

Nortel CS1000M Release 4.0 using T1 Q.SIG to Cisco Unified Communications Manager 6.0

07/09/2007 Initial Version

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Introduction

This is an application note for connectivity of Nortel CS1000M Release 4.0 PBX with Cisco Unified Communications Manager Release 6.0 using Cisco 3825 T1 QSIG as MGCP gateway.

The network topology diagram (Figure 1) shows the test setup for end-to-end interoperability with the Cisco Unified Communications Manager connected to the PBX via a Cisco 3825 T1 QSIG link as MGCP gateway.

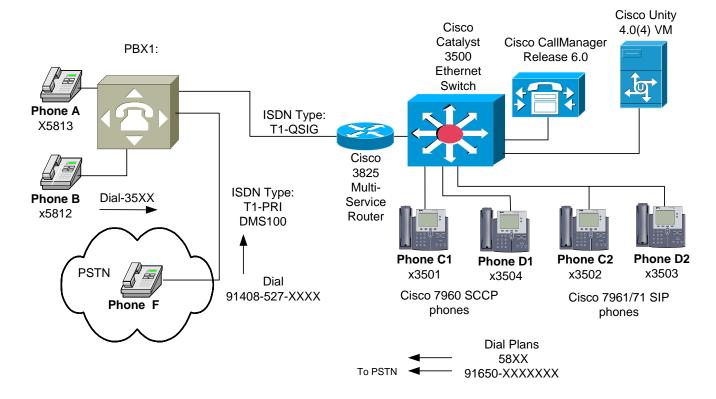
Connectivity is achieved by using the PRI QSIG T1 protocol type on the MGCP gateway and ISO QSIG switch type on the of Nortel CS1000M Release 4.0 PBX.

This Application Note uses the Cisco 3825 T1 voice gateway, however other Cisco voice gateways are also an option to use since Cisco Unified Communications Manager QSIG implementation does not depend on the physical interface.



Network Topology

Figure 1. Basic Call Setup



Limitations

Sending Busy Name

Both the Cisco Unified Communications Manager and the Nortel PBX sends a "Busy Name" information in its Disconnect Message to the originating side when receiving a call directed to a station that is currently in a busy state. However, this information is not displayed on the originating station phone. Upon examination of the call traces, the CUCM sends the "Busy Name" information using InvokeID 3. On the other hand, the Nortel PBX sends this information using InvokeID 256.

Call Forwarding (Diversion) by Reroute

The Nortel does not initiate a Call Diversion by Reroute to deflect a call that is meant for a local station programmed to forward all calls to another station within the network. Thus, although the call was completed, no Reroute was done during the call. The Nortel, however, will respond to a Call Reroute message sent by another node and respond by initiating a new SETUP message to an alternate route.

Path Replacement for Call Diversion by Forward

As of the publication of this Application Note, the Nortel CS1000M PBX Release 4.0 did not initiate Path Replacement Proposal for diverted calls in a Call Forward scenario to optimize the path for a call that is meant for a Cisco Unified Communications Manager station programmed to forward all calls to another Nortel station within the network. Thus, although the call was completed, no Path Replacement Proposal was sent by Nortel during the call. The Nortel, however, will respond to a Path Replacement Proposal message sent by another node and respond by initiating a new SETUP message to an alternate route.



As a work around, in cases where the Path Replacement is not initiated by the PBX, Call Forward by Reroute may be used on Cisco Unified Communications Manager 6.0 instead of Path Replacement. This will enable the optimal use of path between the originating station and terminating station by using one call leg instead of two call legs.

Note: Path Replacement for Call Diversion by Forward did work in previous tests using Nortel Meridian 1 PBX Release 25.15, Nortel Meridian 1 PBX Release 25.40 and Cisco Unified Communications Manager 5.0. A call was placed from a station on Nortel Meridian 1 PBX Release 25.15 to station on Cisco Unified Communications Manager which forwarded to a station on Nortel Meridian 1 PBX Release 25.40. The Nortel Meridian 1 PBX Release 25.15 proposed Path Replacement and an optimized path was used for that call. The Nortel CS1000M PBX used for this test may not have the appropriate patch to fix this bug.

System Components

Hardware Requirements

The following hardware is required:

Cisco Catalyst 3500

Cisco 3845 router with VWIC2-2MFT-T1/E1 on NM-HDV

Cisco Unified Communication Manager Server

Nortel CS1000M PBX

Software Requirements

The following software is required:

Cisco Unified Communications Manager Release 6.0

PBX software release 4.0

Cisco IOS Release version 12.4

Features

This section lists new and changed features and features that are not supported.

Features Supported

CLIP-Calling Line (Number) Identification Presentation

CLIR-Calling Line (Number) Identification Restriction

CNIP-Calling Name Identification Presentation

CNIR-Calling Name Identification Restriction

COLP-Connected Line (Number) Identification Presentation

COLR- Connected Line (Number) Identification Restriction

CONP-Connected Name Identification Presentation

CONR- Connected Name Identification Restriction

Sending Alerting Name



Sending Busy Name - See Limitations Section

CT-Call Transfer (by join)

CFU-Call Forwarding Unconditional (by join)

CFB-Call Forwarding Busy (by join)

CFNR-Call Forwarding No Reply (by join)

CFU-Call Forwarding Unconditional (by Reroute) - see Limitations Section

CFB-Call Forwarding Busy (by Reroute) - see Limitations Section

CFNR-Call Forwarding No Reply (by Reroute) – see Limitations Section

CCBS-Call Completion to Busy Subscriber

CCNR-Call Completion No Reply

ANF-PR-Additional Network Feature Path Replacement (for Call Transfer by join)

ANF-PR-Additional Network Feature Path Replacement (for Call Diversion by forward switching) - see Limitations Section

ANF-PR-Additional Network Feature Path Replacement (for Trombone connection)

MWI- Message Waiting Indication (lamp ON, lamp OFF)

Configuration

This section contains configuration menus and commands and describes configuration sequences and tasks.

Configuring the Nortel CS1000M PBX with Software Release 4.0

Configure in the following sequence:

- 1. Configure common equipment
- 2. Configure the D-Channel
- 3. Configure the Route Data Block.
- 4. Configure the Trunk Data Block
- 5. Configure Route Data Block
- 6. Configure the Coordinated Dialing Plan
- 7. Configure the Digital Station Phone



Configuration Menus and Commands Nortel Configuration COMMON EQUIPMENT CONFIGURATION (LD 17) REQ prt TYPE cequ CEQU MPED 8D SUPL 000 004 008 012 016 032 036 040 044 048 064 068 072 V096 V100 V104 V108 V112 TDS 000 CONF 029 030 031 062 094 095 DLOP NUM DCH FRM TMDI LCMT YALM T1TE TRSH PRI 02 23 ESF YES B8S FDL 0 00 03 23 ESF YES B8S FDL 0 00 DTI2 MISP REQ ********************************* D-CHANNEL CONFIGURATION (LD 17) REO PRT TYPE ADAN DCH 13 ADAN DCH 13 CTYP TMDI CARD 03 PORT 1 DES appnotes USR PRI DCHL 3 OTBF 32 PARM RS232 DTE DRAT 64KC CLOK EXT IFC ISGF PINX_CUST 0 ISDN_MCNT 300 CLID OPT0 CO_TYPE STD SIDE USR CNEG 1 RLS ID ** RCAP COLP NDI CCBI CCNI PRI DV3I CTI QMWI PR_TRIGS DIV 23 CNG 2 3 CTR2 2 3



PTYP PRI AUTO NO DNIS NO DCDR NO

PR_RTN NO MBGA NO **OVLR YES** DIDD 0 **OVLS YES** OVLT 0 T310 120 T2003 T203 10 N2003 N201 260 K 7 REQ ROUTE DATE BLOCK CONFIGURATION (LD 16) REQ: PRT TYPE: RDB CUST 0 **ROUT 103** TYPE RDB CUST 00 **DMOD ROUT 103** DES APPNOTE TKTP TIE NPID_TBL_NUM 0 ESN NO CNVT NO SAT NO RCLS EXT VTRK NO NODE DTRK YES **BRIP NO** DGTP PRI ISDN YES MODE PRA IFC ISGF SBN NO PNI 00001 NCNA NO NCRD NO CHTY BCH CTYP UKWN INAC NO ISAR NO CPFXS YES DAPC NO INTC NO DSEL VOD



ICOG IAO SRCH RRB TRMB YES

STEP ACOD 4003 TCPP NO TARG 01 CLEN 1 BILN NO OABS **INST ANTK** SIGO STD **ICIS YES** TIMR ICF 512 OGF 512 EOD 13952 NRD 10112 DDL 70 ODT 4096 RGV 640 GRD 896 SFB 3 NBS 2048 NBL 4096 IENB 5 TFD 0 PAGE 002 VSS 0 VGD 6 DRNG NO CDR NO VRAT NO MUS NO FRL 00 FRL 10 FRL 20 FRL 30 FRL 40 FRL 50 FRL 60 FRL 70 OHQ NO OHQT 00 CBQ NO **AUTH NO** TTBL 0 ATAN NO PLEV 2 ALRM NO ART 0 SGRP 0 AACR NO



REQ:

REQ: PRT TYPE: TNB TN 3 1
DATE PAGE DES
DES APPNOTES TN 003 01
TYPE TIE CDEN SD CUST 0
TRK PRI PDCA 1 PCML MU
NCOS 0 RTMB 103 1 B-CHANNEL SIGNALING
TGAR 0 AST NO
IAPG 0 CLS UNR DTN WTA LPR APN THFD HKD P10 VNL
TKID AACR NO DATE 6 JUN 2007

REQ PRT
CUST 0 FEAT CDP TYPE DSC
DSC 35 DSC 35 FLEN 0
DSP LSC RLI 3 NPA
NXX

REQ PRT CUST 0
FEAT RLB RLI 3
RLI 3



ENTR 0 LTER NO **ROUT 103** TOD 0 ON 1 ON 2 ON 3 ON 4 ON 5 ON 6 ON 7 ON VNS NO CNV NO EXP NO FRL 0 DMI 0 FCI 0 FSNI 0 SBOC NRR **IDBB DBD** IOHQ NO OHQ NO CBQ NO ISET 0 NALT 5 MFRL 0 OVLL 1

DIGITAL STATION PHONE (2616) CONFIGURATION (LD 11)

REQ: PRT TYPE: 2616

TN 4003

DATE

PAGE

DES

DES APP

TN 004 0 00 03

TYPE 2616

CDEN 8D

CUST 0

AOM 0

FDN 3503

TGAR 0

LDN NO

NCOS 0 SGRP 0

RNPG 0

SCI 0

SSU

XLST

CLS CTD FBD WTA LPR MTD FND HTD ADD HFD

MWA LMPN RMMD SMWD AAD IMD XHD IRD NID OLD VCE DRG1

 ${\tt POD\ DSX\ VMD\ CMSD\ SLKD\ CCSD\ SWD\ LND\ CNDA}$

CFTA SFD MRD DDV CNID CDCA MSID DAPA BFED RCBD

ICDD CDMD LLCN MCTD CLBD AUTU

GPUD DPUD DNDD CFXA ARHD CLTD ASCD



```
CPFA CPTA ABDD CFHA FICD NAID BUZZ AGRD MOAD AHD
 DDGA NAMA
 DRDD EXR0
 USMD USRD ULAD RTDD RBDD RBHD PGND OCBD FLXD FTTC DNDY DNO3 MCBN CDMR
CPND_LANG ENG
RCO 0
EFD 3503
HUNT 3503
EHT 3503
LHK 0
PLEV 02
CSDN
AST
IAPG 0
AACS NO
ITNA NO
DGRP
MLWU_LANG 0
DNDR 0
KEY 00 SCR 5813 0 MARP
  CPND
   NAME TONY BLAIR
   XPLN 10
   DISPLAY_FMT FIRST,LAST
 01
 02
 03 CFW 4 3503
 04 AO6
 05 TRN
 06
 07
 08
 09
 10
 11
 12
 13
 14
 15 RGA
DATE 22 JUN 2007
NACT
SOFTWARE RELEASE (LD 22)
*******************************
REQ ISS
BRANCH MEDIA GATEWAY
VERSION 2121
RELEASE 4
ISSUE 00 T \,+\,
IDLE_SET_DISPLAY NORTEL
```



REQ

MUS

ACDA

MWC

AAB

GRP

NFCR ACDD

LNK

FCA SR

AA HIST 44

45

46

47

48 49

52

55

53 54

50 51

FEATURES / PACKAGES INSTALLED (LD 22) REQ PRT TYPE PKG **OPTF** 1 **CUST** 2 CDR 4 CTY 5 7 RAN 8 TAD DNDI 9 **EES** 10 INTR 11 ANI 12 **ANIR** 13 **BRTE** 14 **DNDG** 16 17 MSB SS25 18 **DDSP** 19 **ODAS** 20 DI 21 CHG 23 CAB 24 **BAUT** 25 **CASM** 26 27 CASR **BQUE** 28 NTRF 29 **NCOS** 32 **CPRK** 33 SSC 34 **IMS** 35 UST 35 UMG 35 36 ROA NSIG 37 **MCBQ** 38 39 NSC 40 **BACD ACDB** 41 **ACDC** 42 **LMAN** 43



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DLDN	76
CSL	77
OOD	79
SCI	80
CCOS	81
CDRQ	83
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FTDS	87
DSET	88
TSET	89
LNR	90
DLT2	91
PXLT	92
SUPV	93
CPND	95
DNIS	98
BGD	99
RMS	100
MR	101
AWU	102
PMSI	103
LLC	105
MCT	107
ICDR	108
APL	109
TVS	110
TOF	111
IDC	113
AUXS	114
DCP	115
PAGT	116
CBC	117
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EMUS	119
PLDN	120
SCMP	121
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BKI	123
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ECT 215 216 BRI **IVR** 218 MWI 219 MSDL 222 FC68 223 M911 224 225 **CWNT** 229 SSAU **BRIT** 233 **FCDR** 234 235 **BRIL** MCMO 240 MULTI_USER 242 ALRM_FILTER 243 SYS_MSG_LKUP 245 VMBA 246 247 CALL_ID M911 ENH 249 **DPNA** 250 **SCDR** 251

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ARFW 253 **PHTN** 254 **ADMINSET** 256 258 ATX CDRX 259 QSIG 263 NI-2 291 **IPEX** 295 MAT 296 MOA 297 CPP 301 **QSIGGF** 305 **CPRKNET** 306 **PAGENET** 307 CPCI 310 NGCC 311 TATO 312 OPEN_ALARM 315 316 **QSIG-SS** QTN 321 **NGEN** 324 **RANBRD** 327 **MUSBRD** 328 **ESA** 329 ESA_SUPP 330 ESA_CLMP 331 **CNUMB** 332 333 **CNAME** NI-2_CBC 334 **MEET** 348 350 MC32 DBA 351



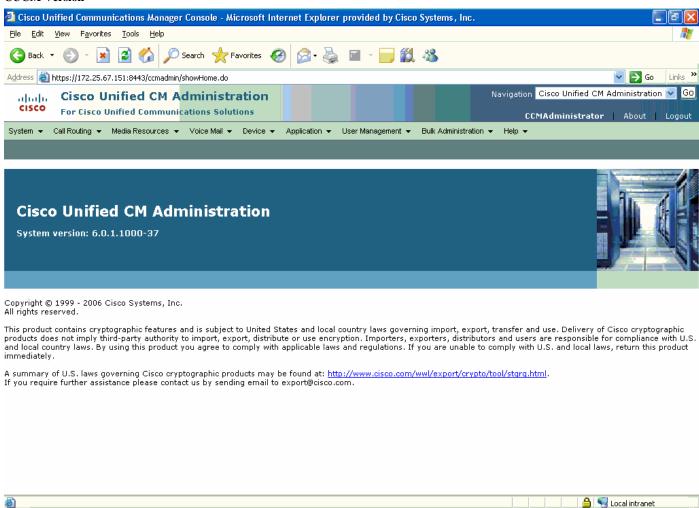
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REQ



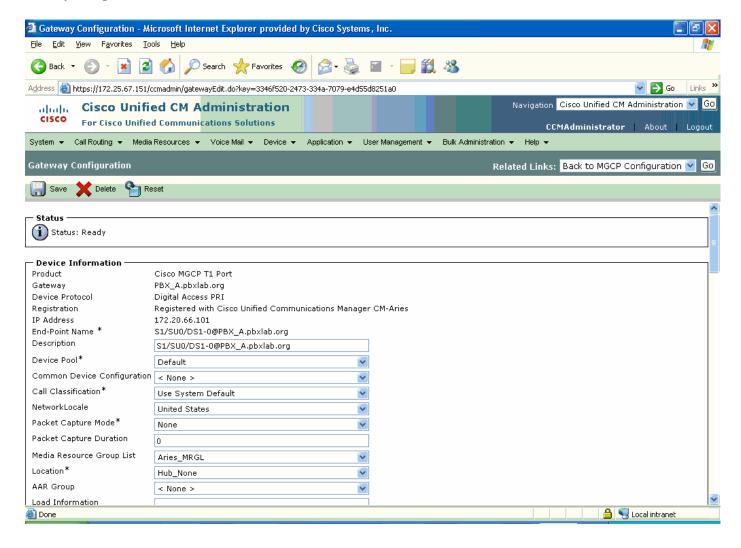
Configuring the Cisco Unified Communication Manager

CUCM Version

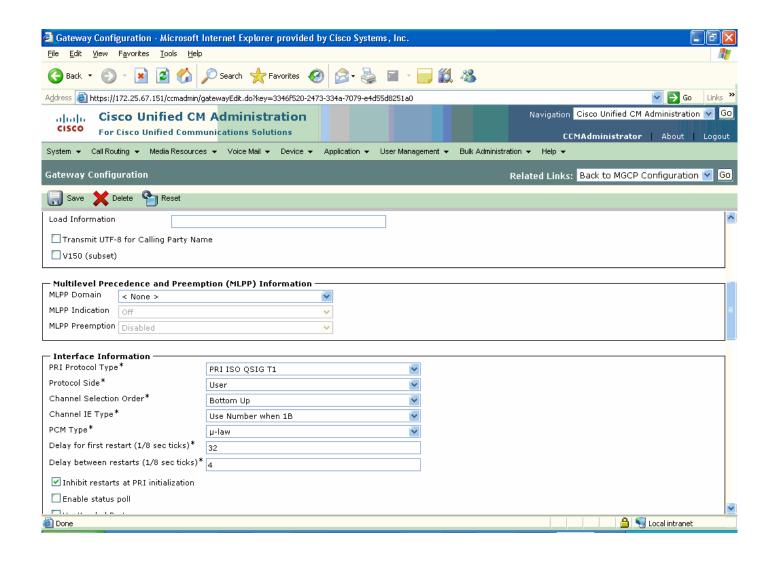




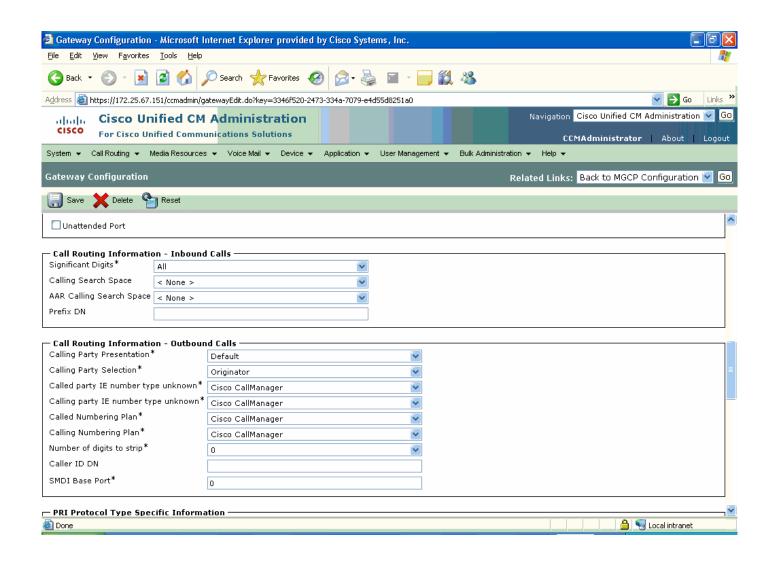
Gateway Configuration



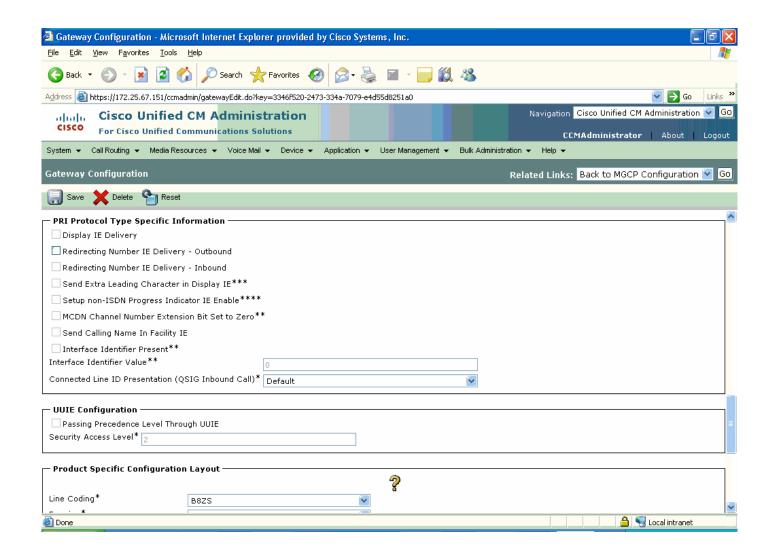




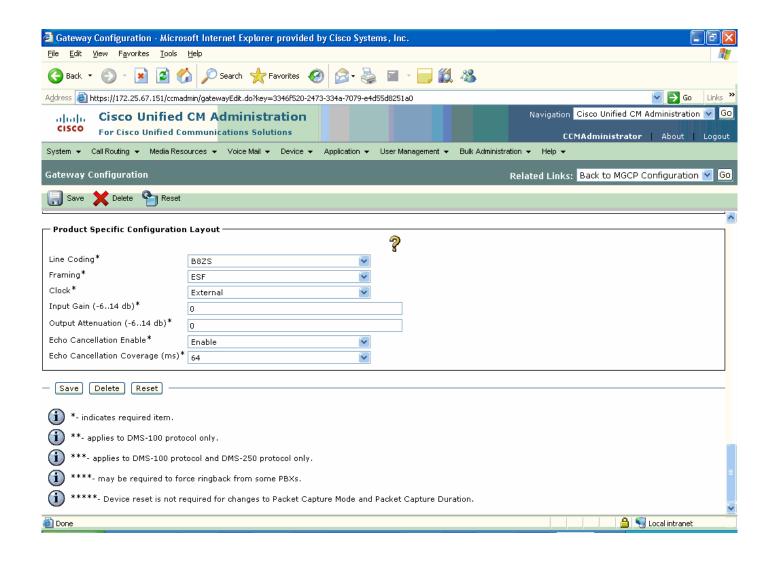






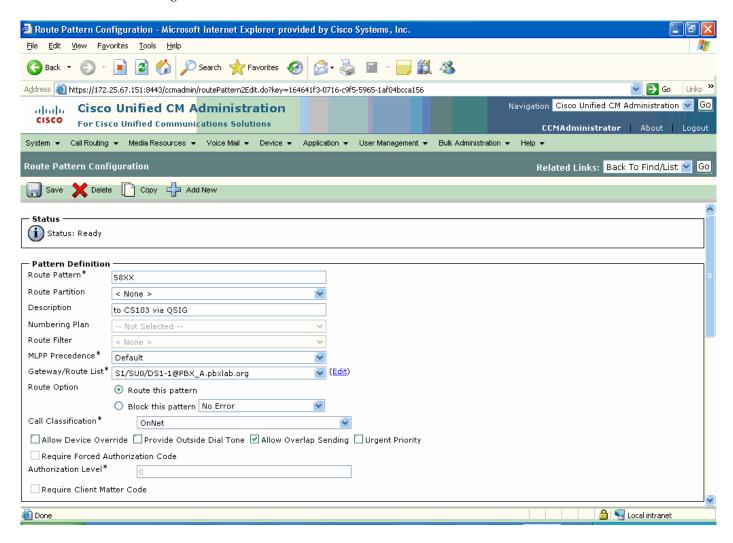




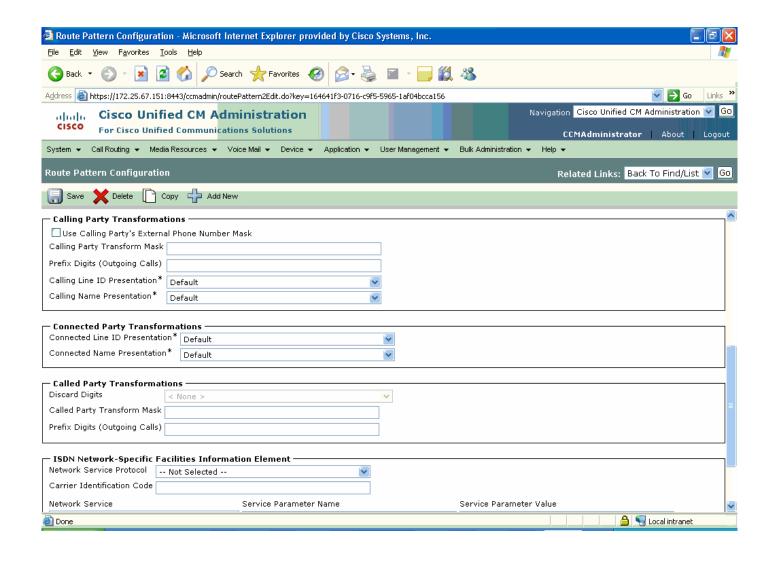




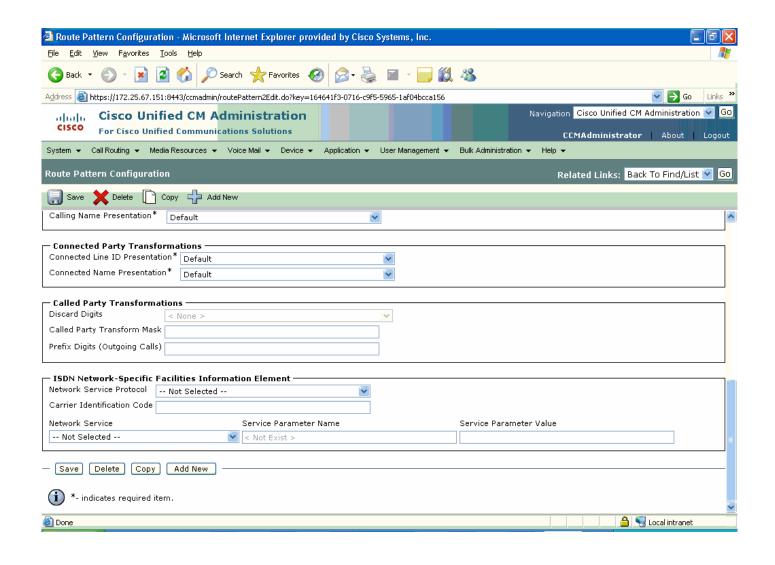
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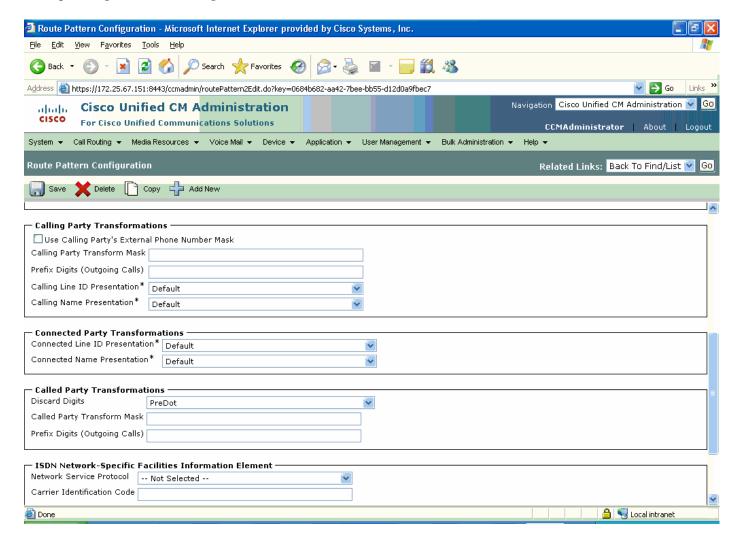




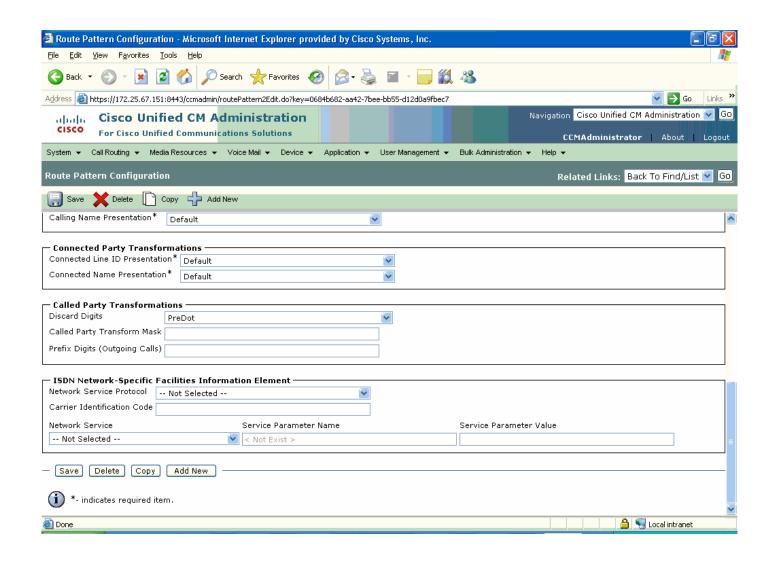




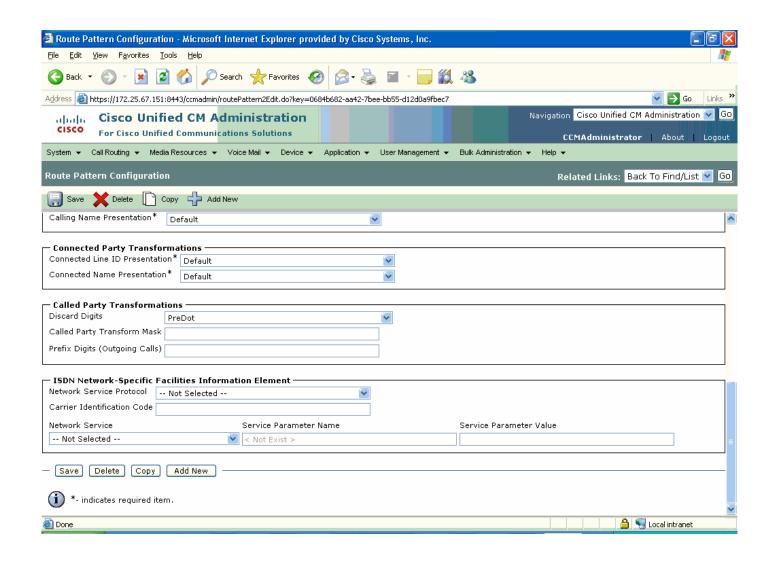
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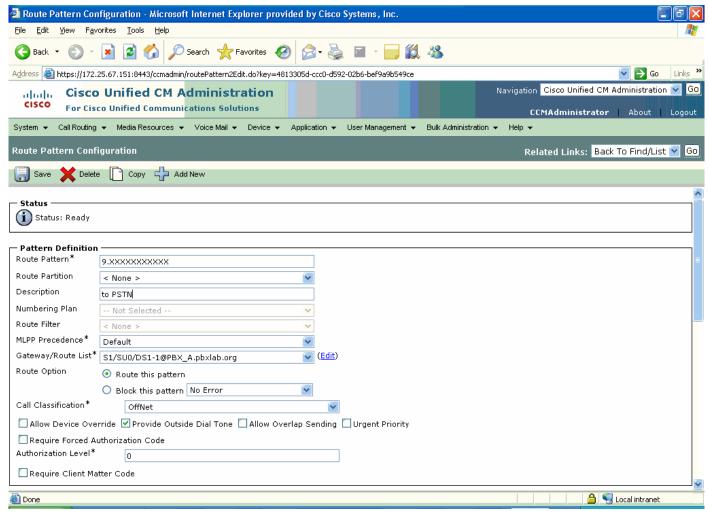




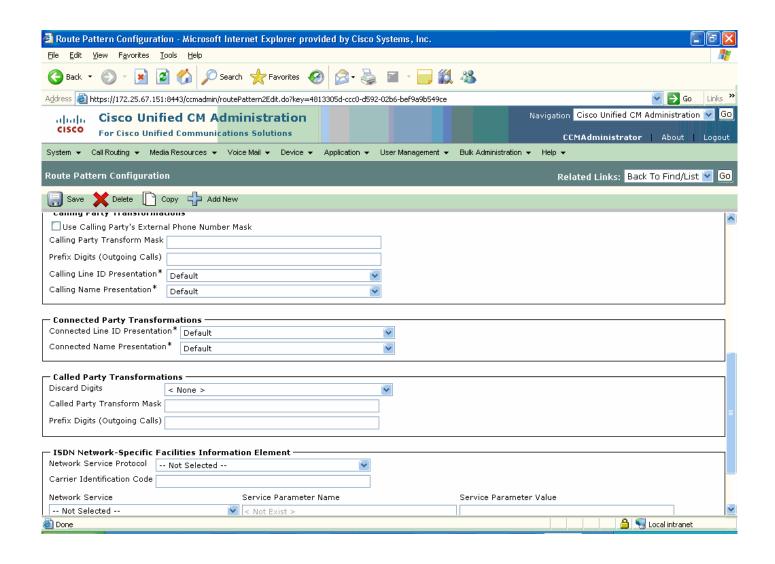




PSTN Route Pattern Configuration

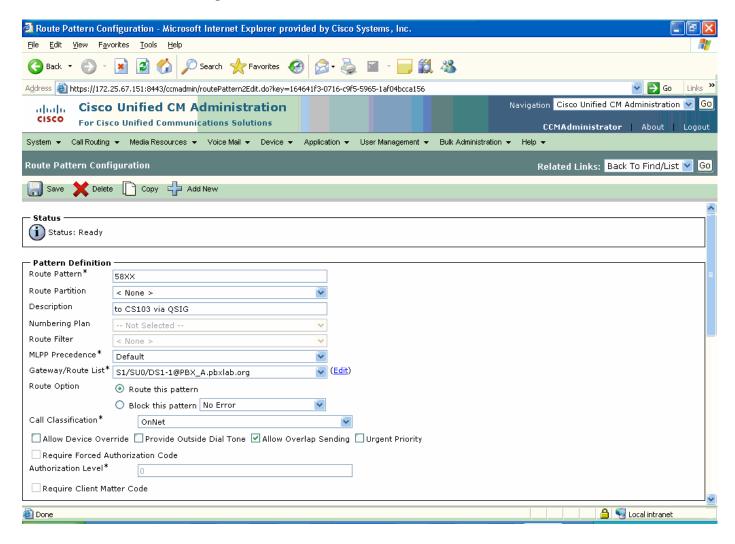




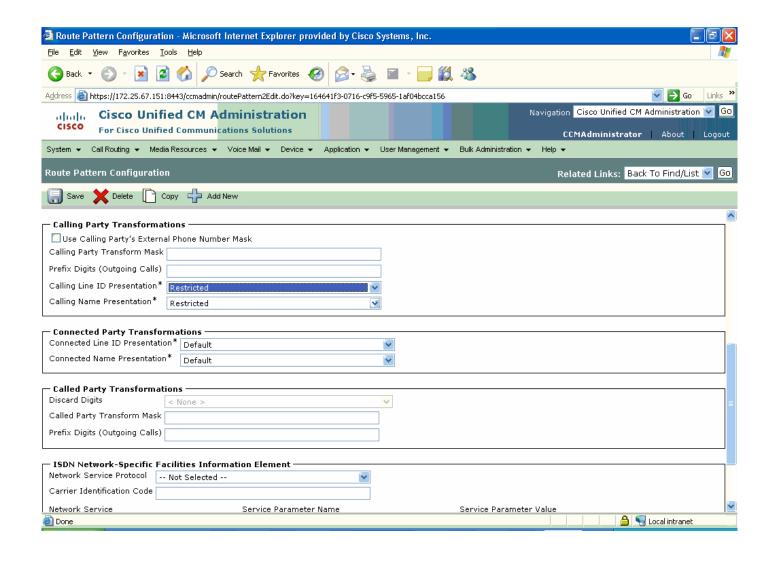




CLIR and CNIR Route Pattern Configuration

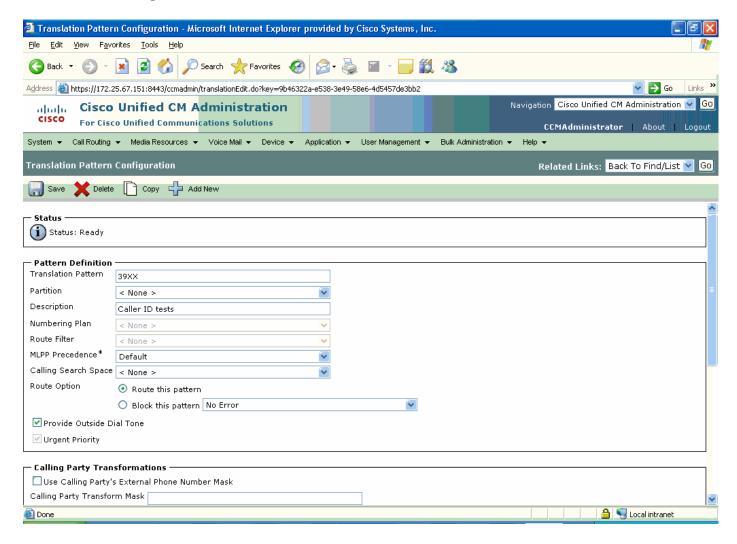




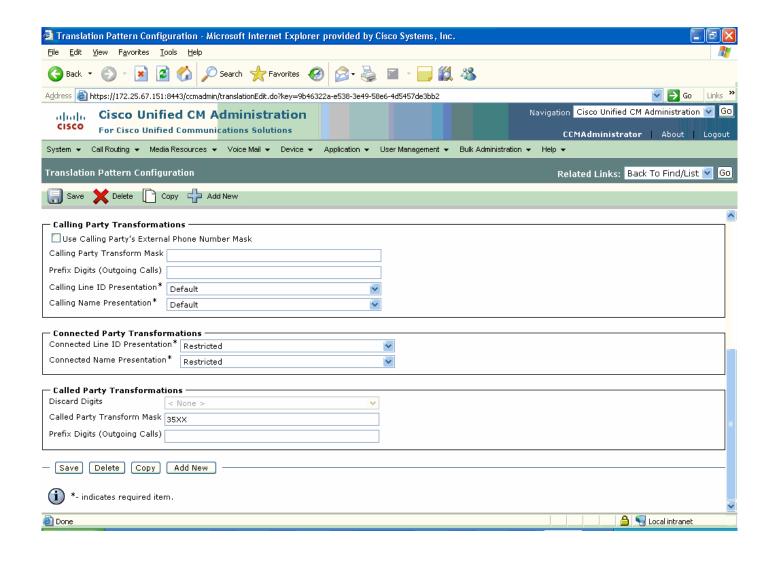




COLR and CONR Configuration

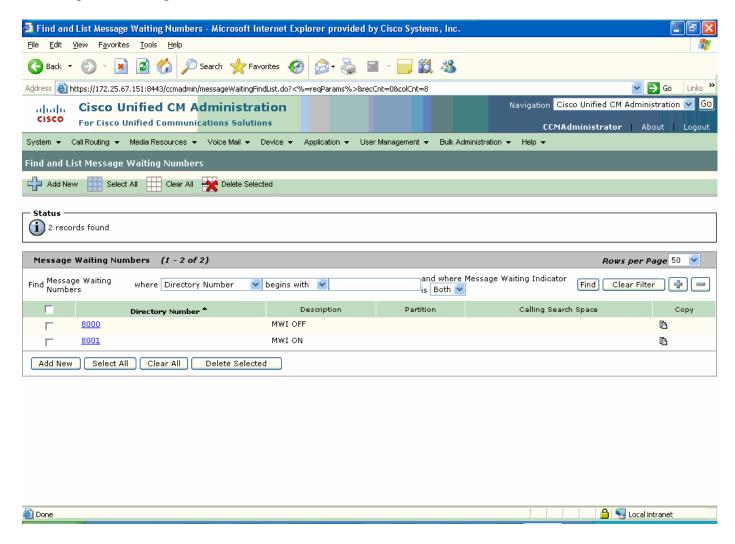




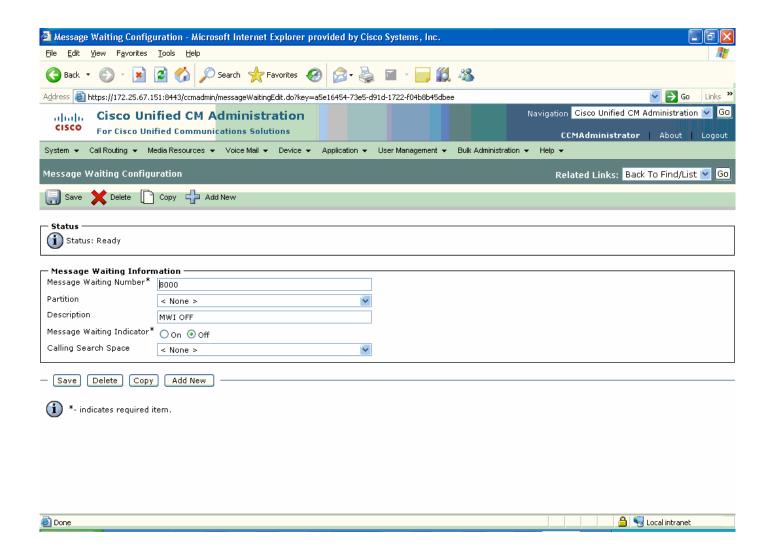




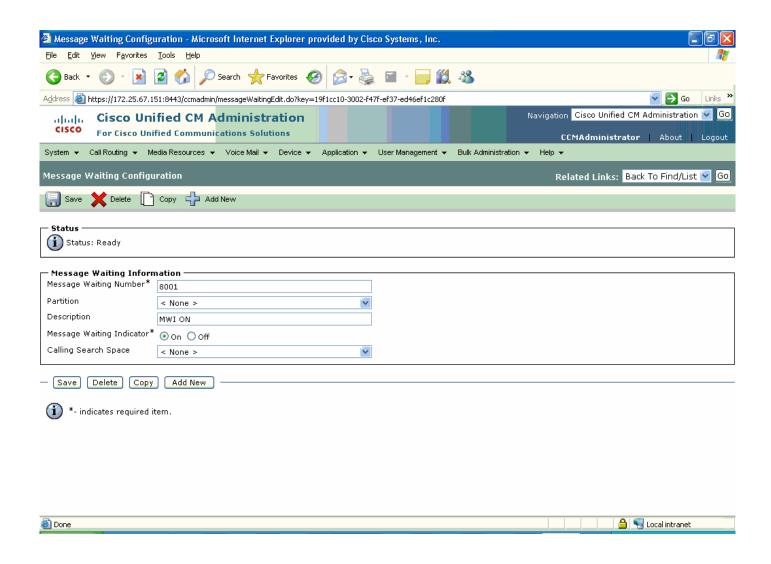
MWI Lamp ON/OFF Configuration





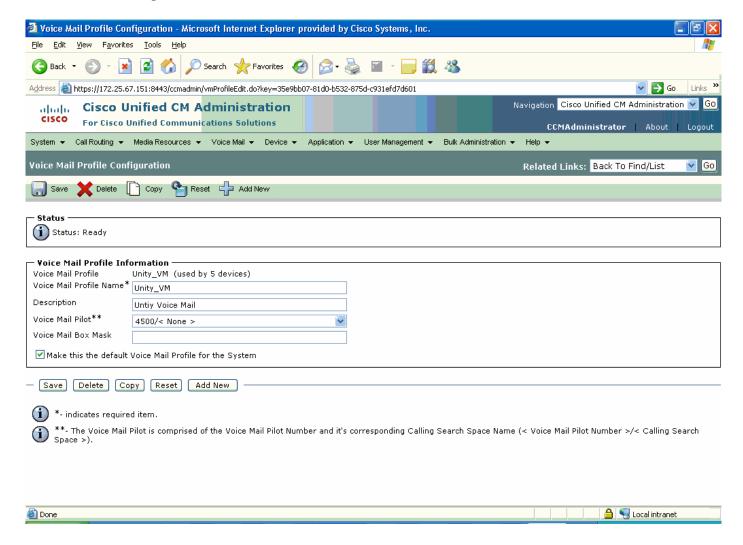






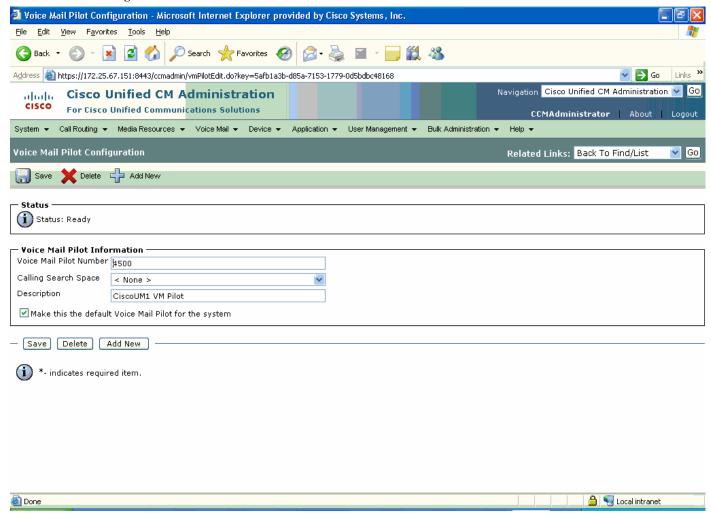


Voice Mail Profile Configuration



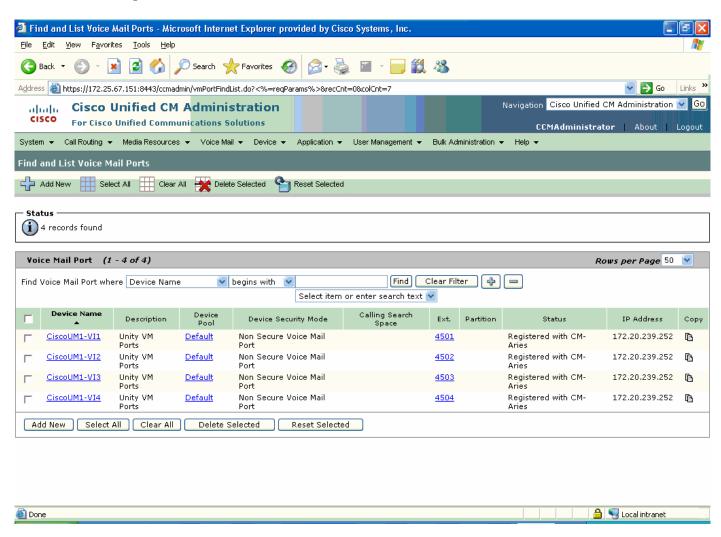


Voice Mail Pilot Configuration

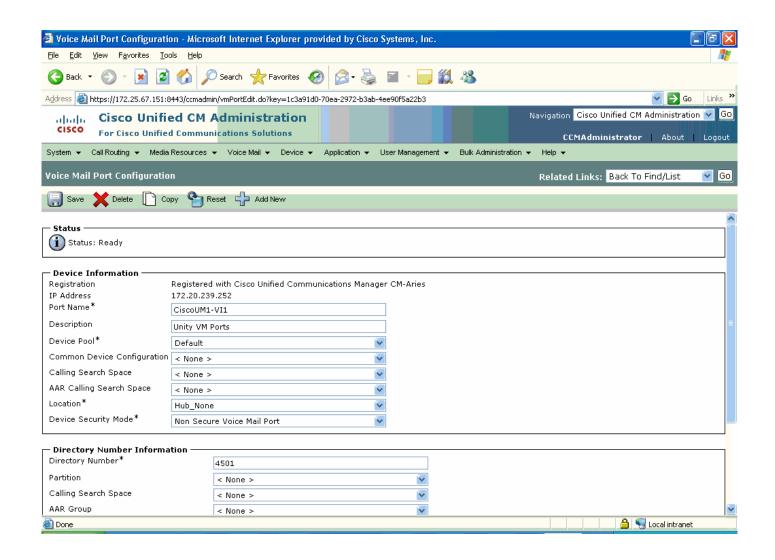




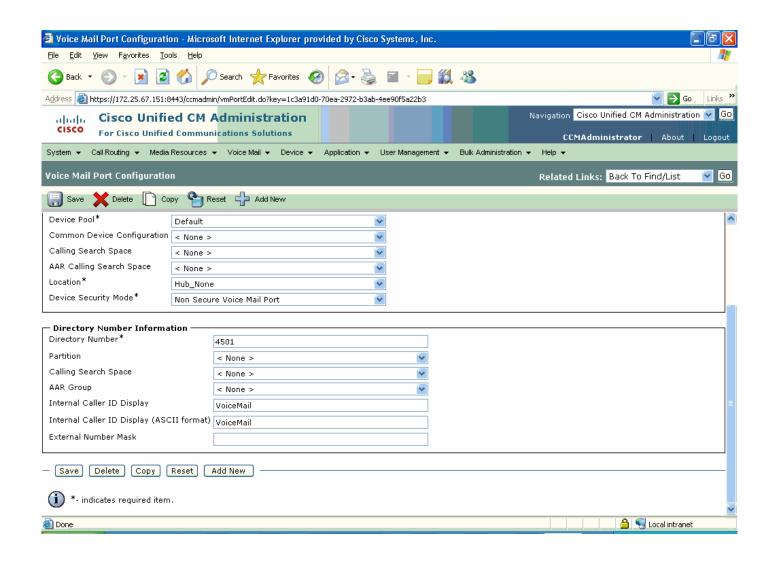
Voice Mail Ports Configuration





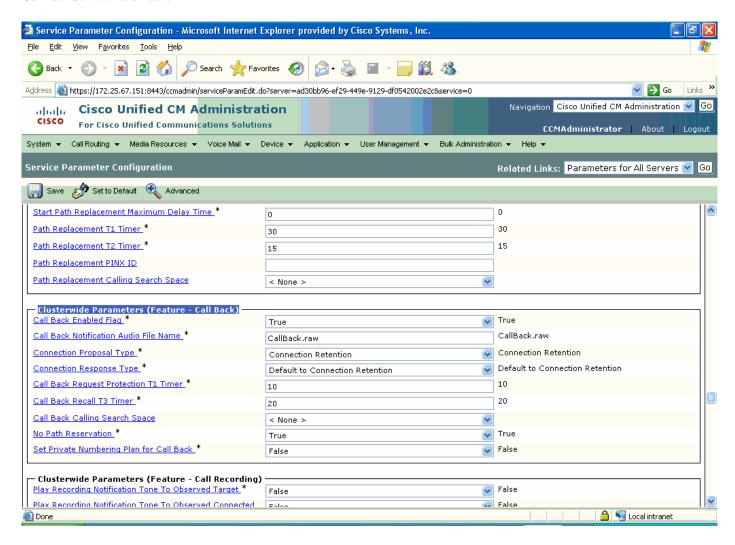






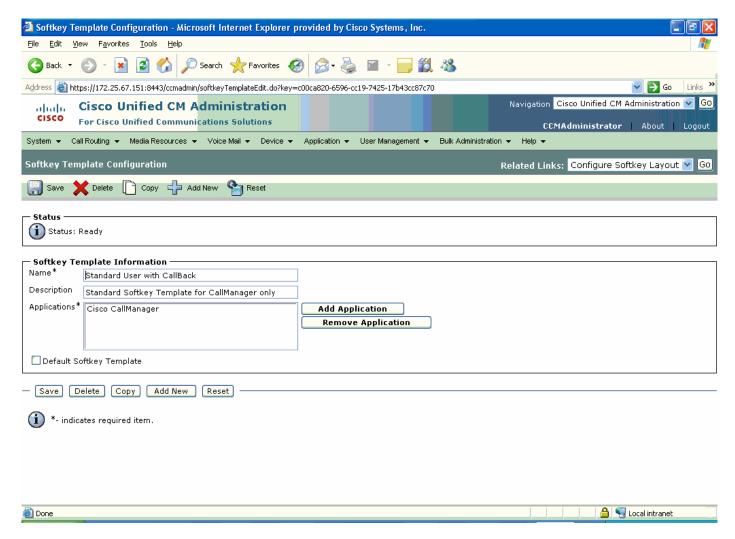


CallBack Service Parameters

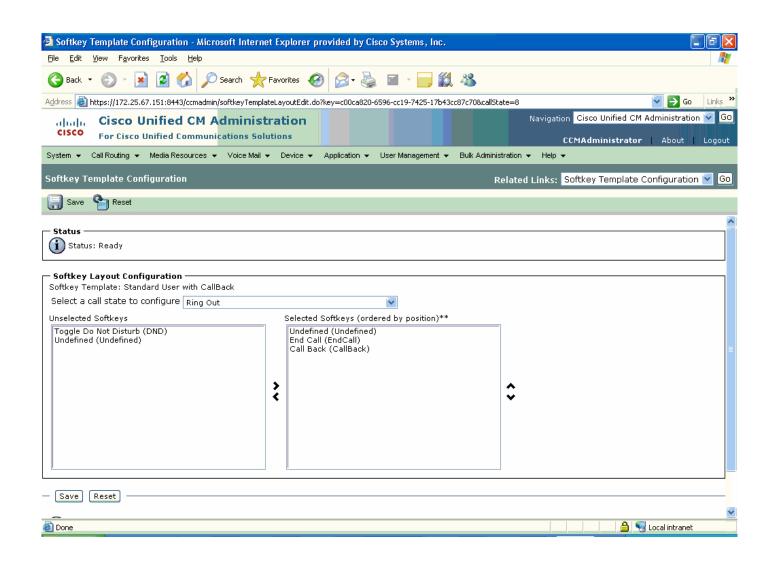




CallBack Softkey Configuration

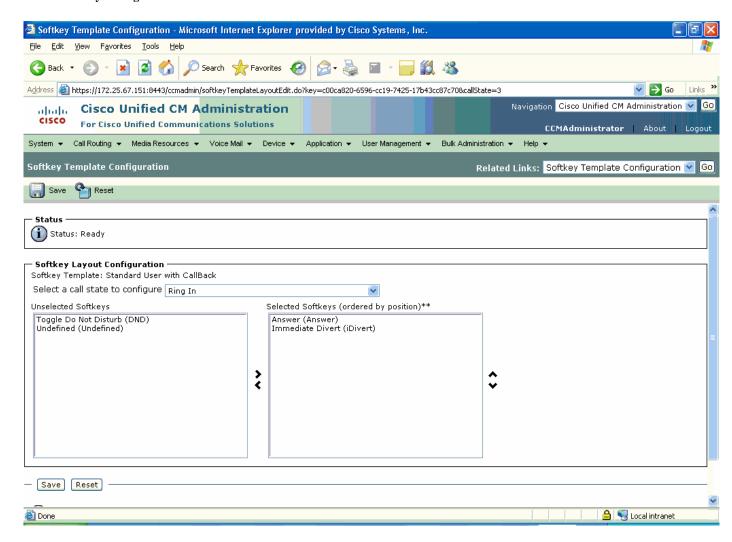




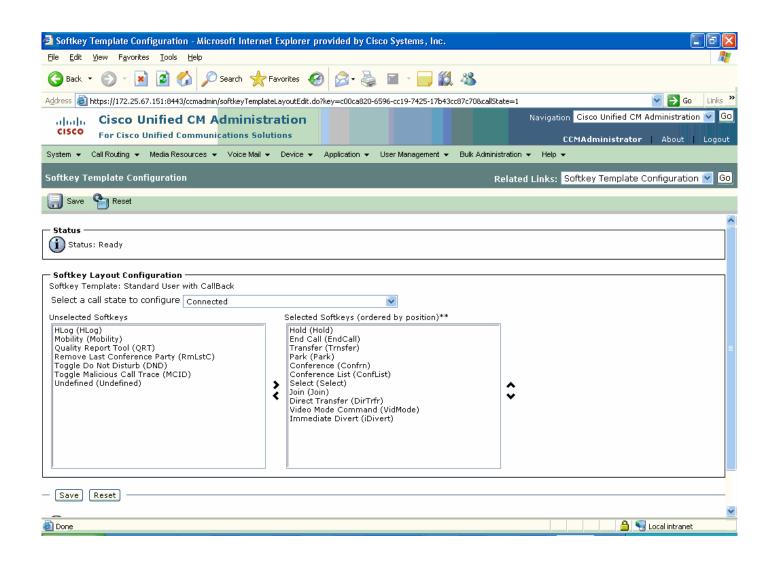




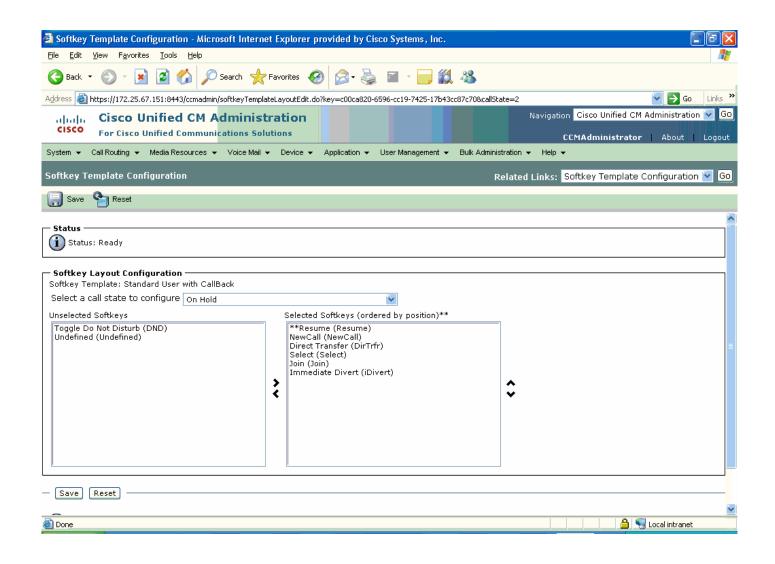
iDivert Softkey Configuration



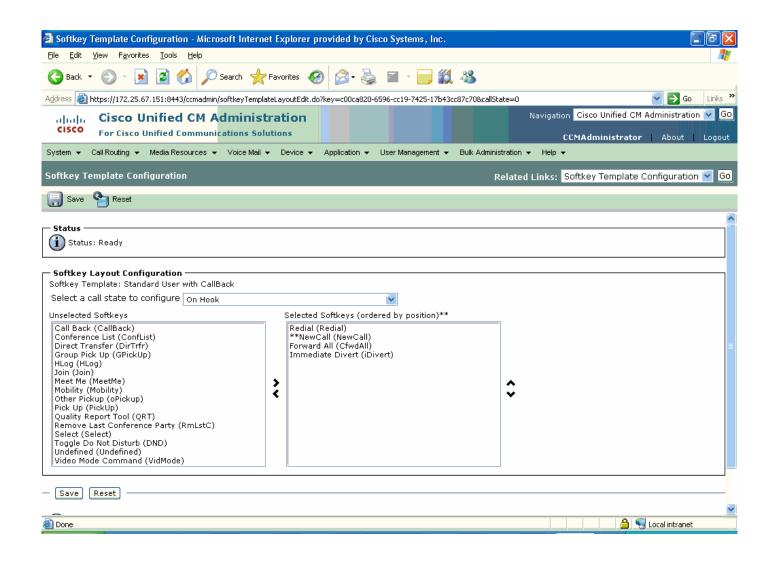






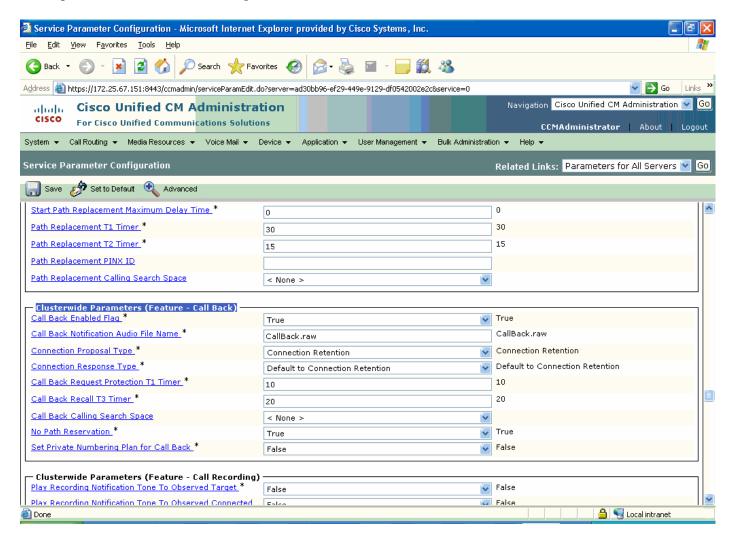






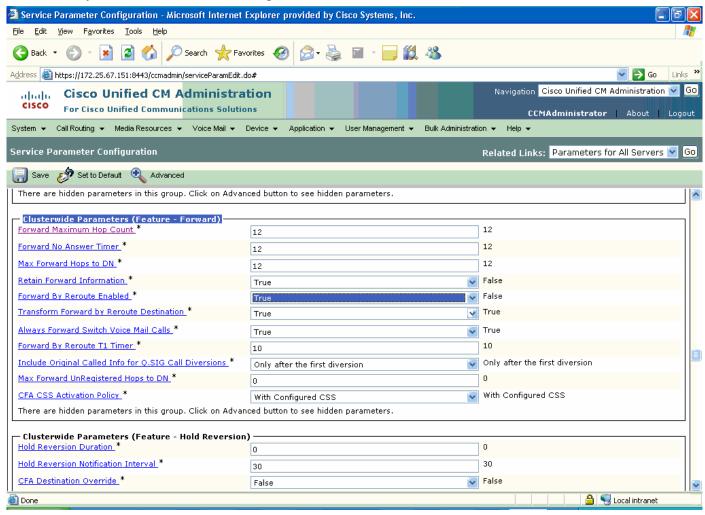


Path Replacement Service Parameter Configuration



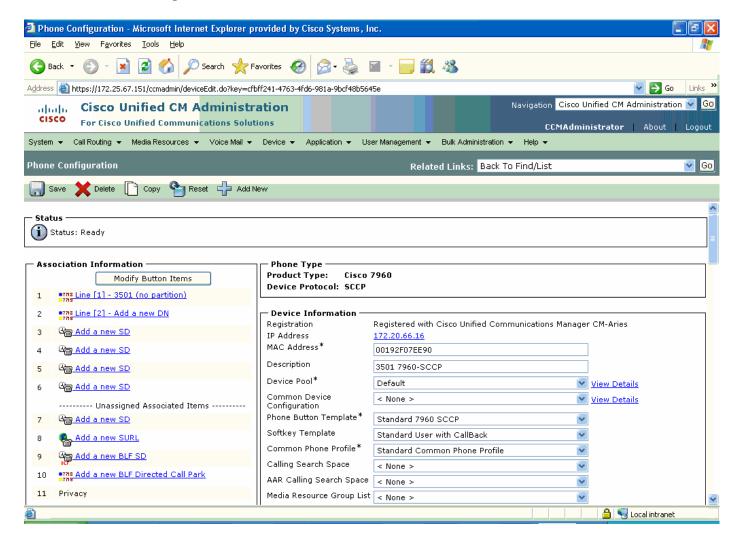


Call Forward by Reroute Service Parameter Configuration

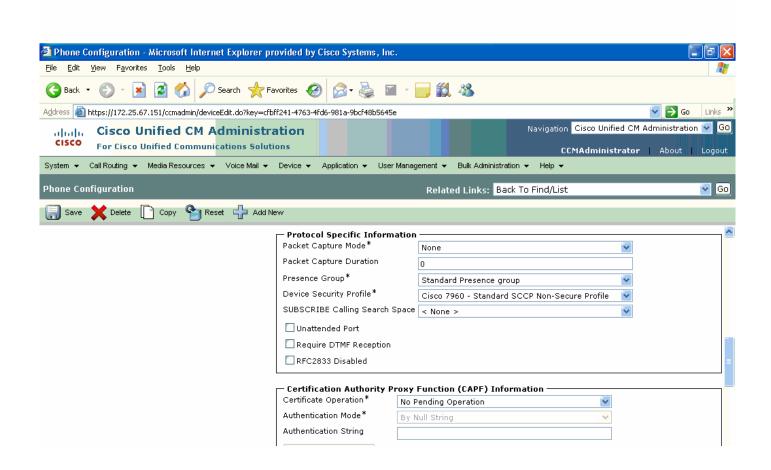




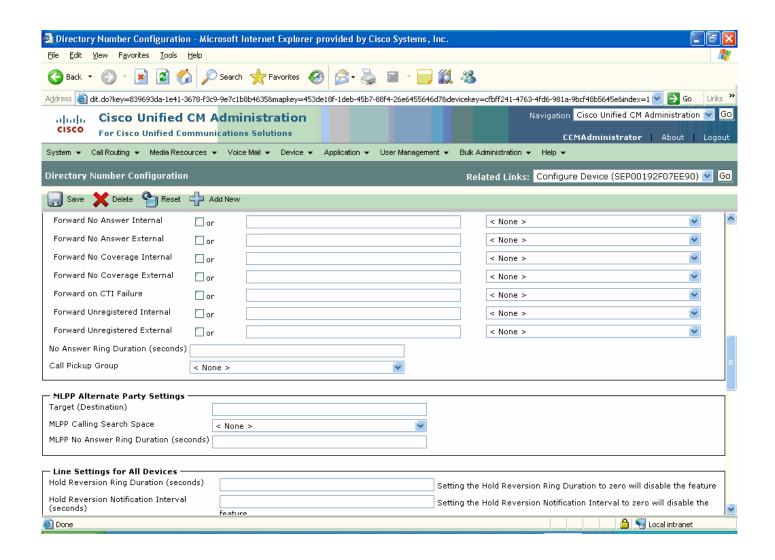
7960 IP (SCCP) Phone Configuration



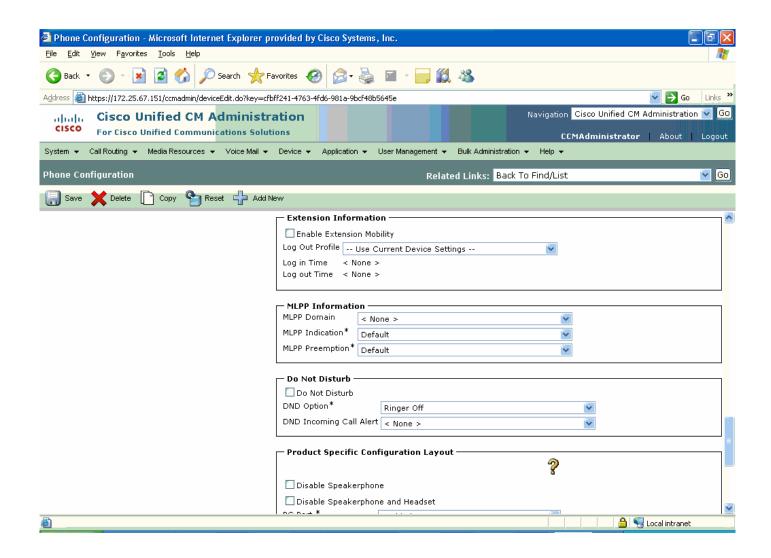




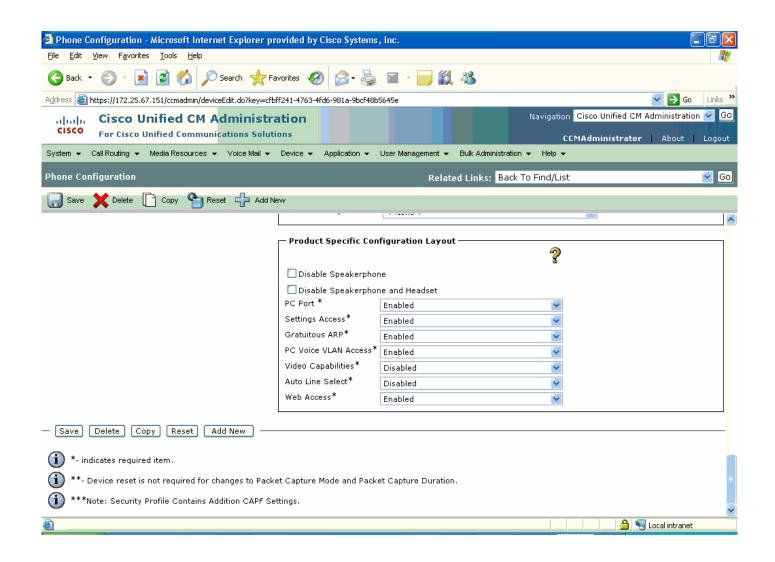




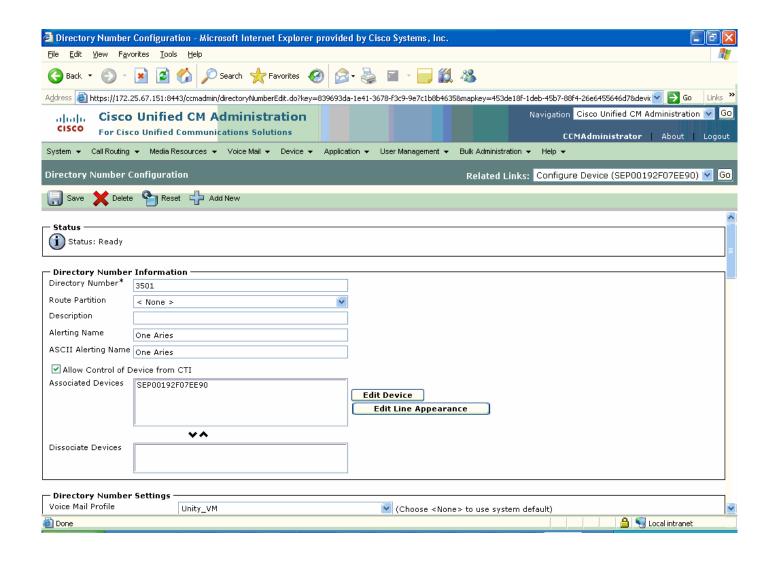




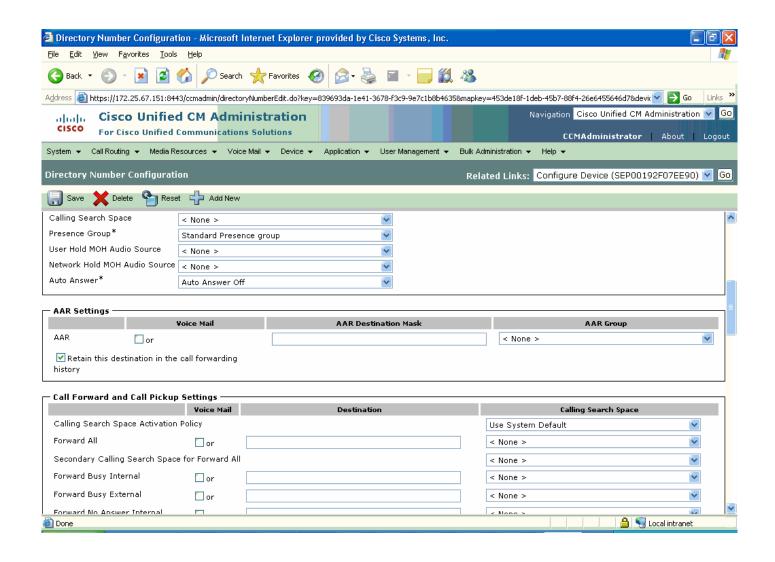




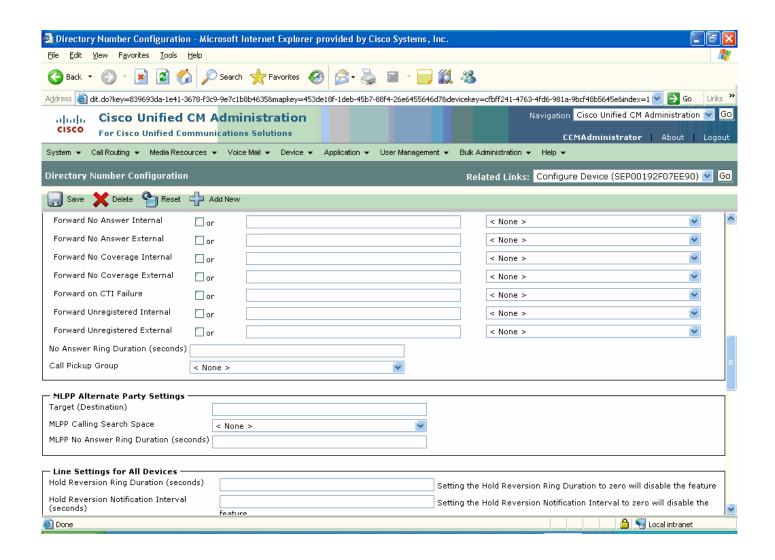




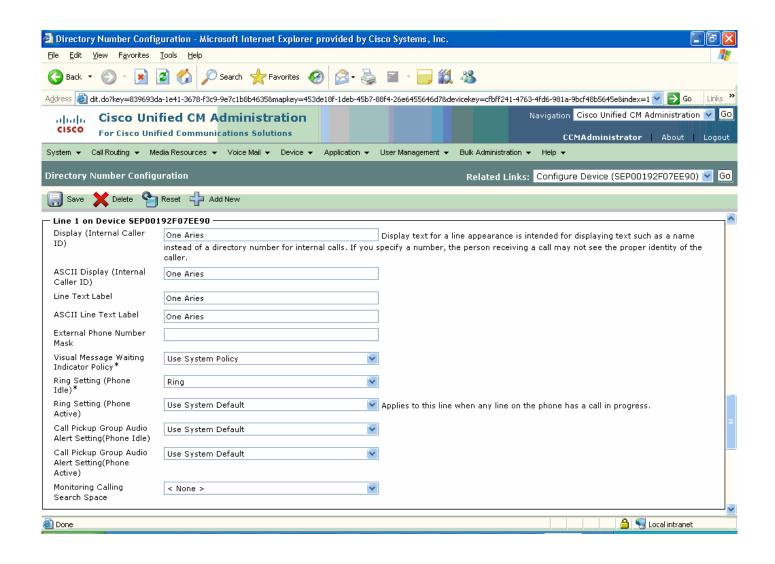




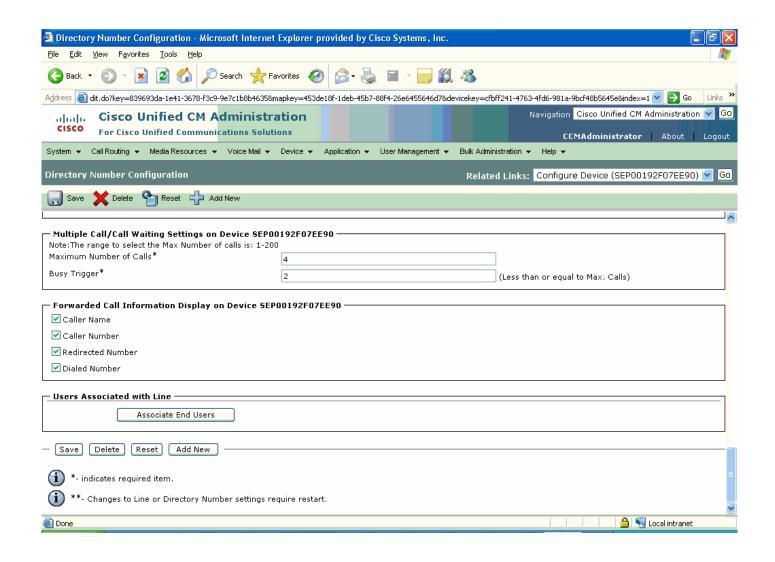






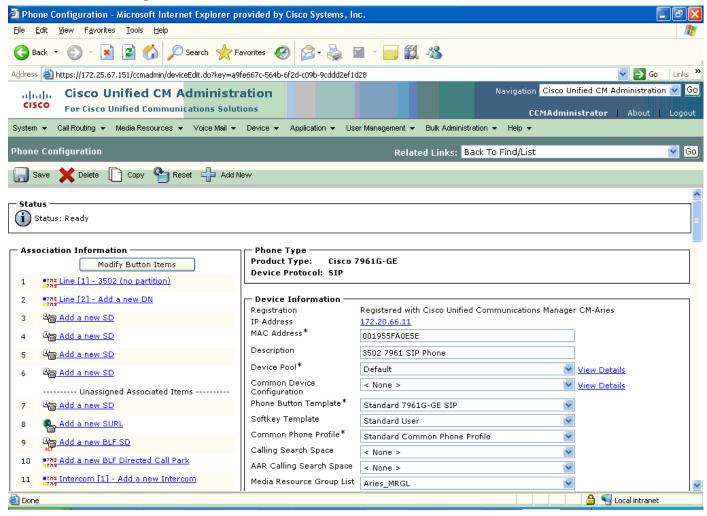




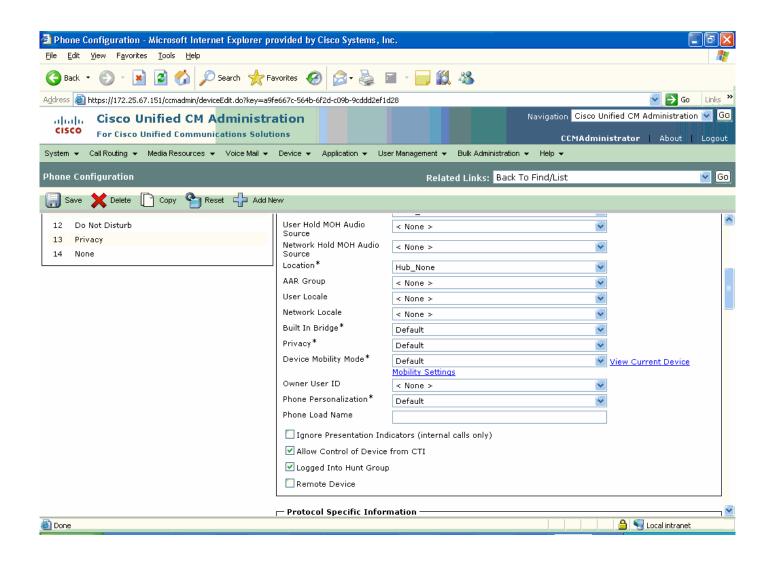




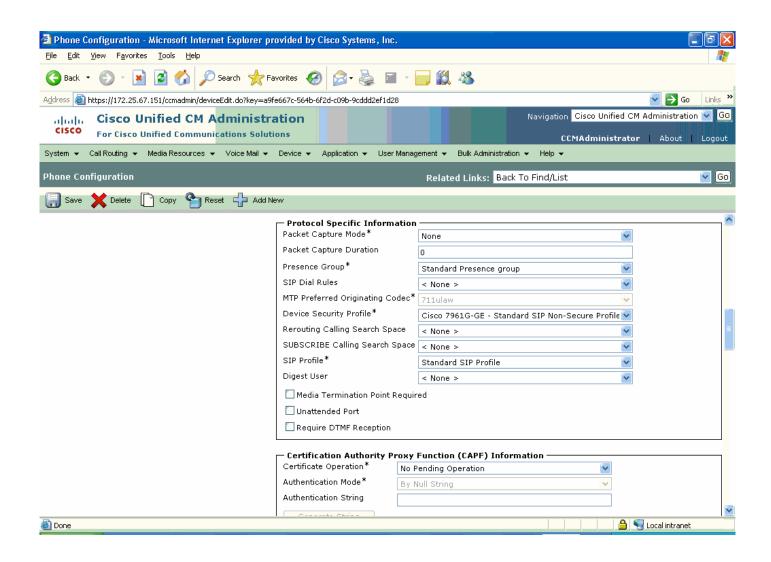
7961 IP (SIP) Phone Configuration



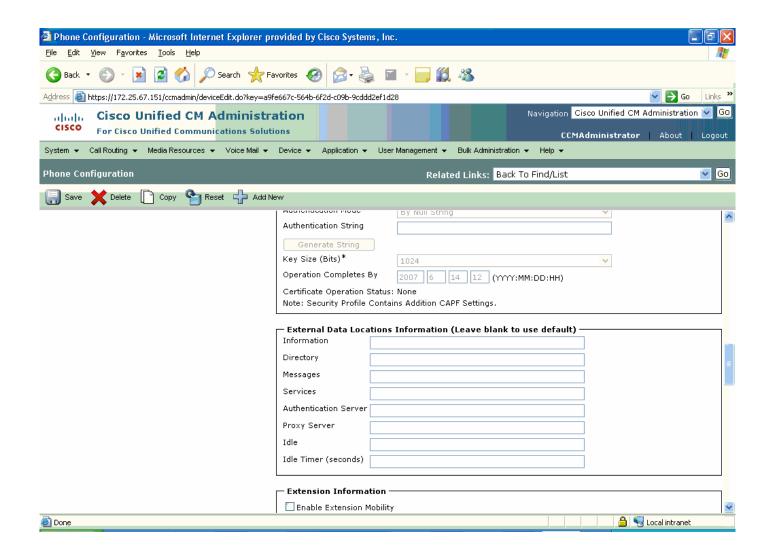




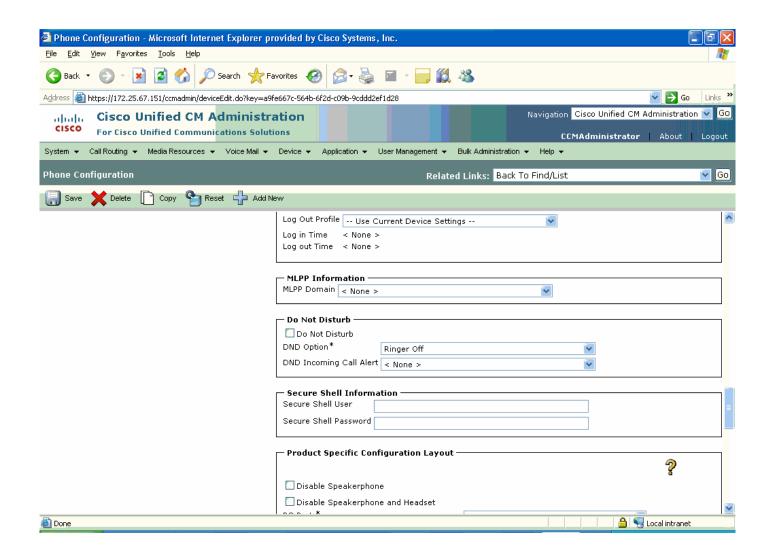




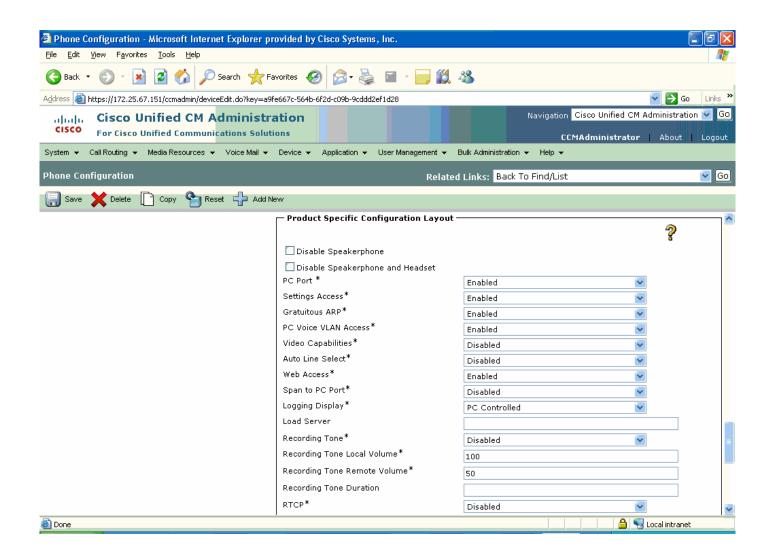




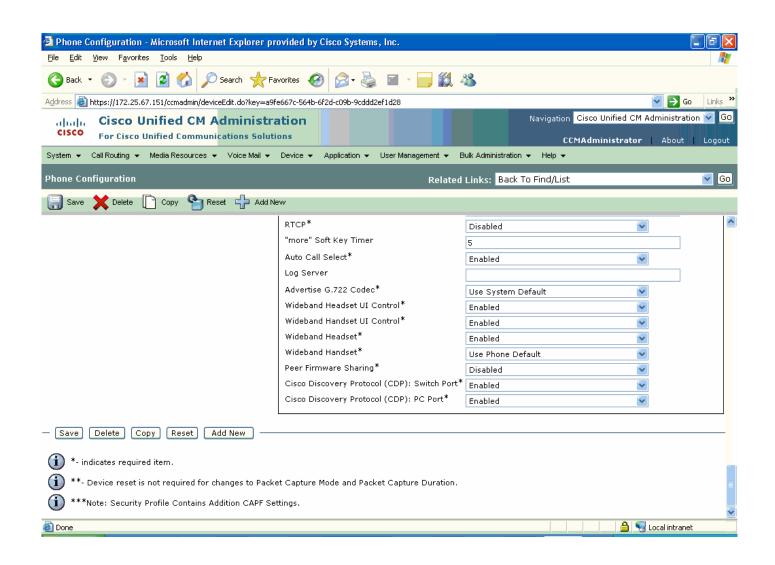




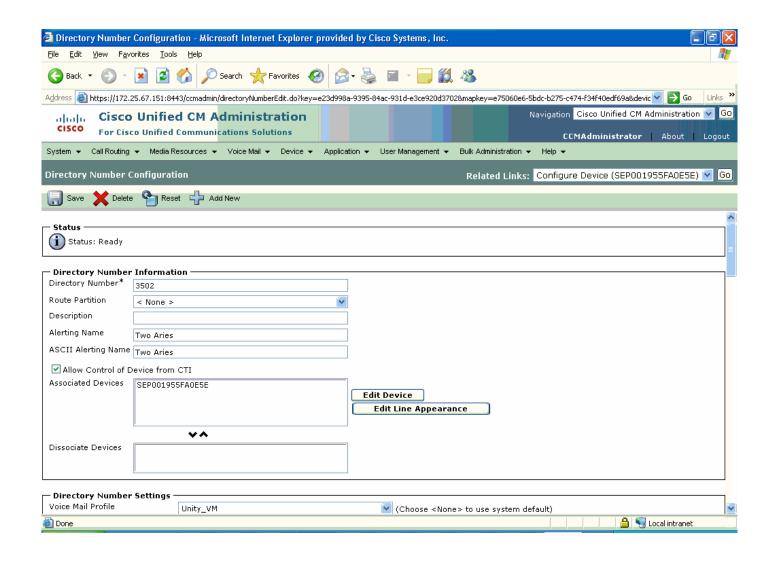




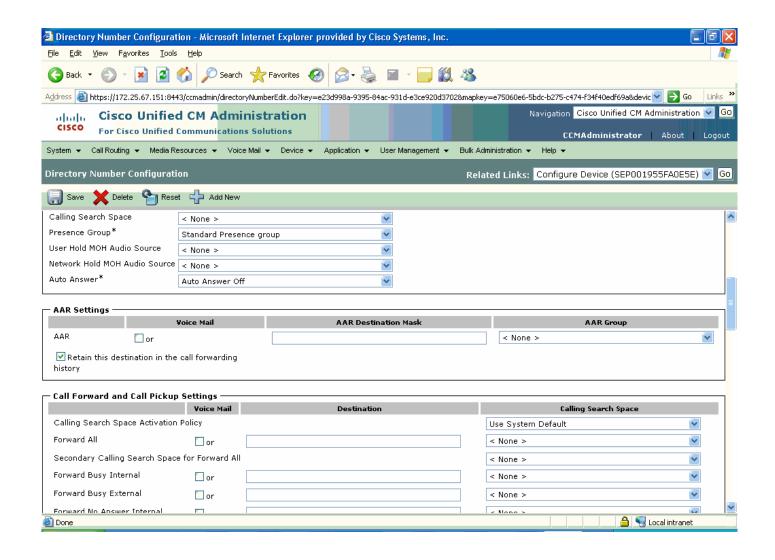




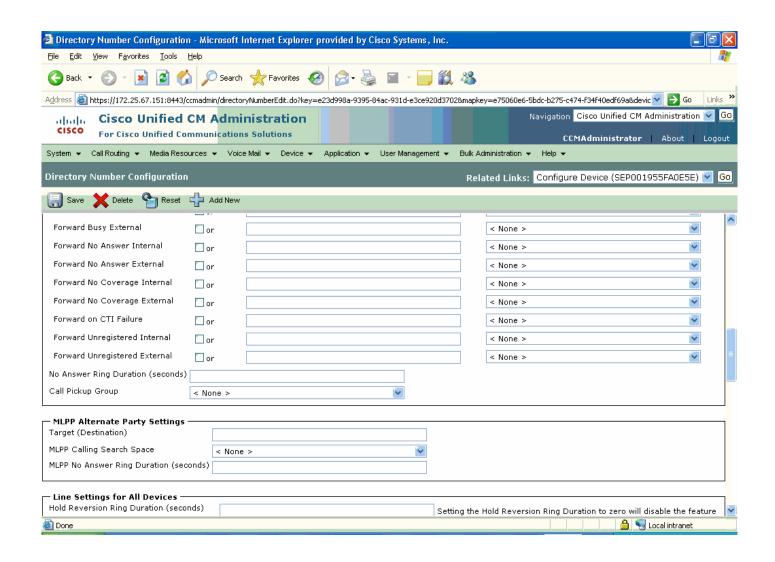




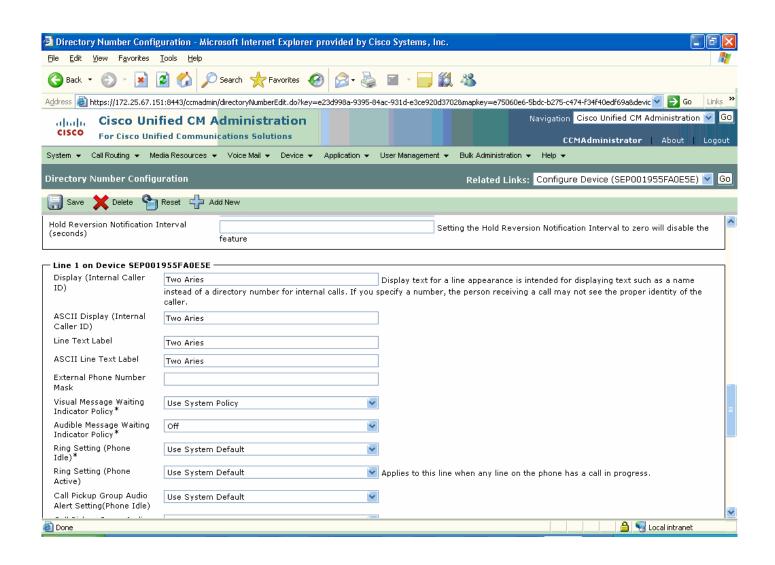




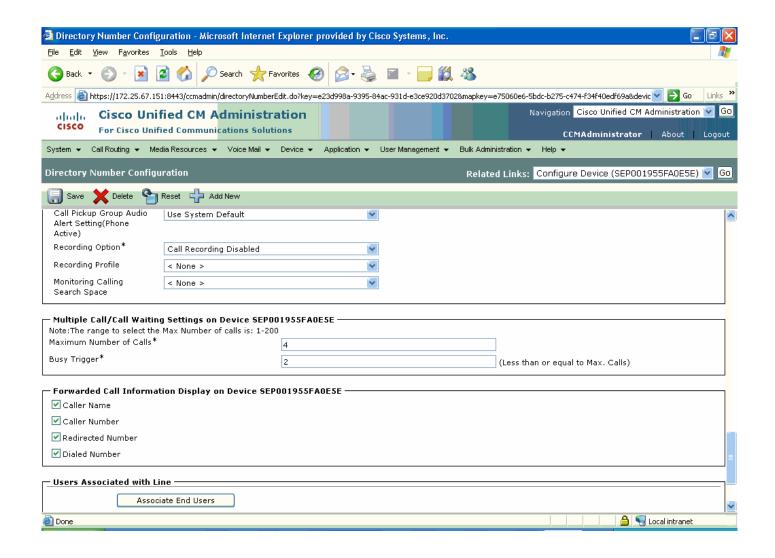












Configuring the Cisco 3825

PBX_A#sh ver Cisco IOS Software, 3800 Software (C3825-IPVOICE-M), Experimental Version 12.4(20060425:234737) [elou-dz06790 173] Copyright (c) 1986-2006 by Cisco Systems, Inc. Compiled Tue 25-Apr-06 17:27 by elou

ROM: System Bootstrap, Version 12.3(11r)T1, RELEASE SOFTWARE (fc1)

PBX_A uptime is 6 days, 37 minutes System returned to ROM by reload at 18:31:41 PST Tue Jul 3 2007 System restarted at 18:32:33 PST Tue Jul 3 2007 System image file is "flash:c3825-ipvoice-mz.dz06790"



```
Cisco 3825 (revision 1.0) with 226304K/35840K bytes of memory.
Processor board ID FHK0847F0QM
2 Gigabit Ethernet interfaces
109 Serial interfaces
2 Channelized E1/PRI ports
2 Channelized T1/PRI ports
2 Voice FXO interfaces
2 Voice FXS interfaces
DRAM configuration is 64 bits wide with parity enabled.
479K bytes of NVRAM.
62592K bytes of ATA System CompactFlash (Read/Write)
Configuration register is 0x2102
PBX_A#
PBX_A#sh run
Building configuration...
Current configuration: 3561 bytes
! Last configuration change at 14:19:41 PST Mon Jul 9 2007
! NVRAM config last updated at 14:19:56 PST Mon Jul 9 2007
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
hostname PBX_A
boot-start-marker
boot system flash:c3825-ipvoice-mz.dz06790
boot system flash:c3825-ipvoice-mz.124-3a.bin
boot-end-marker
card type t1 1 0
logging buffered 1000000 debugging
enable secret 5 $1$yxlm$dISbwKK6d8UvEDxhJ3Tr61
no aaa new-model
clock timezone PST -7
no network-clock-participate slot 1
network-clock-participate wic 0
voice-card 0
no dspfarm
voice-card 1
dspfarm
ip cef
ip domain name pbxlab.org
ip name-server 172.20.2.181
ip name-server 171.70.168.183
```



```
isdn switch-type primary-4ess
!
!
!
!
!
!
controller E1 0/0/0
pri-group timeslots 1-30
controller E1 0/0/1
pri-group timeslots 1-31 service mgcp
controller T1 1/0/0
framing esf
linecode b8zs
pri-group timeslots 1-24 service mgcp
controller T1 1/0/1
framing esf
linecode b8zs
pri-group timeslots 1-24 service mgcp
interface GigabitEthernet0/0
ip address 172.20.66.101 255.255.255.0
duplex auto
speed auto
media-type rj45
interface GigabitEthernet0/1
no ip address
shutdown
duplex auto
speed auto
media-type rj45
interface Serial0/0/0:15
no ip address
encapsulation hdlc
isdn switch-type primary-dms100
isdn protocol-emulate network
isdn incoming-voice voice
isdn contiguous-bchan
isdn bchan-number-order descending
isdn channel-id invert extend-bit
no cdp enable
interface Serial0/0/1:15
```



```
no ip address
encapsulation hdlc
isdn switch-type primary-qsig
isdn protocol-emulate network
isdn incoming-voice voice
isdn T310 120000
isdn bind-13 ccm-manager
no cdp enable
interface Serial1/0/0:23
no ip address
encapsulation hdlc
isdn switch-type primary-qsig
isdn incoming-voice voice
isdn bind-13 ccm-manager
no isdn outgoing ie facility
no isdn outgoing ie notify-indicator
no isdn outgoing display-ie
no cdp enable
interface Serial1/0/1:23
no ip address
encapsulation hdlc
isdn switch-type primary-qsig
isdn protocol-emulate network
isdn incoming-voice voice
isdn T310 120000
isdn bind-13 ccm-manager
no cdp enable
ip route 0.0.0.0 0.0.0.0 172.20.66.1
ip http server
!
control-plane
voice-port 0/0/0:15
compand-type u-law
voice-port 0/1/0
voice-port 0/1/1
voice-port 0/0/1:15
voice-port 0/2/0
voice-port 0/2/1
voice-port 1/0/0:23
voice-port 1/0/1:23
```



```
ccm-manager mgcp
ccm-manager music-on-hold
ccm-manager config server 172.20.66.254
ccm-manager config
!
mgcp
mgcp call-agent 172.20.66.254 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
no mgcp package-capability res-package
mgcp package-capability sst-package
no mgcp package-capability fxr-package
mgcp package-capability pre-package
no mgcp timer receive-rtcp
mgcp sdp simple
mgcp fax t38 inhibit
mgcp rtp payload-type g726r16 static
mgcp bind control source-interface GigabitEthernet0/0
mgcp bind media source-interface GigabitEthernet0/0
mgcp profile default
line con 0
stopbits 1
line aux 0
stopbits 1
line vty 0 4
session-timeout 120
exec-timeout 0 0
password cisco
login
line vtv 5 10
session-timeout 120
exec-timeout 0 0
password cisco
login
scheduler allocate 20000 1000
ntp clock-period 17178799
ntp server 171.68.10.80
ntp server 171.68.10.150
end
```



Acronyms

Acronym	Definitions
ANF-PR	Additional Network Feature Path Replacement
AOC	Advice-of-charge. Information element is sent with the connection setup information for incoming Euro-ISDN connections. The AOC IE is used for call charge calculation.
CUCM	Cisco Unified Communication Manager
CCBS	Call Completion to Busy Subscriber
CCNR	Call Completion on No Reply
CFB	Call Forwarding on Busy
CFNR	Call Forwarding No Reply
CFU	Call Forwarding Unconditional
CLIP	Calling Line (Number) Identification Presentation
CLIR	Calling Line (Number) Identification Restriction
CNIP	Calling Name Identification Presentation
CNIR	Calling Name Identification Restriction
COLP	Connected Line (Number) Identification Presentation
COLR	Connected Line (Number) Identification Restriction
CONP	Connected Name Identification Presentation
CONR	Connected Name Identification Restriction
CT	Call Transfer
MWI	Message Waiting Indicator
PSTN	Public Switched Telephone Network



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