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简介

本文描述配置示例会话初始化协议(SIP)传输层安全(TLS)和安全实时传输协议(SRTP)在Cisco Unified Communications Manager (CUCM)， IP电话和Cisco Unified Border Element (多维数据集)之间使用企业Certificate Authority (CA) (第三方CA)签名证书和使用普通的企业CA签署所有网络组件的证书包括思科通信设备类似IP电话、CUCM、网关和多维数据集。

贡献用Onkar Mahajan， Mudit Mathur， Cisco TAC工程师。

先决条件

要求

Cisco 建议您了解以下主题：

- 企业CA服务器配置CUCM团星在混合模式配置，并且IP电话注册？安全模式(加密)多维数据集基本语音服务voip和拨号对等配置被执行

使用的组件

本文档中的信息基于以下软件和硬件版本：

- Windows 2008服务器-认证机关
- CUCM 10.5
- 多维数据集？与IOS 15.3(3) M3的3925E
- CIPC

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您使用的是真实网络，请确保您已经了解所有命令的潜在影响。

背景信息

在多维数据集的安全语音通信可以分开成两部分

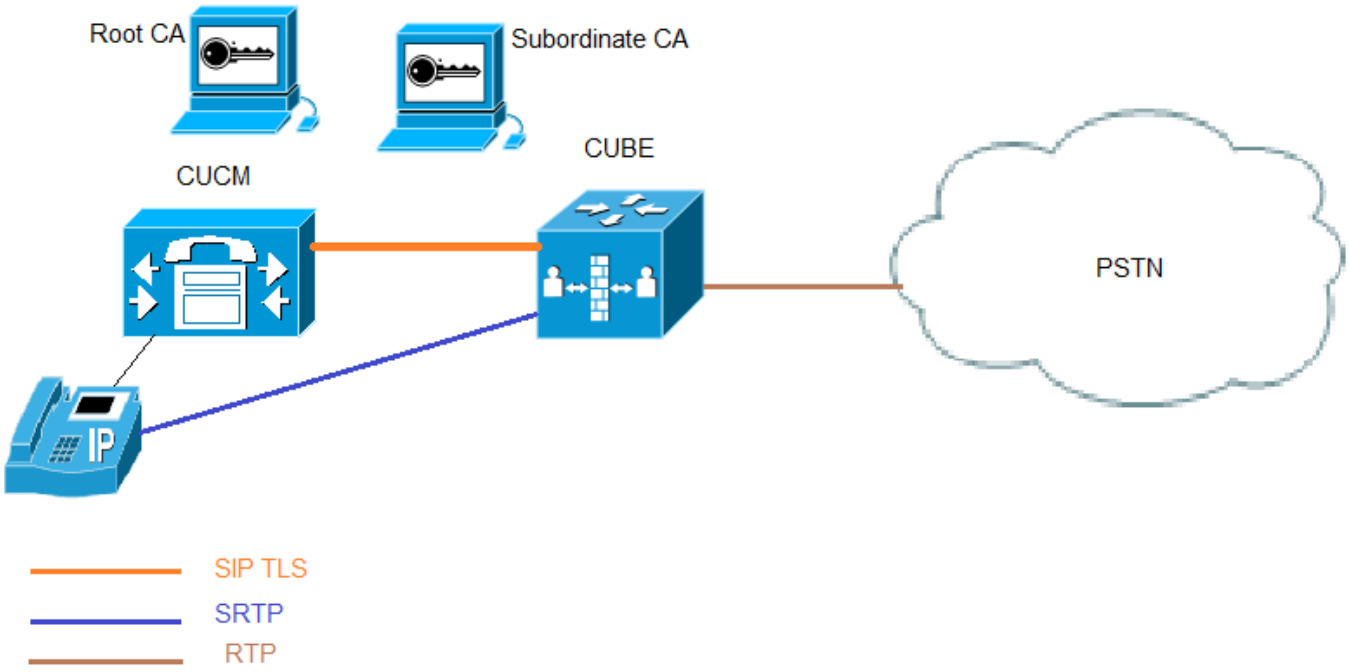
- 安全信令-求使用TLS的立方获取在SIP和IPSec (Internet协议安全性)
- 巩固梅迪亚？

CUCM认证机关代理功能(CAPF)提供局部重要的证书(LSC)给电话。因此，当CAPF由外部CA时签字，它作为电话的辅助CA。

要知道如何获得CA签名的CAPF，请参考：

配置

网络图



在此设置根CA和一个辅助CA中使用，所有CUCM，并且多维数据集证书由辅助CA签字。

配置多维数据集

1.生成RSA密钥对。

此步骤生成私有和公共密钥。

在本例中，多维数据集是标签，这可以是任何。

```
CUBE-2(config)#crypto key generate rsa general-keys label CUBE modulus 2048
The name for the keys will be: CUBE

% The key modulus size is 2048 bits
% Generating 2048 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 12 seconds)

CUBE-2(config)#
```

2.创建辅助CA和根CA的一信任点，辅助CA信任点使用SIP TLS通信。

在本例中，信任点名称对于辅助CA是SUBCA1，并且对于根CA它是ROOT

登记终端pem允许手工的剪贴证书登记。pem关键字用于发出证书请求或接收在PEM格式化的文件的已签发证书到控制台终端。

用于此步骤的主题名称在CUCM SIP中继安全配置文件的X.509主题名称应该配比。最佳实践是使用主机名以域名(如果域名启用)

关联在step1创建的RSA密钥对。

```
crypto pki trustpoint SUBCA1
enrollment terminal pem
serial-number none
ip-address none
subject-name CN=CUBE-2
revocation-check none
rsakeypair CUBE

crypto pki trustpoint ROOT
enrollment terminal
revocation-check none
```

3. 生成多维数据集证书签名请求(CSR)

crypto pki登记提供给企业CA获得签名证书的命令生产CSR。

```
CUBE-2(config)#crypto pki enroll SUBCA1
% Start certificate enrollment ..

% The subject name in the certificate will include: CN=CUBE-2
% The subject name in the certificate will include: CUBE-2
Display Certificate Request to terminal? [yes/no]: yes
Certificate Request follows:

-----BEGIN CERTIFICATE REQUEST-----
MIICjjCCAXYCAQAwKDEPMA0GA1UEAxMGQ1VCRS0yMRUwEwYJKoZIhvcNAQkCFgZD
VUJFLTIwggEiMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEKAoIBAQDAmVvufevAg1ip
Kn8FhWjFlNNUFMqkgh2Cr1IMV+ovR2HyPTFwgr0XDhZHMSsnBw67Ttze3Ebxxoau
cBQcIASZ4hdTSIgjxG+9YQacLm9MXpfxHp5kcICzSfSllrTexArTQglW8+rErYpk
2THN1S0PC4cRlBwoUCgB/+KCDkjJkUy8eCX+Gmd+6ehRKEQ5HdFHEfUr5hc/7/pB
liHietNKSxYEOr9TVZPiRJrtpUPMRMZElRUm7GoxBrCWIXVdvEAGC0Xqd1ZVLlTz
z2sQQDqvJ9fMN6fngKv2ePr+f5qejWVzGO0DFVQs0y5x+Yl+pHbsdV1hSSnPpJk6
TaaBmX83AgMBAAGgITAfBgkqhkiG9w0BCQ4xEjAQMA4GA1UdDwEB/wQEAwIFoDAN
BgkqhkiG9w0BAQUFAAOCAQEArWMJbdhlU8VfaF1cMJIbr569BZT+tIjQOz3OqNGQ
QpzHwclLoaKuC5pc/u0hw14MGS6Z440Iw4zK2/5bb/KL47r8H3d7T7PYMfK6lAzK
sU9Kf96zTvHNWl9wXImB5blJfRLXnFWXNsVEF4FjU74plxJL7siaa5e86eNy9deN
20iKjvP8o4MgWewILrD01YZMDMDS1Uy82kWI6hvXG5+xBT5A1lo2xCj1S9y6/D4d
f0ilDZvaQk+7jjBCzLv5hET+1neoQBw52e7RWU8s2biQw+7TEAdO8NytF3q/mA/x
bUKw5wT4pgGUJcDAWej3ZLqP91g5yyd9MiCdCRY+3mLccQ==
-----END CERTIFICATE REQUEST-----

---End - This line not part of the certificate request---

Redisplay enrollment request? [yes/no]: no
CUBE-2(config)#
```

复制之间输出开始证书请求对END证书请求并且储存它在记事本文件。

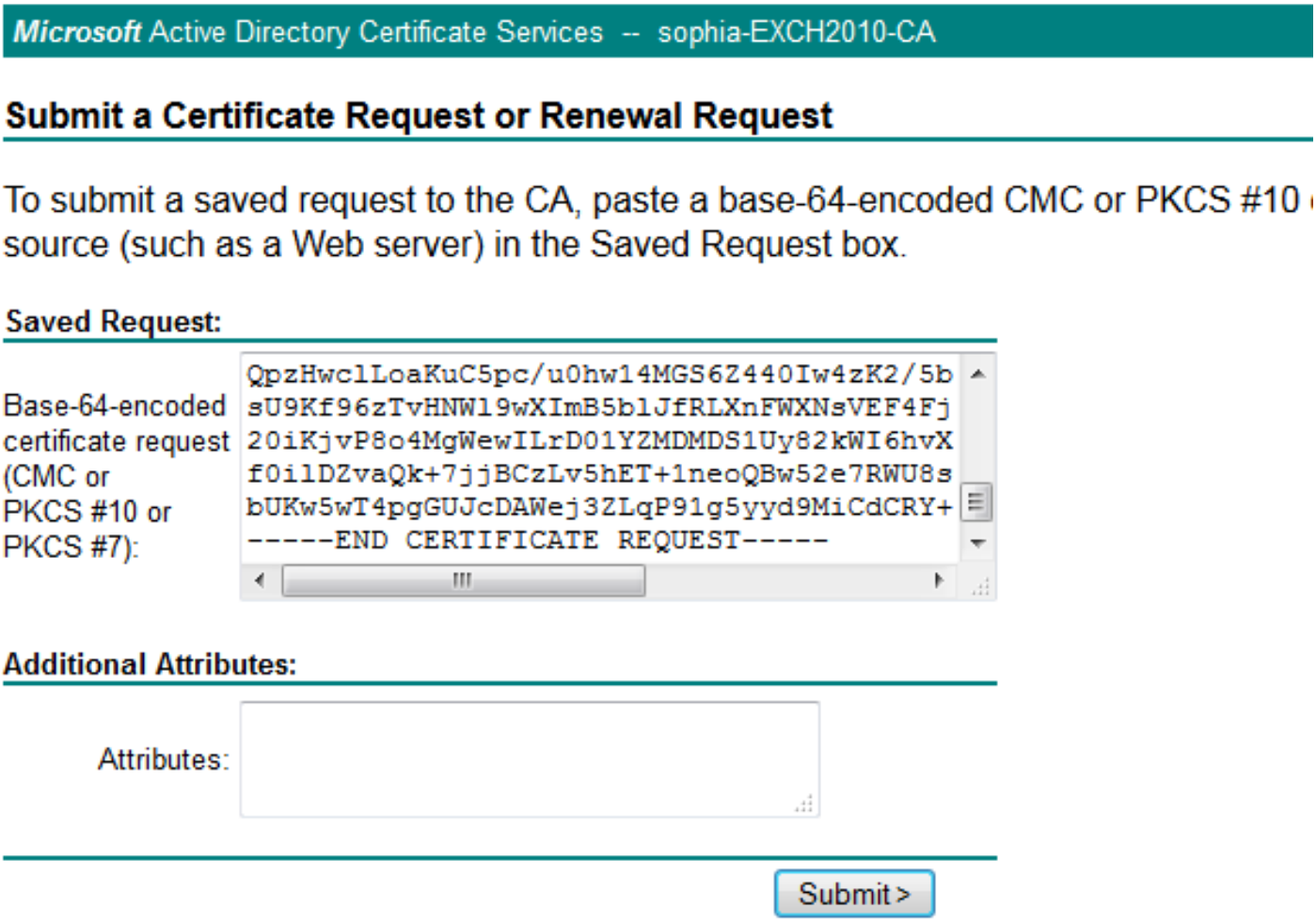
多维数据集CSR将有这些关键属性

```
CUBE-2(config)#crypto pki enroll SUBCA1
% Start certificate enrollment ..

% The subject name in the certificate will include: CN=CUBE-2
% The subject name in the certificate will include: CUBE-2
Display Certificate Request to terminal? [yes/no]: yes
Certificate Request follows:

-----BEGIN CERTIFICATE REQUEST-----
```

```
MIICjjCCAXYCAQAwKDEPMA0GA1UEAxMGQ1VCRS0yMRUwEwYJKoZIhvcNAQkCFgZD
VUJFLTIwggEiMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEKAoIBAQDAmVvufevAg1ip
Kn8FhWjFlNNUFMqkgh2Cr1IMV+ovR2HyPTFwgr0XDhZHMSsnBw67Ttze3Ebxxoau
cBQcIASZ4hdTSIgjxG+9YQacLm9MXpfxHp5kcICzSfSllrTexArTQglW8+rErYpk
2THN1S0PC4cRlBwoUCgB/+KCDkjJkUy8eCX+Gmd+6ehRKEQ5HdFHEfUr5hc/7/pB
liHietNKSxYEOr9TVZPiRJrtpUPMRMZElRUm7GoxBrCWIXVdvEAGC0Xqd1ZVLlTz
z2sQQDqvJ9fMN6fngKv2ePr+f5qejWVzGO0DFVQs0y5x+Yl+pHbsdV1hSSnPpJk6
TaaBmX83AgMBAAGgITAfBgkqhkiG9w0BCQ4xEjAQMA4GA1UdDwEB/wQEAwIFoDAN
BgkqhkiG9w0BAQUFAAOCAQEArWMJbdhlU8VfaF1cMJIbr569BZT+tIjQOz3OqNGQ
QpzHwclLoaKuC5pc/u0hw14MGS6Z440Iw4zK2/5bb/KL47r8H3d7T7PYMfK6lAzK
sU9Kf96zTvHNWl9wXImB5blJfRLXnFWXNsVEF4FjU74plxJL7siaa5e86eNy9deN
20iKjvP8o4MgWewILrD01YZMDMDS1Uy82kWI6hvXG5+xBT5A1lo2xCj1S9y6/D4d
f0ilDZvaQk+7jjBCzLv5hET+1neoQBw52e7RWU8s2biQw+7TEAdO8NytF3q/mA/x
bUKw5wT4pgGUJcDAWej3ZLqP91g5yyd9MiCdCRY+3mLccQ==
-----END CERTIFICATE REQUEST-----

---End - This line not part of the certificate request---

Redisplay enrollment request? [yes/no]: no
CUBE-2(config)#
```

4.从辅助CA获得CA证书根CA然后CA证书和签字的多维数据集证书。

要获得在步骤3.签署了多维数据集证书，使用生成的CSR。镜像是从Microsoft CA Web服务器。



5.根CA和辅助CA导入CA证书。

在记事本的开放证书和复制和粘贴内容从开始证书请求对END证书请求。

```
CUBE-2(config)#crypto pki authenticate SUBCA1
```

```
Enter the base 64 encoded CA certificate.
End with a blank line or the word "quit" on a line by itself

-----BEGIN CERTIFICATE-----
MIIFhDCCBGygAwIBAgIKYZVFyQAAAAAAFjANBgkqhkiG9w0BAQUFADBQMRIwEAYK
CZImiZPyLGQBGRYCbGkxFjAUBgoJkiaJk/IsZAEZFgZzb3BoaWExIjAgBgNVBAMT
GXNvcGhpYS1XSU4tM1MxOEpDM0xNMkEtQ0EwHhcNMTQwOTI1MDAwNzU2WhcNMTYw
OTI1MDAxNzU2WjBJMRIwEAYKCZImiZPyLGQBGRYCbGkxFjAUBgoJkiaJk/IsZAEZ
FgZzb3BoaWExGzAZBgNVBAMTEnNvcGhpYS1FWENIMjAxMC1DQTCCASIwDQYJKoZI
hvcNAQEBBQADggEPADCCAQoCggEBAJK+Nmz4rieYfr9gH3ISTuYz3TWpafpjDJ7l
7kIwwwC28TvjFl5vrKEiaPyFzxL5TEHaWQ9YAo/WMdtuyF7aB+pLJ1soKcZxtrGv
gTMtuphcJ5Fpd4368lR8ZXJiAT/Dz+Nsh4PC9GUUKQeycyRDeOBz08vL5pLj/W99
b8UMUlVOqBu4e1ZwxWPMFxB7zOeYsCfXMnGFUlp3HFdWZczgK3ldNO9I0X+p70UP
R0CQpMEQxuheqv9kazIIJKfNH8N0qO8IHl76Y32vUzLg3uvZgqWG6hGch/gjm4L/
1KmdZTNSH8H7Kf6vG6PNWrXWwLNkhrWaYEryHelIshEj7ZUeB8sCAwEAAaOCAmUw
ggJhMBIGCSsGAQQBgjcVAQQFAgMBAAEwIwYJKwYBBAGCNxUCBBYEFLnnd8HnCfKE
isPgI58Oog/LqwVSMB0GA1UdDgQWBBSsdYJZIU9IXyGm9aL67+8uDhM/EzAZBgkr
BgEEAYI3FAIEDB4KAFMAdQBiAEMAQTAOBgNVHQ8BAf8EBAMCAYYwDwYDVR0TAQH/
BAUwAwEB/zAfBgNVHSMEGDAWgBTvo1P6OP4LXm9RDv5MbIMk8jnOfDCB3QYDVR0f
BIHVMIHSMIHPoIHMoIHJhoHGbGRhcDovLy9DTj1zb3BoaWEtV0lOLTNTMThKQzNM
TTJBLUNBLENOPVdJTi0zUzE4SkMzTE0yQSxDTj1DRFAsQ049UHVibGljJTIwS2V5
JTIwU2VydmljZXMsQ049U2VydmljZXMsQ049Q29uZmlndXJhdGlvbixEQz1zb3Bo
aWEsREM9bGk/Y2VydGlmaWNhdGVSZXZvY2F0aW9uTGlzdD9iYXNlP29iamVjdENs
YXNzPWNSTERpc3RyaWJ1dGlvblBvaW50MIHJBggrBgEFBQcBAQSBvDCBuTCBtgYI
KwYBBQUHMAKGgalsZGFwOi8vL0NOPXNvcGhpYS1XSU4tM1MxOEpDM0xNMkEtQ0Es
Q049QUlBLENOPVB1YmxpYyUyMEtleSUyMFNlcnZpY2VzLENOPVNlcnZpY2VzLENO
PUNvbmZpZ3VyYXRpb24sREM9c29waGlhLERDPWxpP2NBQ2VydGlmaWNhdGU/YmFz
ZT9vYmplY3RDbGFzcz1jZXJ0aWZpY2F0aW9uQXV0aG9yaXR5MA0GCSqGSIb3DQEB
BQUAA4IBAQBj/+rX+9NJiSZq1YwQXkLq6+LUh7OkCoeCHHfBGUaS+gvbYQ5OVwJI
TlPTj4YNh62A6pUXplo8mdxKxOmZeRLTYgf9Q/SiOY+qoxJ5zNliSqlRU4E02sRz
wrzfaQpLGgyHXsyK1ABOGRgGqqWqZ7oXoKMRNmO+eu3NzBs4AVAAfL8UhFCv4IVx
/t6qIHY6YkNMVByjZ3MdFmohepN5CHZUHIvrOv9eAiv6+Vaan2nTeynyy7WnEv7P
+5L2kEFOSfnL4Zt2tEMqc5WyX6yjxDWmII0DTSyRshmxAoYlo3EJHwW+fIocdmIS
hgWDzioZ70SM9mJqNReHMC1jL3FD2nge
-----END CERTIFICATE-----

Trustpoint 'SUBCA1' is a subordinate CA and holds a non self signed cert
Certificate has the following attributes:
Fingerprint MD5: C420B7BB 88A2545F E26B0875 37D9EB45
Fingerprint SHA1: 110AF87E 53E6D1C2 19404BA5 0149C5CA 2CF2BE1C

% Do you accept this certificate? [yes/no]: yes
Trustpoint CA certificate accepted.
% Certificate successfully imported

CUBE-2(config)#
CUBE-2(config)#crypto pki authenticate ROOT

Enter the base 64 encoded CA certificate.
End with a blank line or the word "quit" on a line by itself

-----BEGIN CERTIFICATE-----
MIIDezCCAmOgAwIBAgIQMVF/OWq+ELxFC2IdUGvd2jANBgkqhkiG9w0BAQUFADBQ
MRIwEAYKCZImiZPyLGQBGRYCbGkxFjAUBgoJkiaJk/IsZAEZFgZzb3BoaWExIjAg
BgNVBAMTGXNvcGhpYS1XSU4tM1MxOEpDM0xNMkEtQ0EwHhcNMTQwOTEzMjMzODA2
WhcNMTkwOTEzMjM0ODA1WjBQMRIwEAYKCZImiZPyLGQBGRYCbGkxFjAUBgoJkiaJ
k/IsZAEZFgZzb3BoaWExIjAgBgNVBAMTGXNvcGhpYS1XSU4tM1MxOEpDM0xNMkEt
Q0EwggEiMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEKAoIBAQC4aywr1oOpTdTrM8Ya
R3RkcahbbhR3q7P1luTDUDNM5Pi6P8z3MckfjB/yy6SWr1Qnddhyv MG6IGNtVxJ4
eyw0c7jbArXWOemGLOt454A0mCfcbwMhjQBycg9SM1r1Umzad7kOCzj/rD6hMbC4
jXpg6uU8g7eB3LzN1XF93DHjxYCBKMIeG45pqmsOc3mUj1CbCtnYXgno+mfhNzhR
HSth02z4XlGm99v46j/PqGjNRq4WKCwDc45SG3QjJDqDxnRJPKtRdNva66UJfDJp
4YMXQxOSkKMtDEDhH/Eic7CrJ3EywpUpMZAmqh4bmQ7Vo2pnRTbYdaAv/+yr8sMj
+FU3AgMBAAGjUTBPMAsGA1UdDwQEAwIBhjAPBgNVHRMBAf8EBTADAQH/MB0GA1Ud
```

```
DgQWBBTvo1P6OP4LXm9RDv5MbIMk8jnOfDAQBgkrBgEEAYI3FQEEAwIBADANBgkq
hkiG9w0BAQUFAAOCAQEAmd7hJ2EEUmuMZrc/qtSJ223loJlpKEPMVi7CrodtWSgu
5mNt1XsgxijYMqD5gJe1oq5dmv7efYvOvI2WTCXfwOBJ0on8tgLFwp1+SUJWs95m
OXTyoS9krsI2G2kQkjQWniMqPdNxpmJ3C4WvQLPLwtEOSRZRBvsKy6lczrgrV2mZ
kx12n5YGrGcXSblPPUddlJep1l8U+AQC8wkSzfJu0yHJwoH+lrIfgqKUee4x7z6s
SCaGddCYr3OK/3Wzs/WjSO2UETvNL3NEtWHDc2t4Y7mmIMSDvGjHZUgGZotwc9kt
9f2dZA0rtgBq4IDtpxkR3CQaauB7wUCpzemHzf+z9Q==
-----END CERTIFICATE-----

Certificate has the following attributes:
Fingerprint MD5: 511E1008 6D315E03 4B748601 7EE1A0E5
Fingerprint SHA1: 8C35D9FA 8F7A00AC 0AA2FCA8 AAC22D5F D08790BB

% Do you accept this certificate? [yes/no]: yes
Trustpoint CA certificate accepted.
% Certificate successfully imported

CUBE-2(config)#
```

6.导入多维数据集签名证书。

在记事本的开放证书和复制和粘贴内容从开始证书请求对END证书请求。

```
CUBE-2(config)#crypto pki import SUBCA1 certificate

Enter the base 64 encoded certificate.
End with a blank line or the word "quit" on a line by itself

-----BEGIN CERTIFICATE-----
MIIEAjCCAuqgAwIBAgIKQZZrHQABAAAAEzANBgkqhkiG9w0BAQUFADBJMRIwEAYK
CZImiZPyLGQBGRYCbGkxFjAUBgoJkiaJk/IsZAEZFgZzb3BoaWExGzAZBgNVBAMT
EnNvcGhpYS1FWENIMjAxMC1DQTAeFw0xNTA0MDEwMDEzNDFaFw0xNjA0MDEwMDIz
NDFaMBExDzANBgNVBAMTBkNVQkUtMjCCASIwDQYJKoZIhvcNAQEBBQADggEPADCC
AQoCggEBAMCZW+5968CDWKkqfwWFaMWU01QUyqSCHYKvUgxX6i9HYfI9MXCCvRcO
FkcxKycHDrtO3N7cRvHGhq5wFBwgBJniF1NIiCPEb71hBpwub0xel/EenmRwgLNJ
9KWWtN7ECtNCCVbz6sStimTZMc3VLQ8LhxGUHChQKAH/4oIOSMmRTLx4Jf4aZ37p
6FEoRDkd0UcR9SvmFz/v+kGWIeJ600pLFgQ6v1NVk+JEmu2lQ8xExkSVFSbsajEG
sJYhdV28QAYLRep3VlUuVPPPaxBAOq8n18w3p+eAq/Z4+v5/mp6NZXMY7QMVVCzT
LnH5iX6kdux1XWFJKc+kmTpNpoGZfzcCAwEAAaOCASIwggEeMA4GA1UdDwEB/wQE
AwIFoDAdBgNVHQ4EFgQU9PbHMHSkYrjJ2+/+hSSMEoma0QIwHwYDVR0jBBgwFoAU
rHWCWSFPSF8hpvWi+u/vLg4TPxMwTwYDVR0fBEgwRjBEoEKgQIY+ZmlsZTovL0VY
Q0gyMDEwLnNvcGhpYS5saS9DZXJ0RW5yb2xsL3NvcGhpYS1FWENIMjAxMC1DQSgx
KS5jcmwwbQYIKwYBBQUHAQEEYTBfMF0GCCsGAQUFBzAChlFmaWxlOi8vRVhDSDIw
MTAuc29waGlhLmxpL0NlcnRFbnJvbGwvRVhDSDIwMTAuc29waGlhLmxpX3NvcGhp
YS1FWENIMjAxMC1DQSgxKS5jcnQwDAYDVR0TAQH/BAIwADANBgkqhkiG9w0BAQUF
AAOCAQEAe7EAoXKIAij4vxZuxROOFOfsmjcojU31ac5nrLCbq/FyW7eNblphL0NI
Dt/DlfZ5WK2q3Di+/UL1lDt3KYt9NZ1dLpmccnipbbNZ5LXLoHDkLNqt3qtLfKjv
J6GnnWCxLM18lxm1DzZT8VQtiQk5XZ8SC78hbTFtPxGZvfX70v22hekkOL1Dqw4h
/3mtaqxfnslB/J3Fgps1och45BndGiMAWavzRjjOKQaVLgVRvVrPIy3ZKDBaUleR
gsy5uODVSrhwMo3z84r+f03k4QarecgwZE+KfXoTpTAfhiCbLKw0ZyRMXXzWqNfl
iotEQbs52neCwXNwV24aOCChQMw2xw==
-----END CERTIFICATE-----

% Router Certificate successfully imported

CUBE-2(config)#
```

7.配置TCP TLS作为传输协议。

这可以执行在全局或在dial-peer级别。

```
CUBE-2(config)#crypto pki import SUBCA1 certificate

Enter the base 64 encoded certificate.
End with a blank line or the word "quit" on a line by itself

-----BEGIN CERTIFICATE-----
MIIEAjCCAuqgAwIBAgIKQZZrHQABAAAAEzANBgkqhkiG9w0BAQUFADBJMRIwEAYK
CZImiZPyLGQBGRYCbGkxFjAUBgoJkiaJk/IsZAEZFgZzb3BoaWExGzAZBgNVBAMT
EnNvcGhpYS1FWENIMjAxMC1DQTAeFw0xNTA0MDEwMDEzNDFaFw0xNjA0MDEwMDIz
NDFaMBExDzANBgNVBAMTBkNVQkUtMjCCASIwDQYJKoZIhvcNAQEBBQADggEPADCC
AQoCggEBAMCZW+5968CDWKkqfwWFaMWU01QUyqSCHYKvUgxX6i9HYfI9MXCCvRcO
FkcxKycHDrtO3N7cRvHGhq5wFBwgBJniF1NIiCPEb71hBpwub0xel/EenmRwgLNJ
9KWWtN7ECtNCCVbz6sStimTZMc3VLQ8LhxGUHChQKAH/4oIOSMmRTLx4Jf4aZ37p
6FEoRDkd0UcR9SvmFz/v+kGWIeJ600pLFgQ6v1NVk+JEmu2lQ8xExkSVFSbsajEG
sJYhdV28QAYLRep3VlUuVPPPaxBAOq8n18w3p+eAq/Z4+v5/mp6NZXMY7QMVVCzT
LnH5iX6kdux1XWFJKc+kmTpNpoGZfzcCAwEAAaOCASIwggEeMA4GA1UdDwEB/wQE
AwIFoDAdBgNVHQ4EFgQU9PbHMHSkYrjJ2+/+hSSMEoma0QIwHwYDVR0jBBgwFoAU
rHWCWSFPSF8hpvWi+u/vLg4TPxMwTwYDVR0fBEgwRjBEoEKgQIY+ZmlsZTovL0VY
Q0gyMDEwLnNvcGhpYS5saS9DZXJ0RW5yb2xsL3NvcGhpYS1FWENIMjAxMC1DQSgx
KS5jcmwwbQYIKwYBBQUHAQEEYTBfMF0GCCsGAQUFBzAChlFmaWxlOi8vRVhDSDIw
MTAuc29waGlhLmxpL0NlcnRfbnJvbGwvRVhDSDIwMTAuc29waGlhLmxpX3NvcGhp
YS1FWENIMjAxMC1DQSgxKS5jcnQwDAYDVR0TAQH/BAIwADANBgkqhkiG9w0BAQUF
AAOCAQEAe7EAoXKIAij4vxZuxROOFOfsmjcojU31ac5nrLCbq/FyW7eNblphL0NI
Dt/DlfZ5WK2q3Di+/UL1lDt3KYt9NZ1dLpmccnipbbNZ5LXLoHDkLNqt3qtLfKjv
J6GnnWCxLM18lxm1DzZT8VQtiQk5XZ8SC78hbTFtPxGZvfX70v22hekkOL1Dqw4h
/3mtaqxfnslB/J3Fgps1och45BndGiMAWavzRjjOKQaVLgVRvVrPIy3ZKDBaUleR
gsy5uODVSrhwMo3z84r+f03k4QarecgwZE+KfXoTpTAfhiCbLKw0ZyRMXXzWqNfl
iotEQbs52neCwXNwV24aOCChQMw2xw==
-----END CERTIFICATE-----

% Router Certificate successfully imported

CUBE-2(config)#
```

8.为SIP UA分配信任点，此信任点将使用发信号在多维数据集和CUCM之间的所有sip，


```
CUBE-2(config)#crypto pki import SUBCA1 certificate

Enter the base 64 encoded certificate.
End with a blank line or the word "quit" on a line by itself

-----BEGIN CERTIFICATE-----
MIIEAjCCAuqgAwIBAgIKQZZrHQABAAAAEzANBgkqhkiG9w0BAQUFADBJMRIwEAYK
CZImiZPyLGQBGRYCbGkxFjAUBgoJkiaJk/IsZAEZFgZzb3BoaWExGzAZBgNVBAMT
EnNvcGhpYS1FWENIMjAxMC1DQTAeFw0xNTA0MDEwMDEzNDFaFw0xNjA0MDEwMDIz
NDFaMBExDzANBgNVBAMTBkNVQkUtMjCCASIwDQYJKoZIhvcNAQEBBQADggEPADCC
AQoCggEBAMCZW+5968CDWKkqfwWFaMWU01QUyqSCHYKvUgxX6i9HYfI9MXCCvRcO
FkcxKycHDrtO3N7cRvHGhq5wFBwgBJniF1NIiCPEb71hBpwub0xel/EenmRwgLNJ
9KWWtN7ECtNCCVbz6sStimTZMc3VLQ8LhxGUHChQKAH/4oIOSMmRTLx4Jf4aZ37p
6FEoRDkd0UcR9SvmFz/v+kGWIeJ600pLFgQ6v1NVk+JEmu2lQ8xExkSVFSbsajEG
sJYhdV28QAYLRep3VlUuVPPPaxBAOq8n18w3p+eAq/Z4+v5/mp6NZXMY7QMVVCzT
LnH5iX6kdux1XWFJKc+kmTpNpoGZfzcCAwEAAaOCASIwggEeMA4GA1UdDwEB/wQE
AwIFoDAdBgNVHQ4EFgQU9PbHMHSkYrjJ2+/+hSSMEoma0QIwHwYDVR0jBBgwFoAU
rHWCWSFPSF8hpvWi+u/vLg4TPxMwTwYDVR0fBEgwRjBEoEKgQIY+ZmlsZTovL0VY
Q0gyMDEwLnNvcGhpYS5saS9DZXJ0RW5yb2xsL3NvcGhpYS1FWENIMjAxMC1DQSgx
KS5jcmwwbQYIKwYBBQUHAQEEYTBfMF0GCCsGAQUFBzAChlFmaWxlOi8vRVhDSDIw
MTAuc29waGlhLmxpL0NlcnRfbnJvbGwvRVhDSDIwMTAuc29waGlhLmxpX3NvcGhp
YS1FWENIMjAxMC1DQSgxKS5jcnQwDAYDVR0TAQH/BAIwADANBgkqhkiG9w0BAQUF
AAOCAQEAe7EAoXKIAij4vxZuxROOFOfsmjcojU31ac5nrLCbq/FyW7eNblphL0NI
Dt/DlfZ5WK2q3Di+/UL1lDt3KYt9NZ1dLpmccnipbbNZ5LXLoHDkLNqt3qtLfKjv
J6GnnWCxLM18lxm1DzZT8VQtiQk5XZ8SC78hbTFtPxGZvfX70v22hekkOL1Dqw4h
```

```
/3mtaqxfnslB/J3Fgps1och45BndGiMAWavzRjjOKQaVLgVRvVrPIy3ZKDBaUleR
gsy5uODVSrhwMo3z84r+f03k4QarecgwZE+KfXoTpTAfhiCbLKw0ZyRMXXzWqNfl
iotEQbs52neCwXNwV24aOCChQMw2xw==
-----END CERTIFICATE-----

% Router Certificate successfully imported

CUBE-2(config)#
```

或者默认信任点可以为发信号从多维数据集的所有sip配置。

```
CUBE-2(config)#crypto pki import SUBCA1 certificate

Enter the base 64 encoded certificate.
End with a blank line or the word "quit" on a line by itself

-----BEGIN CERTIFICATE-----
MIIEAjCCAuqgAwIBAgIKQZZrHQABAAAAEzANBgkqhkiG9w0BAQUFADBJMRIwEAYK
CZImiZPyLGQBGRYCbGkxFjAUBgoJkiaJk/IsZAEZFgZzb3BoaWExGzAZBgNVBAMT
EnNvcGhpYS1FWENIMjAxMC1DQTAeFw0xNTA0MDEwMDEzNDFaFw0xNjA0MDEwMDIz
NDFaMBExDzANBgNVBAMTBkNVQkUtMjCCASIwDQYJKoZIhvcNAQEBBQADggEPADCC
AQoCggEBAMCZW+5968CDWKkqfwWFaMWU01QUyqSCHYKvUgxX6i9HYfI9MXCCvRcO
FkcxKycHDrtO3N7cRvHGhq5wFBwgBJniF1NIiCPEb71hBpwub0xel/EenmRwgLNJ
9KWWtN7ECtNCCVbz6sStimTZMc3VLQ8LhxGUHChQKAH/4oIOSMmRTLx4Jf4aZ37p
6FEoRDkd0UcR9SvmFz/v+kGWIeJ600pLFgQ6v1NVk+JEmu2lQ8xExkSVFSbsajEG
sJYhdV28QAYLRep3VlUuVPPPaxBAOq8n18w3p+eAq/Z4+v5/mp6NZXMY7QMVVCzT
LnH5iX6kdux1XWFJKc+kmTpNpoGZfzcCAwEAAaOCASIwggEeMA4GA1UdDwEB/wQE
AwIFoDAdBgNVHQ4EFgQU9PbHMHSkYrjJ2+/+hSSMEoma0QIwHwYDVR0jBBgwFoAU
rHWCWSFPSF8hpvWi+u/vLg4TPxMwTwYDVR0fBEgwRjBEoEKgQIY+ZmlsZTovL0VY
Q0gyMDEwLnNvcGhpYS5saS9DZXJ0RW5yb2xsL3NvcGhpYS1FWENIMjAxMC1DQSgx
KS5jcmwwbQYIKwYBBQUHAQEEYTBfMF0GCCsGAQUFBzAChlFmaWxlOi8vRVhDSDIw
MTAuc29waGlhLmxpL0NlcnRfbnJvbGwvRVhDSDIwMTAuc29waGlhLmxpX3NvcGhp
YS1FWENIMjAxMC1DQSgxKS5jcnQwDAYDVR0TAQH/BAIwADANBgkqhkiG9w0BAQUF
AAOCAQEAe7EAoXKIAij4vxZuxROOFOfsmjcojU31ac5nrLCbq/FyW7eNblphL0NI
Dt/DlfZ5WK2q3Di+/UL1lDt3KYt9NZ1dLpmccnipbbNZ5LXLoHDkLNqt3qtLfKjv
J6GnnWCxLM18lxm1DzZT8VQtiQk5XZ8SC78hbTFtPxGZvfX70v22hekkOL1Dqw4h
/3mtaqxfnslB/J3Fgps1och45BndGiMAWavzRjjOKQaVLgVRvVrPIy3ZKDBaUleR
gsy5uODVSrhwMo3z84r+f03k4QarecgwZE+KfXoTpTAfhiCbLKw0ZyRMXXzWqNfl
iotEQbs52neCwXNwV24aOCChQMw2xw==
-----END CERTIFICATE-----

% Router Certificate successfully imported

CUBE-2(config)#
```

9. Enable (event) SRTP。

这可以执行在全局或在dial-peer级别。

```
CUBE-2(config)#crypto pki import SUBCA1 certificate

Enter the base 64 encoded certificate.
End with a blank line or the word "quit" on a line by itself

-----BEGIN CERTIFICATE-----
MIIEAjCCAuqgAwIBAgIKQZZrHQABAAAAEzANBgkqhkiG9w0BAQUFADBJMRIwEAYK
CZImiZPyLGQBGRYCbGkxFjAUBgoJkiaJk/IsZAEZFgZzb3BoaWExGzAZBgNVBAMT
EnNvcGhpYS1FWENIMjAxMC1DQTAeFw0xNTA0MDEwMDEzNDFaFw0xNjA0MDEwMDIz
NDFaMBExDzANBgNVBAMTBkNVQkUtMjCCASIwDQYJKoZIhvcNAQEBBQADggEPADCC
AQoCggEBAMCZW+5968CDWKkqfwWFaMWU01QUyqSCHYKvUgxX6i9HYfI9MXCCvRcO
FkcxKycHDrtO3N7cRvHGhq5wFBwgBJniF1NIiCPEb71hBpwub0xel/EenmRwgLNJ
```

```
9KWWtN7ECtNCCVbz6sStimTZMc3VLQ8LhxGUHChQKAH/4oIOSMmRTLx4Jf4aZ37p
6FEoRDkd0UcR9SvmFz/v+kGWIeJ600pLFgQ6v1NVk+JEmu2lQ8xExkSVFSbsajEG
sJYhdV28QAYLRep3VlUuVPPPaxBAOq8n18w3p+eAq/Z4+v5/mp6NZXMY7QMVVCzT
LnH5iX6kdux1XWFJKc+kmTpNpoGZfzcCAwEAAaOCASIwggEeMA4GA1UdDwEB/wQE
AwIFoDAdBgNVHQ4EFgQU9PbHMHSkYrjJ2+/+hSSMEoma0QIwHwYDVR0jBBgwFoAU
rHWCWSFPSF8hpvWi+u/vLg4TPxMwTwYDVR0fBEgwRjBEoEKgQIY+ZmlsZTovL0VY
Q0gyMDEwLnNvcGhpYS5saS9DZXJ0RW5yb2xsL3NvcGhpYS1FWENIMjAxMC1DQSgx
KS5jcmwwbQYIKwYBBQUHAQEEYTBfMF0GCCsGAQUFBzAChlFmaWxlOi8vRVhDSDIw
MTAuc29waGlhLmxpL0NlcnRFbnJvbGwvRVhDSDIwMTAuc29waGlhLmxpX3NvcGhp
YS1FWENIMjAxMC1DQSgxKS5jcnQwDAYDVR0TAQH/BAIwADANBgkqhkiG9w0BAQUF
AAOCAQEAe7EAoXKIAij4vxZuxROOFOfsmjcojU31ac5nrLCbq/FyW7eNblphL0NI
Dt/DlfZ5WK2q3Di+/UL1lDt3KYt9NZ1dLpmccnipbbNZ5LXLoHDkLNqt3qtLfKjv
J6GnnWCxLM18lxm1DzZT8VQtiQk5XZ8SC78hbTFtPxGZvfX70v22hekkOL1Dqw4h
/3mtaqxfnslB/J3Fgps1och45BndGiMAWavzRjjOKQaVLgVRvVrPIy3ZKDBaUleR
gsy5uODVSrhwMo3z84r+f03k4QarecgwZE+KfXoTpTAfhiCbLKw0ZyRMXXzWqNfl
iotEQbs52neCwXNwV24aOCChQMw2xw==
-----END CERTIFICATE-----

% Router Certificate successfully imported

CUBE-2(config)#
```

10. 对于SRTP和RTP (

如果IOS版本然后15.2.2T (多维数据集9.0)或以后，本地转码接口(LTI)代码转换器可以是配置最小化配置。

LTI代码转换器不需要SRTP-RTP呼叫的

```
 dspfarm profile 1 transcode universal security
codec g711ulaw
codec g711alaw
codec g729ar8
codec g729abr8
maximum sessions 10
associate application CUBE
```

如果IOS在15.2.2T之下，则请配置SCCP代码转换器。

SCCP代码转换器将需要发信号的信任点然而，如果同一路由器用于主机代码转换器同样信任点(SUBCA1)可以然后用于多维数据集以及代码转换器。

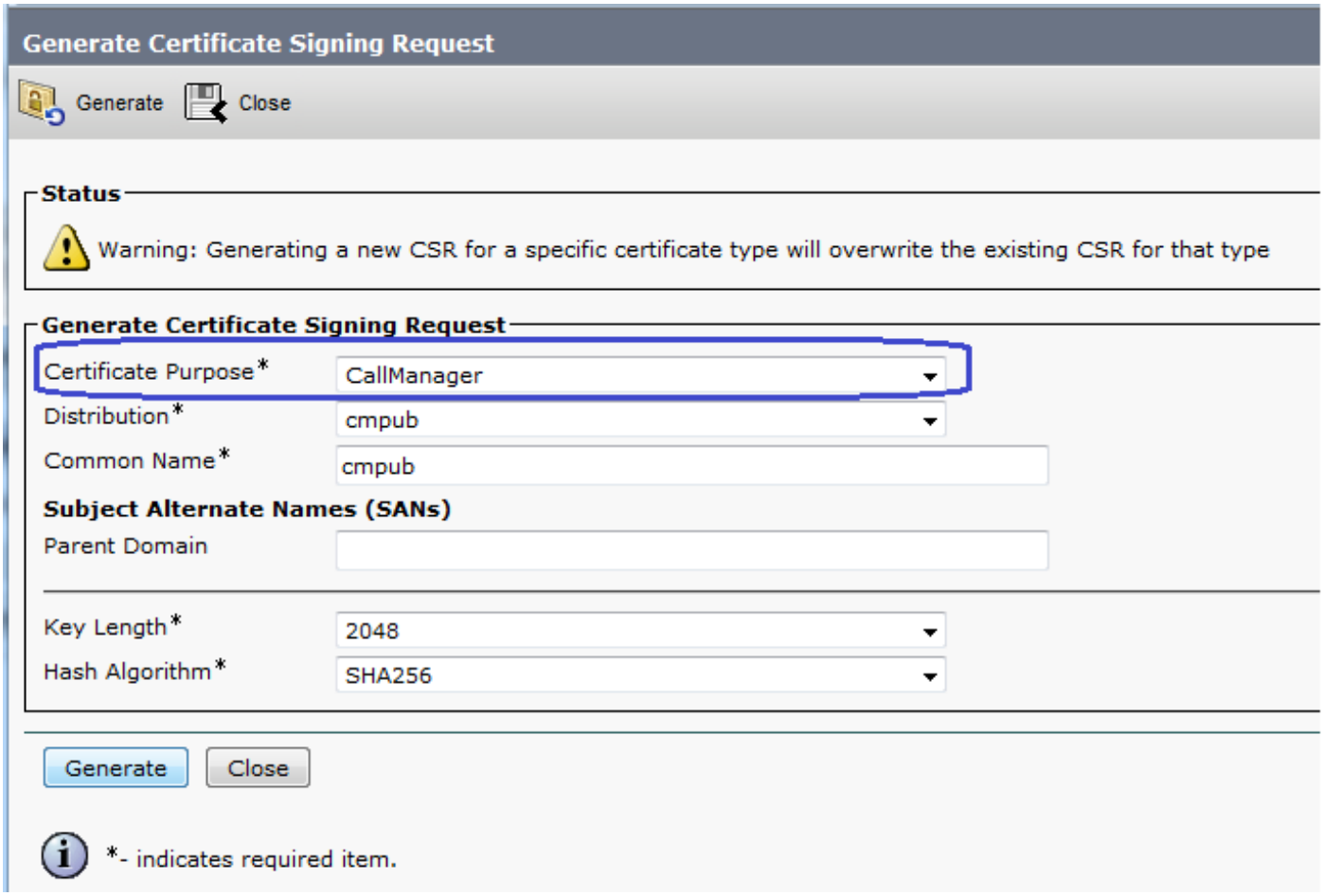
```
sccp local GigabitEthernet0/2
sccp ccm 10.106.95.153 identifier 1 priority 1 version 7.0
sccp
!
sccp ccm group 1
bind interface GigabitEthernet0/0
associate ccm 1 priority 1
associate profile 2 register secxcode
!
dspfarm profile 2 transcode universal security
trustpoint SUBCA1
codec g711ulaw
codec g711alaw
codec g729ar8
codec g729abr8
maximum sessions 10
associate application SCCP

telephony-service
secure-signaling trustpoint SUBCA1
```

```
sdspfarm units 1
sdspfarm transcode sessions 10
sdspfarm tag 1 secxcode
max-ephones 1
max-dn 1
ip source-address 10.106.95.153 port 2000
max-conferences 8 gain -6
transfer-system full-consult
```

配置CUCM

1.生成在所有CUCM节点的CallManager CSR。

导航对**CM OS管理> Security > Certificate Management >生成CSR**



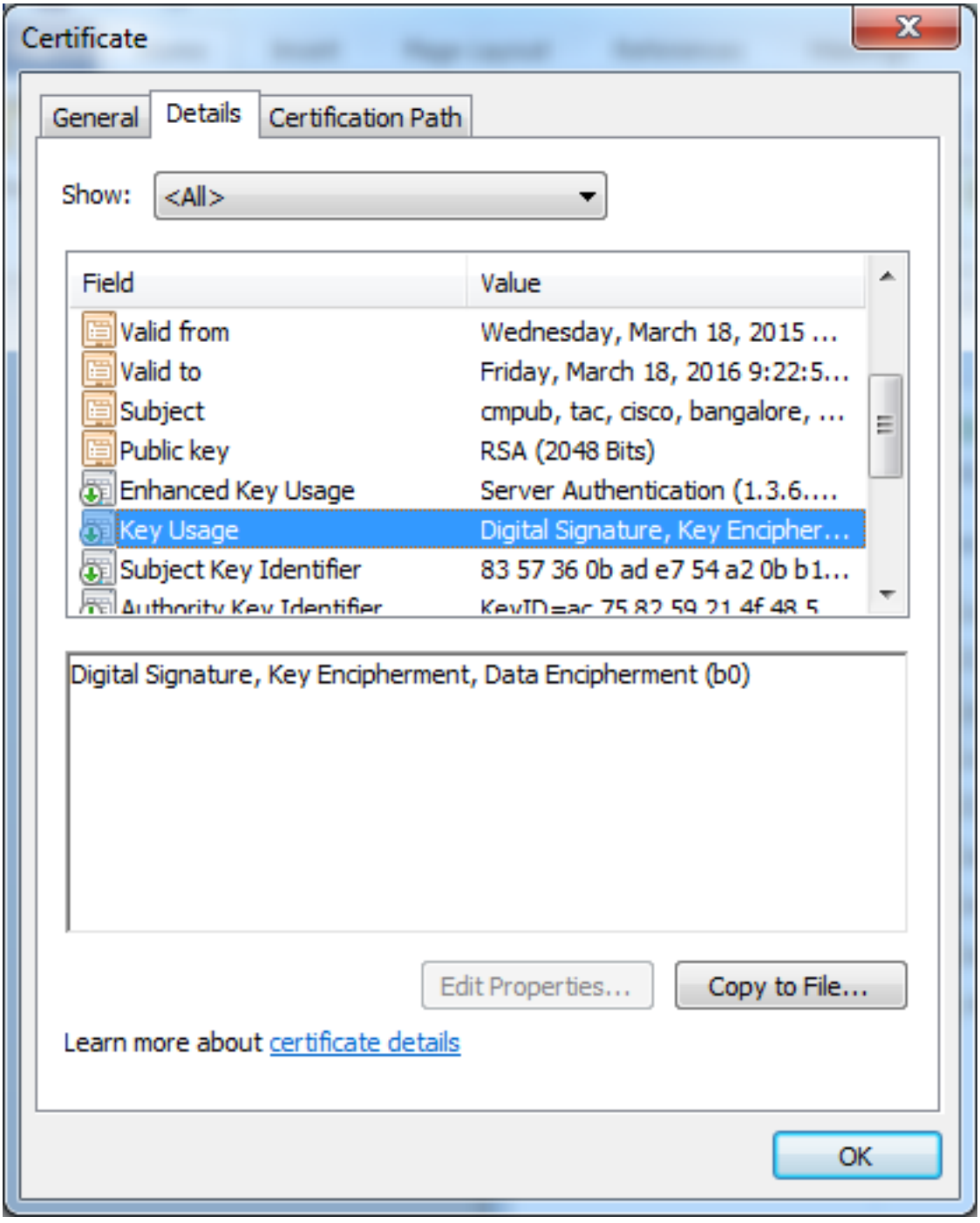
CallManager CSR将有这些关键属性：

```
sccp local GigabitEthernet0/2
sccp ccm 10.106.95.153 identifier 1 priority 1 version 7.0
sccp
!
sccp ccm group 1
bind interface GigabitEthernet0/0
associate ccm 1 priority 1
associate profile 2 register secxcode
!
dspfarm profile 2 transcode universal security
trustpoint SUBCA1
codec g711ulaw
codec g711alaw
codec g729ar8
codec g729abr8
maximum sessions 10
associate application SCCP
```

```
telephony-service
secure-signaling trustpoint SUBCA1
sdspfarm units 1
sdspfarm transcode sessions 10
sdspfarm tag 1 secxcode
max-ephones 1
max-dn 1
ip source-address 10.106.95.153 port 2000
max-conferences 8 gain -6
transfer-system full-consult
```

2.获得辅助CA签字的所有CM节点的CallManager证书。

请使用生成的CSR在step1。所有Web服务器认证模板将工作，保证签名证书有至少这些密钥用法属性：数字签名，关键编码，数据编码。



3.从根CA和辅助CA的加载CA证书作为CallManager托拉斯。

导航到**CM OS管理> Security > Certificate Management >加载证书/证书链**

4.上传CallManager签名证书作为CallManager

5. 更新在发行商的

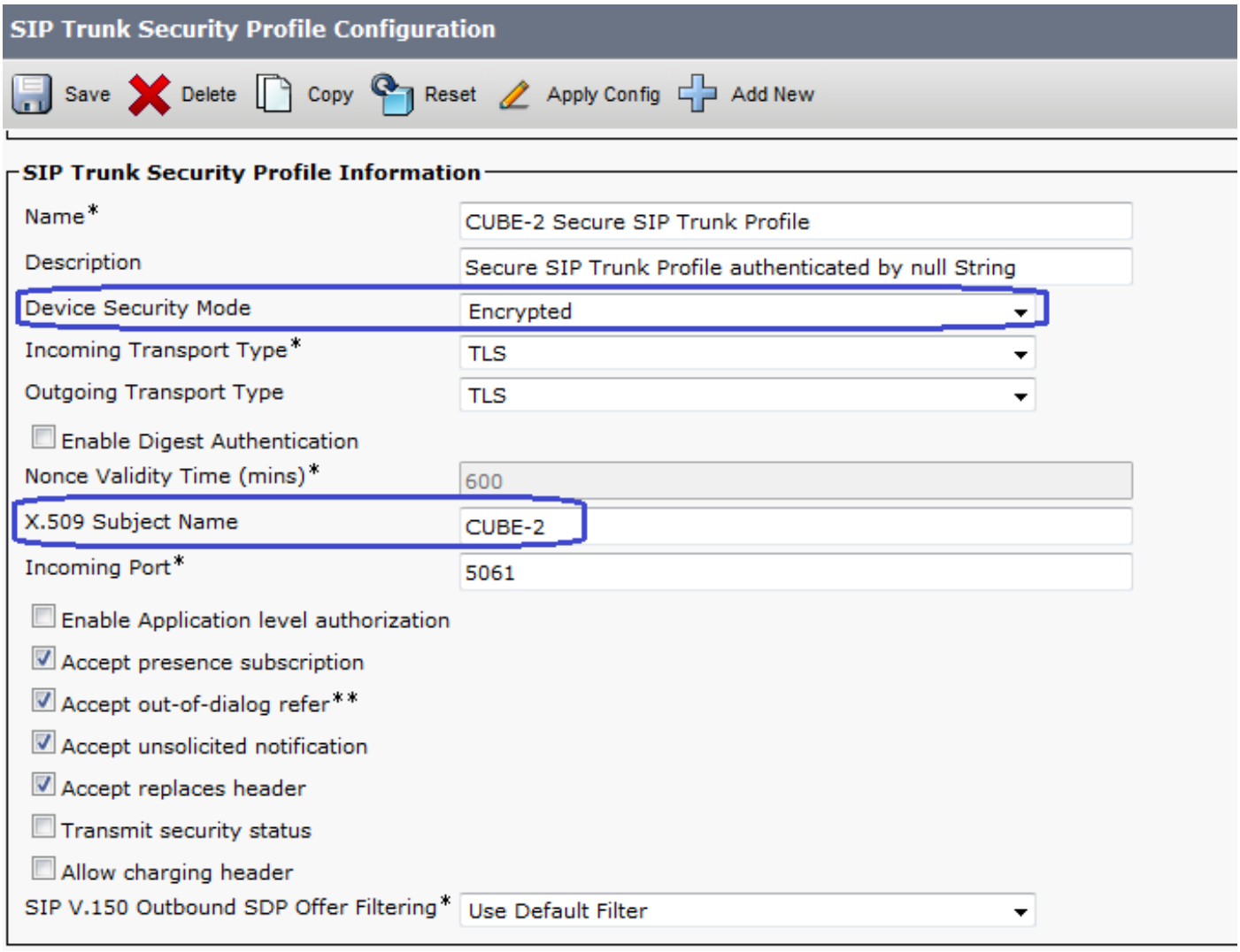
```
admin:utils ctl update CTLFile
This operation will update the CTLFile. Do you want to continue? (y/n):

Updating CTL file
CTL file Updated
Please Restart the TFTP and Cisco CallManager services on all nodes in the cluster that run
these services
admin:
```

6.重新启动CallManager和TFTP服务在所有节点和CAPF服务在发行商。

7.创建新的SIP中继安全配置文件

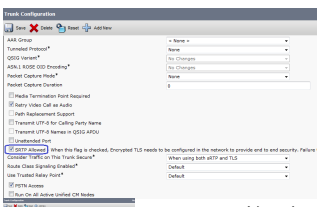
在CM管理，请导航对**系统> Security > SIP中继安全配置文件>查找**

如此镜像所显示，复制存在非安全SIP中继配置文件创建新建的安全配置文件。



8.创建SIP中继对多维数据集。

启用在SIP中继的SRTP。



15061 (TLS)并且应用在SIP中继的新的安全SIP中继安全配置文件。

验证

使用本部分可确认配置能否正常运行。

```
show sip-ua connections tcp tls detail
show call active voice brief
```

e.g.

```
Secure-CUBE#show sip-ua connections tcp tls detail
Total active connections : 2
No. of send failures : 0
No. of remote closures : 13
No. of conn. failures : 0
No. of inactive conn. ageouts : 0
TLS client handshake failures : 0
TLS server handshake failures : 0

---------Printing Detailed Connection Report---------
Note:
** Tuples with no matching socket entry
- Do 'clear sip <tcp[tls]/udp> conn t ipv4:<addr>:<port>'
to overcome this error condition
++ Tuples with mismatched address/port entry
- Do 'clear sip <tcp[tls]/udp> conn t ipv4:<addr>:<port> id <connid>'
to overcome this error condition

Remote-Agent:10.106.95.151, Connections-Count:2
Remote-Port Conn-Id Conn-State WriteQ-Size Local-Address
=========== ======= =========== =========== ===========
5061 16 Established 0 10.106.95.153
57396 17 Established 0 10.106.95.153


-------------- SIP Transport Layer Listen Sockets ---------------
Conn-Id Local-Address
=========== ============================
2 [10.106.95.153]:5061
```

当使用时，输出**show call active voice brief命令**捕获LTI代码转换器。

```
Telephony call-legs: 0
SIP call-legs: 2
H323 call-legs: 0
Call agent controlled call-legs: 0
SCCP call-legs: 0
Multicast call-legs: 0
Total call-legs: 2
1283 : 33 357052840ms.1 (23:57:23.929 IST Sun Feb 15 2015) +2270 pid:3 Answer 3001 active
dur 00:00:08 tx:383/61280 rx:371/59360 dscp:0 media:0 audio tos:0xB8 video tos:0x0
IP 10.106.95.132:17172 SRTP: off rtt:0ms pl:0/0ms lost:0/0/0 delay:0/0/0ms g711ulaw TextRelay:
off Transcoded: Yes
media inactive detected:n media contrl rcvd:n/a timestamp:n/a
long duration call detected:n long duration call duration:n/a timestamp:n/a
LostPacketRate:0.00 OutOfOrderRate:0.00

1283 : 34 357052840ms.2 (23:57:23.929 IST Sun Feb 15 2015) +2270 pid:1 Originate 2001 active
dur 00:00:08 tx:371/60844 rx:383/62812 dscp:0 media:0 audio tos:0xB8 video tos:0x0
IP 10.65.58.24:24584 SRTP: on rtt:0ms pl:0/0ms lost:0/0/0 delay:0/0/0ms g711ulaw TextRelay: off
Transcoded: Yes
media inactive detected:n media contrl rcvd:n/a timestamp:n/a
long duration call detected:n long duration call duration:n/a timestamp:n/a
LostPacketRate:0.00 OutOfOrderRate:0.00
```

并且，当SRTP加密的呼叫被做在Cisco IP电话之间和多维数据集或者网关时，锁图标在IP电话显示。

故障排除

这些调试为排除故障PKI/TLS/SIP/SRTP问题是有用。

```
Telephony call-legs: 0
SIP call-legs: 2
H323 call-legs: 0
Call agent controlled call-legs: 0
SCCP call-legs: 0
Multicast call-legs: 0
Total call-legs: 2
1283 : 33 357052840ms.1 (23:57:23.929 IST Sun Feb 15 2015) +2270 pid:3 Answer 3001 active
dur 00:00:08 tx:383/61280 rx:371/59360 dscp:0 media:0 audio tos:0xB8 video tos:0x0
IP 10.106.95.132:17172 SRTP: off rtt:0ms pl:0/0ms lost:0/0/0 delay:0/0/0ms g711ulaw TextRelay:
off Transcoded: Yes
media inactive detected:n media contrl rcvd:n/a timestamp:n/a
long duration call detected:n long duration call duration:n/a timestamp:n/a
LostPacketRate:0.00 OutOfOrderRate:0.00

1283 : 34 357052840ms.2 (23:57:23.929 IST Sun Feb 15 2015) +2270 pid:1 Originate 2001 active
dur 00:00:08 tx:371/60844 rx:383/62812 dscp:0 media:0 audio tos:0xB8 video tos:0x0
IP 10.65.58.24:24584 SRTP: on rtt:0ms pl:0/0ms lost:0/0/0 delay:0/0/0ms g711ulaw TextRelay: off
Transcoded: Yes
media inactive detected:n media contrl rcvd:n/a timestamp:n/a
long duration call detected:n long duration call duration:n/a timestamp:n/a
LostPacketRate:0.00 OutOfOrderRate:0.00
```