Create Windows CA Certificate Templates for CUCM

Contents

Introduction

This document describes a step-by-step procedure to create certificate templates on Windows Server-based Certification Authorities (CA).

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- CUCM version 11.5(1).
- Basic knowledge of Windows Server administration

Components Used

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

- CUCM Version 11.5(1).
- 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

These certificate templates are compliant with X.509 extension requirements for every type of Cisco Unified

Communications Manager (CUCM) certificate.

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

Certificate	Use	Impacted Services
Callmanager	Presented at secure device registration and 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 Primary · 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

Note: ipsec certificate is not related to Cisco DRF Primary and Cisco DRF Local since 14, in newer versions, Tomcat certificate is used instead. There is no plan to add this change to 12.5 or earlier versions.

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

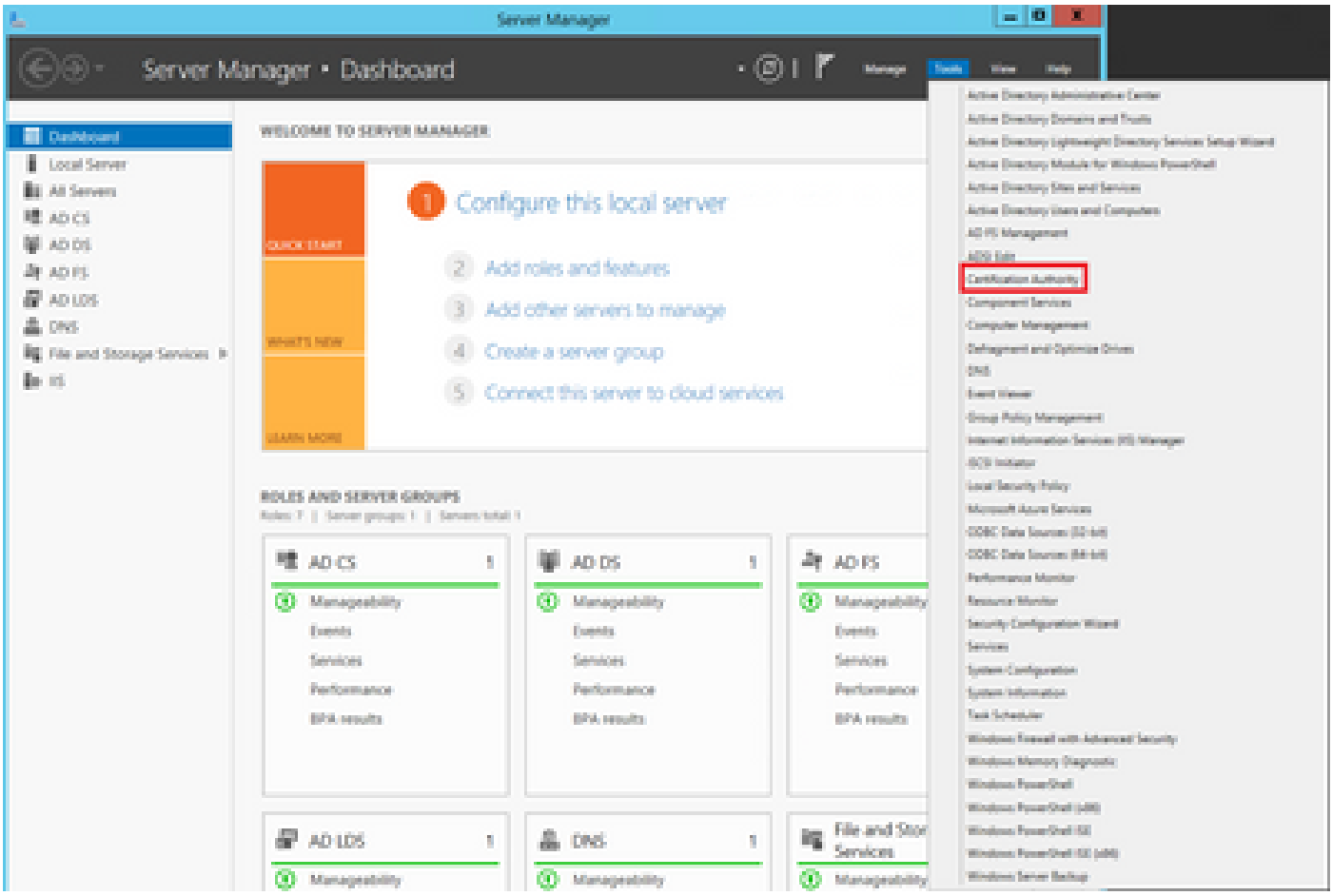
Certificate	X.509 Key Usage	X.509 Extended Key Usage
Callmanager	· Digital Signature	· Web Server Authentication

	· Key Encipherment · Data Encipherment	· 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

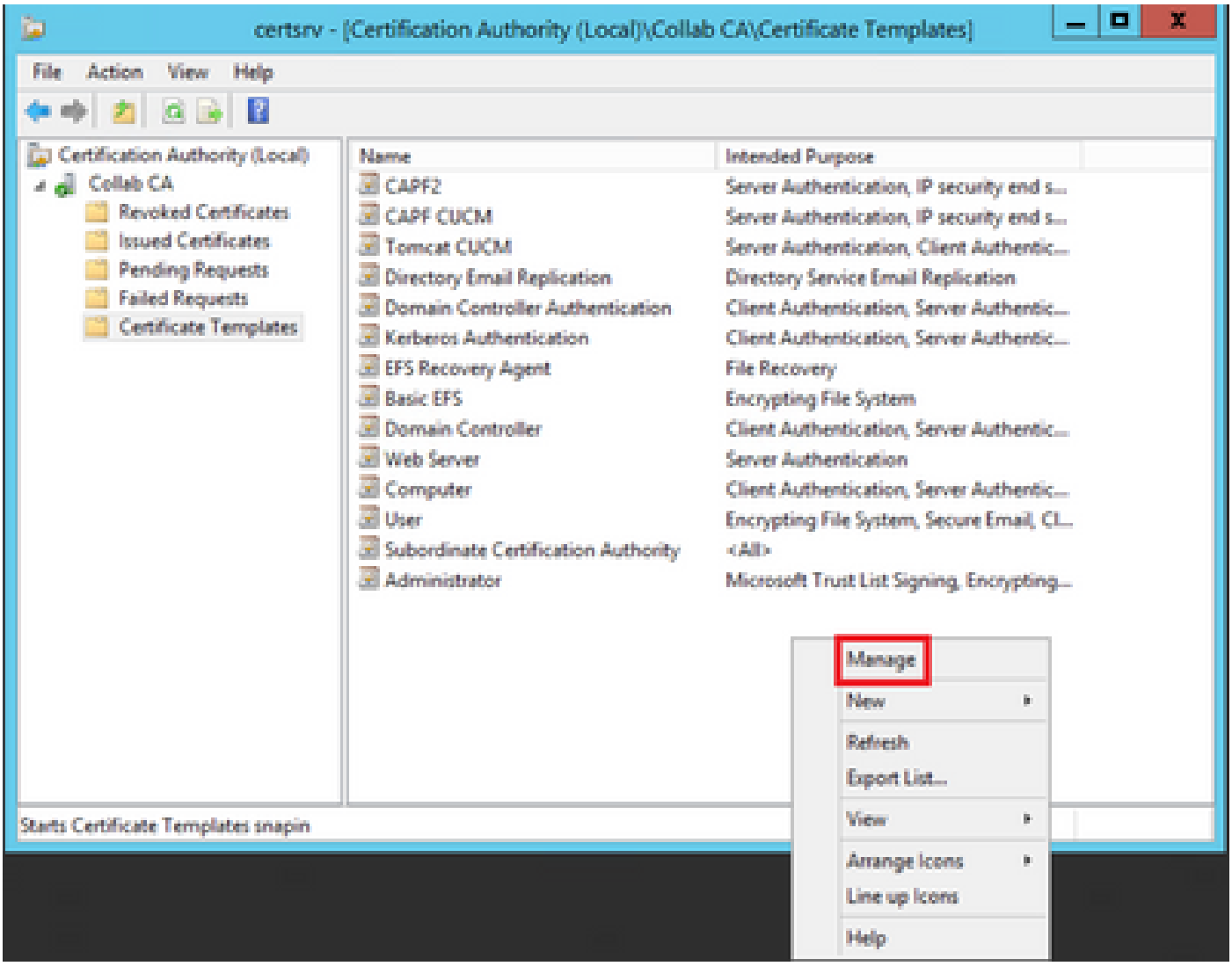
For more information, reference the Security Guide for Cisco Unified Communications Manager

Configure

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



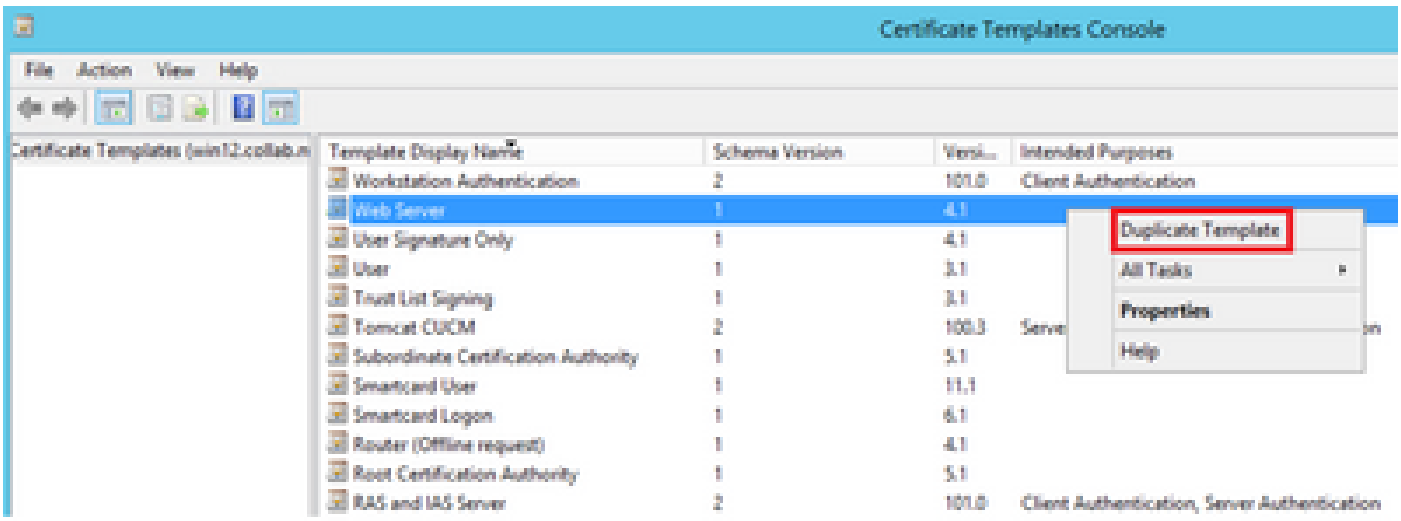
Step 2. Select your CA, then navigate to **Certificate Templates**, right-click on the list and select **Manage**, as shown in the image.



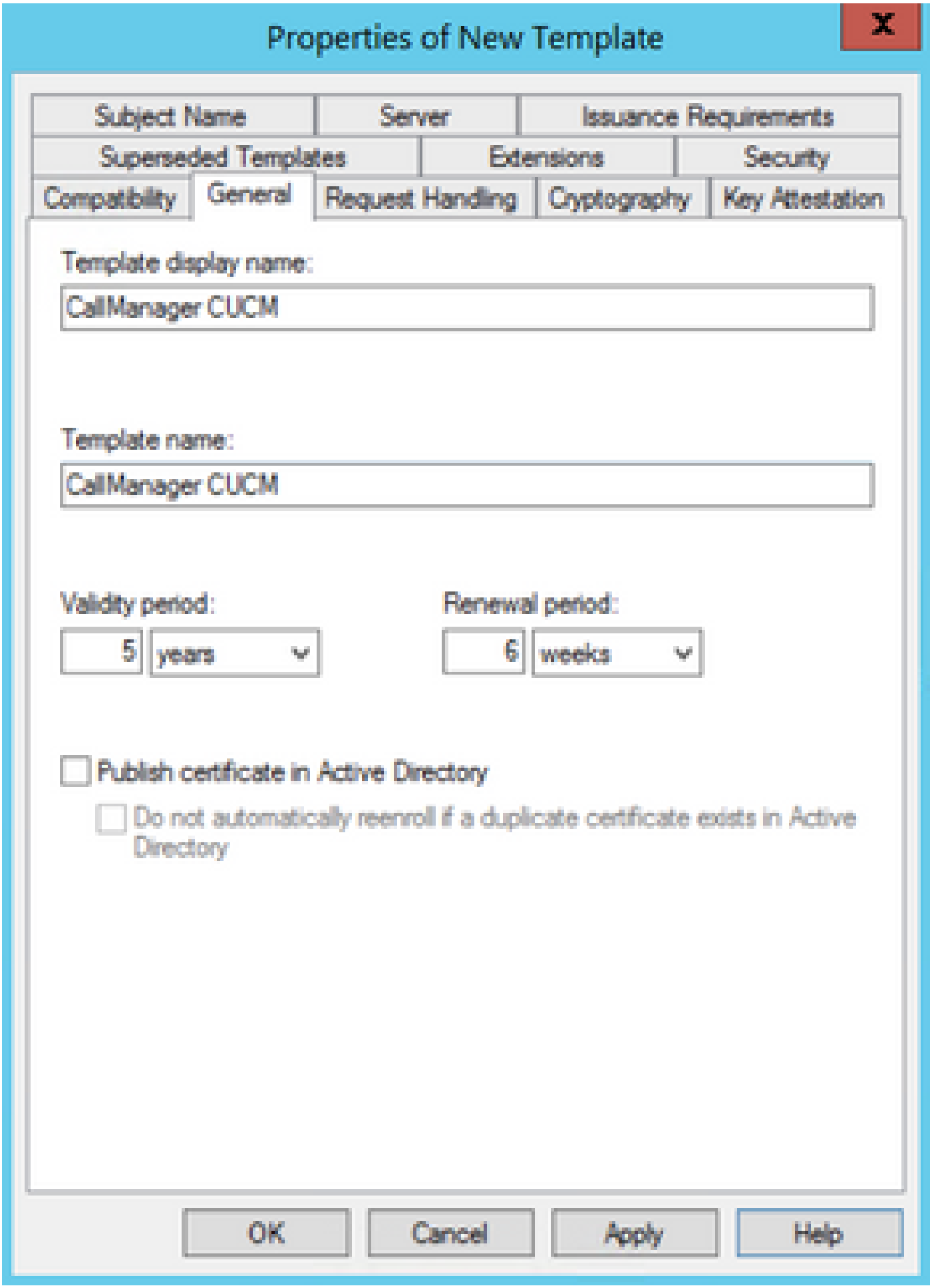
Callmanager / Tomcat / TVS Template

The next images display only the creation of the CallManager template; but the same steps can be followed to create 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 in step 2.

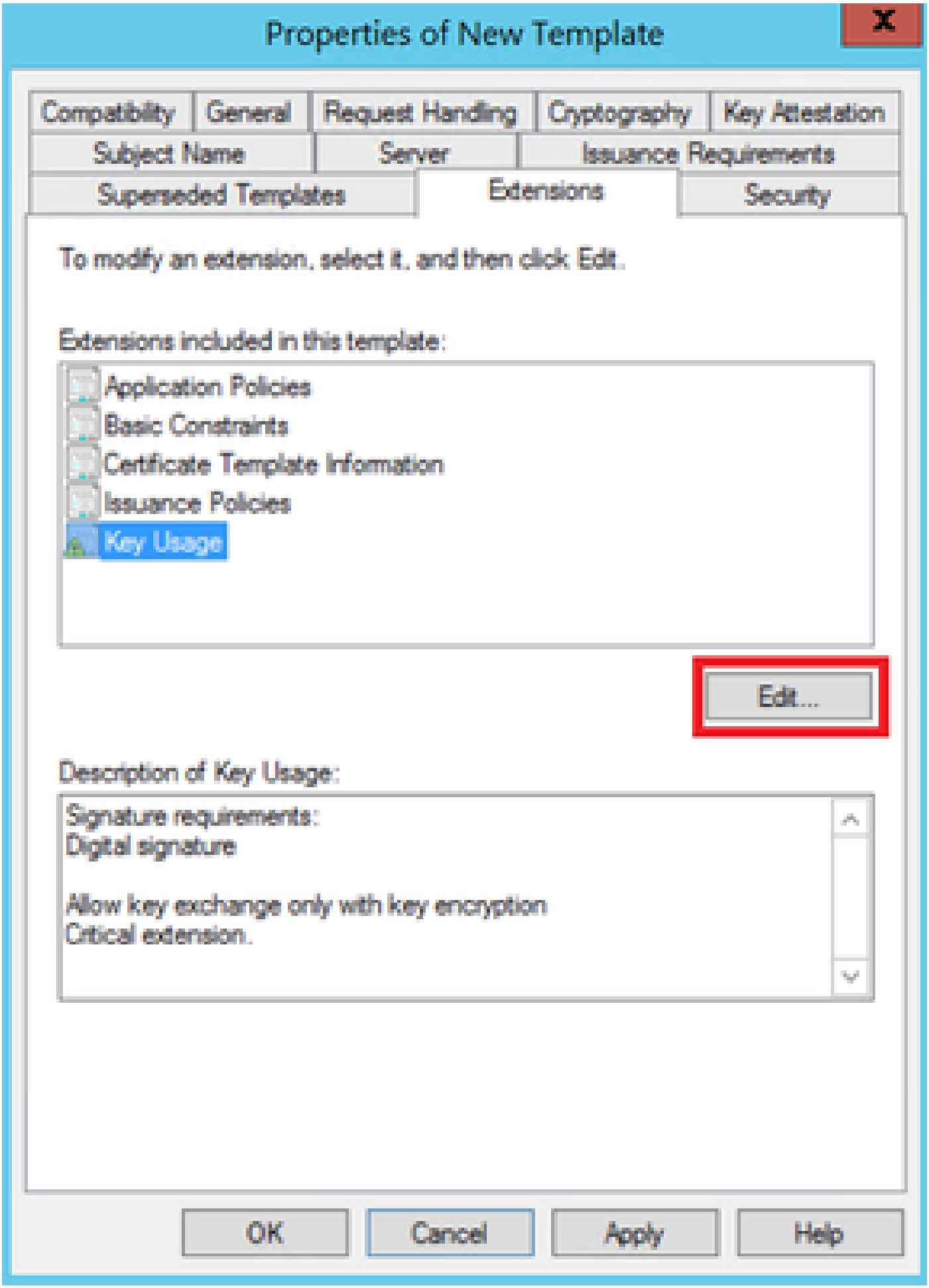
Step 1. Find the **Web Server** template, right-click on it and select **Duplicate Template**, as shown in the image.



Step 2. Under **General**, you can change the certificate template's name, display name, validity, and some other variables.

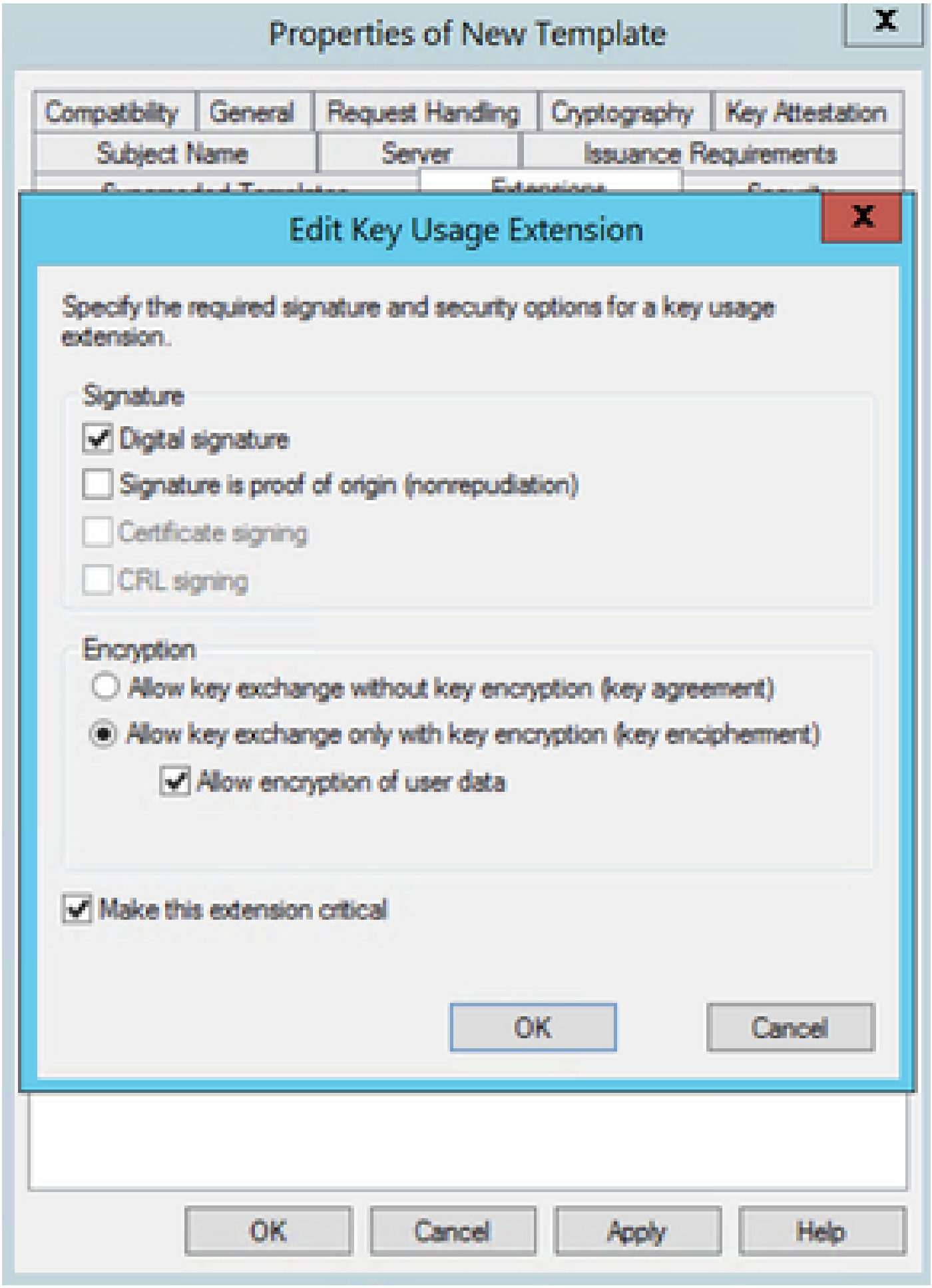

Properties of New Template
Subject Name
Server
Issuance Requirements
Superseded Templates
Extensions
Security
Compatibility
General
Request Handling
Cryptography
Key Attestation
Template display name:
CallManager CUCM
Template name:
CallManager CUCM
Validity period:
5
years
Renewal period:
6
weeks
Publish certificate in Active Directory
Do not automatically reenroll if a duplicate certificate exists in Active Directory
OK
Cancel
Apply
Help

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

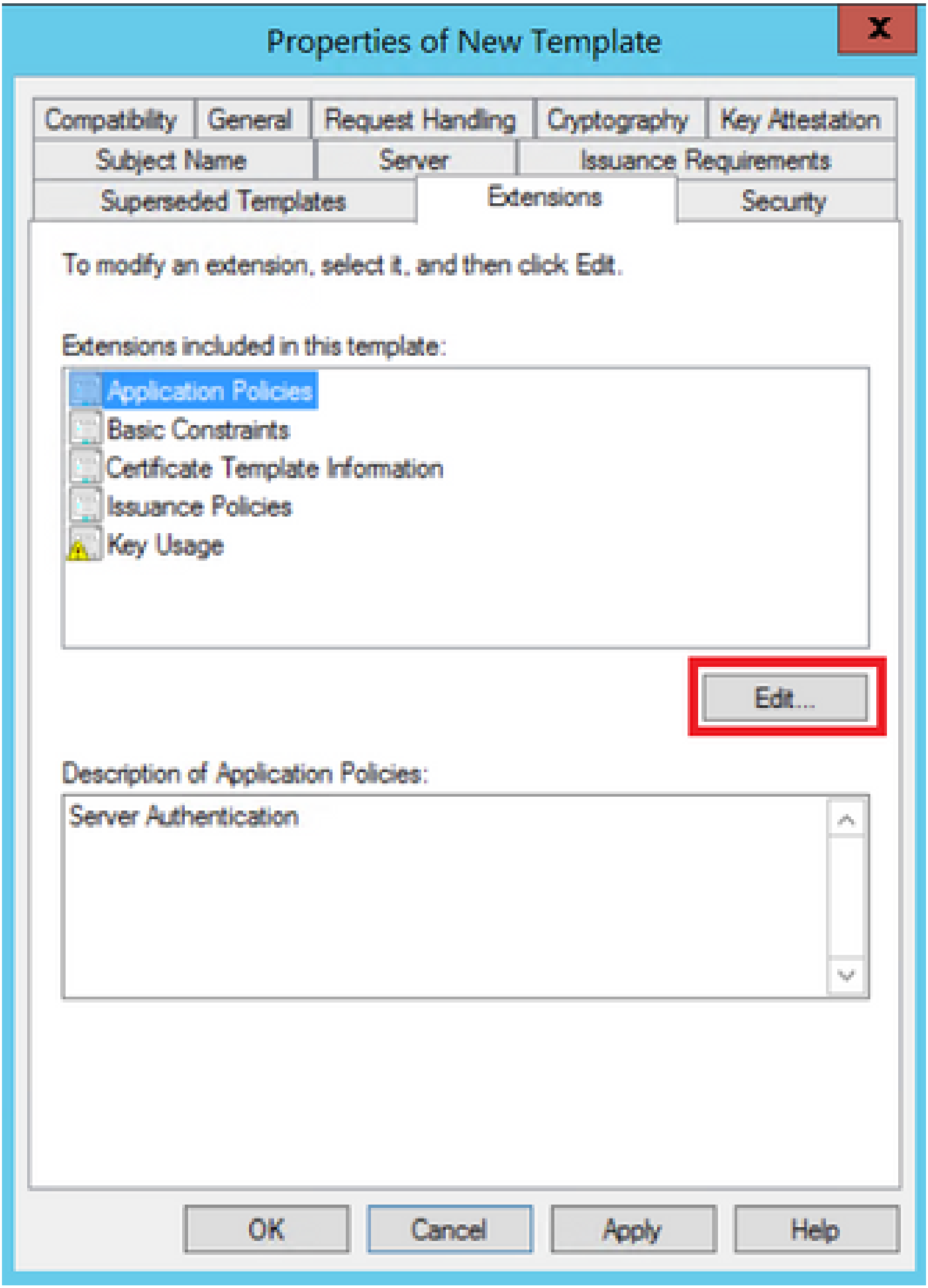

Properties of New Template
Compatibility
General
Request Handling
Cryptography
Key Attestation
Subject Name
Server
Issuance Requirements
Superseded Templates
Extensions
Security
To modify an extension, select it, and then click Edit.
Extensions included in this template:
Application Policies
Basic Constraints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

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

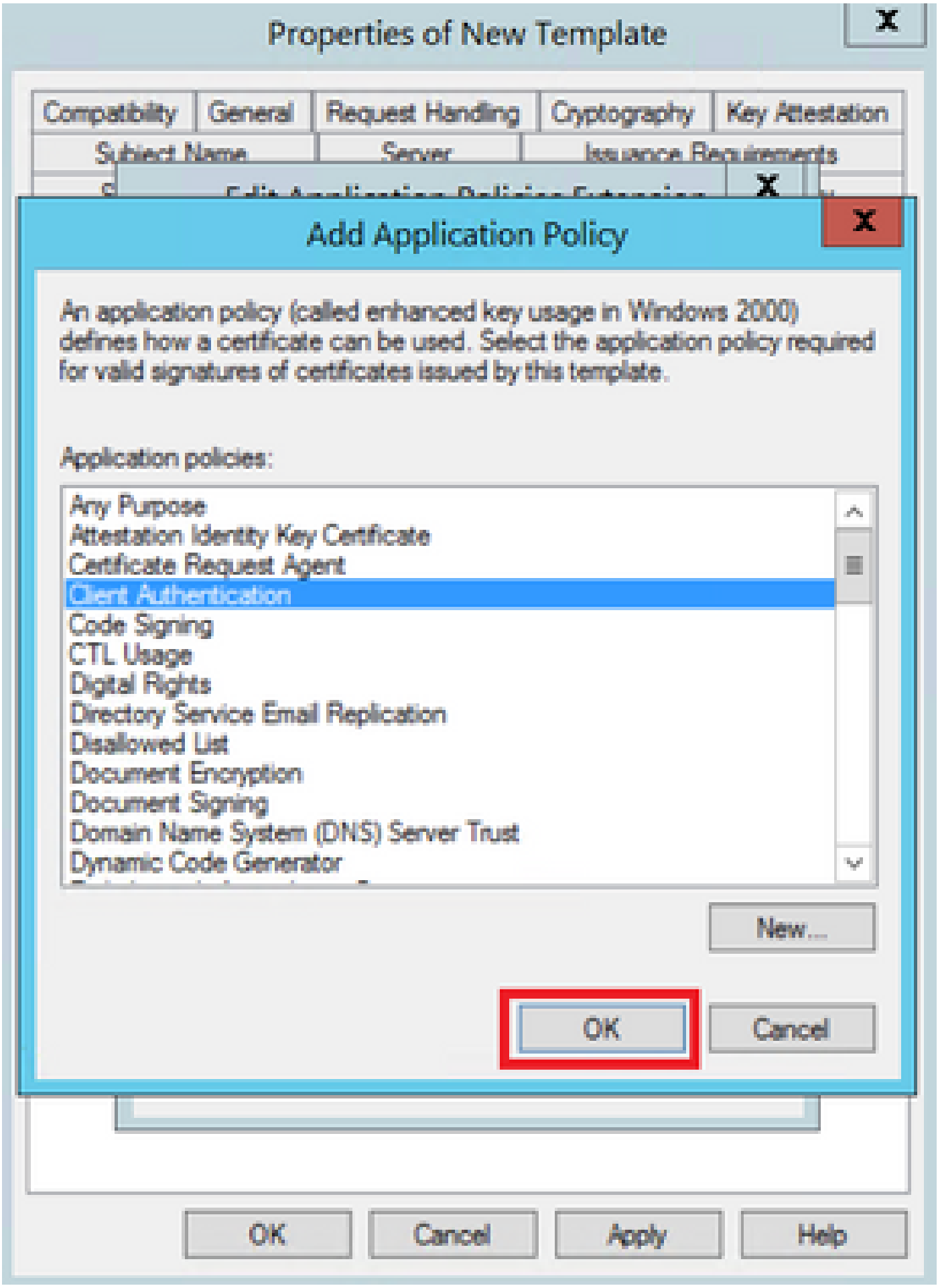
- **Digital signature**
- **Allow key exchange only with key encryption (key encipherment)**
- **Allow encryption of user data**


Properties of New Template
Compatibility
General
Request Handling
Cryptography
Key Attestation
Subject Name
Server
Issuance Requirements
Edit Key Usage Extension
Specify the required signature and security options for a key usage extension.
Signature
Digital signature
Signature is proof of origin (nonrepudiation)
Certificate signing
CRL signing
Encryption
Allow key exchange without key encryption (key agreement)
Allow key exchange only with key encryption (key encipherment)
Allow encryption of user data
Make this extension critical
OK
Cancel
OK
Cancel
Apply
Help

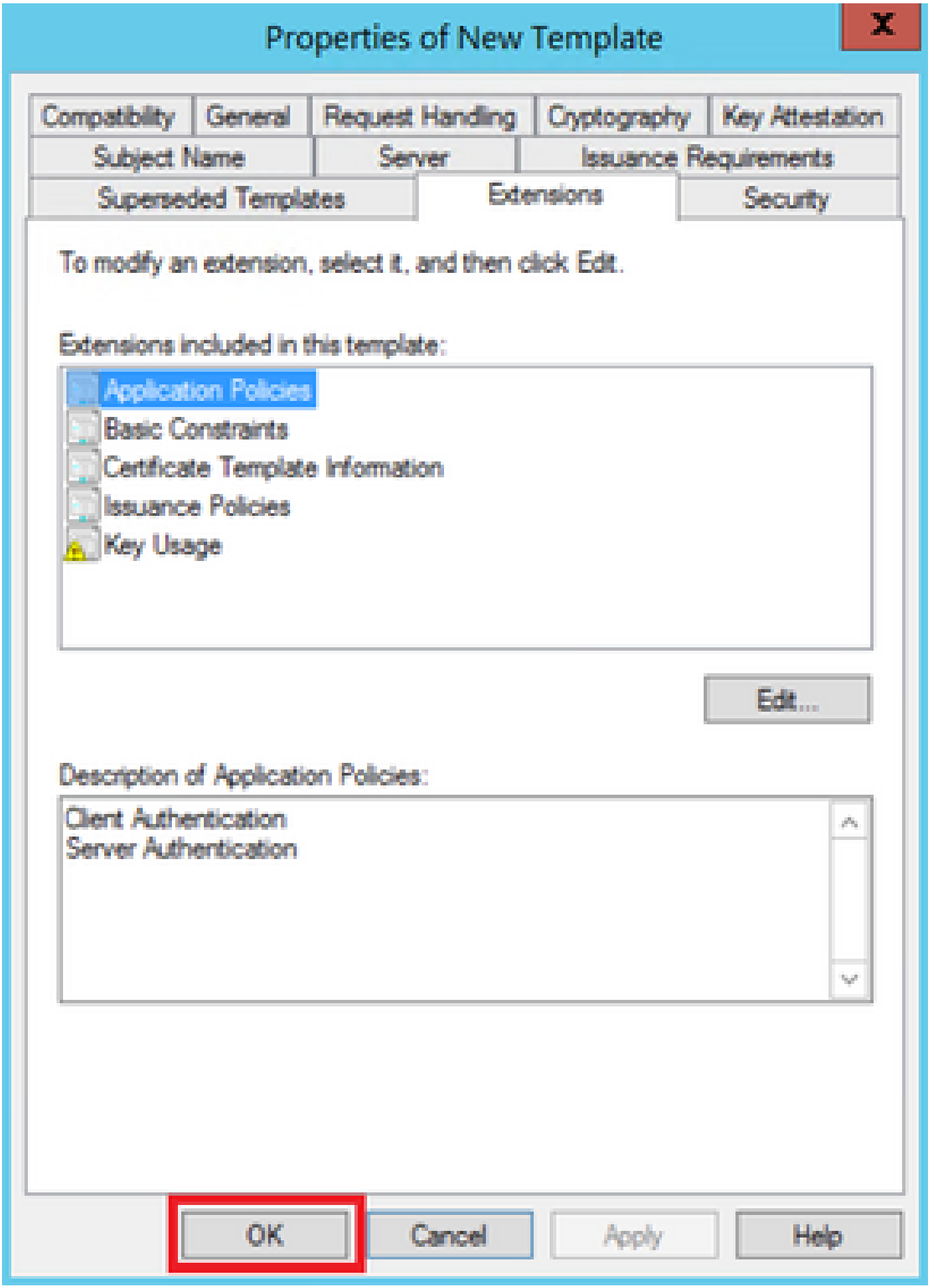
Step 5. Navigate to **Extensions > Application Policies > Edit > Add**, as shown in the image.


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

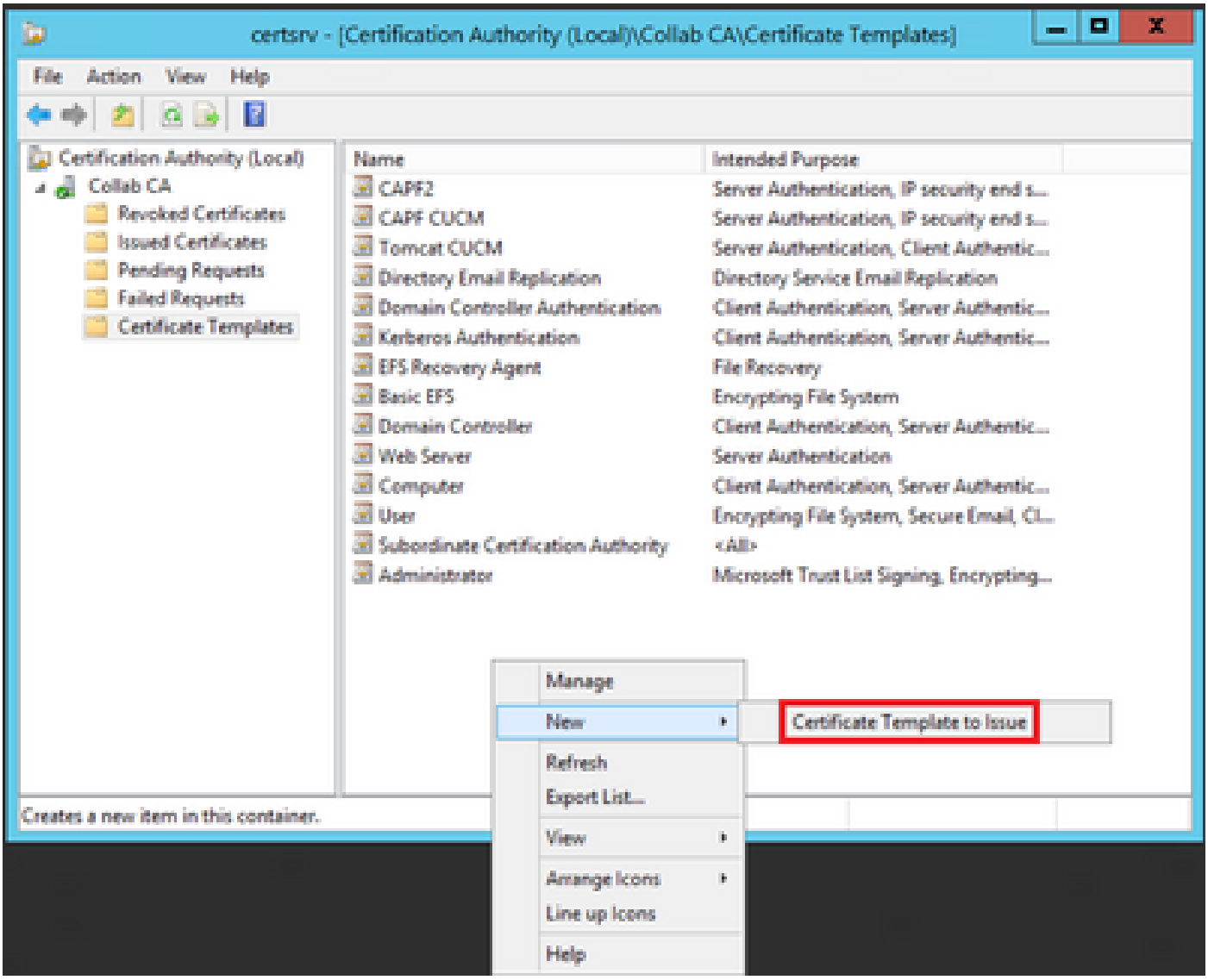
Step 6. Search for **Client Authentication**, select it and select **OK** on both this window and the previous one, as shown in the image.



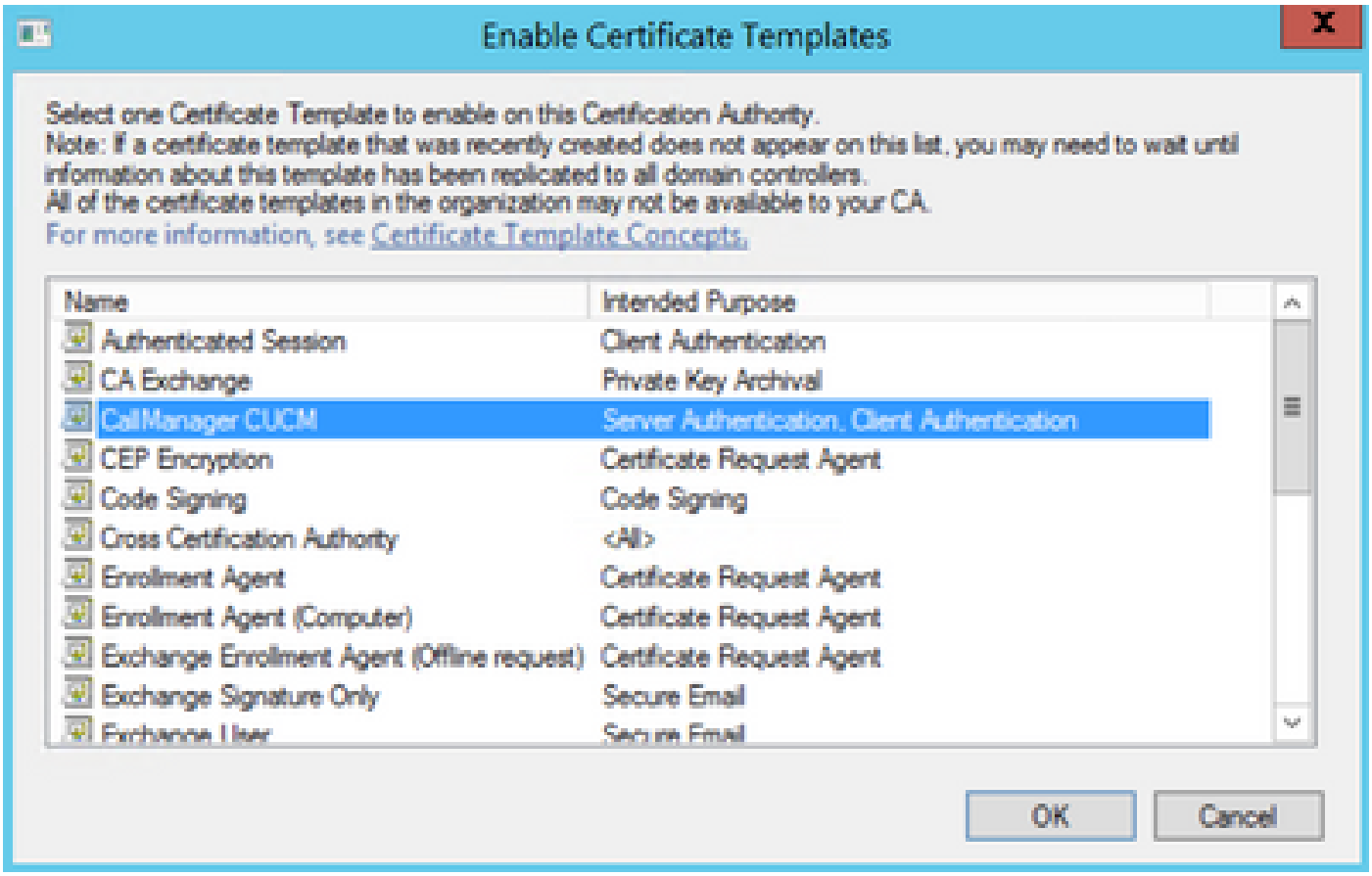
Step 7. Back on the template, select **Apply** and then **OK**.


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:
Client Authentication
Server Authentication
OK
Cancel
Apply
Help

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.



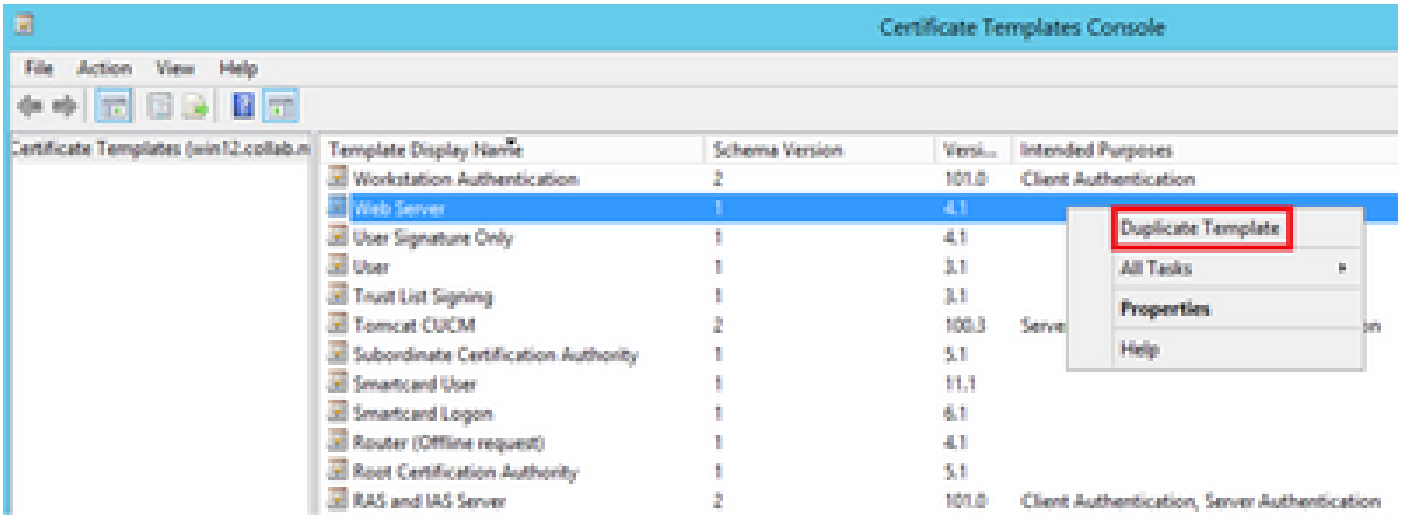
Step 9. Select the new **CallManager CUCM** template and select **OK**, as shown in the image.



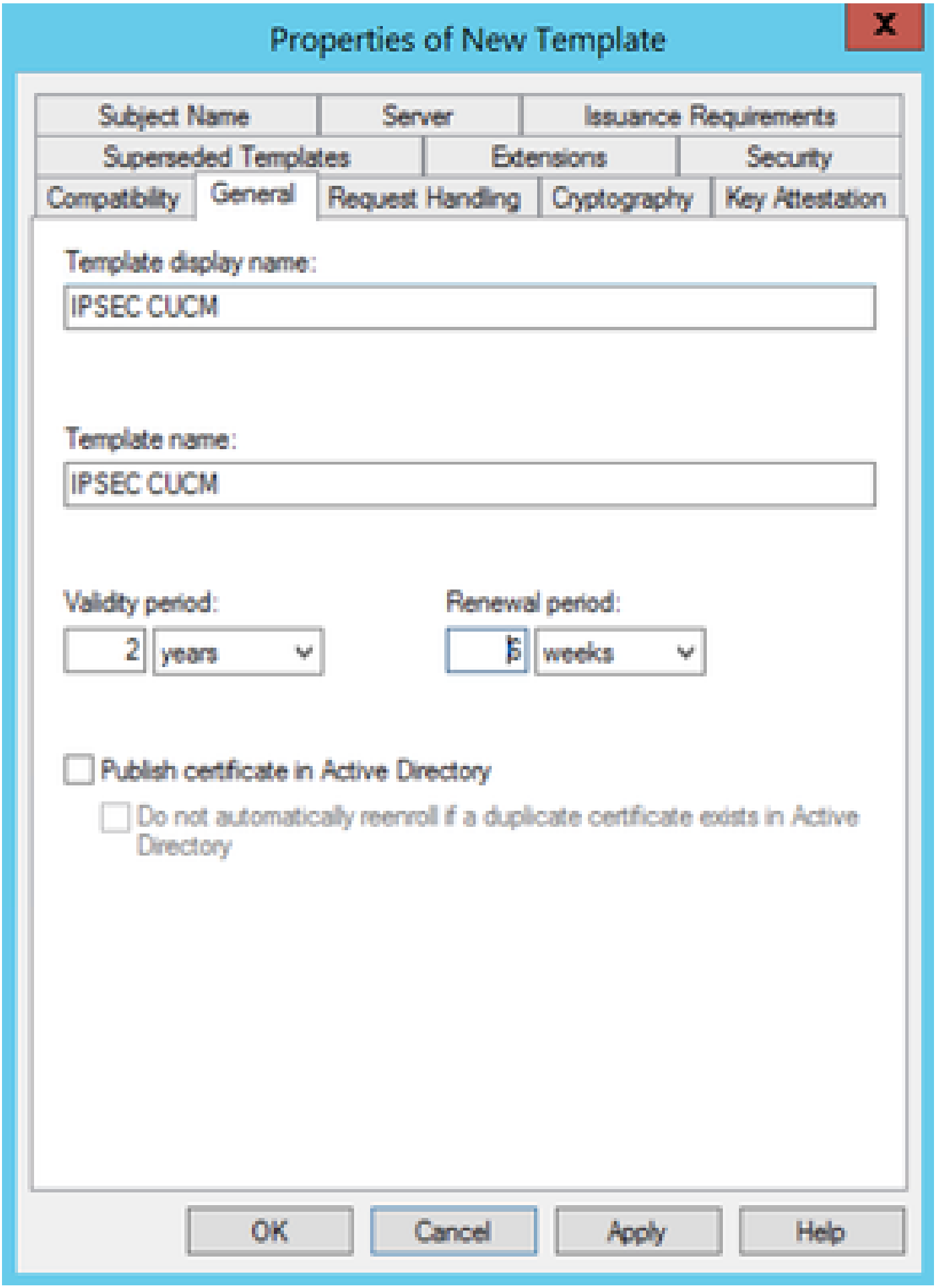
Step 10. Repeat all previous steps to create certificate templates for the Tomcat and TVS services as needed.

IPsec Template

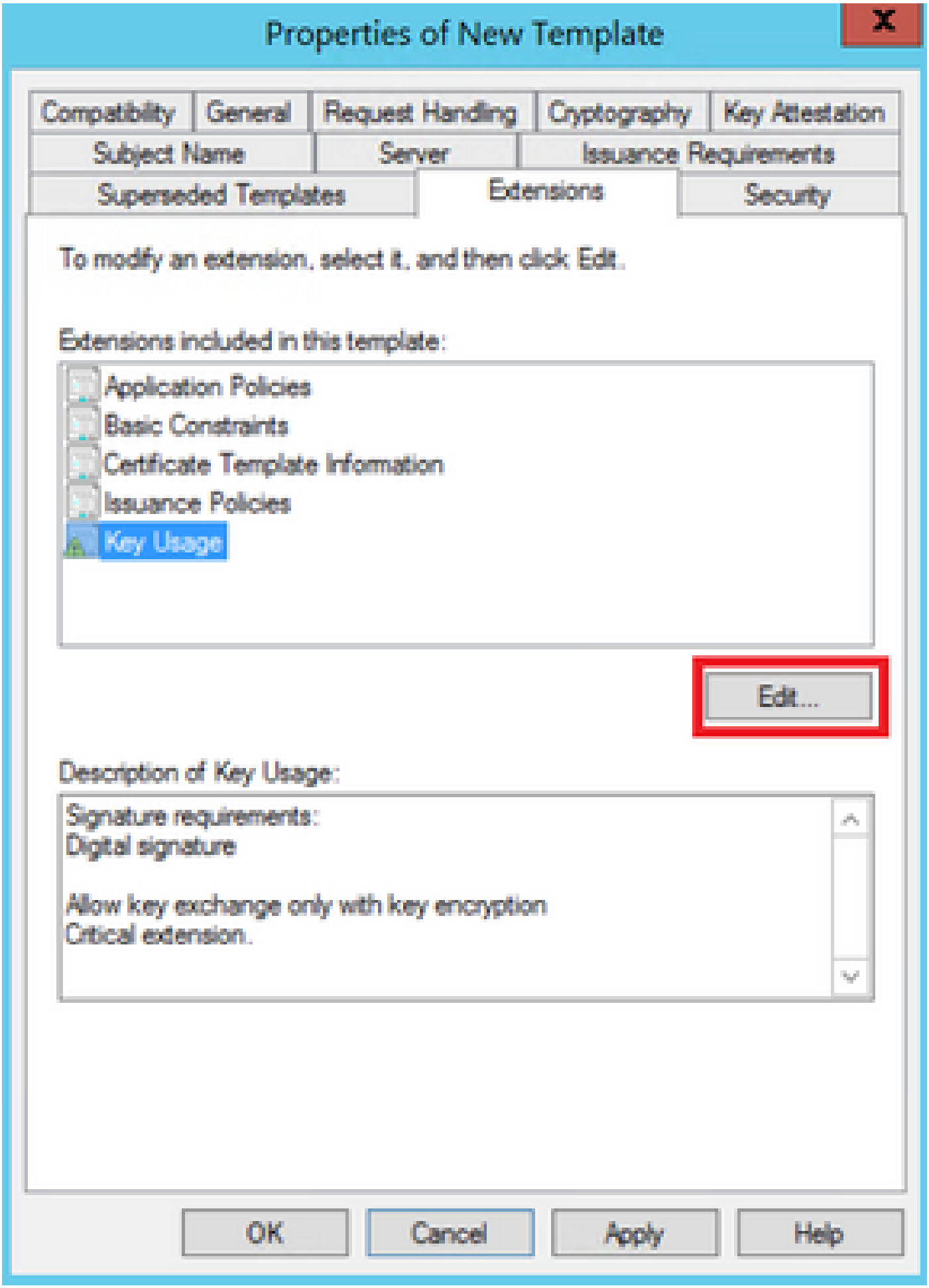
Step 1. Find the **Web Server** template, right-click on it and select **Duplicate Template**, as shown in the image.



Step 2. Under **General**, you can change the certificate template's name, display name, validity, and some other vairiables.

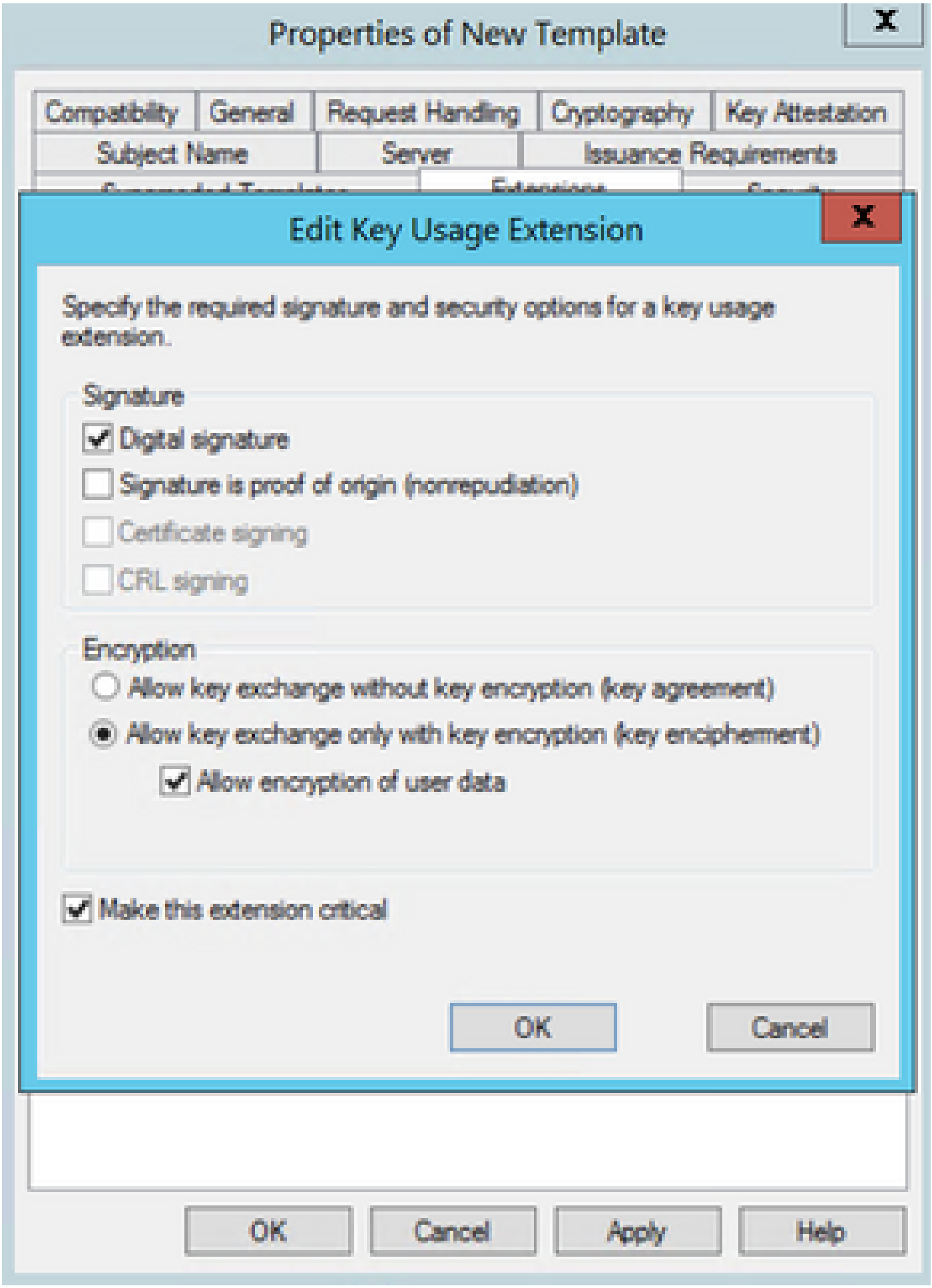

Properties of New Template
Subject Name
Server
Issuance Requirements
Superseded Templates
Extensions
Security
Compatibility
General
Request Handling
Cryptography
Key Attestation
Template display name:
IPSEC CUCM
Template name:
IPSEC CUCM
Validity period:
2
years
Renewal period:
6
weeks
Publish certificate in Active Directory
Do not automatically reenroll if a duplicate certificate exists in Active Directory
OK
Cancel
Apply
Help

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

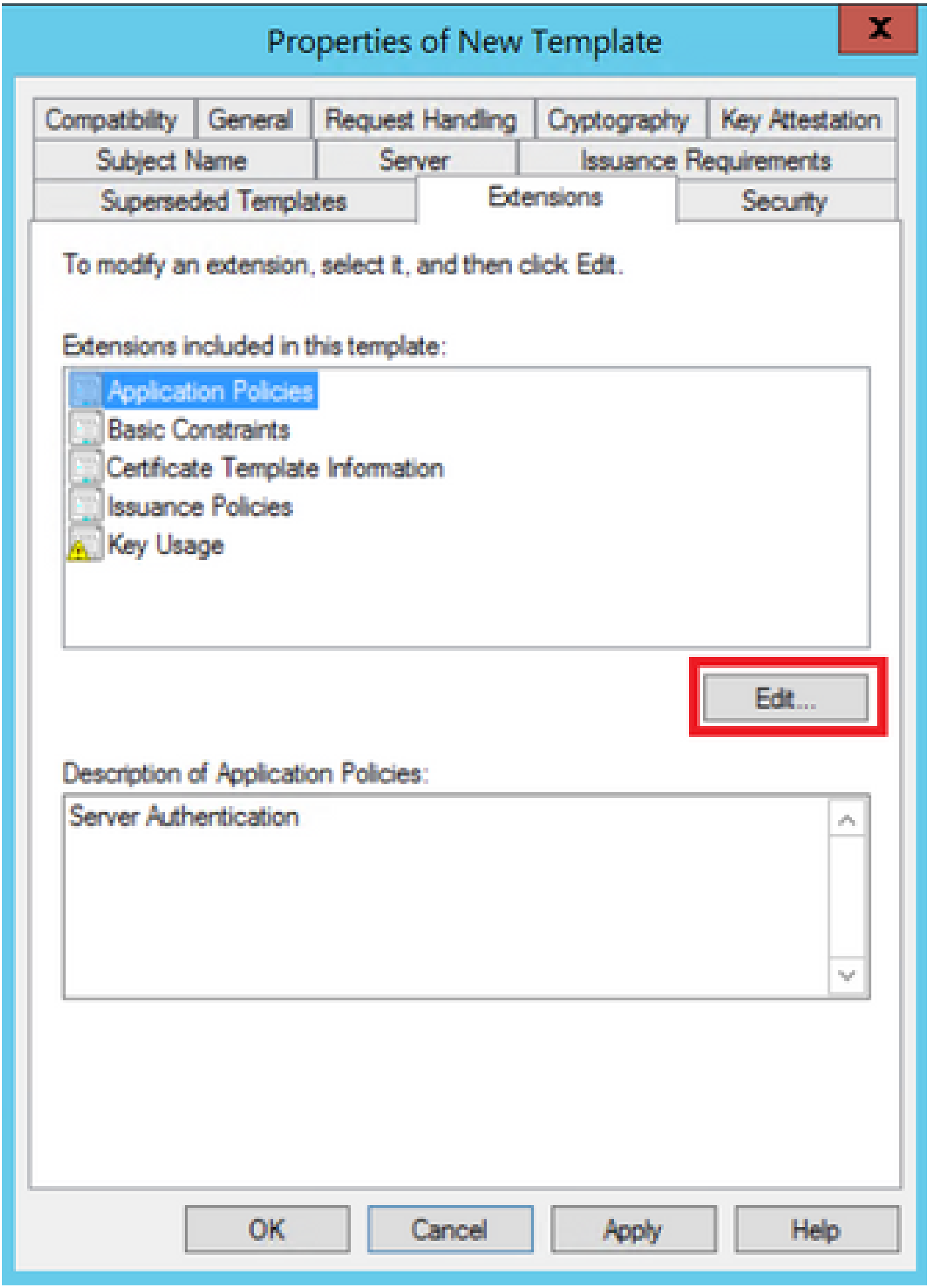

Properties of New Template
Compatibility
General
Request Handling
Cryptography
Key Attestation
Subject Name
Server
Issuance Requirements
Superseded Templates
Extensions
Security
To modify an extension, select it, and then click Edit.
Extensions included in this template:
Application Policies
Basic Constraints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

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

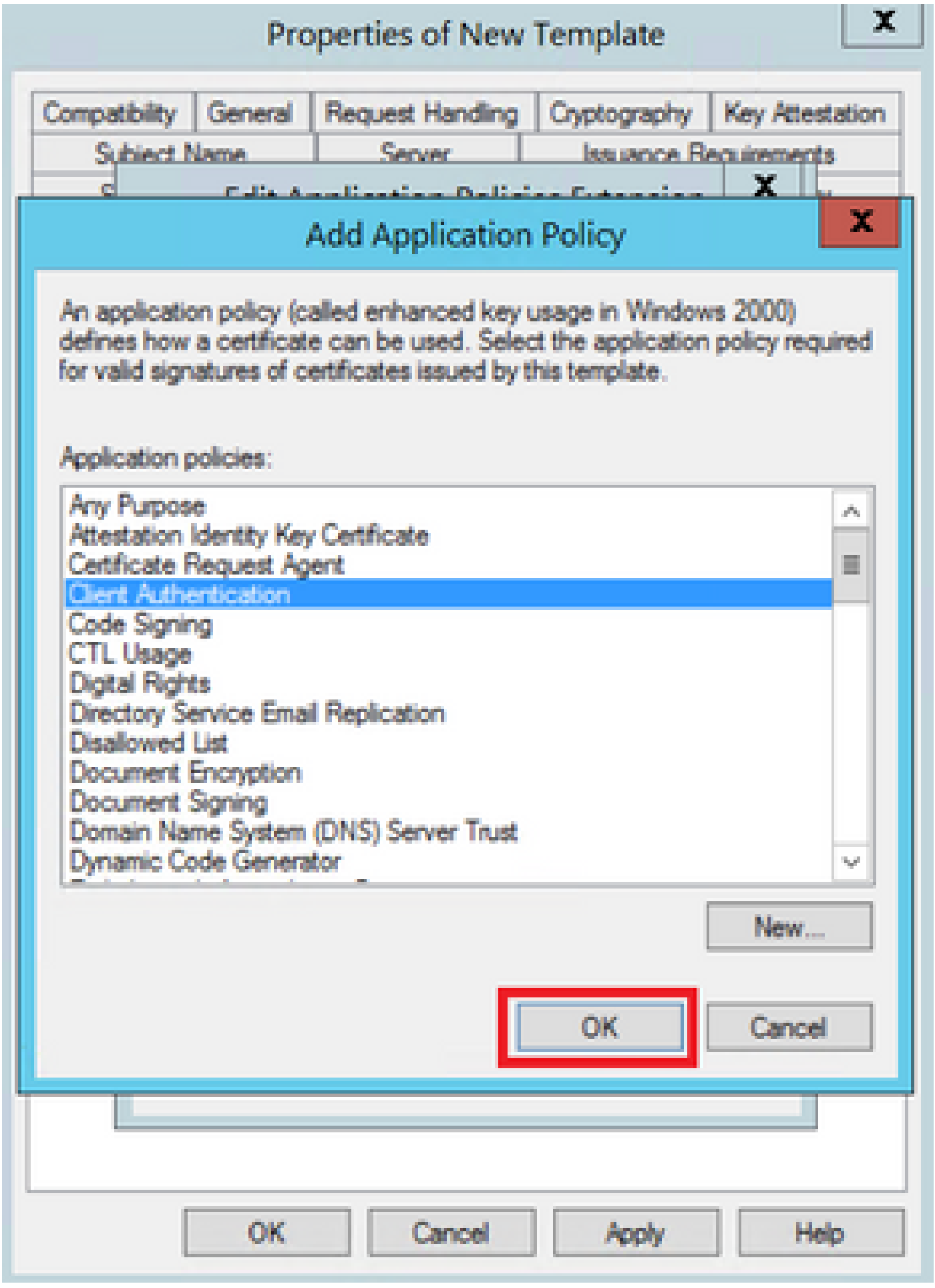
- **Digital signature**
- **Allow key exchange only with key encryption (key encipherment)**
- **Allow encryption of user data**


Properties of New Template
Compatibility
General
Request Handling
Cryptography
Key Attestation
Subject Name
Server
Issuance Requirements
Edit Key Usage Extension
Specify the required signature and security options for a key usage extension.
Signature
Digital signature
Signature is proof of origin (nonrepudiation)
Certificate signing
CRL signing
Encryption
Allow key exchange without key encryption (key agreement)
Allow key exchange only with key encryption (key encipherment)
Allow encryption of user data
Make this extension critical
OK
Cancel
OK
Cancel
Apply
Help

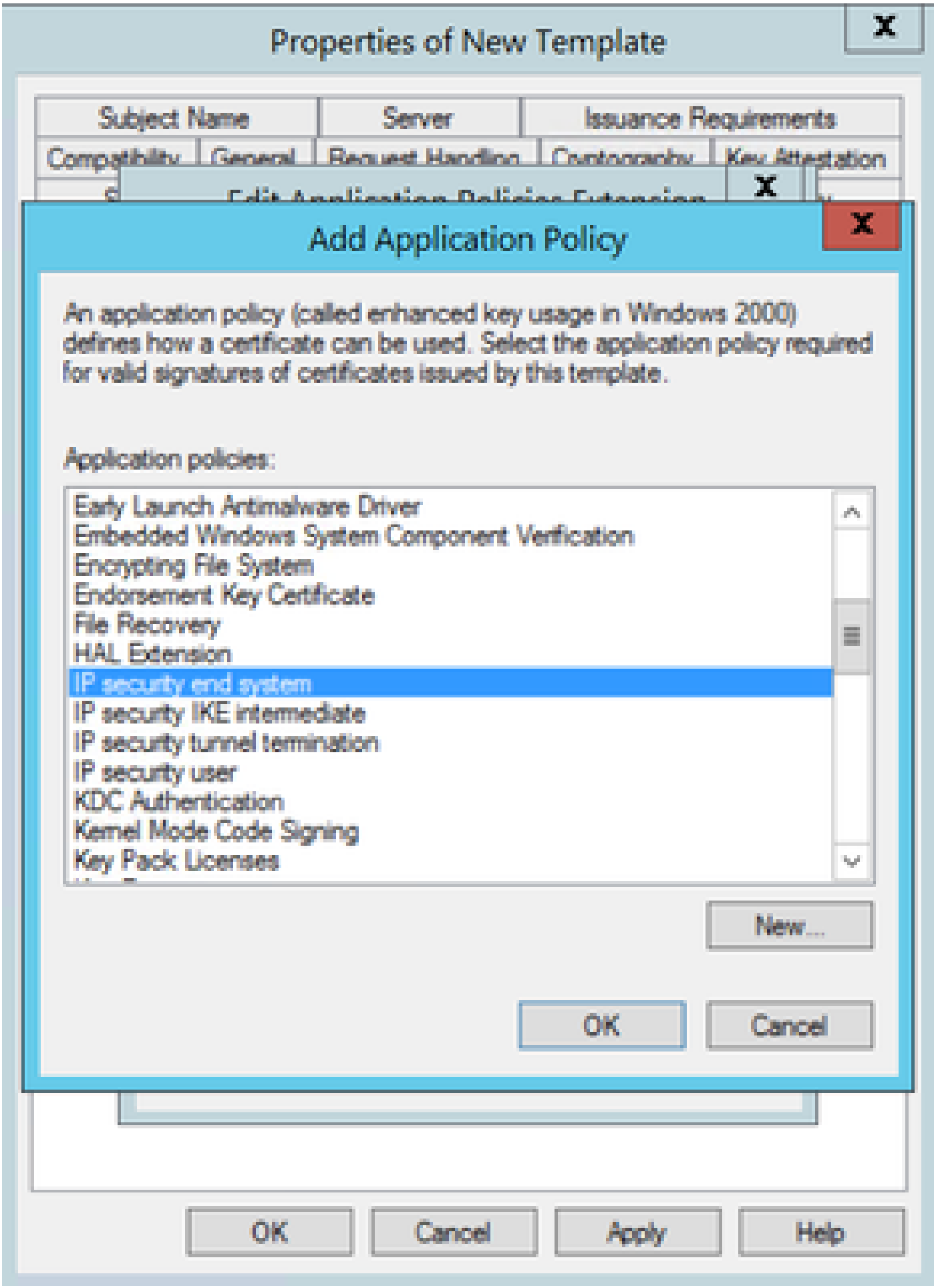
Step 5. Navigate to **Extensions > Application Policies > Edit > Add**, as shown in the image.


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

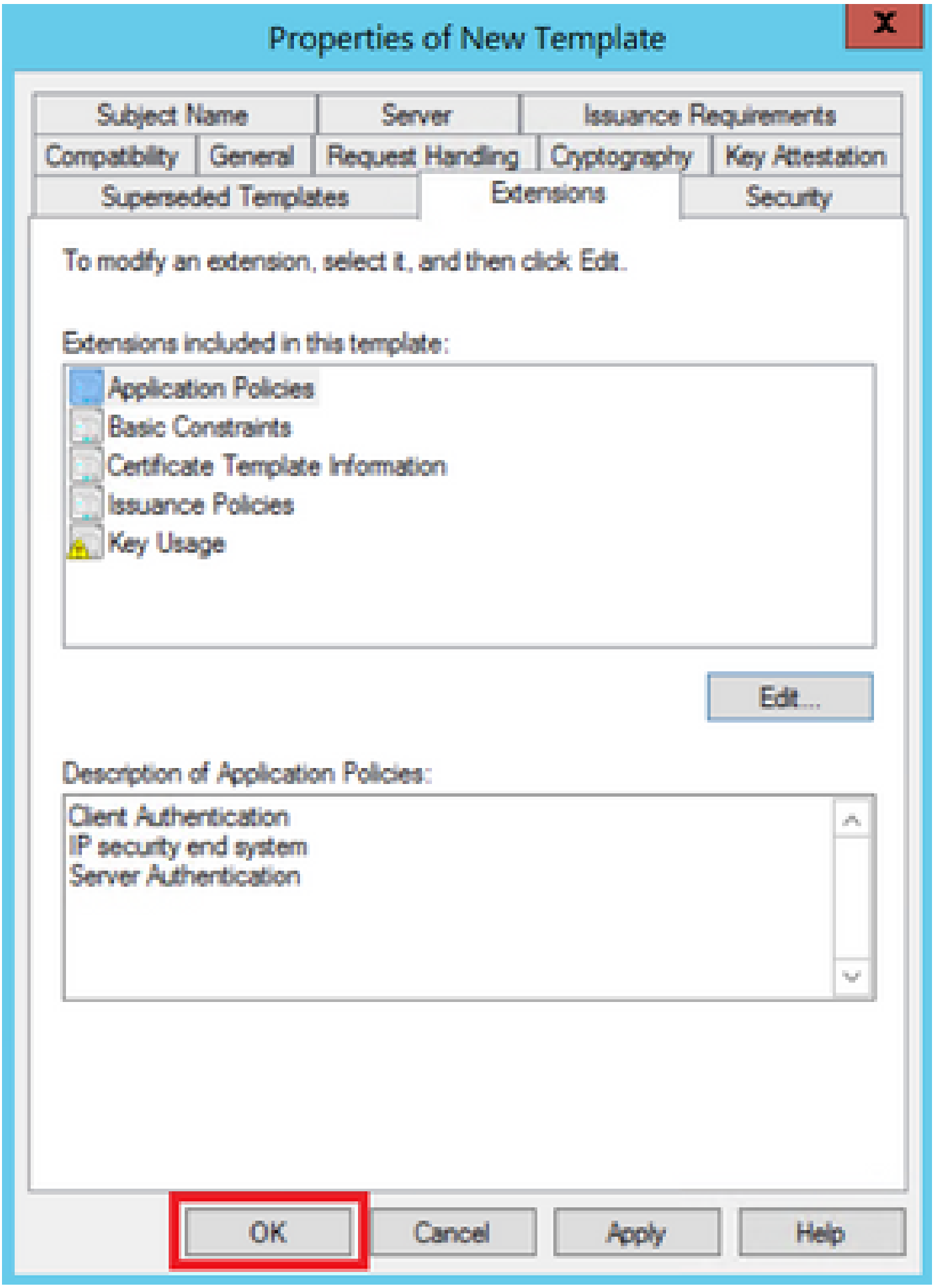
Step 6. Search for **Client Authentication**, select it and then **OK**, as shown in the image.



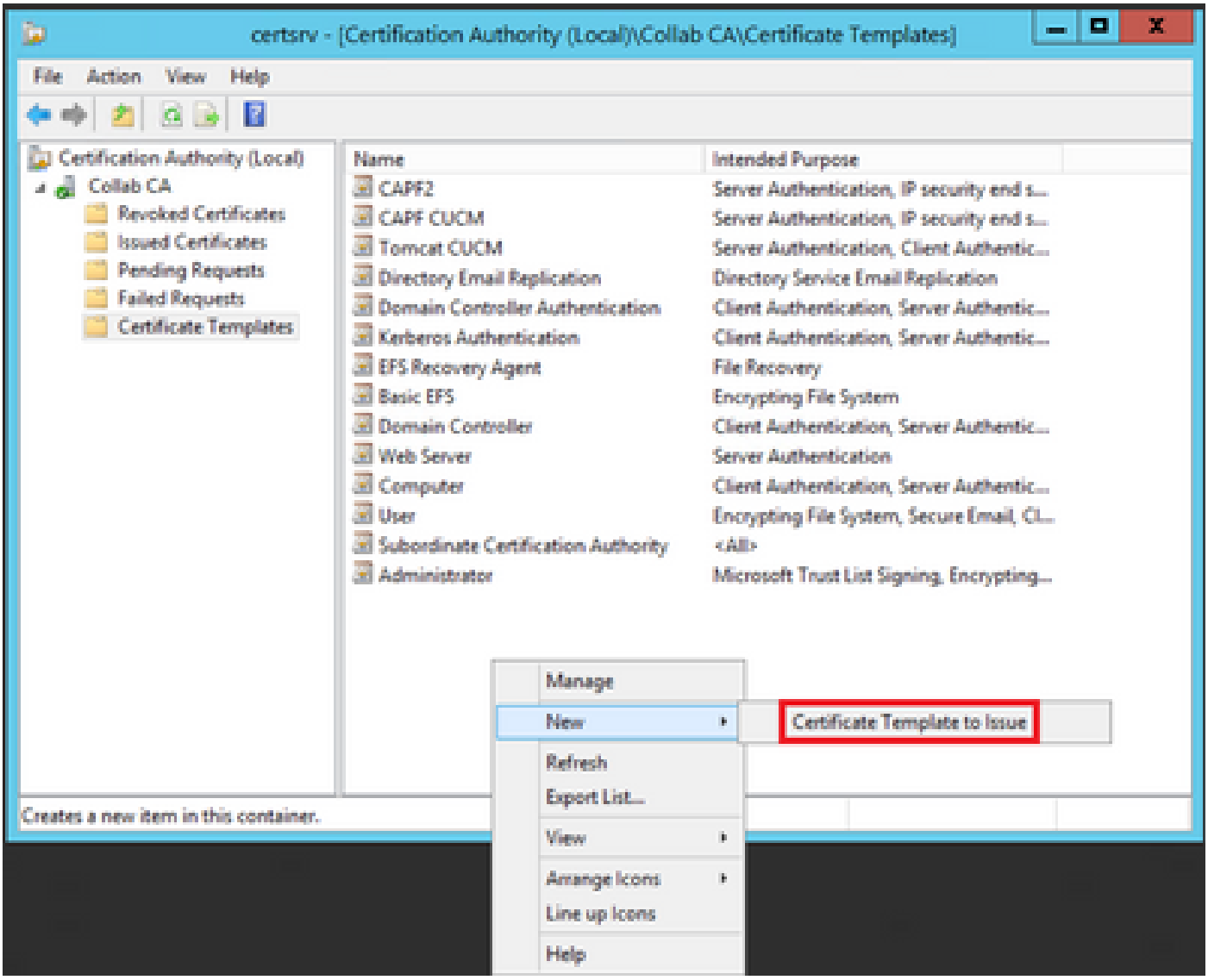
Step 7. Select **Add** again, search for **IP security end system**, select it and then select **OK** on this and on the previous window as well.


Properties of New Template
Subject Name
Server
Issuance Requirements
Add Application Policy
An application policy (called enhanced key usage in Windows 2000) defines how a certificate can be used. Select the application policy required for valid signatures of certificates issued by this template.
Application policies:
Early Launch Antimalware Driver
Embedded Windows System Component Verification
Encrypting File System
Endorsement Key Certificate
File Recovery
HAL Extension
IP security end system
IP security IKE intermediate
IP security tunnel termination
IP security user
KDC Authentication
Kernel Mode Code Signing
Key Pack Licenses
New...
OK
Cancel
OK
Cancel
Apply
Help

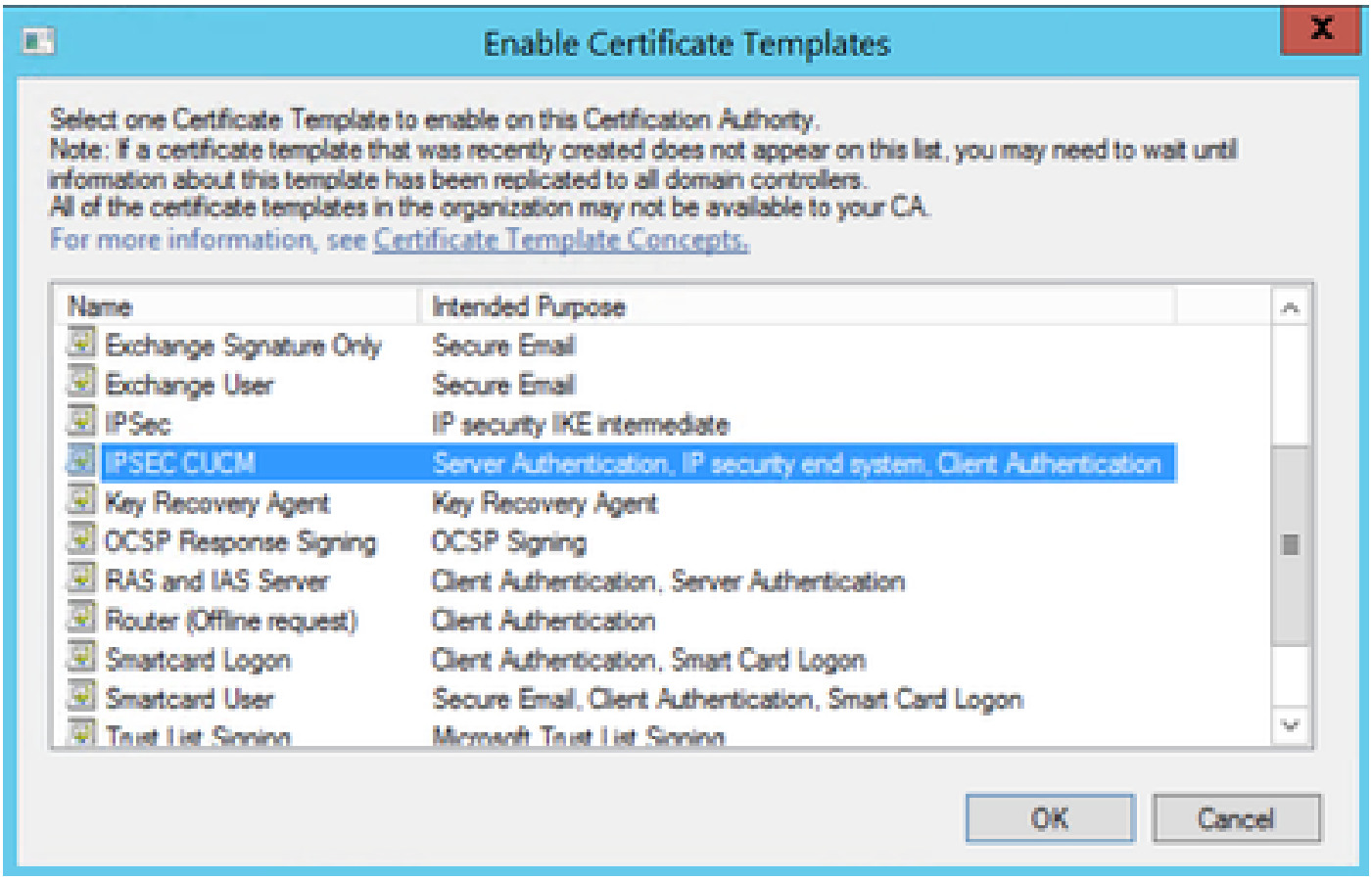
Step 8. Back on the template, select **Apply** and then **OK**, as shown in the image.



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.

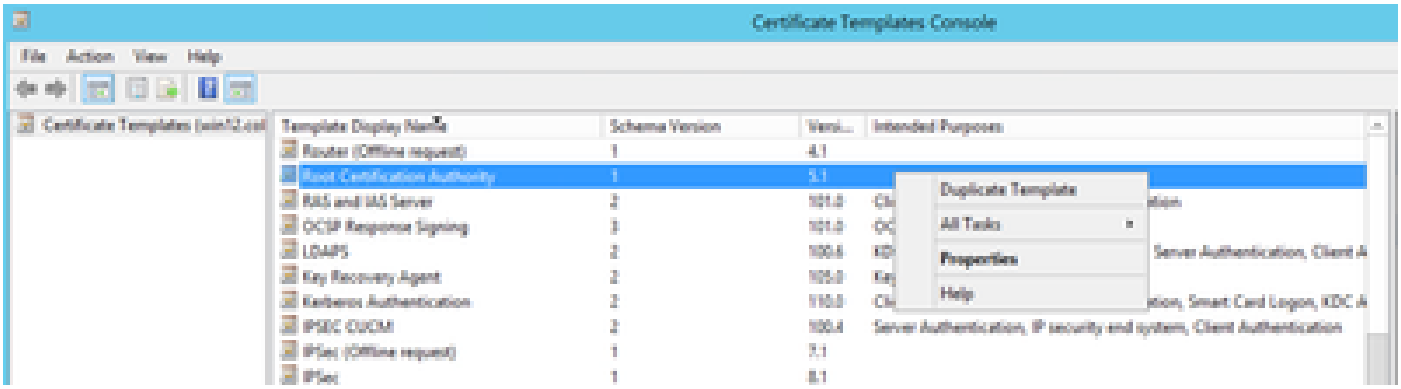


Step 10. Select the new **IPSEC CUCM** template and select **OK**, as shown in the image.

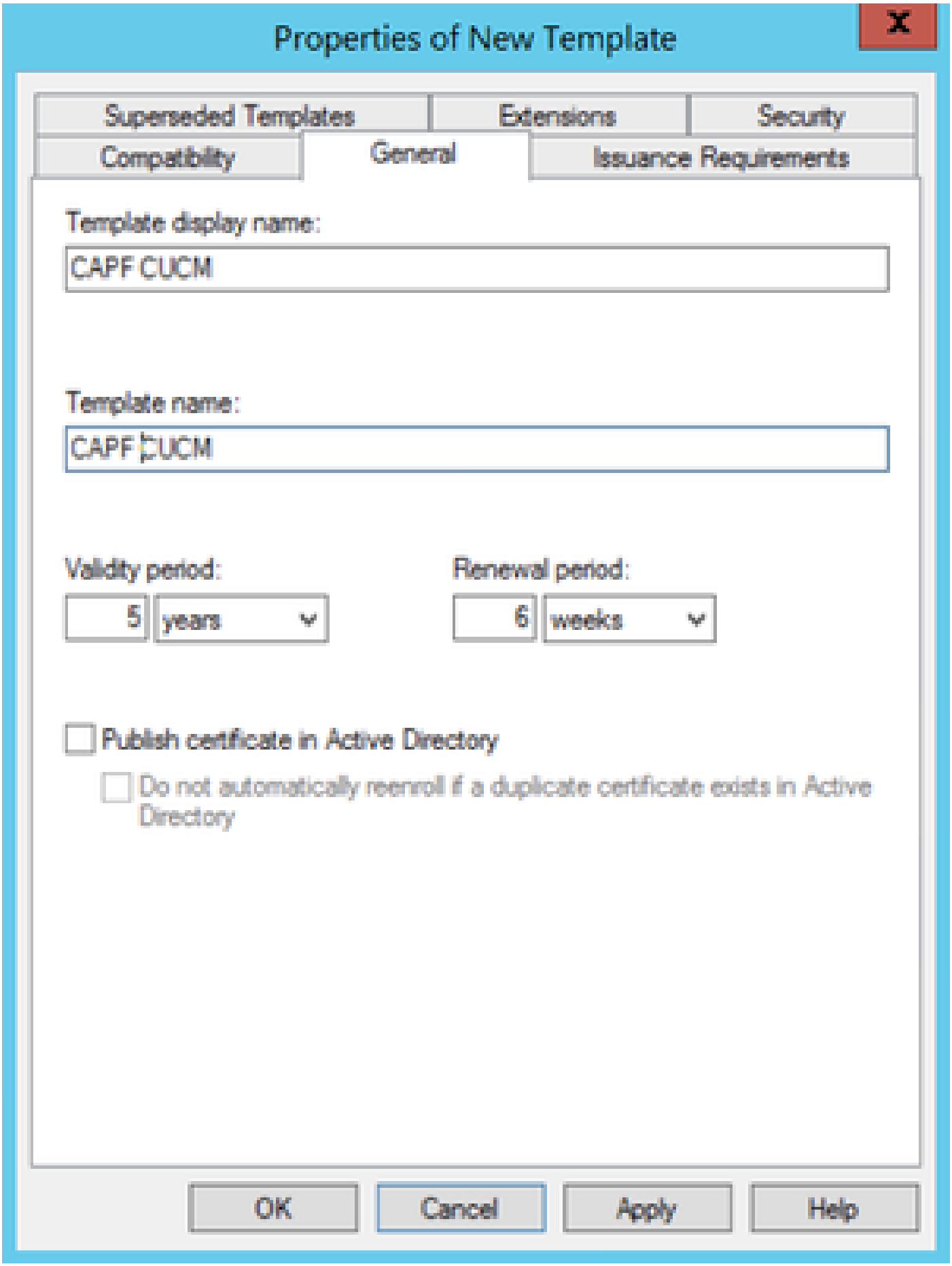


CAPF Template

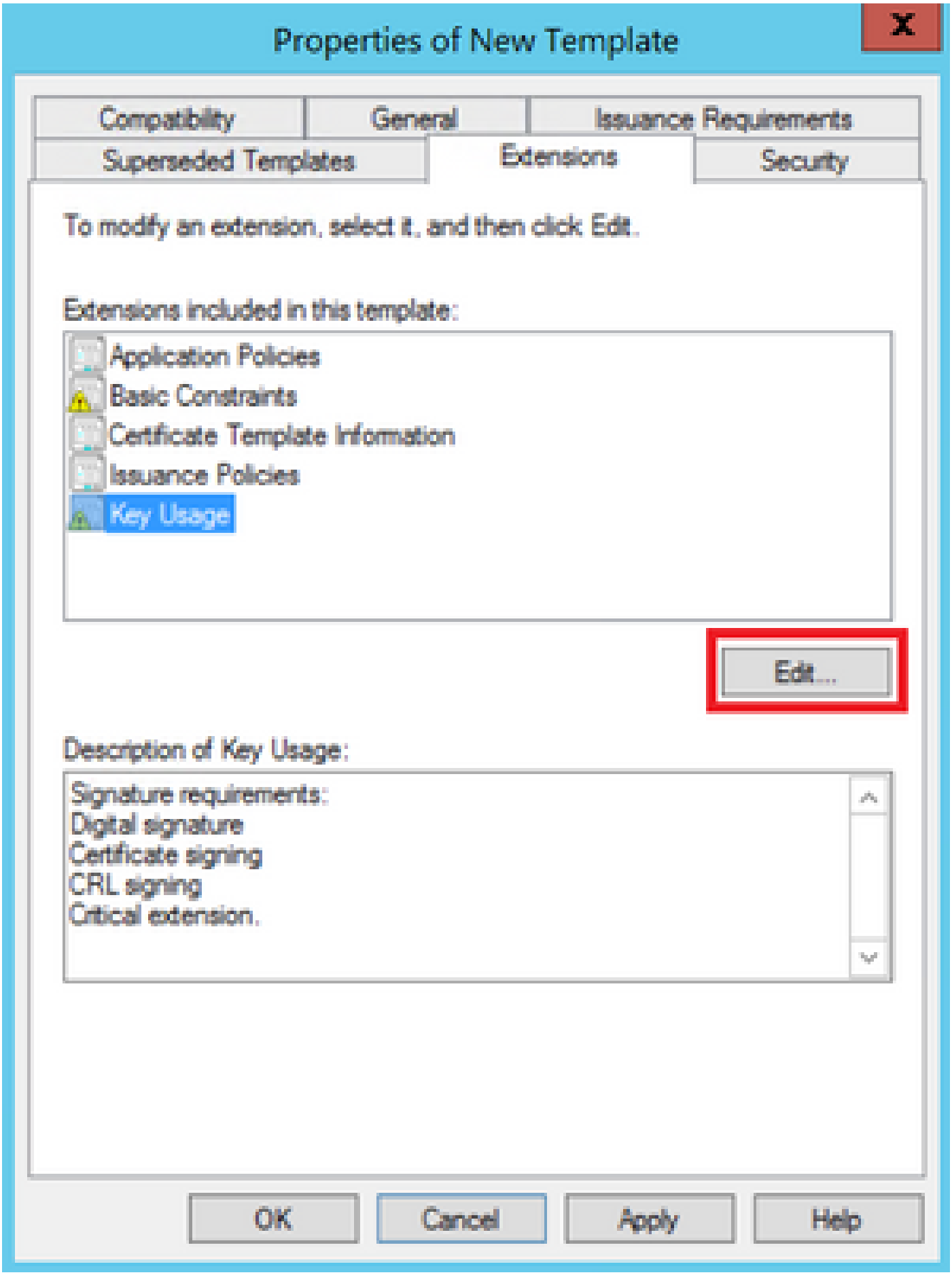
Step 1. Find the **Root CA** template and right-click on it. Then select **Duplicate Template**, as shown in the image.



Step 2. Under **General**, you can change the certificate template's name, display name, validity, ans some other variables.

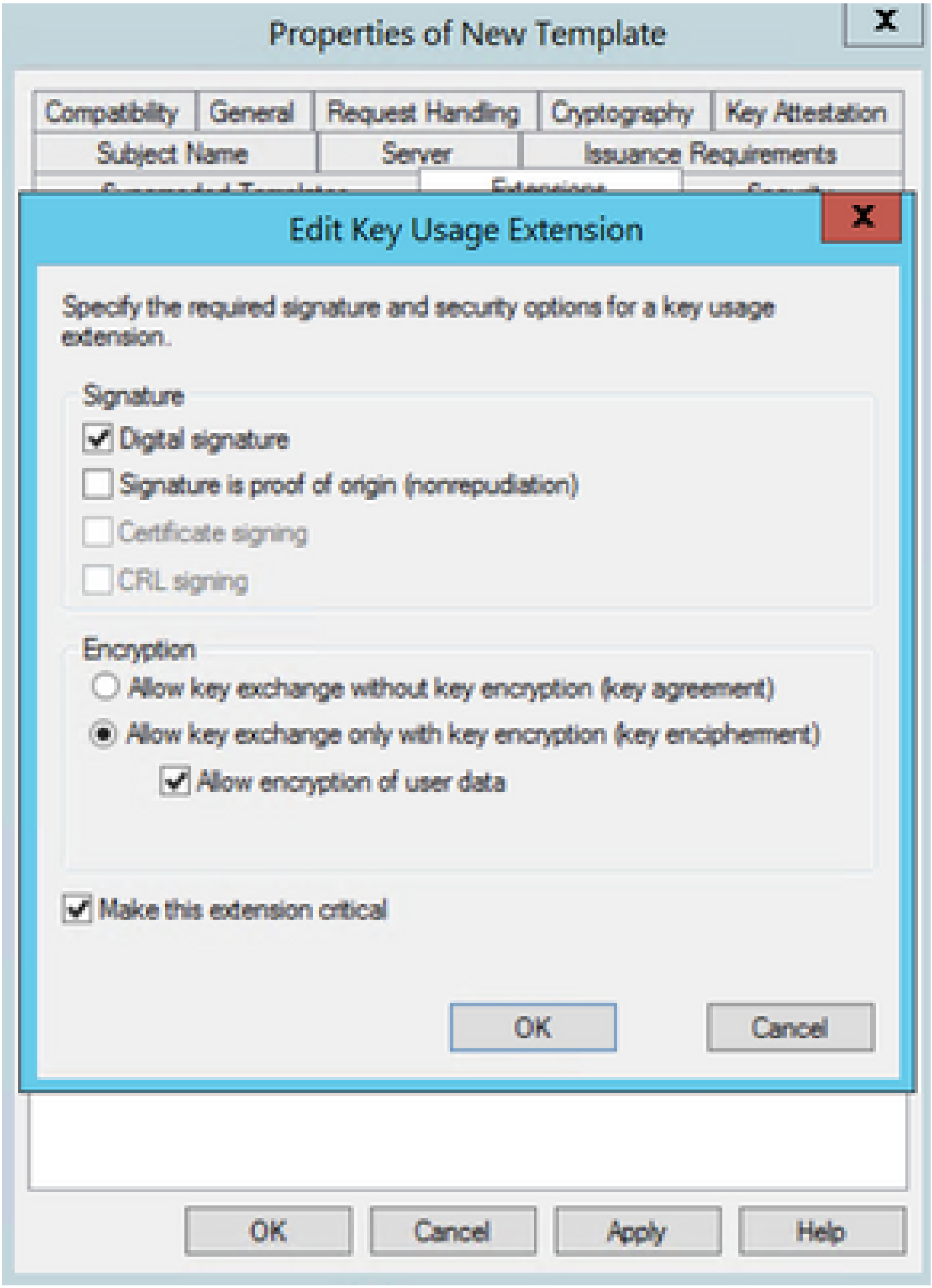


Step 3. Navigate to **Extensions > Key Usage > Edit**, as shown in the image.

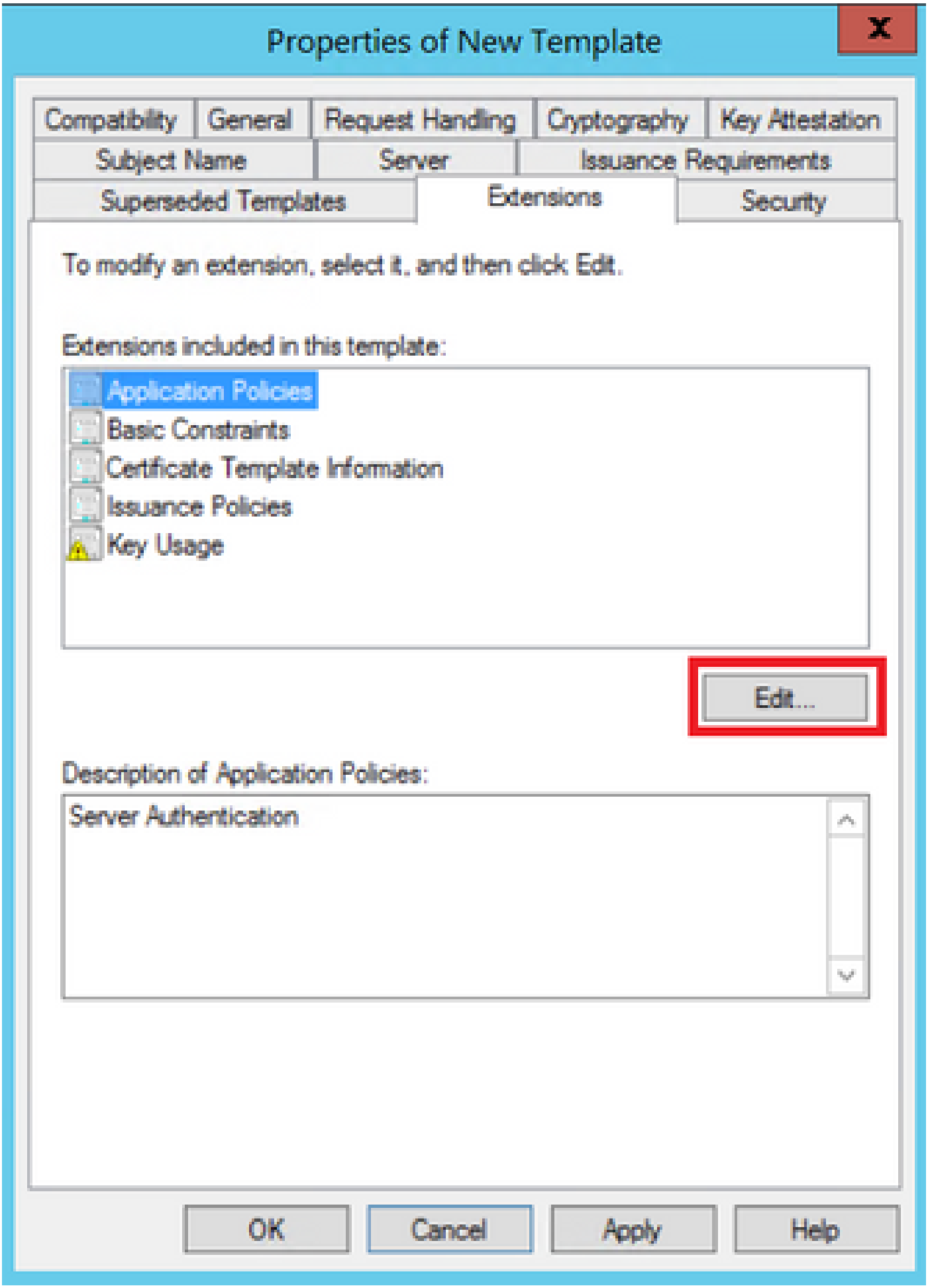


Step 4. Select these options and select **OK**, as shown in the image.

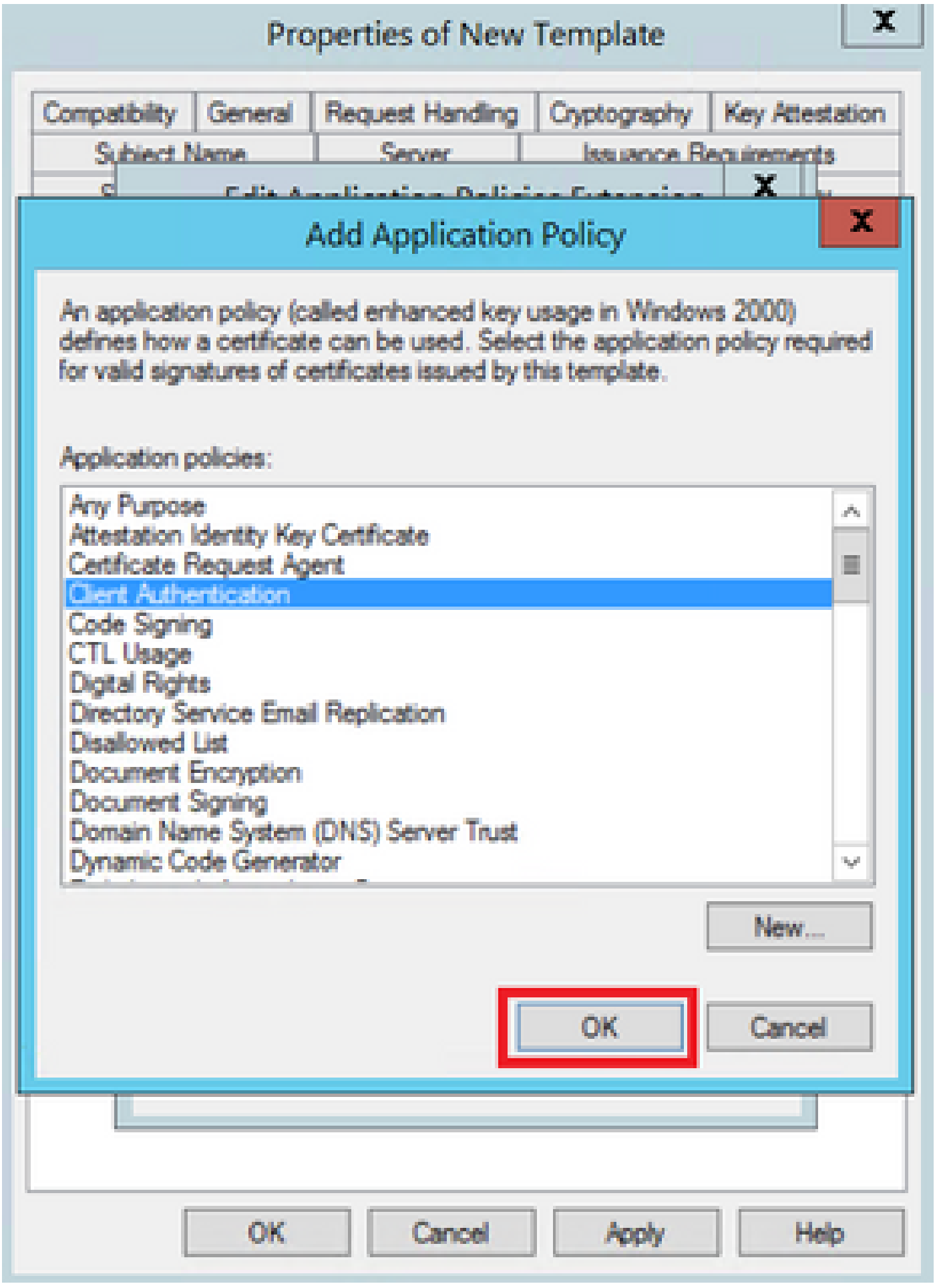
- **Digital signature**
- **Certificate signing**
- **CRL signing**


Properties of New Template
Compatibility
General
Request Handling
Cryptography
Key Attestation
Subject Name
Server
Issuance Requirements
Edit Key Usage Extension
Specify the required signature and security options for a key usage extension.
Signature
Digital signature
Signature is proof of origin (nonrepudiation)
Certificate signing
CRL signing
Encryption
Allow key exchange without key encryption (key agreement)
Allow key exchange only with key encryption (key encipherment)
Allow encryption of user data
Make this extension critical
OK
Cancel
OK
Cancel
Apply
Help

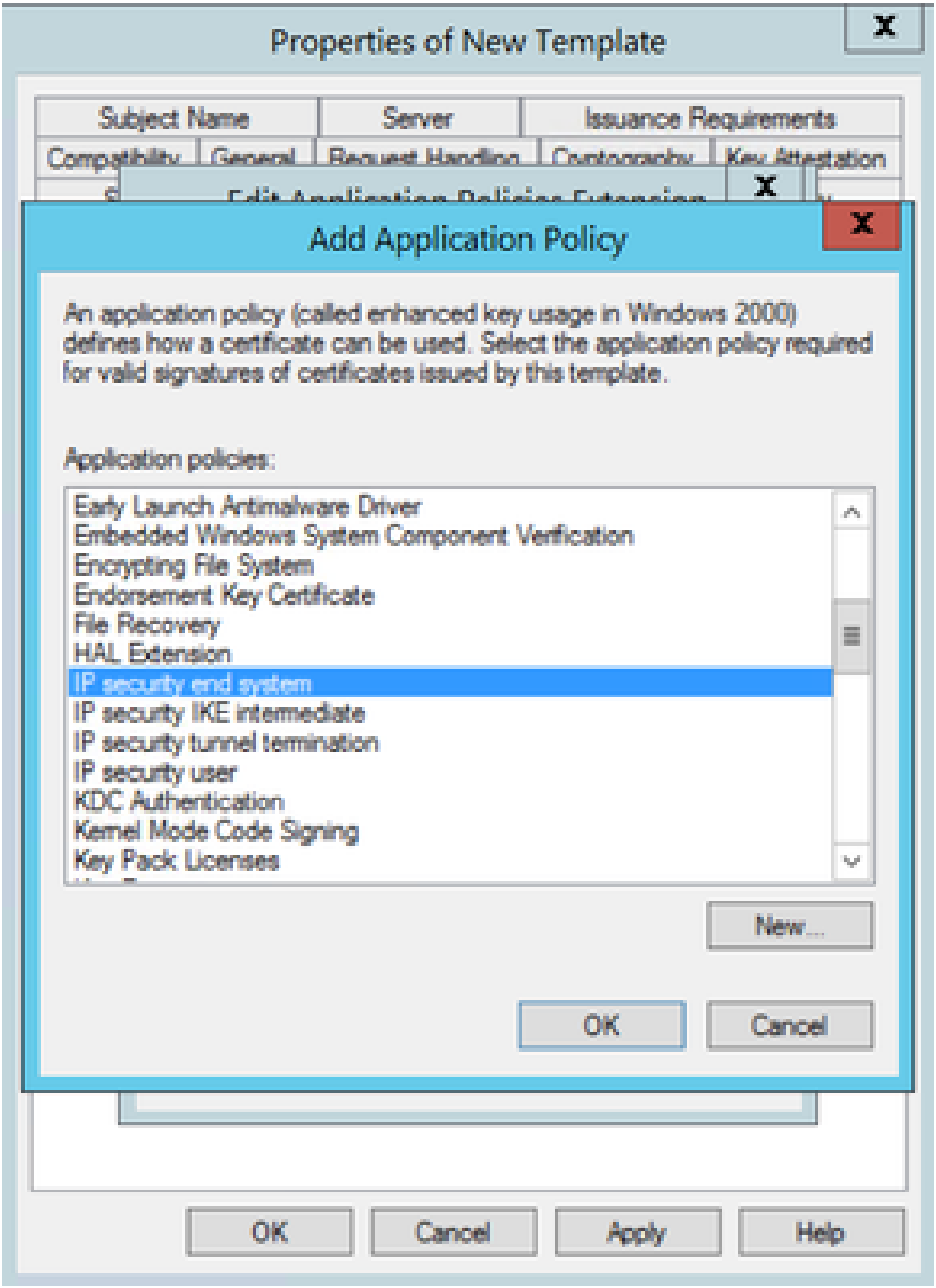
Step 5. Navigate to **Extensions > Application Policies > Edit > Add**, as shown in the image.


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

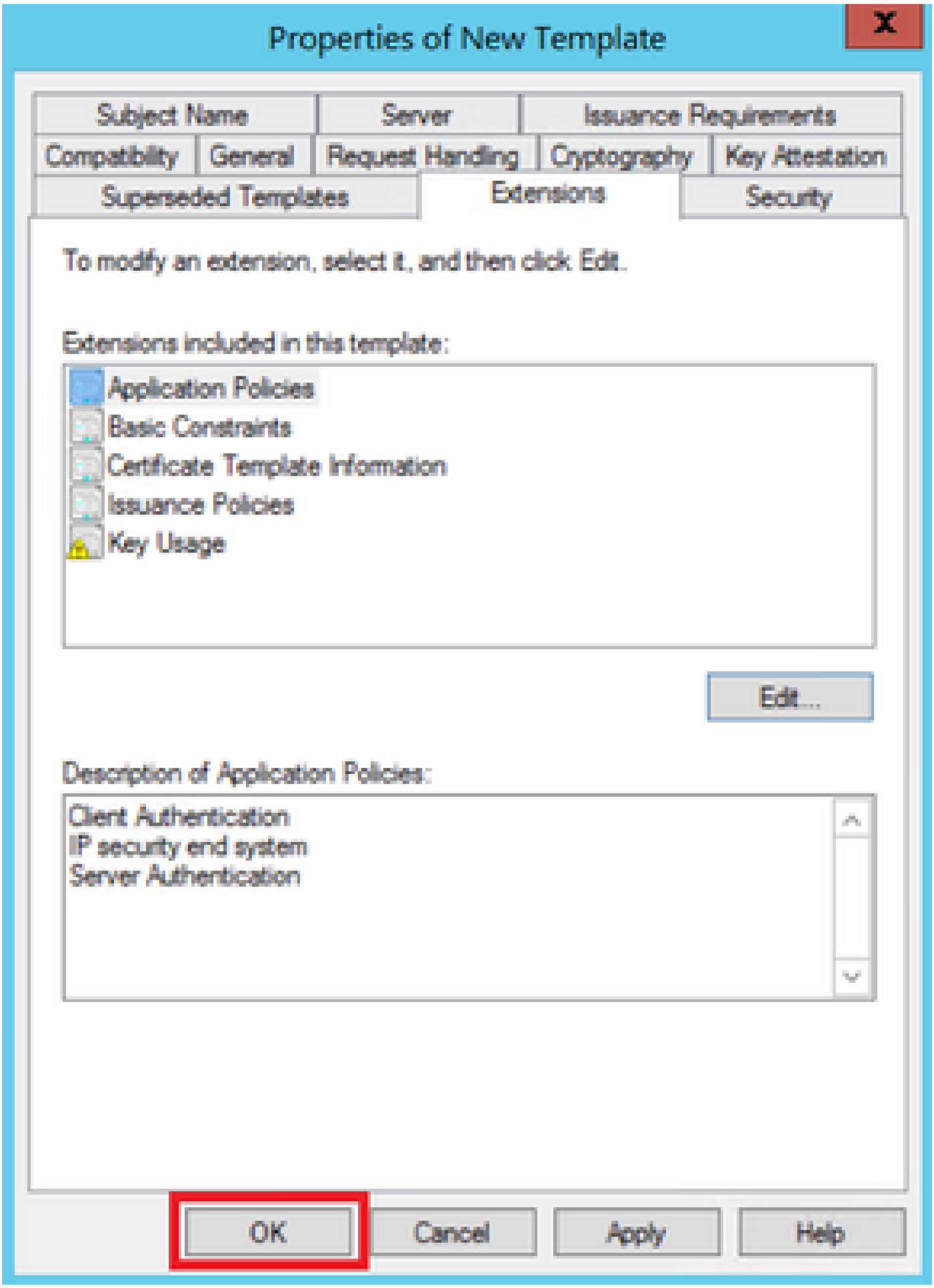
Step 6. Search for **Client Authentication**, select it and then select **OK**, as shown in the image.



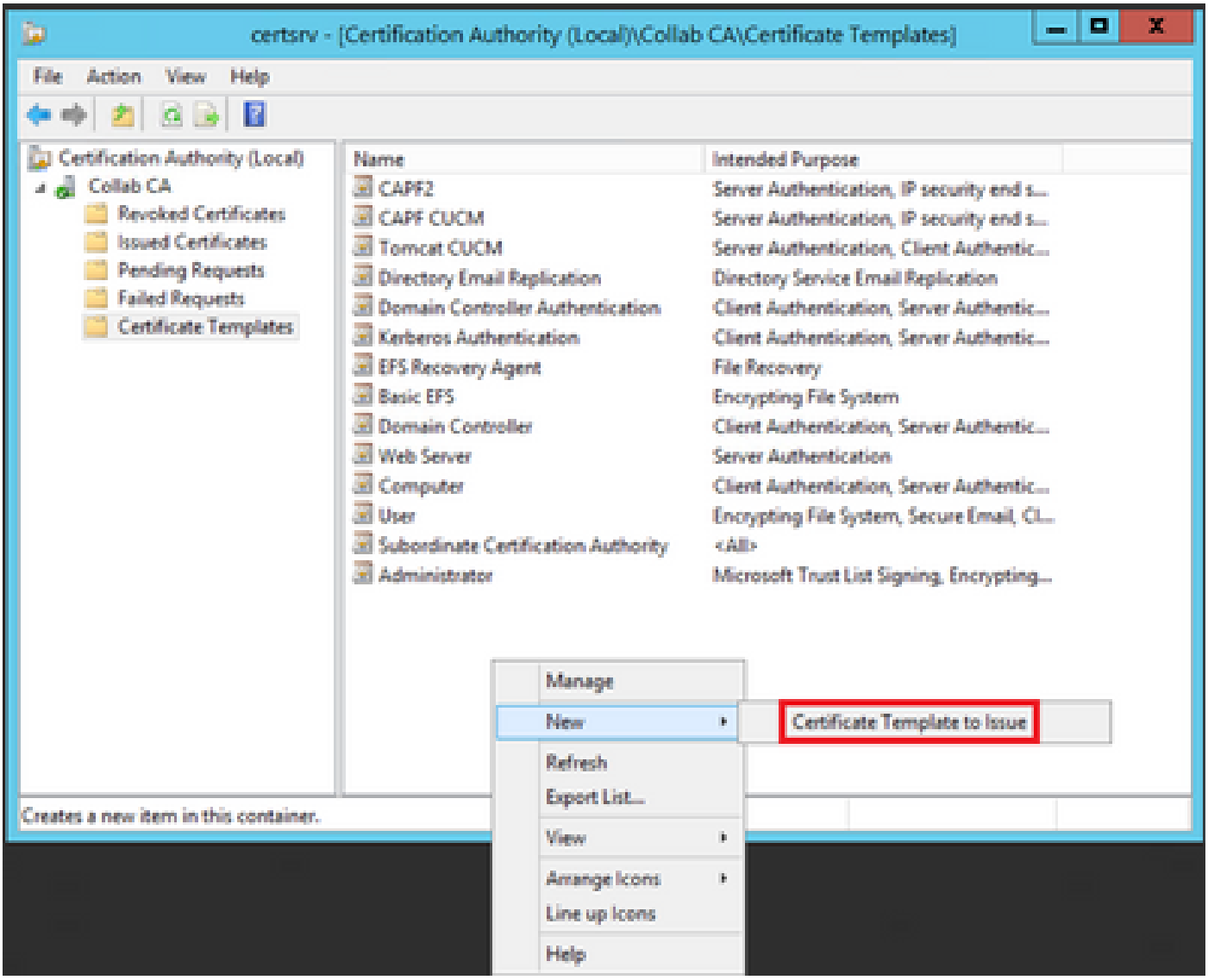
Step 7. Select **Add** again, search for **IP security end system**, select it and then select **OK** on this and on the previous window as well, as shown in the image.


Properties of New Template
Subject Name
Server
Issuance Requirements
Add Application Policy
An application policy (called enhanced key usage in Windows 2000) defines how a certificate can be used. Select the application policy required for valid signatures of certificates issued by this template.
Application policies:
Early Launch Antimalware Driver
Embedded Windows System Component Verification
Encrypting File System
Endorsement Key Certificate
File Recovery
HAL Extension
IP security end system
IP security IKE intermediate
IP security tunnel termination
IP security user
KDC Authentication
Kernel Mode Code Signing
Key Pack Licenses
New...
OK
Cancel
OK
Cancel
Apply
Help

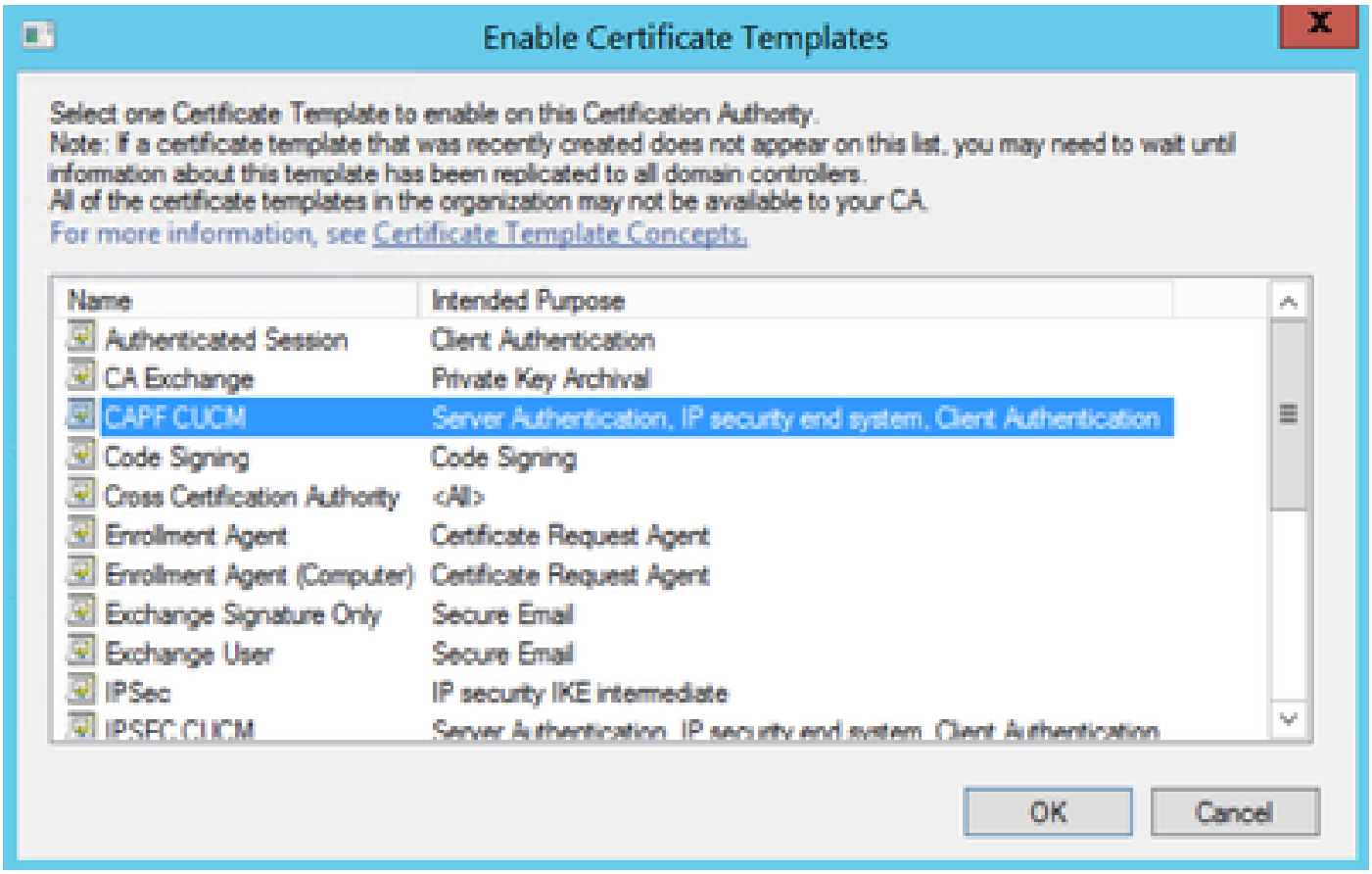
Step 8. Back on the template, select **Apply** and then **OK**, as shown in the image.



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.



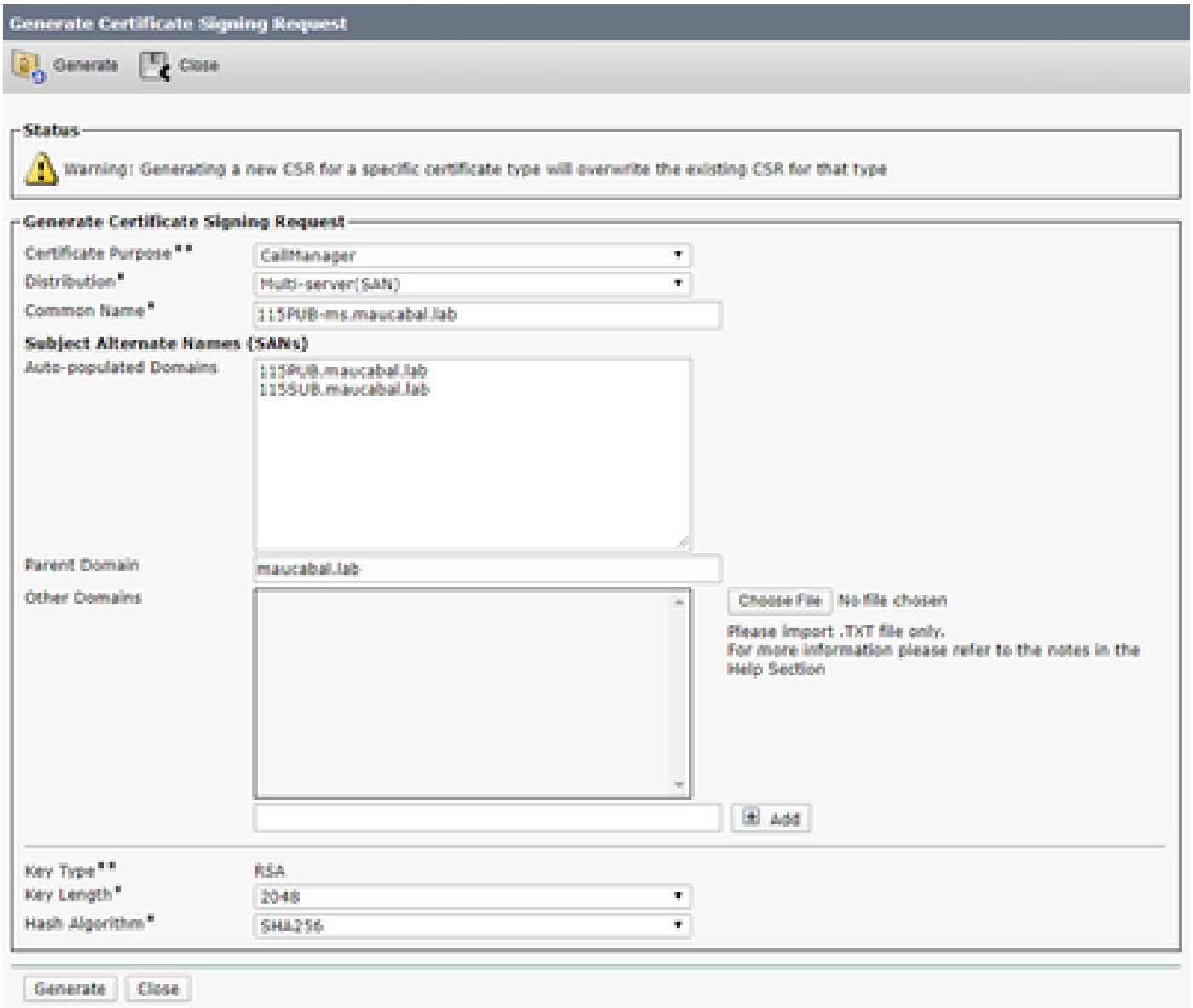
Generate a Certificate Signing Request

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:

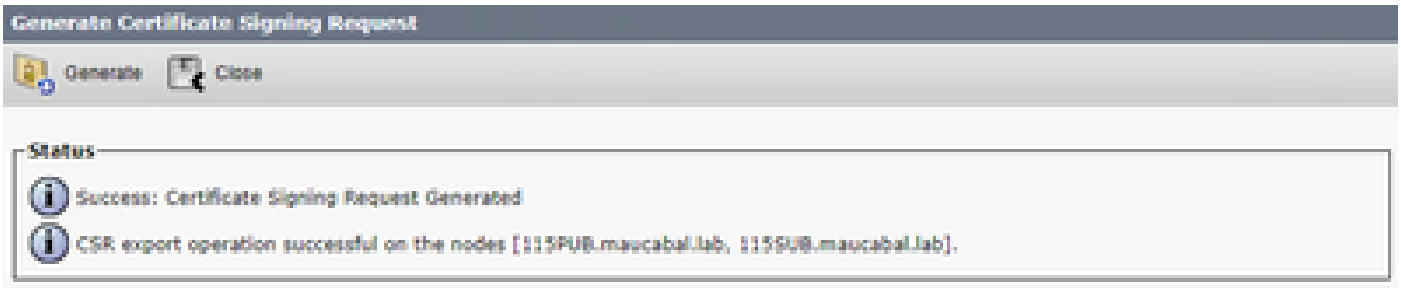
Step 1. On CUCM, navigate to **OS Administration > Security > Certificate Management > Generate CSR**.

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

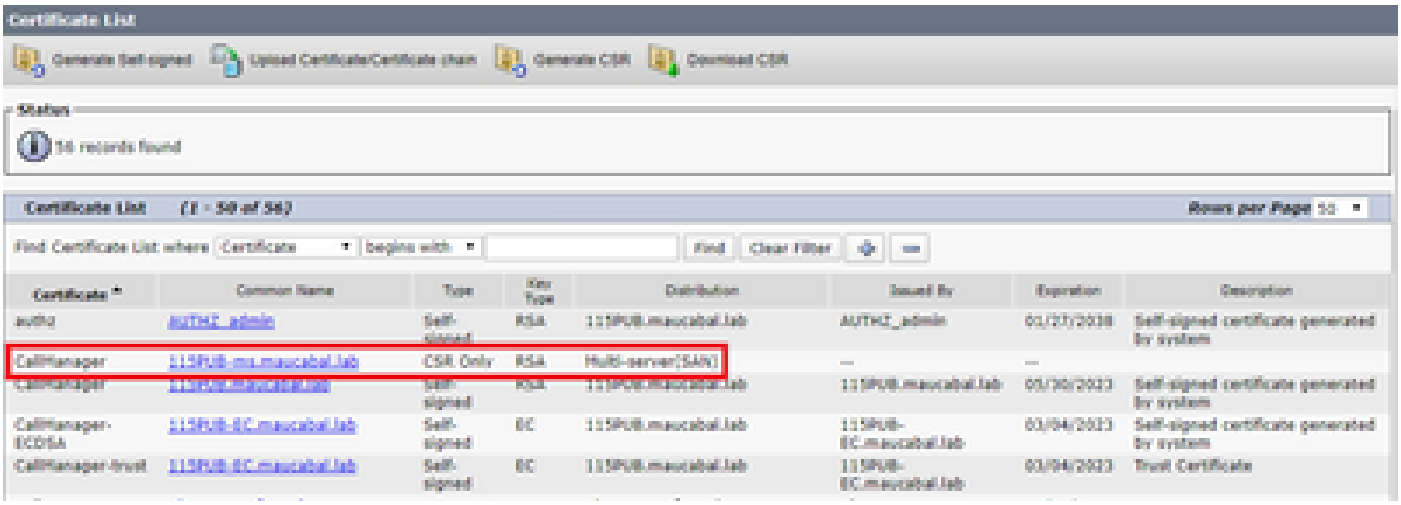
- Certificate Purpose: **CallManager**
- Distribution: **<This can either be just for one server or Multi-SAN>**



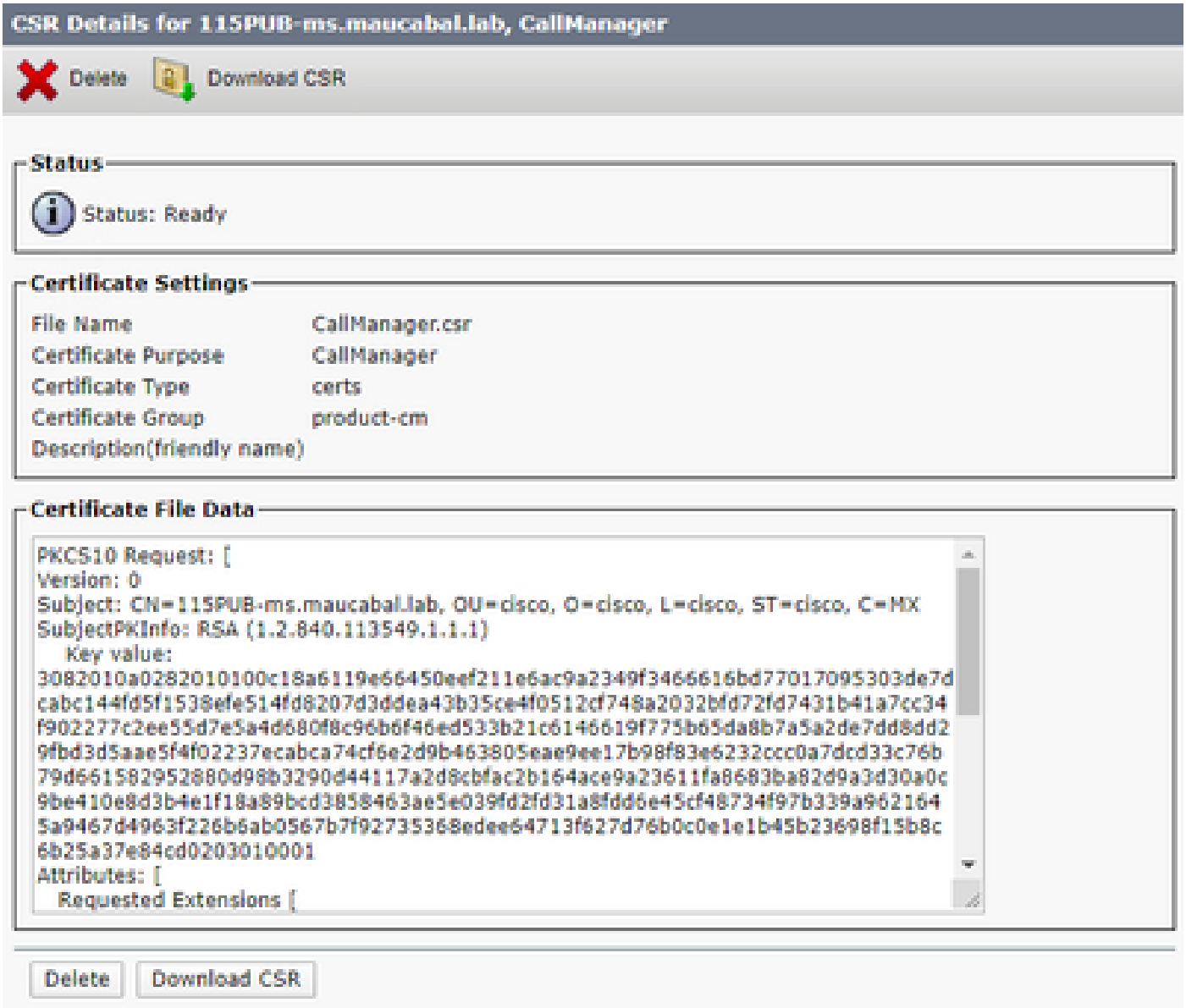
Step 3. A confirmation message is generated, as shown in the image.



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

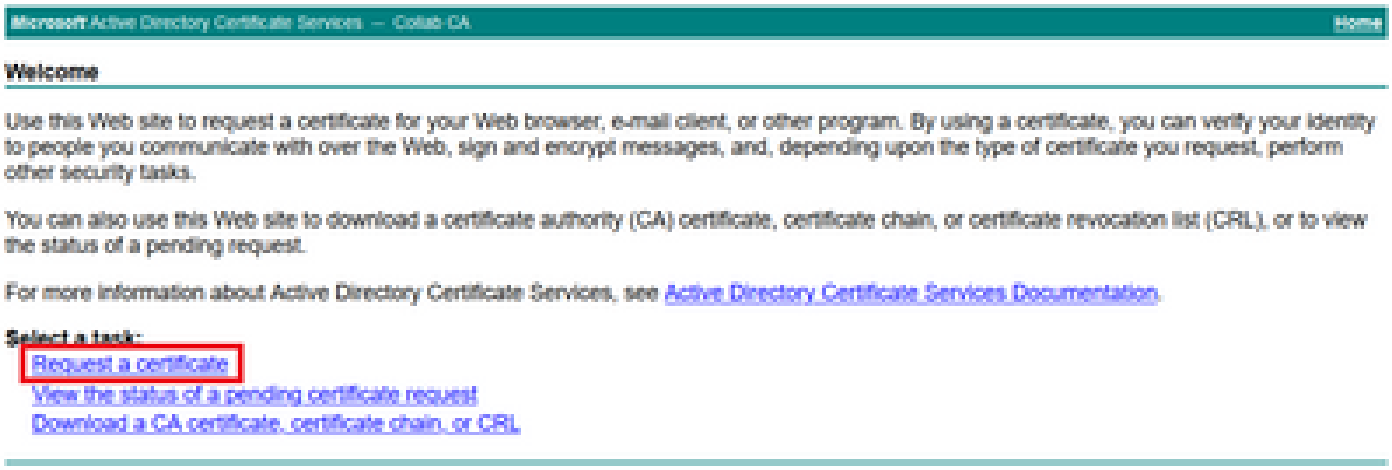


Step 5. On the pop-up window, select **Download CSR**, and save the file on your computer.

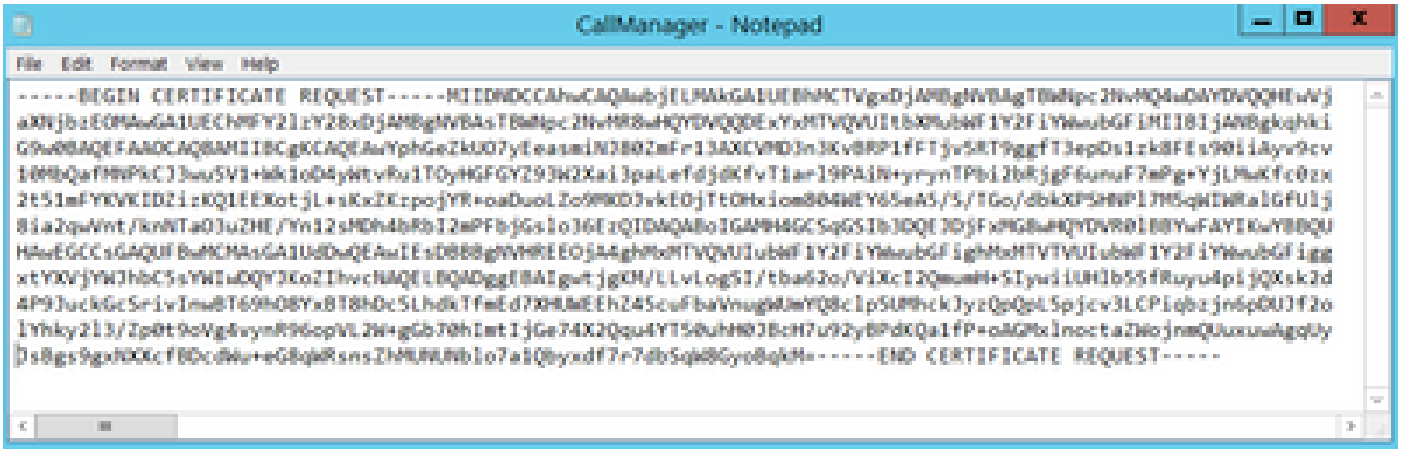


Step 6. On your browser, navigate to this URL, and enter your domain controller administrator credentials: **https://<yourWindowsServerIP>/certsrv/**.

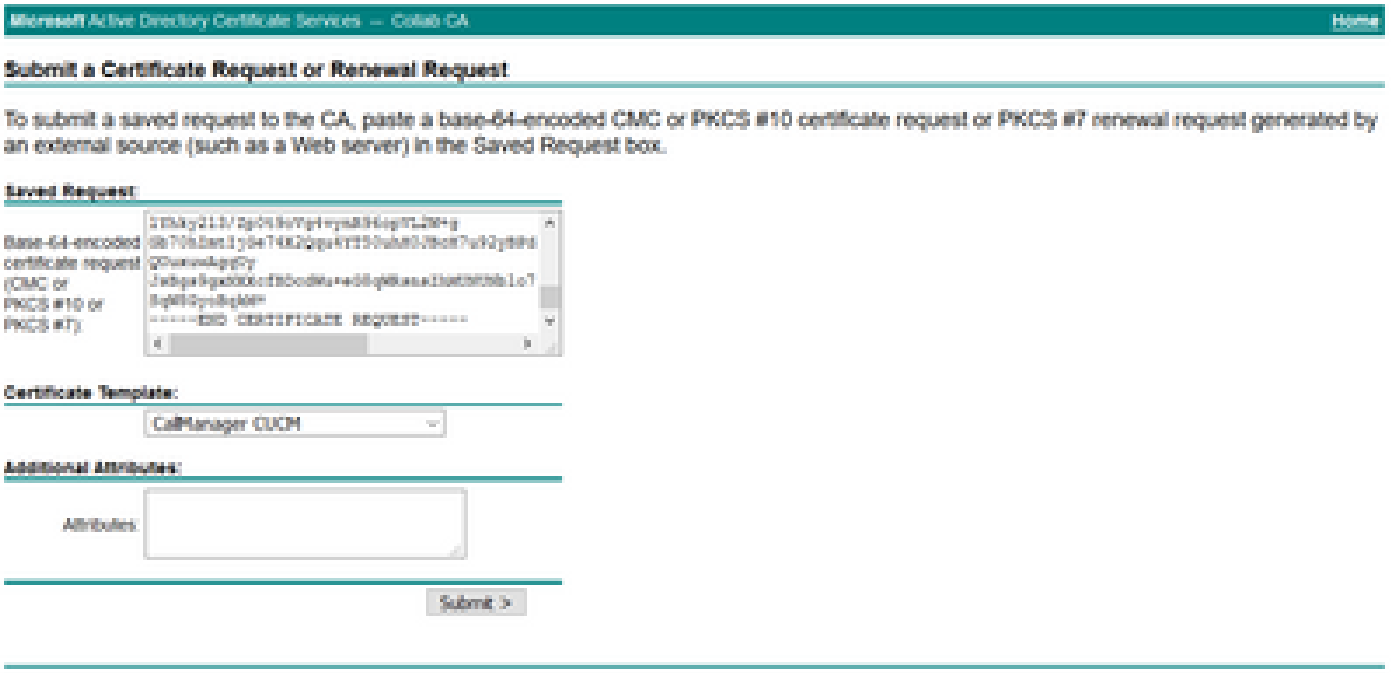
Step 7. Navigate to **Request a certificate** > **advanced certificate request**, as shown in the image.



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



Step 9. Paste the CSR in 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 to the CUCM.

Verify

The verification procedure is actually part of the configuration process.

Troubleshoot

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