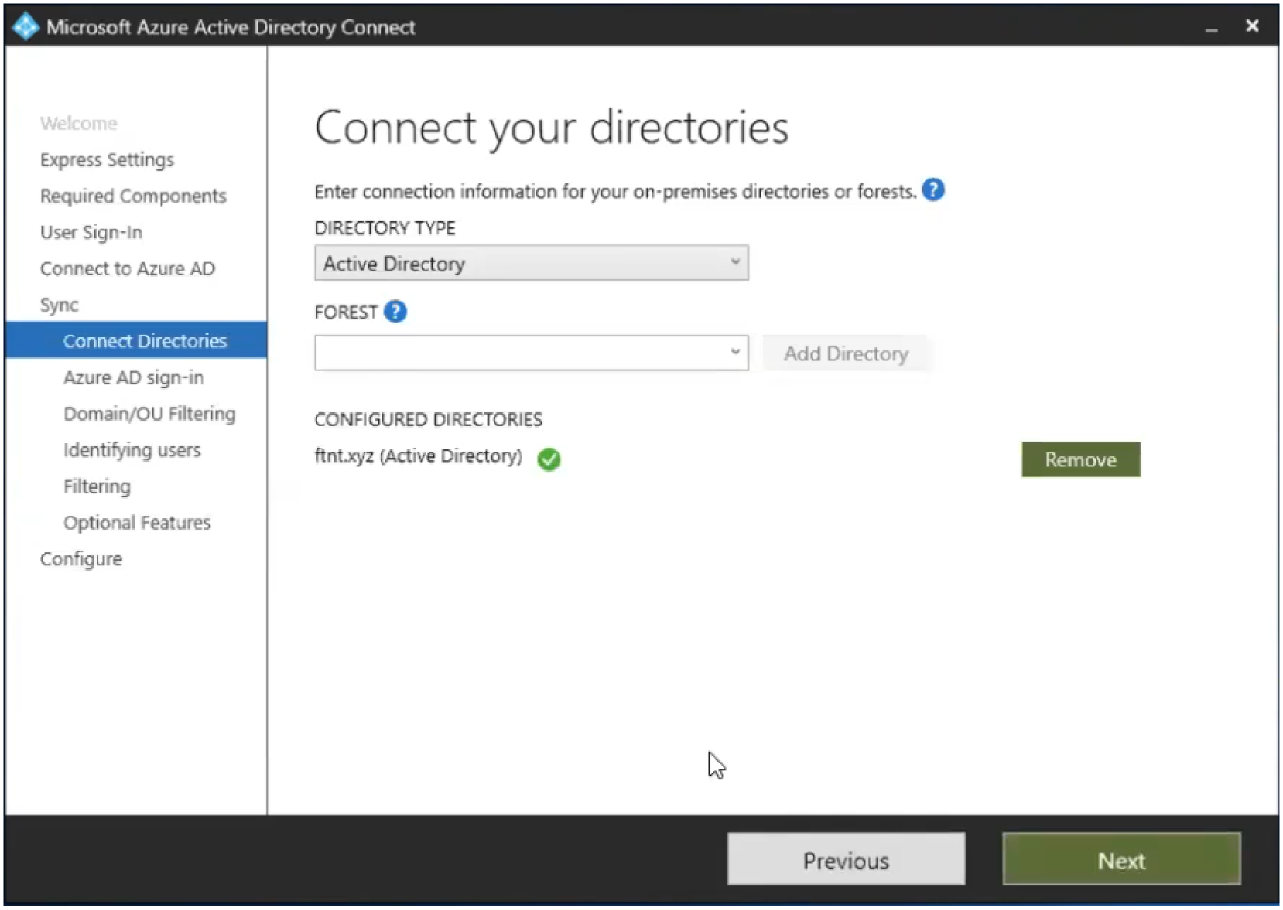
Enter your Azure AD global administrator credentials.

USERNAME

username@contoso.onmicrosoft.com

PASSWORD

5. Select your Active Directory Forest, and click *Add Directory*. Create your on-premise AD admin user account.



Connect your directories

Enter connection information for your on-premises directories or forests.

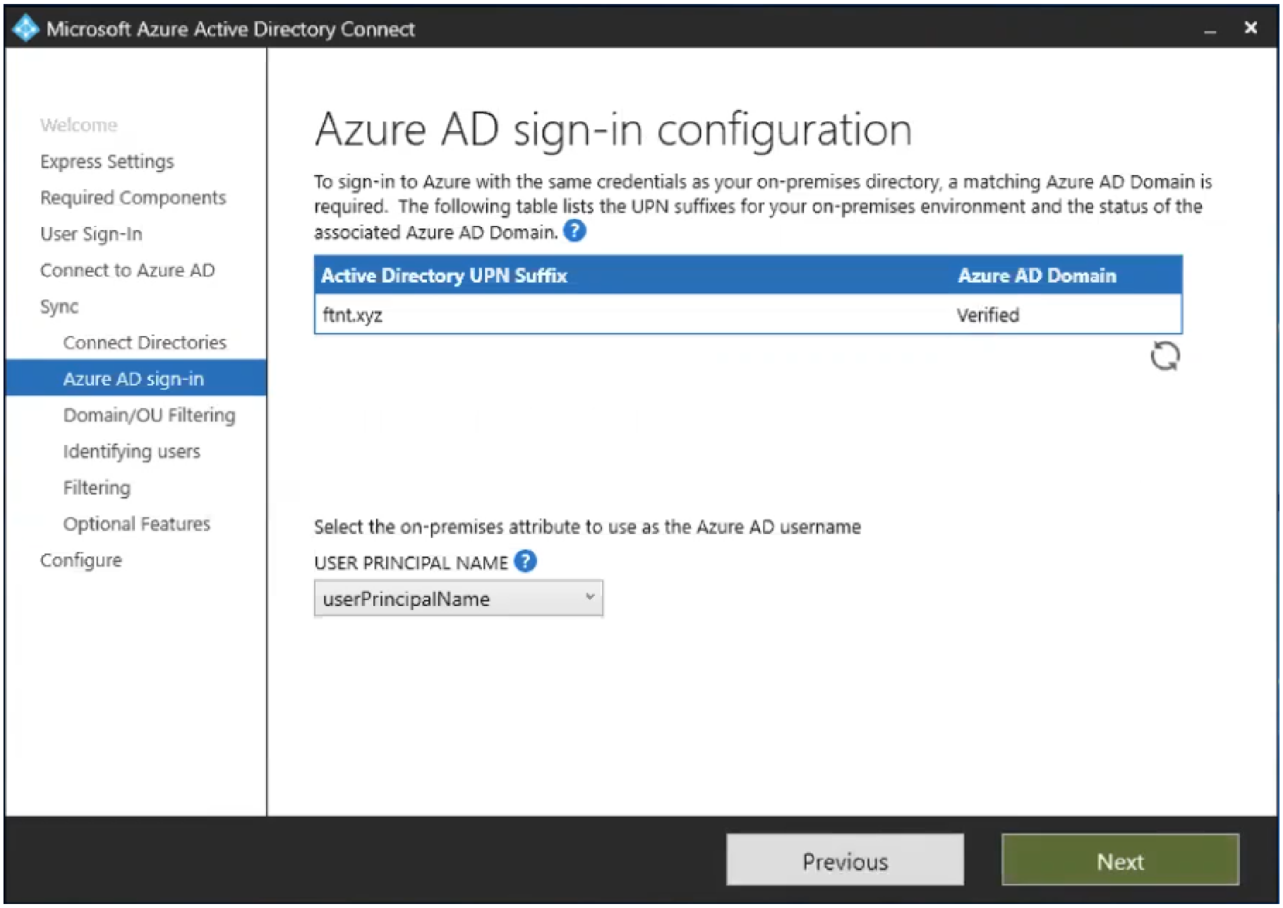
DIRECTORY TYPE: Active Directory

FOREST:

CONFIGURED DIRECTORIES

ftnt.xyz (Active Directory) ✓

When finished, click *Next*. If completed successfully, you will see your domain has been verified.
Click *Next* again.



Azure AD sign-in configuration

To sign-in to Azure with the same credentials as your on-premises directory, a matching Azure AD Domain is required. The following table lists the UPN suffixes for your on-premises environment and the status of the associated Azure AD Domain.

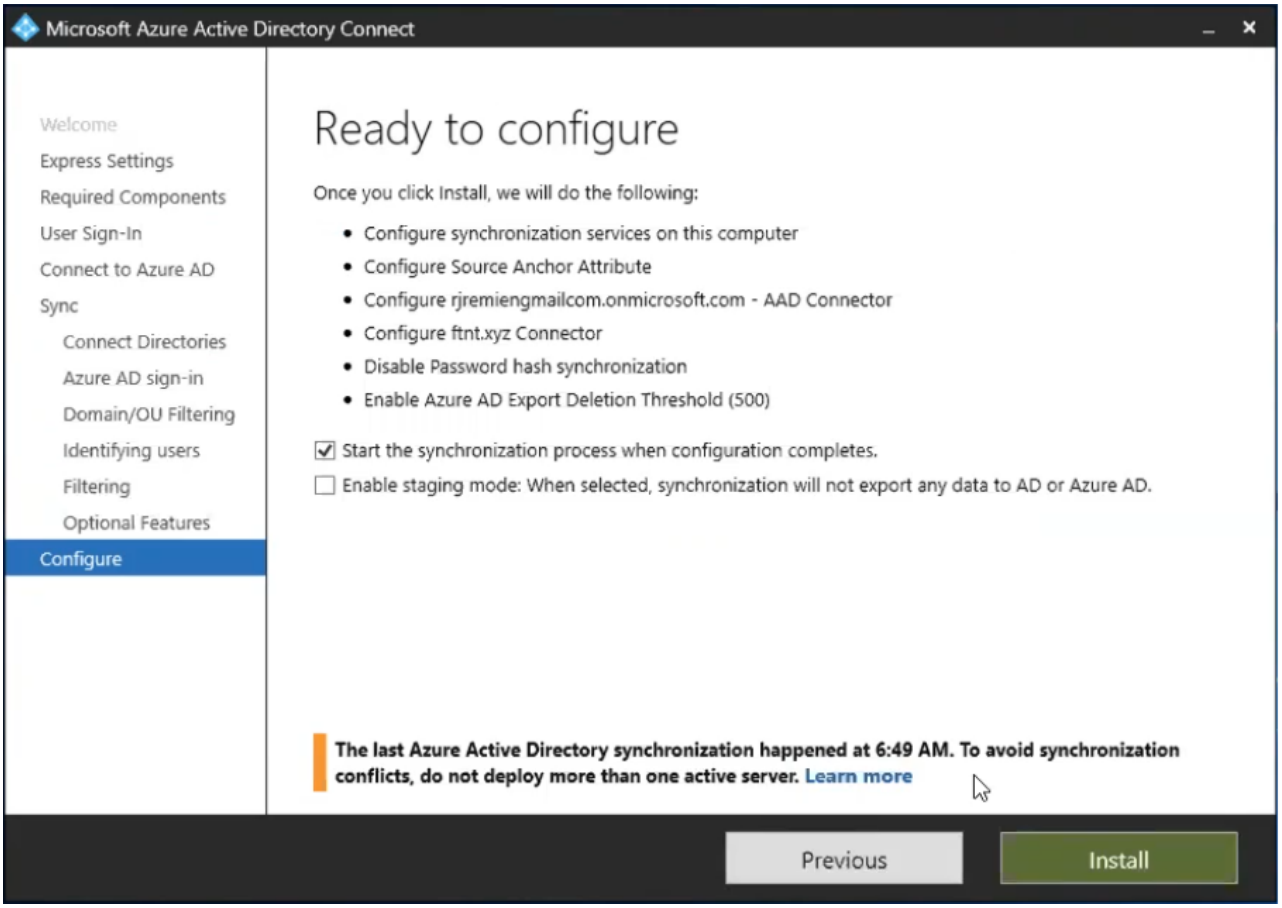
| Active Directory UPN Suffix | Azure AD Domain |
|---|---|
| ftnt.xyz | Verified |

Select the on-premises attribute to use as the Azure AD username

USER PRINCIPAL NAME

userPrincipalName

6. Click *Next* on the remaining pages in the configuration wizard, and click *Install* on the *Ready to configure* page.



Ready to configure

Once you click Install, we will do the following:

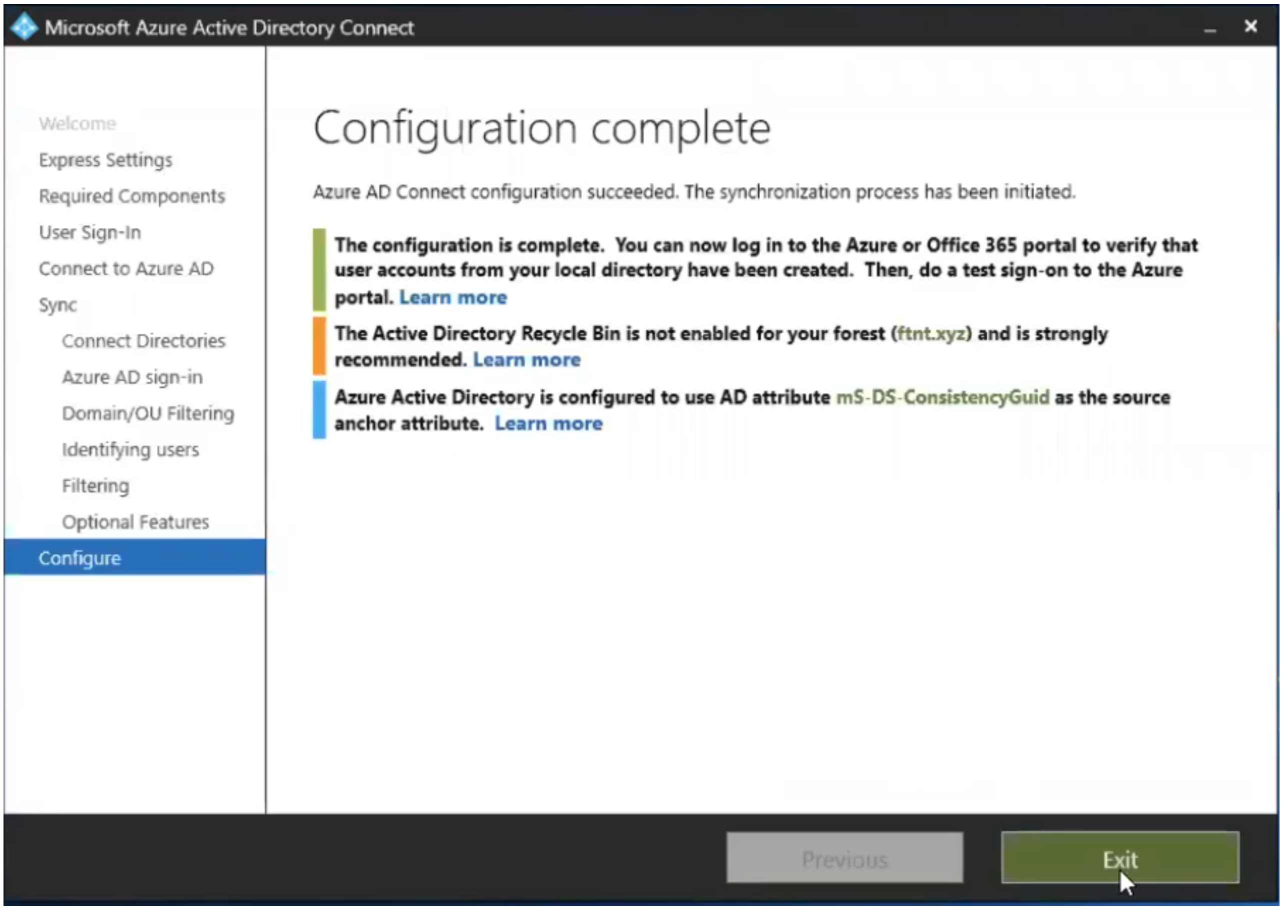
- Configure synchronization services on this computer
- Configure Source Anchor Attribute
- Configure rjremiengmailcom.onmicrosoft.com - AAD Connector
- Configure ftnt.xyz Connector
- Disable Password hash synchronization
- Enable Azure AD Export Deletion Threshold (500)

☑ Start the synchronization process when configuration completes.

□ Enable staging mode: When selected, synchronization will not export any data to AD or Azure AD.

**The last Azure Active Directory synchronization happened at 6:49 AM. To avoid synchronization conflicts, do not deploy more than one active server. Learn more**

7. Once the installation is complete, you are presented with the Configuration complete page which provides a summary of the configuration changes.



Configuration complete

Azure AD Connect configuration succeeded. The synchronization process has been initiated.

The configuration is complete. You can now log in to the Azure or Office 365 portal to verify that user accounts from your local directory have been created. Then, do a test sign-on to the Azure portal. Learn more

The Active Directory Recycle Bin is not enabled for your forest (ftnt.xyz) and is strongly recommended. Learn more

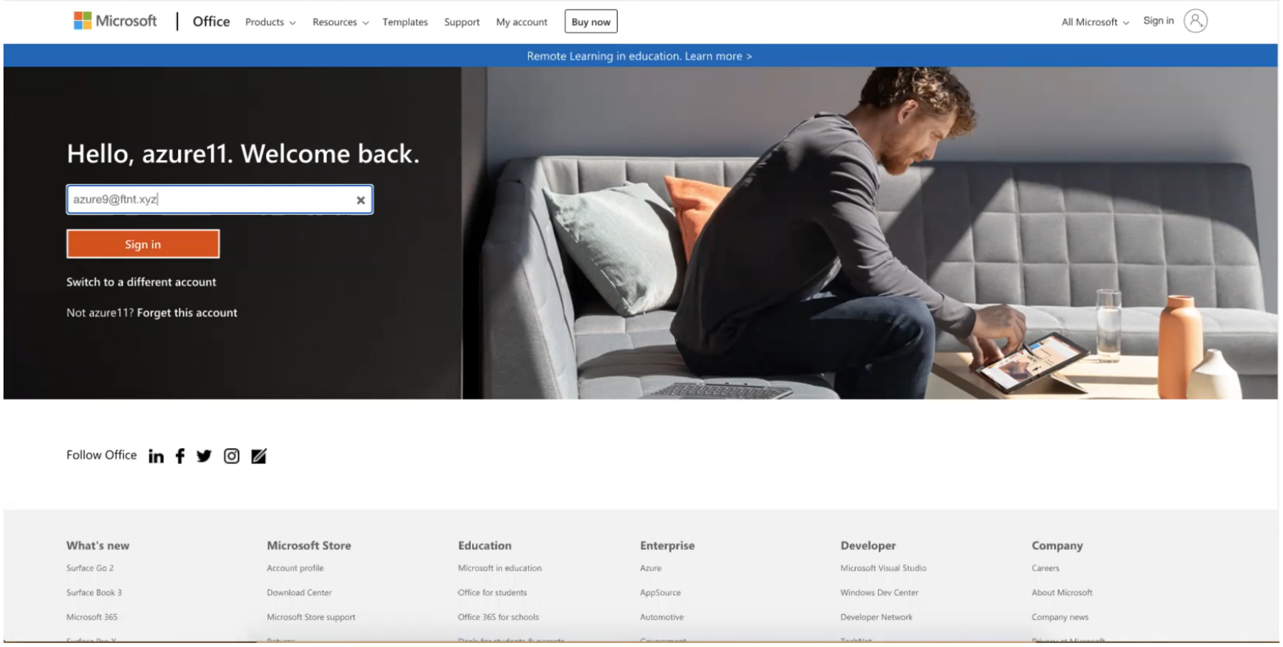
Azure Active Directory is configured to use AD attribute mS-DS-ConsistencyGuid as the source anchor attribute. Learn more

## Results

Once configured, Active Directory synchronized users can sign in to Office 365 using two-factor authentication from FortiAuthenticator.

### To sign in to Office 365 using FortiAuthenticator with two-factor authentication:

1. Navigate to Office 365 and click *Sign in* or *Switch to a different account*.
2. Enter a user account with domain and click *Sign in*.

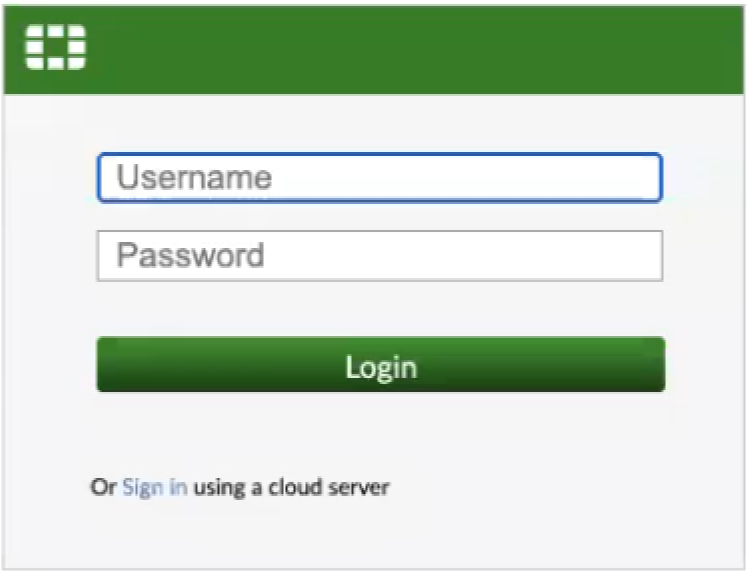


Hello, azure11. Welcome back.

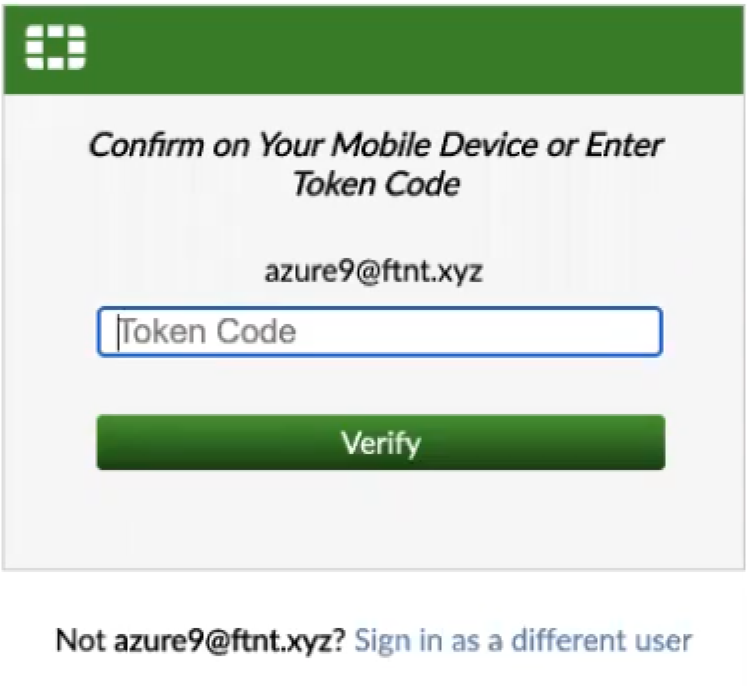
azure9@ftnt.xyz

Not azure11? Forget this account

3. Authentication is redirected to FortiAuthenticator. Enter your user credentials, and click *Login*.



Enter your 2FA token or approve the access request from your FortiToken push request.



Confirm on Your Mobile Device or Enter Token Code

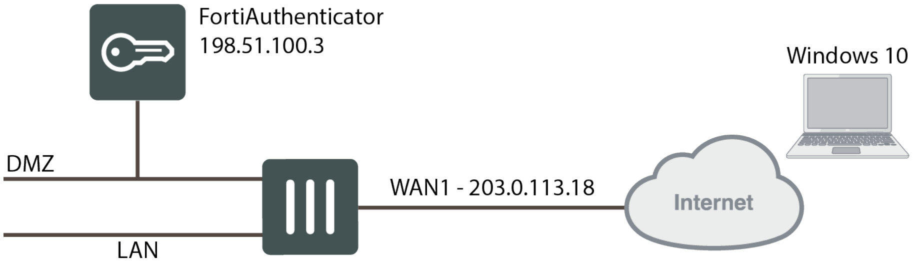
azure9@ftnt.xyz

Once approved you are logged in to your Office 365 account.

# FortiGate SSL VPN with FortiAuthenticator as the IdP proxy for Azure

This example configuration allows FortiAuthenticator to act as the IdP proxy for Azure authentication to a FortiGate SSL VPN connection. This allows authentication of SSL VPN users against an Azure IdP using two factor authentication with FortiToken by inserting FortiAuthenticator into the authentication flow.

This configuration uses the following topology:

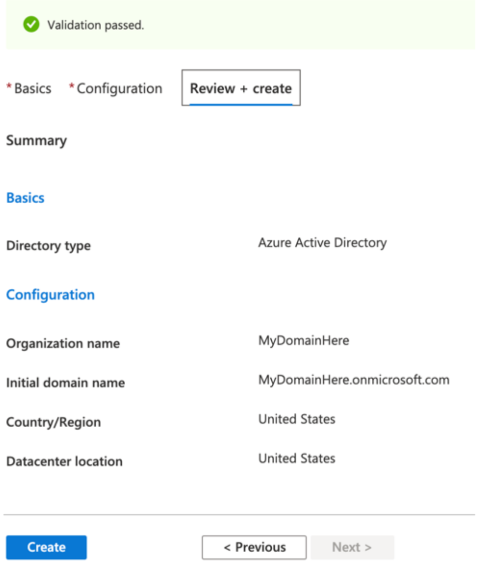


**To configure FortiAuthenticator as the IdP proxy for Azure:**

1. Configuring Azure on page 191
2. Configuring FortiAuthenticator on page 194
3. Configuring FortiGate on page 199
4. Results on page 201

## Configuring Azure

1. Login to the Azure portal. If you do not yet have a directory or need to create a new one, go to *Azure AD* and click *Create a tenant*.
   Configure the directory with the following settings:
   a. **Select a directory type**: *Azure Active Directory*.
   b. **Organization name**: Enter a name for the organization.
   c. **Initial domain name**: Enter the domain name.
   d. **Country/Region**: Select the relevant country or region.
   e. Click *Create*. The directory will be created after a few minutes. When finished, select the directory in the top-right corner of Azure.



Validation passed.

Summary

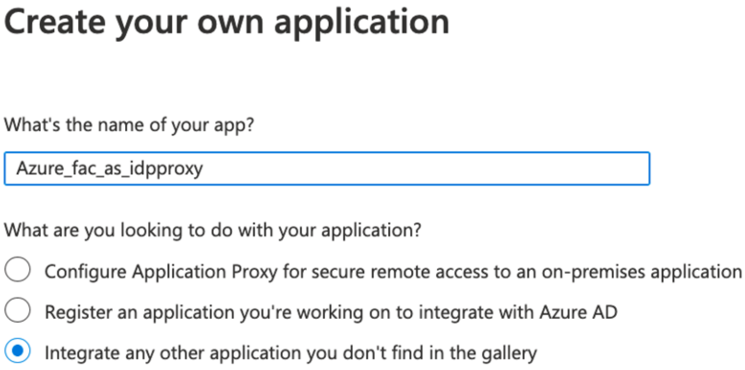
Basics

| | |
|---|---|
| Directory type | Azure Active Directory |

Configuration

| | |
|---|---|
| Organization name | MyDomainHere |
| Initial domain name | MyDomainHere.onmicrosoft.com |
| Country/Region | United States |
| Datacenter location | United States |

2. Go to *Enterprise Applications*, and select *Create your own application*. Enter a name for your application, for example: `Azure_fac_as_idpproxy`.



Create your own application

What's the name of your app?

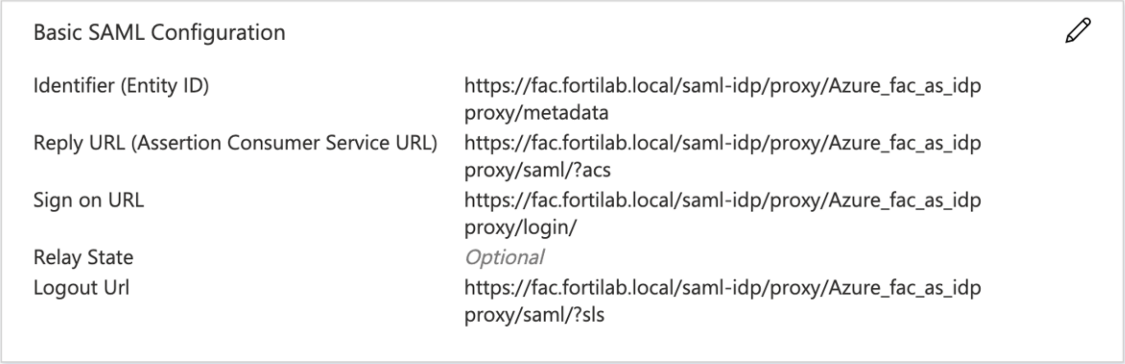
Azure_fac_as_idpproxy

What are you looking to do with your application?

○ Configure Application Proxy for secure remote access to an on-premises application
○ Register an application you're working on to integrate with Azure AD
● Integrate any other application you don't find in the gallery

3. Go to the *Single Sign-on* section, select *SAML*, and edit the basic SAML configuration.
   Here you will include information obtained from FortiAuthenticator. In this example, the FortiAuthenticator FQDN is *fac.fortilab.local*, and the name of the server is defined as *Azure_fac_as_idpproxy*. You should adjust these settings

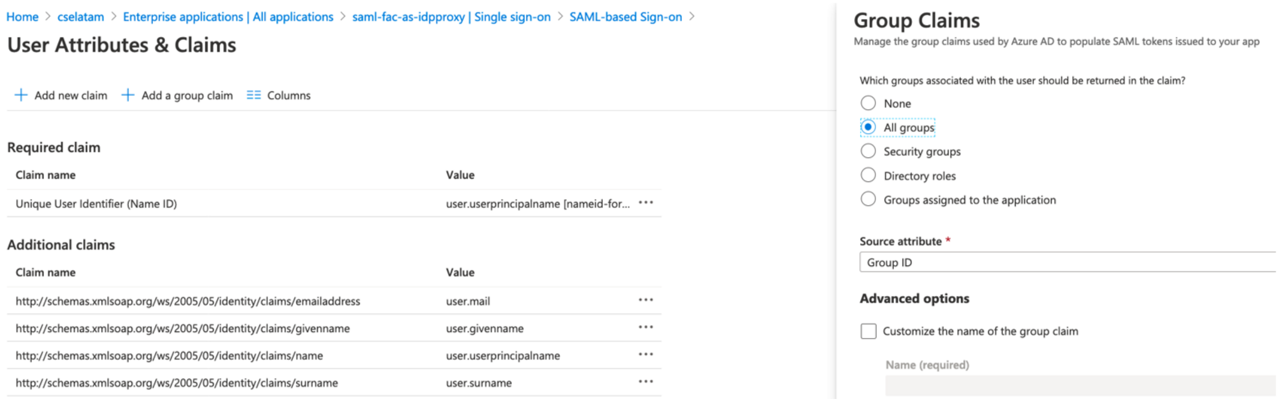
to match your FortiAuthenticator's configuration.



Basic SAML Configuration

| | |
|---|---|
| Identifier (Entity ID) | https://fac.fortilab.local/saml-idp/proxy/Azure_fac_as_idp proxy/metadata |
| Reply URL (Assertion Consumer Service URL) | https://fac.fortilab.local/saml-idp/proxy/Azure_fac_as_idp proxy/saml/?acs |
| Sign on URL | https://fac.fortilab.local/saml-idp/proxy/Azure_fac_as_idp proxy/login/ |
| Relay State | *Optional* |
| Logout Url | https://fac.fortilab.local/saml-idp/proxy/Azure_fac_as_idp proxy/saml/?sls |

4. Edit the *User Attributes & Claims* section to insert any attributes required for the SAML assertion. In this example, only user groups have been included.
   Click the edit icon, and then click *Add a group claim*. Select *All groups*.



Home > cselatam > Enterprise applications | All applications > saml-fac-as-idpproxy | Single sign-on > SAML-based Sign-on >

User Attributes & Claims

+ Add new claim
+ Add a group claim
Columns

Required claim

| Claim name | Value |
|---|---|
| Unique User Identifier (Name ID) | user.userprincipalname [nameid-for... |

Additional claims

| Claim name | Value |
|---|---|
| http://schemas.xmlsoap.org/ws/2005/05/identity/claims/emailaddress | user.mail |
| http://schemas.xmlsoap.org/ws/2005/05/identity/claims/givenname | user.givenname |
| http://schemas.xmlsoap.org/ws/2005/05/identity/claims/name | user.userprincipalname |
| http://schemas.xmlsoap.org/ws/2005/05/identity/claims/surname | user.surname |

Group Claims

Manage the group claims used by Azure AD to populate SAML tokens issued to your app

Which groups associated with the user should be returned in the claim?

○ None
● All groups
○ Security groups
○ Directory roles
○ Groups assigned to the application

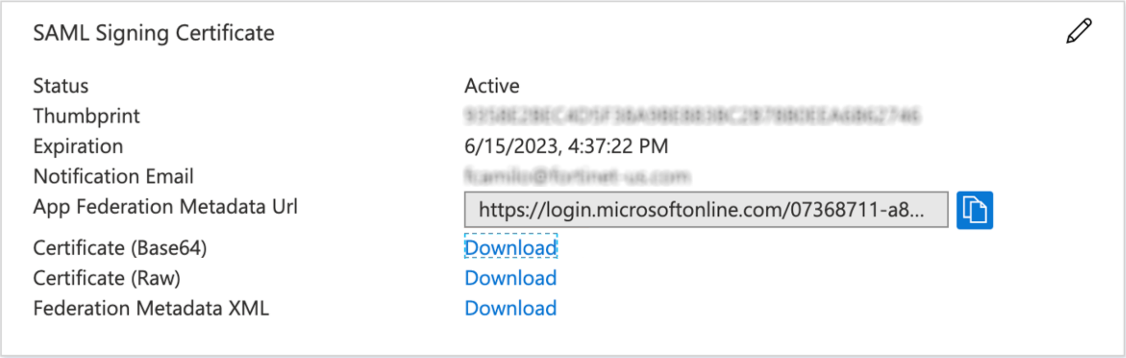
Source attribute *
Group ID

Advanced options

□ Customize the name of the group claim

Name (required)

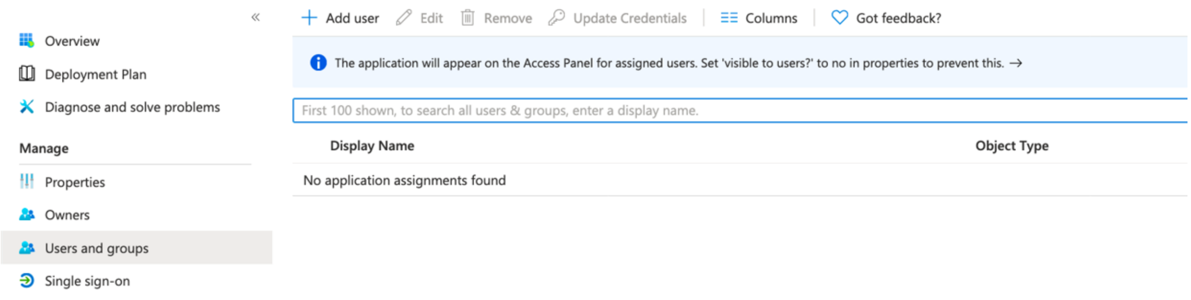
5. Download the certificate file. It will be used later when configuring FortiAuthenticator.



SAML Signing Certificate

| | |
|---|---|
| Status | Active |
| Thumbprint | [redacted] |
| Expiration | 6/15/2023, 4:37:22 PM |
| Notification Email | [redacted] |
| App Federation Metadata Url | https://login.microsoftonline.com/07368711-a8... |
| Certificate (Base64) | Download |
| Certificate (Raw) | Download |
| Federation Metadata XML | Download |

6. Go to *Users and Groups*, and click *Add user*. Include all users that will be able to authenticate using this application.

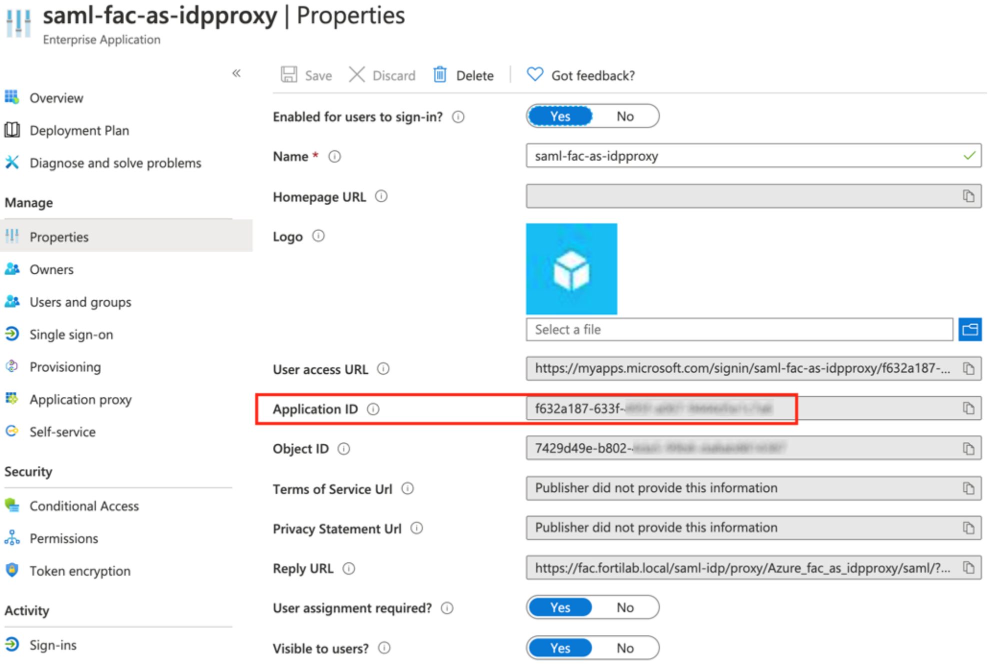


The application will appear on the Access Panel for assigned users. Set 'visible to users?' to no in properties to prevent this. →

First 100 shown, to search all users & groups, enter a display name.

| Display Name | Object Type |
|---|---|
| No application assignments found | |

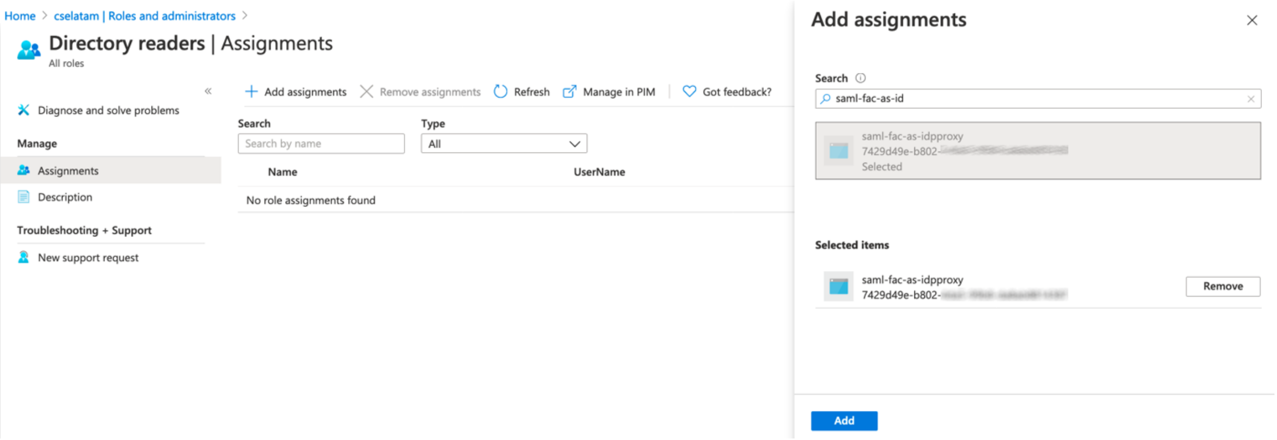
7. Go to *Properties* and get the *Application ID*. This will be required later.



**saml-fac-as-idpproxy | Properties**
Enterprise Application

| | |
|---|---|
| Enabled for users to sign-in? | [✓ Yes] No |
| Name * | saml-fac-as-idpproxy |
| Homepage URL | |
| Logo | Select a file |
| User access URL | https://myapps.microsoft.com/signin/saml-fac-as-idpproxy/f632a187-... |
| Application ID | f632a187-633f-[redacted] |
| Object ID | 7429d49e-b802-[redacted] |
| Terms of Service Url | Publisher did not provide this information |
| Privacy Statement Url | Publisher did not provide this information |
| Reply URL | https://fac.fortilab.local/saml-idp/proxy/Azure_fac_as_idpproxy/saml/?... |
| User assignment required? | [✓ Yes] No |
| Visible to users? | [✓ Yes] No |

8. From the directory home, select *Roles and Administrators* > *Directory Readers*, and click *Add assignments*. Search for your application name, then select and add it.



Home > cselatam | Roles and administrators >

**Directory readers | Assignments**
All roles

Search: Search by name
Type: All

| Name | UserName |
|---|---|
| No role assignments found | |

**Add assignments**

Search: saml-fac-as-id

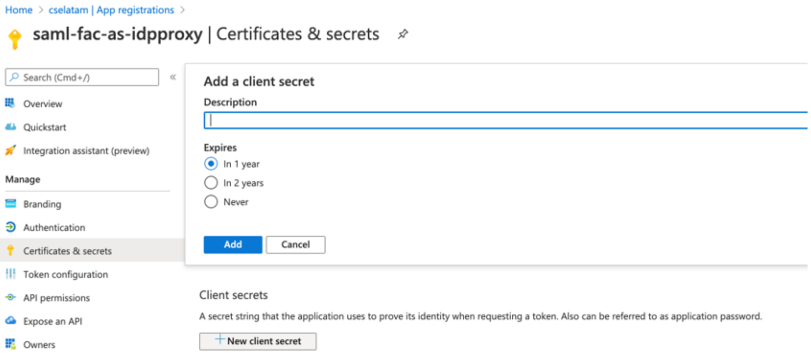
saml-fac-as-idpproxy
7429d49e-b802-[redacted]
Selected

Selected items

saml-fac-as-idpproxy
7429d49e-b802-[redacted] Remove

Add

9. Finally, create your authentication key. Go to *App Registrations*, click *Certificates & Secrets*, and create a new key.



Home > cselatam | App registrations >

**saml-fac-as-idpproxy | Certificates & secrets**

Add a client secret

Description

Expires
● In 1 year
○ In 2 years
○ Never

Add Cancel

Client secrets

A secret string that the application uses to prove its identity when requesting a token. Also can be referred to as application password.

+ New client secret

Before proceeding, make sure to copy the key value. The key is presented only after its creation, and you cannot get this information again later.

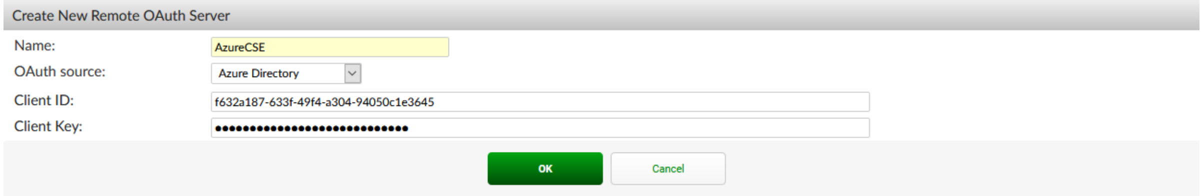
# Configuring FortiAuthenticator

## Configure the remote servers

A remote OAuth server is used to obtain group membership from Azure AD. Later, a FortiToken can be associated with those users.

**To configure the remote OAuth server:**

1. Go to *Authentication* > *Remote Auth. Servers* > *OAUTH*, and click *Create New*.
2. Configure the following information:
   - **Name**: Enter a name for your OAuth server, for example: *AzureCSE*.
   - **OAuth source**: *Azure Directory*.
   - **Client ID**: Enter your *Azure Application ID*.
   - **Client Key**: Enter your Azure key.



Create New Remote OAuth Server

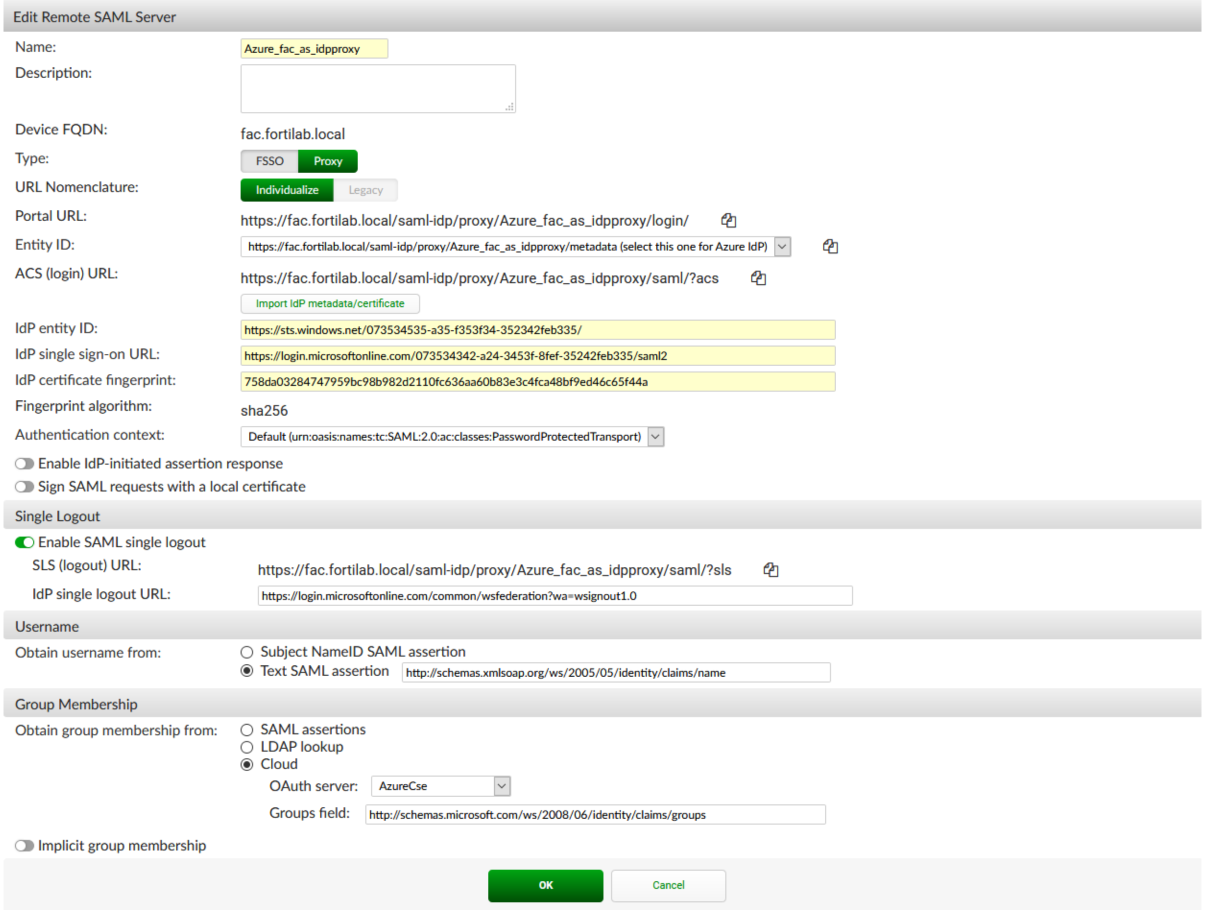
Name: AzureCSE
OAuth source: Azure Directory
Client ID: f632a187-633f-49f4-a304-94050c1e3645
Client Key: •••••••••••••••••••••••••••••

3. Click *OK*.

**To configure the remote SAML server:**

1. Go to *Authentication* > *Remote Auth. Servers* > *SAML*, and click *Create New*.
2. Under *Remote SAML Server*, configure the following:
   - **Name**: Enter a name for the server. This name must match the server name configured in Azure. In this example, the server name is *Azure_fac_as_idpproxy*.
   - **Type**: *Proxy*.
   - **Entity ID**: Select the Azure IdP option.
   - **Import IdP metadata/certificate**: Import the certificate that you previously exported from Azure.
   - **IdP entity ID**: Enter the *Azure AD Identifier* from your Azure configuration.
   - **IdP single sign-on URL**: Enter the *Login URL* from your Azure configuration.
3. Under *Single Logout*, configure the following:
   - **Enable SAML single logout**: Optionally, you can enable this setting to enable SAML single logout.
   - **IdP single logout URL**: Enter the *Logout URL* from your Azure configuration.
4. Under *Username*, configure the following:
   - **Obtain username from**: Select *Text SAML assertion* and use the configured username claim URL from your Azure configuration.

5. In *Group Membership*, configure the following:
   - **Obtain group membership from**: Select *Cloud* and choose your remote OAuth server. Group membership of a particular user will be retrieved dynamically through OAuth upon authentication.



Edit Remote SAML Server

Name: Azure_fac_as_idpproxy

Description:

Device FQDN: fac.fortilab.local

Type: FSSO [✓ Proxy]

URL Nomenclature: [✓ Individualize] Legacy

Portal URL: https://fac.fortilab.local/saml-idp/proxy/Azure_fac_as_idpproxy/login/

Entity ID: https://fac.fortilab.local/saml-idp/proxy/Azure_fac_as_idpproxy/metadata (select this one for Azure IdP)

ACS (login) URL: https://fac.fortilab.local/saml-idp/proxy/Azure_fac_as_idpproxy/saml/?acs

IdP entity ID: https://sts.windows.net/073534535-a35-f353f34-352342feb335/

IdP single sign-on URL: https://login.microsoftonline.com/073534342-a24-3453f-8fef-35242feb335/saml2

IdP certificate fingerprint: 758da03284747959bc98b982d2110fc636aa60b83e3c4fca48bf9ed46c65f44a

Fingerprint algorithm: sha256

Authentication context: Default (urn:oasis:names:tc:SAML:2.0:ac:classes:PasswordProtectedTransport)

○ Enable IdP-initiated assertion response

○ Sign SAML requests with a local certificate

Single Logout

● Enable SAML single logout

SLS (logout) URL: https://fac.fortilab.local/saml-idp/proxy/Azure_fac_as_idpproxy/saml/?sls

IdP single logout URL: https://login.microsoftonline.com/common/wsfederation?wa=wsignout1.0

Username

Obtain username from:
○ Subject NameID SAML assertion
● Text SAML assertion http://schemas.xmlsoap.org/ws/2005/05/identity/claims/name

Group Membership

Obtain group membership from:
○ SAML assertions
○ LDAP lookup
● Cloud

OAuth server: AzureCse

Groups field: http://schemas.microsoft.com/ws/2008/06/identity/claims/groups

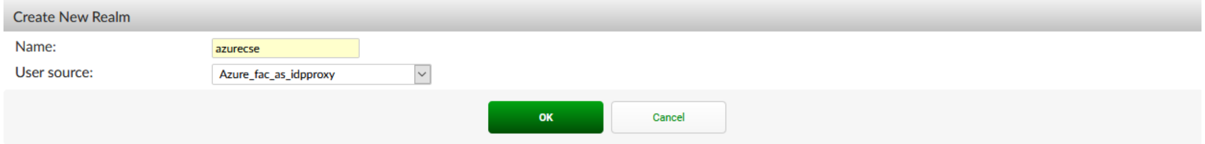
○ Implicit group membership

6. Click *OK*.

## Configure the SAML IdP settings on FortiAuthenticator

### To create the Azure realm:

1. Go to *Authentication* > *User Management* > *Realms*, and click *Create New*.
2. Configure the following information:
   a. **Name**: Enter a name for your user realm, for example: *azurecse*
   b. **User source**: Select your remote SAML server as the user source.



Create New Realm

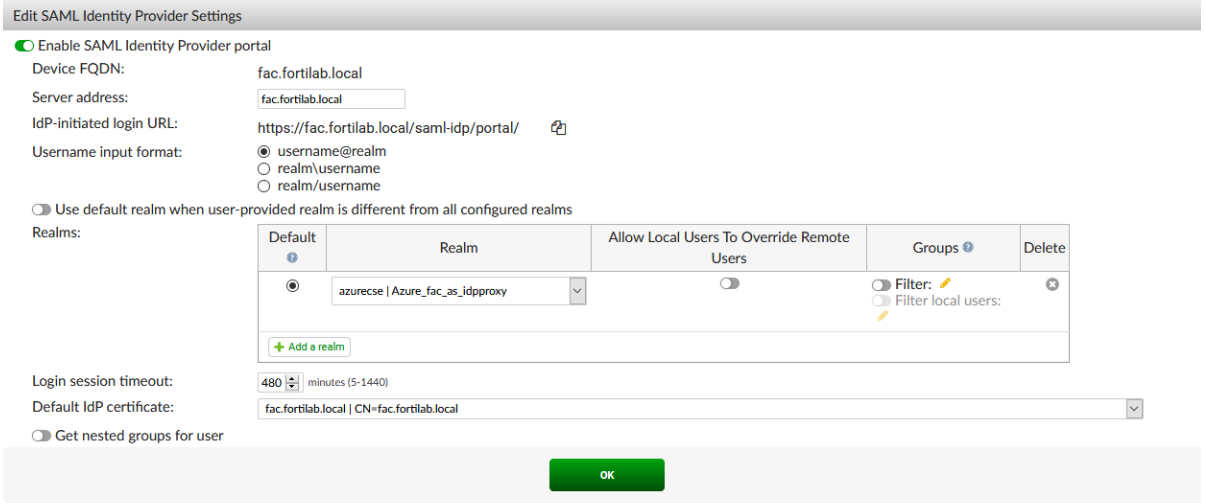
Name: azurecse

User source: Azure_fac_as_idpproxy

3. Click *OK*.

### To enable SAML IdP on FortiAuthenticator:

1. Go to *Authentication* > *SAML IdP* > *General*, click *Enable SAML Identity Provider portal*, and configure the following:
   a. **Server address**: Enter the IP or FQDN of your FortiAuthenticator.
   b. **Realms**: Select the SAML realm as the default.
   c. **Default IdP certificate**: Select a default IdP certificate.



Edit SAML Identity Provider Settings

Enable SAML Identity Provider portal

Device FQDN: fac.fortilab.local

Server address: fac.fortilab.local

IdP-initiated login URL: https://fac.fortilab.local/saml-idp/portal/

Username input format:
● username@realm
○ realm\username
○ realm/username

Use default realm when user-provided realm is different from all configured realms

Realms:

| Default | Realm | Allow Local Users To Override Remote Users | Groups | Delete |
|---|---|---|---|---|
| ● | azurecse \| Azure_fac_as_idpproxy | | Filter:<br>Filter local users: | |

Add a realm

Login session timeout: 480 minutes (5-1440)

Default IdP certificate: fac.fortilab.local | CN=fac.fortilab.local

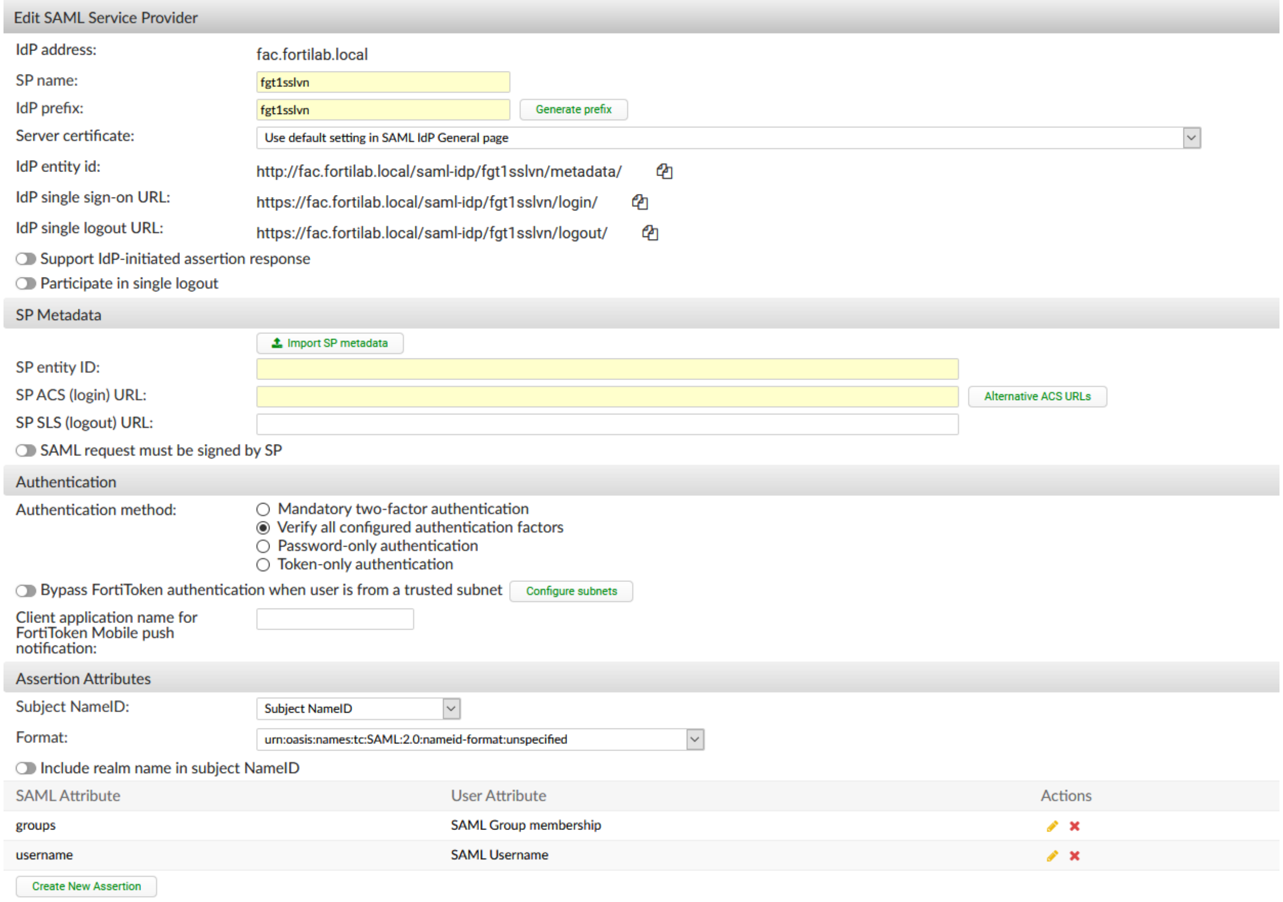
Get nested groups for user

2. Click *OK*.
   You will also need to download your IdP certificate for use later. It can be downloaded from *Certificate Management > End Entities*.

### To add FortiGate as a SAML service provider:

1. Go to *Authentication* > *SAML IdP* > *Service Providers*, and click *Create New*.
2. Under *Edit SAML Service Provider*, configure the following:
   - **SP name**: Enter a name for this service provider, for example: *fgt1sslvpn*.
   - **IdP prefix**: Enter a custom IdP prefix or click *Generate prefix* to automatically populate this field.
3. Under *Assertion Attributes*, configure the following:
   - **Subject NameID**: *Remote SAML Server* > *Subject NameID*.
   - **Format**: *urn:oasis:names:tc:SAML:2.0:nameid-format:unspecified*.
4. Under *SAML Attributes*, add the following attributes. The user and group information will be propagated by the FortiAuthenticator IdP in SAML assertions to FortiGate. These must match with the *user-name* and *group-name* keywords defined for the SAML user. See Configure the SAML user on page 199.
   - Attribute 1: SAML attribute: *groups*,  User attribute: *SAML Group membership*.
   - Attribute 2: SAML attribute: *username*, User attribute: *SAML Username*.

5. Click *Save*.



Edit SAML Service Provider

| | |
|---|---|
| IdP address: | fac.fortilab.local |
| SP name: | fgt1sslvn |
| IdP prefix: | fgt1sslvn [Generate prefix] |
| Server certificate: | Use default setting in SAML IdP General page |
| IdP entity id: | http://fac.fortilab.local/saml-idp/fgt1sslvn/metadata/ |
| IdP single sign-on URL: | https://fac.fortilab.local/saml-idp/fgt1sslvn/login/ |
| IdP single logout URL: | https://fac.fortilab.local/saml-idp/fgt1sslvn/logout/ |

○ Support IdP-initiated assertion response

○ Participate in single logout

SP Metadata

[Import SP metadata]

| | |
|---|---|
| SP entity ID: | |
| SP ACS (login) URL: | [Alternative ACS URLs] |
| SP SLS (logout) URL: | |

○ SAML request must be signed by SP

Authentication

Authentication method:
- ○ Mandatory two-factor authentication
- ● Verify all configured authentication factors
- ○ Password-only authentication
- ○ Token-only authentication

○ Bypass FortiToken authentication when user is from a trusted subnet [Configure subnets]

Client application name for FortiToken Mobile push notification:

Assertion Attributes

| | |
|---|---|
| Subject NameID: | Subject NameID |
| Format: | urn:oasis:names:tc:SAML:2.0:nameid-format:unspecified |

○ Include realm name in subject NameID

| SAML Attribute | User Attribute | Actions |
|---|---|---|
| groups | SAML Group membership | ✎ ✖ |
| username | SAML Username | ✎ ✖ |

[Create New Assertion]

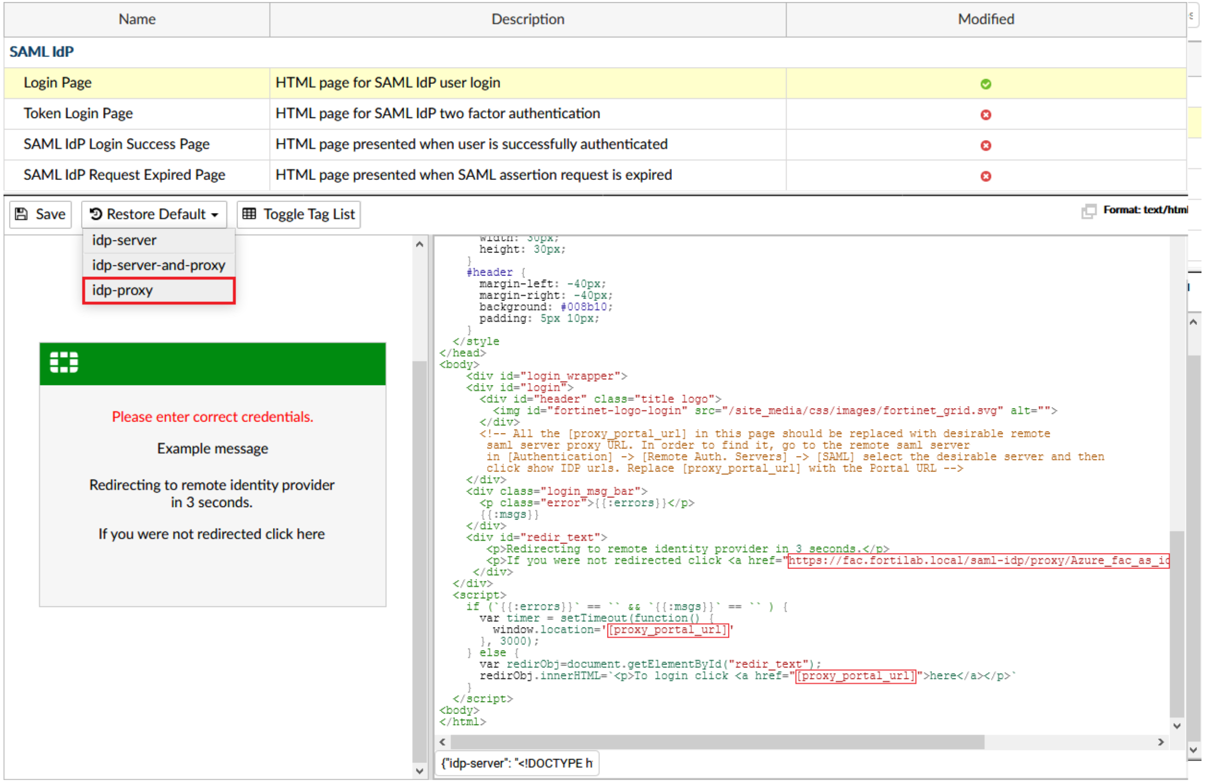
Once the settings have been saved, you will see that additional options are available.

You can return to complete the configuration of the SAML service provider settings on FortiAuthenticator once you have configured your FortiGate SAML user. You will need to enter the *SP entity ID*, *SP ACS (login) URL*, and *SP SLS (logout) URL* from the FortiGate configuration.

### To update the SAML replacement message:

1. Go to *Authentication > SAML IdP > Replacement Messages*.
2. Select *SAML IdP > Login Page*, and then select *idp-proxy* in the *Restore Default* dropdown menu.
   You can now edit the content in the right pane to include the *Portal URL* obtained from your remote SAML server.

The URL must be replaced in three places as indicated by `[proxy_portal_url]` in the text.



| Name | Description | Modified |
|---|---|---|
| **SAML IdP** | | |
| Login Page | HTML page for SAML IdP user login | ✓ |
| Token Login Page | HTML page for SAML IdP two factor authentication | ✗ |
| SAML IdP Login Success Page | HTML page presented when user is successfully authenticated | ✗ |
| SAML IdP Request Expired Page | HTML page presented when SAML assertion request is expired | ✗ |

Please enter correct credentials.

Example message

Redirecting to remote identity provider in 3 seconds.

If you were not redirected click here

```
      width: 30px;
      height: 30px;
    }
    #header {
      margin-left: -40px;
      margin-right: -40px;
      background: #008b10;
      padding: 5px 10px;
    }
  </style
</head>
<body>
    <div id="login_wrapper">
    <div id="login">
      <div id="header" class="title logo">
        <img id="fortinet-logo-login" src="/site_media/css/images/fortinet_grid.svg" alt="">
      </div>
      <!-- All the [proxy_portal_url] in this page should be replaced with desirable remote
       saml server proxy URL. In order to find it, go to the remote saml server
       in [Authentication] -> [Remote Auth. Servers] -> [SAML] select the desirable server and then
       click show IDP urls. Replace [proxy_portal_url] with the Portal URL -->
    </div>
    <div class="login_msg_bar">
      <p class="error">{{:errors}}</p>
      {{:msgs}}
    </div>
    <div id="redir_text">
       <p>Redirecting to remote identity provider in 3 seconds.</p>
       <p>If you were not redirected click <a href="https://fac.fortilab.local/saml-idp/proxy/Azure_fac_as_id
     </div>
  </div>
  <script>
    if (`{{:errors}}` == `` && `{{:msgs}}` == `` ) {
      var timer = setTimeout(function() {
        window.location='[proxy_portal_url]'
      }, 3000);
    } else {
      var redirObj=document.getElementById("redir_text");
      redirObj.innerHTML=`<p>To login click <a href="[proxy_portal_url]">here</a></p>`
    }
  </script>
<body>
</html>
```

{"idp-server": "<!DOCTYPE h

3. Click *Save*.

## Configure FortiToken

### To include tokens in a user's authentication:

1. Go to *Authentication* > *User Management* > *Remote Users*, select *SAML*, and click *Import*.
2. Under *Import Remote SAML Users*, configure the following settings:
    a. **Remote SAML server**: Select your remote SAML server, for example: *Azure_fac_as_idpproxy*.
    b. **Group**: Select *All users* or choose a user group.
3. Click *OK*.
4. Edit an imported user to define the token. Enable *Token-based authentication*, and select your token type.
5. Click *OK*.

# Configuring FortiGate

## Import the certificate

### To import the FortiAuthenticator IdP certificate:

1. Go to *System* > *Certificates*, and click *Import* > *Remote Certificate*.
2. Click *Upload* and select your FortiAuthenticator IdP certificate.
3. Click *OK*.
   FortiGate will choose a name by default. You can rename the certificate for easier management with the following CLI commands:
   ```
   config vpn certificate remote
      rename <DEFAULT_CERT_NAME> to <NEW_CERT_NAME>
   end
   ```

## Configure the SAML user

You can now configure a FortiGate SAML user to point to FortiAuthenticator as the IdP.

In this example configuration, the FortiGate SSL VPN link is `https://203.0.113.18:10443`. This can be replaced with the SSL VPN link from your own configuration.

You will also need to adjust the FortiAuthenticator IdP entity ID, login URL, and logout URL to match those configured in your FortiAuthenticator. This information is available on FortiAuthenticator in *Authentication* > *SAML IdP* > *Service Providers*.

Configuring the SAML user must be done through the FortiGate CLI.

### To configure a SAML user:

1. In the FortiGate CLI, enter the following commands:
   ```
   config user saml
      edit "fac-samlproxy-sslvpn"
         set cert "Fortinet_Factory"
         set entity-id "https://203.0.113.18:10443/remote/saml/metadata"
         set single-sign-on-url "https://203.0.113.18:10443/remote/saml/login"
         set single-logout-url "https://203.0.113.18:10443/remote/saml/logout"
         set idp-entity-id "http://fac.fortilab.local/saml-idp/fgt1sslvpn/metadata/"
         set idp-single-sign-on-url "https://fac.fortilab.local/saml-
              idp/fgt1sslvpn/login/"
         set idp-single-logout-url "https://fac.fortilab.local/saml-
              idp/fgt1sslvpn/logout/"
         set idp-cert "FAC_IdP"
         set user-name "username"
         set group-name "groups"
      next
   end
   ```

The entity ID, single sign on URL, and single logout URL configured in the FortiGate CLI must now be entered in the FortiAuthenticator service provider configuration.

See To add FortiGate as a SAML service provider: on page 196

The user-name and group-name configured must match what is being returned from FortiAuthenticator in the SAML assertions. See Configure the SAML IdP settings on FortiAuthenticator on page 195.

You can now create a SAML group which includes that user. You can also define the SAML groups that will be allowed to login as this group. In this example, only user that belong to "FGTGroup1" will be allowed to login to the SSL VPN. This can only be done through FortiGate CLI.

### To configure a SAML group:

1. In the FortiGate CLI, enter the following commands:

```
config user group
   edit "samlproxy-sslvpn"
      set member "fac-samlproxy-sslvpn"
      config match
         edit 1
            set server-name fac-samlproxy-sslvpn
            set group-name “FGTGroup1”
         next
      end
   next
end
```

Next, increase the remote authentication timeout. This must be set to allow for enough time for the user to authenticate into Azure AD. This can only be done through the FortiGate CLI.

### To increase the remote authentication timeout:

1. In the FortiGate CLI, enter the following commands:

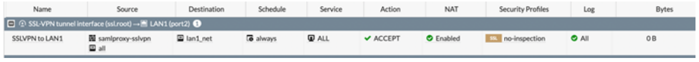
```
config system global
   set remoteauthtimeout 60
end
```

## Configure the SSL VPN

You can define a portal for the SAML group in your SSL VPN settings.

### To add a portal to your SSL VPN:

1. Go to *VPN > SSL-VPN Settings*, and edit your SSL VPN configuration.
2. Under *Authentication/Portal Mapping*, click *Create New*.
3. Configure the following information:
   a. **Users/Groups**: Select the configured user group.
   b. **Portal**: *full-access*.
4. Click *OK* and save your changes to the SSL VPN settings.
5. Configure your SSL VPN rules as required.



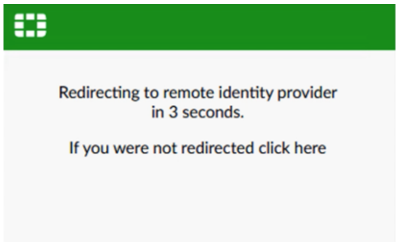
| Name | Source | Destination | Schedule | Service | Action | NAT | Security Profiles | Log | Bytes |
|---|---|---|---|---|---|---|---|---|---|
| SSL-VPN tunnel interface (ssl.root) → LAN1 (port2) 1 | | | | | | | | | |
| SSLVPN to LAN1 | samlproxy-sslvpn<br>all | lan1_net | always | ALL | ✓ ACCEPT | ✓ Enabled | SSL no-inspection | ✓ All | 0 B |

For more information on configuring SSL VPN on FortiGate, see the FortiGate Administration Guide.

## Results

**To sign in to your SSL VPN:**

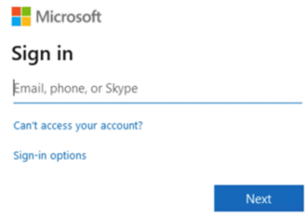
1. Once the user tries to connect to the SSL VPN web portal, FortiGate will redirect the user to FortiAuthenticator. Please note that SAML does not work with the tunnel mode for SSL VPN.



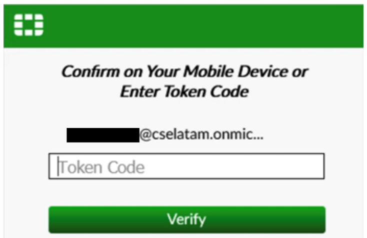
Redirecting to remote identity provider
in 3 seconds.

If you were not redirected click here

2. The FortiAuthenticator will act as a SAML proxy and forward the request to Azure for authentication.



3. After entering their credentials, if the user has a token assigned they will be requested to enter it for two factor authentication.



*Confirm on Your Mobile Device or*
*Enter Token Code*

[redacted]@cselatam.onmic...

4. The user is now connected to the SSL VPN.

# Computer Authentication

This section describes configuring computer authentication.

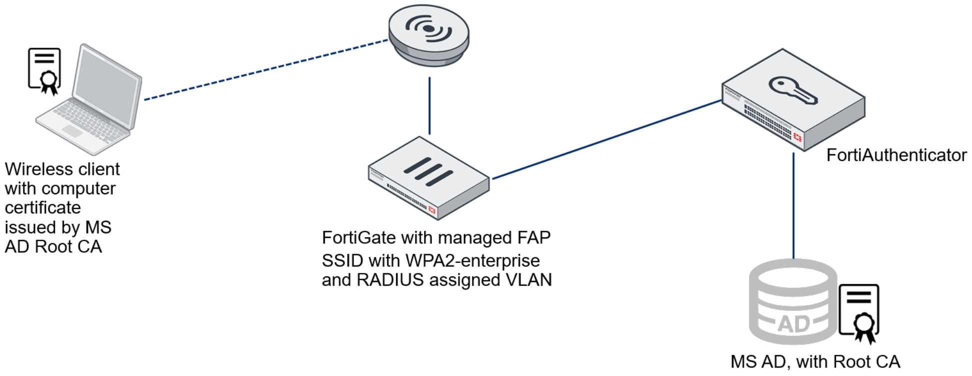
- Computer authentication using FortiAuthenticator with MS AD Root CA on page 202

## Computer authentication using FortiAuthenticator with MS AD Root CA

This example includes the configuration required for computer authentication using FortiAuthenticator with a Microsoft Active Directory Root CA.

This configuration uses the following topology:

- Microsoft Active Directory configured with a Root CA.
- A wireless client with a computer certificate issued by the MS AD Root CA.
- A FortiGate and a managed FortiAP SSID with a WPA2-enterprise and RADIUS assigned VLAN.
- A FortiAuthenticator.


Wireless client with computer certificate issued by MS AD Root CA
FortiGate with managed FAP SSID with WPA2-enterprise and RADIUS assigned VLAN
FortiAuthenticator
AD
MS AD, with Root CA

**To configure computer authentication using FortiAuthenticator with a Microsoft AD Root CA:**

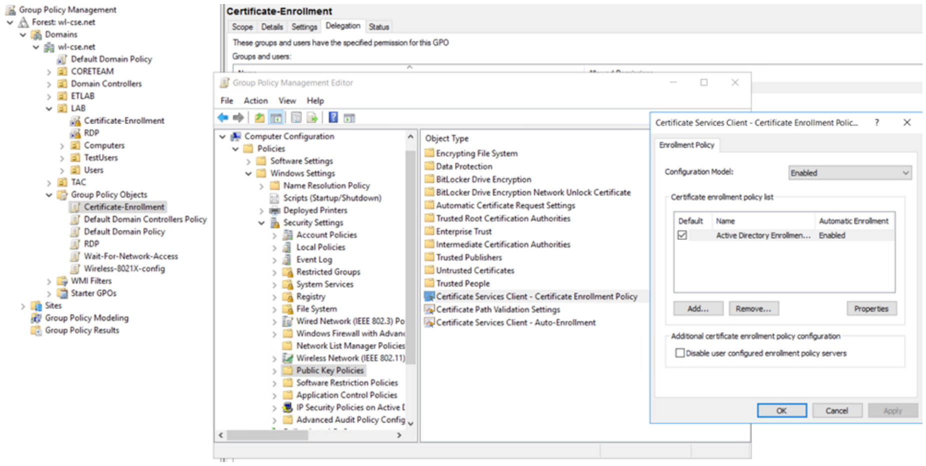
1. Configure the certificates and Root CA on page 202
2. Configure LDAP users on FortiAuthenticator on page 204
3. Configure RADIUS authentication on page 207
4. Configure the SSID and interface objects on page 212
5. Results on page 214

### Configure the certificates and Root CA

With Microsoft Active Directory as the Root CA, use Group Policy Management to deploy client certificates to domain computers. This is the certificate that will be used to validate RADIUS requests.

## To create a computer client certificate:

1. In *Active Directory* > *Group Policy Management*, create a new Group Policy Object (GPO) with settings configured for auto-enrollment.



Certificate Services Client - Certificate Enrollment Polic...

Enrollment Policy

Configuration Model: Enabled

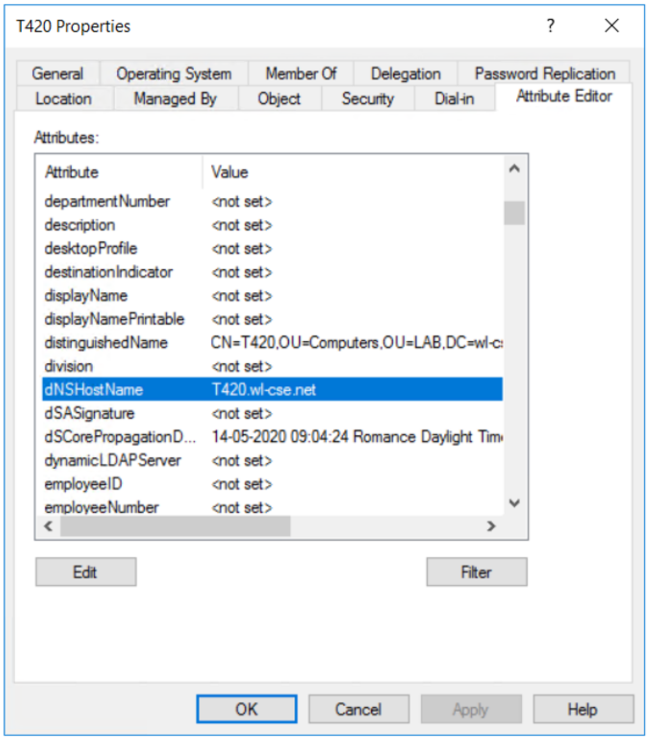
Certificate enrollment policy list

| Default | Name | Automatic Enrollment |
|---|---|---|
| ☑ | Active Directory Enrollmen... | Enabled |

Additional certificate enrollment policy configuration

□ Disable user configured enrollment policy servers

2. Link the GPO to the OU where the client computers are located.
   The computer account in Active Directory must use the attribute `dNSHostName` with the value of the computer's name. This attribute is used later on FortiAuthenticator when creating the user remote sync rule.



T420 Properties

Attributes:

| Attribute | Value |
|---|---|
| departmentNumber | <not set> |
| description | <not set> |
| desktopProfile | <not set> |
| destinationIndicator | <not set> |
| displayName | <not set> |
| displayNamePrintable | <not set> |
| distinguishedName | CN=T420,OU=Computers,OU=LAB,DC=wl-c |
| division | <not set> |
| dNSHostName | T420.wl-cse.net |
| dSASignature | <not set> |
| dSCorePropagationD... | 14-05-2020 09:04:24 Romance Daylight Tim |
| dynamicLDAPServer | <not set> |
| employeeID | <not set> |
| employeeNumber | <not set> |

## To import the Microsoft AD Root CA as a trusted CA:

1. On the FortiGate, go to *System* > *Certificates*, and click *Import* > *CA Certificate*. Configure the following settings, and click *OK* when complete.
   a. **Type**: *File*.
   b. **Upload**: Click *Upload* and browse to the location of your certificate.

2. On the FortiAuthenticator, go to *Certificate Management* > *Certificate Authorities* > *Trusted CAs*, and click *Import*. Configure the following settings, and click *OK* when complete.
   a. **Certificate ID**: Enter the certificate ID.
   b. **Certificate**: Click *Upload a file* and browse to the location of your certificate.

Once the Root CA is configured, you can issue certificates from AD to both the FortiGate and the FortiAuthenticator.

# Configure LDAP users on FortiAuthenticator

You can now configure the remote LDAP server on FortiAuthenticator to connect to Active Directory, create a user realm and user group, and import the AD users into FortiAuthenticator using a remote user sync rule.

### To configure LDAP users on FortiAuthenticator:

1. Configuring the LDAP server on page 204
2. Creating a user realm on page 205
3. Creating a user group on page 206
4. Importing users with a remote user sync rule on page 206

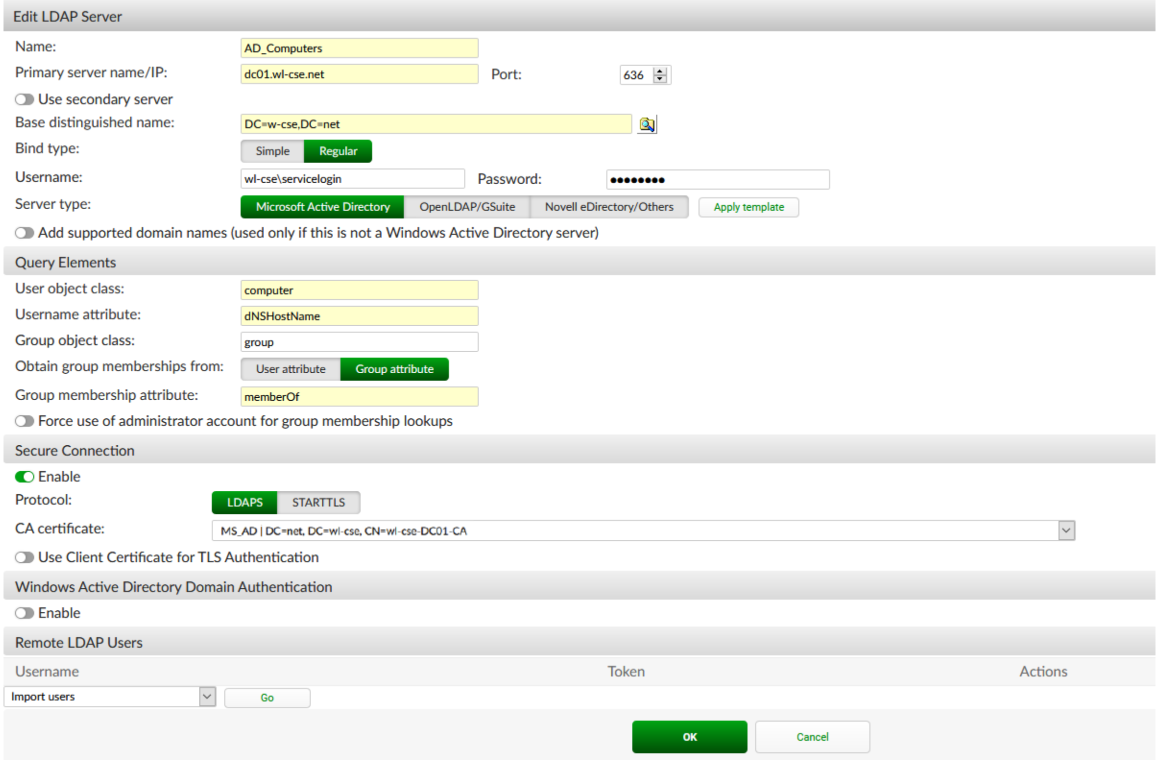
## Configuring the LDAP server

Create an LDAP entry for remote lookup of computers with the username attribute as `dNSHostName`.

### To configure remote LDAP server on FortiAuthenticator:

1. In FortiAuthenticator, go to *Authentication* > *Remote Auth. Servers* > *LDAP*, and click *Create New*.
2. Under *Create New LDAP Server*, set the following:
   a. **Name**: Enter the server name, for example: `AD_Computers`.
   b. **Primary server name/IP**: Enter the LDAP server name, for example: `dc01.wl-cse.net` using *Port* 636.
   c. **Base distinguished name**: Enter the base distinguished name, for example: `DC=wl-cse,DC=net`.
   d. **Bind type**: *Regular*.
   Enter the username and password for your LDAP user.
3. Under *Query Elements*, set the following:
   a. **User object class**: `computer`.
   b. **Username attribute**: `dNShostName`.
   c. **Group object class**: `group`.
   d. **Obtain group memberships from**: *Group attribute*.
   e. **Group membership attribute**: `memberOf`.

4. Enable *Secure Connection*, and set the following:
   a. **Protocol**: *LDAPS*.
   b. **CA certificate**: Select the CA certificate you previously configured.



Edit LDAP Server

Name: AD_Computers
Primary server name/IP: dc01.wl-cse.net  Port: 636
○ Use secondary server
Base distinguished name: DC=w-cse,DC=net
Bind type: Simple [✓ Regular]
Username: wl-cse\servicelogin  Password: ●●●●●●●●
Server type: [✓ Microsoft Active Directory] OpenLDAP/GSuite Novell eDirectory/Others  Apply template
○ Add supported domain names (used only if this is not a Windows Active Directory server)

Query Elements

User object class: computer
Username attribute: dNSHostName
Group object class: group
Obtain group memberships from: User attribute [✓ Group attribute]
Group membership attribute: memberOf
○ Force use of administrator account for group membership lookups

Secure Connection

● Enable
Protocol: [✓ LDAPS] STARTTLS
CA certificate: MS_AD | DC=net, DC=wl-cse, CN=wl-cse-DC01-CA
○ Use Client Certificate for TLS Authentication

Windows Active Directory Domain Authentication

○ Enable

Remote LDAP Users

| Username | Token | Actions |
|---|---|---|

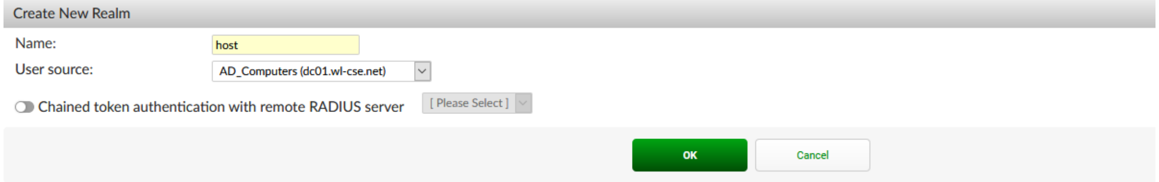
5. Click *OK*.

## Creating a user realm

Create a user realm for the users (computers) from your remote LDAP. This realm is used later when configuring RADIUS authentication.

### To create a user realm:

1. Go to *Authentication* > *User Management* > *Realms*, and click *Create New*.
2. Set the following:
   a. **Name**: Enter a name for the realm, for example: `host`.
   b. **User source**: Select the previously configured remote LDAP server.



Create New Realm

Name: host
User source: AD_Computers (dc01.wl-cse.net)
○ Chained token authentication with remote RADIUS server  [ Please Select ]

3. Click *OK*.

## Creating a user group

Create a user group for the users (computers) from your remote LDAP.

**To create a remote LDAP user group:**

1. Go to *Authentication* > *User Management* > *User Groups*, and click *Create New*.
2. Set the following:
   a. **Name**: Enter a name for the LDAP group, for example: `AD_LAB_PC`.
   b. **Type**: *Remote LDAP*.
   c. **User retrieval**: Set a list of imported remote LDAP users.
   d. **Remote LDAP**: Select the previously configured remote LDAP server, for example *AD_Computers*.
   e. **LDAP users**: Add your chosen LDAP users to the *Selected LDAP Users* pane.
3. Click *OK*.

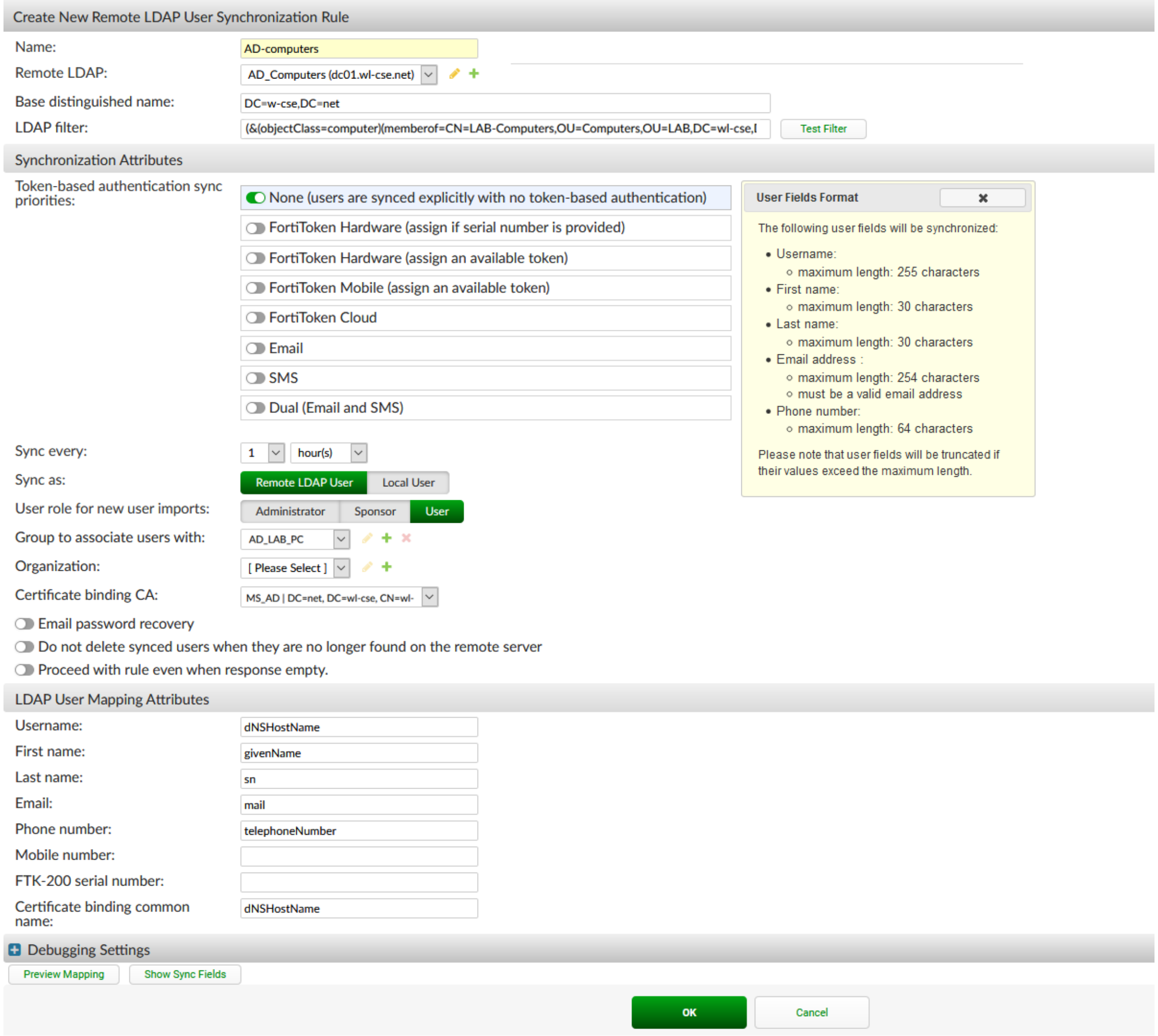
## Importing users with a remote user sync rule

Create the user sync rule to import your users (computers) into FortiAuthenticator. You can configure this rule with an LDAP filter to match specific groups in Active Directory. For the LDAP *username* and *certificate binding common name*, use `dNSHostName`. This must match the CN of the actual issued certificate.

**To configure a remote user sync rule:**

1. Go to *Authentication* > *User Management* > *Remote User Sync Rules*, and click *Create New*.
2. Under *Edit Remote LDAP User Synchronization Rule*, set the following:
   a. **Name**: Enter a name for the rule, for example: `AD-computers`.
   b. **Remote LDAP**: Select the remote LDAP server you previously configured.
   c. **Base distinguished name**: Enter your base distinguished name, for example: `DC=wl-cse,DC=net`.
   d. **LDAP filter**: Select the LDAP filter which matches your specific group in Active Directory, for example: `(&(objectClass=computer)(memberof=CN=LAB-Computers,OU=Computers,OU=LAB,DC=wl-cse,DC=net))`.
3. Under *Synchronization Attributes*, set the following:
   a. **Token-based authentication sync priorities**: Select *None*.
   b. **Sync every**: Select the sync frequency based on your preferences, for example: *1 hour(s).*
   c. **Sync as**: *Remote LDAP User*.
   d. **User role for new user imports**: *User*.
   e. **Group to associate users with**: Select your remote LDAP user group.
   f. **Certificate binding CA**: Select your CA for certificate binding.

4. Under *LDAP User Mapping Attributes*, set the following:
   a. **Username**: `dNSHostName`.
   b. **Certificate binding common name**: `dNSHostName`.



Create New Remote LDAP User Synchronization Rule

| | |
|---|---|
| Name: | AD-computers |
| Remote LDAP: | AD_Computers (dc01.wl-cse.net) |
| Base distinguished name: | DC=w-cse,DC=net |
| LDAP filter: | (&(objectClass=computer)(memberof=CN=LAB-Computers,OU=Computers,OU=LAB,DC=wl-cse,I |

Synchronization Attributes

Token-based authentication sync priorities:

- ● None (users are synced explicitly with no token-based authentication)
- ○ FortiToken Hardware (assign if serial number is provided)
- ○ FortiToken Hardware (assign an available token)
- ○ FortiToken Mobile (assign an available token)
- ○ FortiToken Cloud
- ○ Email
- ○ SMS
- ○ Dual (Email and SMS)

User Fields Format

The following user fields will be synchronized:

- Username:
  - maximum length: 255 characters
- First name:
  - maximum length: 30 characters
- Last name:
  - maximum length: 30 characters
- Email address :
  - maximum length: 254 characters
  - must be a valid email address
- Phone number:
  - maximum length: 64 characters

Please note that user fields will be truncated if their values exceed the maximum length.

| | |
|---|---|
| Sync every: | 1 hour(s) |
| Sync as: | [✓ Remote LDAP User] Local User |
| User role for new user imports: | Administrator Sponsor [✓ User] |
| Group to associate users with: | AD_LAB_PC |
| Organization: | [ Please Select ] |
| Certificate binding CA: | MS_AD \| DC=net, DC=wl-cse, CN=wl- |

○ Email password recovery
○ Do not delete synced users when they are no longer found on the remote server
○ Proceed with rule even when response empty.

LDAP User Mapping Attributes

| | |
|---|---|
| Username: | dNSHostName |
| First name: | givenName |
| Last name: | sn |
| Email: | mail |
| Phone number: | telephoneNumber |
| Mobile number: | |
| FTK-200 serial number: | |
| Certificate binding common name: | dNSHostName |

5. Click *OK*.

Once the user sync rule has been created, run it to import your user (computer) account, and then verify the user was successfully created in *Authentication* > *User Management* > *Remote Users* and that the certificate binding is in place.

## Configure RADIUS authentication

You can now configure RADIUS authentication between the FortiAuthenticator and FortiGate.

### To configure RADIUS authentication:

1. Adding RADIUS attributes on page 208
2. Configuring the RADIUS client on page 208
3. Configuring the EAP server certificate on page 209

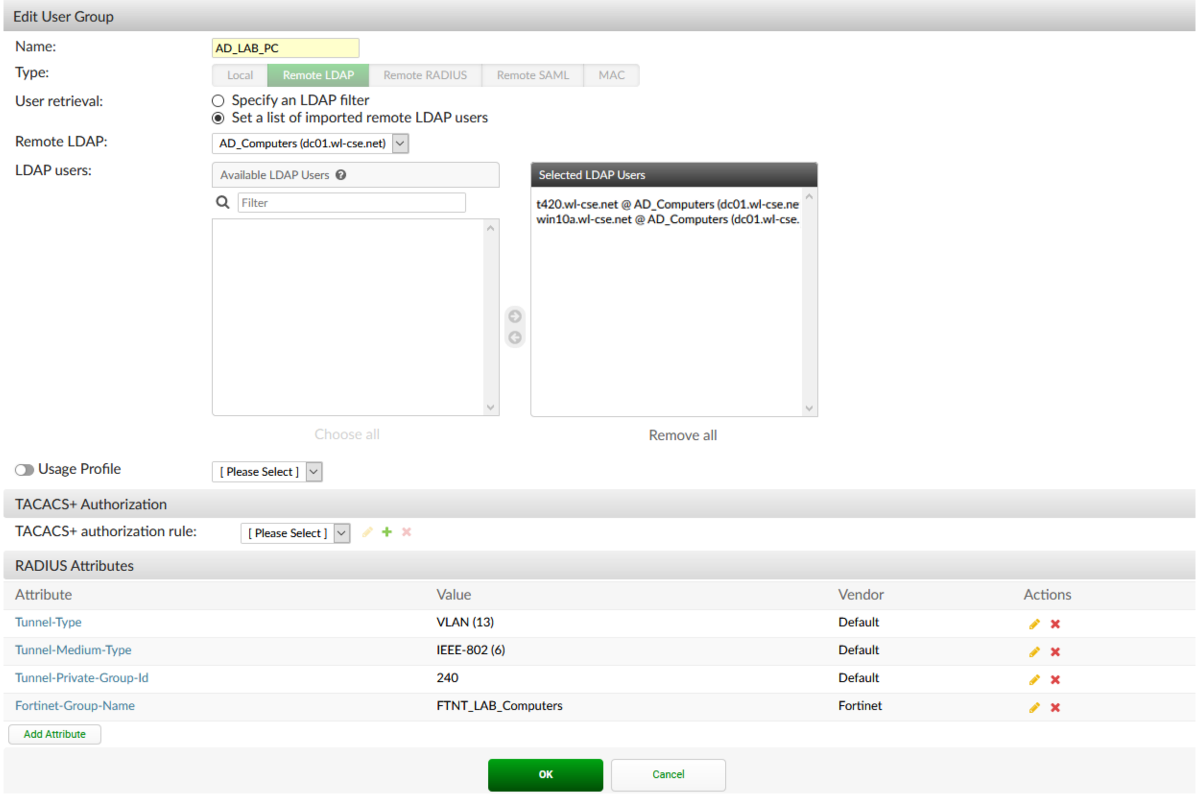
4. [Creating a RADIUS policy on page 209]
5. [Configuring the RADIUS server on FortiGate on page 211]

## Adding RADIUS attributes

RADIUS attributes can be added to the previously configured LDAP user group.

### To add RADIUS attributes to the LDAP user group:

1. Go to *Authentication* > *User Management* > *User Groups*, and edit the user group associated with the remote LDAP users.
2. Under *RADIUS Attributes*, add the RADIUS attributes required by your configuration. In this example, the following attributes are required:
   - Tunnel-Type: VLAN.
   - Tunnel-Medium-Type: IEEE-802.
   - Tunnel-Private-Group-Id: 240.
   - Fortinet-Group-Name: FTNT_LAB_Computers.



Edit User Group

Name: AD_LAB_PC

Type: Local | Remote LDAP | Remote RADIUS | Remote SAML | MAC

User retrieval:
○ Specify an LDAP filter
● Set a list of imported remote LDAP users

Remote LDAP: AD_Computers (dc01.wl-cse.net)

LDAP users:

Available LDAP Users

Selected LDAP Users
t420.wl-cse.net @ AD_Computers (dc01.wl-cse.ne
win10a.wl-cse.net @ AD_Computers (dc01.wl-cse.

Usage Profile: [ Please Select ]

TACACS+ Authorization

TACACS+ authorization rule: [ Please Select ]

RADIUS Attributes

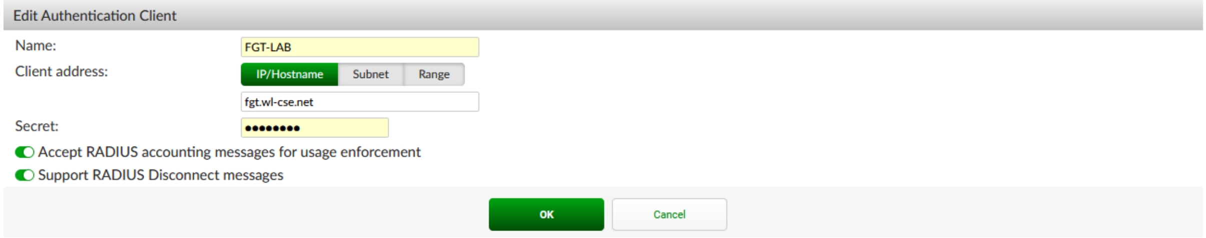
| Attribute | Value | Vendor | Actions |
|---|---|---|---|
| Tunnel-Type | VLAN (13) | Default | |
| Tunnel-Medium-Type | IEEE-802 (6) | Default | |
| Tunnel-Private-Group-Id | 240 | Default | |
| Fortinet-Group-Name | FTNT_LAB_Computers | Fortinet | |

## Configuring the RADIUS client

To configure RADIUS authentication using FortiAuthenticator, the FortiGate must be configured as a RADIUS client.

### To configure the RADIUS client settings:

1. Go to *Authentication* > *RADIUS Service* > *Clients*, and click *Create New*.
2. Set the following:
   a. **Name**: Enter a name for the RADIUS client, for example: `FGT-LAB`.
   b. **Client address**: Select IP/Hostname, and enter your RADIUS client's IP or hostname, for example: `fgt.wl-cse.net`.
   c. **Secret**: Enter a shared secret. This will also be used to configure RADIUS settings on FortiGate.
   d. **(Optional) Accept RADIUS accounting messages for usage enforcement**: *Enabled*.
   e. **(Optional) Support RADIUS Disconnect messages**: *Enabled.*



Edit Authentication Client

Name: FGT-LAB

Client address: IP/Hostname | Subnet | Range

fgt.wl-cse.net

Secret: ••••••••

Accept RADIUS accounting messages for usage enforcement

Support RADIUS Disconnect messages

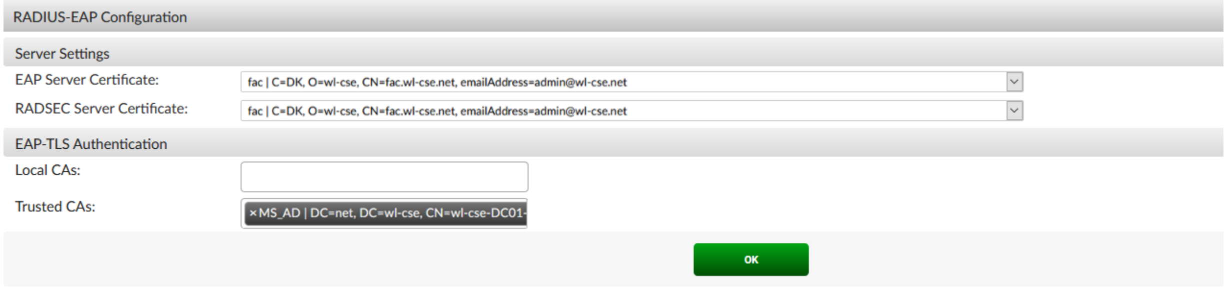
3. Click *OK*.

## Configuring the EAP server certificate

In order to use EAP, you must specify the certificate used for FortiAuthenticator in the RADIUS-EAP configuration settings.

### To configure the RADIUS certificate for EAP-TLS:

1. Go to *Authentication* > *RADIUS Service* > *Certificates*.
2. Specify the *EAP Server Certificate* and the *Trusted CA* from Active Directory that you previously configured.



RADIUS-EAP Configuration

Server Settings

EAP Server Certificate: fac | C=DK, O=wl-cse, CN=fac.wl-cse.net, emailAddress=admin@wl-cse.net

RADSEC Server Certificate: fac | C=DK, O=wl-cse, CN=fac.wl-cse.net, emailAddress=admin@wl-cse.net

EAP-TLS Authentication

Local CAs:

Trusted CAs: × MS_AD | DC=net, DC=wl-cse, CN=wl-cse-DC01-

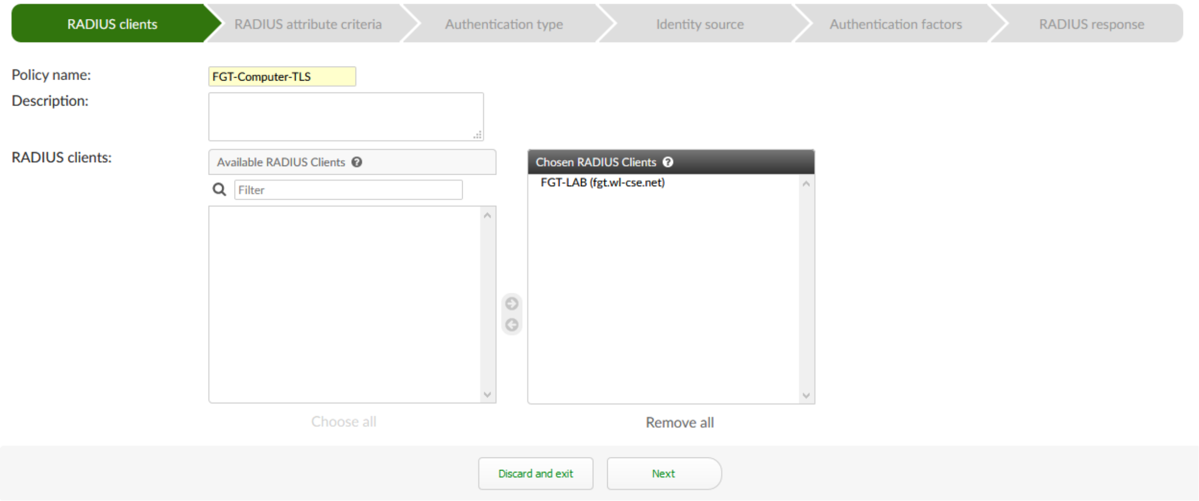
3. Click *OK*.

## Creating a RADIUS policy

A RADIUS policy must be configured in order to allow RADIUS authentication for the selected client.

### To create a RADIUS policy:

1. Go to *Authentication > RADIUS Service > Policies*, and click *Create New*.
2. Under RADIUS clients, configure the following, and click *Next*.
   a. **Policy name**: Enter a name for this policy, for example: *FGT-Computer-TLS*.
   b. **RADIUS clients**: Add the previously configured FortiGate RADIUS client to the *Chosen RADIUS Clients* section.



Policy name: FGT-Computer-TLS

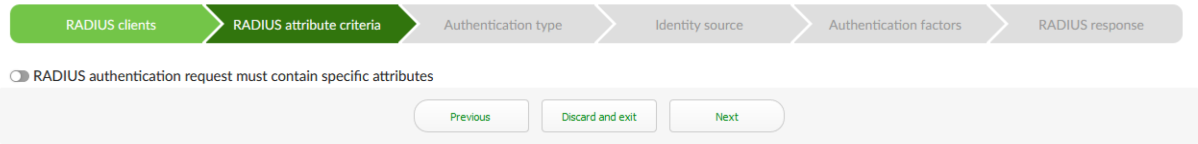
Description:

RADIUS clients:

Available RADIUS Clients

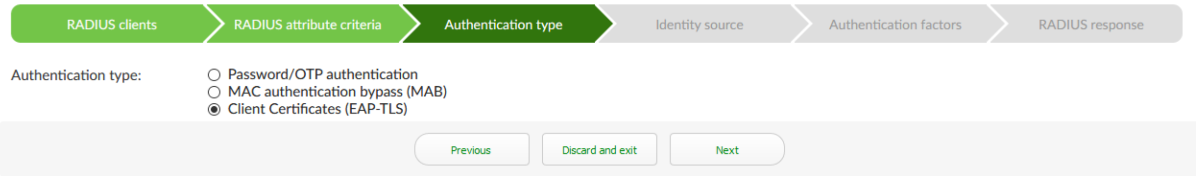
Chosen RADIUS Clients: FGT-LAB (fgt.wl-cse.net)

3. Under *RADIUS attribute criteria*, click *Next*.



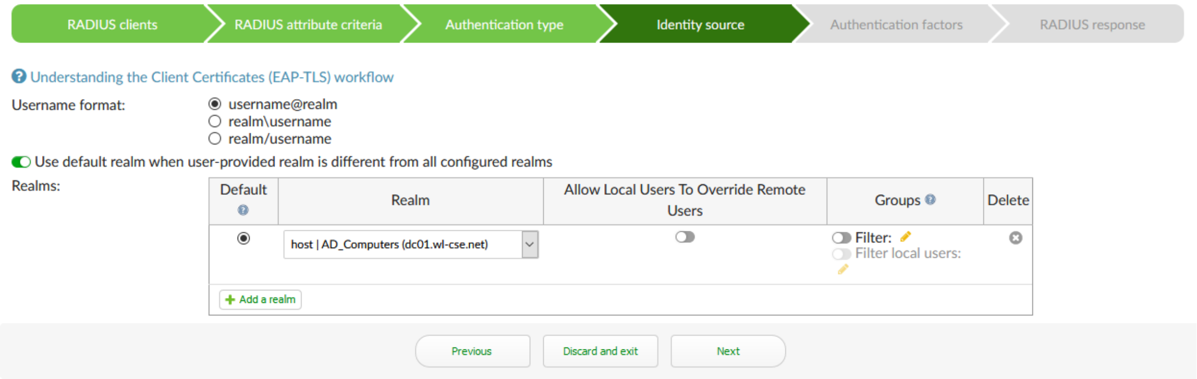
RADIUS authentication request must contain specific attributes

4. Under *Authentication type*, choose *Client Certificates (EAP-TLS)*, and click *Next*.



Authentication type:
○ Password/OTP authentication
○ MAC authentication bypass (MAB)
● Client Certificates (EAP-TLS)

5. Under *Identity source*, configure the following, and click *Next*.
   a. **Username format**: Select your preferred username format, for example: *realm\username*.
   b. **Realms**: In the *Realms* table, select your AD realm.
   You can additionally apply a group filter if required.



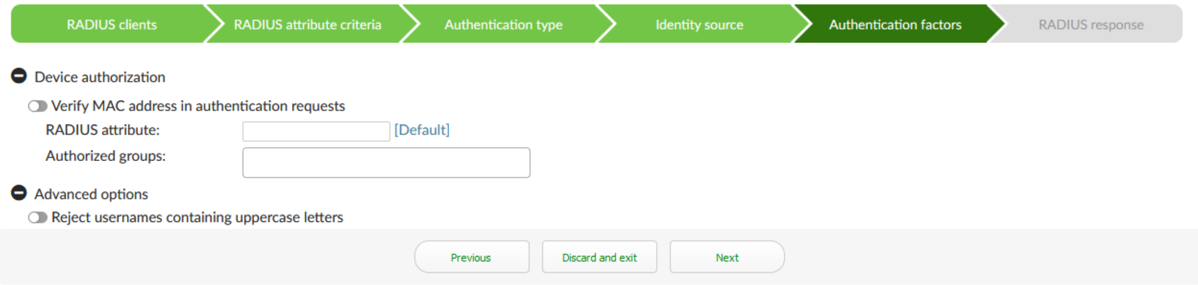
Username format:
● username@realm
○ realm\username
○ realm/username

Use default realm when user-provided realm is different from all configured realms

Realms:

| Default | Realm | Allow Local Users To Override Remote Users | Groups | Delete |
|---|---|---|---|---|
| ● | host \| AD_Computers (dc01.wl-cse.net) | | Filter:<br>Filter local users: | |

6. Under *Authentication factors*, click *Next*.



Device authorization

Verify MAC address in authentication requests

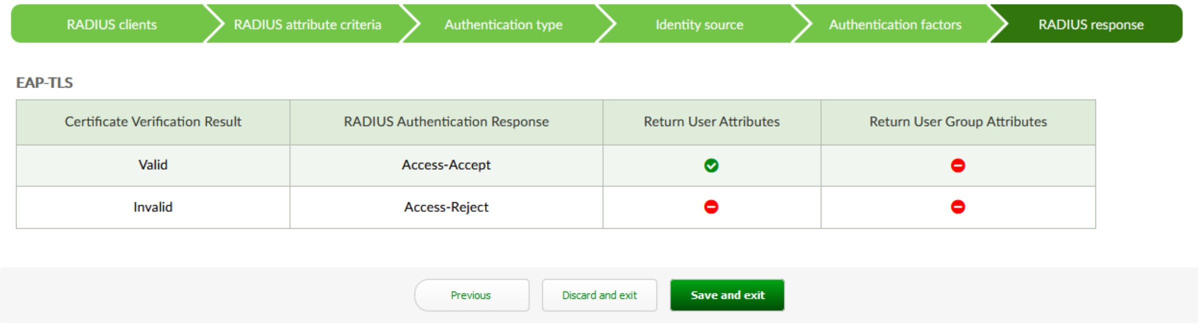
RADIUS attribute: [Default]

Authorized groups:

Advanced options

Reject usernames containing uppercase letters

7. Under *RADIUS response*, click *Save and exit*.



EAP-TLS

| Certificate Verification Result | RADIUS Authentication Response | Return User Attributes | Return User Group Attributes |
|---|---|---|---|
| Valid | Access-Accept | ✓ | ⛔ |
| Invalid | Access-Reject | ⛔ | ⛔ |

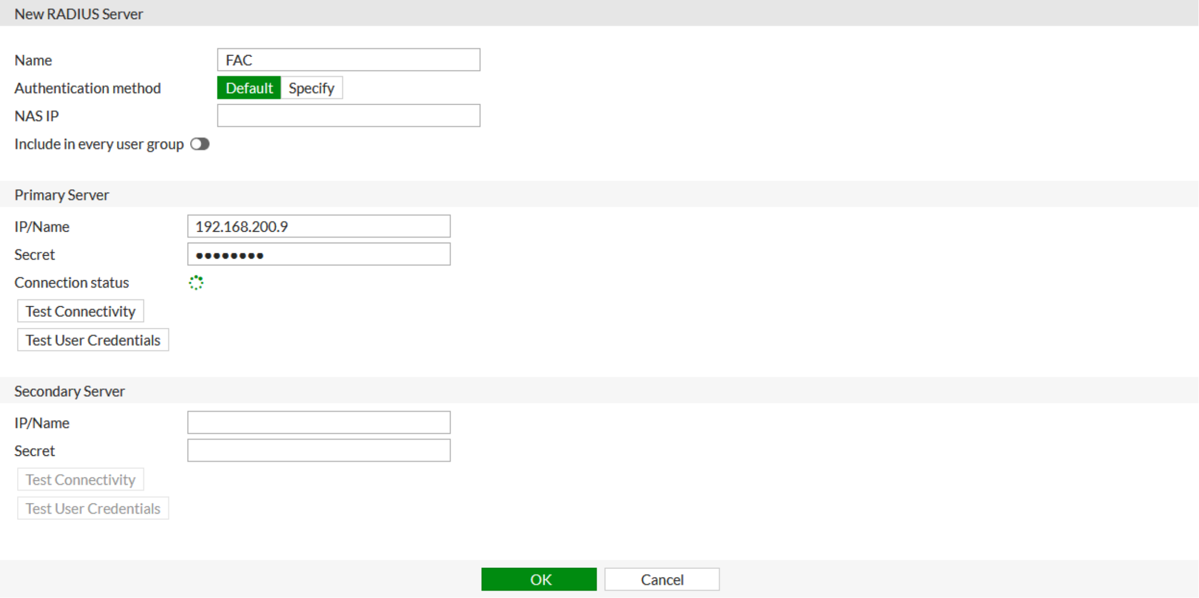
## Configuring the RADIUS server on FortiGate

Finally, you can configure the RADIUS server settings (FortiAuthenticator) on FortiGate.

### To configure the RADIUS server on FortiGate:

1. On FortiGate, go to *User & Authentication* > *RADIUS Servers*, and click *Create New*.
2. Under *New RADIUS Server*, set the following:
   a. **Name**: Enter a name for the RADIUS server, for example: *FAC*.
   b. **Authentication method**: *Default*.

3. Under *Primary Server*, set the following:
   a. **IP/Name**: Enter the IP address of the FortiAuthenticator.
   b. **Secret**: Enter the RADIUS server secret created on FortiAuthenticator.



New RADIUS Server

Name: FAC

Authentication method: Default | Specify

NAS IP:

Include in every user group

Primary Server

IP/Name: 192.168.200.9

Secret: ••••••••

Connection status

Secondary Server

IP/Name:

Secret:

4. Click *OK*.

## Configure the SSID and interface objects

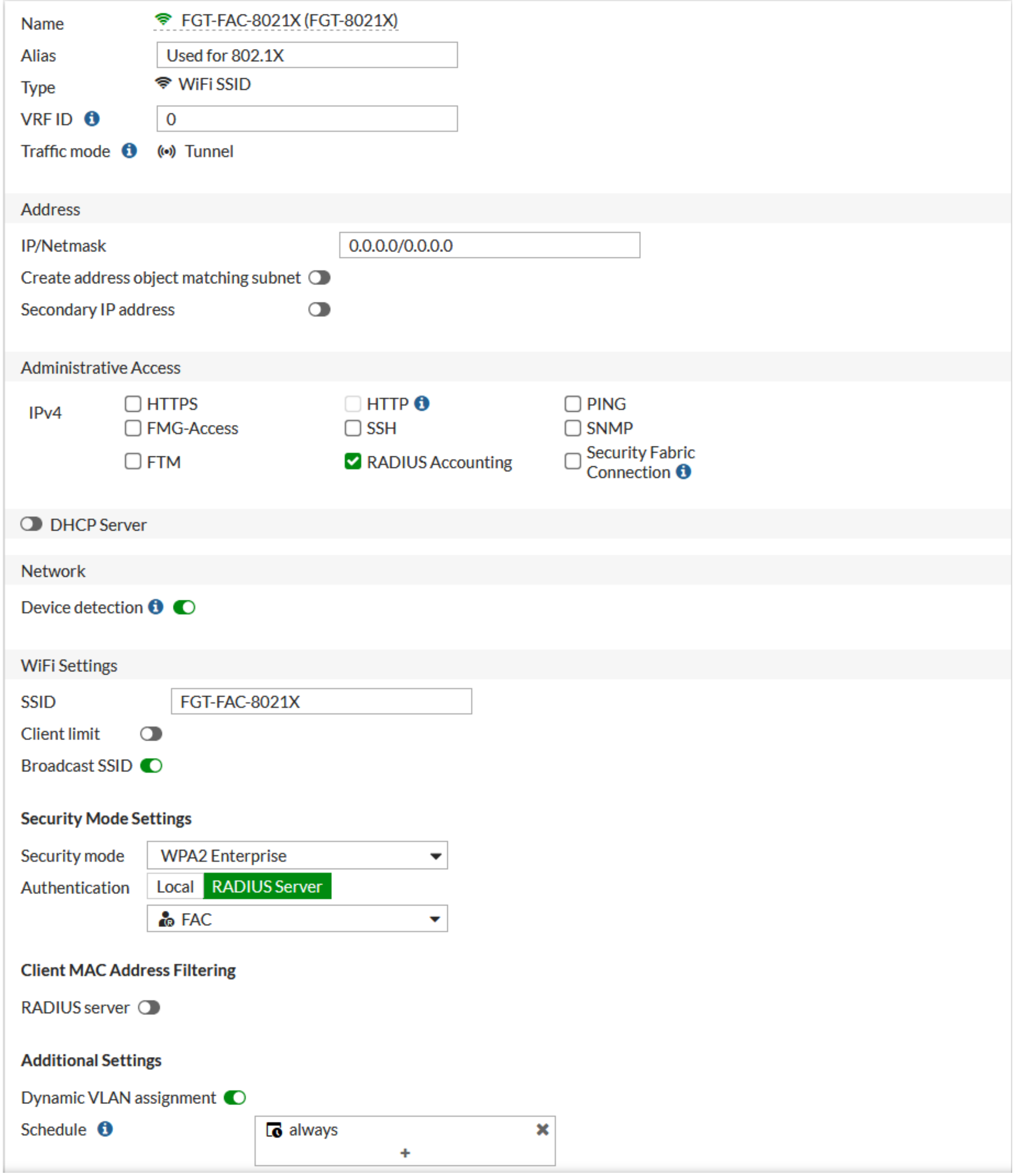
### To configure the SSID and interface objects:

1. Creating the SSID on page 213
2. Creating interfaces on page 214

## Creating the SSID

**To create an SSID with dynamic VLAN assignment:**

1. On FortiGate, go to *WiFi & Switch Controller > SSID*, and click *Create New > SSID*.
2. Create a new SSID with *Dynamic VLAN assignment* enabled under *Additional Settings*.



Name FGT-FAC-8021X (FGT-8021X)
Alias Used for 802.1X
Type WiFi SSID
VRF ID 0
Traffic mode Tunnel

Address
IP/Netmask 0.0.0.0/0.0.0.0
Create address object matching subnet ○
Secondary IP address ○

Administrative Access
IPv4 □ HTTPS □ HTTP □ PING
□ FMG-Access □ SSH □ SNMP
□ FTM ☑ RADIUS Accounting □ Security Fabric Connection

○ DHCP Server

Network
Device detection ●

WiFi Settings
SSID FGT-FAC-8021X
Client limit ○
Broadcast SSID ●

**Security Mode Settings**
Security mode WPA2 Enterprise
Authentication Local [✓ RADIUS Server]
FAC

**Client MAC Address Filtering**
RADIUS server ○

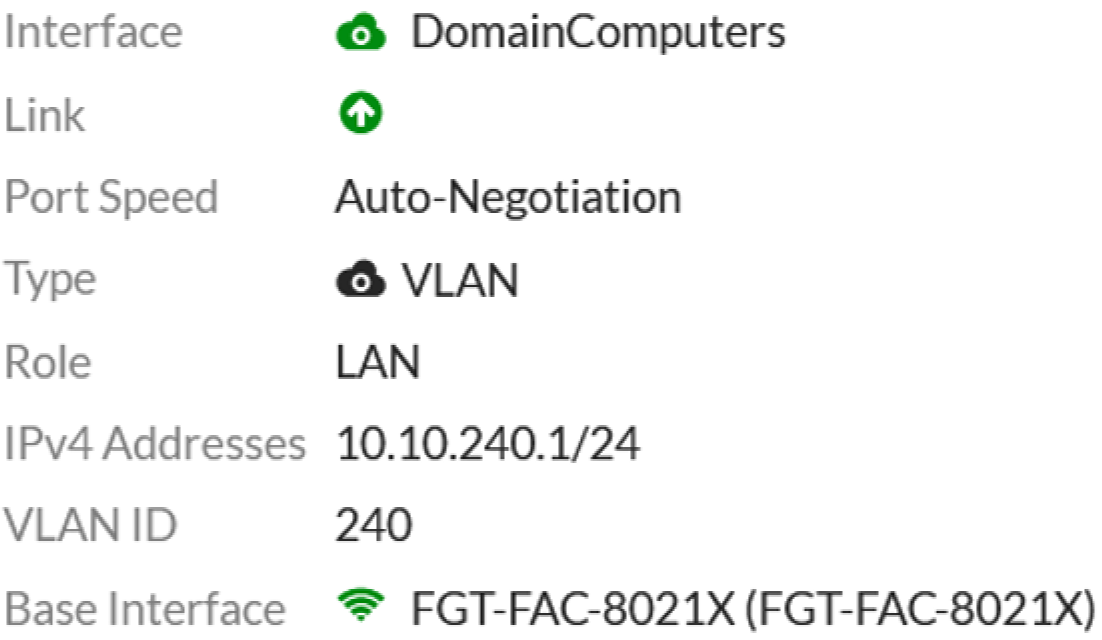
**Additional Settings**
Dynamic VLAN assignment ●
Schedule always

## Creating interfaces

You can now create interfaces as required.

**To create additional interfaces:**

1. Go to *Network* > *Interfaces*, and click *Create New* > *Interface*.
2. Configure your VLAN interface. In this example, the DomainComputers VLAN is created with the following settings:
   a. **Name**: DomainComputers.
   b. **Type**: *VLAN*.
   c. **Interface**: The configured SSID, FGT-FAC-8021X (FGT-FAC-8032X).
   d. **VLAN ID**: 240
   e. **Role**: LAN.



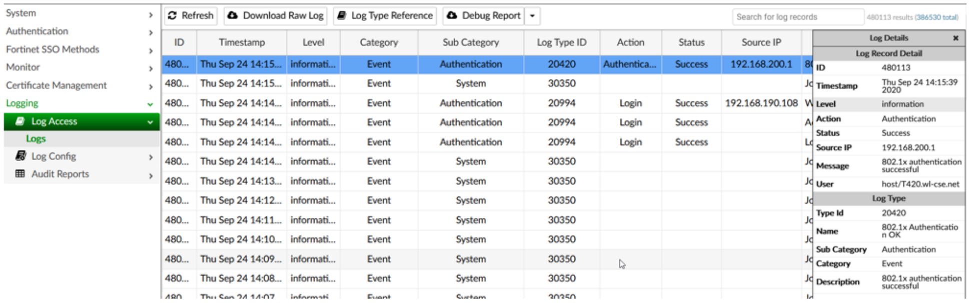
| | |
|---|---|
| Interface | DomainComputers |
| Link | |
| Port Speed | Auto-Negotiation |
| Type | VLAN |
| Role | LAN |
| IPv4 Addresses | 10.10.240.1/24 |
| VLAN ID | 240 |
| Base Interface | FGT-FAC-8021X (FGT-FAC-8021X) |

# Results

Once the configuration is complete, you should now be able to authenticate your computer using FortiAuthenticator with a Microsoft AD Root CA.

To confirm computer authentication is working as intended:

1. When connecting to the client, you can see *Authentication Success* in the FortiAuthenticator logs.

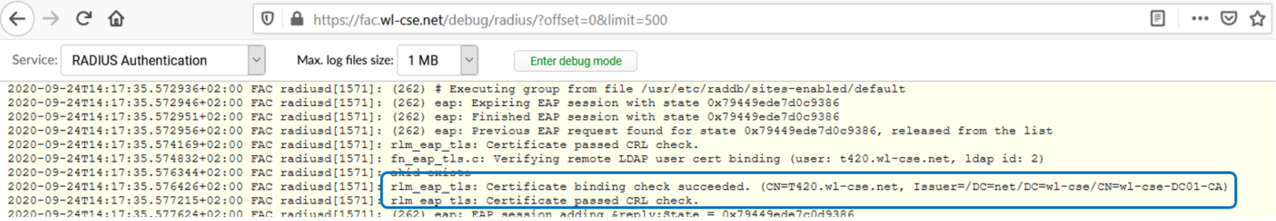


| ID | Timestamp | Level | Category | Sub Category | Log Type ID | Action | Status | Source IP | |
|---|---|---|---|---|---|---|---|---|---|
| 480... | Thu Sep 24 14:15... | informati... | Event | Authentication | 20420 | Authentica... | Success | 192.168.200.1 | 8( |
| 480... | Thu Sep 24 14:15... | informati... | Event | System | 30350 | | | | Jc |
| 480... | Thu Sep 24 14:14... | informati... | Event | Authentication | 20994 | Login | Success | 192.168.190.108 | W |
| 480... | Thu Sep 24 14:14... | informati... | Event | Authentication | 20994 | Login | Success | | A |
| 480... | Thu Sep 24 14:14... | informati... | Event | Authentication | 20994 | Login | Success | | Lc |
| 480... | Thu Sep 24 14:14... | informati... | Event | System | 30350 | | | | Jc |
| 480... | Thu Sep 24 14:13... | informati... | Event | System | 30350 | | | | Jc |
| 480... | Thu Sep 24 14:12... | informati... | Event | System | 30350 | | | | Jc |
| 480... | Thu Sep 24 14:11... | informati... | Event | System | 30350 | | | | Jc |
| 480... | Thu Sep 24 14:10... | informati... | Event | System | 30350 | | | | Jc |
| 480... | Thu Sep 24 14:09... | informati... | Event | System | 30350 | | | | Jc |
| 480... | Thu Sep 24 14:08... | informati... | Event | System | 30350 | | | | Jc |
| 480 | Thu Sep 24 14:07 | informati | Event | System | 30350 | | | | Jc |

Log Details

| Log Record Detail | |
|---|---|
| ID | 480113 |
| Timestamp | Thu Sep 24 14:15:39 2020 |
| Level | information |
| Action | Authentication |
| Status | Success |
| Source IP | 192.168.200.1 |
| Message | 802.1x authentication successful |
| User | host/T420.wl-cse.net |
| **Log Type** | |
| Type Id | 20420 |
| Name | 802.1x Authentication OK |
| Sub Category | Authentication |
| Category | Event |
| Description | 802.1x authentication successful |

2. When reviewing the debug logs, you can see that certificate binding check has passed.



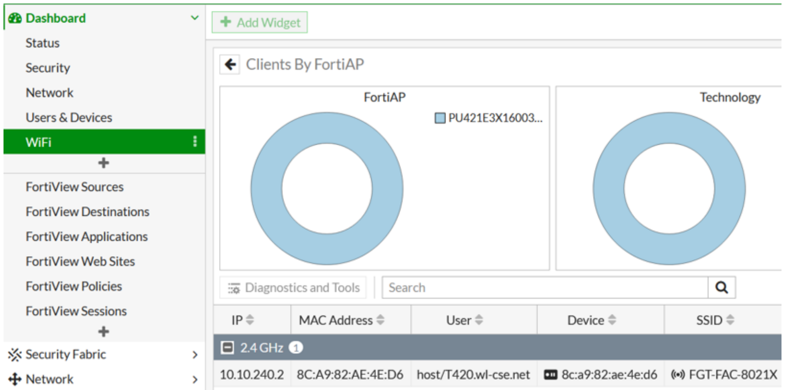
https://fac.wl-cse.net/debug/radius/?offset=0&limit=500

Service: RADIUS Authentication

Max. log files size: 1 MB

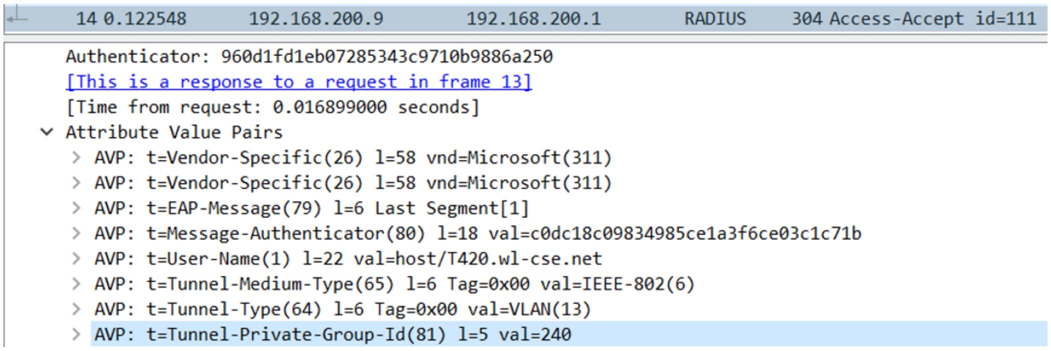
```
2020-09-24T14:17:35.572936+02:00 FAC radiusd[1571]: (262) # Executing group from file /usr/etc/raddb/sites-enabled/default
2020-09-24T14:17:35.572946+02:00 FAC radiusd[1571]: (262) eap: Expiring EAP session with state 0x79449ede7d0c9386
2020-09-24T14:17:35.572951+02:00 FAC radiusd[1571]: (262) eap: Finished EAP session with state 0x79449ede7d0c9386
2020-09-24T14:17:35.572956+02:00 FAC radiusd[1571]: (262) eap: Previous EAP request found for state 0x79449ede7d0c9386, released from the list
2020-09-24T14:17:35.574169+02:00 FAC radiusd[1571]: rlm_eap_tls: Certificate passed CRL check.
2020-09-24T14:17:35.574832+02:00 FAC radiusd[1571]: fn_eap_tls.c: Verifying remote LDAP user cert binding (user: t420.wl-cse.net, ldap id: 2)
2020-09-24T14:17:35.576344+02:00 FAC radiusd[1571]: akid exists
2020-09-24T14:17:35.576426+02:00 FAC radiusd[1571]: rlm_eap_tls: Certificate binding check succeeded. (CN=T420.wl-cse.net, Issuer=/DC=net/DC=wl-cse/CN=wl-cse-DC01-CA)
2020-09-24T14:17:35.577215+02:00 FAC radiusd[1571]: rlm_eap_tls: Certificate passed CRL check.
2020-09-24T14:17:35.577624+02:00 FAC radiusd[1571]: (262) eap: EAP session adding &reply:State = 0x79449ede7c0d9386
```

3. On FortiGate, you can see that the client successfully connected:



| IP | MAC Address | User | Device | SSID |
|---|---|---|---|---|
| 2.4 GHz 1 | | | | |
| 10.10.240.2 | 8C:A9:82:AE:4E:D6 | host/T420.wl-cse.net | 8c:a9:82:ae:4e:d6 | FGT-FAC-8021X |

4. Packet capture shows the RADIUS-Accept message, including the VLAN 240.



```
   14 0.122548      192.168.200.9       192.168.200.1       RADIUS    304 Access-Accept id=111

      Authenticator: 960d1fd1eb07285343c9710b9886a250
      [This is a response to a request in frame 13]
      [Time from request: 0.016899000 seconds]
    ∨ Attribute Value Pairs
      > AVP: t=Vendor-Specific(26) l=58 vnd=Microsoft(311)
      > AVP: t=Vendor-Specific(26) l=58 vnd=Microsoft(311)
      > AVP: t=EAP-Message(79) l=6 Last Segment[1]
      > AVP: t=Message-Authenticator(80) l=18 val=c0dc18c09834985ce1a3f6ce03c1c71b
      > AVP: t=User-Name(1) l=22 val=host/T420.wl-cse.net
      > AVP: t=Tunnel-Medium-Type(65) l=6 Tag=0x00 val=IEEE-802(6)
      > AVP: t=Tunnel-Type(64) l=6 Tag=0x00 val=VLAN(13)
      > AVP: t=Tunnel-Private-Group-Id(81) l=5 val=240
```

# WiFi onboarding using FortiAuthenticator Smart Connect

This example demonstrates how to configure WiFi onboarding using FortiAuthenticator Smart Connect with either Google G Suite or Microsoft Azure.

This configuration assumes that you have already configured your FortiAuthenticator following the initial configuration steps available within the FortiAuthenticator Administration Guide. FortiAuthenticator must be version 6.1.1 or higher.

Before starting, you should already have the following available:

- A registered domain name and functional DNS. This example uses fortixpert.com.
- A publicly signed wildcard certificate for your domain (for example *.fortixpert.com used to sign MS Azure DS Secure LDAP Connector).
- A publicly signed host/server certificate for FortiAuthenticator.
- An active Google G Suite Enterprise or MS Azure subscription, depending on your chosen configuration.
  - Please note: Secure LDAP is not supported using G Suite Business or G Suite Basic subscriptions.
  - An active MS Azure subscription requires AD Directory Services to be provisioned in order to support Secure LDAP.
- Have the appropriate Fortinet infrastructure in place, for example, Fortigate running FOS 6.2.4GA+, FortiSwitch running 6.2.4GA+, FortiAP/FortiAP-U running latest GA and FortiAuthenticator 6.1.1 and above.

**To configure WiFi onboarding using Smart Connect:**

1. Initial settings on FortiAuthenticator on page 216
2. Select either the G Suite or Azure configuration:
   a. Option A - WiFi onboarding with Smart Connect and G Suite on page 220
   b. Option B - WiFi onboarding with Smart Connect and Azure on page 230
3. FortiGate configuration on page 238
4. Results on page 249

## Initial settings on FortiAuthenticator

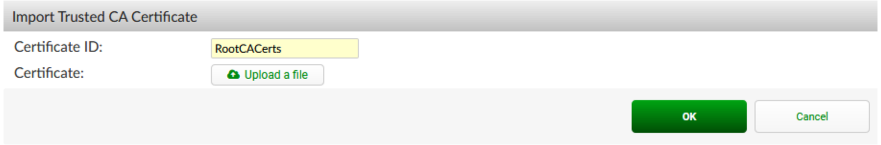
### To set up the initial configuration on FortiAuthenticator:

1. Install certificates on page 216
2. Configure the RADIUS client settings on page 218
3. Configure the local root CA on page 218
4. Configure the EAP server certificate and CA for EAP-TLS on page 219

## Install certificates

**To install a wildcard certificate on FortiAuthenticator:**

1. Go to *Certificate Management > Certificate Authorities > Trusted CA*.
   Import a trusted root/intermediate public CA certificate in order to support your wildcard certificate.

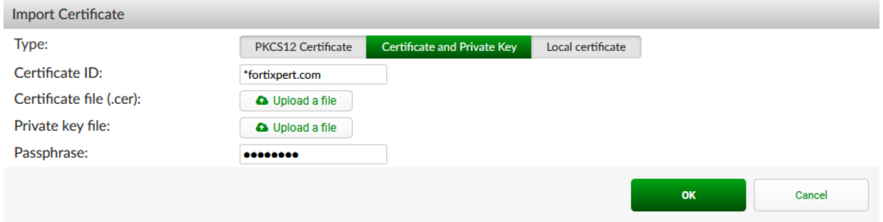


Import Trusted CA Certificate

Certificate ID: RootCACerts

Certificate:

2. In *Certificate Management* > *End Entities* > *Local Services*, click *Import*, select *Certificate and Private Key*, and import your domain wildcard certificate as *domainname. For example, `*fortixpert.com`.



Import Certificate

Type: Certificate and Private Key

Certificate ID: *fortixpert.com

Certificate file (.cer):

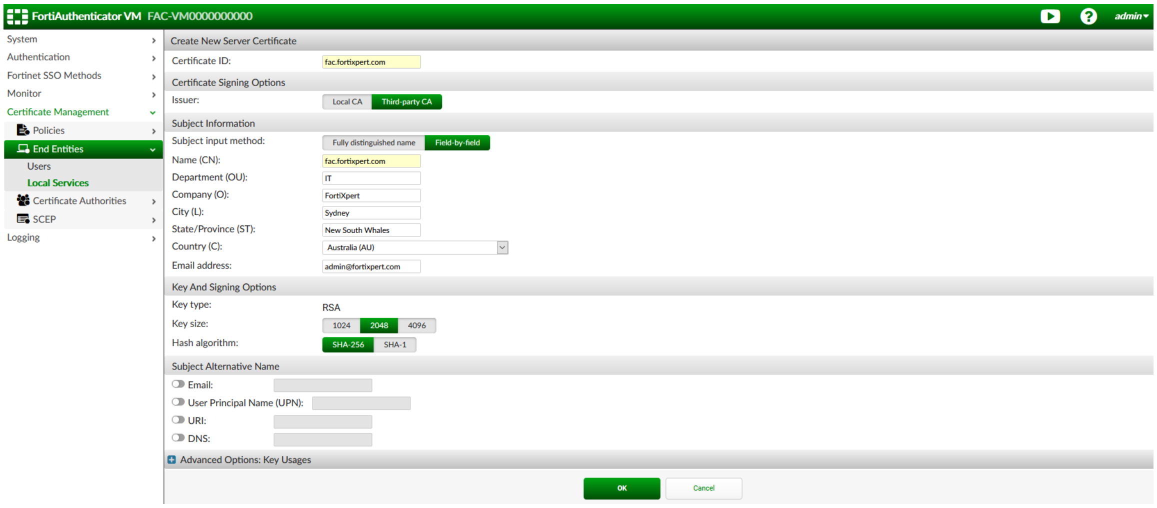
Private key file:

Passphrase: ••••••••

### To generate a Certificate Signing Request (optional):

The following steps are optional and can be done if the server certificate matching the FortiAuthenticator FQDN is not yet available.

1. In *Certificate Management* > *End Entities* > *Local Services*, select the *Create New* button.
   Configure the following settings:
   a. Under *Create New Server Certificate*, set the *Certificate ID* to your certificate name, for example, fac.fortixpert.com.
   b. Under *Subject Information*, configure the *Name*, *Department*, *Company*, *City*, *State/Province*, *Country* and *Email Address* for your certificate.
   c. (Optional) If you are using a self-signed certificate on FortiAuthenticator, add a Subject Alternative Name (SAN) matching the FQDN under *Subject Alternative Name*.
   d. (Optional) Under *Advanced Options: Key Usages*, choose all *Key Usages* and *Extended Key Usages*.
   e. All other fields can be left in their default state. Click *OK* to save your changes.



Create New Server Certificate

Certificate ID: fac.fortixpert.com

Certificate Signing Options

Issuer: Third-party CA

Subject Information

Subject input method: Field-by-field

Name (CN): fac.fortixpert.com

Department (OU): IT

Company (O): FortiXpert

City (L): Sydney

State/Province (ST): New South Whales

Country (C): Australia (AU)

Email address: admin@fortixpert.com

Key And Signing Options

Key type: RSA

Key size: 2048

Hash algorithm: SHA-256

Subject Alternative Name

Email:

User Principal Name (UPN):

URI:

DNS:

Advanced Options: Key Usages

2. Export the pending CSR by selecting the pending entry and then clicking *Export Certificate*. Use the downloaded *`certificate-name`*`.csr` file to obtain a certificate from a public CA.
3. Import the signed certificate file from the public CA by selecting *Import* and uploading the *`certificatename`*`.cer` file.

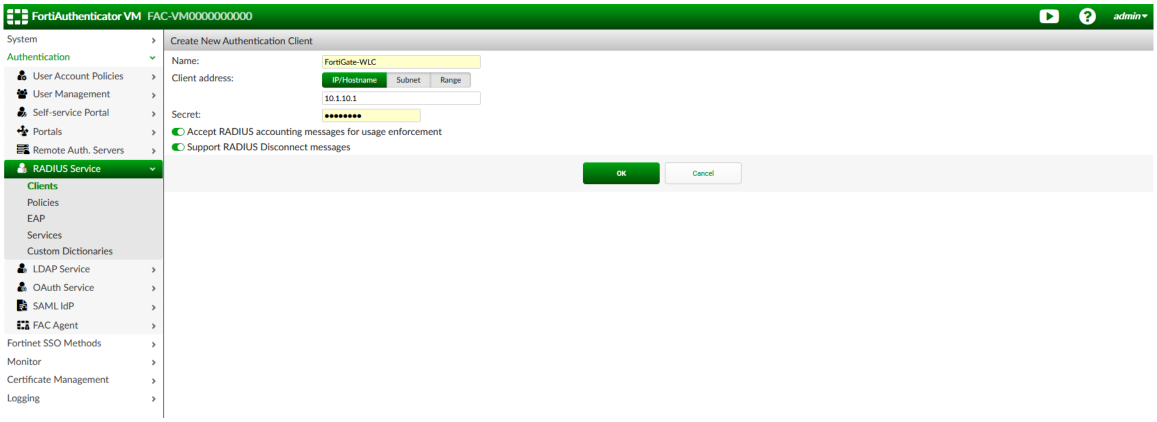
### To install local service certificates:

1. Go to *Certificate Management* > *Certificate Authorities* > *Trusted CA*.
   Upload the trusted root/intermediate public CA certificates in order to support your host/server certificate.
2. Under *Certificate Management* > *End Entities* > *Local Services*, *Import* your publicly signed host/server certificate matching the FQDN (i.e. fac.fortixpert.com) along with the matching private key.
3. Under *System* > *Administration* > *System Access* > *GUI Access*, configure the following:
   a. For *HTTPS Certificate*, select the server certificate matching the device FQDN from the dropdown box.
   b. For *CA Certificate*, select the Root CA certificate that was used to sign the host/server certificate selected above.
4. Select *OK*.

## Configure the RADIUS client settings

### To configure the RADIUS client:

1. Add the FortiAuthenticator host record to your local DNS server.
   If you are using FortiGate as the DNS server, this can be set under *Network* > *DNS Servers* on FortiGate.
2. Under *System* > *Dashboard* > *Status*, edit and set the hostname and FQDN for FortiAuthenticator so that it matches the DNS host record.
3. In *Authentication* > *RADIUS Service* > *Clients*, add the wireless controller, in this example FortiGate, as a new RADIUS client.
   Enter the *Name* and *IP/Hostname* of the wireless controller, and create a *Secret*.
4. Click *OK*.



Create New Authentication Client

Name: FortiGate-WLC

Client address: IP/Hostname 10.1.10.1

Secret: ••••••••

● Accept RADIUS accounting messages for usage enforcement

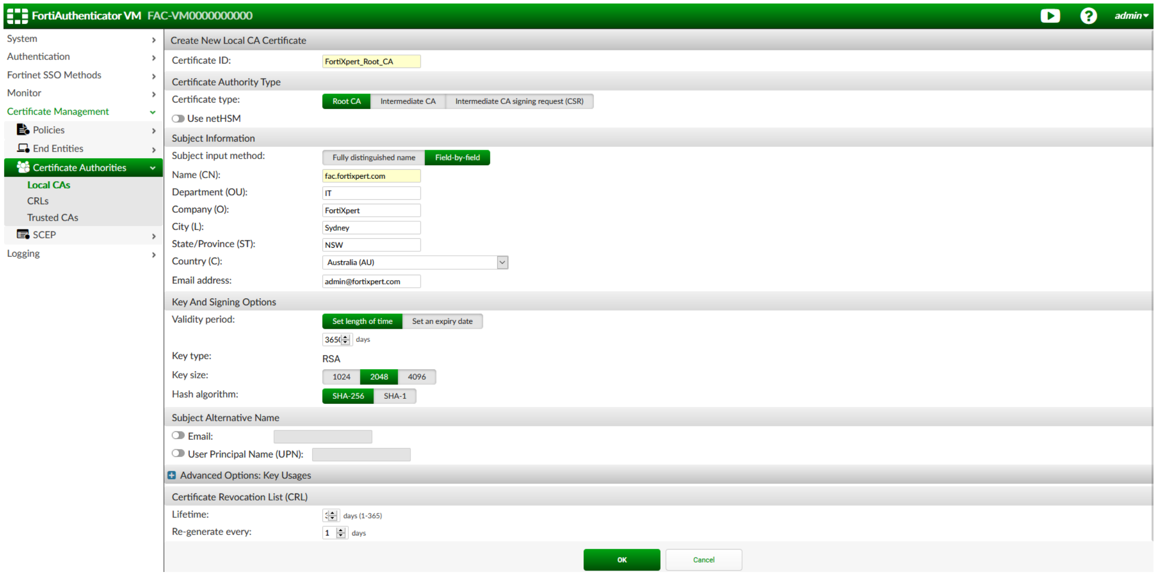
● Support RADIUS Disconnect messages

## Configure the local root CA

You can now configure a local CA on FortiAuthenticator. This will be used to generate client certificates for authentication via EAP-TLS.

### To configure the Local Root CA:

1. In *Certificate Management* > *Certificate Authorities* > *Local CAs*, select *Create New*.
2. Configure the following settings:
   - **a.** Set the *Certificate ID* to the Local_Root_CA_Name.
   - **b.** In *Certificate Authority Type*, set the *Certificate Type* to *Root CA*.
   - **c.** In *Subject Information*, configure the *Name*, *Department*, *Company*, *City*, *State/Province*, *Country*, and *Email address* for your certificate.
   - **d.** In *Advanced Options* > *Key Usages*, choose *all* Key Usages and Extended Key Usages.
3. Leave all other settings as their default, and click *OK*.



Create New Local CA Certificate

Certificate ID: FortiXpert_Root_CA

Certificate Authority Type

Certificate type: [✓ Root CA] Intermediate CA Intermediate CA signing request (CSR)

○ Use netHSM

Subject Information

Subject input method: Fully distinguished name [✓ Field-by-field]

Name (CN): fac.fortixpert.com

Department (OU): IT

Company (O): FortiXpert

City (L): Sydney

State/Province (ST): NSW

Country (C): Australia (AU)

Email address: admin@fortixpert.com

Key And Signing Options

Validity period: [✓ Set length of time] Set an expiry date

365( days

Key type: RSA

Key size: 1024 [✓ 2048] 4096

Hash algorithm: [✓ SHA-256] SHA-1

Subject Alternative Name

○ Email:

○ User Principal Name (UPN):

Advanced Options: Key Usages

Certificate Revocation List (CRL)

Lifetime: 3 days (1-365)

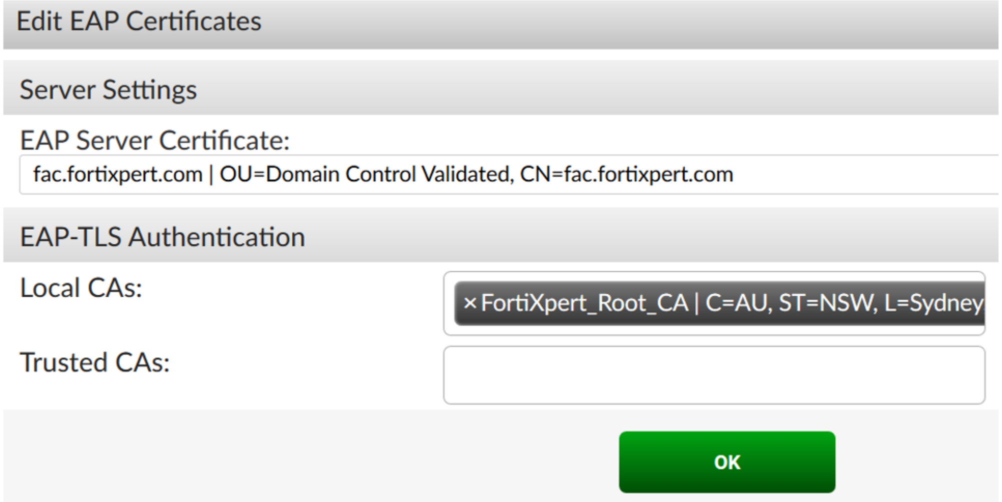
Re-generate every: 1 days

## Configure the EAP server certificate and CA for EAP-TLS

### To set an EAP Server Certificate and CA for EAP-TLS:

1. Go to *Authentication* > *RADIUS Service* > *Certificates*.
2. In *Server Settings* > *EAP Server Certificate*, select the publicly signed certificate matching the FortiAuthenticator FQDN (e.g. fac.fortixpert.com).

3. In *EAP-TLS Authentication* > *Local CAs*, select the local CA (e.g. FortiXpert_Root_CA).



Edit EAP Certificates

Server Settings

EAP Server Certificate: fac.fortixpert.com | OU=Domain Control Validated, CN=fac.fortixpert.com

EAP-TLS Authentication

Local CAs: × FortiXpert_Root_CA | C=AU, ST=NSW, L=Sydney

Trusted CAs:

4. Click *OK*.

# Option A - WiFi onboarding with Smart Connect and G Suite

This section outlines how to configure the FortiAuthenticator to communicate with G Suite via Secure Lightweight Directory Access Protocol.

**To configure WiFi Onboarding with G Suite:**

1. Configure G Suite LDAPS Integration on page 220
2. Configure Smart Connect and the captive portal on page 226
3. Configure RADIUS settings on FortiAuthenticator on page 229

## Configure G Suite LDAPS Integration

Here you will configure FortiAuthenticator to communicate with Google G Suite via Secure Lightweight Directory Access Protocol.

**To configure FortiAuthenticator and G Suite LDAPS integration:**

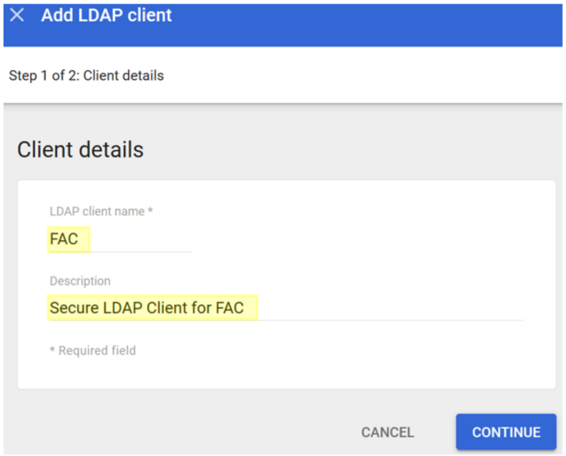
1. Provision the LDAP connector in G Suite on page 221
2. Configure certificates on FortiAuthenticator on page 223
3. Configure the remote LDAP server and users on page 224

## Provision the LDAP connector in G Suite

**To provision the LDAP connector in G Suite:**

Configure FortiAuthenticator to communicate with Google G Suite via Secure Lightweight Directory Access Protocol (LDAPS).

1. Login to the G Suite admin console using a G Suite admin account.
2. Click the Apps icon, then select *LDAP* and *Add Client*.
3. In *Add LDAP Client Step 1*, configure the following settings:
   a. **Name**:Enter a name, for example *FAC*.
   b. **Description**: Enter a description, for example *Secure LDAP Client for FAC*.



Add LDAP client

Step 1 of 2: Client details

Client details

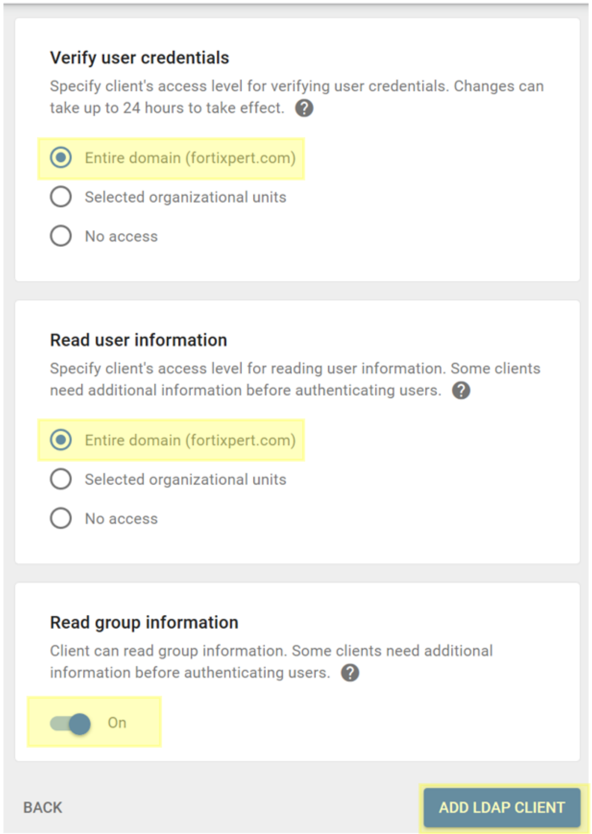
LDAP client name *
FAC

Description
Secure LDAP Client for FAC

* Required field

4. Under Add LDAP Client Step 2, configure the following settings:
   a. **Verify User Credentials**: *Entire domain*.
   b. **Read user information**: *Entire domain*.
   c. **Read Group Information**: *On*.

5. Click *Add LDAP Client*.



**Verify user credentials**

Specify client's access level for verifying user credentials. Changes can take up to 24 hours to take effect.

● Entire domain (fortixpert.com)
○ Selected organizational units
○ No access

**Read user information**

Specify client's access level for reading user information. Some clients need additional information before authenticating users.

● Entire domain (fortixpert.com)
○ Selected organizational units
○ No access

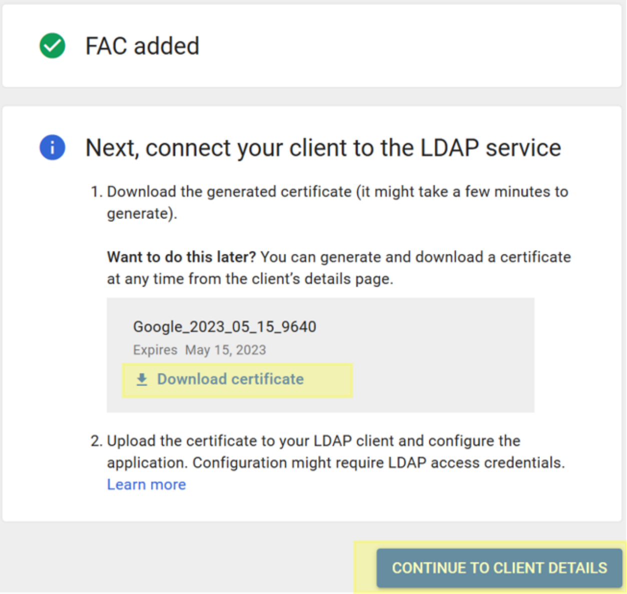
**Read group information**

Client can read group information. Some clients need additional information before authenticating users.

On

You will now be prompted to connect your client to the LDAP service.

6. Click *Download Certificate* and save the ZIP file.



FAC added

Next, connect your client to the LDAP service

1. Download the generated certificate (it might take a few minutes to generate).

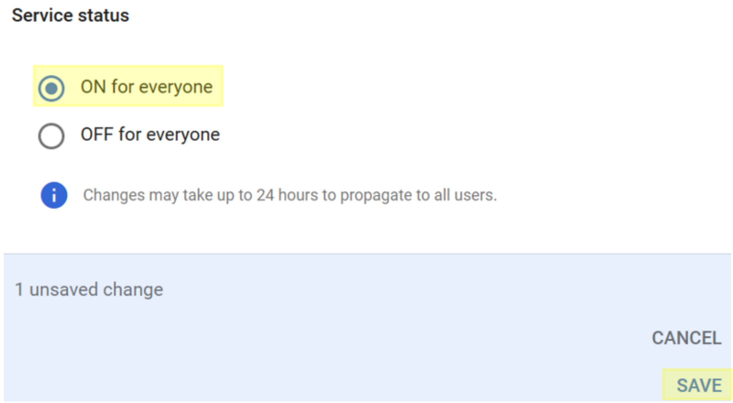
**Want to do this later?** You can generate and download a certificate at any time from the client's details page.

Google_2023_05_15_9640
Expires May 15, 2023

2. Upload the certificate to your LDAP client and configure the application. Configuration might require LDAP access credentials. Learn more

Unzip the certificate file to a local folder. Contained within will be a public certificate along with a private key.

7. Select *Continue to Client Details*. Select Service status and change the status to *On*.



Service status

● ON for everyone

○ OFF for everyone

Changes may take up to 24 hours to propagate to all users.

1 unsaved change

8. Click *Save*.

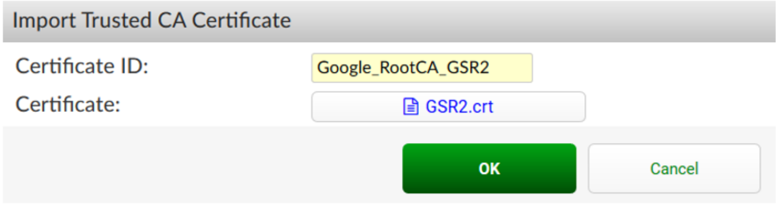
## Configure certificates on FortiAuthenticator

### To download Google Root CA Certificate:

1. Open a new Internet browser and navigate to https://pki.goog.
2. Under *Root CAs* in the *Repository* tab, download the *GS Root R2* certificate in the DER format. The file will be called *GSR2.crt*.

### To import the Google Certificates into FortiAuthenticator:

1. In FortiAuthenticator, go to *Certificate Management* > *Certificate Authorities* > *Trusted CAs*, and click *Import*.
2. Enter a *Certificate ID* and then upload the Google Root CA certificate previously downloaded.

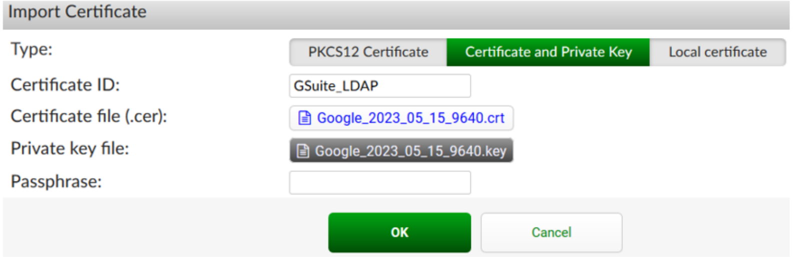


Import Trusted CA Certificate

Certificate ID: Google_RootCA_GSR2

Certificate: GSR2.crt

3. Go to *Certificate Management* > *End Entities* > *Local Services*, and click *Import*.
4. Under *Import Certificate* , select *Certificate and Private Key* as the *Type*.
   Enter a *Certificate ID*, and select the *Certificate file* and *Private key file* from the file you unzipped previously. A *Passphrase* is not required. Click *OK*.



Import Certificate

Type: PKCS12 Certificate | **Certificate and Private Key** | Local certificate

Certificate ID: GSuite_LDAP

Certificate file (.cer): Google_2023_05_15_9640.crt

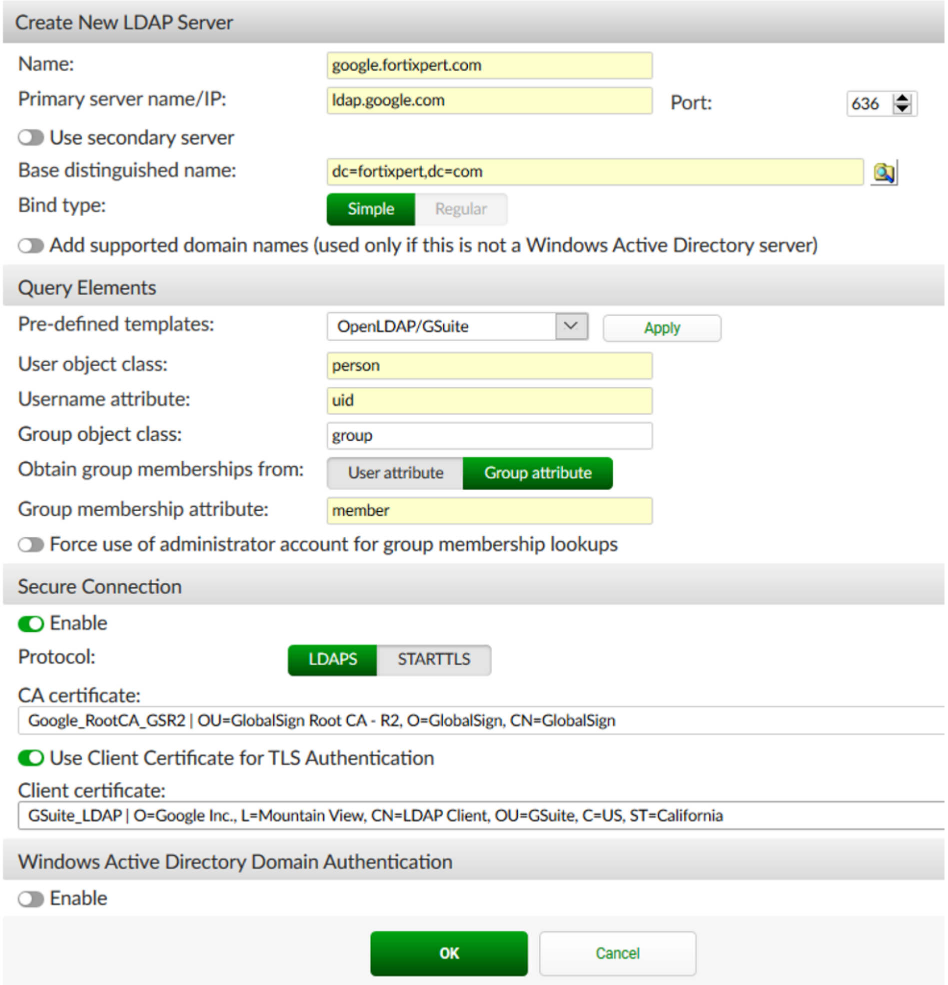
Private key file: Google_2023_05_15_9640.key

Passphrase:

## Configure the remote LDAP server and users

**To provision the remote LDAP server:**

1. In FortiAuthenticator, go to *Authentication* > *Remote Auth. Servers* > *LDAP*, and click *Create New*.
2. Under *Create New LDAP Server*, set the following:
   a. **Name**: Enter a name for the remote LDAP server, for example *google.fortixpert.com*.
   b. **Primary server name/IP**: *ldap.google.com*.
   c. **Base distinguished name**: Enter the base LDAP search directory, for example the G Suite domain: *dc=fortixpert,dc=com*.
   d. **Bind type**: *Simple*.
3. Under *Query Elements*, set the following:
   a. **Pre-defined templates**: Select *OpenLDAP/G Suite* from the dropdown box, and click *Apply*.
4. Under *Secure Connection*, enable the secure connection function, and set the following:
   a. **Protocol**: *LDAPS*.
   b. **CA Certificate**: Select the *Google_RootCA_GSR2* certificate from the dropdown box.
   c. **Use Client Certificate for TLS Authentication**: *Enabled*.
   d. **Client certificate**: Select the *G Suite_LDAP* client certificate from the dropdown box.
5. At the top of the page under Base distinguished name, select the directory lookup icon.
   Once the LDAPS connection is established you'll see the Directory of Groups and Users within G Suite. Select *OK*.



Create New LDAP Server

Name: google.fortixpert.com

Primary server name/IP: ldap.google.com Port: 636

○ Use secondary server

Base distinguished name: dc=fortixpert,dc=com

Bind type: [✓ Simple] Regular

○ Add supported domain names (used only if this is not a Windows Active Directory server)

Query Elements

Pre-defined templates: OpenLDAP/GSuite Apply

User object class: person

Username attribute: uid

Group object class: group

Obtain group memberships from: User attribute [✓ Group attribute]

Group membership attribute: member

○ Force use of administrator account for group membership lookups

Secure Connection

● Enable

Protocol: [✓ LDAPS] STARTTLS

CA certificate:
Google_RootCA_GSR2 | OU=GlobalSign Root CA - R2, O=GlobalSign, CN=GlobalSign

● Use Client Certificate for TLS Authentication

Client certificate:
GSuite_LDAP | O=Google Inc., L=Mountain View, CN=LDAP Client, OU=GSuite, C=US, ST=California

Windows Active Directory Domain Authentication

○ Enable

6. Select *OK* again to save the LDAP server settings.

### To import remote user accounts:

1. Go to *Authentication* > *User Management* > *Remote Users*, and confirm that *LDAP* is selected at the top right of the page.
2. Click *Import*.
3. Under *Import Remote LDAP Users*, set the following:
   a. **Remote** LDAP server: Select your connector bound to ldap.google.com from the dropdown box.
   b. **Action**: *Import Users*.
4. Click *Go*. A list of all the users within your G Suite directory will be displayed.
5. Select the users you want to be able to connect to the wireless network using their G Suite account, and select *OK* to import the relevant user accounts.
6. Under *Synchronization Attributes*, set the following:
   a. **Token-based authentication sync priorities**: *None*.
   b. **Sync every**: Select the sync frequency. In production environments, this should be set to 30 minutes or more depending on the number of users being synchronized.
   c. **Sync as**: *Remote LDAP User*.
   d. **User role for new user imports**: *User*.
7. Leave all other settings in their default state, and click *OK*.

### To create a new realm:

1. Go to *Authentication* > *User Management* > *Realms*, and click *Create New*.
2. Configure the following settings:
   a. **Name**: Enter a name for your realm, for example fortixpert.com.
   b. **User source**: Select the remote LDAP service from the dropdown box.
3. Click *OK*.

## Configure Smart Connect and the captive portal

This section outlines the configuration required on FortiAuthenticator to provision a captive portal using Smart Connect authenticating against Google G Suite.

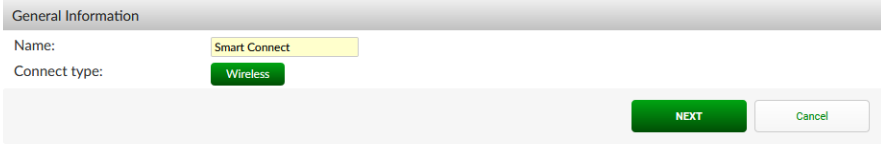
### To configure Smart Connect and portals on FortiAuthenticator:

1. Create the Smart Connect profile on page 226
2. Create the captive portal on page 227
3. Create the self-service portal policy on page 228

## Create the Smart Connect profile

### To create Smart Connect profiles:

1. Go to *Authentication* > *Portals* > *Smart Connect Profiles*, and click *Create New*.
2. Under *General Information*, enter a name for the profile, and click *Next*.

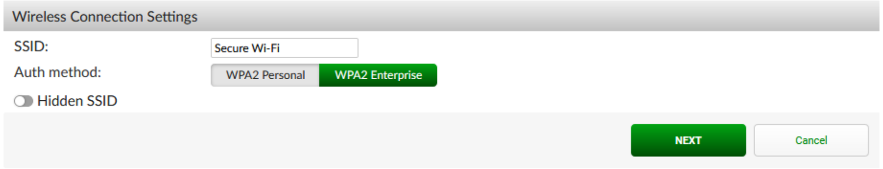


General Information

Name: Smart Connect

Connect type: Wireless

3. Under *Wireless Connection Settings*, set the following and then click *Next*.
   a. **SSID**: Enter your SSID name, for example Secure Wi-Fi.
   b. **Auth method**: *WPA2 Enterprise*.
   c. **Hidden SSID**: *Disabled*.



Wireless Connection Settings

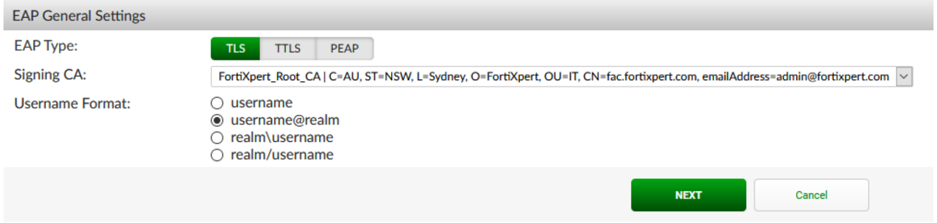
SSID: Secure Wi-Fi

Auth method: WPA2 Personal | WPA2 Enterprise

○ Hidden SSID

4. Under *EAP General Settings*, set the following and then click *Next*.
   a. **EAP Type**: *TLS*.
   b. **Signing CA**: Select the local Root CA configured earlier.

c. **Username Format**: Select your preference, for example *username@realm*.



EAP General Settings

EAP Type: TLS | TTLS | PEAP

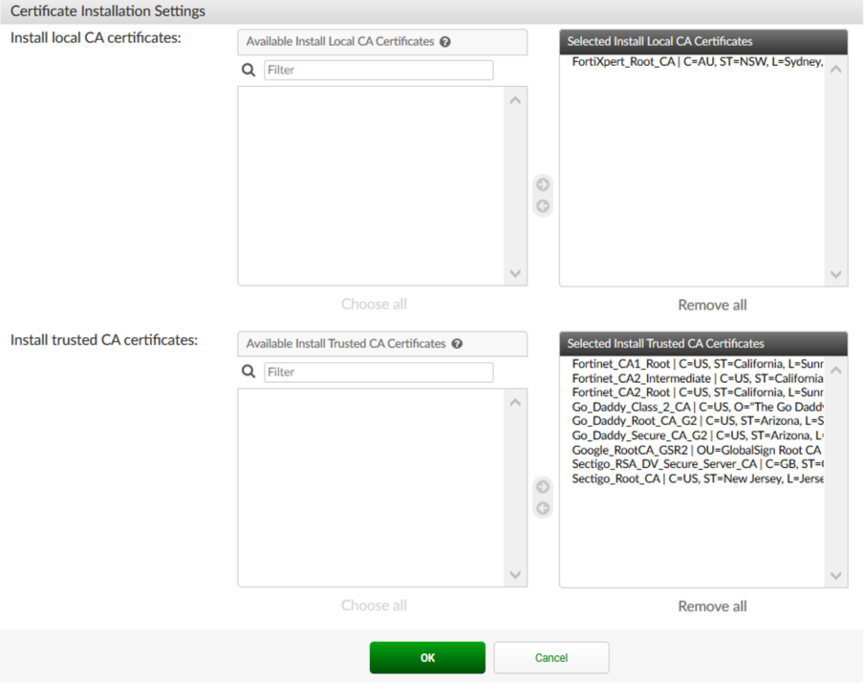
Signing CA: FortiXpert_Root_CA | C=AU, ST=NSW, L=Sydney, O=FortiXpert, OU=IT, CN=fac.fortixpert.com, emailAddress=admin@fortixpert.com

Username Format:
○ username
● username@realm
○ realm\username
○ realm/username

5. Under *Certificate Installation Settings*, set the following and then click *OK*.

a. **Install local CA certificates**: Choose to install the local Root_CA certificate.

b. **Install trusted CA certificates**: Choose to install any certificate that is required for all relevant certificate chains to be fully trusted.



Certificate Installation Settings

Install local CA certificates:

Available Install Local CA Certificates

Selected Install Local CA Certificates
FortiXpert_Root_CA | C=AU, ST=NSW, L=Sydney,

Install trusted CA certificates:

Available Install Trusted CA Certificates

Selected Install Trusted CA Certificates
Fortinet_CA1_Root | C=US, ST=California, L=Sunr
Fortinet_CA2_Intermediate | C=US, ST=California
Fortinet_CA2_Root | C=US, ST=California, L=Sunr
Go_Daddy_Class_2_CA | C=US, O="The Go Dadd
Go_Daddy_Root_CA_G2 | C=US, ST=Arizona, L=S
Go_Daddy_Secure_CA_G2 | C=US, ST=Arizona, L
Google_RootCA_GSR2 | OU=GlobalSign Root CA
Sectigo_RSA_DV_Secure_Server_CA | C=GB, ST=
Sectigo_Root_CA | C=US, ST=New Jersey, L=Jerse

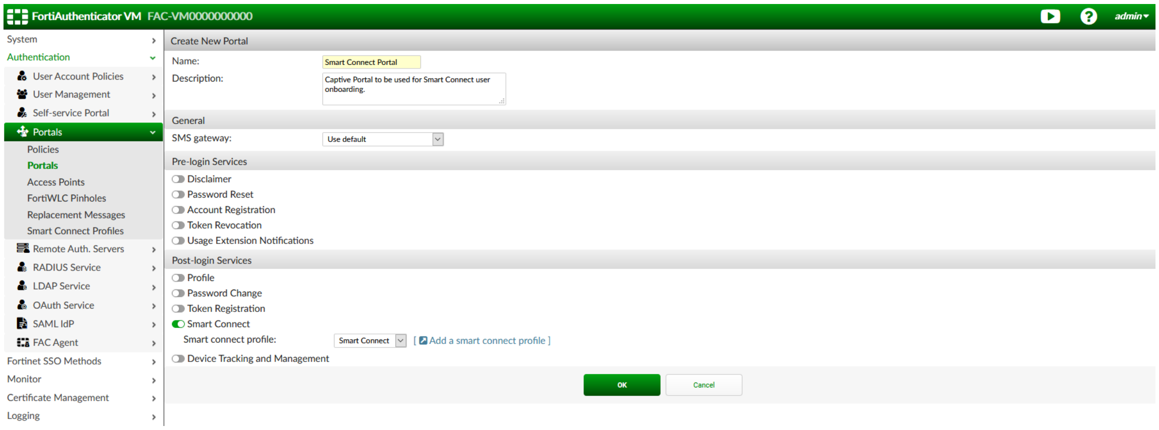
6. Select *OK* to complete the setup of the Smart Connect profile.

## Create the captive portal

### To create a captive portal:

1. Go to *Authentication > Portals > Portals*, and click *Create New*.
2. Under *Create New Portal*, enter a name and optional description for the portal.
3. Under *Post-login services*, enable *Smart Connect* and select the previously configured Smart Connect profile from the dropdown.

4. Select *OK*.



Name: Smart Connect Portal

Description: Captive Portal to be used for Smart Connect user onboarding.

SMS gateway: Use default

Pre-login Services

- ○ Disclaimer
- ○ Password Reset
- ○ Account Registration
- ○ Token Revocation
- ○ Usage Extension Notifications

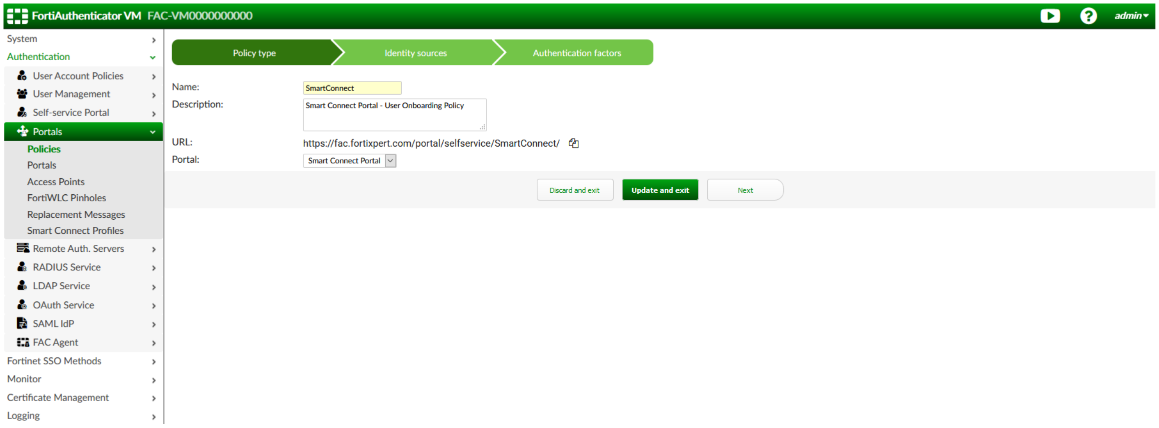
Post-login Services

- ○ Profile
- ○ Password Change
- ○ Token Registration
- ● Smart Connect
  - Smart connect profile: Smart Connect
- ○ Device Tracking and Management

## Create the self-service portal policy

### To create a self-service portal policy:

1. Go to *Authentication* > *Portals* > *Policies*. Select the *Self-Service Portal* option, and click *Create New*.
2. Under *Policy Type*, set the following and then click *Next*.
   a. **Name**: Enter a policy name, for example *SmartConnect*.
   b. **Description**: Enter an optional description for the policy.
   c. **URL**: Note this URL. This is the external captive portal redirection URL which must be added to the Onboarding SSID configured on the FortiGate/WLC later.
   d. **Portal**: Select the previously configured Smart Connect portal.



Name: SmartConnect

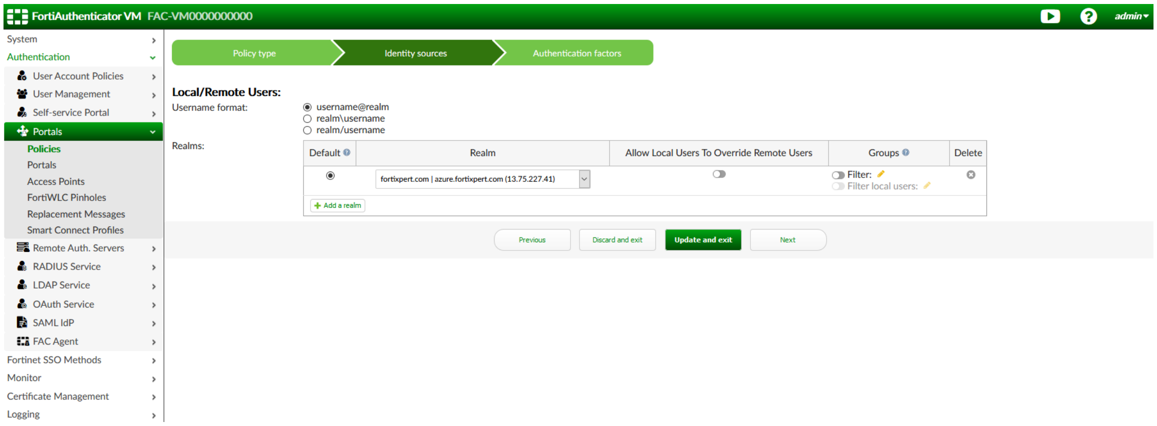
Description: Smart Connect Portal - User Onboarding Policy

URL: https://fac.fortixpert.com/portal/selfservice/SmartConnect/

Portal: Smart Connect Portal

3. Under *Identity sources*, set the following and then click *Next*:
   a. **Username format**: username@realm.

   b. **Realms**: In the dropdown box, select the LDAP realm associated with ldap.google.com, for example fortixpert.com.



**Local/Remote Users:**

Username format:
● username@realm
○ realm\username
○ realm/username

Realms:

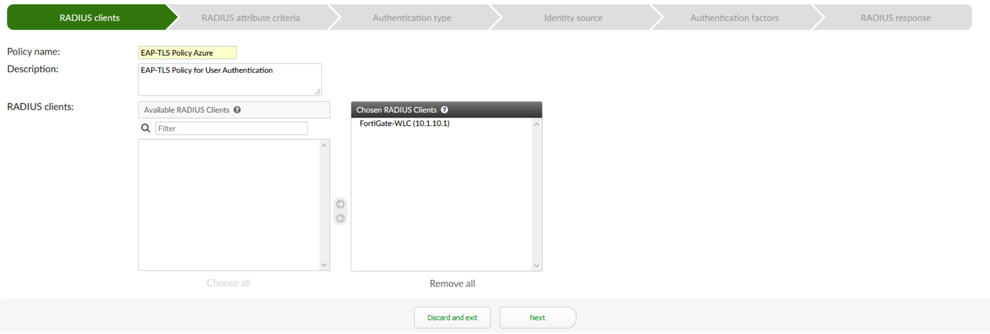
| Default | Realm | Allow Local Users To Override Remote Users | Groups | Delete |
|---|---|---|---|---|
| ● | fortixpert.com \| azure.fortixpert.com (13.75.227.41) | | Filter:<br>Filter local users: | |

4. Under *Authentication factors*, leave the default options in place, and click *Save and exit*.

## Configure RADIUS settings on FortiAuthenticator

### To create a RADIUS service policy:

1. Go to *Authentication* > *RADIUS Service* > *Policies*, and click *Create New*.
2. Under *RADIUS clients*, set the following and then click *Next*:
   a. **Policy Name**: Enter a name for the policy, for example EAP-TLS Policy G Suite.
   b. **Description**: Enter an optional description, for example EAP-TLS Policy for User Authentication.
   c. **RADIUS Clients**: Add the FortiGate to the *Chosen RADIUS Clients* section.



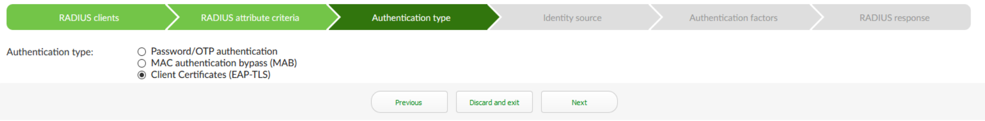
Policy name: EAP-TLS Policy Azure

Description: EAP-TLS Policy for User Authentication

RADIUS clients:

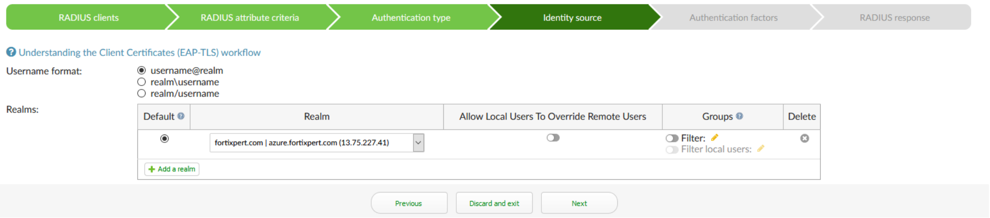
Chosen RADIUS Clients: FortiGate-WLC (10.1.10.1)

3. Under *RADIUS attribute criteria*, click *Next* without making changes.
4. Under *Authentication type*, select *Client Certificates (EAP-TLS)*, and click *Next*.



Authentication type:
○ Password/OTP authentication
○ MAC authentication bypass (MAB)
● Client Certificates (EAP-TLS)

5. Under *Identity source*, set the following and then click *Next*:
   a. **Username format**: Select your preferred format, for example username@realm.
   b. **Realms**: Select the realm that you set up to communicate with ldap.google.com, for example fortixpert.com.



Understanding the Client Certificates (EAP-TLS) workflow

Username format: ● username@realm ○ realm\username ○ realm/username

Realms:

| Default | Realm | Allow Local Users To Override Remote Users | Groups | Delete |
|---|---|---|---|---|
| ● | fortixpert.com \| azure.fortixpert.com (13.75.227.41) |  | Filter:<br>Filter local users: |  |

+ Add a realm

6. Under *Authentication factors*, click *Next* without making changes.
7. Under *RADIUS response*, validate that the EAP-TLS response is as expected, and click *Save and exit*.

# Option B - WiFi onboarding with Smart Connect and Azure

This section outlines how to configure the FortiAuthenticator to communicate with Microsoft Azure AD Directory Services via Secure Lightweight Directory Access Protocol

**To configure WiFi Onboarding with Azure:**

1. Configure Azure AD DS LDAPS integration on page 230
2. Configure Smart Connect and the captive portal on page 235
3. Configure RADIUS settings on FortiAuthenticator on page 238

## Configure Azure AD DS LDAPS integration

This guide does not include information on how to provision Azure AD DS. Please refer to Microsoft's support site for instructions on how to do this.

**To configure Azure AD DS LDAPS integration:**

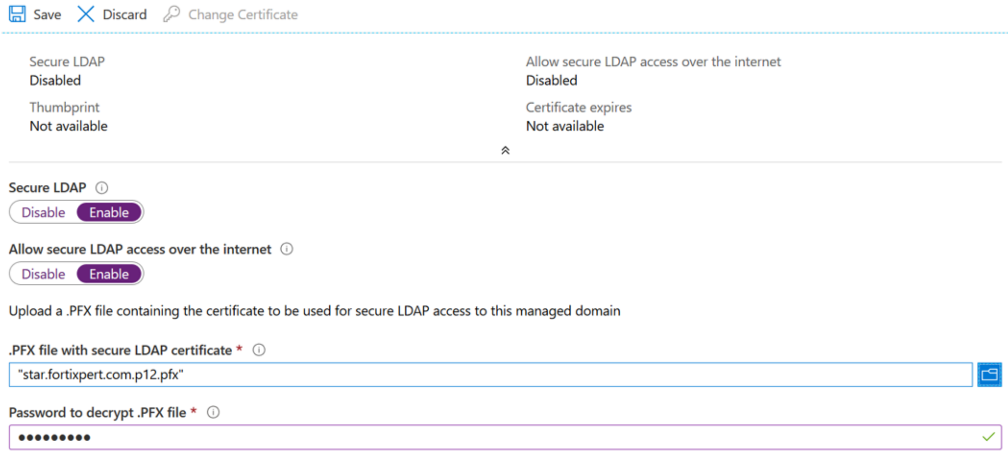
1. Provision the LDAPS connector in Azure AD DS on page 230
2. Provision the remote LDAP server on FortiAuthenticator on page 232

### Provision the LDAPS connector in Azure AD DS

**To provision the LDAP connector in Azure AD DS:**

1. Login to the Azure admin portal using an Azure admin account.
2. Select *Active Directory Domain Services*.
3. Select *View*.
4. Select your AD DS instance, for example fortixpert.com.
5. Within the AD DS menu for your domain, select *Secure LDAP* under *Settings*.

6. In the Secure LDAP window, perform the following:
   a. Set *Secure LDAP* to *Enable*.
   b. Set *Allow secure LDAP access over the internet* to *Enable*.
   c. Upload your domain wildcard certificate, for example *.fortixpert.com, in .PFX format.
   d. Enter the password to decrypt the PFX file.



Secure LDAP
Disabled

Allow secure LDAP access over the internet
Disabled

Thumbprint
Not available

Certificate expires
Not available

Secure LDAP: Enable

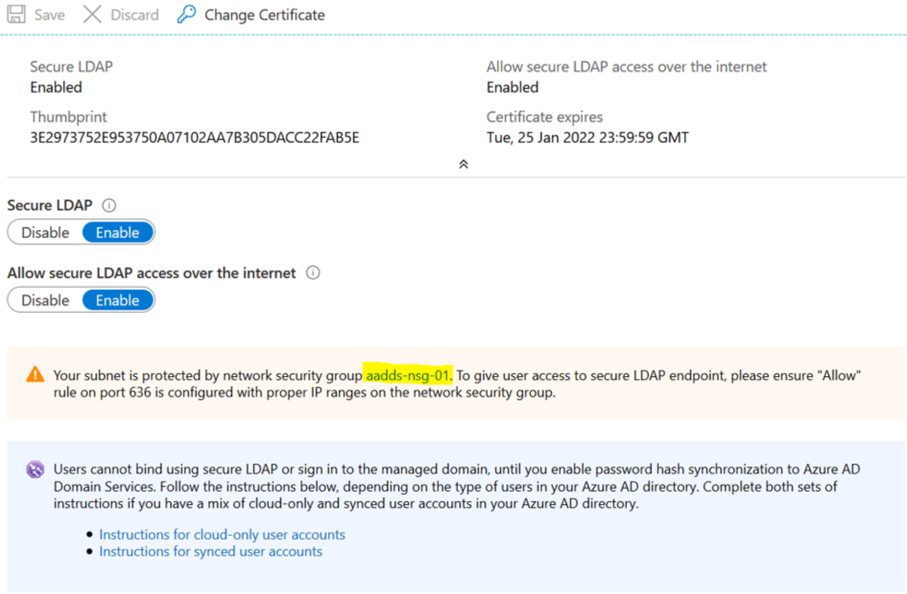
Allow secure LDAP access over the internet: Enable

Upload a .PFX file containing the certificate to be used for secure LDAP access to this managed domain

.PFX file with secure LDAP certificate *
"star.fortixpert.com.p12.pfx"

Password to decrypt .PFX file *
●●●●●●●●●

7. Select the *Save* button at the top of the page, and wait for Azure to configure Secure LDAP.
   This process takes approximately five minutes.
8. Once provisioning is complete, you must now allow inbound access for the secure LDAP protocol (port 636 to your AD DS instance.
9. Browse to the network security group linked in your Secure LDAP connector.
10. Select the network secure group link to access the network security group settings.
    You can follow the steps found on Microsoft's support website to enable user accounts for Azure AD DS. This is required for users to authenticate through Secure LDAP.



Secure LDAP
Enabled

Allow secure LDAP access over the internet
Enabled

Thumbprint
3E2973752E953750A07102AA7B305DACC22FAB5E

Certificate expires
Tue, 25 Jan 2022 23:59:59 GMT

Secure LDAP: Enable

Allow secure LDAP access over the internet: Enable

Your subnet is protected by network security group aadds-nsg-01. To give user access to secure LDAP endpoint, please ensure "Allow" rule on port 636 is configured with proper IP ranges on the network security group.

Users cannot bind using secure LDAP or sign in to the managed domain, until you enable password hash synchronization to Azure AD Domain Services. Follow the instructions below, depending on the type of users in your Azure AD directory. Complete both sets of instructions if you have a mix of cloud-only and synced user accounts in your Azure AD directory.

- Instructions for cloud-only user accounts
- Instructions for synced user accounts

### To create an Azure inbound firewall policy:

1. Within the network security group, go to *Settings* > *Inbound Security Rules*, and click *Add*.
2. In *Add inbound security rule*, set the following:
    a. **Source**: IP Address.
    b. **Source IP address/CIDR ranges**: Set as the IP address/range that the inbound request will be originating from.
    c. **Destination port ranges**: 636.
    d. **Name**: Enter the name, for example AllowSecureLDAP.
    e. **Description**: Add an optional description.
3. Leave all other settings as their default values, and click *Add*.

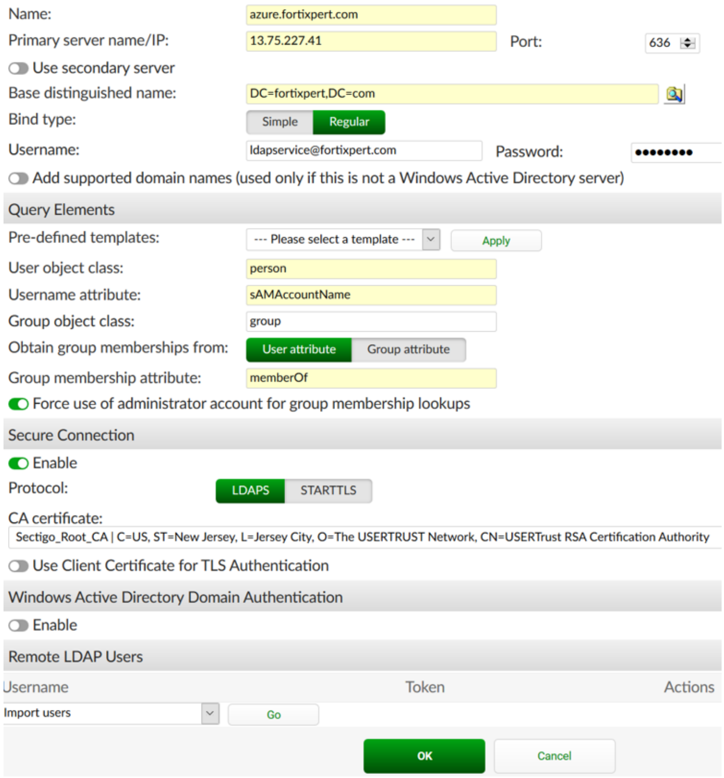
### To obtain the LDAPS IP address:

1. Go to Azure AD Directory Services, and select the Azure domain.
2. Go to *Settings* > *Properties*. Note down the Secure LDAP external IP address.

## Provision the remote LDAP server on FortiAuthenticator

### To provision the remote LDAP server:

1. In FortiAuthenticator, go to *Authentication* > *Remote Auth. Servers* > *LDAP*, and click *Create New*.
2. In the *Create New LDAP Server* window, set the following:
    a. **Name**: Enter a name, for example azure.fortixpert.com.
    b. **Primary server name/IP**: Enter the Secure LDAP IP.
    c. **Bind type**: *Regular*.
    d. **Username/Password**: Enter a username and password that can access MS Azure DS to perform directory lookups.
    e. **Base distinguished name**: Leave blank.
3. In the *Query Elements* section, set the following:
    a. **Pre-defined templates**: Select *Microsoft Active Directory* and click *Apply*.
    b. **Force use of administrator account for group membership lookups**: Enabled.
4. In the *Secure Connection* section, set the following
    a. **Secure Connection**: Enabled.
    b. **Protocol**: *LDAPS*.
    c. **CA Certificate**: Select the Root CA certificate for the wildcard certificate that was uploaded to MS Azure to use with the Secure LDAP connector.
5. Select the lookup icon next to *Base distinguished name*. Choose the base DN for your user accounts, for example DC=fortixpert,DC=com. Click *OK*.



Name: azure.fortixpert.com

Primary server name/IP: 13.75.227.41 Port: 636

○ Use secondary server

Base distinguished name: DC=fortixpert,DC=com

Bind type: Simple [✓ Regular]

Username: ldapservice@fortixpert.com Password: ••••••••

○ Add supported domain names (used only if this is not a Windows Active Directory server)

Query Elements

Pre-defined templates: --- Please select a template --- Apply

User object class: person

Username attribute: sAMAccountName

Group object class: group

Obtain group memberships from: [✓ User attribute] Group attribute

Group membership attribute: memberOf

● Force use of administrator account for group membership lookups

Secure Connection

● Enable

Protocol: [✓ LDAPS] STARTTLS

CA certificate:
Sectigo_Root_CA | C=US, ST=New Jersey, L=Jersey City, O=The USERTRUST Network, CN=USERTrust RSA Certification Authority

○ Use Client Certificate for TLS Authentication

Windows Active Directory Domain Authentication

○ Enable

Remote LDAP Users

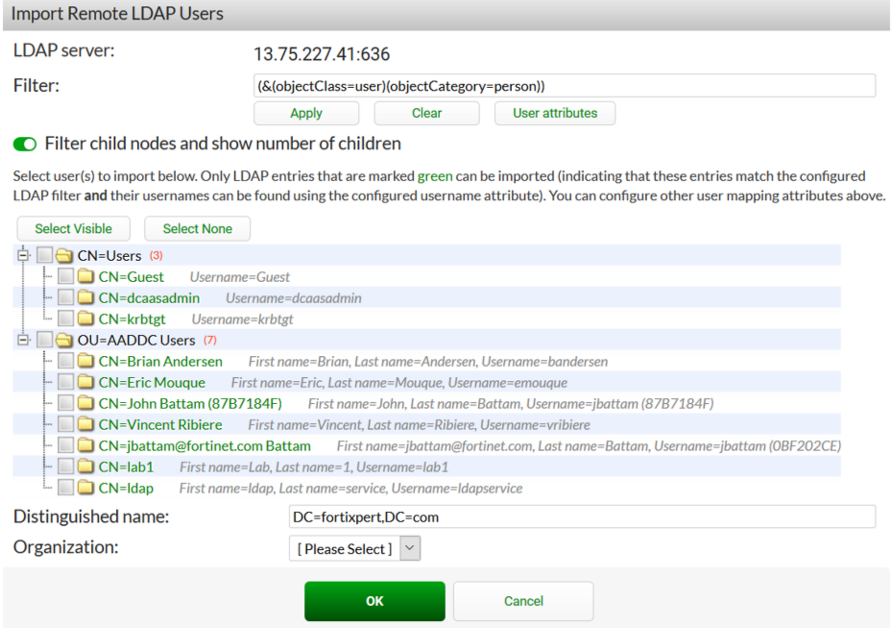
| Username | Token | Actions |
|---|---|---|
| Import users Go | | |

6. Click *OK* to save the remote LDAP server configuration.

### To import remote user accounts:

1. Go to *Authentication* > *User Management* > *Remote Users*. Confirm *LDAP* is selected at the top of the page, and click *Import*.
2. Under *Import Remote LDAP User*, complete the following:
   a. **Remote LDAP Server**: Select the Azure remote LDAP server.
   b. **Action**: Select *Import users*, and click *Go* to view a list of users within your Azure directory.

c. Select the users you wish to be able to connect to the wireless network using their Azure based account.



Import Remote LDAP Users

LDAP server: 13.75.227.41:636

Filter: (&(objectClass=user)(objectCategory=person))

● Filter child nodes and show number of children

Select user(s) to import below. Only LDAP entries that are marked green can be imported (indicating that these entries match the configured LDAP filter **and** their usernames can be found using the configured username attribute). You can configure other user mapping attributes above.

- □ CN=Users (3)
  - □ CN=Guest *Username=Guest*
  - □ CN=dcaasadmin *Username=dcaasadmin*
  - □ CN=krbtgt *Username=krbtgt*
- □ OU=AADDC Users (7)
  - □ CN=Brian Andersen *First name=Brian, Last name=Andersen, Username=bandersen*
  - □ CN=Eric Mouque *First name=Eric, Last name=Mouque, Username=emouque*
  - □ CN=John Battam (87B7184F) *First name=John, Last name=Battam, Username=jbattam (87B7184F)*
  - □ CN=Vincent Ribiere *First name=Vincent, Last name=Ribiere, Username=vribiere*
  - □ CN=jbattam@fortinet.com Battam *First name=jbattam@fortinet.com, Last name=Battam, Username=jbattam (0BF202CE)*
  - □ CN=lab1 *First name=Lab, Last name=1, Username=lab1*
  - □ CN=ldap *First name=ldap, Last name=service, Username=ldapservice*

Distinguished name: DC=fortixpert,DC=com

Organization: [ Please Select ]

3. Click *OK*.

### To set up a remote user sync rule:

1. Go to *Authentication* > *User Management* > *Remote User Sync Rule*, and click *Create New*.
2. Under *Create New Remote LDAP User Synchronization Rule*, set the following:
   a. **Name**: Enter a name, for example Azure_Remote_Sync.
   b. **Remote LDAP**: Select your Azure remote LDAP server.
   c. **Base distinguished name**: This setting can be left as the default, for example DC=fortixpert,DC=com.
3. Under *Synchronization Attributes*, set the following:
   a. **Token-based authentication sync priorities**: Enable *None*.
   b. **Sync every**: Select the sync frequency. In production environments, this should be set to 30 minutes or more depending on the number of users being synchronized.
   c. **Sync as**: *Remote LDAP User*.
   d. **User role for new user imports**: *User*.
4. Leave all other settings in their default states, and click *OK*.

### To create a new realm:

1. Go to *Authentication* > *User Management* > *Realms*, and click *Create New*.
2. Under *Create New Realm*, set the following:
   a. **Name**: Enter the realm name, for example fortixpert.com.
   b. **User source**: Select the remote LDAP service from the dropdown box.
3. Click *OK*.

# Configure Smart Connect and the captive portal

This section outlines the configuration required on FortiAuthenticator to provision a Captive Portal using Smart Connect authenticating against MS Azure AD DS.

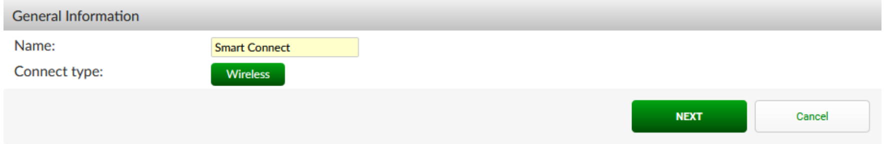
**To configure Smart Connect and portals on FortiAuthenticator:**

1. Create the Smart Connect profile on page 235
2. Create the captive portal on page 236
3. Create the self-service portal policy on page 237

## Create the Smart Connect profile

**To create Smart Connect profiles:**

1. Go to *Authentication* > *Portals* > *Smart Connect Profiles*, and click *Create New*.
2. Under *General Information*, enter a name for the profile, and click *Next*.

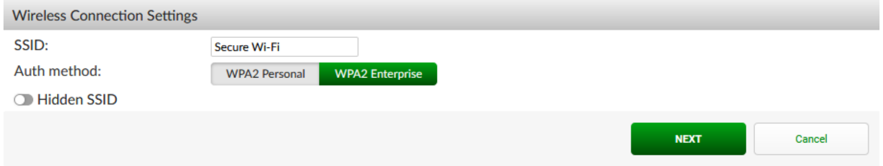


General Information

Name: Smart Connect

Connect type: Wireless

3. Under *Wireless Connection Settings*, set the following and then click *Next*.
   a. **SSID**: Enter your SSID name, for example Secure Wi-Fi.
   b. **Auth method**: *WPA2 Enterprise*.
   c. **Hidden SSID**: *Disabled*.



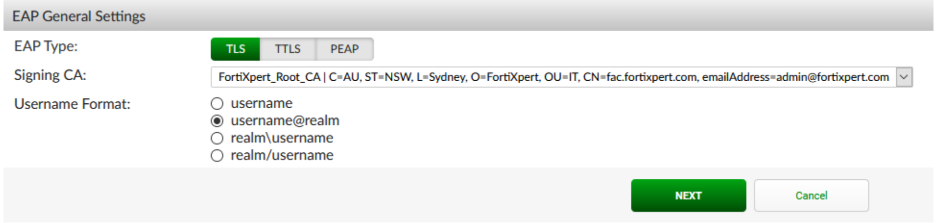
Wireless Connection Settings

SSID: Secure Wi-Fi

Auth method: WPA2 Personal [✓ WPA2 Enterprise]

Hidden SSID

4. Under *EAP General Settings*, set the following and then click *Next*.
   a. **EAP Type**: *TLS*.
   b. **Signing CA**: Select the local Root CA configured earlier.
   c. **Username Format**: Select your preference, for example *username@realm*.



EAP General Settings

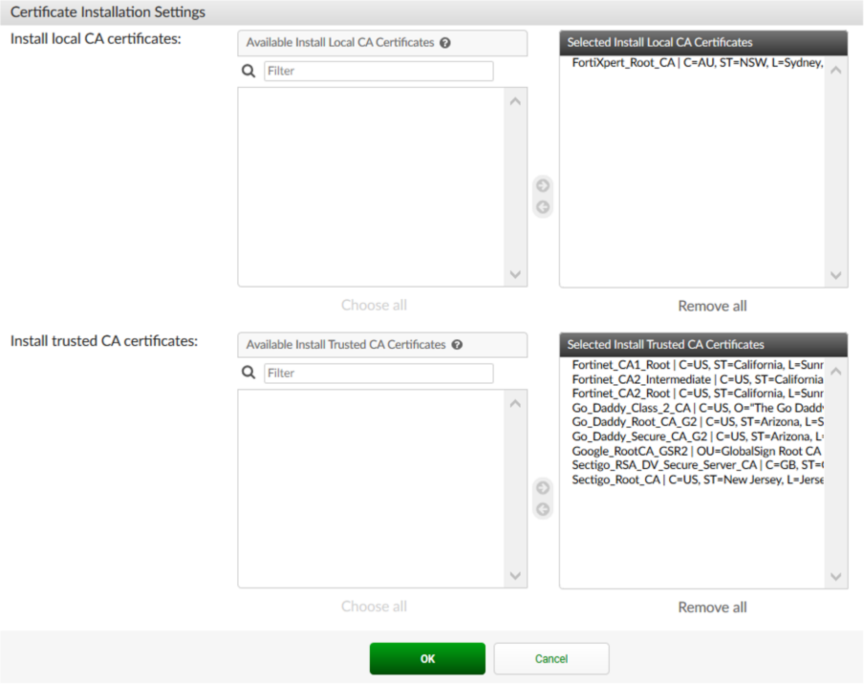
EAP Type: [✓ TLS] TTLS PEAP

Signing CA: FortiXpert_Root_CA | C=AU, ST=NSW, L=Sydney, O=FortiXpert, OU=IT, CN=fac.fortixpert.com, emailAddress=admin@fortixpert.com

Username Format:
○ username
● username@realm
○ realm\username
○ realm/username

5. Under *Certificate Installation Settings*, set the following and then click *OK*.
   a. **Install local CA certificates**: Choose to install the local Root_CA certificate.
   b. **Install trusted CA certificates**: Choose to install any certificate that is required for all relevant certificate

chains to be fully trusted.



Certificate Installation Settings

Install local CA certificates:

Selected Install Local CA Certificates

FortiXpert_Root_CA | C=AU, ST=NSW, L=Sydney,

Install trusted CA certificates:

Selected Install Trusted CA Certificates

Fortinet_CA1_Root | C=US, ST=California, L=Sunr
Fortinet_CA2_Intermediate | C=US, ST=California
Fortinet_CA2_Root | C=US, ST=California, L=Sunr
Go_Daddy_Class_2_CA | C=US, O="The Go Dadd
Go_Daddy_Root_CA_G2 | C=US, ST=Arizona, L=S
Go_Daddy_Secure_CA_G2 | C=US, ST=Arizona, L
Google_RootCA_GSR2 | OU=GlobalSign Root CA
Sectigo_RSA_DV_Secure_Server_CA | C=GB, ST=
Sectigo_Root_CA | C=US, ST=New Jersey, L=Jerse

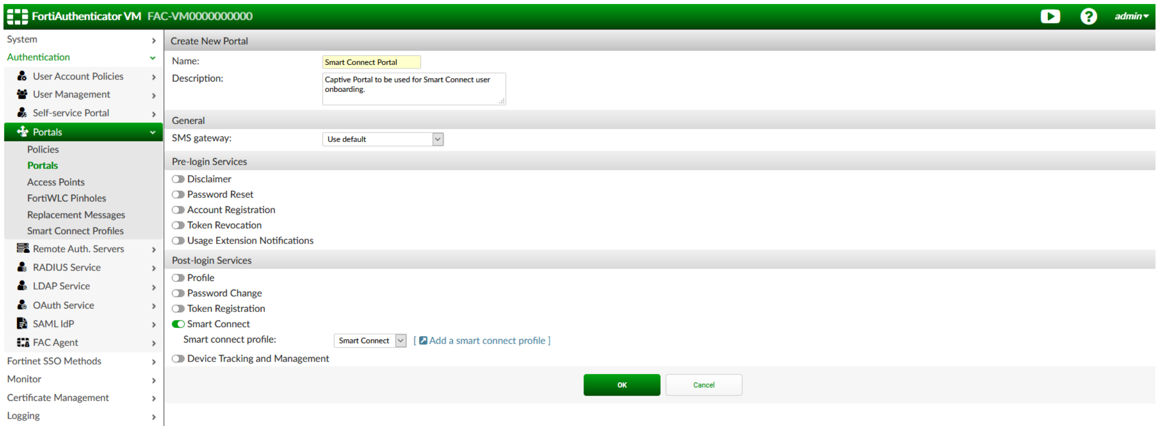
Available Install Local CA Certificates
Filter
Choose all
Remove all
Available Install Trusted CA Certificates
Filter
Choose all
Remove all
OK
Cancel

6. Select *OK* to complete the setup of the Smart Connect profile.

## Create the captive portal

### To create a captive portal:

1. Go to *Authentication > Portals > Portals*, and click *Create New*.
2. Under *Create New Portal*, enter a name and optional description for the portal.
3. Under *Post-login services*, enable *Smart Connect* and select the previously configured Smart Connect profile from the dropdown.
4. Select *OK*.



Create New Portal

Name: Smart Connect Portal

Description: Captive Portal to be used for Smart Connect user onboarding.

General

SMS gateway: Use default

Pre-login Services

○ Disclaimer
○ Password Reset
○ Account Registration
○ Token Revocation
○ Usage Extension Notifications

Post-login Services

○ Profile
○ Password Change
○ Token Registration
● Smart Connect

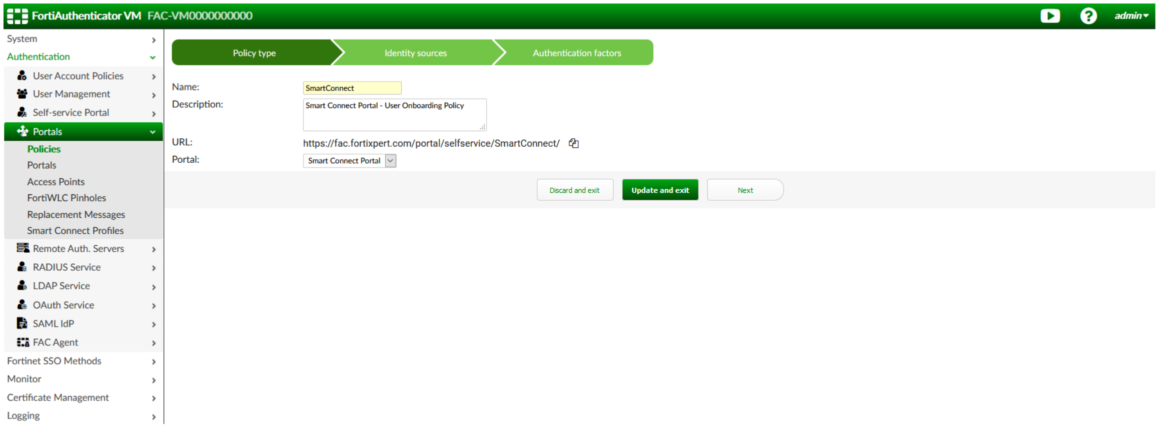
Smart connect profile: Smart Connect

○ Device Tracking and Management

## Create the self-service portal policy

### To create a self-service portal policy:

1. Go to *Authentication* > *Portals* > *Policies*. Select the *Self-Service Portal* option, and click *Create New*.
2. Under *Policy Type*, set the following and then click *Next*.
   a. **Name**: Enter a policy name, for example *SmartConnect*.
   b. **Description**: Enter an optional description for the policy.
   c. **URL**: Note this URL. This is the external captive portal redirection URL which must be added to the Onboarding SSID configured on the FortiGate/WLC later.
   d. **Portal**: Select the previously configured Smart Connect portal.



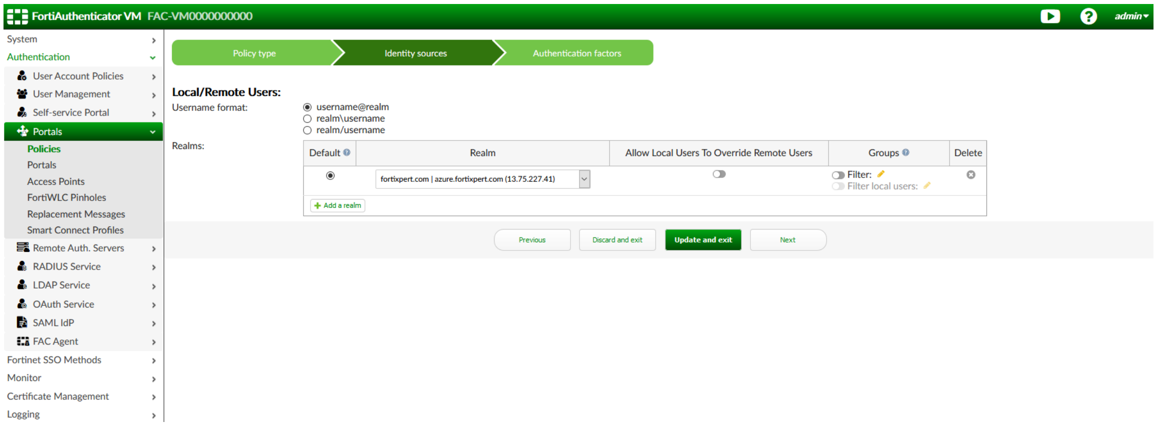
Name: SmartConnect

Description: Smart Connect Portal - User Onboarding Policy

URL: https://fac.fortixpert.com/portal/selfservice/SmartConnect/

Portal: Smart Connect Portal

3. Under *Identity sources*, set the following and then click *Next*:
   a. **Username format**: username@realm.
   b. **Realms**: In the dropdown box, select the LDAP realm associated with Azure, for example fortixpert.com.



**Local/Remote Users:**

Username format:
● username@realm
○ realm\username
○ realm/username

Realms:

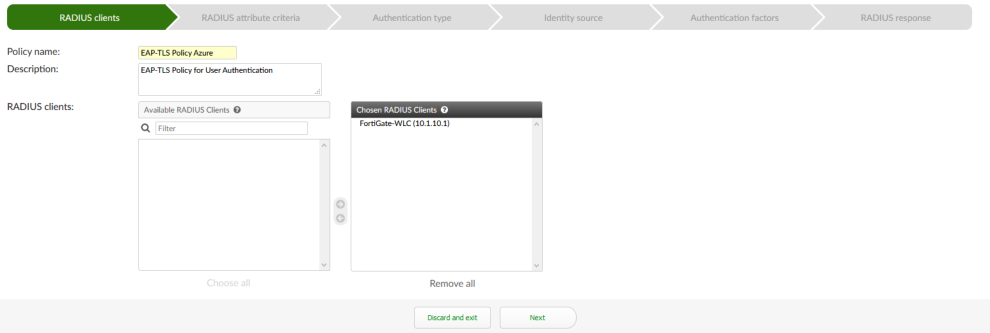
| Default | Realm | Allow Local Users To Override Remote Users | Groups | Delete |
|---|---|---|---|---|
| ● | fortixpert.com \| azure.fortixpert.com (13.75.227.41) | ○ | Filter:<br>Filter local users: | ⊗ |

4. Under *Authentication factors*, leave the default options in place, and click *Save and exit*.

## Configure RADIUS settings on FortiAuthenticator

**To create a RADIUS service policy:**

1. Go to *Authentication* > *RADIUS Service* > *Policies*, and click *Create New*.
2. Under *RADIUS clients*, set the following and then click *Next*:
   a. **Policy Name**: Enter a name for the policy, for example EAP-TLS Policy Azure.
   b. **Description**: Enter an optional description, for example EAP-TLS Policy for User Authentication.
   c. **RADIUS Clients**: Add the FortiGate to the *Chosen RADIUS Clients* section.

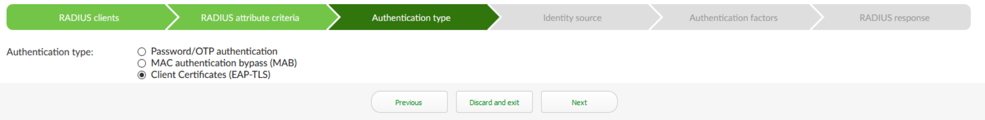


Policy name: EAP-TLS Policy Azure

Description: EAP-TLS Policy for User Authentication

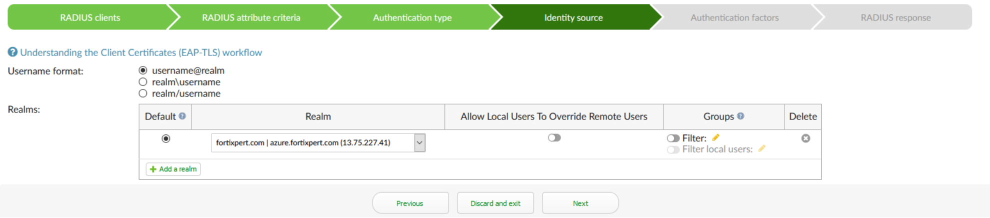
RADIUS clients: Chosen RADIUS Clients: FortiGate-WLC (10.1.10.1)

3. Under *RADIUS attribute criteria*, click *Next* without making changes.
4. Under *Authentication type*, select *Client Certificates (EAP-TLS)*, and click *Next*.



Authentication type:
○ Password/OTP authentication
○ MAC authentication bypass (MAB)
● Client Certificates (EAP-TLS)

5. Under *Identity source*, set the following and then click *Next*:
   a. **Username format**: Select your preferred format, for example username@realm.
   b. **Realms**: Select the realm that you set up to communicate with Azure, for example fortixpert.com.



Username format:
● username@realm
○ realm\username
○ realm/username

Realms:

| Default | Realm | Allow Local Users To Override Remote Users | Groups | Delete |
|---|---|---|---|---|
| ● | fortixpert.com \| azure.fortixpert.com (13.75.227.41) | | Filter:<br>Filter local users: | |

6. Under *Authentication factors*, click *Next* without making changes.
7. Under *RADIUS response*, validate that the EAP-TLS response is as expected, and click *Save and exit*.

# FortiGate configuration

This section outlines the configuration required on FortiGate WLAC to provision an onboarding (Smart Connect enabled) WiFi network and a secure (WPA2 + EAP-TLS enabled) Wi-Fi network.

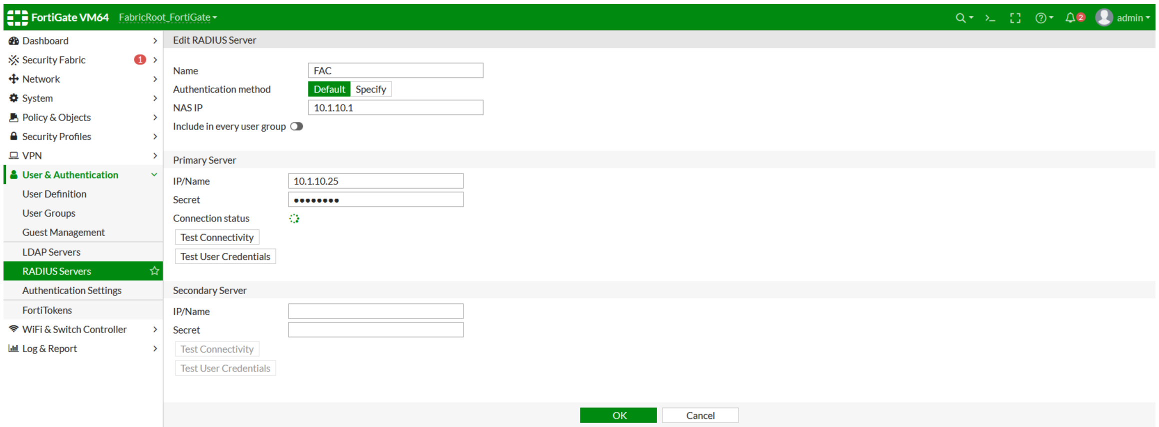
**To configure the FortiGate:**

1. Configure the RADIUS server on FortiGate on page 239
2. Create the user group for cloud-based directory user accounts on page 239
3. Provision the Onboarding and Secure WiFi networks on page 240

## Configure the RADIUS server on FortiGate

**To configure the RADIUS server:**

1. In FortiGate, go to *User & Authentication* > *RADIUS Servers*, and click *Create New*.
2. Under *New RADIUS Server*, set the following:
   a. **Name**: Enter a name for the RADIUS server, for example FAC.
   b. **NAS IP**: Enter the Network Access Server (NAS) IP. This should ideally be the IP from the interface/VLAN FortiAuthenticator is on.
3. Under *Primary Server*, set the following:
   a. **IP/Name**: Enter the FortiAuthenticator IP address.
   b. **Secret**: Enter the secret matching the one configured on FortiAuthenticator.
4. Click *Test Connectivity* to test if the connection is correctly configured, and click *OK*.



Edit RADIUS Server

Name: FAC
Authentication method: Default | Specify
NAS IP: 10.1.10.1
Include in every user group

Primary Server
IP/Name: 10.1.10.25
Secret: ••••••••
Connection status

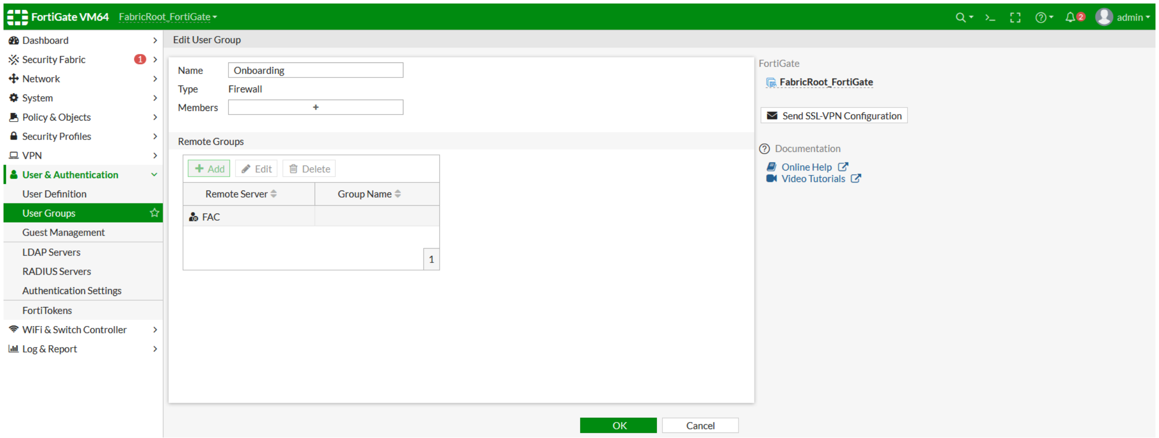
Secondary Server
IP/Name:
Secret:

## Create the user group for cloud-based directory user accounts

**To create user groups:**

1. Go to *User & Authentication* > *User Groups*, and click *Create New*.
2. Configure the following settings:
   a. **Name**: Configure a name, for example Onboarding.
   b. **Type**: Firewall.
   c. **Remote Groups**: Select *Add*. Within the Add Group Match window, select FortiAuthenticator as the remote server from the dropdown box.
   d. **Groups**: Any.

3. Select *OK* on the *Add Group Match* window. The Onboarding group is now created.



Edit User Group

Name: Onboarding
Type: Firewall
Members: +

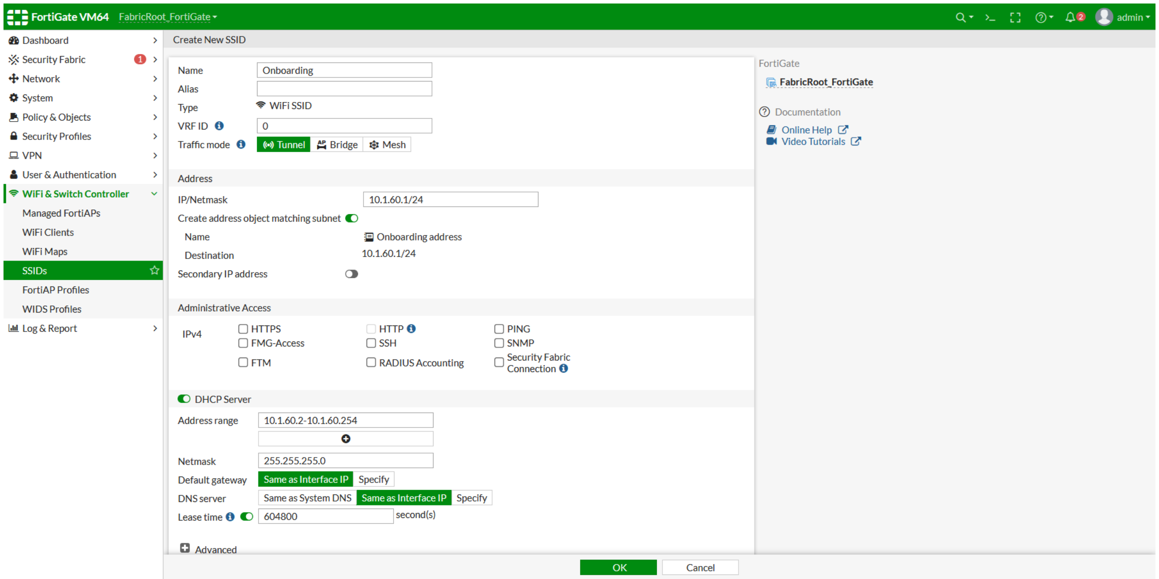
Remote Groups

| Remote Server | Group Name |
|---|---|
| FAC | |

## Provision the Onboarding and Secure WiFi networks

### To provision the Smart Connect enabled "Onboarding" SSID:

1. Go to *Wi-Fi & Switch Controller > SSID*, and click *Create New*.
2. Under *Create New SSID*, set the following:
   a. **Profile name**: Enter a name for the profile, for example Onboarding.
   b. **Traffic mode**: *Tunnel*.
3. Under *Address*, set the following:
   a. **IP/Netmask**: Enter the interface IP address for the Onboarding SSID.
4. Under *DHCP Server*, enable the DHCP Server setting and set the following:
   a. Leave *Address range*, *Netmask*, *Gateway*, and *Lease time* in their default states.
   b. **DNS server**: Select *Same as Interface IP* or specify a local DNS server that can resolve your FortiAuthenticator FQDN. If you are using the DNS database on FortiGate, select *Same as Interface IP*.



Create New SSID

Name: Onboarding
Alias:
Type: WiFi SSID
VRF ID: 0
Traffic mode: [✓ Tunnel] Bridge Mesh

Address

IP/Netmask: 10.1.60.1/24
Create address object matching subnet: enabled
Name: Onboarding address
Destination: 10.1.60.1/24
Secondary IP address: disabled

Administrative Access

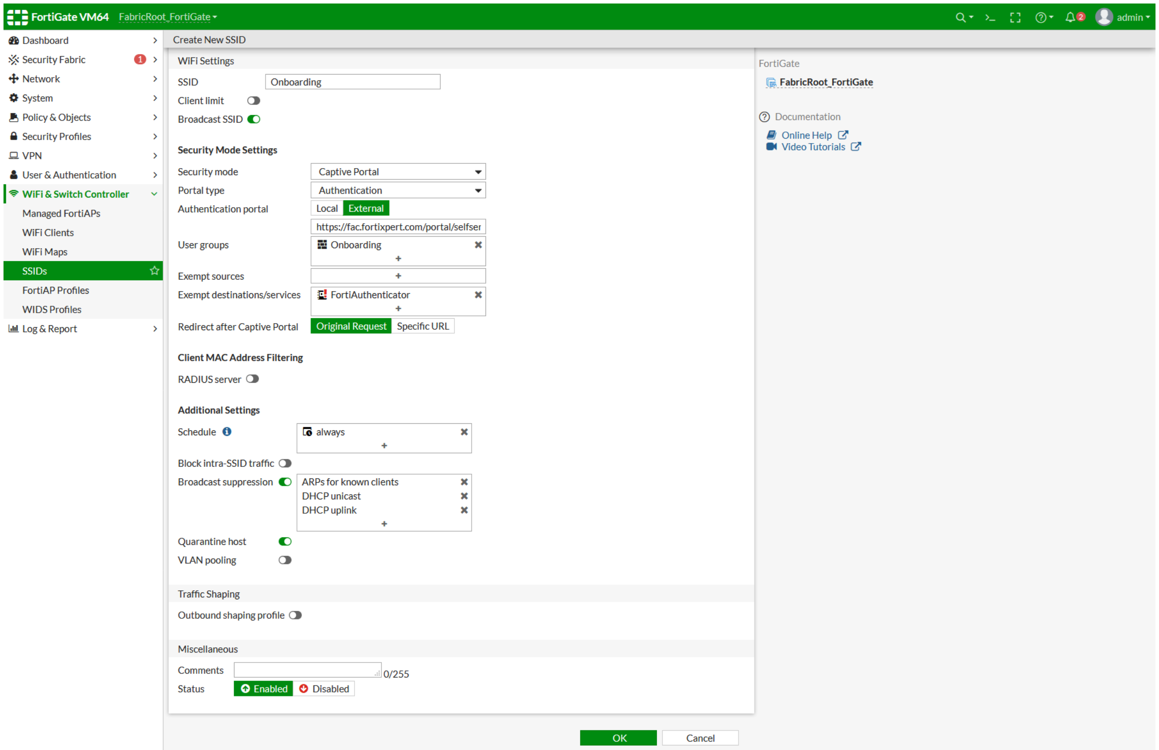
IPv4: □ HTTPS □ HTTP □ PING □ FMG-Access □ SSH □ SNMP □ FTM □ RADIUS Accounting □ Security Fabric Connection

DHCP Server: enabled

Address range: 10.1.60.2-10.1.60.254
Netmask: 255.255.255.0
Default gateway: [✓ Same as Interface IP] Specify
DNS server: Same as System DNS [✓ Same as Interface IP] Specify
Lease time: 604800 second(s)

5. Under *Network*, leave the *Decide detection* setting enabled.

6. Under *WiFi Settings*, set the following:
   a. **SSID**: Enter the SSID, for example Onboarding.
   b. **Security mode**: *Captive Portal*.
   c. **Portal type**: *Authentication*.
   d. **Authentication portal**: Select *External*, and enter the FortiAuthenticator Smart Connect portal redirection URL obtained when configuring Smart Connect on FortiAuthenticator.
   e. **User groups**: Select the previously configured user group, for example Onboarding.
   f. **Exempt destinations/services**: Select FortiAuthenticator.
   g. Leave all other settings as their default state.



Create New SSID

WiFi Settings

SSID: Onboarding
Client limit ○
Broadcast SSID ●

Security Mode Settings

Security mode: Captive Portal
Portal type: Authentication
Authentication portal: Local [✓ External]
https://fac.fortixpert.com/portal/selfser
User groups: Onboarding
Exempt sources:
Exempt destinations/services: FortiAuthenticator
Redirect after Captive Portal: [✓ Original Request] Specific URL

Client MAC Address Filtering

RADIUS server ○

Additional Settings

Schedule: always
Block intra-SSID traffic ○
Broadcast suppression ●: ARPs for known clients, DHCP unicast, DHCP uplink
Quarantine host ●
VLAN pooling ○

Traffic Shaping

Outbound shaping profile ○

Miscellaneous

Comments: 0/255
Status: [✓ Enabled] Disabled

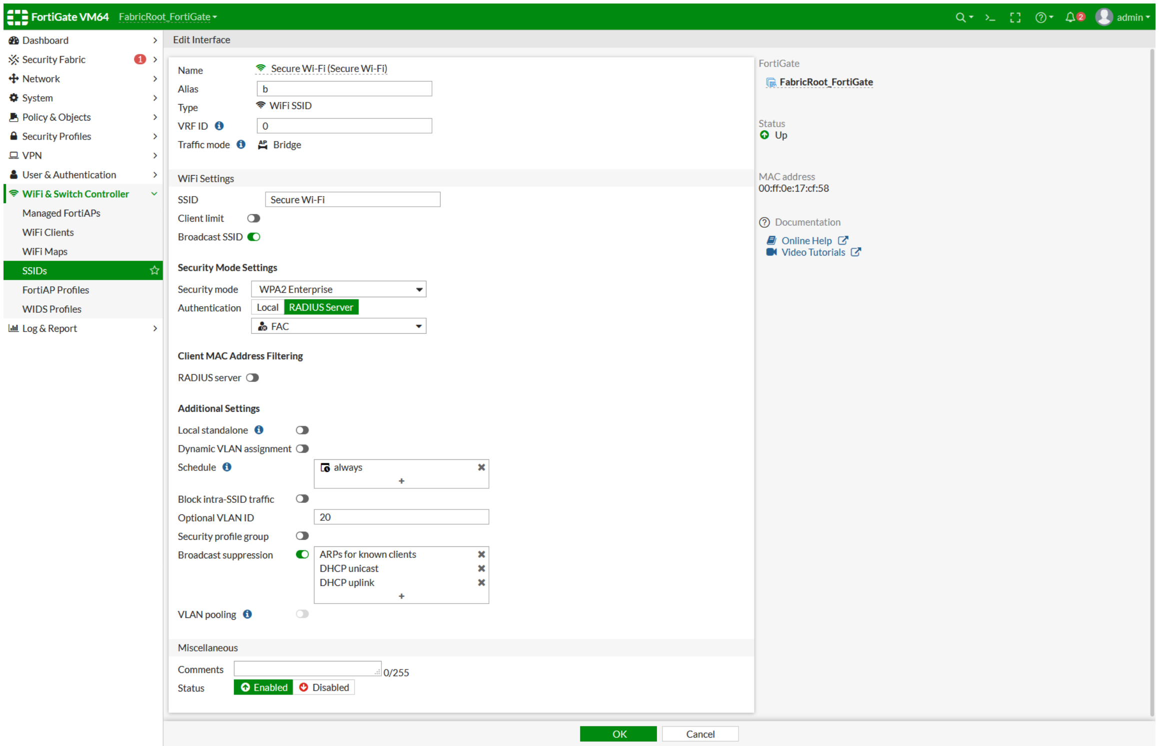
OK Cancel

7. Click *OK*.

### To provision the "Secure Wi-Fi" network:

1. Go to *WiFi & Switch Controller > SSID*, and click *Create New*.
2. Configure the following settings:
   a. **Profile name**: Enter a profile name, for example Secure Wi-Fi.
   b. **Traffic mode**: *Bridge*.
   c. **SSID**: Enter the SSID name, for example Secure Wi-Fi.
   d. **Security mode**: *WPA2 Enterprise*.
   e. **Authentication**: Choose *RADIUS Server*, and select the FortiAuthenticator.

f. **Optional VLAN ID**: This setting is optional and can be configured if WiFi traffic needs to be tagged by the AP to a VLAN configured on your local switch. Dynamic VLAN assignment is also supported.



Edit Interface

Name: Secure Wi-Fi (Secure Wi-Fi)
Alias: b
Type: WiFi SSID
VRF ID: 0
Traffic mode: Bridge

WiFi Settings

SSID: Secure Wi-Fi
Client limit: off
Broadcast SSID: on

Security Mode Settings

Security mode: WPA2 Enterprise
Authentication: Local [✓ RADIUS Server]
FAC

Client MAC Address Filtering

RADIUS server: off

Additional Settings

Local standalone: off
Dynamic VLAN assignment: off
Schedule: always
Block intra-SSID traffic: off
Optional VLAN ID: 20
Security profile group: off
Broadcast suppression: on — ARPs for known clients, DHCP unicast, DHCP uplink
VLAN pooling: off

Miscellaneous

Comments: 0/255
Status: [✓ Enabled] Disabled

FortiGate: FabricRoot_FortiGate
Status: Up
MAC address: 00:ff:0e:17:cf:58

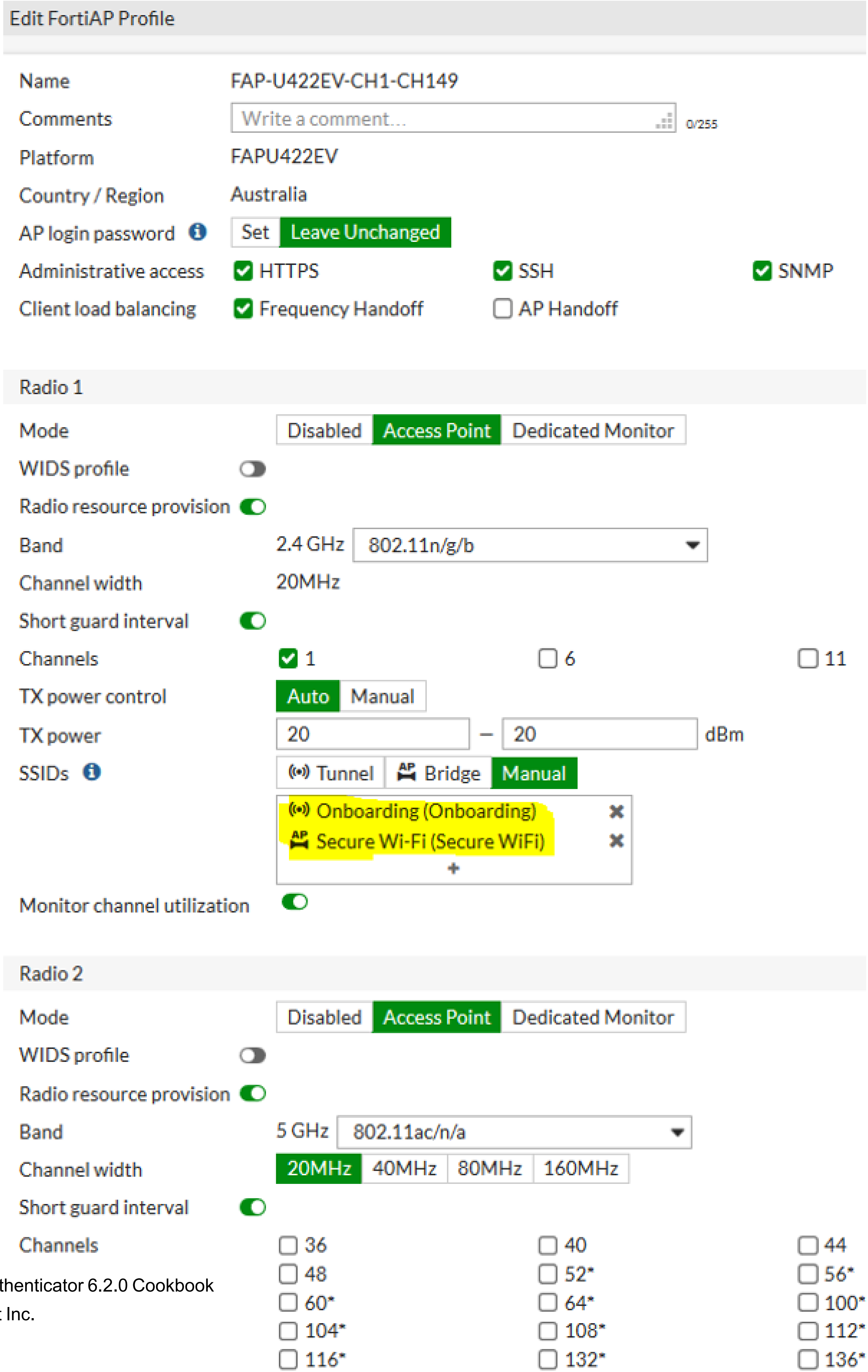
3. Click *OK*.

### To assign SSIDs to FortiAP profiles:

1. Go to *WiFi & Switch Controller > FortiAP Profiles*.
2. Select the relevant AP profile(s) and assign the previously created SSIDs (Onboarding and Secure Wi-Fi) to the

AP radio interfaces.

3. Confirm the SSIDs are broadcasting and can be seen by WiFi enabled devices.



Edit FortiAP Profile

Name FAP-U422EV-CH1-CH149

Comments Write a comment... 0/255

Platform FAPU422EV

Country / Region Australia

AP login password Set [✓ Leave Unchanged]

Administrative access ☑ HTTPS ☑ SSH ☑ SNMP

Client load balancing ☑ Frequency Handoff □ AP Handoff

Radio 1

Mode Disabled [✓ Access Point] Dedicated Monitor

WIDS profile ○

Radio resource provision ●

Band 2.4 GHz 802.11n/g/b

Channel width 20MHz

Short guard interval ●

Channels ☑ 1 □ 6 □ 11

TX power control [✓ Auto] Manual

TX power 20 – 20 dBm

SSIDs Tunnel Bridge [✓ Manual]

Onboarding (Onboarding) ✖
Secure Wi-Fi (Secure WiFi) ✖
+

Monitor channel utilization ●

Radio 2

Mode Disabled [✓ Access Point] Dedicated Monitor

WIDS profile ○

Radio resource provision ●

Band 5 GHz 802.11ac/n/a

Channel width [✓ 20MHz] 40MHz 80MHz 160MHz

Short guard interval ●

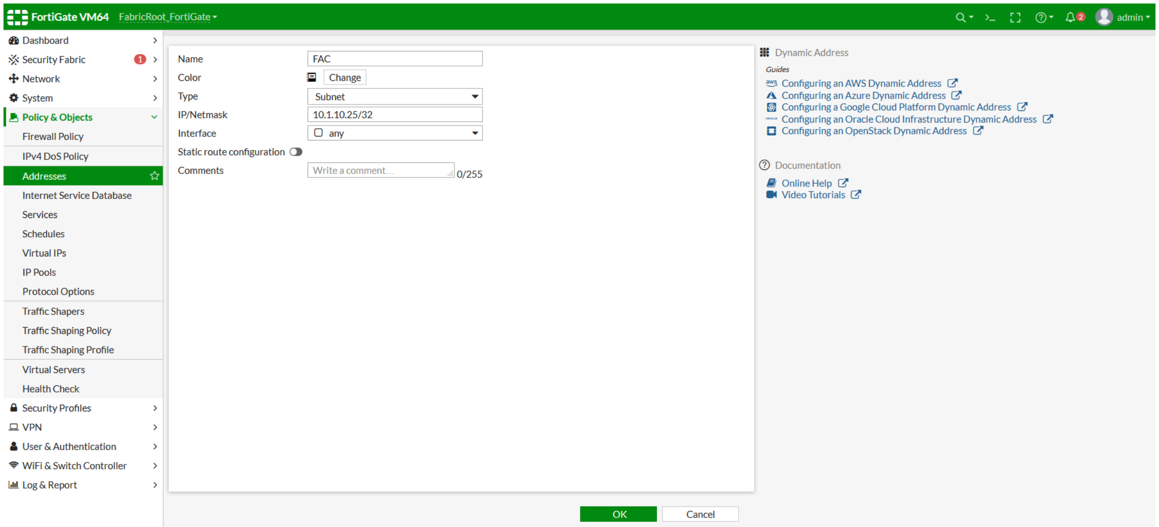
Channels

| | | |
|---|---|---|
| □ 36 | □ 40 | □ 44 |
| □ 48 | □ 52* | □ 56* |
| □ 60* | □ 64* | □ 100* |
| □ 104* | □ 108* | □ 112* |
| □ 116* | □ 132* | □ 136* |

4. Click *OK*.

### To create a new FortiAuthenticator object to use with firewall policies:

1. Go to *Policy & Objects* > *Addresses*, and click *Create New* > *Address*.
2. Configure the following settings:
   a. **Name**: Enter a name, for example FAC.
   b. **Type**: *Subnet*.
   c. **IP/Netmask**: The FortiAuthenticator IP address.
   d. **Interface**: *any*.



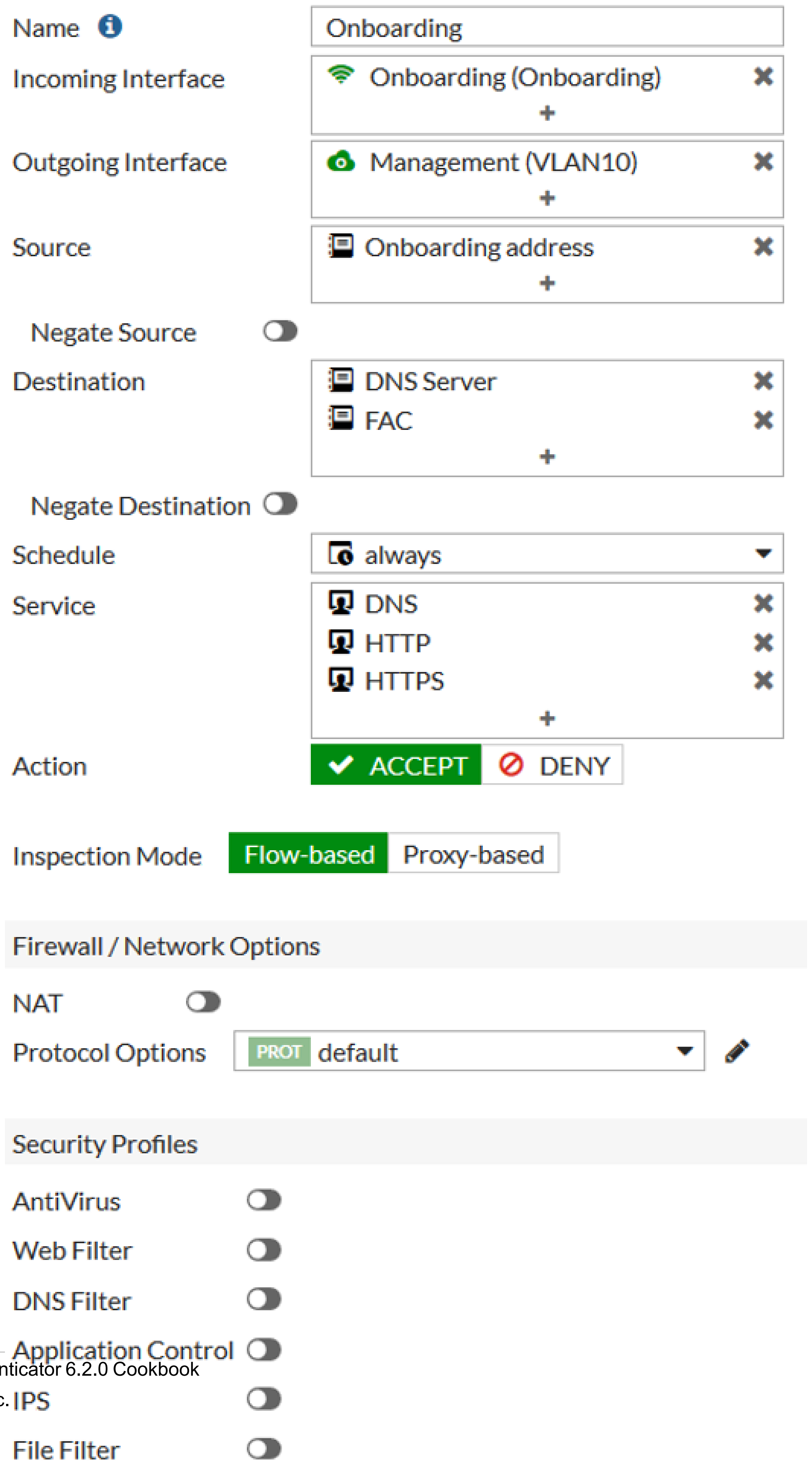
| | |
|---|---|
| Name | FAC |
| Color | Change |
| Type | Subnet |
| IP/Netmask | 10.1.10.25/32 |
| Interface | □ any |
| Static route configuration | |
| Comments | Write a comment... 0/255 |

3. Click *OK*.

### To create a firewall policy for the Onboarding SSID:

1. Go to *Policy & Objects* > *Firewall Policy*, and click *Create New*.
2. On the *New Policy* page, set the following:
   a. **Name**: Enter a name, for example Onboarding Policy.
   b. **Incoming Interface**: Select the Onboarding SSID.
   c. **Outgoing Interface**: Select the Management VLAN.
   d. **Source**: Select *all* or the Onboarding address subnet range.
   e. **Destination**: Select FortiAuthenticator and the DNS server if you are using a third party DNS server.
   f. **Service**: *DNS*, *HTTP*, and *HTTPS*.
   g. Under *Advanced*, enable the *Exempt from Captive Portal* option.
   When using a FortiOS version earlier than 6.4.1, you can enable this setting in the CLI with the command `set`

`captive-portal-exempt enable`.



| | |
|---|---|
| Name | Onboarding |
| Incoming Interface | Onboarding (Onboarding) |
| Outgoing Interface | Management (VLAN10) |
| Source | Onboarding address |
| Negate Source | ○ |
| Destination | DNS Server<br>FAC |
| Negate Destination | ○ |
| Schedule | always |
| Service | DNS<br>HTTP<br>HTTPS |
| Action | [✓ ACCEPT] DENY |
| Inspection Mode | [✓ Flow-based] Proxy-based |

Firewall / Network Options

| | |
|---|---|
| NAT | ○ |
| Protocol Options | PROT default |

Security Profiles

| | |
|---|---|
| AntiVirus | ○ |
| Web Filter | ○ |
| DNS Filter | ○ |
| Application Control | ○ |
| IPS | ○ |
| File Filter | ○ |

3. Click *OK*.

# Results

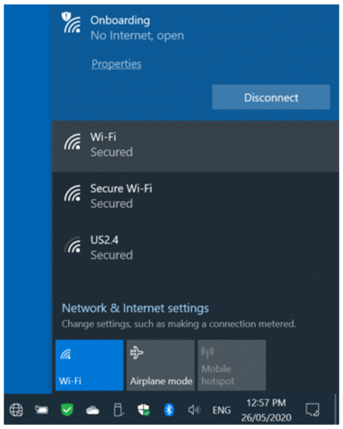
You can now connect your device to the Onboarding SSID and proceed with the Smart Connect onboarding process:

- Smart Connect Windows device onboarding process on page 249
- Smart Connect iOS device onboarding process on page 251

## Smart Connect Windows device onboarding process

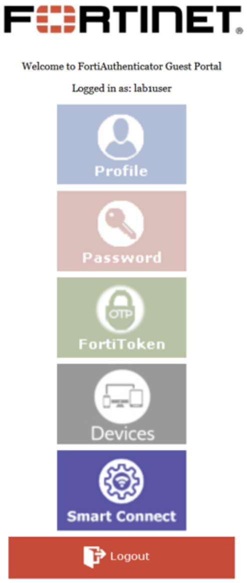
**To onboard a Windows device:**

1. On your Windows device, connect to the Onboarding WiFi network.



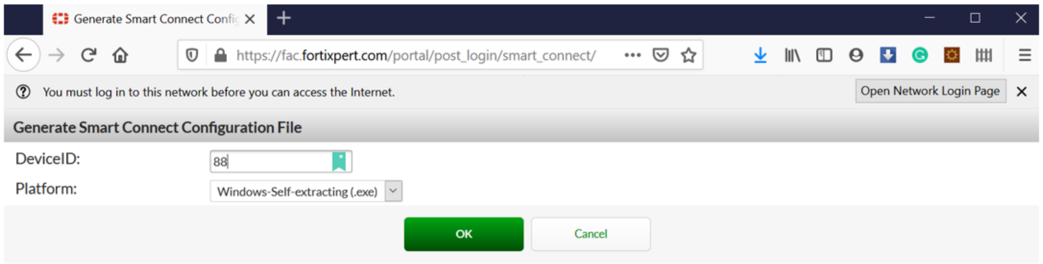
The FortiAuthenticator login screen is displayed.

2. Enter either your G Suite or Azure login credentials, and select *Login*.
Once logged in, select *Smart Connect*.


Welcome to FortiAuthenticator Guest Portal

Logged in as: lab1user

3. Enter a unique *Device ID* and choose your operating system from the *Platform* dropdown. Click *OK*.



Generate Smart Connect Confi

https://fac.fortixpert.com/portal/post_login/smart_connect/

You must log in to this network before you can access the Internet.

Generate Smart Connect Configuration File

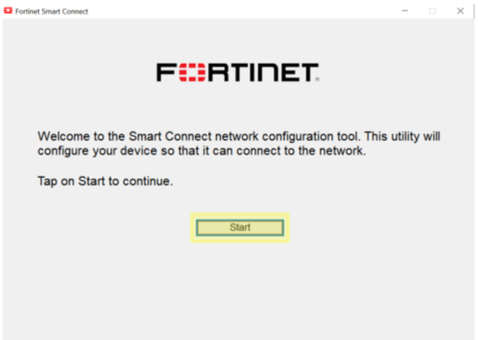
DeviceID: 88

Platform: Windows-Self-extracting (.exe)

A *SmartConnect_UserName.exe* file will be made available. Save this file.

4. Run the *SmartConnect_UserName.exe* file.
If the Microsoft Defender warning message appears, click *More info* > *Run anyway*. If the User Account Control warning appears, click *Yes*.
The Fortinet Smart Connect network configuration tool will now run.

5. Select *Start*.



Fortinet Smart Connect

Welcome to the Smart Connect network configuration tool. This utility will configure your device so that it can connect to the network.

Tap on Start to continue.

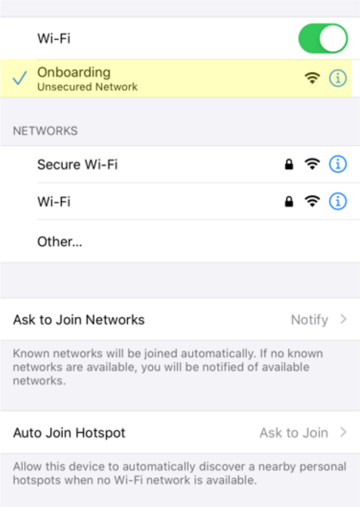
Your device will now be provisioned with the wireless network information and certificates in order to connect to the Secure Wi-Fi SSID.

6. Once provisioning is complete, click *Connect*. Your device will now connect to the Secure Wi-Fi network using WPA2 and EAP-TLS.
You may wish to forget the Onboarding network to prevent your device from automatically connecting to it in the future.

## Smart Connect iOS device onboarding process

### To onboard an iOS device:

1. On the iOS device, connect to the Onboarding WiFi network.



Wi-Fi

✓ Onboarding
Unsecured Network

NETWORKS

Secure Wi-Fi

Wi-Fi

Other...

Ask to Join Networks — Notify

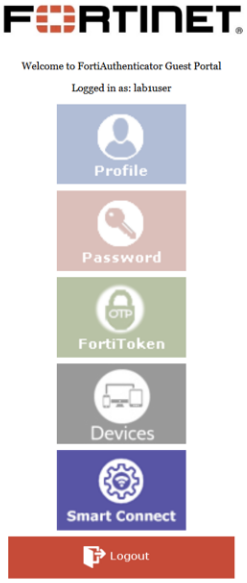
Known networks will be joined automatically. If no known networks are available, you will be notified of available networks.

Auto Join Hotspot — Ask to Join

Allow this device to automatically discover a nearby personal hotspots when no Wi-Fi network is available.

The FortiAuthenticator login screen is displayed.

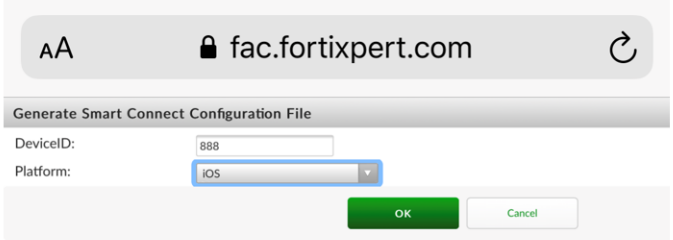
2. Enter either your G Suite or Azure login credentials, and select *Login*.
Once logged in, select *Smart Connect*.



Welcome to FortiAuthenticator Guest Portal

Logged in as: lab1user

3. Enter a unique *Device ID* and choose your operating system from the *Platform* dropdown. Click *OK*.

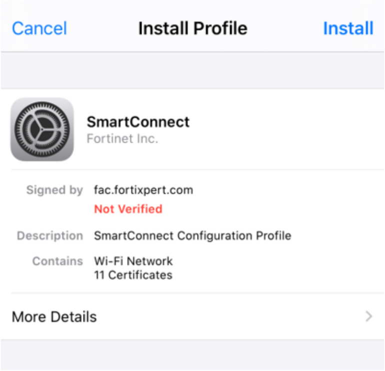


Generate Smart Connect Configuration File

DeviceID: 888

Platform: iOS

4. When prompted, download the configuration profile.
5. In *Settings*, select *Profile Downloaded*.
6. Select *Install* within the SmartConnect Install Profile. Depending on your device setup, you may be prompted to enter your device passcode/password.



SmartConnect
Fortinet Inc.

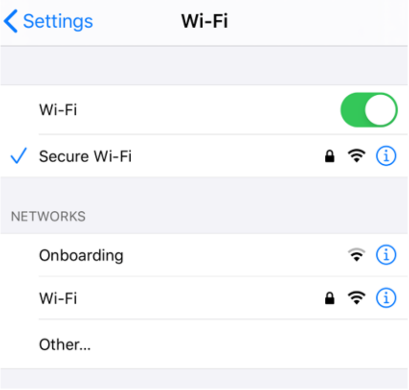
Signed by fac.fortixpert.com
Not Verified

Description SmartConnect Configuration Profile

Contains Wi-Fi Network
11 Certificates

More Details

7. On the warning screen, select *Install* to install any root certificates included within the profile. Once the installation is finished, click *Done*.
8. In *Settings*, select the information icon next to the Onboarding WiFi network and select *Forget this Network*. Once the network has been forgotten, the device will automatically connect to the Secure Wi-Fi network.



Wi-Fi

✓ Secure Wi-Fi

NETWORKS

Onboarding

Wi-Fi

Other...