Application Note

# AT&T IP Toll-Free: Connecting Cisco Unified Communications Manager 6.1(1a) via the Cisco Unified Border Element using SIP

**July 18, 2008**

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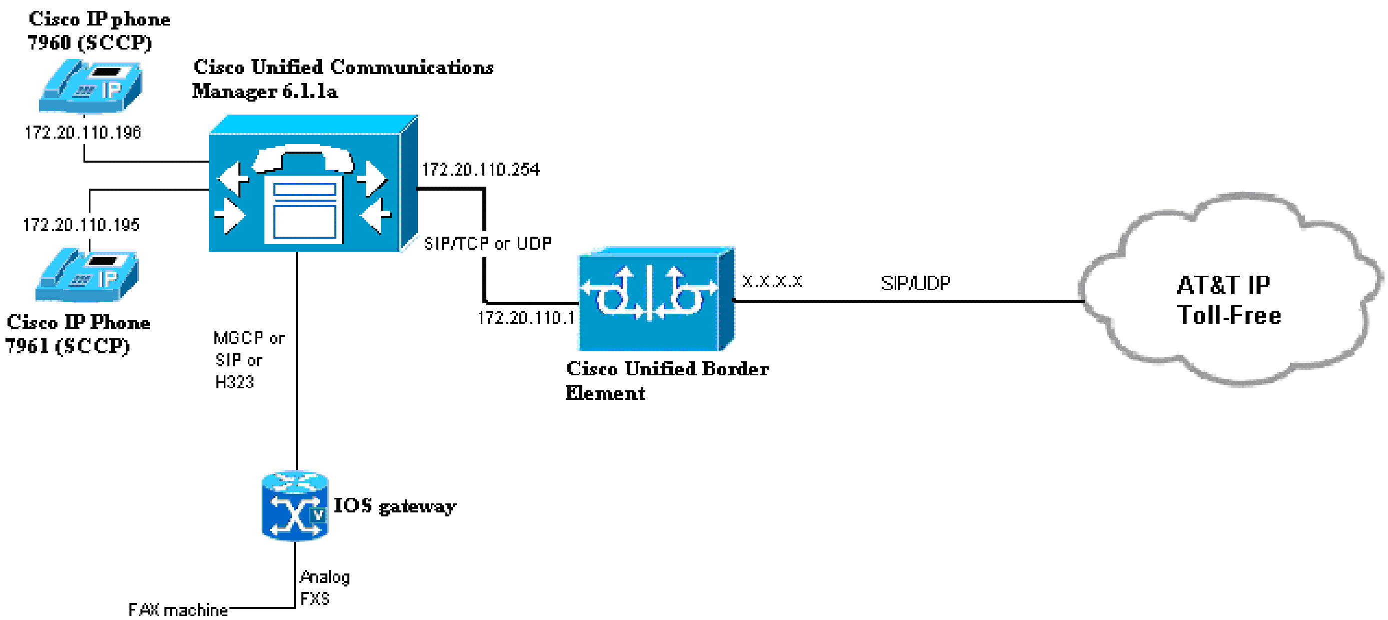
## Introduction

Service Providers today, such as AT&T, 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 a centralized IP to TDM gateway to provide on-net and off-net services. AT&T IP TollFree is a SP offering that allows connection to the PSTN and may offer the end customer a viable alternative to traditional PSTN connectivity via either Analog or T1 lines. A demarcation device between these services and customer owned services is recommended. The Cisco Unified Border Element providers demarcation, security, interworking and session management services.

- This application note describes how to configure a Cisco Unified Communications Manager (CUCM) 6.1.1a with a Cisco Unified Border Element (CUBE) for connectivity to AT&T's IP Toll-Free SIP trunk service. The deployment model covered in this application note is CPE (CUCM6.1.1a/CUBE) to PSTN (AT&T IP toll-free SIP). AT&T's IP Toll-Free provides inbound call service only (PSTN to CPE). Outbound calls (CPE to PSTN), including emergency 911 calls, are not supported.
- Testing was performed in accordance to AT&T's IP Toll-Free test plan and all features were verified. Key features verified are: Basic Call, DNIS translations, Codec Negotiation, Transfer Connect (8YY xfer), Intra-site Transfers, Intra-site Conferencing, Fax using G711ulaw (pass-through) and Fax using T.38 (G3 and SG3 speeds)
- The Cisco Unified Border Element configuration detailed in this document is based on a lab environment with a simple dial-plan used to ensure proper interoperability between AT&T SIP network and Cisco Unified Communications. The configuration described in this document details the important commands to have enabled for interoperability to be successful and care must be taken, by the network administrator deploying CUBE in a production environment, to ensure these commands are set per each dial-peer requiring to interoperate to AT&T SIP network.

## Network Topology

**Figure 1.** Basic Call Setup




## System Components

### Hardware Components

- Cisco IOS gateway running CUBE 1.2 (IOS image version 12.4(15)XZ or later)
  - Cisco Unified Border Element is an integrated Cisco IOS Software application that runs on various IOS platforms, follow the link for more details: http://www.cisco.com/go/cube
- Cisco MCS 7800 Series server (Cisco Unified Communications Manager)
- Cisco IP Phones ( The topology diagram shows 7960 and 7961, but any Cisco IP phone model can be used)
- Cisco IOS Gateway (only needed if Fax, analog phones or TDM systems are to interconnect). This component may be a H323, SIP or MGCP gateway, the protocol is optional and the choice is left up to the customers network design.

### Software Requirements

- Cisco Unified CM 6.1.1.2000-3 (6.1(1a))
- CUBE version 1.2 (IOS version 12.4(15)XZ or later, IOS version 12.4(20)T or later)
- Cisco GW IOS Release: 12.4 or later

## Features

### Features Supported

- Basic Call using G.729 or G.711ulaw
- Calling Party Number Presentation and Restriction
- AT&T Transfer Connect (8YY)
- Intra-site Call Transfer
- Intra-site Conference, see caveat section for details.
- Fax using G711ulaw and/or T.38
- Incoming DNIS Translation and Routing
- CUBE: performs Delay-Offer-to-Early-Offer transcoding of an initial SIP INIVTE without SDP

### Features Not Supported

- CUCM/CUBE Codec negotiation of G.726
- AT&T does not support SIP Session Timer (Session-Expires and Min-SE headers)

## Caveats

- When using G.729 between AT&T IP Toll-Free and Cisco Unified Border Element/Cisco Unified Communications Manager SIP trunk it is required to configure a Conference Bridge (CFB) resource on CUBE in order for Cisco Unified Communications Manager IP phone to initiate a three-way conference between G729 media end-points. See configuration section for details.
- For DTMF digit passing using RFC2833 you must set a payload-type value of 96 for "nte" (network telephone-events DTMF) on CUBE dial-peer pointing towards Cisco Unified Communications Manager. See configuration section for details.
- AT&T SIP trunk offering does not support the SIP Session Timer. Cisco CUBE version 1.2 (IOS 12.4(15)XZ or 12.4(20)T have been enabled to address this limmitation by default. The IOS CLI administrator can also utilize SIP profile configuration in order to add, modify or strip SIP headers from SIP messages as the administrator sees fit . . See configuration section for detailed example.
- Cisco Unified Communications Manager will only handle one codec type per SIP trunk. Eventhough AT&T SIP INVITE proposes a list of codecs (e.g. G729, G711, G726) the UCM SIP trunk will only allow the codec value it has been configured for. See configuration section for details

## Configuration

### Configuring Cisco Unified Border Element (CUBE)

Critical commands are marked bold with footnote and description at bottom of the page

```
c3825_CUBE#sh runn
Building configuration...

Current configuration : 4299 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname c3825_CUBE
!
boot-start-marker
boot-end-marker
!
logging message-counter syslog
logging buffered 10000000
no logging console
no logging monitor
enable password cisco
!
no aaa new-model
!
ip cef
!
!
!
!
no ip domain lookup
multilink bundle-name authenticated
!
!
voice-card 0
 dspfarm [1]
 dsp services dspfarm[1]
!
!
!
voice service voip
 allow-connections sip to sip[2]
 redirect ip2ip
 fax protocol t38 ls-redundancy 0 hs-redundancy 0 fallback cisco[3]
 sip
  early-offer forced[4]
  midcall-signaling passthru
  sip-profiles 1[5]
```

[1] Command enables dsp farming to allow for conference bridge resources using G729 media on CUCM.
[2] Command enables CUBE SIP-to-SIP functionality
[3] Command enables fax-relay using T.38 globally on CUBE, to enable fax G711ulaw simply remove this feature by using the “no” command
[4] Command enables delay-offer to early-offer translation of initial SIP INVITE w/o SDP.

```
!
!
!
voice class codec 1[6]
 codec preference 1 g729br8
 codec preference 2 g729r8
 codec preference 3 g711ulaw
!
!
!
!
voice class sip-profiles 1[5]
 request INVITE sip-header Supported remove
 request INVITE sip-header Min-SE remove
!
!
!
!
!
!
!
!
!
!
!
!
!
archive
 log config
  hidekeys
!
!
!
!
!
!
!
interface GigabitEthernet0/0
 description "interface connecting to WAN via SP(AT&T SIP)"
 ip address 99.136.XX.XX 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/1
 description "interface connecting to Cisco Unified CM LAN"
 ip address 172.20.110.XX 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
ip default-gateway 99.136.XX.XX
ip forward-protocol nd
ip route 0.0.0.0 0.0.0.0 99.136.XX.XX
```

[5] Command enables a SIP profile to strip min-SE and session-timer headers from the SIP INVITE going towards AT&T network. This command is only necessary if your CUBE is running an IOS version earlier than 12.4(15)XZ.
[6] Command provides codec filtering of G726 for incoming SIP INVITE from AT&T

```
ip route 172.20.110.0 255.255.255.0 GigabitEthernet0/1
!
!
ip http server
!
!
!
!
control-plane
!
!
!
!
!
!
```

**sccp local GigabitEthernet0/1**[7]
**sccp ccm 172.20.110.254 identifier 1 version 6.0**
**sccp**
**!**
**sccp ccm group 1**
 **associate ccm 1 priority 1**
 **associate profile 1 register cfb0018185bb7a1**[8]
**!**
**dspfarm profile 1 conference**
 **codec g729r8**
 **codec g729abr8**
 **codec g729ar8**
 **codec g729br8**
 **codec g711ulaw**
 **maximum sessions 6**
 **associate application SCCP**
!
!
dial-peer voice 1041 voip
 decription “default incoming call dial-peer from AT&T ”
 **rtp payload-type cisco-codec-fax-ind 98**[9]
 **rtp payload-type nte 96**[10]
 **voice-class codec 1**[11]
 **session protocol sipv2**[12]
 **incoming called-number 00000104.**[13]
 **dtmf-relay rtp-nte**[14]
 **fax-relay sg3-to-g3**[15]
 **fax protocol t38 nse ls-redundancy 0 hs-redundancy 0 fallback pass-through g711ulaw**[16]

---

[7] Command enables SCCP registration of dsp resources for conferencing on Cisco Unified Communications Manager

[8] This id number will be created using the letters cfb as the leading characters and obtaining the complete mac address from the ethernet interface connecting to the Cisco Unified Communications Manager LAN. (example: “show interface GigabitEthernet 0/1”)

[9] Command removes the mentioned codec type from Dynamic Payload-Type value 96 in order to re-assign value 96 for RFC2833 DTMF relay

[10] Command assigns Payload-Type value 96 to DTMF RFC2833 (nte events) for the particular dial-peer, 'other DTMF PT values (96-127) can be configured'

[11] Command applies the codec filtering rule to the particular dial-peer

[12] Command enables SIP trunk communication towards Cisco Unified Communications Manager Call Leg (outbound dial-peer)

[13] Command sets the dial-peer configuration values to be applied to all incoming calls with a called number matching pattern. This number shall be set to match the “called” number pattern from AT&T’s incoming INVITE message.

[14] Command enables DTMF relay using RFC2833 for that particular dial-peer

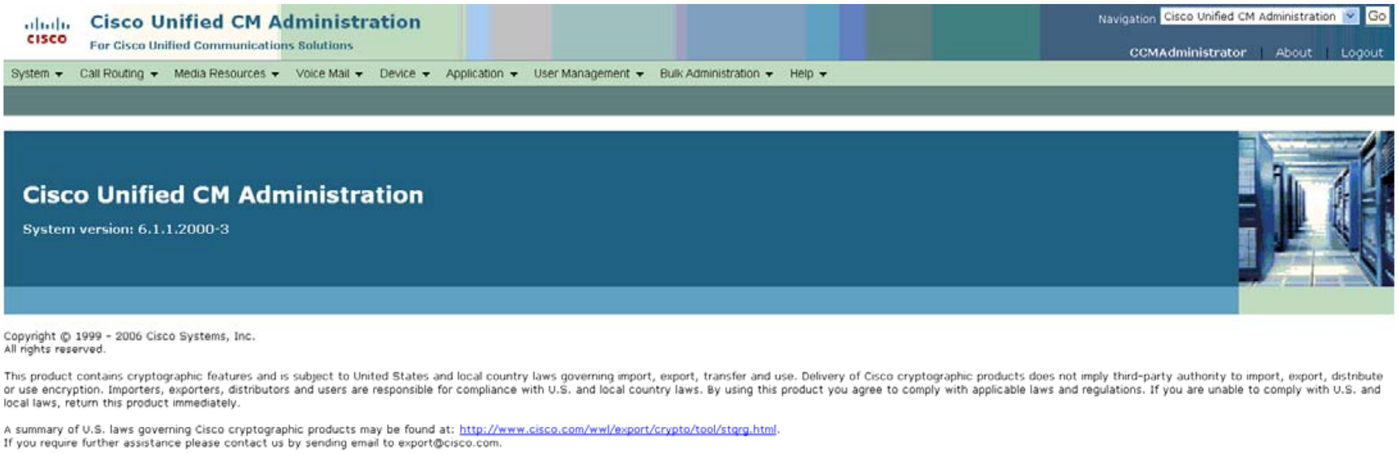
[15] Command enables interworking between SG3 and G3 faxes

```
!
dial-peer voice 1042 voip
 description “outgoing dial-peer towards Cisco Unified CM”
 destination-pattern 00000104.
 rtp payload-type cisco-codec-fax-ind 98[17]
 rtp payload-type nte 96[18]
 voice-class codec 1
 session protocol sipv2
 session target ipv4:172.20.110.XX
 dtmf-relay rtp-nte
 fax-relay sg3-to-g3[19]
 fax protocol t38 nse ls-redundancy 0 hs-redundancy 0 fallback pass-through g711ulaw[20]
!
!
!
sip-ua
 no remote-party-id
!
!
gatekeeper
 shutdown
!
!
line con 0
 password cisco
 login
line aux 0
line vty 0 4
 exec-timeout 0 0
 password cisco
 login
!
exception data-corruption buffer truncate
scheduler allocate 20000 1000
end
```

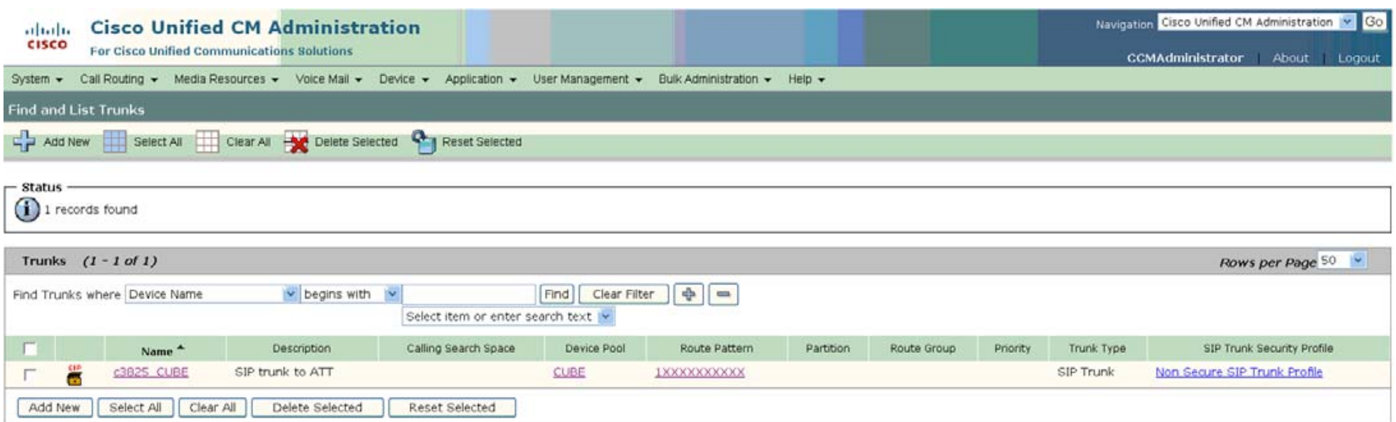
[16] Command enables fax T.38 for the particular dial-peer, you must remove this command (and the global command if set) in order for fax G711ulaw functionality.
[17] Command removes the mentioned codec type from Dynamic Payload-Type value 96 in order to re-assign value 96 for RFC2833 DTMF relay
[18] Command assigns Payload-Type value 96 to DTMF RFC2833 (nte events) for the particular dial-peer, 'other DTMF PT values (96-127) can be configured'
[19] Command enables interworking between SG3 and G3 faxes
[20] Command enables fax T.38 for the particular dial-peer, you must remove this command (and the global command if set) in order for fax G711ulaw functionality.

## Configuring the Cisco Unified Communications Manager

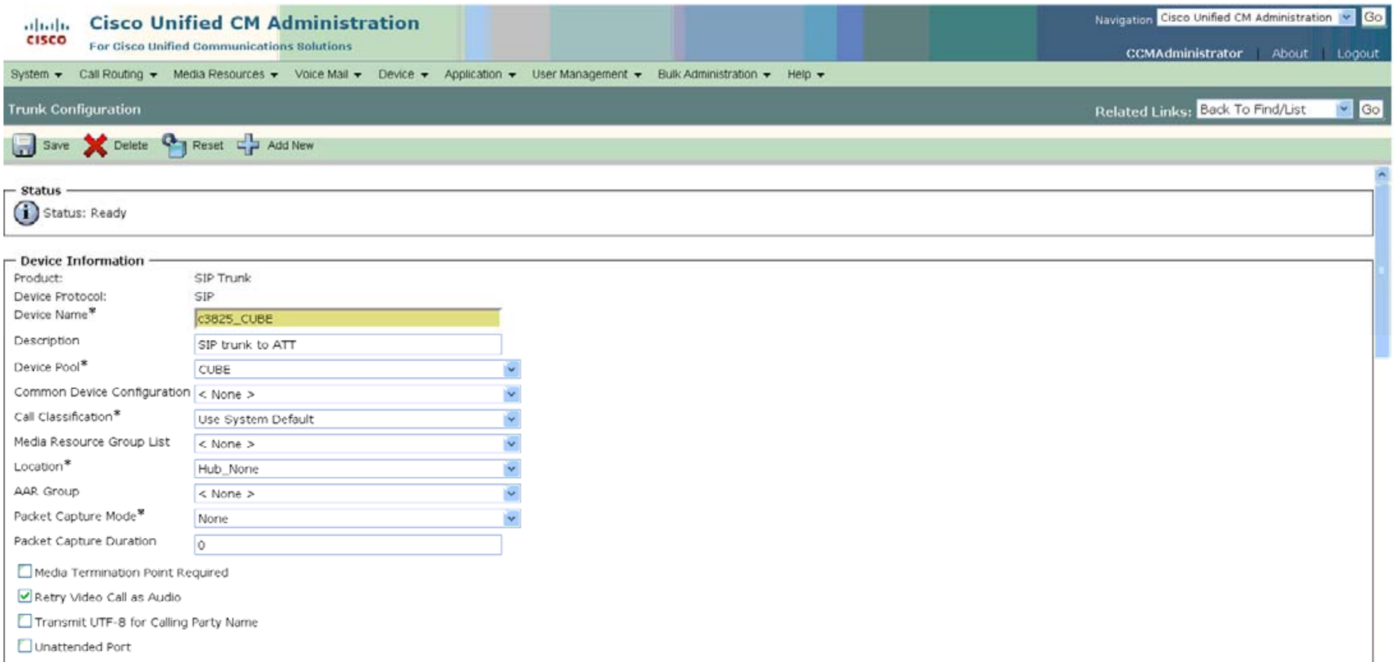
### Cisco Unified Communications Manager version

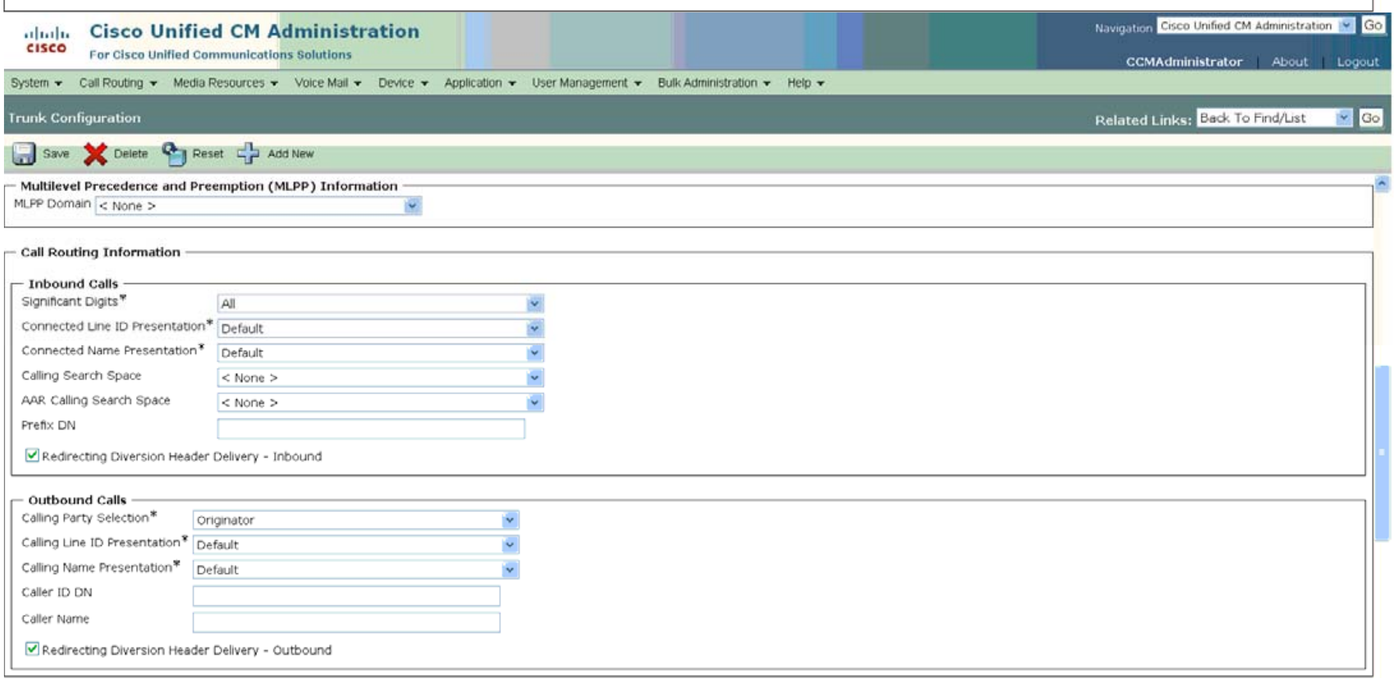


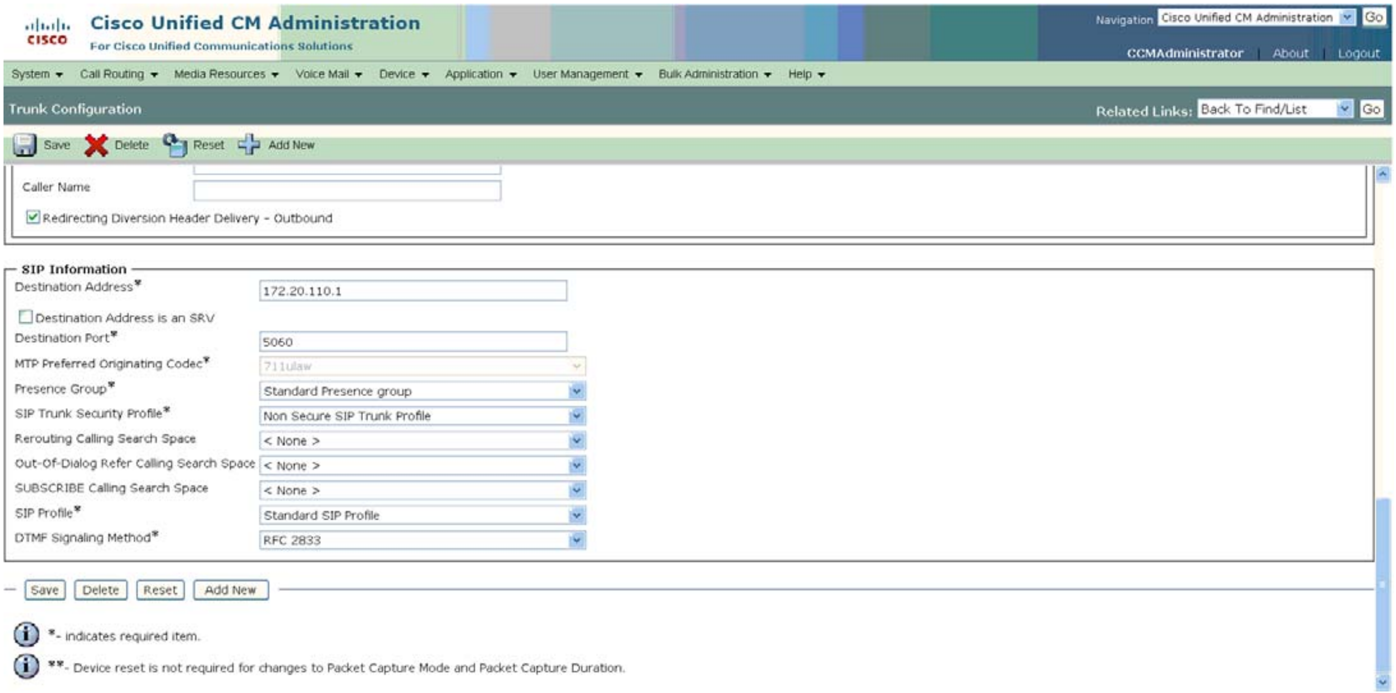

### SIP Trunk configuration (Title page)



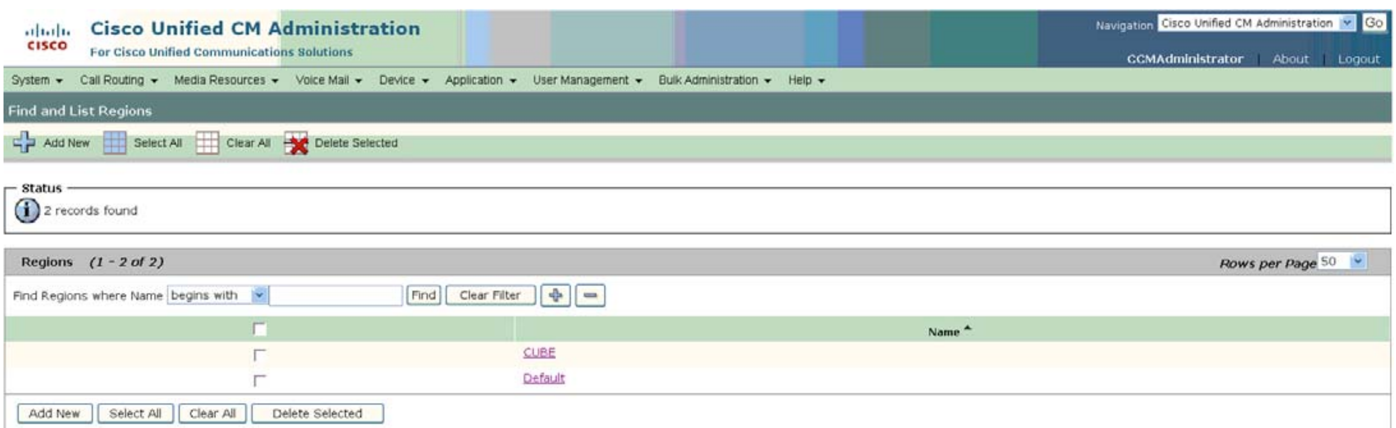
**SIP Trunk configuration**

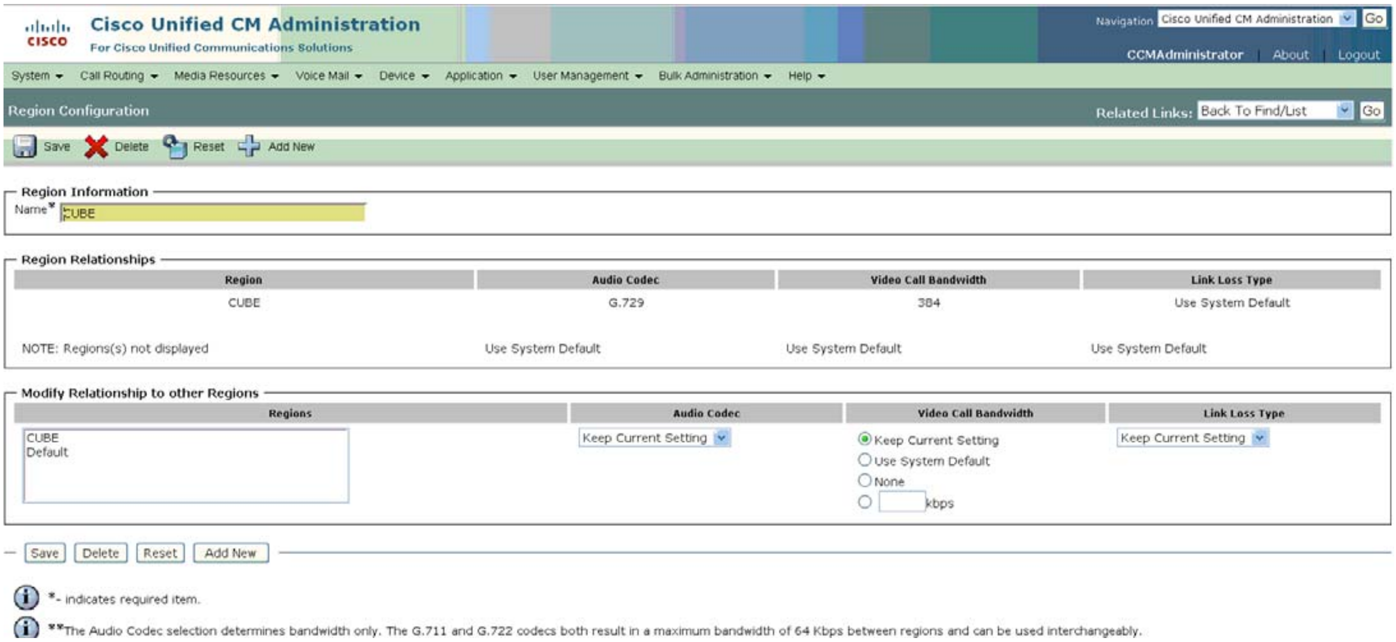





**Regions (codec settings)**

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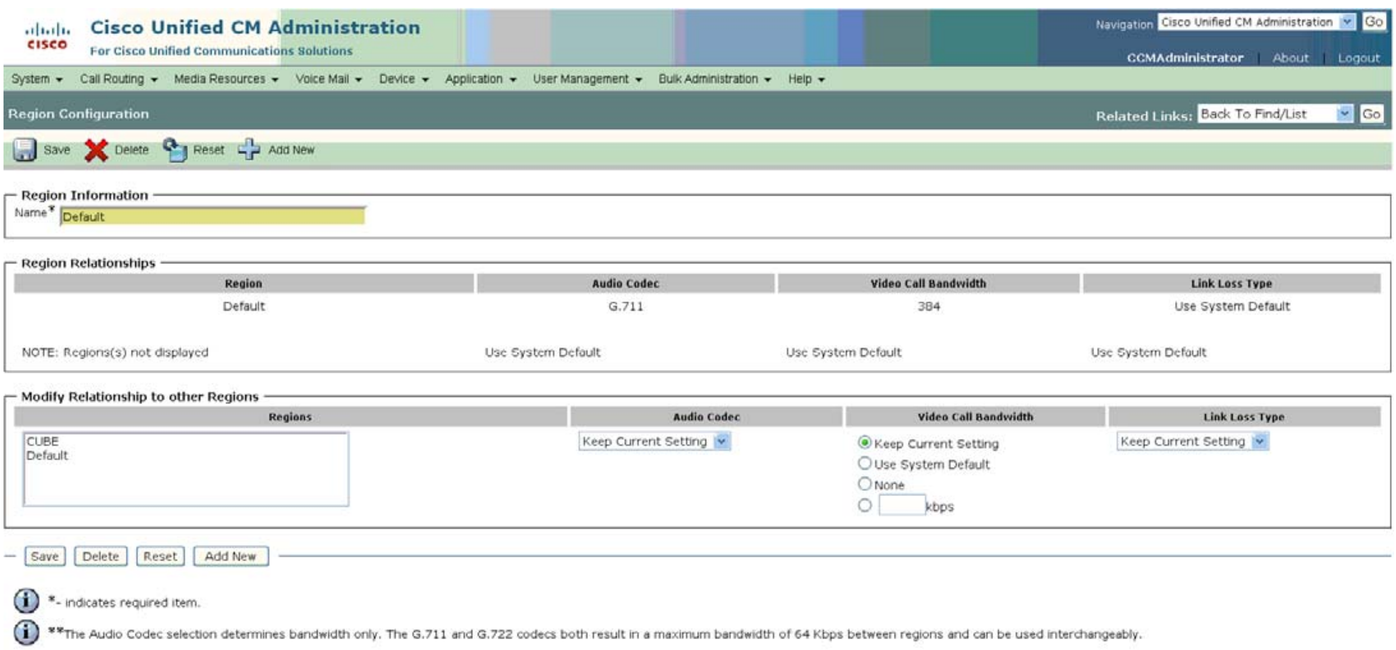
Region Information
Name* CUBE
Region Relationships
Region
Audio Codec
Video Call Bandwidth
Link Loss Type
CUBE
G.729
384
Use System Default
NOTE: Regions(s) not displayed
Use System Default
Use System Default
Use System Default
Modify Relationship to other Regions
Regions
Audio Codec
Video Call Bandwidth
Link Loss Type
CUBE
Default
Keep Current Setting
Keep Current Setting
Use System Default
None
kbps
Keep Current Setting
Save Delete Reset Add New
*- indicates required item.
**The Audio Codec selection determines bandwidth only. The G.711 and G.722 codecs both result in a maximum bandwidth of 64 Kbps between regions and can be used interchangeably.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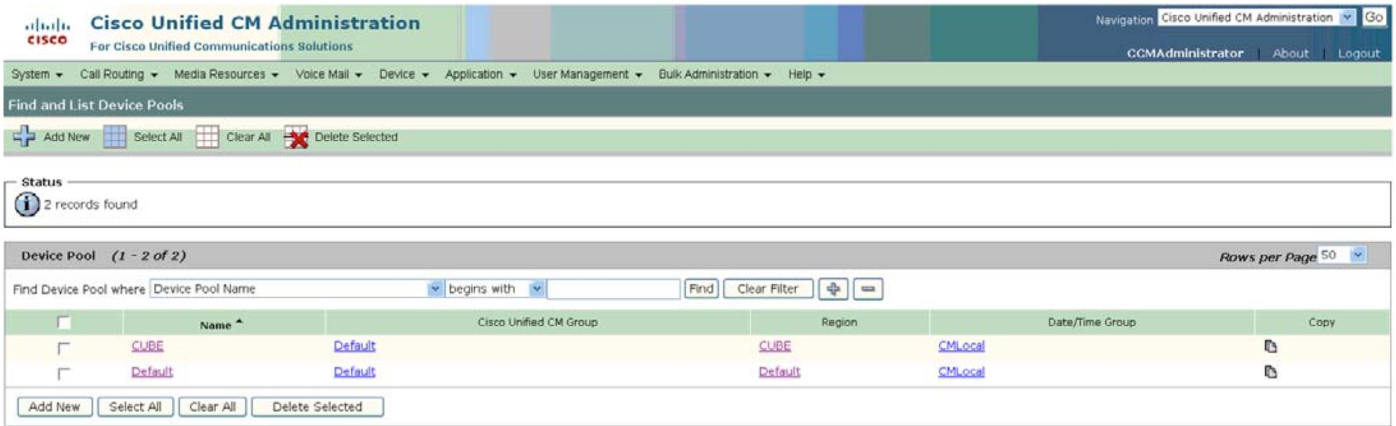
Save Delete Reset Add New
Region Information
Name* Default
Region Relationships
Region
Audio Codec
Video Call Bandwidth
Link Loss Type
Default
G.711
384
Use System Default
NOTE: Regions(s) not displayed
Use System Default
Use System Default
Use System Default
Modify Relationship to other Regions
Regions
Audio Codec
Video Call Bandwidth
Link Loss Type
CUBE
Default
Keep Current Setting
Keep Current Setting
Use System Default
None
kbps
Keep Current Setting
Save Delete Reset Add New
*- indicates required item.
**The Audio Codec selection determines bandwidth only. The G.711 and G.722 codecs both result in a maximum bandwidth of 64 Kbps between regions and can be used interchangeably.

## Device Pool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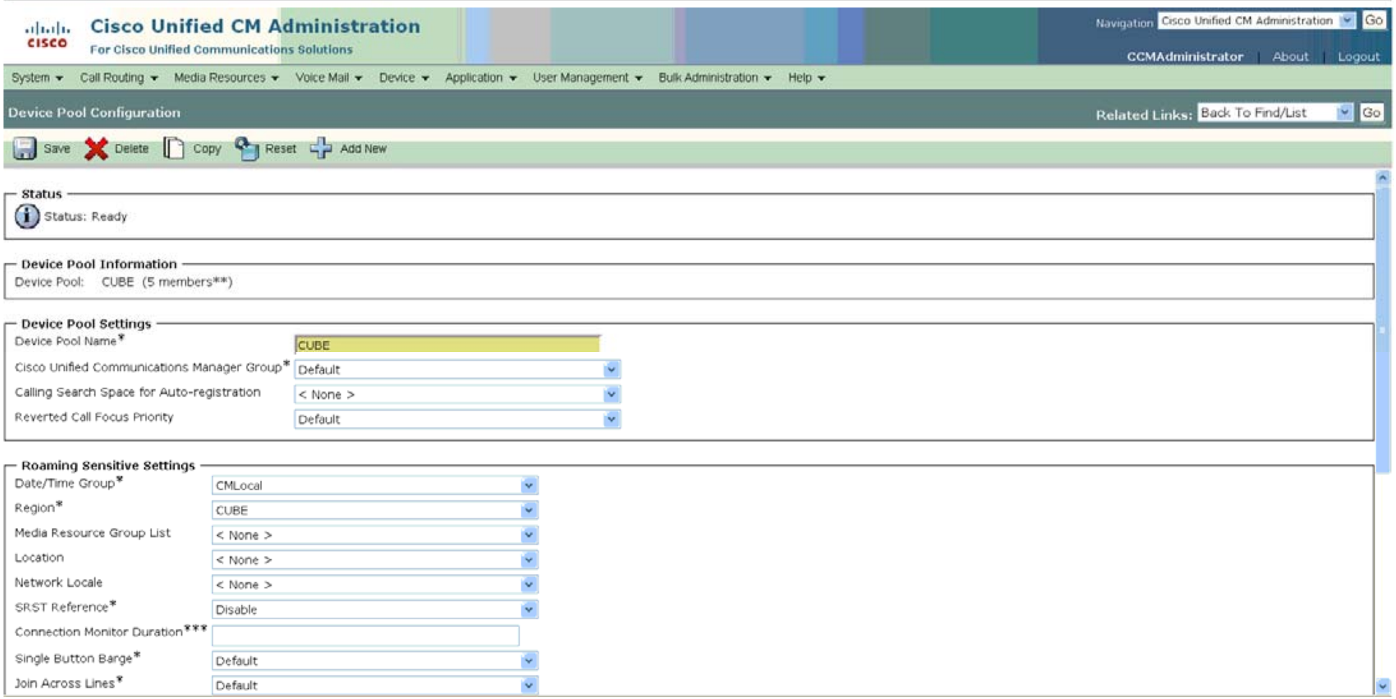
Find and List Device Pools
Add New Select All Clear All Delete Selected
Status
2 records found
Device Pool (1 - 2 of 2)
Rows per Page 50
Find Device Pool where Device Pool Name begins with Find Clear Filter
Name
Cisco Unified CM Group
Region
Date/Time Group
Copy
CUBE Default CUBE CMLocal
Default Default Default CMLocal
Add New Select All Clear All Delete Selected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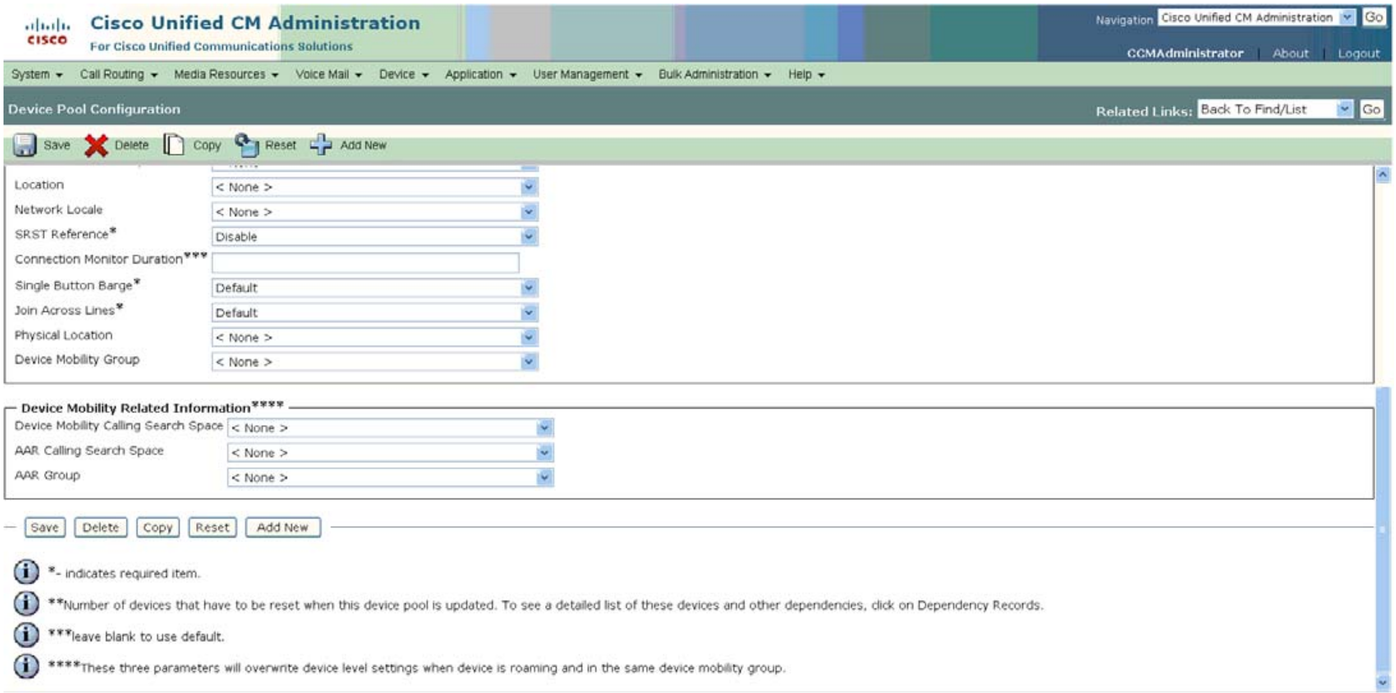
Device Pool Configuration
Related Links: Back To Find/List Go
Save Delete Copy Reset Add New
Status
Status: Ready
Device Pool Information
Device Pool: CUBE (5 members**)
Device Pool Settings
Device Pool Name* CUBE
Cisco Unified Communications Manager Group* Default
Calling Search Space for Auto-registration < None >
Reverted Call Focus Priority Default
Roaming Sensitive Settings
Date/Time Group* CMLocal
Region* CUBE
Media Resource Group List < None >
Location < None >
Network Locale < None >
SRST Reference* Disable
Connection Monitor Duration***
Single Button Barge* Default
Join Across Lines* Default



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Device Pool Configuration
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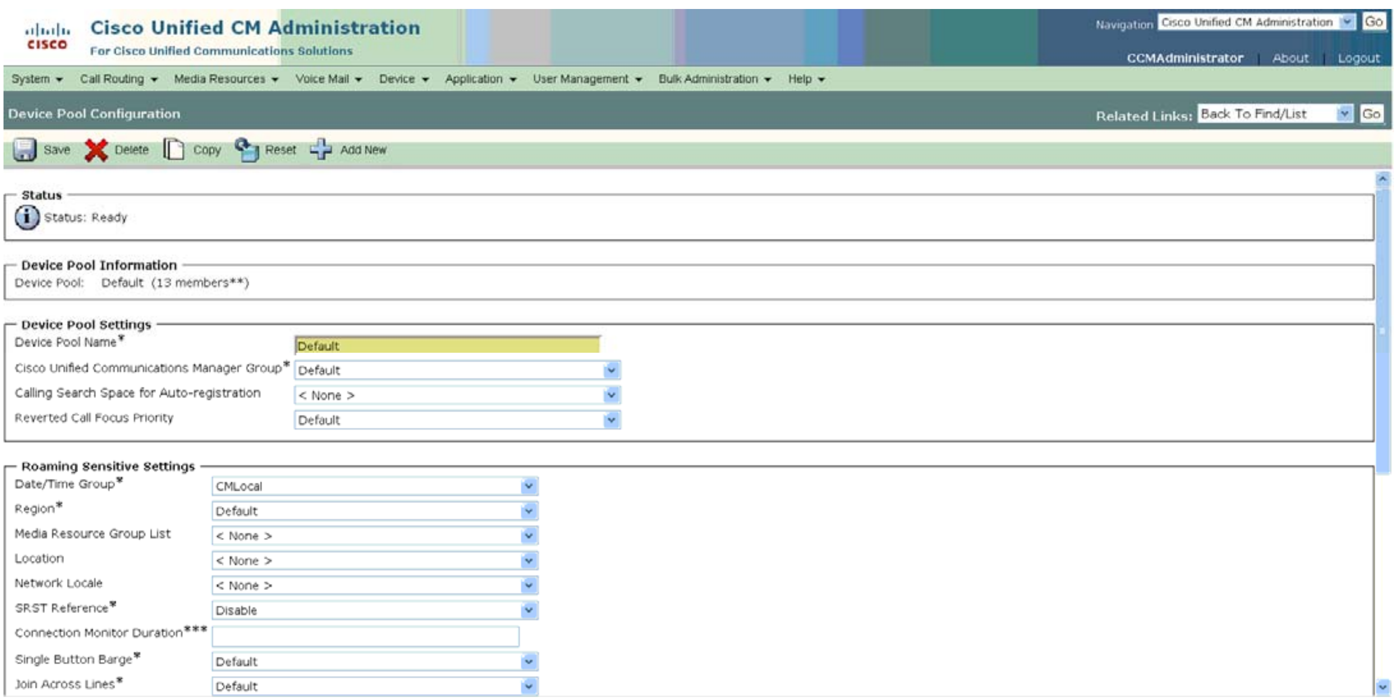
Save Delete Copy Reset Add New
Location < None >
Network Locale < None >
SRST Reference* Disable
Connection Monitor Duration***
Single Button Barge* Default
Join Across Lines* Default
Physical Location < None >
Device Mobility Group < None >
Device Mobility Related Information****
Device Mobility Calling Search Space < None >
AAR Calling Search Space < None >
AAR Group < None >
Save Delete Copy Reset Add New
*- indicates required item.
**Number of devices that have to be reset when this device pool is updated. To see a detailed list of these devices and other dependencies, click on Dependency Records.
***leave blank to use default.
****These three parameters will overwrite device level settings when device is roaming and in the same device mobility group.

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Device Pool Configuration
Related Links: Back To Find/List Go
Save Delete Copy Reset Add New
Status
Status: Ready
Device Pool Information
Device Pool: Default (13 members**)
Device Pool Settings
Device Pool Name* Default
Cisco Unified Communications Manager Group* Default
Calling Search Space for Auto-registration < None >
Reverted Call Focus Priority Default
Roaming Sensitive Settings
Date/Time Group* CMLocal
Region* Default
Media Resource Group List < None >
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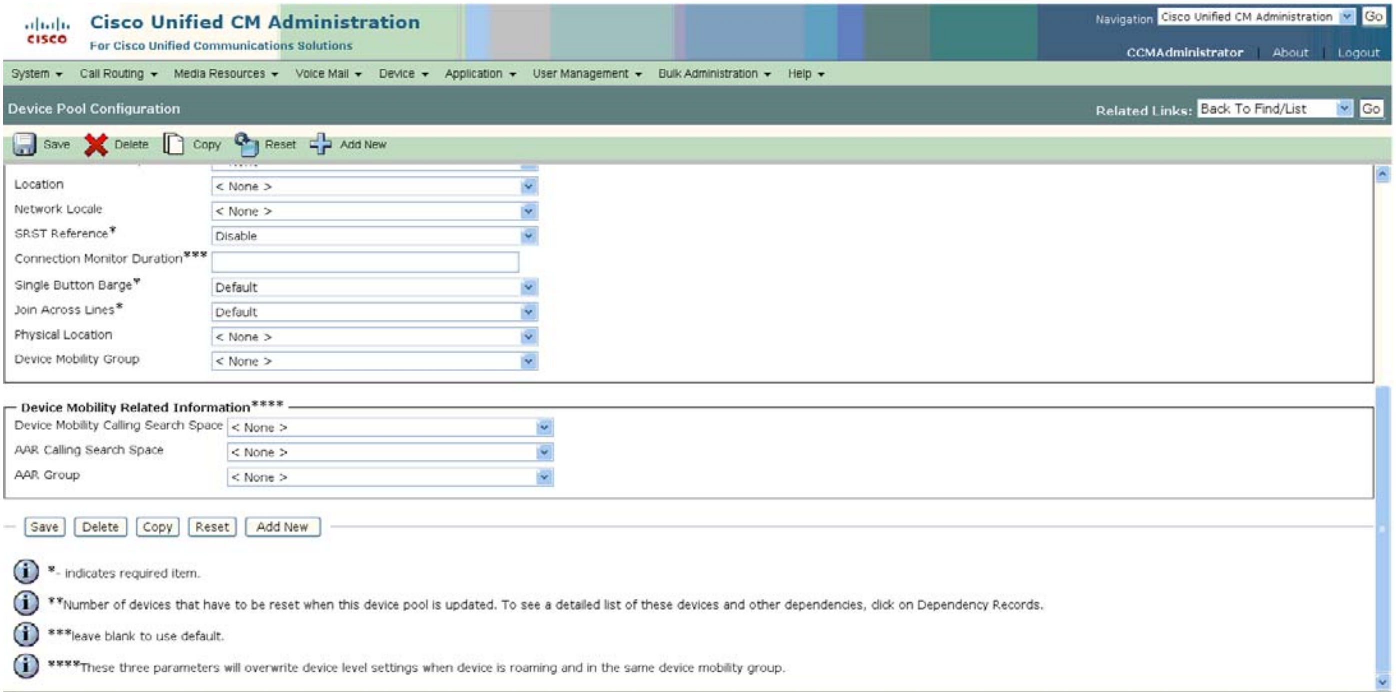
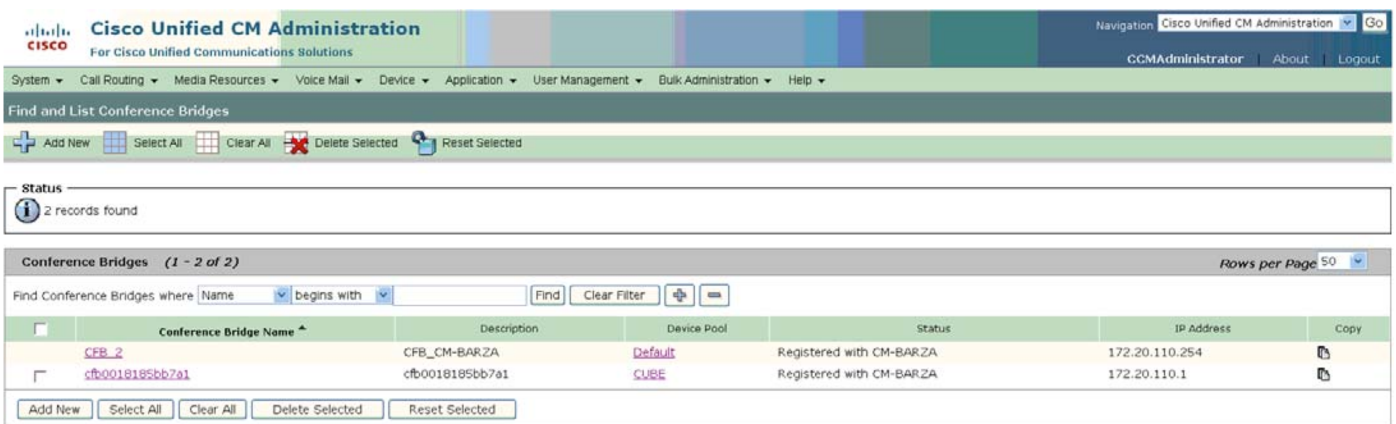
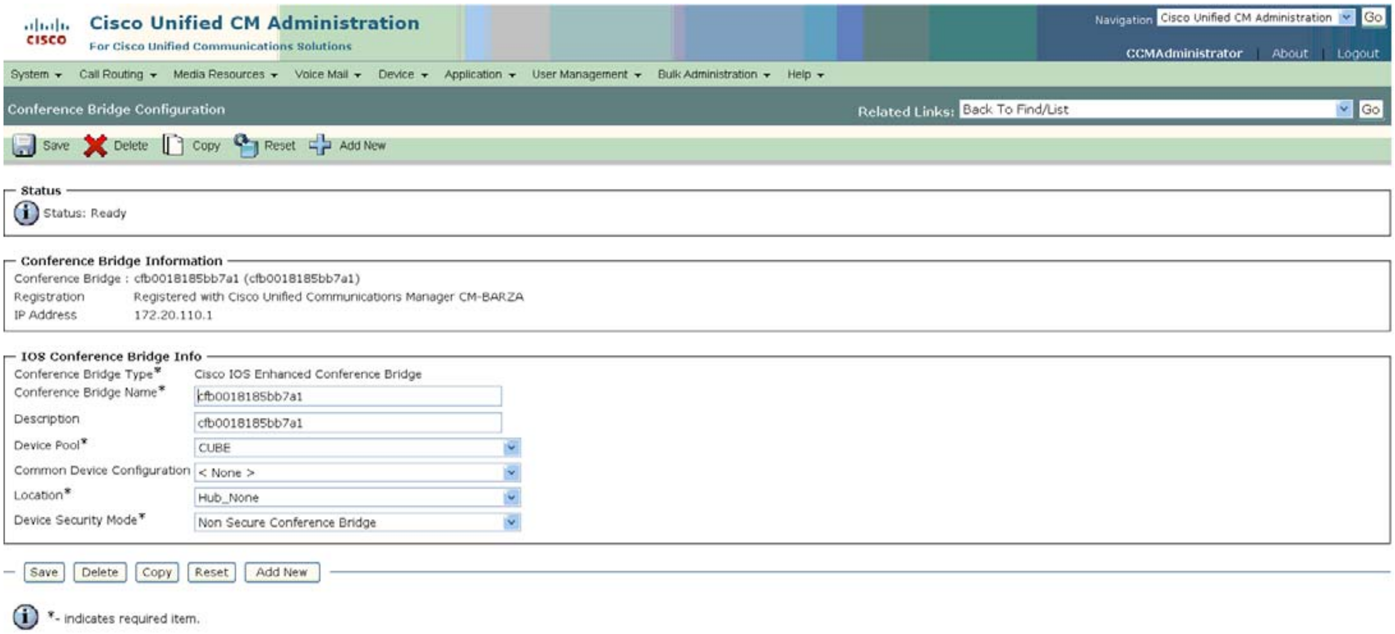
Network Locale < None >
SRST Reference* Disable
Connection Monitor Duration***
Single Button Barge* Default
Join Across Lines* Default

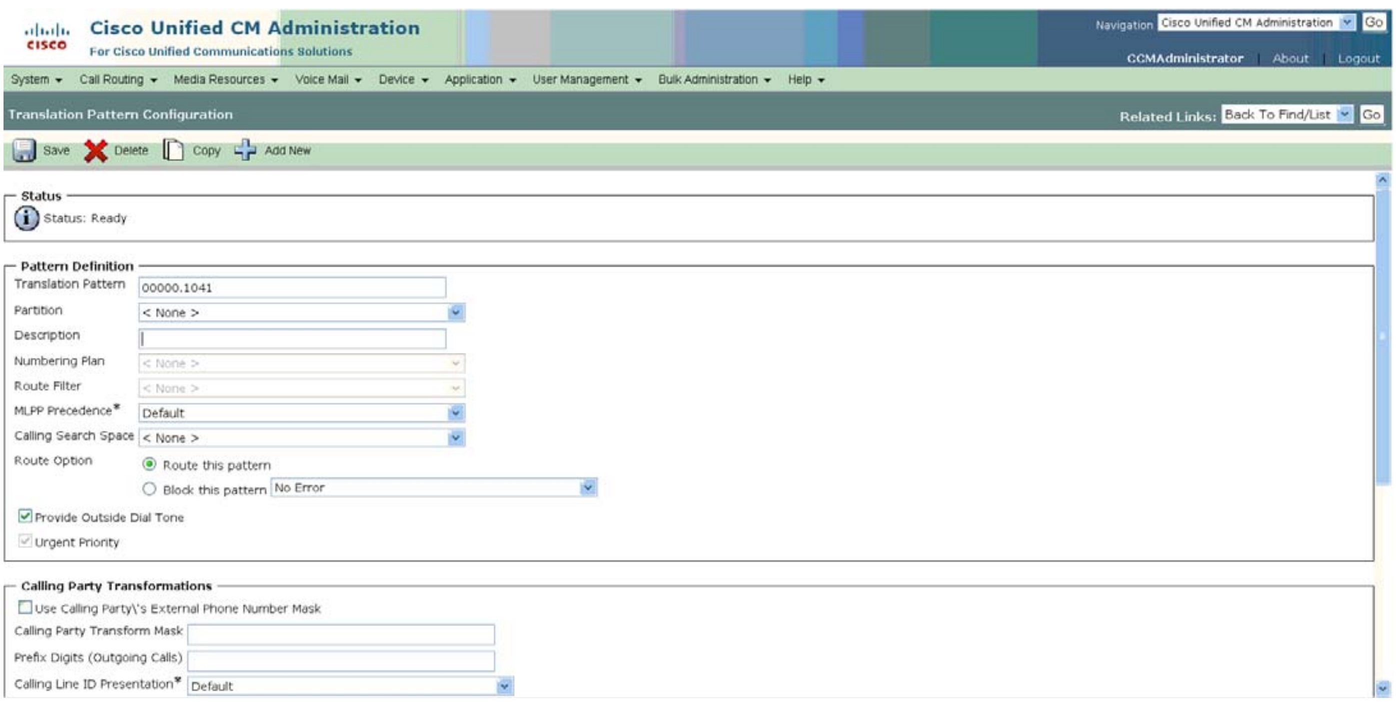


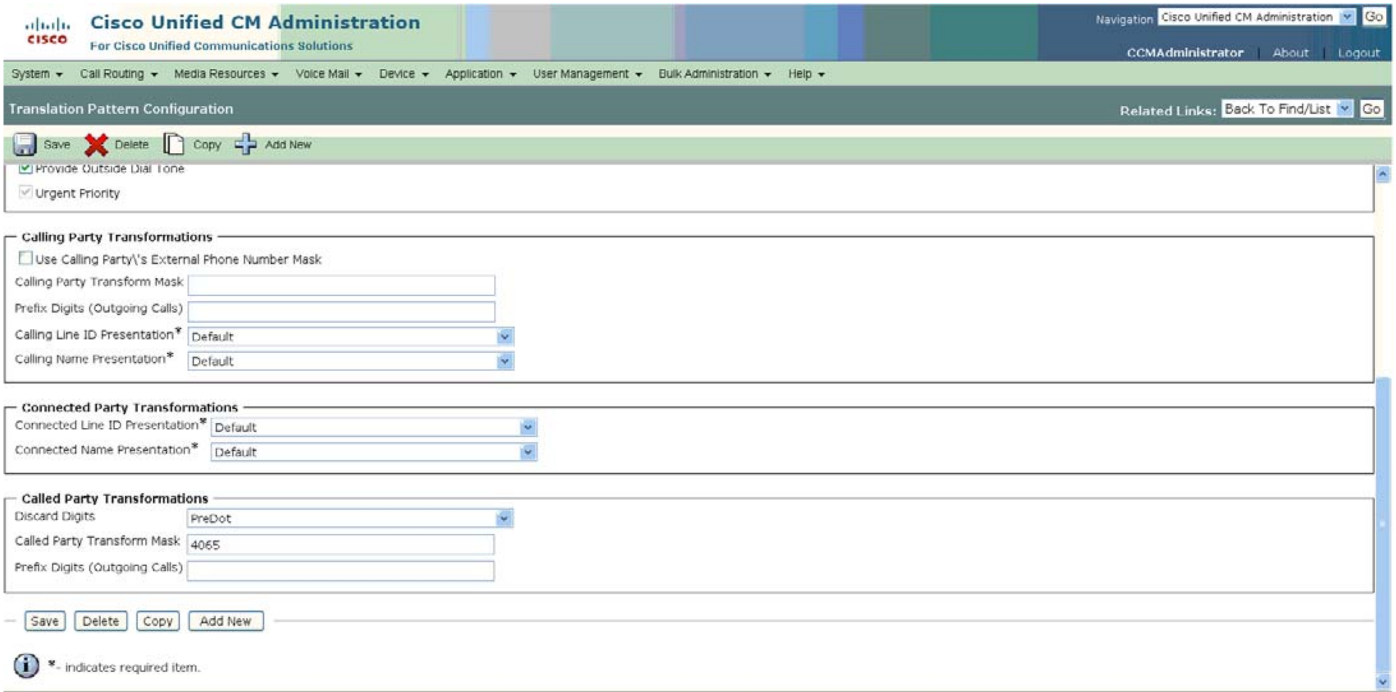

**IOS conference bridge for G729 conferencing**






**Sample DNIS Translation-Pattern**

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Translation Pattern Configuration
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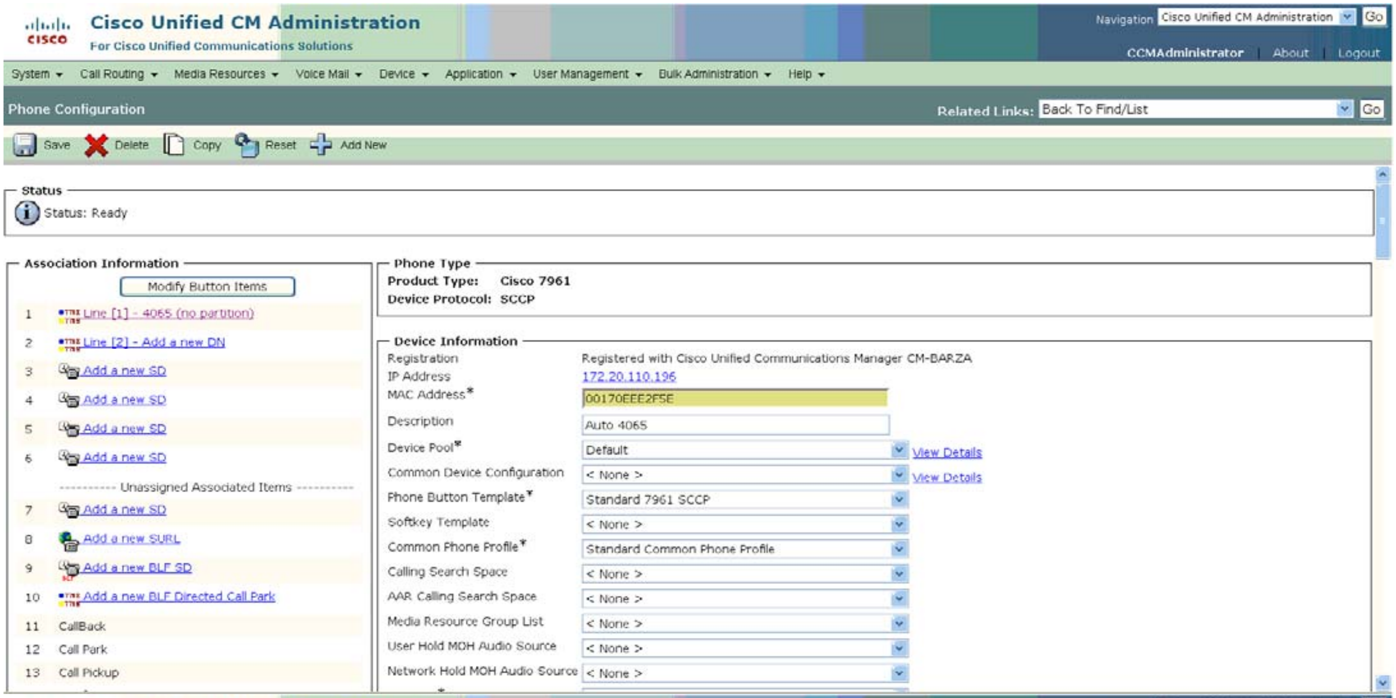
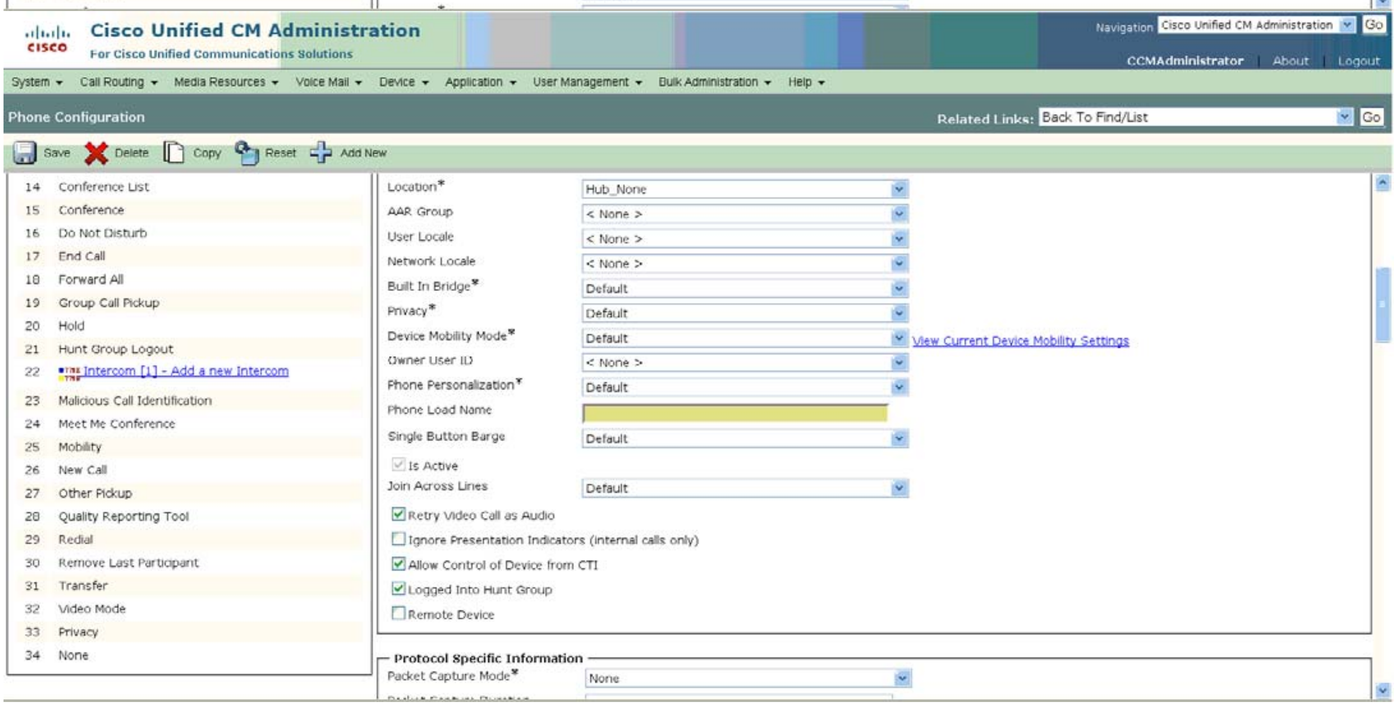
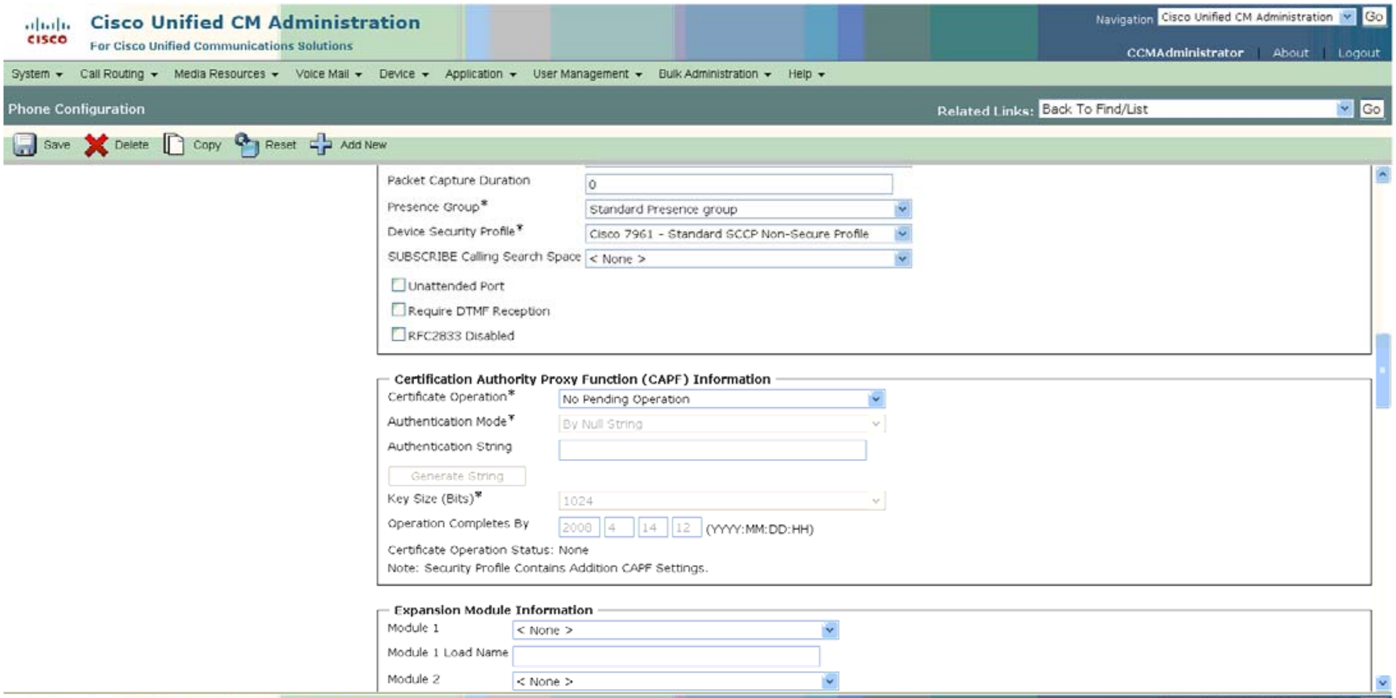
Urgent Priority
Calling Party Transformations
Use Calling Party\'s External Phone Number Mask
Calling Party Transform Mask
Prefix Digits (Outgoing Calls)
Calling Line ID Presentation* Default
Calling Name Presentation* Default
Connected Party Transformations
Connected Line ID Presentation* Default
Connected Name Presentation* Default
Called Party Transformations
Discard Digits PreDot
Called Party Transform Mask 4065
Prefix Digits (Outgoing Calls)
Save Delete Copy Add New
*- indicates required item.

**IP phone configuration**

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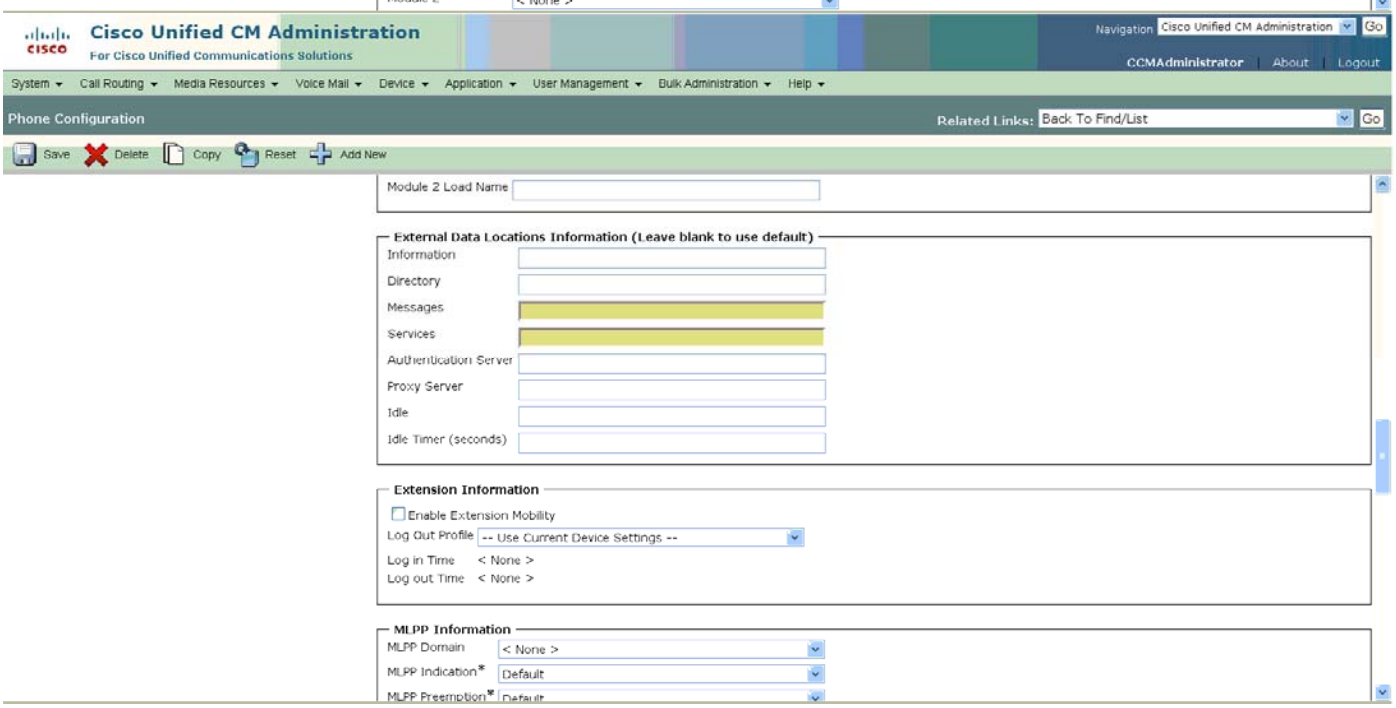
Phone Configuration
Related Links: Back To Find/List Go
Save Delete Copy Reset Add New
Packet Capture Duration 0
Presence Group* Standard Presence group
Device Security Profile* Cisco 7961 - Standard SCCP Non-Secure Profile
SUBSCRIBE Calling Search Space < None >
Unattended Port
Require DTMF Reception
RFC2833 Disabled
Certification Authority Proxy Function (CAPF) Information
Certificate Operation* No Pending Operation
Authentication Mode* By Null String
Authentication String
Generate String
Key Size (Bits)* 1024
Operation Completes By 2008 4 14 12 (YYYY:MM:DD:HH)
Certificate Operation Status: None
Note: Security Profile Contains Addition CAPF Settings.
Expansion Module Information
Module 1 < None >
Module 1 Load Name
Module 2 < None >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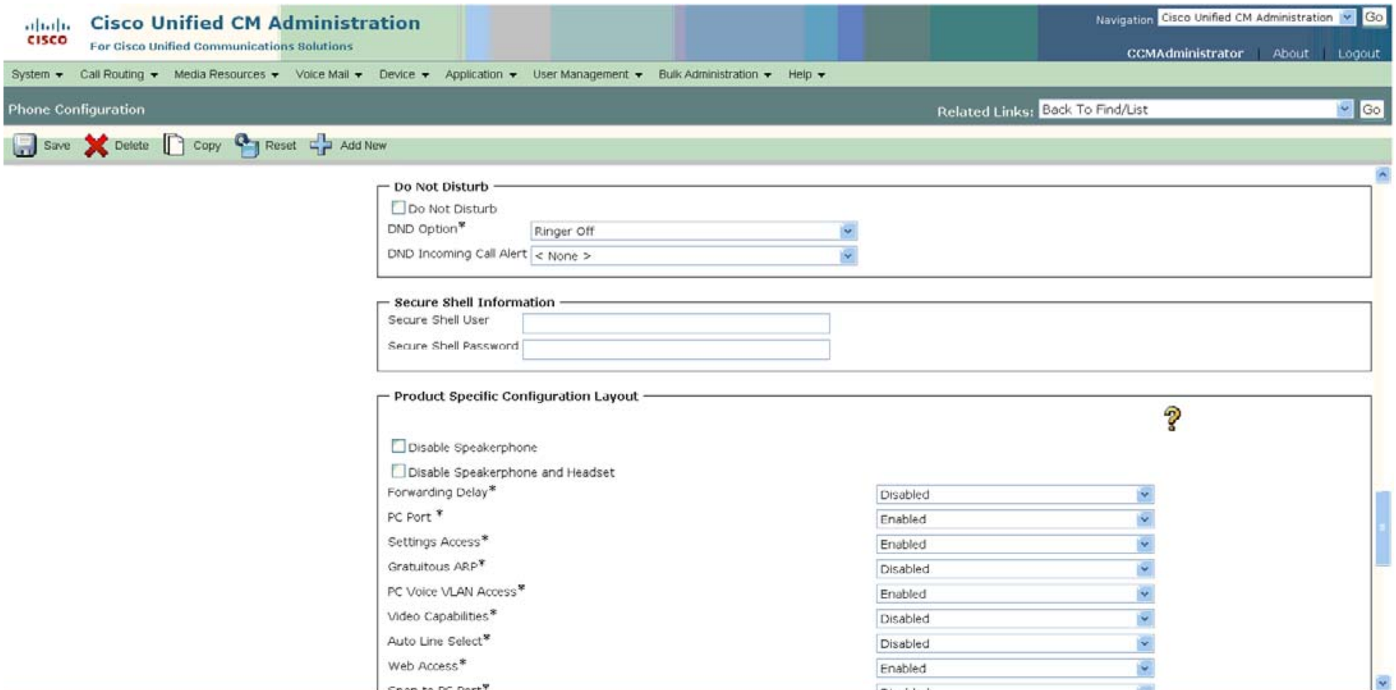
Save Delete Copy Reset Add New
Module 2 Load Name
External Data Locations Information (Leave blank to use default)
Information
Directory
Messages
Services
Authentication Server
Proxy Server
Idle
Idle Timer (seconds)
Extension Information
Enable Extension Mobility
Log Out Profile -- Use Current Device Settings --
Log in Time < None >
Log out Time < None >
MLPP Information
MLPP Domain < None >
MLPP Indication* Default
MLPP Preemption* Default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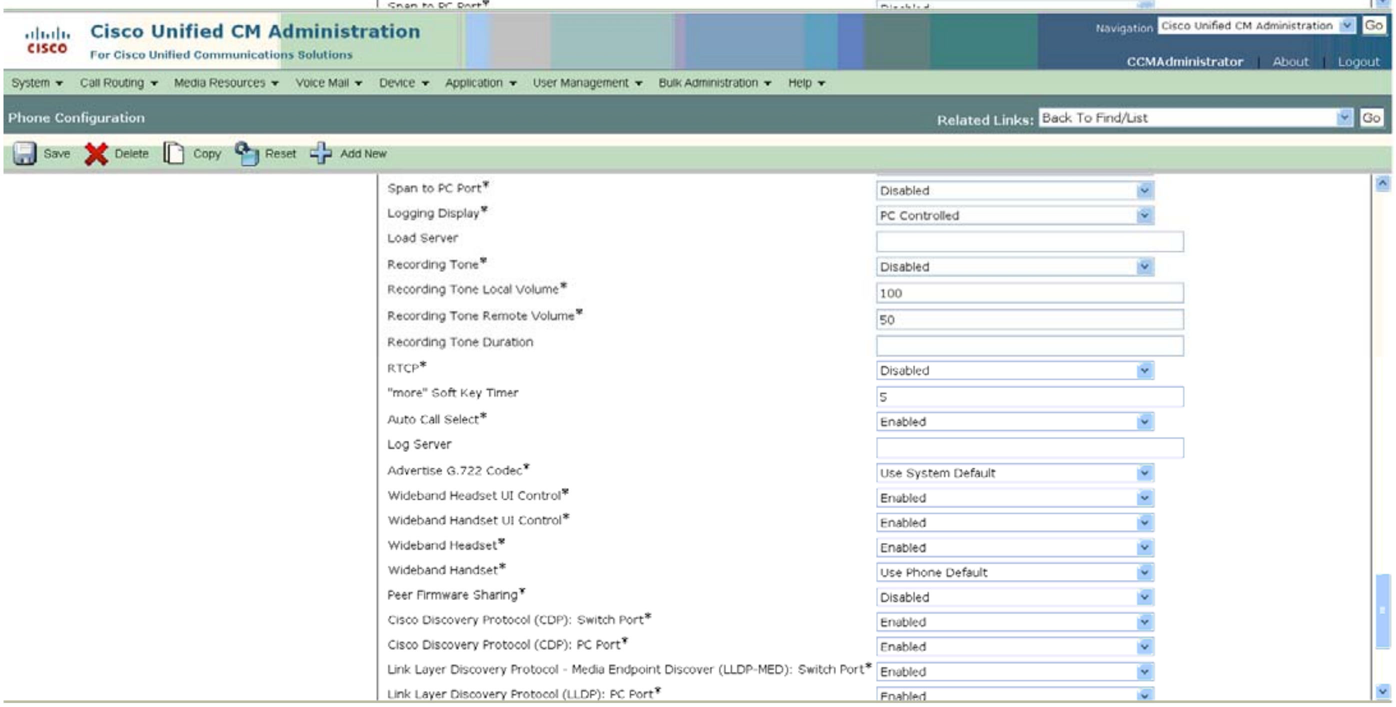
Save Delete Copy Reset Add New
Do Not Disturb
Do Not Disturb
DND Option* Ringer Off
DND Incoming Call Alert < None >
Secure Shell Information
Secure Shell User
Secure Shell Password
Product Specific Configuration Layout
Disable Speakerphone
Disable Speakerphone and Headset
Forwarding Delay* Disabled
PC Port* Enabled
Settings Access* Enabled
Gratuitous ARP* Disabled
PC Voice VLAN Access* Enabled
Video Capabilities* Disabled
Auto Line Select* Disabled
Web Access* Enabled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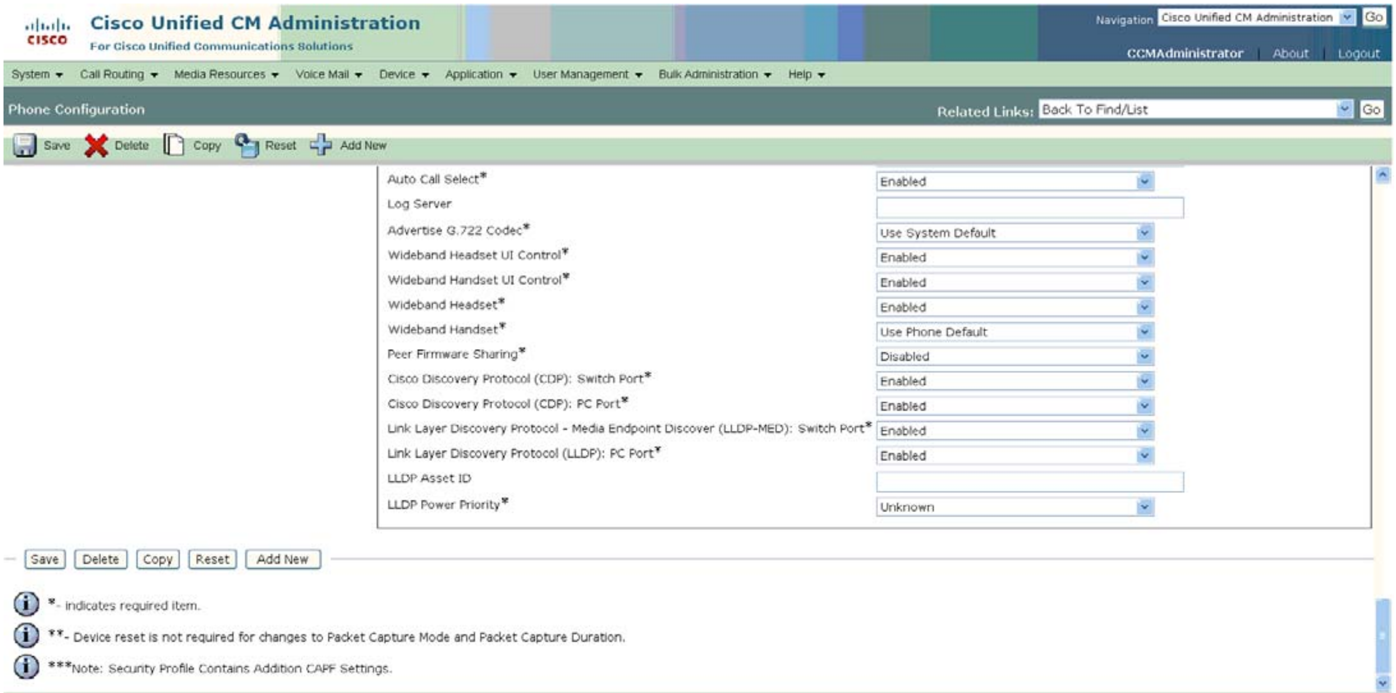
CCMAdministrator | About | Logout
System Call Routing Media Resources Voice Mail Device Application User Management Bulk Administration Help
Phone Configuration
Related Links: Back To Find/List Go
Save Delete Copy Reset Add New
Span to PC Port* Disabled
Logging Display* PC Controlled
Load Server
Recording Tone* Disabled
Recording Tone Local Volume* 100
Recording Tone Remote Volume* 50
Recording Tone Duration
RTCP* Disabled
"more" Soft Key Timer 5
Auto Call Select* Enabled
Log Server
Advertise G.722 Codec* Use System Default
Wideband Headset UI Control* Enabled
Wideband Handset UI Control* Enabled
Wideband Headset* Enabled
Wideband Handset* Use Phone Default
Peer Firmware Sharing* Disabled
Cisco Discovery Protocol (CDP): Switch Port* Enabled
Cisco Discovery Protocol (CDP): PC Port* Enabled
Link Layer Discovery Protocol - Media Endpoint Discover (LLDP-MED): Switch Port* Enabled
Link Layer Discovery Protocol (LLDP): PC Port* Enabled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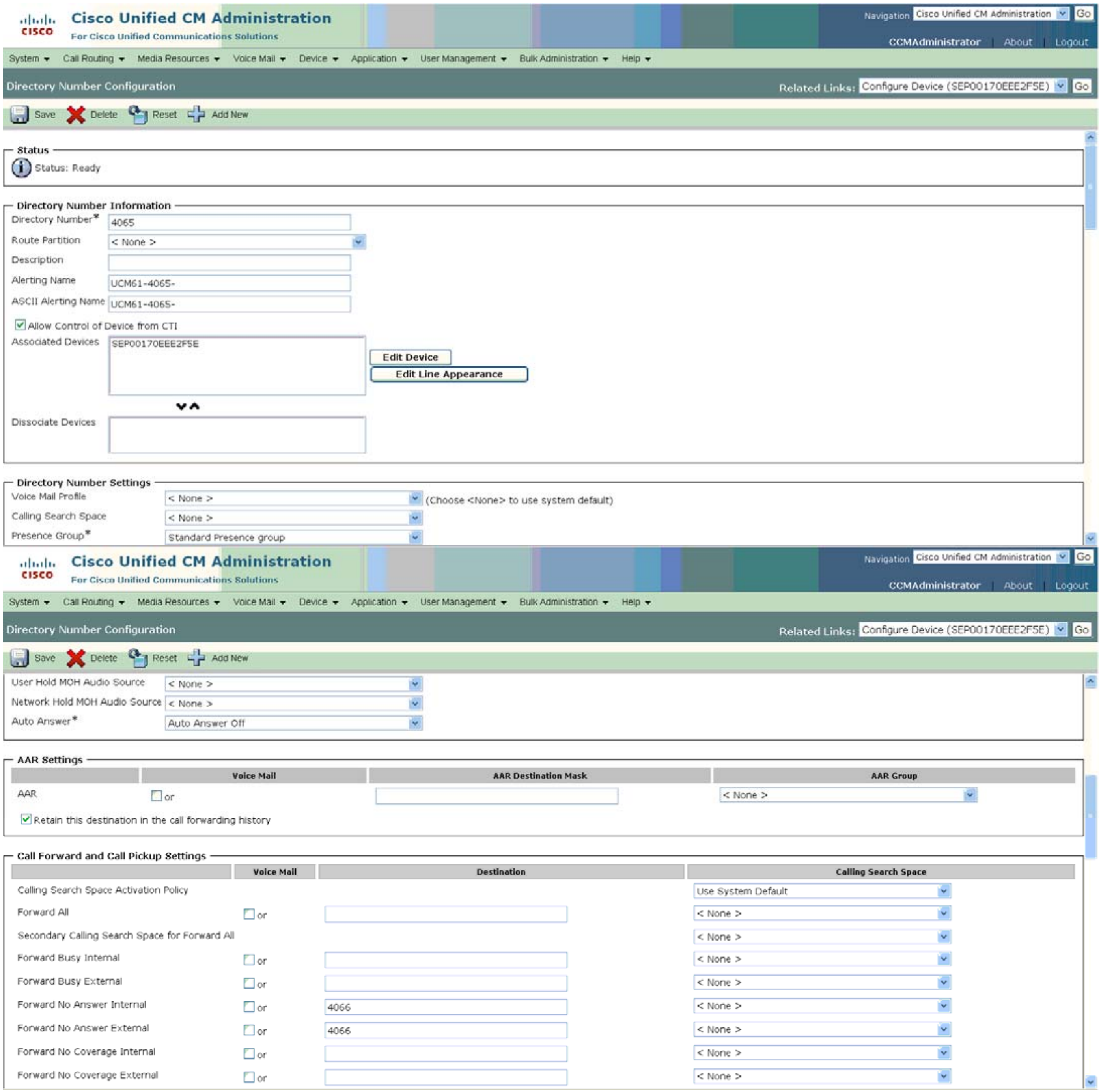
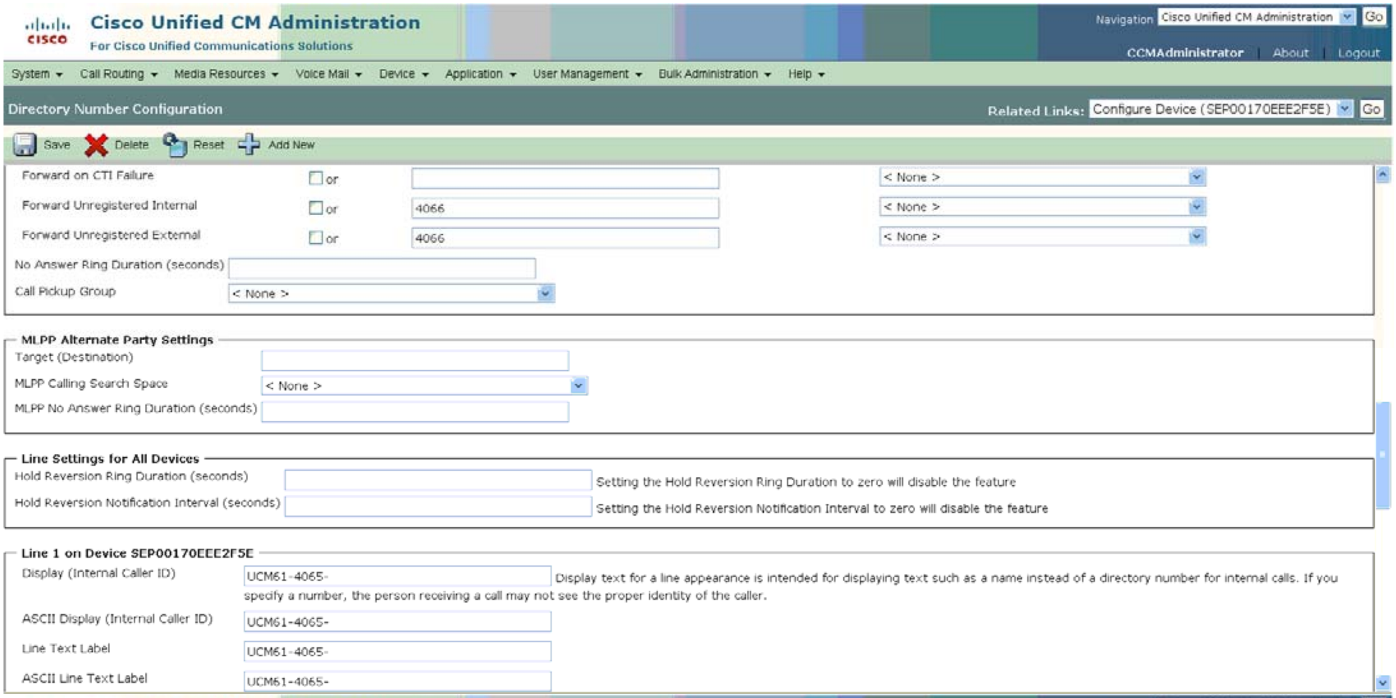
Log Server
Advertise G.722 Codec* Use System Default
Wideband Headset UI Control* Enabled
Wideband Handset UI Control* Enabled
Wideband Headset* Enabled
Wideband Handset* Use Phone Default
Peer Firmware Sharing* Disabled
Cisco Discovery Protocol (CDP): Switch Port* Enabled
Cisco Discovery Protocol (CDP): PC Port* Enabled
Link Layer Discovery Protocol - Media Endpoint Discover (LLDP-MED): Switch Port* Enabled
Link Layer Discovery Protocol (LLDP): PC Port* Enabled
LLDP Asset ID
LLDP Power Priority* Unknown
Save Delete Copy Reset Add New
*- indicates required item.
**- Device reset is not required for changes to Packet Capture Mode and Packet Capture Duration.
***Note: Security Profile Contains Addition CAPF Settings.

## IP Phone DN configuration

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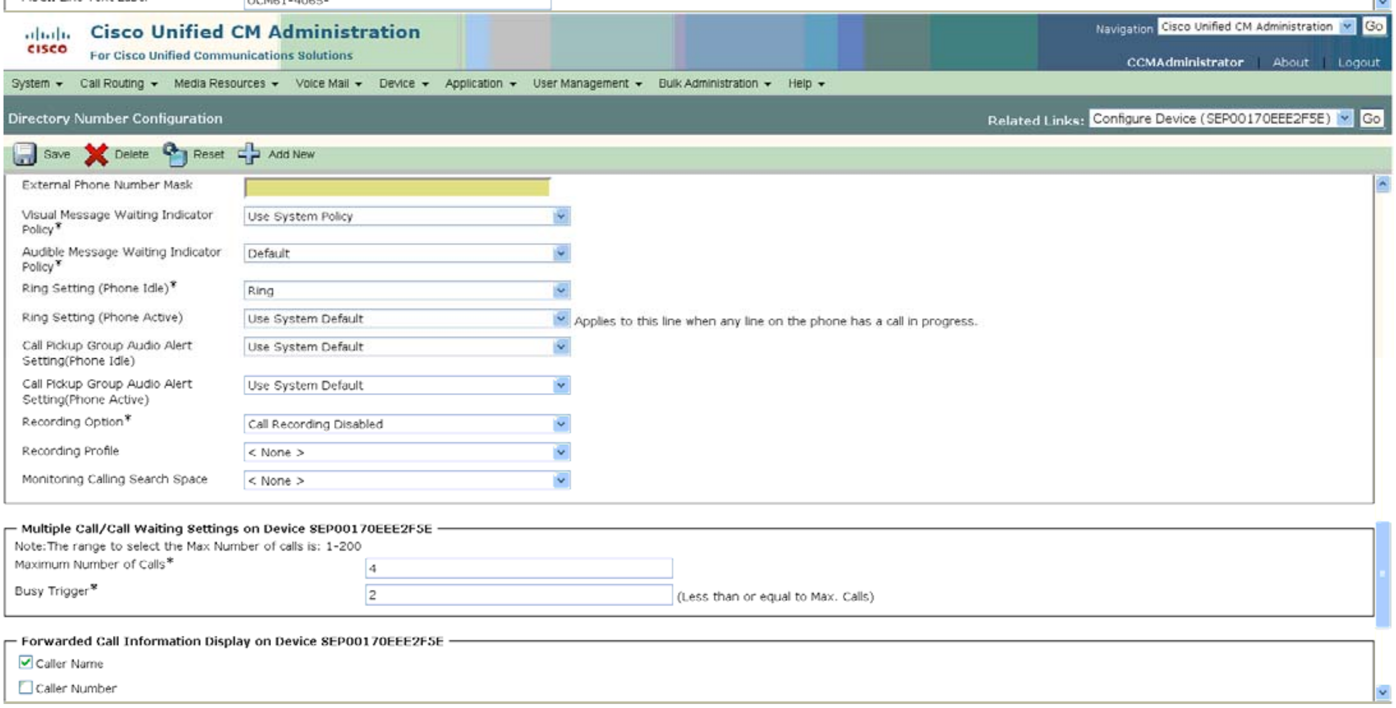
Directory Number Configuration
Related Links: Configure Device (SEP00170EEE2F5E) Go
Save Delete Reset Add New
Forward on CTI Failure or < None >
Forward Unregistered Internal or 4066 < None >
Forward Unregistered External or 4066 < None >
No Answer Ring Duration (seconds)
Call Pickup Group < None >
MLPP Alternate Party Settings
Target (Destination)
MLPP Calling Search Space < None >
MLPP No Answer Ring Duration (seconds)
Line Settings for All Devices
Hold Reversion Ring Duration (seconds) Setting the Hold Reversion Ring Duration to zero will disable the feature
Hold Reversion Notification Interval (seconds) Setting the Hold Reversion Notification Interval to zero will disable the feature
Line 1 on Device SEP00170EEE2F5E
Display (Internal Caller ID) UCM61-4065- Display text for a line appearance is intended for displaying text such as a name instead of a directory number for internal calls. If you specify a number, the person receiving a call may not see the proper identity of the caller.
ASCII Display (Internal Caller ID) UCM61-4065-
Line Text Label UCM61-4065-
ASCII Line Text Label UCM61-4065-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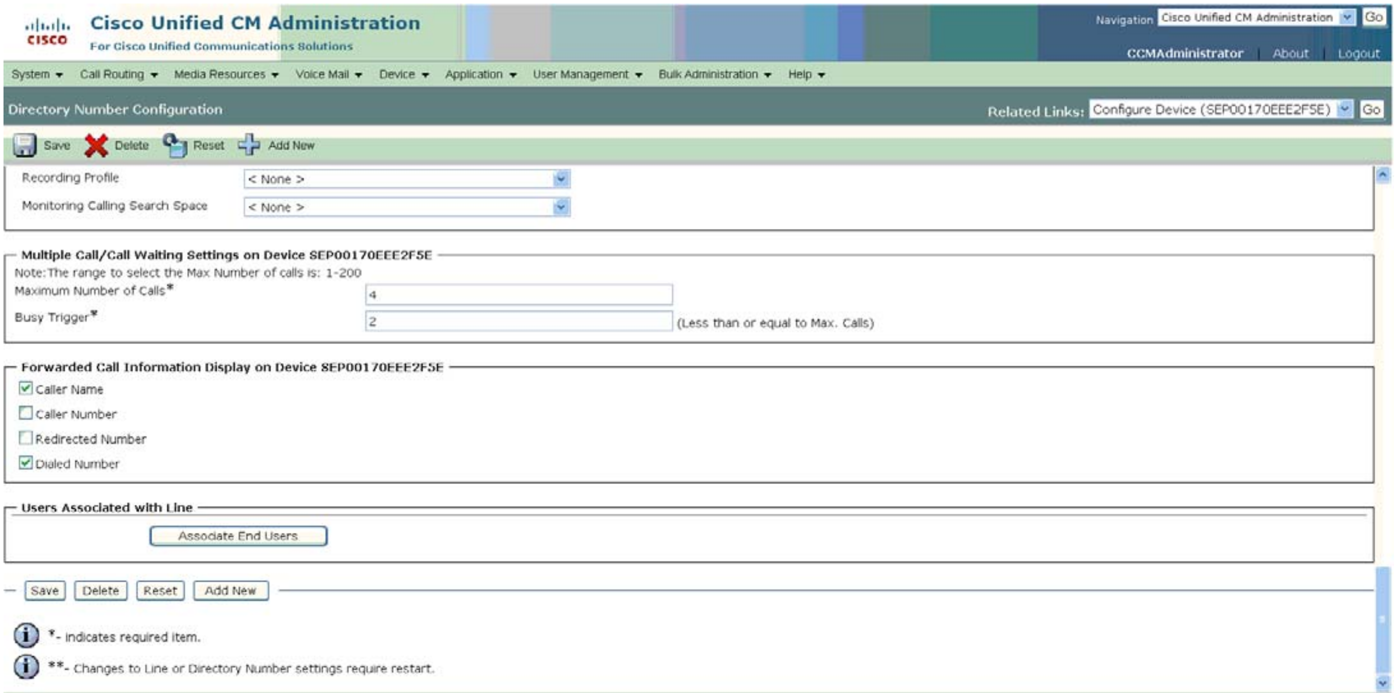
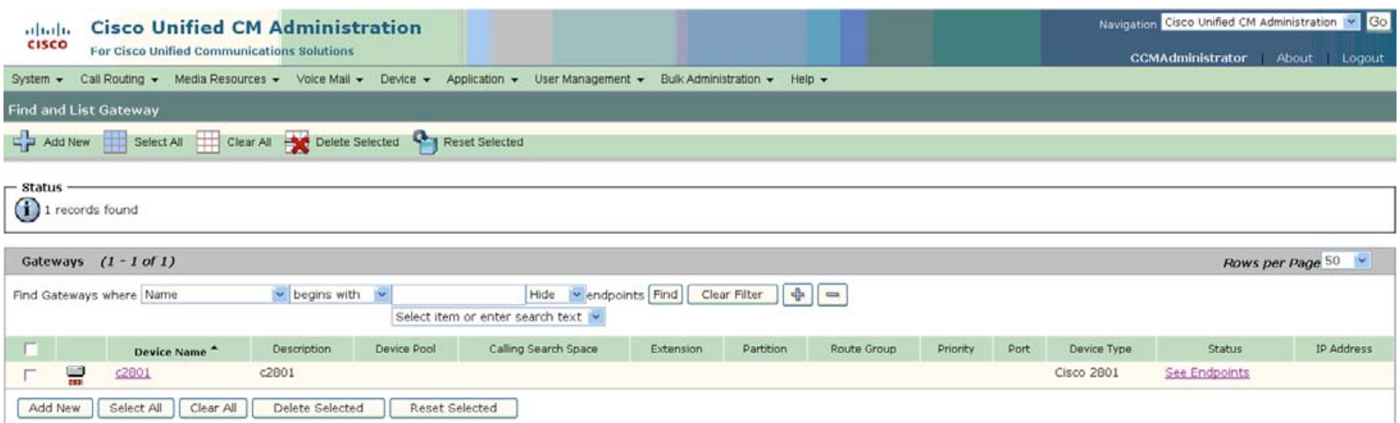
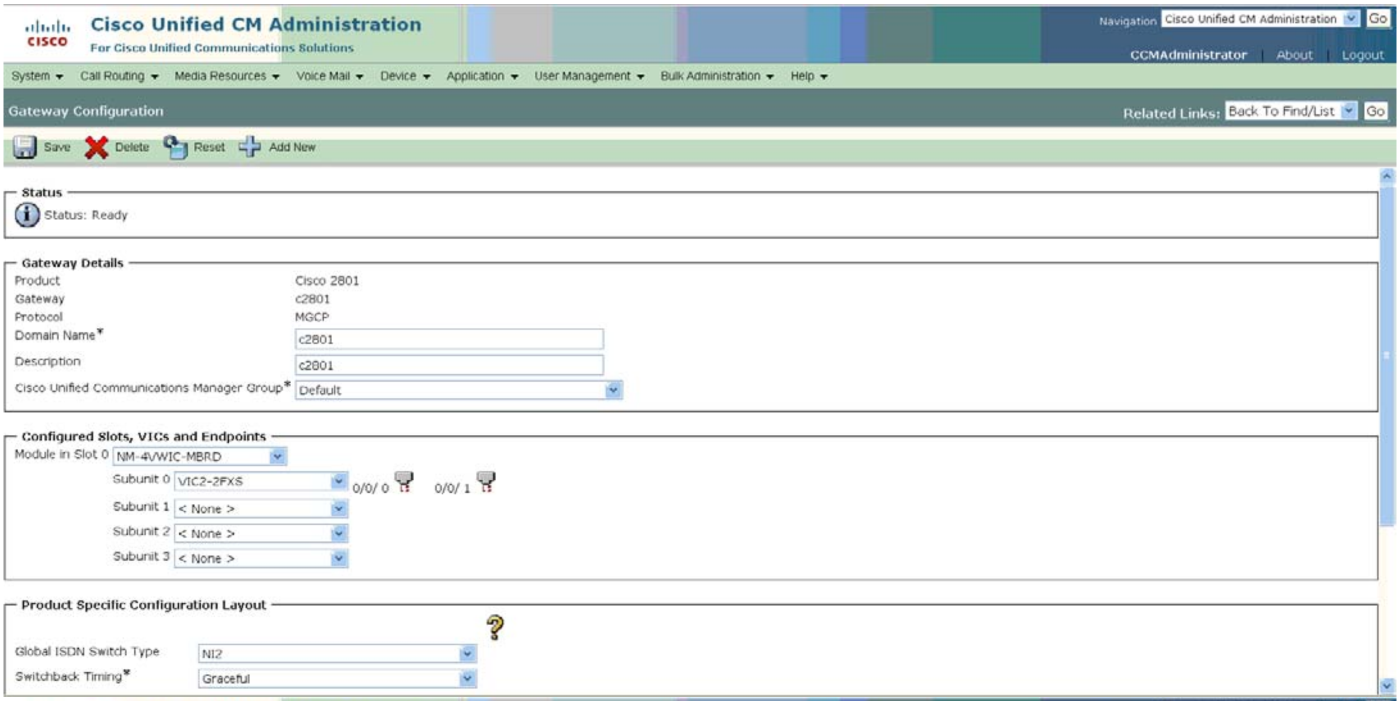
Directory Number Configuration
Related Links: Configure Device (SEP00170EEE2F5E) Go
Save Delete Reset Add New
External Phone Number Mask
Visual Message Waiting Indicator Policy* Use System Policy
Audible Message Waiting Indicator Policy* Default
Ring Setting (Phone Idle)* Ring
Ring Setting (Phone Active) Use System Default Applies to this line when any line on the phone has a call in progress.
Call Pickup Group Audio Alert Setting(Phone Idle) Use System Default
Call Pickup Group Audio Alert Setting(Phone Active) Use System Default
Recording Option* Call Recording Disabled
Recording Profile < None >
Monitoring Calling Search Space < None >
Multiple Call/Call Waiting Settings on Device SEP00170EEE2F5E
Note: The range to select the Max Number of calls is: 1-200
Maximum Number of Calls* 4
Busy Trigger* 2 (Less than or equal to Max. Calls)
Forwarded Call Information Display on Device SEP00170EEE2F5E
Caller Name
Caller Number




## MGCP Gateway (for fax interface)

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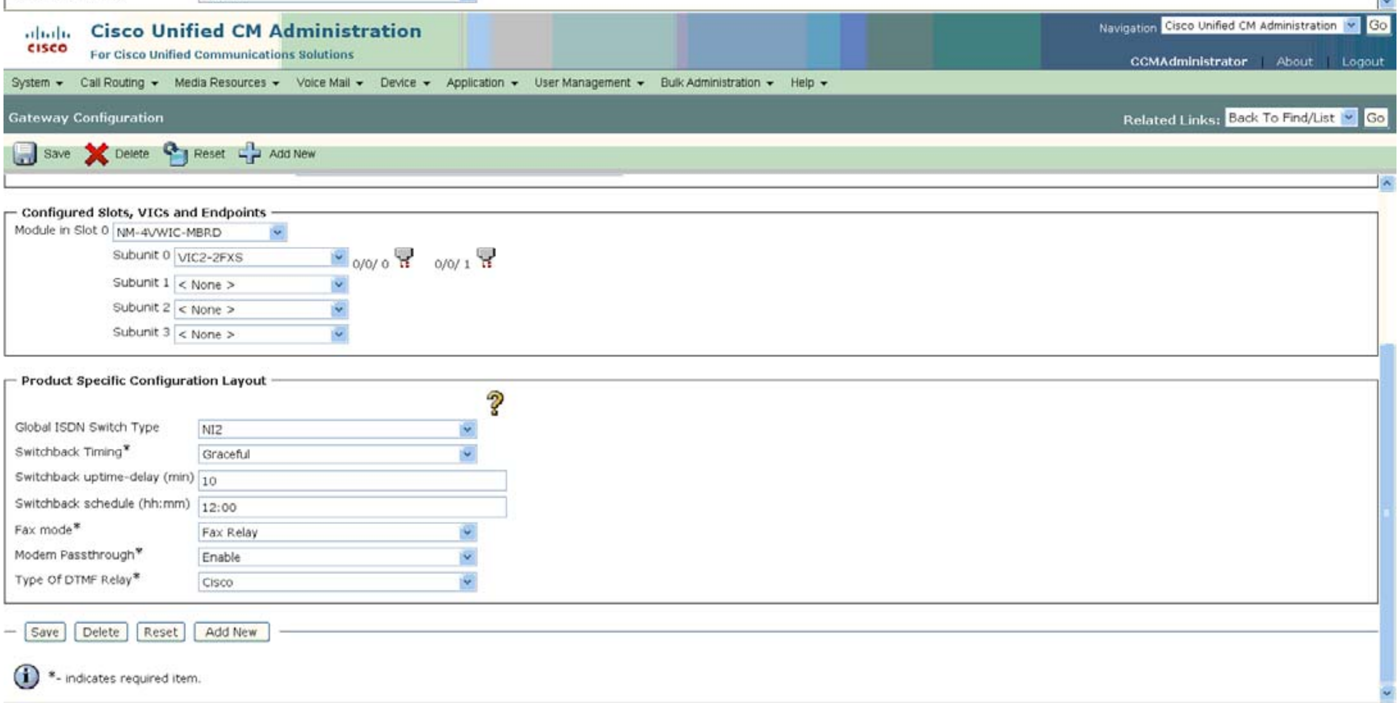
Gateway Configuration
Related Links: Back To Find/List Go
Save Delete Reset Add New
Status
Status: Ready
Gateway Details
Product Cisco 2801
Gateway c2801
Protocol MGCP
Domain Name* c2801
Description c2801
Cisco Unified Communications Manager Group* Default
Configured Slots, VICs and Endpoints
Module in Slot 0 NM-4VWIC-MBRD
Subunit 0 VIC2-2FXS 0/0/ 0 0/0/ 1
Subunit 1 < None >
Subunit 2 < None >
Subunit 3 < None >
Product Specific Configuration Layout
Global ISDN Switch Type NI2
Switchback Timing* Graceful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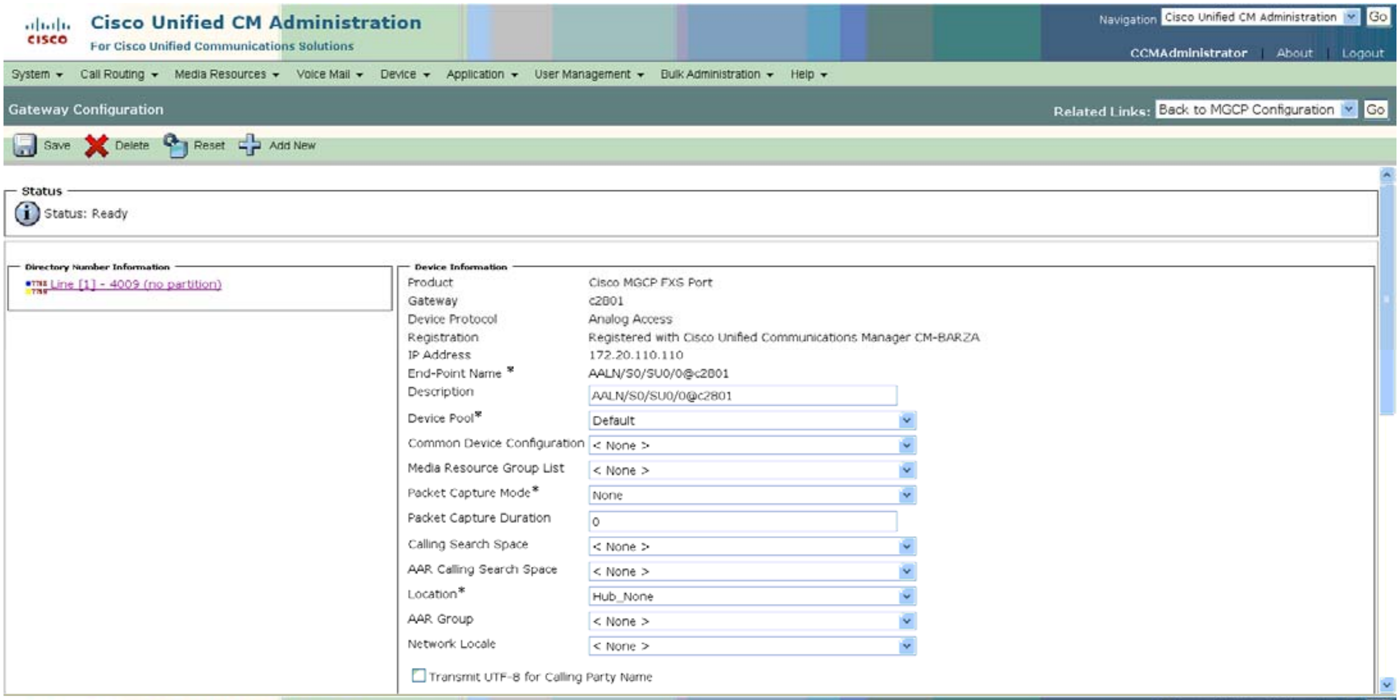
Gateway Configuration
Related Links: Back To Find/List Go
Save Delete Reset Add New
Configured Slots, VICs and Endpoints
Module in Slot 0 NM-4VWIC-MBRD
Subunit 0 VIC2-2FXS 0/0/ 0 0/0/ 1
Subunit 1 < None >
Subunit 2 < None >
Subunit 3 < None >
Product Specific Configuration Layout
Global ISDN Switch Type NI2
Switchback Timing* Graceful
Switchback uptime-delay (min) 10
Switchback schedule (hh:mm) 12:00
Fax mode* Fax Relay
Modem Passthrough* Enable
Type Of DTMF Relay* Cisco
Save Delete Reset Add New
*- indicates required item.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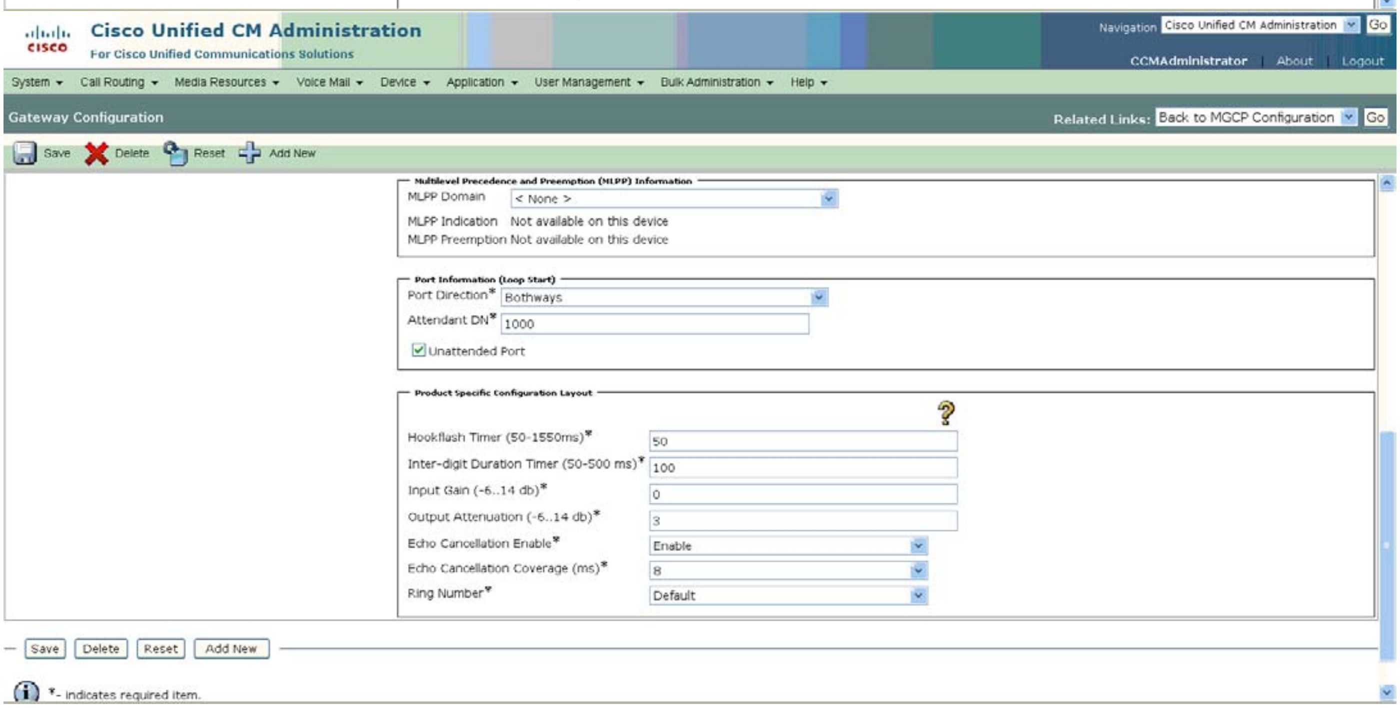
Gateway Configuration
Related Links: Back to MGCP Configuration Go
Save Delete Reset Add New
Status
Status: Ready
Directory Number Information
Line [1] - 4009 (no partition)
Device Information
Product Cisco MGCP FXS Port
Gateway c2801
Device Protocol Analog Access
Registration Registered with Cisco Unified Communications Manager CM-BARZA
IP Address 172.20.110.110
End-Point Name* AALN/S0/SU0/0@c2801
Description AALN/S0/SU0/0@c2801
Device Pool* Default
Common Device Configuration < None >
Media Resource Group List < None >
Packet Capture Mode* None
Packet Capture Duration 0
Calling Search Space < None >
AAR Calling Search Space < None >
Location* Hub_None
AAR Group < None >
Network Locale < None >
Transmit UTF-8 for Calling Party Name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CCMAdministrator About Logout
System Call Routing Media Resources Voice Mail Device Application User Management Bulk Administration Help
Gateway Configuration
Related Links: Back to MGCP Configuration Go
Save Delete Reset Add New
Multilevel Precedence and Preemption (MLPP) Information
MLPP Domain < None >
MLPP Indication Not available on this device
MLPP Preemption Not available on this device
Port Information (Loop Start)
Port Direction* Bothways
Attendant DN* 1000
Unattended Port
Product Specific Configuration Layout
Hookflash Timer (50-1550ms)* 50
Inter-digit Duration Timer (50-500 ms)* 100
Input Gain (-6..14 db)* 0
Output Attenuation (-6..14 db)* 3
Echo Cancellation Enable* Enable
Echo Cancellation Coverage (ms)* 8
Ring Number* Default
Save Delete Reset Add New
*- indicates required item.

**(Optional) Configuring the Cisco IOS Gateway or MGCP (fax T.38 and fax G.711ulaw)**

Critical commands have been bolded

```
c2801# sh run
Building configuration...

Current configuration : 2945 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname c2801
!
boot-start-marker
boot-end-marker
!
logging buffered 100000000
no logging console
enable password cisco
!
no aaa new-model
network-clock-participate wic 1
network-clock-participate wic 2
network-clock-select 1 T1 0/1/0
ip cef
!
!
!
!
no ip domain lookup
ip host CM-BARZA 172.20.110.254
multilink bundle-name authenticated
!
isdn switch-type primary-ni
!
voice-card 0
 dsp services dspfarm
!
!
!
!
!
!
!
!
!
!
!
!
!
```

```
!
!
!
!
!
!
archive
 log config
  hidekeys
!
!
controller T1 0/1/0
 framing esf
 linecode b8zs
 pri-group timeslots 1-24 service mgcp
!
controller T1 0/1/1
 framing esf
 linecode b8zs
 pri-group timeslots 1-24
!
!
!
!
!
interface FastEthernet0/0
 ip address 172.20.110.110 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 shutdown
 duplex auto
 speed auto
!
interface Serial0/1/0:23
 no ip address
 encapsulation hdlc
 isdn switch-type primary-ni
 isdn incoming-voice voice
 isdn bind-l3 ccm-manager
 no cdp enable
!
interface Serial0/1/1:23
 no ip address
 encapsulation hdlc
 isdn switch-type primary-dms100
 isdn protocol-emulate network
 isdn incoming-voice voice
 no cdp enable
!
interface BRI0/2/0
```

```
 no ip address
 isdn switch-type basic-ni
 isdn point-to-point-setup
!
interface BRI0/2/1
 no ip address
 isdn switch-type basic-ni
 isdn point-to-point-setup
!
ip route 0.0.0.0 0.0.0.0 172.20.110.1
!
!
ip http server
no ip http secure-server
!
disable-eadi
!
!
!
control-plane
!
!
!
voice-port 0/0/0
!
voice-port 0/0/1
!
voice-port 0/1/0:23
!
voice-port 0/1/1:23
!
voice-port 0/2/0
!
voice-port 0/2/1
!
ccm-manager mgcp
ccm-manager music-on-hold
ccm-manager config server CM-BARZA
ccm-manager config
!
mgcp
mgcp call-agent CM-BARZA 2427 service-type mgcp version 0.1
mgcp dtmf-relay voip codec all mode out-of-band
mgcp rtp unreachable timeout 1000 action notify
mgcp modem passthrough voip mode nse
mgcp package-capability rtp-package
mgcp package-capability sst-package
mgcp package-capability pre-package
no mgcp fax t38 inhibit[21]
no mgcp package-capability res-package
```

[21] This command "must" be entered in order for fax T.38 to be enabled, in order to enable fax G711ulaw the command must be entered to inhibit T.38

```
no mgcp package-capability fxr-package
no mgcp timer receive-rtcp
mgcp sdp simple
mgcp fax rate 14400
mgcp rtp payload-type g726r16 static
!
mgcp profile default
!
!
!
dial-peer voice 999 pots
 service mgcpapp
 port 0/0/0
!
dial-peer voice 998 pots
 service mgcpapp
 port 0/0/1
!
!
line con 0
 password cisco
 login
line aux 0
line vty 0 4
 exec-timeout 0 0
 password cisco
 login
!
scheduler allocate 20000 1000
end

c2801#
```

## Acronyms

| Acronym | Definitions |
|---|---|
| SIP | Session Initiation Protocol |
| MGCP | Media Gateway Control Protocol |

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