Configure ACI APIC GUI HTTPS Certificate

Contents

Introduction

This document describes the configuration of Custom SSL and Self-signed SSL Certificates.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Digital signatures and digital certificates
- Certificate issuance process by Certificate Authority (CA) organization

Components Used

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

- Application Policy Infrastructure Controller (APIC)
- Browser
- ACI running 5.2 (8e)

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.

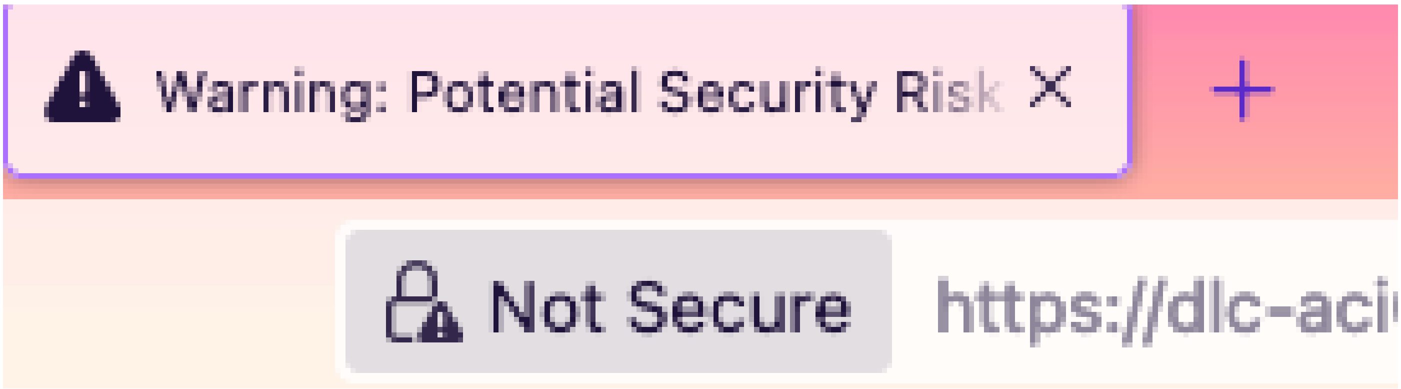
Configure

After the device is initialized, it uses the self-signed certificate as the SSL certificate for HTTPS. The self-signed certificate is valid for 1000 days.

By default, the device automatically renews and generates a new self-signed certificate one month prior to the expiration of the self-signed certificate.

Configurations

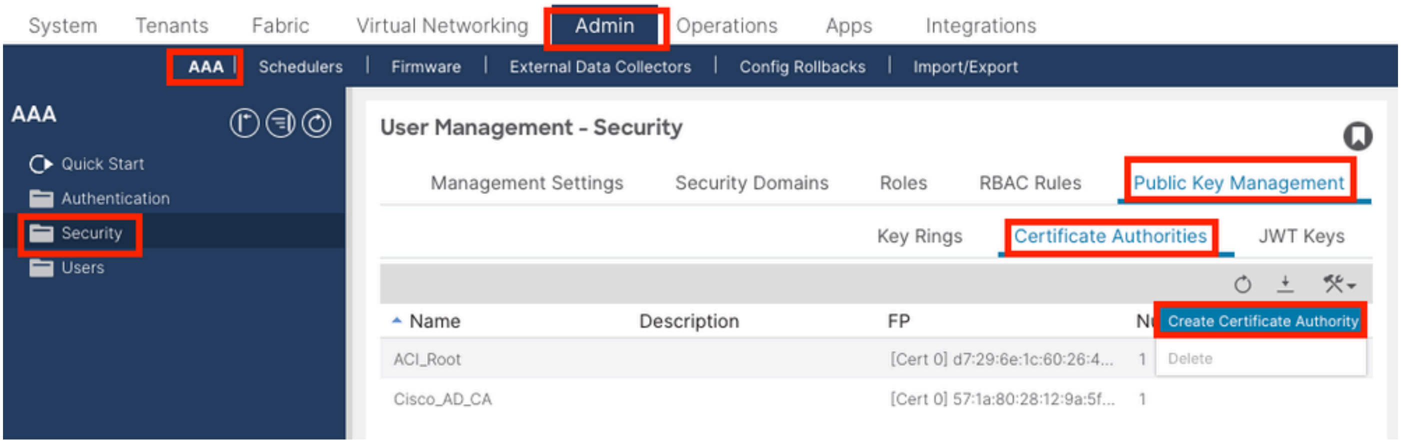
The device uses a self-signed certificate. When accessing the APIC GUI, the browser prompts that the certificate is not trustworthy. In order to solve this problem, this document uses a trusted CA authority in order to sign the certificate.



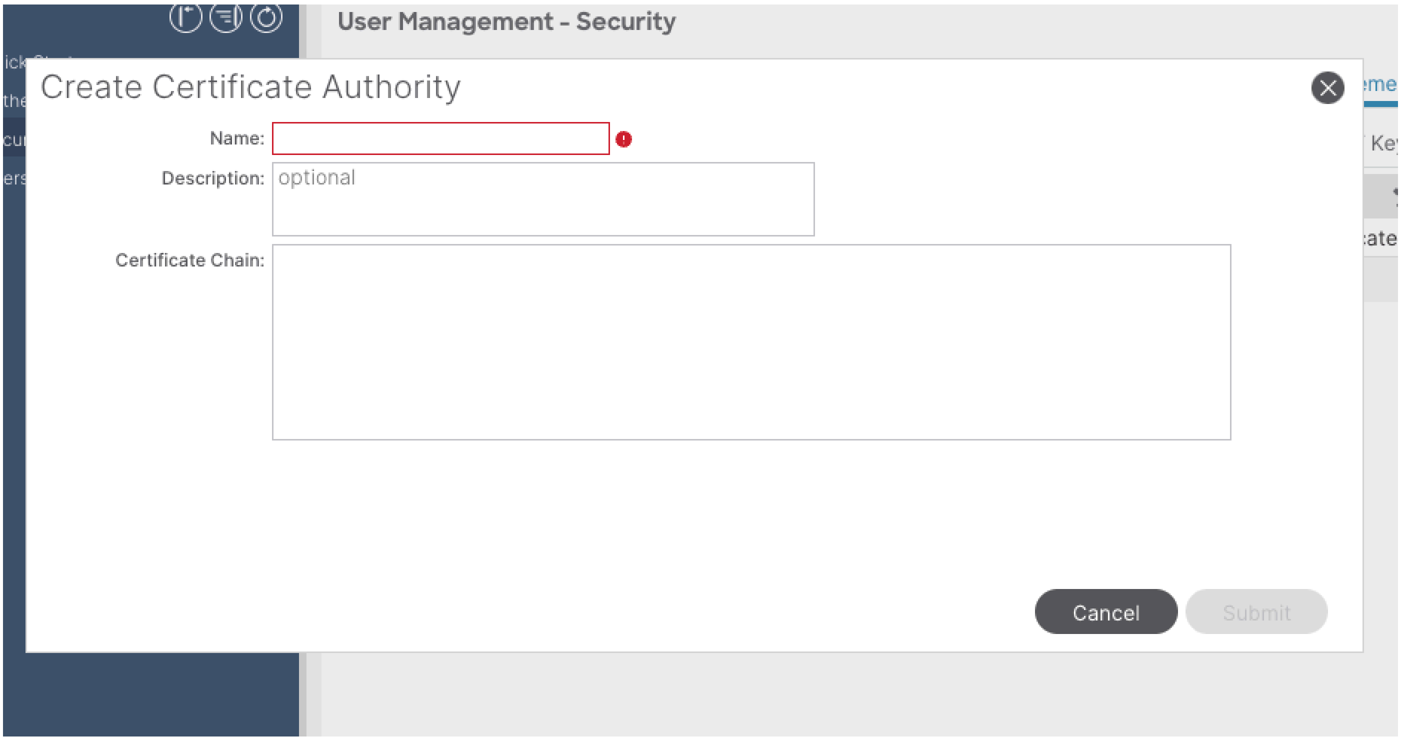
Step 1. Import the CA Authority Root Certificate or Intermediate Certificate

Note: If you are using the CA root certificate for signing directly, you can just import the CA root certificate. But if you are using an intermediate certificate for signing, you must import the complete certificate chain, that is: the root certificate and the less trusted intermediate certificates.

On the menu bar, navigate to Admin > AAA > Security > Public Key Management > Certificate Authorities.



Name	Description	FP	N
ACI_Root		[Cert 0] d7:29:6e:1c:60:26:4...	1
Cisco_AD_CA		[Cert 0] 57:1a:80:28:12:9a:5f...	1



Create Certificate Authority

Name:

Description: optional

Certificate Chain:

Name: **Required**.

Formulate the content according to your naming rules. It can contain _, but it cannot contain special English characters, such as:
, . ; ' " : | + * / = ` ~ ! @ # $ % ^ & ( ) and space characters.

Description: **Optional**.

Certification Chain: **Required**.

Fill in the trusted CA root certificate and CA intermediate certificate.

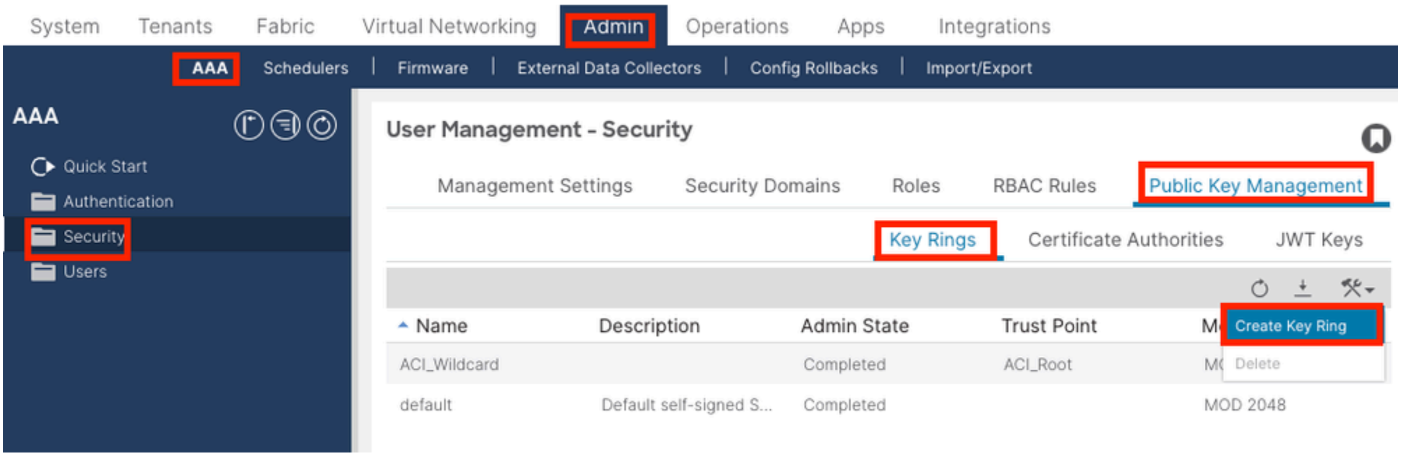
Note: Each certificate must conform to a fixed format.

-----BEGIN CERTIFICATE----- INTER-CA-2 CERTIFICATE CONTENT HERE -----END CERTIFICATE----- -----BEGIN CERTIFICATE----- INTER-CA-1 CERTIFICATE CONTENT HERE -----END CERTIFICATE----- -----BEGIN CERTIFICATE----- ROOT-CA CERTIFICATE CONTENT HERE -----END CERTIFICATE-----

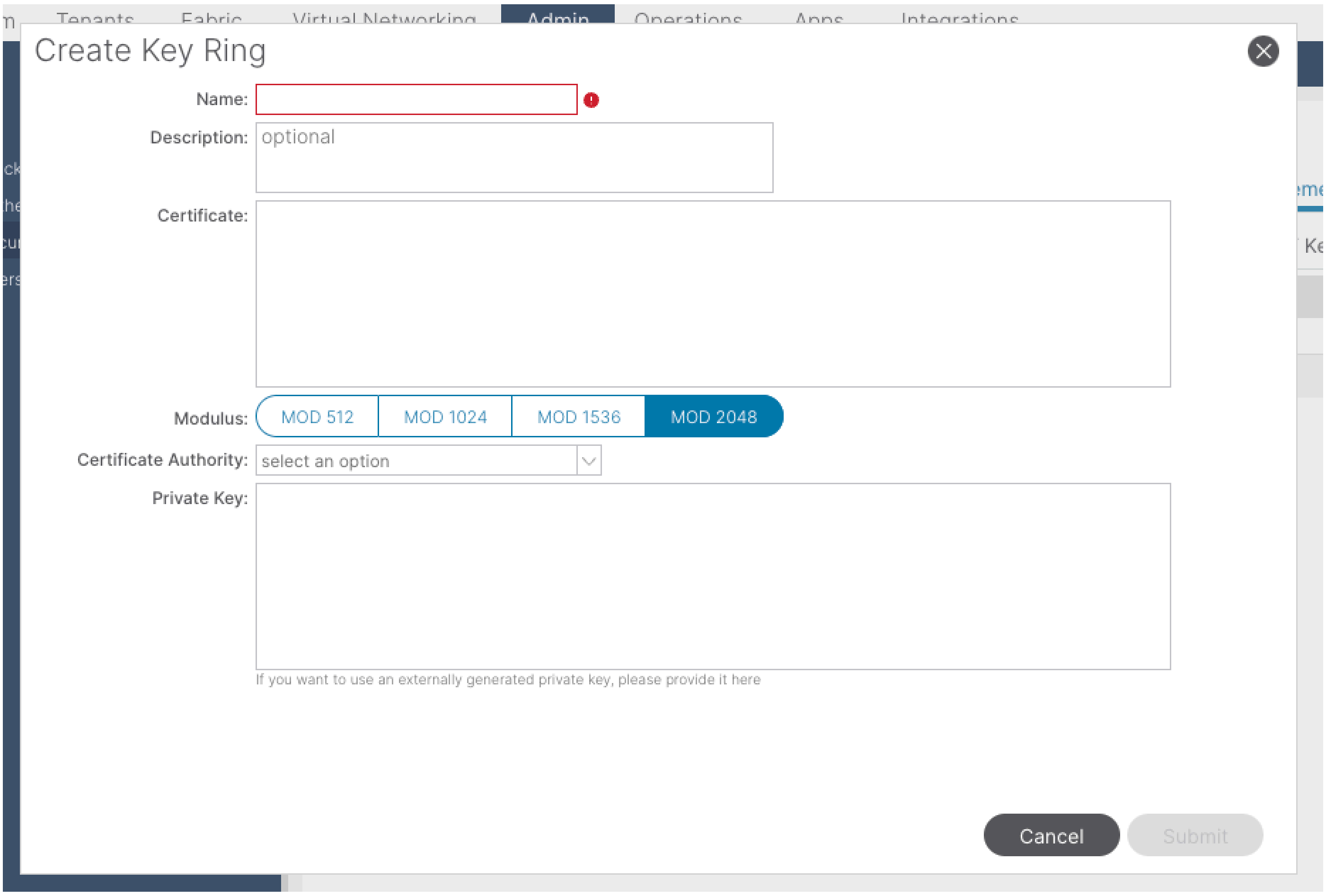
Click the **Submit** button.

Step 2. Create Key Ring

On the menu bar, navigate to Admin > AAA > Security > Public Key Management > Key Rings.



Name	Description	Admin State	Trust Point	M
ACI_Wildcard		Completed	ACI_Root	M(
default	Default self-signed S...	Completed		MOD 2048



Name:

Description: optional

Certificate:

Modulus: ○ MOD 512 ○ MOD 1024 ○ MOD 1536 ● MOD 2048

Certificate Authority: select an option

Private Key:

If you want to use an externally generated private key, please provide it here

Name:**Required** (enter a name).

Certificate**:do not add** any content if you generate a Certificate Signing Request (CSR) using the Cisco APIC through the key ring. Alternatively, add the signed certificate content if you already have one that was signed by the CA from the previous steps by generating a private key and CSR outside of the Cisco APIC.

Modulus: **Required** (click the radio button for the desired key strength).

Certificate Authority: **Required**. From the drop-down list, choose the certificate authority that you created earlier.

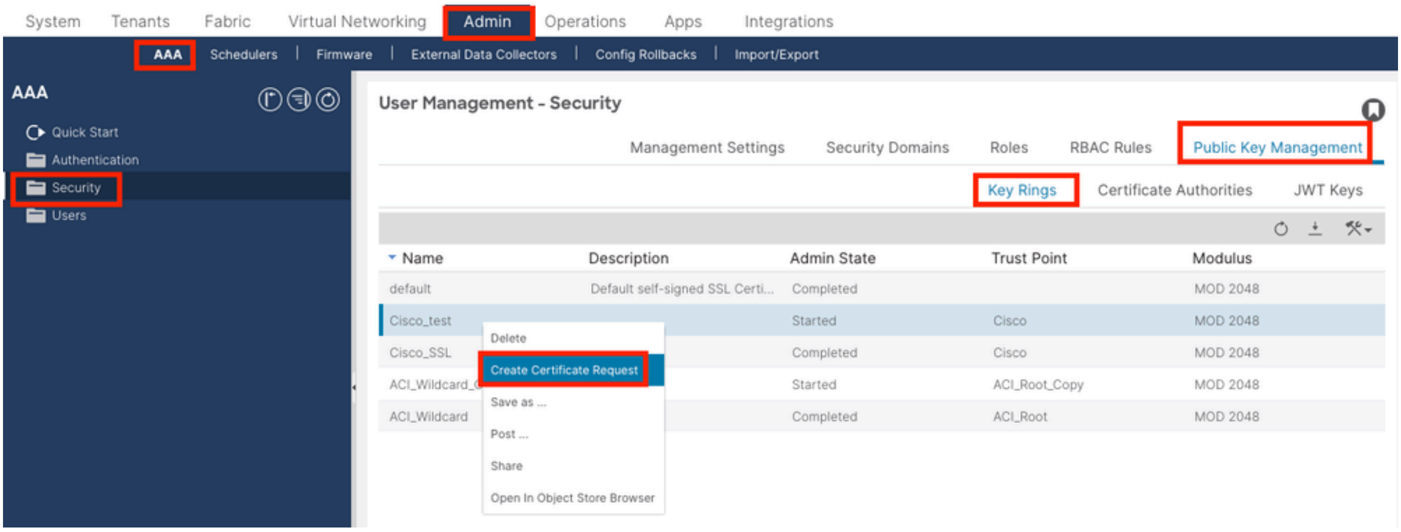
Private Key:**do not add** any content if you generate a CSR using theCisco APICthrough the key ring. Alternatively, add the private key used to generate the CSR for the signed certificate that you entered.

Note: If you do not want to use the system-generated private key and CSR and use a custom private key and certificate, you only need to fill in four items: Name, Certificate, Certificate Authority, and Private Key. After submitting you only need to perform the last step, Step 5.

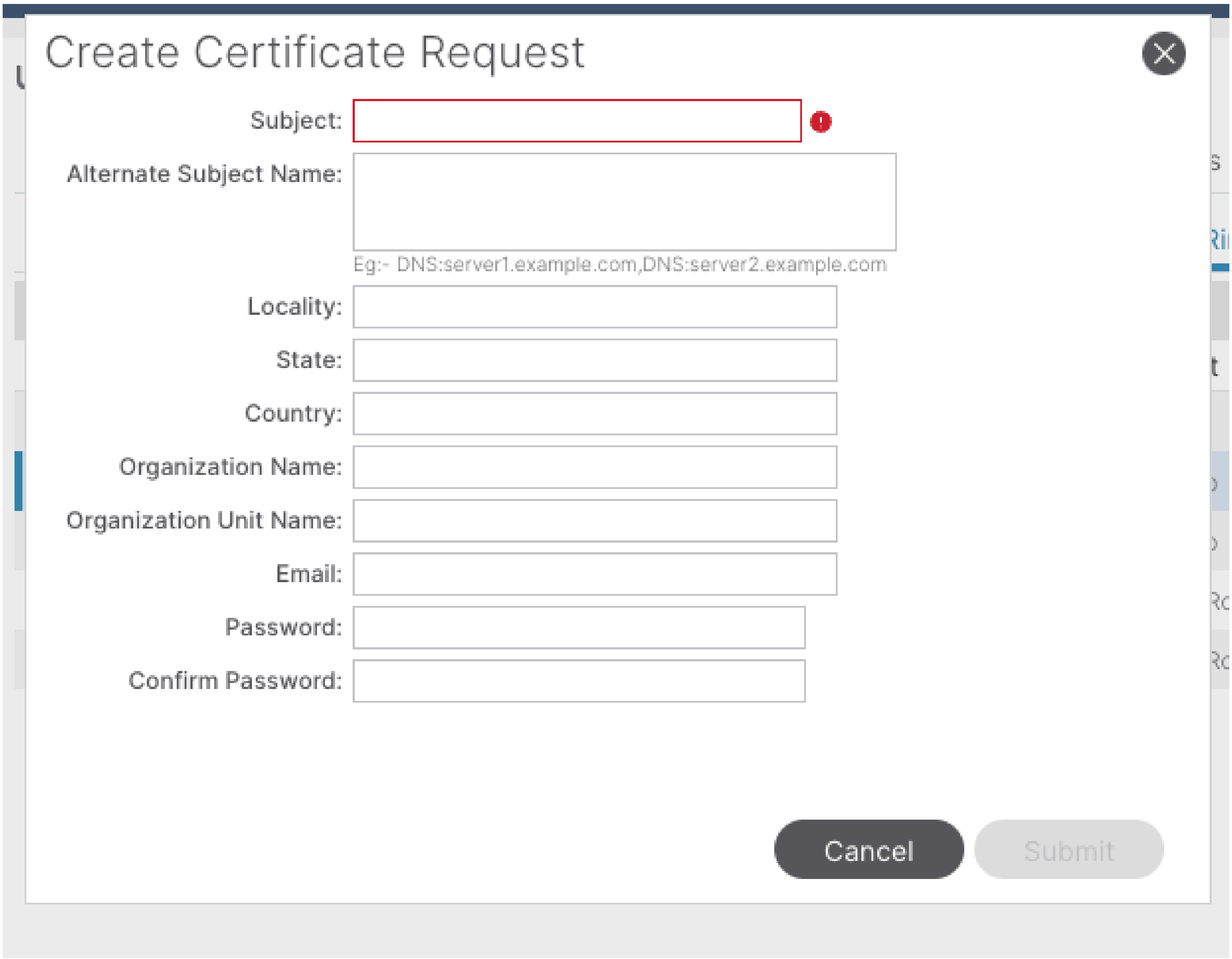
Click the **Submit** button.

Step 3. Generate Private Key and CSR

On the menu bar, navigate to Admin > AAA > Security > Public Key Management > Key Rings.



Name	Description	Admin State	Trust Point	Modulus
default	Default self-signed SSL Certi...	Completed		MOD 2048
Cisco_test		Started	Cisco	MOD 2048
Cisco_SSL		Completed	Cisco	MOD 2048
ACI_Wildcard_(		Started	ACI_Root_Copy	MOD 2048
ACI_Wildcard		Completed	ACI_Root	MOD 2048



Subject: **Required**. Enter the common name (CN) of the CSR.

You can enter the fully qualified domain name (FQDN) of the Cisco APICs using a wildcard, but in a modern certificate, it is generally recommended that you enter an identifiable name of the certificate and enter the FQDN of all Cisco APICs in the Alternate Subject Name field (also known as the SAN – Subject Alternative Name) because many modern browsers expect the FQDN in the SAN field.

Alternate Subject Name: **Required.** Enter the FQDN of allCisco APICs, such as

DNS:apic1.example.com,DNS:apic2.example.com,DNS:apic3.example.com or DNS:*example.com.

Alternatively, if you want SAN to match an IP address, enter the IP addresses of Cisco APICs with the format: IP:192.168.1.1.

Note: You can use Domain Name Server (DNS) names, IPv4 addresses, or a mixture of both in this field. IPv6 addresses are not supported.

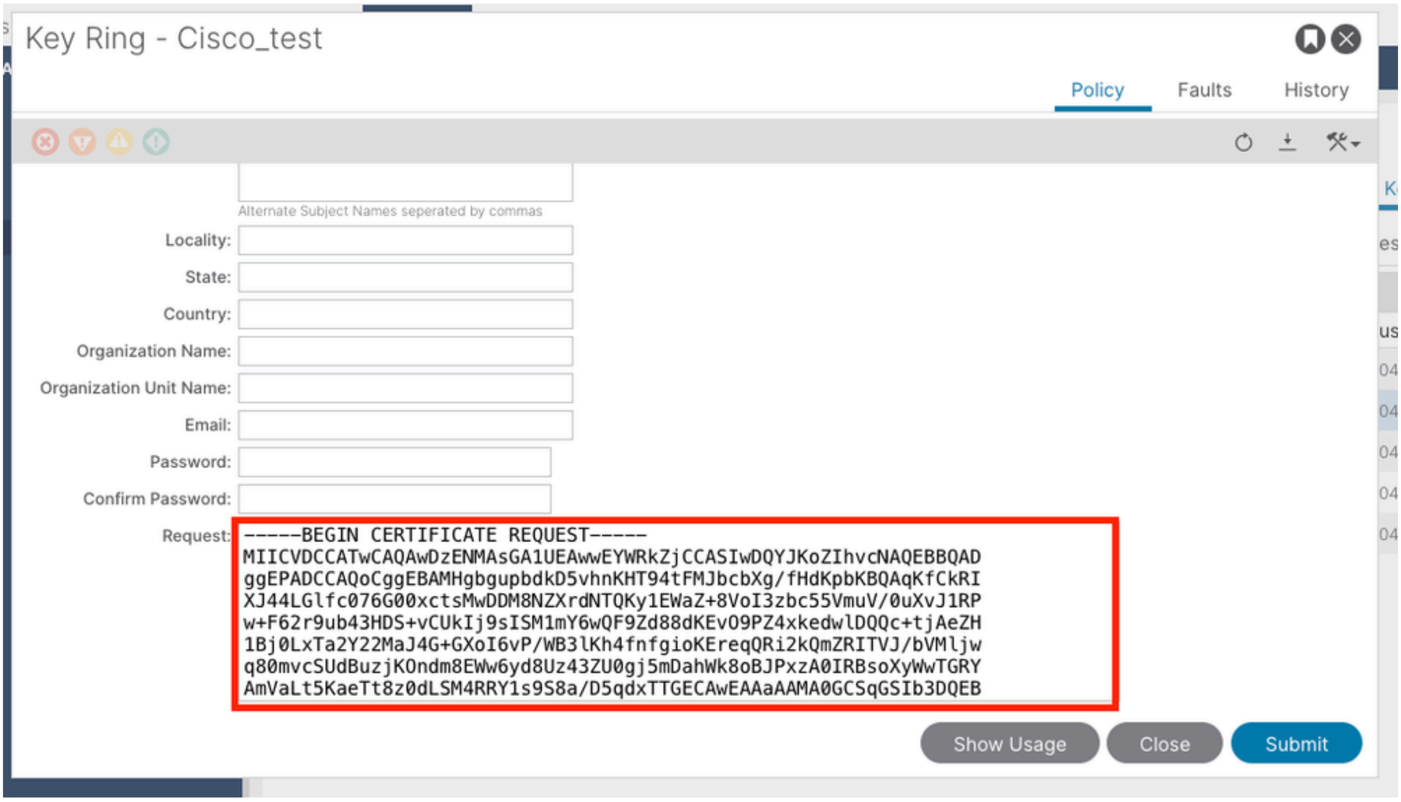
Fill in the remaining fields according to the requirements of the CA organization you are applying in order to issue the certificate.

Click the **Submit** button.

Step 4. Get the CSR and Send it to the CA Organization

On the menu bar, navigate to Admin > AAA > Security > Public Key Management > Key Rings.

Double-click your create **Key Ring** name and find the **Request** option. The content in the Request is the CSR.



Alternate Subject Names seperated by commas

Locality:

State:

Country:

Organization Name:

Organization Unit Name:

Email:

Password:

Confirm Password:

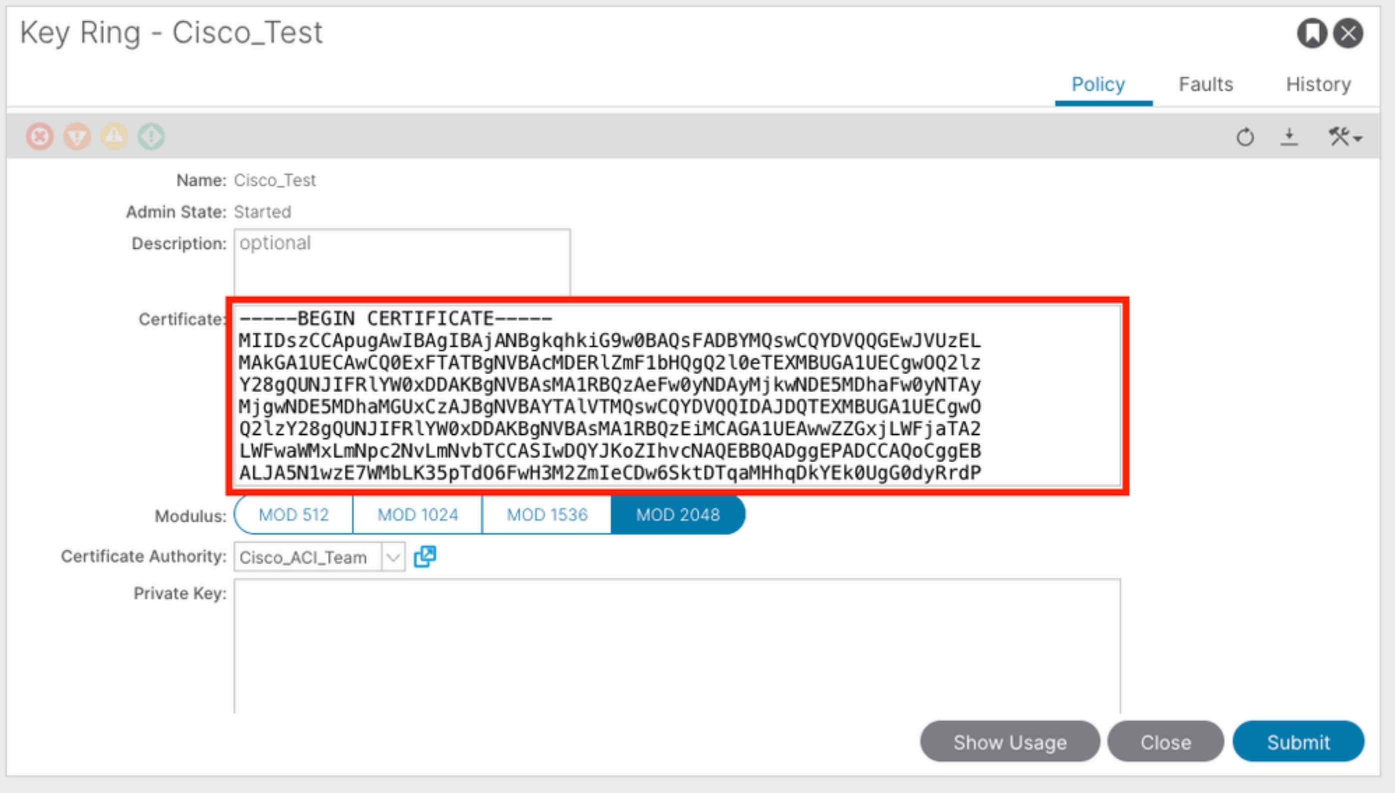
Request:

```
-----BEGIN CERTIFICATE REQUEST-----
MIICVDCCATwCAQAwDzENMAsGA1UEAwwEYWRkZjCCASIwDQYJKoZIhvcNAQEBBQAD
ggEPADCCAQoCggEBAMHgbgupbdkD5vhnKHT94tFMJbcbXg/fHdKpbKBQAqKfCkRI
XJ44LGlfc076G00xctsMwDDM8NZXrdNTQKy1EWaZ+8VoI3zbc55VmuV/0uXvJ1RP
w+F62r9ub43HDS+vCUkIj9sISM1mY6wQF9Zd88dKEvO9PZ4xkedwlDQQc+tjAeZH
1Bj0LxTa2Y22MaJ4G+GXoI6vP/WB3lKh4fnfgioKEreqQRi2kQmZRITVJ/bVMljw
q80mvcSUdBuzjKOndm8EWw6yd8Uz43ZU0gj5mDahWk8oBJPxzA0IRBsoXyWwTGRY
AmVaLt5KaeTt8z0dLSM4RRY1s9S8a/D5qdxTTGECAwEAAaAAMA0GCSqGSIb3DQEB
```

Copy all the contents of the request and send it to your CA.

The CA uses its private key in order to perform signature verification on your CSR.

After obtaining the signed certificate from the CA, it copies the certificate to the Certificate.



Name: Cisco_Test

Admin State: Started

Description: optional

Certificate:

```
-----BEGIN CERTIFICATE-----
MIIDszCCApugAwIBAgIBAjANBgkqhkiG9w0BAQsFADBYMQswCQYDVQQGEwJVUzEL
MAkGA1UECAwCQ0ExFTATBgNVBAcMDERlZmF1bHQgQ2l0eTEXMBUGA1UECgwOQ2lz
Y28gQUNJIFRlYW0xDDAKBgNVBAsMA1RBQzAeFw0yNDAyMjkwNDE5MDhaFw0yNTAy
MjgwNDE5MDhaMGUxCzAJBgNVBAYTAlVTMQswCQYDVQQIDAJDQTEXMBUGA1UECgwO
Q2lzY28gQUNJIFRlYW0xDDAKBgNVBAsMA1RBQzEiMCAGA1UEAwwZZGxjLWFjaTA2
LWFwaWMxLmNpc2NvLmNvbTCCASIwDQYJKoZIhvcNAQEBBQADggEPADCCAQoCggEB
ALJA5N1wzE7WMbLK35pTdO6FwH3M2ZmIeCDw6SktDTqaMHhqDkYEk0UgG0dyRrdP
```

Modulus: MOD 512 | MOD 1024 | MOD 1536 | [✓ MOD 2048]

Certificate Authority: Cisco_ACI_Team

Private Key:

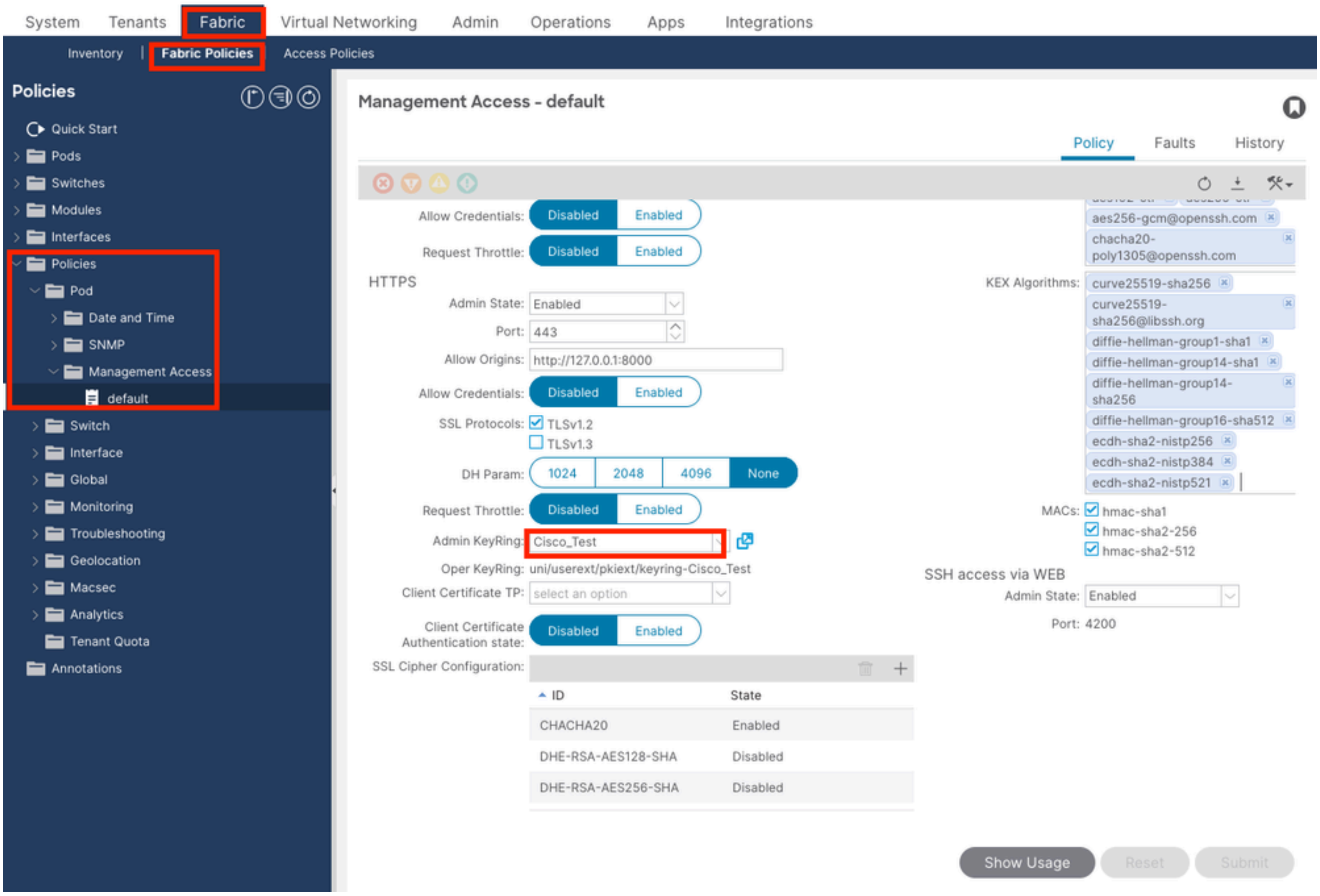
Note: Each certificate must conform to a fixed format.

-----BEGIN CERTIFICATE----- CERTIFICATE CONTENT HERE -----END CERTIFICATE-----

Click the **Submit** button.

Step 5. Update the Signing Certificate on the Web

On the menu bar, navigate to Fabric > Fabric Policies > Policies > Pod > Management Access > Default.



Allow Credentials: Disabled | Enabled

Request Throttle: Disabled | Enabled

HTTPS

Admin State: Enabled

Port: 443

Allow Origins: http://127.0.0.1:8000

Allow Credentials: Disabled | Enabled

SSL Protocols: ☑ TLSv1.2 ☐ TLSv1.3

DH Param: 1024 | 2048 | 4096 | None

Request Throttle: Disabled | Enabled

Admin KeyRing: Cisco_Test

Oper KeyRing: uni/userext/pkiext/keyring-Cisco_Test

Client Certificate TP: select an option

Client Certificate Authentication state: Disabled | Enabled

SSL Cipher Configuration:

ID	State
CHACHA20	Enabled
DHE-RSA-AES128-SHA	Disabled
DHE-RSA-AES256-SHA	Disabled

aes256-gcm@openssh.com

chacha20-poly1305@openssh.com

KEX Algorithms: curve25519-sha256, curve25519-sha256@libssh.org, diffie-hellman-group1-sha1, diffie-hellman-group14-sha1, diffie-hellman-group14-sha256, diffie-hellman-group16-sha512, ecdh-sha2-nistp256, ecdh-sha2-nistp384, ecdh-sha2-nistp521

MACs: ☑ hmac-sha1 ☑ hmac-sha2-256 ☑ hmac-sha2-512

SSH access via WEB

Admin State: Enabled

Port: 4200

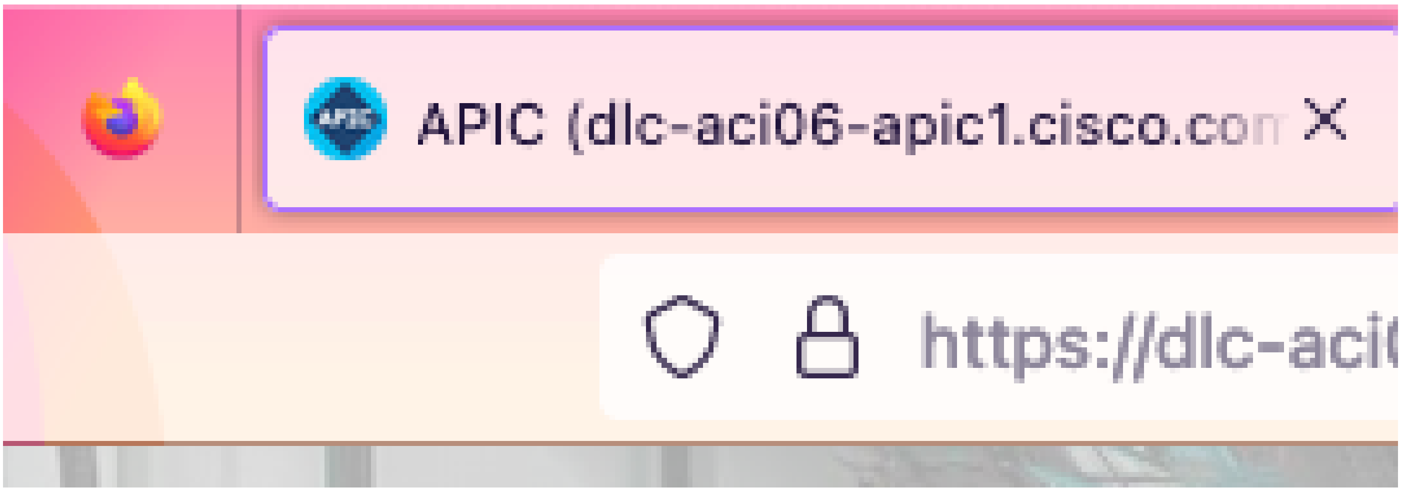
in the **Admin KeyRing** drop-down list, choose the desired KeyRing.

Click the **Submit** button.

After clicking submit, an error occurs due to certificate reasons. Refresh with the new certificate.

Verify

After accessing the APIC GUI, APIC uses the CA-signed certificate to communicate. View the certificate information in the browser in order to verify it.



Note: The methods of viewing HTTPS certificates in different browsers are not exactly the same. For specific methods, refer to the user guide of your browser.

Troubleshoot

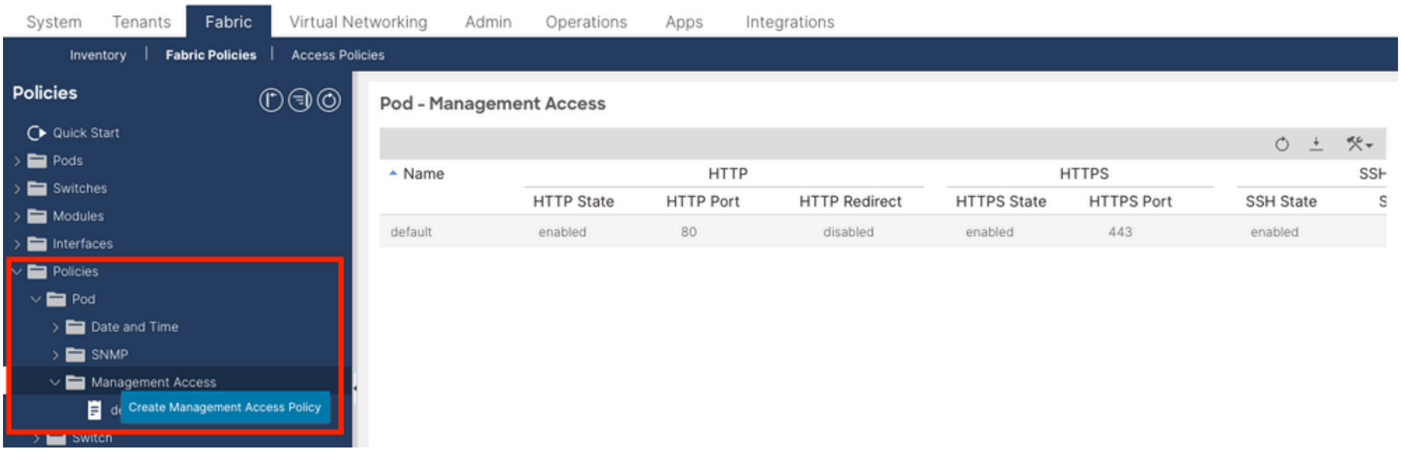
If the browser still prompts that the APIC GUI is untrusted, verify in the browser whether the certificate of the GUI is consistent with the one submitted in the Keyring.
You need to trust the **CA root certificate** that issued the certificate on your computer or browser.

Note: The Google Chrome browser must verify the **SAN** of the certificate in order to trust this certificate.

In APICs that use self-signed certificates, certificate expiration warnings can appear in rare cases.

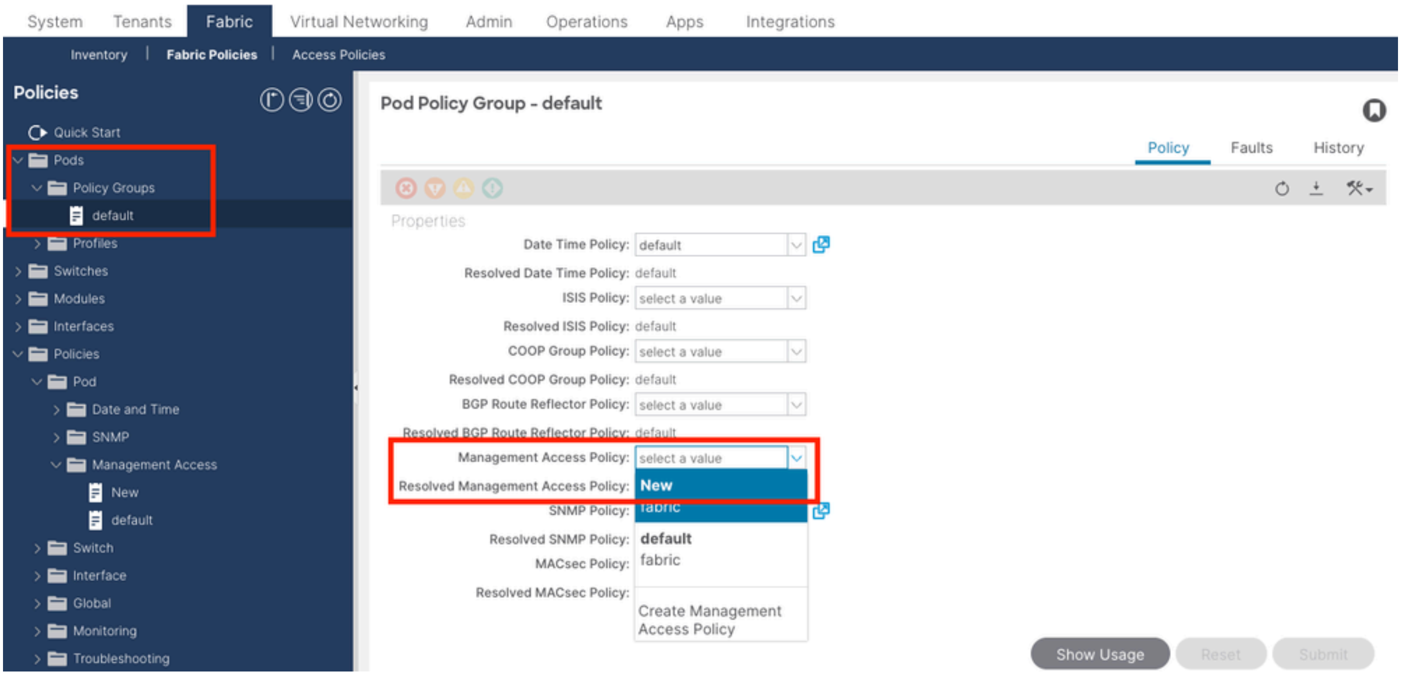
Find the certificate in Keyring, use the certificate parsing tool in order to parse the certificate, and compare it with the certificate used in the browser.

If the certificate in the keyring is renewed, create a new Management Access Policy and apply it.



Pod - Management Access

Name	HTTP			HTTPS		SSH	
	HTTP State	HTTP Port	HTTP Redirect	HTTPS State	HTTPS Port	SSH State	S
default	enabled	80	disabled	enabled	443	enabled	



Pod Policy Group - default

Date Time Policy: default
Resolved Date Time Policy: default
ISIS Policy: select a value
Resolved ISIS Policy: default
COOP Group Policy: select a value
Resolved COOP Group Policy: default
BGP Route Reflector Policy: select a value
Resolved BGP Route Reflector Policy: default
Management Access Policy: select a value
Resolved Management Access Policy:
SNMP Policy:
Resolved SNMP Policy:
MACsec Policy:
Resolved MACsec Policy:

If the certificate in Keyring is not automatically renewed, contact Cisco TAC for more assistance.

Related Information

- Cisco APIC Security Configuration Guide, Release 5.2(x)
- Cisco Technical Support & Downloads