Integrate ISE 3.3 with WSA Using External CA

Contents

Introduction

This document describes procedures to integrate ISE 3.3 with Cisco Secure Web Appliance (WSA) using pxGrid connections.

Prerequisites

Requirements

Cisco recommends knowledge in these topics:

- Identity Services Engine
- Cisco Secure Web Appliance (WSA)
- Platform Exchange Grid (pxGrid)
- TLS/SSL Certificates.
- PKI on Windows Server 2016

Components Used

The information in this document is based on these software and hardware versions:

- Identity Services Engine (ISE) version 3.3 patch 4
- Cisco Secure Web Appliance version 15.2.0-116

- Windows server 2016 as an External Certificate Authority (CA) server.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Configure

Section A: Cisco Identity Services Engine 3.3 Certificate Configuration

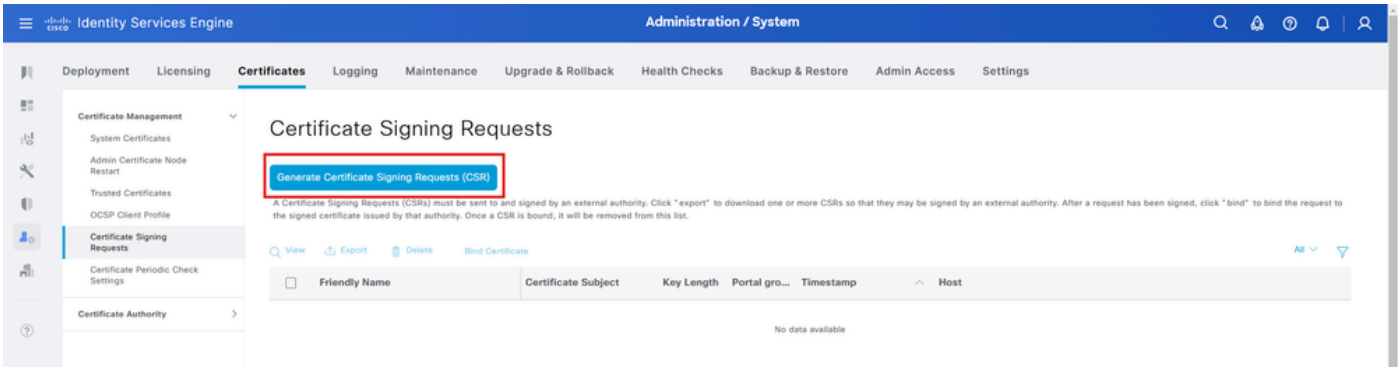
Step 1: Generate anISEServer pxGrid Certificate

Generate a CSR for an ISE server pxGrid certificate:

1.**Log in**to Cisco Identity Services Engine (ISE) GUI.

2.**Navigate**to**Administration > System > Certificates > Certificate Management >Certificate Signing Requests.**

3. Select**Generate Certificate Signing Request (CSR).**



4. Select**pxGrid**in the Certificate(s) is used for field.

5. Select**ISE node**for which the certificate is generated.

6.**Fill**in other certificates details as necessary.

7. Click**Generate**.

Usage

Certificate(s) will be used for: pxGrid

Allow Wildcard Certificates

Node(s)

Generate CSR's for these Nodes:

Node	CSR Friendly Name
ise33	ise33#pxGrid

Subject

Common Name (CN): $FQDN$

Organizational Unit (OU): AAA

Organization (O): Cisco

City (L): Bangalore

State (ST): KA

Country (C): IN

Subject Alternative Name (SAN)

DNS Name	ise33.lab.local
IP Address	10.127.197.128

* Key type: RSA

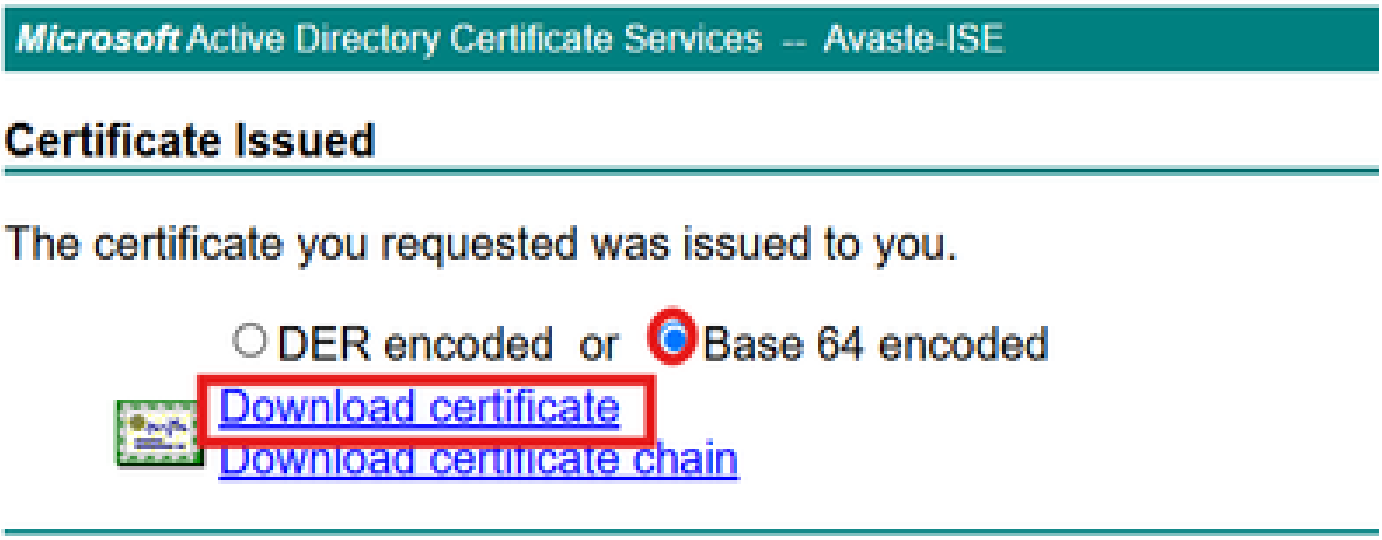
* Key Length: 4096

* Digest to Sign With: SHA-384

Certificate Policies

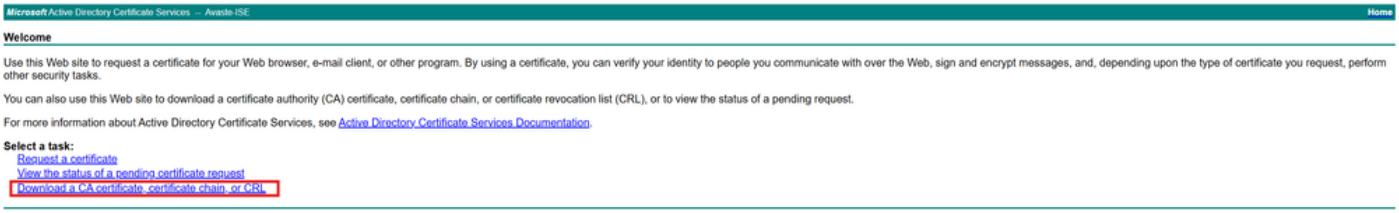
: Certificate Template pxGrid used needs both Client authentication and server authentication in the Enhanced Key Usage field.

6.**Download**the generated certificate in**Base-64**format and**Save**it as ISE_pxGrid.cer.

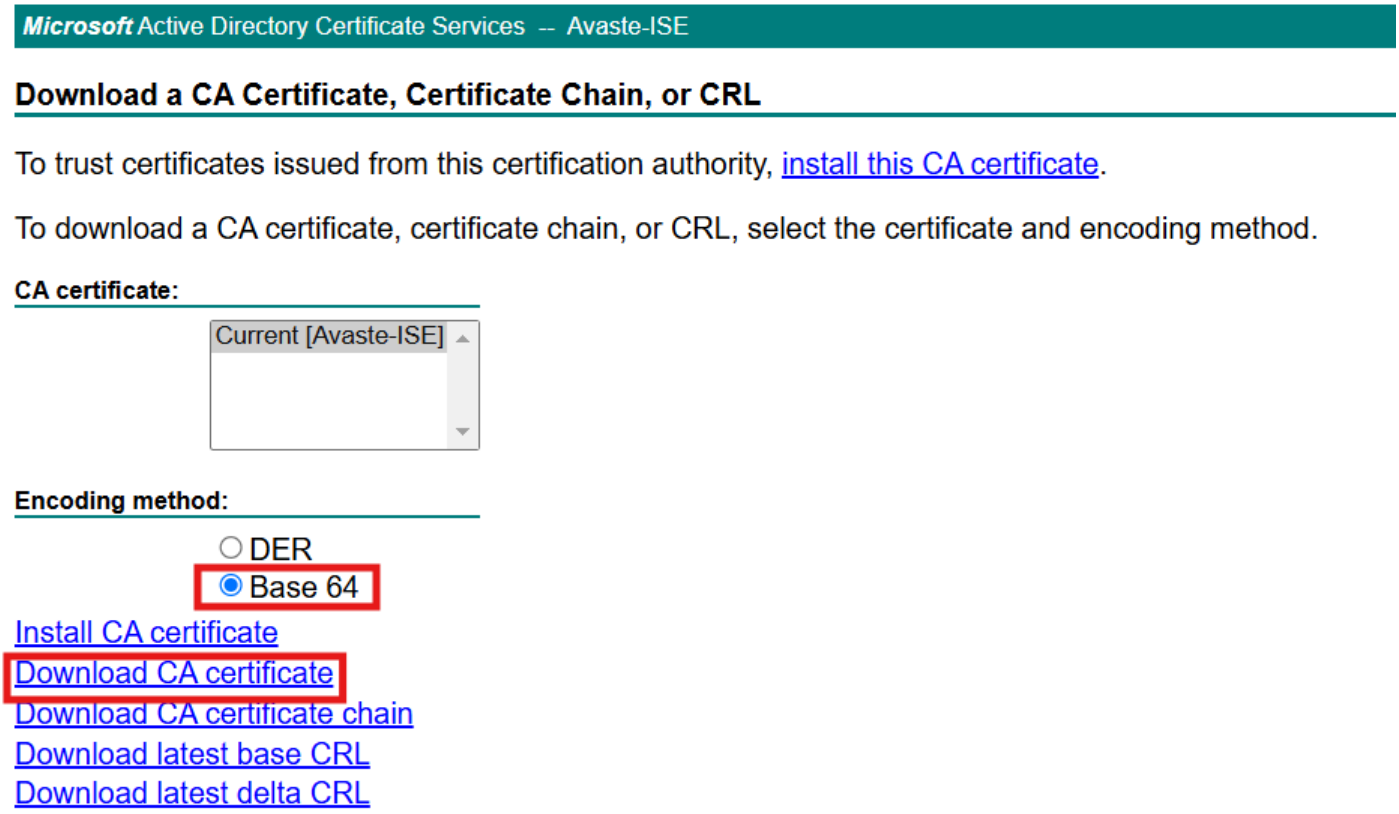


Step 3: Import the CA Root Certificate into the ISE Trust Store

1.**Navigate** to MS Active Directory Certificate Servicehome page and select**Download a CA certificate, certificate chain, or CRL**.



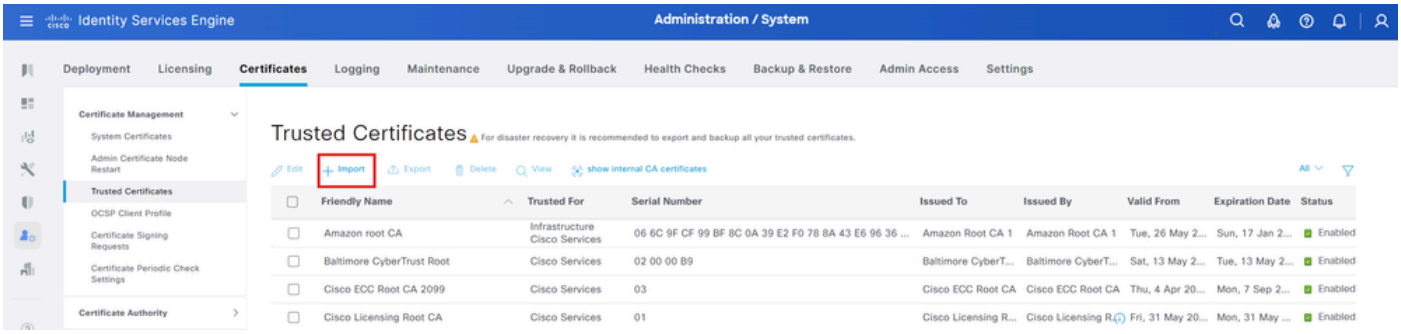
2. Select**Base-64**format, then click**Download**CA certificate.



3.**Save**the certificate as CA_Root.cer.

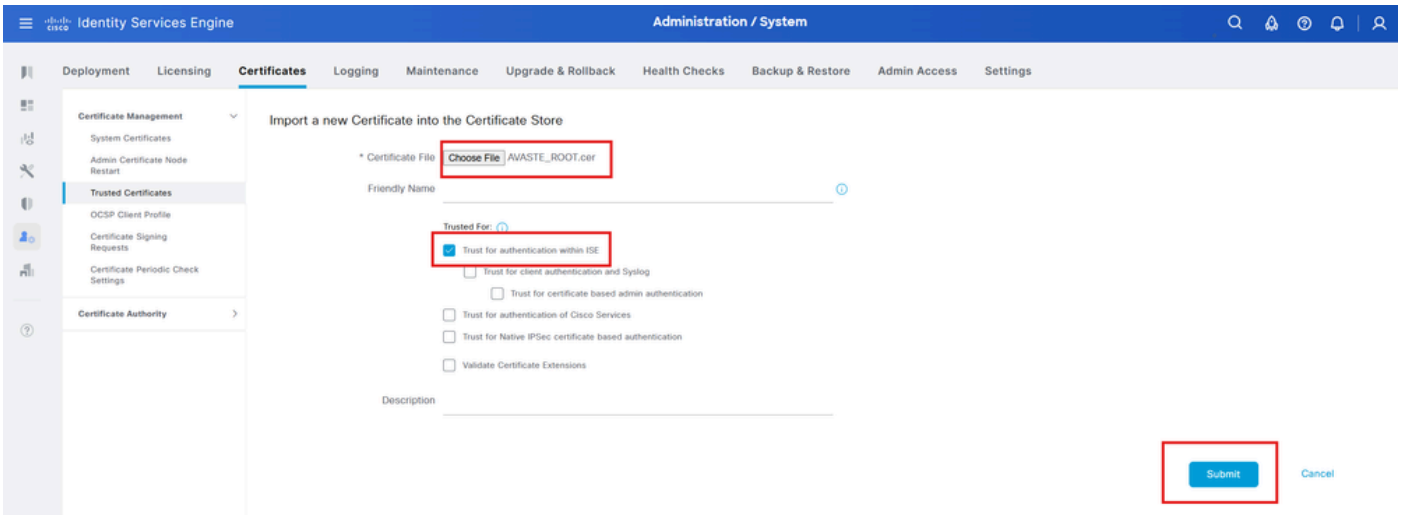
4.**Log in**to Cisco Identity Services Engine (ISE) GUI.

5. Select**Administration > System > Certificates > Certificate Management >Trusted Certificates**.



6. Select**Import > Certificate file**and**Import**the root certificate.

7. Ensure the**Trust for authentication within ISE**check box is selected.



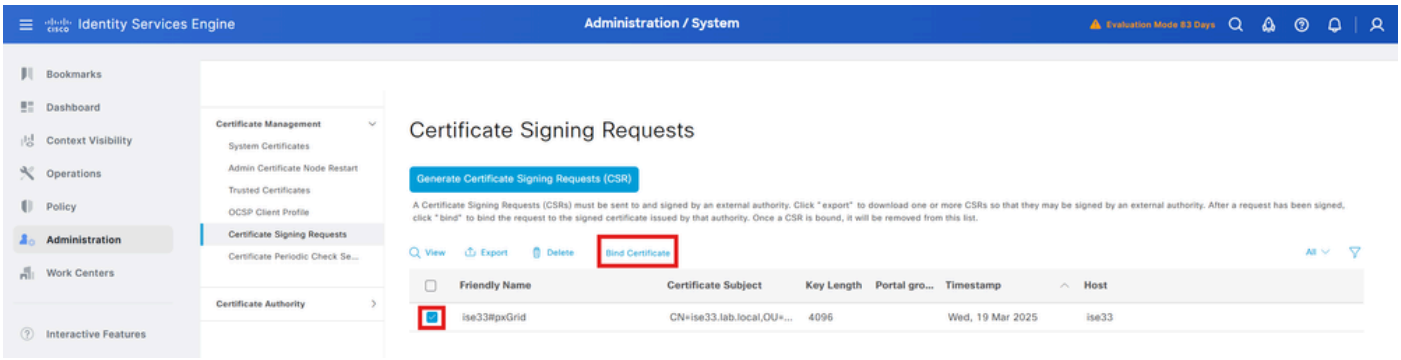
8. Click**Submit**.

Step 4: Binding the ISE certificate to the Certificate Signing Request (CSR).

1.**Log in**to Cisco Identity Services Engine (ISE) GUI.

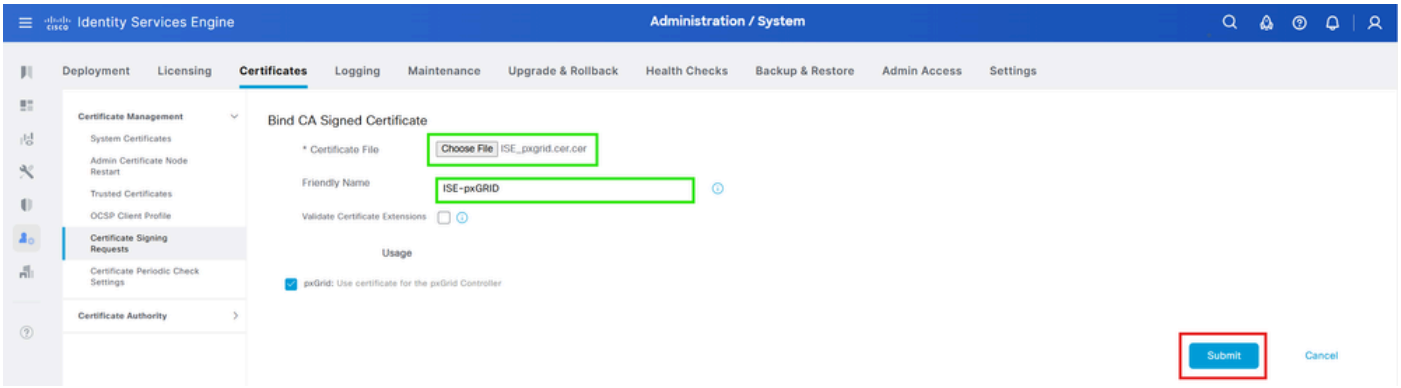
2. Select**Administration > System > Certificates > Certificate Management >Certificate Signing Requests**.

3. Select the CSR generated in the previous section, then click**Bind Certificate**.



4. On the Bind CA Signed Certificate form,**choose**the ISE_pxGrid.cer certificate generated previously.

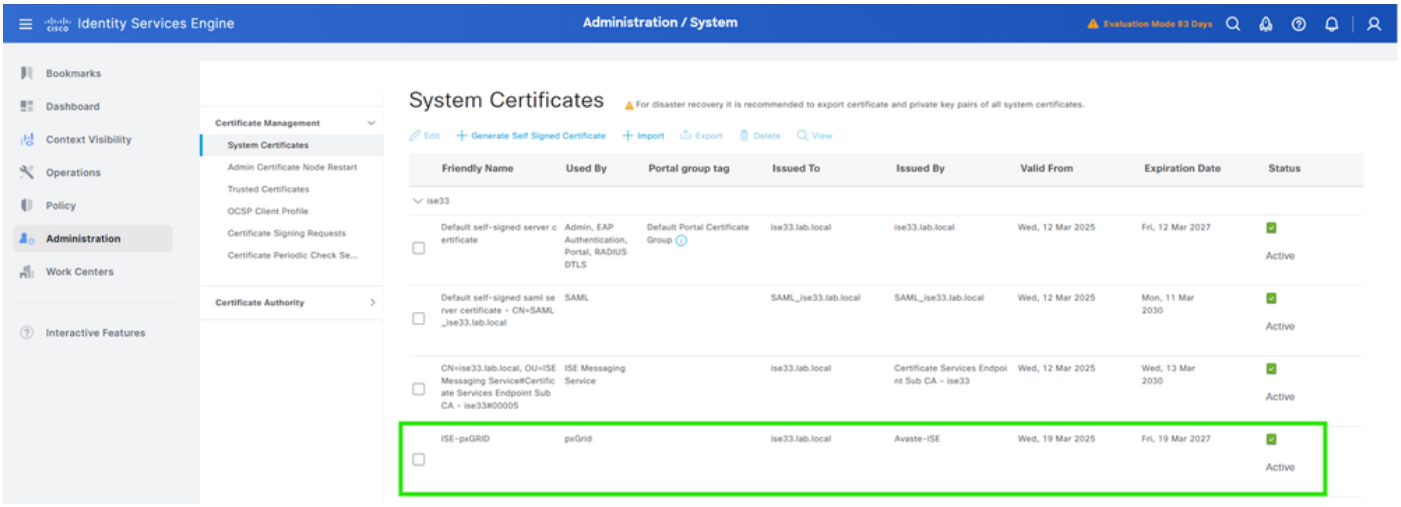
5. Give the certificate a friendly name, then click**Submit**.



7. Click**Yes**if the system asks to replace the certificate.

8. Select**Administration > System > Certificates > System Certificates**.

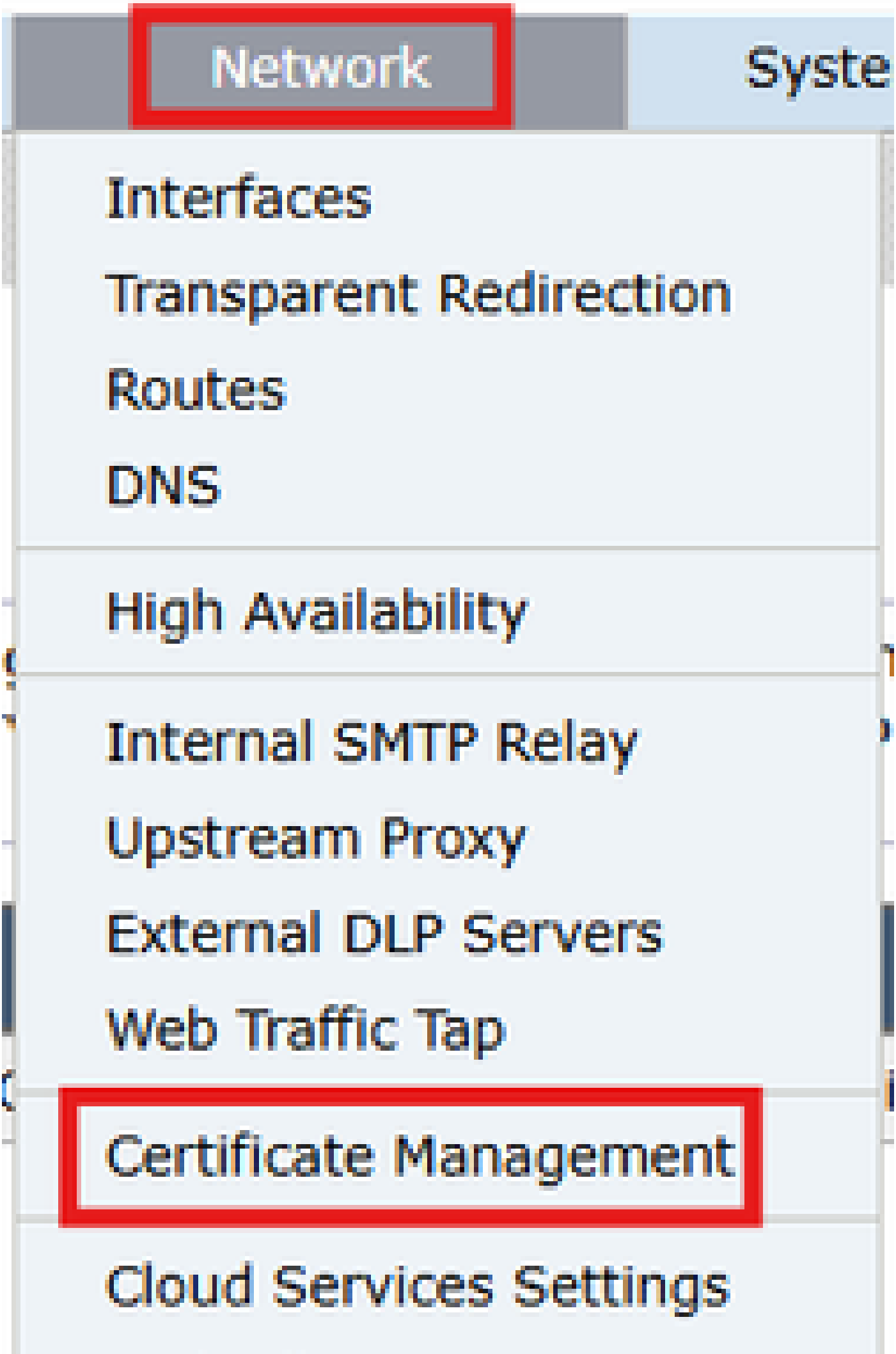
9. You can see the created pxGrid certificate signed by the external CA in the list.



Section B: Adding CA Root Certificate to WSA Certificate Trust Store

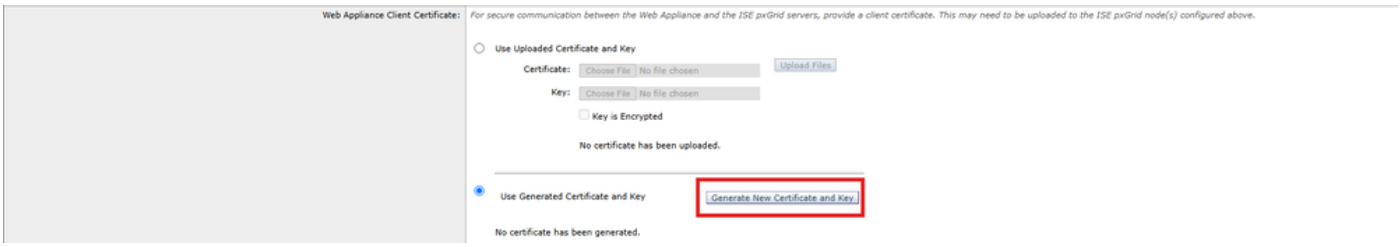
Add CA Root Certificate to WSA Trusted Store:

1.**Log in**to Web Security Appliance (WSA) GUI.
2. **Navigate** to **Network > Certificate Management > Manage Trusted Root Certificates**.

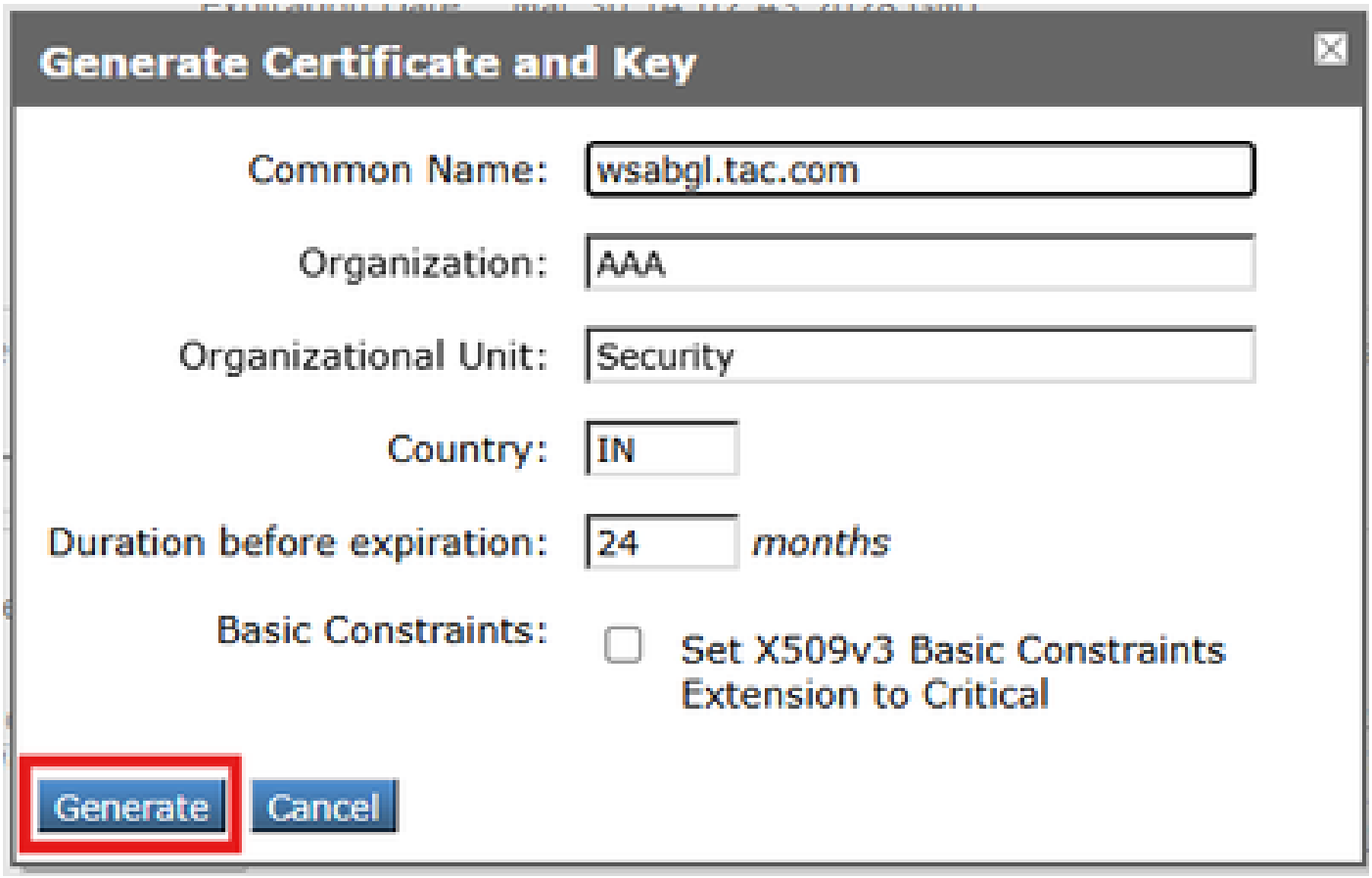

Network
Syste
Interfaces
Transparent Redirection
Routes
DNS
High Availability
Internal SMTP Relay
Upstream Proxy
External DLP Servers
Web Traffic Tap
Certificate Management
Cloud Services Settings

: There can be only two pxGrid nodes per ISE deployment. This serves as a pxGrid Active-Standby configuration; only one ISE+pxGrid node can be active at a time. In a pxGrid Active-Standby configuration, all information is passed through the PPAN, where the second ISE+pxGrid node remains inactive.

8. **Scroll** to the Web Appliance Client Certificate section and click **Generate New Certificate and Key**.

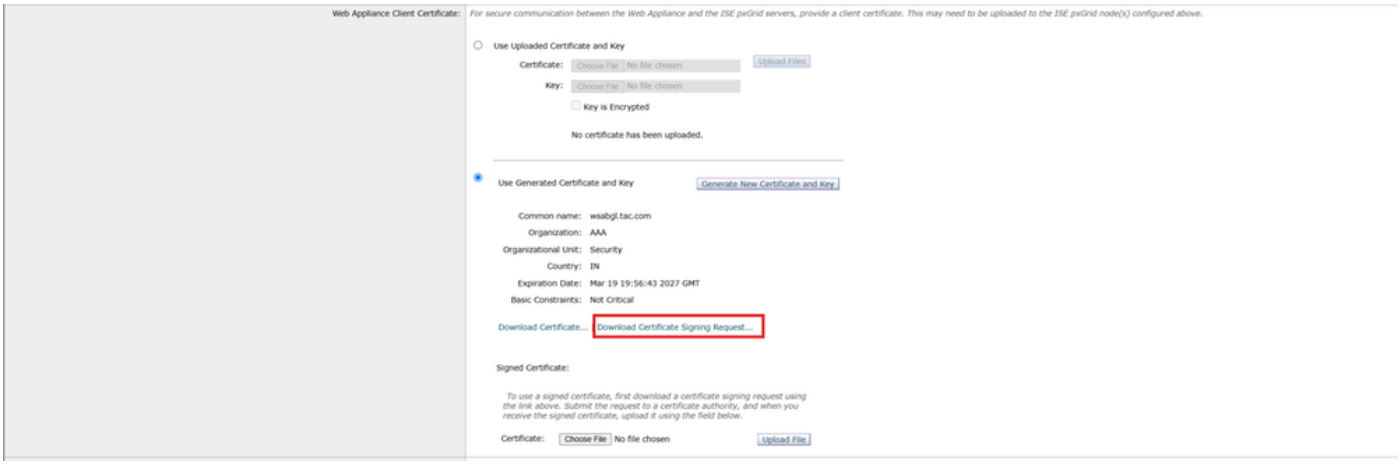


9. **Fill**in certificate details as necessary and **Click Generate**.



Note: Duration of certificate must be an integer between 24 and 60 months and Country must be a ISO two character country code (uppercase letters only).

10. Click **Download Certificate Signing Request**.



11. Click **Submit**.

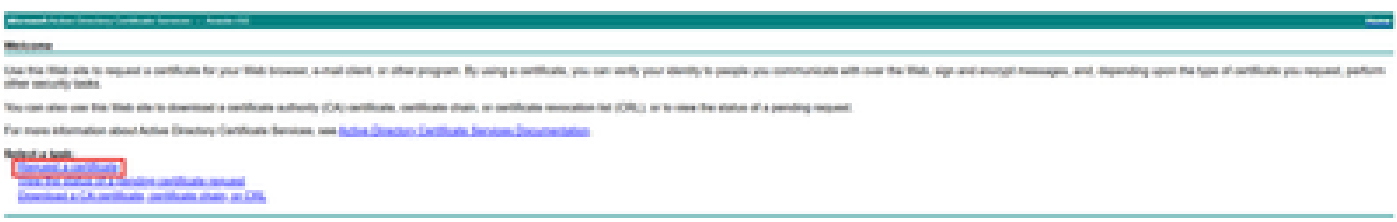
12. Click **Commit Changes** to Apply the changes.

Warning: If you do not submit and commit mentioned changes and directly upload the signed certificate and perform commit, you can face issues during the integration.

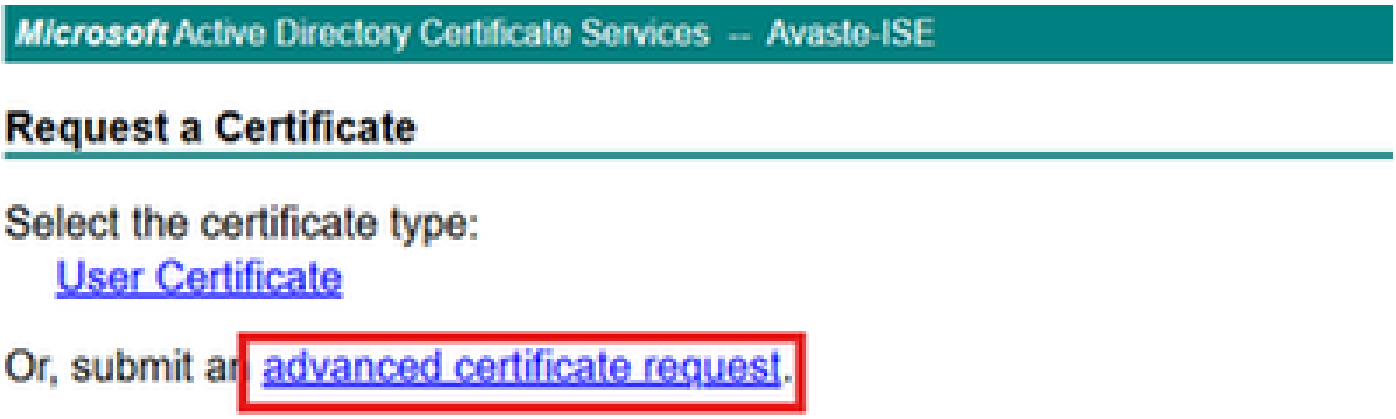
Section B: Sign an WSA client CSR Using an External CA

1.**Navigate** to **MS Active Directory Certificate Service**,https://server/certsrv/, where server is IP or DNS of your MS Server.

2. Click**Request a certificate.**

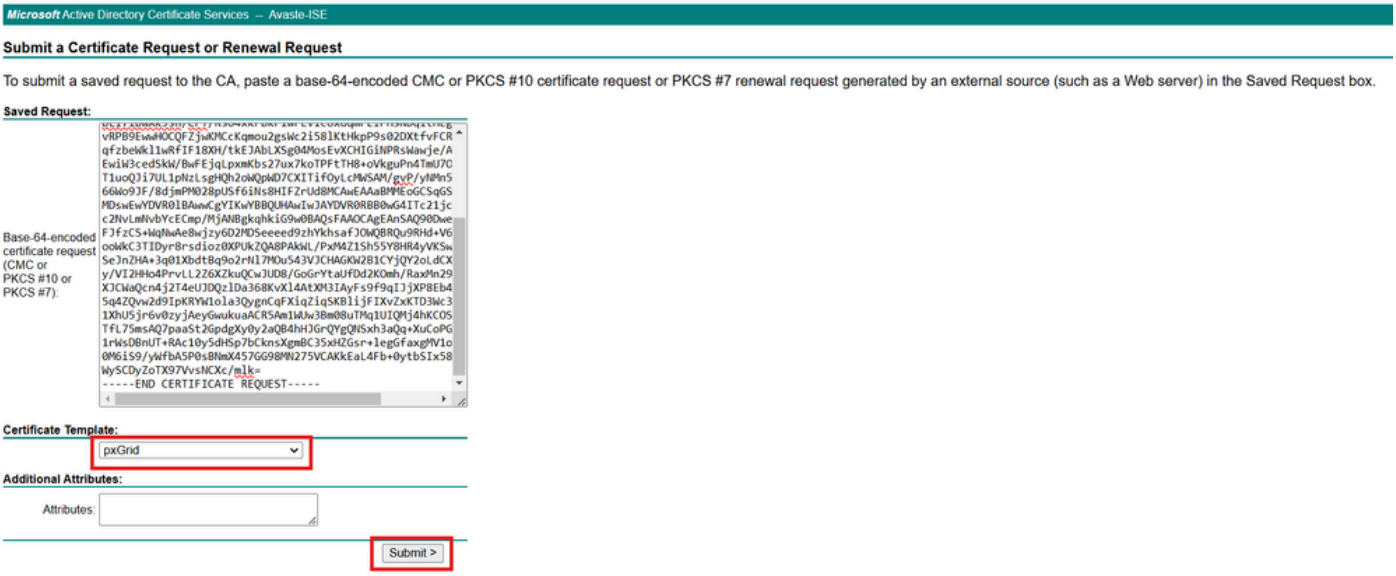


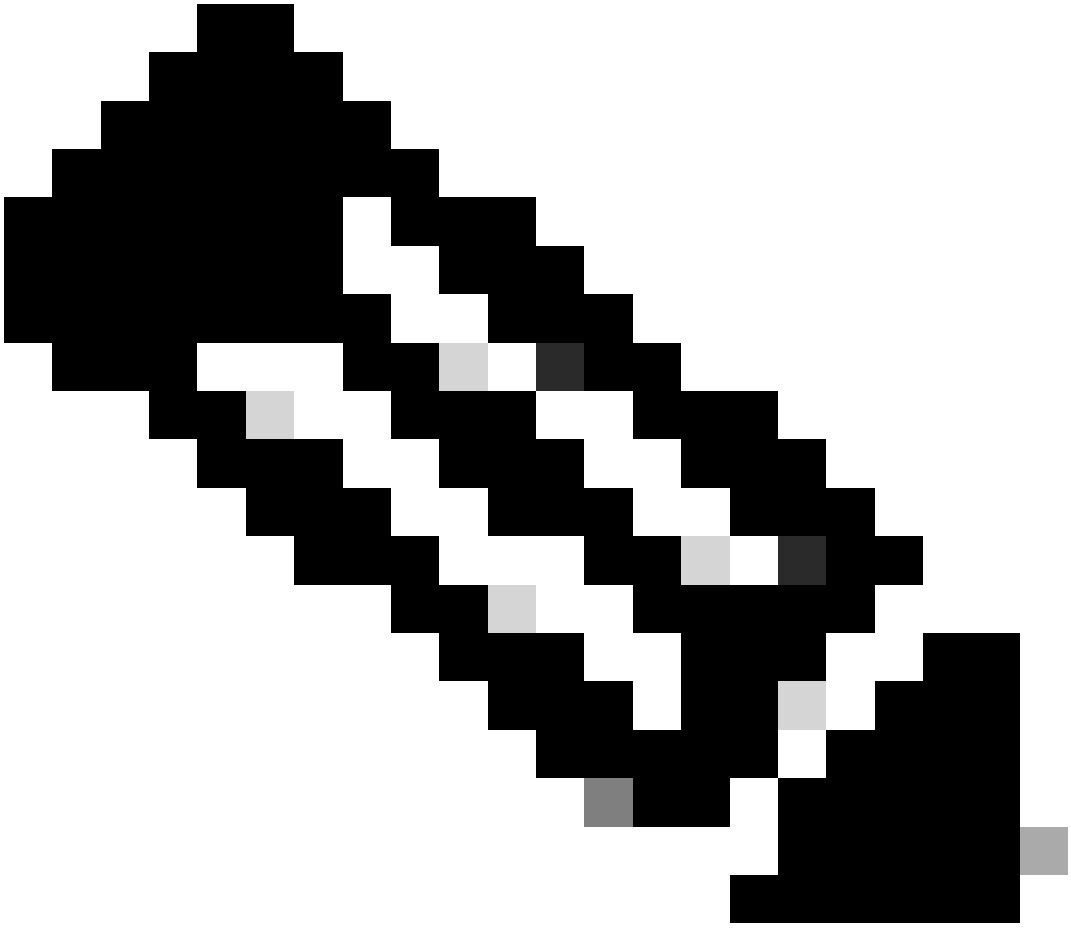
3. Choose to submit an **advanced certificate request**.



4.**Copy**the contents of the CSR generated in the previous section into the**Saved Request field**.

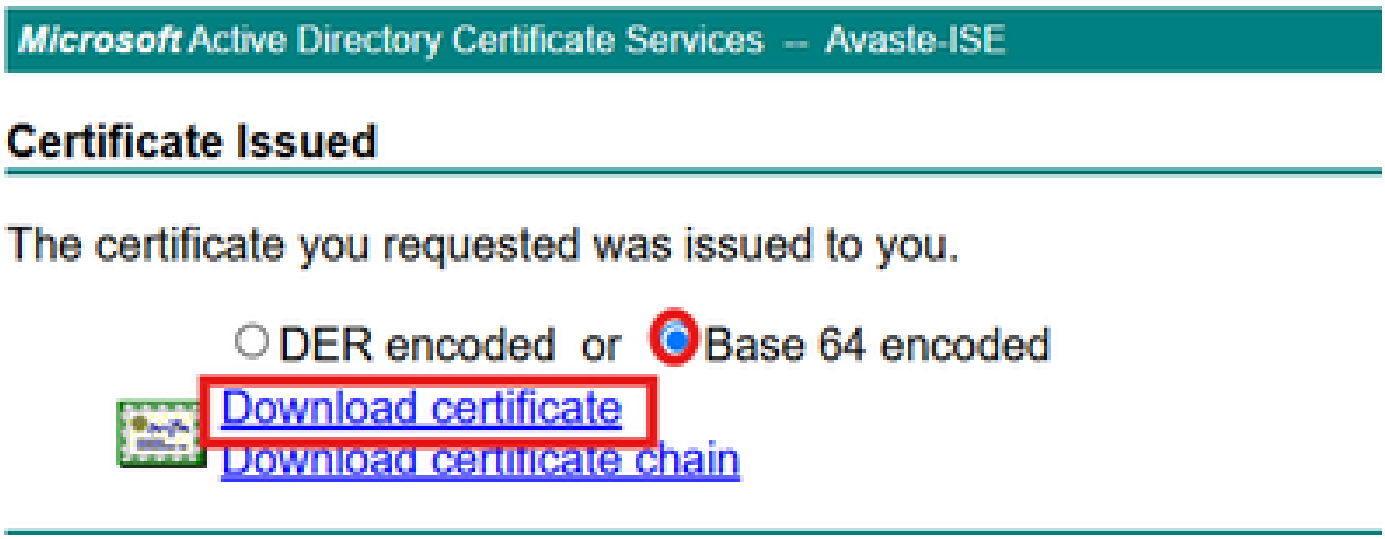
5. Select**pxGrid**as the**Certificate Template**, then click**Submit**.





Note: Note: Certificate Template pxGrid used needs both Client authentication and server authentication in the Enhanced Key Usage field.

6.**Download**the generated certificate in**Base-64**format and**Save**it as WSA-Client.cer.



Section C: Binding the WSA client certificate to the Certificate Signing Request (CSR) and integrating.

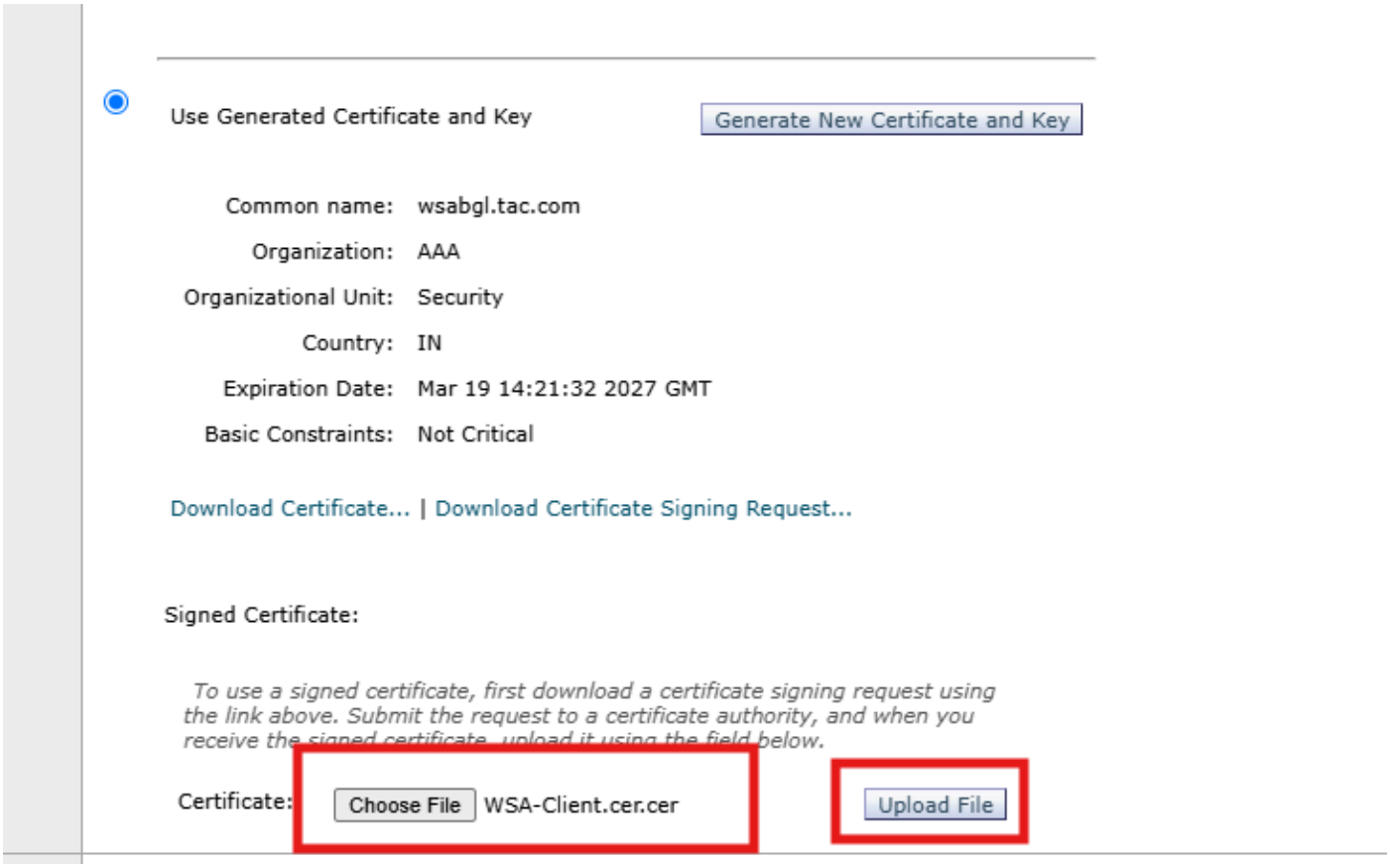
1.**Navigate**to Web Security Appliance (WSA) GUI.

2. **Navigate** to **Network > Identification Services >Identification Service Engine.**

3.Click **Edit Settings**.

4.**Navigate** to **Web Appliance Client Certificate** section.

5.Under the **signed certificate** section, **Upload** the signed certificate WSA-Client.cer



6.Click **Submit**.

7.Click **Commit Changes** to Apply the changes.

8.**Click Edit Settings**.

9.**Scroll** to **Test Communication with ISE Nodes** and click **Start Test,** which can result as follows:

Test Communication with ISE Nodes

Test Communication with ISE Nodes

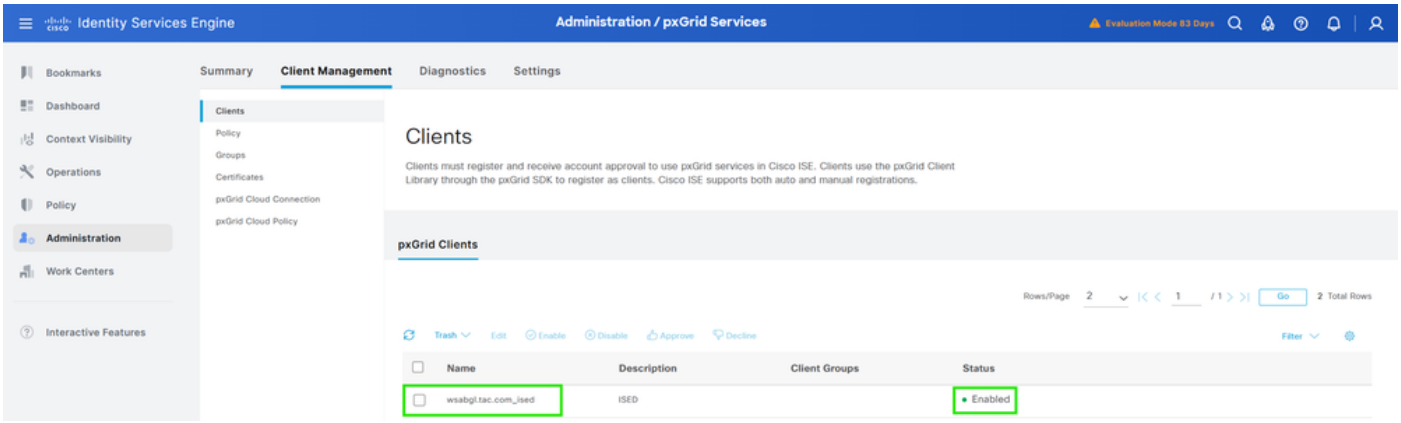
```
Checking DNS resolution of ISE pxGrid Node hostname(s) ...
Success: Resolved '10.127.197.128' address: 10.127.197.128
Validating WSA client certificate ...
Success: Certificate validation successful
Validating ISE pxGrid Node certificate(s) ...
```

```
Success: Certificate validation successful
Checking connection to ISE pxGrid Node(s) ...
Trying primary PxGrid server...
SXP not enabled.
ERS not enabled.
Preparing TLS connection...
Completed TLS handshake with PxGrid successfully.
Trying download user-session from (https://ise33.lab.local:8910)...
Failure: Failed to download user-sessions.
Trying download SGT from (https://ise33.lab.local:8910)...
Able to Download 17 SGTs.
Skipping all SXP related service requests as SXP is not configured.
Success: Connection to ISE pxGrid Node was successful.
Test completed successfully.
```

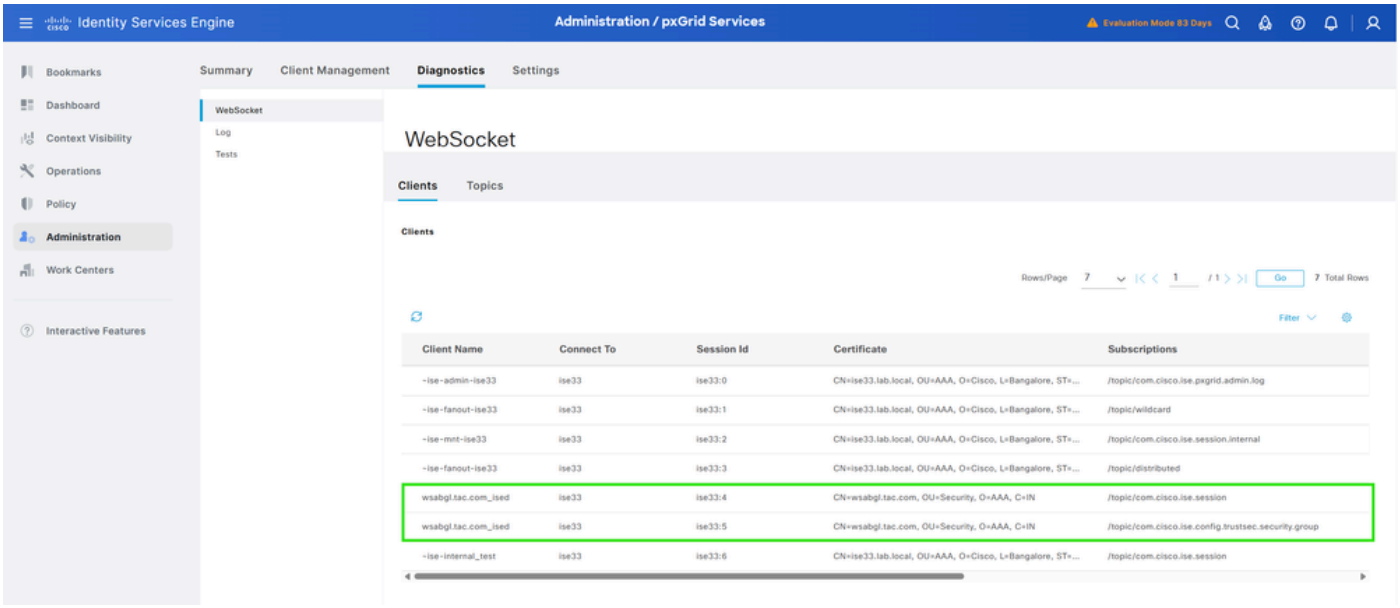
Verify

On Cisco ISE, navigate to**Administration >pxGrid Services > Client Management > Clients**.

This generates the WSA as a pxgrid client with the status**Enabled**.



To verify topic subscription on Cisco ISE, navigate to**Administration >pxGrid Services > Diagnostics > Websocket > Clients**:



Cisco ISE Pxgrid-server.log TRACE level.reference.

<#root>

```
{"timestamp":1742395398803,"level":"INFO","type":"WS_SERVER_CONNECTED","host":"ise33","client":"
```

wsabgl.lab.local_ised

```
","server":"wss://ise33.lab.local:8910/pxgrid/ise/pubsub","message":"WebSocket connected. session\u003d
TRACE [Thread-8][[]] cpm.pxgridwebapp.ws.pubsub.SubscriptionDistributor -::::::- Drop. exclude=[id=3,cl
DEBUG [Thread-8][[]] cisco.cpm.pxgridwebapp.config.MyX509Filter -::::::- Authenticating null
DEBUG [Thread-8][[]] cisco.cpm.pxgridwebapp.config.MyX509Filter -::::::- Certs up to date. user=~ise-pu
DEBUG [Thread-8][[]] cisco.cpm.pxgridwebapp.config.MyX509Filter -::::::- preAuthenticatedPrincipal = ~i
DEBUG [Thread-8][[]] cisco.cpm.pxgridwebapp.config.MyX509Filter -::::::- X.509 client authentication ce
DEBUG [Thread-8][[]] cisco.cpm.pxgridwebapp.config.MyX509Filter -::::::- Authentication
```

success

```
: PreAuthenticatedAuthenticationToken [Principal=org.springframework.security.core.userdetails.User [Us
DEBUG [Thread-8][[]] cisco.cpm.pxgridwebapp.data.AuthzDaoImpl -::::::- requestNodeName=wsabgl.lab.local
DEBUG [Thread-13][[]] cpm.pxgridwebapp.ws.pubsub.SubscriptionDistributor -::::::- Adding subscription=[
INFO [Thread-13][[]] cpm.pxgridwebapp.ws.pubsub.StompPubsubEndpoint -::::::- Pubsub subscribe. subscrip
TRACE [WsIseClientConnection-804][[]] cpm.pxgrid.ws.client.WsEndpoint -::::::- Send. session=[id=34eae1
```

"wsabgl.lab.local_ised

```
","server":"wss://ise33.lab.local:8910/pxgrid/ise/pubsub","message":"Pubsub subscribe. subscription\u00
TRACE [Thread-3][[]] cpm.pxgridwebapp.ws.pubsub.StompPubsubEndpoint -::::::- Received frame=[command=SE
TRACE [Thread-3][[]] cpm.pxgridwebapp.ws.pubsub.StompPubsubEndpoint -::::::- Authorized to send (cached
TRACE [Thread-3][[]] cpm.pxgridwebapp.ws.pubsub.SubscriptionDistributor -::::::- Distribute from=[id=0,
TRACE [Thread-3][[]] cpm.pxgridwebapp.ws.pubsub.SubscriptionDistributor -::::::- Distribute distributed
TRACE [Thread-3][[]] cpm.pxgridwebapp.ws.pubsub.SubscriptionDistributor -::::::- Distribute distributed
TRACE [sub-sender-1][[]] cpm.pxgridwebapp.ws.pubsub.SubscriptionSender -::::::- Send. subscription=[id=
TRACE [sub-sender-0][[]] cpm.pxgridwebapp.ws.pubsub.SubscriptionSender -::::::- Send. subscription=[id=
DEBUG [Grizzly(1)][[]] cpm.pxgrid.ws.client.WsSubscriber -::::::- onStompMessage session=[id=34eae17d-5
DEBUG [Grizzly(1)][[]] cpm.pxgrid.ws.client.WsSubscriber -::::::- onStompMessage session=[id=4b4d7de4-b
TRACE [Grizzly(1)][[]] cpm.pxgrid.ws.client.WsEndpoint -::::::- Send. session=[id=dd1d138d-a640-4f4f-bd
TRACE [Grizzly(1)][[]] cpm.pxgridwebapp.ws.distributed.FanoutDistributor -::::::- DownstreamHandler sen
TRACE [Thread-10][[]] cpm.pxgridwebapp.ws.pubsub.StompPubsubEndpoint -::::::- Received frame=[command=S
TRACE [Thread-10][[]] cpm.pxgridwebapp.ws.pubsub.StompPubsubEndpoint -::::::- Authorized to send (cache
```

Troubleshooting

Problem

Unknown CA Issue, On the WSA the test for ISE connection fails with error. Failure: Connection to ISE PxGrid server timed out.

Cisco ISE Pxgrid-server.log TRACE level.reference.

<#root>

ERROR

```
 [Thread-8][[]] cisco.cpm.pxgrid.cert.LoggingTrustManagerWrapper -:::::::- checkClientTrusted exception.
```

unable to find valid certification path to requested target principle=CN=wsabgl.lab.local, OU=Security,

```
TRACE [WsIseClientConnection-804][[]] cpm.pxgrid.ws.client.WsEndpoint -:::::::- Send. session=[id=34eae1
TRACE [Thread-9][[]] cpm.pxgridwebapp.ws.pubsub.StompPubsubEndpoint -:::::::- Received frame=[command=SE
TRACE [Thread-9][[]] cpm.pxgridwebapp.ws.pubsub.StompPubsubEndpoint -:::::::- Authorized to send (cached
TRACE [Thread-9][[]] cpm.pxgridwebapp.ws.pubsub.SubscriptionDistributor -:::::::- Distribute from=[id=0,
```

unable to find valid certification path to requested target

```
 principle\u003dCN\u003dwsabgl.lab.local, OU\u003dSecurity, O\u003dAAA, C\u003dIN"}
TRACE [Thread-9][[]] cpm.pxgridwebapp.ws.pubsub.SubscriptionDistributor -:::::::- Distribute distributed
TRACE [Thread-9][[]] cpm.pxgridwebapp.ws.pubsub.SubscriptionDistributor -:::::::- Distribute distributed
TRACE [sub-sender-1][[]] cpm.pxgridwebapp.ws.pubsub.SubscriptionSender -:::::::- Send. subscription=[id=
DEBUG [Grizzly(2)][[]] cpm.pxgrid.ws.client.WsSubscriber -:::::::- onStompMessage session=[id=4b4d7de4-b
TRACE [Grizzly(2)][[]] cpm.pxgrid.ws.client.WsEndpoint -:::::::- Send. session=[id=dd1d138d-a640-4f4f-bd
```

The reason for the failure can be seen with packet captures,

Source	Destination	Protocol	Length	Info
10.76.105.168	10.127.197.128	TCP	74	42883 → 8910 [SYN] Seq=0 Win=65535 Len=0 MSS=1254 WS=64 SACK_PERM TSval=984988989 TSecr=0
10.127.197.128	10.76.105.168	TCP	74	8910 → 42883 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1460 SACK_PERM TSval=1459800712 TSecr=984988989 WS=128
10.76.105.168	10.127.197.128	TCP	66	42883 → 8910 [ACK] Seq=1 Ack=1 Win=66496 Len=0 TSval=984988999 TSecr=1459800712
10.76.105.168	10.127.197.128	TLSv1.2	583	Client Hello (SNI=10.127.197.128)
10.127.197.128	10.76.105.168	TCP	66	8910 → 42883 [ACK] Seq=1 Ack=518 Win=30080 Len=0 TSval=1459800715 TSecr=984988999
10.127.197.128	10.76.105.168	TLSv1.2	4818	Server Hello, Certificate, Server Key Exchange, Certificate Request, Server Hello Done
10.76.105.168	10.127.197.128	TCP	66	42883 → 8910 [ACK] Seq=518 Ack=1243 Win=65280 Len=0 TSval=984989019 TSecr=1459800739
10.76.105.168	10.127.197.128	TCP	66	42883 → 8910 [ACK] Seq=518 Ack=2485 Win=65280 Len=0 TSval=984989019 TSecr=1459800739
10.76.105.168	10.127.197.128	TCP	66	42883 → 8910 [ACK] Seq=518 Ack=3727 Win=64064 Len=0 TSval=984989019 TSecr=1459800739
10.76.105.168	10.127.197.128	TCP	66	42883 → 8910 [ACK] Seq=518 Ack=4753 Win=65472 Len=0 TSval=984989019 TSecr=1459800739
10.76.105.168	10.127.197.128	TLSv1.2	1526	Certificate, Client Key Exchange, Certificate Verify, Change Cipher Spec, Encrypted Handshake Message
10.127.197.128	10.76.105.168	TCP	66	8910 → 42883 [ACK] Seq=4753 Ack=1978 Win=33024 Len=0 TSval=1459800761 TSecr=984989039
10.127.197.128	10.76.105.168	TLSv1.2	73	Alert (Level: Fatal, Description: Certificate Unknown)
10.127.197.128	10.76.105.168	TCP	66	8910 → 42883 [FIN, ACK] Seq=4760 Ack=1978 Win=33024 Len=0 TSval=1459800769 TSecr=984989039
10.76.105.168	10.127.197.128	TCP	66	42883 → 8910 [ACK] Seq=1978 Ack=4760 Win=66496 Len=0 TSval=984989049 TSecr=1459800769
10.76.105.168	10.127.197.128	TCP	66	42883 → 8910 [ACK] Seq=1978 Ack=4761 Win=66496 Len=0 TSval=984989049 TSecr=1459800769
10.76.105.168	10.127.197.128	TCP	66	42883 → 8910 [FIN, ACK] Seq=1978 Ack=4761 Win=66496 Len=0 TSval=984989049 TSecr=1459800769
10.127.197.128	10.76.105.168	TCP	66	8910 → 42883 [ACK] Seq=4761 Ack=1979 Win=33024 Len=0 TSval=1459800770 TSecr=984989049

Solution

1. Ensure the Web Appliance signed certificate is bind successfully on the WSA and changes have been committed.

2. Ensure the issuer or the Root CA certificate of WSA Client certificate is part of Trusted Store on Cisco ISE.

Known Defects

Cisco Bug ID	Description
Cisco bug ID 23986	Pxgrid getUserGroups API request return empty response.
Cisco bug ID 77321	WSA receives SIDs instead of AD groups from ISE.