Application Note

Public

Connecting Cisco Unified Communication Manager [12.5.1] to Amazon Chime Voice Connector SIP Trunk via Cisco Unified Border Element v12.1.0 [IOS-XE 16.09.04]

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Introduction

Service Providers today, such as Amazon Chime Voice Connector, are offering alternative methods to connect to the PSTN via their IP network. 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.

Amazon Chime Voice Connector is a service provider offering that allows connection to the PSTN and may offer the end customer a viable alternative to traditional PSTN connectivity. A demarcation device between these services and customer owned services is recommended. As an intermediary device between Cisco Unified Communications Manager (Cisco UCM) and Amazon Chime Voice Connector network, Cisco Unified Border Element (Cisco UBE) ISR4431/K9 running IOS-XE 16.9.4 can be used. The Cisco Unified Border Element provides demarcation, security, interworking and session control services for Cisco Unified Communications Manager 12.5.1 connected to Amazon Chime Voice Connector IP network.

This document assumes the reader is knowledgeable with the terminology and configuration of Cisco Unified Communications Manager. Only configuration settings specifically required for Amazon Chime Voice Connector 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 Cisco UCM 12.5.1, and Cisco UBE on ISR 4431/K9 [IOS-XE 16.9.4] for connectivity to Amazon Chime Voice Connector SIP Trunking service. The deployment model covered in this application note is CPE (Cisco UCM) to PSTN (Amazon Chime Voice Connector) via Cisco UBE v12.1.0 [IOS-XE 16.9.4].
- Testing was performed in accordance to Amazon Chime Voice Connector generic SIP Trunking test methodology and among features verified were – basic calls, DTMF transport, Music on Hold (MOH), semi-attended and attended transfers, call forward, conferences and High Availability.
- The Cisco UBE configuration detailed in this document is based on a lab environment with a simple dial-plan used to ensure proper interoperability between Amazon Chime Voice Connector 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 Cisco UCM to interoperate to Amazon Chime Voice Connector SIP Trunking network.

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Network Topology

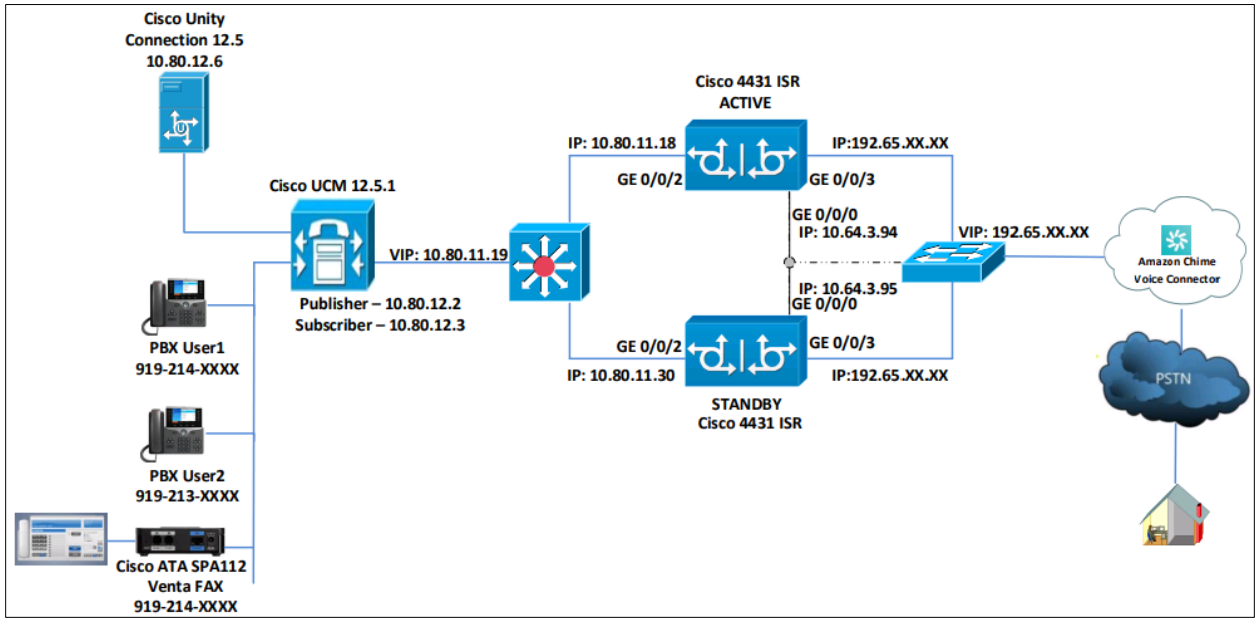

Figure 1 Network Topology

- The network topology includes the Cisco UCM Cluster, Cisco Unity Connection Voicemail system and Cisco Endpoints. Cisco UCM has a trunk configured to Cisco UBE's Virtual IP Address. Amazon Chime Voice Connector is used as the service provider with SIP trunk to the Cisco UBE using the WAN Virtual IP Address.
- 2 Cisco UBE's are used here for High Availability.
- SIP Trunk transport type used between Cisco UBE and Cisco UCM is UDP and to Amazon Chime Voice Connector is UDP.

Cisco UCM and Cisco UBE Settings:

Setting	Value
Transport from Cisco UBE to Cisco UCM	UDP with RTP
Transport from Cisco UBE to Amazon Chime Voice Connector	UDP with RTP
Voice Mail Support	YES
Session Refresh	YES
Early Media support with PRACK	YES

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System Components

Hardware Requirements

- Cisco UBE on Cisco ISR 4431 router
- Cisco UCM cluster on UCS C240, 1 Publisher node and 1 Subscriber node
- Generic Cisco IP-Phones

Software Requirements

- Cisco UBE-Version: 12.1.0 running IOS-XE 16.9.4
- Cisco UCM-Version: 12.5.1.11900-146

Features

Features Supported

- Incoming and outgoing national and international calls using G711ulaw voice codecs
- Call Conference
- Fax
    - G711 Mu-Law Pass-through
    - T.38
- Voice Mail
- Auto Attendant
- Call hold & Resume(MoH and ToH)
- Semi-attended and Attended Call transfer
- Call forward (all, busy and no answer)
- DTMF (RFC2833)
- IP-PBX Calling number privacy
- High Availability

Features Not Supported

- The following are not supported by Amazon Chime Voice Connector,
    - G.729 codec
    - Outbound calls to,
        - 911
        - 411
        - 0 (Operator assistance)
        - 0 followed by DID
- Cisco UCM does not support Blind Call transfer

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Caveats

- Only G3 fax speeds are supported in T.38 fax(CPE to PSTN and PSTN to CPE)
- Only one IP PBX is used for testing

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Configuration

Configuring Cisco Unified Border Element

Network Interface

The IP address used are for illustration only, the actual IP address can vary. The Active/Standby pair share the same virtual IP address and continually exchange status messages.

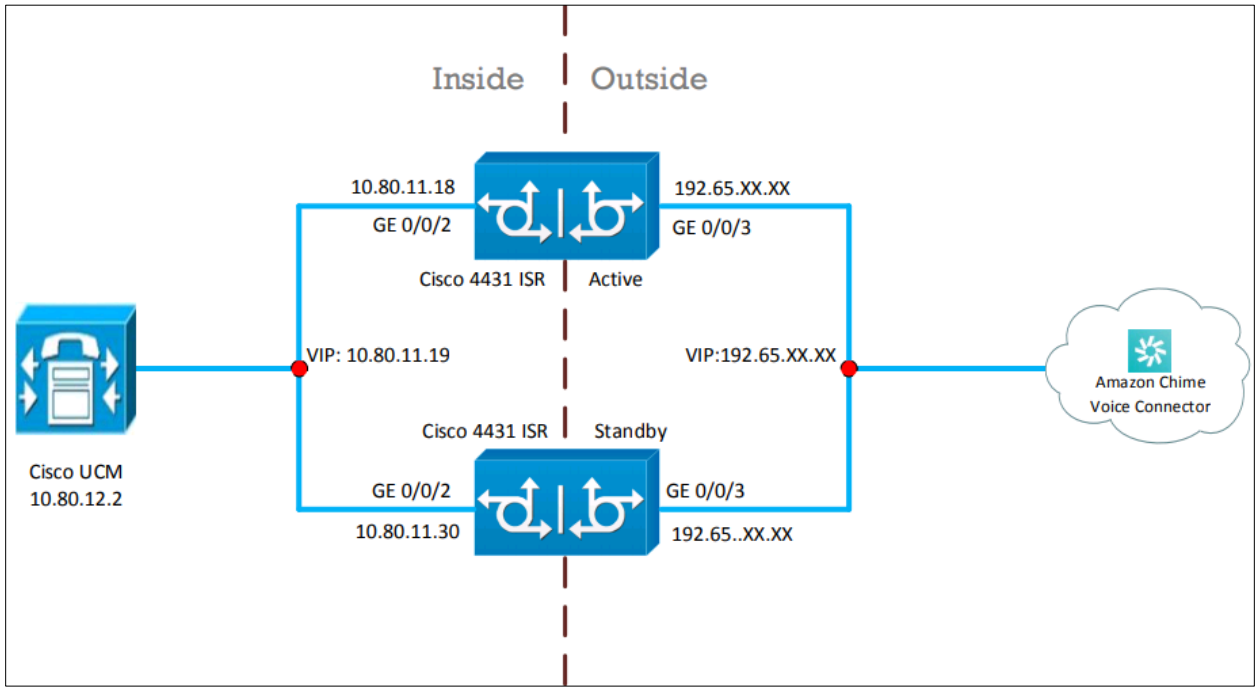

Figure 2 High Availability topology

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Cisco UBE -Active:

```
interface GigabitEthernet0/0/0
 description AMAZONCVC HA INTERFACE
 ip address 10.64.3.94 255.255.0.0
 negotiation auto
!
interface GigabitEthernet0/0/2
 description AMAZONCVC CUBE_LAN_INTERFACE
 ip address 10.80.11.18 255.255.0.0
 negotiation auto
 redundancy rii 16
 redundancy group 1 ip 10.80.11.19 exclusive
!
interface GigabitEthernet0/0/3
 description AMAZONCVC CUBE_WAN_INTERFACE
 ip address 192.65.XX.XX 255.255.XX.XX
 negotiation auto
 redundancy rii 15
 redundancy group 1 ip 192.65.XX.XX exclusive
```

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Cisco UBE -Standby:

```
interface GigabitEthernet0/0/0
 description AMAZONCVC HA INTERFACE
 ip address 10.64.3.95 255.255.0.0
 negotiation auto
!
interface GigabitEthernet0/0/2
 description AMAZONCVC CUBE_LAN_INTERFACE
 ip address 10.80.11.30 255.255.0.0
 negotiation auto
 redundancy rii 16
 redundancy group 1 ip 10.80.11.19 exclusive
!
interface GigabitEthernet0/0/3
 description AMAZONCVC CUBE_WAN_INTERFACE
 ip address 192.65.XX.XX 255.255.XX.XX
 negotiation auto
 redundancy rii 15
 redundancy group 1 ip 192.65.XX.XX exclusive
!
```

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Global Cisco UBE settings

In order to enable Cisco UBE IP2IP SBC functionality, following command has to be entered:

```
voice service voip
 ip address trusted list
  ipv4 3.80.XX.XX 255.255.XX.XX
  ipv4 52.55.XX.XX 255.255.XX.XX
  ipv4 52.55.XX.XX 255.255.XX.XX
  ipv4 34.212.XX.XX 255.255.XX.XX
  ipv4 34.223.XX.XX 255.255.XX.XX
  ipv4 10.80.12.2 255.255.255.255
  ipv4 10.80.12.3 255.255.255.255
 address-hiding
 mode border-element license capacity 20
 allow-connections sip to sip
 redundancy-group 1
 no supplementary-service sip refer
 supplementary-service media-renegotiate
 fax protocol pass-through g711ulaw
 sip
  bind control source-interface GigabitEthernet0/0/3
  bind media source-interface GigabitEthernet0/0/3
  session refresh
  asserted-id pai
  early-offer forced
  midcall-signaling passthru
  g729 annexb-all
  pass-thru headers unsupp
```

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Explanation

Command	Description
allow-connections sip to sip	Allow IP2IP connections between two SIP call legs
redundancy-group 1	Enable High Availability for the VoIP service
fax protocol	Specifies the fax protocol
asserted-id	Specifies the privacy header in the outgoing SIP requests and response messages

Codecs

G711u-Law and G729 voice codecs are configured for this testing. Codec preferences used to change according to the test plan description.

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

Dial peer

Outbound calls to Amazon Chime Voice Connector:

```
dial-peer voice 100 voip
 description *** Inbound Call from CUCM to CUBE-LAN ***
 session protocol sipv2
 session transport udp
 incoming uri via CUCM
 voice-class codec 1
 voice-class sip bind control source-interface GigabitEthernet0/0/2
 voice-class sip bind media source-interface GigabitEthernet0/0/2
 dtmf-relay rtp-nte
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 201 voip
 description *** Outbound Call from CUBE-WAN to AmazonCVC ****
```

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```
 translation-profile outgoing Amazon-Out
 destination-pattern [0-9]T
 session protocol sipv2
 session target dns:dtndxrmXXXXX.voiceconnector.chime.aws:5060
 session transport udp
 voice-class codec 1
 voice-class sip localhost dns:dtndxrmXXXXX.voiceconnector.chime.aws
 voice-class sip options-keepalive
 voice-class sip bind control source-interface GigabitEthernet0/0/3
 voice-class sip bind media source-interface GigabitEthernet0/0/3
 dtmf-relay rtp-nte
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
```

Inbound calls from Amazon Chime Voice Connector:

```
dial-peer voice 200 voip
 description *** Inbound Call from AmazonCVC to CUBE-WAN ***
 translation-profile incoming Amazon-In
 session protocol sipv2
 session transport udp
 incoming called e164-pattern-map 890
 voice-class codec 1
 voice-class sip bind control source-interface GigabitEthernet0/0/3
 voice-class sip bind media source-interface GigabitEthernet0/0/3
 dtmf-relay rtp-nte
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
```

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```
dial-peer voice 101 voip
 description *** Outbound Call from CUBE-LAN to CUCM****
 destination-pattern 919.......
 session protocol sipv2
 session target ipv4:10.80.12.2:5060
 session transport udp
 voice-class codec 1
 voice-class sip bind control source-interface GigabitEthernet0/0/2
 voice-class sip bind media source-interface GigabitEthernet0/0/2
 dtmf-relay rtp-nte
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
```

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Configuration example

The following configuration snippet contains a sample configuration of Cisco UBE with all parameters mentioned previously.

Active Cisco UBE:

```
version 16.9
service timestamps debug datetime msec
service timestamps log datetime msec
service call-home
platform qfp utilization monitor load 80
no platform punt-keepalive disable-kernel-core
!
hostname AmazonCVC_R1
!
boot-start-marker
boot system bootflash:isr4400-universalk9.16.09.04.SPA.bin
boot-end-marker
!
!
vrf definition Mgmt-intf
 !
 address-family ipv4
 exit-address-family
 !
 address-family ipv6
 exit-address-family
!
enable secret 9 $9$EFEy1Ya.dXD5kU$aeO365JZcPu3f94TxDsJ6mMQFp6rz.xHTikGVK5/TnY
!
no aaa new-model
call-home
 ! If contact email address in call-home is configured as sch-smart-
licensing@cisco.com
```

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```
 ! the email address configured in Cisco Smart License Portal will be used as
contact email address to send SCH notifications.
 contact-email-addr sch-smart-licensing@cisco.com
 profile "CiscoTAC-1"
  active
  destination transport-method http
  no destination transport-method email
!
ip name-server 8.8.8.8
!
login on-success log
!
subscriber templating
!
multilink bundle-name authenticated
!
crypto pki trustpoint TP-self-signed-1179880555
 enrollment selfsigned
 subject-name cn=IOS-Self-Signed-Certificate-1179880555
 revocation-check none
 rsakeypair TP-self-signed-1179880555
!
!
crypto pki certificate chain TP-self-signed-1179880555
 certificate self-signed 01
  30820330 30820218 A0030201 02020101 300D0609 2A864886 F70D0101 05050030
  31312F30 2D060355 04031326 494F532D 53656C66 2D536967 6E65642D 43657274
  69666963 6174652D 31313739 38383035 3535301E 170D3139 31313131 31363137
  30385A17 0D333030 31303130 30303030 305A3031 312F302D 06035504 03132649
  4F532D53 656C662D 5369676E 65642D43 65727469 66696361 74652D31 31373938
  38303535 35308201 22300D06 092A8648 86F70D01 01010500 0382010F 00308201
  0A028201 0100A797 78192671 2CDE73B5 BD12EC79 9E3FF593 ED0D39A7 091F723A
  3FD4DA46 7A7AF91D FCC4EF82 1626AE81 412BADAC 60E764E3 EDB6CD92 9877666B
  56F89F8A BDC79192 57EC6279 97EDD00E 6DBE5833 92DC6340 A19060F0 F60A38F4
  12FB504C 339EBEB4 04F5A4C2 3149F7C4 AED89D01 EF970043 07878691 DAAD7065
```

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```
  B48A15DA 8202C63D D8B0F9C2 AC58B55A AF1D3DD2 17DC53C8 FEF0FDC5 149FD425
  A55BB56D 4E327D1F F48E867F CF2E90BD CE0140B9 4F3F8119 CEED71B8 8BEA6E20
  DB297AF9 5D0386AA 05A01504 A026D20E 7C39CDA9 A729B81F D62E2ED0 F11020C8
  1829DA69 EC544AED 371A2AF1 303747E4 BEC84A1D C6F259B4 0BABC65A 04E4D542
  D4C45797 A0670203 010001A3 53305130 0F060355 1D130101 FF040530 030101FF
  301F0603 551D2304 18301680 142CF32D F55DA8FB 182F8477 E55FE854 0FDC1975
  79301D06 03551D0E 04160414 2CF32DF5 5DA8FB18 2F8477E5 5FE8540F DC197579
  300D0609 2A864886 F70D0101 05050003 82010100 977EA900 3D956274 812EB05F
  980EF196 2AE8359F 0FD37F16 32D9C315 AFE28326 B81E446F 6032617E CBD17AC9
  17F218F2 5CB32C98 31B35366 1E505265 9C93E78B D5780464 349CA574 F14EED7B
  236D7B4D B2D1B2AD D692DDAD B5FCCC4C 1B18740C 0673EA3D 862DA989 4B782E59
  5645E785 4D9F315C A5F500AF 022614A7 1EC7592D 76CD90A2 28A6D8D8 1F9B5DB5
  A04A2649 F0547D8A CD8EBAA4 AA28CD61 B46211D1 BDF5E2E2 9A37B28C 6DAC8011
  654C2F27 9593CEDB EDFEBFFC 8E7A5338 1FA354C9 307D2B44 FED35E3F 525E5314
  5998B445 F3B42DA8 DFE6EFED E68A9AA6 7AD2A6A1 F3EB8631 895735F1 9AFC040A
  197259EB ADA28784 0F2DA5ED 555F1103 C8C1F4F4
        quit
!
voice service voip
 ip address trusted list
  ipv4 3.80.XX.XX 255.255.XX.XX
  ipv4 52.55.XX.XX 255.255.XX.XX
  ipv4 52.55.XX.XX 255.255.XX.XX
  ipv4 34.212.XX.XX 255.255.XX.XX
  ipv4 34.223.XX.XX 255.255.XX.XX
  ipv4 10.80.12.2 255.255.255.255
  ipv4 10.80.12.3 255.255.255.255
 address-hiding
 mode border-element license capacity 20
 allow-connections sip to sip
 redundancy-group 1
 no supplementary-service sip refer
 supplementary-service media-renegotiate
 fax protocol pass-through g711ulaw
```

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```
 sip
  bind control source-interface GigabitEthernet0/0/3
  bind media source-interface GigabitEthernet0/0/3
  session refresh
  asserted-id pai
  early-offer forced
  midcall-signaling passthru
  g729 annexb-all
  pass-thru headers unsupp
!
!
voice class uri CUCM sip
 host 10.80.12.2
voice class codec 1
 codec preference 1 g729r8
 codec preference 2 g711ulaw
!
voice class e164-pattern-map 890
  e164 +191........$
!
voice translation-rule 10
 rule 1 /\(^..........$\)/ /+1\1/
!
voice translation-rule 11
 rule 1 /\(^..........$\)/ /+1\1/
!
voice translation-rule 20
 rule 1 /^\+1\(.*\)/ /\1/
!
voice translation-profile Amazon-In
 translate called 20
!
voice translation-profile Amazon-Out
 translate calling 11
```

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```
 translate called 10
!
voice-card 0/1
 no watchdog
!
no license feature hseck9
license udi pid ISR4431/K9 sn FOC18261KJL
license accept end user agreement
license boot suite AdvUCSuiteK9
license boot level appxk9
license boot level uck9
license boot level securityk9
no license smart enable
diagnostic bootup level minimal
!
spanning-tree extend system-id
memory free low-watermark processor 67178
!
redundancy
 mode none
 application redundancy
  group 1
   name b2bHAAmazonCVC
   priority 100 failover threshold 75
   timers delay 30 reload 60
   control GigabitEthernet0/0/0 protocol 1
   data GigabitEthernet0/0/0
   track 1 shutdown
   track 2 shutdown
!
track 1 interface GigabitEthernet0/0/2 line-protocol
track 2 interface GigabitEthernet0/0/3 line-protocol
!
!
```

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```
interface GigabitEthernet0/0/0
 description AMAZONCVC HA INTERFACE
 ip address 10.64.3.94 255.255.0.0
 negotiation auto
!
interface GigabitEthernet0/0/1
 no ip address
 negotiation auto
!
interface GigabitEthernet0/0/2
 description AMAZONCVC CUBE_LAN_INTERFACE
 ip address 10.80.11.18 255.255.0.0
 negotiation auto
 redundancy rii 16
 redundancy group 1 ip 10.80.11.19 exclusive
!
interface GigabitEthernet0/0/3
 description AMAZONCVC CUBE_WAN_INTERFACE
 ip address 192.65.XX.XX 255.255.XX.XX
 negotiation auto
 redundancy rii 15
 redundancy group 1 ip 192.65.XX.XX exclusive
!
interface Service-Engine0/1/0
!
interface GigabitEthernet0
 vrf forwarding Mgmt-intf
 no ip address
 negotiation auto
!
ip forward-protocol nd
ip http server
ip http secure-server
ip tftp source-interface GigabitEthernet0/0/3
```

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```
ip route 0.0.0.0 0.0.0.0 192.65.XX.XX
ip route 10.64.0.0 255.255.0.0 10.80.11.1
ip route 172.16.29.0 255.255.255.0 10.80.11.1
ip route 172.16.31.0 255.255.255.0 10.80.11.1
!
control-plane
!
voice-port 0/1/0
!
voice-port 0/1/1
!
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 100 voip
 description *** Inbound Call from CUCM to CUBE-LAN ***
 session protocol sipv2
 session transport udp
 incoming uri via CUCM
 voice-class codec 1
 voice-class sip bind control source-interface GigabitEthernet0/0/2
 voice-class sip bind media source-interface GigabitEthernet0/0/2
 dtmf-relay rtp-nte
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 101 voip
 description *** Outbound Call from CUBE-LAN to CUCM****
 destination-pattern 919.......
 session protocol sipv2
```

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```
 session target ipv4:10.80.12.2:5060
 session transport udp
 voice-class codec 1
 voice-class sip bind control source-interface GigabitEthernet0/0/2
 voice-class sip bind media source-interface GigabitEthernet0/0/2
 dtmf-relay rtp-nte
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 200 voip
 description *** Inbound Call from AmazonCVC to CUBE-WAN ***
 translation-profile incoming Amazon-In
 session protocol sipv2
 session transport udp
 incoming called e164-pattern-map 890
 voice-class codec 1
 voice-class sip bind control source-interface GigabitEthernet0/0/3
 voice-class sip bind media source-interface GigabitEthernet0/0/3
 dtmf-relay rtp-nte
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 201 voip
 description *** Outbound Call from CUBE-WAN to AmazonCVC ****
 translation-profile outgoing Amazon-Out
 destination-pattern [0-9]T
 session protocol sipv2
 session target dns:dtndxrmXXXXX.voiceconnector.chime.aws:5060
 session transport udp
 voice-class codec 1
 voice-class sip localhost dns:dtndxrmXXXXX.voiceconnector.chime.aws
 voice-class sip options-keepalive
 voice-class sip bind control source-interface GigabitEthernet0/0/3
 voice-class sip bind media source-interface GigabitEthernet0/0/3
```

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```
 dtmf-relay rtp-nte
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
gateway
 timer receive-rtp 1200
!
!
line con 0
 transport input none
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 exec-timeout 0 0
 password XXXXXXX
 login
 transport preferred telnet
!
end
```

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Standby Cisco UBE:

```
version 16.9
service timestamps debug datetime msec
service timestamps log datetime msec
platform qfp utilization monitor load 80
no platform punt-keepalive disable-kernel-core
!
hostname AmazonCVC_R2
!
boot-start-marker
boot system bootflash:isr4400-universalk9.16.09.04.SPA.bin
boot-end-marker
!
!
vrf definition Mgmt-intf
 !
 address-family ipv4
 exit-address-family
 !
 address-family ipv6
 exit-address-family
!
enable secret 5 $1$xeaJ$oiP/3kf8IhWRet/HL7jZls/
!
no aaa new-model
!
ip name-server 8.8.8.8
!
login on-success log
!
subscriber templating
!
multilink bundle-name authenticated
!
```

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```
crypto pki trustpoint TP-self-signed-988930787
 enrollment selfsigned
 subject-name cn=IOS-Self-Signed-Certificate-988930787
 revocation-check none
 rsakeypair TP-self-signed-988930787
!
!
crypto pki certificate chain TP-self-signed-988930787
 certificate self-signed 01
  3082032E 30820216 A0030201 02020101 300D0609 2A864886 F70D0101 05050030
  30312E30 2C060355 04031325 494F532D 53656C66 2D536967 6E65642D 43657274
  69666963 6174652D 39383839 33303738 37301E17 0D313931 31313131 38333234
  335A170D 33303031 30313030 30303030 5A303031 2E302C06 03550403 1325494F
  532D5365 6C662D53 69676E65 642D4365 72746966 69636174 652D3938 38393330
  37383730 82012230 0D06092A 864886F7 0D010101 05000382 010F0030 82010A02
  82010100 99134C75 CDA52830 CE9787E8 C7FBD409 EE855E26 B65F8FD1 C05D7601
  CF7B360B 1137AA9E C75EB7C3 E789C2D6 7ED590F7 666B152C EC49CCDD 1C06E05F
  2D6A8DA2 32C9A28E 2FA16714 EF1BF5B5 A71ABCCA FEC9BF64 7A425DE7 047CAFE2
  0FD02F1A 33050CA2 C06A4DA7 D1E88926 D2694FDA 8C6F0613 A344A2FB ADFECF89
  8005096F E823E5A6 1E70CA60 BA1A8C49 D6CCA4CE 8F0937E2 28C57A21 E47D47D9
  A49BD094 FA8F6AFF 919A99DD 818545A9 7FC12529 372AE481 0D4BBEC5 60B28856
  C531FCEC 148E55C4 30FC1597 41124933 113D859D 17B31ED1 3FA56427 15CE4F8A
  73FC42D6 CD9D9C94 ABACF792 A931D556 64C36419 F67DE44A CBEE89C9 FC82FD2F
  52178E73 02030100 01A35330 51300F06 03551D13 0101FF04 05300301 01FF301F
  0603551D 23041830 1680140E 2DF36F2C B6AC986A C7EDAA41 26332060 91D2DA30
  1D060355 1D0E0416 04140E2D F36F2CB6 AC986AC7 EDAA4126 33206091 D2DA300D
  06092A86 4886F70D 01010505 00038201 01005C2B AF77334C 565B7E26 E91E16C3
  92A79476 1E550F68 9C709D43 4FEF2D56 AF3ED020 AB918B46 797EFEF5 FB4E843E
  586B68F8 BD74271C B5711217 F923262E 48928375 833FF0D1 FD69832B EB41B89C
  F15196F1 76AFF48B 19ACD296 3E2F2D86 FAE1529E 279059E0 62F4306A C5742935
  931E66D3 AB2DE46E 6854F2A5 DAFE9630 011E05C5 8A454DB2 A1561617 304B4B17
  02A4A9A3 C60C991F BF5F37D8 66BF1286 AB558CC0 91C0E247 30ABAA22 7ED0216F
  6FF65E1C E2FDA9B7 43E2685C 9FA065D2 62EAD9A9 02101CAF 480C06D0 8ACC30AA
  EDE43E1C 4762F842 944492D2 495ADBAD 62BC329F A8771990 B29645B5 7F829B4C
```

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```
  51A1CFC2 0A224CFC F7C9D222 886D530A 3A18
        quit
!
voice service voip
 ip address trusted list
  ipv4 3.80.XX.XX 255.255.XX.XX
  ipv4 52.55.XX.XX 255.255.XX.XX
  ipv4 52.55.XX.XX 255.255.XX.XX
  ipv4 34.212.XX.XX 255.255.XX.XX
  ipv4 34.223.XX.XX 255.255.XX.XX
  ipv4 10.80.12.2 255.255.255.255
  ipv4 10.80.12.3 255.255.255.255
 address-hiding
 mode border-element license capacity 20
 allow-connections sip to sip
 redundancy-group 1
 no supplementary-service sip refer
 supplementary-service media-renegotiate
 fax protocol pass-through g711ulaw
 sip
  bind control source-interface GigabitEthernet0/0/3
  bind media source-interface GigabitEthernet0/0/3
  session refresh
  asserted-id pai
  early-offer forced
  midcall-signaling passthru
  g729 annexb-all
  pass-thru headers unsupp
!
!
voice class uri CUCM sip
 host 10.80.12.2
voice class codec 1
 codec preference 1 g729r8
```

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```
 codec preference 2 g711ulaw
!
voice class e164-pattern-map 890
  e164 +191........$
 !
!
voice translation-rule 10
 rule 1 /\(^..........$\)/ /+1\1/
!
voice translation-rule 11
 rule 1 /\(^..........$\)/ /+1\1/
!
voice translation-rule 20
 rule 1 /^\+1\(.*\)/ /\1/
!
voice translation-profile Amazon-In
 translate called 20
!
voice translation-profile Amazon-Out
 translate calling 11
 translate called 10
!
license udi pid ISR4431/K9 sn FOC18232988
license accept end user agreement
license boot suite AdvUCSuiteK9
license boot level appxk9
license boot level uck9
license boot level securityk9
no license smart enable
diagnostic bootup level minimal
!
spanning-tree extend system-id
!
!
```

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```
redundancy
 mode none
 application redundancy
  group 1
   name b2bHAAmazonCVC
   priority 150 failover threshold 75
   timers delay 30 reload 60
   control GigabitEthernet0/0/0 protocol 1
   data GigabitEthernet0/0/0
   track 1 shutdown
   track 2 shutdown
!
track 1 interface GigabitEthernet0/0/2 line-protocol
!
track 2 interface GigabitEthernet0/0/3 line-protocol
!
interface GigabitEthernet0/0/0
 description AMAZONCVC HA INTERFACE
 ip address 10.64.3.95 255.255.0.0
 negotiation auto
!
interface GigabitEthernet0/0/1
 no ip address
 shutdown
 negotiation auto
!
interface GigabitEthernet0/0/2
 description AMAZONCVC CUBE_LAN_INTERFACE
 ip address 10.80.11.30 255.255.0.0
 negotiation auto
 redundancy rii 16
 redundancy group 1 ip 10.80.11.19 exclusive
!
!
```

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```
interface GigabitEthernet0/0/3
 description AMAZONCVC CUBE_WAN_INTERFACE
 ip address 192.65.XX.XX 255.255.XX.XX
 negotiation auto
 redundancy rii 15
 redundancy group 1 ip 192.65.XX.XX exclusive
!
interface GigabitEthernet0
 vrf forwarding Mgmt-intf
 no ip address
 shutdown
 negotiation auto
!
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.XX.XX
ip route 10.64.0.0 255.255.0.0 10.80.11.1
ip route 172.16.29.0 255.255.255.0 10.80.11.1
ip route 172.16.31.0 255.255.255.0 10.80.11.1
!
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
!
!
```

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```
dial-peer voice 100 voip
 description *** Inbound Call from CUCM to CUBE-LAN ***
 session protocol sipv2
 session transport udp
 incoming uri via CUCM
 voice-class codec 1
 voice-class sip bind control source-interface GigabitEthernet0/0/2
 voice-class sip bind media source-interface GigabitEthernet0/0/2
 dtmf-relay rtp-nte
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 101 voip
 description *** Outbound Call from CUBE-LAN to CUCM****
 destination-pattern 919.......
 session protocol sipv2
 session target ipv4:10.80.12.2:5060
 session transport udp
 voice-class codec 1
 voice-class sip bind control source-interface GigabitEthernet0/0/2
 voice-class sip bind media source-interface GigabitEthernet0/0/2
 dtmf-relay rtp-nte
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 200 voip
 description *** Inbound Call from AmazonCVC to CUBE-WAN ***
 translation-profile incoming Amazon-In
 session protocol sipv2
 session transport udp
 incoming called e164-pattern-map 890
 voice-class codec 1
 voice-class sip bind control source-interface GigabitEthernet0/0/3
 voice-class sip bind media source-interface GigabitEthernet0/0/3
```

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```
 dtmf-relay rtp-nte
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 201 voip
 description *** Outbound Call from CUBE-WAN to AmazonCVC ****
 translation-profile outgoing Amazon-Out
 destination-pattern [0-9]T
 session protocol sipv2
 session target dns:dtndxrmXXXXX.voiceconnector.chime.aws:5060
 session transport udp
 voice-class codec 1
 voice-class sip localhost dns:dtndxrmXXXXX.voiceconnector.chime.aws
 voice-class sip options-keepalive
 voice-class sip bind control source-interface GigabitEthernet0/0/3
 voice-class sip bind media source-interface GigabitEthernet0/0/3
 dtmf-relay rtp-nte
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
gateway
 timer receive-rtp 1200
!
line con 0
 transport input none
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 exec-timeout 0 0
 password XXXXXXX
 login
!
end
```

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Configuring Cisco UCM 12.5

Cisco UCM Version

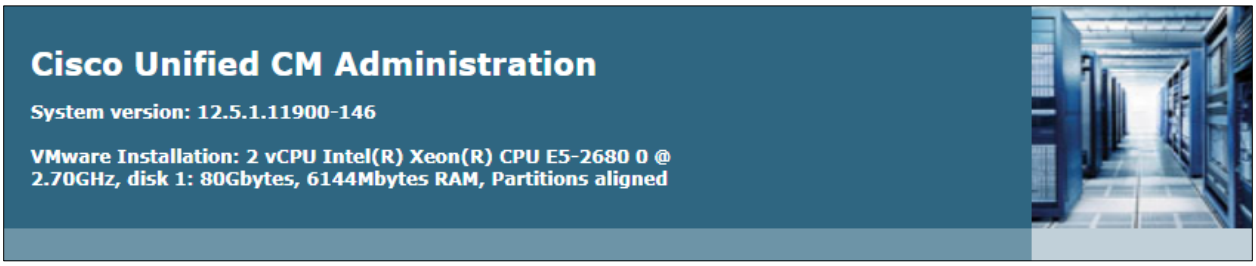

Figure 3: Cisco UCM Version

Cisco Call Manager Service Parameters

Navigation: System → Service Parameters

- Select Server* = clus22pub--CUCM Voice/Video (Active)
- Select Service*= Cisco CallManager (Active)
- All fields are set to default values

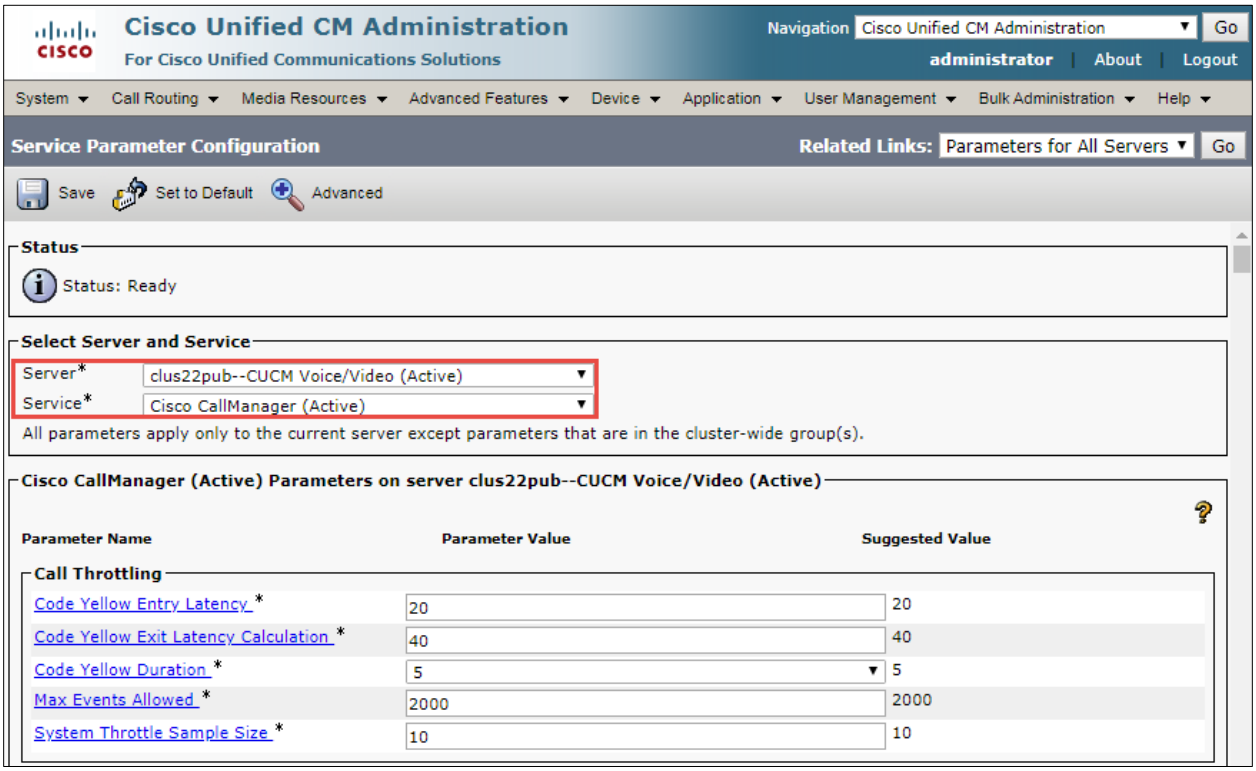

Figure 4: Service Parameters

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SIP Trunk Security Profile

Navigation: System → Security → SIP Trunk Security Profile

- Name*= **Non Secure SIP Trunk Profile-Service Provider**
- Description = **Non Secure SIP Trunk Profile authenticated by null String**
- Device Security Mode = **Non Secure**
- Incoming Transport Type* = **TCP + UDP**
- Outgoing Transport Type = **UDP**

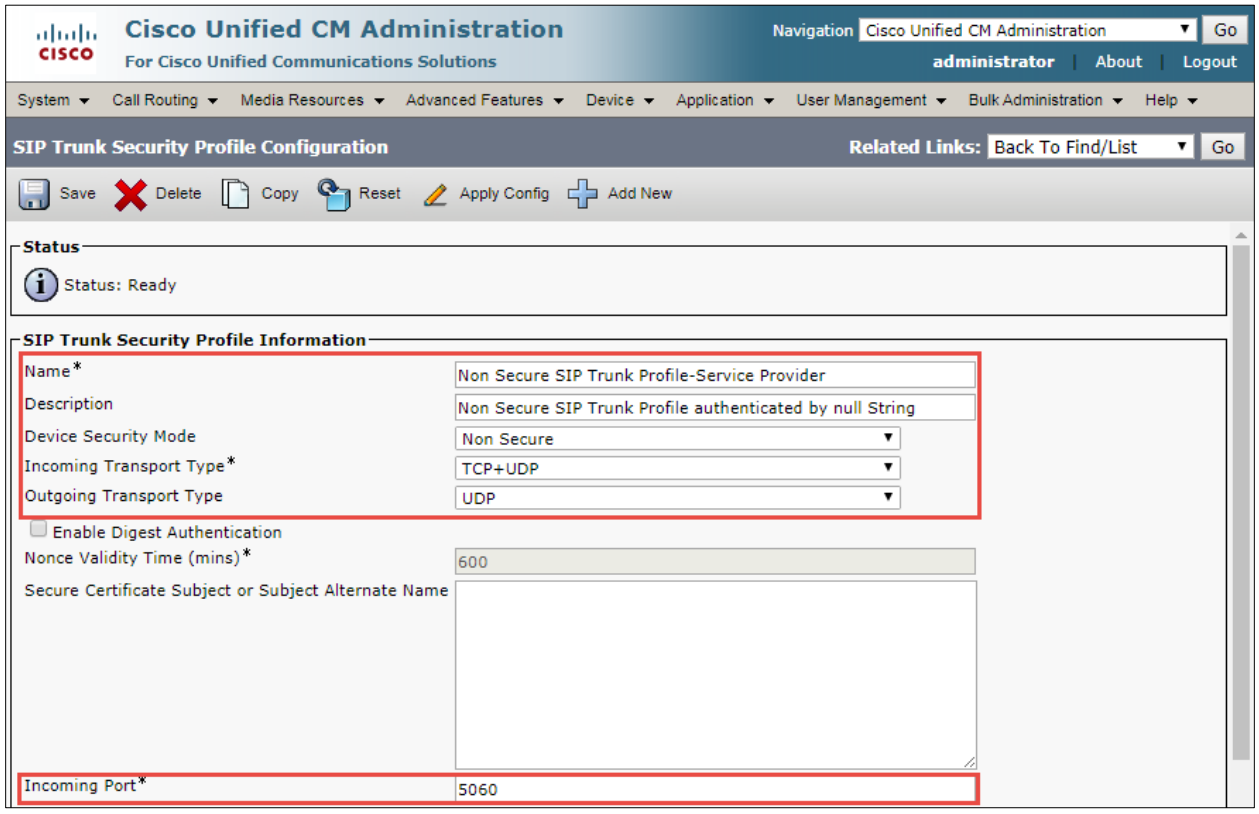

Figure 5: SIP Trunk Security Profile

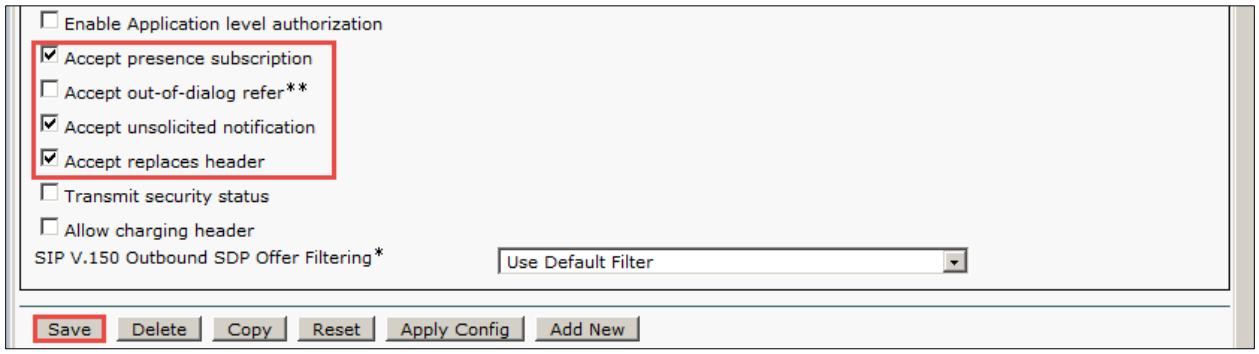

Figure 6 SIP Trunk Security Profile Contd.,

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SIP Profile

Navigation: Device → Device Settings → SIP Profile

- Name*= **Standard SIP Profile-Service Provider**
- Description = **Standard SIP Profile- Service Provider**
- All the other fields are set to default values

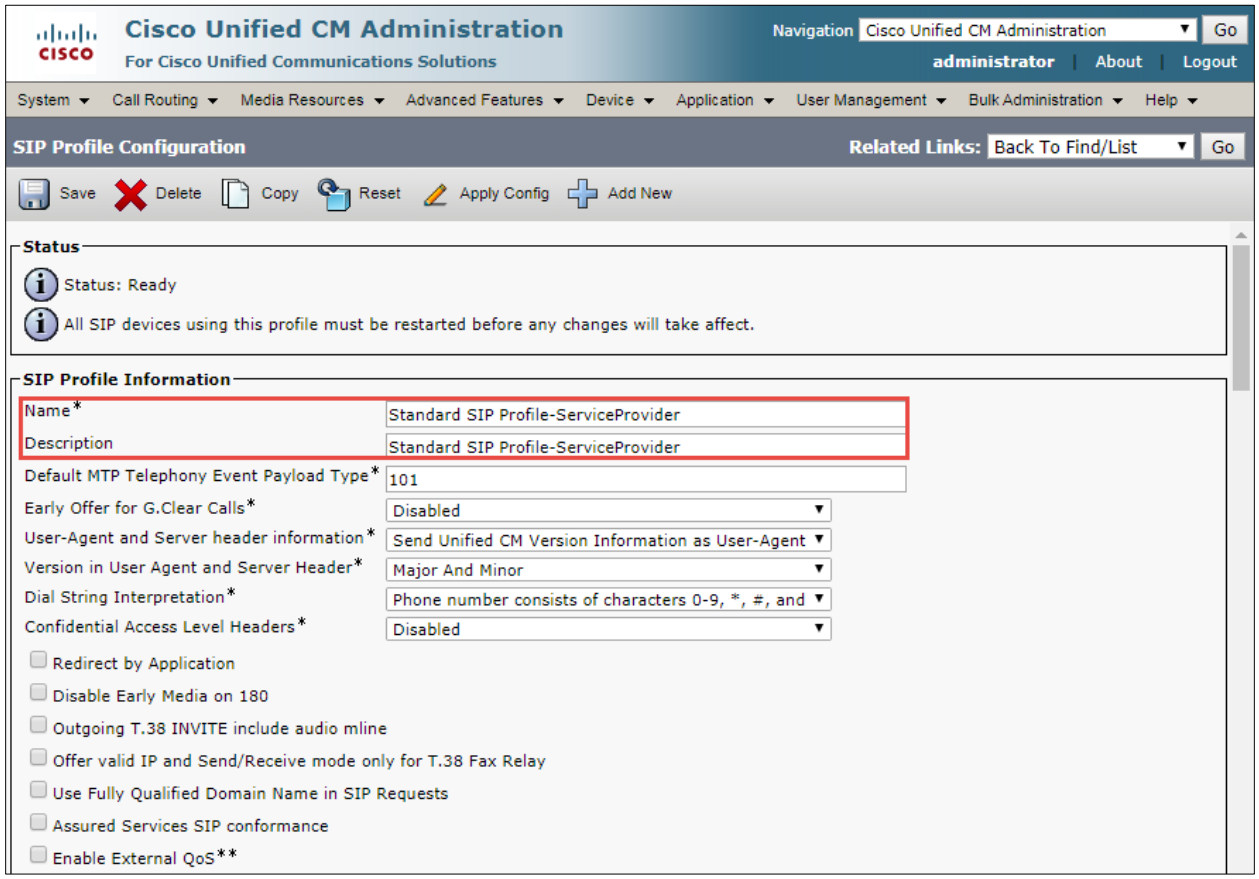

Figure 7: SIP Profile

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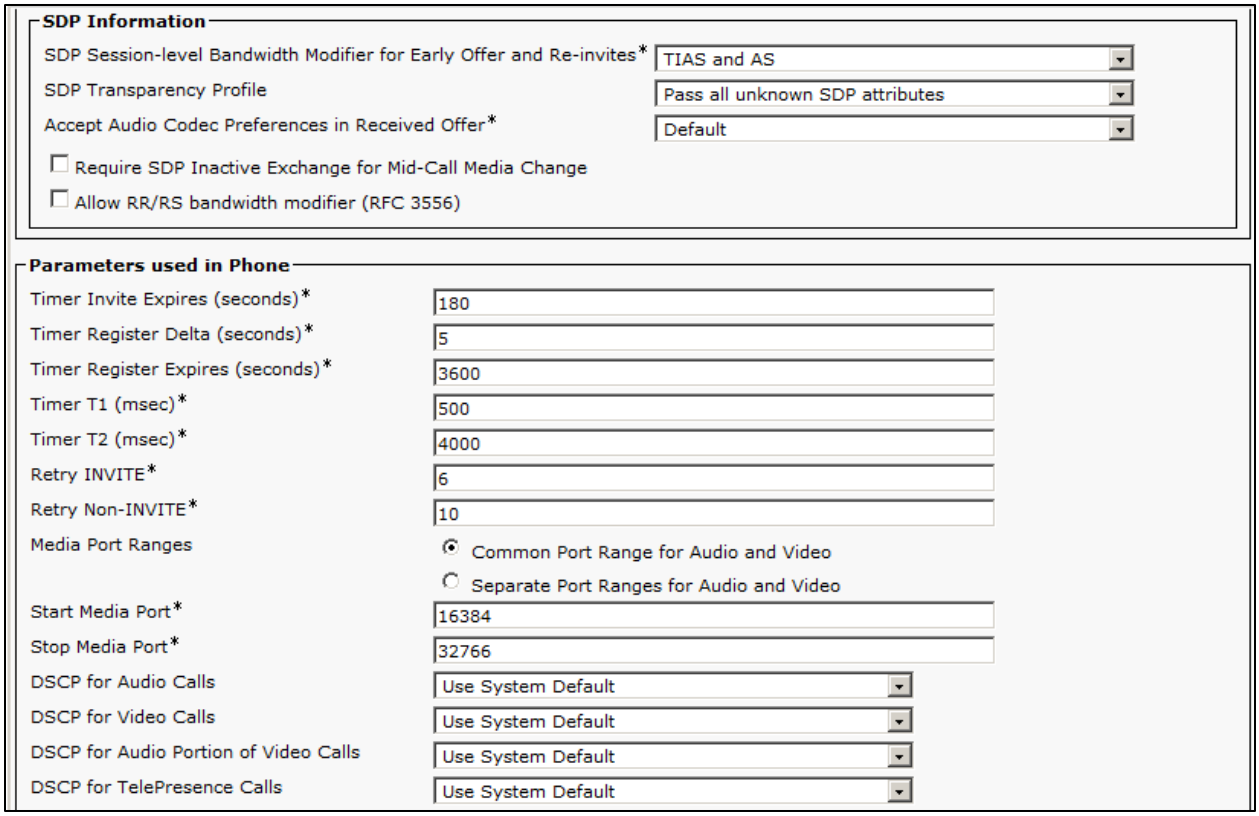

Figure 8 SIP Profile Contd.,

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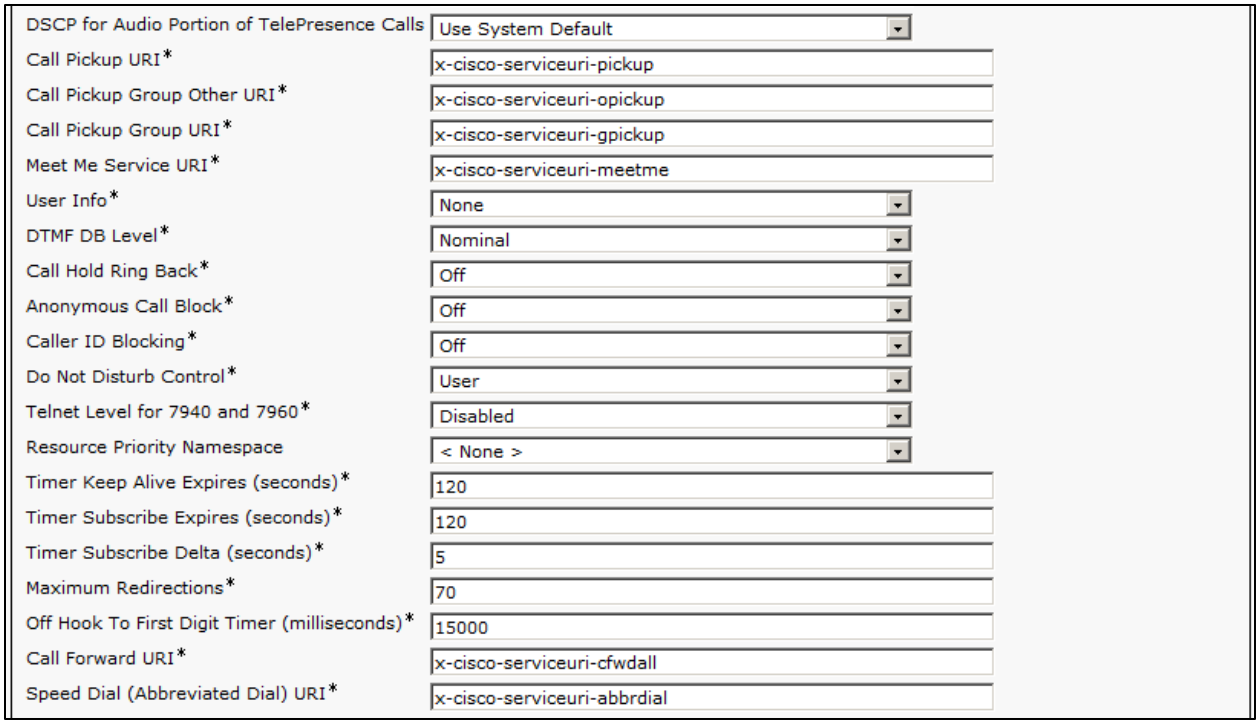

Figure 9 SIP Profile Contd.,

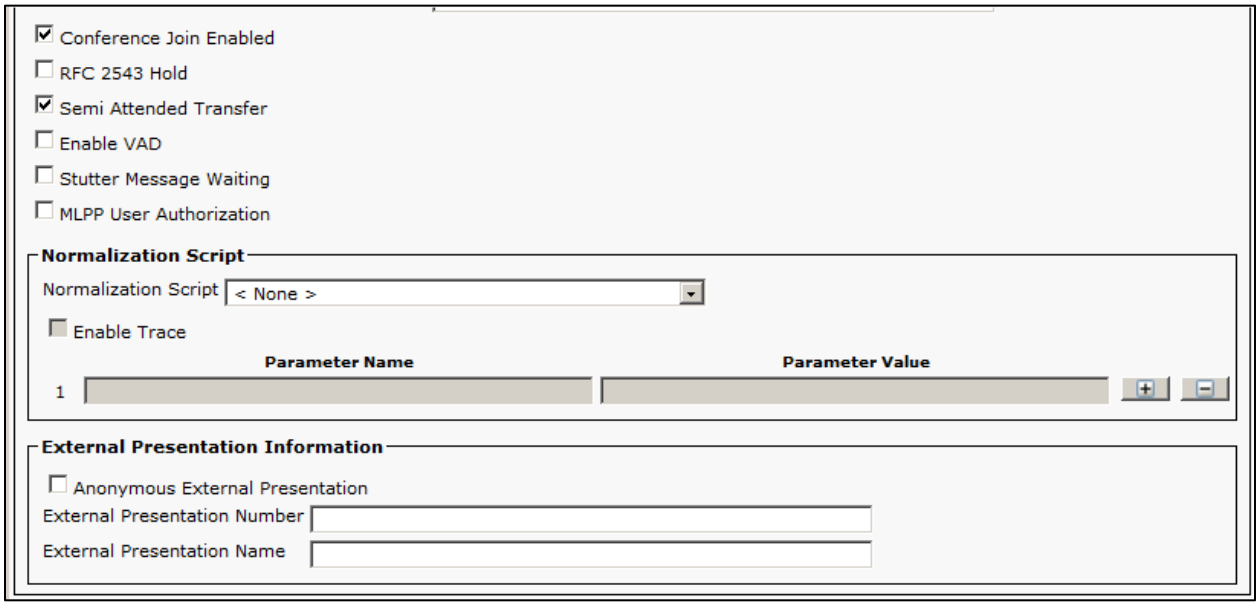

Figure 10 SIP Profile Contd.,

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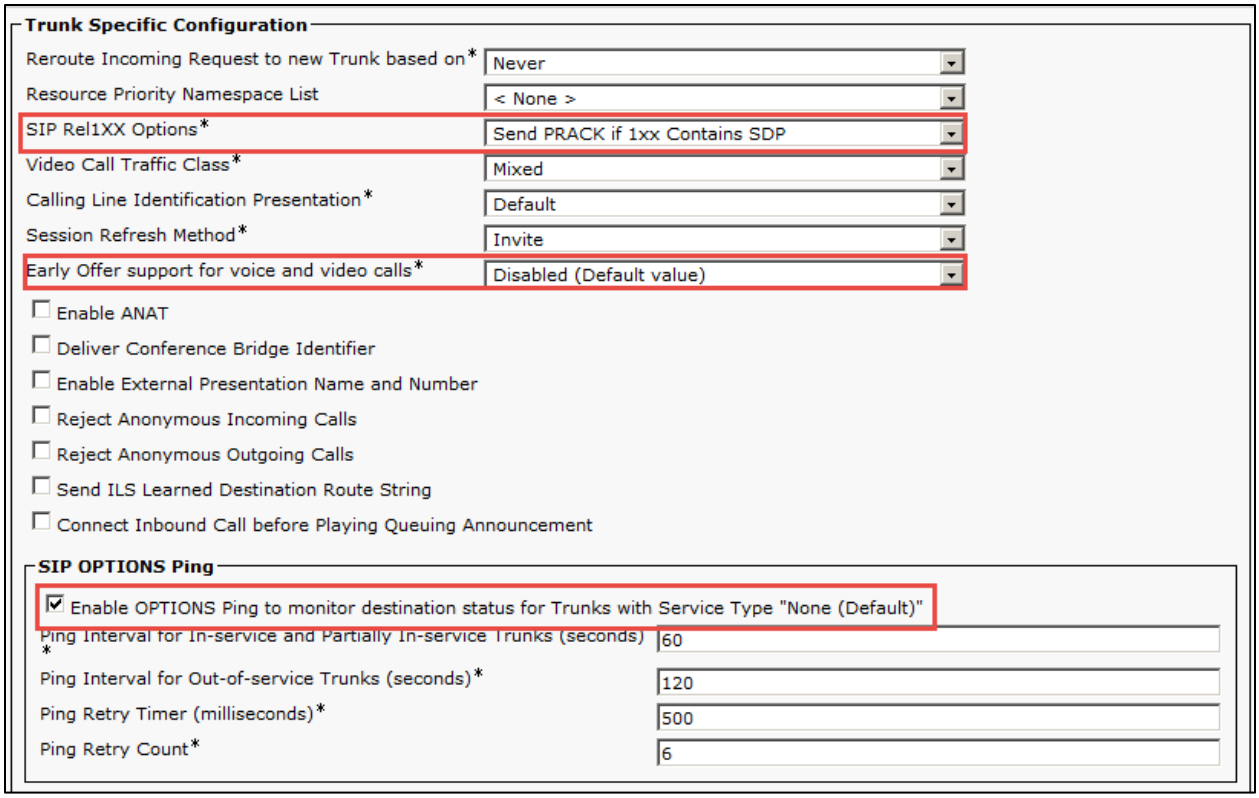

Figure 11 SIP Profile Contd.,

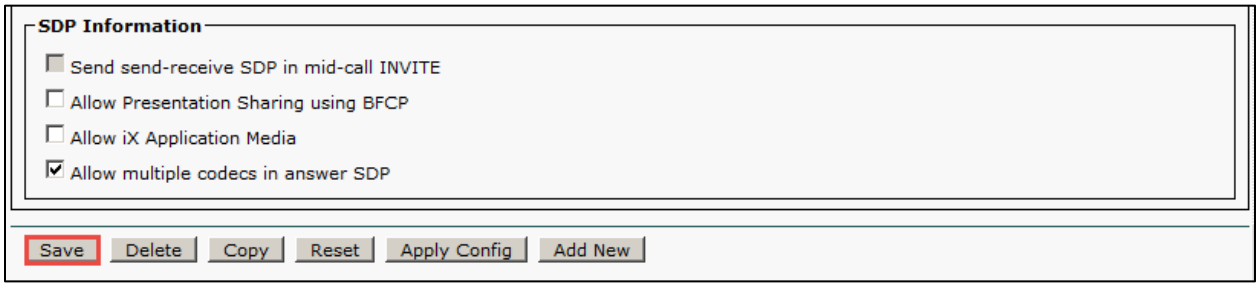

Figure 12 SIP Profile Contd.,

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Trunk configuration

Trunk configuration from Cisco UCM to the LAN side of the Cisco UBE:

Navigation: Device → Trunk

- Name*= **AmazonCVC_SIPTrunk_CUBE**
- Description = **AmazonCVC_SIPTrunk_CUBE**

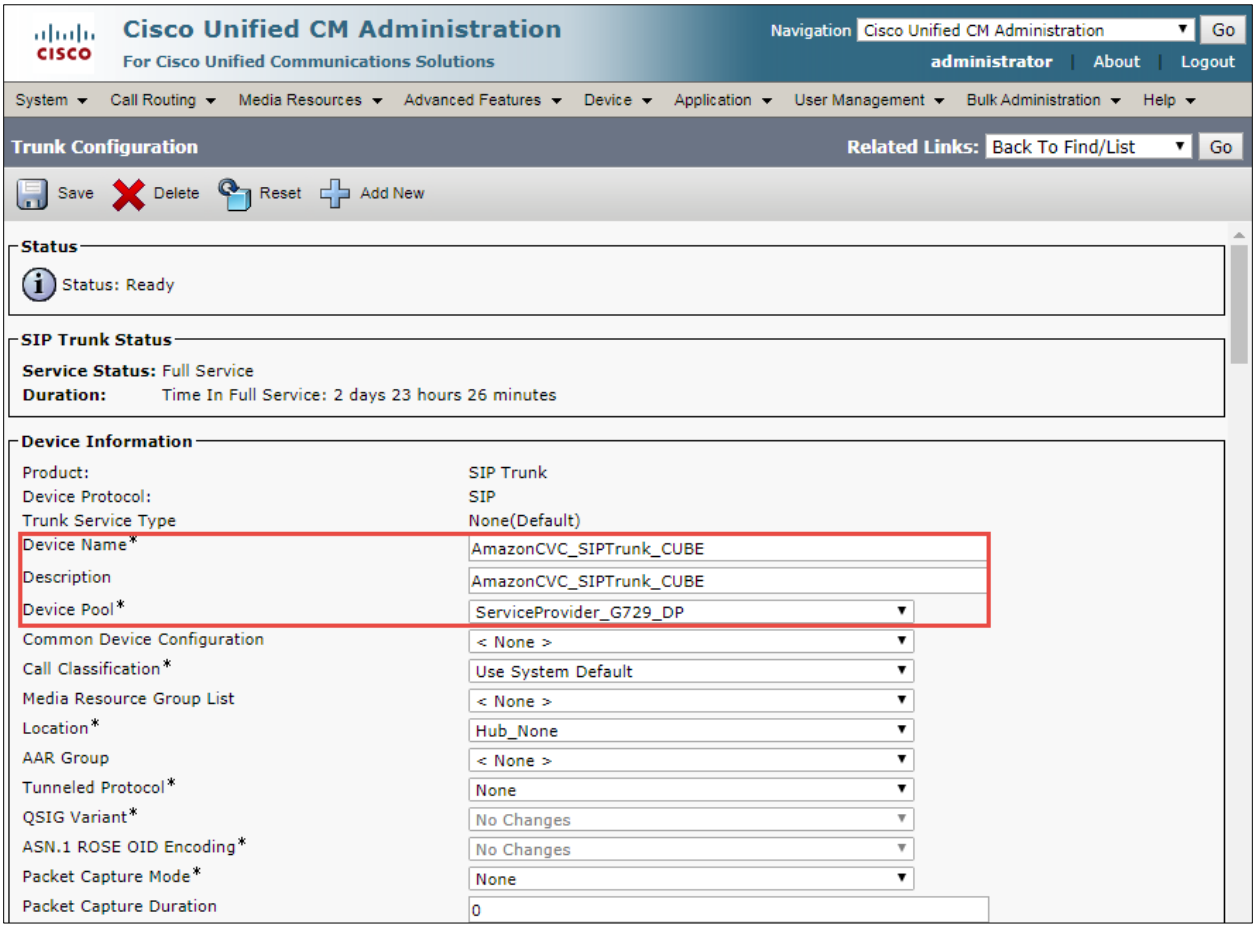

Figure 13 SIP Trunk

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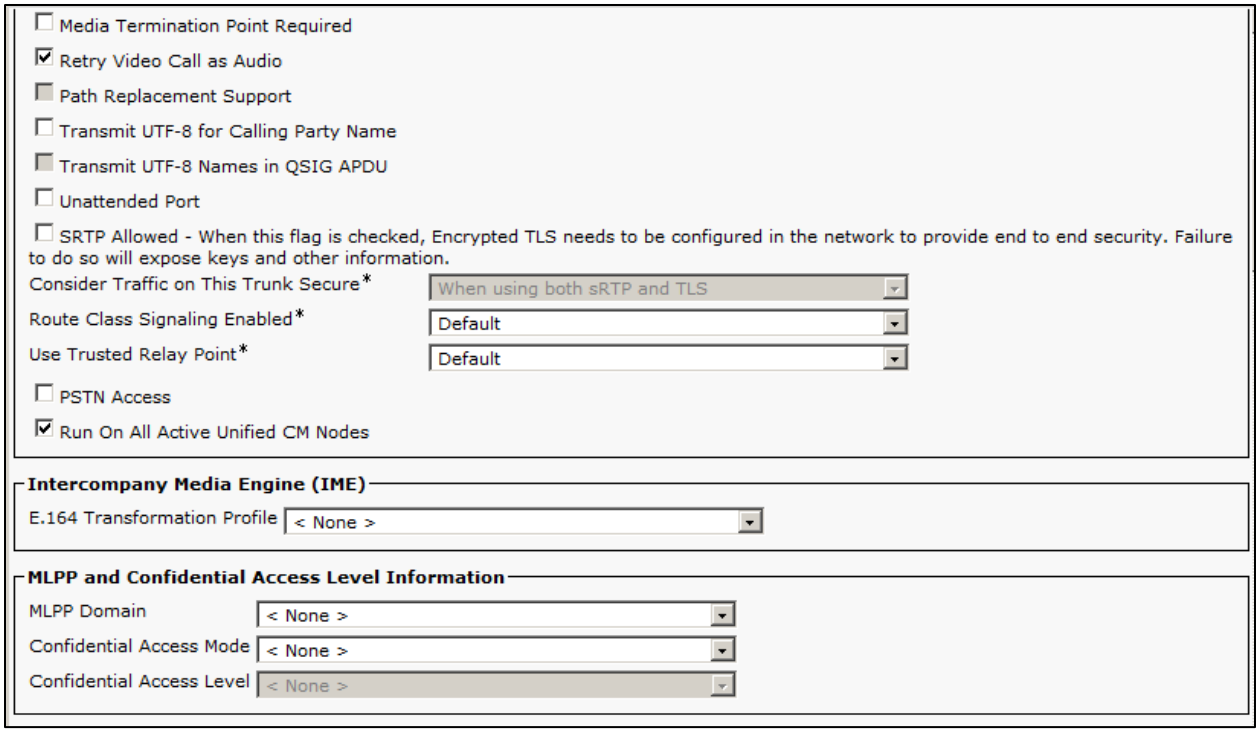

Figure 14 SIP Trunk Contd.,

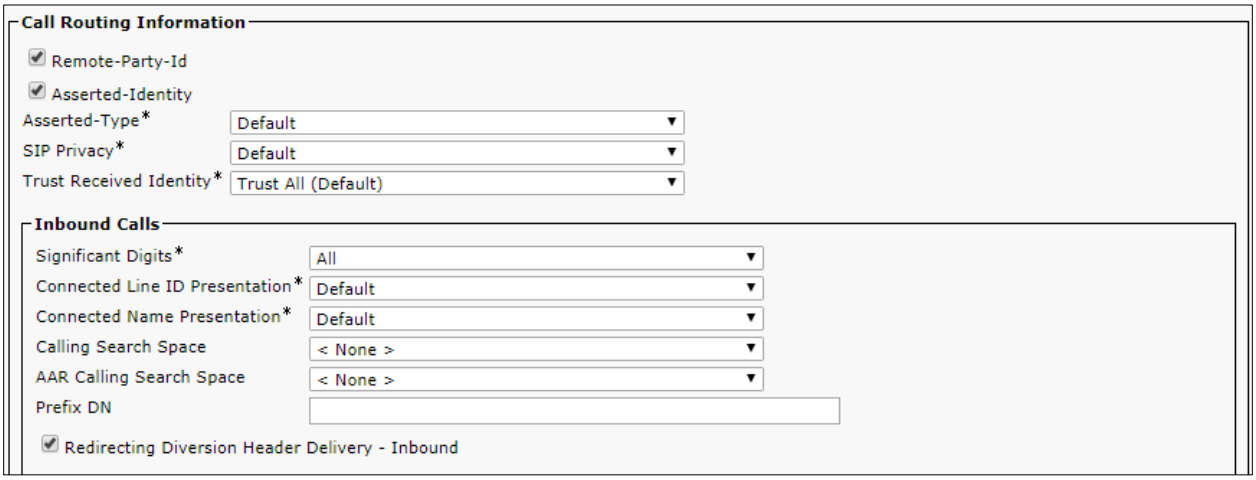

Figure 15 SIP Trunk Contd.,

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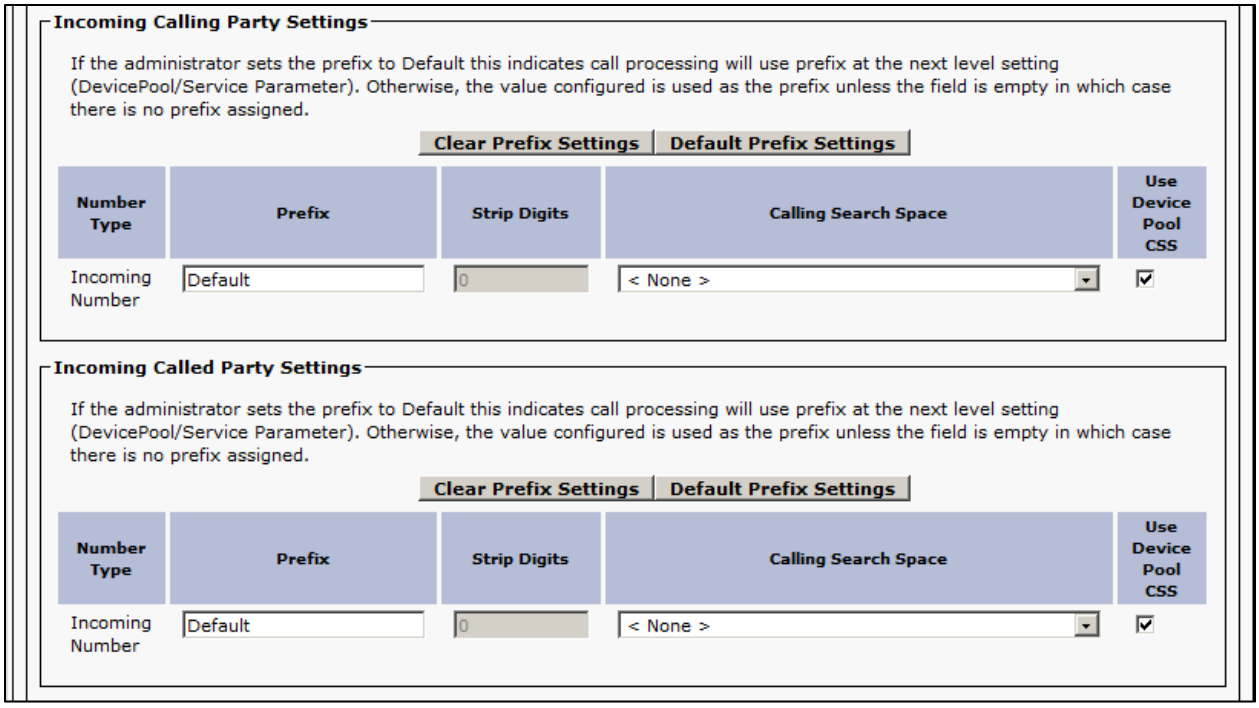

Figure 16 SIP Trunk Contd.,

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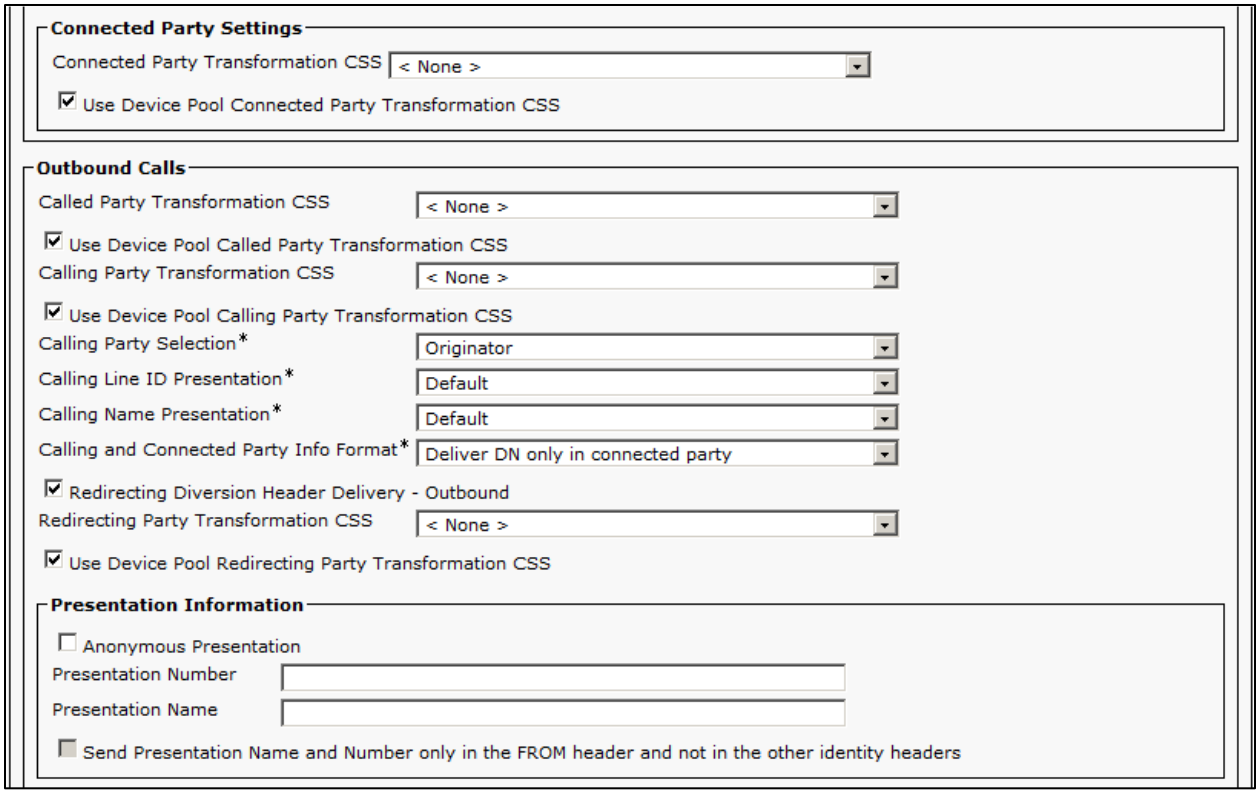

Figure 17 SIP Trunk Contd.,

- Configure the **Virtual LAN IP address of the Cisco UBE** and the Destination **Port**
- Associate the **SIP Trunk Security Profile** and **SIP Profile** as created earlier
- DTMF Signaling Method: **RFC2833**
- The rest of the configuration are set to default

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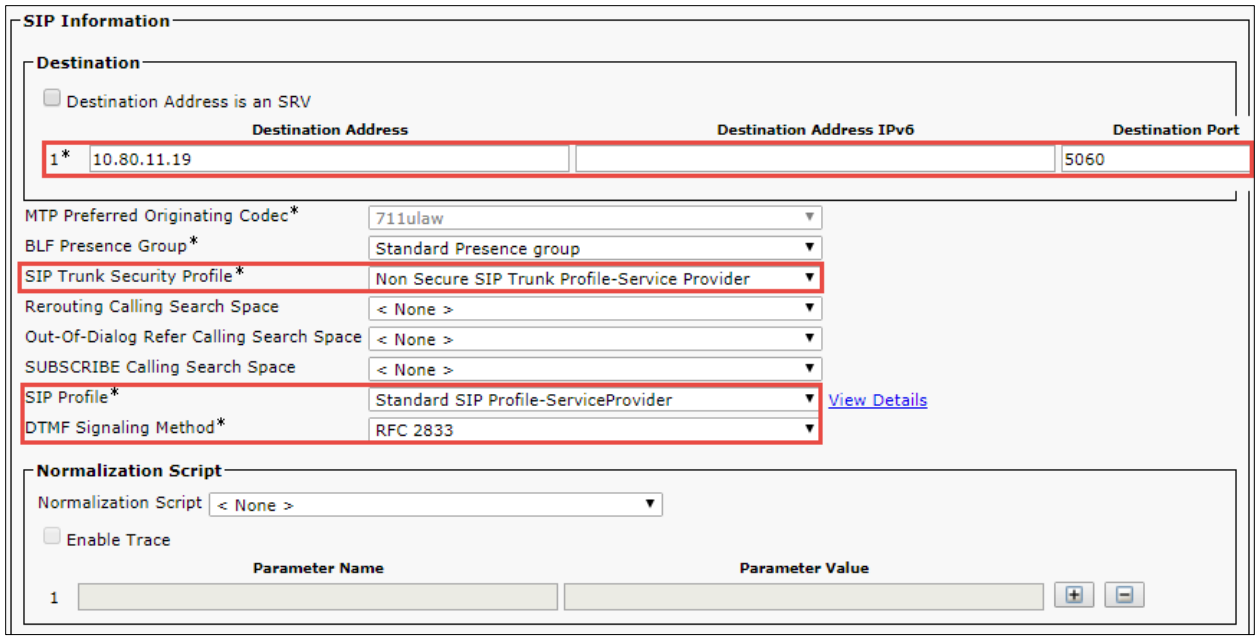

Figure 18 SIP Trunk Contd.,

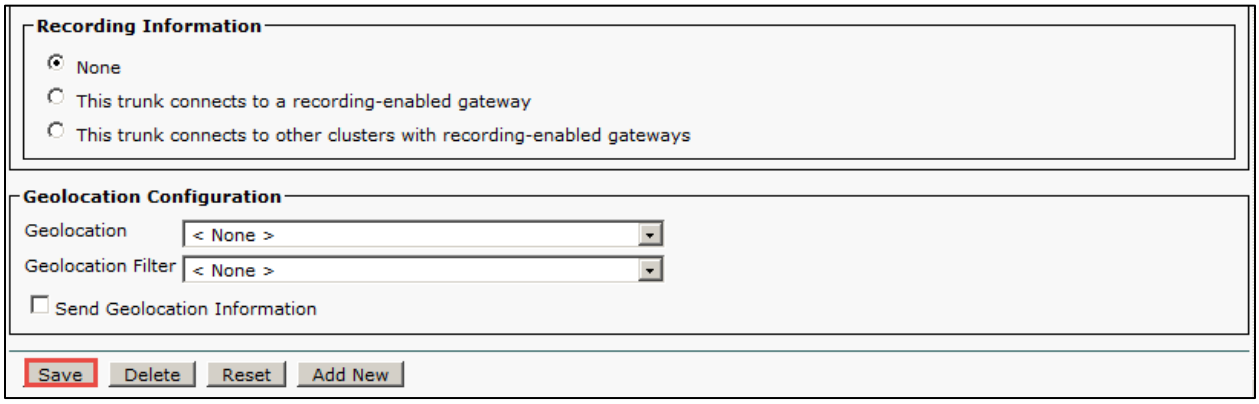

Figure 19 SIP Trunk Contd.,

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Routing configuration

Route Pattern for Cisco UBE:

Navigation: Call Routing → Route/Hunt → Route Pattern

- Route Pattern= **9.XXXXXXXXXX** (Create Route patterns based on the dial plan requirement)
- Description = **RP_AmazonCVC_CUBE**
- Gateway/Route List = **AmazonCVC_SIPTrunk_CUBE** (Associate the SIP Trunk created earlier)

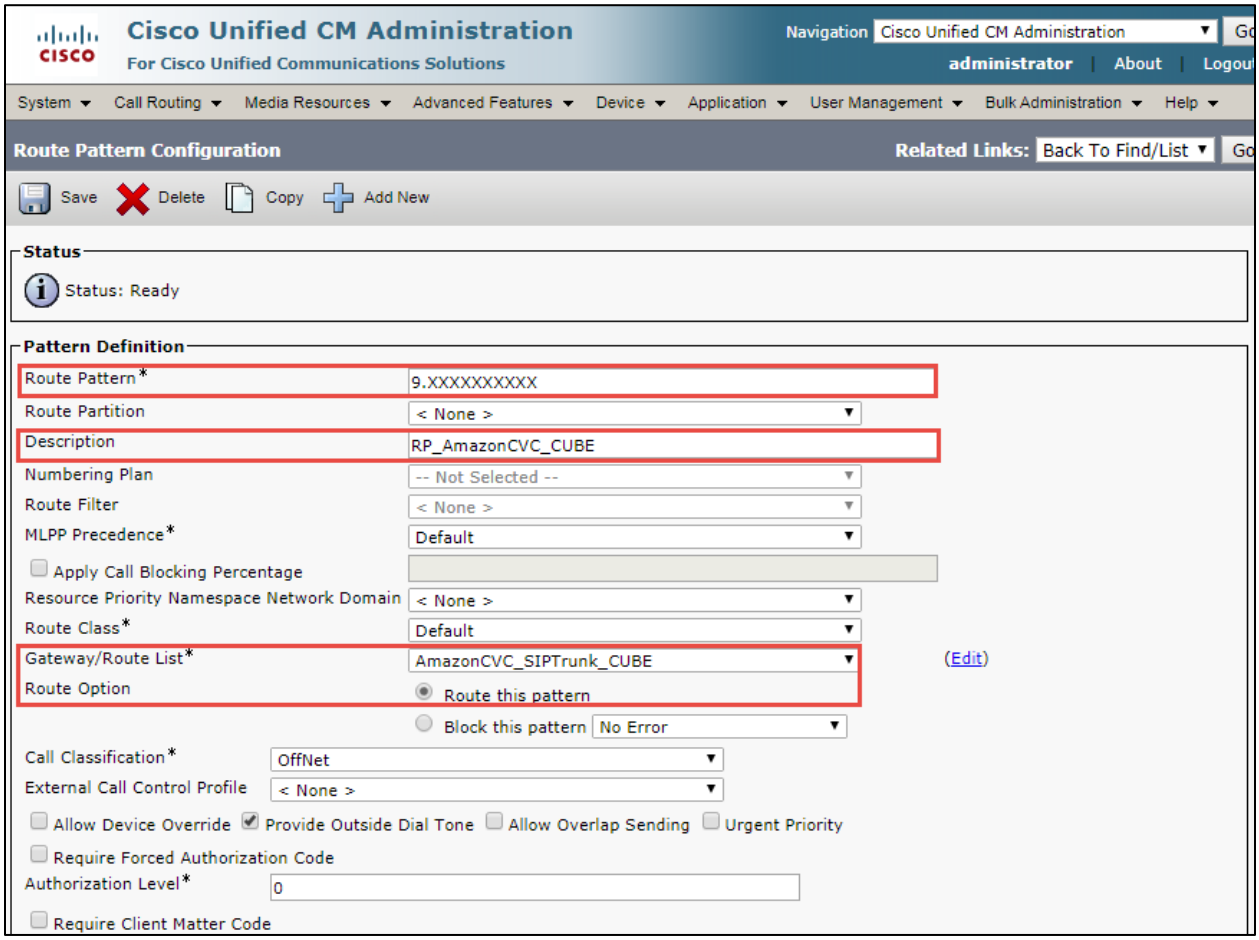

Figure 20 Route Pattern

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- Discard Digits **PreDot**

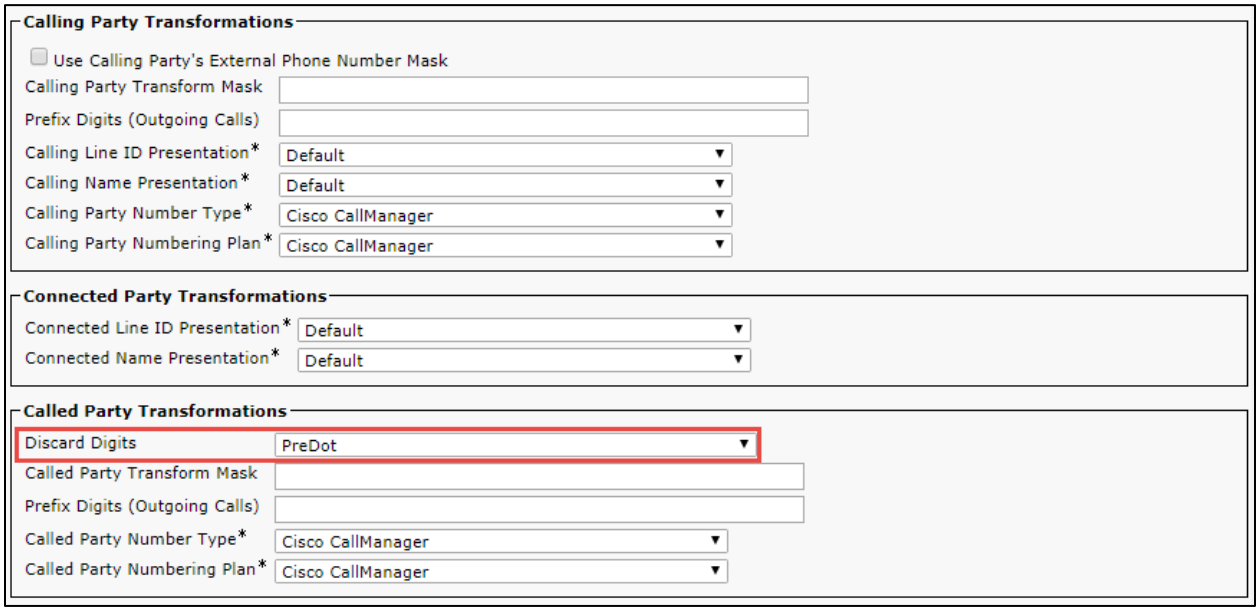

Figure 21 Route Pattern Contd.,

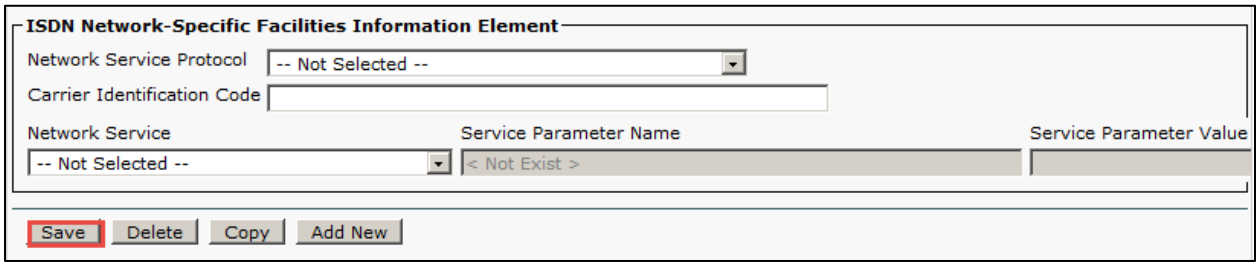

Figure 22 Route Pattern Contd.,

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Acronyms

Acronym	Definitions
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
SP	Service Provider

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