Application Note

Intelepeer SIP Trunking:

Connecting Cisco Unified Communications Manager [v12.0.1] to Intelepeer SIP Trunks via Cisco Unified Border Element v12.2.0 [IOS-XE 16.09.01]

January 24, 2019

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Introduction

Service Providers today, such as Intelepeer, 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.

Intelepeer 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 Intelepeer network, Cisco Unified Border Element (Cisco UBE) ISR 4321/K9 running IOS-XE 16.09.01 can be used. The Cisco Unified Border Element v12.2 provides demarcation, security, interworking and session control services for Cisco Unified Communications Manager 12.0.1 connected to Intelepeer 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 Intelepeer interoperability are presented. Feature configuration and most importantly the dial plan are customer specific and need individual approach.

- This application note describes how to configure Cisco UCM 12.0.1, and Cisco UBE on ISR 4321/K9 [IOS-XE – 16.09.01] for connectivity to Intelepeer SIP Trunking service. The deployment model covered in this application note is CPE (Cisco UCM) to PSTN (Intelepeer) via Cisco UBE v12.2.0 [IOS-XE] 16.09.01.
- Testing was performed in accordance to Intelepeer generic SIP Trunking test methodology and among features verified were – basic calls, DTMF transport, Music on Hold (MOH), unattended and attended transfers, call forward, conferences and 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 Intelepeer SIP network and Cisco Unified Communications. The configuration described in this document details the important configuration settings to have enabled for interoperability to be successful and care must be taken by the network administrator deploying Cisco UCM to interoperate to Intelepeer SIP Trunking network.

Network Topology

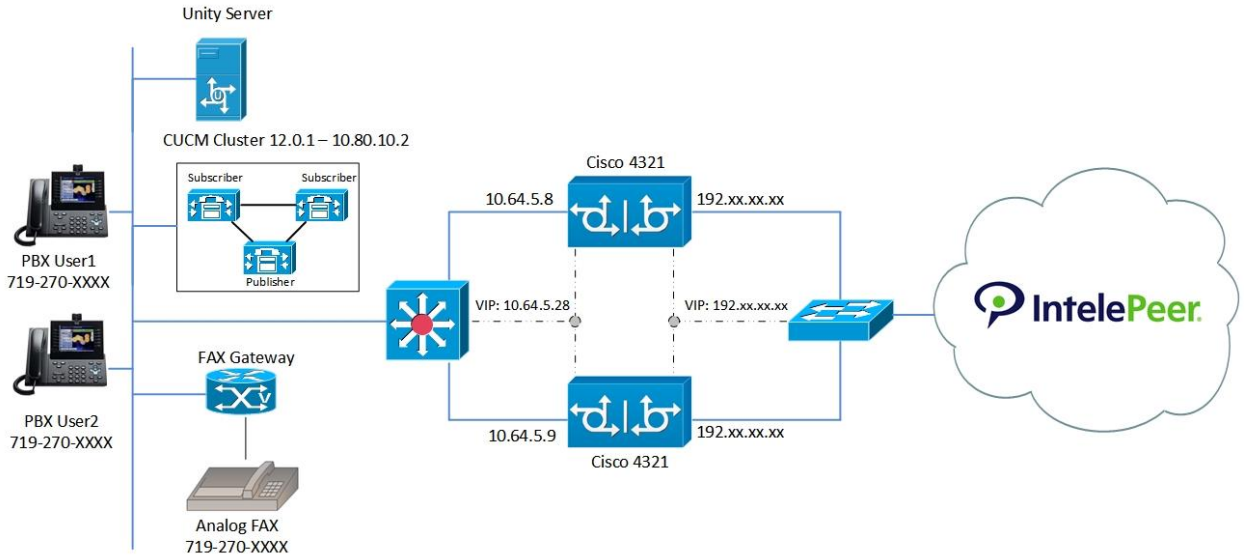

Figure 1 Network Topology

- The network topology includes the Cisco UCM Cluster, Unity Voicemail system, Cisco Fax gateway and 2 Cisco Endpoints. Cisco UCM has a trunk configured to Cisco UBE's Virtual IP Address. Intelepeer was used as the service provider with SIP trunk to the Cisco UBE using the WAN Virtual IP Address.
- 2 Cisco Unified Border Elements are used here for High Availability.
- SIP Trunk transport type used between Cisco UBE and Cisco UCM is UDP and to Intelepeer 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 Intelepeer	UDP with RTP
Voice Mail Support	YES
Session Refresh	YES

System Components

Hardware Requirements

- Cisco UBE on Cisco ISR 4321/K9 router
- CUCM cluster on UCS C240, 1 Publisher node, 2 Subscriber nodes and Cisco Unity Connection
- Cisco 2851 with FXS ports and Analog Fax machine
- Generic Cisco IP-Phones: 7841 and 7941

Software Requirements

- CUBE-Version: 12.2.0 running IOS-XE 16.09.01
- CUCM UCOS 12.0.1.22900-11 for 1 Publisher and 2 Subscriber
- Cisco Unity Connection 12.0.1.22900-14
- Cisco IOS v15.0(1) for the fax gateway

Features

Features Supported

- Incoming and outgoing calls using G711ulaw and G729 codecs
- International Calls and digit manipulations
- Call Conference
- CPE Voice Mail support
- Call hold & Resume with and without MoH
- Unattended and Attended Call transfer
- Call forward (all, busy and no answer)
- DTMF (RFC2833)
- Fax (T38 and G711 Pass-through)
- IP-PBX Calling number privacy
- High Availability

Features Not Supported

- Cisco UCM does not support Blind Call transfer
- In HA Redundancy mode, the Primary Cisco UBE will not take over the Primary/Active role after a reboot/network outage

Caveats

- Caller ID is not updated on attended and unattended transfer scenarios.
- Only one IP PBX used for the testing.
- The Cisco UBE HA tested is layer 2 box to box Cisco UBE redundancy.
- Intelepeer has negotiated the fax rate only on G3 speed. However on T.38 Loop back scenarios the fax rate was on SG3 speed.

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.

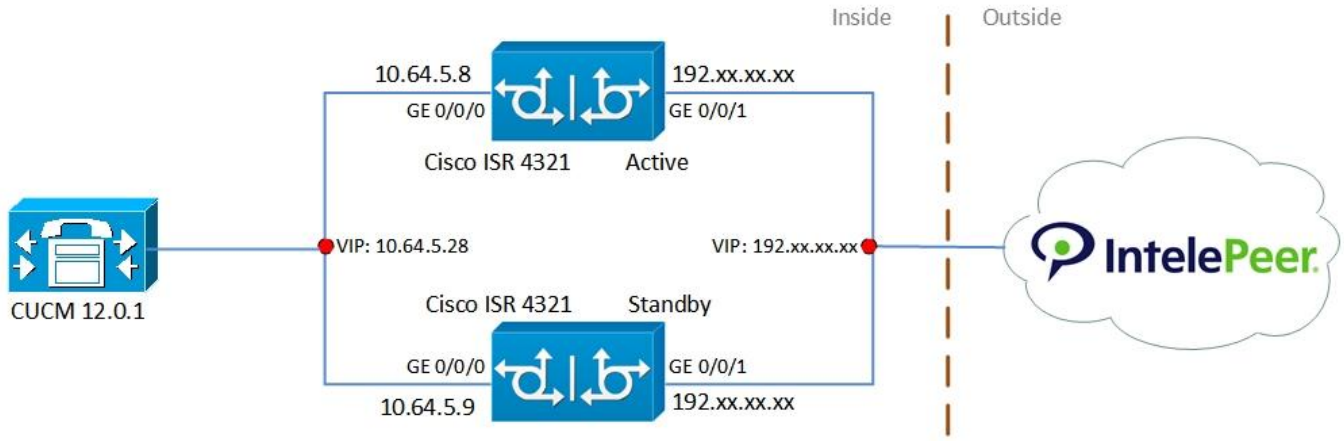

Figure 2 High Availability topology

Cisco UBE 1:

```
interface GigabitEthernet0/0/0
 description Intelepeer CUBE LAN
 ip address 10.64.5.8 255.255.0.0
 negotiation auto
 redundancy rii 4
 redundancy group 2 ip 10.64.5.28 exclusive
!
interface GigabitEthernet0/0/1
 description Intelepeer CUBE WAN
 ip address 192.65.xx.xx 255.255.255.224
 negotiation auto
 redundancy rii 3
 redundancy group 2 ip 192.65.xx.xx exclusive
!
interface GigabitEthernet0/1/0
 description Intelepeer CUBE  HA
 ip address 10.80.10.48 255.255.255.0
 negotiation auto
!
interface GigabitEthernet0
 vrf forwarding Mgmt-intf
 no ip address
 shutdown
 negotiation auto
```

Cisco UBE 2:

```
interface GigabitEthernet0/0/0
 description Intelepeer CUBE LAN
 ip address 10.64.5.9 255.255.0.0
 negotiation auto
 redundancy rii 4
 redundancy group 2 ip 10.64.5.28 exclusive
```

```
!
interface GigabitEthernet0/0/1
 description Intelepeer CUBE WAN
 ip address 192.65.xx.xx 255.255.255.224
 negotiation auto
 redundancy rii 3
 redundancy group 2 ip 192.65.xx.xx exclusive
!
interface GigabitEthernet0/1/0
 description Intelepeer CUBE HA
 ip address 10.80.10.49 255.255.255.0
 negotiation auto
!
interface GigabitEthernet0
 vrf forwarding Mgmt-intf
 no ip address
 shutdown
 negotiation auto
```

Global Cisco UBE settings

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

```
voice service voip
 no ip address trusted authenticate
 address-hiding
 mode border-element license capacity 20
 allow-connections sip to sip
 redundancy-group 2
 sip
  rel1xx supported "rel100"
  session refresh
  asserted-id pai
  privacy pstn
  early-offer forced
  midcall-signaling passthru
  g729 annexb-all
```

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
asserted-id	Specifies the privacy header in the outgoing SIP requests and response messages
`midcall-signaling passthru`	Pass-through media change method optimizes or consumes mid-call, media-related signaling within the call

Codecs

G711ulaw and G729 voice codecs are used 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
 codec preference 3 g711alaw
!
voice class codec 2
 codec preference 1 g711ulaw
 codec preference 2 g711alaw
 codec preference 3 g729r8
!
```

Dial Peer

Outbound Dial-peer to Intelepeer:

```
dial-peer voice 1 voip
 description Ingress CUCM to PSTN - LAN Interface
 huntstop
 session protocol sipv2
 session transport udp
 incoming called-number .T
 incoming uri via cucm
 voice-class codec 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
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 2 voip
```

```
 description Egress CUCM to PSTN - WAN Interface
 huntstop
 destination-pattern .T
 session protocol sipv2
 session target ipv4:68.68.xx.xx:5060
 session transport udp
 voice-class codec 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
 fax rate 14400
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
```

Inbound Dial-peer from Intelepeer:

```
dial-peer voice 3 voip
 description Ingress PSTN to CUCM - WAN Interface
 huntstop
 session protocol sipv2
 session transport udp
 incoming called-number 719270....
 voice-class codec 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
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 4 voip
 description Egress PSTN to CUCM - LAN Interface
 huntstop
 destination-pattern 719270....
 session protocol sipv2
 session target ipv4:10.80.10.3:5060
```

```
session transport udp
voice-class codec 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
fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
no vad
```

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
platform qfp utilization monitor load 80
no platform punt-keepalive disable-kernel-core
!
hostname IntelepeerCUBE1
!
boot-start-marker
boot system flash isr4300-universalk9.16.09.01.SPA.bin
boot-end-marker
vrf definition Mgmt-intf
 !
 address-family ipv4
 exit-address-family
 address-family ipv6
 exit-address-family
!
enable secret 5 $1$nU
!
no aaa new-model
ip admission watch-list expiry-time 0
!
subscriber templating
multilink bundle-name authenticated
```

```
!
voice service voip
 no ip address trusted authenticate
 address-hiding
 mode border-element license capacity 20
 allow-connections sip to sip
 redundancy-group 2
 sip
  rel1xx supported "rel100"
  session refresh
  asserted-id pai
  privacy pstn
  early-offer forced
  midcall-signaling passthru
  g729 annexb-all
!
voice class uri cucm sip
 host 10.80.10.3
voice class codec 1
 codec preference 1 g729r8
 codec preference 2 g711ulaw
 codec preference 3 g711alaw
!
voice class codec 2
 codec preference 1 g711ulaw
 codec preference 2 g711alaw
 codec preference 3 g729r8
!
license udi pid ISR4321/K9 sn FDO19220MSQ
```

```
license accept end user agreement
license boot suite AdvUCSuiteK9
license boot level appxk9
license boot level securityk9
no license smart enable
diagnostic bootup level minimal
!
spanning-tree extend system-id
!
username **** privilege 15 password 0 ******
!
redundancy
 mode none
 application redundancy
  group 2
   name IntelepeerB2BHA
   priority 100 failover threshold 75
   timers delay 30 reload 60
   control GigabitEthernet0/1/0 protocol 1
   data GigabitEthernet0/1/0
   track 1 shutdown
   track 2 shutdown
!
track 1 interface GigabitEthernet0/0/0 line-protocol
!
track 2 interface GigabitEthernet0/0/1 line-protocol
!
interface GigabitEthernet0/0/0
 description Intelepeer CUBE LAN
```

```
 ip address 10.64.5.8 255.255.0.0
 negotiation auto
 redundancy rii 4
 redundancy group 2 ip 10.64.5.28 exclusive
!
interface GigabitEthernet0/0/1
 description Intelepeer CUBE WAN
 ip address 192.65.xx.xx 255.255.255.224
 negotiation auto
 redundancy rii 3
 redundancy group 2 ip 192.65.xx.xx exclusive
!
interface GigabitEthernet0/1/0
 description Intelepeer CUBE  HA
 ip address 10.80.10.48 255.255.255.0
 negotiation auto
!
interface GigabitEthernet0
 vrf forwarding Mgmt-intf
 no ip address
 shutdown
 negotiation auto
!
ip forward-protocol nd
no ip http server
no 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 10.80.10.0 255.255.255.0 10.64.1.1
```

```
ip route 172.16.24.0 255.255.248.0 10.64.1.1
!
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
!
dial-peer voice 1 voip
 description Ingress CUCM to PSTN - LAN Interface
 huntstop
 session protocol sipv2
 session transport udp
 incoming called-number .T
 incoming uri via cucm
 voice-class codec 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
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 2 voip
 description Egress CUCM to PSTN - WAN Interface
 huntstop
 destination-pattern .T
```

```
 session protocol sipv2
 session target ipv4:68.68.xx.xx:5060
 session transport udp
 voice-class codec 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
 fax rate 14400
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 3 voip
 description Ingress PSTN to CUCM - WAN Interface
 huntstop
 session protocol sipv2
 session transport udp
 incoming called-number 719270....
 voice-class codec 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
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 4 voip
 description Egress PSTN to CUCM - LAN Interface
 huntstop
 destination-pattern 719270....
 session protocol sipv2
```

```
 session target ipv4:10.80.10.3:5060
 session transport udp
 voice-class codec 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
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
line con 0
 exec-timeout 0 0
 password ******
 login local
 transport input none
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 exec-timeout 0 0
 password ******
 login local
end
```

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 IntelepeerCUBE2
!
boot-start-marker
boot system flash:isr4300-universalk9.16.09.01.SPA.bin
boot-end-marker
!
vrf definition Mgmt-intf
 !
 address-family ipv4
 exit-address-family
 address-family ipv6
 exit-address-family
!
enable secret 5 $1$u
!
no aaa new-model
ip admission watch-list expiry-time 0
!
subscriber templating
!
multilink bundle-name authenticated
!
```

```
voice service voip
 no ip address trusted authenticate
 address-hiding
 mode border-element license capacity 20
 allow-connections sip to sip
 redundancy-group 2
  sip
  rel1xx supported "rel100"
  session refresh
  asserted-id pai
  privacy pstn
  early-offer forced
  midcall-signaling passthru
  g729 annexb-all
!
voice class uri cucm sip
 host 10.80.10.3
voice class codec 1
 codec preference 1 g729r8
 codec preference 2 g711ulaw
 codec preference 3 g711alaw
!
voice class codec 2
 codec preference 1 g711ulaw
 codec preference 2 g711alaw
 codec preference 3 g729r8
!
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
no license smart enable
diagnostic bootup level minimal
!
spanning-tree extend system-id
!
username **** privilege 15 password 0 ******
!
redundancy
 mode none
 application redundancy
  group 2
   name IntelepeerB2BHA
   priority 100 failover threshold 75
   timers delay 30 reload 60
   control GigabitEthernet0/1/0 protocol 1
   data GigabitEthernet0/1/0
   track 1 shutdown
   track 2 shutdown
!
track 1 interface GigabitEthernet0/0/0 line-protocol
!
track 2 interface GigabitEthernet0/0/1 line-protocol
!
interface GigabitEthernet0/0/0
 description Intelepeer CUBE LAN
```

```
 ip address 10.64.5.9 255.255.0.0
 negotiation auto
 redundancy rii 4
 redundancy group 2 ip 10.64.5.28 exclusive
!
interface GigabitEthernet0/0/1
 description Intelepeer CUBE WAN
 ip address 192.65.xx.xx 255.255.255.224
 negotiation auto
 redundancy rii 3
 redundancy group 2 ip 192.65.xx.xx exclusive
!
interface GigabitEthernet0/1/0
 description Intelepeer CUBE HA
 ip address 10.80.10.49 255.255.255.0
 negotiation auto
!
interface GigabitEthernet0
 vrf forwarding Mgmt-intf
 no ip address
 shutdown
 negotiation auto
!
ip forward-protocol nd
ip http server
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 10.80.10.0 255.255.255.0 10.64.1.1
```

```
ip route 172.16.24.0 255.255.248.0 10.64.1.1
!
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
!
dial-peer voice 1 voip
 description Ingress CUCM to PSTN - LAN Interface
 huntstop
 session protocol sipv2
 session transport udp
 incoming called-number .T
 incoming uri via cucm
 voice-class codec 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
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 2 voip
 description Egress CUCM to PSTN - WAN Interface
 huntstop
```

```
 destination-pattern .T
 session protocol sipv2
 session target ipv4:68.68.xx.xx:5060
 session transport udp
 voice-class codec 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
 fax rate 14400
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 3 voip
 description Ingress PSTN to CUCM - WAN Interface
 huntstop
 session protocol sipv2
 session transport udp
 incoming called-number 719270....
 voice-class codec 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
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
dial-peer voice 4 voip
 description Egress PSTN to CUCM - LAN Interface
 huntstop
 destination-pattern 719270....
```

```
 session protocol sipv2
 session target ipv4:10.80.10.3:5060
 session transport udp
 voice-class codec 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
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
!
gateway
 timer receive-rtp 1200
!
line con 0
 exec-timeout 0 0
 transport input none
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 login local
 transport input telnet
end
```

Configuring Cisco UCM 12.0.1 Cluster

Cisco UCM Version

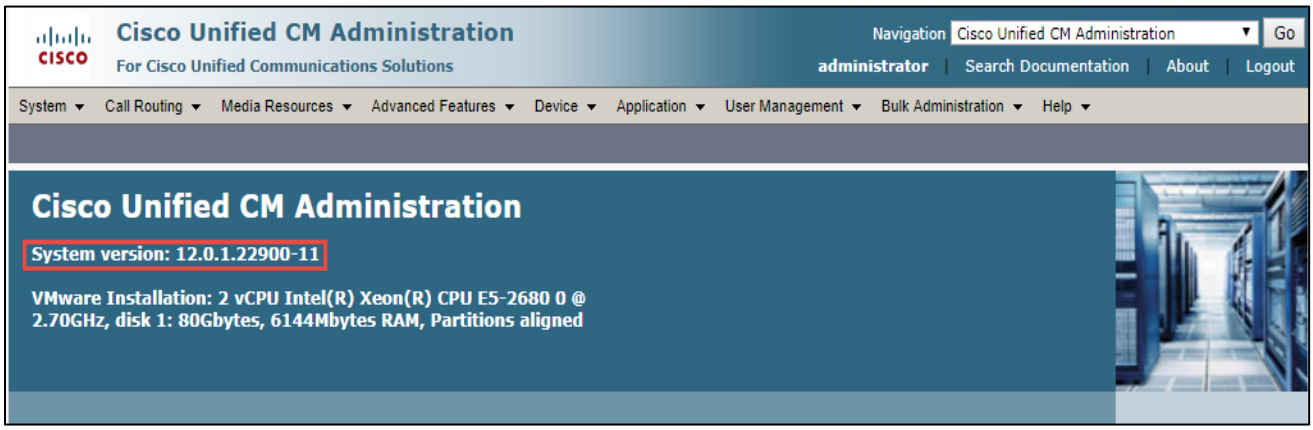

Figure 3: Cisco UCM Version

Cisco Call Manager Service Parameters

Navigation: System → Service Parameters

- Select Server* = Clus20pub--CUCM Voice/Video (Active)
- Select Service*= Cisco CallManager (Active)
- All other fields are set to default values

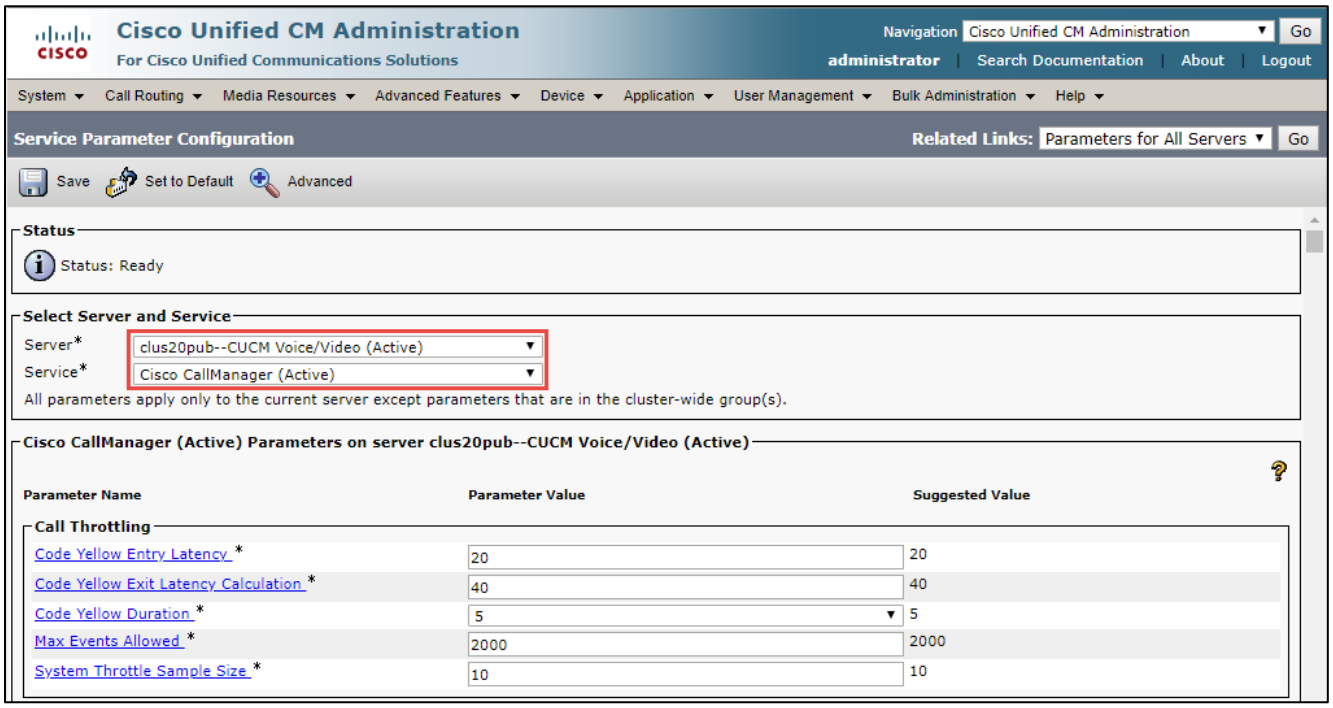

Figure 4: Service Parameters

SIP Trunk Security Profile

Navigation: System → Security → SIP Trunk Security Profile

- Name*= **Non Secure SIP Trunk Profile for Intelepeer** is used as an example
- Description = **Non Secure SIP Trunk Profile Intelepeer** is used as an example
- Device Security Mode = **Non Secure**
- Incoming Transport Type* = **TCP + UDP**
- Outgoing Transport Type = **UDP**

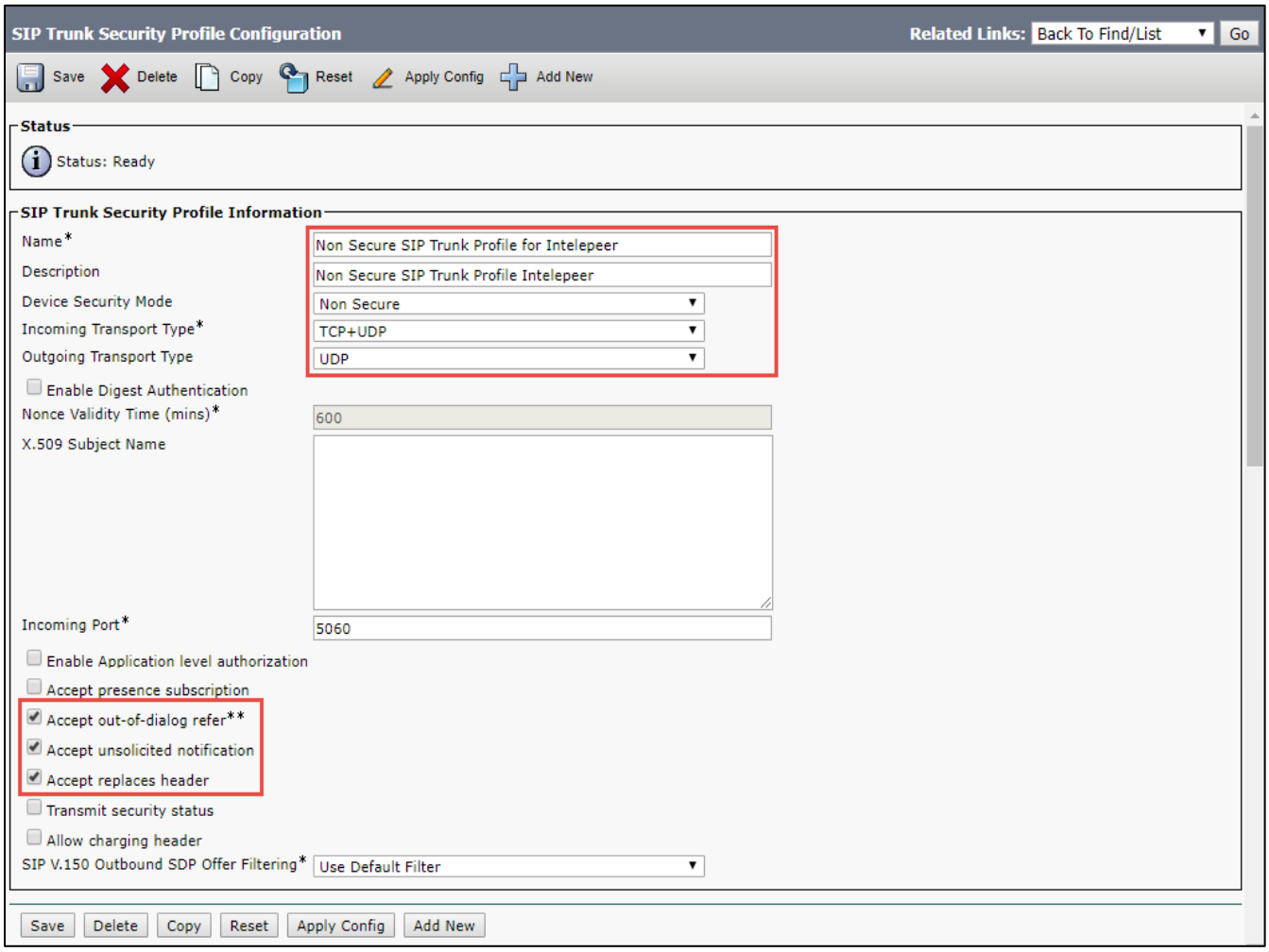

Figure 5: SIP Trunk Security Profile

SIP Profile

Navigation: Device → Device Settings → SIP Profile

- Name*= **Standard SIP Profile for Intelepeer** is used as an example
- **SIP Rel1XX Options**: Send PRACK if 1XX contains SDP is selected for this example

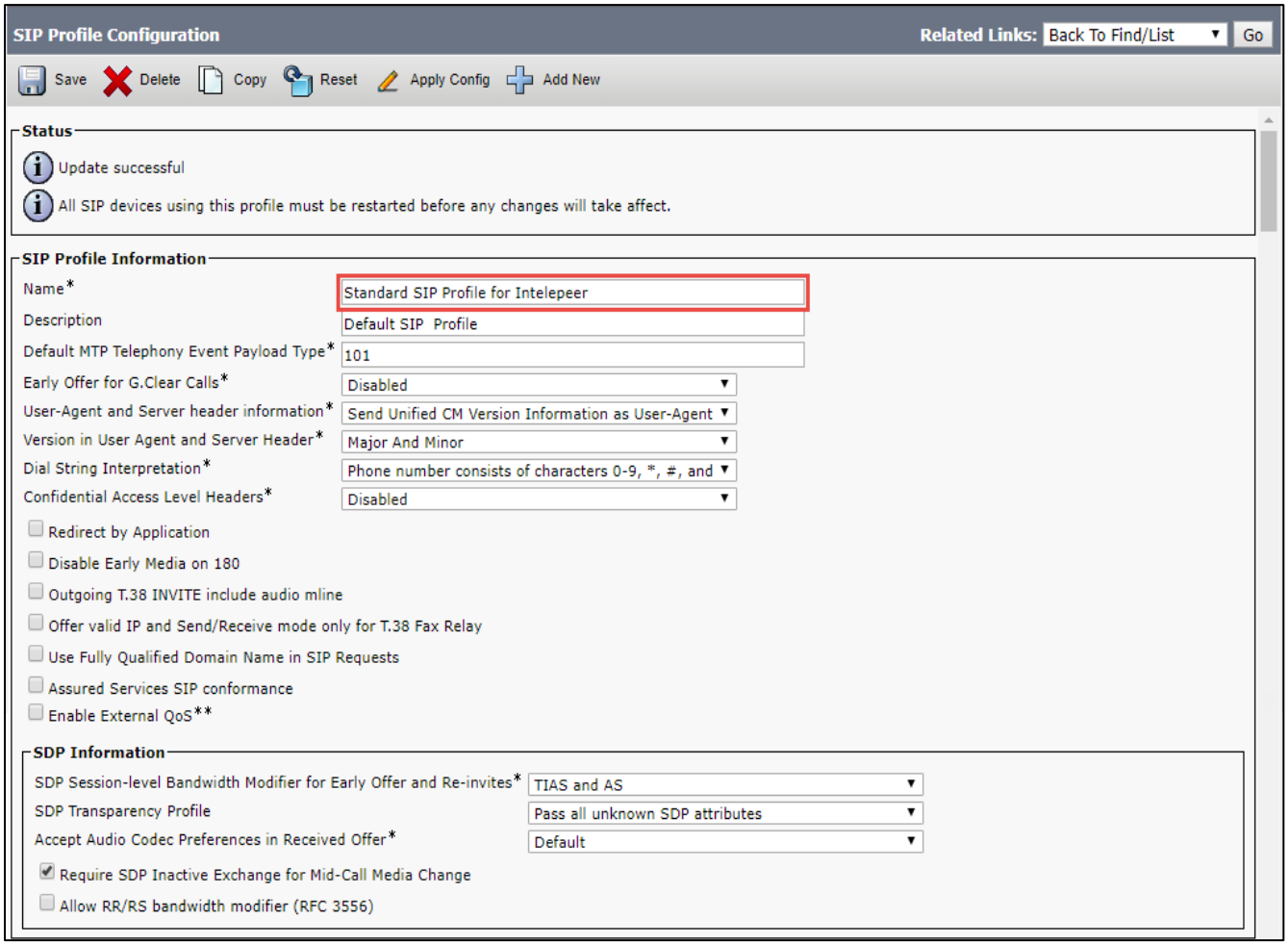

Figure 6: SIP Profile

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	(●) Common Port Range for Audio and Video ( ) Separate Port Ranges for Audio and Video
Start Media Port*	16384
Stop Media Port*	32766
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

Figure 7: SIP Profile (Cont.)

Call Forward URI* x-cisco-serviceuri-cfwdall

Speed Dial (Abbreviated Dial) URI* x-cisco-serviceuri-abbrdial

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

Normalization Script

Normalization Script < None >

- [ ] Enable Trace

	Parameter Name	Parameter Value
1		

Incoming Requests FROM URI Settings

Caller ID DN

Caller Name

Trunk Specific Configuration

Reroute Incoming Request to new Trunk based on*	Never
Resource Priority Namespace List	< None >
SIP Rel1XX Options*	Send PRACK if 1xx Contains SDP
Video Call Traffic Class*	Mixed
Calling Line Identification Presentation*	Default
Session Refresh Method*	Invite
Early Offer support for voice and video calls*	Disabled (Default value)

- [ ] 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
- [ ] Connect Inbound Call before Playing Queuing Announcement

Figure 8: SIP Profile (Cont.)

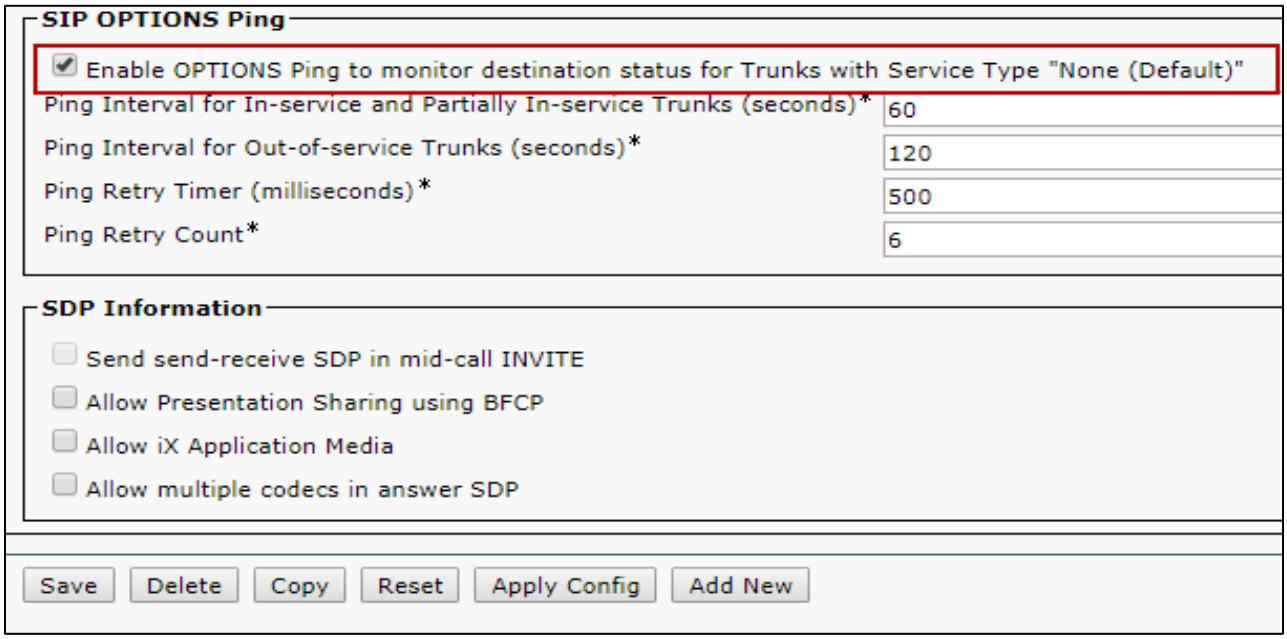

Figure 9: SIP Profile (Cont.)

Trunk configuration

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

Navigation: Device → Trunk → Add New

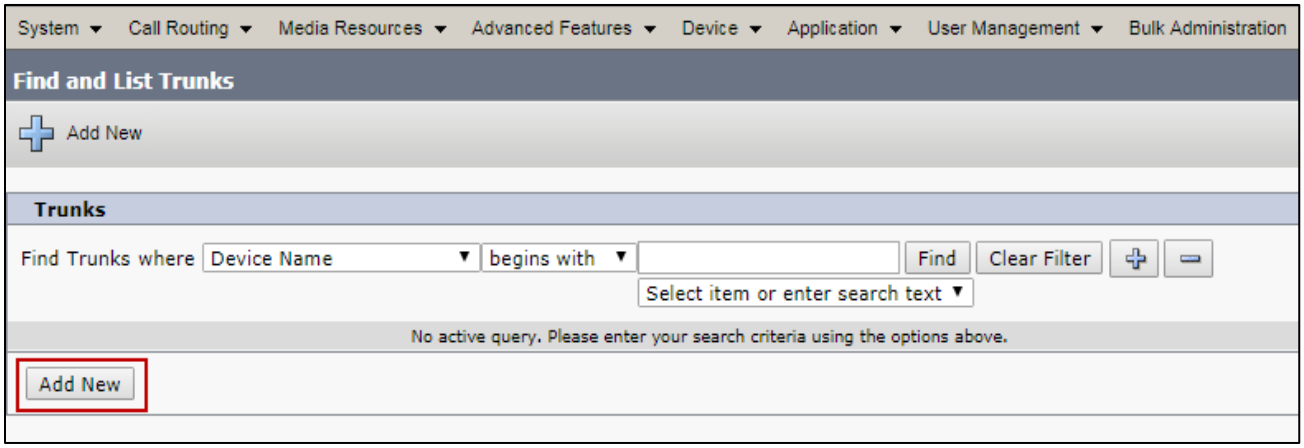

Figure 10: Add New Trunk to Cisco UBE

- Select 'Trunk Type' as SIP Trunk and 'Device Protocol' as SIP and select 'Next' as shown below.
- Set **Device Name**: Intelepeer_SIP_trunk_to_CUBE is given for this example
- Set **Description**: Intelepeer SIP trunk to CUBE is given for this example
- Select **Device Pool**: "Intelepeer G711Ulaw" is selected for this example.
- Set Significant Digits: 4
- Under Destination:
  Set **Destination Address**: 10.64.5.28 is given for this example. This is the CUBE LAN side VIP IP address.
- Set **Destination Port**: 5060
- Set **BLF Presence Group**: Standard presence group is selected from dropdown menu
- Set **SIP Trunk security profile**: Non Secured SIP Trunk Profile for Intelepeer is selected from drop down menu
- Set **SIP Profile**: Standard SIP Profile for Intelepeer is selected from drop down menu

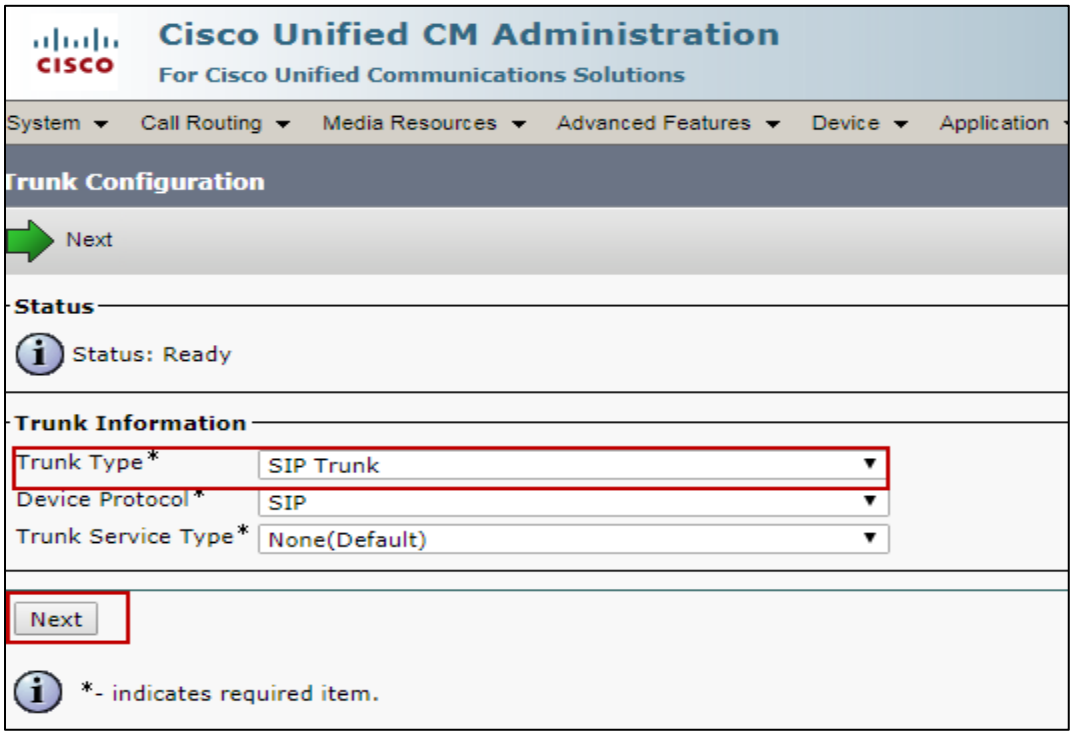

Figure 11: Add SIP Trunk Type

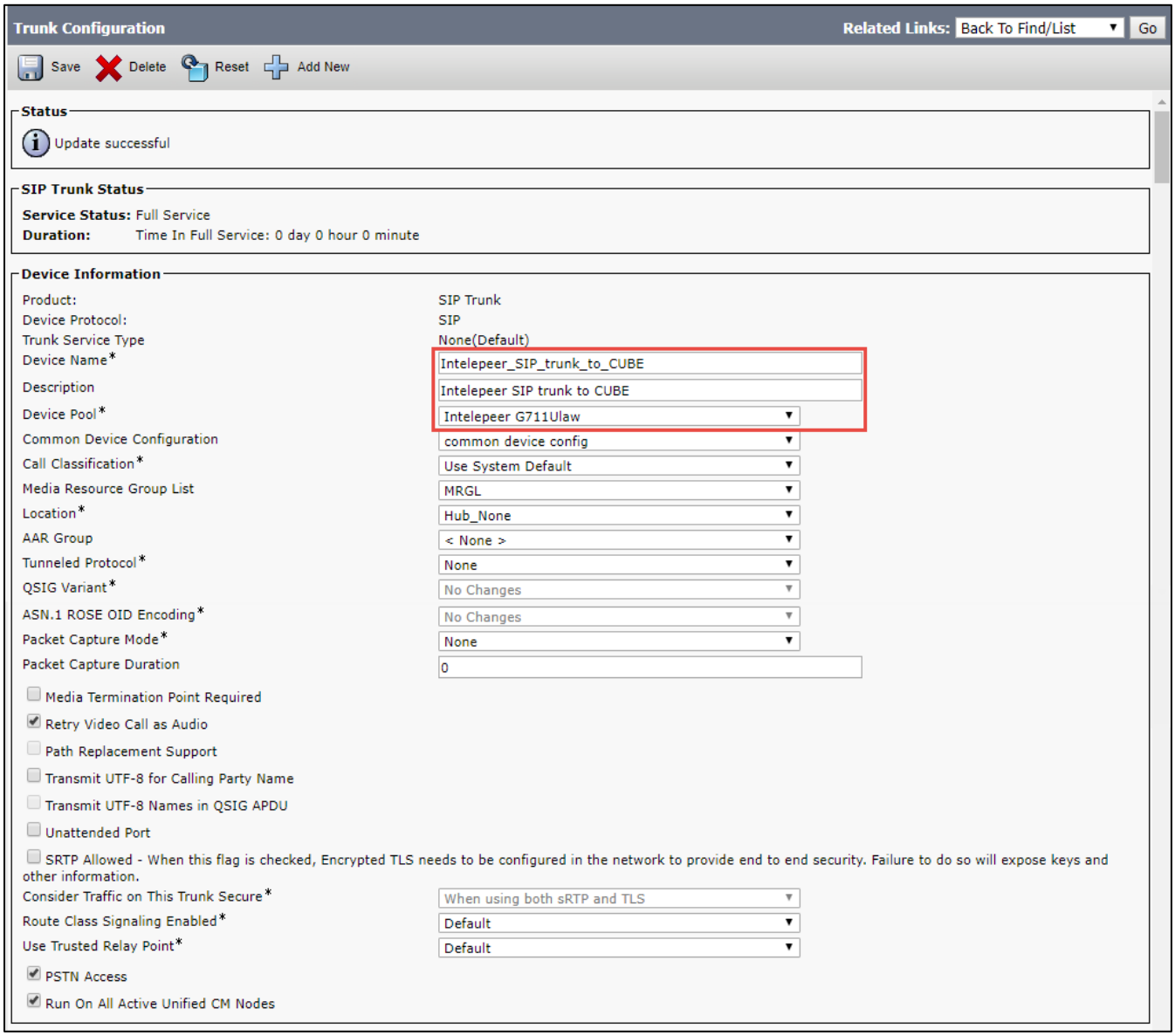

Figure 12: SIP Trunk to Cisco UBE

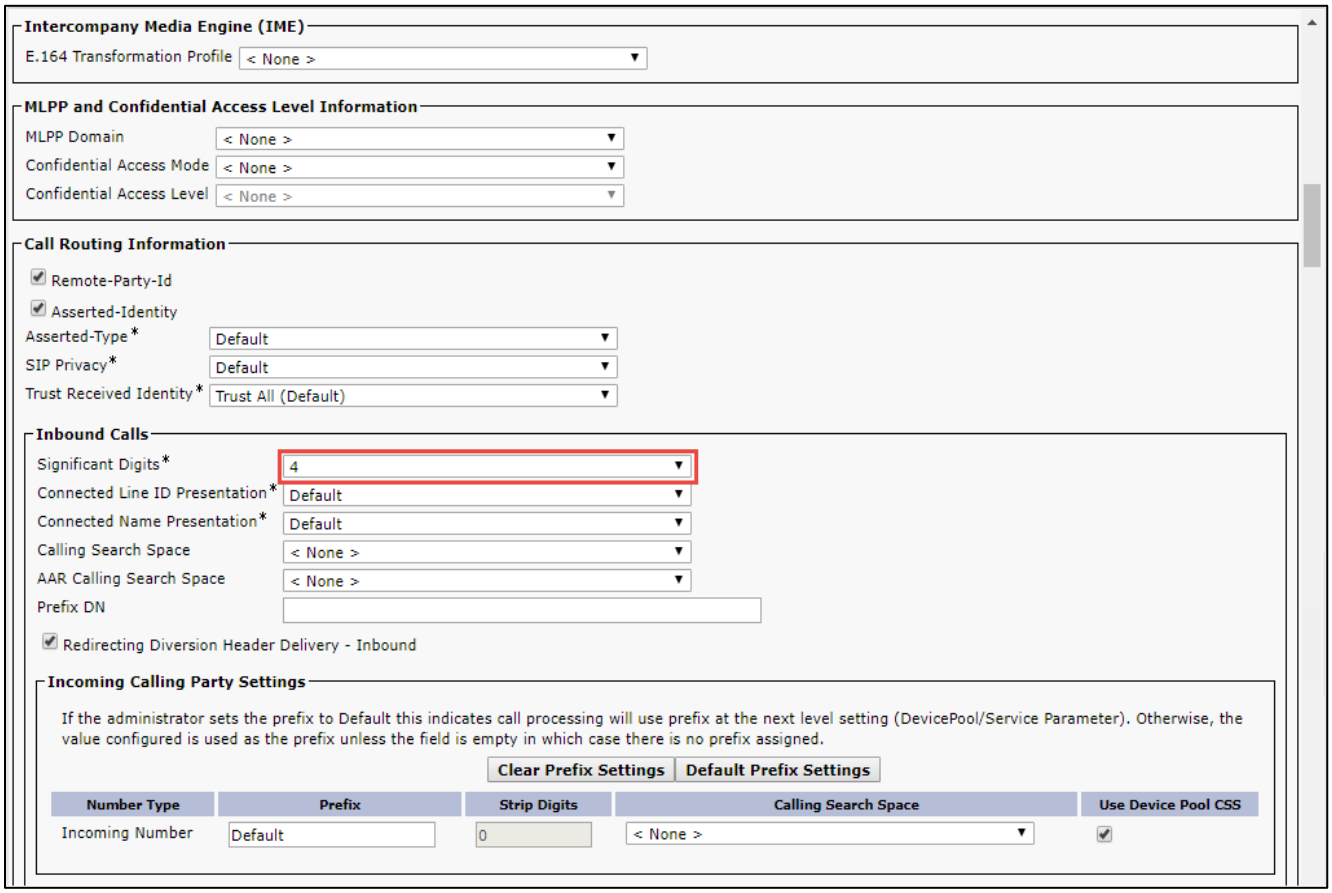

Figure 13: SIP Trunk to Cisco UBE (Cont.)

- Configure the Virtual LAN IP address of the Cisco UBE and the Destination Port
- Configure the SIP Trunk Security Profile and SIP Profile as shown below
- The rest of the configuration is all default
- Click Save and Reset after completion

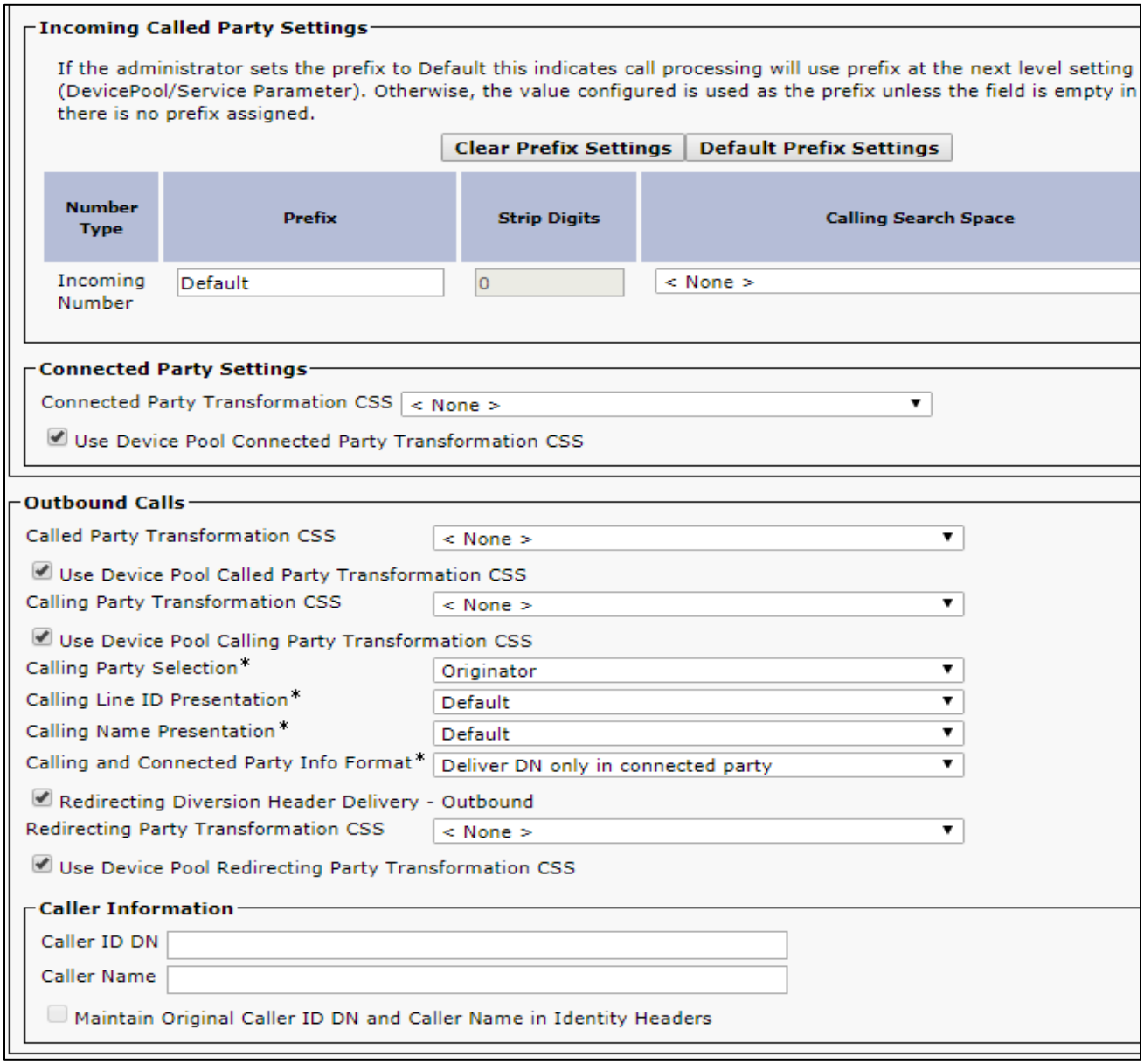

Figure 14: SIP Trunk to Cisco UBE (Cont.)

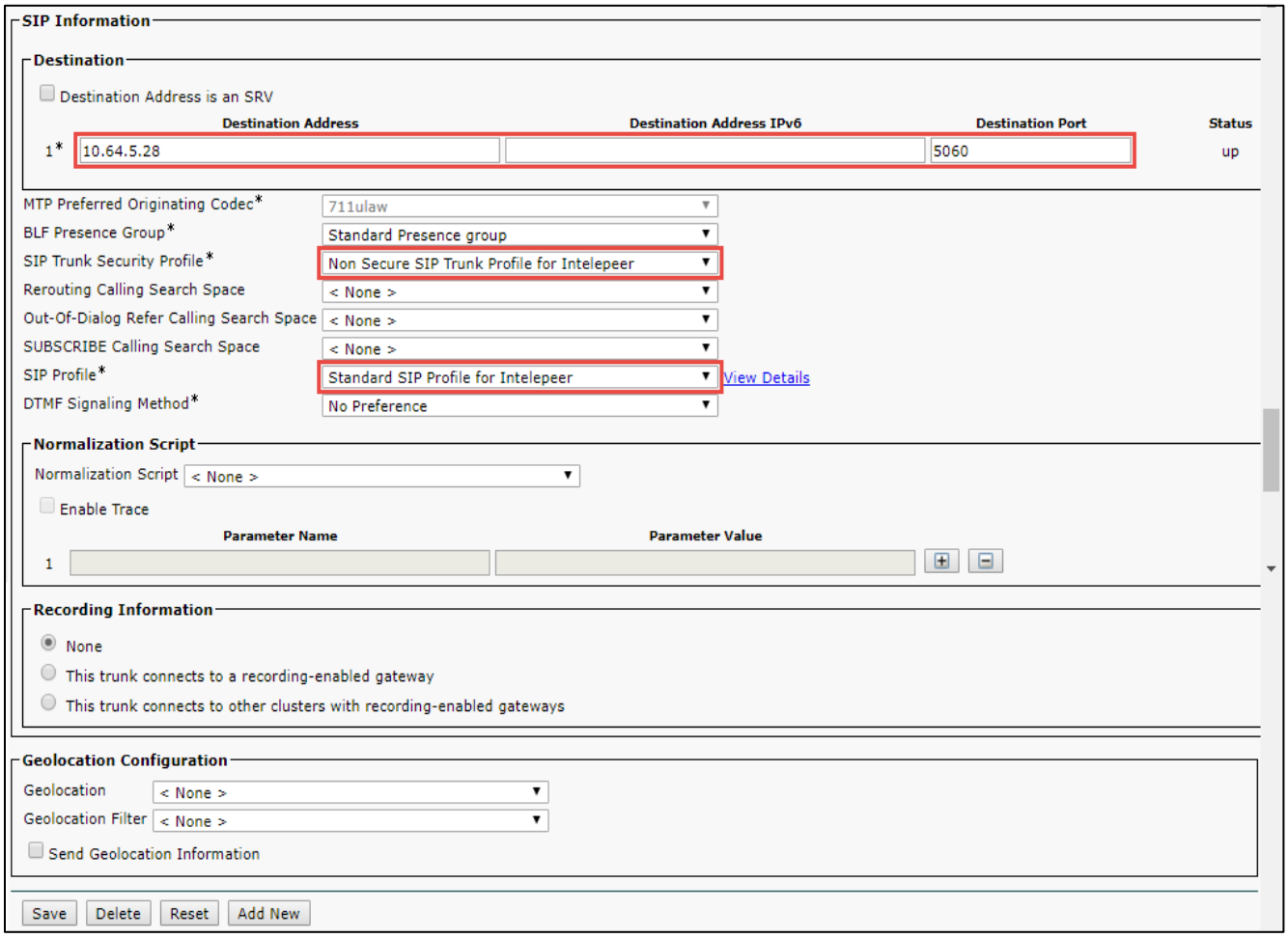

Figure 15: SIP Trunk to Cisco UBE (Cont.)

Trunk configuration from Cisco UCM to Fax Gateway:

Navigation: Device → Trunk → Add New

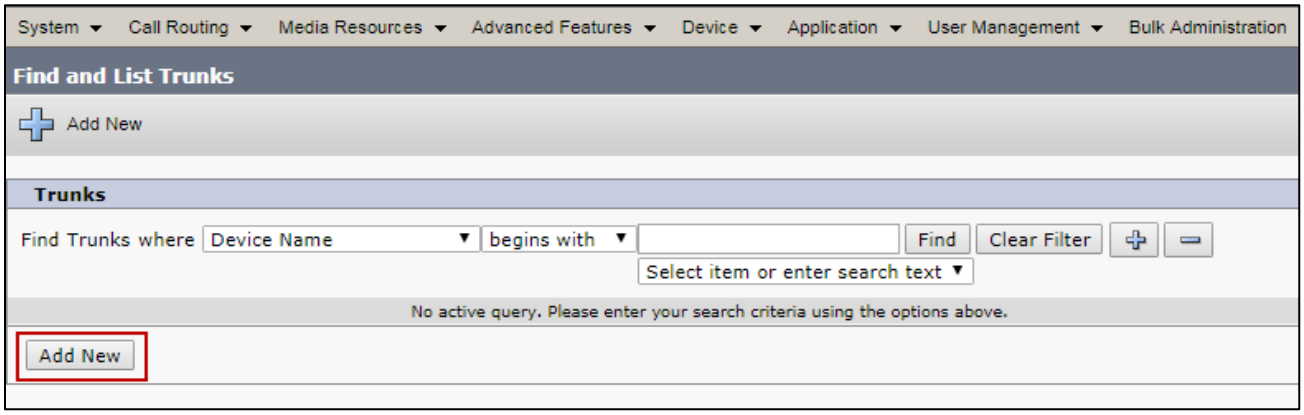

Figure 16: Add New Trunk to Fax Gateway

- Select 'Trunk Type' as SIP Trunk and 'Device Protocol' as SIP and select 'Next' as shown below.
- Set **Device Name**: FaxGatewayIntelepeer is given for this example
- Set **Description**: faxGateway is given for this example
- Select **Device Pool**: "Intelepeer G711Ulaw" is selected for this example.
- Set Significant Digits: All
- Under Destination:
  Set **Destination Address**: 172.16.31.50 is given for this example. This is the Fax gateway IP address.
- Set **Destination Port**: 5060
- Set **BLF Presence Group**: Standard presence group is selected from dropdown menu
- Set **SIP Trunk security profile**: Non Secured SIP Trunk Profile for Intelepeer is selected from drop down menu
- Set **SIP Profile**: Standard SIP Profile for Intelepeer is selected from drop down menu

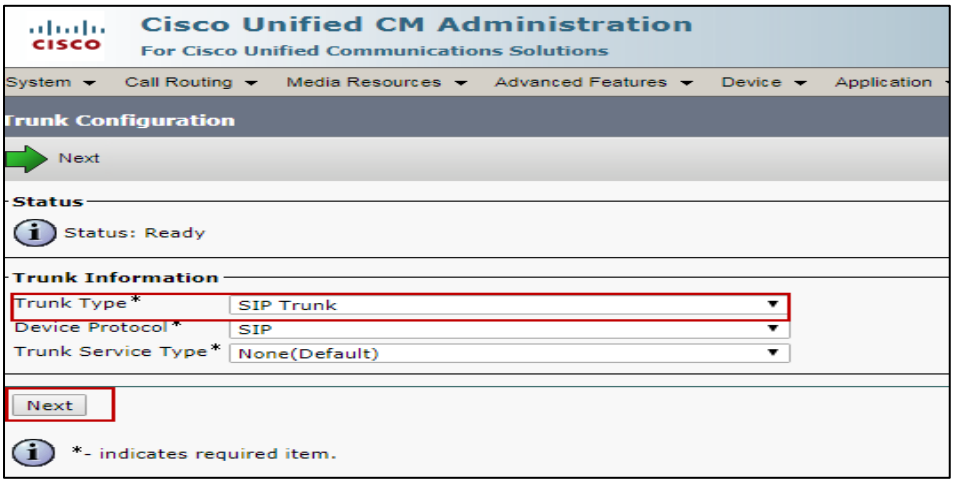

Figure 17: Add SIP Trunk Type

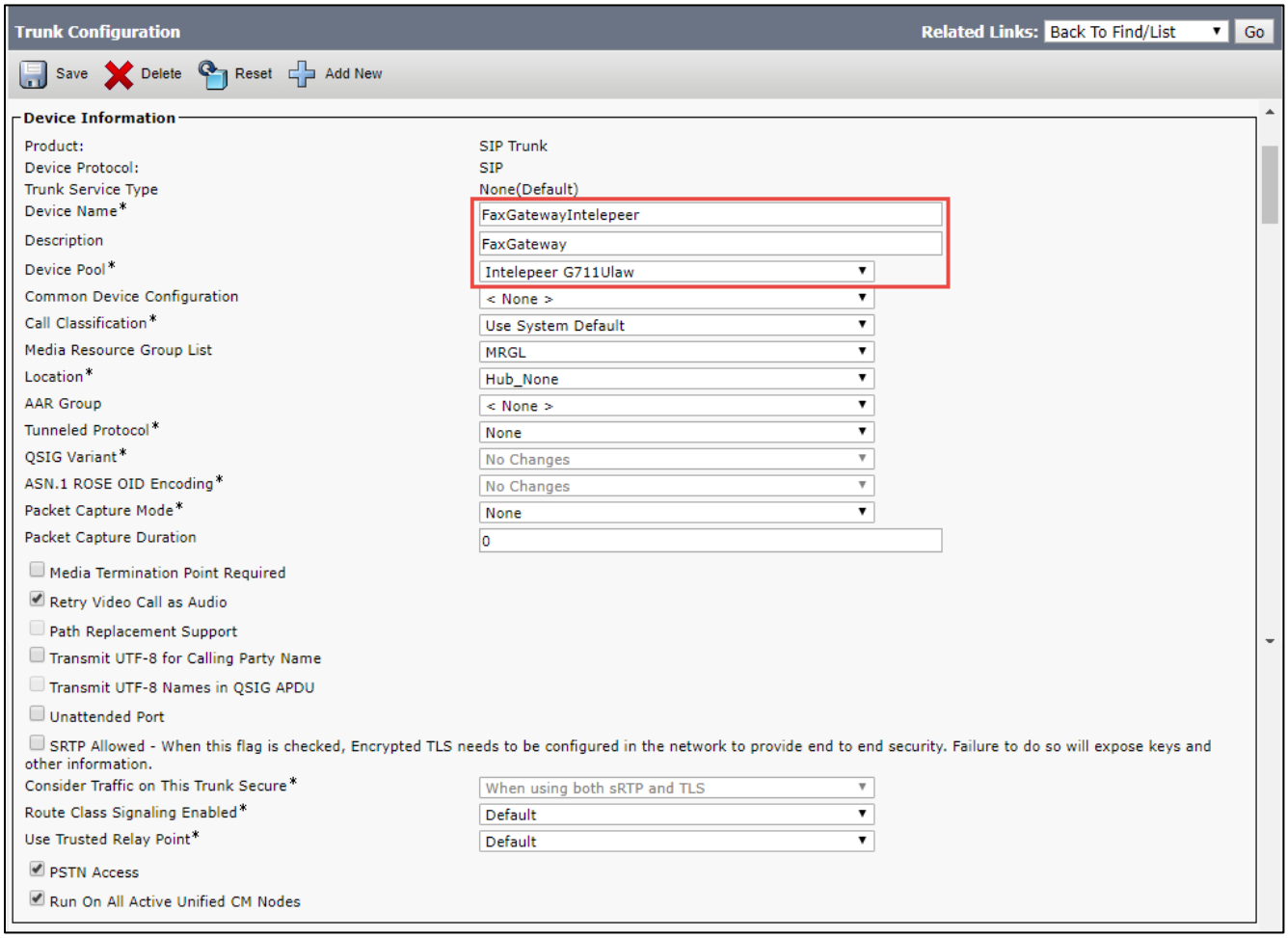

Figure 18: SIP Trunk to Fax Gateway

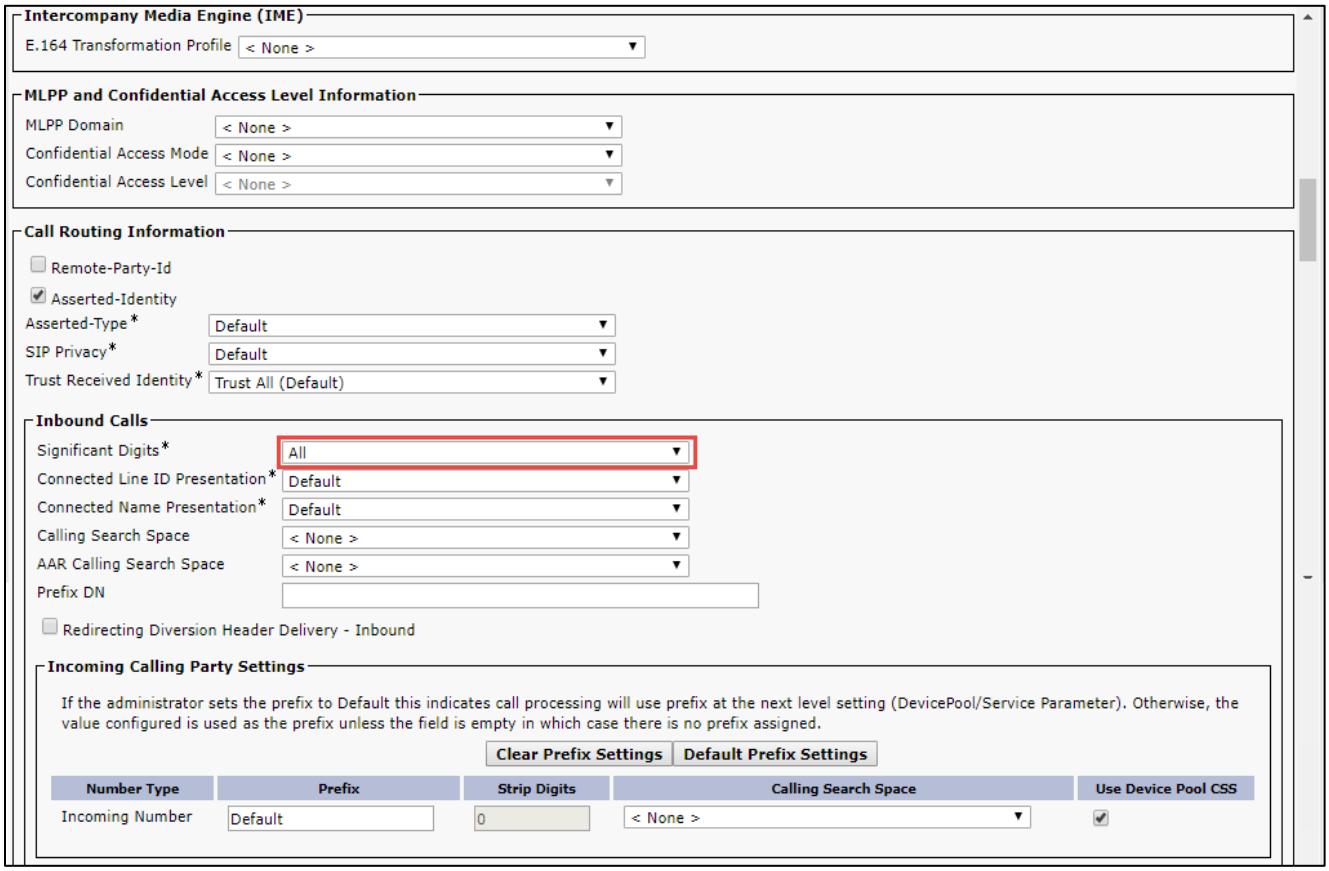

Figure 19: SIP Trunk to Fax Gateway (Cont.)

- Configure the IP address of the Fax gateway and the Destination Port
- Configure the SIP Trunk Security Profile and SIP Profile as shown below
- The rest of the configuration is all default
- Click Save and Reset after completion

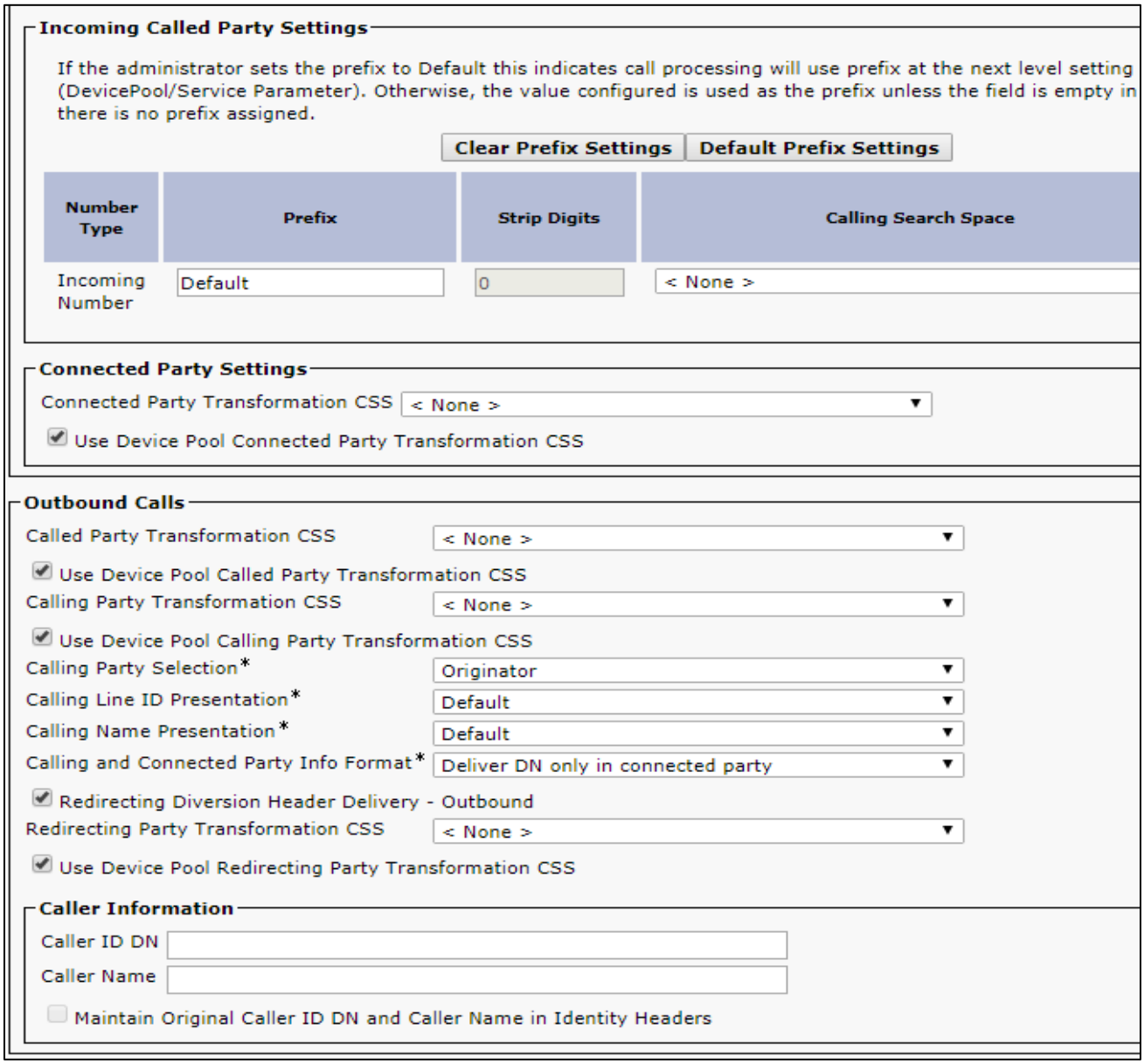

Figure 20: SIP Trunk to Fax Gateway (Cont.)

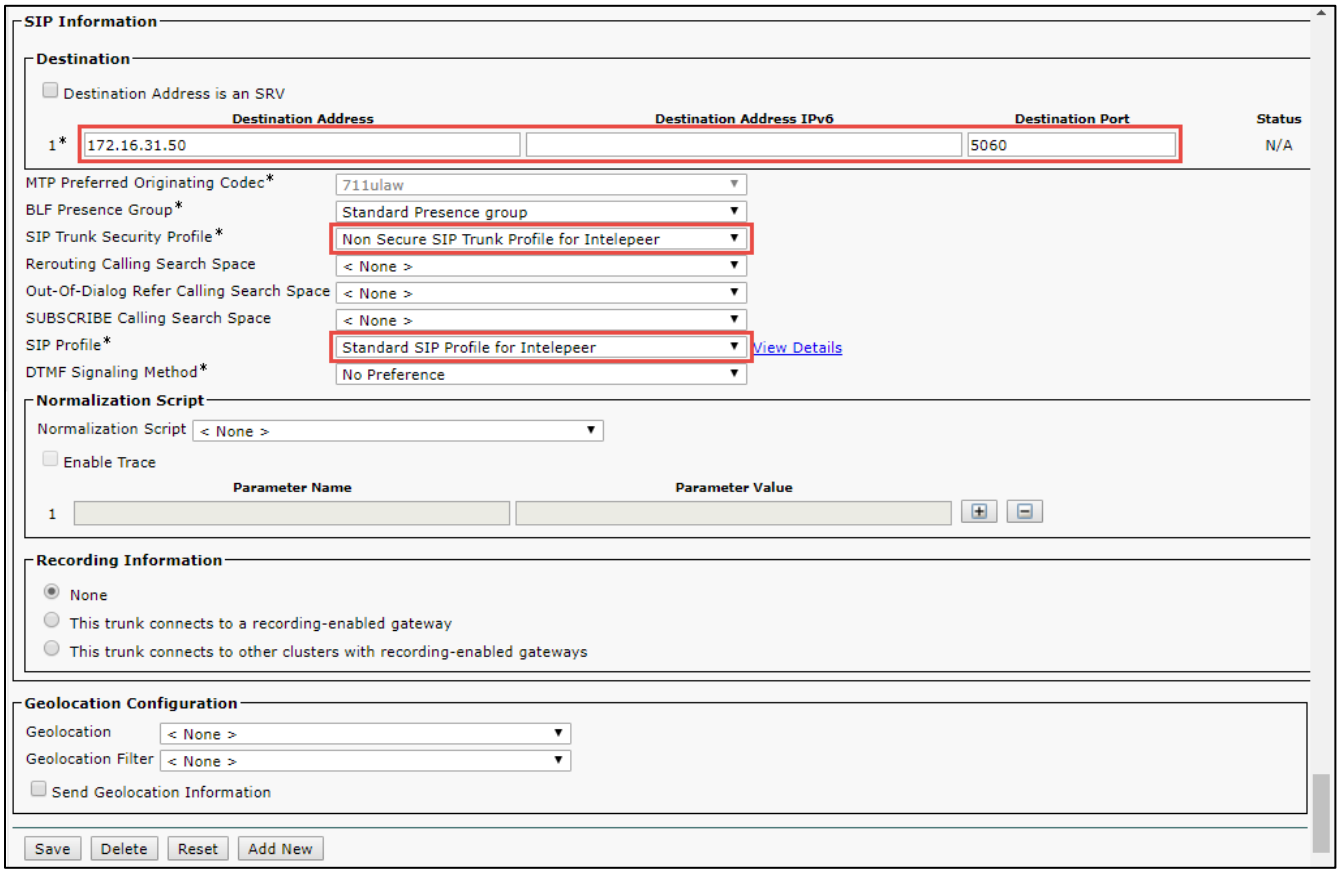

Figure 21: SIP Trunk to Fax Gateway (Cont.)

Routing configuration

Route Pattern for Cisco UBE:

Navigation: Call Routing → Route/Hunt → Route Pattern → Add New

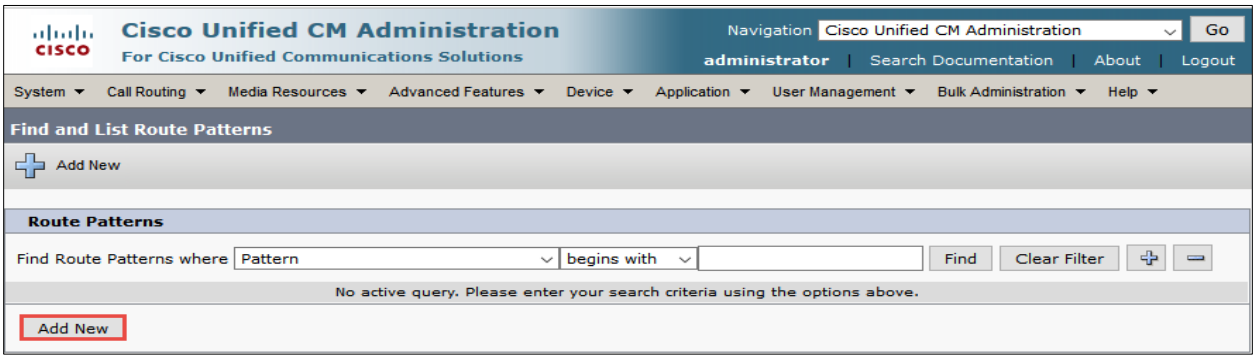

Figure 22: Add New Route Pattern for Cisco UBE

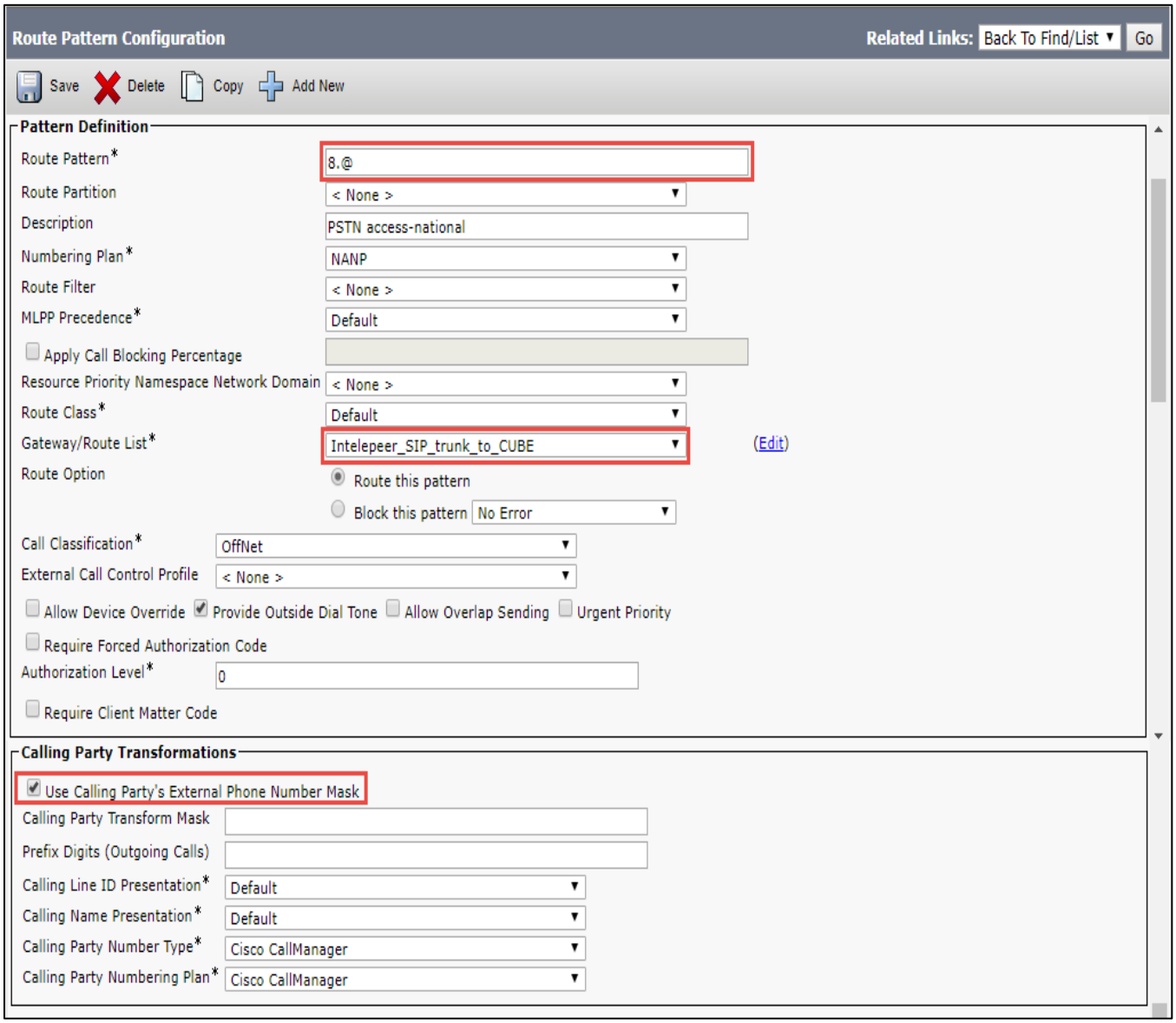

Figure 23: Route Pattern Configuration for Cisco UBE-PSTN Access

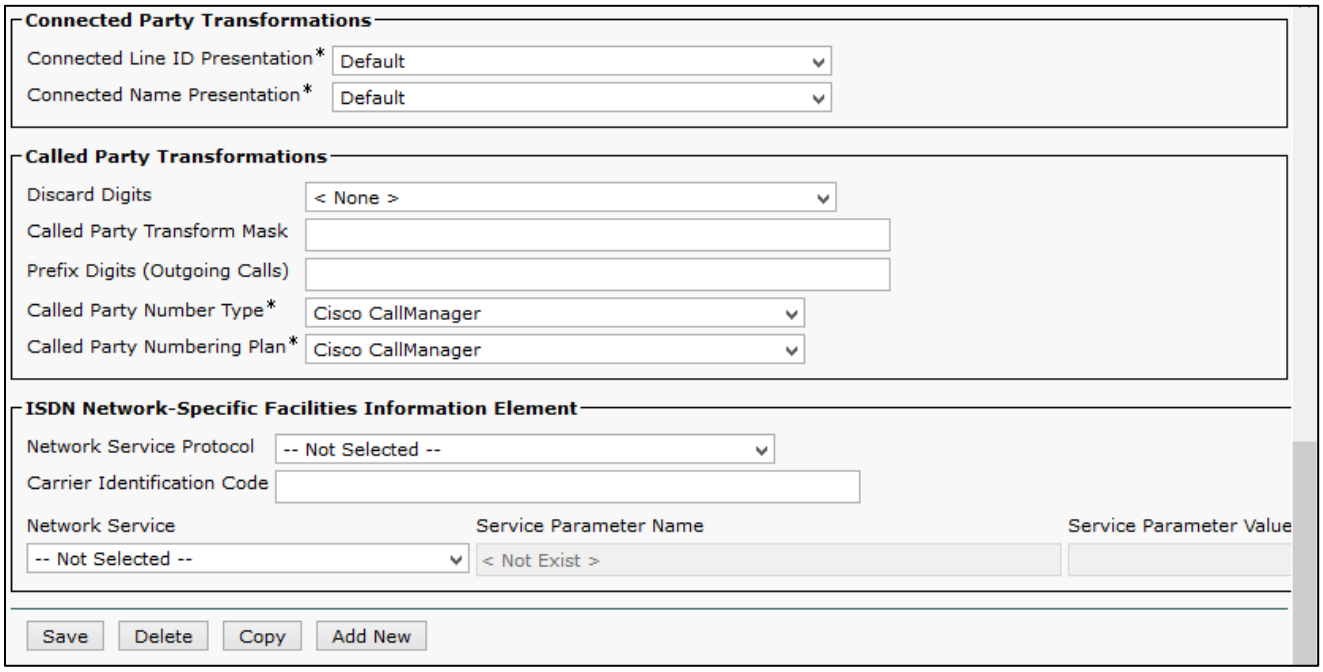

Figure 24: Route Pattern Configuration for Cisco UBE-PSTN Access (Cont.)

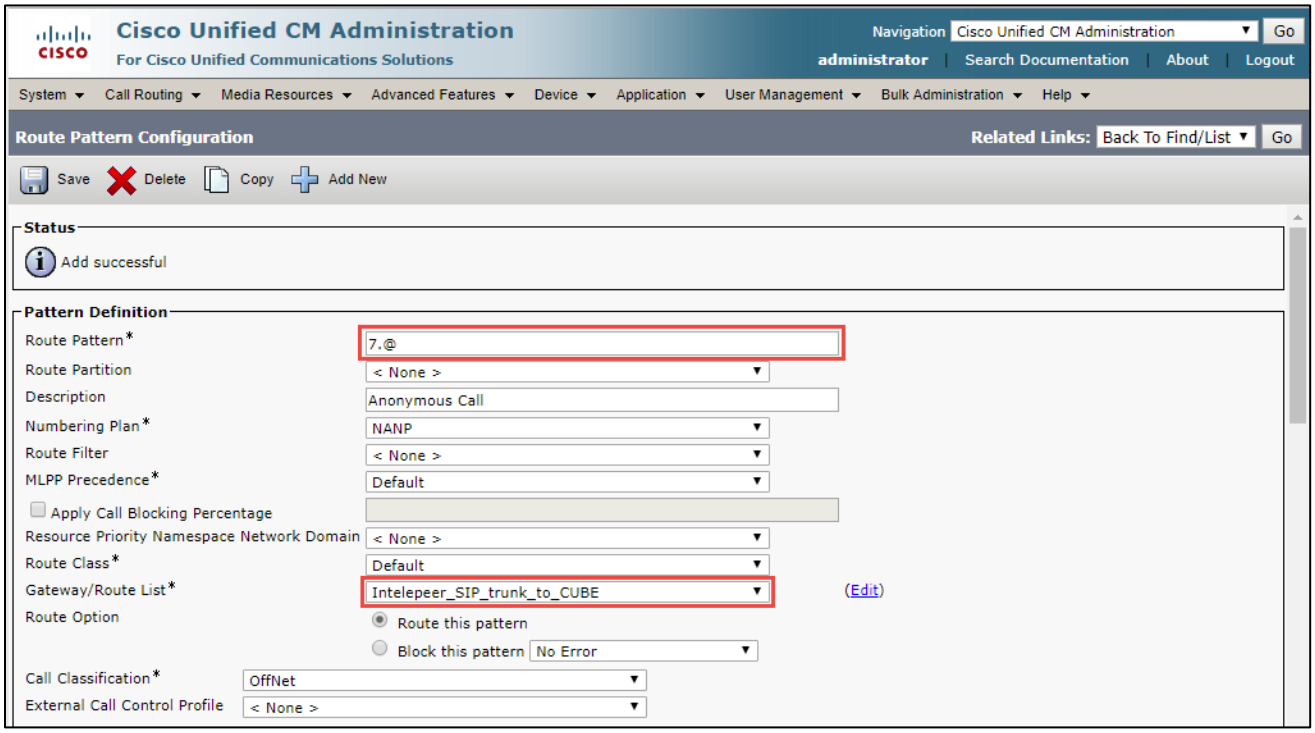

Figure 25 Route Pattern Configuration for Cisco UBE-PSTN Access National- Anonymous Call

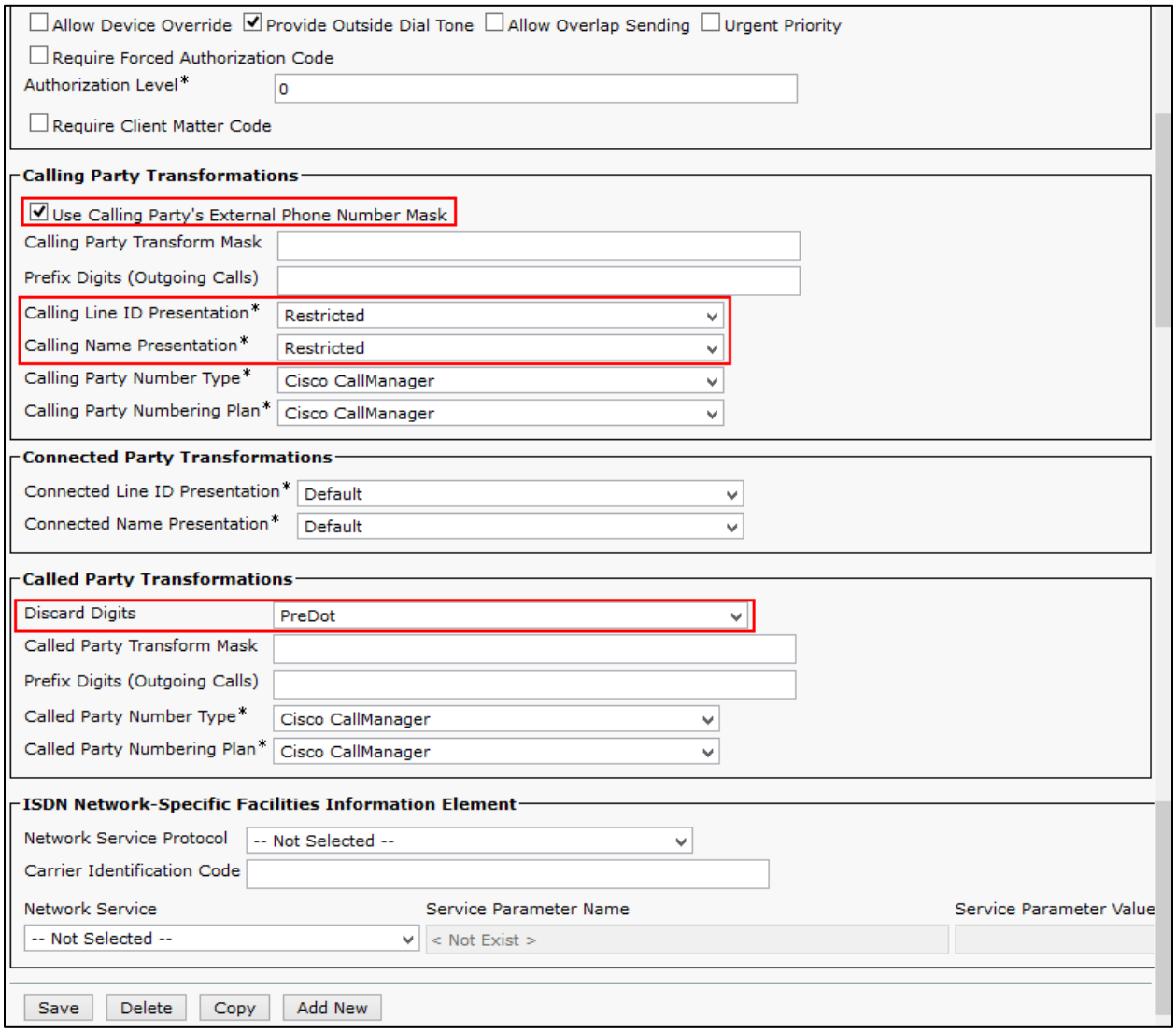

Figure 26: Route Pattern Configuration for Cisco UBE-PSTN Access National- Anonymous Call (Cont.)

Route Pattern for Fax Gateway:

- **Navigation**: Call Routing → Route/Hunt → Route Pattern → Add New

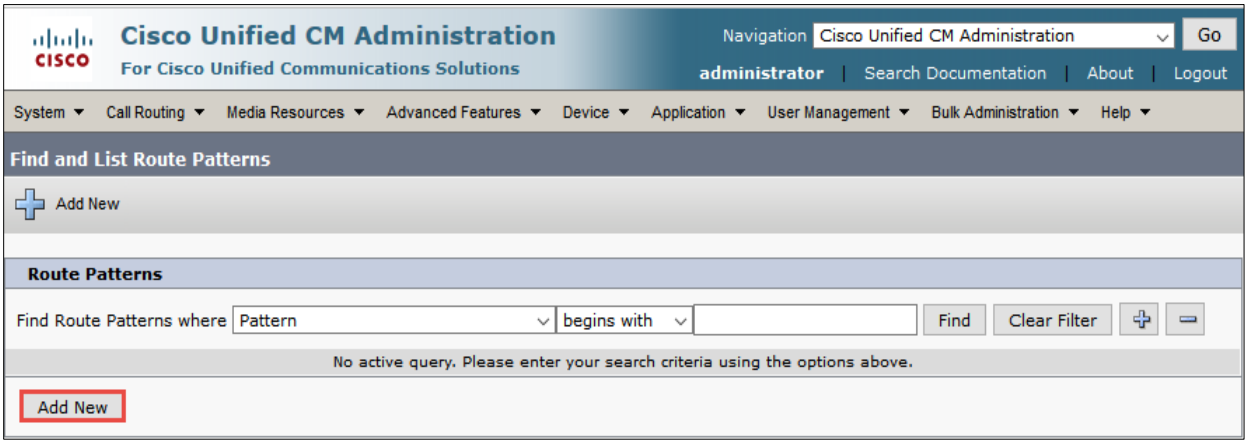

Figure 27: Add New Route patter to Fax Gateway

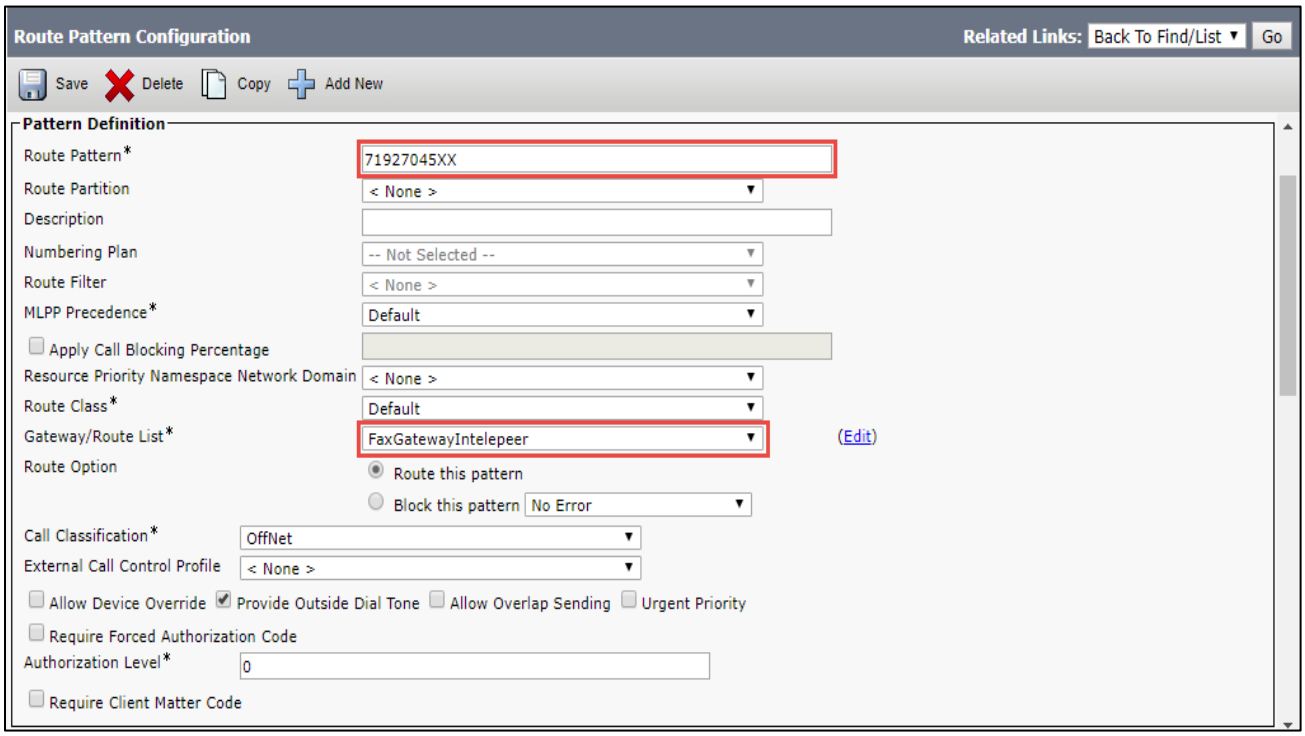

Figure 28: Route Pattern Configuration for Fax Gateway

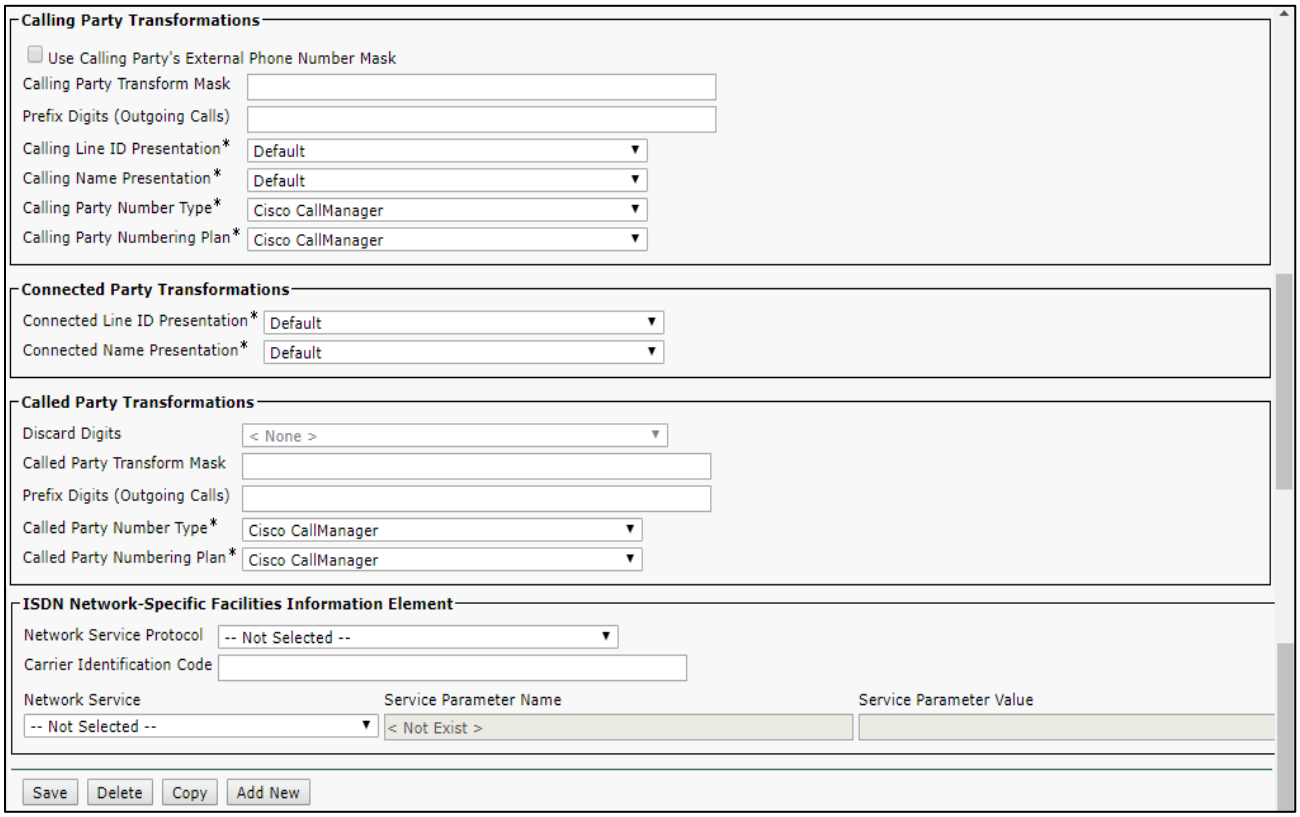

Figure 29: Route Pattern Configuration for Fax Gateway (Cont.)

Configuring Cisco Voice Gateway for Fax

Global Settings

```
voice service voip
 allow-connections sip to sip
 no supplementary-service sip handle-replaces
 redirect ip2ip
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no fax-relay sg3-to-g3
 sip
  midcall-signaling passthru
  g729 annexb-all
```

Codecs

G711ulaw and G729 voice codecs are used 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
 codec preference 3 g711alaw
!
voice class codec 2
 codec preference 1 g711ulaw
 codec preference 2 g711alaw
 codec preference 3 g729r8
!
```

Dial Peer

Inbound Dial-peer from Cisco UCM:

```
dial-peer voice 4500 voip
 description Inbound DP for CUCM-FAX
 session protocol sipv2
 session target sip-server
 session transport udp
 incoming called-number 71927045x.
 voice-class codec 1
 dtmf-relay rtp-nte
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
```

Outbound Dial-peer to Cisco UCM:

```
dial-peer voice 4501 voip
 description Outbound DP for CUCM-FAX
 destination-pattern 8.
 session protocol sipv2
 session target ipv4:10.80.10.3:5060
 session transport udp
 voice-class codec 1
 dtmf-relay rtp-nte
 fax protocol t38 version 0 ls-redundancy 0 hs-redundancy 0 fallback none
 no vad
```

POTS and Port Configuration

Based on configured POTS destination pattern, gateway forwards the call to designated voice port.

```
dial-peer voice 4502 pots
 service session
 destination-pattern 71927045xx
 no digit-strip
 port 0/0/0
 forward-digits all
```

```
!

voice-port 0/0/0
 no echo-cancel enable
 no vad
 cptone IN
 description Fax Test-Intelepeer
 station-id number 71927045xx
 caller-id enable
!
```

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

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