在ISR4000上配置安全SIP SRST

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简介

本文档介绍如何在ISR4000系列路由器和思科统一通信管理器(CUCM)上配置安全会话初始协议(SIP)可存活远程站点电话(SRST)。

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先决条件

要求

Cisco 建议您了解以下主题：

思科统一通信管理器 (CUCM)

思科统一可存活远程站点电话(SRST)

传输层安全(TLS)

安全实时传输协议(SRTP)

实时传输协议 (RTP)

会话初始协议 (SIP)

用户数据报协议 (UDP)

使用的组件

CUCM:10.5.2

SIP SRST版本 — 根据SRST管理指南，最低12.1版

SRST 路由器:ISR 4451

CA 服务器:已在ISR 2921和第三方CA服务器上测试。

测试的电话：78XX和88XX

根据SRST兼容性表提供的平台容量和固件要求。

ISRG2用作IOS CA服务器（同一SRST网关也可用作IOS CA服务器）

> **警告：**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。如果您的网络处于活动状态，请确保您了解所有命令的潜在影响。

安全SRST概述

Cisco Unified Secure SRST提供身份验证、完整性和媒体加密等安全功能。

身份验证向一方提供另一方是其所声明的身份的保证。

完整性保证给定数据未在实体之间更改。

加密意味着机密性；也就是说，除了预定接收方，没有人能够读取数据。这些安全功能允许Cisco Unified SRST语音呼叫的隐私，并防止语音安全违规和身份盗窃。

在以下情况下可实现 SRST 安全：

- 终端设备通过证书进行身份验证。
- 信令通过TCP的传输层安全(TLS)进行身份验证和加密。
- 安全介质路径通过安全实时传输协议(SRTP)加密。
- 证书由证书颁发机构(CA)生成和分发

背景信息

在此配置之前，CUCM必须调整为启用安全功能的混合模式。

电话必须注册为安全电话。

有关如何在安全模式下向CUCM注册电话的信息，请检查IP电话安全和CTL

要在Cisco 4000系列集成多业务路由器上支持安全SIP SRST，请在路由器上启用以下技术包许可证：

安全 uck9

配置步骤和示例

步骤1.在SRST和CA服务器上启用Http

ip http server

```
Router1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router1(config)#ip http server
Router1(config)#
```

2.IOSCACA

A)基于IOS的CA服务器;

- 创建Cisco IOS证书服务器:

```
1.    crypto pki serverCA-Name
2.    database level{minimal| names | complete}

minimal: Enough information is stored only to continue to issue new certificates without
conflict; this is the default.
names: In addition to the information given in the minimal level, the serial number and subject
name of each certificate are stored.
complete: In addition to the information given in the minimal and names levels, each issued
certificate is written to the database.

3.    database urlroot-url
The default location for the database entries to be written is flash; however, NVRAM is
recommended for this task.
4.    issuer-nameDN-string
      Eg: issuer-name CN= CA-Name
5.    grant auto
6.    no shutdown
```

```
router(config)#crypto pki server srstcaserver
router(cs-server)#databa
router(cs-server)#database level complete
router(cs-server)#database url nvram
% Server database url was changed. You need to move the
% existing database to the new location.
router(cs-server)#issuer-name CN=srstcaserver
router(cs-server)#grant auto
router(cs-server)#no shut
%Some server settings cannot be changed after CA certificate generation.
% Please enter a passphrase to protect the private key
% or type Return to exit
Password:

Re-enter password:
% Generating 1024 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 0 seconds)

% Certificate Server enabled.
router(cs-server)#
```

- 向CA服务器自动注册并验证SRST路由器:

1. **crypto pki trustpoint** SRST-Trustpoint-Name
2. **enrollment url** url

If the CA is on your router itself url would be http://router-ip-address

3. **revocation-check** none
4. **rsakeypair keypair**-label
5. exit
6. **crypto pki authenticate** SRST-Trustpoint-Name

```
Certificate has the following attributes:
Fingerprint MD5: 4C894B7D 71DBA53F 50C65FD7 75DDBFCA
Fingerprint SHA1: 5C3B6B9E EFA40927 9DF6A826 58DA618A BF39F291
% Do you accept this certificate? [yes/no]: y
Trustpoint CA certificate accepted.
```

```
Router1(config)#crypto pki trustpoint srstca
Router1(ca-trustpoint)#rsakeypair srstcakey 2048
Router1(ca-trustpoint)#enrollment url http:// · ... ... ..
Router1(ca-trustpoint)#revo
Router1(ca-trustpoint)#revocation-check none
Router1(ca-trustpoint)#exit
Router1(config)#cryp
Router1(config)#crypto pki auth
Router1(config)#crypto pki authenticate srstca
Certificate has the following attributes:
       Fingerprint MD5: AA086E13 EE0E5F61 2A585804 2DA3FB28
      Fingerprint SHA1: DD59741A DB10F1E3 566F6F9E C0AC97C2 9B7116D0

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

7. crypto pki enroll *SRST-Trustpoint-Name*

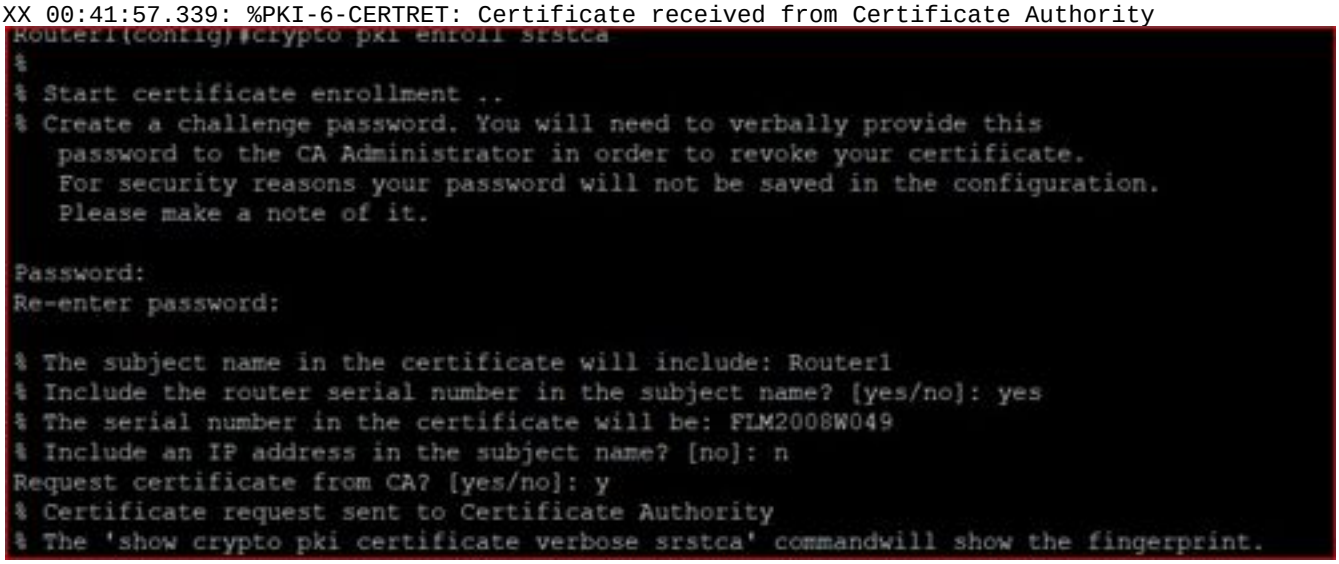
```
% Start certificate enrollment ..
% Create a challenge password. You will need to verbally provide this
```

```
password to the CA Administrator in order to revoke your certificate.
For security reasons your password will not be saved in the configuration.
Please make a note of it.

Password:
Re-enter password:

% The fully-qualified domain name in the certificate will be: router.cisco.com
% The subject name in the certificate will be: router.cisco.com
% Include the router serial number in the subject name? [yes/no]: y
% The serial number in the certificate will be: D0B9E79C
% Include an IP address in the subject name? [no]: n
Request certificate from CA? [yes/no]: y
% Certificate request sent to Certificate Authority
% The certificate request fingerprint will be displayed.
% The 'show crypto pki certificate' command will also show the fingerprint.


Sep XX 00:41:55.427: CRYPTO_PKI: Certificate Request Fingerprint MD5: D154FB75
2524A24D 3D1F5C2B 46A7B9E4
Sep XX 00:41:55.427: CRYPTO_PKI: Certificate Request Fingerprint SHA1: 0573FBB2
98CD1AD0 F37D591A C595252D A17523C1
Sep XX 00:41:57.339: %PKI-6-CERTRET: Certificate received from Certificate Authority
```



B)第三方CA服务器

总结步骤:

1. **crypto key generate rsa general-keys label** *SRST-Trustpoint-Name* modulus 2048
2. Router(config)#**crypto pki trustpoint** srstca

   Router(ca-trustpoint)#**enrollment terminal pem**

   Router(ca-trustpoint)#**subject-name** CN=srstca

   Router(ca-trustpoint)#revocation-check none

   Router(ca-trustpoint)#**rsakeypair** cube

```
Router1#
Router1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router1(config)#crypto key generate rsa gene
Router1(config)#crypto key generate rsa general-keys label srstca mod
Router1(config)#crypto key generate rsa general-keys label srstca modulus 2048
The name for the keys will be: srstca

% The key modulus size is 2048 bits
% Generating 2048 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 1 seconds)

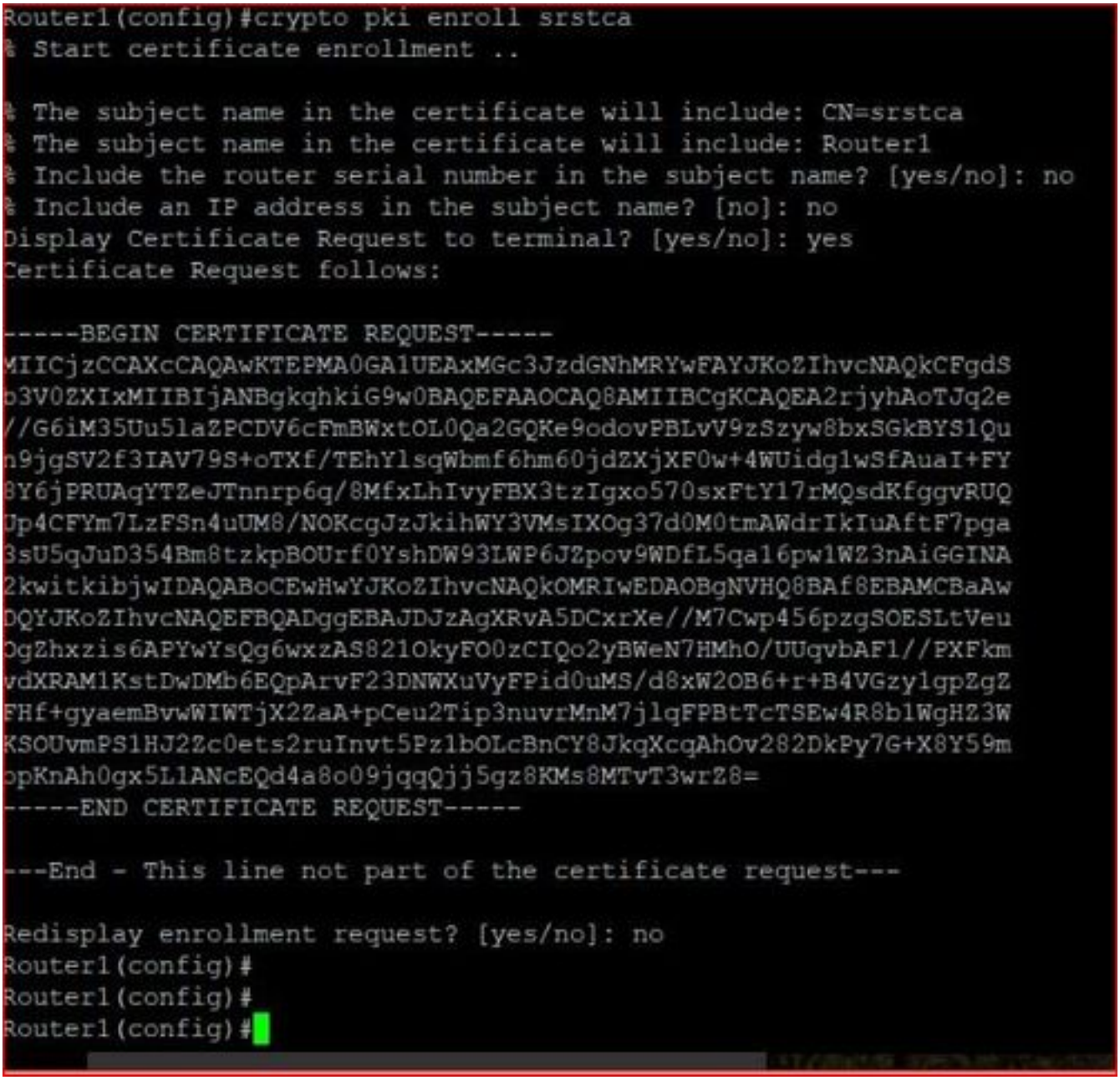
Router1(config)#
Router1(config)#
Router1(config)#
Router1(config)#
Router1(config)#cryp
Router1(config)#crypto pki tru
Router1(config)#crypto pki trustp
Router1(config)#crypto pki trustpo?
trustpoint  trustpool

Router1(config)#crypto pki trustpoi
Router1(config)#crypto pki trustpoint srstca
Router1(ca-trustpoint)#enr
Router1(ca-trustpoint)#enrollment term
Router1(ca-trustpoint)#enrollment terminal pem
Router1(ca-trustpoint)#subje
Router1(ca-trustpoint)#subject-?
subject-alt-name  subject-name

Router1(ca-trustpoint)#subject-name CN=srstca
Router1(ca-trustpoint)#revo
Router1(ca-trustpoint)#revocation-check non
Router1(ca-trustpoint)#revocation-check none
Router1(ca-trustpoint)#rsa
Router1(ca-trustpoint)#rsakeypair ?
  WORD  RSA keypair label

Router1(ca-trustpoint)#rsakeypair srstca
Router1(ca-trustpoint)#
Router1(ca-trustpoint)#
Router1(ca-trustpoint)#
```

3. **Crypto pki enroll** srstca



将证书提供给第三方CA。

4. CA provides the Signed Certificate as well as the Root CA Certificate and any Intermediate (subordinate) CA certificates if any.

5. Install Root CA cert;

crypto pki authenticate srstca

```
Router1(config)#crypto pki authenticate srstca

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

MIIDfTCCAmWgAwIBAgIQT7YJxPVkzYNIGhhGW4aFATANBgkqhkiG9w0BAQsFADBR
MRMwEQYKCZImiZPyLGQBGRYDY29tMRowGAYKCZImiZPyLGQBGRYKcmNkbmNvbGxh
YjEeMBwGA1UEAxMVcmNkbmNvbGxhYi1XSU4yMDEyLUNBMB4XDTE4MDYxNDE2MTk1
N1oXDTIzMDYxNDE2Mjk1NlowUTETMBEGCgmSJomT8ixkARkWA2NvbTEaMBgGCgmS
JomT8ixkARkWCnJjZG5jb2xsYWIxHjAcBgNVBAMTFXJjZG5jb2xsYWItV01OMjAx
Mi1DQTCCASIwDQYJKoZIhvcNAQEBBQADggEPADCCAQoCggEBALe03mprczCRg8AY
4cBAgezyjF386xHjwu5K0kNA3zl7xWYmX3s/6vZoDkUFvy50GjwPHzyLxJAvmJ6P
3eaTsSx80JO9PY8NBi4LH0WaWo1zFVj1JO1Fwz1B9LxwBt/KwWnkARrGdBEM5xaT
tMnFK3K6UuWMMWnX1ELvUOKIA7eXFsorSvVrx+KcJLuYowgODPINC7VjBoGBSwun
hnLEIQ3XXIIYbceBEHj0tlo+zoQp9UkLjcp4WgGCr4/rg9h/B/6ppZoMgoyDmBaz
7kNV4C6Nbz9K+XAaRc4MEy0wNjqxIskj3OF0/IK53n1jzGg8JTGw+oqLCUoLYfD0
MKAeM+MCAwEAAaNRME8wCwYDVR0PBAQDAgGGMA8GA1UdEwEB/wQFMAMBAf8wHQYD
VR0OBBYEFCWR/A/DRJ31hAGRFwcgnWrEeAEGMBAGCSsGAQQBgjcVAQQDAgEAMA0G
CSqGSIb3DQEBCwUAA4IBAQCPKhkjEyfKvNK8S2W7SCQao6LWHm6g6ln5CS1zixnv
kG+nY8mhIIhueW7GJ0+n28ufLEA6D6PMqeaL1TzJRwOK4EMq2060Jd6pA34Y6J8s
+teZWPINNvVbyX/eSAVzWeesjjNeI2feQWEhSEyhmyRe5cl7/09k6kyM8bGj86vj
wZ4AFaw+IU/zQ80A+TgBBiPlyz/f90RipPEp+tzfZR2D3xCPrK4jRL7uvDtArdMr
dPH3cVf78ios1FUffDRcubXktfOLFfmqyI+0splwCfEW113IWWuTdbP+UA8FyYJo
DIlRvfK1eVToIROnWJ16U57YB3Ig4/A0TmtTygjLVAjj
quit
Certificate has the following attributes:
       Fingerprint MD5: 4A2FD70E FBC823DA B5AE978B 1B02DEC8
      Fingerprint SHA1: 1F428EAD 360A1944 08F1AB77 CCDF80B5 5F4F8055

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

6. Install Signed cert from CA;

crypto pki import srstca certificate

```
Router1(config)#crypto pki import srstca certificate

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

MIIFIzCCBAugAwIBAgITeAAAAAabDPlyI/7cowAAAAAABjANBgkqhkiG9w0BAQsF
ADBRMRMwEQYKCZImiZPyLGQBGRYDY29tMRowGAYKCZImiZPyLGQBGRYKcmNkbmNv
bGxhYjEeMBwGA1UEAxMVcmNkbmNvbGxhYi1XSU4yMDEyLUNBMB4XDTE4MTAwNTE4
MzMwNVoXDTIwMTAwNDE4MzMwNVowETEPMA0GA1UEAxMGc3JzdGNhMIIBIjANBgkq
hkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEA2rjyhAoTJq2e//G6iM35Uu51aZPCDV6c
FmBWxtOL0Qa2GQKe9odovPBLvV9zSzyw8bxSGkBYS1Qun9jgSV2f3IAV79S+oTXf
/TEhYlsqWbmf6hm60jdZXjXF0w+4WUidg1wSfAuaI+FY8Y6jPRUAqYTZeJTnnrp6
q/8MfxLhIvyFBX3tzIgxo570sxFtY17rMQsdKfggvRUQUp4CFYm7LzFSn4uUM8/N
OKcgJzJkihWY3VMsIXOg37d0M0tmAWdrIkIuAftF7pga3sU5qJuD354Bm8tzkpBO
Urf0YshDW93LWP6JZpov9WDfL5qa16pw1WZ3nAiGGINA2kwitkibjwIDAQABo4IC
MjCCAi4wDgYDVR0PAQH/BAQDAgWgMB0GA1UdDgQWBBSK4+gNzQY5gac/9LftIdsd
8z/33zAfBgNVHSMEGDAWgBQlkfwPw0Sd9YQBkRcHIJ1qxHgBBjCB1gYDVR0fBIHO
MIHLMIHIoIHFoIHChoG/bGRhcDovLy9DTj1yY2RuY29sbGFiLVdJTjIwMTItQ0Es
Q049d2luMjAxMixDTj1DRFAsQ049UHVibGljJTIwS2V5JTIwU2VydmljZXMsQ049
U2VydmljZXMsQ049Q29uZmlndXJhdGlvbixEQz1yY2RuY29sbGFiLERDPWNvbT9j
ZXJ0aWZpY2F0ZVJldm9jYXRpb25MaXN0P2Jhc2U/b2JqZWN0Q2xhc3M9Y1JMRGlz
dHJpYnV0aW9uUG9pbnQwgcoGCCsGAQUFBwEBBIG9MIG6MIG3BggrBgEFBQcwAoaB
qmxkYXA6Ly8vQ049cmNkbmNvbGxhYi1XSU4yMDEyLUNBLENOPUFJQSxDTj1QdWJs
aWMlMjBLZXklMjBTZXJ2aWNlcyxDTj1TZXJ2aWNlcyxDTj1Db25maWd1cmF0aW9u
LERDPXJjZG5jb2xsYWIsREM9Y29tP2NBQ2VydGlmaWNhdGU/YmFzZT9vYmplY3RD
bGFzcz1jZXJ0aWZpY2F0aW9uQXV0aG9yaXR5MCEGCSsGAQQBgjcUAgQUHhIAVwBl
AGIAUwBlAHIAdgBlAHIwEwYDVR0lBAwwCgYIKwYBBQUHAwEwDQYJKoZIhvcNAQEL
BQADggEBAC+YzH4UyqXF3dZp5wP3PHvTa64Bhynp8x6EmwGVEcw55EOKZI8x+bR2
cfbailJbs+LVXxjbTHfywtF2a9mg79QF4QEIQbbWoN75doYhYXa4CJfJf2nQahgc
F8cRBejSSs4n+WwGqagWmCe6qq34ZStEVTD62YAogujT3gErSS1rj6hKx8UlC6XV
4yDKSRmRJvIqK4Lkf9R/A6Bb95zHz5euYIiewUpKzHU3nILE7x+vXlCd/rSWesnG
JsUtctJx1a89Wg7OH4fOLZgEfFul3x3nGbL0//lGkOiTUSQcYVaNhgIw+36HVDGY
PW12TrRRnZpAYpplhTmu/4Cp2JOuu4s=
quit
% Router Certificate successfully imported
```

步骤3.在SRST路由器上启用凭证服务：

总结步骤：

1. **credentials**
2. **ip source-address** srst-router-ip port 2445
3. **trustpoint** SRST-trustpoint-name

```
credentials
 ip source-address [illegible] port 2445
 trustpoint srstca
```

步骤4.将隐私增强型邮件(PEM)格式的电话证书文件导入安全SRST路由器：

CUCMCisco unified OS administration >**Security > Certificate management**

CAPF-trustCisco_Manufacturing_CACisco_Root_CA_2048CAP-RTP-001CAP-RTP-002CAPFCAPF-xxxCallManager-trustCAPF-trustCAPF-xxx



CallManager-trust	CAPF-2fbd03a4
CallManager-trust	CAPF-dc3cda68
CallManager-trust	Cisco_Manufacturing_CA
CallManager-trust	CAPF-19a340e5
CallManager-trust	CAP-RTP-002
CallManager-trust	CAPF-851d4452
CallManager-trust	Cisco_Manufacturing_CA_SHA2
CallManager-trust	CAP-RTP-001
CallManager-trust	cm10
CallManager-trust	ACT2_SUDI_CA
CAPF	CAPF-72c7ffbb
CAPF-trust	Cisco_Root_CA_2048
CAPF-trust	CAPF-72c7ffbb
CAPF-trust	Cisco_Root_CA_M2
CAPF-trust	CAPF-2fbd03a4
CAPF-trust	Cisco_Manufacturing_CA
CAPF-trust	CAP-RTP-002
CAPF-trust	CAPF-851d4452
CAPF-trust	Cisco_Manufacturing_CA_SHA2
CAPF-trust	CAP-RTP-001
CAPF-trust	ACT2_SUDI_CA
ipsec	cm10.vipul.com
ipsec-trust	cm10.vipul.com
ITLRecovery	ITLRECOVERY_cm10

在SRST路由器上为每个信任点配置信任点。确保为信任点命名与.pem相同。

总结步骤：

1. **crypto pki** trustpointname
2. **revocation-check none**
3. **enrollment terminal**
4. **exit**
5. **crypto pki authenticate** name

此处复制在- *BEGIN CERTIFICATE* — 和- *END CERTIFICATE* — 之间的相应.pem文件的所有内容，其末尾有空行，或者***quit*** 并粘贴到终端上，按Enter键。

```
Router1(config)#crypto pki tru
Router1(config)#crypto pki trustpoi
Router1(config)#crypto pki trustpoint Cisco_Manufacturing_CA
Router1(ca-trustpoint)#revocat
Router1(ca-trustpoint)#revocation-check none
Router1(ca-trustpoint)#enroll
Router1(ca-trustpoint)#enrollment termi
Router1(ca-trustpoint)#enrollment terminal
Router1(ca-trustpoint)#exit
Router1(config)#crypto pki auth
Router1(config)#crypto pki authenticate Cisco_Manufacturing_CA

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

MIIE2TCCA8GgAwIBAgIKamlnswAAAAAAAzANBgkqhkiG9w0BAQUFADAlMRYwFAYD
VQQKEw1DaXNjbyBTeXN0ZW1zMRswGQYDVQQDExJDaXNjbyBSb290IENBIDIwNDgw
HhcNMDUwNjEwMjIxNjAxWhcNMjkwNTE0MjAyNTQyWjA5MRYwFAYDVQQKEw1DaXNj
byBTeXN0ZW1zMR8wHQYDVQQDEx2DaXNjbyNYW51ZmFjdHVyaW5nIENBMIIBIDAN
BgkqhkiG9w0BAQEFAAOCAQ0AMIIBCAKCAQEAoMX33JaUNRXx9JlOu5tB4X3beRaR
u/NU8kFKlDJiYskj95rnu5t56AcpTjD1rhvFIVZGsPj05o6BuBbMqJuF0kKB23zL
lKkRYRIcXOozIByaFqd925kGauI2r+z4Cv+YZwf0MO6l+IgaqujHPBzO7kj9zVw3
8YaTnj1xdX007ksUqcApewUQ74eeaTEw9Ug2P9irzhXi6FifPmJxBIcmpBViASWq
1d/JyVu4yaEHe75okpOTIKhsvRV100RdRDvsqNpgx9jI1cjtQeH1X1eOUzRTSdXZ
D/g2qgfEMkHFp68dGf/2c5k5WnNnYhM0DR9elXBSZBcG7FNcXNtq6jUAQQIBA6OC
AecwggHjMBIGA1UdEwEB/wQIMAYBAf8CAQAwHQYDVR0OBBYEFNDFIiarT0Zg7K4F
kcfcWtGwR/dsMAsGA1UdDwQEAwIBhjAQBgkrBgEEAYI3FQEEAwIBADAZBgkrBgEE
AYI3FAIEDB4KAFMAdQBiAEMAQTAfBgNVHSMEGDAWgBQn88gVHm6aAgkWrSugiWBf
2nsvqjBDBgNVHR8EPDA6MDigNqA0hjJodHRwOi8vd3d3LmNpc2NvLmNvbS9zZWNI
cml0eS9wa2kvY3JsL2NyY2EyMDQ4LmNybDBQBggrBgEFBQcBAQREMEIwQAYIKwYB
BQUHMAKGNGh0dHA6Ly93d3cuY2lzY28uY29tL3N1Y3VyaXR5L3Bra59jZXJ0cy9j
cmNhMjA0OC5jZXIwXAYDVR0gBFUwUzBRBgorBgEEAQkVAQIAMEMwQQYIKwYBBQUH
AgEWNWh0dHA6Ly93d3cuY2lzY28uY29tL3N1Y3VyaXR5L3Bra59wb2xpY2llcy9p
bmRleC5odGlsMF4GA1UdJQRXMFUGCCsGAQUFBwMBBggrBgEFBQcDAgYIKwYBBQUH
AwUGCCsGAQUFBwMGBggrBgEFBQcDBwYKKwYBBAGCNwoDAQYKKwYBBAGCNxQCAQYJ
KwYBBAGCNxUGMA0GCSqGSIb3DQEBBQUAA4IBAQAw8zAtjPLKN0pkmSQpCvKGqkLV
I+ii6itvaSN6go4cTAnPpE+rhC836WVg0ZrG2PML9d7QJwBcbx2RvdFOWFEdyeP3
OOfTC9Fovo4ipUsG4eakqjN9GnW6JvNwxmEApcN5JlunGdGTjaubEBEpH6GC/f08
S2513JNFBemvM2tnIwcGhiLa69yHz1khQhrpz3B1iOAkFV19TpY4gJfVb/Cbcdi6
YBmlsGGGrd11Zva5J6LuL2GbuqEwYf2+rDUU+bgtlwavw+9tzD0865XpgdOKXrbO
+nmka9eiV2TEP0zJ2+iC7AFmlBCIolblPFft6QKo3JFjB6thJksaE5/k3Npf
quit
Certificate has the following attributes:
       Fingerprint MD5: 6EA241F5 AC9A1148 CC8B4B43 C7C13025
      Fingerprint SHA1: E3E703D3 CC9C30AE DEFFCDEB 5ECFEE08 FF0F1684
Certificate validated - Signed by existing trustpoint CA certificate.

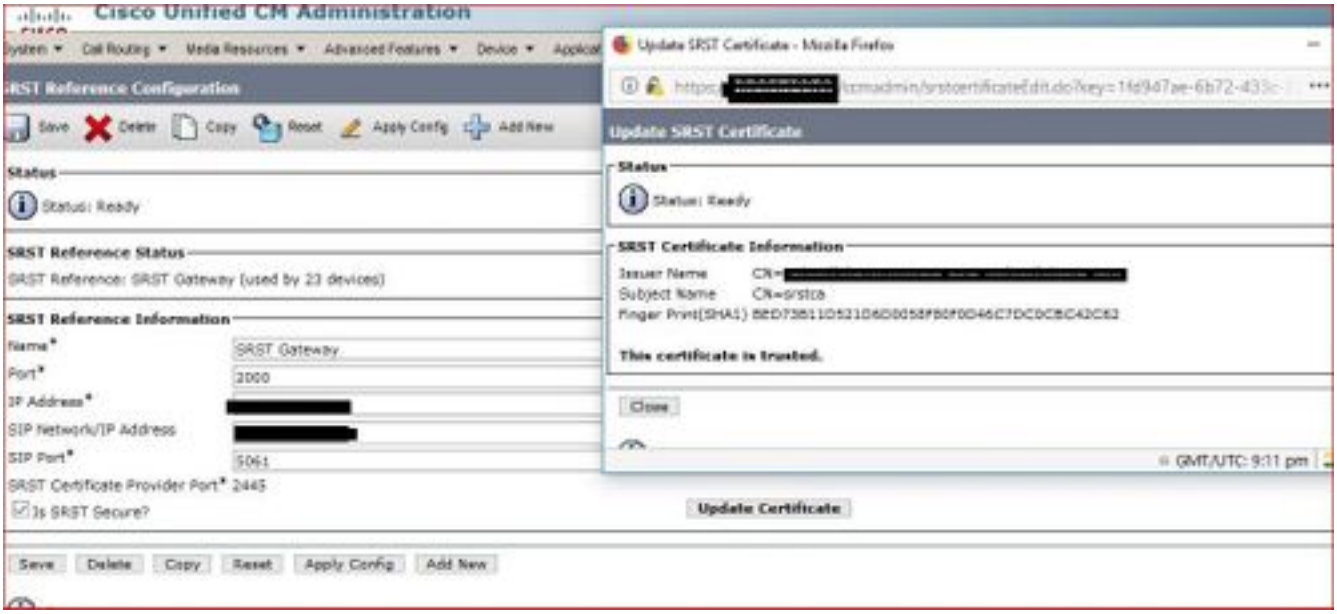
Trustpoint CA certificate accepted.
% Certificate successfully imported

Router1(config)#
```

对所有信任点重复此步骤

步骤5. CUCM配置：

1. 在系统 ***下添加***SRST引用
2. 选中SRST Secure ***？复选框***。
3. 对于SIP Secure-SRST，不要忘记将SRST参考中的端口更改为***5061。***
4. 在“系统”>“安全”>“电话安全”配置***文件下为电话创建安全配置文***件。在“设备安全配置文件”下将此安全配置***文件添加到电话***。
5. 选择Update Certificate以验证CUCM上填充的srst证书；



步骤6. SRST路由器的SRST特定配置

A)。 为加密电话配置SIP SRTP

总结步骤：

```
 enable
configure terminal
voice service voip
srtp
allow-connections sip to h323
allow-connections sip to sip
end
```

注意：如果希望非srtp呼叫工作，请使用srtp fallback。

B)。 配置SIP SRST安全策略

:

```
voice register global

security-policy secure
```

示例配置

```
Router1#sh run

Building configuration...



Current configuration : 43277 bytes
```

```
!
!
!
version 16.8
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
service sequence-numbers
platform qfp utilization monitor load 80
no platform punt-keepalive disable-kernel-core
!
hostname Router1
!
boot-start-marker
boot system bootflash:isr4400-universalk9.16.08.01.SPA.bin
boot-end-marker
!
!
vrf definition Mgmt-intf
 !
 address-family ipv4
 exit-address-family
 !
 address-family ipv6
 exit-address-family
!
! card type command needed for slot/bay 0/2
no logging queue-limit
logging buffered 10000000
no logging rate-limit
no logging console
enable password cisco
!
```

```
no aaa new-model
!
no ip domain lookup
!
!
!
!
!
!
!
!
!
!
subscriber templating
!
!
!
!
!
!
!
!
multilink bundle-name authenticated
!
!
!
!
!
!
!
crypto pki trustpoint TP-self-signed-2252801652
 enrollment selfsigned
 subject-name cn=IOS-Self-Signed-Certificate-2252801652
 revocation-check none
```

```
 rsakeypair TP-self-signed-2252801652
!
crypto pki trustpoint srstca
 enrollment url http://X.X.X.X:80
 serial-number
 revocation-check none
 rsakeypair srstcakey 2048
!
crypto pki trustpoint CAPF
 enrollment terminal
 revocation-check none
!
crypto pki trustpoint ACT2_SUDI_CA
 enrollment terminal
 revocation-check none
!
crypto pki trustpoint CAPF-2fbd03a4
 enrollment terminal
 revocation-check none
!
crypto pki trustpoint CAPF-72c7ffbb
 enrollment terminal
 revocation-check none
!
crypto pki trustpoint CAPF-851d4452
 enrollment terminal
 revocation-check none
!
crypto pki trustpoint CAP-RTP-001
 enrollment terminal
 revocation-check none
!
```

```
crypto pki trustpoint CAP-RTP-002
 enrollment terminal
 revocation-check none
!
crypto pki trustpoint Cisco_Manufacturing_CA
 enrollment terminal
 revocation-check none
!
crypto pki trustpoint Cisco_Manufacturing_CA_SHA2
 enrollment terminal
 revocation-check none
!
crypto pki trustpoint Cisco_Root_CA_2048
 enrollment terminal
 revocation-check none
!
crypto pki trustpoint Cisco_Root_CA_M2
 enrollment terminal
 revocation-check none
!
crypto pki trustpoint CAPF-19a340e5
 enrollment terminal
 revocation-check none
!
crypto pki trustpoint CAPF-dc3cda68
 enrollment terminal
 revocation-check none
!
!
crypto pki certificate chain TP-self-signed-2252801652
 certificate self-signed 01
 30820330 30820218 A0030201 02020101 300D0609 2A864886 F70D0101 05050030
```

```
 31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274
 69666963 6174652D 32323532 38303136 3532301E 170D3138 30353232 31393534
 35315A17 0D323030 31303130 30303030 305A3031 312F302D 06035504 03132649
 4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D32 32353238
 30313635 32308201 22300D06 092A8648 86F70D01 01010500 0382010F 00308201
 0A028201 01009A19 F3B5F20E E7451414 CB037164 CDE972C0 C3CBA15B 9A1B47AC
 36BF9279 B910BBDD 4EB7AA4B 59D2D498 1D9864E7 83FDBA4B 256F99C6 FD4F8BF8
 041692BB 6996565C 2B956192 ACAB67B2 50E6A345 0F587D3C D743DA12 FB4720BB
 74F45FF9 5030CDAD 6182981C FE9AB5C7 C87FE94F 08FA1D46 37D3AC40 D6AB5311
 ED0CE720 AA2CE8FC 38A1B392 86B2D5C9 01E3D052 51CC8925 CBFE790D D5DBC179
 FDCA96C7 004483B6 D4A064C6 06D1F593 45610881 94E8AECC 27E71EAF 412E9DE1
 DBA67CA5 4C5B8E2F D547A86B 374A04B8 F4A04AE7 9D38D398 B43801AE 779DD7A3
 B26FD7AE 542D15BC 71A1E602 E2710F70 587D7380 508FC890 1CD3CF7D A541DCB5
 025F645D CF9B0203 010001A3 53305130 0F060355 1D130101 FF040530 030101FF
 301F0603 551D2304 18301680 14C3E99A 3F385791 A48AB9CE A8A499B9 D07449D4
 58301D06 03551D0E 04160414 C3E99A3F 385791A4 8AB9CEA8 A499B9D0 7449D458
 300D0609 2A864886 F70D0101 05050003 82010100 39D88E81 B3762195 4E312E27
 1B5F1B0F 41D1F3C1 2BD6D35D 70B8FFCA 9B94DD5F 4176549B 3B91CD8B 63B67B9B
 2A0DAE22 F1FF44A4 12FB9E45 2E6A7040 5745F00E E585F4B9 F3358ABA BBA28EF6
 2DBE3930 250BC148 37A667EB C8B02B57 8A69AB6C 6F63E7D5 3FE0B6E7 7E0C5187
 87948F48 CD2B0275 D7E1538A EB91D857 083D47C1 41D78DB9 2B23E37D A08684C9
 4FC9FD8D 16809B90 331A2E28 B11F090B 867D4453 5B00F635 32477591 5D68044F
 44AC8679 997F6CA5 A4243FA2 C920A7B9 763881F5 EDA90EC1 F92611A4 E9D00B40
 A034343D 8C516C12 01A36C4D 305F85F2 FE76DD08 8B2958FD 44810372 694D80E8
 CB836B61 46B7E336 F2993913 BA6A9878 F47D35B7

       quit
crypto pki certificate chain srstca
 certificate 02
 30820291 308201FA A0030201 02020102 300D0609 2A864886 F70D0101 05050030
 17311530 13060355 0403130C 73727374 63617365 72766572 301E170D 31383130
 30333137 35313332 5A170D31 39313030 33313735 3133325A 3031312F 30120603
 55040513 0B464A43 32313337 44313232 30190609 2A864886 F70D0109 02160C41
```

4E41532D 54455354 5F465830 82012230 0D06092A 864886F7 0D010101 05000382

010F0030 82010A02 82010100 A38F8654 32A14C89 94139845 9BFE0C10 E229EBB4

F4F2466B 1AA81A3C A0C9F48F D421C5D7 A3B7CCC3 61C80E70 82850A29 B862FED8

DE82E342 4E5FAE59 F2EF6DE5 61DCC85A BB9F38C0 0C20C94D 601A7F9B 1FC9DEA0

06690351 44BC61D2 C21AAEC8 92084F45 E3A0E91B D1961D49 F4604B29 78C93417

EF8D8F6C DE842A22 935F99E7 940F8160 37DDB460 6CDAFC36 7A8C9BD6 B05B0D67

D5919817 FEBFA31D 4F681558 2B241BA2 B865E06A AAF68493 B67F86A4 681865BD

6E5794FD BA70435C 910FBFF3 F0A15C26 BBF96D72 05A567F9 B6406E1D A60F559D

A08B7F79 4D0C3201 9E7AA715 E711D4ED 174B6352 340BA097 289E577B E21FC6F6

13A1F17D F2461076 6C68A461 02030100 01A34F30 4D300B06 03551D0F 04040302

05A0301F 0603551D 23041830 1680142B F374EDE2 C716627B CEE1A0F2 BEE9D139

2E4C7B30 1D060355 1D0E0416 04144E01 3013A936 E68046F8 62A3A552 89635BAB

9127300D 06092A86 4886F70D 01010505 00038181 0059B995 2E24119E 731DE753

0D13A8A2 63937E96 834BC76D F6160309 9D6AF8EA FBA0134A 1655731C 8387A0FA

3092B7CA 66947B1C 1B12EF42 E19AB43D 2570664C 82D58CE9 6747F0A5 D1FC1ED7

B25454B2 B1570F1A 783D1FAB E76C2938 136C9475 3F1A63E8 4D931DD0 97B5D0FA

CFC879FD B9CC3A3A 49037341 D61EC7D6 F3781DE8 F5

      quit

certificate ca 01

30820207 30820170 A0030201 02020101 300D0609 2A864886 F70D0101 04050030

17311530 13060355 0403130C 73727374 63617365 72766572 301E170D 31383130

30333136 31363338 5A170D32 31313030 32313631 3633385A 30173115 30130603

55040313 0C737273 74636173 65727665 7230819F 300D0609 2A864886 F70D0101

01050003 818D0030 81890281 8100BB90 D2ABF45E 235EC458 80CAF0AC 5E7E9D16

A2BE8B5E DC3C8F78 C6CD325F 5A7DAED0 06FAB17A 1E9A8C50 D661E3EE 8B9DC29E

5DCD1B36 2AC4B89B E844F2F9 B98D54B8 CE539098 BBAC4913 E6822196 00C6964E

16B793DD B7E7A5E7 CFC66CD1 3E01965D FBC29260 052AFBF2 930832E6 DF976644

EC89CDAC 9B48A8C0 47CD30B6 219B0203 010001A3 63306130 0F060355 1D130101

FF040530 030101FF 300E0603 551D0F01 01FF0404 03020186 301F0603 551D2304

18301680 142BF374 EDE2C716 627BCEE1 A0F2BEE9 D1392E4C 7B301D06 03551D0E

04160414 2BF374ED E2C71662 7BCEE1A0 F2BEE9D1 392E4C7B 300D0609 2A864886

F70D0101 04050003 81810021 90395C26 1C020400 22F51B91 84715407 DB17A0C6

```
 63E1D9FD 45F6B4C5 9F20823C 77C6A8E5 36488C3D F6D91F00 87567D03 D6C35A79
 665DB0BC 3C96A357 C402ABE8 47472636 28EC20F5 787D79F5 C913B62D 4B4E236F
 9FF26BB8 B1BC4A11 82AE890A 83258084 2F288359 5F52E5DB 80F7A7DC A923BE70
 83C9B689 6DB4A7F5 59DA9F
       quit
crypto pki certificate chain CAPF
 certificate ca 6DBF757CC9B4B5D97357362ACF2F6A5B
 308203A1 30820289 A0030201 0202106D BF757CC9 B4B5D973 57362ACF 2F6A5B30
 0D06092A 864886F7 0D01010B 05003065 310B3009 06035504 06130255 53310E30
 0C060355 040A0C05 63697363 6F310C30 0A060355 040B0C03 74616331 16301406
 03550403 0C0D4341 50462D37 32633766 66626231 0B300906 03550408 0C027478
 31133011 06035504 070C0A72 69636861 7264736F 6E301E17 0D313830 33323032
 30303730 385A170D 32333033 31393230 30373037 5A306531 0B300906 03550406
 13025553 310E300C 06035504 0A0C0563 6973636F 310C300A 06035504 0B0C0374
 61633116 30140603 5504030C 0D434150 462D3732 63376666 6262310B 30090603
 5504080C 02747831 13301106 03550407 0C0A7269 63686172 64736F6E 30820122
 300D0609 2A864886 F70D0101 01050003 82010F00 3082010A 02820101 00B65FDA
 4AA4FBAF 24374D68 110FF40D FDD90234 C0242C1C 6928A6AB 06E98725 62B6F006
 A1CE0D00 8C70B706 9961FF19 06FB66F0 66DF762F C739884C 3A29B36C E0F7BF1C
 9178182D 19C9AA3C 7B26840F 0B14E615 8B65E27B C1777D57 0DA158C8 0E203B16
 A00B5124 2C3A09FE 3871921B E7D3A7BD 8316B6C1 C18F09F2 2F5A62D1 A04E7709
 E1C9C0AC 8DE1F853 D63A64DD 7980EE9D 085DBEBB BE788B30 E644E364 868A0F11
 2764218A 3B86A603 AE58575B C5D53E47 69819971 2A6C3038 0390138D 904C5632
 2167CA22 A3F35409 2A2047BB F09A220F 13796E6D 044C19FB 3C15B2CE F90FFCD5
 8ED067DB 6E7F28F6 BE0DE28F 97B99AE8 726E3E75 093B9208 414033B7 DF020301
 0001A34D 304B300B 0603551D 0F040403 0202A430 1D060355 1D250416 30140608
 2B060105 05070301 06082B06 01050507 0305301D 0603551D 0E041604 145E5F34
 7B18A5FE 71A2A609 0DFB5A15 3A8B9A38 A2300D06 092A8648 86F70D01 010B0500
 03820101 003364ED 00769497 12D3A98D FB362FAE 4241391D FF8B40D9 C9D28565
 B633A082 46EAF721 1E7C96E6 BD82CFB6 64D0908A C0B09941 66C905E1 2FEE394F
 560E89A0 E159983A A492D1E3 741A42CC 9B2D75E4 B1145EF1 C0956B76 380A1BE3
 B9C1A6BF F1AD89C4 F3A0FDD0 455EAB60 4C85814F 821D4DEA D43AC5DD E43702FA
```

```
 50F6B7F3 82FF80AC 647731E5 A79372EE 1666EEF6 A18BF2BE B2FDC8BE C9CAA4EE
 A658E864 3C66ECFA BA3213D3 576F124F B14B56E3 802B0B9C 9026FB69 00373361
 66002D9F EAD2C465 2E473265 2550098E 3FD28A04 3850BDA4 32EBC7FA 03A75A8F
 80C2AFEB F108500B 97F5D6E9 06854D5C A6E656F6 0BAD484F B49C0857 8EC4D05E
 73379F52 83
       quit
crypto pki certificate chain ACT2_SUDI_CA
 certificate ca 61096E7D000000000000C
 3082043C 30820324 A0030201 02020A61 096E7D00 00000000 0C300D06 092A8648
 86F70D01 01050500 30353116 30140603 55040A13 0D436973 636F2053 79737465
 6D73311B 30190603 55040313 12436973 636F2052 6F6F7420 43412032 30343830
 1E170D31 31303633 30313735 3635375A 170D3239 30353134 32303235 34325A30
 27310E30 0C060355 040A1305 43697363 6F311530 13060355 0403130C 41435432
 20535544 49204341 30820122 300D0609 2A864886 F70D0101 01050003 82010F00
 3082010A 02820101 00D26E65 DD31C8C4 0F6D37F8 52E6A47F E94651A5 D77EF5A1
 3625B164 36386DEA 07C729DE 3BEC0912 E5702D52 CE68C436 15B7FCC4 6EC959AB
 7F8B47AA ABA8A290 56EE8962 F1F4E546 0B06A0A3 DFCB3BE8 D2E4E77F 74E56CE9
 F6945C99 108FB97F 9AEAD1C5 FEA46E3A 2278E267 5E0D8668 DEA3C2A7 1CE9AD62
 433DC94C E2260A1E E98C40CA A682683E C6084722 8A164BCD 0139C762 CA711B78
 FE6B67BA 91B9EC0A 3299754E 223759D0 4D8D98E7 A5F8E0EB A17E3F84 9A0E419B
 0577468F 5DE855E1 7E132156 2EB1638F DEDF2F6F BCA1AB95 E3742BBE 77F777F1
 9FA978FB 7B0FB3FE C5E55ED1 0E8D25C9 511B3230 48F9DD17 5DF6D270 1E4CBC9D
 E6A9B334 BEAFE91D 55020301 0001A382 015A3082 0156300B 0603551D 0F040403
 0201C630 1D060355 1D0E0416 041448D8 F1F1C270 D55BBB7C 730993AF B8B83003
 F87F301F 0603551D 23041830 16801427 F3C8151E 6E9A0209 16AD2BA0 89605FDA
 7B2FAA30 43060355 1D1F043C 303A3038 A036A034 86326874 74703A2F 2F777777
 2E636973 636F2E63 6F6D2F73 65637572 6974792F 706B692F 63726C2F 63726361
 32303438 2E63726C 30500608 2B060105 05070101 04443042 30400608 2B060105
 05073002 86346874 74703A2F 2F777777 2E636973 636F2E63 6F6D2F73 65637572
 6974792F 706B692F 63657274 732F6372 63613230 34382E63 6572305C 0603551D
 20045530 53305106 0A2B0601 04010915 010C0030 43304106 082B0601 05050702
 01163568 7474703A 2F2F7777 772E6369 73636F2E 636F6D2F 73656375 72697479
```

```
 2F706B69 2F706F6C 69636965 732F696E 6465782E 68746D6C 30120603 551D1301
 01FF0408 30060101 FF020100 300D0609 2A864886 F70D0101 05050003 82010100
 6875A9C9 6BF6DC78 8735A00C 4466DFBD 727AE126 A9C21F8B D6FDF866 CC4896E2
 64773F09 C0A5D252 6ED1AF73 4D703DC3 8EC7F7FB 7A95E76E 1B16F859 E2F17300
 A2520BC5 B426B9D4 8925B7C9 CD6DC298 FF8770D5 EC7EEDA9 804D440E E1082020
 4EBBC152 0FBBA6E0 004DC96B F9D14B7C 4A6129E3 F07E537A 18A6052B FA4C40A2
 8B98D484 E5ABC802 B8755A3C 8428E48C 4933BB7B 9F05325A A67BFCF6 0F4E13E1
 F754A338 2FEFCA76 450EFB9D 9D8C52A7 872978ED DEDC651E 036382C8 B853363F
 502CF18C A3CE8369 2BFBAB49 1235E167 48969951 D671FB28 D0E5E7AD 7CC9F54F
 D0814964 11ABA280 91063392 C05BFC72 95826E65 9D3DA090 4F69F022 34DF63C7
       quit
crypto pki certificate chain CAPF-2fbd03a4
 certificate ca 7FA76BD99C1DDA013BE037763BC78C33
 3082029C 30820205 A0030201 0202107F A76BD99C 1DDA013B E037763B C78C3330
 0D06092A 864886F7 0D010105 05003065 310B3009 06035504 06130255 53310E30
 0C060355 040A1305 63697363 6F310C30 0A060355 040B1303 74616331 16301406
 03550403 130D4341 50462D32 66626430 33613431 0B300906 03550408 13027478
 31133011 06035504 07130A72 69636861 7264736F 6E301E17 0D313430 38313831
 39333633 395A170D 31393038 31373139 33363338 5A306531 0B300906 03550406
 13025553 310E300C 06035504 0A130563 6973636F 310C300A 06035504 0B130374
 61633116 30140603 55040313 0D434150 462D3266 62643033 6134310B 30090603
 55040813 02747831 13301106 03550407 130A7269 63686172 64736F6E 30819F30
 0D06092A 864886F7 0D010101 05000381 8D003081 89028181 00A175B5 F8D9CED4
 A7972459 B51B335C E1DCCF3B 6E2D9504 78A95267 C5BFEC43 5FD0B430 AD87632F
 8643B1AF 542F3028 526EA7AC F7721A3B 79BBF5BE E650883B B7AD60F1 62C7EA02
 A1DBAA49 738FE258 B47F9D28 1D6CF1E5 7974151B 9D4F8CFB 68EA7D17 68E47D75
 61787FB3 3A64CC9D 26FAB9D0 684A4F15 EA917F79 7696E0C5 7B020301 0001A34D
 304B300B 0603551D 0F040403 0202A430 1D060355 1D250416 30140608 2B060105
 05070301 06082B06 01050507 0305301D 0603551D 0E041604 1470BF75 2404D5FB
  8F0197BE 8AAD174A AB785D53 FB300D06 092A8648 86F70D01 01050500 03818100
 4C39EC6E 28E512E1 B034E827 F9034E5B B01A33CF DB321FFD 30374692 8521592E
 CD7583BE 5BAB0CD7 A03E12B0 0B4E8120 A028E08C CEBEB871 67DF12B6 20000DD2
```

```
 CE77ED30 188F728A B60D877D 513B9BB1 FCF79545 9FC38909 D8808EEE BB013106
 5560DAAB 3AE7ADA5 E437063E 8A50F3A7 FC5584D5 66A6B9D7 261E9331 53A66AB9
       quit
crypto pki certificate chain CAPF-72c7ffbb
 certificate ca 6DBF757CC9B4B5D97357362ACF2F6A5B
 308203A1 30820289 A0030201 0202106D BF757CC9 B4B5D973 57362ACF 2F6A5B30
 0D06092A 864886F7 0D01010B 05003065 310B3009 06035504 06130255 53310E30
 0C060355 040A0C05 63697363 6F310C30 0A060355 040B0C03 74616331 16301406
 03550403 0C0D4341 50462D37 32633766 66626231 0B300906 03550408 0C027478
 31133011 06035504 070C0A72 69636861 7264736F 6E301E17 0D313830 33323032
 30303730 385A170D 32333033 31393230 30373037 5A306531 0B300906 03550406
 13025553 310E300C 06035504 0A0C0563 6973636F 310C300A 06035504 0B0C0374
 61633116 30140603 5504030C 0D434150 462D3732 63376666 6262310B 30090603
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 01FF301D 0603551D 0E041604 1427F3C8 151E6E9A 020916AD 2BA08960 5FDA7B2F
 AA301006 092B0601 04018237 15010403 02010030 0D06092A 864886F7 0D010105
 05000382 0101009D 9D8484A3 41A97C77 0CB753CA 4E445062 EF547CD3 75171CE8
 E0C6484B B6FE4C3A 198156B0 56EE1996 62AA5AA3 64C1F64E 5433C677 FEC51CBA
 E55D25CA F5F0939A 83112EE6 CBF87445 FEE705B8 ABE7DFCB 4BE13784 DAB98B97
 701EF0E2 8BD7B0D8 0E9DB169 D62A917B A9494F7E E68E95D8 83273CD5 68490ED4
 9DF62EEB A7BEEB30 A4AC1F44 FC95AB33 06FB7D60 0ADEB48A 63B09CA9 F2A4B953
 0187D068 A4277FAB FFE9FAC9 40388867 B439C684 6F57C953 DBBA8EEE C043B2F8
 09836EFF 66CF3EEF 17B35818 2509345E E3CBD614 B6ECF292 6F74E42F 812AD592
 91E0E097 3C326805 854BD1F7 57E2521D 931A549F 0570C04A 71601E43 0B601EFE
 A3CE8119 E10B35
       quit
crypto pki certificate chain Cisco_Root_CA_M2
 certificate ca 01
 30820313 308201FB A0030201 02020101 300D0609 2A864886 F70D0101 0B050030
 2B310E30 0C060355 040A1305 43697363 6F311930 17060355 04031310 43697363
 6F20526F 6F742043 41204D32 301E170D 31323131 31323133 30303138 5A170D33
 37313131 32313330 3031385A 302B310E 300C0603 55040A13 05436973 636F3119
 30170603 55040313 10436973 636F2052 6F6F7420 4341204D 32308201 22300D06
 092A8648 86F70D01 01010500 0382010F 00308201 0A028201 0100D806 2521134F
 8D3A757C E93DC874 413B4DA0 65F9C2BF 9484EF6B 0B7187D4 58C26032 2CBACCBA
 BB6334DB B312426A 798586B3 E87FC992 8BE3A737 45D39483 686520DB 8AD44341
```

```
 DFCA4CD4 D710CD68 2795724E 744A54F5 DA71E9A5 AF4D0CB1 6C31FB0C DE73829A
 50095E0E E335BEBA 4EC2CAE0 6EC8842D 8AB3EE92 EC0482E4 C76E4D18 B5E964CB
 6486D2F0 B8E15916 3AA62648 05EE6329 1E1583EF 1E79C182 0029D456 8F0A6DC2
 C858392D 63B87180 3AE1DCEB B3135222 05514700 88876DED D13CD7B8 DA857924
 C62A5D1D F2834D81 1FA7CDD4 198EAB69 40E6FB07 0AF28E65 3E6DE53D C132EE06
 262DECBB 1EB14562 512BF059 1731721A CC0074C3 0CBB84CA 73AD0203 010001A3
 42304030 0E060355 1D0F0101 FF040403 02010630 0F060355 1D130101 FF040530
 030101FF 301D0603 551D0E04 160414C9 00F91F8A 1FC266BD A5D26D65 0E222E34
 C305A030 0D06092A 864886F7 0D01010B 05000382 0101007A BE3C8D27 E8CDE492
 1CA68B30 6EC1D9D6 891AC3C0 9975F74E B582C895 2259B7A0 A8508E59 190B6F16
 D90FF219 274D504D DEF46D0C E6745C74 F1447F82 92BC5C5E E3B37E25 A38BB910
 3C6B5D5D 3E693BDC A85BEDA7 C2BAE8C2 F768CB28 8B707291 CF2C3FBA 75597333
 52198294 ED709ED2 67147631 1B26A6A9 F97E7B19 B6E2A752 A2D453EA 6F867833
 07C1DE7D DF15D03D 6CA225BC C732F049 7B6DF230 669BD914 5DB60FA5 6C5B926B
 86B41304 8763F57D 69AE2262 6C767292 9AF3055E 6633E597 20E00D79 346F311D
 585ECDE0 25C1C3A5 DD10DCCE 7E95F6DB 44A75DC6 7192CFA1 81FAF08D E9A6D992
 C3E4F0AD DB6CAFEE ADDA8B09 4AFBDA2A 9E981650 077F87
       quit
crypto pki certificate chain CAPF-19a340e5
 certificate ca 4745CDD0D3E0387C09316AE7ED0914CD
 308203A1 30820289 A0030201 02021047 45CDD0D3 E0387C09 316AE7ED 0914CD30
 0D06092A 864886F7 0D010105 05003065 310B3009 06035504 06130255 53310E30
 0C060355 040A0C05 63697363 6F310C30 0A060355 040B0C03 74616331 16301406
 03550403 0C0D4341 50462D31 39613334 30653531 0B300906 03550408 0C027478
 31133011 06035504 070C0A72 69636861 7264736F 6E301E17 0D313630 35323031
 37303530 385A170D 32313035 31393137 30353037 5A306531 0B300906 03550406
 13025553 310E300C 06035504 0A0C0563 6973636F 310C300A 06035504 0B0C0374
 61633116 30140603 5504030C 0D434150 462D3139 61333430 6535310B 30090603
 5504080C 02747831 13301106 03550407 0C0A7269 63686172 64736F6E 30820122
 300D0609 2A864886 F70D0101 01050003 82010F00 3082010A 02820101 0097753D
 51483CE9 66F8EF0D DC131D63 C6B7408E C0B465A0 0D597B8E 2F7EEEBB 34E0E4F8
 77D2C53C 4C9AF2E0 D75D6F92 C5CCBDC6 C7CCB58D A1CC7288 300D9678 94E1645B
```

```
 109DD7DF A7104B07 C98B41CD 7262096D A9DE1076 7F40F787 16BA70DF C18C3C66

 9453CC28 F294A7F2 BFFE8F8C 0D7268D4 55C63554 6C6B28ED 073BF7F9 BED32D99

 A5D63ACD 673D8476 5E26F6A4 73526766 7E34063D 86AFFFA5 E5B509BB 962FF514

 8263F539 2542A9DB A4473F49 E2D79CF4 C495E608 DBBA015A B2F69281 50FB0400

 8D946575 42DD1689 B2435512 0BEBC2E5 6C223C1B D5B45F40 527C67F1 F89A97AF

 5ECFD7ED 738F4D19 D5421F95 E0E940DF 1F8C83B0 28F80862 F5CDC690 55020301

 0001A34D 304B300B 0603551D 0F040403 0202A430 1D060355 1D250416 30140608

 2B060105 05070301 06082B06 01050507 0305301D 0603551D 0E041604 14F66D8B

 E1B34990 F0483694 A2D1D37E ACA52C59 22300D06 092A8648 86F70D01 01050500

 03820101 006C0E8F 9E3B17B5 C902C177 F931099A 3177669F C1196185 0A3F72E4

 EB046423 FB1C7BB1 D0D7255C BB4C6074 9AD2815F 9059FF2E 8216E473 6839DB2A

 9600C167 40172BAF 17679406 3EDDB4CD E5F5B96D 1354C6C2 7ACE1867 74EB5CB2

 0423ACE8 B66FF253 13393E13 BE08C8D6 28AF907B 2FCECC91 C1A86A2B C311DEC0

 9A20C3AF FD0629A0 2A30ED70 7369F570 1A38FD85 B4BEA740 4D87AF64 42B68F99

 C8B16842 F75F49A5 2FA41571 BA9757F0 F0C7D22D 221A4442 9E20D7C7 5A90D912

 7C4BAD41 BB929AC5 89526810 F6B96C28 FC6BFE69 BEBFF33B ECC59282 0F20D269

 13A662BB E11D2E69 B1D8561B 881F35DF 8E1549A7 2154A8E1 AE967842 5CC6FC22

 0F99CE3D 90

       quit

crypto pki certificate chain CAPF-dc3cda68

 certificate ca 55FF50FABA2D6E7EBD5EF96F32451117

 308203A1 30820289 A0030201 02021055 FF50FABA 2D6E7EBD 5EF96F32 45111730

 0D06092A 864886F7 0D010105 05003065 310B3009 06035504 06130255 53310E30

 0C060355 040A0C05 63697363 6F310C30 0A060355 040B0C03 74616331 16301406

 03550403 0C0D4341 50462D64 63336364 61363831 0B300906 03550408 0C027478

 31133011 06035504 070C0A72 69636861 7264736F 6E301E17 0D313630 35323632

 30303430 345A170D 32313035 32353230 30343033 5A306531 0B300906 03550406

 13025553 310E300C 06035504 0A0C0563 6973636F 310C300A 06035504 0B0C0374

 61633116 30140603 5504030C 0D434150 462D6463 33636461 3638310B 30090603

 5504080C 02747831 13301106 03550407 0C0A7269 63686172 64736F6E 30820122

 300D0609 2A864886 F70D0101 01050003 82010F00 3082010A 02820101 0088A466

 E4A472FB BA1CF50D CF98FA6A BC625C9B 51B46772 30ECA673 6226002C 2E6A5F53
```

```
 FD193E14 E08DEEB9 0DDF2485 1EE7DBC1 2B45973A 94659A40 37E1AAE0 CF56AE82
 78C369F2 B0BF2D7C 9072CA2C F00D9754 E641F27D 140A849C A1D71922 35167213
 30BED42B 11C7A601 C12F5DFC 0F3C4277 0638F285 9FF6F3A4 CD017CBA A4B4685B
 62BDF035 2A570A48 1ACA0618 763BBA81 C2734558 9575E08B 008A365C EE376461
 31D3FEE1 0A579F46 4CEAF0F3 4231A81B 9A82ABD7 60D91735 1DE7F325 79D15BD5
 55DD807E D37008DD F4440C36 5A8ABB0E 15EF5530 07031278 D0BFB69F 6F3BDC95
 046F7949 0A848C86 7B72BEDF 496748BC 300B3772 6E997BA8 73204638 FF020301
 0001A34D 304B300B 0603551D 0F040403 0202A430 1D060355 1D250416 30140608
 2B060105 05070301 06082B06 01050507 0305301D 0603551D 0E041604 147B0417
 3B747718 BBA4521F 3727684A 05DBDE19 5A300D06 092A8648 86F70D01 01050500
 03820101 007F6D12 E049495C 081D95F9 49FC254A EA3144DA 9CAA8A9A 5A865938
 F43D2FC3 1B060434 720B2F85 EF5EEA48 3E5F528B 9F222526 42FE5E83 59F91EBA
 EAC14360 4A05BEE3 2FA68B9E 5C49091F 34D8A956 B1ABA51F 8CD416A5 24A57763
 A26A59AC 9B525EE2 B927D87F E28DA955 7EC0D322 04AAA2A1 BB92CF21 A5D14151
 6E551D5E AEE4BE5C F205AF08 AFEB44D4 624D34AE A9ECD8DE CD09A1E1 212DAA19
 61555E04 29A2A688 76515E91 EB2600CE F005C570 7F37C514 654F2A5C 7E52B88B
 6341575E 08C71102 BC536A18 D5797501 AC8C775A 230ACCC2 41FA0B03 D3B01653
 D3083B3C F942F0A6 FC71969B 006B3975 B9DA33D1 5041A500 38646FFA 2BB0DCC4
 DB80BE20 2C
       quit
!
!
!
voice service voip
 ip address trusted list
 ipv4 0.0.0.0 0.0.0.0
 no ip address trusted authenticate
 media bulk-stats
 media disable-detailed-stats
 srtp
 allow-connections sip to sip
 no supplementary-service sip refer
```

```
 no supplementary-service sip handle-replaces
 supplementary-service media-renegotiate
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 modem passthrough nse codec g711ulaw
 sip
 bind control source-interface GigabitEthernet0/0/0
 bind media source-interface GigabitEthernet0/0/0
 rel1xx disable
 registrar server expires max 120 min 60
!
voice class codec 1
 codec preference 1 g711ulaw
!
!
!
!
!
voice iec syslog
!
voice register global
 default mode
 no allow-hash-in-dn
 security-policy secure
 max-dn 50
 max-pool 40
!
voice register pool  1
 id network A.B.C.0 mask 255.255.255.0
 dtmf-relay rtp-nte
 codec g711ulaw
!
!
```

```
!
voice-card 0/1
 no local-bypass
 no watchdog
!
voice-card 0/3
 no watchdog
!
voice-card 0/4
 no watchdog
!
license udi pid ISR4431/K9 sn FOCXXXXXXXX
license accept end user agreement
license boot level uck9
license boot level securityk9
diagnostic bootup level minimal
!
spanning-tree extend system-id
!
!
!


!
redundancy
 mode none
!
!
interface GigabitEthernet0/0/0
 ip address A.B.C.D 255.255.255.192
 negotiation auto
!
```

```
interface GigabitEthernet0/0/1
 no ip address
 shutdown
 negotiation auto
!
interface GigabitEthernet0/0/2
 no ip address
 shutdown
 negotiation auto
!
interface GigabitEthernet0/0/3
 no ip address
 shutdown
 negotiation auto
!
interface Service-Engine0/1/0
!
interface Service-Engine0/3/4
!
interface Service-Engine0/4/0
!
interface GigabitEthernet0
 vrf forwarding Mgmt-intf
 no ip address
 shutdown
 negotiation auto
!
interface BRI0/3/0:0
 isdn incoming-voice voice
!
interface BRI0/3/1:0
 isdn incoming-voice voice
```

```
!
interface BRI0/3/2:0
 isdn incoming-voice voice
!
interface BRI0/3/3:0
 isdn incoming-voice voice
!
ip forward-protocol nd
ip http server
ip http authentication local
ip http secure-server
ip tftp source-interface GigabitEthernet0/0/0
ip route 0.0.0.0 0.0.0.0 GigabitEthernet0/0/0 XX.XX.XX.XX
!
!
!
!
!
!
control-plane
!
!
voice-port 0/1/0
 no battery-reversal
!
voice-port 0/1/1
!
voice-port 0/1/2
!
voice-port 0/1/3
!
voice-port 0/1/4
```

```
!
voice-port 0/1/5


!
voice-port 0/3/0
!
voice-port 0/3/1
!
voice-port 0/3/2
!
voice-port 0/3/3
!
mgcp behavior rsip-range tgcp-only
mgcp behavior comedia-role none
mgcp behavior comedia-check-media-src disable
mgcp behavior comedia-sdp-force disable
!
mgcp profile default
!
!
!
!


!
!
!
credentials
 ip source-address A.B.C.D port 2445
 trustpoint srstca
!
sip-ua
```

```
 crypto signaling default trustpoint srstca
!
!
!
line con 0
 logging synchronous
 transport input none
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 logging synchronous
 login local
 transport input all
!
wsma agent exec
!
wsma agent config
!
wsma agent filesys
!
wsma agent notify
!
!
end


Router1#
```

验证

使用本部分可确认配置能否正常运行。

如果将Cisco IOS证书服务器用作CA，请使用 **show running-config** 命令以验证证书注册或 **show crypto pki server** 命令以验证CA服务器的状态。

总结步骤

1.show running-config

2.show crypto pki server

```
Router# show crypto pki server
Certificate Server srstcaserver:
Status: enabled
Server's configuration is locked (enter "shut" to unlock it)
Issuer name: CN=srstcaserver
CA cert fingerprint: AC9919F5 CAFE0560 92B3478A CFF5EC00
Granting mode is: auto
Last certificate issued serial number: 0x2
CA certificate expiration timer: 13:46:57 PST Dec 1 2021
CRL NextUpdate timer: 14:54:57 PST Jan 19 2019
Current storage dir: nvram
Database Level: Complete - all issued certs written as <serialnum>.cer
```

使用**show sip-ua status registrar**验证注册

故障排除

目前没有针对此配置的故障排除信息。

相关信息

- SRST管理指南
- 技术支持和文档 - Cisco Systems

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