

# Configuration du SRST SIP sécurisé sur ISR4000

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## Introduction

Ce document décrit comment configurer le protocole SIP (Secure Session Initiation Protocol) Survivable Remote Site Telephony (SRST) sur les routeurs de la gamme ISR4000 et Cisco Unified Communications Manager (CUCM).

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## Conditions préalables

### Conditions requises

Cisco vous recommande de prendre connaissance des rubriques suivantes :

Gestionnaire de communications unifiées de Cisco (version CUCM)

Cisco Unified Survivable Remote Site Telephony (SRST)

Sécurité de la couche transport (TLS)

Protocole SRTP (Secure Real-Time Transport Protocol)

Protocole RTP (Real-Time Transport Protocol)

Session Initiation Protocol (SIP)

Protocole UDP (User Datagram Protocol)

#### Components Used

CUCM: 10.5.2

Version SRST SIP - Minimum 12.1 selon le [Guide d'administration](#) SRST

Routeur SRST : ISR 4451

Serveur AC : Testé sur le routeur ISR 2921 et le serveur CA tiers.

Téléphones testés : 78XX et 88XX

Capacité de la plate-forme et exigences du micrologiciel conformément à la [matrice de compatibilité SRST](#).

ISR2 utilisé en tant que serveur CA IOS (la même passerelle SRST peut également être utilisée en tant que serveur CA IOS)

**Attention** : 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. Si votre réseau est en ligne, assurez-vous de bien comprendre l'incidence possible des commandes.

## Présentation de Secure SRST

Cisco Unified Secure SRST fournit des fonctionnalités de sécurité telles que l'authentification, l'intégrité et le cryptage des supports.

L'authentification donne l'assurance à une partie que l'autre partie est celle qu'elle prétend être.

L'intégrité garantit que les données fournies n'ont pas été modifiées entre les entités.

Le chiffrement implique la confidentialité ; c'est-à-dire que personne ne peut lire les données sauf le destinataire prévu. Ces fonctions de sécurité permettent la confidentialité des appels vocaux Cisco Unified SRST et protègent contre les violations de sécurité vocale et le vol d'identité.

La sécurité SRST est assurée lorsque :

- Les périphériques finaux sont authentifiés par le biais de certificats.
- La signalisation est authentifiée et cryptée via TLS (Transport Layer Security) pour TCP.
- Un chemin de support sécurisé est chiffré via le protocole SRTP (Secure Real-Time Transport

Protocol).

- Les certificats sont générés et distribués par une autorité de certification (AC)

## Informations générales

Avant cette configuration, le CUCM doit être réglé en mode Mix avec la sécurité enable.

Les téléphones doivent être enregistrés en tant que téléphones sécurisés.

Pour plus d'informations sur l'enregistrement des téléphones avec CUCM en mode sécurisé, consultez [Sécurité des téléphones IP et CTL](#)

Pour que Secure SIP SRST soit pris en charge sur les routeurs à services intégrés de la gamme Cisco 4000, activez ces licences de package technologique sur le routeur :

sécurité uck9

## Étapes de configuration et exemple

### Étape 1. Activer Http sur le serveur SRST et CA

```
ip http server
```

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

### Étape 2. Installer le certificat à partir d'un serveur AC basé sur IOS ou d'un serveur AC tiers

#### A) Serveur CA basé sur IOS :

- Créer un serveur de certificats Cisco IOS:

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 url**root-url

The default location for the database entries to be written is flash; however, NVRAM is recommended for this task.

4. **issuer-name**DN-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)#

```

- Inscrivez et authentifiez automatiquement le routeur SRST sur le serveur AC ;

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. **rsa keypair** 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)#rsa keypair 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: DOB9E79C
% 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
```

```
Router1(config)#crypto pki enroll srstca
%
% 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 subject name in the certificate will include: Router1
% Include the router serial number in the subject name? [yes/no]: yes
% The serial number in the certificate will be: FLM2008W049
% Include an IP address in the subject name? [no]: n
Request certificate from CA? [yes/no]: y
% Certificate request sent to Certificate Authority
% The 'show crypto pki certificate verbose srstca' command will show the fingerprint.
```

## B) Serveur CA tiers

### Étapes récapitulatives :

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)#**rsa keypair 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**



```

Router1(config)#crypto pki enroll srstca
% Start certificate enrollment ..

% The subject name in the certificate will include: CN=srstca
% The subject name in the certificate will include: Router1
% Include the router serial number in the subject name? [yes/no]: no
% Include an IP address in the subject name? [no]: no
Display Certificate Request to terminal? [yes/no]: yes
Certificate Request follows:

-----BEGIN CERTIFICATE REQUEST-----
MIICjzCCAAXcCAQAwKTEPMA0GA1UEAxMGc3JzdGNhMRYwFAYJKoZIhvcNAQkCFgdS
o3V0ZXIwMIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAA2rjyhAoTJq2e
//G6iM35Uu51aZPCDV6cFmBWxtOL0Qa2GQKe9odovPBLvV9zSzyw8bxSGkBYs1Qu
n9jgSV2f3IAV79S+oTXf/TEhYlsqWbmf6hm60jdZXjXF0w+4WUidg1wsfAuaI+FY
8Y6jPRUAqYTZeJTnnp6q/8MfxLhIvyFBX3tzIgx0570sxFtY17rMQsdKfggvRUQ
Up4CFYm7LzFSn4uUM8/NOKcgJzJkihWY3VMsIXOg37d0M0tmAWdrIkIuAftF7pga
3sU5qJuD354Bm8tzkpBOUrf0YshDW93LWP6JZpov9WDFL5qa16pw1WZ3nAiGGINA
2kwitkibjwIDAQABoCEwHwYJKoZIhvcNAQkOMRIwEDAObgNVHQ8BAf8EBAMCBaAw
DQYJKoZIhvcNAQEFBQADggEBAJDJzAgXRvA5DCxrXe//M7Cwp456pZgSOESLtVeu
OgZhxzis6APYwYsQg6wxzAS821OkYFO0zCIQo2yBWeN7HMhO/UUqvbaF1//PXFkm
vdXRAM1KstDwDMb6EQpArvF23DNWXuVyFPid0uMS/d8xW2OB6+r+B4VGzy1gpZgZ
EHf+gYaemBvwWIWTjX2ZaA+pCeu2Tip3nuvrMnM7j1qFPBtTcTSEw4R8b1WgHZ3W
KSOUvmPS1HJ22c0ets2ruInvt5Pz1bOLcBnCY8JkqXcqAhOv282DkPy7G+X8Y59m
opKnAh0gx5LlANcEQd4a8o09jqQjj5gz8KMs8MTvT3wrZ8=
-----END CERTIFICATE REQUEST-----

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

Redisplay enrollment request? [yes/no]: no
Router1(config)#
Router1(config)#
Router1(config)#

```

Fournir le certificat à une autorité de certification tierce.

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
```







Téléchargez tous les certificats répertoriés sous CAPF-trust, notamment Cisco\_Manufacturing\_CA, Cisco\_Root\_CA\_2048, CAP-RTP-001, CAP-RTP-002, CAPF et CAPF-xxx . Téléchargez également tous les certificats CAPF-xxx qui sont répertoriés sous CallManager-trust et non sous CAPF-trust.

CallManager-trust	<a href="#">CAPF-2fbd03a4</a>
CallManager-trust	<a href="#">CAPF-dc3oda68</a>
CallManager-trust	<a href="#">Cisco_Manufacturing_CA</a>
CallManager-trust	<a href="#">CAPF-19a340e5</a>
CallManager-trust	<a href="#">CAP-RTP-002</a>
CallManager-trust	<a href="#">CAPF-851d4452</a>
CallManager-trust	<a href="#">Cisco_Manufacturing_CA_SHA2</a>
CallManager-trust	<a href="#">CAP-RTP-001</a>
CallManager-trust	<a href="#">cm10</a>
CallManager-trust	<a href="#">ACT2_SUDI_CA</a>
CAPF	<a href="#">CAPF-72c7ffbb</a>
CAPF-trust	<a href="#">Cisco Root CA 2048</a>
CAPF-trust	<a href="#">CAPF-72c7ffbb</a>
CAPF-trust	<a href="#">Cisco_Root_CA_M2</a>
CAPF-trust	<a href="#">CAPF-2fbd03a4</a>
CAPF-trust	<a href="#">Cisco_Manufacturing_CA</a>
CAPF-trust	<a href="#">CAP-RTP-002</a>
CAPF-trust	<a href="#">CAPF-851d4452</a>
CAPF-trust	<a href="#">Cisco_Manufacturing_CA_SHA2</a>
CAPF-trust	<a href="#">CAP-RTP-001</a>
CAPF-trust	<a href="#">ACT2_SUDI_CA</a>
ipsec	<a href="#">cm10.vipul.com</a>
ipsec-trust	<a href="#">cm10.vipul.com</a>
ITLRecovery	<a href="#">ITLRECOVERY_cm10</a>

Configurez des points de confiance pour chacun d'entre eux sur votre routeur SRST. Assurez-vous de donner le même nom de point de confiance que le .pem.

### ÉTAPES RÉCAPITULATIVES :

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

Copiez ici tout le contenu qui s'affiche entre `—BEGIN CERTIFICATE—`and`—END CERTIFICATE—` du fichier .pem correspondant avec une ligne vide à la fin ou le mot **quit et collez-le sur le terminal, appuyez sur Entrée.**

```

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

MIIEZTCCA8GgAwIBAgIKAmInswAAAAAARzANBgkqhkiG9w0BAQUFADA1MRYwFAyD
VQqKEw1DaXNjbyBTeXN0ZW1zMRswGQYDVoQDEwJDAeXNjbyBzSb290IENBIDIwNDgw
HhcNMDUwNjEwMjIxNjAxNjcwNTEOMjAyNTQyWjA5MRYwFAyDVoQqKEw1DaXNj
byBTeXN0ZW1zMRswGQYDVoQDEwJDAeXNjbyBNYw51ZmFjdHVyaW5nIENBMTIBIDAN
BgkqhkiG9w0BAQEFAAOCAQ0AMIIBCACQAQEAAoMX33JaUNRXx9J1Ou5tB4X3beRaR
u/NUSkFKlDjIYskj95rnu5t56AcpTjDirhVFIvZGsPj05o6BuBmMqJuF0kKB23zL
lKkRYRiC0ozIByaFqd925xGauI2r+z4Cv+YEwf0M06l+IgaqujHPBz07k9zVw3
8YaTnjlxdX007ksDqcApewDQ74eeATEw9Ug2P9irzhXi6FifPmJxBIcmpBVIASWq
ld/JyVu4yaEHe75okpOTIKhsvRV100rDRUvvsqNpgx9jIicjtQeH1X1eOUzKTSdXZ
D/g2qgfEMkHPp68d6f/2c5k5WnNnYhM0DR9elXBszBcG7FncXNtq6jUAQQIBA6OC
AecwggHjMBIGA1UdEwEB/wQIMAYBAf8CAQAwwHQYDVR0OBBYEFNDFIiarT0Eg7K4F
kcfCwGwR/dsMAAGAlUdDwQEAWIBhjAQBgkrBgEEAYI3PQEAAwIBADAZBgkrBgEE
AYI3FAIEDB4KAFMAdQBiAEMAQTA1BgNVRSMEGDAMQBgQn88gVHm6aAgkWrSuglWbf
2nsvqjBDBgNVHR8EPDA6MDIgaNqA0hjJodHRwOi8vd3d3LmNpc2NvLmVhS9zZWNI
cm10eS9wa2kvY3JsL2NyY2E5YMDQ4LmNybDBBQggrBgEFBQcBAQREMEIwQAYIKwYB
BQUHMAKGNGh0dHA6Ly93d3cuY21zY28uY29tL3N1Y3VyaXR5L3BraS9j2XJ0cy9j
cmNhMjA0OC5jZEXIwAYDVR0gBFUwUzBRBggrBgEEAQkVAQIAMEMwQYIKwYBBQUH
AgEWNWh0dHA6Ly93d3cuY21zY28uY29tL3N1Y3VyaXR5L3BraS9wb2xpY21lcY9p
bmRleC5odG1sSMF4GA1UdJQXMFUGCCsGAQUFBwMBBggrBgEFBQcDAgYIKwYBBQUH
AwUGCCsGAQUFBwMBBggrBgEFBQcDBWYKKwYBBAGCNwoDAQYKKwYBBAGCNxQCAQYJ
KwYBBAGCNrUGMA0GCSqGSIb3DQEBBQUAA4IBAQAww8zAtjPLKN0pkmSqpCvKGGkLV
I+ii6itvaSN6go4cTAnPpE+rhC836WVg0ZrG2PML9d7QJwBcbx2RvdFOWFEdyeP3
OOFTC9Fovo4ipUsG4eakqjN9GnW6JvNwxEAPcN5JlunGdGTjaubEBEPh6GC/f08
S25l3JNFBemwM2tnIwcGh1La69yHz1khQhrpz3BliOAKPV19TpY4gJfVh/Cbcdi6
YBmlsGGGrdl1Eva5J6LuL2GbusqEwYf2+rDUU+bgtlwaww+9tzD0865XpgdOKXrbo
+nmka9eiV2TEP0zJ2+ic7APmIBCiolblPfft6QKoSJfjB6thJksaE5/k3Npf
quit
Certificate has the following attributes:
  Fingerprint MD5: 6EA241F5 AC9A1148 CC8B4B43 C7C13025
  Fingerprint SHA1: E3E783D3 CC9C30AE DEFFCDEB 5ECFEE08 FF8F1684
Certificate validated - Signed by existing trustpoint CA certificate.

Trustpoint CA certificate accepted.
% Certificate successfully imported

Router1(config)#

```

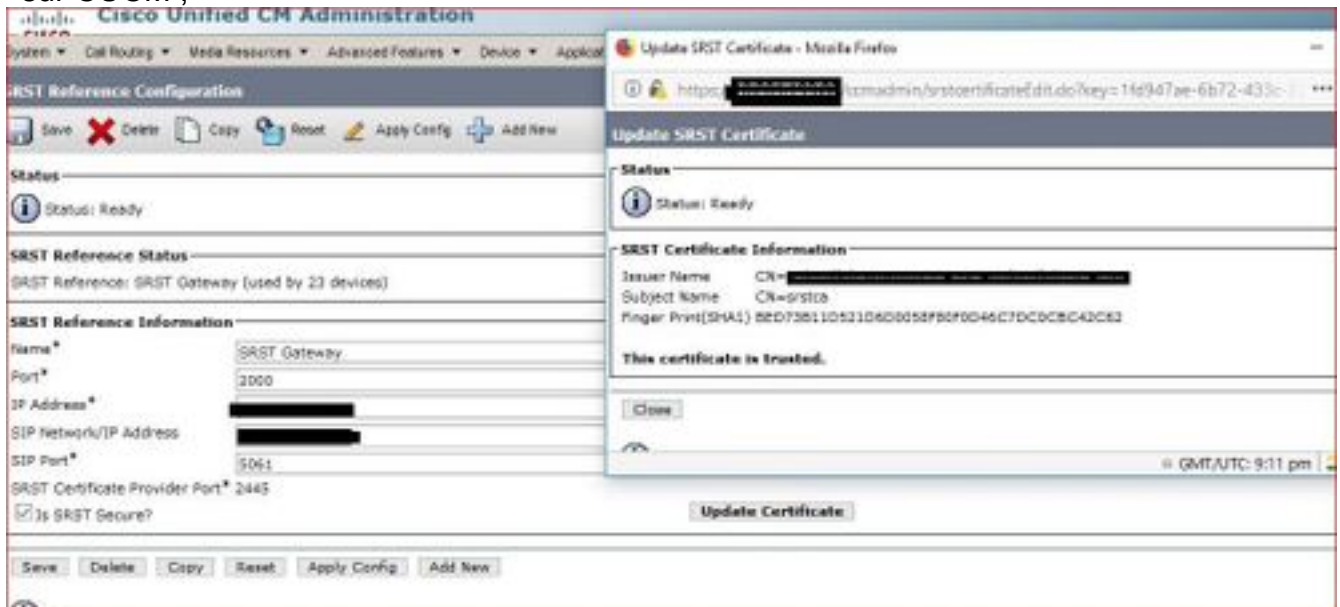
RÉPÉTEZ ceci pour tous les points de confiance

## Étape 5. CONFIGURATIONS CUCM :

1. Ajoutez votre *référence SRST* sous système
2. Activez la case à cocher *Is SRST Secure* ?
3. Pour SIP Secure-SRST, n'oubliez pas de modifier le port de votre référence SRST en tant que **5061**.
4. Créez un profil de sécurité pour votre téléphone sous *System>Security>Phone security profile*. Ajoutez ce profil de sécurité à votre téléphone sous *Profil de sécurité du périphérique*.
5. Sélectionnez Mettre à jour le certificat pour vérifier que le premier certificat a été renseigné



sur CUCM :



## Étape 6. Configurations spécifiques SRST pour votre routeur SRST

### A). Configuration du protocole SIP SRTP pour les téléphones cryptés

#### ÉTAPES RÉCAPITULATIVES :

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

**Note:** Utilisez srtp fallback si vous voulez que les appels non srtp fonctionnent.

### B). Configurer la stratégie de sécurité SRST SIP

#### ÉTAPES RÉCAPITULATIVES :

```
voice register global
security-policy secure
```

## Sample Config

```
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
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69666963 6174652D 32323532 38303136 3532301E 170D3138 30353232 31393534  
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DBA67CA5 4C5B8E2F D547A86B 374A04B8 F4A04AE7 9D38D398 B43801AE 779DD7A3  
B26FD7AE 542D15BC 71A1E602 E2710F70 587D7380 508FC890 1CD3CF7D A541DCB5  
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quit

crypto pki certificate chain srstca

certificate 02

30820291 308201FA A0030201 02020102 300D0609 2A864886 F70D0101 05050030  
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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  
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6E5794FD BA70435C 910FBFF3 F0A15C26 BBF96D72 05A567F9 B6406E1D A60F559D  
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quit

certificate ca 01

30820207 30820170 A0030201 02020101 300D0609 2A864886 F70D0101 04050030  
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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  
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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  
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73379F52 83

quit

crypto pki certificate chain ACT2\_SUDI\_CA

certificate ca 61096E7D000000000000C

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6D73311B 30190603 55040313 12436973 636F2052 6F6F7420 43412032 30343830  
1E170D31 31303633 30313735 3635375A 170D3239 30353134 32303235 34325A30  
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FE6B67BA 91B9EC0A 3299754E 223759D0 4D8D98E7 A5F8E0EB A17E3F84 9A0E419B  
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9FA978FB 7B0FB3FE C5E55ED1 0E8D25C9 511B3230 48F9DD17 5DF6D270 1E4CBC9D  
E6A9B334 BEAFE91D 55020301 0001A382 015A3082 0156300B 0603551D 0F040403  
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F87F301F 0603551D 23041830 16801427 F3C8151E 6E9A0209 16AD2BA0 89605FDA  
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2E636973 636F2E63 6F6D2F73 65637572 6974792F 706B692F 63726C2F 63726361  
32303438 2E63726C 30500608 2B060105 05070101 04443042 30400608 2B060105  
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01163568 7474703A 2F2F7777 772E6369 73636F2E 636F6D2F 73656375 72697479  
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quit

crypto pki certificate chain CAPF-2fbd03a4

certificate ca 7FA76BD99C1DDA013BE037763BC78C33

3082029C 30820205 A0030201 0202107F A76BD99C 1DDA013B E037763B C78C3330  
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61633116 30140603 55040313 0D434150 462D3266 62643033 6134310B 30090603  
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A7972459 B51B335C E1DCCF3B 6E2D9504 78A95267 C5BFEC43 5FD0B430 AD87632F  
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quit

crypto pki certificate chain CAPF-72c7ffbb

certificate ca 6DBF757CC9B4B5D97357362ACF2F6A5B

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7B18A5FE 71A2A609 0DFB5A15 3A8B9A38 A2300D06 092A8648 86F70D01 010B0500  
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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 CAPF-851d4452

certificate ca 497E1692253769919F72D12F6754F2CF  
308203A1 30820289 A0030201 02021049 7E169225 3769919F 72D12F67 54F2CF30  
0D06092A 864886F7 0D010105 05003065 310B3009 06035504 06130255 53310E30  
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03550403 0C0D4341 50462D38 35316434 34353231 0B300906 03550408 0C027478  
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748805B0 79C36694 C3430D8E ABF7541D B258FD44 E1191E56 13B08CCA FCDE02BB  
F4E14129 3EDB3D19 98DA5464 9E0DCC92 F84E95D3 EB318D8F AEAFFB6CB 941843F2  
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8650BCA9 5EBF6FF5 09060341 0ED13620 A08C53C7 9012E2F6 7DC439DA 3C4C0DE7  
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B2B74889 39D8CA52 0A46B2FE 196AD4F4 3E0E327C 98DF3850 43FD421A D7CB64F8  
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quit

crypto pki certificate chain CAP-RTP-001

certificate ca 7612F960153D6F9F4E42202032B72356  
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170D3033 30323036 32333237 31335A17 0D323330 32303632 33333633 345A302E  
31163014 06035504 0A130D43 6973636F 20537973 74656D73 31143012 06035504  
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quit

crypto pki certificate chain CAP-RTP-002

certificate ca 353FB24BD70F14A346C1F3A9AC725675  
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20537973 74656D73 31143012 06035504 03130B43 41502D52 54502D30 3032301E  
170D3033 31303130 32303138 34395A17 0D323331 30313032 30323733 375A302E  
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00038201 0D003082 01080282 010100C4 266504AD 7DC3FD8D 65556FA6 308FAE95  
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FB4D221B 21D7A3AD 38184171 8FD8C271 42183E65 09461434 736C77CC F380EEBF  
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quit

crypto pki certificate chain Cisco\_Manufacturing\_CA

certificate ca 6A6967B3000000000003

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1E170D30 35303631 30323231 3630315A 170D3239 30353134 32303235 34325A30  
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04031316 43697363 6F204D61 6E756661 63747572 696E6720 43413082 0120300D  
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94A91161 121C5CEA 33201C9A 16A77DDB 99066AE2 36AFECF8 0AFF9867 07F430EE  
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quit

crypto pki certificate chain Cisco\_Manufacturing\_CA\_SHA2

certificate ca 02

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37313131 32313330 3031375A 3036310E 300C0603 55040A13 05436973 636F3124  
30220603 55040313 1B436973 636F204D 616E7566 61637475 72696E67 20434120  
53484132 30820122 300D0609 2A864886 F70D0101 01050003 82010F00 3082010A  
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A1BB3860 1E6520D4 DB6201F2 4444CFE9 3F17AFA4 ED0F4877 EB9E0E50 7716FB59  
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3DF268D5 EF020301 0001A382 01873082 0183300E 0603551D 0F0101FF 04040302  
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3BC0BE2A 0EAA876E 73

quit

crypto pki certificate chain Cisco\_Root\_CA\_2048

certificate ca 5FF87B282B54DC8D42A315B568C9ADFF

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20537973 74656D73 311B3019 06035504 03131243 6973636F 20526F6F 74204341  
20323034 38301E17 0D303430 35313432 30313731 325A170D 32393035 31343230  
32353432 5A303531 16301406 0355040A 130D4369 73636F20 53797374 656D7331



1B301906 03550403 13124369 73636F20 526F6F74 20434120 32303438 30820120  
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ABA7AF0A 77A7E271 B6B46662 94788847 C6625584 4032BFC0 AB2EA51C 71D6BC6E  
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quit

crypto pki certificate chain Cisco\_Root\_CA\_M2

certificate ca 01

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37313131 32313330 3031385A 302B310E 300C0603 55040A13 05436973 636F3119  
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092A8648 86F70D01 01010500 0382010F 00308201 0A028201 0100D806 2521134F  
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BB6334DB B312426A 798586B3 E87FC992 8BE3A737 45D39483 686520DB 8AD44341  
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6486D2F0 B8E15916 3AA62648 05EE6329 1E1583EF 1E79C182 0029D456 8F0A6DC2  
C858392D 63B87180 3AE1DCEB B3135222 05514700 88876DED D13CD7B8 DA857924  
C62A5D1D F2834D81 1FA7CDD4 198EAB69 40E6FB07 0AF28E65 3E6DE53D C132EE06  
262DECEB 1EB14562 512BF059 1731721A CC0074C3 0CBB84CA 73AD0203 010001A3  
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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 C311DECO  
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

srtplib

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

rellxx 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 FOCXXXXXXXXX  
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#
```

## Vérification

Référez-vous à cette section pour vous assurer du bon fonctionnement de votre configuration.

Si vous avez utilisé le serveur de certificats Cisco IOS comme autorité de certification, utilisez la **show running-config** pour vérifier l'inscription au certificat ou **show crypto pki server** pour vérifier

l'état du serveur AC.

## Étapes récapitulatives

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
```

Utilisez **show sip-ua status registrar** pour vérifier l'enregistrement

## Dépannage

Il n'existe actuellement aucune information de dépannage spécifique pour cette configuration.

## Informations connexes

- [Guide d'administration SRST](#)
- [Support et documentation techniques - Cisco Systems](#)