Create Windows CA Certificate Templates for CUCM

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Introduction

This document describes a step-by-step procedure in order to create certificate templates on Windows Server-based Certification Authorities (CA), that are compliant with X.503 extension requirements for every type of Cisco Unified Communications Manager (CUCM) certificate.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- CUCM version 11.5(1) or later
- Basic knowledge of Windows Server administration is also recommended

Components Used

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

- The information in this document is based on CUCM Version 11.5(1) or later.
- Microsoft Windows Server 2012 R2 with CA services installed.

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.

Background information

There are five types of certificates that can be signed by an external CA:

Certificate	Use	Impacted Services
Callmanager	Presented at secure device registration, can sign Certificate Trust List (CTL)/Internal Trust List (ITL) files, used for secure interactions with other servers such as secure Session Initiation Protocol (SIP) Trunks.	· Cisco Call Manager · Cisco CTI Manager · Cisco TFTP
tomcat	Presented for Secure Hypertext Transfer Protocol (HTTPS) interactions.	· Cisco Tomcat · Single Sign-On (SSO) · Extension Mobility · Corporate Directory
ipsec	Used for backup file generation, as well as IP Security (IPsec) interaction with Media Gateway Control Protocol (MGCP) or H323 gateways.	· Cisco DRF Master · Cisco DRF Local
CAPF	Used to generate Locally Significant Certificates (LSC) for phones.	· Cisco Certificate Authority Proxy Function
TVS	Used to create a connection to the Trust Verification Service (TVS), when the phones are not able to authenticate an unknown certificate.	·Cisco Trust Verification Service

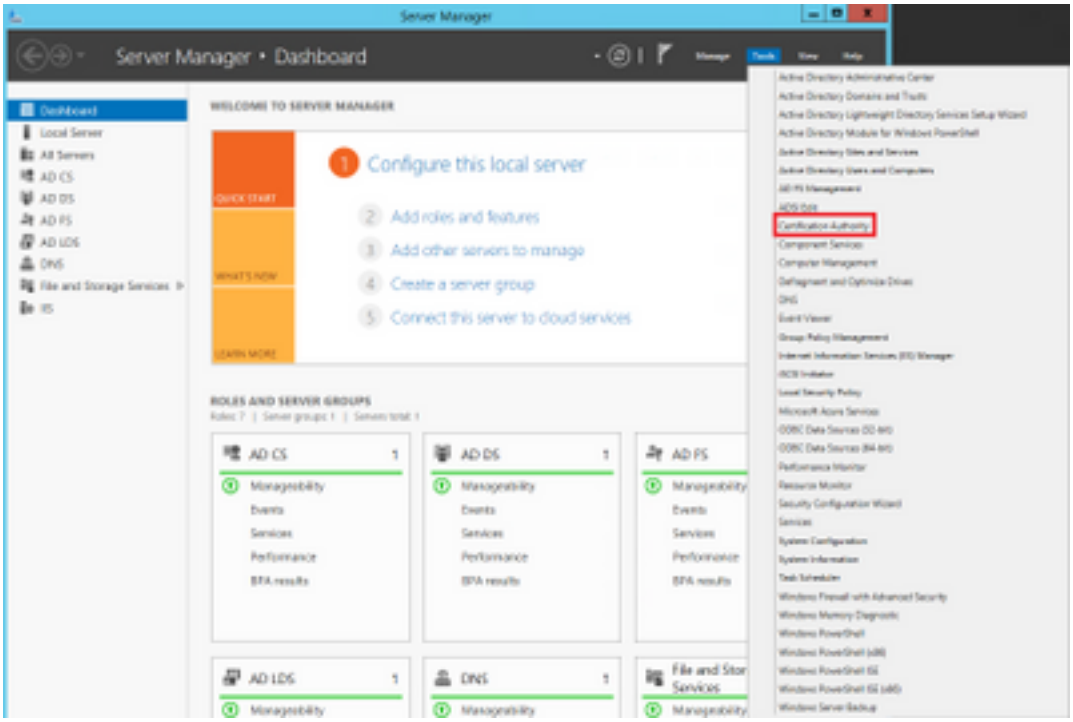
Each of these certificates has some X.509 extension requirements that need to be set, otherwise, you can encounter misbehaviours on any of the aforementioned services:

Certificate	X.509 Key Usage	X.509 Extended Key Usage
Callmanager	· Digital Signature · Key Encipherment · Data Encipherment	· Web Server Authentication · Web Client Authentication
tomcat	· Digital Signature · Key Encipherment · Data Encipherment	· Web Server Authentication · Web Client Authentication
ipsec	· Digital Signature · Key Encipherment · Data Encipherment	· Web Server Authentication · Web Client Authentication · IPsec End System
CAPF	· Digital Signature · Certificate Sign · Key Encipherment	· Web Server Authentication · Web Client Authentication
TVS	· Digital Signature · Key Encipherment · Data Encipherment	· Web Server Authentication · Web Client Authentication

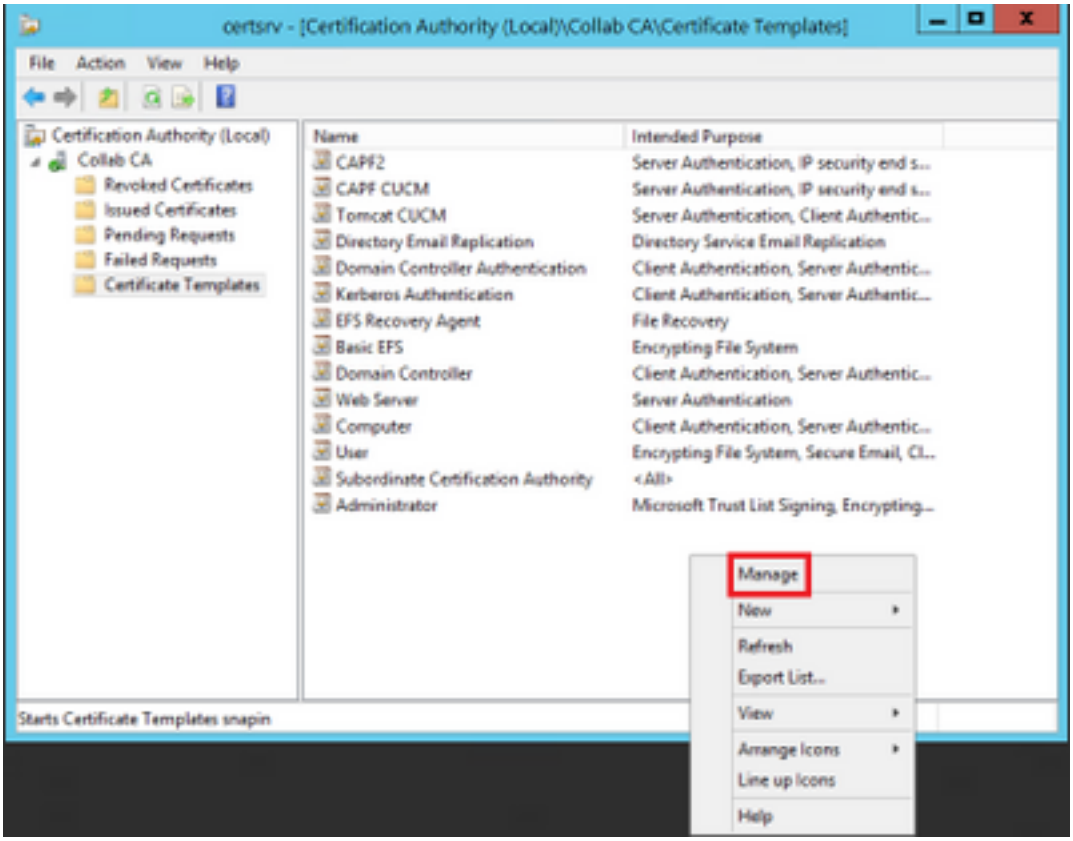
For more information, reference the Security Guide for Cisco Unified Communications Manager

Configure

Step 1. On the Windows Server, navigate to **Server Manager > Tools > Certification Authority**, as shown in the image.



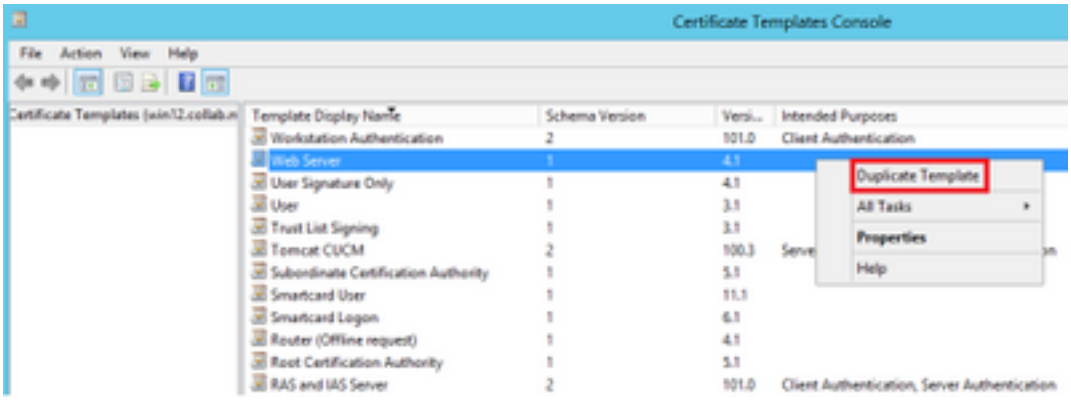
Step 2. Select your CA, then navigate to **Certificate Templates**, right-click on the list and select **Manage**, as shown in the image.



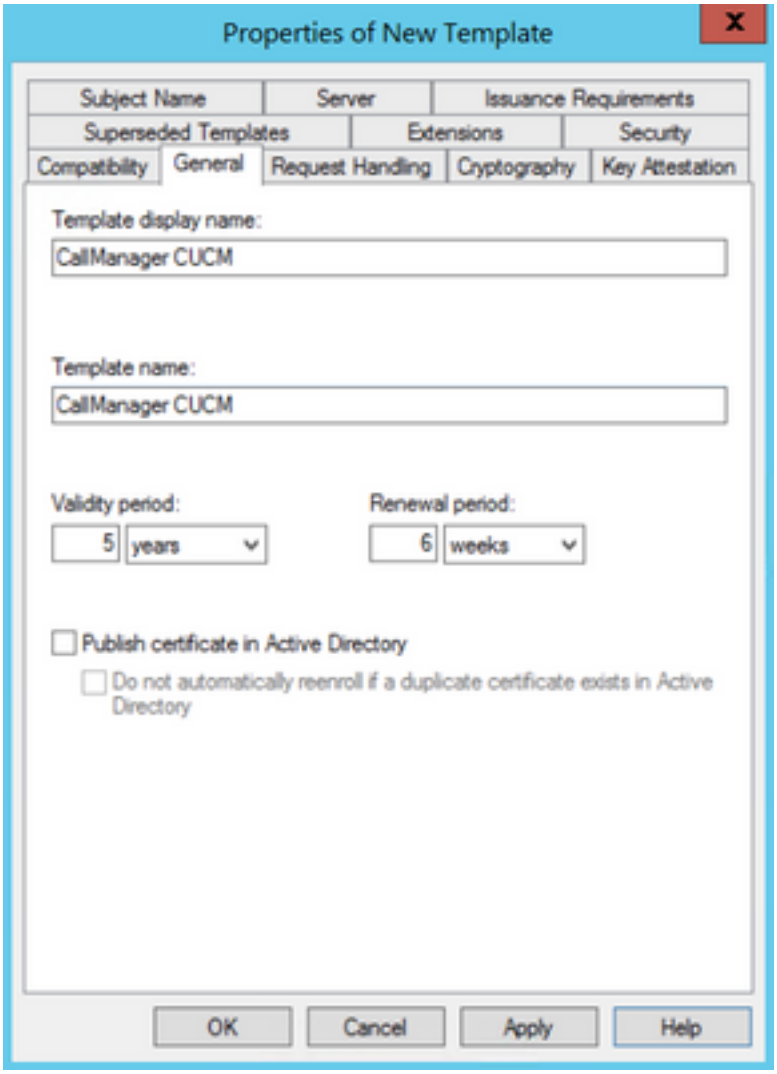
Callmanager / Tomcat / TVS Template

The next images display only the creation of the CallManager template; but the same steps can be followed for creating the certificate templates for the Tomcat and the TVS services. The only difference is to ensure the respective service name is used for each new template during step 2.

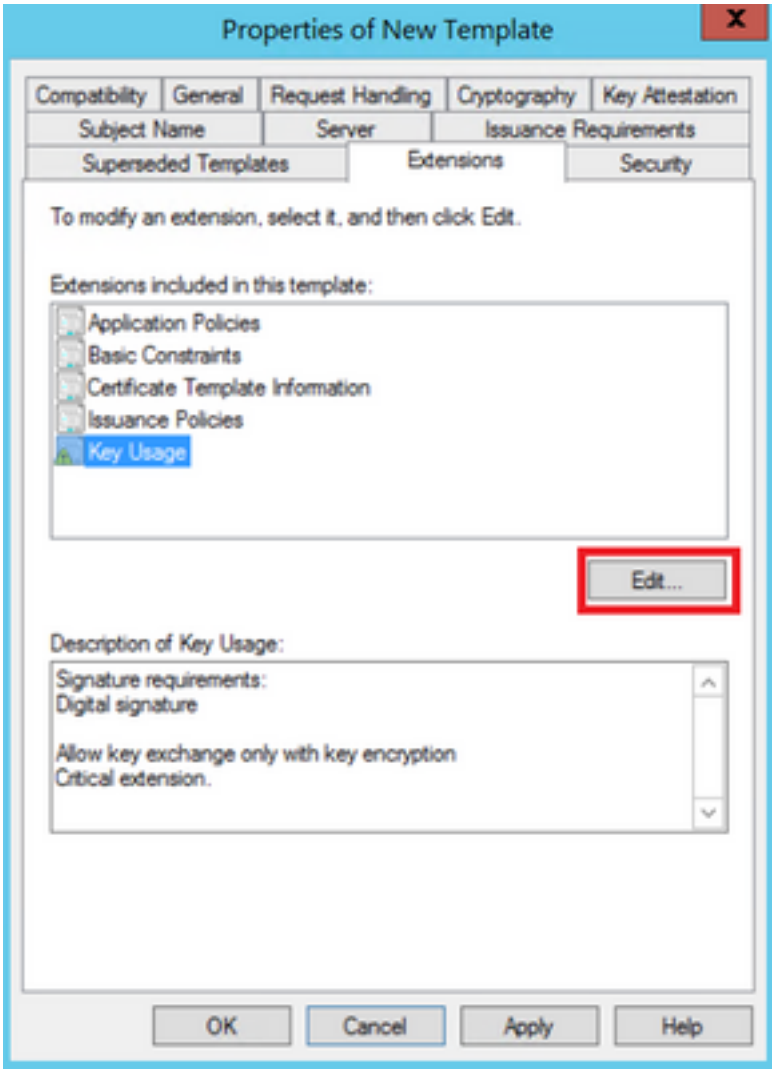
Step 1. Find the **Web Server** template, right-click on it and select **Duplicate Template**, as shown in the image.



Step 2. Under **General**, you can change the certificate template's name, display name, validity, etc.

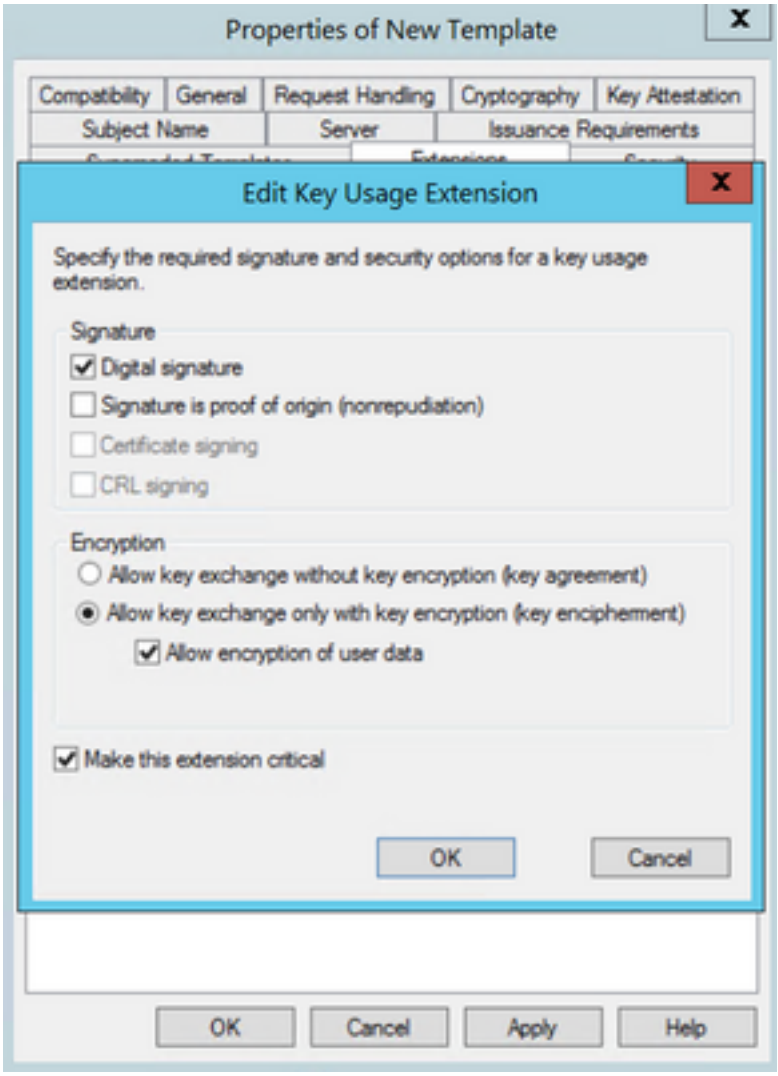


Step 3. Navigate to **Extensions > Key Usage > Edit**, as shown in the image.

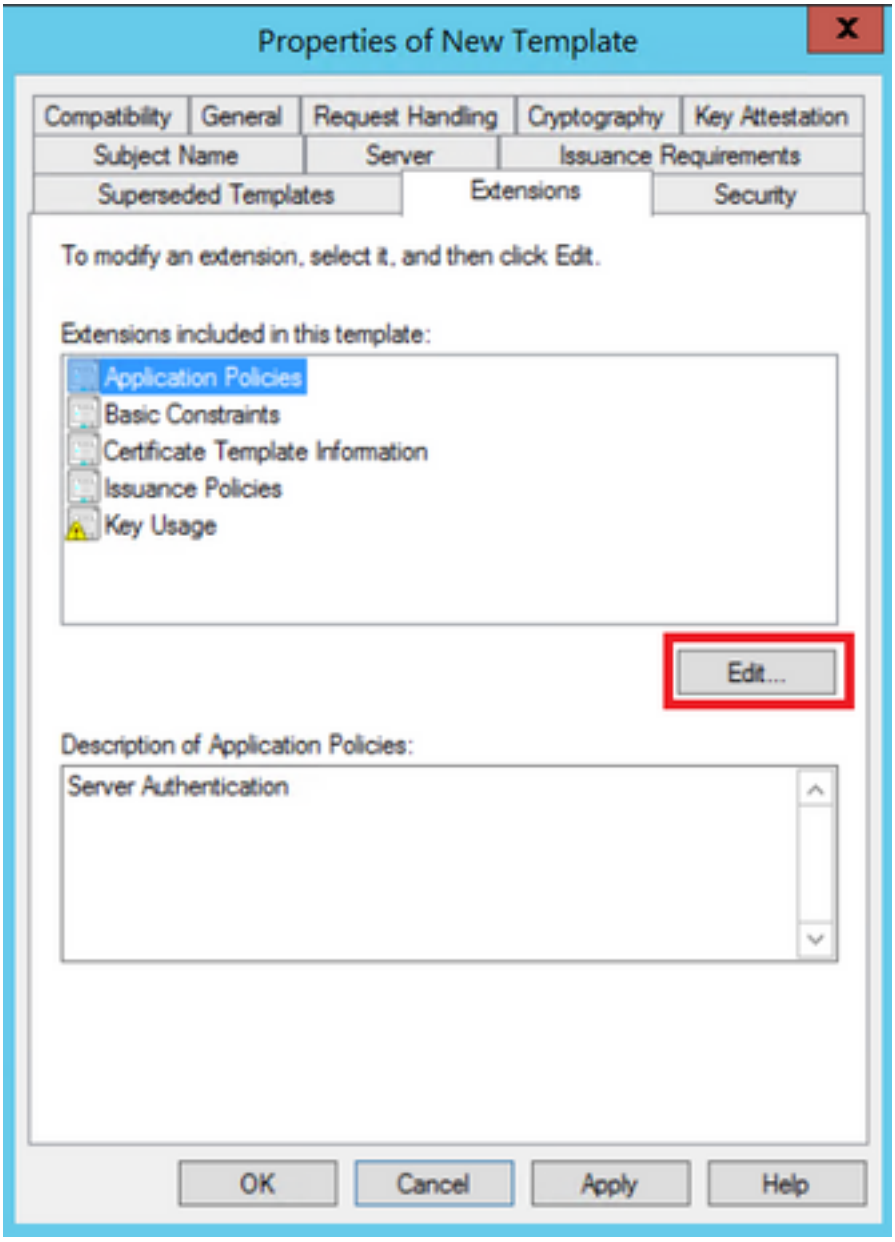


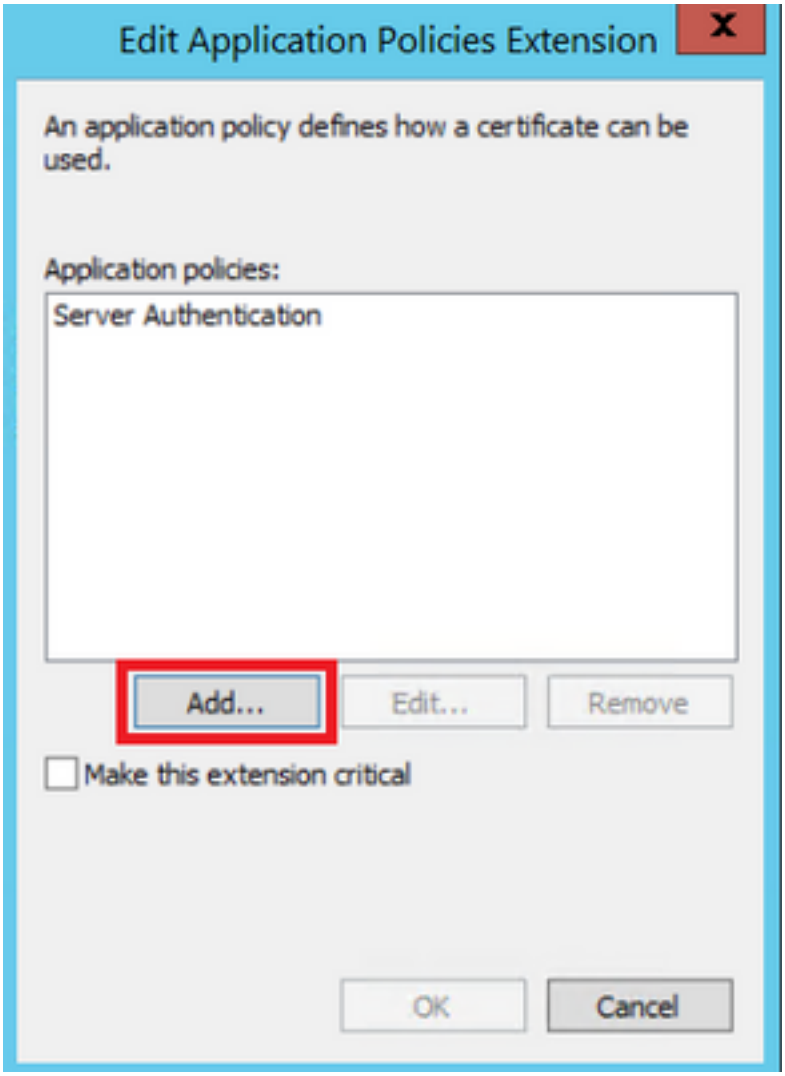
Step 4. Select these options and select **OK**, as shown in the image.

- **Digital signature**
- **Allow key exchange only with key encryption (key encipherment)**
- **Allow encryption of user data**

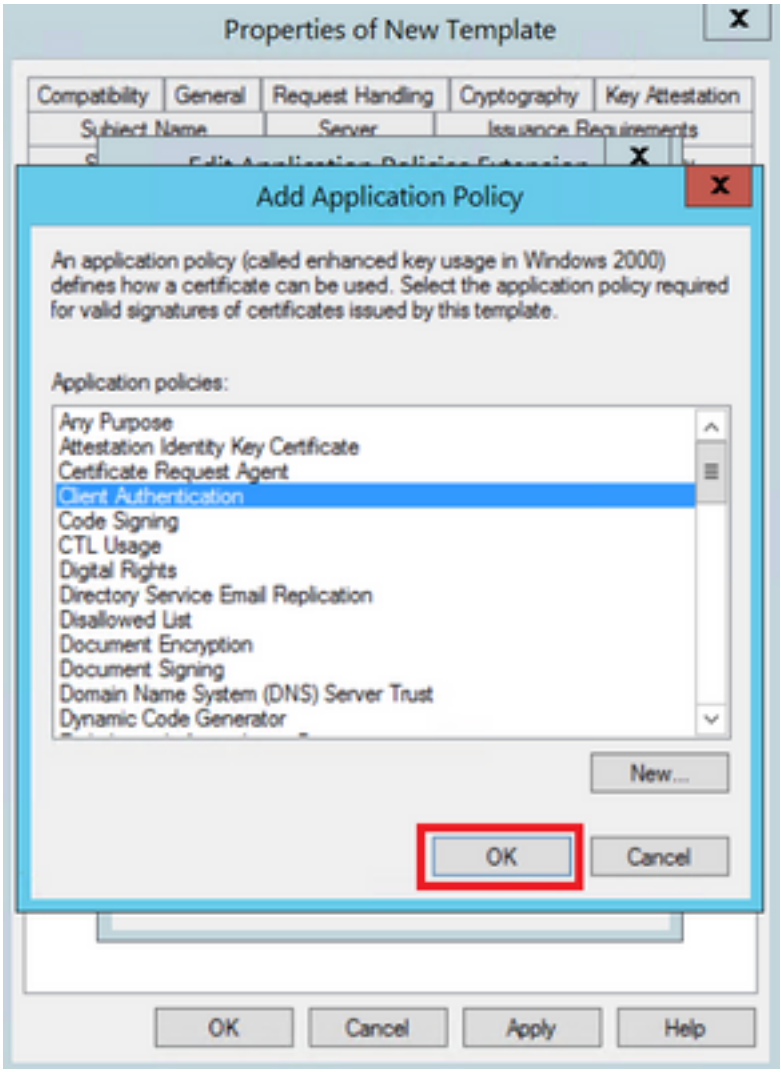


Step 5. Navigate to **Extensions > Application Policies > Edit > Add**, as shown in the image.

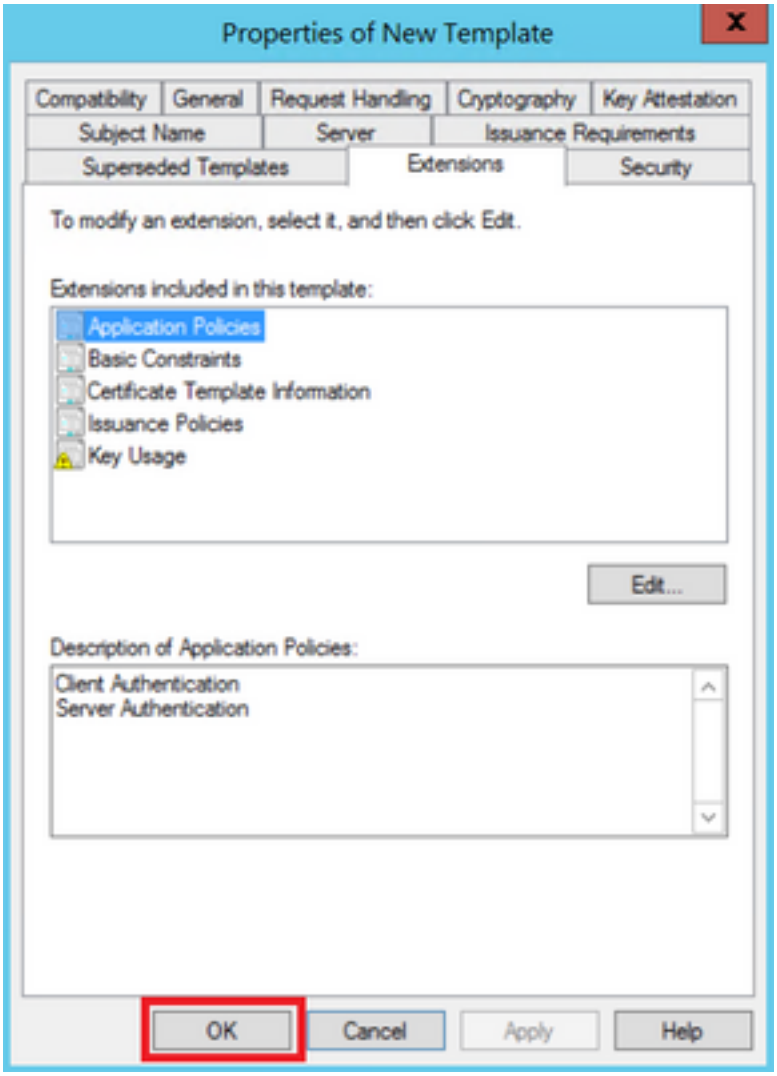

Properties of New Template
Compatibility
General
Request Handling
Cryptography
Key Attestation
Subject Name
Server
Issuance Requirements
Superseded Templates
Extensions
Security
To modify an extension, select it, and then click Edit.
Extensions included in this template:
Application Policies
Basic Constraints
Certificate Template Information
Issuance Policies
Key Usage
Edit...
Description of Application Policies:
Server Authentication
OK
Cancel
Apply
Help



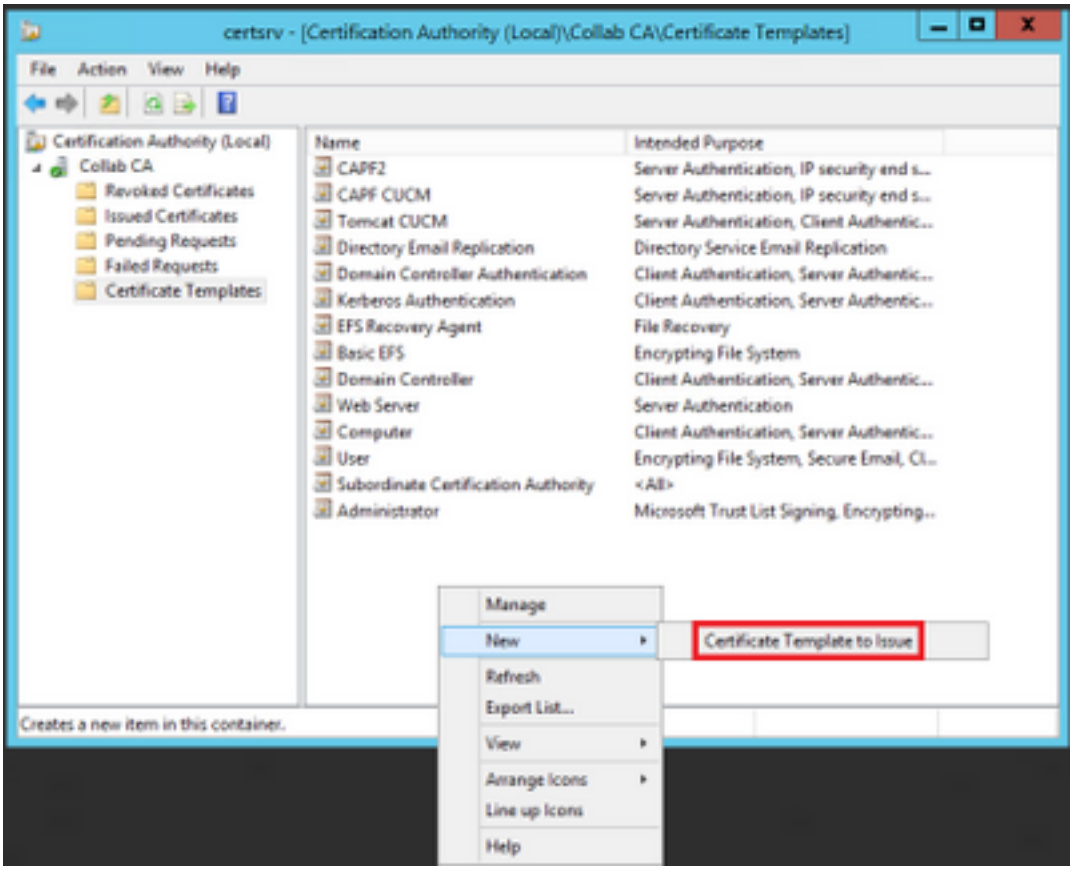
Step 6. Search for **Client Authentication,** select it and select **OK** on both this window and the previous one, as shown in the image.



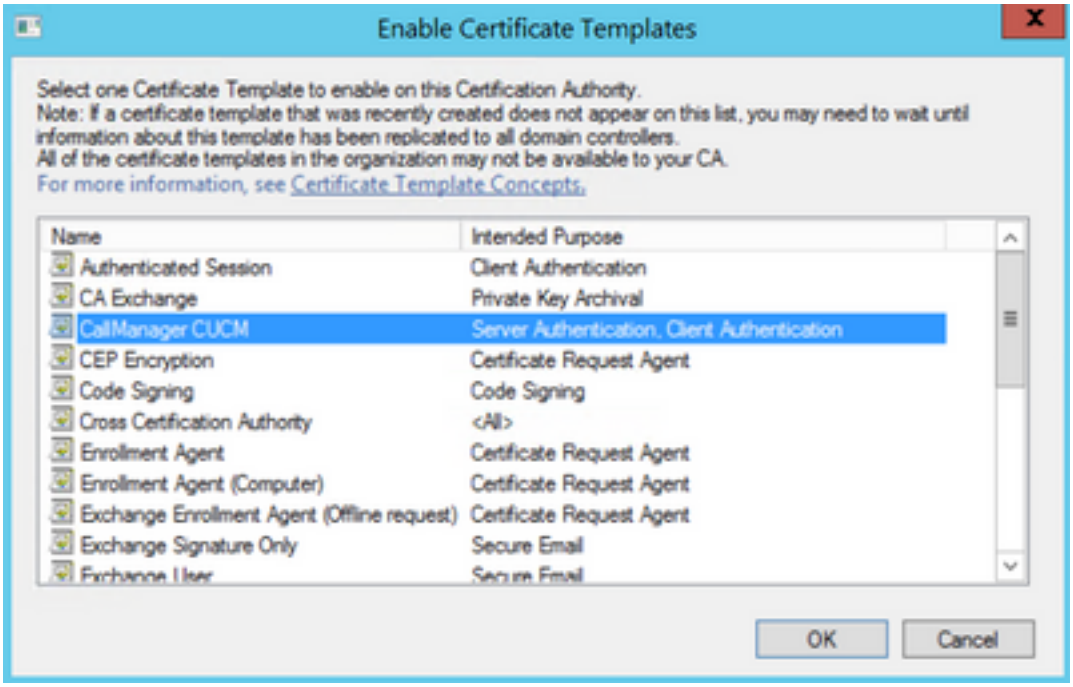
Step 7. Back on the template, select **Apply** and then **OK.**



Step 8. Close the **Certificate Template Console** window, and back on the very first window, navigate to **New > Certificate Template to Issue**, as shown in the image.



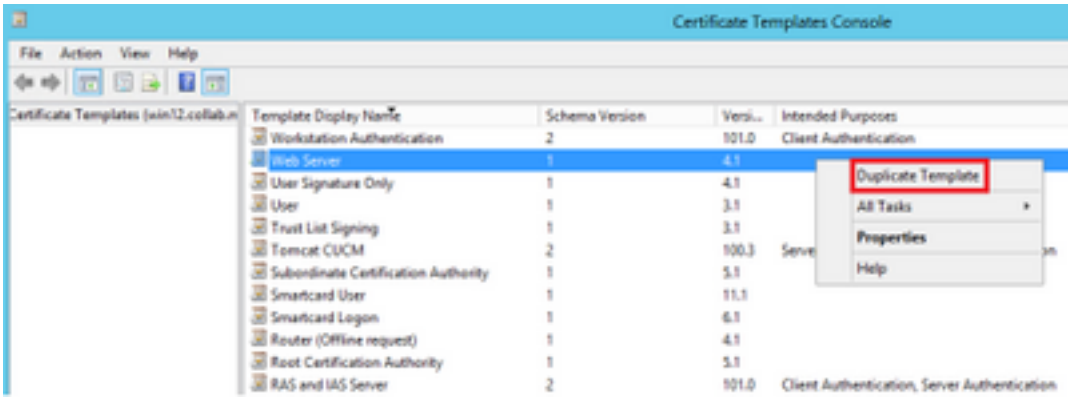
Step 9. Select the new **CallManager CUCM** template and select **OK**, as shown in the image.



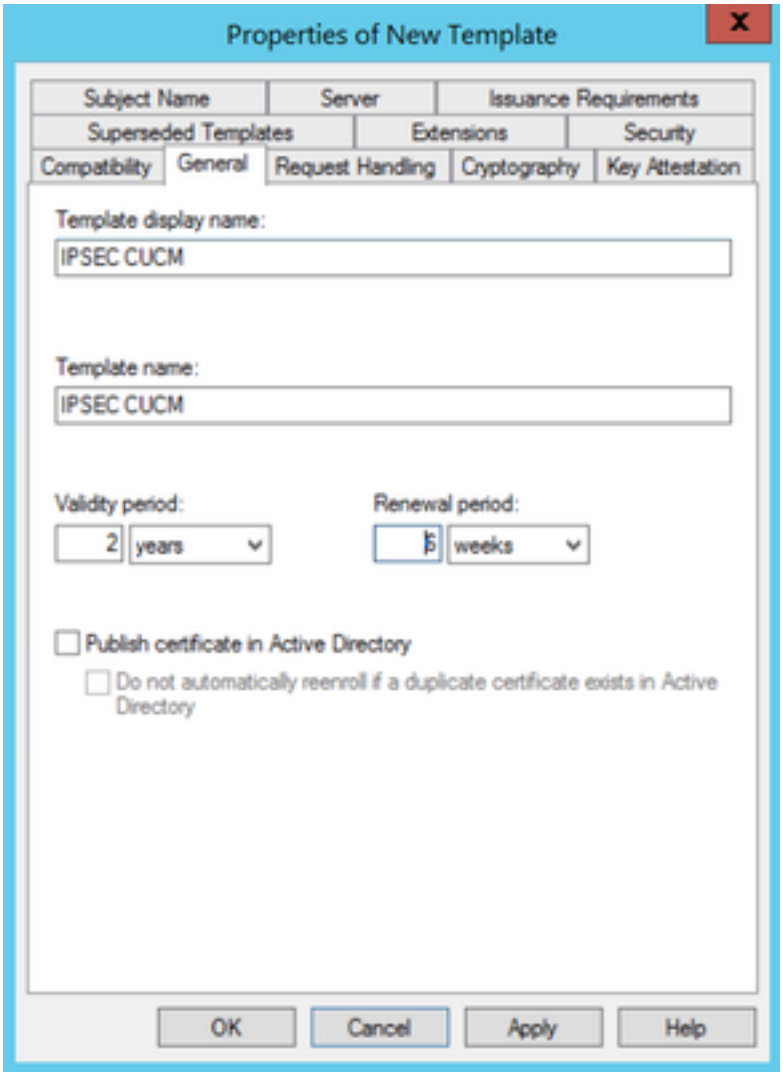
Step 10. Repeat all previous steps to create certificate templates for the Tomcat and TVS services as needed.

IPsec Template

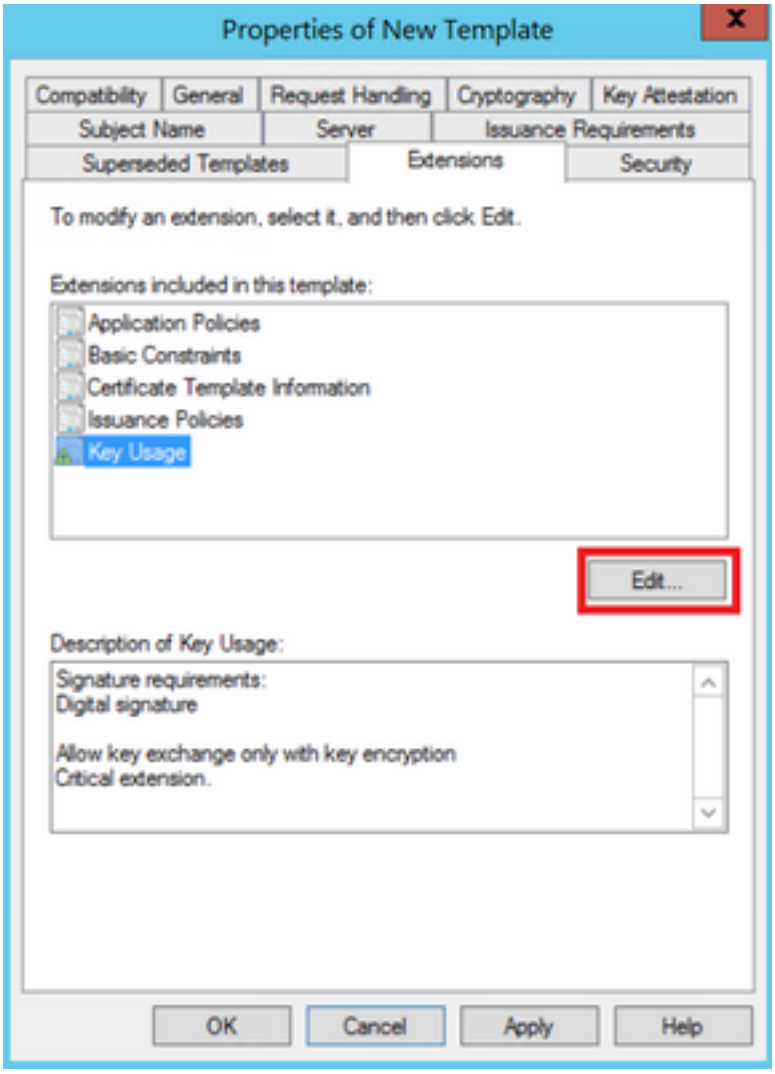
Step 1. Find the **Web Server** template, right-click on it and select **Duplicate Template**, as shown in the image.



Step 2. Under **General**, you can change the certificate template's name, display name, validity, etc..

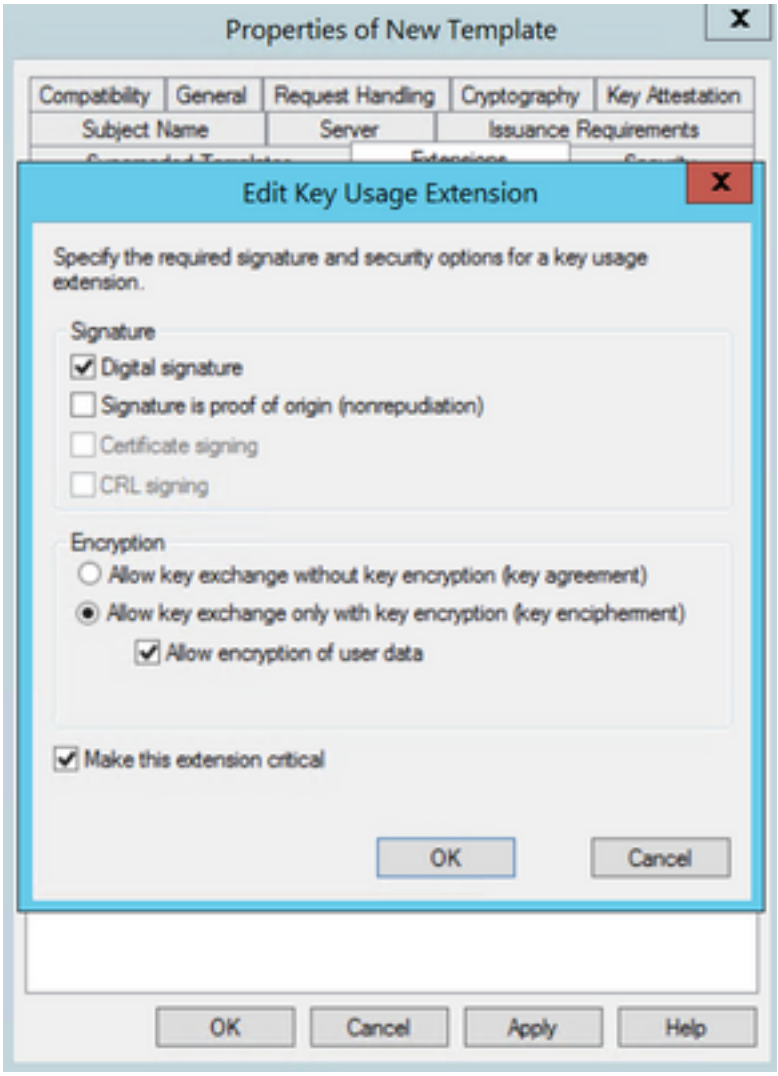


Step 3. Navigate to **Extensions > Key Usage > Edit**, as shown in the image.

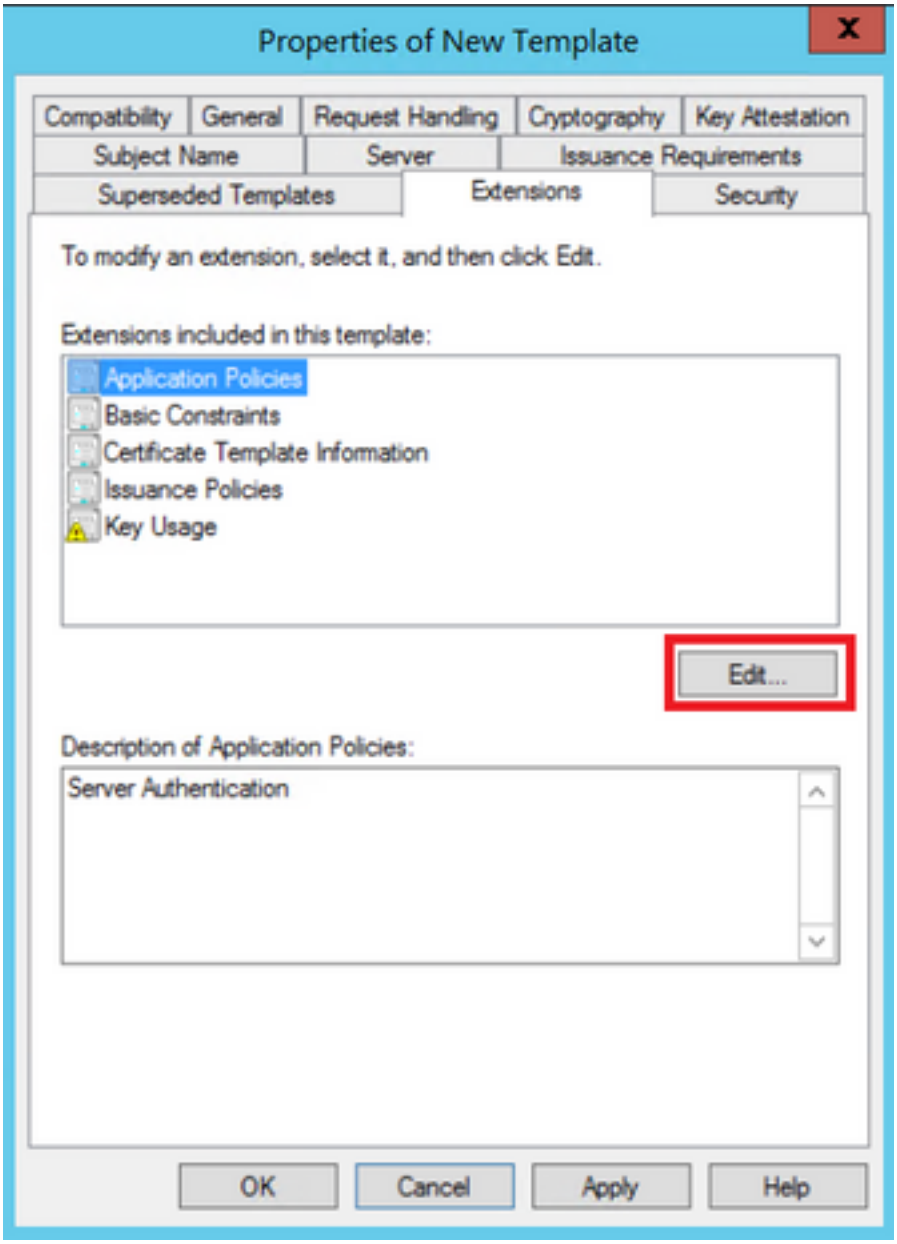


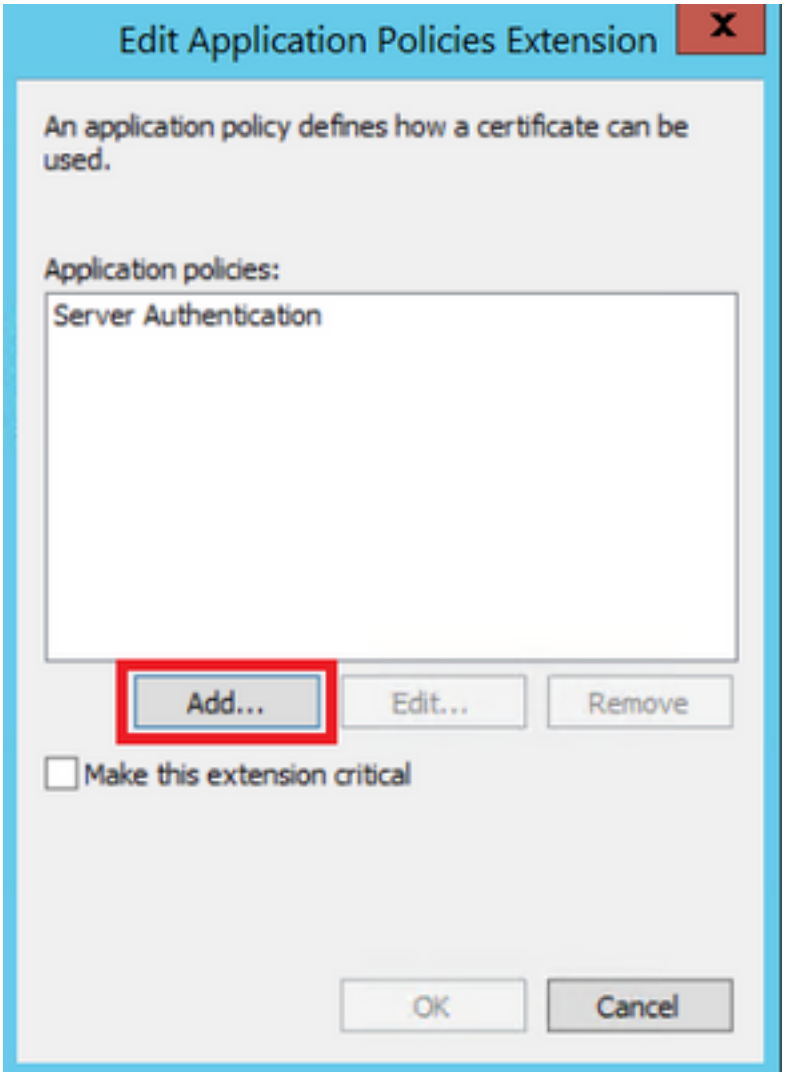
Step 4. Select these options and select **OK**, as shown in the image.

- **Digital signature**
- **Allow key exchange only with key encryption (key encipherment)**
- **Allow encryption of user data**

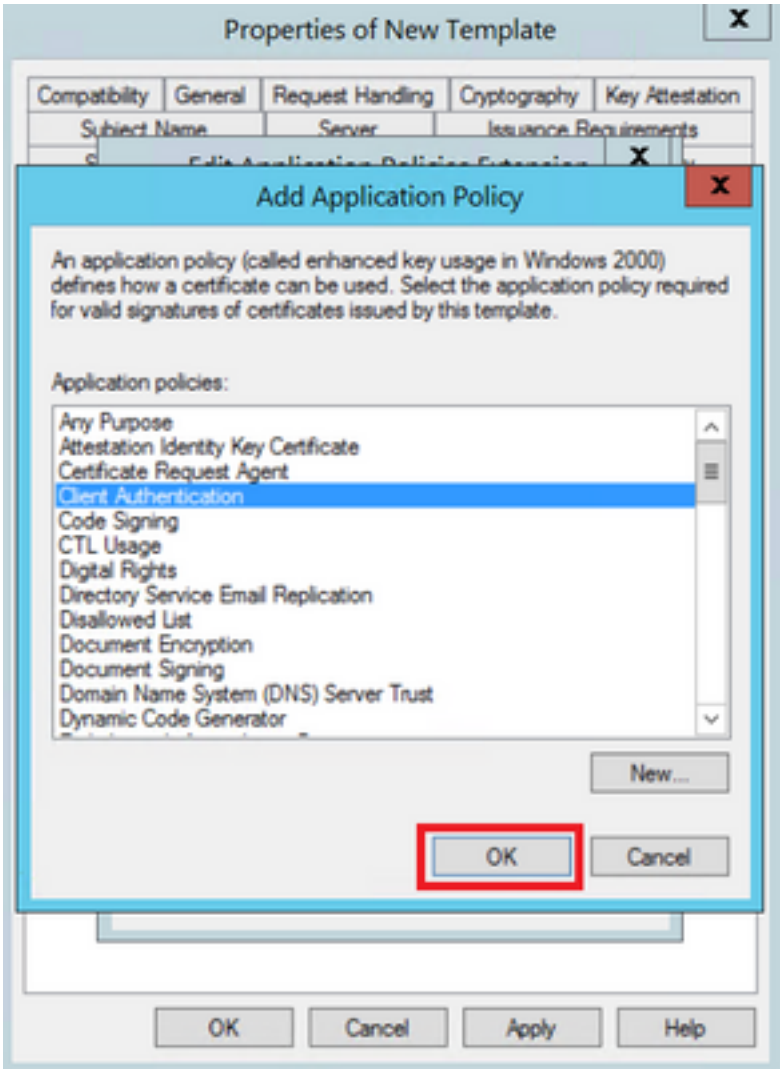


Step 5. Navigate to **Extensions > Application Policies > Edit > Add**, as shown in the image.

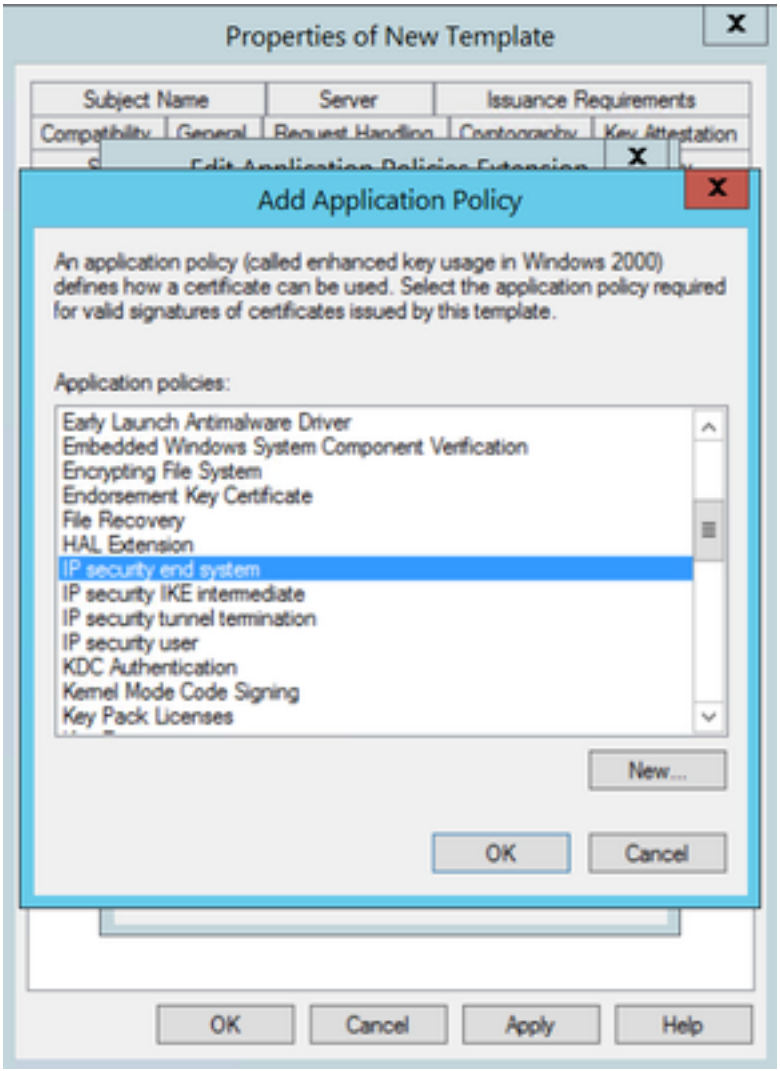

Properties of New Template
Compatibility
General
Request Handling
Cryptography
Key Attestation
Subject Name
Server
Issuance Requirements
Superseded Templates
Extensions
Security
To modify an extension, select it, and then click Edit.
Extensions included in this template:
Application Policies
Basic Constraints
Certificate Template Information
Issuance Policies
Key Usage
Edit...
Description of Application Policies:
Server Authentication
OK
Cancel
Apply
Help



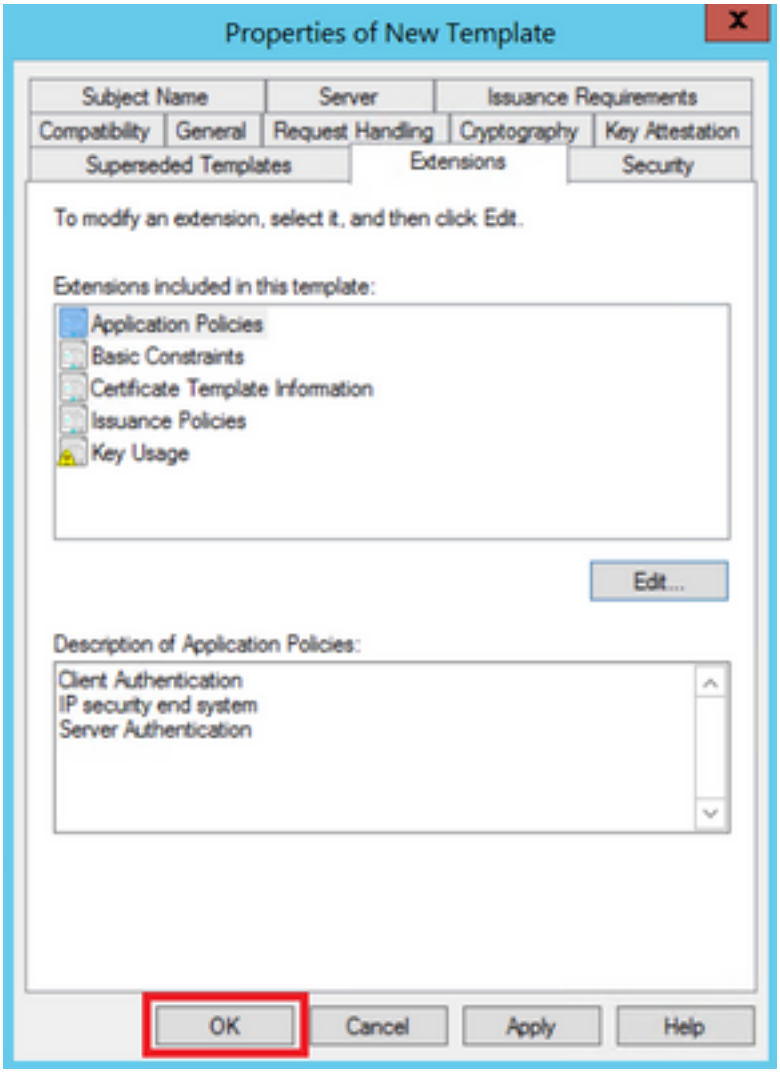
Step 6. Search for **Client Authentication,** select it and then **OK**, as shown in the image.



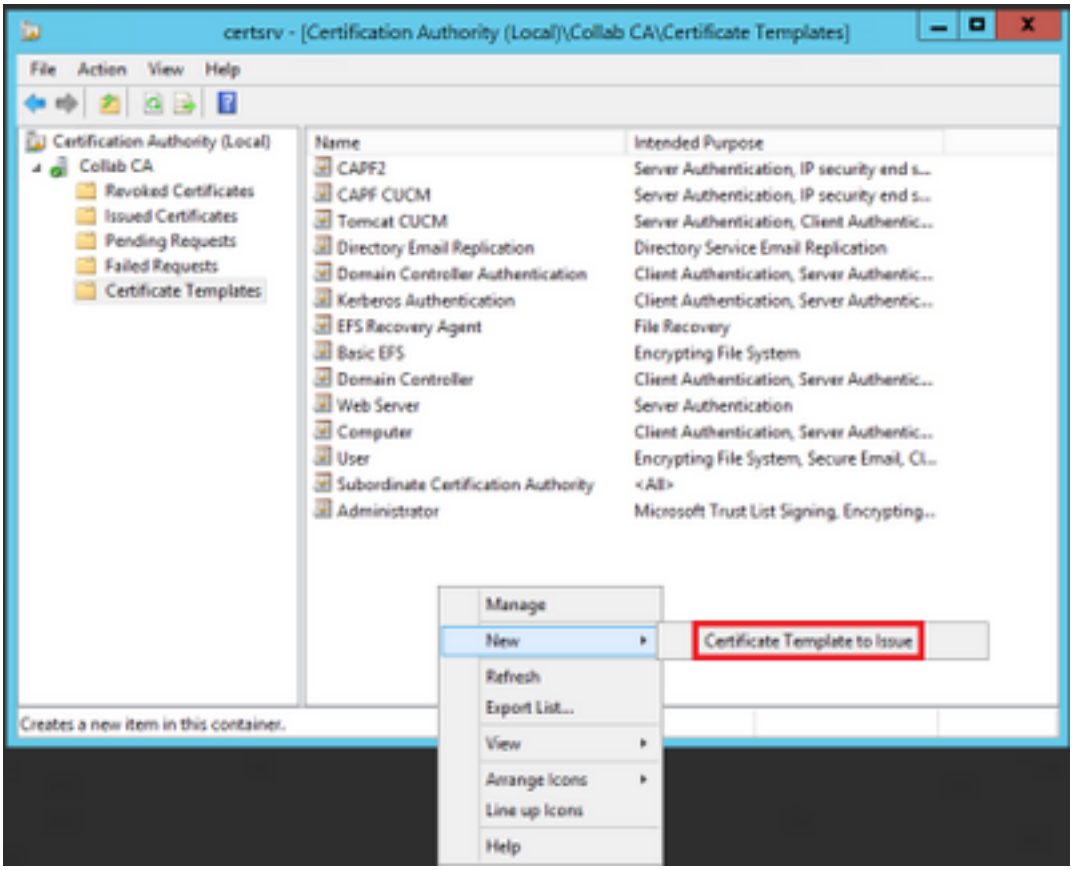
Step 7. Select **Add** again, search for **IP security end system**, select it and then select **OK** on this and on the previous window as well.



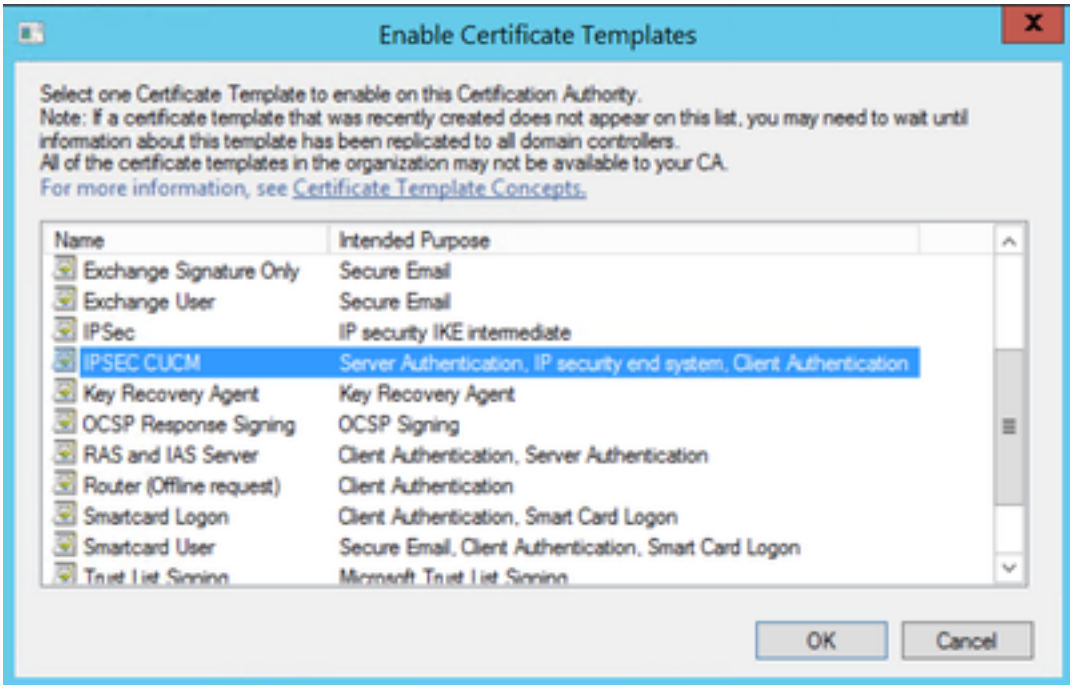
Step 8. Back on the template, select **Apply** and then **OK**, as shown in the image.



Step 9. Close the **Certificate Templates Console** window, and back on the very first window, navigate to **New > Certificate Template to Issue**, as shown in the image.

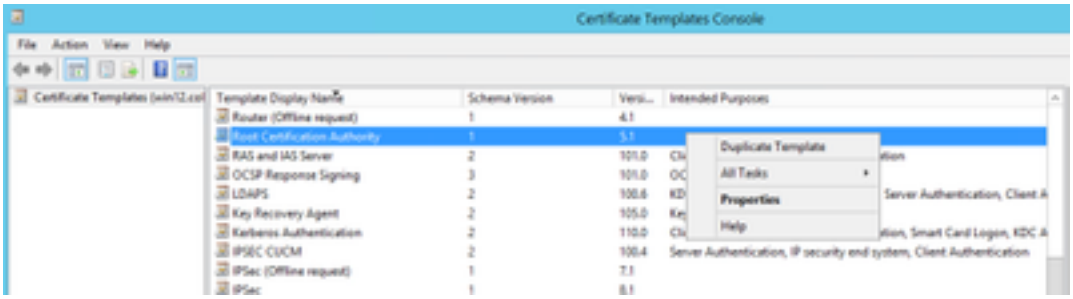


Step 10. Select the new **IPSEC CUCM** template and select on **OK**, as shown in the image.



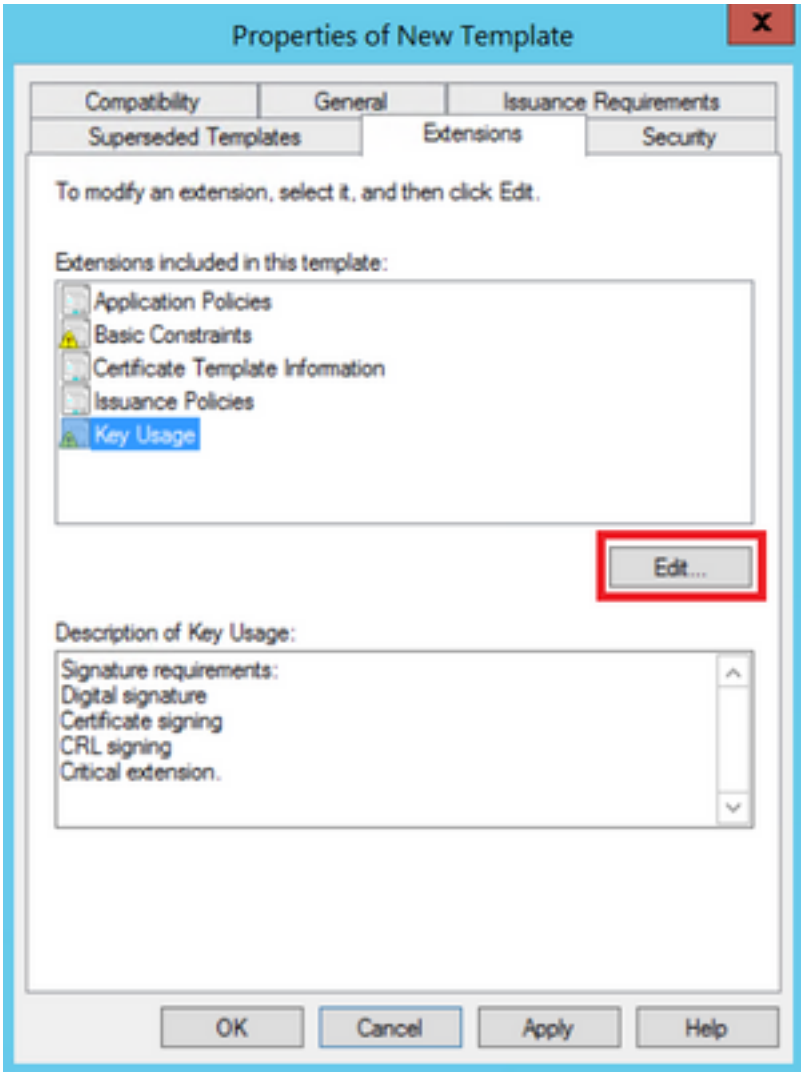
CAPF Template

Step 1. Find the **Root CA** template and right-click on it. Then select **Duplicate Template**, as shown in the image.



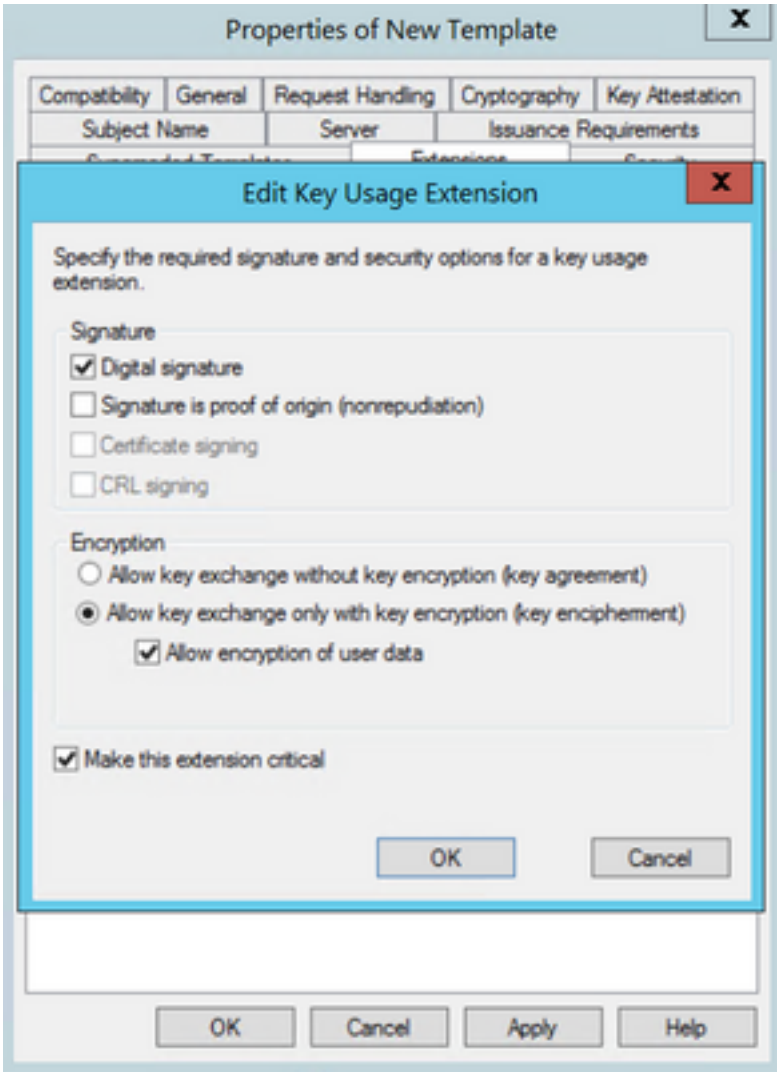
Step 2. Under **General**, you can change the certificate template's name, display name, validity, etc.

Step 3. Navigate to **Extensions > Key Usage > Edit**, as shown in the image.

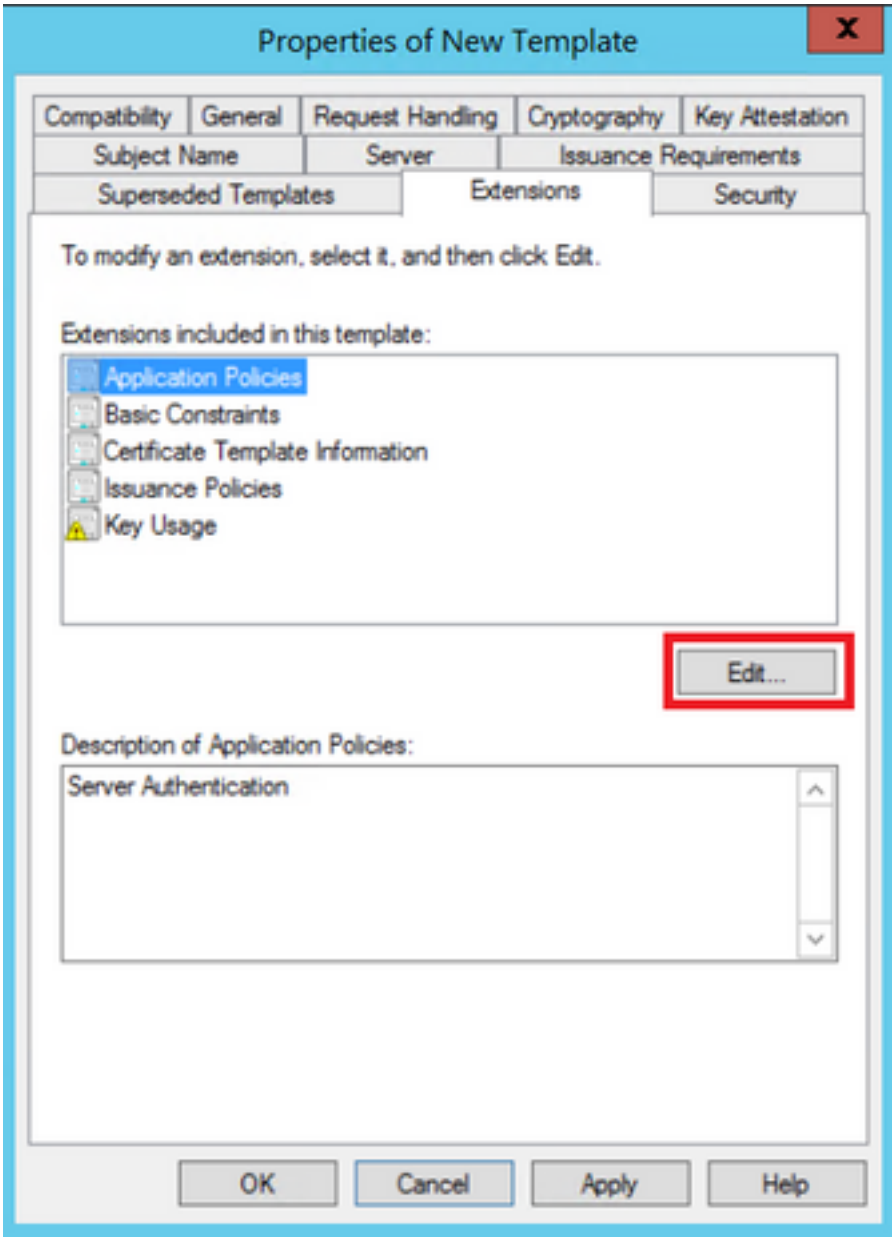


Step 4. Select these options and select **OK**, as shown in the image.

- **Digital signature**
- **Certificate signing**
- **CRL signing**



Step 5. Navigate to **Extensions > Application Policies > Edit > Add**, as shown in the image.


Properties of New Template
Compatibility
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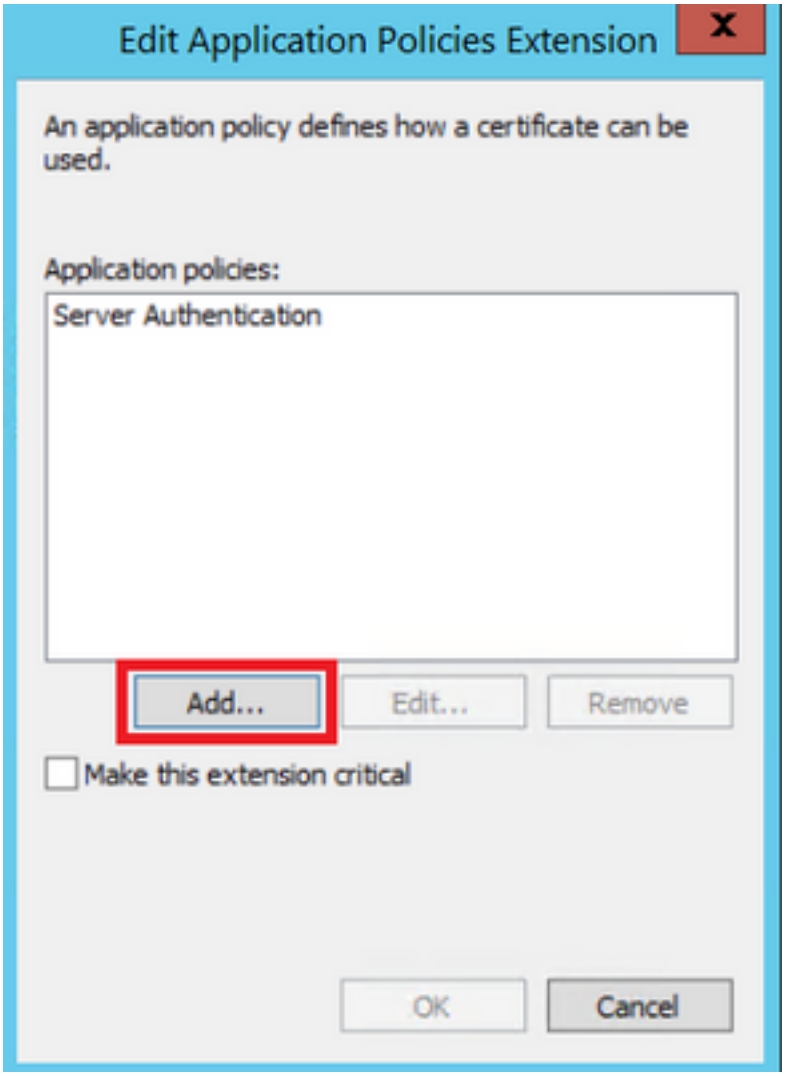
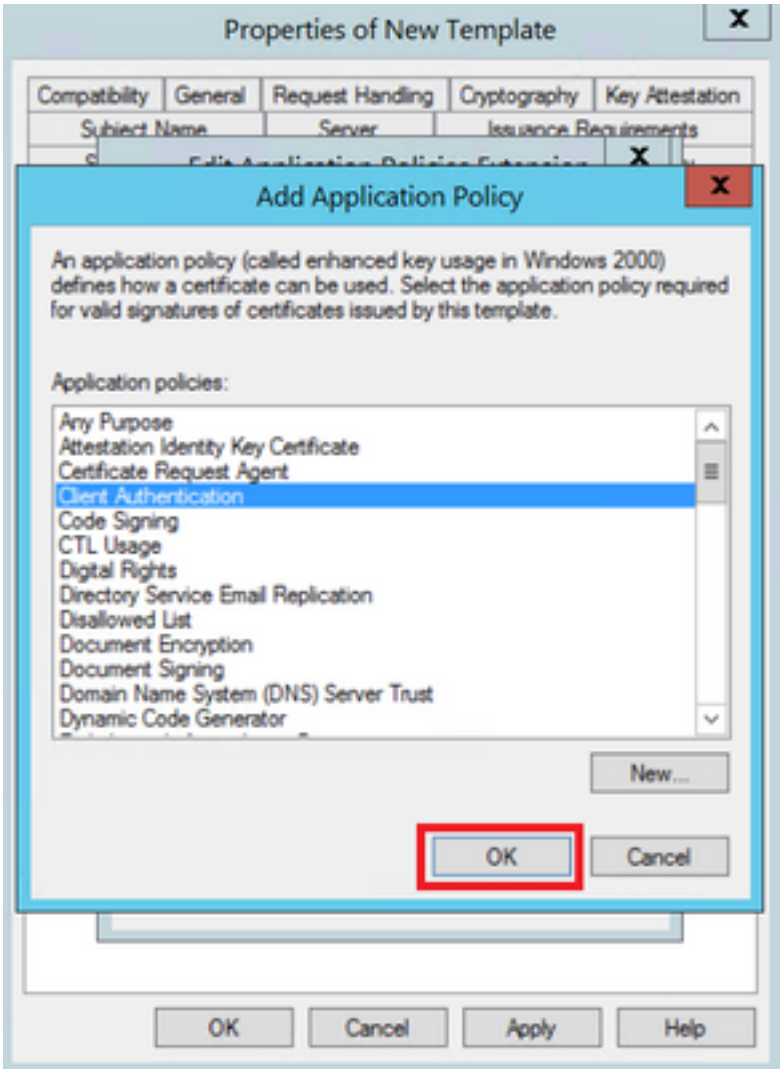
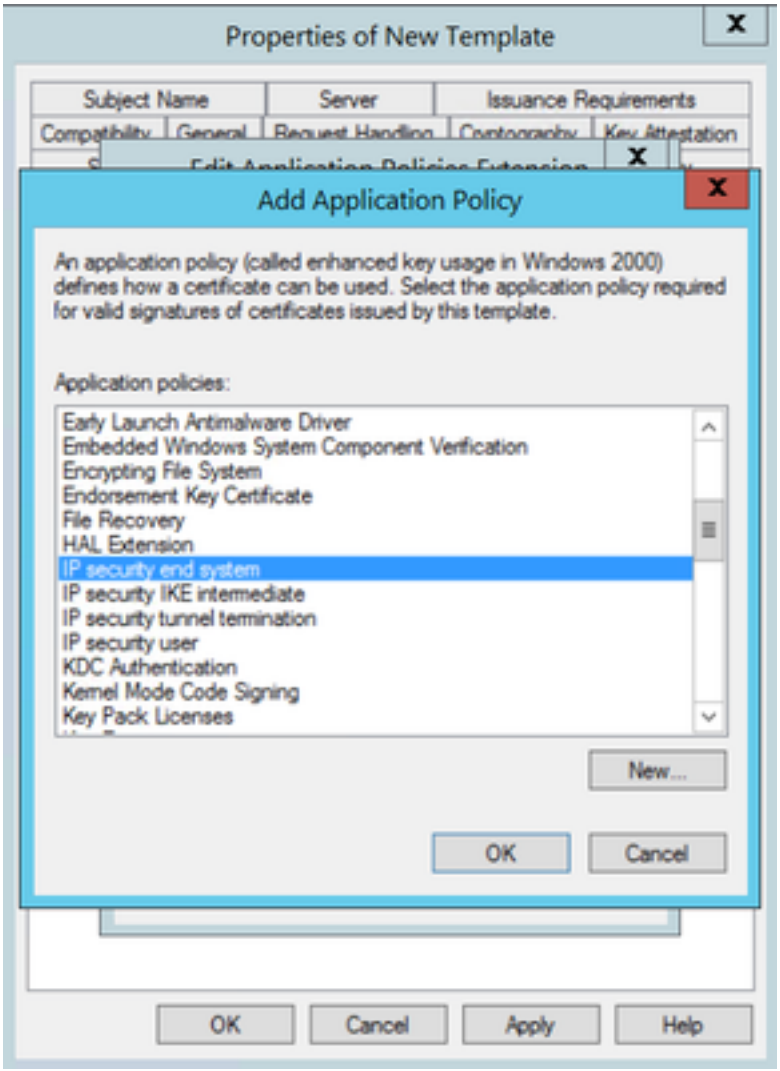
Request Handling
Cryptography
Key Attestation
Subject Name
Server
Issuance Requirements
Superseded Templates
Extensions
Security
To modify an extension, select it, and then click Edit.
Extensions included in this template:
Application Policies
Basic Constraints
Certificate Template Information
Issuance Policies
Key Usage
Edit...
Description of Application Policies:
Server Authentication
OK
Cancel
Apply
Help



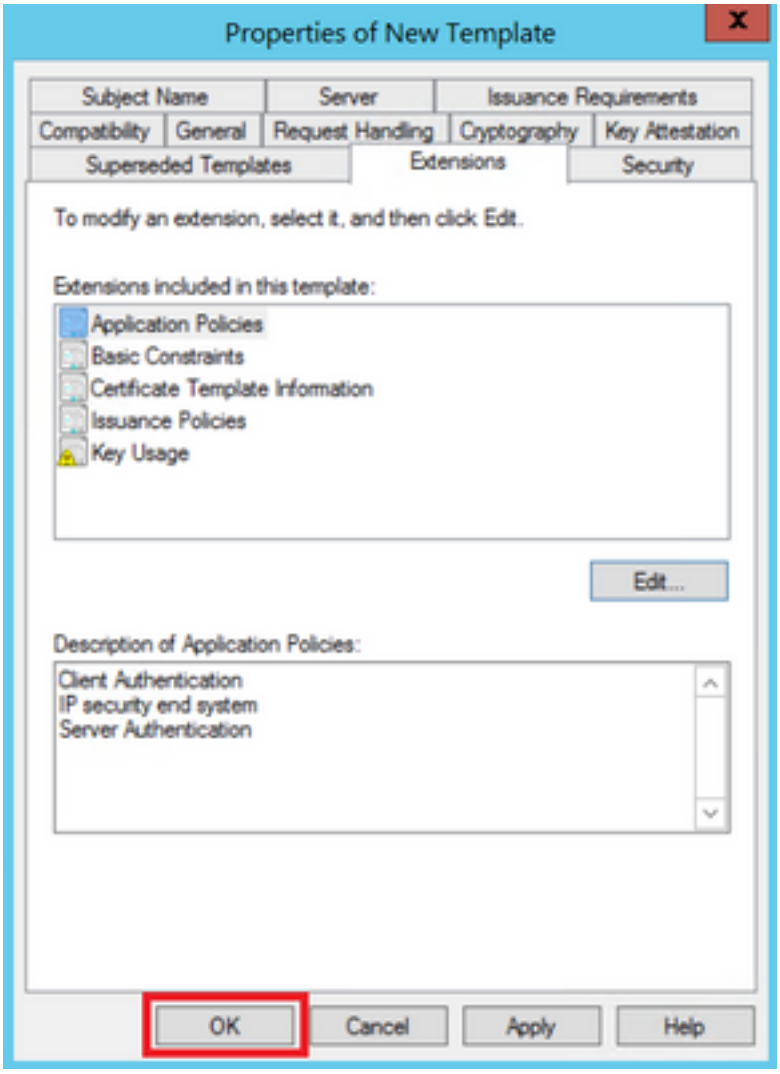
Step 6. Search for **Client Authentication,** select it and then select **OK**, as shown in the image.



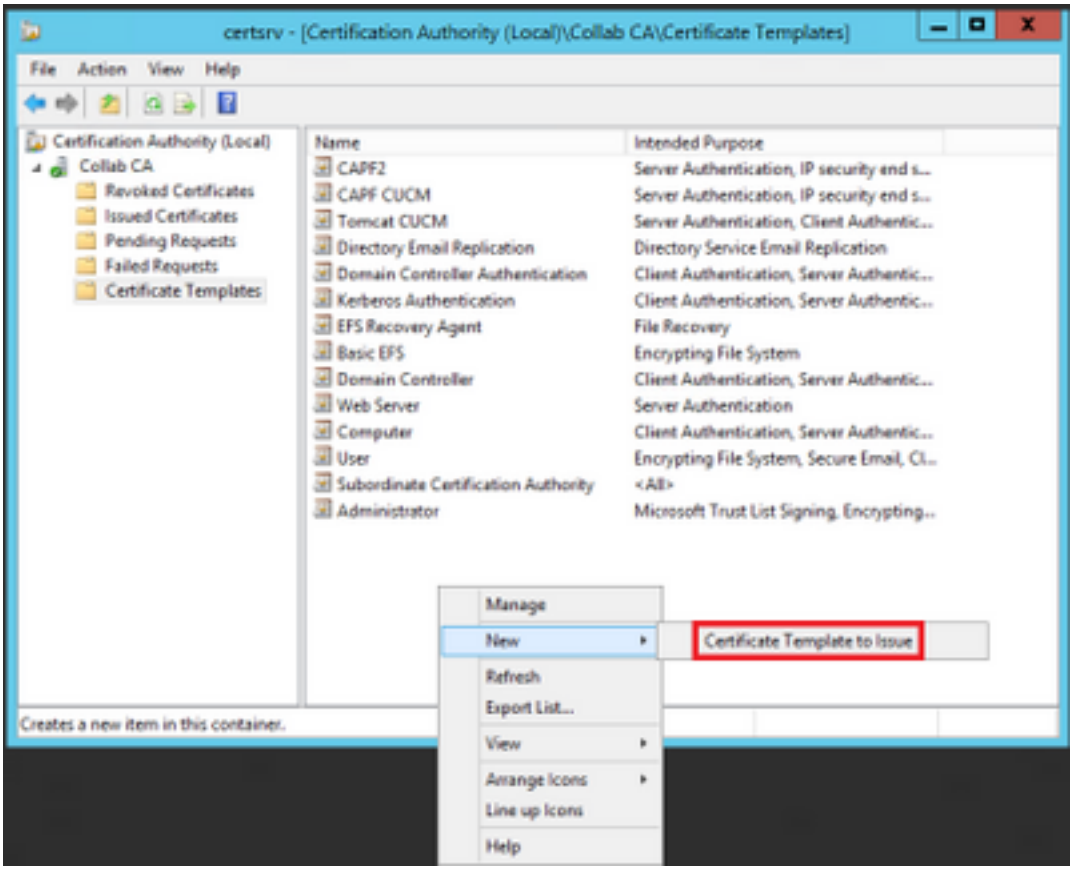
Step 7. Select **Add** again, search for **IP security end system**, select it and then select OK on this and on the previous window as well, as shown in the image.



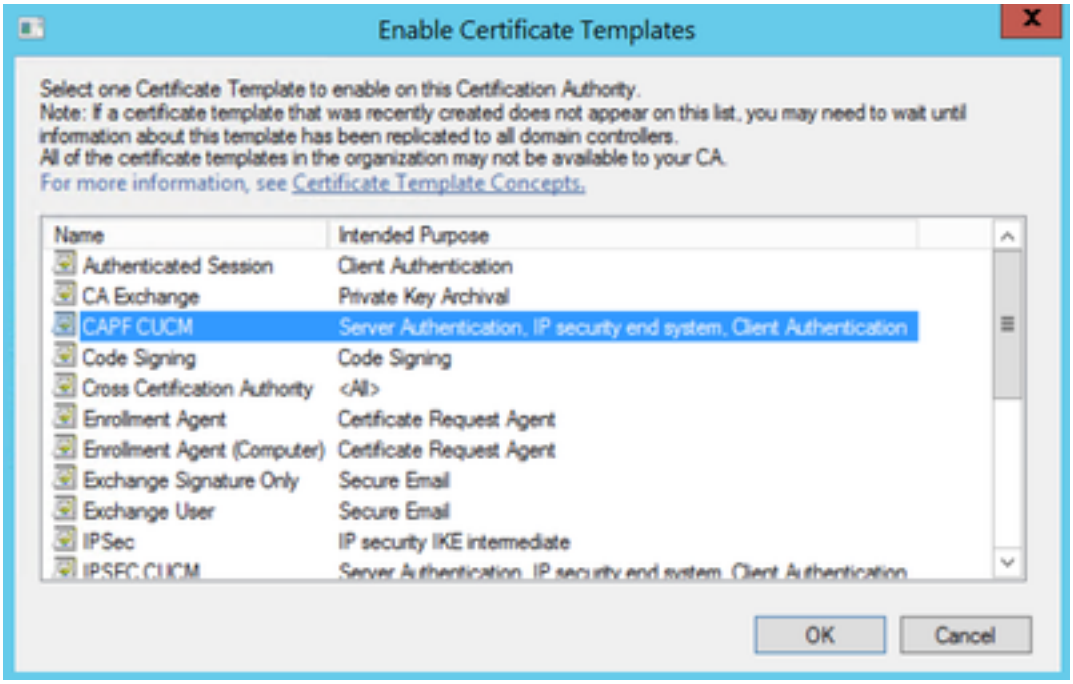
Step 8. Back on the template, select **Apply** and then **OK**, as shown in the image.



Step 9. Close the **Certificate Templates Console** window, and back on the very first window, navigate to **New > Certificate Template to Issue**, as shown in the image.



Step 10. Select the new **CAPF CUCM** template and select **OK**, as shown in the image.



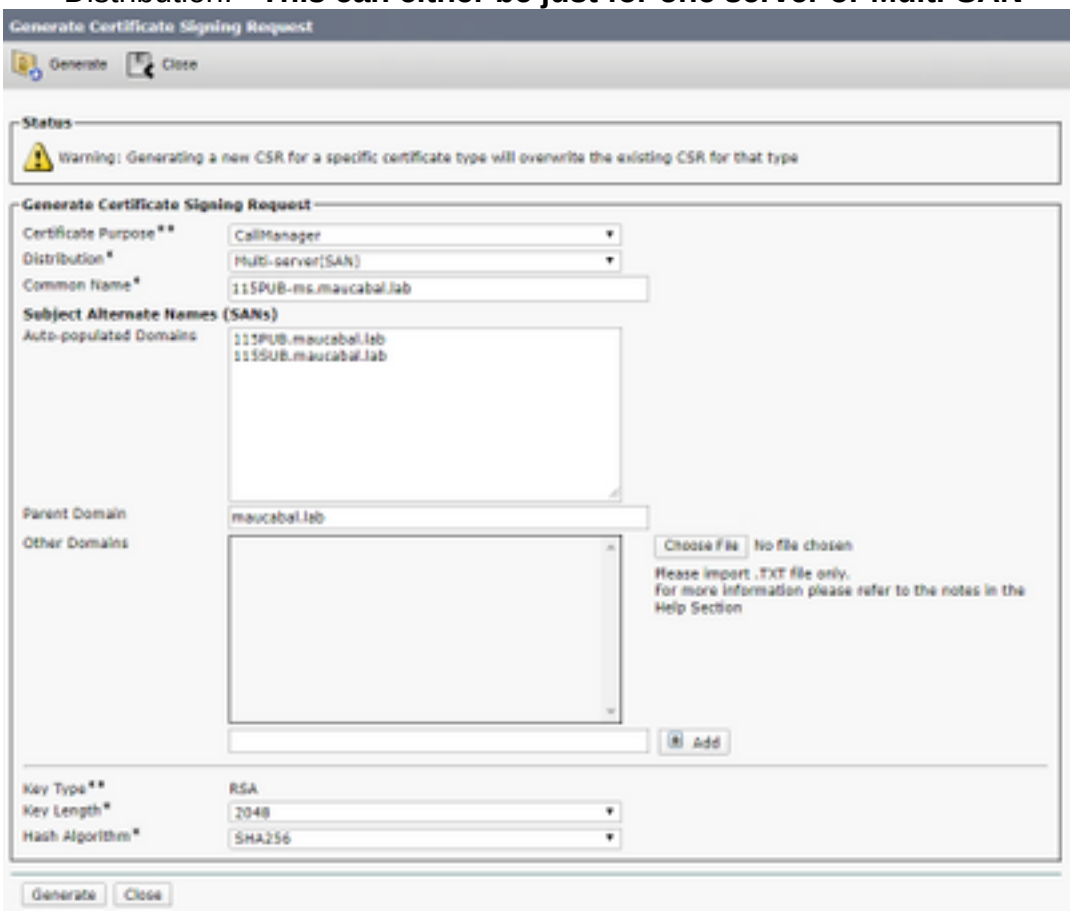
Generate a Certificate Signing Request

Use this example in order to generate a CallManager certificate with the use of the newly created templates. The same procedure can be used for any certificate type, you just need to select the certificate and template types accordingly:

Step 1. On CUCM, navigate to **OS Administration > Security > Certificate Management > Generate CSR**.

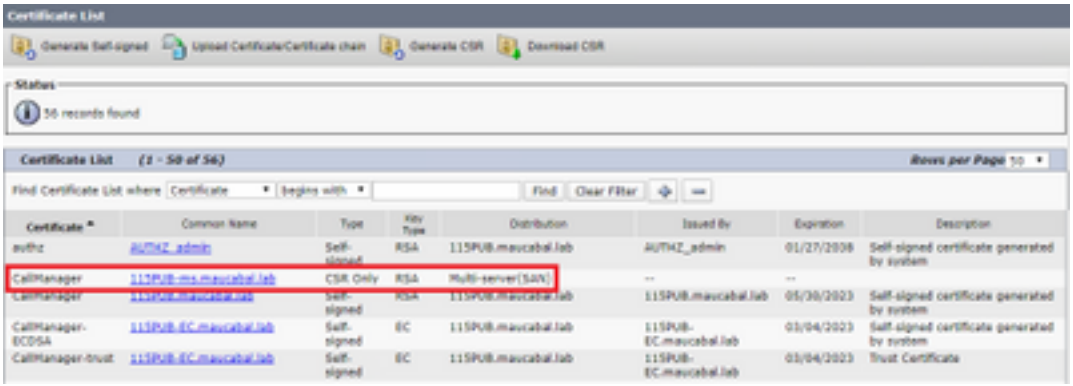
Step 2. Select these options and select **Generate**, as shown in the image.

- Certificate Purpose: **CallManager**
- Distribution: **<This can either be just for one server or Multi-SAN>**

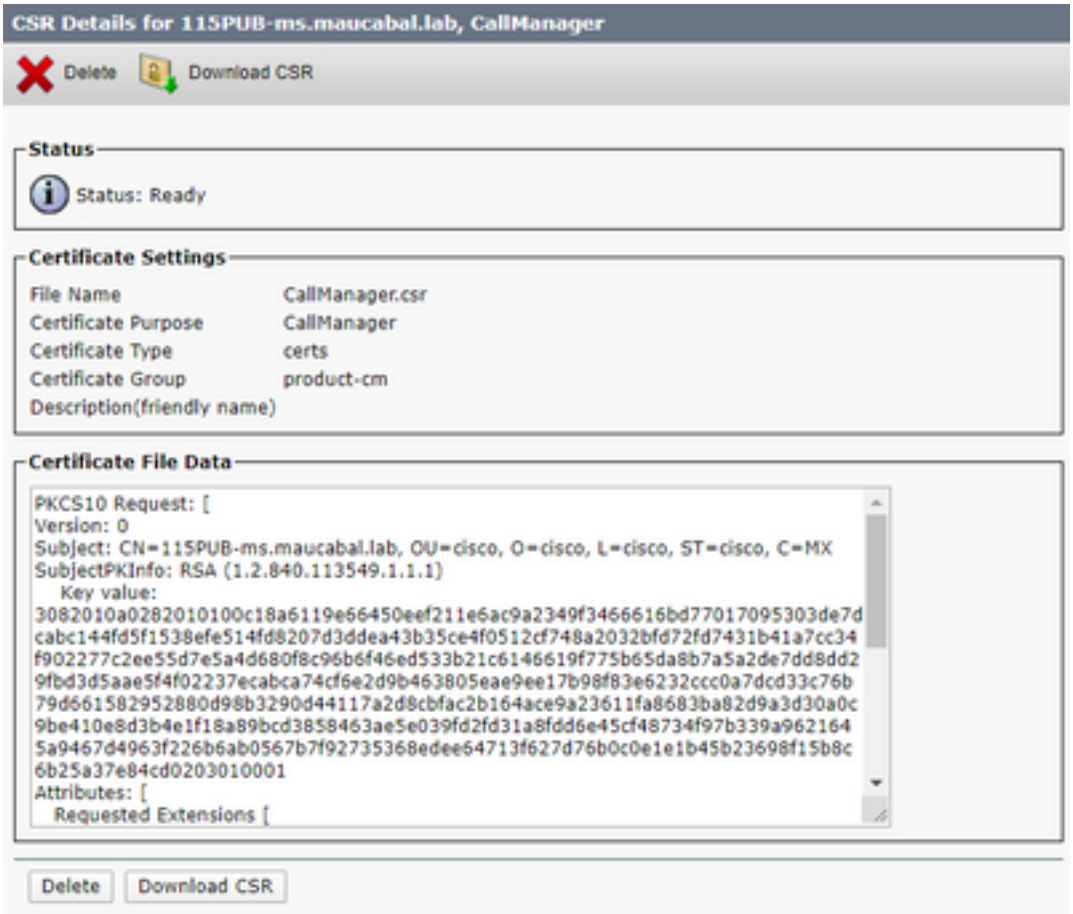


Step 3. A confirmation message is generated, as shown in the image.

Step 4. On the certificate list, look for the entry with type **CSR Only** and select it, as shown in the image.

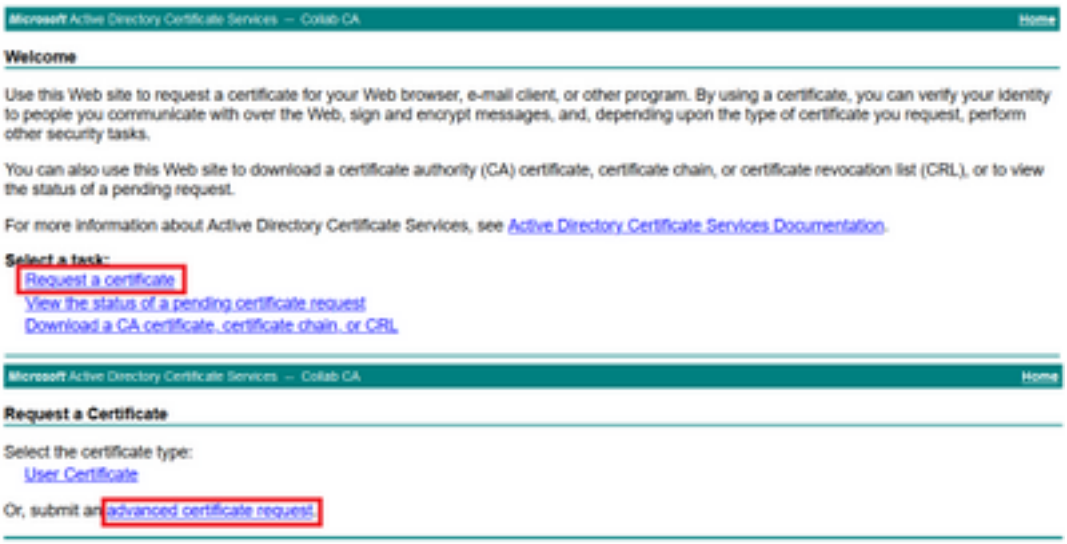


Step 5. On the pop-up window, select **Download CSR**, and save the file on your computer.

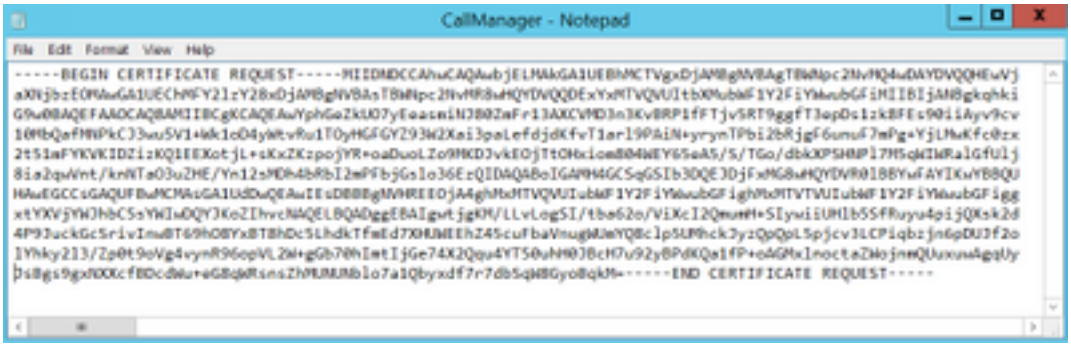


Step 6. On your browser, navigate to this URL, and enter your domain controller administrator credentials: **https://<yourWindowsServerIP>/certsrv/.**

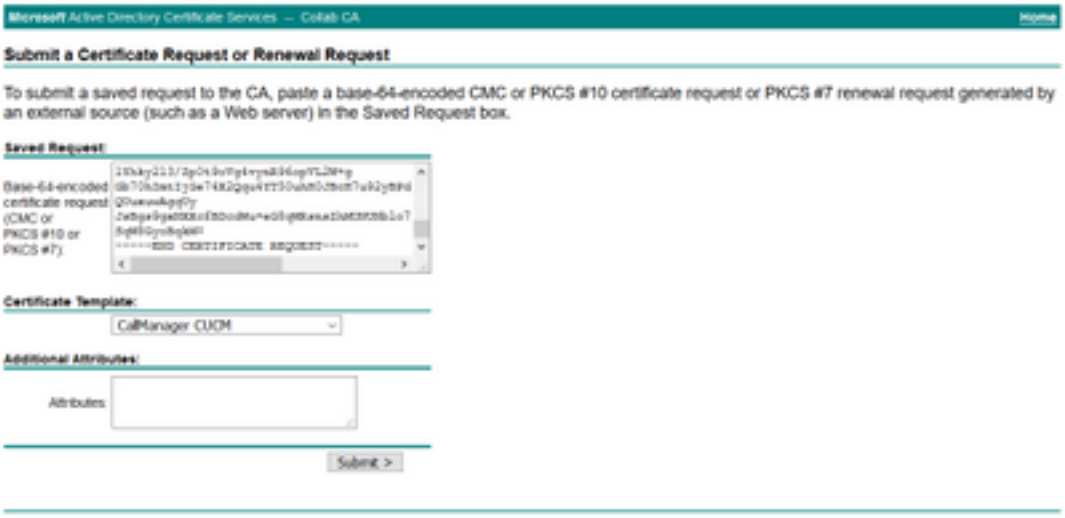
Step 7. Navigate to **Request a certificate > advanced certificate request**, as shown in the image.



Step 8. Open the CSR file and copy all its contents:



Step 9. Paste the CSR on the **Base-64-encoded certificate request** field. Under **Certificate Template**, select the correct template and select **Submit**, as shown in the image.



Step 10. Finally, select **Base 64 encoded** and **Download certificate chain**, the generated file can now be uploaded the CUCM.

Verify

The verification procedure is actually part of the configuration process.

Troubleshoot

There is currently no specific troubleshooting information available for this configuration.