



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 IntelPeer, 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 IntelPeer 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 IntelPeer 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 IntelPeer 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 IntelPeer SIP Trunking service available in the former IntelPeer Business service area¹. The deployment model covered in this application note is CPE (Cisco UCM 11.5.1) to PSTN (IntelPeer).
- Testing was performed in accordance to IntelPeer 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 IntelPeer 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 IntelPeer 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

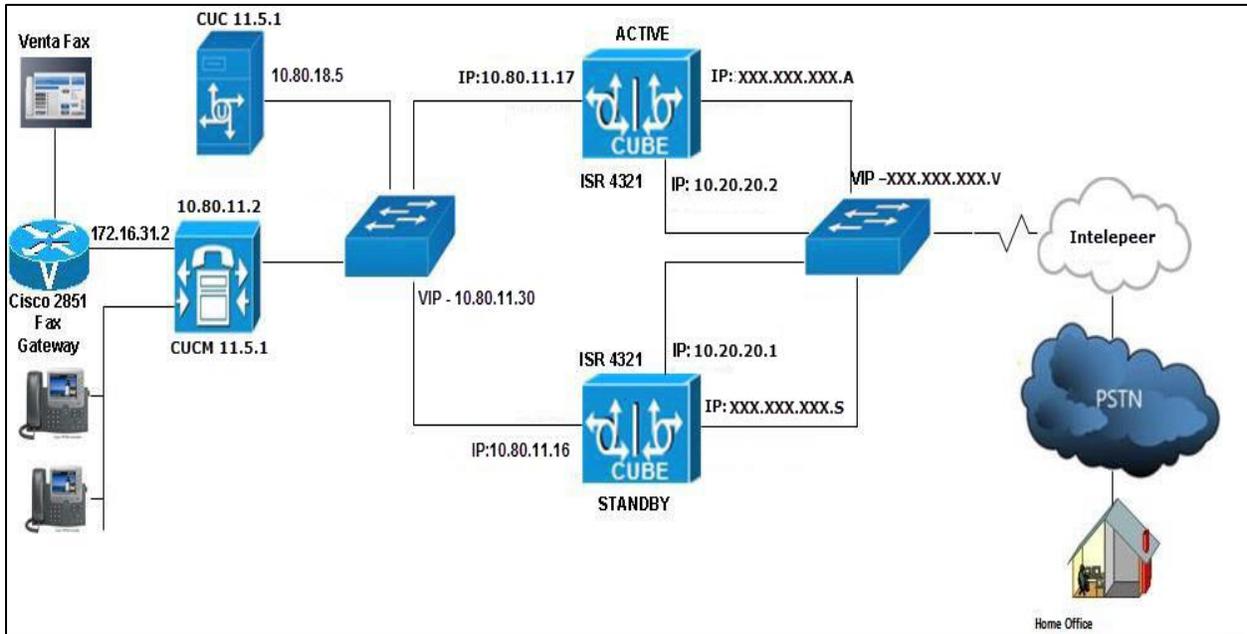


Figure 1: Network Topology

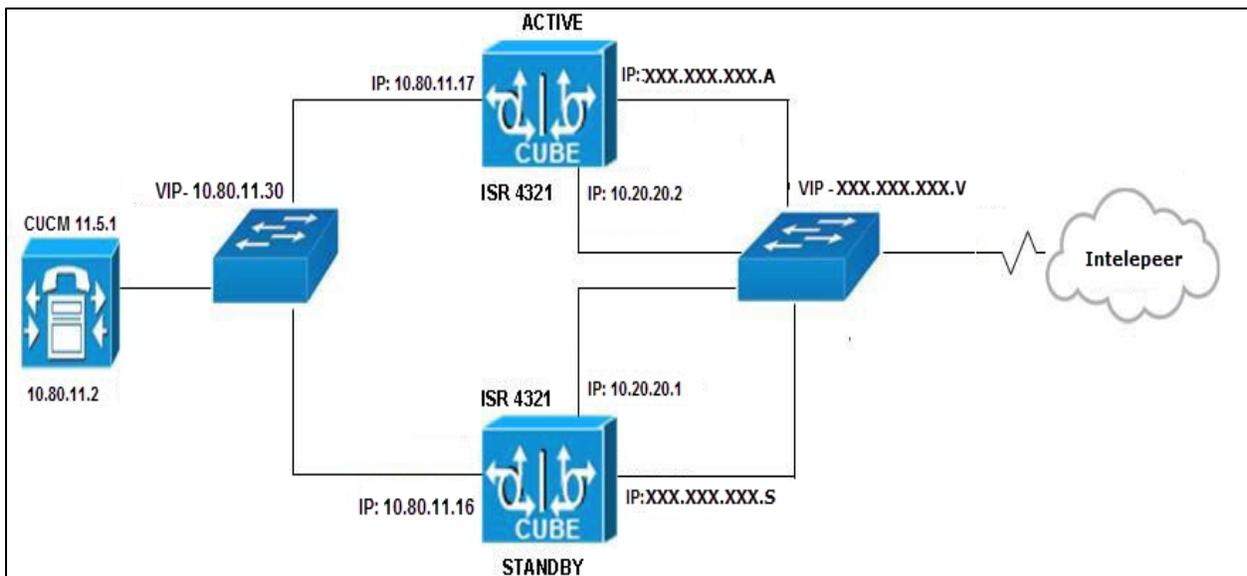


Figure 2: CUBE High Availability



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 g711 ulaw
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 g711 ulaw
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 IntelPeer, 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.

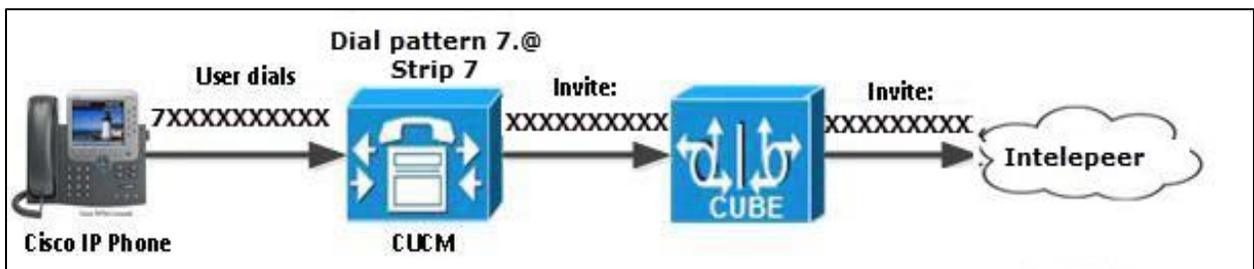


Figure 3: Outbound Voice Call

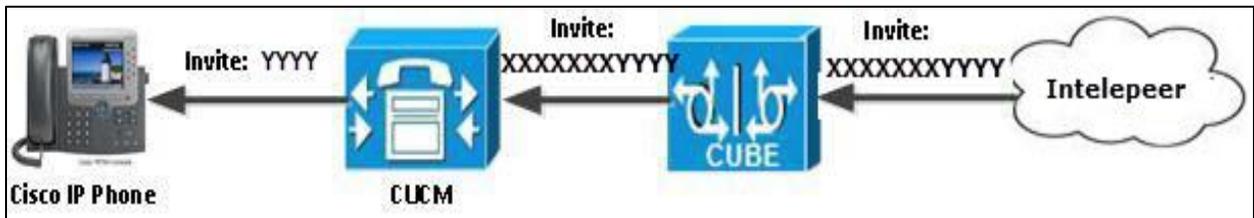


Figure 4: Inbound Voice Call

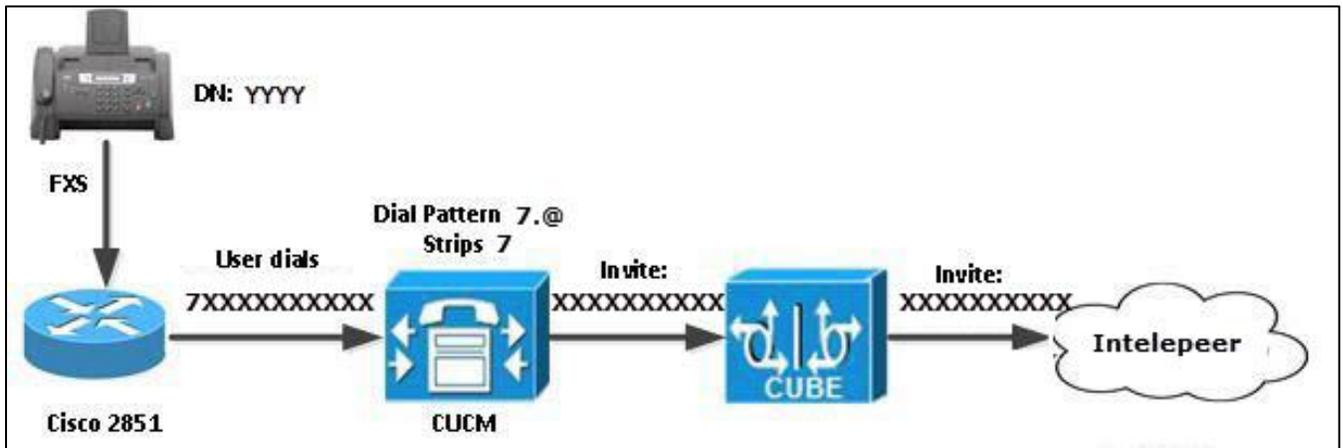


Figure 5: Outbound Fax Call

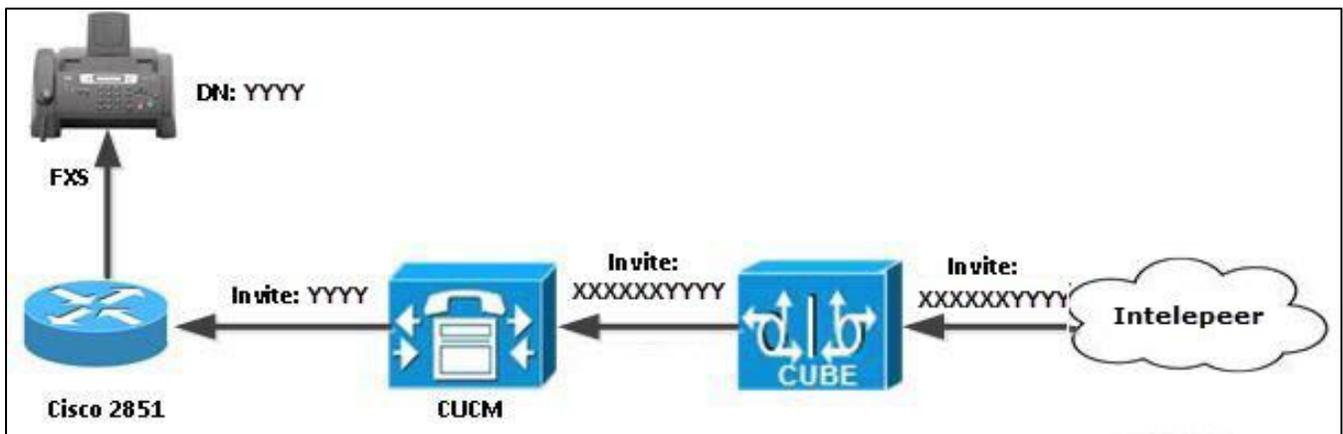


Figure 6: Inbound Fax Call

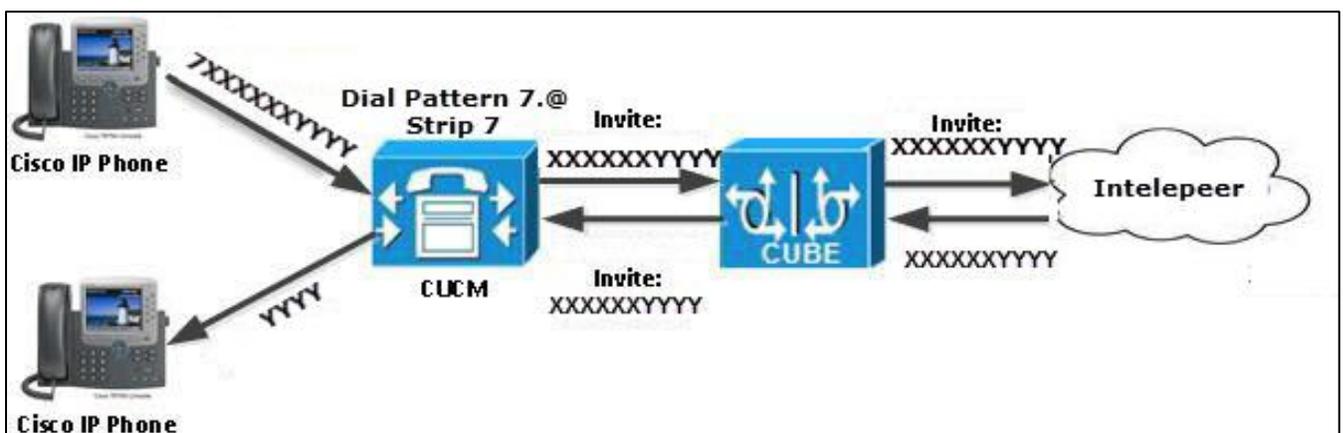


Figure 7: PBX to PBX via Spectrum Call



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
rsaкеypair 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 510000071DE5686AC5661895B00000000071
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 EDDDD9D7 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 6174655F
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 DFF7A3B4 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 3AC94ED1
87AE11B6 156B943F 5F7E419D 763C6430 41634BA2 72B41016 DFB373FB 26CEACC96
C1EFA19A 4197D85C 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
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 788D800D 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
9E8EBB6B 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 0C863471 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 CFB9C9130
```



```
0D06092A 864886F7 0D01010B 05003061 310B3009 06035504 06130255 53311530
13060355 040A130C 44696769 43657274 20496E63 31193017 06035504 0B131077
7772E64 69676963 6572742E 636F6D31 20301E06 03550403 13174469 67694365
72742047 6C6F6E21 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 143B659B 92BEC207 654EFCDA FCF77AAE DC5C7E55
310CE839 07A4D7BE 2FD30B6A D2B1DF5F FE577453 3B3580DD AE8E4498 B39F0ED3
DAE0D7F4 6B29AB44 A74B5884 6D924B81 C3DA738B 12974890 0445751A DD373197
92E8CD54 0D3BEAC1 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 CDA2A2A65
E5394F1E 83A56E5C 98A22426 E6FBA1ED 93C72E02 C64D4ABF B042DF78 DAB3A8F9
6DF2185 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:98023311@l2>"
!
voice class srtp-crypto 1
crypto 1 AES_CM_128_HMAC_SHA1_32
!
```



```
voice translation-rule 1
 rule 1 /980233\{9116\}/ \Lambda1/
!
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 mnpqrst
!
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
rsa-keypair 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
rsa-keypair itpcube
!
```



crypto pki certificate chain lynclabcc-DC-CA

```
certificate 510000072086071C6F517FA1F00000000072
3082055E 30820446 A0030201 02021351 00000072 086071C6 F517FA1F 00000000
0072300D 06092A86 4886F70D 01010505 00304C31 15301306 0A099226 8993F22C
64011916 056C6F63 616C3119 3017080A 09922689 93F22C64 01191609 6C796E63
6C616263 63311830 16000055 0403130F 6C796E63 6C616263 63204443 2D441130
1E170D31 37303831 31303732 3135335A 170D3139 30383131 30373231 35335A30
19311730 15060355 0403130E 696E7465 6C506565 72437562 65313082 0122300D
06092A86 4886F70D 01010105 00030201 0F003082 010A0282 010100A8 21166761
4405090C CEA717BF 949E192 1E1E5748 4C1B7539 4278A00D F0245F54 5464806D
3434FA14 55028A75 375C1553 28C48F25 D627C8E2 76FE8414 E9533AD0 8AF6CC26
890EA09E 5A16D908 FC55D044 79A864E8 2C83AD99 CASC1C39 D03B184E 1C740A44
569161F0 F413BA84 6C683F89 D4B410CA A597DDCD 78CE7FBE FB8D6B7C 10C396EC
31F92F2F 82D9932D 3D348936 77546185 1E6AD5F5 BEECBAD2 3E317FF1 3D64FF54
A2FEFF73 2B088E54 6B4BF04C 882FEAD0 37C0D280 D4383AC9 8388F718 BD064E2D
FF34A6A2 B14E1D7E BACD348E 55D56F41 39D41658 02727044 768020DB F6264863
B96D27CD 83AC35FD B5A7902A 197118D0 9DA5E157 2BBE82D 3DA80502 03010001
A382026A 30820266 30060E03 551D0F01 01FF0404 030205A0 30100603 551D0E04
16041453 7970581E 6C193F58 9ED366C1 34E24945 05CAD930 1F600355 10230418
30168014 F4482916 1373177E 925C695A 432785EA 91EA1449 3081C806 03551D1F
0481C030 81BD3081 BAA081B7 A081B486 81E16C64 61703A2F 2F2F434E 3D6C796E
636C6162 63632D44 432D4341 2C434E3D 44432C43 4E3D4344 502C434E 3D507592
6C696320 48857920 33657276 69636573 2C434E3D 50557276 69636573 2C434E3D
43F6F6E6 69675772 6174696F 6E2C44A3 3D6C796E 636C6162 63632C44 433D6C6F
63616C3F 63657274 69666963 61746552 65766F63 6174696F 6E4C6973 743F6261
73653F6F 626A6563 74436C61 73733063 524C4469 73747269 62757469 6F6E506F
696E7430 81C10608 2B060105 05070101 0461B430 81B13081 AED6082B 06010505
07302816 61A16C54 61703A2F 37F4346E 300C796E 636C6162 63632C44 432D4341
2C434E3D 414941D2 434E3D50 75626C69 63204865 79205365 72766963 65732C43
4E3D5365 72766963 65732C43 4E3D436F 6E666967 75726174 696F6E2C 44432D6C
796E636C 61626363 2C44433D 6C6F6361 6C3F6341 43657274 69666963 6174653F
62617363 63F62616 65637443 6C617373 6C636572 74696966 63617469 6F6E4175
74686F72 69747930 3D06092B 06010401 82371507 0430302E 06262B06 01040182
37150885 EEBE0581 9FDE6482 BD8715F6 980E82FA A5608166 82949CA4 87E68D40
02016402 0104301D 0603551D 25041630 14060828 06010505 07030106 082B0601
05050703 02302706 04010105 05003040 31153013 060A0992 268993F2 2C640119
0301300A 06082B 0601050507 0302300D 06092A86 4886F70D 01010505 00038201
01005B4E E7888085 4FDD82A0 BFF99BCA 6836FD71 F2FB1269 05C31DAA 4CF05187
18A5F63F F38E424F B34795DE 48EC780D 0F9CEAD6 F6FF308E 91FC9C41 868824CD
9F08EA4E 4D423004 60F4EE9E 9D50F98 38E27F78 FB9E6373 F075617F
1A1CD84B 78504FB8 5EE089A8 C79B1428 9B93A7D4 EDF59419 7A058E27 88ABFCD2
E1FF0794 0885560F AAB85553 E8D2825C B9B02318 BEA539E1 66667E2B 2A9EA088
18FD9B1B D79FFED7 FD4AFC87 A6C34A11 59AD67AE EE248851 3915E9A0 E1426FA9
EFD49287 B889CEE8 836D59D9 F88039B9 D15F636C 45D899CF F2F5148D 7BD85374
7A73063C EB4DF074 AA497868 7A59A82A F13E2978 F96117C2 96336882 38C86D96 2892
quit
```

```
certificate ca 133A5FA76CC004AD432C2B40E2D2384
30820373 3082029B A0030201 02021013 3A5FA76C C004AD43 3C2CB40E 2DD38430
0D06092A 864886F7 0D010105 05003040 31153013 060A0992 268993F2 2C640119
160506CF 63616C31 19301706 0A099226 8993F22C 64011916 096C796E 636C6162
63633118 30160603 55040313 0F6C796E 636C6162 63632D44 432D4341 301E170D
31353131 30343132 34363232 5A170D32 30313130 34313235 3632325A 304C3115
3013060A 08922889 80F22C64 01191609 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 268D7788 62912768 6DC18C85
80E4755 788D300D 2D51E888 CD2E974 E58ACFAD 0DB83C89 22F557D8 3CE1246A
486F34A 5E161338 8F4C342 BC0741 F0F38E24 F8E26E33 158748E2 843E7889
22453F2D 7AE669F1 3D3818E3 FAA63C64 F36C2190 74AD92D5 EDA56282 197B980D
8D2FC9A3 00B4F9D6 6DA40496 490BF0D3A 2D7538A6 62024136 ADAD4D3B 26BB1AC5
B8E4C881 20B8986E 9E200964 A6B0D904 A98898DC 0E0388E6 A3DC545D 0DF3F583
8D53C23 34462871 64094302 22886533 A08F8C31 717CE6FE 2D11EC3F A551A49E
75C488E6 71A27710 16983900 DB1C30A8 7A7FEB9C 0725746A B1FBF0A3 A8C96EA5
9E6EBB68 6292261E 81B11102 03010001 A351304F 300B0603 551D0F04 04030201
8630F06 03551D13 0101FF04 05300301 01FF301D 0603551D 0E041604 14F44829
81137317 7E92C68A 5A327805 EA91E14 46301006 08280601 04018237 15010403
0210030D 0D06092A 864886F7 0D010105 05000382 01010060 CBABE054 DE68A314
C8C858EE 6B0FD21F 33C3F8CD D4DDACD6 ED7259FF 4386CF70 15EAB220 E9F25BDC
F47E2B02 8F327253 743DC063 3A481673 1794C1DE A7666CE2 B63888BA E1D5D8E3
63BDF849 9430F42F 0E19487D 7DE451D8 A19C4579 A8FEAACC 4A74AF45 73C791E5
1BCD5D76 072FE3A BE80E760 FED63262 F52298A8 10185308 167C7F72 DBS8A338
22E2725E 12B92472 83196591 1AB38B16 688C2FD3 B070CF58 620F6FC3 40EA4F32
568BA69D 0CB63471 DFC28524 23AB16DA 945070AB 273F6574 7EEC7E72 0C267CCD
CAD13831 28C0C430 16511679 14DCD4F4 32FAC8E 072F7862 4D08704D 3823385E
257D2887 59E1EABE 74A80CD6 5ED6574 7E4E3FB3 81E2D8
quit
```

crypto pki certificate chain "DigiCert SHA2 Secure Server CA"

certificate ca 01FDA3EBE6CA75C889438B724BCFBC91

```
30820494 3082037C 30820201 02021011 FDA3EBE6 CA75C888 438B724B CFB9C130
0D06092A 864886F7 0D01010B 05003061 310B3009 06035504 06130255 53311530
13060355 0A0A130C 44696769 43657274 20496E63 31193017 06035504 0B131077
7772E64 69676963 6572742E 636F6D31 20301E06 03550403 13174469 67694365
72742047 0C6F6261 3C20528F 6F742043 41301E17 00313330 33303831 32303030
305A170D 32330333 30383132 30303030 5A30A4D31 0B300906 03550406 13025553
31153013 06035504 0A130C44 69676943 65727420 496E6331 27302506 03550403
131E4469 67694365 72742053 48413220 53656375 72652053 65727665 72204341
30820122 30D060E9 2A864886 F70D0101 01050038 8201F0D0 3082010A 02820101
00DCAE59 904DC104 30150885 68863C82 1F5F302C B0E389FF 7148F484 298004EE
18A24DF0 66D00A73 6E119836 1764AF37 9DFDFA41 84ACF7AF BCFE1A73 4DCFC397
90A29687 5382BB9 A675482D 1D56377B DA31321A D7ACAB06 F4A45AD8 B74746DD
2A9C390 2E798080 EF13048A 1438B598 92BC2C07 654EFCDA FCFF7AAE DC5C7E55
310C6390 07A4D79E 2F30398A D2B1D13F FE571453 383390DD 4BE4E486 8A8F0ED3
DAE0D774 6B29AB44 A7485884 6D924B81 C3DA7388 12974890 0445751A DD373197
92E8CD54 0D38E4C1 3F395E2E B8F35C7E 108E8641 008D4566 47B0A165 CEAA0A29
094F39F EBE8E2AB 0F72A730 0EFACT74 FD1477C3 A4682857 C2B3F982 FDB74858
98303301 0001A3E2 015A2082 01563112 0603551D 310011FF 04083006 0101FF02
0100300E 0603551D 0F0101FF 04040302 01863034 06082B06 01050507 01010428
30263024 06082B06 01050507 30018618 68747470 3A2F2F6F 637302E 64696769
63657274 2E636F6D 307B0603 551D1F04 74307230 37A035A0 33863168 7474703A
2F2F6372 6C332E64 69676943 6572742E 636F6D2F 44696769 43657274 47626F62
616C826F 6F744341 2E63726C 3037A035 A0386331 68747470 3A2F2F6F 726C342E
64696769 63657274 2E636F6D 2F446967 69436572 74476C6F 62616C52 6F6F7443
412E6372 6C303D06 03551D20 04363034 30320604 551D2000 302A3028 06082B06
01050507 0201161C 68747470 733A2F2F 777772E 64696769 63657274 2E636F6D
2F436563 301D0603 551D0E04 16041453 80611C92 3161D60F 28E78046 38B4AC21
C6D9E230 1F060355 1D230418 30168014 03DE5035 56D14CBB 6F6FA3E2 1B18C397
B23DD155 30D060E9 2A864886 F70D0101 0500003 82010100 233EDF4B D23142A5
B67E428C 1A44CC89 D168846D 4BED0X21 6C4BE20D CCB1E087 8FA65309 CDAA2A65
E5394F1E 63A5655C 98A22426 E6F8A1ED 30C72E02 C6D4480F 804CD178 DA83A8F9
6DF2185 5336604C 76CEEC38 DCD65180 F0C5D6E5 A4D02764 AB98C73E 71FB4897
B8336DC9 1307EE9E A21B1815 F65C4C40 EDB3C2EC FF71E3 47FFD4B9 00B43742
DA20C9EA 6EAE1E4 06AE7DA2 598888A8 1B6F2DFA F2C9145F 26CF2C8D 7EED37C0
4D23989 82B1F884A0 2168848D 73E2C382 DA382508 5SD39A1D F06888E8
2E413AEF CAA5501D BF3AF9D3 01080CE8 ED1E8A58 25E48877 AD2D6EFS 52DD0B474
8FAB492E 9D3B9334 281F78CE 94EACTBD D3C96D1C DESC32F3
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

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```
!
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@12>"
!
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 mnpqrst
!
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

Select Server and Service

Server*

Service*

All parameters apply only to the current server except parameters that are in the cluster-wide group(s).

Cisco CallManager (Active) Parameters on server clus21sub1--CUCM Voice/Video (Active)

Parameter Name	Parameter Value	Suggested Value
Call Throttling		
Code Yellow Entry Latency *	<input type="text" value="20"/>	20
Code Yellow Exit Latency Calculation *	<input type="text" value="40"/>	40
Code Yellow Duration *	<input type="text" value="5"/>	5
Max Events Allowed *	<input type="text" value="2000"/>	2000
System Throttle Sample Size *	<input type="text" value="10"/>	10

Figure 9: Service Parameters



Offnet Calls via IntelPeer SIP Trunk

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

SIP Trunk Security Profile

Navigation: System > Security > SIP Trunk Security Profile

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

SIP Trunk Security Profile Information	
Name*	Secure Profile For intelpeer Trunk
Description	Secure Profile For intelpeer Trunk
Device Security Mode	Encrypted
Incoming Transport Type*	TLS
Outgoing Transport Type	TLS
<input type="checkbox"/> Enable Digest Authentication	
Nonce Validity Time (mins)*	600
X.509 Subject Name	intelPeerCube2, intelPeerCube1
Incoming Port*	5061
<input type="checkbox"/> Enable Application level authorization	
<input type="checkbox"/> Accept presence subscription	
<input checked="" type="checkbox"/> Accept out-of-dialog refer**	
<input type="checkbox"/> Accept unsolicited notification	
<input type="checkbox"/> Accept replaces header	
<input checked="" type="checkbox"/> Transmit security status	
<input type="checkbox"/> Allow charging header	
SIP V.150 Outbound SDP Offer Filtering*	Use Default Filter

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

SIP Profile Information	
Name*	Intelepeer sip profile
Description	Intelepeer sip profile
Default MTP Telephony Event Payload Type*	101
Early Offer for G.Clear Calls*	Disabled
User-Agent and Server header information*	Send Unified CM Version Information as User-Agent
Version in User Agent and Server Header*	Major And Minor
Dial String Interpretation*	Phone number consists of characters 0-9, *, #, anc
Confidential Access Level Headers*	Disabled
<input type="checkbox"/> Redirect by Application	
<input type="checkbox"/> Disable Early Media on 180	
<input type="checkbox"/> Outgoing T.38 INVITE include audio mline	
<input type="checkbox"/> Offer valid IP and Send/Receive mode only for T.38 Fax Relay	
<input type="checkbox"/> Use Fully Qualified Domain Name in SIP Requests	
<input type="checkbox"/> Assured Services SIP conformance	
<input type="checkbox"/> Enable External QoS**	

SDP Information	
SDP Session-level Bandwidth Modifier for Early Offer and Re-invites*	TIAS and AS
SDP Transparency Profile	Pass all unknown SDP attributes
Accept Audio Codec Preferences in Received Offer*	Default
<input type="checkbox"/> Require SDP Inactive Exchange for Mid-Call Media Change	
<input type="checkbox"/> Allow RR/RS bandwidth modifier (RFC 3556)	

Parameters used in Phone	
Timer Invite Expires (seconds)*	180
Timer Register Delta (seconds)*	5
Timer Register Expires (seconds)*	3600
Timer T1 (msec)*	500
Timer T2 (msec)*	4000
Retry INVITE*	6
Retry Non-INVITE*	10
Media Port Ranges	<input checked="" type="radio"/> Common Port Range for Audio and Video <input type="radio"/> Separate Port Ranges for Audio and Video
Start Media Port*	16384
Stop Media Port*	32766

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						
<input checked="" type="checkbox"/> Conference Join Enabled <input type="checkbox"/> RFC 2543 Hold <input checked="" type="checkbox"/> Semi Attended Transfer <input type="checkbox"/> Enable VAD <input type="checkbox"/> Stutter Message Waiting <input type="checkbox"/> MLPP User Authorization							
Normalization Script							
Normalization Script	< None > ▼						
<input type="checkbox"/> Enable Trace							
	<table border="1"> <thead> <tr> <th></th> <th>Parameter Name</th> <th>Parameter Value</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> </tr> </tbody> </table>		Parameter Name	Parameter Value	1		
	Parameter Name	Parameter Value					
1							
Incoming Requests FROM URI Settings							
Caller ID DN							
Caller Name							

Figure 12: SIP Profile (Cont.)



Trunk Specific Configuration

Reroute Incoming Request to new Trunk based on*

Resource Priority Namespace List

SIP Rel1XX Options*

Video Call Traffic Class*

Calling Line Identification Presentation*

Session Refresh Method*

Early Offer support for voice and video calls*

Enable ANAT

Deliver Conference Bridge Identifier

Allow Passthrough of Configured Line Device Caller Information

Reject Anonymous Incoming Calls

Reject Anonymous Outgoing Calls

Send ILS Learned Destination Route String

SIP OPTIONS Ping

Enable OPTIONS Ping to monitor destination status for Trunks with Service Type "None (Default)"

Ping Interval for In-service and Partially In-service Trunks (seconds)*

Ping Interval for Out-of-service Trunks (seconds)*

Ping Retry Timer (milliseconds)*

Ping Retry Count*

SDP Information

Send send-receive SDP in mid-call INVITE

Allow Presentation Sharing using BFCP

Allow iX Application Media

Allow multiple codecs in answer SDP

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

Intelepeer_Trunk	Intelepeer_Trunk	G711 Pool	7.@	SIP Trunk	Unknown - OPTIONS Ping not enabled	Secure Profile For intelepeer Trunk
cucm-faxgateway	cucm-faxgateway	G711 Pool	8021	SIP Trunk	Unknown - OPTIONS Ping not enabled	Secure Profile For faxgw

Figure 14: SIP Trunks List

Device Information

Product: SIP Trunk
 Device Protocol: SIP
 Trunk Service Type: None(Default)

Device Name*: Intelepeer_Trunk
 Description: Intelepeer_Trunk
 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 >

Figure 15: SIP Trunk to CUBE



MLPP and Confidential Access Level Information

MLPP Domain

Confidential Access Mode

Confidential Access Level

Call Routing Information

Remote-Party-Id

Asserted-Identity

Asserted-Type*

SIP Privacy*

Inbound Calls

Significant Digits*

Connected Line ID Presentation*

Connected Name Presentation*

Calling Search Space

AAR Calling Search Space

Prefix DN

Redirecting Diversion Header Delivery - Inbound

Incoming Calling Party Settings

If the administrator sets the prefix to Default this indicates call processing will use prefix at the next level setting (DevicePool/Service Parameter). Otherwise, the value configured is used as the prefix unless the field is empty in which case there is no prefix assigned.

Number Type	Prefix	Strip Digits	Calling Search Space	Use Device Pool CSS
Incoming Number	<input type="text" value=" Default"/>	<input type="text" value=" 0"/>	<input type="text" value=" < None >"/>	<input checked="" type="checkbox"/>

Incoming Called Party Settings

If the administrator sets the prefix to Default this indicates call processing will use prefix at the next level setting (DevicePool/Service Parameter). Otherwise, the value configured is used as the prefix unless the field is empty in which case there is no prefix assigned.

Number Type	Prefix	Strip Digits	Calling Search Space	Use Device Pool CSS
Incoming Number	<input type="text" value=" Default"/>	<input type="text" value=" 0"/>	<input type="text" value=" < None >"/>	<input checked="" type="checkbox"/>

Connected Party Settings

Connected Party Transformation CSS

Use Device Pool Connected Party Transformation CSS

Figure 16: SIP Trunk to CUBE (Cont.)



Outbound Calls

Called Party Transformation CSS

Use Device Pool Called Party Transformation CSS

Calling Party Transformation CSS

Use Device Pool Calling Party Transformation CSS

Calling Party Selection*

Calling Line ID Presentation*

Calling Name Presentation*

Calling and Connected Party Info Format*

Redirecting Diversion Header Delivery - Outbound

Redirecting Party Transformation CSS

Use Device Pool Redirecting Party Transformation CSS

Caller Information

Caller ID DN

Caller Name

Maintain Original Caller ID DN and Caller Name in Identity Headers

SIP Information

Destination

Destination Address is an SRV

	Destination Address	Destination Address IPv6	Destination Port
1*	10.80.11.30		5061

MTP Preferred Originating Codec*

BLF Presence Group*

SIP Trunk Security Profile*

Rerouting Calling Search Space

Out-Of-Dialog Refer Calling Search Space

SUBSCRIBE Calling Search Space

SIP Profile* [View Details](#)

DTMF Signaling Method*

Normalization Script

Normalization Script

Enable Trace

	Parameter Name	Parameter Value	
1	<input type="text"/>	<input type="text"/>	<input type="button" value="+"/> <input type="button" value="-"/>

Recording Information

None

This trunk connects to a recording-enabled gateway

This trunk connects to other clusters with recording-enabled gateways

Geolocation Configuration

Geolocation

Geolocation Filter

Send Geolocation Information

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
S RTP 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

Pattern	Description	Partition	Route Filter	Associated Device	Copy
7.@				Intelepeer Trunk	
8021				cucm-faxgateway	

Figure 18: Route Patterns List



Pattern Definition		
Route Pattern*	7.@	
Route Partition	< None >	
Description		
Numbering Plan*	NANP	
Route Filter	< None >	
MLPP Precedence*	Default	
<input type="checkbox"/> Apply Call Blocking Percentage		
Resource Priority Namespace Network Domain	< None >	
Route Class*	Default	
Gateway/Route List*	Intelepeer_Trunk	(Edit)
Route Option	<input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern No Error	
Call Classification*	OffNet	
External Call Control Profile	< None >	
<input type="checkbox"/> Allow Device Override <input checked="" type="checkbox"/> Provide Outside Dial Tone <input type="checkbox"/> Allow Overlap Sending <input type="checkbox"/> Urgent Priority		
<input type="checkbox"/> Require Forced Authorization Code		
Authorization Level*	0	
<input type="checkbox"/> Require Client Matter Code		

Calling Party Transformations	
<input checked="" type="checkbox"/> Use Calling Party's External Phone Number Mask	
Calling Party Transform Mask	
Prefix Digits (Outgoing Calls)	
Calling Line ID Presentation*	Default
Calling Name Presentation*	Default
Calling Party Number Type*	Cisco CallManager
Calling Party Numbering Plan*	Cisco CallManager

Connected Party Transformations	
Connected Line ID Presentation*	Default
Connected Name Presentation*	Default

Called Party Transformations	
Discard Digits	PreDot
Called Party Transform Mask	
Prefix Digits (Outgoing Calls)	
Called Party Number Type*	Cisco CallManager
Called Party Numbering Plan*	Cisco CallManager

ISDN Network-Specific Facilities Information Element		
Network Service Protocol	-- Not Selected --	
Carrier Identification Code		
Network Service	Service Parameter Name	Service Parameter Value
-- Not Selected --	< Not Exist >	

Figure 19: Route Pattern for Voice



Pattern Definition		
Route Pattern*	8021	
Route Partition	< None >	
Description		
Numbering Plan	-- Not Selected --	
Route Filter	< None >	
MLPP Precedence*	Default	
<input type="checkbox"/> Apply Call Blocking Percentage		
Resource Priority Namespace Network Domain	< None >	
Route Class*	Default	
Gateway/Route List*	cucm-faxgateway	(Edit)
Route Option	<input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern No Error	
Call Classification*	OffNet	
External Call Control Profile	< None >	
<input type="checkbox"/> Allow Device Override <input checked="" type="checkbox"/> Provide Outside Dial Tone <input type="checkbox"/> Allow Overlap Sending <input type="checkbox"/> Urgent Priority <input type="checkbox"/> Require Forced Authorization Code		
Authorization Level*	0	
<input type="checkbox"/> Require Client Matter Code		
Calling Party Transformations		
<input type="checkbox"/> Use Calling Party's External Phone Number Mask		
Calling Party Transform Mask		
Prefix Digits (Outgoing Calls)		
Calling Line ID Presentation*	Default	
Calling Name Presentation*	Default	
Calling Party Number Type*	Cisco CallManager	
Calling Party Numbering Plan*	Cisco CallManager	
Connected Party Transformations		
Connected Line ID Presentation*	Default	
Connected Name Presentation*	Default	
Connected Party Transformations		
Connected Line ID Presentation*	Default	
Connected Name Presentation*	Default	
Called Party Transformations		
Discard Digits	< None >	
Called Party Transform Mask		
Prefix Digits (Outgoing Calls)		
Called Party Number Type*	Cisco CallManager	
Called Party Numbering Plan*	Cisco CallManager	
ISDN Network-Specific Facilities Information Element		
Network Service Protocol	-- Not Selected --	
Carrier Identification Code		
Network Service	Service Parameter Name	Service Parameter Value
-- Not Selected --	< Not Exist >	

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 KeyPair 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
rsa keypair 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**

IOS Conference Bridge Info	
Conference Bridge Type*	Cisco IOS Enhanced Conference Bridge
<input checked="" type="checkbox"/> Device is trusted	
Conference Bridge Name*	DSPfarmRouter
Description	DSPfarmRouter
Device Pool*	G711 Pool
Common Device Configuration	< None >
Location*	Hub_None
Device Security Mode*	Encrypted Conference Bridge
Use Trusted Relay Point*	Default

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
rsaкеypair dspfarm
!
crypto pki certificate chain DSPfarmRouter
certificate 5100000081DA34603075C7B64D0000000081
3082055D 30820445 A0030201 02021351 00000081 DA346030 75C7B64D 00000000
0081300D 06092A86 4886F70D 01010505 00304C31 15301306 0A099226 8993F22C
64011918 086CF8F5 6162C119 3017080A 0922289F 22C064 01191609 6C796E63
6C616263 63311830 16060355 0403130F 6C796E63 6C616263 632D4443 2D434130
1E170D31 37303833 31313034 3235335A 170D3139 30383331 31303432 35335A30
18311630 14060355 0403130D 44535086 61726D52 6F757465 72308201 22300D06
092A868 86F70D01 01010500 0382D10F 00302001 0A026201 0100C47F 267EDEA9
8EC28565 100E5B34 87361DF9 902E26A1 CF64D820 768559BD D8CFEDBC 6C050609
A31DB195 17534256 2120875A 3DC5D168 4EFDD96F AA938050 1BD85389 D8F1CC75
ED44B46E 68F7C52F 1CC82331 62792011 E4A4A166 2F1D9350 FD312520 82C97FC3
33FA0586 00E0C6E4 01682EAC C00982A0 FC5E2F26DD 98808A23 4E27F465 2BD4384A
3DEBD865 528A27B3 F5B2EAD8 8069055B 3B11D6D5 A8F6E891 2CD83D65 870CE552
6CEE0290 E84A58A1 F9DA62F5 B3074ED2 B8978F74 BA230A1E 1A304B3A 3BAD58C2
4908D579 0C61DF09 C565D23A E30D758A 1E059862 49186DF9 699BD54C 56D34214
658A4D38 133CBF20 56EFD30D F7521AFC 2F282546 353F44AB 095F0203 010001A3
82028A30 82028630 0E80355 1D9F0101 FF040403 0205A030 1D060355 1D0E0416
04141682 49BD9975 F8B3AA40 8B29FE62 7C2051A5 2C9A301F 0603551D 23041830
168014F4 48291613 73177E92 5C695A43 2785EA91 EA144930 81C80603 551D1F04
81C03081 8D3081BA A081B7A0 81B48681 B16C8461 703A2F2F 2F434E3D 6C796E63
6C616263 632D4443 2D43412C 434E3D44 432C434E 3D44450 2C434E3D 507526C6
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 63606173 733D6352 4C446973 74726962 7574696F 6E506F69
6E743081 C106028B 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
6E396C61 6268630C 44433D6C 6F63616C 31634143 65727469 66696361 74655F62
6173653F 6F626A65 6374436C 6173733D 63657274 69666963 6174696F 6E417574
686F7269 7479303D 06092B06 01040182 37150704 30302E06 262B0601 04018237
150885E8 8E05819F DE6482BD 8715F69B DE82FAA5 60816682 949CA87 E69D4002
01640201 04301D06 03651D25 04163014 06082B06 01050507 03010608 28060105
05070302 30270609 2B060104 01823715 0A041A30 18300A06 082B0601 05050703
01300A06 082B0601 05050703 02300D06 092A8648 86F70D01 01050500 03820101
009B83CD A3C3F79 E53F67D8 88FD7470 8A072EE4 2D070D4F 3DB46F26 0243E156
A4A4D7E1 1E157917 B6F38C14 57786347 10557879 DEABE24C 5A89DAAC 08107E7B
D92116C3 D5B6B10 42EF39D2 BFDEF8C2 12730C01 DD459ED5 5A8C76A8 04AE71F4
B712C990 4547CA27 9BE60DF5 FE0E4447 A2B54360 D4A07B91 502B097B F325995D
5227463 ABE5E726 09B09E9D 8D13F2EB 7445CA0F 05CFE751 2EBCF038 429679B3
C2D2A25E B78E6822 6054BDF9 A823E06B EA3201E8 5ECC241F 604CD4FC B04EE371
46D7D15F D287753C 6A19607B BD1FE0F7 30941375 6E02E877 2964C84D 69462040
D3C91144 E299FAFD B81487CA 0C6ED499 99B4328C BC60825E 4F41B06D 61D1C968 A9
quit
certificate ca 133A5FA76CC004AD4332C2B40E22D384
30820373 3082025B A0030201 02021013 3AFA76C C004AD43 32C2B40E 2DD38430
0D06092A 864886F7 0D010105 0500304C 31153013 060A0992 268993F2 2C640119
16056CF6 63616C31 19301706 0A099226 8993F22C 64011918 096C796E 636C6162
63633118 30160603 55040313 0F6C796E 636C6162 63632D44 432D4341 301E170D
31535313 30343132 34363232 6A170D32 30313130 34313235 3632325A 30403115
3013060A 09922689 93F22C64 01191605 6C6F6361 6C311930 17060A09 82268993
```

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```
F22C6401 1916096C 79E636C 61626363 31183016 06035504 03130F6C 79E636C
61626363 2D44432D 43413082 0122300D 06092A86 4866F70D 01010105 00038201
0F003082 010A0282 0101009F 402105FF C8F842E0 26BD7788 62912768 6DC18CB5
800E4755 788D800D 2D51BE89 CD2E9574 E55ACFAD 0DBB3C69 22F557D8 3CE1246A
4865F34A 5E151338 8FACE3A2 BCCF41F0 F0F38E24 F8E28E33 15874062 BA3E7882
22453F2D 7AE6E9F1 3D3918E3 FA463C94 F36C2190 744D92D6 EDA56292 1978980D
8D2FC9A3 00BAF9D6 6DA40496 490BFD3A 2D7538A6 62024136 ADAD4D3B 26BB1AC5
B8E4CD81 20BB986E 9B200964 A6B0D904 A9B859DC 0E0388E6 A3DC545D 0DF3F583
8DF53C23 AA6D87D1 64D9A3C6 22880533 A068FC31 717CEE6F 2D11EC3F A551AA9E
75C488E8 712A7710 16989300 DB1C30A8 7A77EB9C 0725746A B1FBF0A3 88C69EAS
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 864868F7 0D010105 05000382 01010060 CBABE054 DES6A314
C8C858EE 6B0FD21F 33C3F8CD D4DDACD6 ED7259FF 4386CF70 15EAB220 E9F25BDC
F47E2B02 8F322753 7435CD63 3A481673 1784C1DE A7666CE2 B63B8BBA E1D5D8E3
62BDF949 8430F42F 0E19487D 7DE431D8 A19C4579 A8FEAA2C A074AF45 73CF87E5
1BCD5D76 072FD3E3A 9E30E070 FED63362 F52298A8 10185308 167077F2 D858A338
22E725E 12B92472 83196591 1AB38B16 6B8C2FD3 B070CF58 620F6FC3 40EA4F32
5668A69D 0CB63471 DFC28524 23A816DA 945070AB 273F6574 7EEC7E72 0C267CCD
CAD13831 2BCC0430 16511679 14DCD4F4 923FAC8E 072F7862 4D08704D 3B233B5E
257D28B7 59E1EA8E 74A80CD6 5ED85574 7E425FB3 81E2D0
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)

SIP Certificate	
Display Name*	Secure sip integration
Subject Name*	SecureConnection
Subject	CN=SecureConnection, OU=ECSBU, O=Cisco Systems Inc.
Issuer	CN=CiscoUnity-4e6e32d0-a783-4607-b662-7f67b0ad3d4d
Valid From	Wed Aug 30 06:02:58 CDT 2017
Valid Until	Fri Feb 19 15:29:54 CST 2021
Version	3
Subject Alternative Name	[6, SecureConnection]
Serial Number	b0ae981ac92549da994157b2dd0d1bb4
Certificate Text	-----BEGIN CERTIFICATE----- MIIC9jCCAl+gAwIBAgIRALCumBrJJUnamUFXst0NG7QwDQYJKoZIhvcNAQEFBQAw OjE4MDYGA1UEAxMvQ2l2Y29Vbml0eS00ZTlMzJkMC1hNzgzLTQ2MDctYjY2Mi03 ZjY3YjBhZDkNGQwHhcNMTEwMTEwMTEwMTEwMTEwMTEwMTEwMTEwMTEwMTEw GQYDVQQKDBJDaXNjbyBTeXN0ZW1zIEluYy4xDjAMBgNVBAsMBUVDU0JVMRkwFwYD VQDDBBTZWN1cmVDb25uZW50aW9uMIIIBjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIB CgKCAQEAE8eezbxOkxxgVVF/CdZYZ3Vehrp/76Muxl17tCxeITG13gmydb37Emgbk 8/P8z46wxCDrrpM49lta3kAi/Fspub22YtAUdxSxD+sZCMjs5tyl9B26nhAdX8+R 1V283lEXIhrHdDPVrMV09hIN1lWdJ3B67+V+Q0eeewtmaUNT0kEY0cF3ZAqmx7Hk pUN1Az1X+cR+ftWA9G+7cwVKbQ30w25LASBVda/e3bxEhzhp2KVySuKPVhOejHU OtPpM0F2dFWmhkNktC3CLjd5mNToldabNtopLeRavyynICgBsHru5osRhW9c05y IwSELRAkv3B5um0jUIVEaZAH0KrWtwIDAQABo2owaDAdBgNVHQ4EFgQUuyGvx20h +JI223PNwQBUAVCEpv0wCwYDVR0PBAQDAgOoMB0GA1UdJQQWMBQGCCsGAQUFBwM B BggrBgEFBQcDAjAbBgNVHREEFDAShhBTZWN1cmVDb25uZW50aW9uMA0GCSqGSIb3

Generate New

Figure 22: Voicemail SIP Certificate



Create Phone System

Navigation: Telephony Integration > Phone System

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

The screenshot shows the 'Phone System Basics' configuration page for a system named 'clus21sip'. The page title is 'Phone System Basics (clus21sip)'. At the top right, there is a search bar with 'Phone System Basics (clus21sip)' and a 'Go' button. Below the title, there are navigation buttons: 'Phone System', 'Edit', 'Refresh', and 'Help'. A toolbar contains 'Save', 'Delete', 'Previous', and 'Next' buttons. The main configuration area is divided into sections:

- Phone System**: The 'Phone System Name*' field is highlighted with a red box and contains the text 'clus21sip'. Below it is a checked checkbox for 'Default TRAP Phone System'.
- Message Waiting Indicators**: This section contains three unchecked checkboxes: 'Send Message Counts', 'Use Same Port for Enabling and Disabling MWIs', and 'Force All MWIs Off for this Phone System'. There is a 'Run' button followed by the text 'Synchronize All MWIs on This Phone System'.
- Call Loop Detection by Using DTMF**: This section contains two unchecked checkboxes: 'Enable for Supervised Transfers' and 'Enable for Forwarded Message Notification Calls (by Using DTMF)'. Below these is a dropdown menu for 'DTMF Tone To Use' set to 'A' and a text input field for 'Guard Time' set to '2500' milliseconds.

Figure 23: Phone System



Add Port Group

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

Search Phone Systems ▶ Phone System Basics (clus21sip)

Phone System Basics (clus21sip) Related Links Add Port Group Go

Phone System Edit Refresh Help

Save Delete Previous Next

Phone System

Phone System Name* clus21sip

Default TRAP Phone System

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**

Search Port Groups ▶ Port Group Basics (clus21sip-1)

Port Group Basics (clus21sip-1) Related Links Add Ports Go

Port Group Edit Refresh Help

Save Delete Previous Next

Port Group

Display Name* clus21sip-1

Integration Method SIP

Reset Status Reset Not Required Reset

Session Initiation Protocol (SIP) Settings

Register with SIP Server

Authenticate with SIP Server

Authentication Username

Authentication Password

Contact Line Name

SIP Security Profile 5061/TLS

Enable Next Generation Encryption

SIP Certificate Secure sip integration

Security Mode Encrypted

Secure RTP

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

New Port Search Ports ▶ New Port

Related Links Check Telephony Configuration ▼ Go

Port Reset Help

Status

Because it has no port groups, Default-1 is not listed in the Phone system field.

Save

New Phone System Port

Enabled

Number of Ports

Phone System clus21sip ▼

Port Group clus21sip-1 ▼

Server clus28unity.lab.tekvizion.com ▼

Port Behavior

Answer Calls

Perform Message Notification

Send MWI Requests (may also be disabled by the port group)

Allow TRAP Connections

Figure 26: Port Configuration



Edit Servers

Navigation: Port Group > Edit > Servers

SIP Servers

Delete Selected Add

<input type="checkbox"/>	Order	IPv4 Address or Host Name	IPv6 Address or Host Name	Port	TLS Port
<input type="checkbox"/>	0	10.80.11.3		5060	5063
<input type="checkbox"/>	1	10.80.11.2		5060	5063

Delete Selected Add

TFTP Servers

Delete Selected Add

<input type="checkbox"/>	Order	IPv4 Address or Host Name	IPv6 Address or Host Name
<input type="checkbox"/>	0	10.80.11.2	

Delete Selected Add

IPv6 Addressing Mode

Preference for Signaling IPv4 ▾

Preference for Media IPv4 ▾

Figure 27: Server Configuration in Port Group



Download CUC Root Certificate

Navigation: Telephony Integration > Security > Root Certificate

1. Upload this Certificate to CUCM

View Root Certificate View Root Certificate

Related Links [Check Telephony Configuration](#)

Root Certificate Refresh Help

Root Certificate for Cisco Unified Communications Manager Authentication and Encryption

Subject	CN=CiscoUnity-4e6e32d0-a783-4607-b662-7f67b0ad3d4d
Issuer	CN=CiscoUnity-4e6e32d0-a783-4607-b662-7f67b0ad3d4d
Valid From	Tue Feb 18 15:29:54 CST 2014
Valid Until	Fri Feb 19 15:29:54 CST 2021
Version	3
File name	a6daed57.0
Serial Number	b98c785767604ef48ad0683992f3f499

Certificate Text

```
-----BEGIN CERTIFICATE-----
MIICPDCCAaWgAwIBAgIRALmMeFdnYE70itBoOZLz9JkwDQYJKoZIhvcNAQEFBQAw
OjE4MDYGA1UEAxMvQ2lzY29Vbml0eS00ZTlMzJkMC1hNzgzLTQ2MDctYjY2Mi03
ZjY3YjBhZDNkNGQwHhcNMjE4MjE4MjE4OTU0WhcNMjE4MjE4MjE4OTU0WjA6MTgw
NgYDVQQDEy9DaXNjb1VuaXR5LmUzZmMwLWE3ODMtNDYwNy1iNjYyLTdmNjdi
MGFkM2Q0ZDZCBnzANBjkqhkG9w0BAQEFAAOBjQAwgYkCgYEAxGx4Zzwyfcm29E4x
bLNzsCX3X9rMu1Dmt16ozVlq09I/3Sv/6H9a8IcF7Xt9oGJ22AB93Wu7vIzG2eCP
V/dEbaUM6FiQgJ2p1WdRzYEWWEmiF5WZos2yfVPZbQ+/X7cym/uC1EfnrwhfBvrj
5UhhI2kEwDnHQx8IhojIEAjnADMCAwEAAaNCMEAwEgYDVR0TAQH/BAgwBgEB/wIB
ADAdBgNVHQ4EFgQUxGXLwhH6cx/mOUUAHjDDNBie2DcwCwYDVR0PBAQDAgKsMA0G
CSqGSIB3DQEBBQUAA4GBABphNdr5QurI3Foil/RLX+HmG3Uv51aP4W67DFqRqxzB
I5h3y7VsQ7FbSE+JinCRDeeNQ1sTWu6pZaKx5v0Jiaely1Bl3+sSWsR1vnt74J8r
6vMA/TO7ITIVnC4vy9yJ/Pvz7MJuK33QqQi1SjpbOp2WwaRg6jdU67VP5SJIIMN
-----END CERTIFICATE-----
```

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

SIP Trunk Security Profile Information

Name*	Unity_Connection_Trunk_Security_Profile
Description	Unity_Connection_Trunk_Security_Profile
Device Security Mode	Encrypted
Incoming Transport Type*	TLS
Outgoing Transport Type	TLS
<input type="checkbox"/> Enable Digest Authentication	
Nonce Validity Time (mins)*	600
X.509 Subject Name	SecureConnection
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

<input type="checkbox"/> Media Termination Point Required	
<input checked="" type="checkbox"/> Retry Video Call as Audio	
<input type="checkbox"/> Path Replacement Support	
<input type="checkbox"/> Transmit UTF-8 for Calling Party Name	
<input type="checkbox"/> Transmit UTF-8 Names in QSIG APDU	
<input type="checkbox"/> Unattended Port	
<input checked="" type="checkbox"/> 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
<input checked="" type="checkbox"/> PSTN Access	
<input checked="" type="checkbox"/> 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

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Call Routing Information

Remote-Party-Id

Asserted-Identity

Asserted-Type*

SIP Privacy*

Inbound Calls

Significant Digits*

Connected Line ID Presentation*

Connected Name Presentation*

Calling Search Space

AAR Calling Search Space

Prefix DN

Redirecting Diversion Header Delivery - Inbound

Incoming Calling Party Settings

If the administrator sets the prefix to Default this indicates call processing will use prefix at the next level setting (DevicePool/Service Parameter). Otherwise, the value configured is used as the prefix unless the field is empty in which case there is no prefix assigned.

Number Type	Prefix	Strip Digits	Calling Search Space	Use Device Pool CSS
Incoming Number	<input type="text" value="Default"/>	<input type="text" value="0"/>	<input type="text" value="< None >"/>	<input checked="" type="checkbox"/>

Incoming Called Party Settings

If the administrator sets the prefix to Default this indicates call processing will use prefix at the next level setting (DevicePool/Service Parameter). Otherwise, the value configured is used as the prefix unless the field is empty in which case there is no prefix assigned.

Number Type	Prefix	Strip Digits	Calling Search Space	Use Device Pool CSS
Incoming Number	<input type="text" value="Default"/>	<input type="text" value="0"/>	<input type="text" value="< None >"/>	<input checked="" type="checkbox"/>

Connected Party Settings

Connected Party Transformation CSS

Use Device Pool Connected Party Transformation CSS

Outbound Calls

Called Party Transformation CSS

Use Device Pool Called Party Transformation CSS

Calling Party Transformation CSS

Use Device Pool Calling Party Transformation CSS

Calling Party Selection*

Calling Line ID Presentation*

Calling Name Presentation*

Calling and Connected Party Info Format*

Redirecting Diversion Header Delivery - Outbound

Redirecting Party Transformation CSS

Use Device Pool Redirecting Party Transformation CSS

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

Caller Information		
Caller ID DN	<input type="text"/>	
Caller Name	<input type="text"/>	
<input type="checkbox"/> Maintain Original Caller ID DN and Caller Name in Identity Headers		
SIP Information		
Destination		
<input type="checkbox"/> Destination Address is an SRV		
	Destination Address	Destination Address IPv6
1*	10.80.18.5	5061
MTP Preferred Originating Codec*	711ulaw	
BLF Presence Group*	Standard Presence group	
SIP Trunk Security Profile*	Unity_Connection_Trunk_Security_Profile	
Rerouting Calling Search Space	< None >	
Out-Of-Dialog Refer Calling Search Space	< None >	
SUBSCRIBE Calling Search Space	< None >	
SIP Profile*	Standard SIP Profile View Details	
DTMF Signaling Method* No Preference		
Normalization Script		
Normalization Script < None >		
<input type="checkbox"/> Enable Trace		
	Parameter Name	Parameter Value
1	<input type="text"/>	<input type="text"/> <input type="button" value="+"/> <input type="button" value="-"/>
Recording Information		
<input checked="" type="radio"/> None		
<input type="radio"/> This trunk connects to a recording-enabled gateway		
<input type="radio"/> This trunk connects to other clusters with recording-enabled gateways		
Geolocation Configuration		
Geolocation < None >		
Geolocation Filter < None >		
<input type="checkbox"/> Send Geolocation Information		

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
rsa keypair 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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