IntelePeer SIP Trunking with TLS:

Connecting Cisco Unified Communications Manager 11.5.1 with Cisco Unified Border Element (CUBE 11.6.0) on ISR 4321/K9 [IOS-XE 16.5.1b] using Secure SIP

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Introduction

Service Providers today, such as IntelePeer, are offering alternative methods to connect to the PSTN via their IP networks. Most of these services utilize SIP as the primary signaling method and centralized IP to TDM POP gateways to provide on-net and off-net services.

A demarcation device between these services and customer owned services is recommended. As an intermediary device between Cisco Unified Communications Manager and IntelePeer network, Cisco Unified Border Element (CUBE) ISR 4321/K9 running IOS-XE 16.5.1b can be used. The Cisco Unified Border Element provides demarcation, security, interworking and session control services for Cisco Unified Communications Manager 11.5.1 connected to IntelePeer network.

This document assumes the reader is knowledgeable with the terminology and configuration of Cisco Unified Communications Manager (CUCM). Only configuration settings specifically required for IntelePeer interoperability are presented. Feature configuration and most importantly the dial plan are customer specific and need individual approach.

- This application note describes how to configure a Cisco Unified Communications Manager (Cisco UCM) 11.5.1 and Cisco Unified Border Element (CUBE) on ISR 4321/K9 [IOS-XE 16.5.1b] for connectivity to IntelePeer SIP Trunking service available in the former IntelePeer Business service area[1] . The deployment model covered in this application note is CPE (Cisco UCM 11.5.1) to PSTN (IntelePeer).
- Testing was performed in accordance to IntelePeer generic SIP Trunking test methodology and among features verified were – basic calls, DTMF transport, Music on Hold (MOH), unattended and attended transfers, call forward, conferences and interoperability with Cisco Unity Connection (CUC).
- The Cisco UCM configuration detailed in this document is based on a lab environment with a simple dial-plan used to ensure proper interoperability between IntelePeer SIP network and Cisco Unified Communications. The configuration described in this document details the important configuration settings to have enabled for interoperability to be successful and care must be taken by the network administrator deploying CUCM to interoperate to IntelePeer SIP Trunking network.

This application note does not cover the use of Calling Search Spaces (CSS) or partitions on Cisco UCM. To understand and learn how to apply CSS and partitions refer to the cisco.com link below:

http://www.cisco.com/c/en/us/td/docs/voice_ip_comm/cucm/srnd/collab10/collab10/dialplan.html

Network Topology

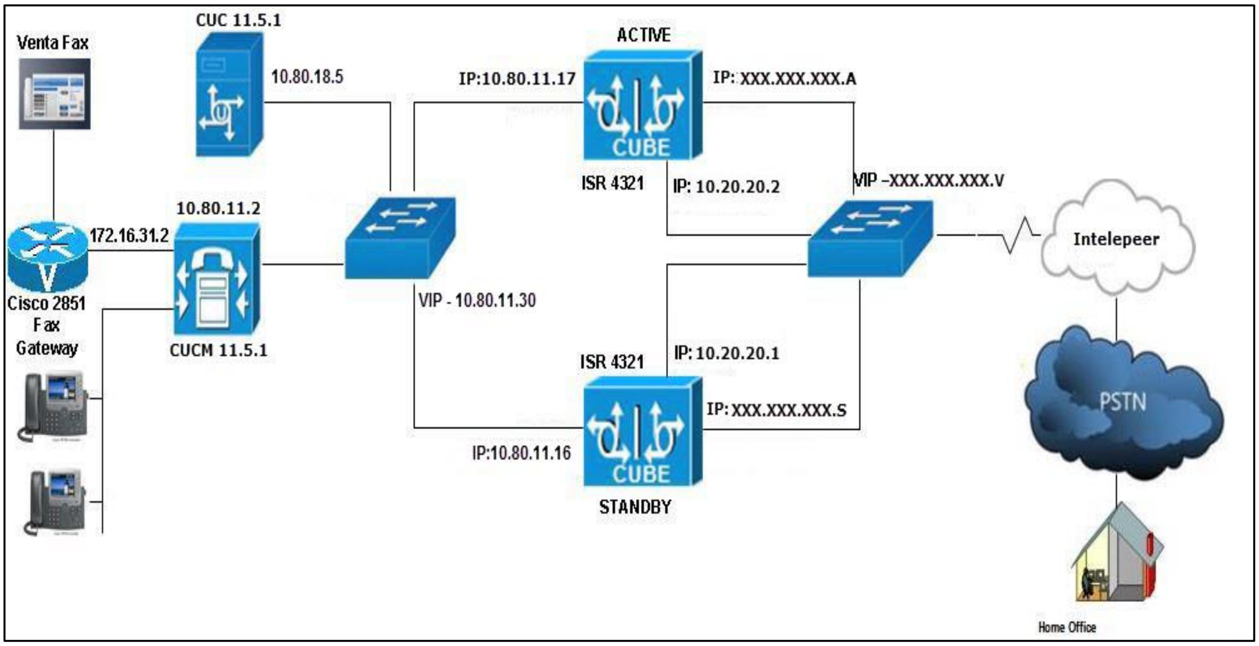

Figure 1: Network Topology

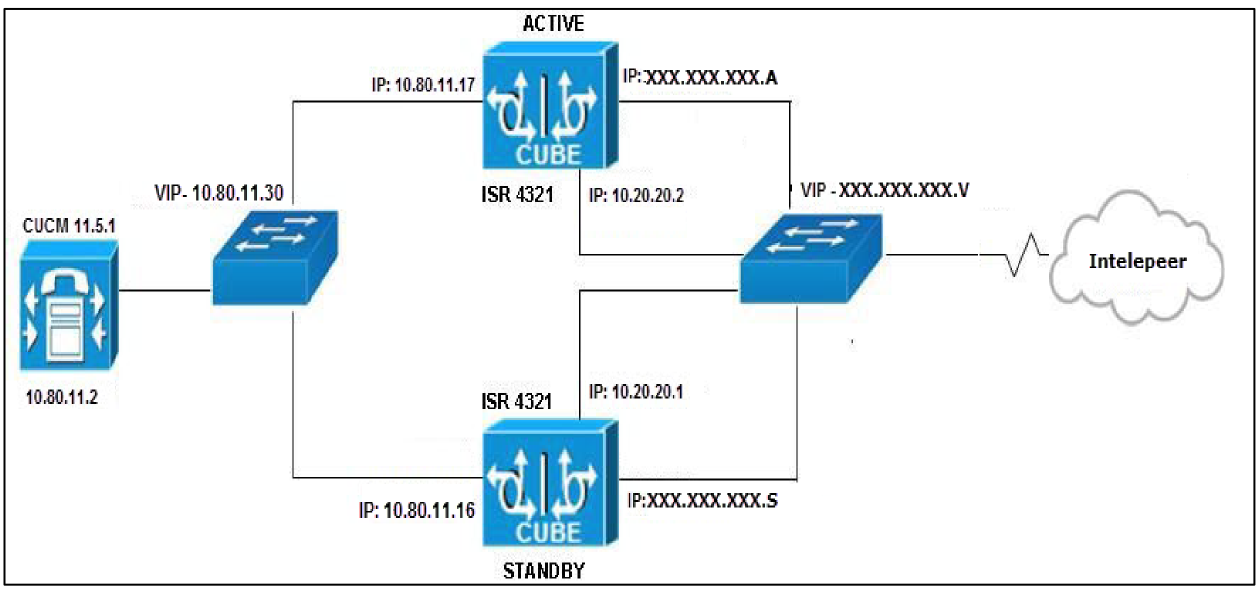

Figure 2: CUBE High Availability

System Components

Hardware Requirements

- Cisco UCSC-C240-M3S VMWare host running ESXi 5.5 Standard
- Cisco ISR4431/K9 router as CUBE
- Cisco ISR4431/K9 (1RU) processor with 1684579K/6147K bytes of memory with 4 Gigabit Ethernet interfaces
- Cisco 2851 Fax Gateway
- IP phones 9971 (SIP) and 8945 (SIP)
- Cisco 3945 router for hardware Conference Bridge

Software Requirements

- Cisco Unified Communications Manager 11.5.1
- Cisco Unity Connection 11.5.1
- IOS 16.05.01b for ISR 4431/K9 Cisco Unified Border Element
- Cisco IOS Software, ISR Software (X86_64_LINUX_IOSD-UNIVERSALK9-M), Version 16.05.01b, RELEASE SOFTWARE (fc1)
- IOS 15.1(4)M5 for Cisco 2851 Fax Gateway

Features

Features Supported Over TLS

- Incoming and outgoing off-net calls using G711ULaw
- Call hold
- Call transfer (unattended and attended)
- Call conference
- Call forward (all, busy and no answer)
- Calling Line (number) Identification Presentation (CLIP)
- Calling Line (number) Identification Restriction (CLIR)
- DTMF relay (both directions) (RFC2833)
- Media flow-through on Cisco UBE
- Fax (G.711 pass-through and T38)

Features Not Supported Over TLS

- Cisco IP phones used in this test do not support blind transfer
- In HA redundancy mode, the primary cube will not take over the primary/active role after a reboot/network outage

Caveats

- Caller ID is not updated after attended or unattended transfers to off-net phones. This is due to a limitation on Cisco UBE and will be resolved in the next release. The issue does not impact the calls.
- CUCM Conference Bridge only supports non-secure conferencing. External Conference Bridge is required for secure conferencing.
- G.711 Pass-through fax transmitted in RTP. First call established in SRTP, when fax gateway sends Re-Invite for fax call it falls back to RTP

Configuration

Configuring Cisco Unified Border Element (CUBE)

Network Interface

Configure Ethernet IP address and sub interface. The IP address and VLAN encapsulation used are for illustration only, the actual IP address can vary. For SIP trunks two IP addresses must be configured - for LAN and WAN. An additional Virtual IP Address (VIP) is required for the LAN and WAN as defined by the redundancy group 1 ip XXX.XXX.XXX.V exclusive statement.

```
interface GigabitEthernet0/0/0
 ip address XXX.XXX.XXX.A 255.255.255.128
 negotiation auto
 redundancy rii 2
 redundancy group 1 ip XXX.XXX.XXX.V exclusive
!
interface GigabitEthernet0/0/1
 ip address 10.80.11.17 255.255.255.0
 negotiation auto
 redundancy rii 1
 redundancy group 1 ip 10.80.11.30 exclusive
```

Global CUBE Settings

In order to enable CUBE IP2IP gateway functionality, enter the following:

```
voice service voip
 no ip address trusted authenticate
 mode border-element
 allow-connections sip to sip
 redundancy-group 1
 fax protocol pass-through g711ulaw
 sip
  bind control source-interface GigabitEthernet0/0/0
  bind media source-interface GigabitEthernet0/0/0
  session transport tcp tls
  rel1xx supported "rel100"
  header-passing
  asserted-id pai
  early-offer forced
  midcall-signaling passthru
  privacy-policy passthru
```

Explanation

Command	Description
allow-connections sip to sip	Allow IP2IP connections between two SIP call legs
fax protocol	Specifies the fax protocol
asserted-id	Specifies the type of privacy header in the outgoing SIP requests and response messages
early-offer forced	Enables SIP Delayed-Offer to Early-Offer globally
midcall-signaling passthru	Passes SIP messages from one IP leg to another IP leg
session transport tcp tls	Enable TLS

Codecs

G711Ulaw is used as the preferred codec for this testing and changed the preferences according to the test plan description

```
voice class codec 1
codec preference 1 g711ulaw
codec preference 2 g729r8
```

Dial Peer

Cisco UBE uses dial-peers to route the call accordingly based on the digits

```
dial-peer voice 10 voip
 description Incoming from CUCM
 huntstop
 session protocol sipv2
 session transport tcp tls
 incoming called-number [0-9]T
 voice-class codec 2
 voice-class sip profiles 100
 voice-class sip srtp-crypto 1
 voice-class sip bind control source-interface GigabitEthernet0/0/1
 voice-class sip bind media source-interface GigabitEthernet0/0/1
 dtmf-relay rtp-nte
 srtp
 fax-relay ecm disable
 fax-relay sg3-to-g3
 fax rate disable
 fax nsf 000000
 fax protocol pass-through g711ulaw
 no vad
!
dial-peer voice 20 voip
 description Outgoing to intelepeer
 huntstop
 destination-pattern [0-9]T
 session protocol sipv2
 session target dns:user@domain.com
 session transport tcp tls
 voice-class codec 2
 voice-class sip conn-reuse
```

```
 voice-class sip options-ping 60
 voice-class sip profiles 100
 voice-class sip srtp-crypto 1
 voice-class sip bind control source-interface GigabitEthernet0/0/0
 voice-class sip bind media source-interface GigabitEthernet0/0/0
 dtmf-relay rtp-nte
 srtp
 fax-relay ecm disable
 fax-relay sg3-to-g3
 fax rate disable
 fax nsf 000000
 fax protocol pass-through g711ulaw
 no vad
!
dial-peer voice 30 voip
 description Incoming from intelepeer
 huntstop
 session protocol sipv2
 session transport tcp tls
 incoming called-number +1980
 voice-class codec 2
 voice-class sip profiles 100
 voice-class sip srtp-crypto 1
 voice-class sip bind control source-interface GigabitEthernet0/0/0
 voice-class sip bind media source-interface GigabitEthernet0/0/0
 dtmf-relay rtp-nte
 srtp
 fax-relay ecm disable
 fax-relay sg3-to-g3
 fax rate disable
 fax nsf 000000
 fax protocol pass-through g711ulaw
 no vad
!
dial-peer voice 40 voip
 description Outgoing to CUCM
 huntstop
 destination-pattern +1980
```

```
session protocol sipv2
session target ipv4:10.80.11.2:5061
session transport tcp tls
voice-class codec 2
voice-class sip options-ping 60
voice-class sip profiles 100
voice-class sip srtp-crypto 1
voice-class sip bind control source-interface GigabitEthernet0/0/1
voice-class sip bind media source-interface GigabitEthernet0/0/1
dtmf-relay rtp-nte
srtp
fax-relay ecm disable
fax-relay sg3-to-g3
fax rate disable
fax nsf 000000
fax protocol pass-through g711ulaw
no vad
```

Call Flow

In the sample configuration presented here, Cisco UCM is provisioned with four-digit directory numbers corresponding to the last four DID digits. No digit manipulation is performed on the Cisco UBE.

For incoming PSTN calls, the Cisco UBE presents the full ten-digit DID number to Cisco UCM. The Cisco UCM picks up the last 4 significant Digits configured under SIP Trunk and routes the call based on those 4 digits. Voice calls are routed to IP phones; Fax calls are routed via a 4-digit route pattern over a SIP trunk that terminates on the Fax Gateway and in turn to the VentaFax client connected to the Fax Gateway.

CPE callers make outbound PSTN calls by dialing a “7” prefix followed by the destination number. For outbound fax calls from the analog fax endpoint, Cisco fax Gateway sends to Cisco UCM the DID with leading access code “7”. A “7.@” route pattern strips the prefix and routes the call with the remaining digits via a SIP trunk terminating on the Cisco UBE for Voice call or Fax. For PBX to PBX via IntelePeer, Caller dial 7 prefix followed by the target 1+10Digit DID no for that extension number, 7 was stripped and the 1 +10 digits number was send to Cisco UBE, Cisco UBE sends the full 1+ 10 digits DID under Dial Peer 20 and send to Spectrum network which will direct back to Cisco UBE and handled same as normal incoming PSTN call. For International calls same pattern 7 followed by 011, country code and calling no is used.

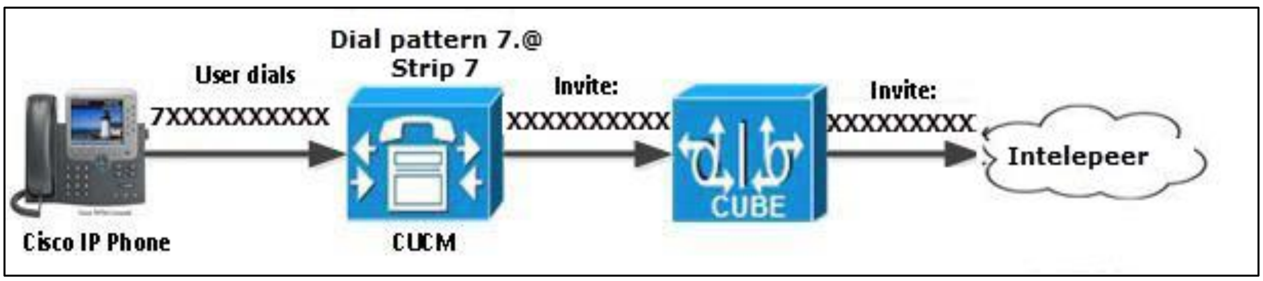

Figure 3: Outbound Voice Call

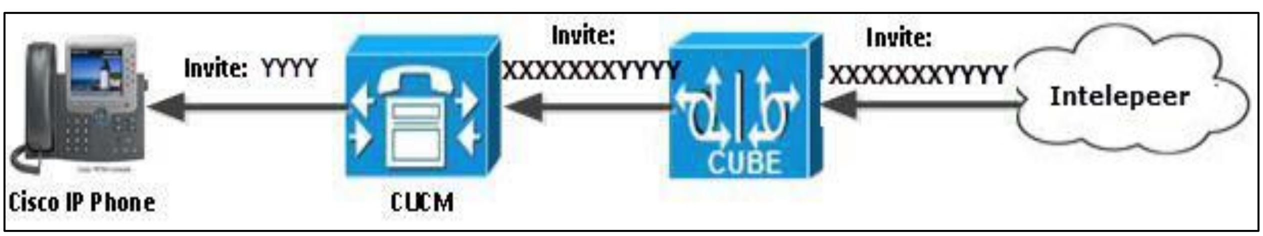

Figure 4: Inbound Voice Call

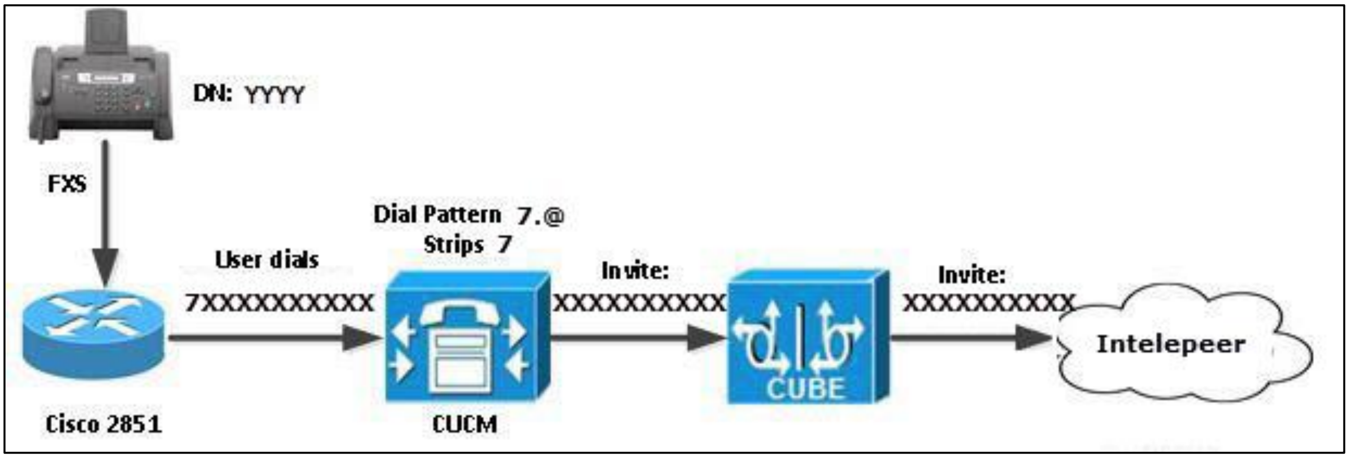

Figure 5: Outbound Fax Call

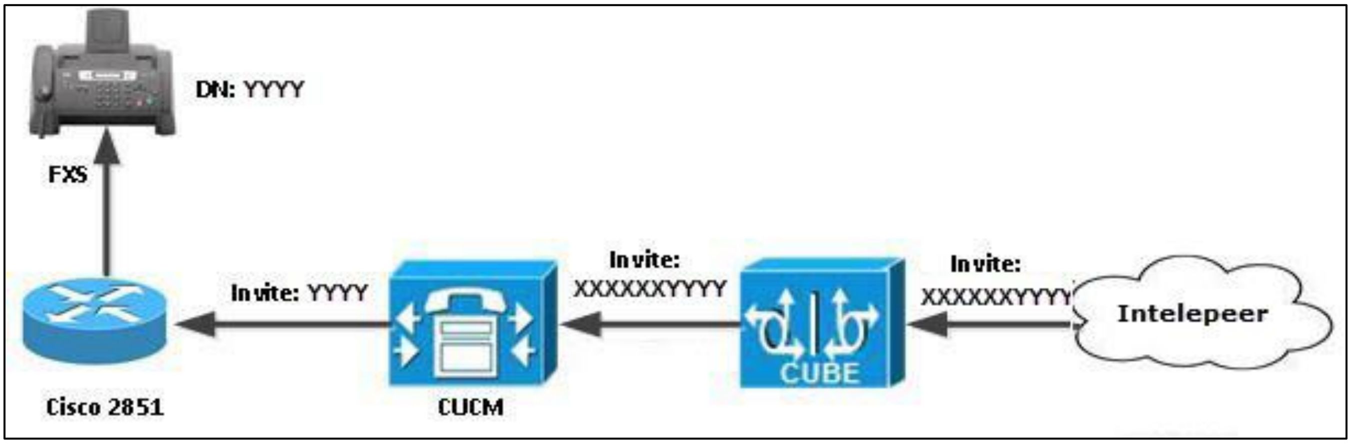

Figure 6: Inbound Fax Call

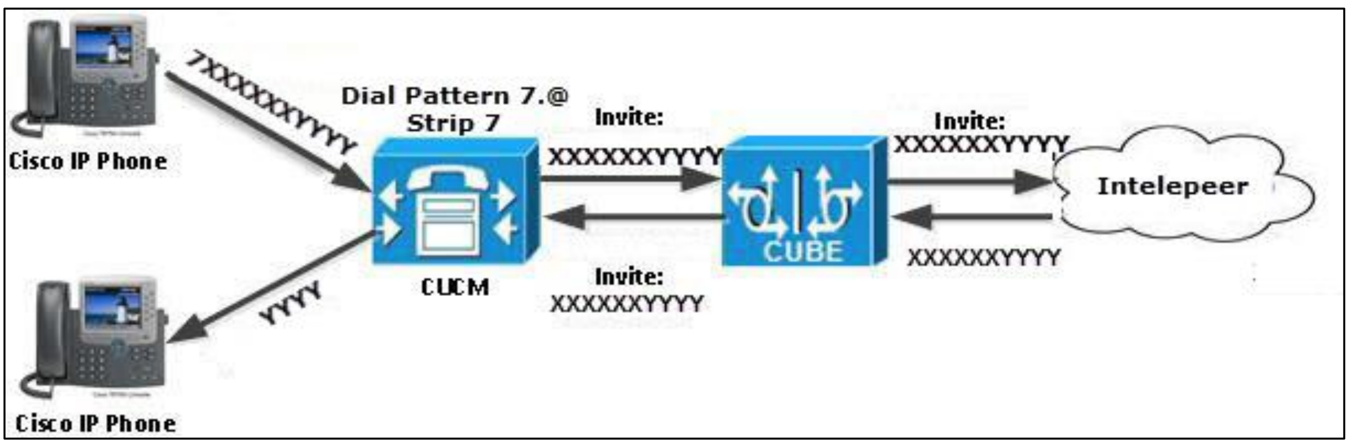

Figure 7: PBX to PBX via Spectrum Call

Configuration Example

The following configuration snippet contains a sample configuration of CUBE with all parameters mentioned previously

Active Cisco UBE

```
intelPeerCube2#sh run
Building configuration...
Current configuration : 14586 bytes
!
 Last configuration change at 11:21:44 UTC Thu Sep 7 2017 by cisco
!
version 16.5
service timestamps debug datetime msec
service timestamps log datetime msec
platform qfp utilization monitor load 80
no platform punt-keepalive disable-kernel-core
!
hostname intelPeerCube2
!
boot-start-marker
boot-end-marker
!
vrf definition Mgmt-intf
 !
 address-family ipv4
 exit-address-family
 !
 address-family ipv6
 exit-address-family
!
enable secret 5 ************
!
no aaa new-model
!
ip name-server 8.8.8.8
!
subscriber templating
!
multilink bundle-name authenticated
!
crypto pki trustpoint lynclabcc-DC-CA
 enrollment terminal
 serial-number none
 ip-address 10.80.11.30
 subject-name CN=intelPeerCube2
 revocation-check none
 rsakeypair itpcube
!
crypto pki trustpoint "DigiCert SHA2 Secure Server CA"
 enrollment terminal
```

```
 serial-number none
 ip-address XXX.XXX.XXX.V
 subject-name CN=intelPeerCube2
 revocation-check none
 rsakeypair itpcube
!
crypto pki certificate chain lynclabcc-DC-CA
 certificate 5100000071DE5686AC5661895B000000000071
  3082055E 30820446 A0030201 02021351 00000071 DE5686AC 5661895B 00000000
  0071300D 06092A86 4886F70D 01010505 00304C31 15301306 0A099226 8993F22C
  64011916 056C6F63 616C3119 3017060A 09922689 93F22C64 01191609 6C796E63
  6C616263 63311830 16060355 0403130F 6C796E63 6C616263 632D4443 2D434130
  1E170D31 37303831 30303931 3232335A 170D3139 30383130 30393132 32335A30
  19311730 15060355 0403130E 696E7465 6C506565 72437562 65323082 0122300D
  06092A86 4886F70D 01010105 00038201 0F003082 010A0282 010100B0 B819E806
  CEBC9BE4 7CE1A36A 31E74125 55A12423 EEEA32E6 5717D6AF 076DB62E E52B68E1
  2FFEC9BA DFDD931E FDED368F BB1D6E45 FC604DAD F805C50E 68D3F5C3 2A222409
  D20808F5 083A4C1F EDDD9D71 71192AF1 2C59D311 4235C773 0F7831FA 0B92E636
  2F336184 E8A1BA63 7869A4E0 CC382516 674C1FCC 8DEF4E0A 43847EBD BC5A5608
  4E70180E 41381B89 D1F8563F D65B0811 CF18F281 C3B61EF5 3E142996 FE3C8AA2
  15085045 F15C7747 D90E9A56 BB5E9209 386C9230 3FA73BB3 0FB82061 B7380ECD
  958C59A1 A30627E2 A9610D32 2593930A 18FCFDA5 3BBA7815 B213CB88 24F34363
  93151FD4 B15713D2 864E5CD2 7BC701C9 4C495700 A06474BB C1020D02 03010001
  A382026A 30820266 300E0603 551D0F01 01FF0404 030205A0 301D0603 551D0E04
  160414D1 C3089AC7 770F33D4 7CE73DF9 DC487A4D 1108D330 1F060355 1D230418
  30168014 F4482916 1373177E 925C695A 432785EA 91EA1449 3081C806 03551D1F
  0481C030 81BD3081 BAA081B7 A081B486 81B16C64 61703A2F 2F2F434E 3D6C796E
  636C6162 63632D44 432D4341 2C434E3D 44432C43 4E3D4344 502C434E 3D507562
  6C696320 4B657920 53657276 69636573 2C434E3D 53657276 69636573 2C434E3D
  436F6E66 69677572 6174696F 6E2C4443 3D6C796E 636C6162 63632C44 433D6C6F
  63616C3F 63657274 69666963 61746552 65766F63 6174696F 6E4C6973 743F6261
  73653F6F 626A6563 74436C61 73733D63 524C4469 73747269 62757469 6F6E506F
  696E7430 81C10608 2B060105 05070101 0481B430 81B13081 AE06082B 06010505
  07300286 81A16C64 61703A2F 2F2F434E 3D6C796E 636C6162 63632D44 432D4341
  2C434E3D 4149412C 434E3D50 75626C69 63204B65 79205365 72766963 65732C43
  4E3D5365 72766963 65732C43 4E3D436F 6E666967 75726174 696F6E2C 44433D6C
  796E636C 61626363 2C44433D 6C6F6361 6C3F6341 43657274 69666963 6174653F
  62617365 3F6F626A 65637443 6C617373 3D636572 74696669 63617469 6F6E4175
  74686F72 69747930 3D06092B 06010401 82371507 0430302E 06262B06 01040182
  37150885 EE8E0581 9FDE6482 BD8715F6 9B0E82FA A5608166 82949C4A 87E69D40
  02016402 0104301D 0603551D 25041630 1406082B 06010505 07030106 082B0601
  05050703 02302706 092B0601 04018237 150A041A 3018300A 06082B06 01050507
  0301300A 06082B06 01050507 0302300D 06092A86 4886F70D 01010505 00038201
  01003955 DF7FA3B4 95363DF3 CCE774A4 F85986EA D71437E4 C54CC97C 18617A36
  89767847 54698335 B0724626 A99CD191 8D367B86 5784BDCC E6C0F8A2 FE4B406B
  2EDC6FDD EE805FC1 64889F82 AE4A62B7 B3164BB3 DD197FE9 574B84A0 925C3596
  B80400C5 41CD4B45 F5E2E63F 92B40A63 B3FF0A7D 847A8E1E A19E36EA 3AE94ED1
  87AE11B6 156B943F 5F7E419D 763C6430 41634BA2 72B41016 DFB373FB 26CACC96
  C1EFA19A 4197DB5C 6E78883B E62FC288 32D53691 B62433FF C5BAA5A1 4ACE46DC
  F87A33D4 1255AB68 B25A8CCF 58F88B22 1CB4C765 0BC677AC EE2594CD F0FAAF7C
  6A536466 14C8C026 5DC1C35F B7DB7CF5 AA596401 4145FE21 C2FA7F35 BAC01F13 1BD5
      quit
 certificate ca 133A5FA76CC004AD4332C2B40E2DD384
  30820373 3082025B A0030201 02021013 3A5FA76C C004AD43 32C2B40E 2DD38430
  0D06092A 864886F7 0D010105 0500304C 31153013 060A0992 268993F2 2C640119
  16056C6F 63616C31 19301706 0A099226 8993F22C 64011916 096C796E 636C6162
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  3013060A 09922689 93F22C64 01191605 6C6F6361 6C311930 17060A09 92268993
  F22C6401 1916096C 796E636C 61626363 31183016 06035504 03130F6C 796E636C
  61626363 2D44432D 43413082 0122300D 06092A86 4886F70D 01010105 00038201
  0F003082 010A0282 0101009F 402105FF C8F842E0 26BD7788 62912768 6DC18CB5
  800E4755 788DB00D 2D51BE89 CD2E9574 E55ACFAD 0DBB3C69 22F557D8 3CE1246A
  4865F34A 5E151338 8FACE3A2 BCCF41F0 F6F38E24 F8E28E33 15B74062 BA3E7B82
  22453F2D 7AEE69F1 3D3818E3 FAA63C64 F36C2190 74AD92D5 EDA56282 197B980D
  8D2FC9A3 00BAF9D6 6DA40496 490BFD3A 2D7538A6 62024136 ADAD4D3B 26BB1AC5
  B8E4CD81 20BB986E 9B200964 A6B0D904 A9B859DC 0E0388E6 A3DC545D 0DF3F583
  8DF53C23 AA6D87D1 6409A3C6 22880533 A068FC31 717CEE6F 2D11EC3F A551AA9E
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  9E6EBB6B 6292261E 81B11102 03010001 A351304F 300B0603 551D0F04 04030201
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  16137317 7E925C69 5A432785 EA91EA14 49301006 092B0601 04018237 15010403
  02010030 0D06092A 864886F7 0D010105 05000382 01010060 CBA8E054 DE68A314
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  62BDF949 8430F42F 0E19487D 7DE431D8 A19C4579 A8FEAAC2 A074AF45 73CF87E5
  1BCD5D76 072FDE3A BE80E670 FED63262 F52298A8 10185308 167C7F72 DB58A338
  222E725E 12B92472 83196591 1AB38B16 6B8C2FD3 B070CF58 620F6FC3 40EA4F32
  5668A69D 0CB63471 DFC28524 23A816DA 945070AB 273F6574 7EEC7E72 0C267CCD
  C4D13831 2BCC0430 16511679 14DCD4F4 923FAC8E 072F7862 4D08704D 3B233B5E
  257D28B7 59E1EA8E 74A80CD6 5ED85574 7E425FB3 81E2D8
      quit
crypto pki certificate chain "DigiCert SHA2 Secure Server CA"
 certificate ca 01FDA3EB6ECA75C888438B724BCFBC91
  30820494 3082037C A0030201 02021001 FDA3EB6E CA75C888 438B724B CFBC9130
```

```
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72742047 6C6F6261 6C20526F 6F742043 41301E17 0D313330 33303831 32303030
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131E4469 67694365 72742053 48413220 53656375 72652053 65727665 72204341
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00DCAE58 904DC1C4 30159035 5B6E3C82 15F52C5C BDE3DBFF 7143FA64 2580D4EE
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2A93C390 2E798080 EF13046A 143BB59B 92BEC207 654EFCDA FCFF7AAE DC5C7E55
310CE839 07A4D7BE 2FD30B6A D2B1DF5F FE577453 3B3580DD AE8E4498 B39F0ED3
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094EF397 EBE82EAB 0F72A730 0EFAC7F4 FD1477C3 A45B2857 C2B3F982 FDB74558
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30263024 06082B06 01050507 30018618 68747470 3A2F2F6F 6373702E 64696769
63657274 2E636F6D 307B0603 551D1F04 74307230 37A035A0 33863168 7474703A
2F2F6372 6C332E64 69676963 6572742E 636F6D2F 44696769 43657274 476C6F62
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01050507 0201161C 68747470 733A2F2F 7777772E 64696769 63657274 2E636F6D
2F435053 301D0603 551D0E04 1604140F 80611C82 3161D52F 28E78D46 38B42CE1
C6D9E230 1F060355 1D230418 30168014 03DE5035 56D14CBB 66F0A3E2 1B1BC397
B23DD155 300D0609 2A864886 F70D0101 0B050003 82010100 233EDF4B D23142A5
B67E425C 1A44CC69 D168B45D 4BE00421 6C4BE26D CCB1E097 8FA65309 CDAA2A65
E5394F1E 83A56E5C 98A22426 E6FBA1ED 93C72E02 C64D4ABF B042DF78 DAB3A8F9
6DFF2185 5336604C 76CEEC38 DCD65180 F0C5D6E5 D44D2764 AB9BC73E 71FB4897
B8336DC9 1307EE96 A21B1815 F65C4C40 EDB3C2EC FF71C1E3 47FFD4B9 00B43742
DA20C9EA 6E8AEE14 06AE7DA2 599888A8 1B6F2DF4 F2C9145F 26CF2C8D 7EED37C0
A9D539B9 82BF190C EA34AF00 2168F8AD 73E2C932 DA38250B 55D39A1D F06886ED
2E4134EF 7CA5501D BF3AF9D3 C1080CE6 ED1E8A58 25E4B877 AD2D6EF5 52DDB474
8FAB492E 9D3B9334 281F78CE 94EAC7BD D3C96D1C DE5C32F3
  quit
!
voice service voip
 no ip address trusted authenticate
 mode border-element
 allow-connections sip to sip
 redundancy-group 1
 fax protocol pass-through g711ulaw
 sip
  bind control source-interface GigabitEthernet0/0/0
  bind media source-interface GigabitEthernet0/0/0
  session transport tcp tls
  rel1xx supported "rel100"
  header-passing
  asserted-id pai
  early-offer forced
  midcall-signaling passthru
  privacy-policy passthru
!
voice class codec 1
 codec preference 1 g711ulaw
 codec preference 2 g729r8
!
voice class codec 2
 codec preference 1 g729r8
 codec preference 2 g711ulaw
!
voice class sip-profiles 100
 request INVITE sip-header Diversion modify "<sip:(.*)@(.*)>" "<sip:980233\1@\2>"
!
voice class srtp-crypto 1
 crypto 1 AES_CM_128_HMAC_SHA1_32
!
```

```
voice translation-rule 1
 rule 1 /980233\(9116\)/ /\1/
!
voice translation-profile 10
 translate called 1
!
license udi pid ISR4321/K9 sn FDO19220MQ9
license accept end user agreement
license boot suite AdvUCSuiteK9
license boot level appxk9
license boot level uck9
license boot level securityk9
!
diagnostic bootup level minimal
spanning-tree extend system-id
!
username abcdef privilege 15 password 0 mnopqrst
!
redundancy
 mode none
 application redundancy
  group 1
   name voice-b2bha
   timers delay 30 reload 60
   control GigabitEthernet0/1/0 protocol 1
   data GigabitEthernet0/1/0
   track 1 shutdown
   track 2 shutdown
!
track 1 interface GigabitEthernet0/0/1 line-protocol
!
track 2 interface GigabitEthernet0/0/0 line-protocol
!
interface GigabitEthernet0/0/0
 ip address XXX.XXX.XXX.A 255.255.255.128
 negotiation auto
 redundancy rii 2
 redundancy group 1 ip XXX.XXX.XXX.V exclusive
!
interface GigabitEthernet0/0/1
 ip address 10.80.11.17 255.255.255.0
 negotiation auto
 redundancy rii 1
 redundancy group 1 ip 10.80.11.30 exclusive
!
interface GigabitEthernet0/1/0
 ip address 20.0.0.2 255.255.255.252
 negotiation auto
!
interface GigabitEthernet0
 vrf forwarding Mgmt-intf
 no ip address
 shutdown
 negotiation auto
```

```
!
threat-visibility
ip forward-protocol nd
ip http server
ip http authentication local
ip http secure-server
ip tftp source-interface GigabitEthernet0
ip route 0.0.0.0 0.0.0.0 192.65.79.129
ip route 10.64.0.0 255.255.0.0 10.80.11.1
ip route 172.16.24.0 255.255.248.0 10.80.11.1
!
ip ssh server algorithm encryption aes128-ctr aes192-ctr aes256-ctr
ip ssh client algorithm encryption aes128-ctr aes192-ctr aes256-ctr
!
control-plane
!
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
!
dial-peer voice 10 voip
 description Incoming from CUCM
 huntstop
 session protocol sipv2
 session transport tcp tls
 incoming called-number [0-9]T
 voice-class codec 2
 voice-class sip profiles 100
 voice-class sip srtp-crypto 1
 voice-class sip bind control source-interface GigabitEthernet0/0/1
 voice-class sip bind media source-interface GigabitEthernet0/0/1
 dtmf-relay rtp-nte
 srtp
 fax-relay ecm disable
 fax-relay sg3-to-g3
 fax rate disable
 fax nsf 000000
 fax protocol pass-through g711ulaw
 no vad
!
dial-peer voice 20 voip
 description Outgoing to intelepeer
 huntstop
 destination-pattern [0-9]T
 session protocol sipv2
 session target dns:user@domain.com
 session transport tcp tls
 voice-class codec 2
 voice-class sip conn-reuse
 voice-class sip options-ping 60
 voice-class sip profiles 100
```

```
 voice-class sip srtp-crypto 1
 voice-class sip bind control source-interface GigabitEthernet0/0/0
 voice-class sip bind media source-interface GigabitEthernet0/0/0
 dtmf-relay rtp-nte
 srtp
 fax-relay ecm disable
 fax-relay sg3-to-g3
 fax rate disable
 fax nsf 000000
 fax protocol pass-through g711ulaw
 no vad
!
dial-peer voice 30 voip
 description Incoming from intelepeer
 huntstop
 session protocol sipv2
 session transport tcp tls
 incoming called-number +1980
 voice-class codec 2
 voice-class sip profiles 100
 voice-class sip srtp-crypto 1
 voice-class sip bind control source-interface GigabitEthernet0/0/0
 voice-class sip bind media source-interface GigabitEthernet0/0/0
 dtmf-relay rtp-nte
 srtp
 fax-relay ecm disable
 fax-relay sg3-to-g3
 fax rate disable
 fax nsf 000000
 fax protocol pass-through g711ulaw
 no vad
!
dial-peer voice 40 voip
 description Outgoing to CUCM
 huntstop
 destination-pattern +1980
 session protocol sipv2
 session target ipv4:10.80.11.2:5061
 session transport tcp tls
 voice-class codec 2
 voice-class sip options-ping 60
 voice-class sip profiles 100
 voice-class sip srtp-crypto 1
 voice-class sip bind control source-interface GigabitEthernet0/0/1
 voice-class sip bind media source-interface GigabitEthernet0/0/1
 dtmf-relay rtp-nte
 srtp
 fax-relay ecm disable
 fax-relay sg3-to-g3
 fax rate disable
 fax nsf 000000
 fax protocol pass-through g711ulaw
 no vad
!
```

```
sip-ua
 crypto signaling default trustpoint lynclabcc-DC-CA
!
line con 0
 transport input none
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 logging synchronous
 login local
!
no network-clock synchronization automatic
!
end
```

Standby Cisco UBE

```
intelPeerCube1#sh run
Building configuration...
Current configuration : 14681 bytes
!
! Last configuration change at 12:35:16 UTC Thu Sep 7 2017 by cisco
!
version 16.5
service timestamps debug datetime msec
service timestamps log datetime msec
platform qfp utilization monitor load 80
no platform punt-keepalive disable-kernel-core
!
hostname intelPeerCube1
!
boot-start-marker
boot system flash isr4300-universalk9.16.05.01b.SPA.bin
boot-end-marker
!
vrf definition Mgmt-intf
 !
 address-family ipv4
 exit-address-family
 !
 address-family ipv6
 exit-address-family
!
enable secret 5 ***************
!
no aaa new-model
!
ip name-server 8.8.8.8
!
subscriber templating
!
multilink bundle-name authenticated
!
crypto pki trustpoint lynclabcc-DC-CA
 enrollment terminal
 serial-number none
 ip-address 10.80.11.30
 subject-name CN=intelPeerCube1
 revocation-check none
 rsakeypair itpcube
!
crypto pki trustpoint "DigiCert SHA2 Secure Server CA"
 enrollment terminal
 serial-number none
 ip-address XXX.XXX.XXX.V
 subject-name CN=intelPeerCube1
 revocation-check none
 rsakeypair itpcube
!
```

crypto pki certificate chain lynclabcc-DC-CA

```
 certificate 5100000072086071C6F517FA1F000000000072
  3082055E 30820446 A0030201 02021351 00000072 086071C6 F517FA1F 00000000
  0072300D 06092A86 4886F70D 01010505 00304C31 15301306 0A099226 8993F22C
  64011916 056C6F63 616C3119 3017060A 09922689 93F22C64 01191609 6C796E63
  6C616263 63311830 16060355 0403130F 6C796E63 6C616263 632D4443 2D434130
  1E170D31 37303831 31303732 3135335A 170D3139 30383131 30373231 35335A30
  19311730 15060355 0403130E 696E7465 6C506565 72437562 65313082 0122300D
  06092A86 4886F70D 01010105 00038201 0F003082 010A0282 010100A8 21166761
  44056990 CEAF71B7 FC49B192 1E1E674B 4C1B7539 42788A00 F0245F54 5464606D
  3434FA14 55028A75 375C1553 28C48F25 D627C9E2 76FE8414 E9533AD0 8AFECD26
  890EA09E 5A16D908 FC55D404 79A864E8 2C83AD99 CA5C1C39 D03B184E 1C740A44
  569161F0 F413BA84 6C683F89 D4B410CA A597DDCD 7BCE7FBE FB8D6B7C 10C396EC
  31F92F27 8D209332 5D346B56 77546185 1E6AD55F 8EDC9A2D 32317FF1 3CB64F54
  A2FEEF73 2BD88E94 4BABF0AC 9B2FEAD0 37C9D28D D4363AC9 8308F71B BD063E2D
  FF34A6A2 B14E1D7E BACD34B8 55D56F41 39D41658 02727044 768020DB F6264863
  B96D27CD 83ACF35D B5A7902A 197118D0 9DA5E157 2BBEB82D 3DA80502 03010001
  A382026A 30820266 300E0603 551D0F01 01FF0404 030205A0 301D0603 551D0E04
  16041453 79705BF5 5C10B758 DE3D66C1 342E4845 05CAD930 1F060355 1D230418
  30168014 F4482916 1373177E 925C695A 432785EA 91EA1449 3081C806 03551D1F
  0481C030 81BD3081 BAA081B7 A081B486 81B16C64 61703A2F 2F2F434E 3D6C796E
  636C6162 63632D44 432D4341 2C434E3D 44432C43 4E3D4344 502C434E 3D507562
  6C696320 4B657920 53657276 69636573 2C434E3D 53657276 69636573 2C434E3D
  436F6E66 69677572 6174696F 6E2C4443 3D6C796E 636C6162 63632C44 433D6C6F
  63616C3F 63657274 69666963 61746552 65766F63 6174696F 6E4C6973 743F6261
  73653F6F 626A6563 74436C61 73733D63 524C4469 73747269 62757469 6F6E506F
  696E7430 81C10608 2B060105 05070101 0481B430 81B13081 AE06082B 06010505
  07300286 81A16C64 61703A2F 2F2F434E 3D6C796E 636C6162 63632D44 432D4341
  2C434E3D 4149412C 434E3D50 75626C69 63204B65 79205365 72766963 65732C43
  4E3D5365 72766963 65732C43 4E3D436F 6E666967 75726174 696F6E2C 44433D6C
  796E636C 61626363 2C44433D 6C6F6361 6C3F6341 43657274 69666963 6174653F
  62617365 3F6F626A 65637443 6C617373 3D636572 74696669 63617469 6F6E4175
  74686F72 69747930 3D06092B 06010401 82371507 0430302E 06262B06 01040182
  37150885 EE8E0581 9FDE6482 BD8715F6 9B0E82FA A5608166 82949C4A 87E69D40
  02016402 0104301D 0603551D 25041630 1406082B 06010505 07030106 082B0601
  05050703 02302706 092B0601 04018237 150A041A 3018300A 06082B06 01050507
  0301300A 06082B06 01050507 0302300D 06092A86 4886F70D 01010505 00038201
  01005B4E E7888085 4FDDB2A0 BFF99BCA 6836FD71 F2FB1269 05C31DAA 4CF05187
  18A5F639 F389E42F B34795DE 48E0C750 0F8CEADE F6FF308E 91FC9C41 868B24CD
  9F08EAAE 4DA203ED 7748400A A9F9EE9E 9D050F9B 3823E7FB F8E06373 F0755FF1
  1A1CD84B 78504F8B 5EE089A8 C79B1428 9B93A7D4 EDF59419 7A058E27 88BABFCD
  E1FF0794 0B85560F AABB5553 E8D2825C B9B02318 BEA539E1 66667E2B 2A9EA988
  1BFD9B1B D79FFED7 FD4AFC87 A6C34A11 59AD67AE EE24A851 3915E9A0 E1426FA9
  EFD49297 BBB9CEEE 836D59D9 F68039B9 D15F638C 45DB99CF F2F514BD 7BDB537A
  7A7306C8 EB4DF7D4 AA497B68 7A59A82A F132C97B F96117C2 963386B2 35C86D98 2892
       quit
 certificate ca 133A5FA76CC004AD4332C2B40E2DD384
  30820373 3082025B A0030201 02021013 3A5FA76C C004AD43 32C2B40E 2DD38430
  0D06092A 864886F7 0D010105 0500304C 31153013 060A0992 268993F2 2C640119
  16056C6F 63616C31 19301706 0A099226 8993F22C 64011916 096C796E 636C6162
  63633118 30160603 55040313 0F6C796E 636C6162 63632D44 432D4341 301E170D
  31353131 30343132 34363232 5A170D32 30313130 34313235 3632325A 304C3115
  3013060A 09922689 93F22C64 01191605 6C6F6361 6C311930 17060A09 92268993
  F22C6401 1916096C 796E636C 61626363 31183016 06035504 03130F6C 796E636C
  61626363 2D44432D 43413082 0122300D 06092A86 4886F70D 01010105 00038201
  0F003082 010A0282 0101009F 402105FF C8F842E0 26BD7788 62912768 6DC18CB5
  800E4755 788DB00D 2D51BE89 CD2E9574 E55ACFAD 0DBB3C69 22F557D8 3CE1246A
  4865F34A 5E151338 8FACE3A2 BCCF41F0 F6F38E24 F8E28E33 15B74062 BA3E7B82
  22453F2D 7AEE69F1 3D3818E3 FAA63C64 F36C2190 74AD92D5 EDA56282 197B980D
  8D2FC9A3 00BAF9D6 6DA40496 490BFD3A 2D7538A6 62024136 ADAD4D3B 26BB1AC5
  B8E4CD81 20BB986E 9B200964 A6B0D904 A9B859DC 0E0388E6 A3DC545D 0DF3F583
  8DF53C23 AA6D87D1 6409A3C6 22880533 A068FC31 717CEE6F 2D11EC3F A551AA9E
  75C488EB 712A7710 16983900 DB1C30A8 7A7FEB9C 0725746A B1FBF0A3 A8C69EA5
  9E6EBB6B 6292261E 81B11102 03010001 A351304F 300B0603 551D0F04 04030201
  86300F06 03551D13 0101FF04 05300301 01FF301D 0603551D 0E041604 14F44829
  16137317 7E925C69 5A432785 EA91EA14 49301006 092B0601 04018237 15010403
  02010030 0D06092A 864886F7 0D010105 05000382 01010060 CBA8E054 DE68A314
  C8C858EE 6B0FD21F 33C3F8CD D4DDACD6 ED7259FF 4386CF70 15EAB220 E9F25BDC
  F47E2B02 8F322753 7435CD63 3A481673 1784C1DE A7666CE2 B63B8BBA E1D5D8E3
  62BDF949 8430F42F 0E19487D 7DE431D8 A19C4579 A8FEAAC2 A074AF45 73CF87E5
  1BCD5D76 072FDE3A BE80E670 FED63262 F52298A8 10185308 167C7F72 DB58A338
  222E725E 12B92472 83196591 1AB38B16 6B8C2FD3 B070CF58 620F6FC3 40EA4F32
  5668A69D 0CB63471 DFC28524 23A816DA 945070AB 273F6574 7EEC7E72 0C267CCD
  C4D13831 2BCC0430 16511679 14DCD4F4 923FAC8E 072F7862 4D08704D 3B233B5E
  257D28B7 59E1EA8E 74A80CD6 5ED85574 7E425FB3 81E2D8
       quit
crypto pki certificate chain "DigiCert SHA2 Secure Server CA"
 certificate ca 01FDA3EB6ECA75C888438B724BCFBC91
  30820494 3082037C A0030201 02021001 FDA3EB6E CA75C888 438B724B CFBC9130
  0D06092A 864886F7 0D01010B 05003061 310B3009 06035504 06130255 53311530
  13060355 040A130C 44696769 43657274 20496E63 31193017 06035504 0B131077
  77772E64 69676963 6572742E 636F6D31 20301E06 03550403 13174469 67694365
  72742047 6C6F6261 6C20526F 6F742043 41301E17 0D313330 33303831 32303030
  305A170D 32333033 30383132 30303030 5A304D31 0B300906 03550406 13025553
  31153013 06035504 0A130C44 69676943 65727420 496E6331 27302506 03550403
  131E4469 67694365 72742053 48413220 53656375 72652053 65727665 72204341
  30820122 300D0609 2A864886 F70D0101 01050003 82010F00 3082010A 02820101
  00DCAE58 904DC1C4 30159035 5B6E3C82 15F52C5C BDE3DBFF 7143FA64 2580D4EE
  18A24DF0 66D00A73 6E119836 1764AF37 9DFDFA41 84AFC7AF 8CFE1A73 4DCF3397
  90A29687 53832BB9 A675482D 1D56377B DA31321A D7ACAB06 F4AA5D4B B74746DD
  2A93C390 2E798080 EF13046A 143BB59B 92BEC207 654EFCDA FCFF7AAE DC5C7E55
  310CE839 07A4D7BE 2FD30B6A D2B1DF5F FE577453 3B3580DD AE8E4498 B39F0ED3
  DAE0D7F4 6B29AB44 A74B5884 6D924B81 C3DA738B 12974890 0445751A DD373197
  92E8CD54 0D3BE4C1 3F395E2E B8F35C7E 108E8641 008D4566 47B0A165 CEA0AA29
  094EF397 EBE82EAB 0F72A730 0EFAC7F4 FD1477C3 A45B2857 C2B3F982 FDB74558
  9B020301 0001A382 015A3082 01563012 0603551D 130101FF 04083006 0101FF02
  0100300E 0603551D 0F0101FF 04040302 01863034 06082B06 01050507 01010428
  30263024 06082B06 01050507 30018618 68747470 3A2F2F6F 6373702E 64696769
  63657274 2E636F6D 307B0603 551D1F04 74307230 37A035A0 33863168 7474703A
  2F2F6372 6C332E64 69676963 6572742E 636F6D2F 44696769 43657274 476C6F62
  616C526F 6F744341 2E63726C 3037A035 A0338631 68747470 3A2F2F63 726C342E
  64696769 63657274 2E636F6D 2F446967 69436572 74476C6F 62616C52 6F6F7443
  412E6372 6C303D06 03551D20 04363034 30320604 551D2000 302A3028 06082B06
  01050507 0201161C 68747470 733A2F2F 7777772E 64696769 63657274 2E636F6D
  2F435053 301D0603 551D0E04 1604140F 80611C82 3161D52F 28E78D46 38B42CE1
  C6D9E230 1F060355 1D230418 30168014 03DE5035 56D14CBB 66F0A3E2 1B1BC397
  B23DD155 300D0609 2A864886 F70D0101 0B050003 82010100 233EDF4B D23142A5
  B67E425C 1A44CC69 D168B45D 4BE00421 6C4BE26D CCB1E097 8FA65309 CDAA2A65
  E5394F1E 83A56E5C 98A22426 E6FBA1ED 93C72E02 C64D4ABF B042DF78 DAB3A8F9
  6DFF2185 5336604C 76CEEC38 DCD65180 F0C5D6E5 D44D2764 AB9BC73E 71FB4897
  B8336DC9 1307EE96 A21B1815 F65C4C40 EDB3C2EC FF71C1E3 47FFD4B9 00B43742
  DA20C9EA 6E8AEE14 06AE7DA2 599888A8 1B6F2DF4 F2C9145F 26CF2C8D 7EED37C0
  A9D539B9 82BF190C EA34AF00 2168F8AD 73E2C932 DA38250B 55D39A1D F06886ED
  2E4134EF 7CA5501D BF3AF9D3 C1080CE6 ED1E8A58 25E4B877 AD2D6EF5 52DDB474
  8FAB492E 9D3B9334 281F78CE 94EAC7BD D3C96D1C DE5C32F3
       quit
!
voice service voip
 no ip address trusted authenticate
 mode border-element
 allow-connections sip to sip
 redundancy-group 1
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
```

```
 sip
  bind control source-interface GigabitEthernet0/0/0
  bind media source-interface GigabitEthernet0/0/0
  session transport tcp tls
  rel1xx supported "rel100"
  header-passing
  asserted-id pai
  early-offer forced
  midcall-signaling passthru
  privacy-policy passthru
!
voice class codec 1
 codec preference 1 g711ulaw
 codec preference 2 g729r8
!
voice class codec 2
 codec preference 1 g729r8
 codec preference 2 g711ulaw
!
voice class sip-profiles 100
 request INVITE sip-header Diversion modify "<sip:(.*)@(.*)>" "<sip:980233\1@\2>"
!
voice class srtp-crypto 1
 crypto 1 AES_CM_128_HMAC_SHA1_32
!
voice translation-rule 1
 rule 1 /980233\(9116\)/ /\1/
!
voice translation-profile 10
 translate called 1
!
license udi pid ISR4321/K9 sn FDO19220MSQ
license accept end user agreement
license boot suite AdvUCSuiteK9
license boot level appxk9
license boot level securityk9
!
diagnostic bootup level minimal
spanning-tree extend system-id
!
username abcdef privilege 15 password 0 mnopqrst
!
redundancy
 mode none
 application redundancy
  group 1
   name voice-b2bha
   timers delay 30 reload 60
   control GigabitEthernet0/1/0 protocol 1
   data GigabitEthernet0/1/0
   track 1 shutdown
   track 2 shutdown
!
track 1 interface GigabitEthernet0/0/1 line-protocol
```

```
!
track 2 interface GigabitEthernet0/0/0 line-protocol
!
interface GigabitEthernet0/0/0
 ip address XXX.XXX.XXX.S 255.255.255.128
 negotiation auto
 redundancy rii 2
 redundancy group 1 ip XXX.XXX.XXX.V exclusive
!
interface GigabitEthernet0/0/1
 ip address 10.80.11.16 255.255.255.0
 negotiation auto
 redundancy rii 1
 redundancy group 1 ip 10.80.11.30 exclusive
!
interface GigabitEthernet0/1/0
 ip address 20.0.0.1 255.255.255.0
 negotiation auto
!
interface GigabitEthernet0
 vrf forwarding Mgmt-intf
 no ip address
 negotiation auto
!
threat-visibility
ip forward-protocol nd
ip http server
ip http authentication local
ip http secure-server
ip route 0.0.0.0 0.0.0.0 192.65.79.129
ip route 10.64.0.0 255.255.0.0 10.80.11.1
ip route 172.16.24.0 255.255.248.0 10.80.11.1
!
ip ssh server algorithm encryption aes128-ctr aes192-ctr aes256-ctr
ip ssh client algorithm encryption aes128-ctr aes192-ctr aes256-ctr
!
control-plane
!
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
!
dial-peer voice 10 voip
 description Incoming from CUCM
 huntstop
 session protocol sipv2
 session transport tcp tls
 incoming called-number [0-9]T
 voice-class codec 2
 voice-class sip profiles 100
 voice-class sip srtp-crypto 1
```

```
 voice-class sip bind control source-interface GigabitEthernet0/0/1
 voice-class sip bind media source-interface GigabitEthernet0/0/1
 dtmf-relay rtp-nte
 srtp
 fax-relay sg3-to-g3
 fax rate 14400
 fax nsf 000000
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 20 voip
 description Outgoing to intelepeer
 huntstop
 destination-pattern [0-9]T
 session protocol sipv2
 session target dns:user@domain.com
 session transport tcp tls
 voice-class codec 2
 voice-class sip conn-reuse
 voice-class sip options-ping 60
 voice-class sip profiles 100
 voice-class sip srtp-crypto 1
 voice-class sip bind control source-interface GigabitEthernet0/0/0
 voice-class sip bind media source-interface GigabitEthernet0/0/0
 dtmf-relay rtp-nte
 srtp
 fax-relay sg3-to-g3
 fax rate 14400
 fax nsf 000000
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 30 voip
 description Incoming from intelepeer
 huntstop
 session protocol sipv2
 session transport tcp tls
 incoming called-number +1980
 voice-class codec 2
 voice-class sip profiles 100
 voice-class sip srtp-crypto 1
 voice-class sip bind control source-interface GigabitEthernet0/0/0
 voice-class sip bind media source-interface GigabitEthernet0/0/0
 dtmf-relay rtp-nte
 srtp
 fax-relay sg3-to-g3
 fax rate 14400
 fax nsf 000000
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 40 voip
 description Outgoing to CUCM
 huntstop
```

```
 destination-pattern +1980
 session protocol sipv2
 session target ipv4:10.80.11.2:5061
 session transport tcp tls
 voice-class codec 2
 voice-class sip options-ping 60
 voice-class sip profiles 100
 voice-class sip srtp-crypto 1
 voice-class sip bind control source-interface GigabitEthernet0/0/1
 voice-class sip bind media source-interface GigabitEthernet0/0/1
 dtmf-relay rtp-nte
 srtp
 fax-relay sg3-to-g3
 fax rate 14400
 fax nsf 000000
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
sip-ua
 crypto signaling default trustpoint lynclabcc-DC-CA
!
line con 0
 exec-timeout 0 0
 transport input none
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 login local
!
no network-clock synchronization automatic
ntp server time-pnp.cisco.com
end
```

Configuring Cisco Unified Communications Manager

Cisco UCM Version

Figure 8: Cisco UCM Version

Cisco Call Manager Service Parameters

Navigation: System > Service Parameters

1. Select **Server***: Clus21Sub1--CUCM Voice/Video (Active)
2. Select **Service***: Cisco CallManager (Active)
3. All other fields are set to default values

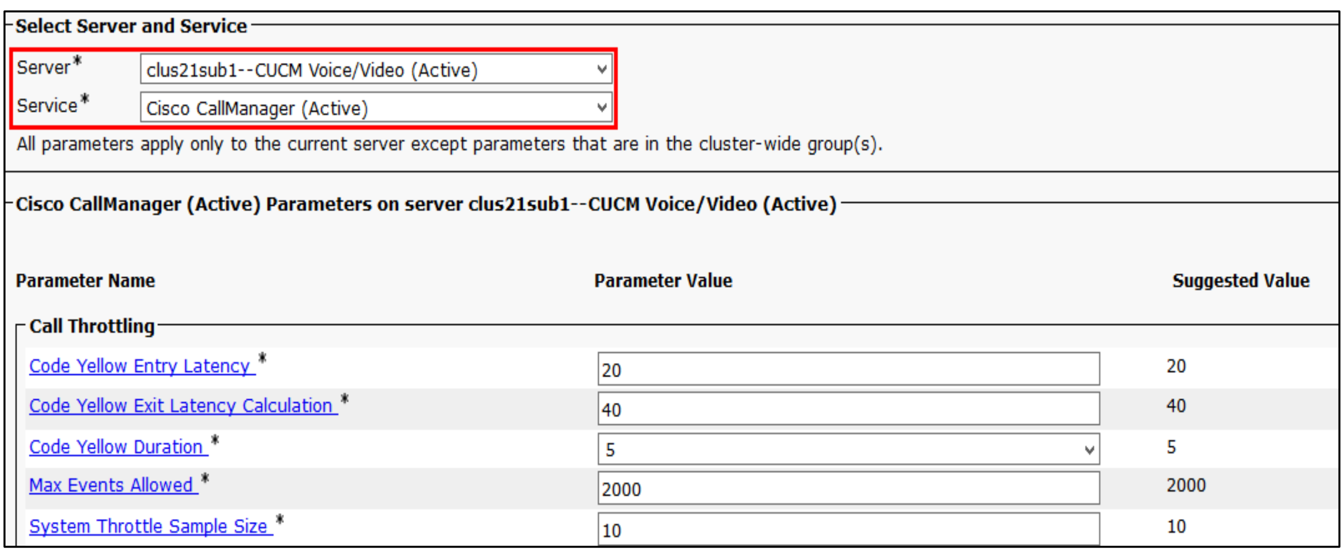


Figure 9: Service Parameters

Offnet Calls via IntelePeer SIP Trunk

Off-net calls are served by SIP trunks configured between Cisco UCM and the IntelePeer network and calls are routed via Cisco UBE

SIP Trunk Security Profile

Navigation: System > Security > SIP Trunk Security Profile

1. **Name***: Secure Profile for intelepeer Trunk
2. **Description**: Secure Profile for intelepeer Trunk
3. **Device Security Mode**: Encrypted

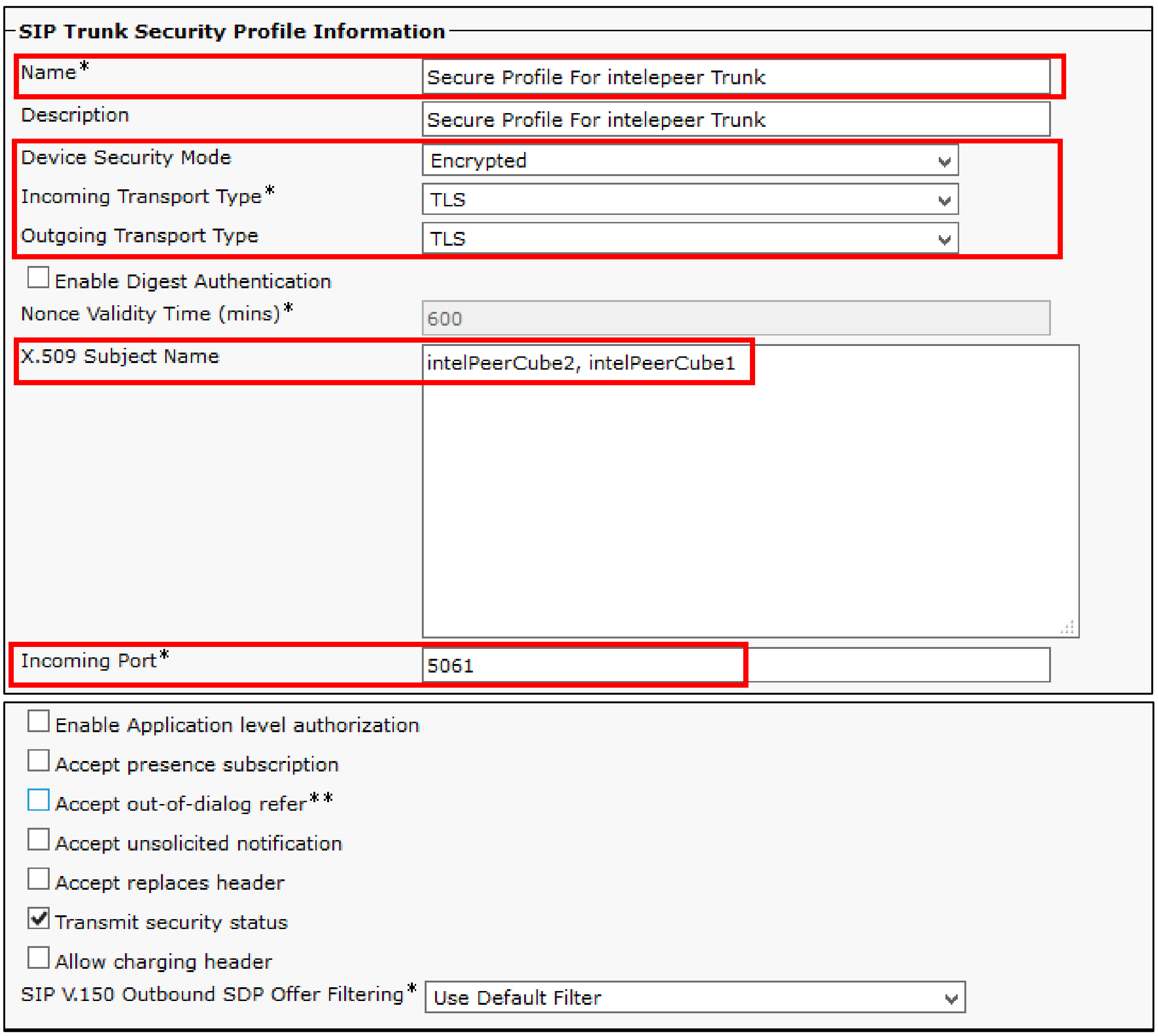


Figure 10: SIP Trunk Security Profile

Explanation

Parameter	Value	Description
Incoming Transport Type	TCP	
Outgoing Transport Type	TCP	SIP trunks to IntelePeer SBC should use TCP as a transport protocol for SIP. This is configured using SIP Trunk Security profile, which is later assigned to the SIP trunk itself.
X.509 Subject Name	intelPeerCube2, intelPeerCube1	Subject given in CUBE

SIP Profile Configuration

SIP Profile will be later associated with the SIP trunk

Navigation: Device → Device Settings → SIP Profile

1. **Name***: Intelepeer SIP Profile
2. **Description:** Intelepeer SIP Profile

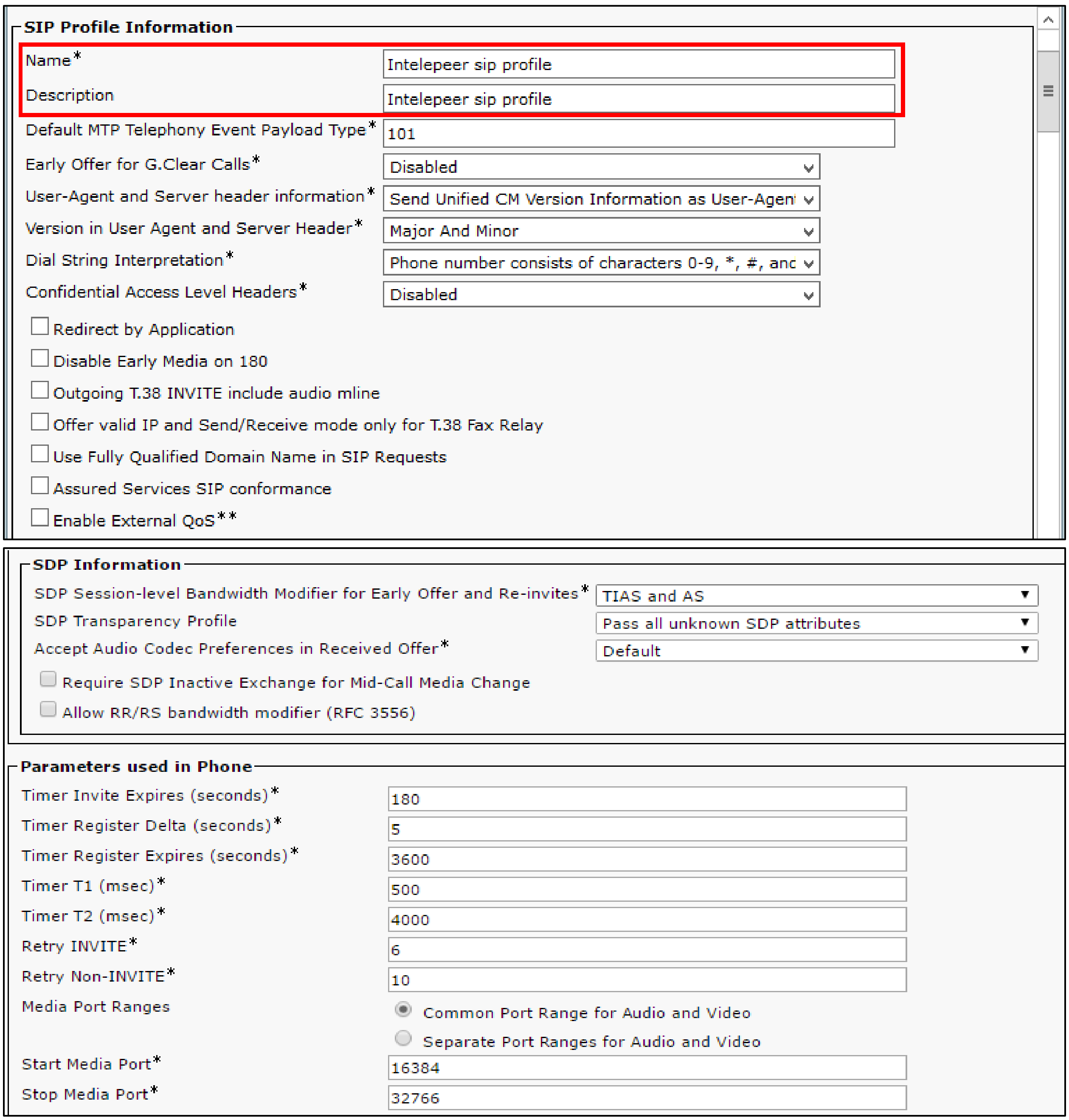
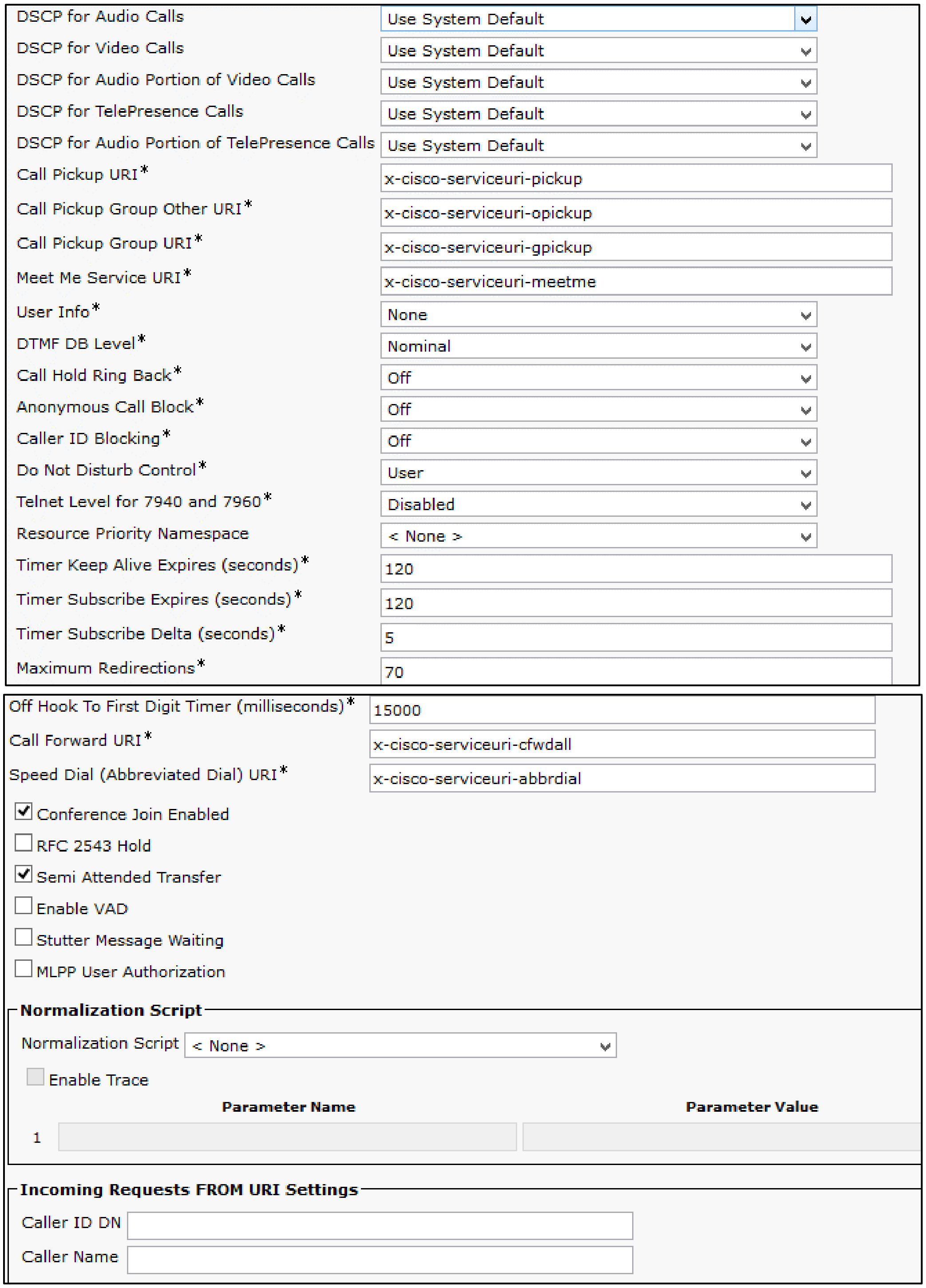


Figure 11: SIP Profile



DSCP for Audio Calls	Use System Default
DSCP for Video Calls	Use System Default
DSCP for Audio Portion of Video Calls	Use System Default
DSCP for TelePresence Calls	Use System Default
DSCP for Audio Portion of TelePresence Calls	Use System Default
Call Pickup URI*	x-cisco-serviceuri-pickup
Call Pickup Group Other URI*	x-cisco-serviceuri-opickup
Call Pickup Group URI*	x-cisco-serviceuri-gpickup
Meet Me Service URI*	x-cisco-serviceuri-meetme
User Info*	None
DTMF DB Level*	Nominal
Call Hold Ring Back*	Off
Anonymous Call Block*	Off
Caller ID Blocking*	Off
Do Not Disturb Control*	User
Telnet Level for 7940 and 7960*	Disabled
Resource Priority Namespace	< None >
Timer Keep Alive Expires (seconds)*	120
Timer Subscribe Expires (seconds)*	120
Timer Subscribe Delta (seconds)*	5
Maximum Redirections*	70
Off Hook To First Digit Timer (milliseconds)*	15000
Call Forward URI*	x-cisco-serviceuri-cfwdall
Speed Dial (Abbreviated Dial) URI*	x-cisco-serviceuri-abbrdial

- [x] Conference Join Enabled
- [ ] RFC 2543 Hold
- [x] Semi Attended Transfer
- [ ] Enable VAD
- [ ] Stutter Message Waiting
- [ ] MLPP User Authorization

Normalization Script

Normalization Script: < None >

- [ ] Enable Trace

	Parameter Name	Parameter Value
1		

Incoming Requests FROM URI Settings

Caller ID DN	
Caller Name	

Figure 12: SIP Profile (Cont.)

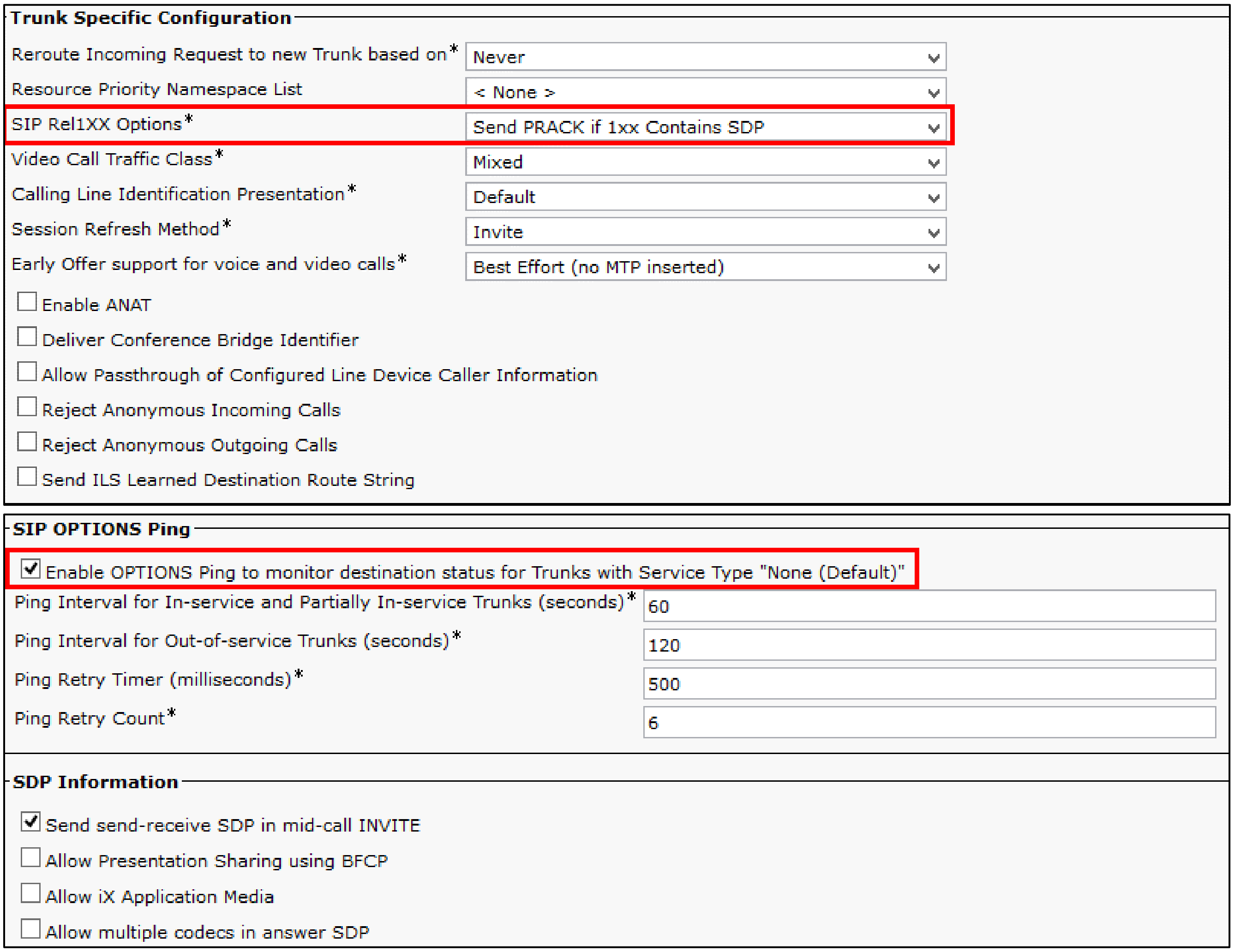


Figure 13: SIP Profile (Cont.)

Explanation

Parameter	Value	Description
Default MTP Telephony Event Payload Type	101	RFC2833 DTMF payload type
SIP Rel1XX Options	Send PRACK for 1xx Messages	Enable Provisional Acknowledgements (Reliable 100 messages)
Ping Interval for In-service and Partially In-service Trunks (seconds)	60	OPTIONS message parameters- interval time
Ping Interval for Out-of-service Trunks (seconds)	120	OPTIONS message parameters- interval time

SIP Trunk Configuration

Create SIP trunks to CUBE

Navigation: Device → Trunk

Figure 14: SIP Trunks List

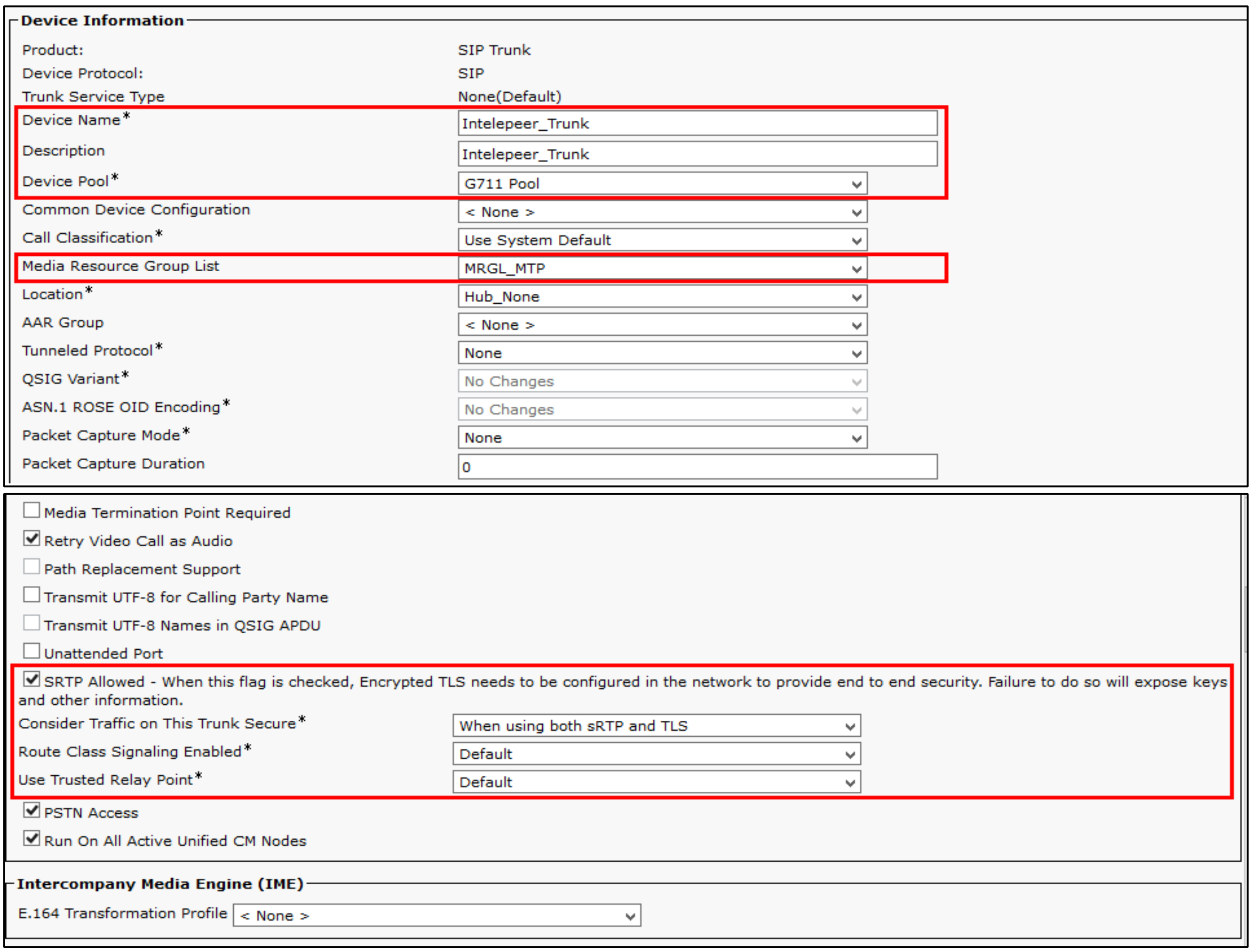


Figure 15: SIP Trunk to CUBE

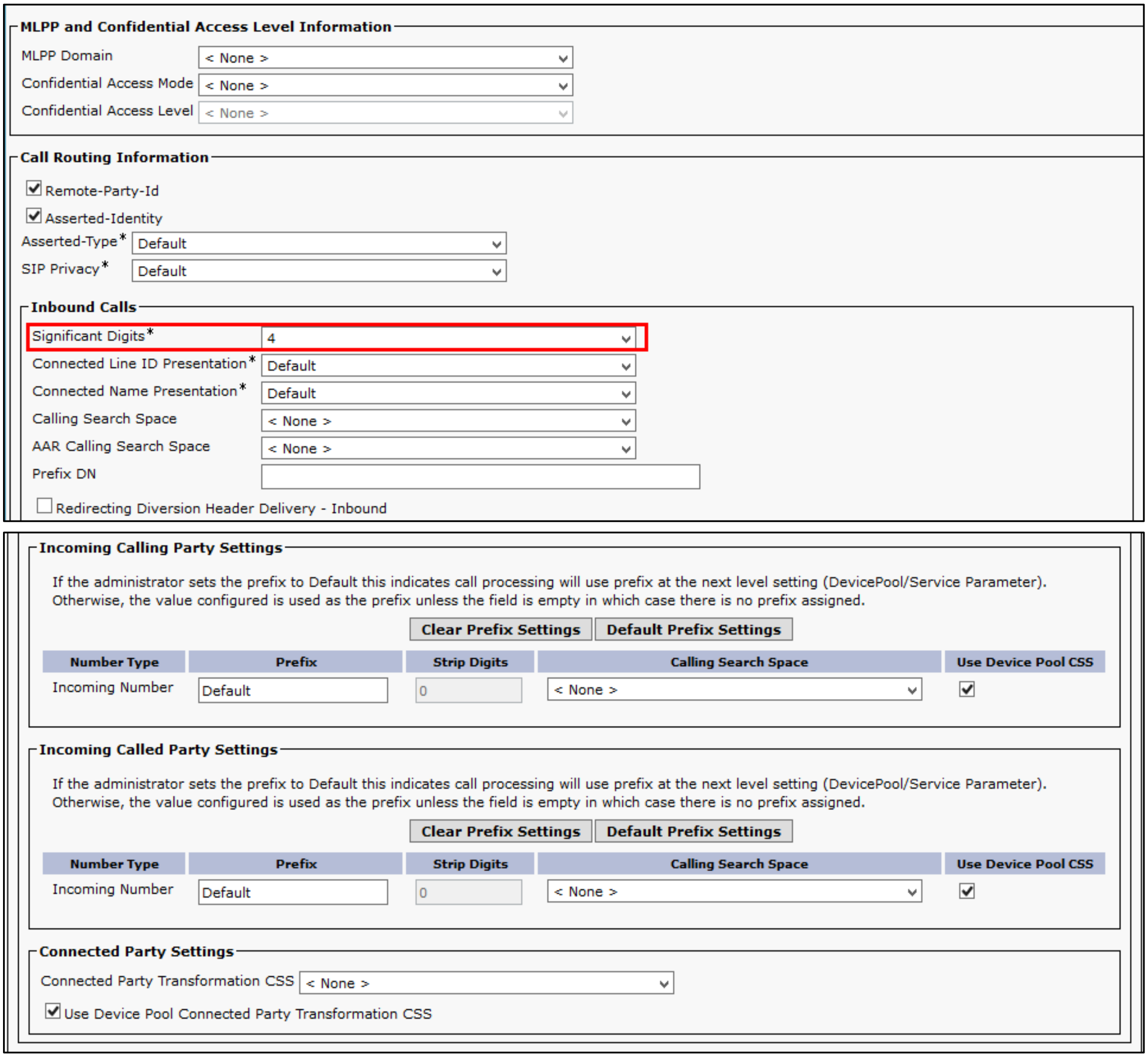


Figure 16: SIP Trunk to CUBE (Cont.)

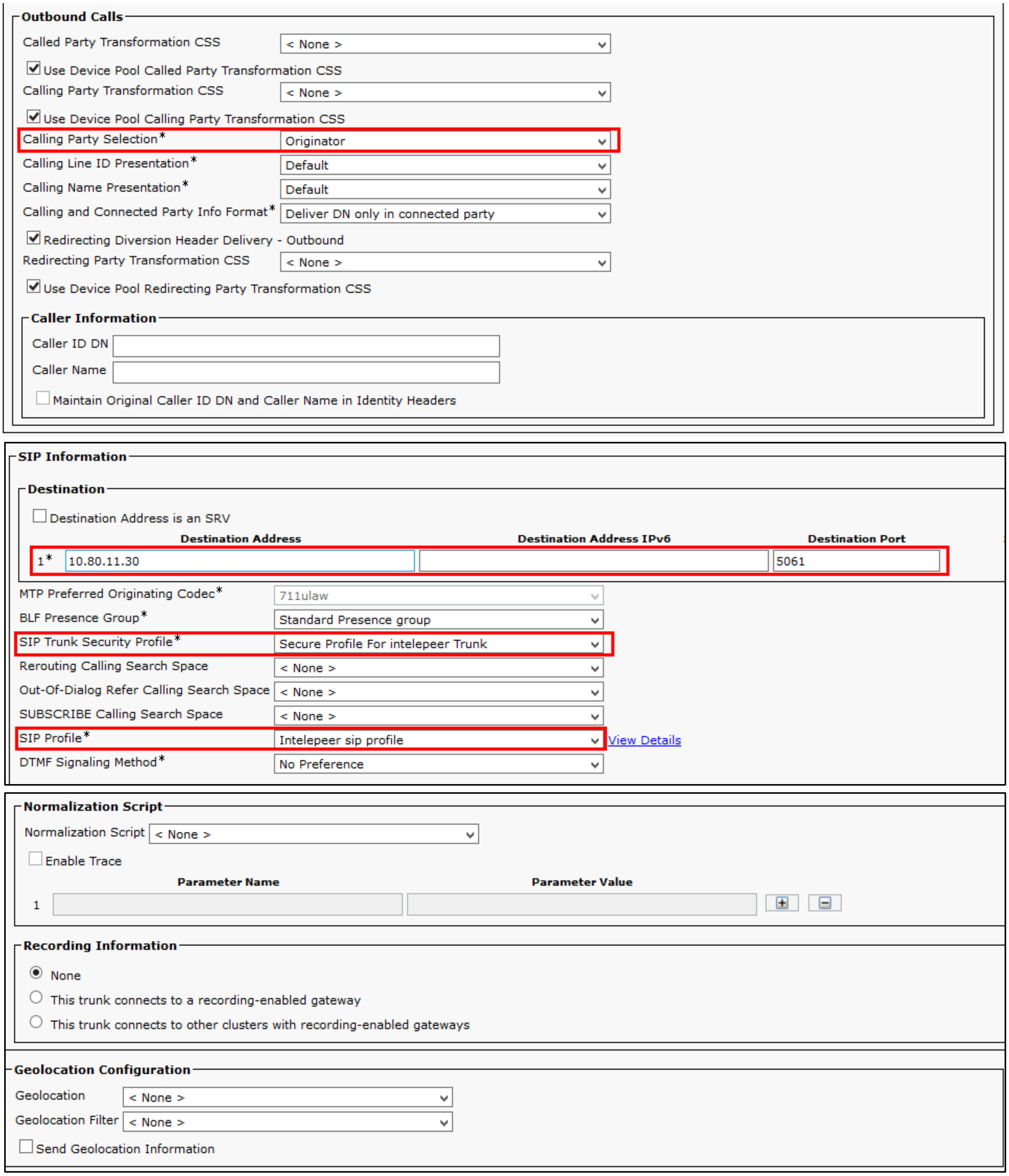


Figure 17: SIP Trunk to CUBE (Cont.)

Explanation

Parameter	Value	Description
Device Name	Intelepeer _Trunk	Name for the trunk
Device Pool	G711pool	Default Device Pool is used for this trunk
Media Resource Group List	MRGL_MTP	MRG with resources: ANN, CFB, MOH and MTP
SRTP allowed	Checked	Enabling secure RTP
Significant Digits	4	4 digits Extension for all CPE phones
Destination Address	10.80.11.30	IP address of the Cisco UBE Virtual LAN
Destination Port No.	5061	Destination Port for TLS
SIP Trunk Security Profile	Secure Profile For intelepeer Trunk	SIP Trunk Security Profile configured earlier
SIP Profile	Intelepeer SIP Profile	SIP Profile configured earlier

Dial Plan

Route Pattern Configuration

Navigation: Call Routing → Route/Hunt → Route Pattern

Route patterns are configured as below:

- Cisco IP phone dial “7”+10 digits number to access PSTN via Cisco UBE
    - “7” is removed before sending to Cisco UCM
- For FAX call, Access Code “7”+10 digits number is used at Cisco Fax gateway
    - “7” is removed at Cisco UCM
    - The rest of the number is sent to Cisco UBE to IntelePeer network
- Incoming fax call to 8021 is sent to Cisco Fax gateway

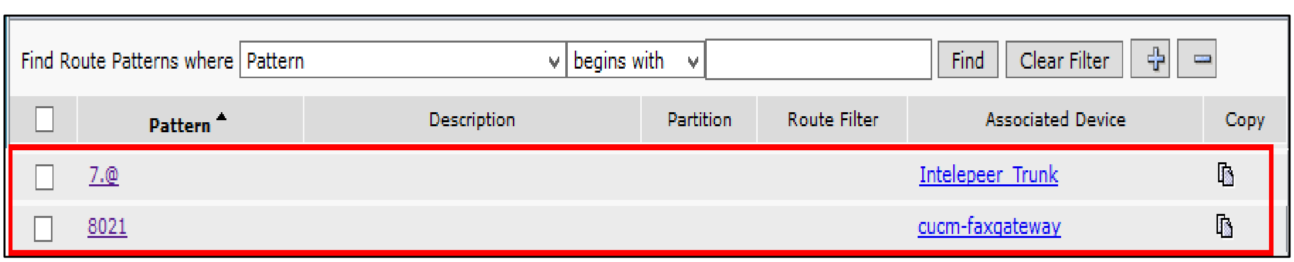


Figure 18: Route Patterns List

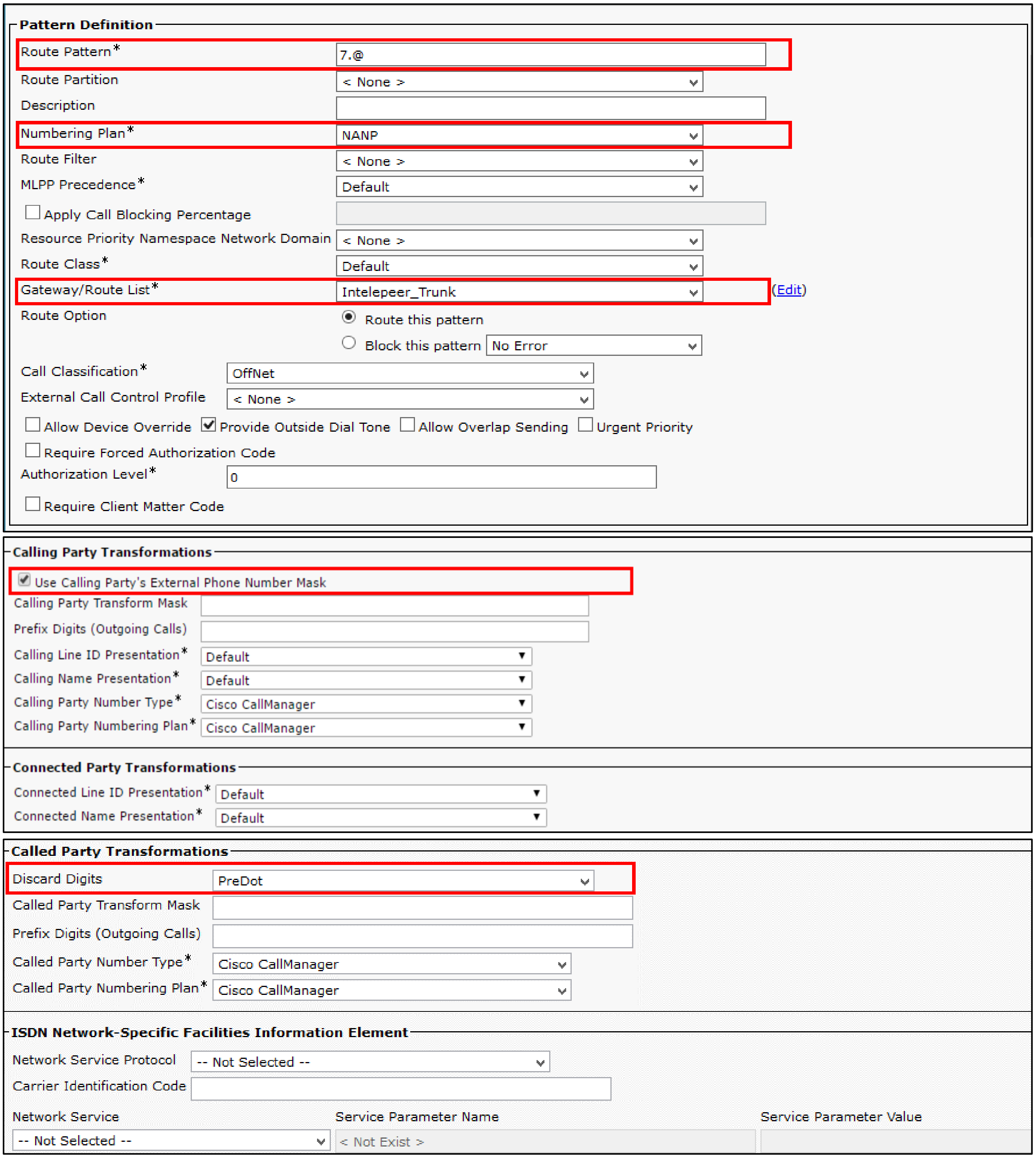


Figure 19: Route Pattern for Voice

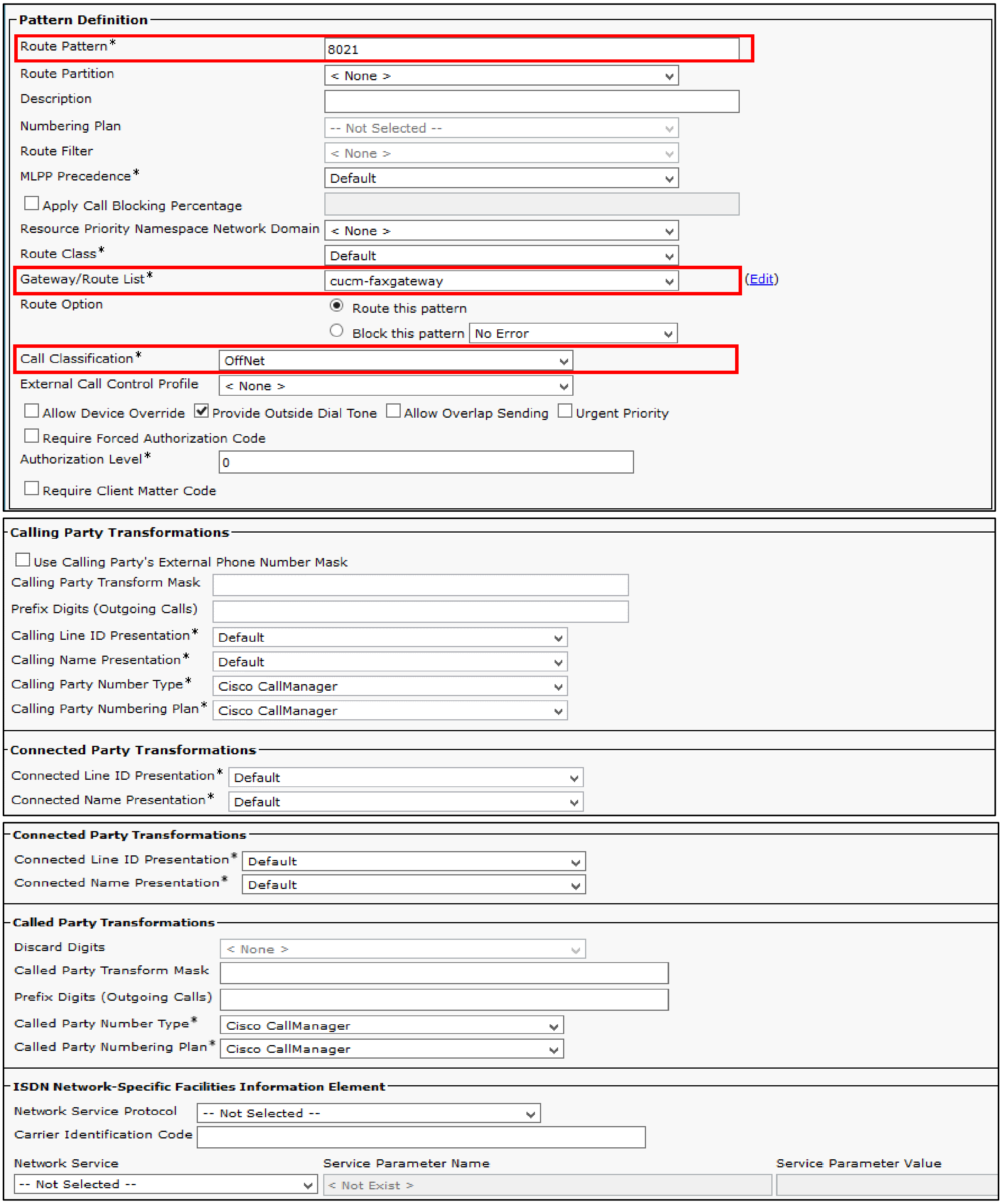


Figure 20: Route Pattern for Fax

Explanation

Setting	Value	Description
Route Pattern	7.@ for Voice & International Calls and 8021 for Fax Call	Specify appropriate Route Pattern
Gateway/Route List	Intelepeer for Route Pattern 7.@ and 8021 for SIP Trunk To Fax Gateway.	SIP Trunk name configured earlier
Numbering Plan	NANP for Route Pattern 7.@	North American Numbering Plan
Call Classification	OffNet for Route Pattern 7.@ and 8021	Restrict the transferring of an external call to an external device
Discard Digits	PreDot for Route Pattern 7.@	Specifies how to modify digit before they are sent to Spectrum network

Secure Conference Bridge Configuration

This section explains how to configure Conference Bridge on a cisco 3900 series router with IOS version of 15.6.3 M2. DSP card is installed to the router.

Generate an RSA KeyPpair for the Gateway

DSPfarmRouter(config)#crypto key generate rsa general-keys label dspfarm modulus 2048

Create a Trustpoint

```
crypto pki trustpoint DSPfarmRouter
 enrollment terminal
 serial-number none
 ip-address none
 subject-name CN=DSPfarmRouter
 revocation-check none
 rsakeypair dspfarm
```

Install the Root CA Certificate to the Local Trustpoint

DSPfarmRouter(config)#crypto pki authenticate DSPfarmRouter

Enroll with the CA Root and install the Local Identity Certificate

DSPfarmRouter(config)#crypto pki enroll DSPfarmRouter

DSPfarmRouter(config)#crypto pki import DSPfarmRouter certificate

Configure Media Resources on CUCM

Create a Secure Conference Bridge

Navigation: CUCM Administration > Media Resources > Conference Bridge

1. Click **Add New**

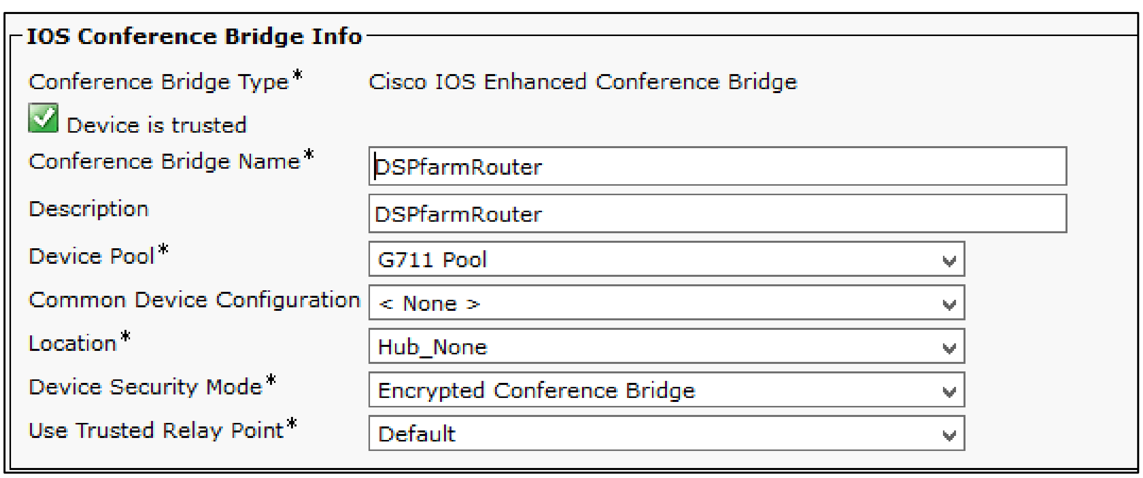


Figure 21: Conference Bridge

Configure Cisco IOS Media Resources

Enable dspfarm Service

DSPfarmRouter(config)#voice-card 0

DSPfarmRouter(config-voicecard)#dsp services dspfarm

Define SCCP Interface

DSPfarmRouter(config)##sccp local GigabitEthernet0/0
DSPfarmRouter(config)#sccp ccm 10.80.11.2 identifier 1 version 7.0 trustpoint DSPfarmRouter

DSPfarmRouter(config)#sccp

DSPfarmRouter(config)#sccp ccm group 1

DSPfarmRouter(config-sccp-ccm)#associate ccm 1 priority 1

DSPfarmRouter(config-sccp-ccm)#associate profile 1 register DSPfarmRouter

DSP Farm Profile Setup

DSPfarmRouter(config)#dspfarm profile 1 conference security

DSPfarmRouter(config-dspfarm-profile)#trustpoint DSPfarmRouter

DSPfarmRouter(config-dspfarm-profile)#codec g729br8

DSPfarmRouter(config-dspfarm-profile)#codec g729r8

DSPfarmRouter(config-dspfarm-profile)#codec g729abr8

DSPfarmRouter(config-dspfarm-profile)#codec g729ar8

DSPfarmRouter(config-dspfarm-profile)#codec g711alaw

DSPfarmRouter(config-dspfarm-profile)#codec g711ulaw

DSPfarmRouter(config-dspfarm-profile)#maximum sessions 4

DSPfarmRouter(config-dspfarm-profile)# associate application SCCP

DSPfarmRouter(config-dspfarm-profile)#no shutdown

Running Configuration

DSPfarmRouter#sh run
Building configuration...
Current configuration : 7919 bytes
!
version 15.6
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname DSPfarmRouter
!
boot-start-marker
boot system flash0 c3900-universalk9-mz.SPA.156-3.M2.bin
boot-end-marker
!
enable secret
!
no aaa new-model
!
crypto pki trustpoint DSPfarmRouter
 enrollment terminal
 serial-number none
 ip-address none
 subject-name CN=DSPfarmRouter
 revocation-check none
 rsakeypair dspfarm
!
crypto pki certificate chain DSPfarmRouter
 certificate 5100000081DA34603075C7B64D000000000081

 3082055D 30820445 A0030201 02021351 00000081 DA346030 75C7B64D 00000000
 0081300D 06092A86 4886F70D 01010505 00304C31 15301306 0A099226 8993F22C
 64011916 056C6F63 616C3119 3017060A 09922689 93F22C64 01191609 6C796E63
 6C616263 63311830 16060355 0403130F 6C796E63 6C616263 632D4443 2D434130
 1E170D31 37303833 31313034 3235335A 170D3139 30383331 31303432 35335A30
 18311630 14060355 0403130D 44535066 61726D52 6F757465 72308201 22300D06
 092A8648 86F70D01 01010500 0382010F 00308201 0A028201 0100C47F 267EDEA9
 86C28565 100E5B34 87361DF9 902E26A1 CF64D820 768559BD D8CFEDBC 6C050609
 A31DB195 17534256 2120875A 3DC5D168 4EFDD96F AA938050 1BD85389 D8F1CC75
 ED44B46E 6BF7C52F 1CC82331 62792011 E4A4A166 2F1D9350 FD312520 82C97FC3
 33FAC5B6 00EC69E4 01582EAC 6D992AFC 5E2F266D 9B80BA23 4E27F465 2BDA584A
 3DEBD865 528A27B3 F5B2EA08 8069055B 3B11D6D5 A8F6E891 2CD83D65 870CE552
 6CEE0290 E84A58A1 F9DA62F5 B3074ED2 B8978F74 BA230A1E 1A304B3A 3BAD58C2
 4908D579 C6C1DF09 C565D23A E30D758A 1E059862 49186DF9 699BD54C 56D34214
 65B5AD38 133CBF20 56EFD30D F7521AFC 2F92B546 353F14AB 095F0203 010001A3
 82026A30 82026630 0E060355 1D0F0101 FF040403 0205A030 1D060355 1D0E0416
 04141682 49BD9975 F8B3AA40 8B29FE62 7C2051A5 2C9A301F 0603551D 23041830
 168014F4 48291613 73177E92 5C695A43 2785EA91 EA144930 81C80603 551D1F04
 81C03081 BD3081BA A081B7A0 81B48681 B16C6461 703A2F2F 2F434E3D 6C796E63
 6C616263 632D4443 2D43412C 434E3D44 432C434E 3D434450 2C434E3D 5075626C
 6963204B 65792053 65727669 6365732C 434E3D53 65727669 6365732C 434E3D43
 6F6E6669 67757261 74696F6E 2C44433D 6C796E63 6C616263 632C4443 3D6C6F63
 616C3F63 65727469 66696361 74655265 766F6361 74696F6E 4C697374 3F626173
 653F6F62 6A656374 436C6173 733D6352 4C446973 74726962 7574696F 6E506F69
 6E743081 C106082B 06010505 07010104 81B43081 B13081AE 06082B06 01050507
 30028681 A16C6461 703A2F2F 2F434E3D 6C796E63 6C616263 632D4443 2D43412C
 434E3D41 49412C43 4E3D5075 626C6963 204B6579 20536572 76696365 732C434E
 3D536572 76696365 732C434E 3D436F6E 66696775 72617469 6F6E2C44 433D6C79
 6E636C61 6263632C 44433D6C 6F63616C 3F634143 65727469 66696361 74653F62
 6173653F 6F626A65 6374436C 6173733D 63657274 69666963 6174696F 6E417574
 686F7269 7479303D 06092B06 01040182 37150704 30302E06 262B0601 04018237
 150885EE 8E05819F DE6482BD 8715F69B 0E82FAA5 60816682 949C4A87 E69D4002
 01640201 04301D06 03551D25 04163014 06082B06 01050507 03010608 2B060105
 05070302 30270609 2B060104 01823715 0A041A30 18300A06 082B0601 05050703
 01300A06 082B0601 05050703 02300D06 092A8648 86F70D01 01050500 03820101
 009BB3CD A3CC3F79 E53F67D8 88FD7470 8A072EE4 2D070D4F 3DB46F26 0243E156
 A4A4D7E1 1E157917 B6F38C14 577963A7 105578FB 0EABE24C 5A89DAAC 8B107EFB
 D92116C3 D5BB6E10 42EF39D2 BFDEFC82 12730C01 DD459ED5 5A8C76A8 40AE71F4
 B712C990 4547CA27 9BE60DF5 FE0E4447 A2B54360 D4A07B91 502B097B F325995D
 52227463 ABE5E726 09BC9E9D 8D13F2EB 7445CAF0 05CFE751 2EBCF038 429679B3
 C2D2A25E B782B6B2 605ABEF9 A823EC6B EA3201E8 5ECC241F 604CDAFC B04EE371
 46D7D15F D287753C 6A19607B BD1FECF7 30941375 6E02E877 2964C84D 69462040
 D3C91144 E299FAFD B81487CA 0C6ED499 99B4328C BC60825E 4F41B06D 61D1C968 A9

 quit
certificate ca 133A5FA76CC004AD4332C2B40E2DD384

 30820373 3082025B A0030201 02021013 3A5FA76C C004AD43 32C2B40E 2DD38430
 0D06092A 864886F7 0D010105 0500304C 31153013 060A0992 268993F2 2C640119
 16056C6F 63616C31 19301706 0A099226 8993F22C 64011916 096C796E 636C6162
 63633118 30160603 55040313 0F6C796E 636C6162 63632D44 432D4341 301E170D
 31353131 30343132 34363232 5A170D32 30313130 34313235 3632325A 304C3115
 3013060A 09922689 93F22C64 01191605 6C6F6361 6C311930 17060A09 92268993

```
F22C6401 1916096C 796E636C 61626363 31183016 06035504 03130F6C 796E636C
61626363 2D44432D 43413082 0122300D 06092A86 4886F70D 01010105 00038201
0F003082 010A0282 0101009F 402105FF C8F842E0 26BD7788 62912768 6DC18CB5
800E4755 788DB00D 2D51BE89 CD2E9574 E55ACFAD 0DBB3C69 22F557D8 3CE1246A
4865F34A 5E151338 8FACE3A2 BCCF41F0 F6F38E24 F8E28E33 15B74062 BA3E7B82
22453F2D 7AEE69F1 3D3818E3 FAA63C64 F36C2190 74AD92D5 EDA56282 197B980D
8D2FC9A3 00BAF9D6 6DA40496 490BFD3A 2D7538A6 62024136 ADAD4D3B 26BB1AC5
B8E4CD81 20BB986E 9B200964 A6B0D904 A9B859DC 0E0388E6 A3DC545D 0DF3F583
8DF53C23 AA6D87D1 6409A3C6 22880533 A068FC31 717CEE6F 2D11EC3F A551AA9E
75C488EB 712A7710 16983900 DB1C30A8 7A7FEB9C 0725746A B1FBF0A3 A8C69EA5
9E6EBB6B 6292261E 81B11102 03010001 A351304F 300B0603 551D0F04 04030201
86300F06 03551D13 0101FF04 05300301 01FF301D 0603551D 0E041604 14F44829
16137317 7E925C69 5A432785 EA91EA14 49301006 092B0601 04018237 15010403
02010030 0D06092A 864886F7 0D010105 05000382 01010060 CBA8E054 DE68A314
C8C858EE 6B0FD21F 33C3F8CD D4DDACD6 ED7259FF 4386CF70 15EAB220 E9F25BDC
F47E2B02 8F322753 7435CD63 3A481673 1784C1DE A7666CE2 B63B8BBA E1D5D8E3
62BDF949 8430F42F 0E19487D 7DE431D8 A19C4579 A8FEAAC2 A074AF45 73CF87E5
1BCD5D76 072FDE3A BE80E670 FED63262 F52298A8 10185308 167C7F72 DB58A338
222E725E 12B92472 83196591 1AB38B16 6B8C2FD3 B070CF58 620F6FC3 40EA4F32
5668A69D 0CB63471 DFC28524 23A816DA 945070AB 273F6574 7EEC7E72 0C267CCD
C4D13831 2BCC0430 16511679 14DCD4F4 923FAC8E 072F7862 4D08704D 3B233B5E
257D28B7 59E1EA8E 74A80CD6 5ED85574 7E425FB3 81E2D8
     quit
!
ip cef
no ipv6 cef
!
multilink bundle-name authenticated
!
voice-card 0
 dsp services dspfarm
!
license udi pid C3900-SPE150/K9 sn FOC14353KLH
license accept end user agreement
license boot suite FoundationSuiteK9
license boot suite AdvUCSuiteK9
hw-module pvdm 0/0
!
hw-module sm 1
!
username cisco privilege 15 password 0
!
redundancy
!
interface Embedded-Service-Engine0/0
 no ip address
 shutdown
!
interface GigabitEthernet0/0
 ip address 10.80.11.25 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 no ip address
 shutdown
 duplex auto
 speed auto
!
interface GigabitEthernet0/2
 no ip address
 shutdown
 duplex auto
```

```
 speed auto
!
ip forward-protocol nd
!
no ip http server
no ip http secure-server
!
ip route 0.0.0.0 0.0.0.0 10.80.11.1
ip ssh server algorithm encryption aes128-ctr aes192-ctr aes256-ctr
ip ssh client algorithm encryption aes128-ctr aes192-ctr aes256-ctr
!
ipv6 ioam timestamp
!
nls resp-timeout 1
cpd cr-id 1
!
control-plane
!
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
!
sccp local GigabitEthernet0/0
sccp ccm 10.80.11.2 identifier 1 version 7.0 trustpoint DSPfarmRouter
sccp
!
sccp ccm group 1
 associate ccm 1 priority 1
 associate profile 1 register DSPfarmRouter
!
dspfarm profile 1 conference security
 trustpoint DSPfarmRouter
 codec g729br8
 codec g729r8
 codec g729abr8
 codec g729ar8
 codec g711alaw
 codec g711ulaw
 maximum sessions 4
 associate application SCCP
!
gatekeeper
 shutdown
!
line con 0
line aux 0
```

```
line 2
 no activation-character
 no exec
 transport preferred none
 transport output pad telnet rlogin lapb-ta mop udptn v120 ssh
 stopbits 1
line vty 0 4
 login local
 transport input all
!
scheduler allocate 20000 1000
!
end

DSPfarmRouter#
```

Secure Voicemail Integration

Configure CUC

Add SIP Certificate

Navigation: CUC Administration > Telephony Integration > Security > SIP Certificate

1. Click **Add New**
2. **Display Name***: Secure sip integration (this name is used here. Display name can be anything)
3. **Subject Name***: SecureConnection (Subject name can be anything but it should match with X.509 Subject name in sip trunk security profile)

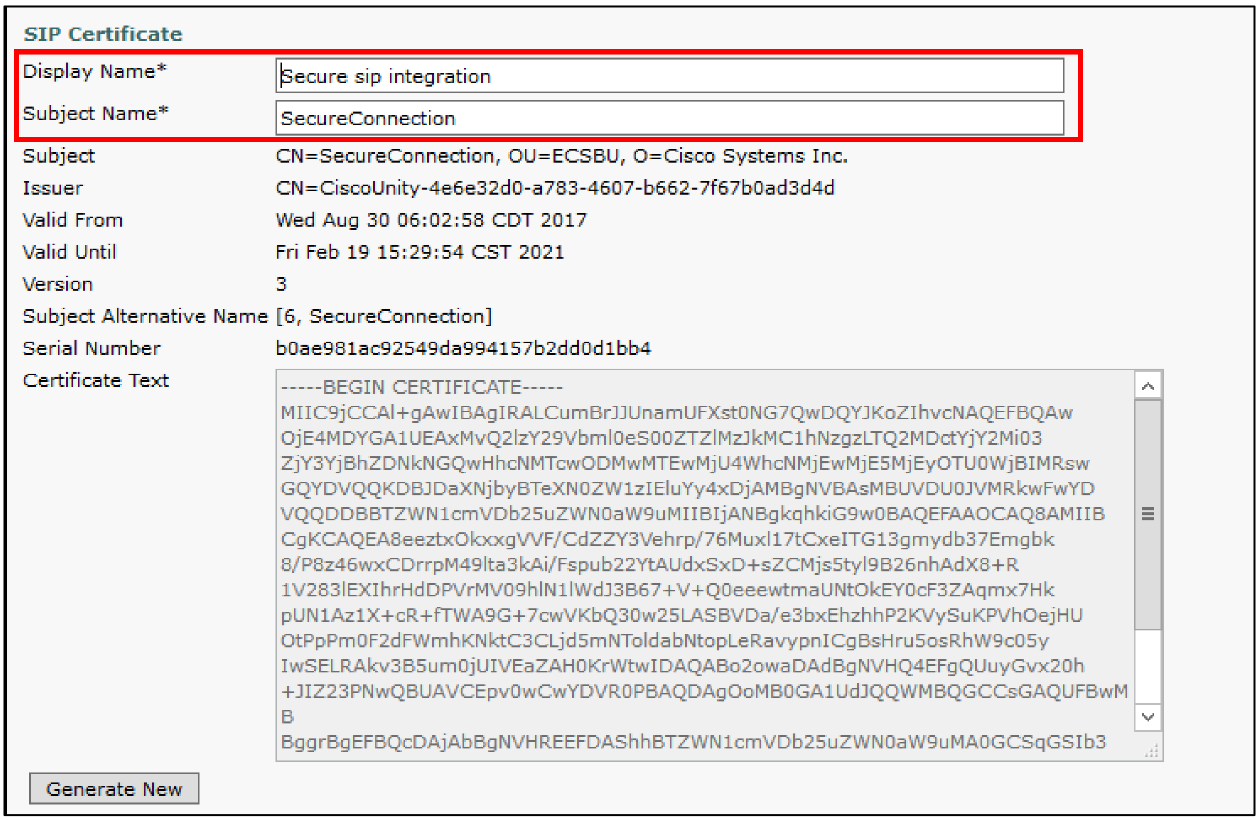


Figure 22: Voicemail SIP Certificate

Create Phone System

Navigation: Telephony Integration > Phone System

1. **Phone System Name***: clus21sip

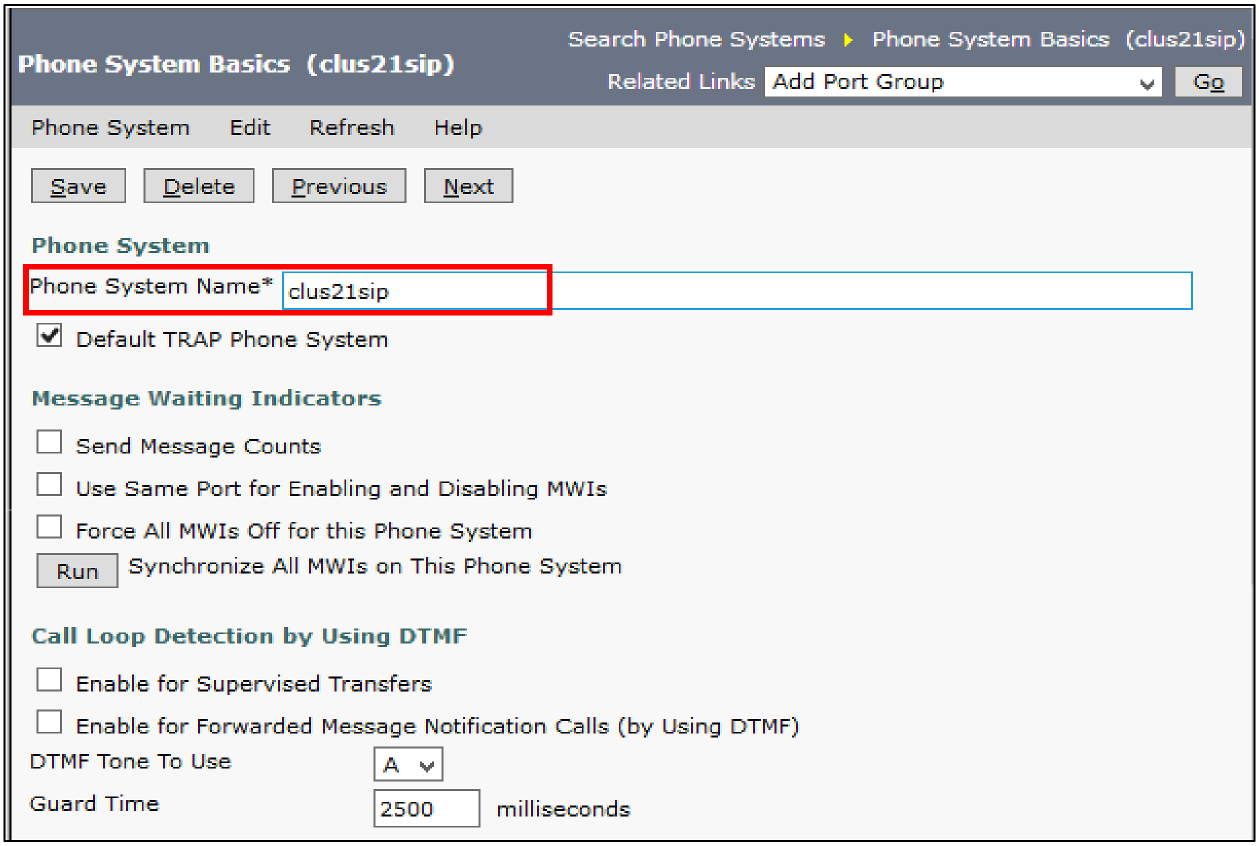


Figure 23: Phone System

Add Port Group

1. Click **Add Port Group** on the Phone System Page

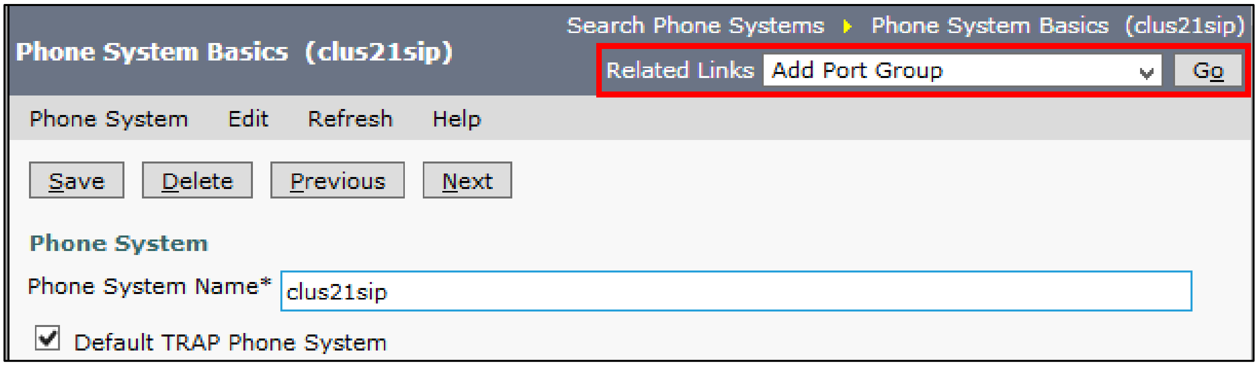


Figure 24: Port Group

2. **SIP Security Profile**: 5061/TLS
3. **SIP Certificate**: Secure sip integration
4. **Security Mode**: Encrypted
5. **Secure RTP**: Checked
6. To add the Port, click **Add Ports**

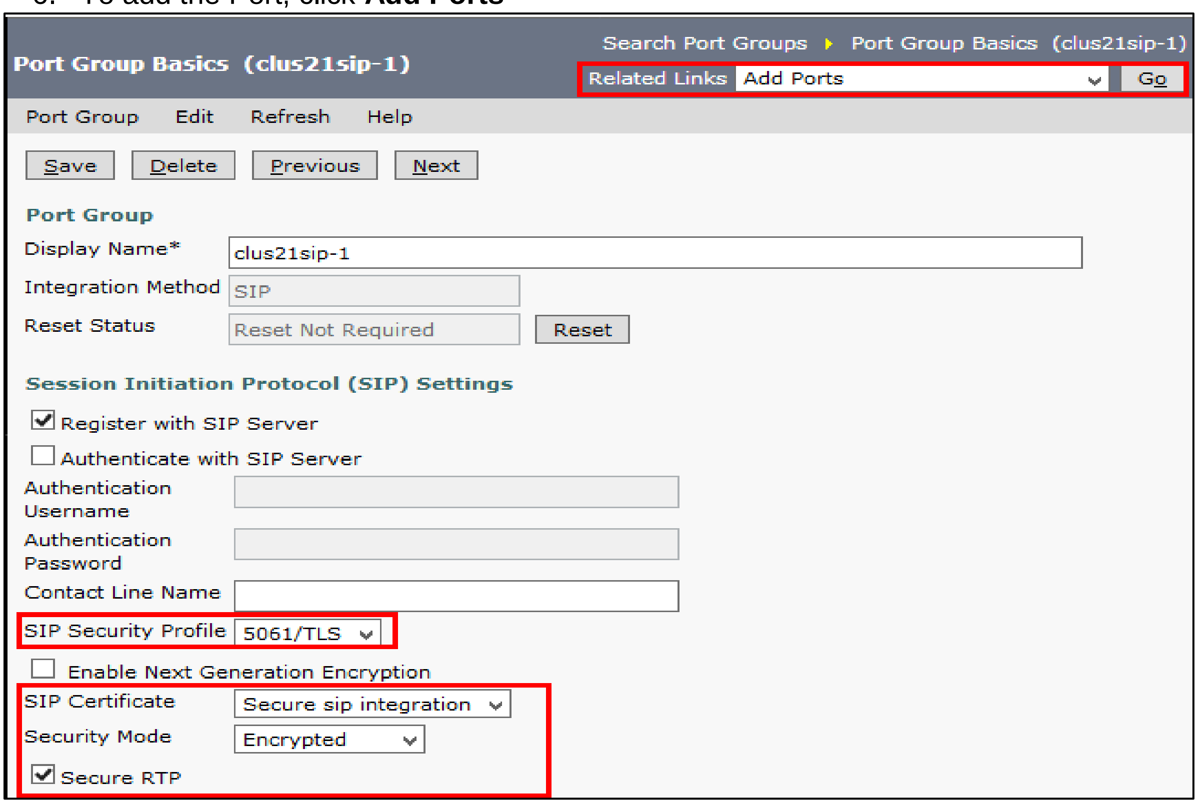


Figure 25: Port Group (Cont.)

Add Ports

1. **Number of Ports**: 2
2. **Phone System**: clus21sip
3. **Port Group**: clus21sip-1
4. **Server:** clus28unity.lab.tekvizion.com

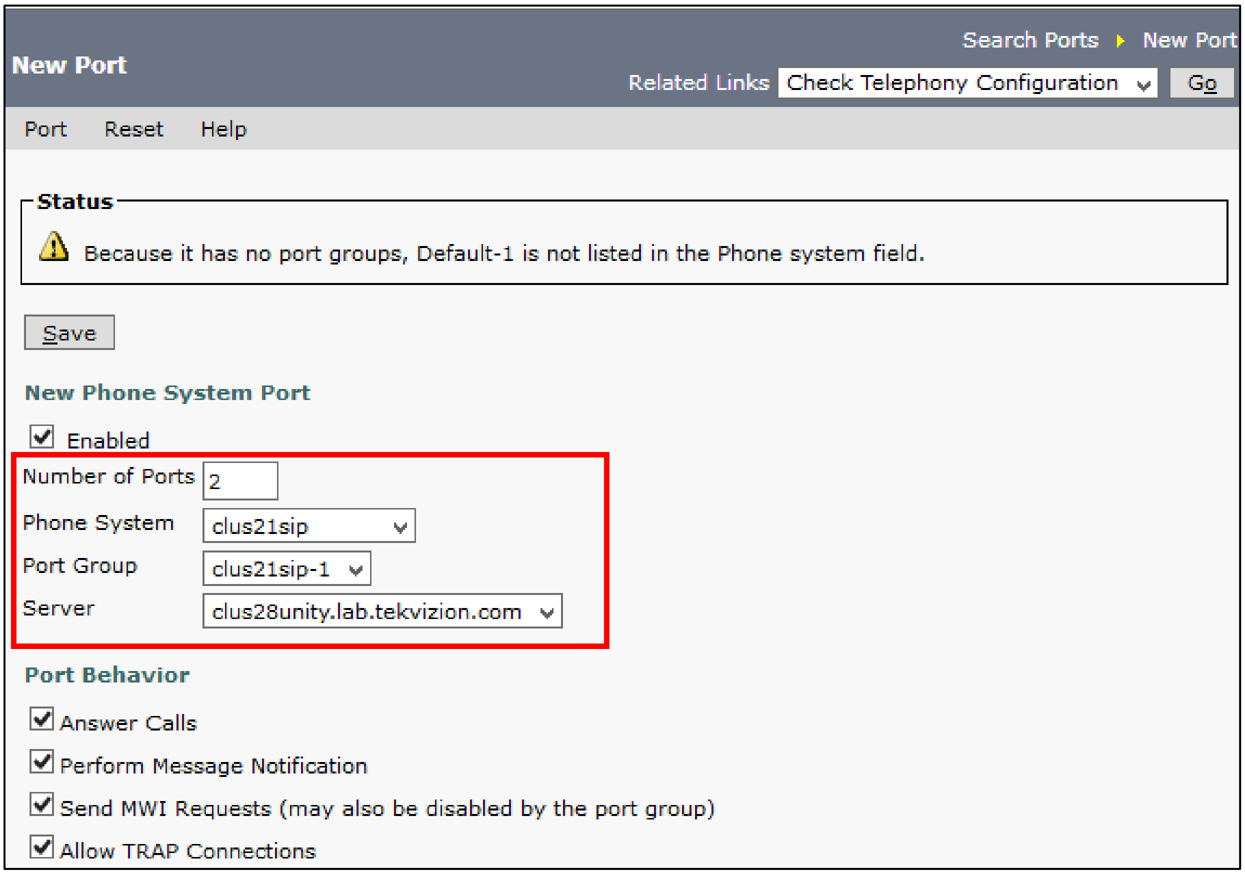


Figure 26: Port Configuration

Edit Servers

Navigation: Port Group > Edit > Servers

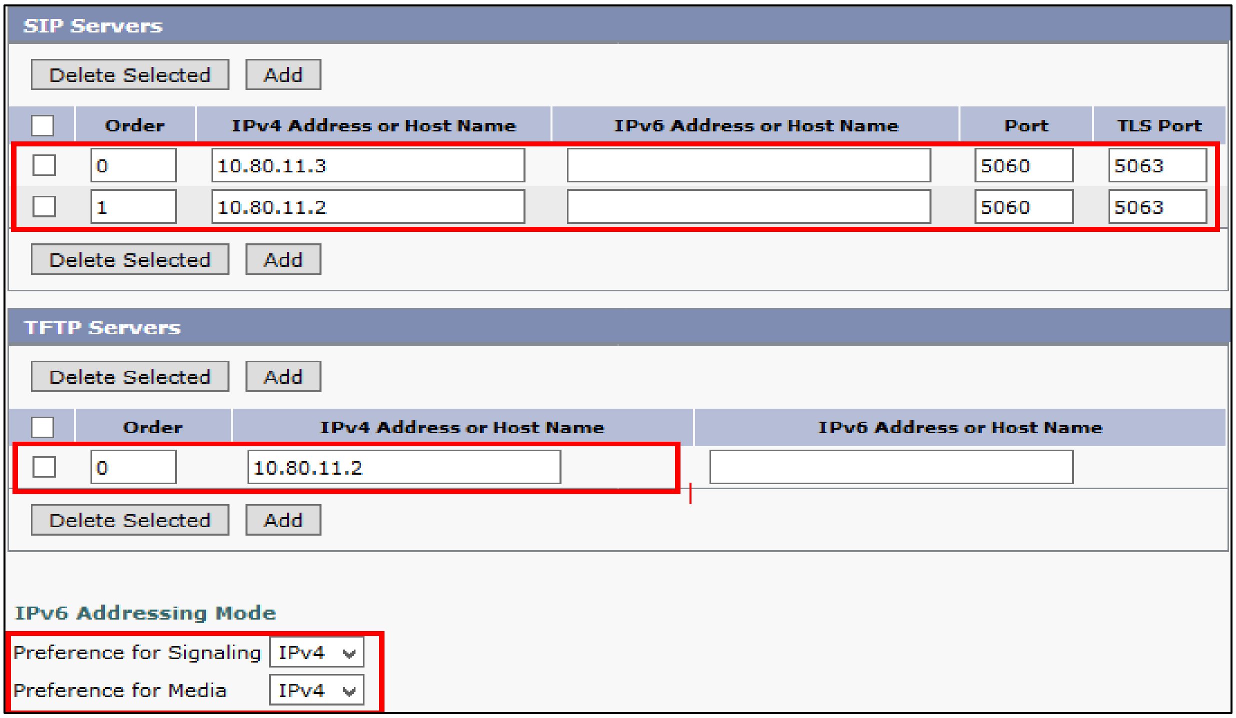


Figure 27: Server Configuration in Port Group

Download CUC Root Certificate

Navigation: Telephony Integration > Security > Root Certificate

1. Upload this Certificate to CUCM

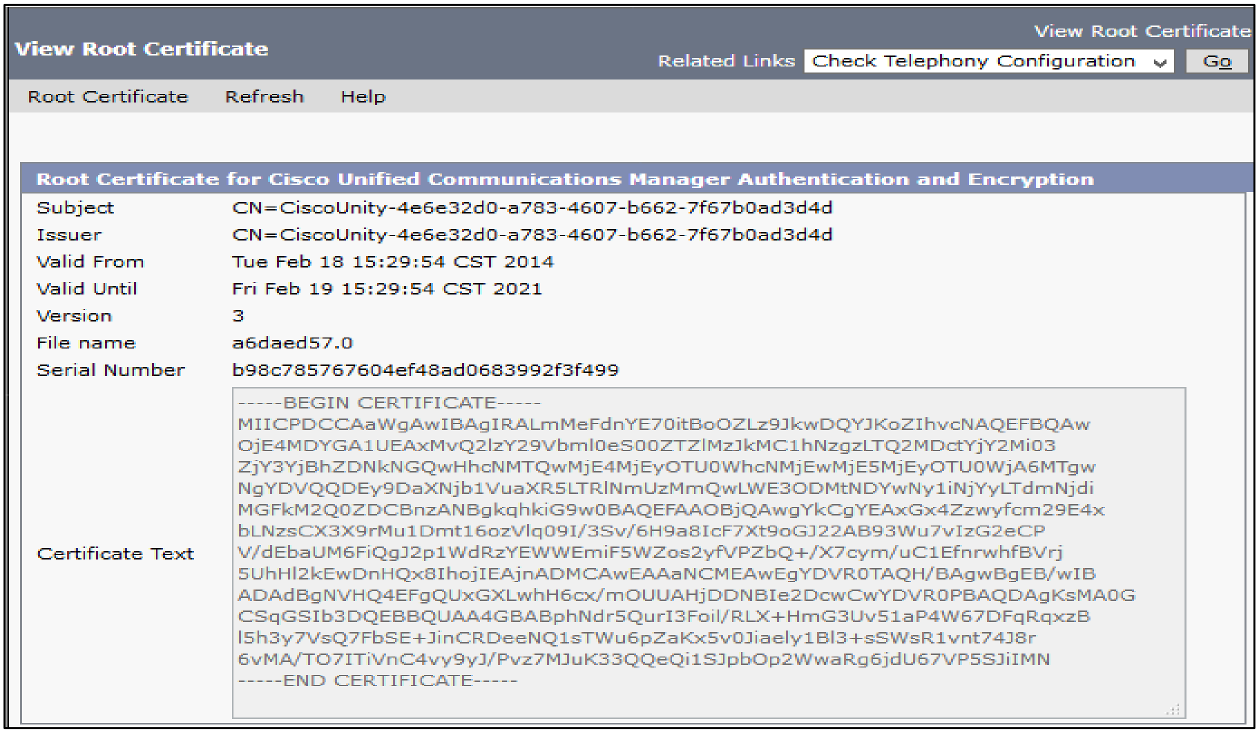


Figure 28: CUC Root Certificate

Create SIP Trunk Security Profile in CUCM

Navigation: System > Security > SIP Trunk Security Profile

1. Click **Add New**
2. **Name***: Unity_Connection_Trunk_Security_Profile
3. **Description**: Unity_Connection_Trunk_Security_Profile
4. **Device Security Mode:** Encrypted
5. **Incoming Transport Type***: TLS
6. **Outgoing Transport Type**: TLS
7. **X.509 Subject Name**: SecureConnection
8. **Incoming Port***: 5063

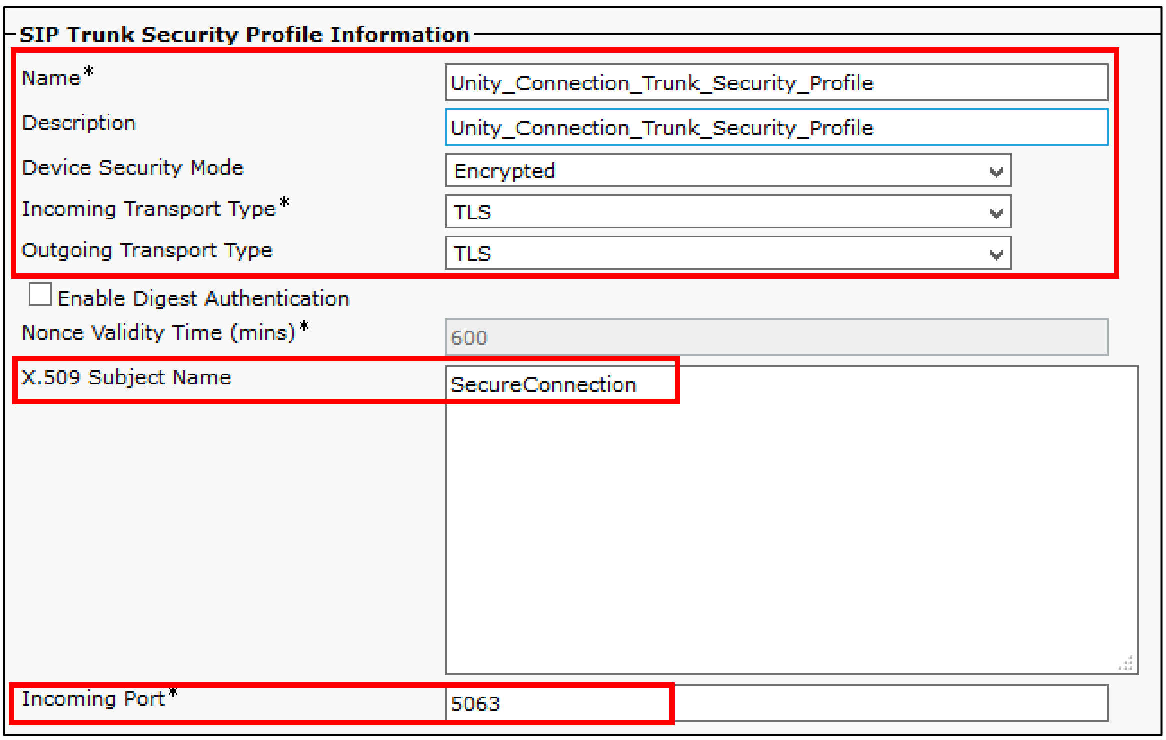
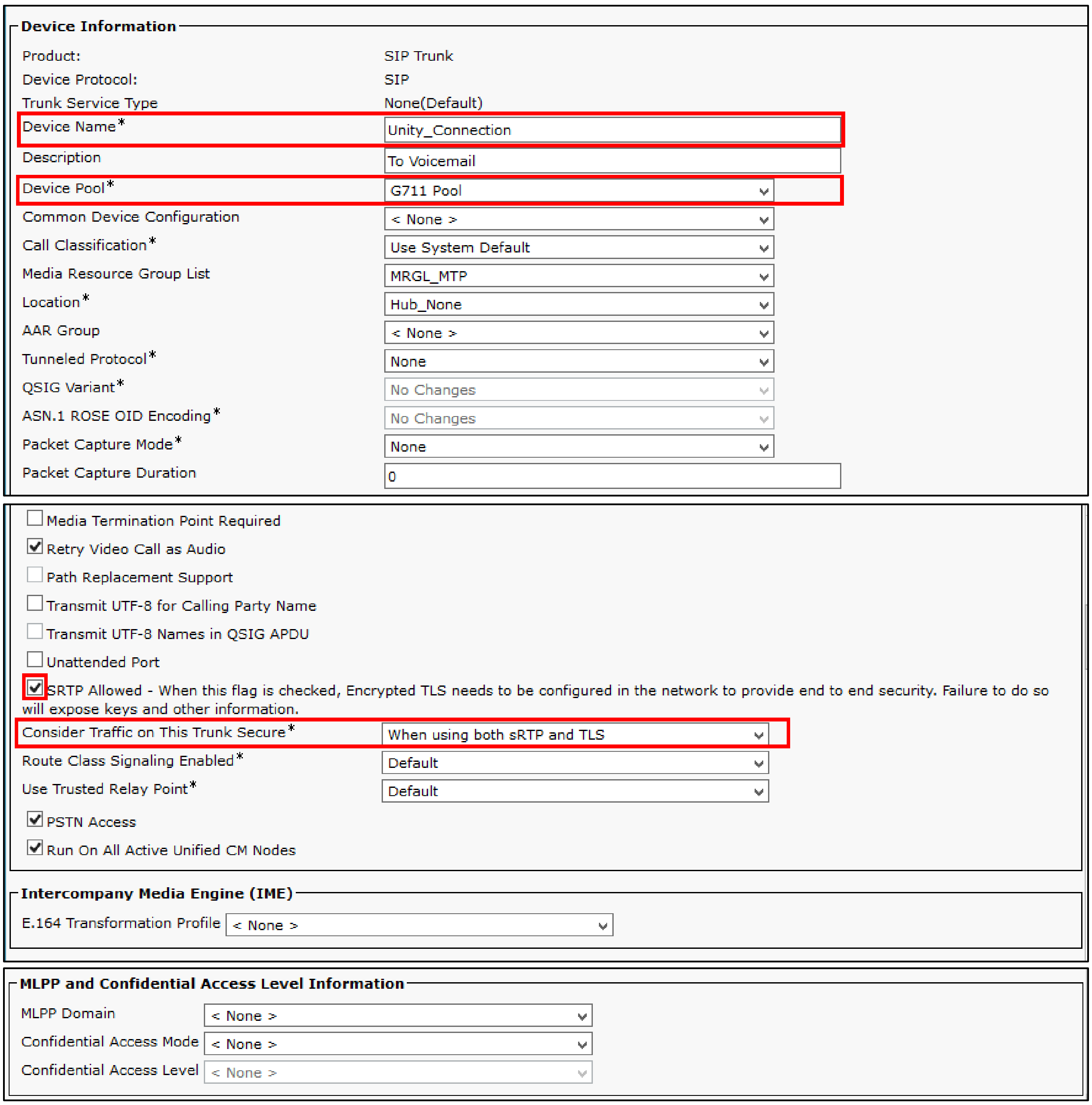


Figure 29: SIP Trunk Security Profile for Voicemail Trunk

SIP Trunk Configuration in CUCM

Navigation: Device > Trunk

1. Click **Add New**
2. **Device Name***: Unity_Connection
3. **Device Pool***: G711 pool
4. **SRTP Allowed**: Checked
5. **Consider Traffic on this Trunk Secure**: When using both SRTP and TLS



Device Information

Product: SIP Trunk
Device Protocol: SIP
Trunk Service Type: None(Default)
Device Name*: Unity_Connection
Description: To Voicemail
Device Pool*: G711 Pool
Common Device Configuration: < None >
Call Classification*: Use System Default
Media Resource Group List: MRGL_MTP
Location*: Hub_None
AAR Group: < None >
Tunneled Protocol*: None
QSIG Variant*: No Changes
ASN.1 ROSE OID Encoding*: No Changes
Packet Capture Mode*: None
Packet Capture Duration: 0

☐ Media Termination Point Required
☑ Retry Video Call as Audio
☐ Path Replacement Support
☐ Transmit UTF-8 for Calling Party Name
☐ Transmit UTF-8 Names in QSIG APDU
☐ Unattended Port
☑ SRTP Allowed - When this flag is checked, Encrypted TLS needs to be configured in the network to provide end to end security. Failure to do so will expose keys and other information.
Consider Traffic on This Trunk Secure*: When using both sRTP and TLS
Route Class Signaling Enabled*: Default
Use Trusted Relay Point*: Default
☑ PSTN Access
☑ Run On All Active Unified CM Nodes

Intercompany Media Engine (IME)

E.164 Transformation Profile: < None >

MLPP and Confidential Access Level Information

MLPP Domain: < None >
Confidential Access Mode: < None >
Confidential Access Level: < None >

Figure 30: SIP Trunk For Unity Connection

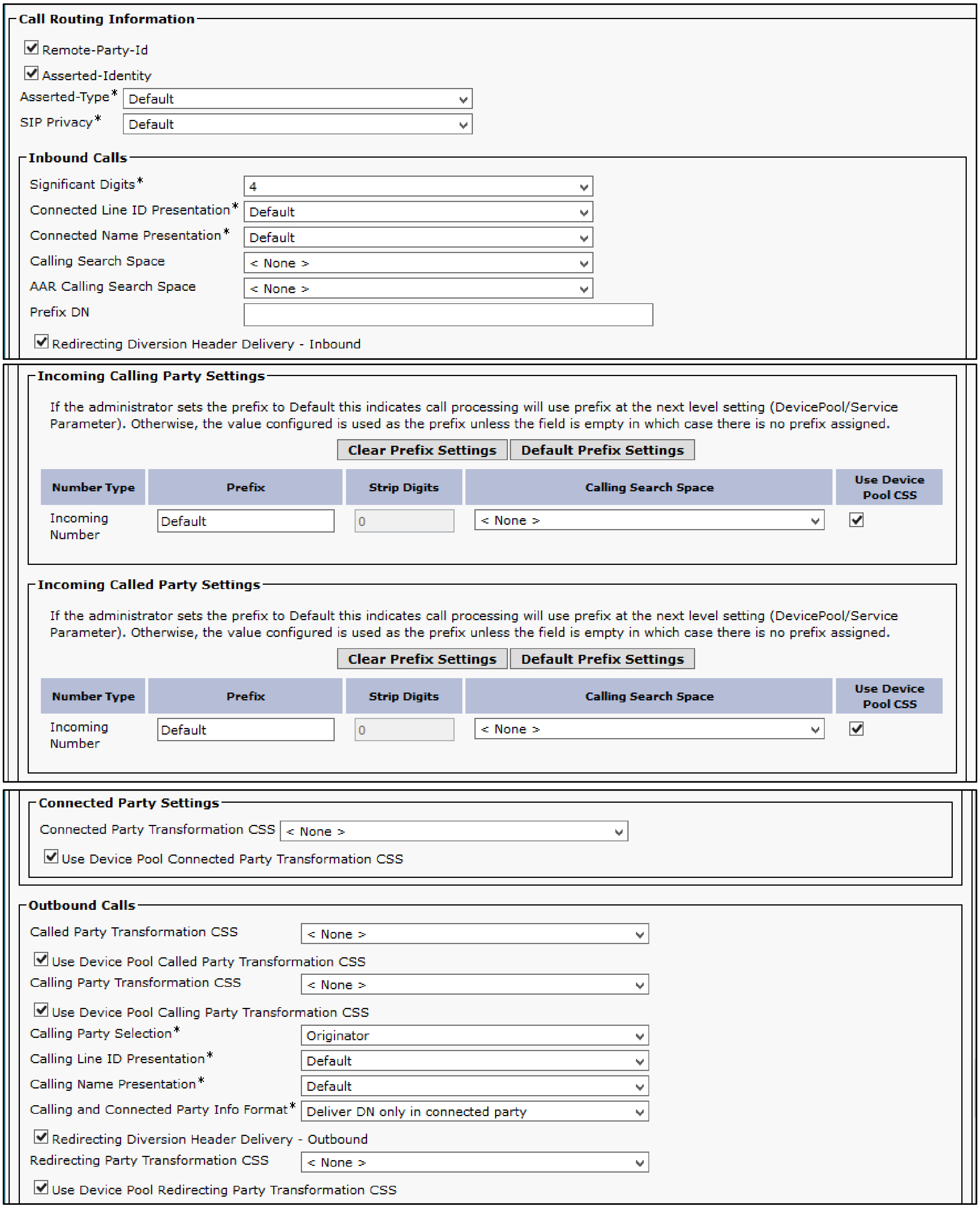


Figure 31: SIP Trunk For Unity Connection (Cont.)

6. **Destination Address**: Unity server IP address
7. **Destination Port**: 5061 for TLS
8. **SIP Trunk Security Profile*** : Unity_Connection_Trunk_Security_Profile
9. **SIP Profile***: Standard SIP Profile

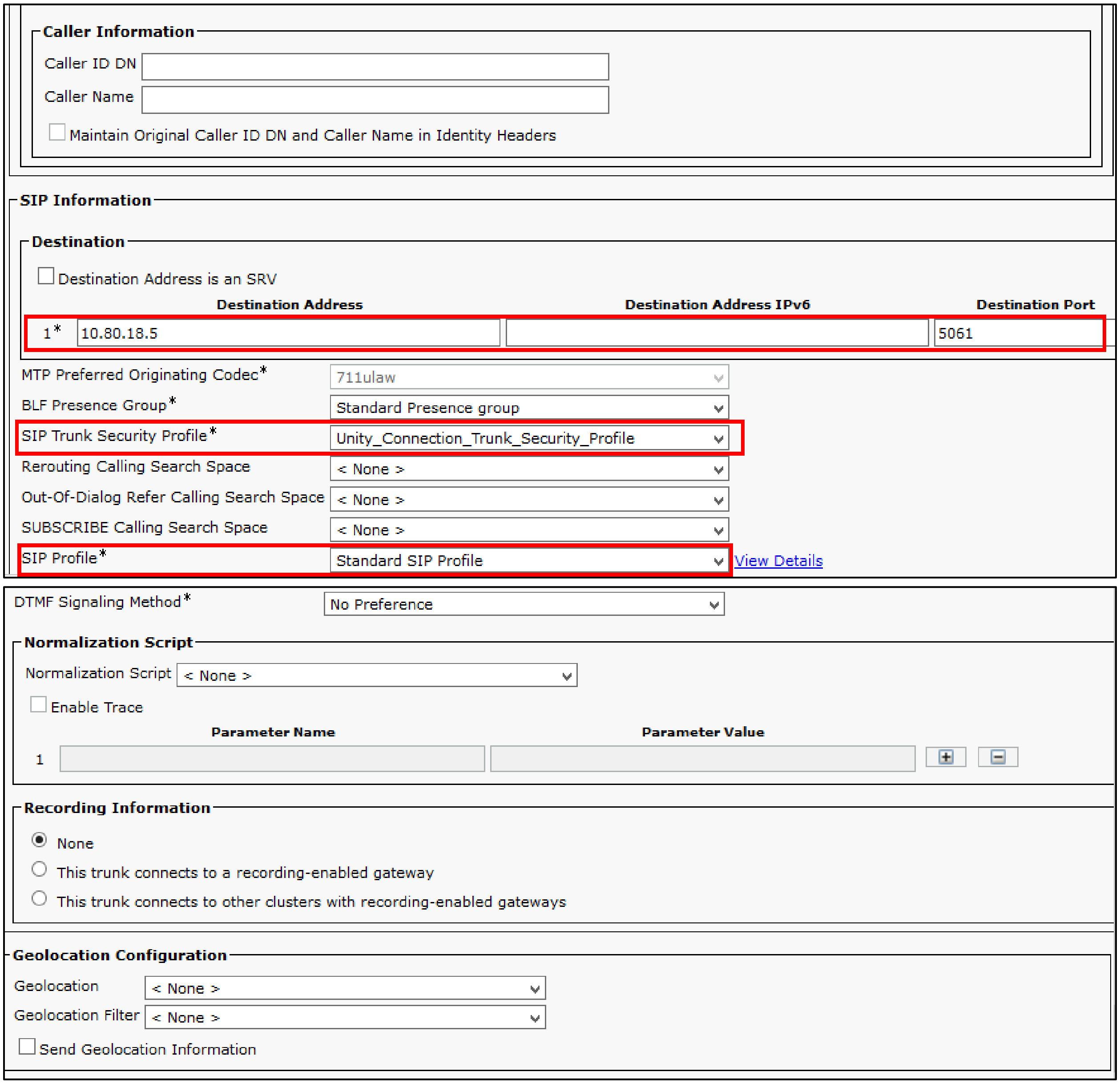


Figure 32: SIP Trunk For Unity Connection (Cont.)

Fax Gateway Configuration

This Section explains how to configure fax gateway on a cisco 2800 series router with Version 15.0(1)XA3

Generate RSA Key-Pair for Fax Gateway

vgw.in.tekvizion.com(config)#crypto key generate rsa general-keys label fax modulus 2048

Create a Trustpoint

```
crypto pki trustpoint lyncca
 enrollment terminal
 serial-number none
 ip-address none
 subject-name CN=vgw.in.tekvizion.com
 revocation-check none
 rsakeypair fax
```

Install the Root CA Certificate to the Local Trustpoint

Use the below command to install Root CA certificate to the local Trustpoint.

vgw.in.tekvizion.com (config)#crypto pki authenticate lyncca

Enroll with the CA Root and Install the Local Identity Certificate

Use below commands to enroll with CA root and install the local identity certificate.

vgw.in.tekvizion.com (config)#crypto pki enroll lyncca

vgw.in.tekvizion.com (config)#crypto pki import lyncca *certificate*

Voice Port Configuration

```
voice-port 0/3/1
 no echo-cancel enable
 no vad
 cptone IN
 description **telephone analog/fax**
 station-id name fax test
 station-id number 9802098021
 caller-id enable
```

Global Configuration

```
voice service voip
 address-hiding
 allow-connections sip to sip
 redirect ip2ip
```

```
 fax protocol pass-through g711ulaw
 no fax-relay sg3-to-g3
 sip
  session transport tcp tls
  midcall-signaling passthru
  g729 annexb-all
```

POTS Dial-Peer

```
dial-peer voice 888 pots
 service session
 destination-pattern 8021
 no digit-strip
 port 0/3/1
 forward-digits all
```

VoIP Dial-Peers

```
dial-peer voice 8021 voip
 description Gateway to CUCM
 service session
 destination-pattern 7XXXXXXXXXX
 session protocol sipv2
 session target ipv4:10.80.11.2:5061
 session transport tcp tls
 voice-class codec 3
 dtmf-relay rtp-nte
 srtp
 fax-relay ecm disable
 fax rate disable
 fax nsf 000000
 fax protocol pass-through g711ulaw
 no vad
!
dial-peer voice 80211 voip
 service session
 session protocol sipv2
 session transport tcp tls
 incoming called-number 9115
 voice-class codec 3
 dtmf-relay rtp-nte
 srtp
 fax-relay ecm disable
 fax rate disable
 fax nsf 000000
 fax protocol pass-through g711ulaw
 no vad
```

Acronyms

Acronym	Definition
CPE	Customer Premise Equipment
Cisco UBE	Cisco Unified Border Element
Cisco UCM	Cisco Unified Communications Manager
MTP	Media Termination Point
POP	Point of Presence
PSTN	Public Switched Telephone Network
ESBC	Enterprise Session Border Controller
SCCP	Skinny Client Control Protocol
SIP	Session Initiation Protocol

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