

Cisco Unified CallManager Release 5.0-PBX Interoperability: Avaya Definity G3 MV1.3 to a Cisco Catalyst 6000 using CMM-E1 QSIG with MGCP

Updated August 23, 2006

Note: This document is for E1 QSIG applications.

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Introduction

This is an application note for connectivity of Avaya Definity G3 MV1.3 PBX with Cisco Unified CallManager Release 5.0 using Cisco Communication Media Module CMM-E1 QSIG as MGCP gateway.

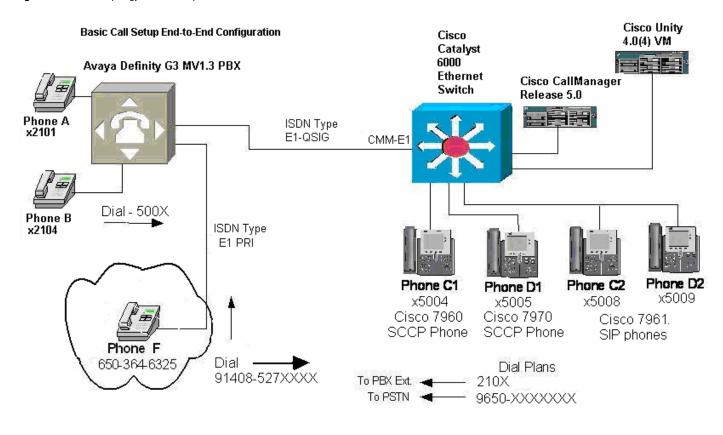
The network topology diagram (Figure 1) shows the test setup for end-to-end interoperability with the Cisco Unified CallManager connected to the PBX via Cisco Communication Media Module (CMM)-E1 QSIG link as MGCP gateway.

Connectivity is achieved by using the PRI QSIG E1 protocol type on the MGCP gateway and ISO QSIG switch type on the of Avaya Definity G3 MV1.3 PBX.

This Application Note uses the Cisco CMM-E1 voice gateway; however, other Cisco voice gateways are also an option to use since Cisco Unified CallManager QSIG implementation does not depend on the physical interface.

Network Topology

Figure 1. Network Topology or Test Setup





Limitations

Call Forward by Join External

As of this round of testing, Avaya Definity G3 MV1.3 PBX does not do External Call Forward By Join (Unconditional, Busy or No Reply) since it automatically performs Call Diversion by Reroute to complete the call. Thus, Call diversion by Reroute happens instead of External Call Forward By Join when a phone on the Avaya Definity G3 MV1.3 PBX is the forwarding station and Cisco Unified CallManager phones are the originating and final destination phones respectively

As of publication of this Application Note, Rerouting cannot be turned off on the Avaya Definity G3 MV1.3 PBX

System Components

Hardware Requirements

Cisco Catalyst 6000 switch with CMM-E1 Gateway

Cisco Unified CallManager Server

Avaya Definity G3 MV1.3 PBX

Software Requirements

Avaya MV1.3

Cisco Unified CallManager 5.0

Features

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

CT-Call Transfer

CFU-Call Forwarding Unconditional (by join) – see Limitations Section

CFB-Call Forwarding Busy (by join) – see Limitations Section

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

CFU-Call Forwarding Unconditional (by Reroute)

CFB-Call Forwarding Busy (by Reroute)

CFNR-Call Forwarding No Reply (by Reroute)

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)

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

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

Configuration

Configuration Sequence and Tasks

Configuring the Avaya Definity G3 MV1.3 PBX

Configure in the following sequence:

- 1. Add the new circuit pack.
- 2. Add the new signaling group.
- 3. Add the new trunk group.
- 4. Add Uniform Dialing Plan.



Configuration Menus and Commands

Avaya Configuration

DS1 Circuit Pack

display ds1 1a12 DS1 CIRCUIT PACK Location: 01A12 Name: to CM-Polaris Bit Rate: 2.048 Line Coding: hdb3 Signaling Mode: isdn-pri Connect: pbx Interface: peer-master TN-C7 Long Timers? n Peer Protocol: Q-SIG Interworking Message: PROGress Side: a Interface Companding: alaw CRC? U Channel Numbering: sequential Idle Code: 11111111 DCP/Analog Bearer Capability: 3.1kHz Slip Detection? n Near-end CSU Type: other

Signaling Group

```
SIGNALING GROUP

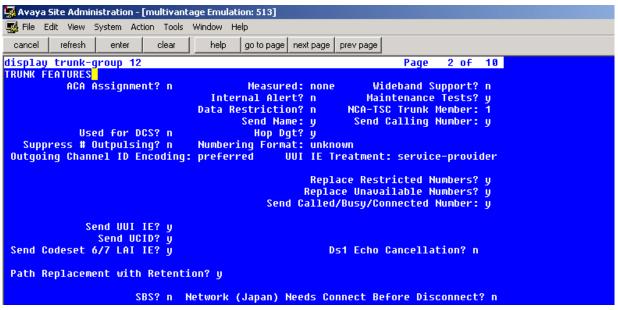
Group Number: 12 Group Type: isdn-pri
Associated Signaling? y Max number of NCA TSC: 15
Primary D-Channel: 01A1224 Max number of CA TSC: 15
Trunk Group for NCA TSC: 12
Trunk Group for Channel Selection: 12 X-Mobility/Wireless Type: NONE
Supplementary Service Protocol: b
```



Trunk Group (1 of 3)

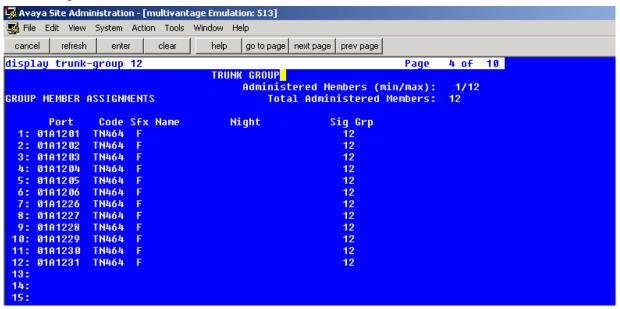
```
🧖 Avaya Site Administration - [multivantage Emulation: 513]
🕵 File Edit View System Action Tools Window Help
 cancel
          refresh
                   enter
                            clear
                                     help
                                           go to page | next page | prev page
display trunk-group 12
                                                                        Page 1 of 10
                                     TRUNK GROUP
Group Number: 12
Group Name: QSIG to CM-POLARIS
Direction: two-way Out
                                        Group Type: isdn
                                                                     CDR Reports: y
                                               COR: 1
                                                               TN: 1
                                                                             TAC: 612
                                                                Carrier Medium: PRI/BRI
                                 Outgoing Display? n
 Dial Access? y
                                   Busy Threshold: 99
                                                                Night Service:
Queue Length: 0
Service Type: tie
                                         Auth Code? n
                                                                    TestCall ITC: rest
                            Far End Test Line No:
TestCall BCC: 4
TRUNK PARAMETERS
                                             Codeset to Send National IEs: 6
          Codeset to Send Display: 0
                                             Charge Advice: none
Digit Handling (in/out): enbloc/enbloc
         Max Message Size to Send: 260
  Supplementary Service Protocol: b
             Trunk Hunt: ascend
                                                            QSIG Value-Added? y
                                                         Digital Loss Group: 13
Calling Number - Delete:
                                Insert:
                                                            Numbering Format: unk-unk
                Bit Rate: 1200
                                          Synchronization: async
                                                                       Duplex: full
 Disconnect Supervision - In? y
                                    Out? y
 Answer Supervision Timeout: 0
```

Trunk Group (2 of 3)

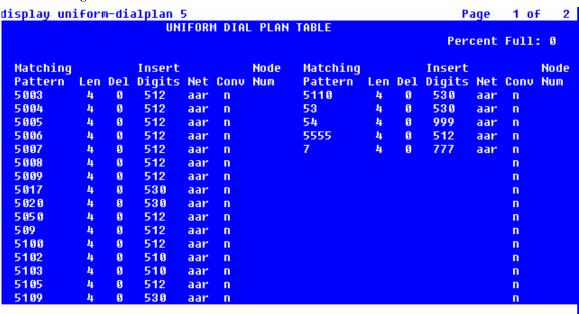




Trunk Group (3 of 3)



Uniform Dialing Plan

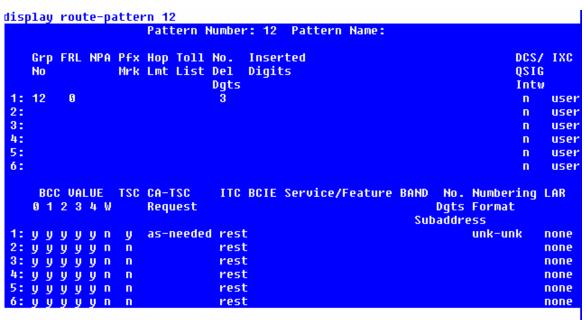




AAR Digit Analysis Table

display aar analysis 512						Page	1 of	2	
AAR DIGIT ANALYSIS TABLE									
				Percent Full: 3					
Dialed	Total		Route	Call	Node	ANI			
String	Min	Max	Pattern	Type	Num	Reqd			
512	7	7	12	aar	3	n			
515	7	7	15	aar		n			
530	7	7	13	aar	4	n			
531	7	7	13	aar	6	n			
555	7	7	105	aar		n			
611	7	7	13	aar		n			
613	7	7	13	aar		n			
614	7	7	14	aar	2	n			
777	7	7	13	aar		n			
888	7	7	15	aar		n			
998	7	7	11	aar		n			
999	7	7	98	aar		n			
						n			
						n			
						n			

Route Pattern





System Parameters Customer Options

```
QSIG OPTIONAL FEATURES

Basic Call Setup? y
Basic Supplementary Services? y
Centralized Attendant? y
Interworking with DCS? y
Supplementary Services with Rerouting? y
Transfer into QSIG Voice Mail? y
Value-Added (VALU)? y

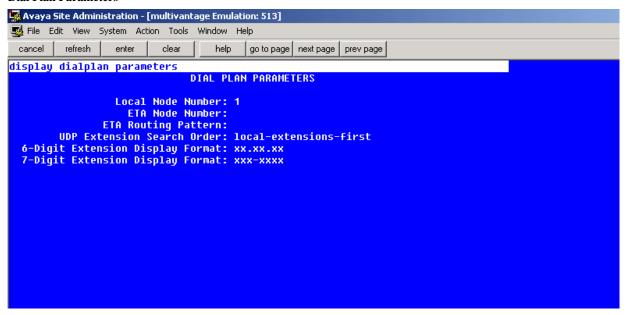
(NOTE: You must logoff & login to effect the permission changes.)
```

Feature Related System Parameters

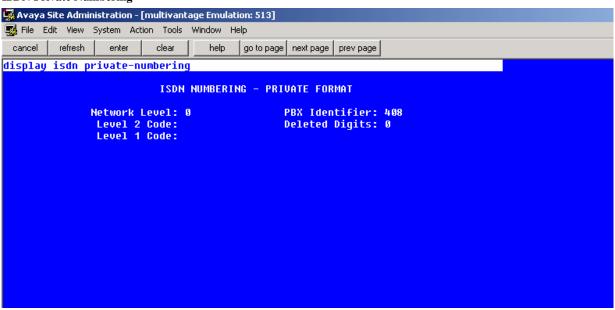
```
display system-parameters features
                                                                Page 7 of 12
                        FEATURE-RELATED SYSTEM PARAMETERS
ISDN PARAMETERS
 Send Non-ISDN Trunk Group Name as Connected Name? n
 Display Connected Name/Number for ISDN DCS Calls? n
       Send ISDN Trunk Group Name on Tandem Calls? n
                               QSIG TSC Extension: 2099
 MWI - Number of Digits Per Voice Mail Subscriber: 4
                                 Feature Plus Ext: 2098
                              National CPN Prefix:
                         International CPN Prefix:
                        Pass Prefixed CPN to ASAI? n
    Unknown Numbers Considered Internal for AUDIX? y
                                                            Maximum Length: 4
             USNI Calling Name for Outgoing Calls? y
               Path Replacement with Measurements? y
                  QSIG Path Replacement Extension: 2097
            Path Replace While in Queue/Vectoring? y
```



Dial Plan Parameters



ISDN Private Numbering

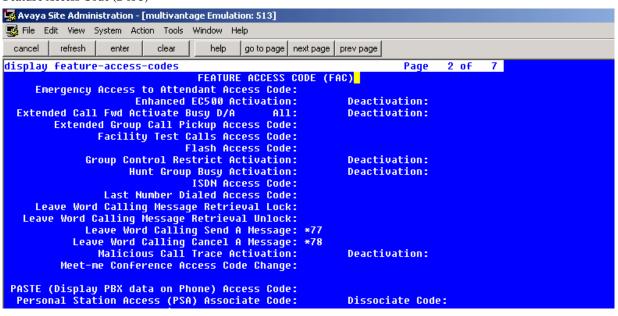




Feature Access Code (1 of 3)

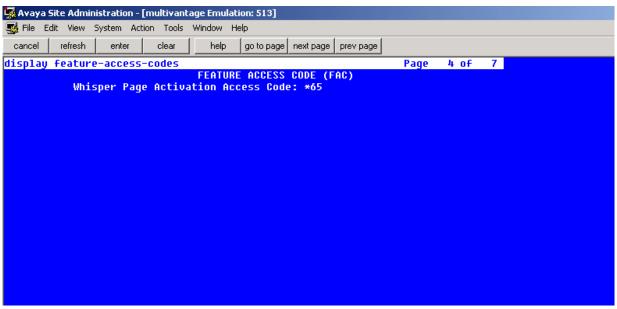
```
🧖 Avaya Site Administration - [multivantage Emulation: 513]
🕵 File Edit View System Action Tools Window Help
 cancel
           refresh.
                     enter
                              clear
                                        help
                                               go to page | next page | prev page
display feature-access-codes
                                                                               Page 1 of 7
                                      FEATURE ACCESS CODE (FAC)
           Abbreviated Dialing List1 Access Code:
           Abbreviated Dialing List2 Access Code:
Abbreviated Dialing List3 Access Code:
Abbreviated Dial - Prgm Group List Access Code:
                           Announcement Access Code:
       Answer Back Access Code:
Auto Alternate Routing (AAR) Access Code: 8
     Auto Route Selection (ARS) - Access Code 1: 9
Automatic Callback Activation:
                                                                   Access Code 2:
                                                                    Deactivation:
Call Forwarding Activation Busy/DA: *66
                                                    A11:
                                                           *67
                                                                    Deactivation: *69
                            Call Park Access Code:
Call Pickup Access Code:
CAS Remote Hold/Answer Hold-Unhold Access Code:
                      CDR Account Code Access Code:
                             Change COR Access Code:
                       Change Coverage Access Code:
                      Data Origination Access Code:
                           Data Privacy Access Code:
```

Feature Access Code (2 of 3)

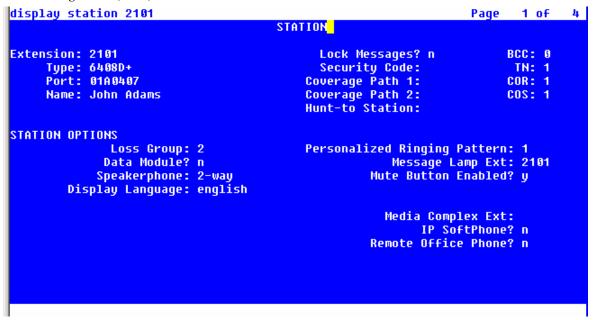




Feature Access Code (3 of 3)

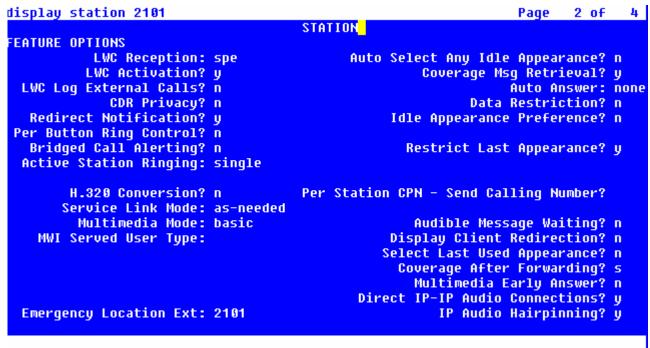


Station configuration (1 of 2)

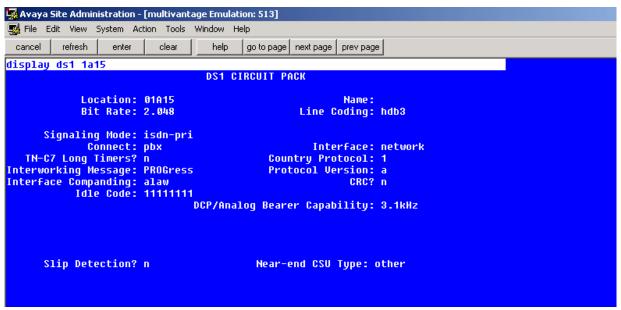




Station Configuration (2 of 2)



PSTN DS1 Circuit Pack 1





PSTN Signaling Group

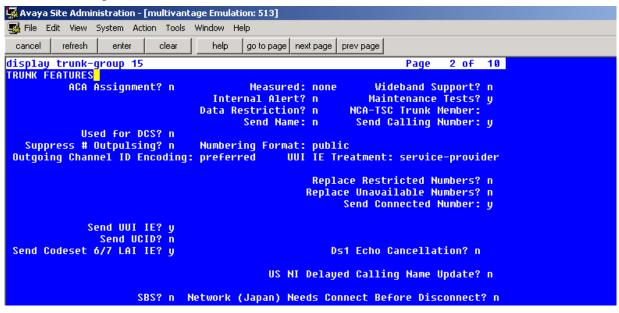
```
🧖 Avaya Site Administration - [multivantage Emulation: 513]
🕵 File Edit View System Action Tools Window Help
                                           go to page | next page | prev page
          refresh
                            clear
display signaling-group 15
                                                                        Page
                                                                                1 of
                                    SIGNALING GROUP
 Group Number: 15
                      Group Type: isdn-pri
Associated Signaling? y
                                                            Max number of NCA TSC: 10
                          Primary D-Channel: 01A1516
                                                             Max number of CA TSC: 10
                                                          Trunk Group for NCA TSC: 15
        Trunk Group for Channel Selection: 15
                                                         X-Mobility/Wireless Type: NONE
           Supplementary Service Protocol: a
```

PSTN Trunk Group (1 of 3)

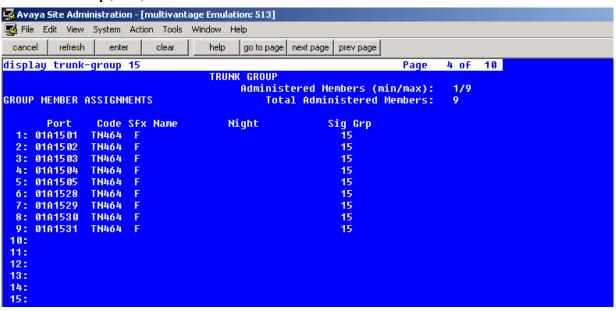




PSTN Trunk Group (2 of 3)

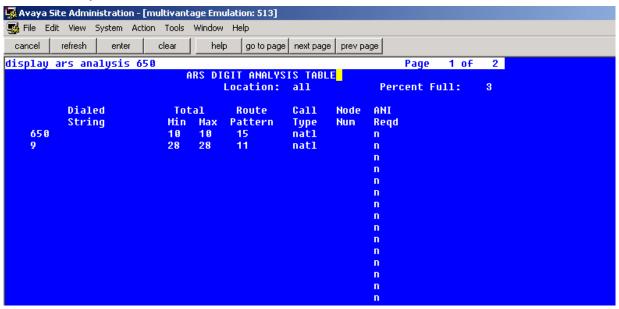


PSTN Trunk Group (3 of 3)

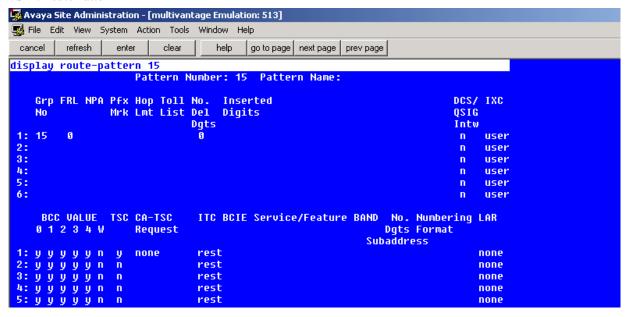




PSTN ARS Analysis

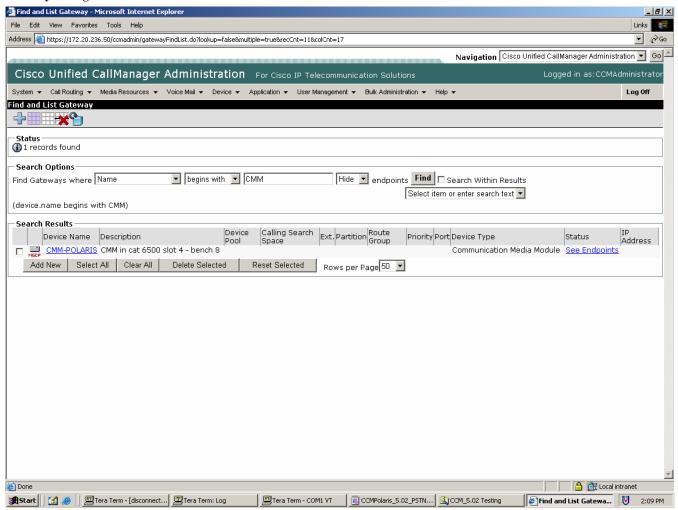


PSTN Route Pattern

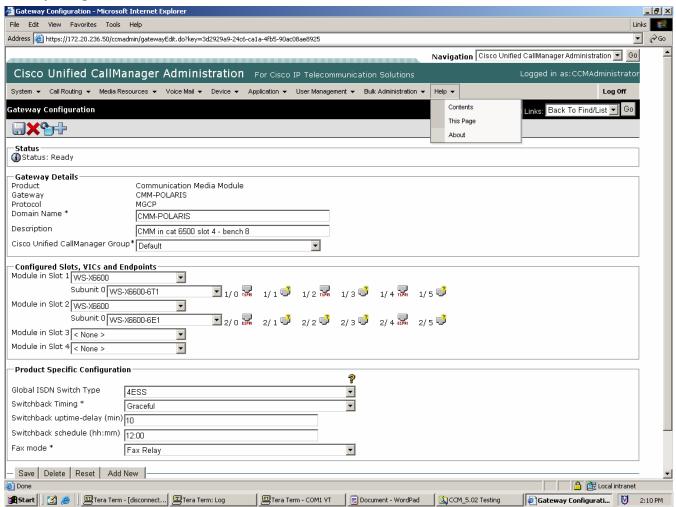




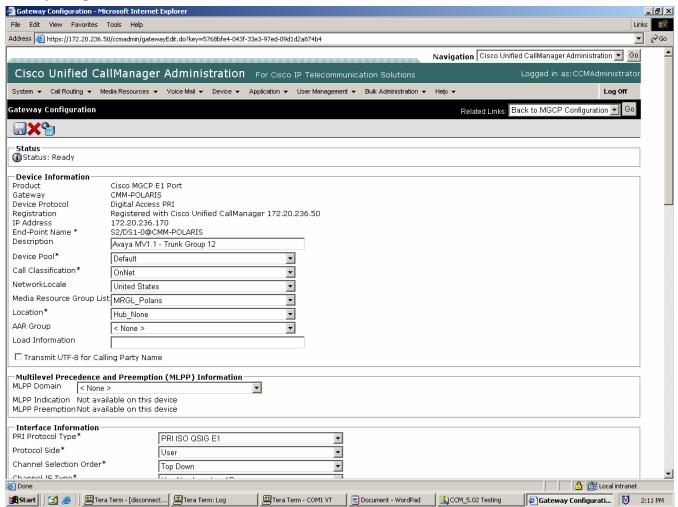
Cisco Unified CallManager Configuration



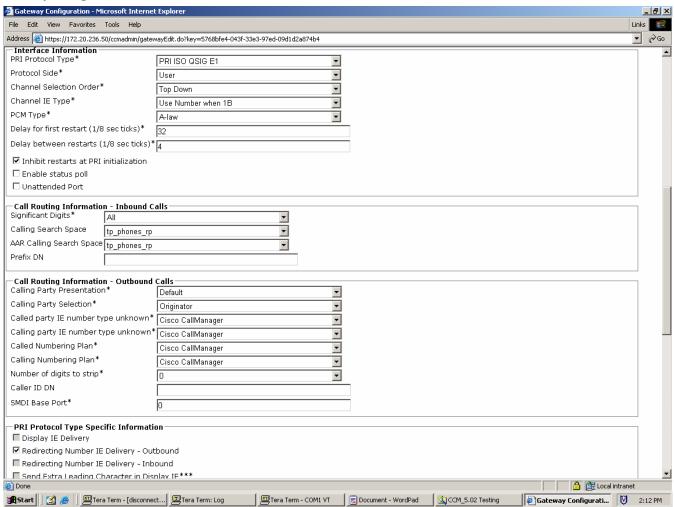




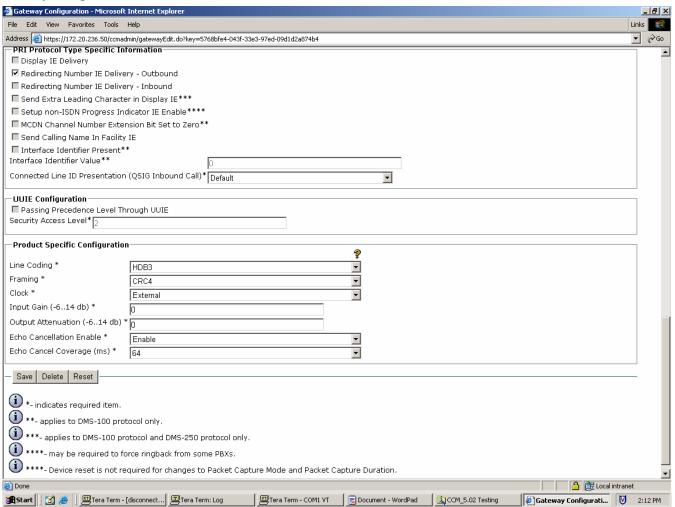




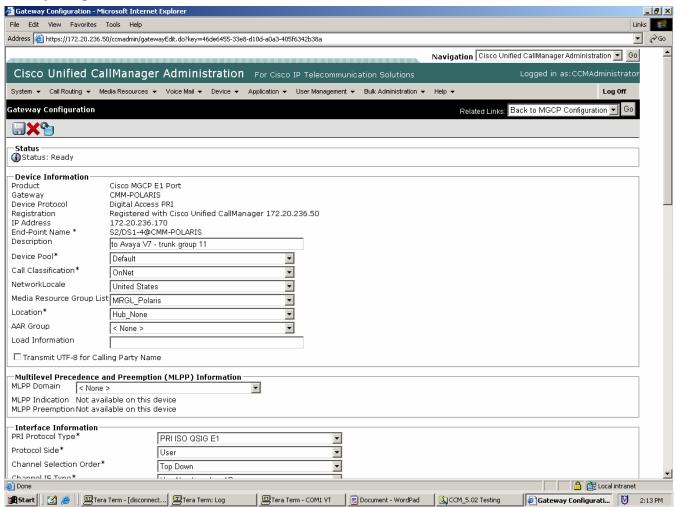




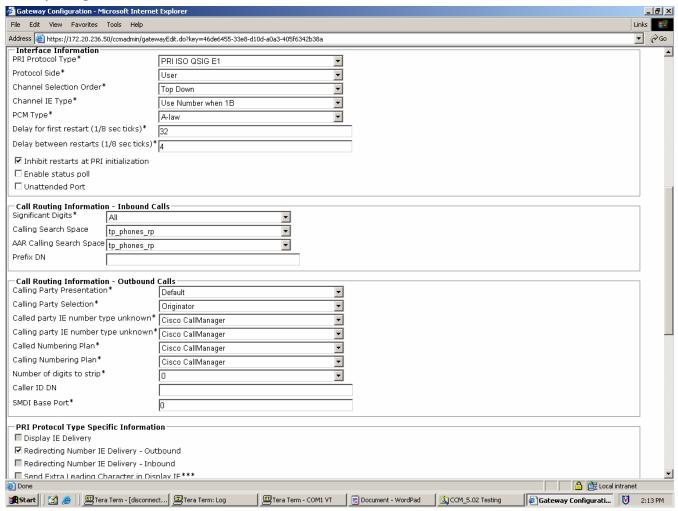




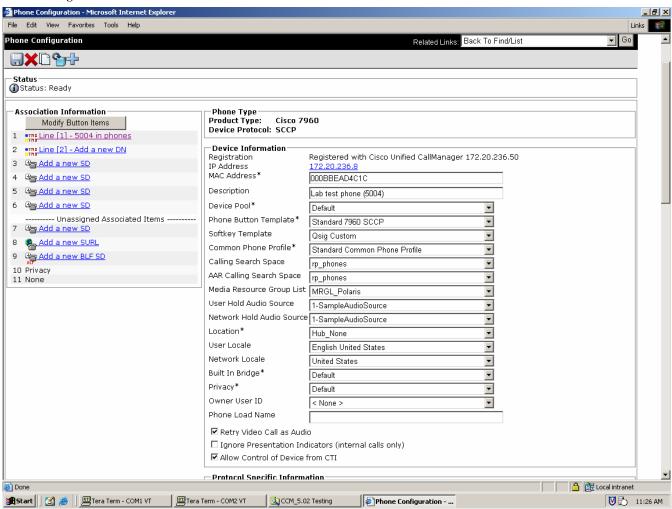




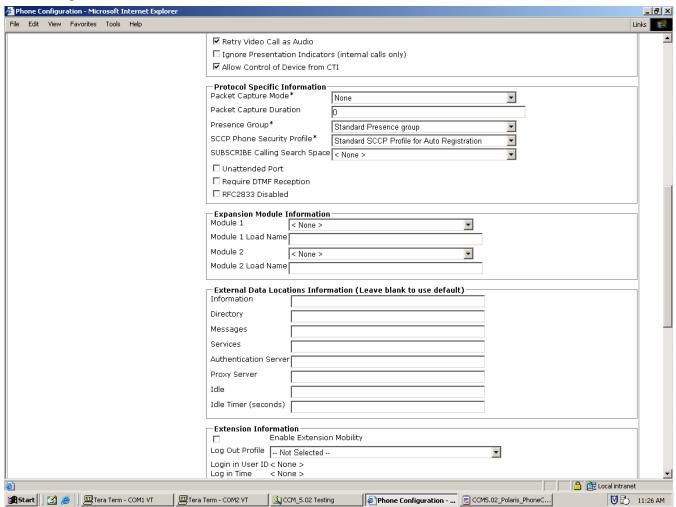




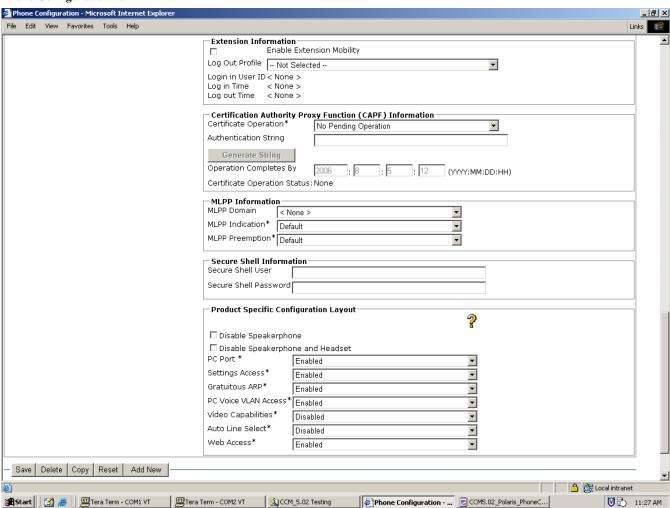




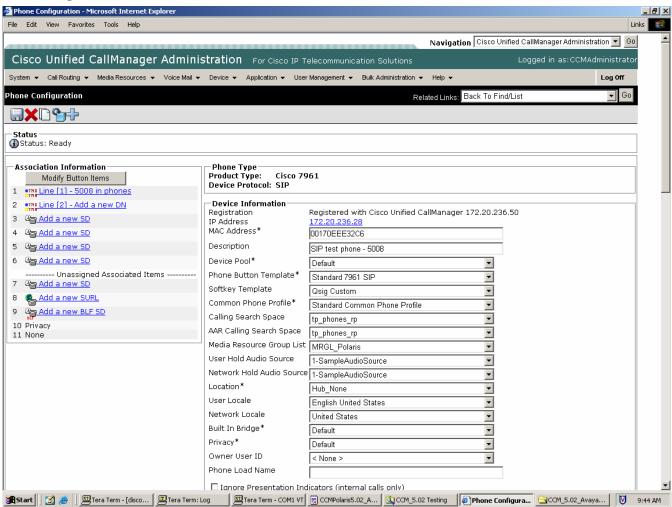




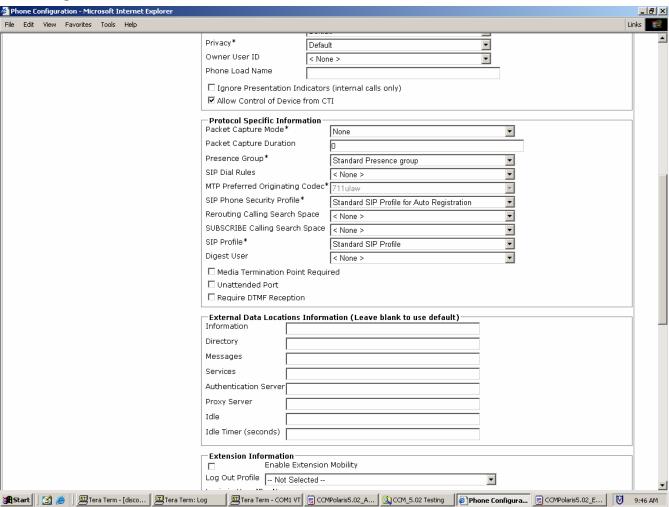




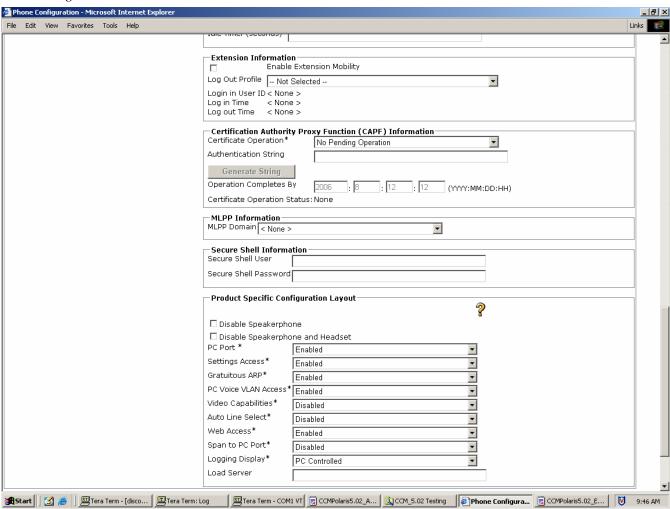




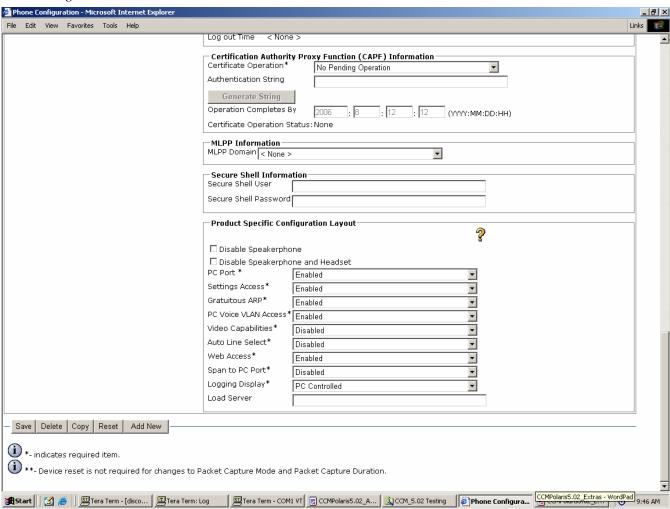




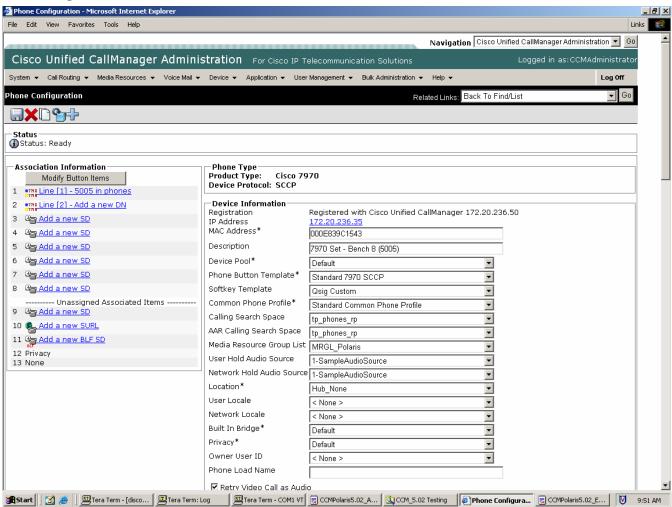




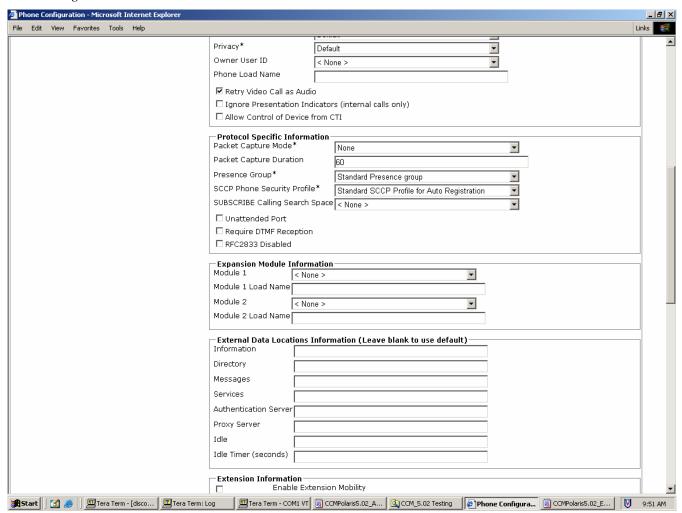




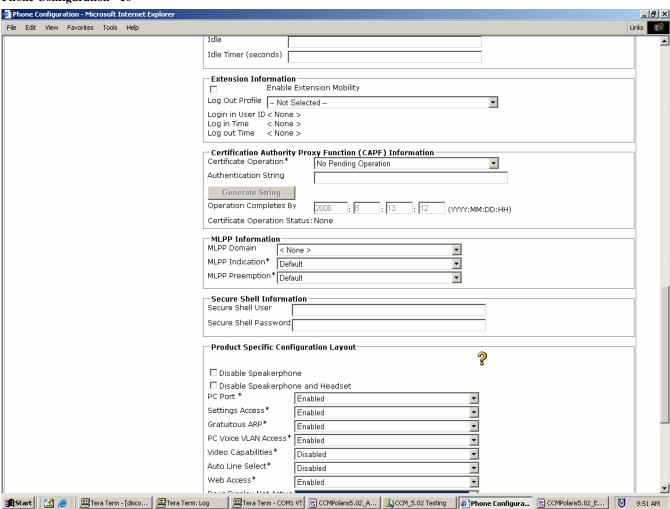




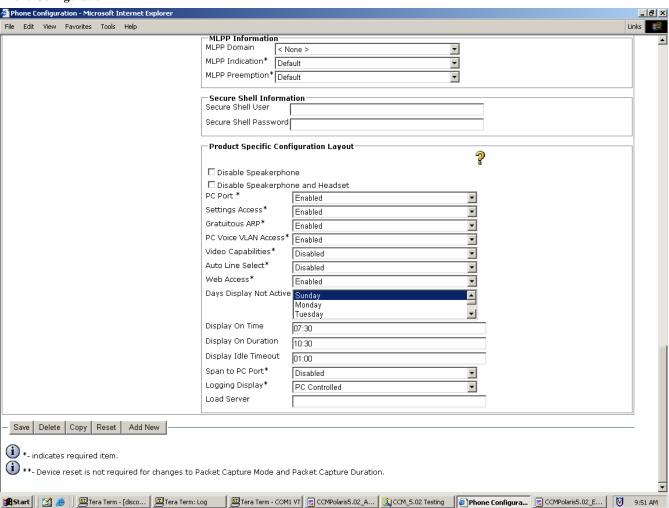






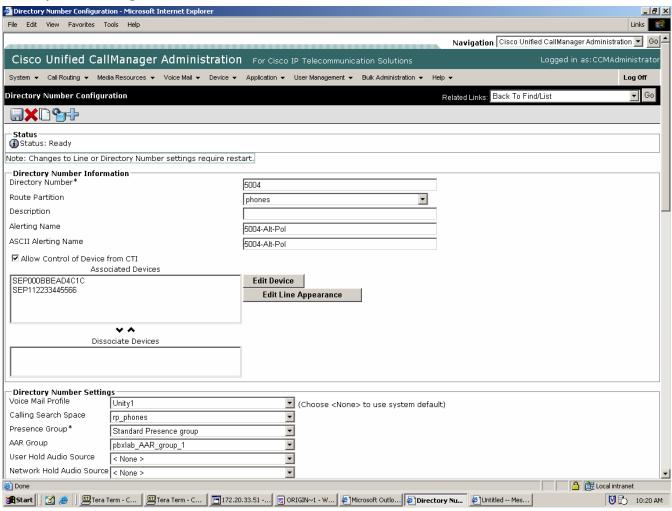






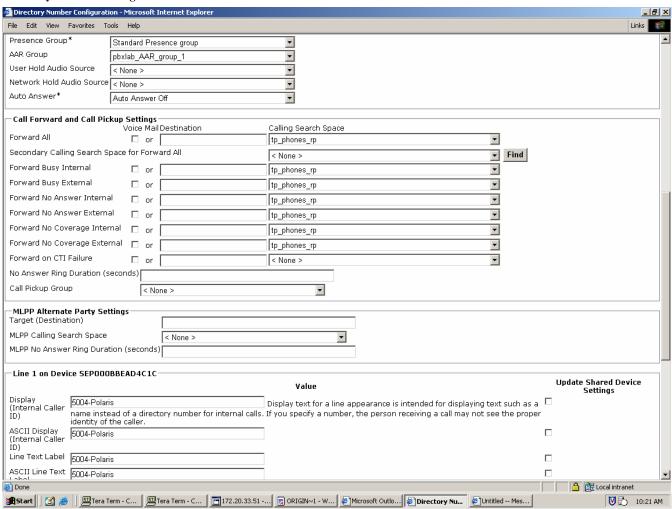


Directory Number Configuration - 1

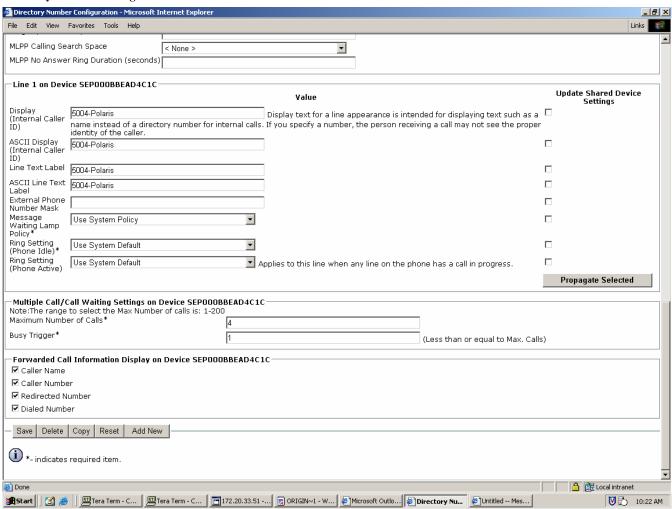




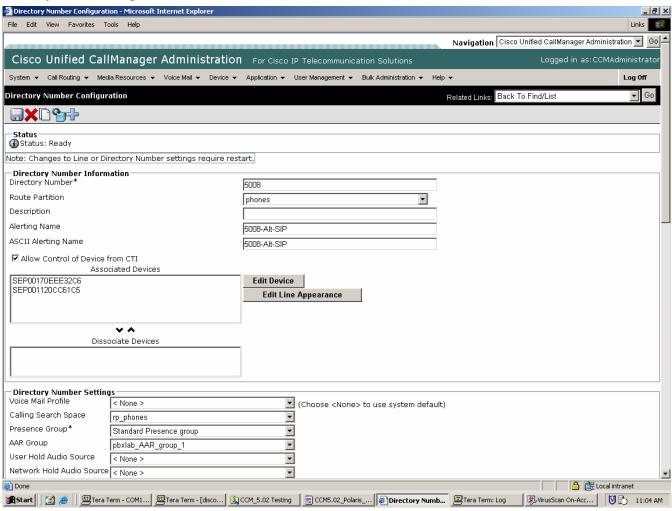
Directory Number Configuration - 2



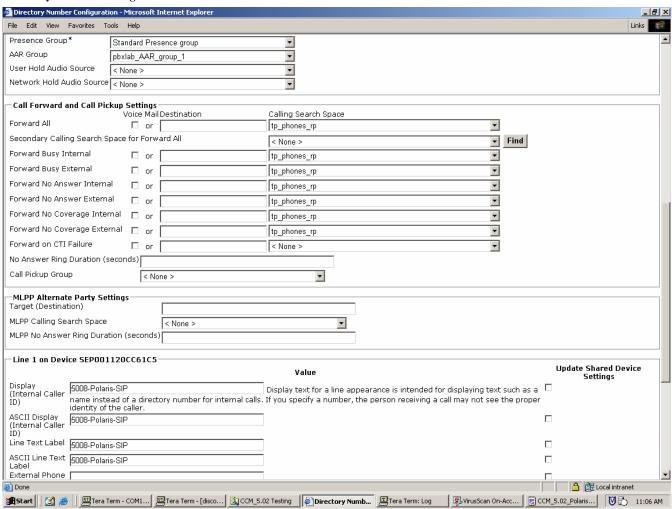




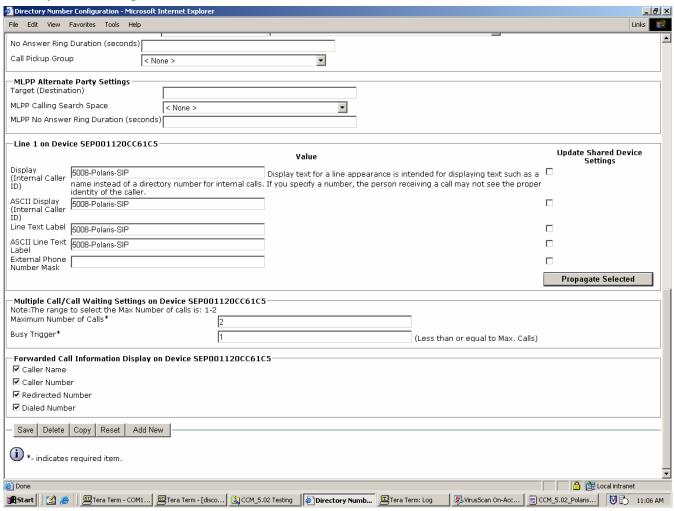




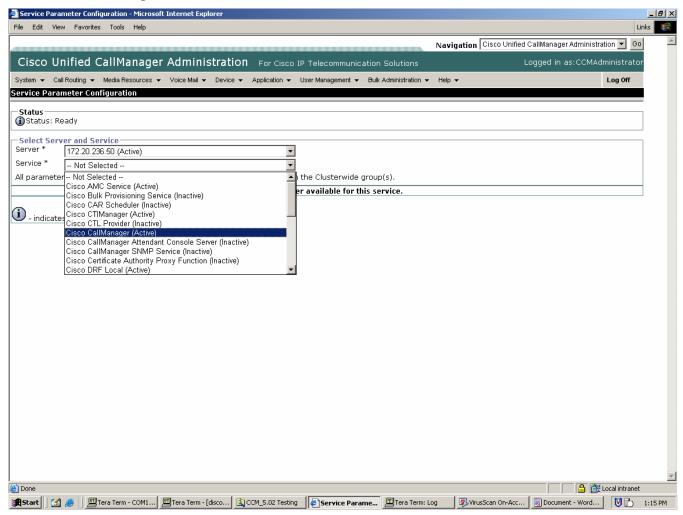




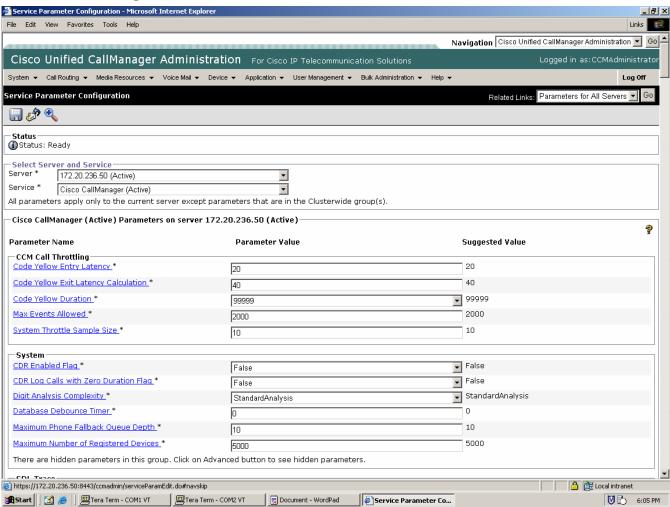




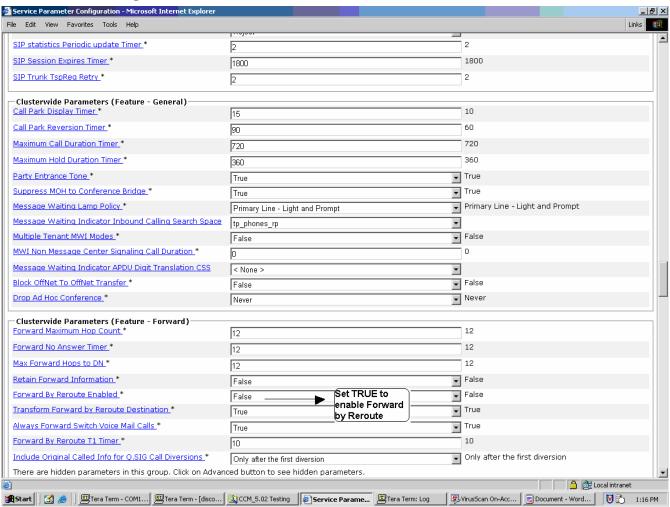




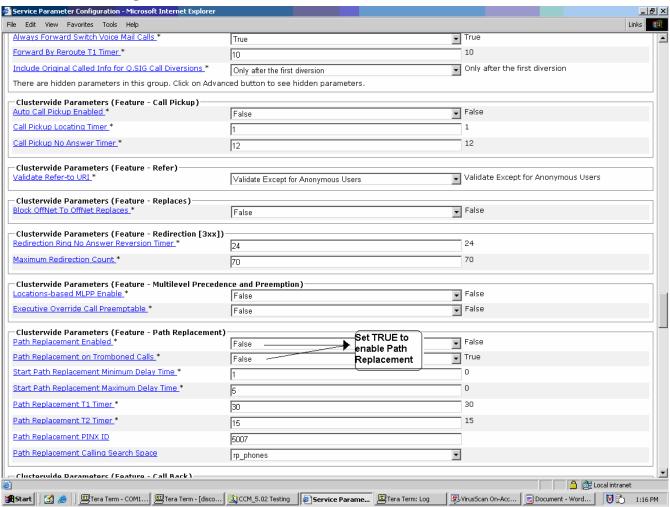




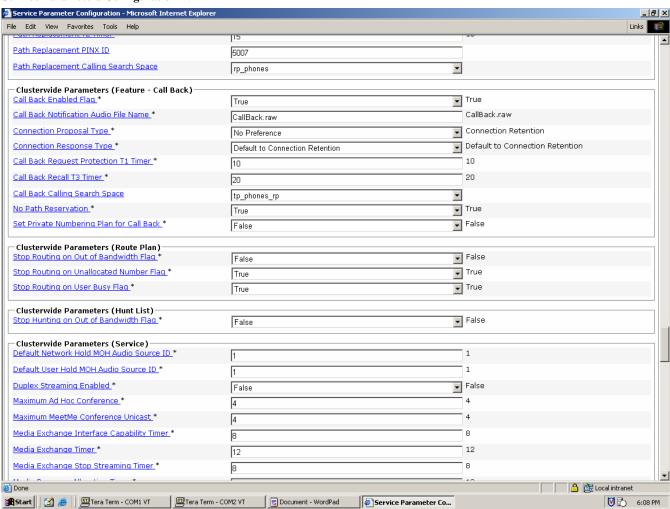




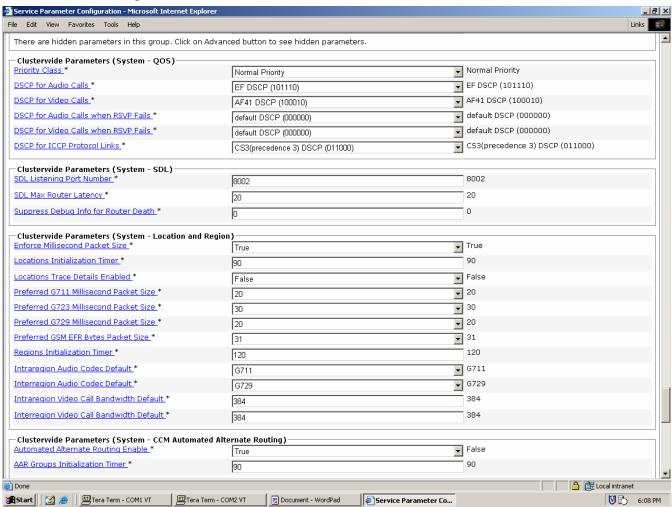






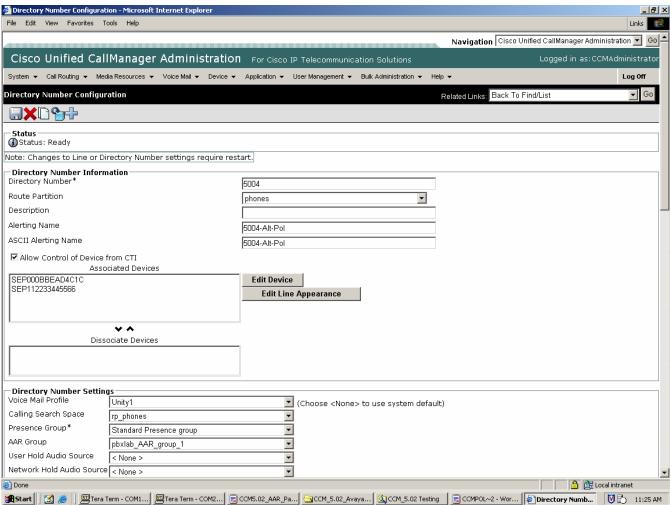






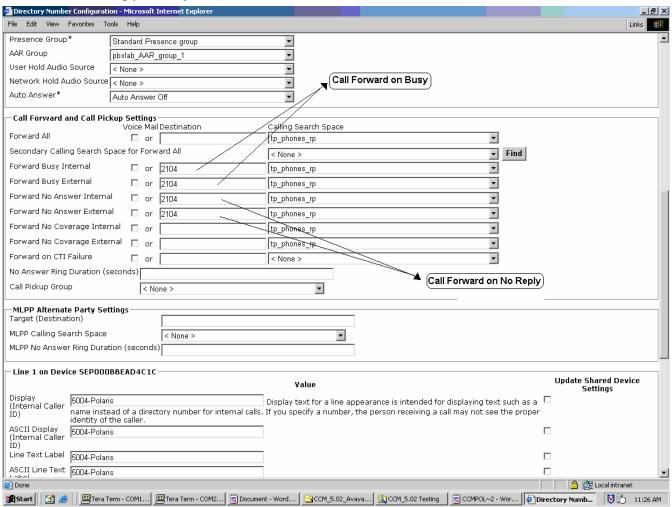


Call Forward on No Reply and Busy - 1



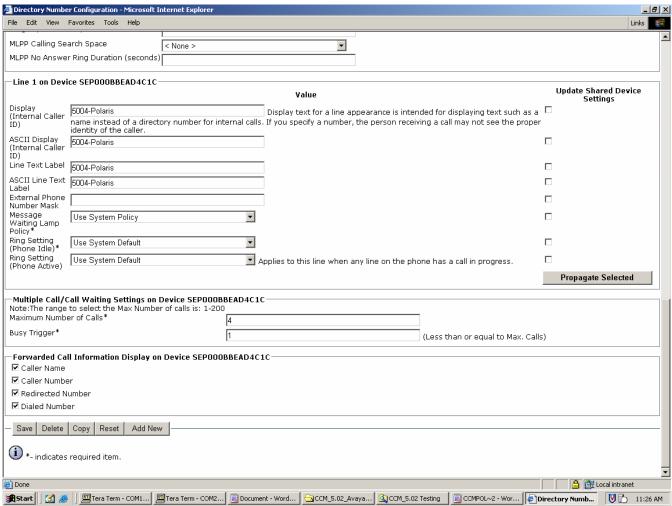


Call Forward on No Reply and Busy - 2



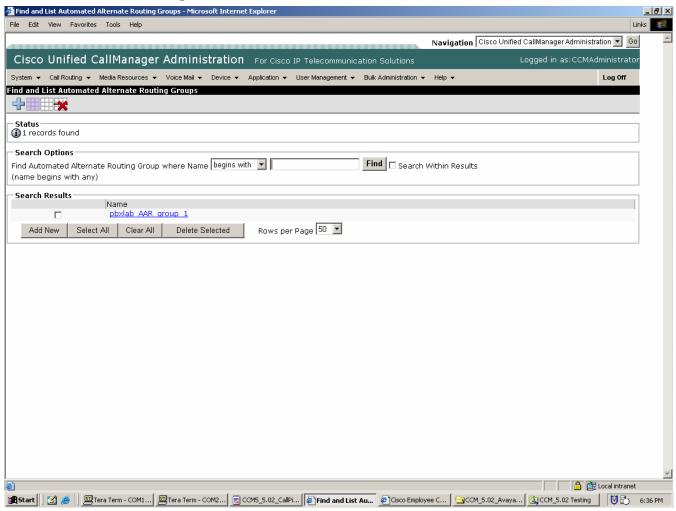


Call Forward on No Reply and Busy - 3



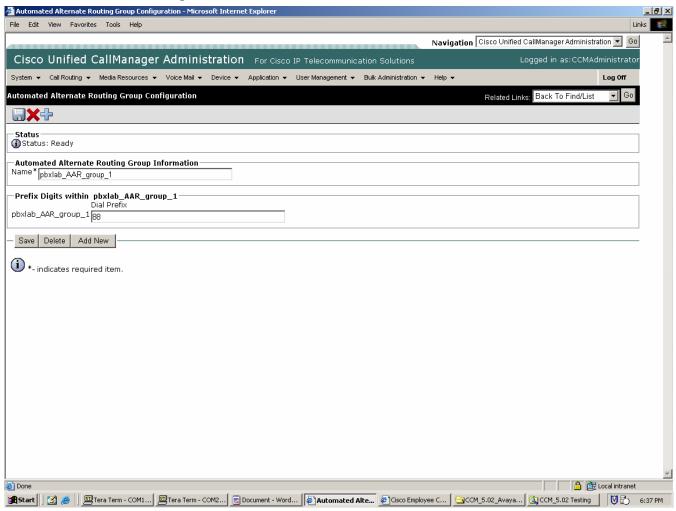


Automated Alternate Route Configuration - 1

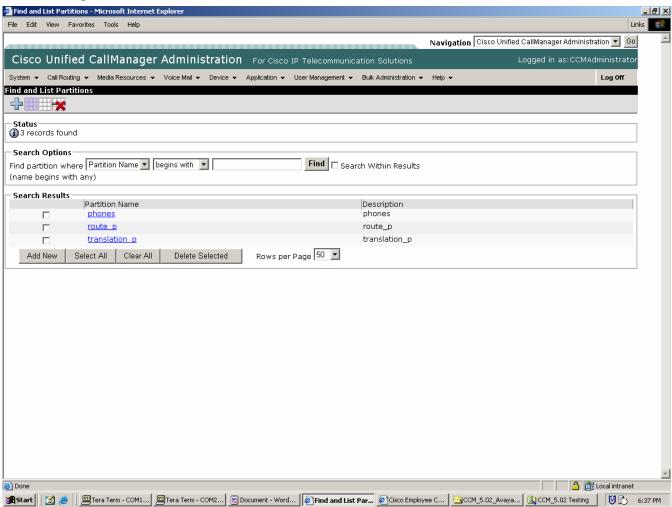




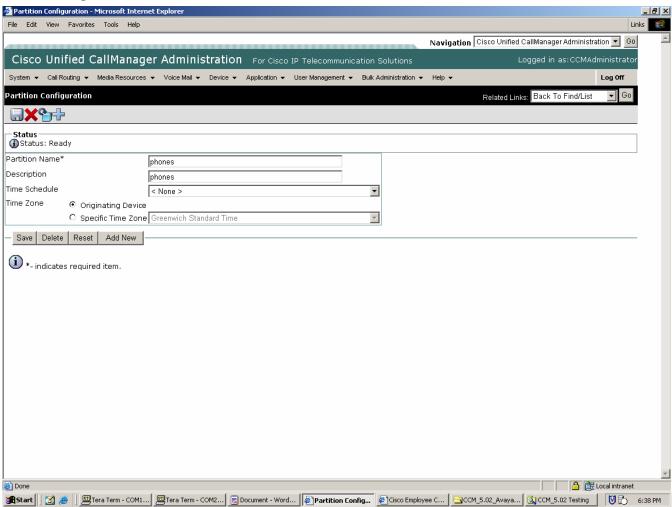
Automated Alternate Route Configuration - 2



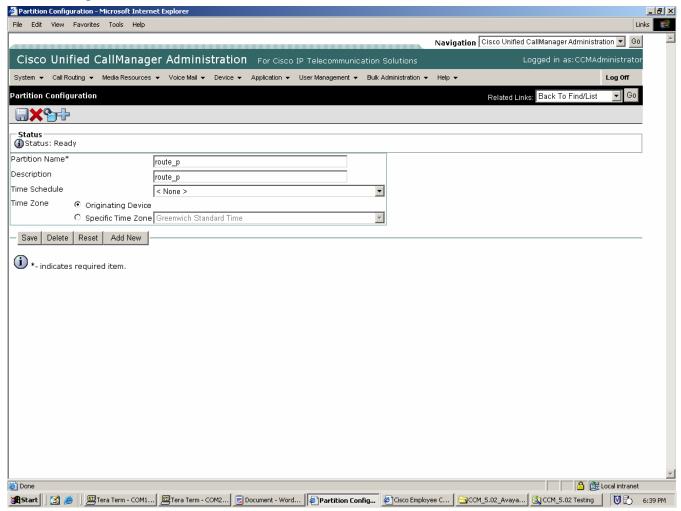




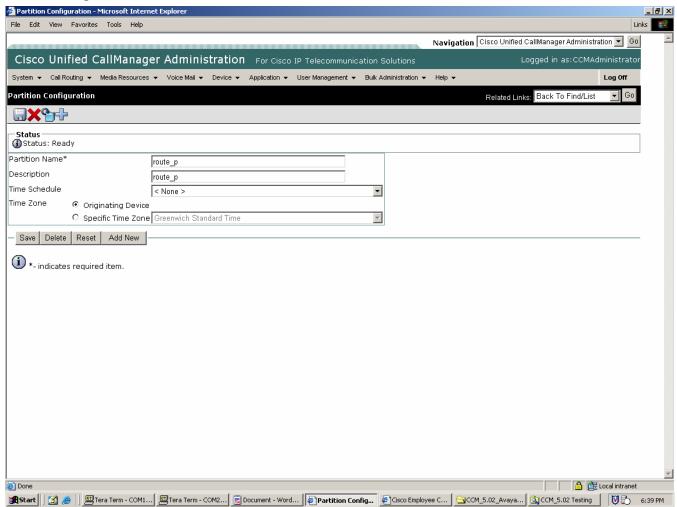




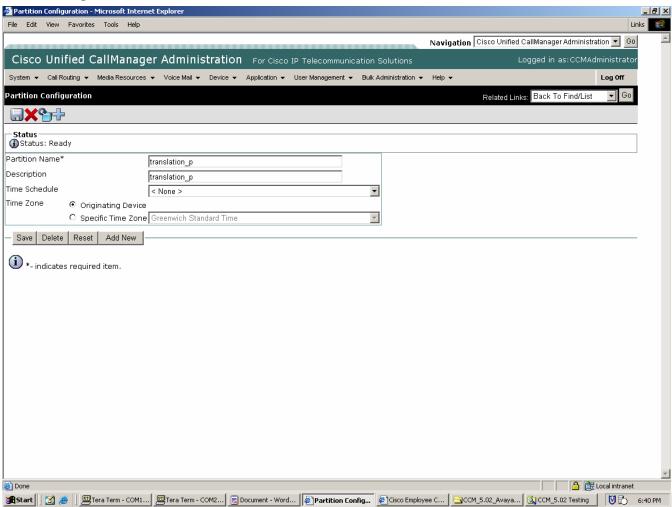






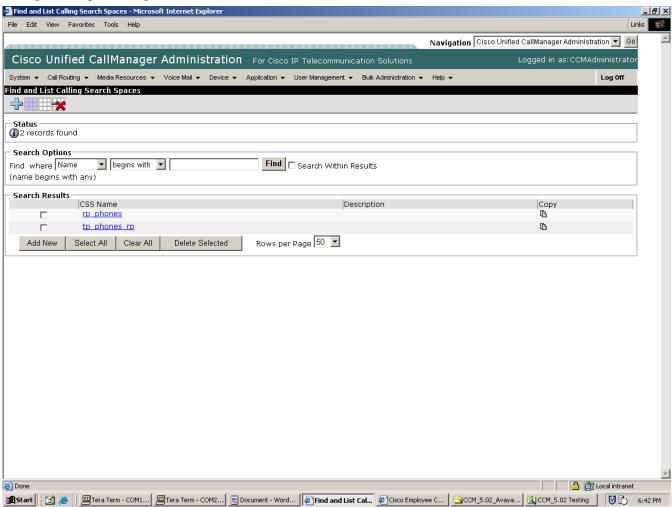






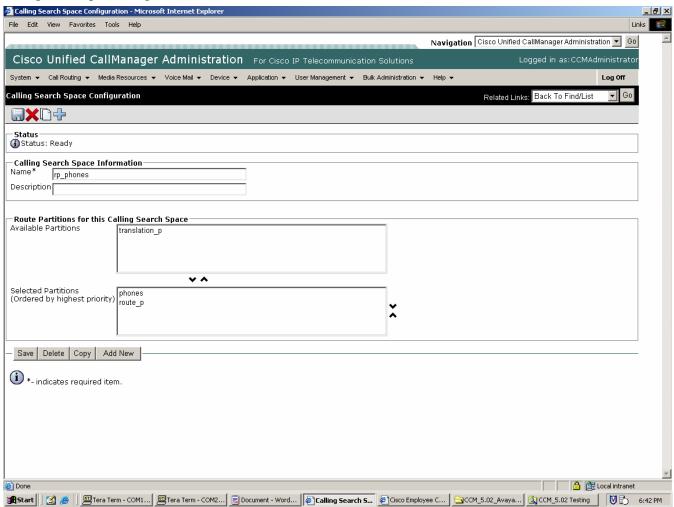


Calling Search Space Configuration - 1



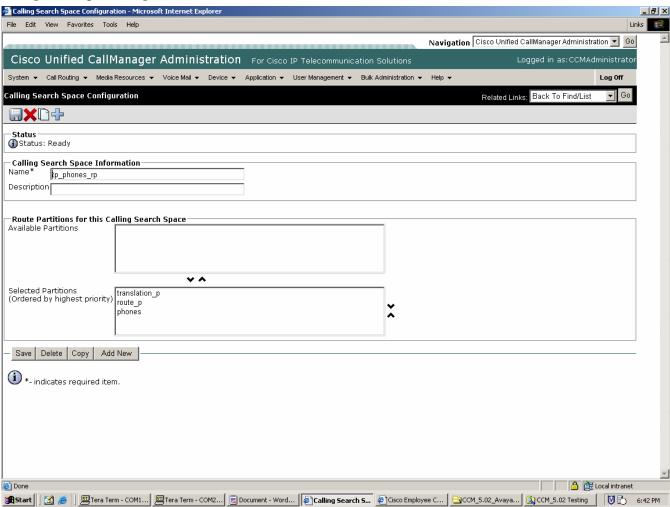


Calling Search Space Configuration - 2



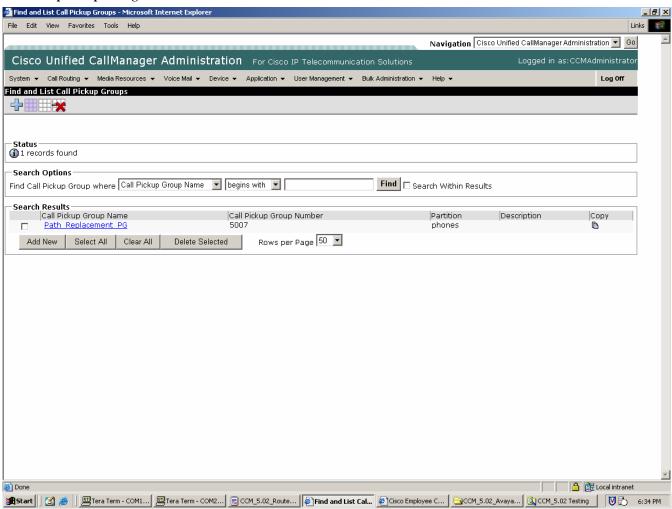


Calling Search Space Configuration - 3



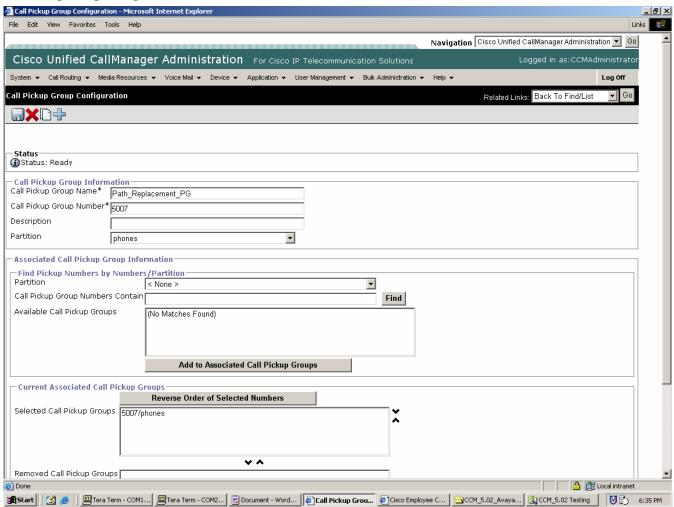


Call Pickup Group Configuration - 1



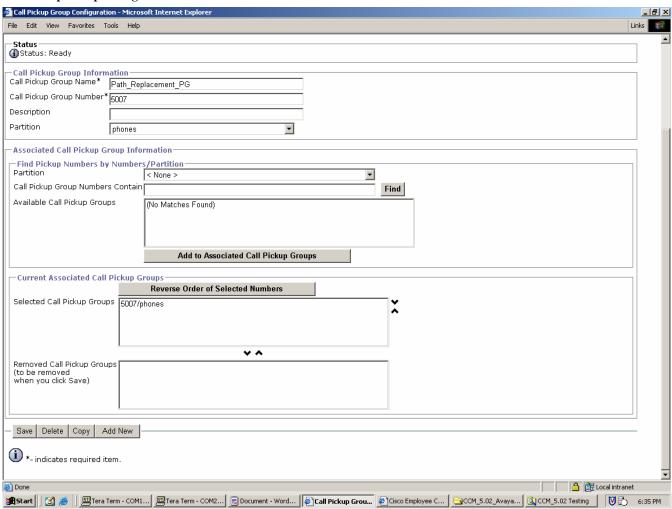


Call Pickup Group Configuration - 2

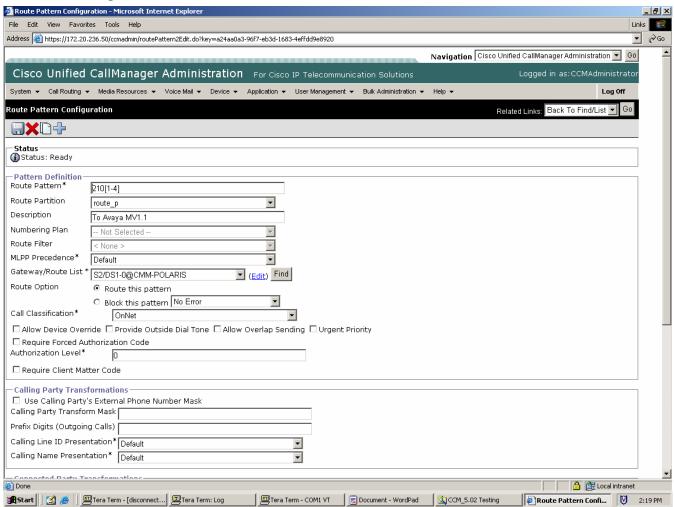




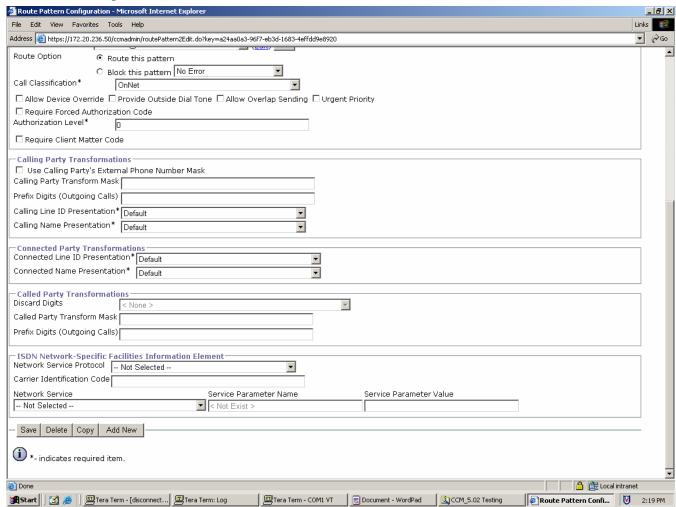
Call Pickup Group Configuration - 3



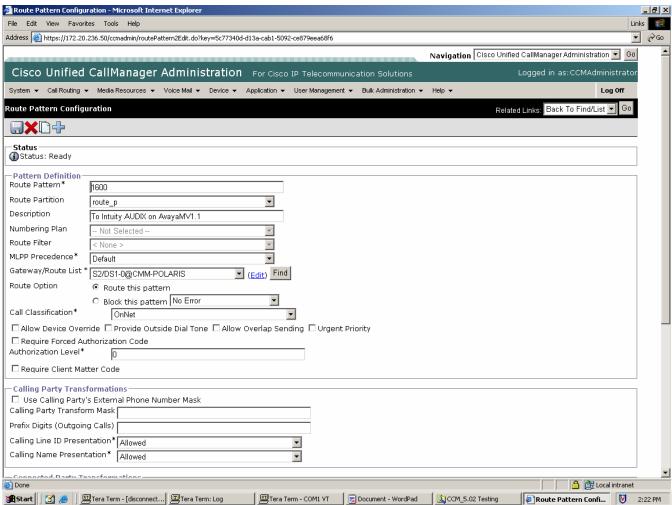




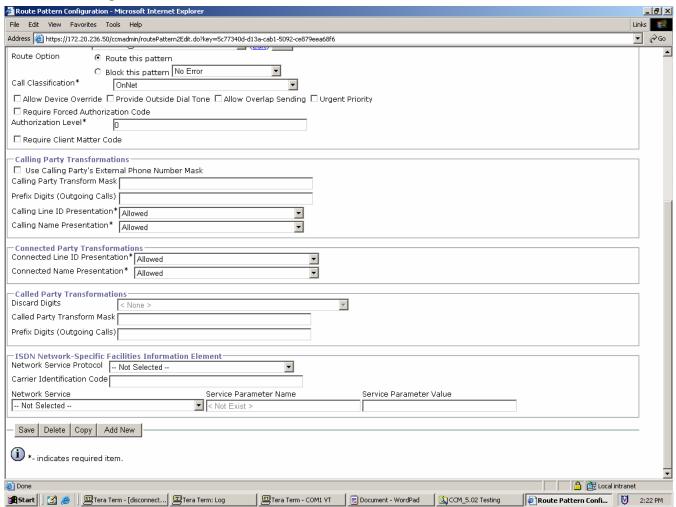






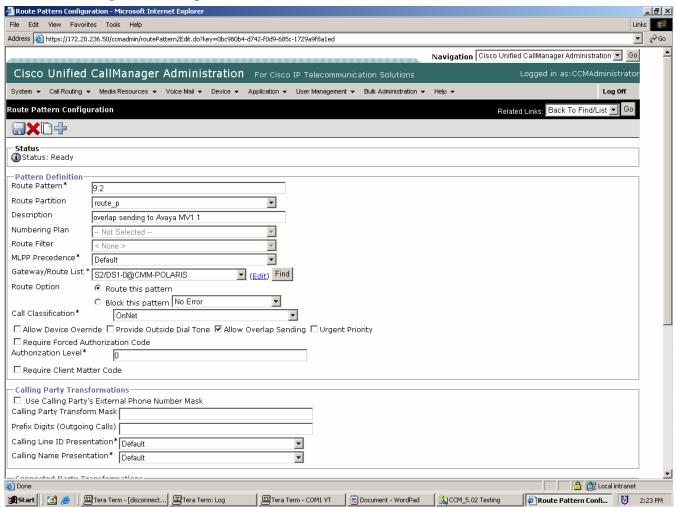






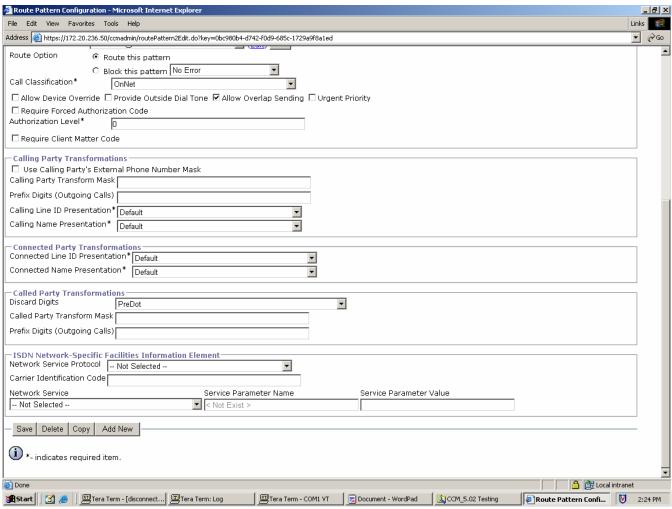


Route Pattern Configuration (Overlap) - 1





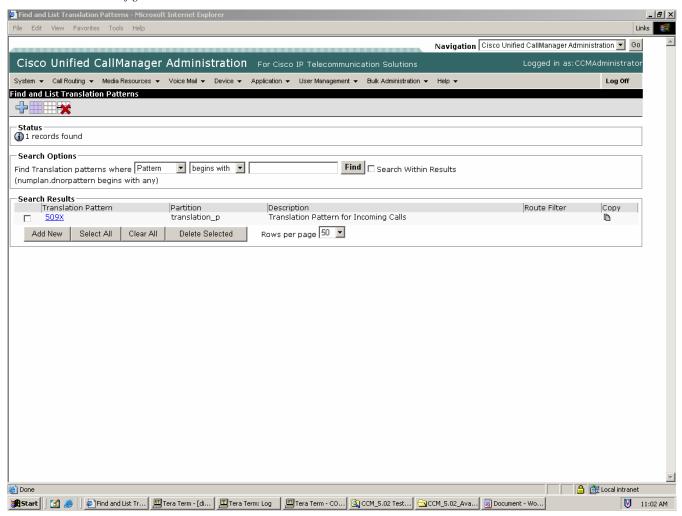
Route Pattern Configuration (Overlap) - 2





Connected Name and Number Restriction (CONR, COLR) - 1

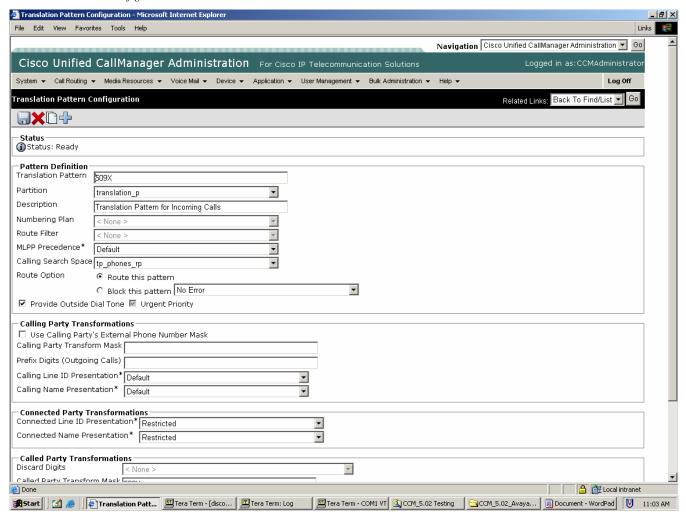
Translation Pattern Configuration





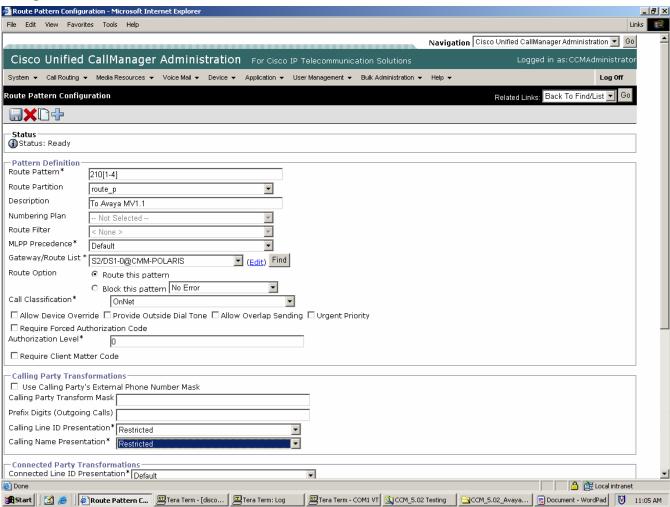
Connected Name and Number Restriction (CONR, COLR) - 2

Translation Pattern Configuration



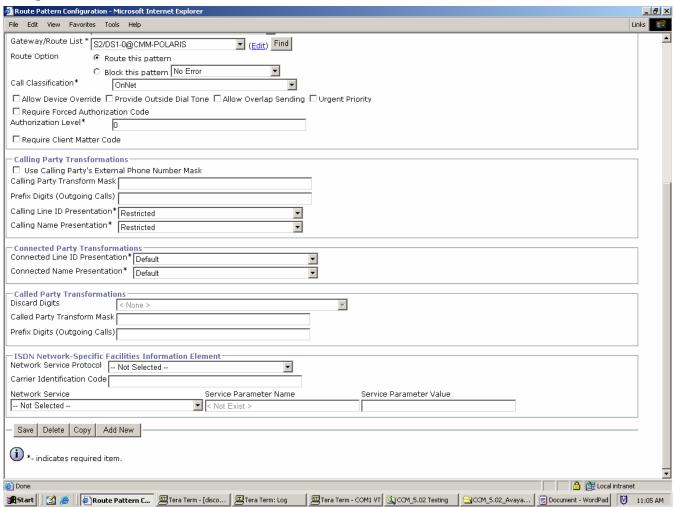


Calling Name and Number Restriction (CNIR, CLIR)- 1



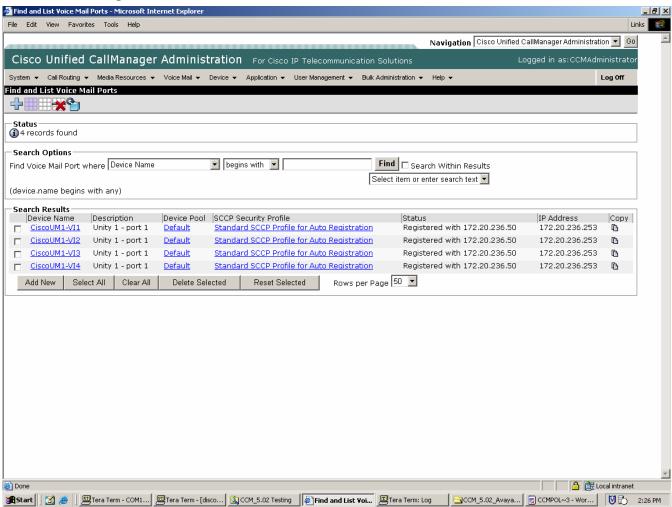


Calling Name and Number Restriction (CNIR, CLIR)- 2



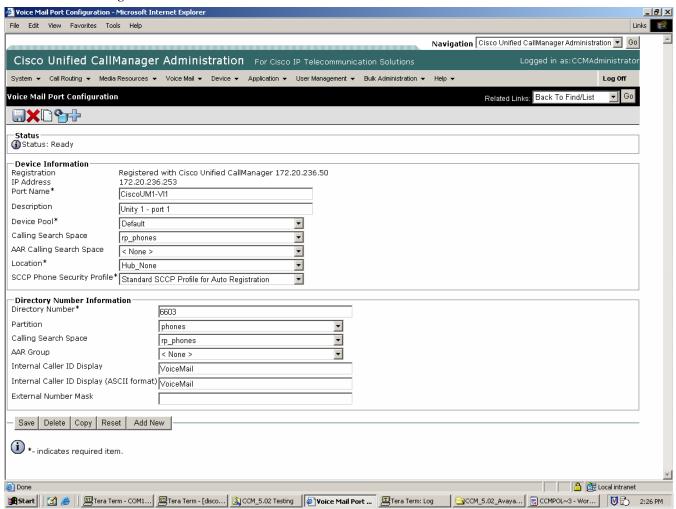


Voice Mail Port Configuration - 1



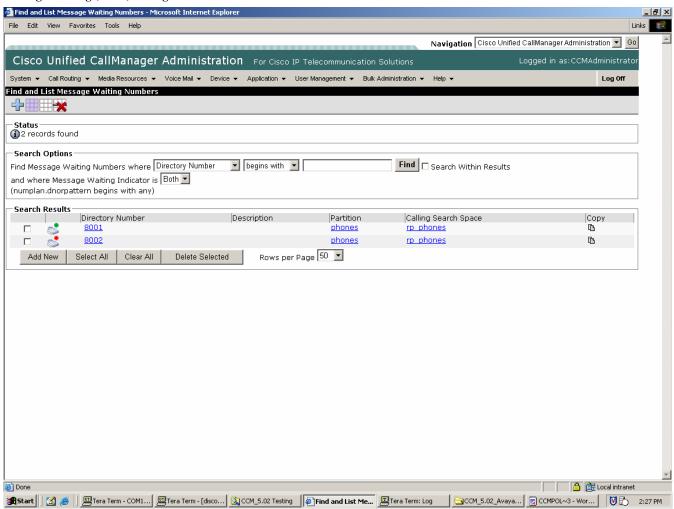


Voice Mail Port Configuration - 2



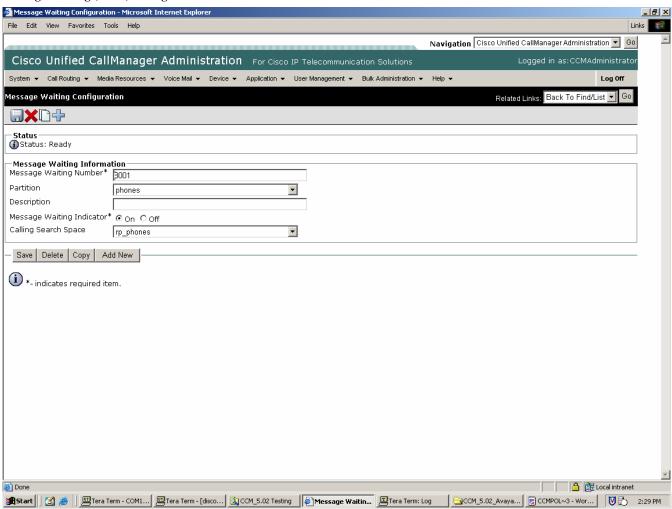


Message Waiting (MWI) Configuration - 1



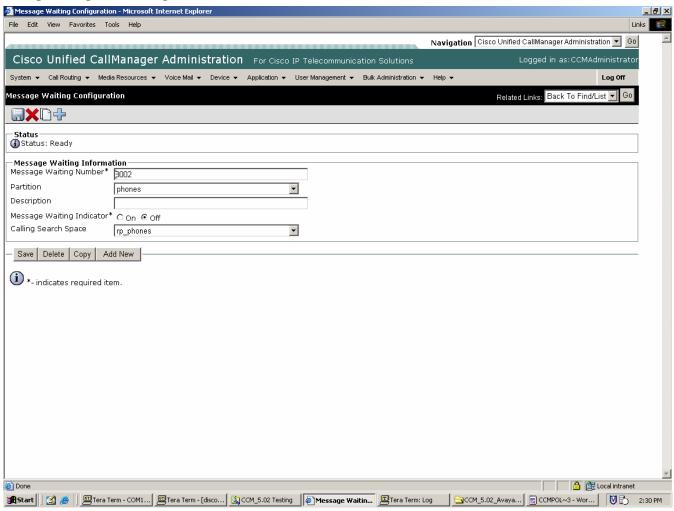


Message Waiting (MWI) Configuration - 2



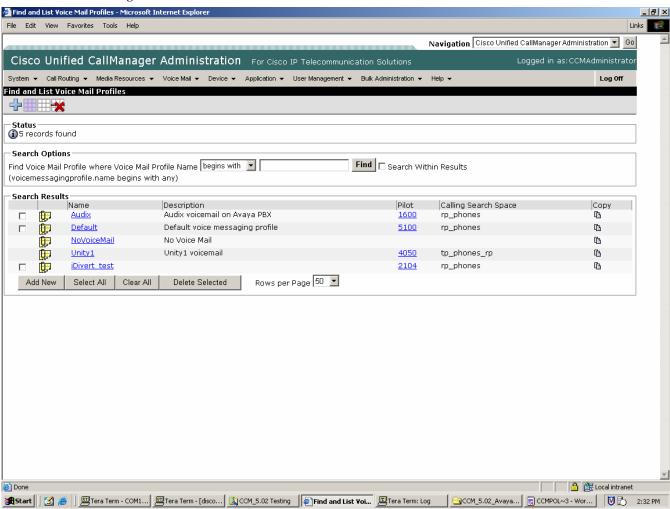


Message Waiting (MWI) Configuration - 3



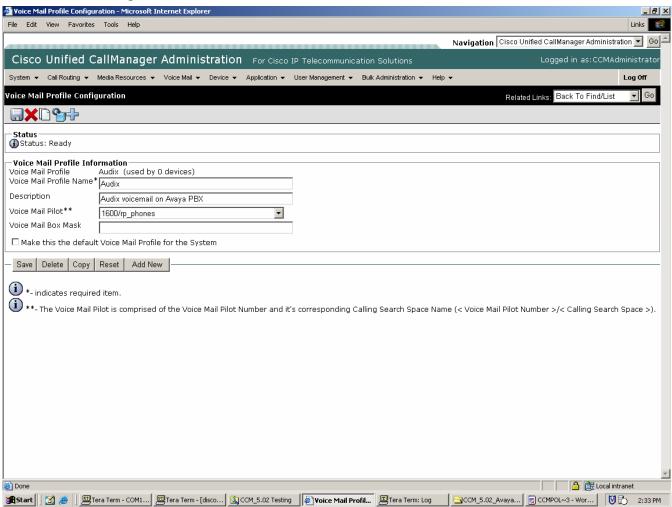


Voice Mail Profile Configuration - 1



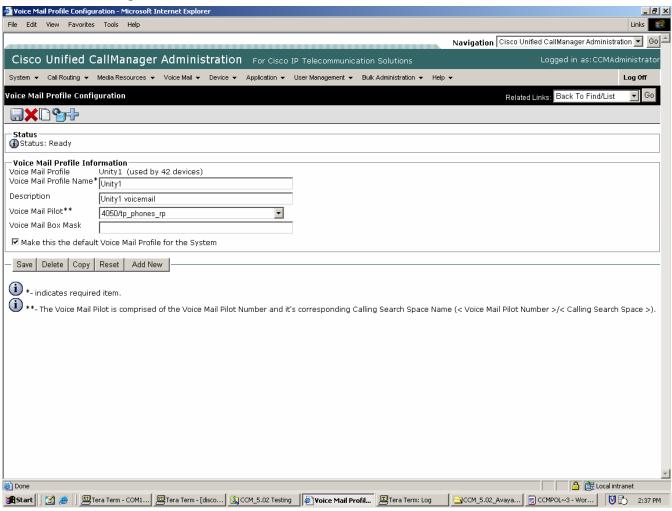


Voice Mail Profile Configuration - 2



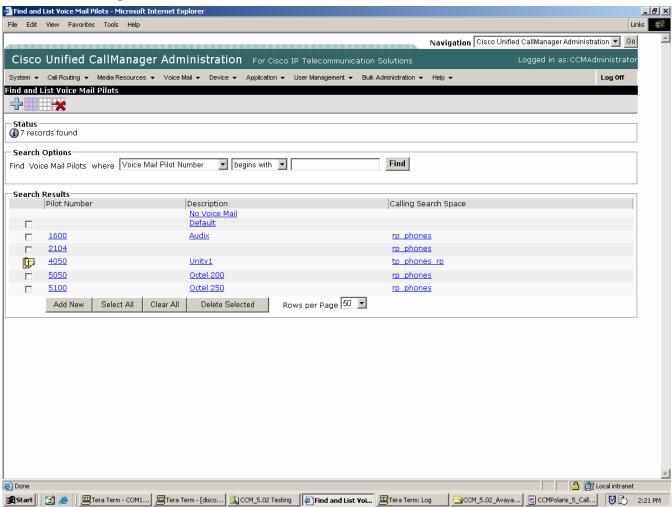


Voice Mail Profile Configuration - 3



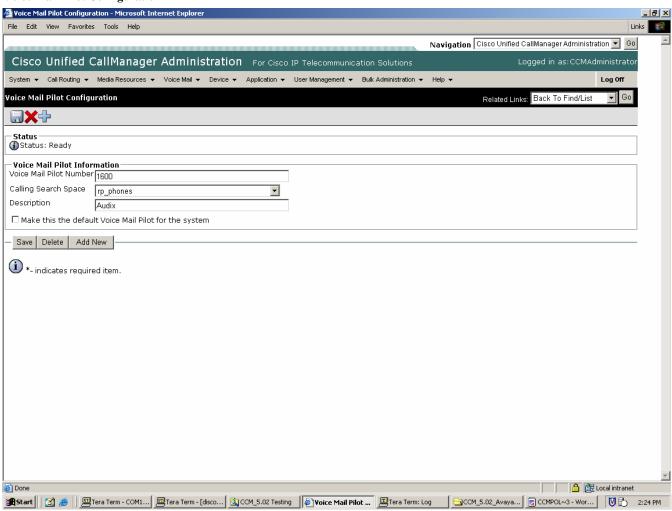


Voice Mail Pilot Configuration - 1



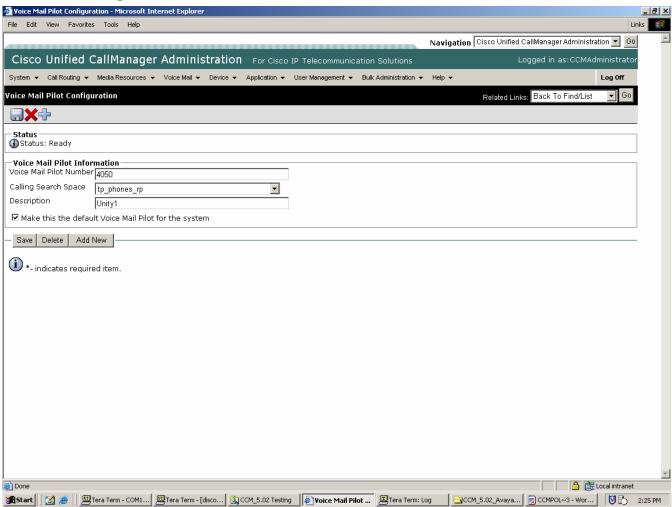


Voice Mail Pilot Configuration - 2

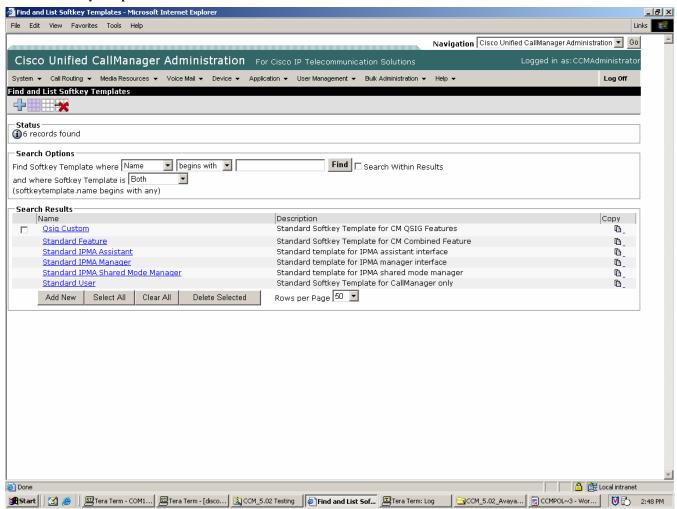




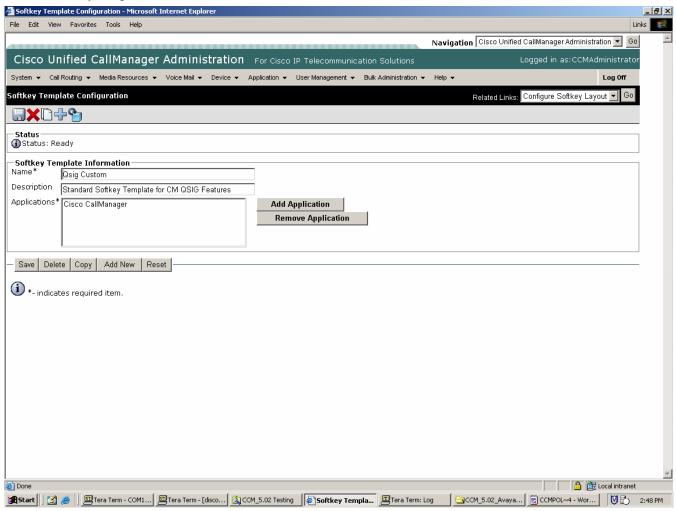
Voice Mail Pilot Configuration - 3



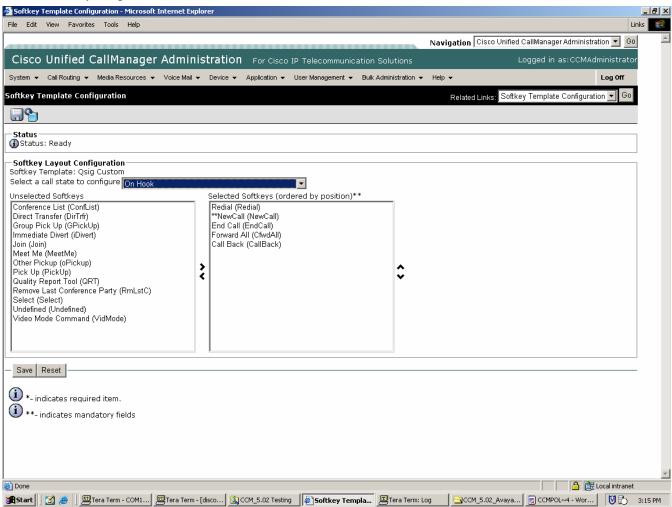




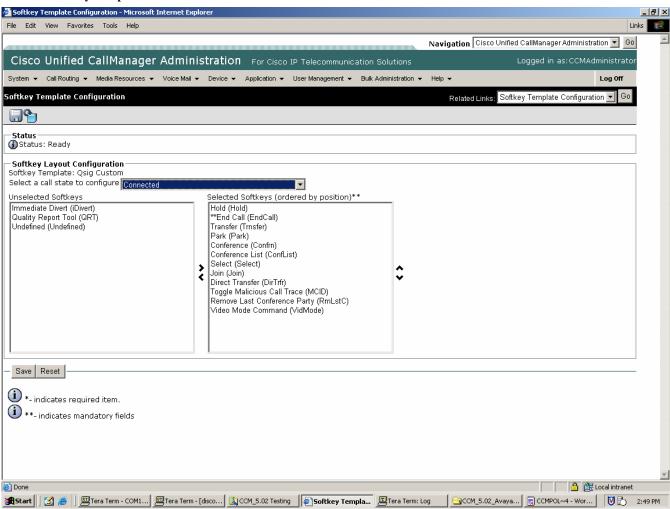




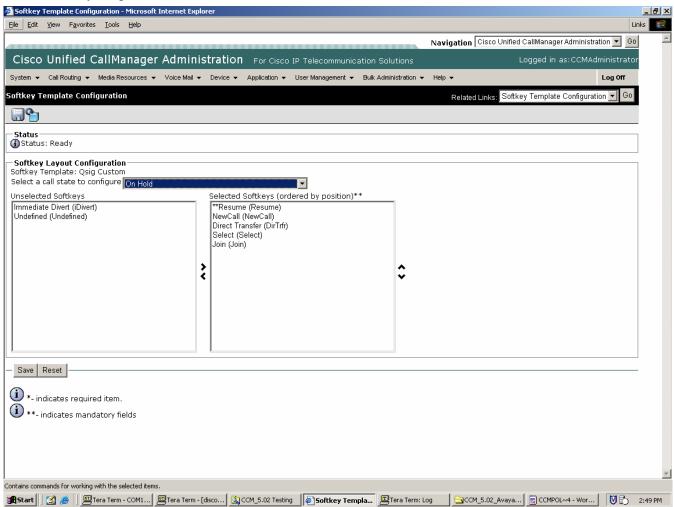




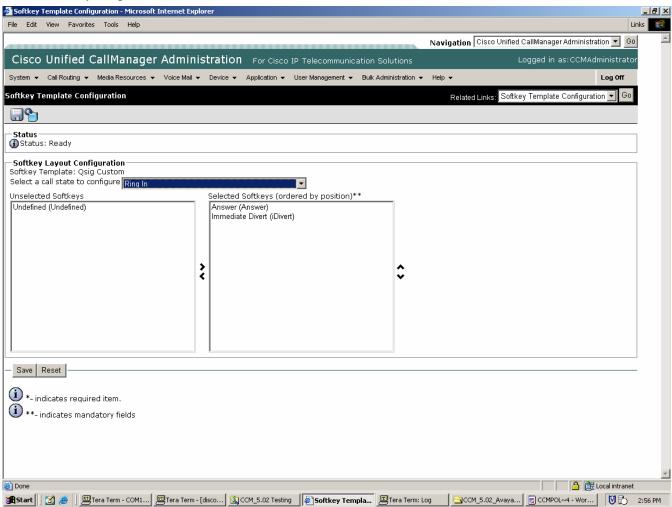




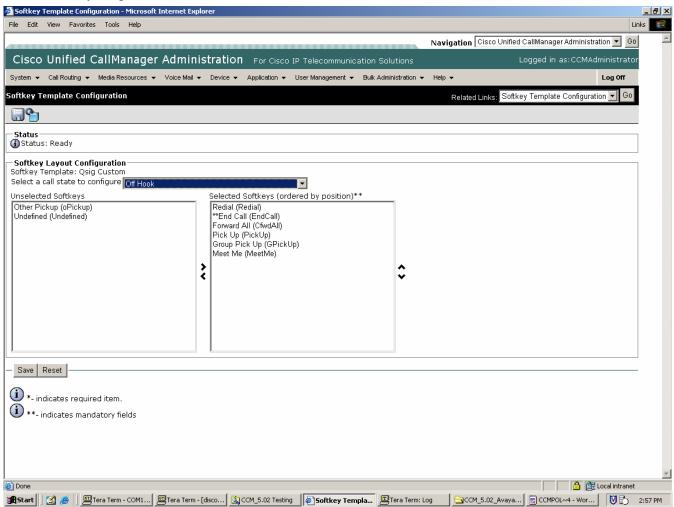




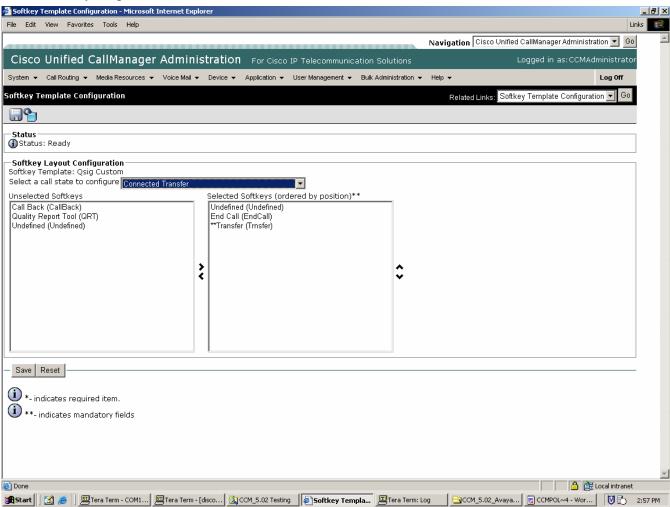




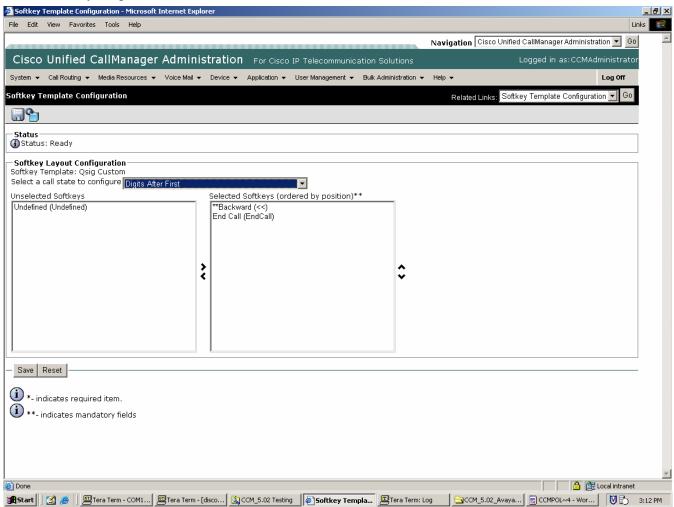




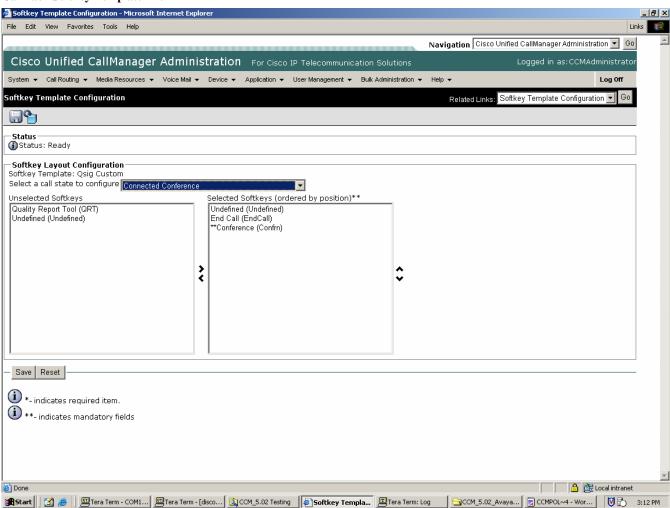




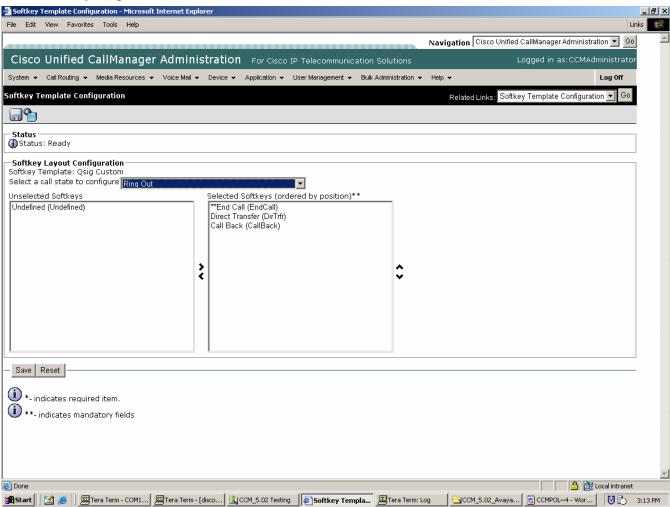




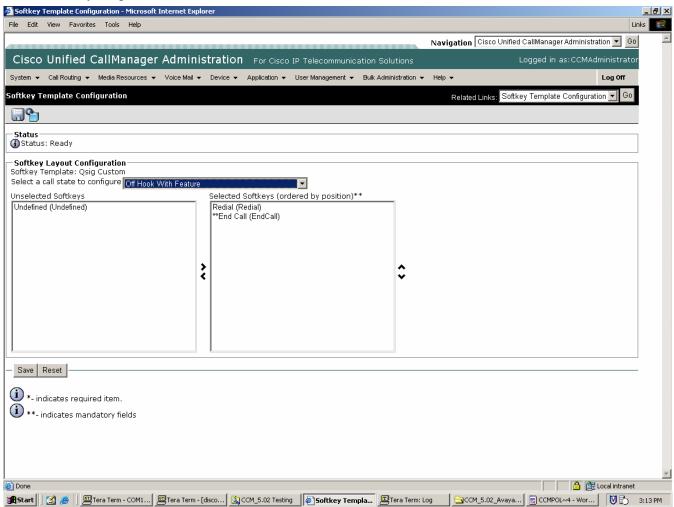




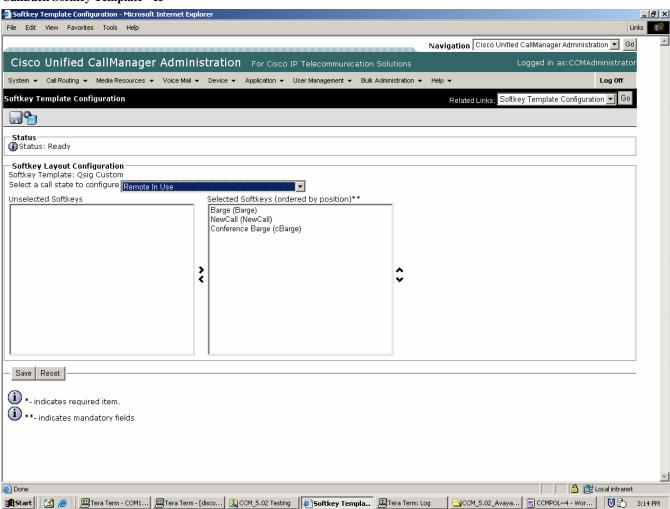




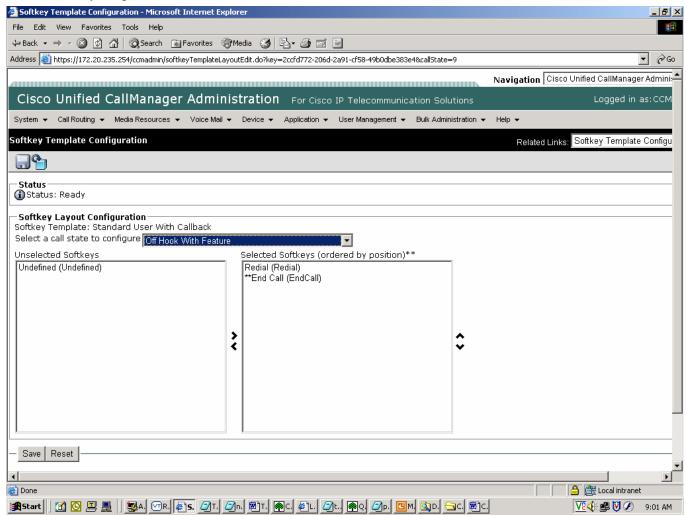




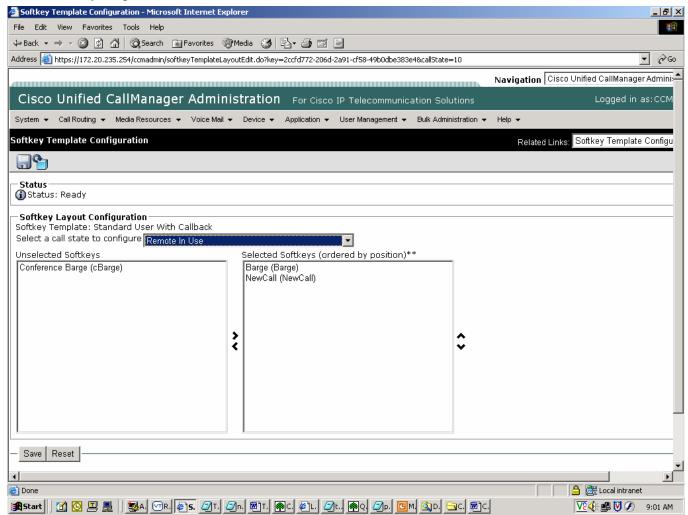






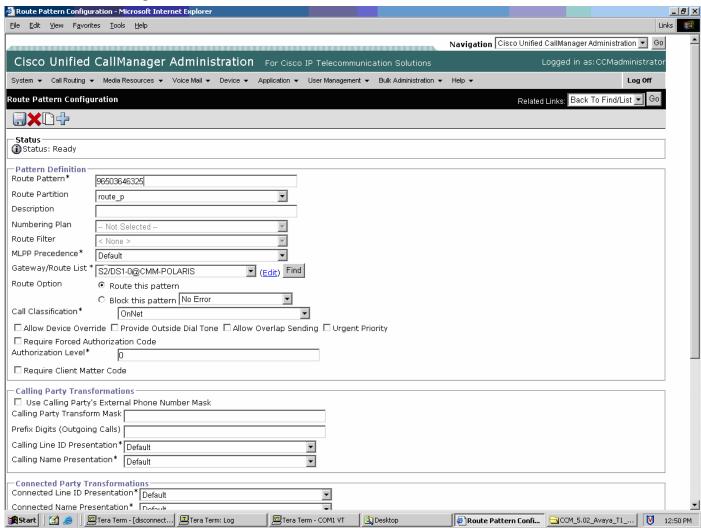






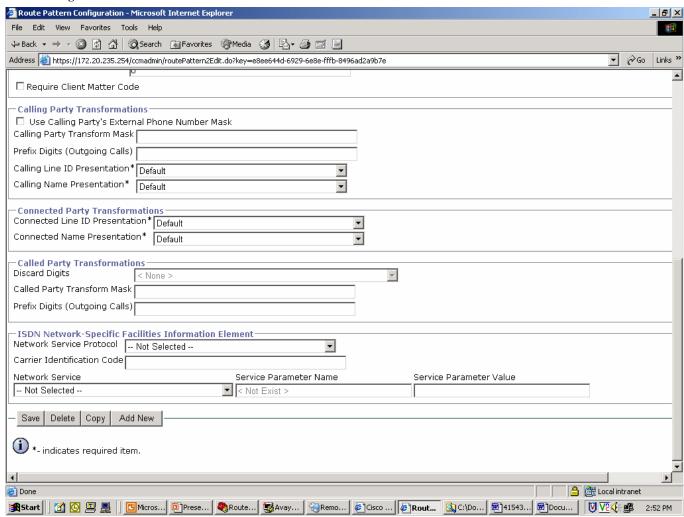


PSTN Route Pattern Configuration - 1





PSTN Configuration - 2





Cisco CMM Gateway Configuration

```
Current configuration: 4359 bytes
!
version 12.4
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
hostname CMM-POLARIS
boot-start-marker
boot system bootflash:wscmm-ipvoicek9-mz.124-8.bin
boot-end-marker
logging buffered 1000000 debugging
no logging console
no aaa new-model
!
resource policy
mmi polling-interval 60
mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
ip tcp synwait-time 13
ip host CM-MARS 172.20.231.254
ip host CM-VENUS 172.20.214.254
isdn switch-type primary-4ess
!
controller T1 1/0
framing esf
linecode b8zs
pri-group timeslots 1-24 service mgcp
controller T1 1/1
framing esf
linecode b8zs
```



```
pri-group timeslots 1-24 service mgcp
controller T1 1/2
framing esf
linecode b8zs
pri-group timeslots 1-24 service mgcp
controller T1 1/3
framing esf
linecode b8zs
pri-group timeslots 1-24
!
controller T1 1/4
framing esf
linecode b8zs
pri-group timeslots 1-24 service mgcp
!
controller T1 1/5
framing esf
linecode b8zs
pri-group timeslots 1-24 service mgcp
controller E1 2/0
pri-group timeslots 1-31 service mgcp
controller E1 2/1
controller E1 2/2
!
controller E1 2/3
controller E1 2/4
pri-group timeslots 1-31 service mgcp
controller E1 2/5
!
interface GigabitEthernet1/0
ip address 172.20.236.170 255.255.255.0
no ip proxy-arp
no negotiation auto
no keepalive
```



```
!
interface Serial 1/0:23
no ip address
encapsulation hdlc
no logging event link-status
isdn switch-type primary-qsig
isdn incoming-voice voice
isdn bind-13 ccm-manager
isdn bchan-number-order ascending
no cdp enable
interface Serial 1/1:23
no ip address
encapsulation hdlc
no logging event link-status
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 Serial 1/2:23
no ip address
encapsulation hdlc
no logging event link-status
isdn switch-type primary-qsig
isdn incoming-voice voice
isdn bind-13 ccm-manager
isdn bchan-number-order ascending
no cdp enable
interface Serial1/3:23
no ip address
encapsulation hdlc
no logging event link-status
isdn switch-type primary-qsig
isdn incoming-voice voice
isdn bchan-number-order ascending
no cdp enable
interface Serial 1/4:23
```



```
no ip address
encapsulation hdlc
no logging event link-status
isdn switch-type primary-qsig
isdn incoming-voice voice
isdn bind-13 ccm-manager
no cdp enable
interface Serial 1/5:23
no ip address
encapsulation hdlc
no logging event link-status
isdn switch-type primary-qsig
isdn incoming-voice voice
isdn bind-13 ccm-manager
no cdp enable
!
interface Serial2/0:15
no ip address
encapsulation hdlc
no logging event link-status
isdn switch-type primary-qsig
isdn incoming-voice voice
isdn bind-13 ccm-manager
no cdp enable
interface Serial2/4:15
no ip address
encapsulation hdlc
no logging event link-status
isdn switch-type primary-qsig
isdn incoming-voice voice
isdn bind-13 ccm-manager
no cdp enable
ip default-gateway 172.20.236.1
ip route 0.0.0.0 0.0.0.0 172.20.236.1
no ip http server
no ip http secure-server
!
```



```
control-plane
voice-port 1/0:23
voice-port 1/1:23
voice-port 1/2:23
voice-port 1/3:23
voice-port 1/4:23
voice-port 1/5:23
voice-port 2/0:15
voice-port 2/4:15
ccm-manager mgcp
ccm-manager music-on-hold
ccm-manager config server 172.20.236.50
ccm-manager config
mgcp
mgcp call-agent 172.20.236.50 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
mgcp package-capability pre-package
no mgcp timer receive-rtcp
mgcp sdp simple
mgcp fax t38 inhibit
mgcp rtp payload-type g726r16 static
mgcp profile default
!
!
```



```
!
dial-peer voice 1 pots
service mgcpapp
port 1/0:23
dial-peer voice 2 pots
service mgcpapp
port 1/1:23
dial-peer voice 3 pots
service mgcpapp
port 1/2:23
dial-peer voice 4 pots
service mgcpapp
dial-peer voice 5 pots
service mgcpapp
port 1/4:23
!
dial-peer voice 6 pots
service mgcpapp
port 1/5:23
!
!
line con 0
transport output all
line vty 04
login
transport input all
transport output all
!
!
end
```

CMM-POLARIS#



PSTN Gateway (Cisco 3745) Configuration

```
3745E1#sh run
Building configuration...
Current configuration: 1806 bytes
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
hostname 3745E1
boot-start-marker
boot system flash:c3745-ipvoice-mz.124-3.bin
boot system slot0:C3745-ipvoice-mz.shamu_p2_18
boot-end-marker
logging buffered 1000000 debugging
no aaa new-model
resource policy
no network-clock-participate slot 2
no network-clock-participate slot 3
no network-clock-participate slot 4
voice-card 2
no dspfarm
voice-card 3
dspfarm
voice-card 4
dspfarm
ip subnet-zero
ip cef
ip tcp synwait-time 13
isdn switch-type primary-ni
no voice call carrier capacity active
```



```
controller E1 4/0
framing NO-CRC4
pri-group timeslots 1-31
controller E1 4/1
translation-rule 1
Rule 1 914085275004 5004
Rule 2 914085275004 5005
interface FastEthernet0/0
ip address 172.20.33.52 255.255.255.0
duplex auto
speed auto
interface FastEthernet0/1
no ip address
shutdown
duplex auto
speed auto
interface Serial4/0:15
no ip address
isdn switch-type primary-ni
isdn incoming-voice voice
isdn bchan-number-order ascending
no cdp enable
ip classless
ip route 0.0.0.0 0.0.0.0 172.20.31.1
ip route 0.0.0.0 0.0.0.0 FastEthernet0/0
ip route 0.0.0.0 0.0.0.0 172.20.33.1
ip http server
control-plane
!
voice-port 2/0/0
station-id name Yahoo-PSTN
voice-port 2/0/1
!
voice-port 4/0:15
no mgcp package-capability res-package
no mgcp package-capability fxr-package
no mgcp timer receive-rtcp
```



```
dial-peer voice 1 pots
destination-pattern 6503646325
port 2/0/0
dial-peer voice 2 pots
destination-pattern 91408527....
translate-outgoing called 1
direct-inward-dial
port 4/0:15
line con 0
line aux 0
line vty 04
exec-timeout 0 0
password CISCO
login
!
!
end
```



Acronyms

Acronym	Definitions
ANF-PR	Additional Network Feature Path Replacement
CCM	Cisco Unified CallManager
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
СТ	Call Transfer
MWI	Message Waiting Indicator
PSTN	Public Switched Telephone Network



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