Application Note

Cisco CallManager Release 4.1(2) - PBX Interoperability: Nortel Communication Server 1000 Release 4.0 Using H.323 Trunk

Introduction

This is an application note for interoperability connectivity of Nortel Communication Server 1000 (formerly known as Succession 1000) PBX with Cisco CallManager Release 4.1(2)SR1 via H.323 trunk.

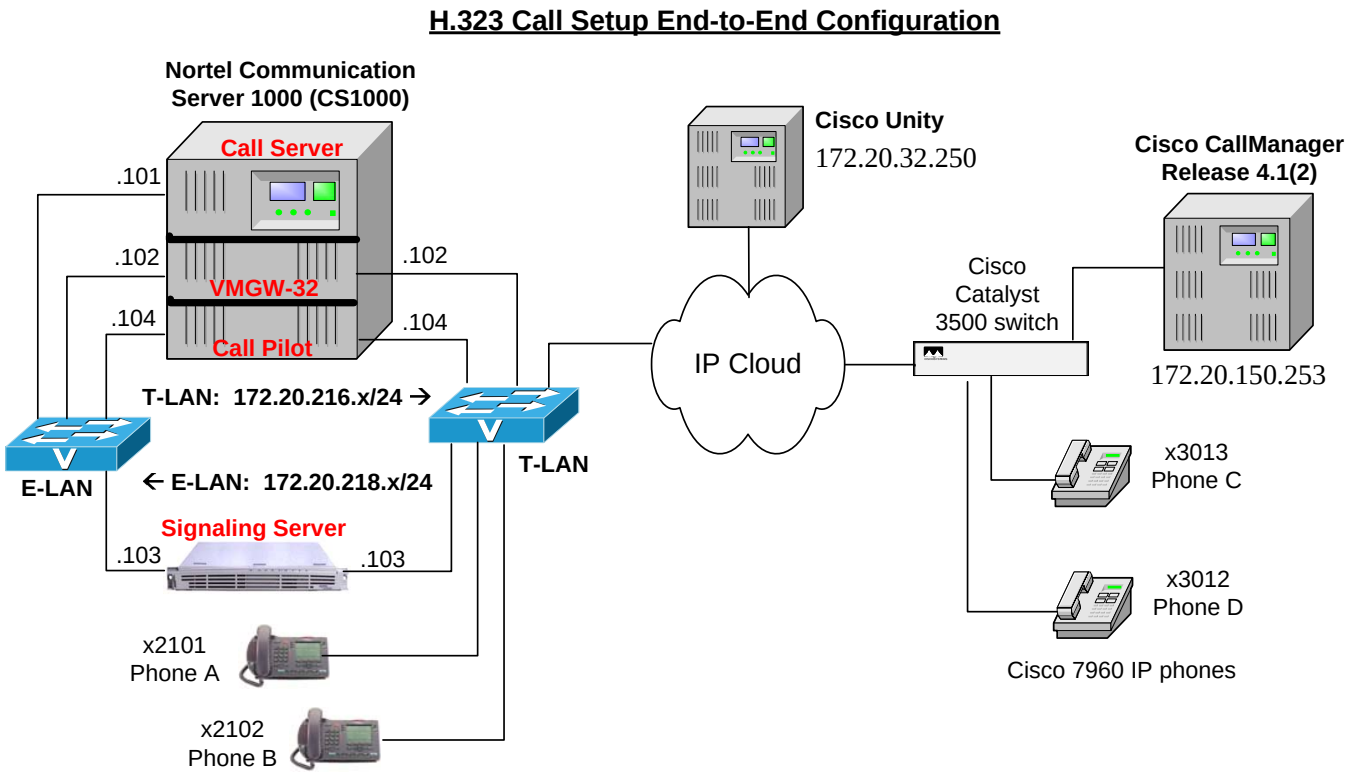
The network topology diagram (Figure 1) shows the test setup for end-to-end interoperability with the Nortel CS1000 PBX configured as a H323 gateway with the Cisco CallManager 4.1(2)SR1 release.

On Cisco CallManager H323 Gateway Configuration web page defined for the Nortel PBX, please ensure the following "Media Termination Point Required", "Enable Inbound FastStart" and "Enable Outbound FastStart" boxes are all checked.

Network Topology

Draw a diagram of the network topology or test setup.

Figure 1. Network Topology or Test Setup



Limitations

Alerting/Connected Name and Number are supported by both PBX. However, they do not interoperate with one another. Cisco CallManager use ”Display IE” and ”Connected Number” field within the H.225 message to pass these information across the H.323 session. Nortel on the other hand, use a priorpretary method of passing these information across using the ”nonStandardData” field within the H.225 message.

Call Transfer and Call Forward features work without any phone’s name or number display update capability.

Call Completion (Callback) Feature is not supported on both Cisco CallManager and Nortel CS1000 using standard H.323 protocol. However, it is supported on between their own system using each priopretary tunneling method.

MWI ON/OFF messages doesn’t work across the H.323connection between the two PBX systems.

End-to-end DTMF relay signaling doesn’t work for Nortel phone when calling Cisco IP Phone which have Nortel Call Pilot as a voice mail system. DTMF relays is not negotiated for the H323 call session

On the Cisco CallManager H323 Gateway Configuration for the Nortel PBX, “Media Termination Point Required”, “Enable Inbound FastStart” and “Enable Outbound FastStart” boxes all must be checked.

Both CCM and Nortel currently do not support H.450 Supplementary Services.

System Components

Hardware Requirements

Cisco CallManager MCS server, Unity server, and Cisco 7960 phones

Nortel Communication System 1000 (which includes Call Server, Signaling Server and Media gateway) and Nortel’s i2004/i2000 IP phones

Software Requirements

Cisco CallManager Release 4.1(2)

Nortel Succession 4.0 Release

Features

CLIP-Calling Line (Number) Identification Presentation (Please see the Limitation section)

CLIR-Calling Line (Number) Identification Restriction (Please see the Limitation section)

CNIP-Calling Name Identification Presentation (Please see the Limitation section)

CNIR-Calling Name Identification Restriction (Please see the Limitation section)

CT-Call Transfer by Join (Please see the Limitation section)

CFU-Call Forwarding Unconditional (Please see the Limitation section)

CFB-Call Forwarding Busy (Please see the Limitation section)

CFB-Call Forwarding Busy (Please see the Limitation section)

COLP-Connected Line (Number) Identification Presentation (Please see the Limitation section)

COLR- Connected Line (Number) Identification Restriction (Please see the Limitation section)

CONP-Connected Name Identification Presentation (Please see the Limitation section)

End-to-End DTMF signaling (Please see the Limitation section)

Features Not Supported

MWI- Message Waiting Indication (lamp ON, lamp OFF) across the H.323 Trunk

Call Completion (Callback; Automatic Callback)

Alerting Name

CT-Call Transfer with Path Replacement

Call Completion

Configuration

Nortel Communication Server 1000 PBX Configuration Sequence and Tasks

Call Server Setup via SSC card console

1. LD 17 – Configure the D-channel (signaling channel) between the Call Server and the Signaling Server
2. LD 97 – Configure the Super-loop for the Virtual Trunks
3. LD 14 – Configure the H.323 Virtual Trunks to the Signaling Server
4. LD 14 – Configure the Virtual Gateway Trunks
5. LD 11 – Configure for the Virtual lines for the Nortel IP phone (i200x series)
6. LD 16 – Configure the H.323 route
7. LD 86 – Configure the Route List Block for the Virtual Trunk route
8. LD 87 – Configure CDP steering codes

Signaling Server Setup via the Nortel Element Manager

9. Configure the Zones
10. Configure a new IP Telephony Node summary
11. Configure the Node section
12. Configure the VGW and IP phone codec profile section
13. Configure the Quality of Service (QoS) section
14. Configure LAN Configuration section
15. Configure the H323 GW Setting section
16. Configure the Card section for the MC-32 VGMC card section
17. Configure the Signaling Server section

NRS (Network Routing Server)

18. Configure the System Wide Settings
19. Configure the NRS Server Settings
20. Configure a Service Domain
21. Configure a L1 Domain (UDP)
22. Configure a L0 Domain (CDP)
23. Configure a H.323 gateway
24. Configure the Routing Entries

Cisco CallManager Setup

25. Create the Media Resource Group and Media Resource Group List for the MTP requirement
26. Add an H323 gateway for the Nortel CS1000 PBX under the Device pull-down menu
27. Add a Route Pattern to reach the Nortel's phone DN extensions
28. Configure Cisco 7960 phone and line DN

Configuration Menus and Commands

Nortel Communication Server 1000 (CS1000) Configuration

Call Server Setup:

1. LD 17 – Configure the D-channel (signaling channel) between the Call Server and the Signaling Server

```
>ld 22
PT2000

REQ  prt
TYPE adan dch 3

ADAN     DCH 3
 CTYP DCIP
 DES  IP_Trunk_DCH
 USR  ISLD
 ISLM 4000
 SSRC 1800
 OTBF 32
 NASA NO
 IFC  SL1
 CNEG 1
 RLS  ID  4
 RCAP ND2
 MBGA NO
 H323
  OVLR NO
  OVLS NO
```

2. LD 97 – Configure the Super-loop for the Virtual Trunks

```
>ld 97
SCSYS000
MEM AVAIL: (U/P): 2854769    USED U P: 182454 59352    TOT: 3096575
DISK RECS AVAIL: 1152
REQ  prt
TYPE supl
SUPL

SUPL  SUPT SLOT XPEC0   XPEC1

 000  STD  LEFT 01 0 1  -- - -
 004  STD  LEFT 02 0 1  -- - -
 008  STD  LEFT 03 0 1  -- - -
 012  STD  LEFT 04 0 1  -- - -
 016  STD  LEFT 05 0 1  -- - -
 032  STD  LEFT 06 0 3  -- - -
 036  STD  LEFT 07 0 3  -- - -
 040  STD  LEFT 08 0 3  -- - -
 044  STD  LEFT 10 0 3  -- - -
 048  STD  LEFT 09 0 3  -- - -
 064  STD  LEFT 11 0 3  -- - -
 068  STD  LEFT 12 0 3  -- - -
```

```
072  STD  LEFT 13 0 3  -- - -
096  VIRTUAL CARDS 61 - 64  81 - 84
100  VIRTUAL CARDS 65 - 68  85 - 88
128  STD  LEFT 32 0 1  33 2 3
132  STD  LEFT 34 0 1  35 2 3
136  STD  LEFT 36 0 1  37 2 3
140  STD  LEFT 38 0 1  39 2 3
144  STD  LEFT 40 0 1  41 2 3
148  STD  LEFT 42 0 1  43 2 3
152  STD  LEFT 44 0 1  45 2 3
156  STD  LEFT 46 0 1  47 2 3
```

3. LD 14 – Configure the H.323 Virtual Trunks to the Signaling Server (One trunk = one line connection)

```
>ld 20
REQ: prt
TYPE: tnb
TN   63 0 0 0                    ➔ H323 Virtual trunk to Signaling Server
DATE
PAGE
DES

DES  H323_IP_VTRK
TN   063 0 00 00  VIRTUAL
TYPE IPTI
CDEN 8D
CUST 0
XTRK VTRK
ZONE 000
LDOP BOP
TIMP 600
BIMP 600
AUTO_BIMP NO
TRK  ANLG
NCOS 0
RTMB 11 1
CHID 101
TGAR 1
STRI/STRO IMM IMM
SUPN YES
AST  NO
IAPG 0
CLS  CTD DTN WTA LPR APN THFD
    P10 NTC MID
TKID
AACR NO
DATE 25 FEB 2005
```

4. LD 14 – Configure the Virtual Gateway Trunks (upto 32 trunks per MC-32)

```
>ld 20
REQ: prt
TYPE: tnb
TN   3
```

CDEN
CUST
DATE
PAGE
DES

DES 192.168.1.2
TN 003 0 00 00
TYPE VGW
CUST 0
XTRK MC32
ZONE 000

DES 192.168.1.2
TN 003 0 00 01
TYPE VGW
CUST 0
XTRK MC32
ZONE 000

5. LD 11 – Configure for the Virtual lines for the Nortel IP phones (phone A and phone B)

Phone A (i2004)

>ld 11
SL1000
MEM AVAIL: (U/P): 2854769 USED U P: 182454 59352 TOT: 3096575
DISK RECS AVAIL: 1152
DIGITAL TELEPHONES AVAIL: 6 USED: 2 TOT: 8
IP USERS AVAIL: 6 USED: 2 TOT: 8
BASIC IP USERS AVAIL: 7 USED: 1 TOT: 8
ACD AGENTS AVAIL: 10 USED: 0 TOT: 10
PCA AVAIL: 0 USED: 0 TOT: 0
AST AVAIL: 1 USED: 0 TOT: 1
TNS AVAIL: 2405 USED: 95 TOT: 2500
DATA PORTS AVAIL: 2500 USED: 0 TOT: 2500

REQ: prt
TYPE: tnb

TN 61 0 0 02
DATE
PAGE
DES

DES I2004
TN 061 0 00 02 VIRTUAL
TYPE I2004
CDEN 8D
CUST 0
ZONE 000
FDN 3019
TGAR 1
LDN NO
NCOS 0
SGRP 0

RNPG 0
SCI 0
SSU
LNRS 16
XLST
CLS CTD **FBA** WTA LPR MTD **FNA HTA** TDD HFD CRPD
MWA LMPN RMMD SMWD AAD IMD XHD IRA NID OLD VCE DRG1
POD DSX VMD CMSD SLKD CCSD SWD LNA **CNDA**
CFTA SFD MRD DDV CNIA CDCA MSID DAPA BFED RCBD
ICDD CDMD LLCN MCTD CLBD AUTU
GPUD DPUD **DNDA CFXA** ARHD CLTD ASCD
CPFA CPTA ABDD CFHD FICD NAID BUZZ AGRD MOAD
AHD **DDGA NAMA**
DRDD EXR0
USRD ULAD RTDD RBDD RBHD PGND OCBD FLXD FTTC DNDY DNO3 MCBN
VOLA VOUD CDMR
CPND_LANG ENG
RCO 0
EFD 3019
HUNT 3019
EHT 3019
LHK 0
LPK 1
PLEV 02
CSDN
AST
IAPG 0
AACS NO
ITNA NO
DGRP
MLWU_LANG 0
DNDR 0
KEY 00 SCR 2101 0 MARP
CPND
NAME ZEUS1_L1
XPLN 8
DISPLAY_FMT FIRST,LAST
01 SCR 2201 0 MARP
CPND
NAME ZEUS1_L2
XPLN 8
DISPLAY_FMT FIRST,LAST
02
03 MIK
04 MCK
05
06
07
08
09
10
11
12
13

14
15
16 MWK 2500
17 TRN
18 AO6
19 CFW 16 3019
20 RGA
21 PRK
22 RNP
23
24 PRS
25 CHG
26 CPN
27
28
29
30
31
DATE 21 APR 2005
NACT

Phone B (i2002):
REQ: prt
TYPE: tnb
TN 61 0 0 1
DATE
PAGE
DES

DES I2002
TN 061 0 00 01 VIRTUAL
TYPE I2002
CDEN 8D
CUST 0
ZONE 000
FDN 2500
TGAR 1
LDN NO
NCOS 0
SGRP 0
RNPG 0
SCI 0
SSU
LNRS 16
XLST
CLS CTD **FBD WTA** LPR MTD **FNA HTA** TDD HFD CRPD
MWA LMPN RMMD SMWD AAD IMD XHD IRA NID OLD VCE DRG1
POD DSX VMD CMSD SLKD CCSD SWD LNA CNDA
CFTD SFD MRD DDV CNID CDCA MSID DAPA BFED RCBD
ICDD CDMD LLCN MCTD CLBD AUTU
GPUD DPUD **DNDA CFXA** ARHD CLTD ASCD
CPFA CPTA ABDD CFHD FICD NAID BUZZ AGRD MOAD AHD
DDGA NAMA

DRDD EXR0
USRD ULAD RTDD RBDD RBHD PGND OCBD FLXD FTTC DNDY DNO3 MCBN
VOLA VOUD CDMR
CPND_LANG ENG
RCO 0
HUNT 2500
LHK 0
LPK 1
PLEV 02
CSDN
AST
IAPG 0
AACS NO
ITNA NO
DGRP
MLWU_LANG 0
DNDR 0
KEY 00 SCR 2102 0 MARP
CPND
NAME ZEUS2_L1
XPLN 8
DISPLAY_FMT FIRST,LAST
01 SCR 2202 0 MARP
CPND
NAME ZEUS2_L2
XPLN 8
DISPLAY_FMT FIRST,LAST
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16 MWK 2500
17 TRN
18 AO6
19 CFW 16 2500
20 RGA
21 PRK
22 RNP
23
24 PRS
25 CHG
26 CPN
27
28

29
30
31
DATE 12 APR 2005
NACT

6. LD 16 – Configure the H.323 route

>ld 21
PT1000

REQ: prt
TYPE: rdb
CUST 0
ROUT 11

TYPE RDB
CUST 00
DMOD
ROUT 11
DES H323_TIE
TKTP TIE
NPID_TBL_NUM 0
ESN NO
CNVT NO
SAT NO
RCLS EXT
VTRK YES
ZONE 000
PCID H323
CRID NO
NODE 101
DTRK NO
ISDN YES
MODE ISLD
DCH 3
IFC SL1
PNI 00001
NCNA YES
NCRD YES
TRO NO
FALT NO
CTYP UKWN
INAC NO
ISAR NO
DAPC NO
PTYP ATT
AUTO NO
DNIS NO
DCDR NO
ICOG IAO
SRCH LIN
TRMB YES
STEP

ACOD 2311
TCPP NO
TARG 01
CLEN 1
BILN NO
OABS
INST
ANTK
SIGO STD
STYP SDAT
ICIS YES
TIMR ICF 512
OGF 512
EOD 13952
DSI 34944
NRD 10112
DDL 70
ODT 4096
RGV 640
GRD 896
SFB 3
NBS 2048
NBL 4096

IENB 5

PAGE 002

TFD 0
VSS 0
VGD 6
SST 5 0
NEDC ORG
FEDC ORG
CPDC NO
DLTN NO
HOLD 02 02 40
SEIZ 02 02
SVFL 02 02
DRNG NO
CDR NO
VRAT NO
MUS NO
MANO NO
FRL 0 0
FRL 1 0
FRL 2 0
FRL 3 0
FRL 4 0
FRL 5 0
FRL 6 0
FRL 7 0
OHQ NO

OHQT 00
CBQ NO
AUTH NO
TTBL 0
ATAN NO
OHTD NO
PLEV 2
ALRM NO
ART 0
SGRP 0
AACR NO

7. LD 86 – Configure the Route List Block for the Virtual Trunk route

>ld 86
ESN000

MEM AVAIL: (U/P): 2854769 USED U P: 182454 59352 TOT: 3096575
DISK RECS AVAIL: 1152
REQ prt
CUST 0
FEAT rlb
RLI 11

RLI 11
ENTR 0
LTER NO
ROUT 11
TOD 0 ON 1 ON 2 ON 3 ON
4 ON 5 ON 6 ON 7 ON
VNS NO
SCNV NO
CNV NO
EXP NO
FRL 0
DMI 0
ISDM 0
FCI 0
FSNI 0
SBOC NRR
IDBB DBD
IOHQ NO
OHQ NO
CBQ NO

ISET 0
NALT 5
MFRL 0
OVLL 1

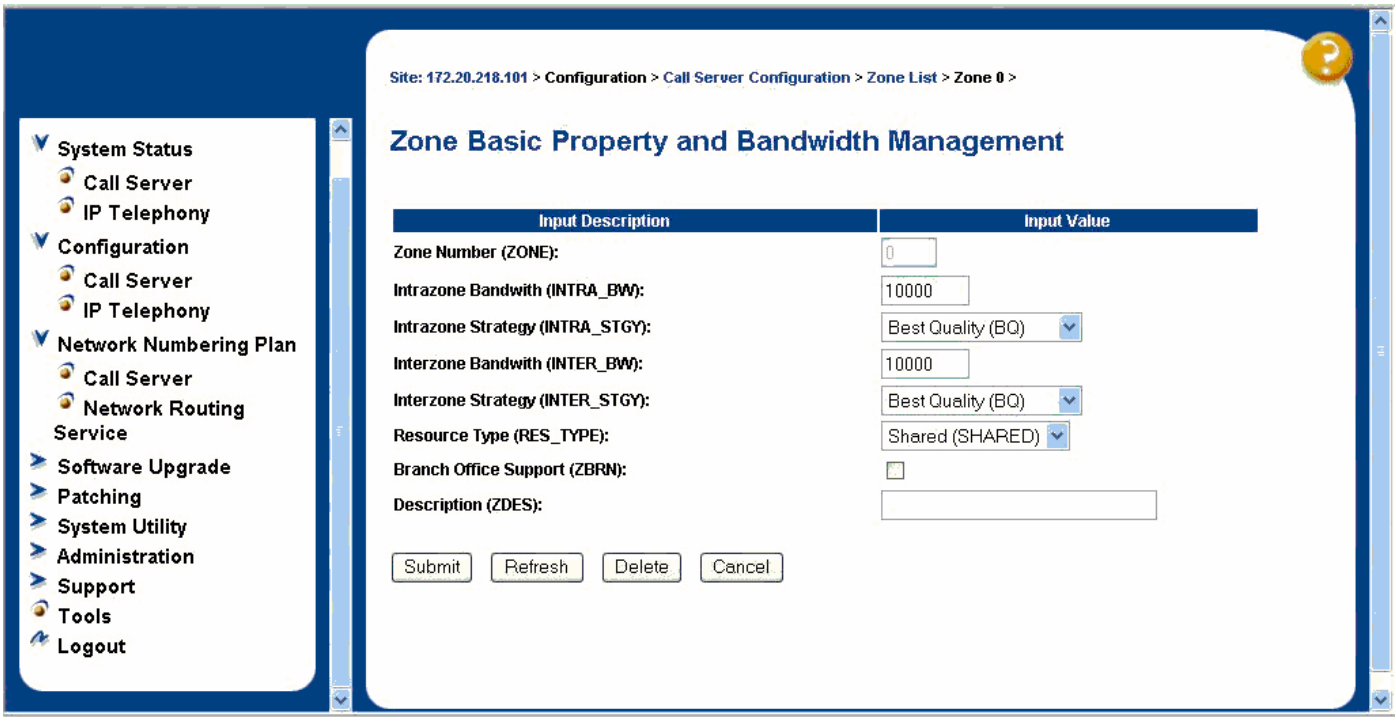
8. LD 87 – Configure CDP steering codes

>ld 87
ESN000

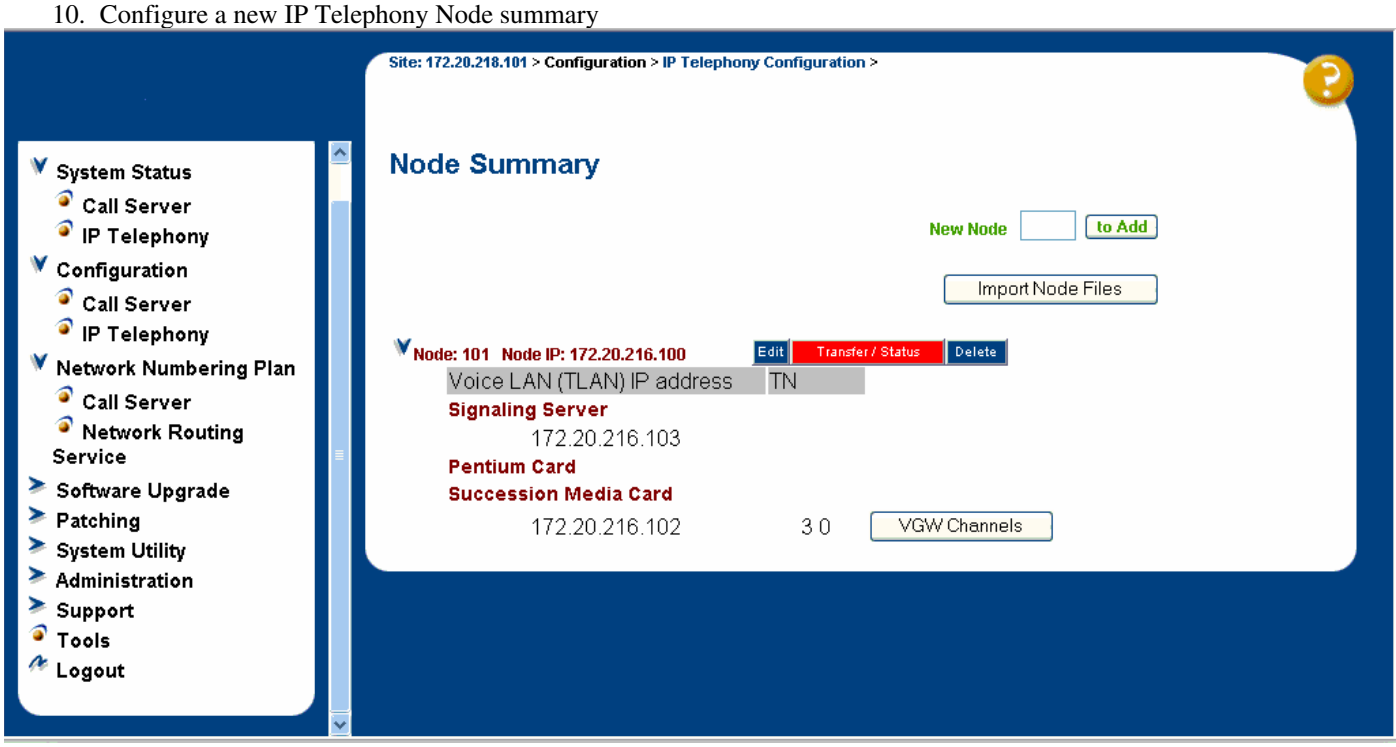
MEM AVAIL: (U/P): 2854769 USED U P: 182454 59352 TOT: 3096575
DISK RECS AVAIL: 1152
REQ prt
CUST 0
FEAT cdp
TYPE dsc
DSC
DSC 30 ➔ **Dial 30xx send it via H323 route**
FLEN 0
DSP LSC
RLI 11 ➔ **H323 Route**
NPA
NXX
DSC 31 ➔ **Dial 30xx send it via SIP route**
FLEN 0
DSP LSC
RLI 10 ➔ **SIP Route**
NPA
NXX
DSC 40
FLEN 0
DSP LSC
RLI 4
NPA
NXX
DSC 490
FLEN 0
DSP LSC
RLI 4
NPA
NXX
DSC 51
FLEN 0
DSP LSC
RLI 11
NPA
NXX
DSC 52
FLEN 0
DSP LSC
RLI 10
NPA
NXX

Signaling Server Setup:

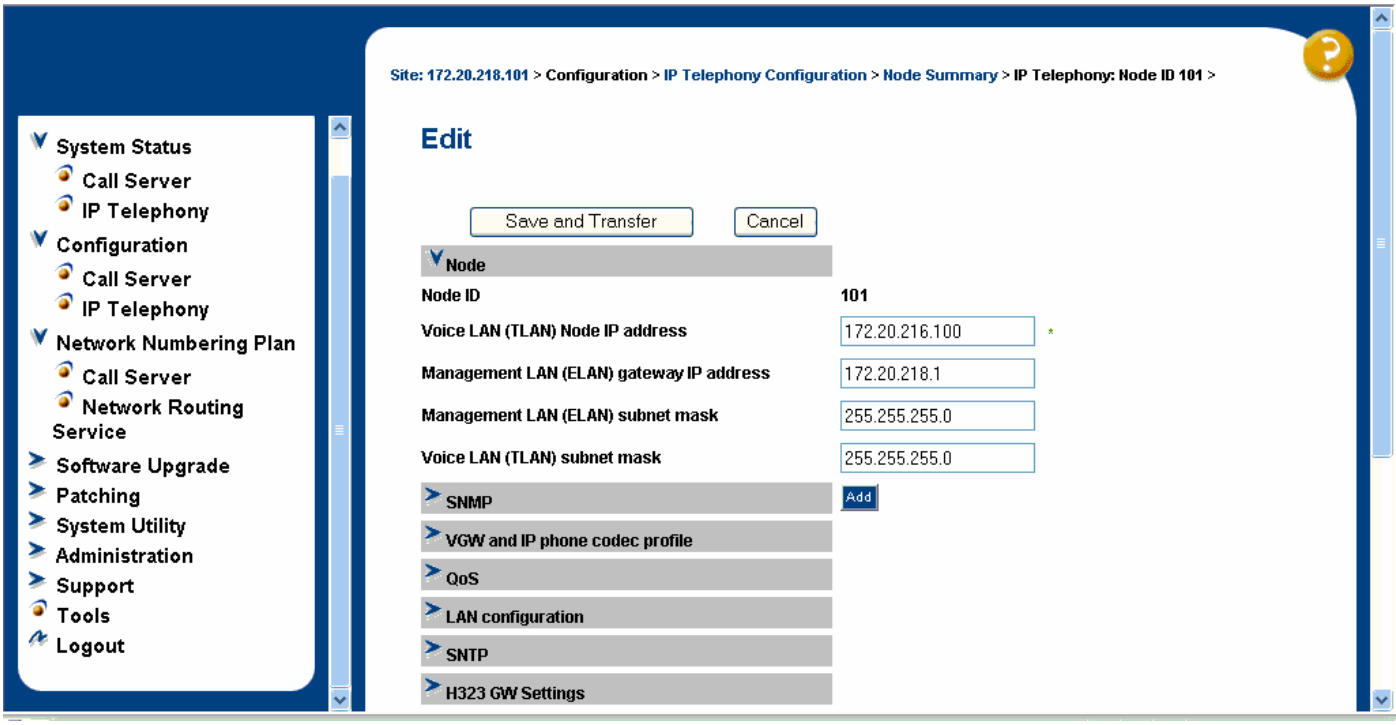
9. Configure the Zones



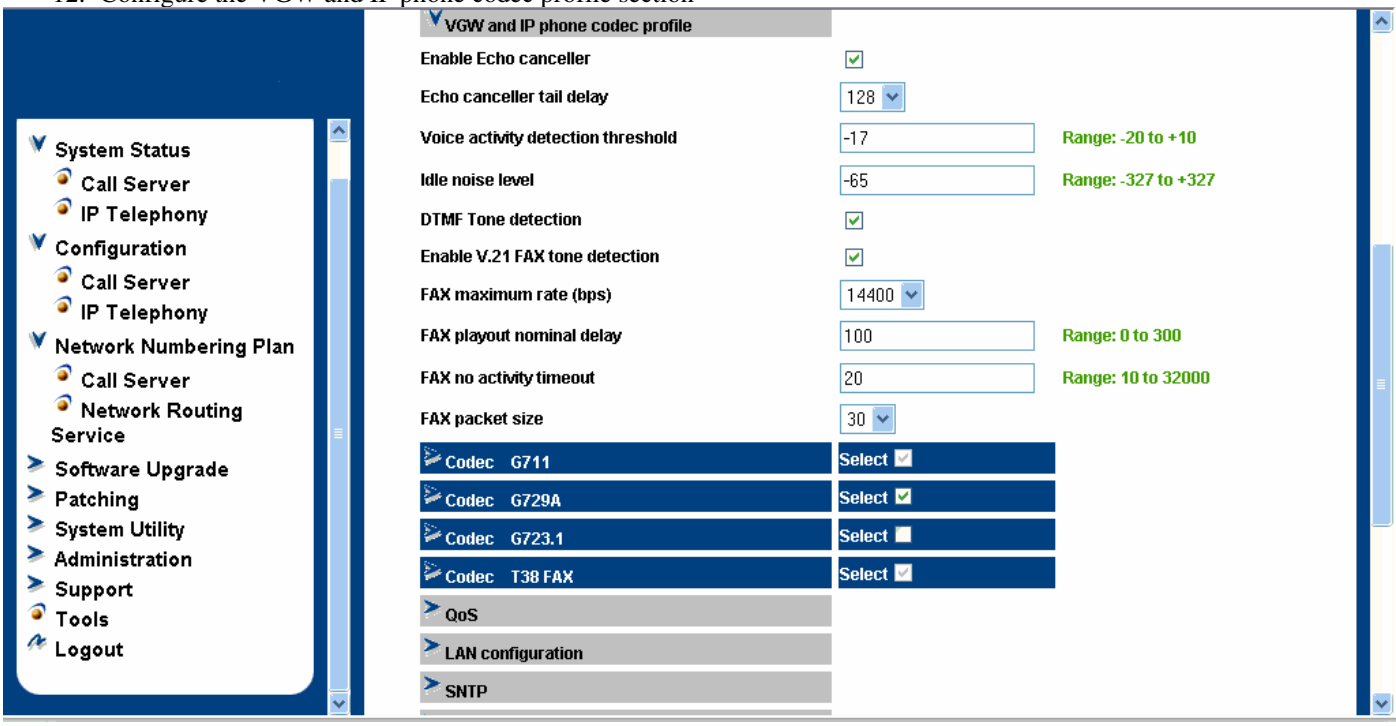
10. Configure a new IP Telephony Node summary



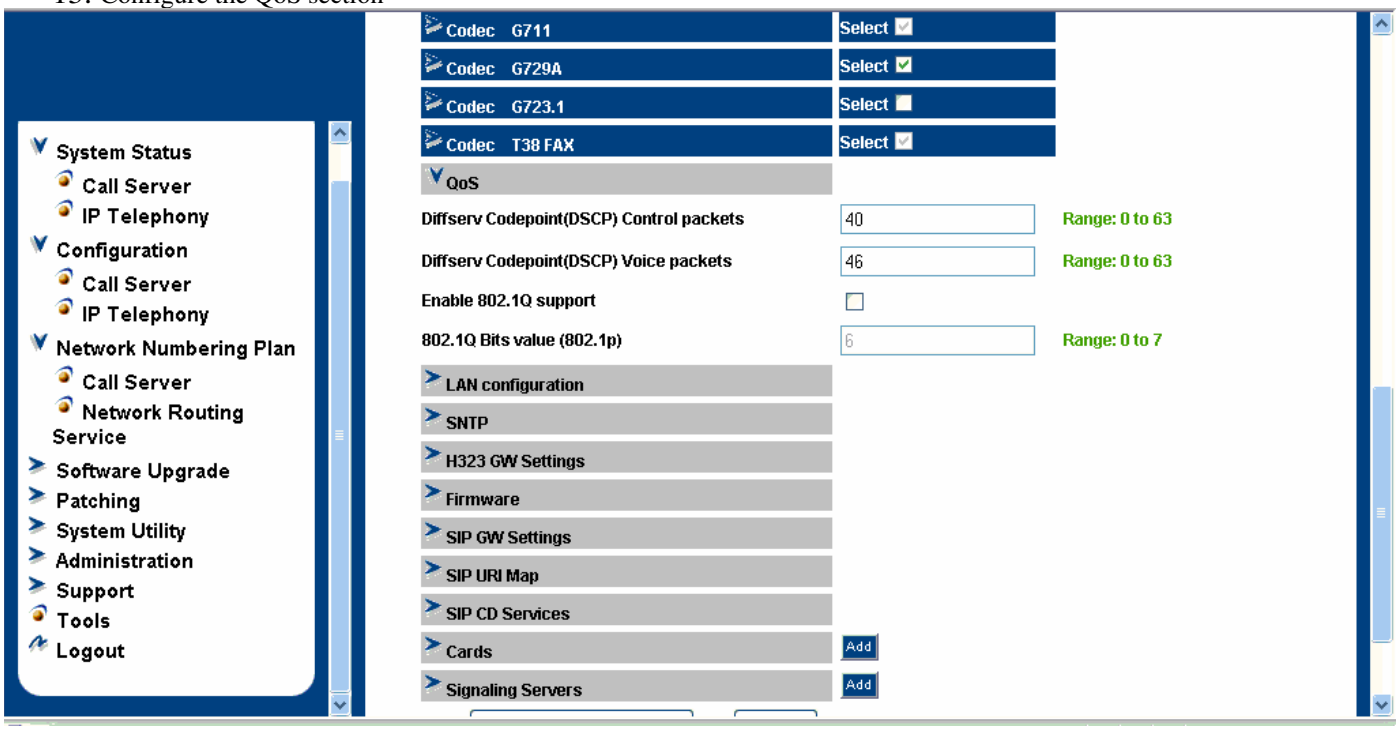
11. Configure the Node section



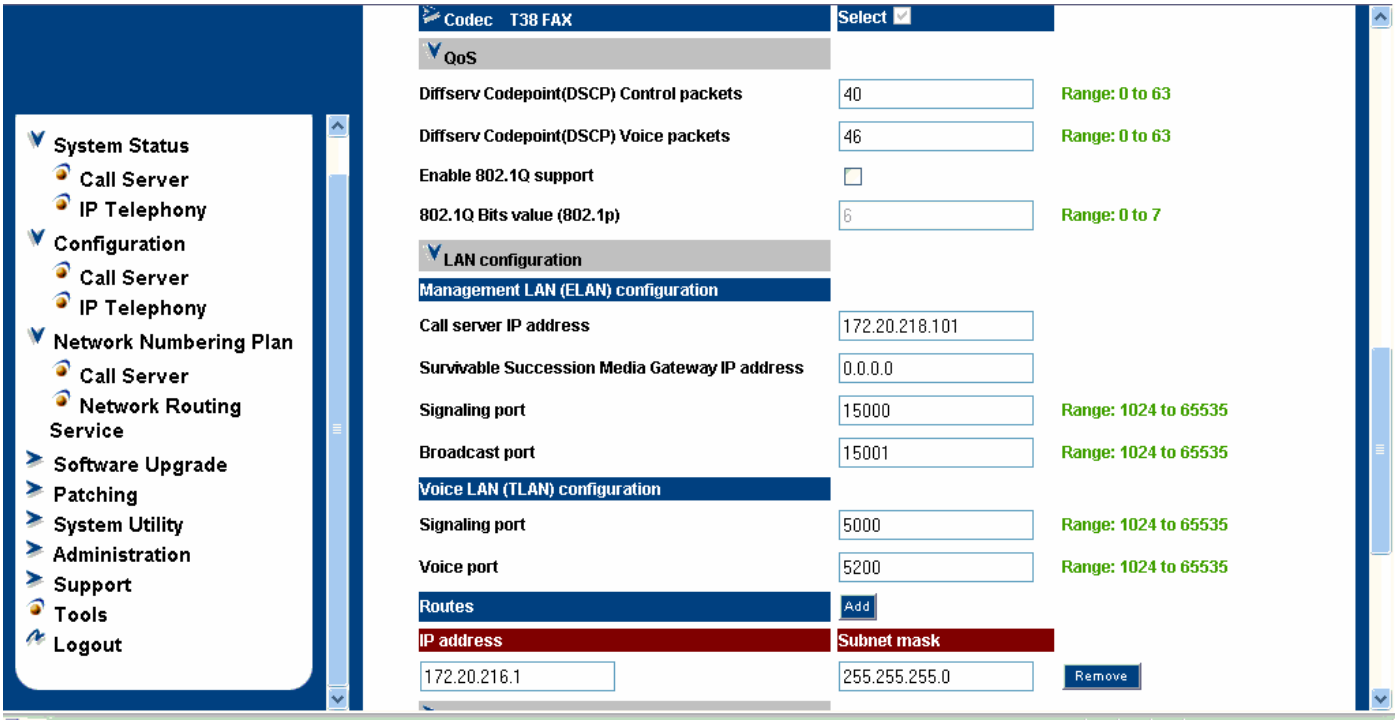
12. Configure the VGW and IP phone codec profile section



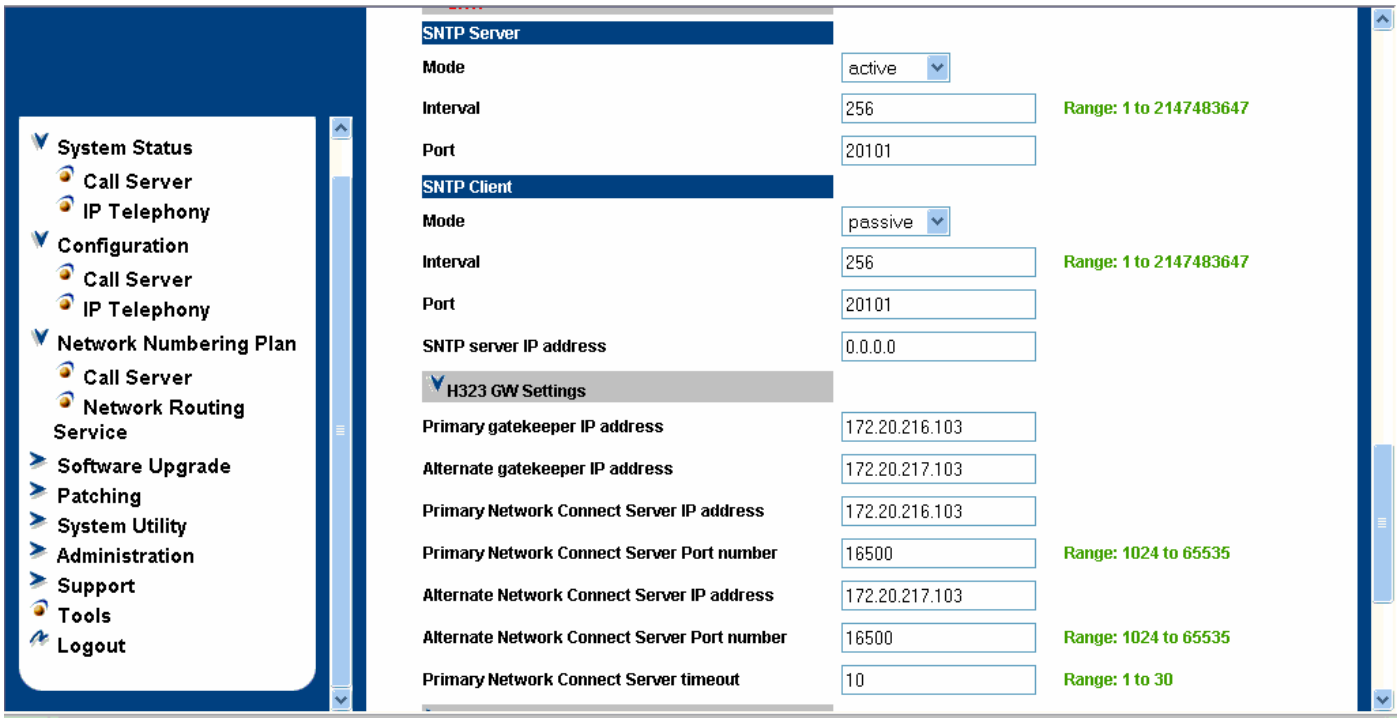
13. Configure the QoS section



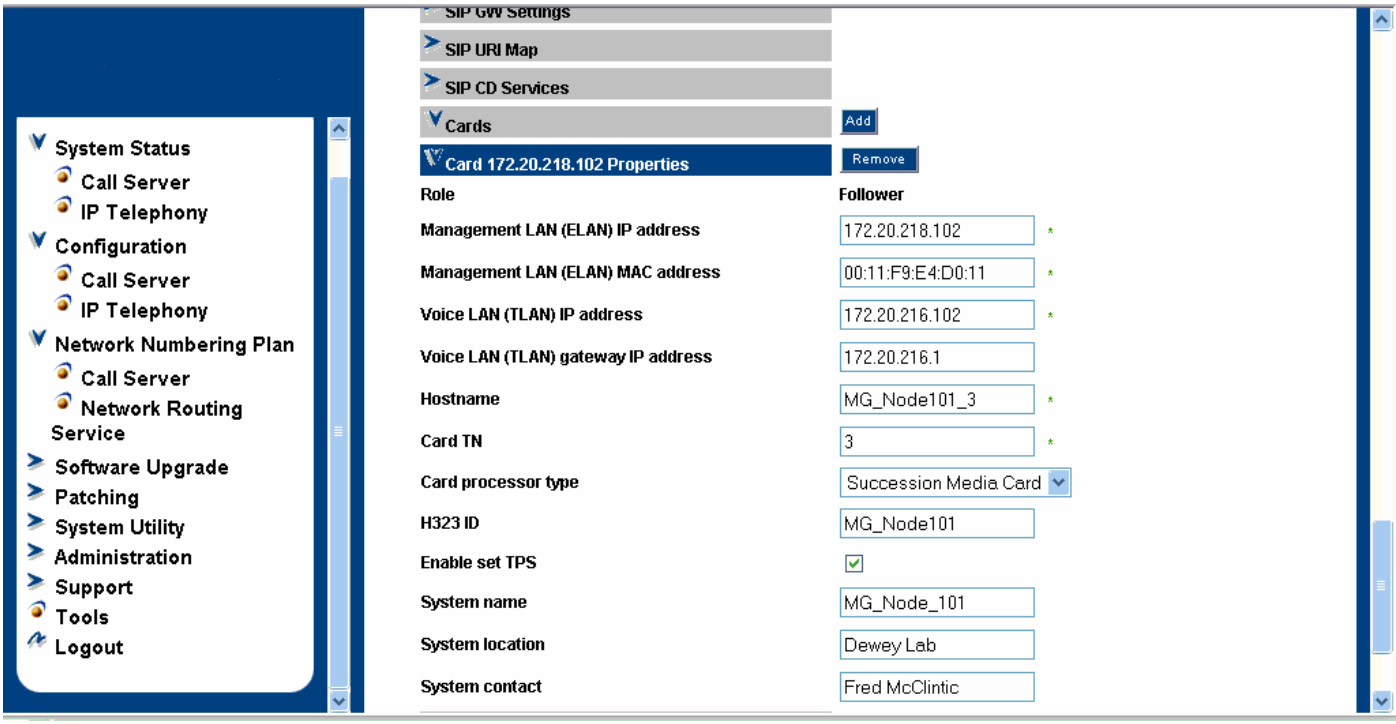
Configure LAN Configuration section



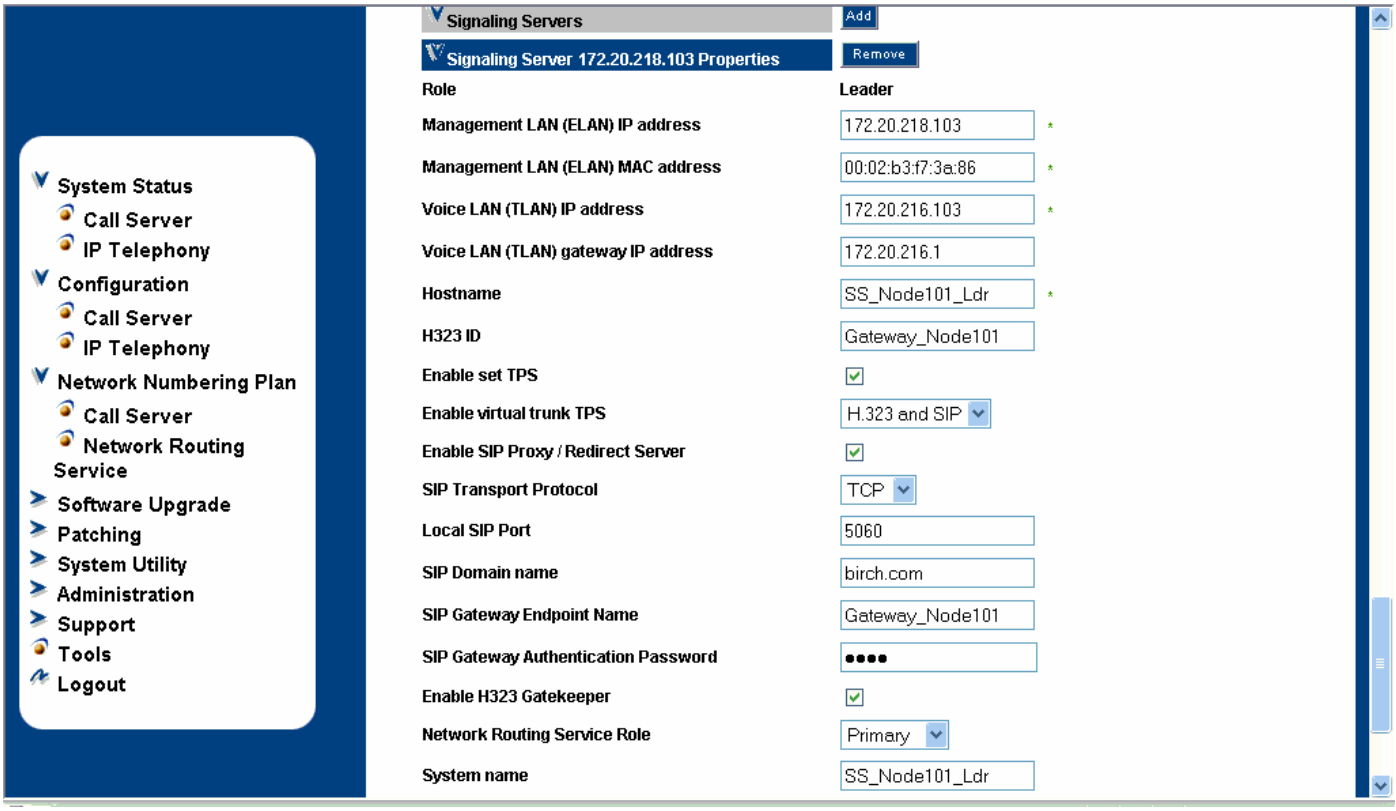
14. Configure the H323 GW Setting section



15. Configure the Card section for the MC-32 VGMC card section

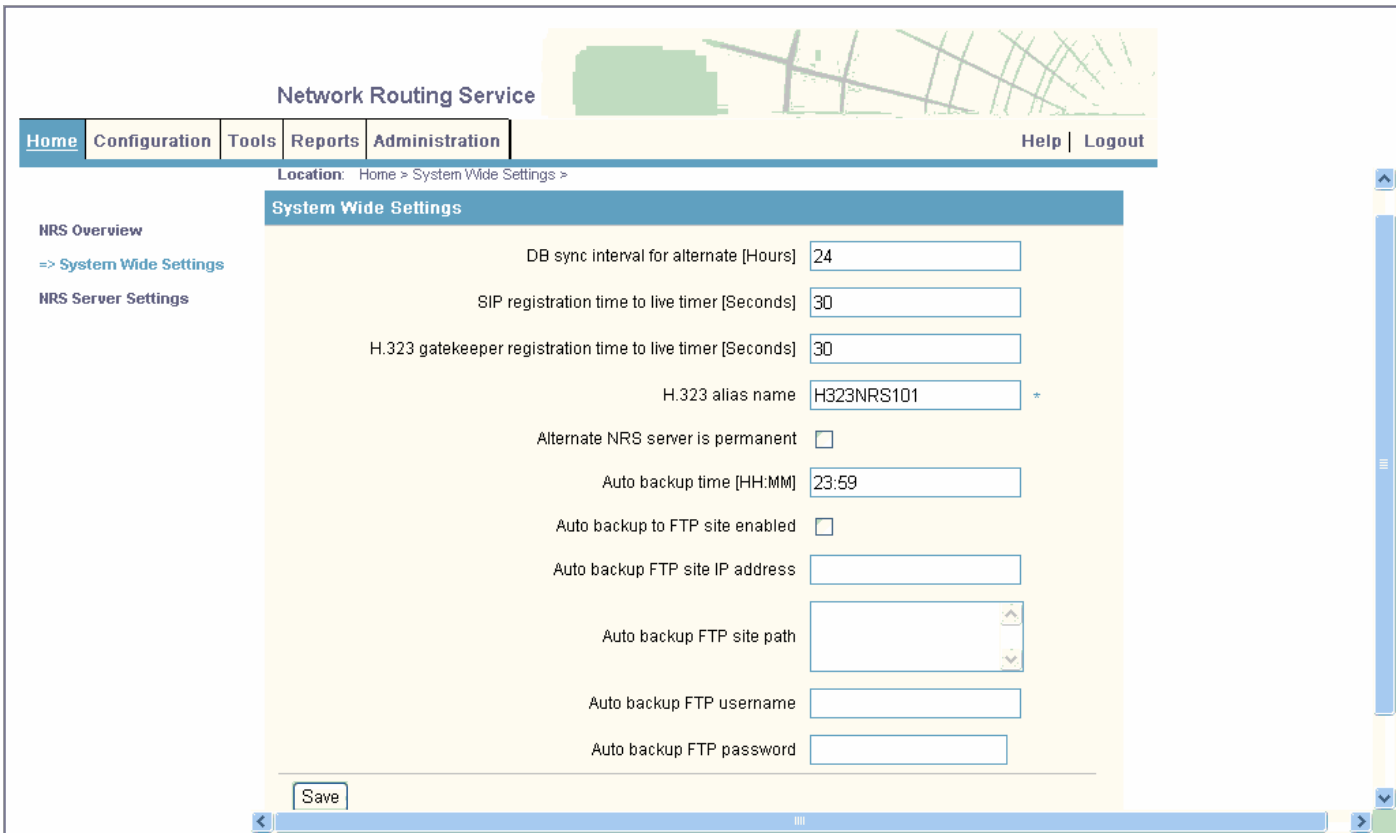


16. Configure the Signaling Server section

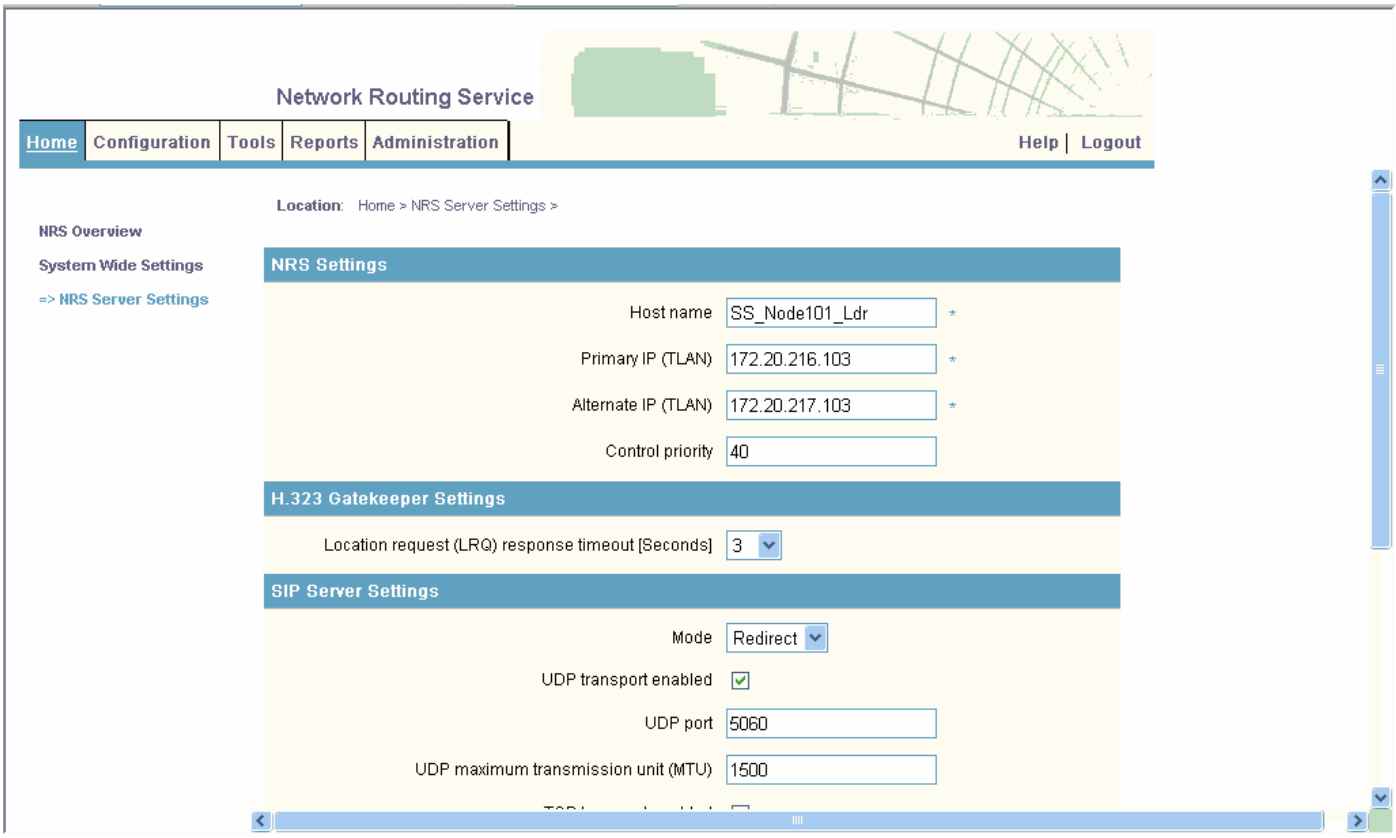


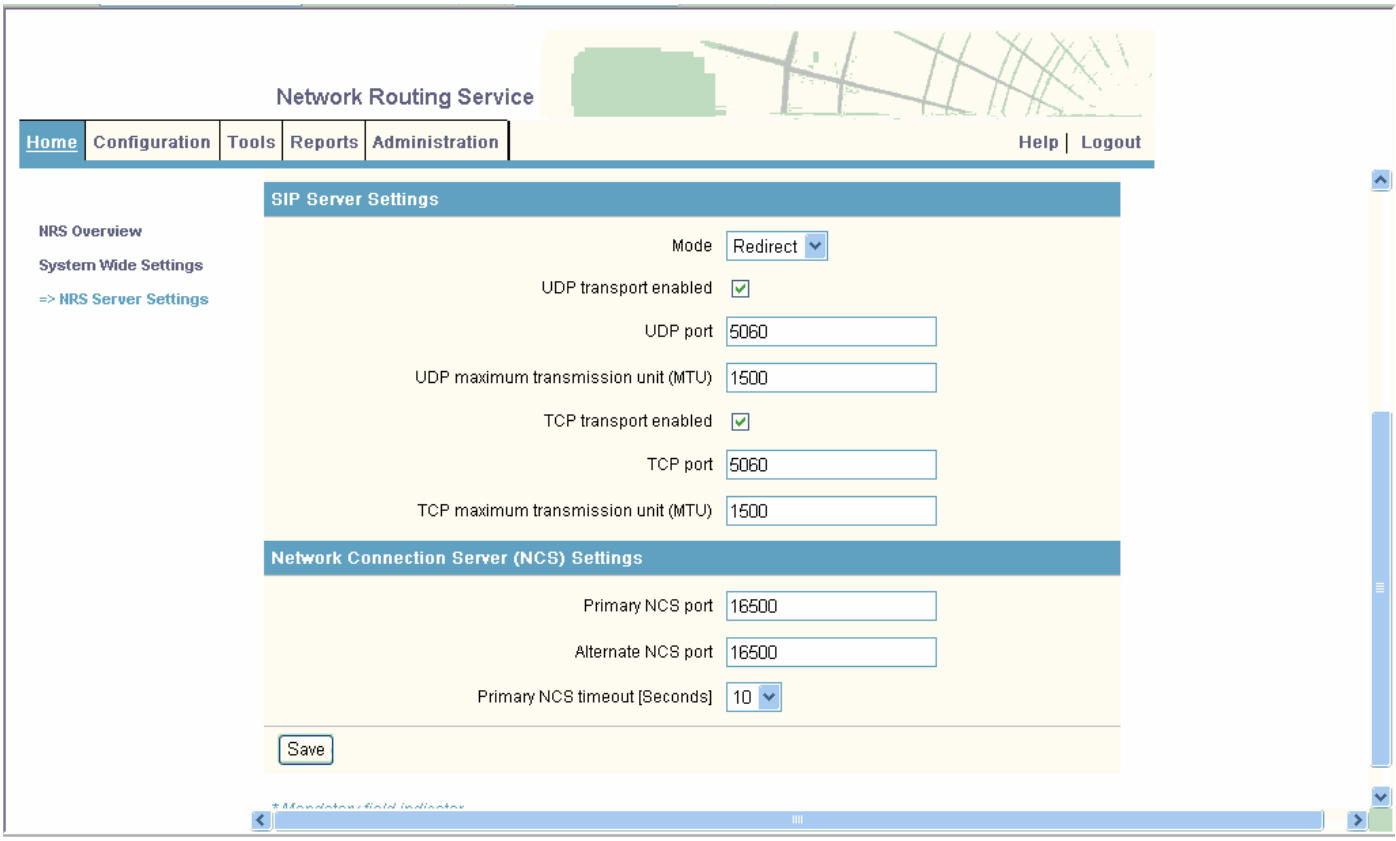
Network Routing Server Setup:

17. Configure the System Wide Settings

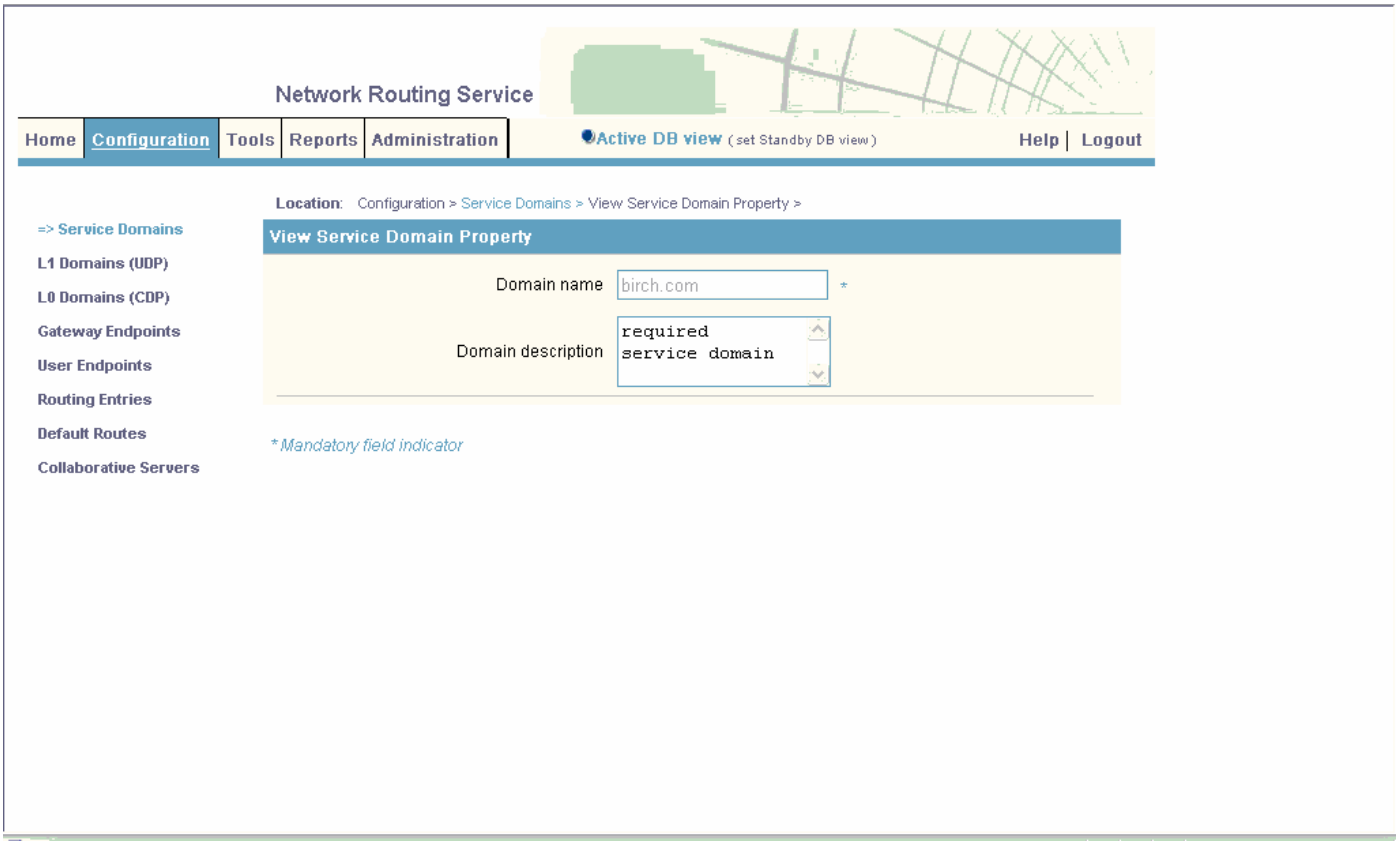


18. Configure the NRS Server Settings

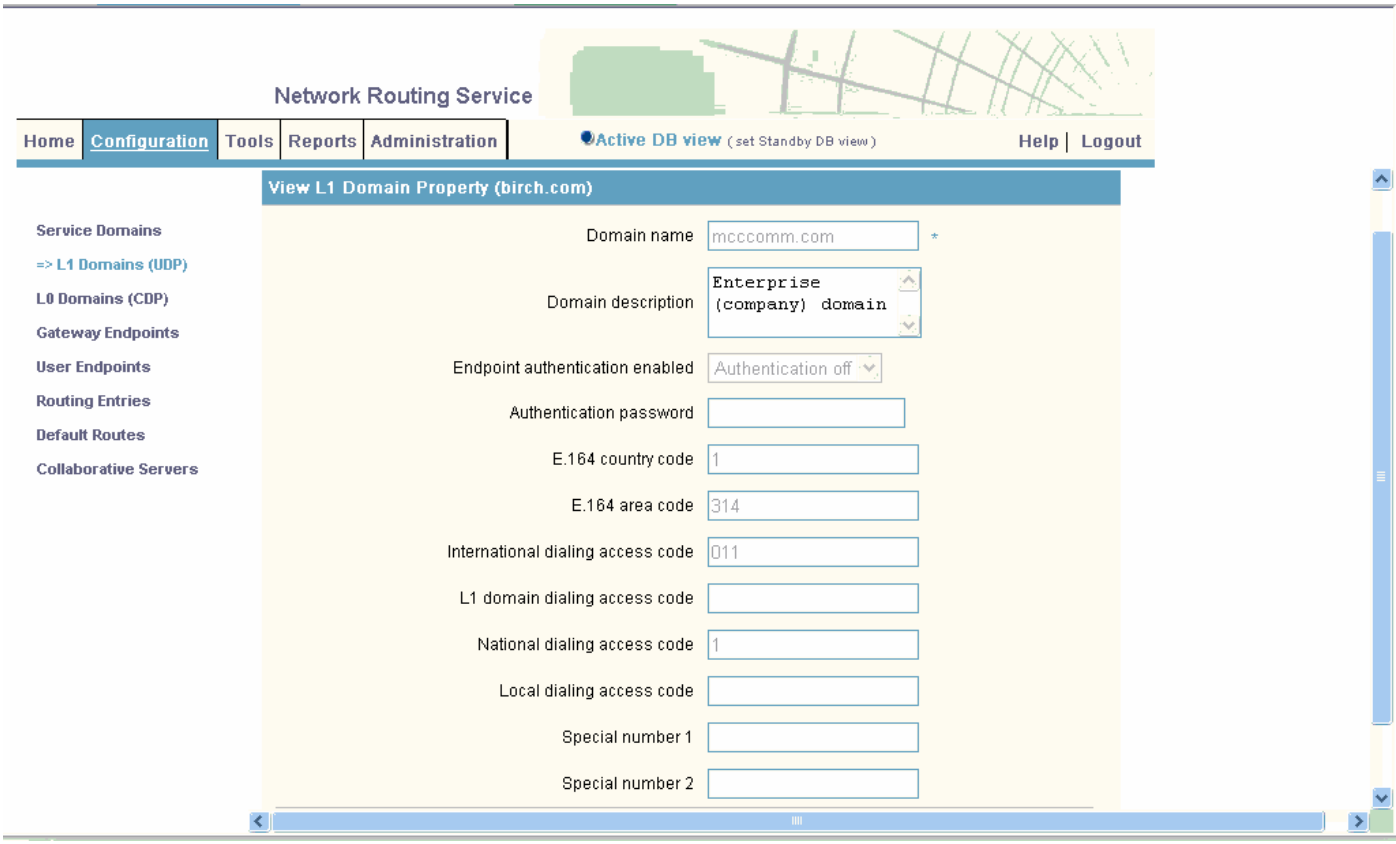




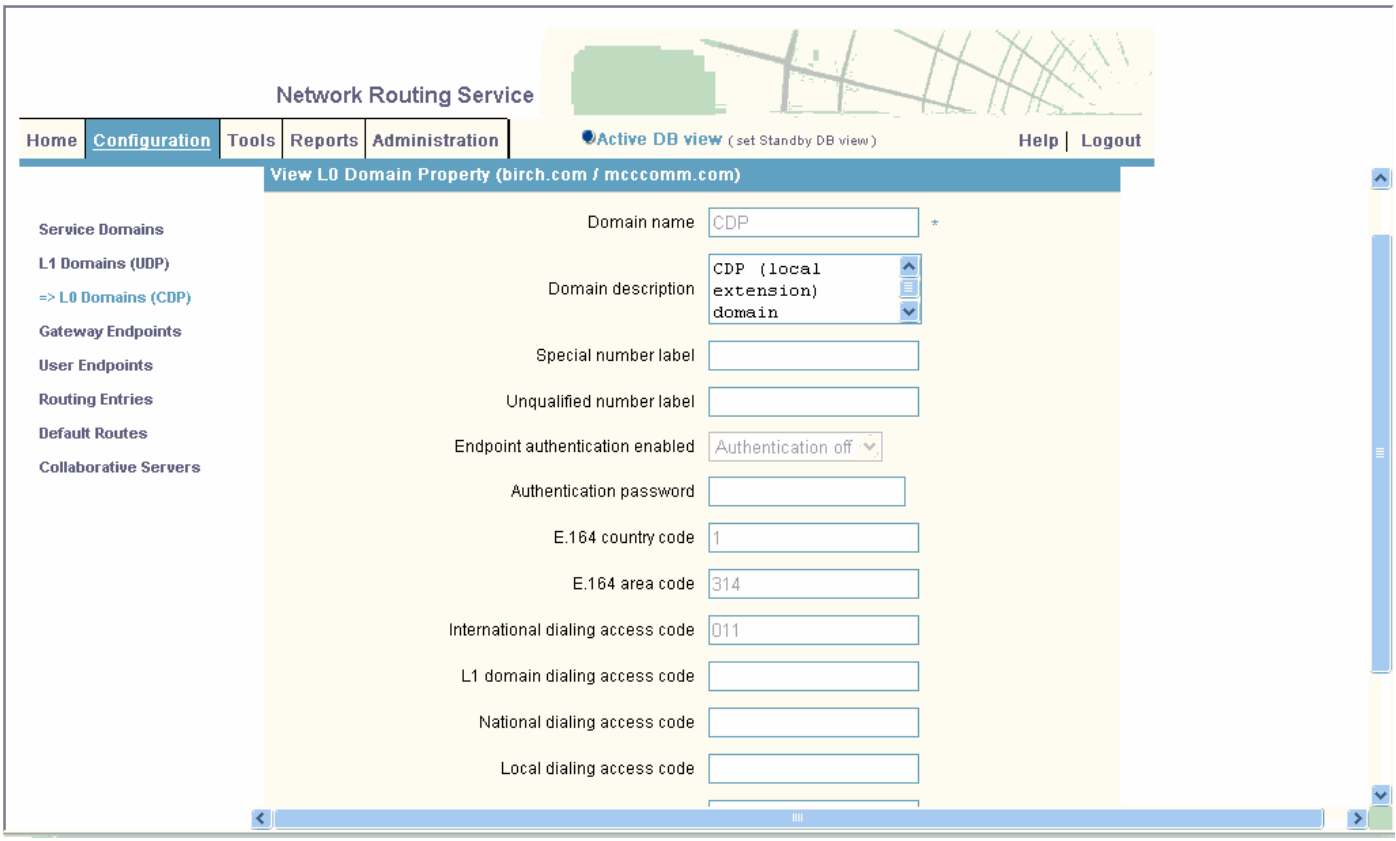
19. Configure a Service Domain



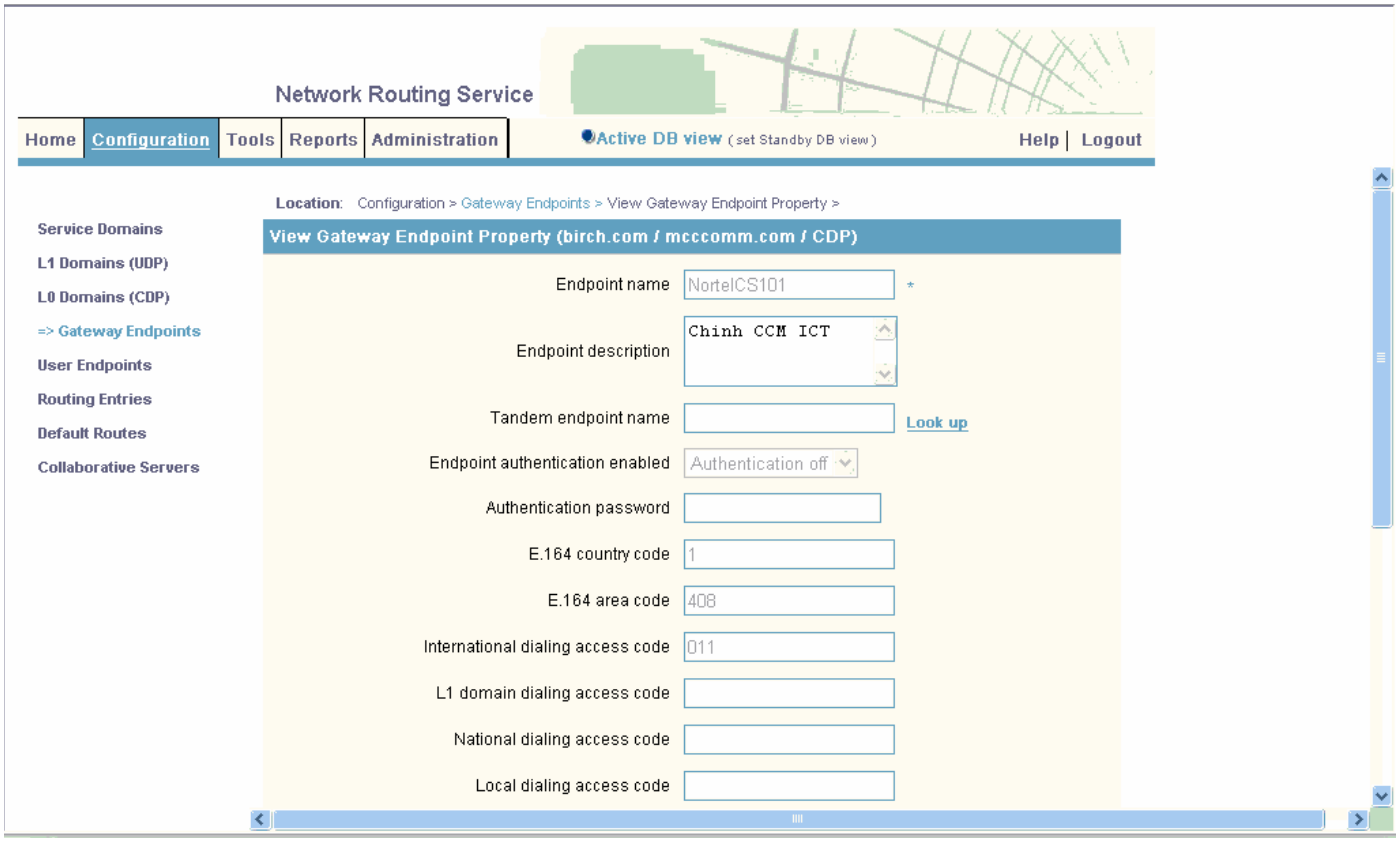
20. Configure a L1 Domain (UDP)

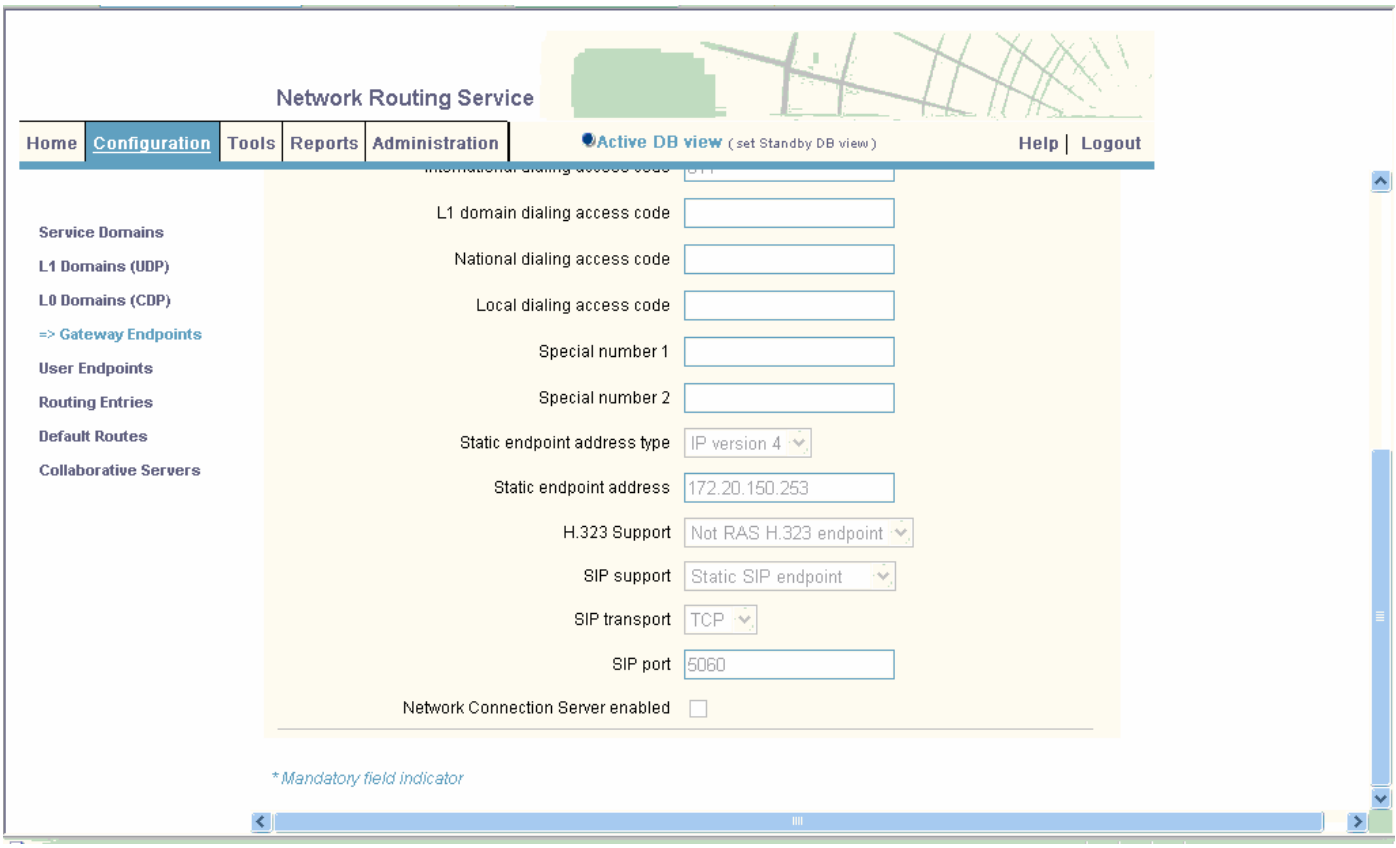


21. Configure a L0 Domain (CDP)

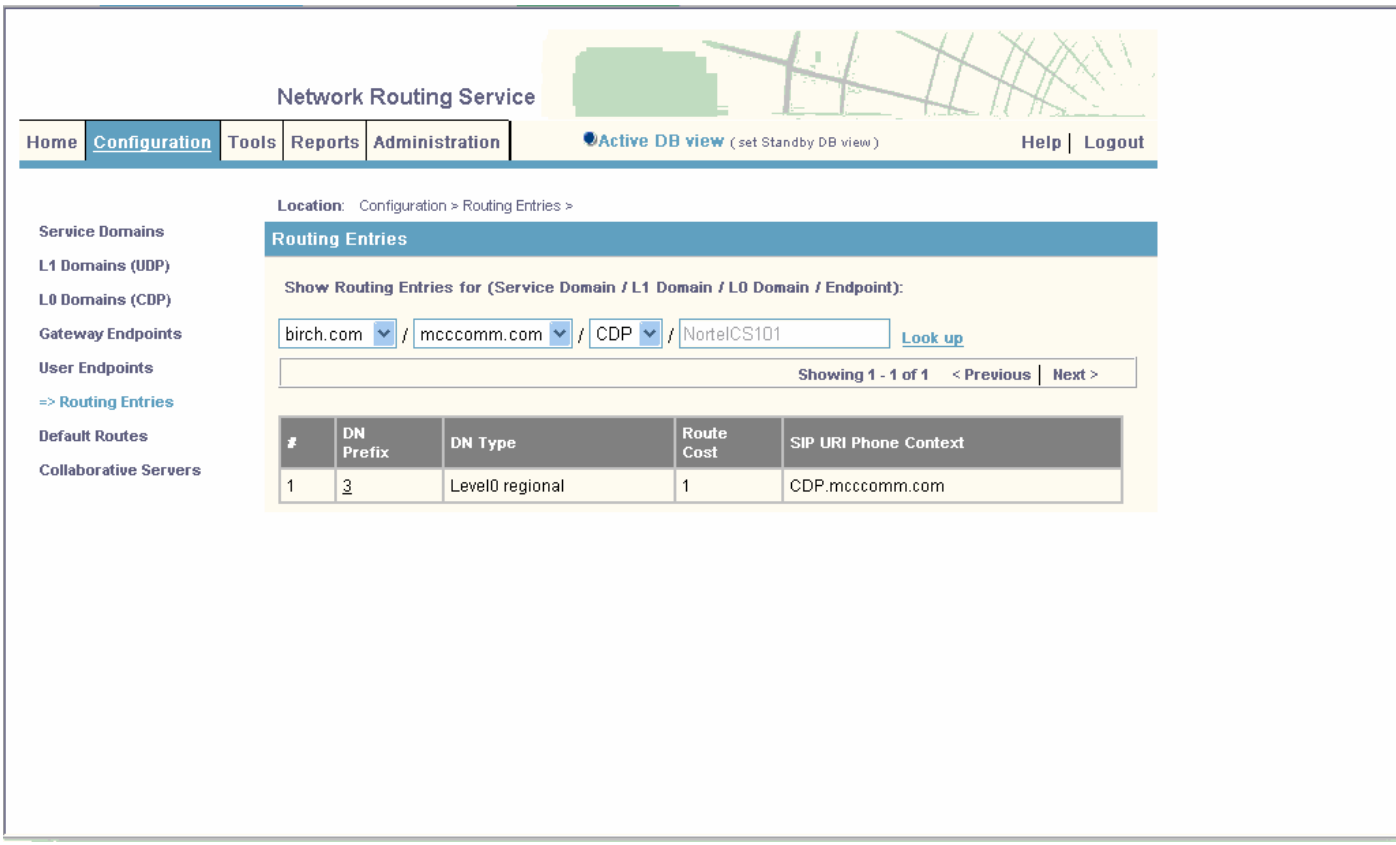


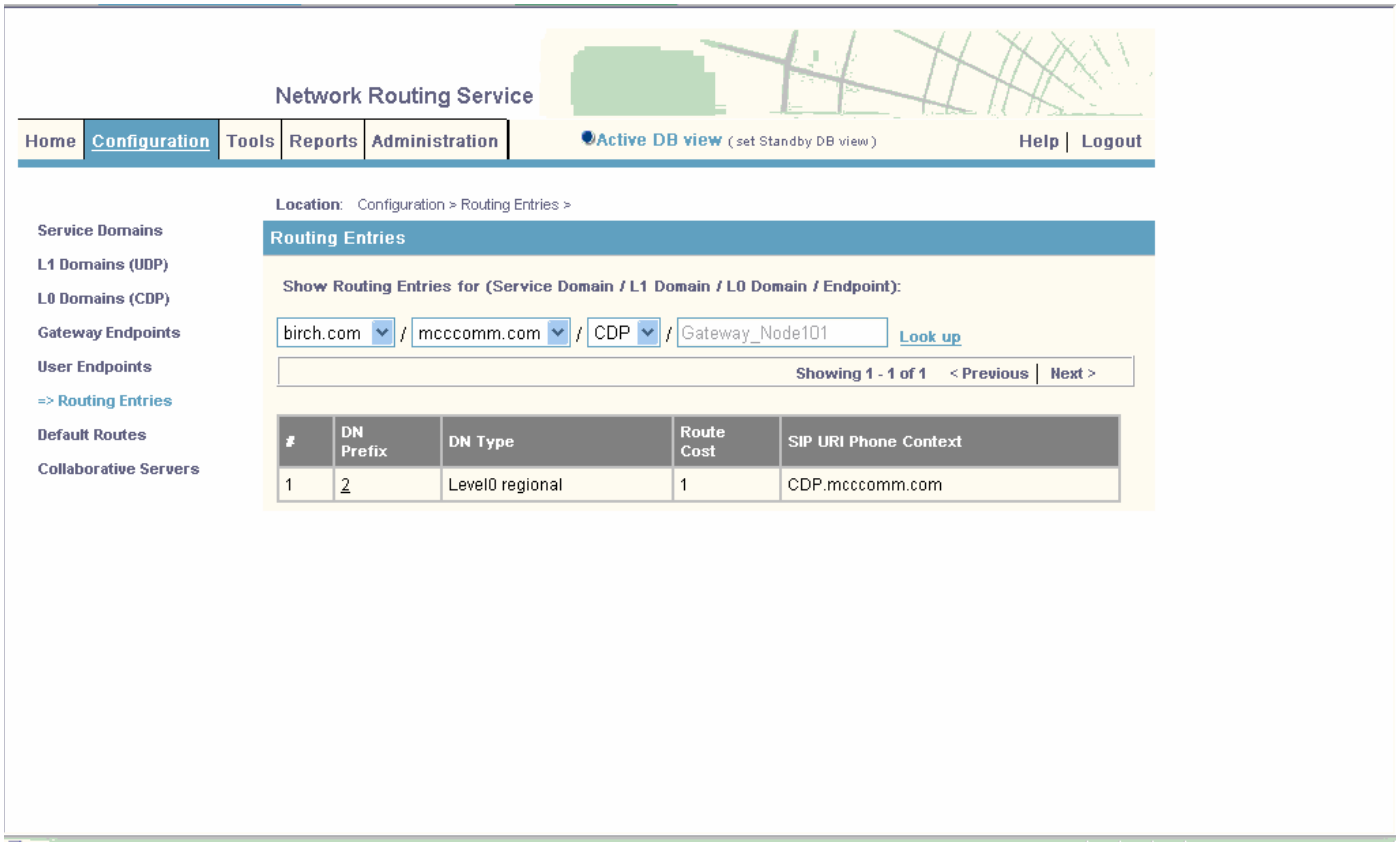
Configure a H.323 gateway





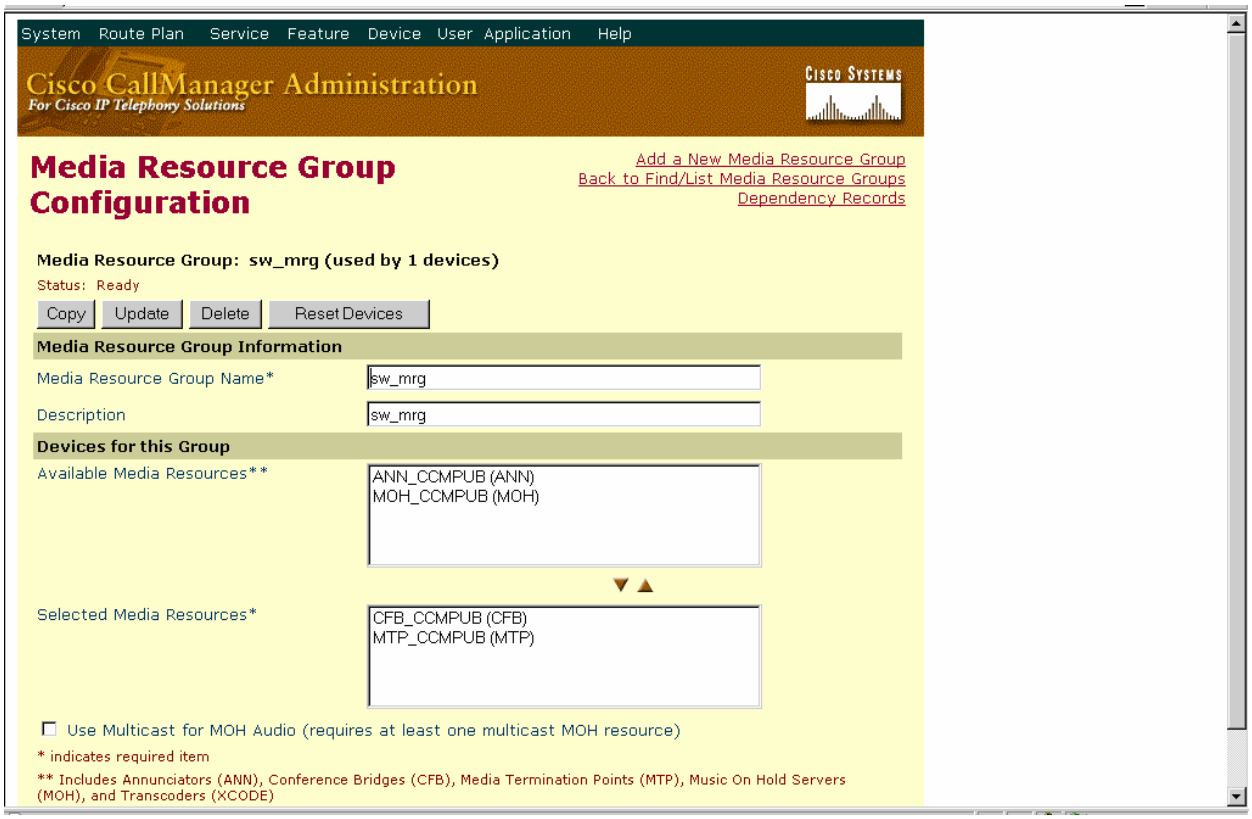
22. Configure the Routing Entries

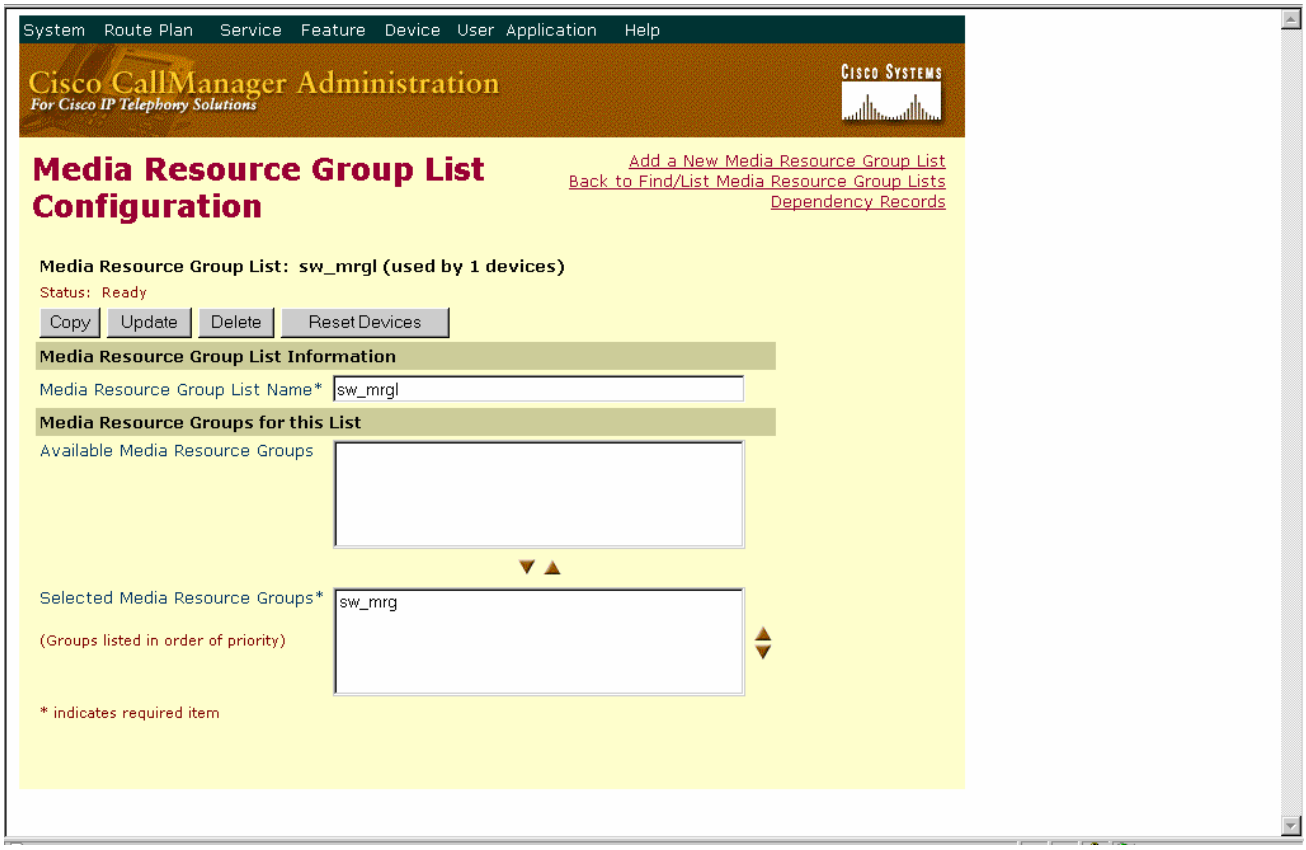




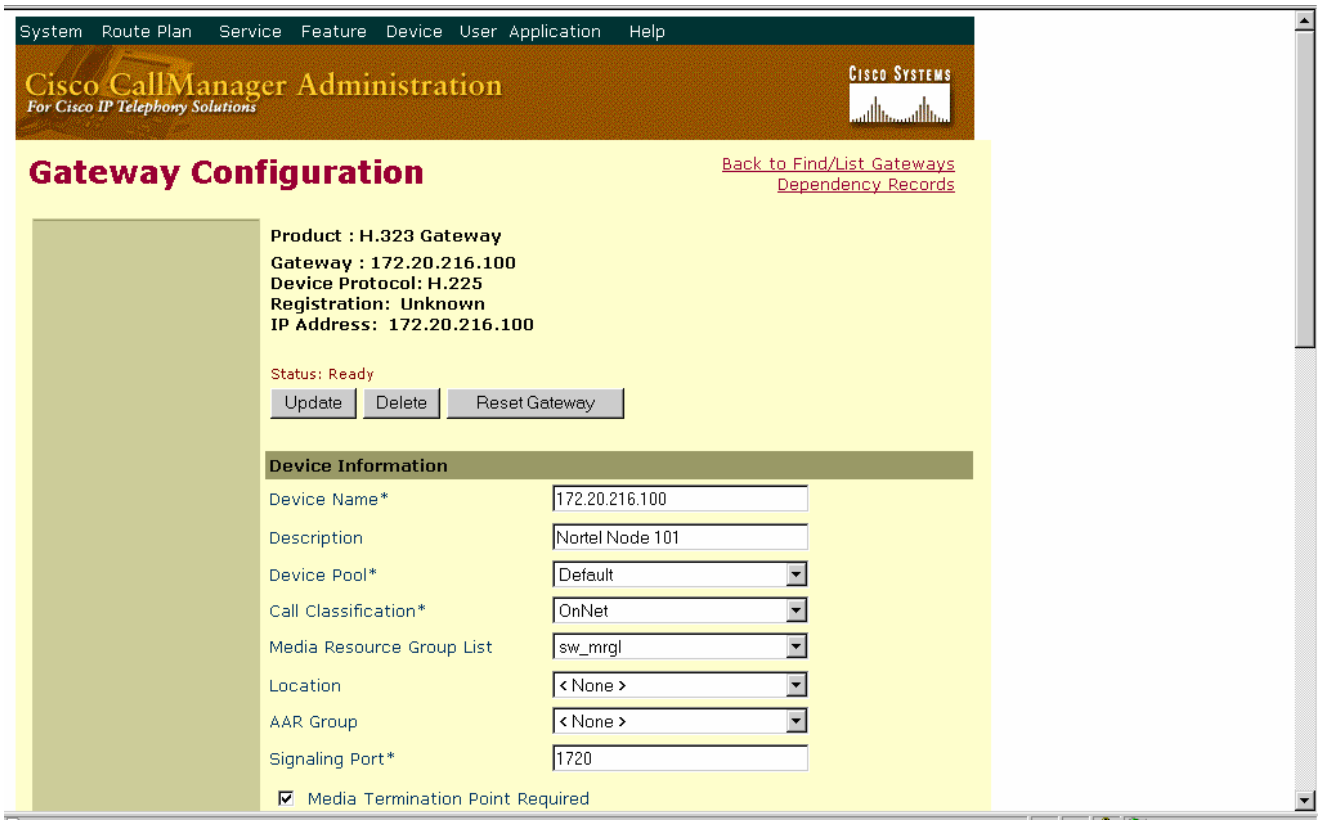
Cisco CallManager Configuration

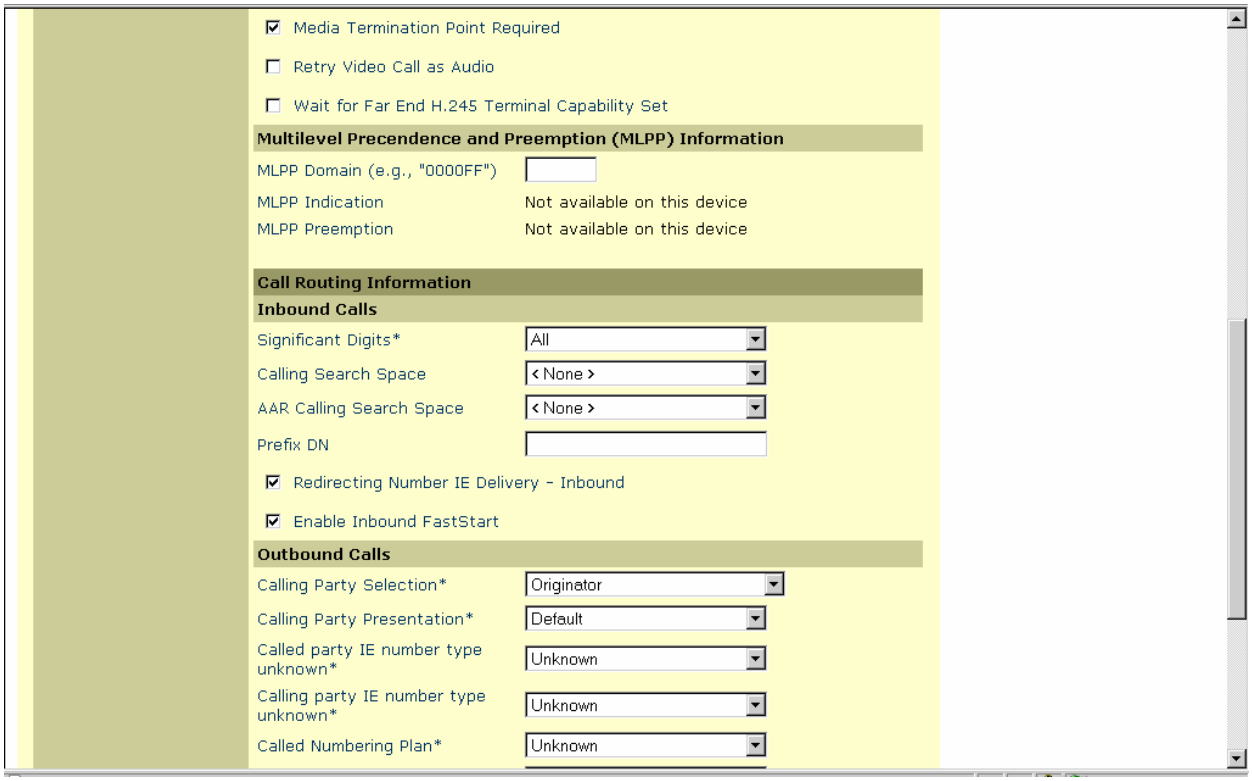
25. Create the Media Resource Group and Media Resource Group List for the MTP requirement

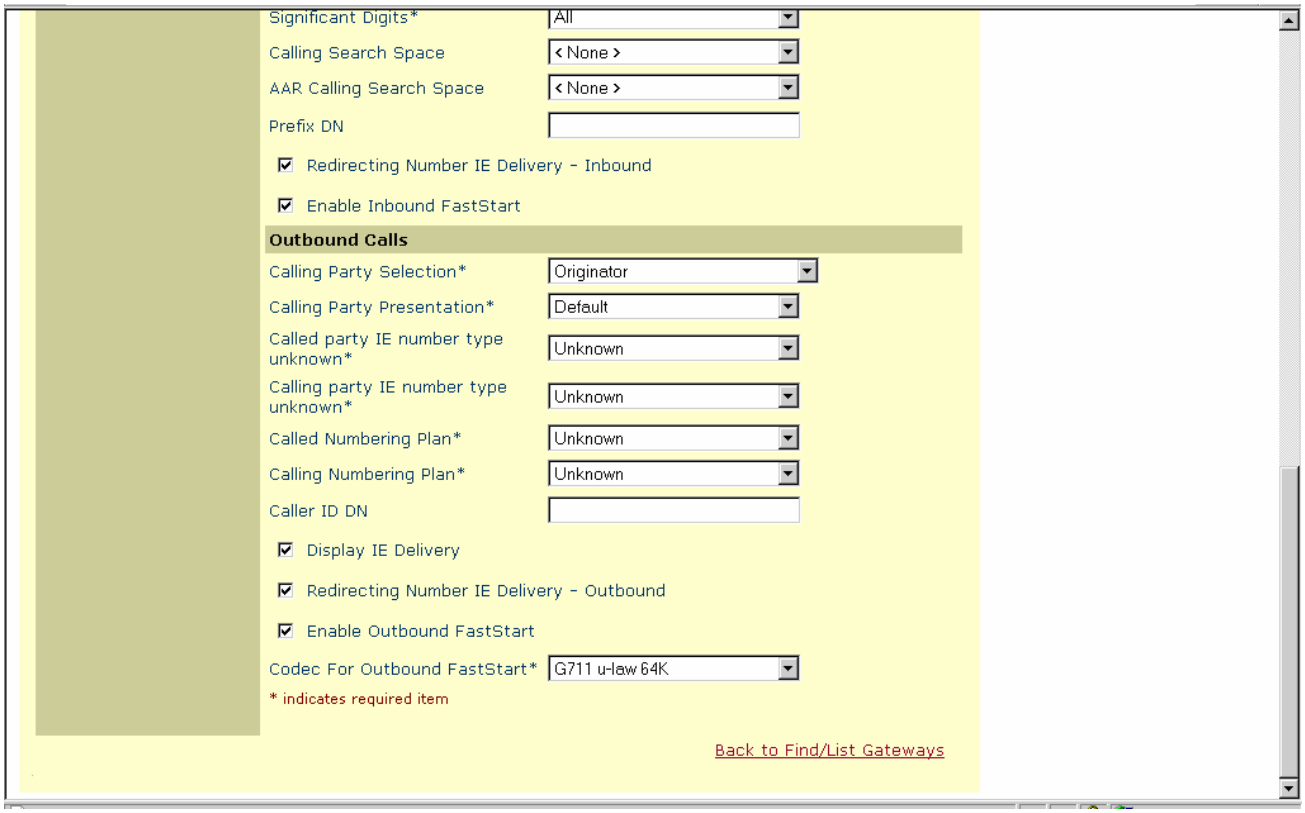




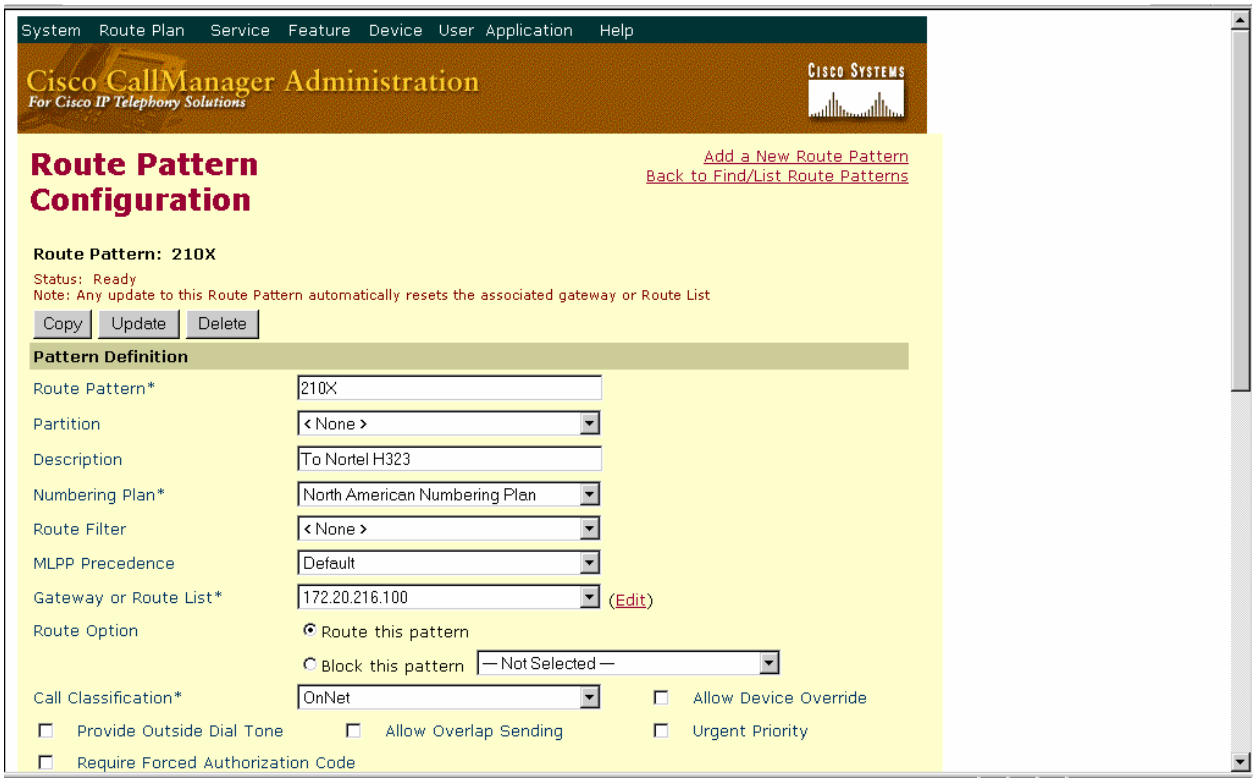
26. Add an H323 gateway for the Nortel CS1000 PBX under the Device pull-down menu

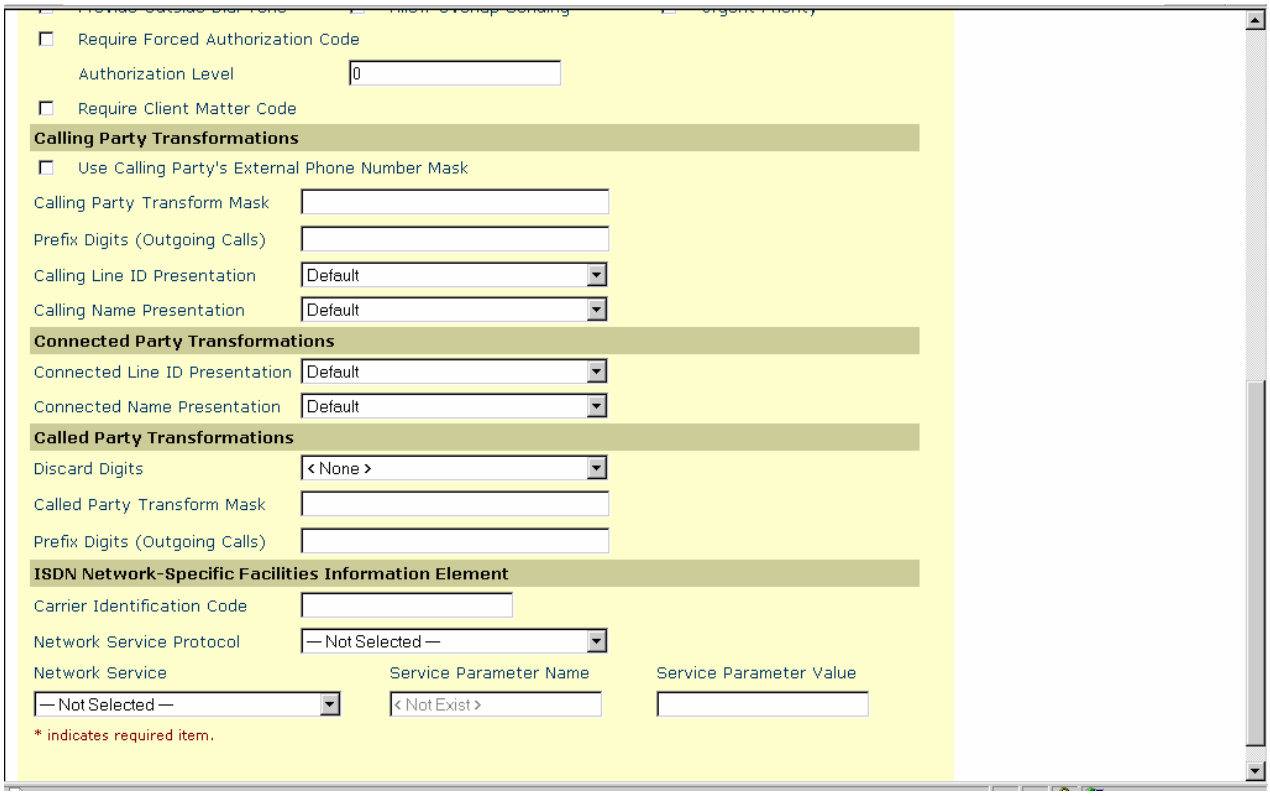




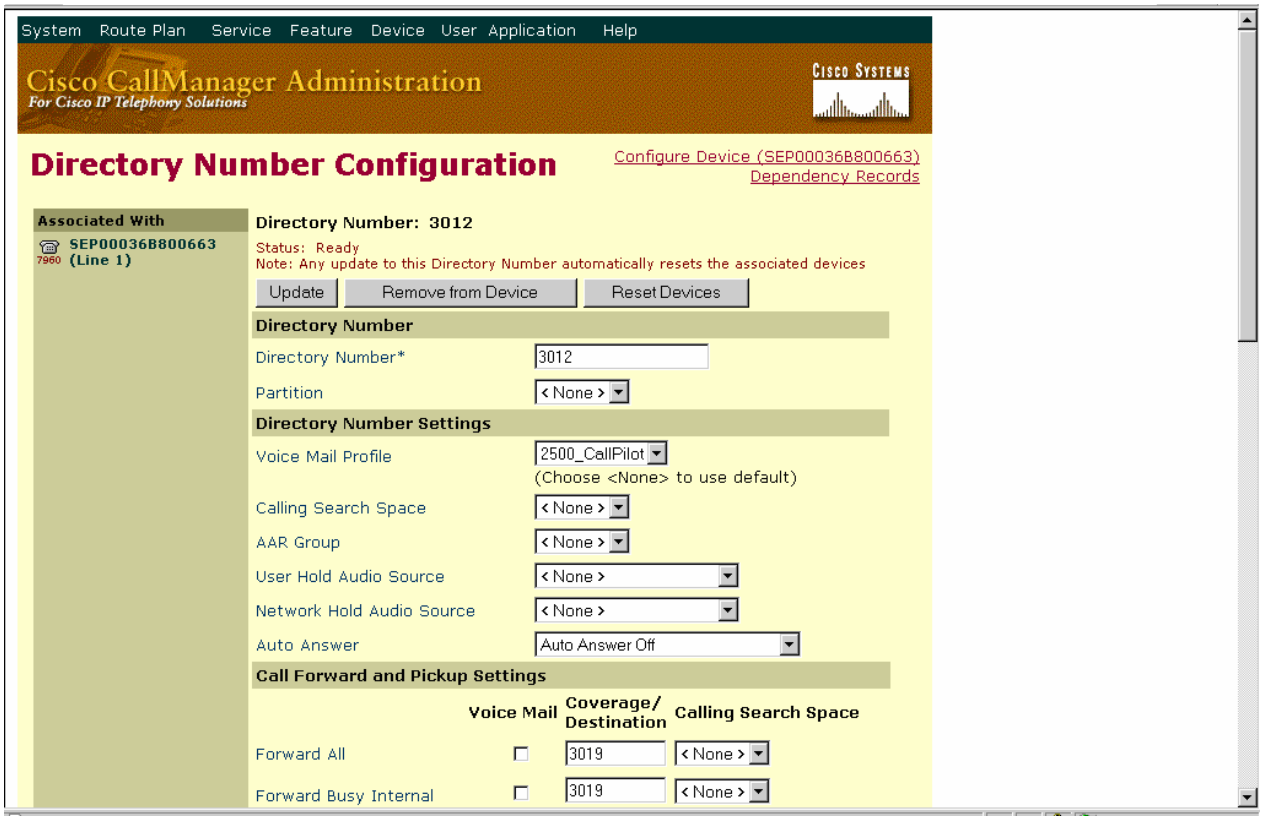


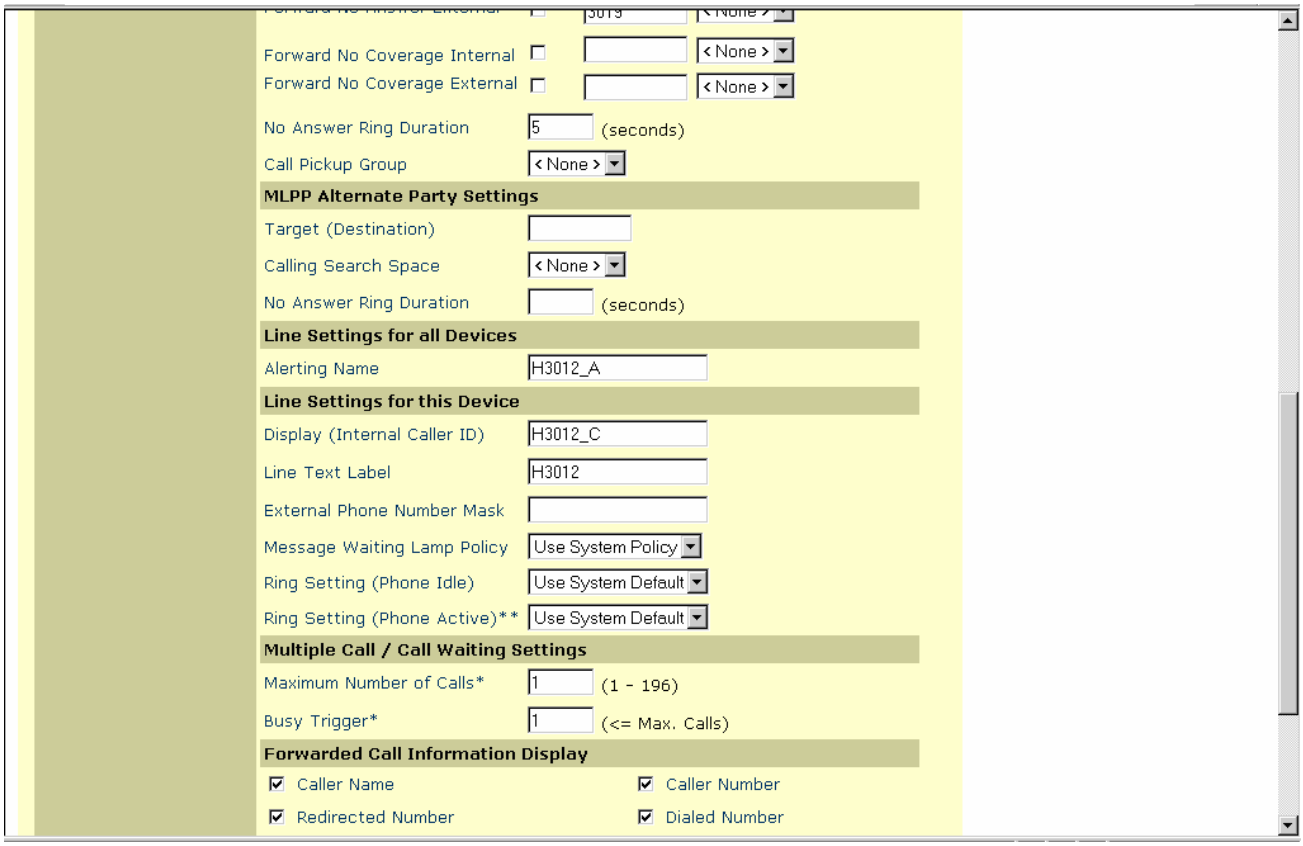
27. Add a Route Pattern to reach the Nortel's phone DN extensions

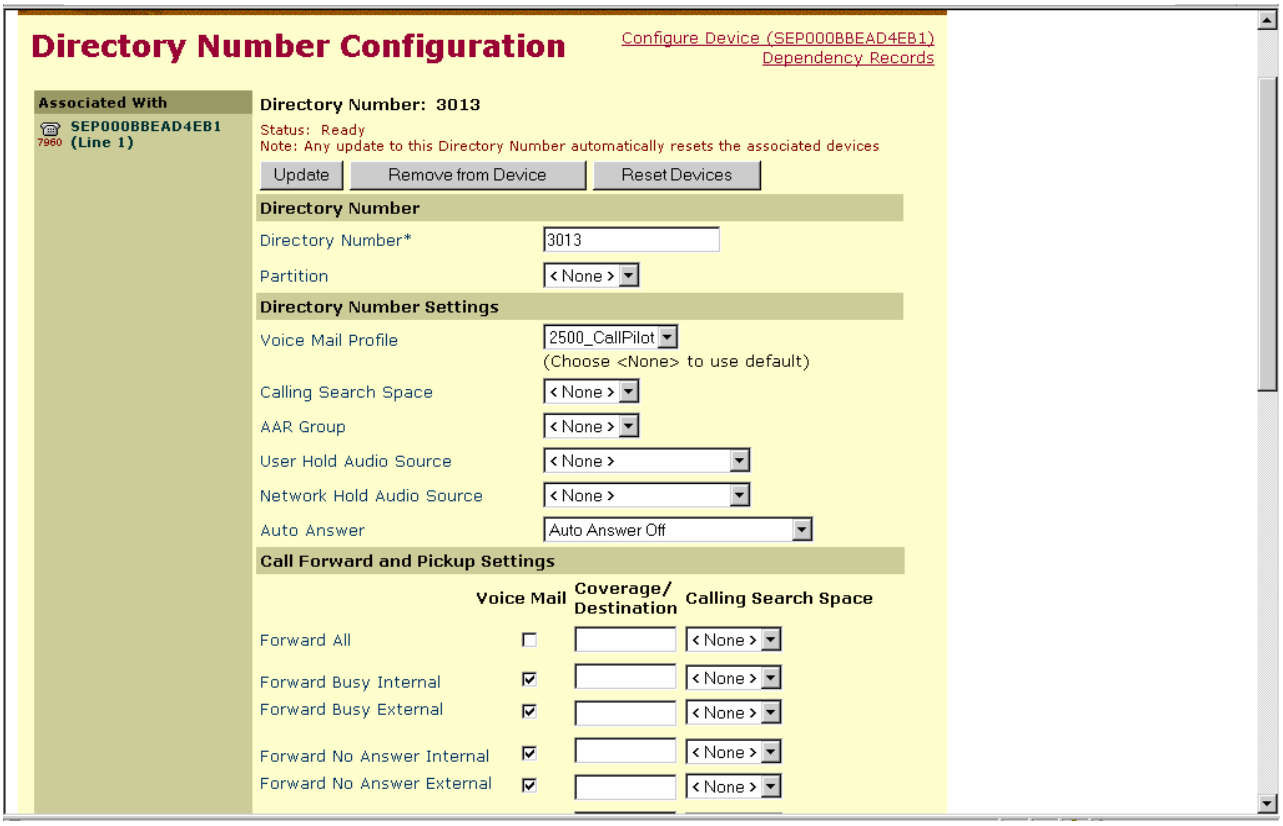


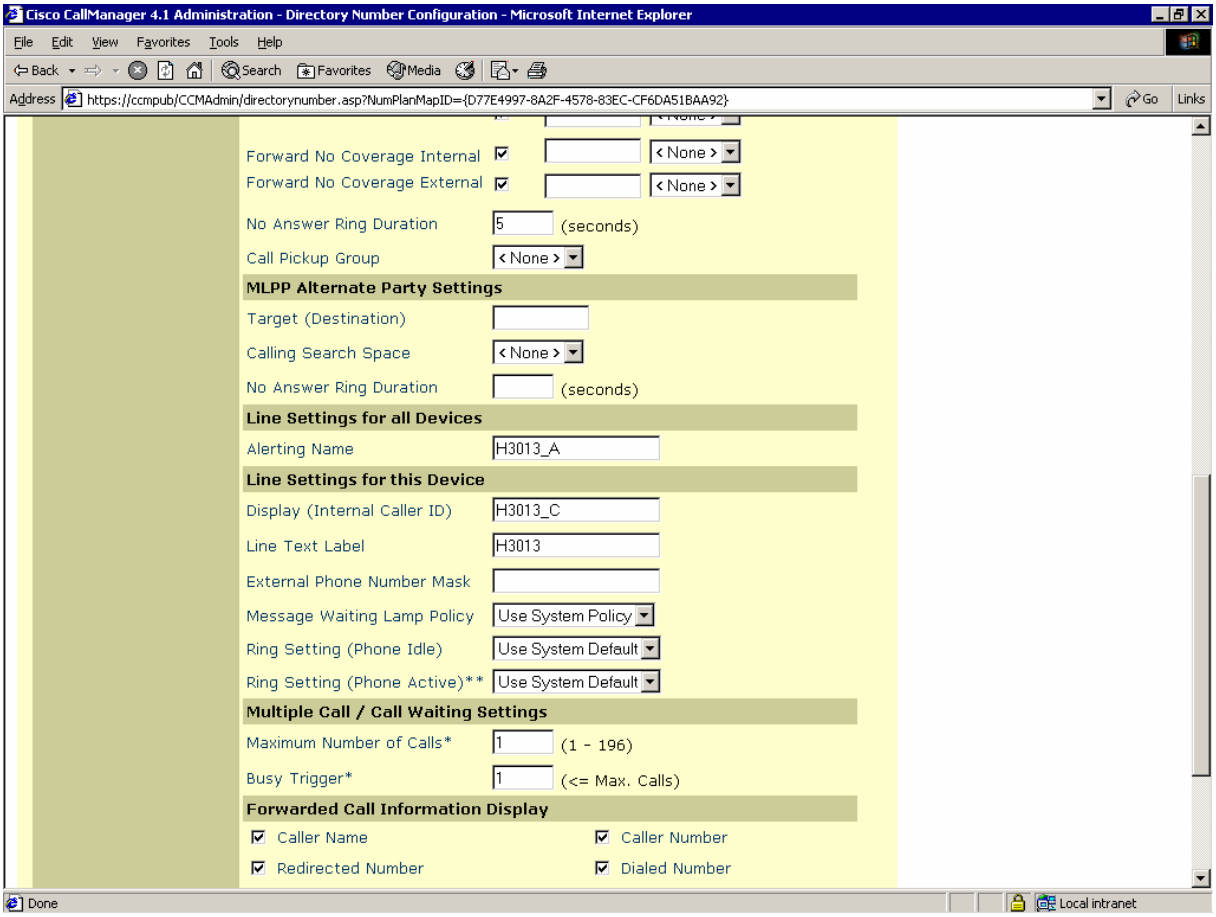


28. Configure Cisco 7960 phones with 3012 and 3013 DN.









Acronyms

Acronym	Definitions
ANF-PR	Additional Network Feature Path Replacement
CCM	Cisco 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
CMM	Communication Media Module (CMM) is a Cisco Catalyst® 6500 Series and Cisco 7600 Series line card that provides flexible and high-density T1/E1 gateways
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

Important Information

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Test Results

Test was performed by Chinh Trieu on 04/11/05.

Table 1. Basic Calls with Enbloc Signaling

Calls Made	Call Comp.?	Calling Number Displayed on Final Destination?	Calling Name Displayed on Final Destination?	Called Number Displayed on Orig. Side?	Called Name Displayed on Orig. Side?
Phone A call Phone C	Yes	Yes	No[1]	Yes	No[1]
Phone C call Phone A	Yes	No[2]	No[2]	Yes	No[2]

Note1: Nortel sends the calling/called party name information via the "nonStandardData" field within the H225 IP packet.
This is why CCM could not display the name information.
CallManager sends out the "connected" name and number information via the H.225 Notify message using the "Display IE" and "Connected Number IE" fields. However, Nortel does not interpret H.225 Notify message. As a result, the information is lost.

Note2: CallManager sends out the calling party number in the H.225 SETUP message, but Nortel doesn't display it. It displays the trunk access code (ACOD) defined in the H.323 Route Data Block for the Rout 10 entry. Not sure why this is the case.
CallManager does display the called party name information but instead, it displays Nortel's NRS node name.
The reason for this is that Nortel sends its NRS system node name via the "Display IE" in the H.225 CONNECT message. CCM interprets and treats it as the "Connected Name" information.

Table 2. Basic Calls with Overlap Sending/Receiving:

Calls Made	Call Comp.?	Calling Number Displayed on Final Destination?	Calling Name Displayed on Final Destination?	Called Number Displayed on Orig. Side?	Called Name Displayed on Orig. Side?
Phone A call Phone C	No	No	No	No	No
Phone C call Phone A	No	No	No	No	No

Note: Cisco CallManager currently doesn't support Overlap Sending and Receiving feature for H.323 gateway/device

Table 3. Basic Calls with Calling Name and Number Restrictions

Calls Made	Call Comp.?	Calling Number Restriction was honored at Final Destination?	Calling Name Restriction was honored at Final Destination?	Called Number Displayed on Orig. Side?	Called Name Displayed on Orig. Side?
Phone A call Phone C Phone A Restrict Calling Name and Number	Yes	Yes[1]	Yes[1]	Yes[1]	No[1]
Phone C call Phone A Phone C Restrict Calling Name and Number	Yes	Yes[2]	Yes[2]	No[2]	No[2]

Note1: Nortel does not sent out any calling party field within the H225 SETUP message. This is probably their method of CLIR.
Nortel sends out their calling party name information via a "nonStandardData" field with the H.225 SETUP which CCM does not support. Thus, the calling name information was not displayed. We couldn't verify if the PI bit was set to restricted or not due to Nortel's proprietary signaling.
CallManager sends out the called name and number information via the "Display IE" and "Connected Number IE" fields within the H.225 Notify message. However, Nortel does not interpret the information within the Notify message.

Note2: Nortel displays the trunk access code (ACOD) only and no calling name information.
CCM phone displays the called party number (this is just the dialed digits and not the alerting/connected number) and Nortel node name. The node name was received via "Display IE" field within H225 CONNECT message.

CCM does not send out any DISPLAY IE field within the H.225 SETUP message and set the calling party number PI bit to be restricted when it's configured with CLIR and CNIR feature.

Table 4. Basic Calls with Called Name and Number Restrictions

Calls Made	Call Comp.?	Calling Number Displayed on Final Destination?	Calling Name Displayed on Final Destination?	Connected Number Restriction was honored at Orig. Side?	Connected Name Restriction was honored at Orig. Side?
Phone A call Phone C **Phone C Restrict Called Name and Number**	Yes	Yes	No[1]	Yes[1]	Yes[1]
Phone C call Phone A **Phone A Restrict Called Name and Number**	Yes	No[2]	No[2]	No[2]	No[2]

Note1: Nortel sends the calling/called party name information using the "nonStandardData" field within the H225 IP packet. This is why CCM could not display the name information.
With CallManager sends the Connected Number with the PI bit set to be Restricted and didn't included the Display IE field in H.225 Notify message sent toward the originating side (Nortel PBX). However, Nortel does not interpret the information within the H.225 Notify message

Note2: CallManager sends out the Connected Name and Number information via the H.225 Notify message, but Nortel does not interpret the information within the message. Nortel displays only the Trunk Access Code (ACOD) number only.
Nortel does not send out any Connected Name or Number information back to CCM. It does include a Display IE field within the H.225 CONNECT message however, that's not the actual called party name information. It's Nortel NRS node name.

Table 5. Alerting Name

Calls Made	Call Setup Comp.?	Alerting Name was sent by Final Destination during Alerting (ringing)?	Alerting Name was displayed on Orig. Side during Alerting (ringing)?
Phone A to Phone C **Phone C does not answer**	Yes	Yes[2]	No[1]
Phone C to Phone A **Phone A does not answer**	Yes	No[1]	No[2]

Note1: CallManager sends out the Connected Name using the Display IE field in H.225 Notify message, however, Nortel does not interpret/support that type of message.

Note2: Nortel sends the calling/called party name information using the "nonStandardData" field within the H225 IP packet. This is why CCM could not display the name information.

Table 6. Call Transfers (Consultation Local Transfers)

Calls Made	Call Comp?	Orig. Calling Number Displayed on Final Dest. Phone?	Orig. Calling Name Displayed on Final Dest. phone?	Called Number Display on Orig. phone Updated After Transfer?	Called Name Display on Orig. Phone Updated After Transfer?
Phone A to Phone C Xfr to Phone D	Yes	Yes	No[1]	No[1]	No[1]
Phone C to Phone A Xfr to Phone B	Yes	No[2]	No[2]	No[2]	No[2]

Note1: CCM phone displays only the calling party number information at the final destination. Nortel phone displays only the original called party number with no name.

CCM sends out a H.225 Notify message with the Transferred-to party's name and number using the DISPLAY IE and Connected Number fields within the H.225 Notify message. However, Nortel does not interpret/understand the message and thus it did not update the phone's display.

Note2: Calling party phone displays the original called party number (2101) and Nortel node name (SS_Node1_Ldr) and not the actual called party phone name. When the call is transferred, Nortel doesn't send out any H.225 Transfer-update information message. As a result, CCM phone's display remains the same after the transfer has completed.
Nortel phone displays a "XFER" keyword with the ACOD number after the transfer is completed. The calling party name in the DISPLAY IE of the H.225 SETUP sent by CCM to Nortel was ignored and not used.

Table 7. Call Transfers (Blind Local Transfers)

Calls Made	Call Comp.?	Orig. Calling Number Displayed on Final Dest. Phone?	Orig. Calling Name Displayed on Final Dest. phone?	Called Number Display on Orig. phone Updated After Transfer?	Called Name Display on Orig. Phone Updated After Transfer?
Phone A to Phone C Xfr to Phone D	**Yes**	**Yes**	**No[1]**	**No[1]**	**No[1]**
Phone C to Phone A Xfr to Phone B	**Yes**	**No[2]**	**No[2]**	**No[2]**	**No[2]**

Note1: CCM phone displays only the calling party number information at the final destination with no name information.
Nortel phone displays only the original called party number with no name.
CCM sends out a H.225 Notify message with the Transferred-to party's name and number using the DISPLAY IE and Connected Number field within the H225 Notify message. However, Nortel does not interpret/understand the message and thus it didn't update the phone display.

Note2: CCM displays the original called party number and Nortel node name (SS_Node1_Ldr) and not the actual called party phone name. When the call is transferred, Nortel doesn't send out any H.225 Transfer-update information message. As a result, CCM phone's display remains the same after the transfer has completed.
Nortel phone display a "XFER" keyword with the ACOD number after the transfer occurred. The calling party name in the DISPLAY IE of the H225 SETUP sent by CCM to Nortel was ignored and not used.

Table 8. Call Transfers (Consultation Network/External)

Calls Made	Call Comp.?	Orig. Calling Number Displayed on Final Dest. Phone?	Orig. Calling Name Displayed on Final Dest. Phone?	Called Number Display on Orig. Phone Updated After Transfer?	Called Name Display on Orig. Phone Updated After Transfer?
Phone A to Phone C Xfr to Phone B	**Yes**	**No[1]**	**No[1]**	**No[1]**	**No[1]**
Phone C to Phone A Xfr to Phone D	**Yes**	**No[2]**	**No[2]**	**No[2]**	**No[2]**

Note1: Nortel calling party phone displays only the original called party number 3013 with no name information.
Nortel final destination (transferred-to) phone display the ACOD number (2311-1)
CCM send out a H225 Notify message with the Transferred-to party's name and number using the DISPLAY IE and Connected Number field within the H225 Notify message. However, Nortel doesn't interpret/understand the message and thus didn't update the phone display.

Note2: CCM calling party phone displays the original called party number (2101) and Nortel node name (SS_Node1_Ldr) and not the actual called party phone name. When the call is transferred, Nortel doesn't send out any H225 Transfer-update information message. As a result, CCM phone's display remained the same after the Transfer has occurred.
CCM final destination phone (Transferred-To) displayed the Transferring phone number (2101) and no name.

*** Nortel maintained the TCP H.323 signaling session up for the calls. It takes the IP address and port information received from the CCM OLC_ACK message and transparently pass it across between the two call legs. As a result, both CCM phones RTP stream are communicating to the CCM SW MTP, but the H.323 signaling is between CCM and Nortel for each call leg.

Table 9. Call Transfers (Blind Network/External)

Calls Made	Call Comp.?	Orig. Calling Number Displayed on Final Dest. Phone?	Orig. Calling Name Displayed on Final Dest. Phone?	Called Number Display on Orig. Phone Updated After Transfer?	Called Name Display on Orig. Phone Updated After Transfer?
Phone A to Phone D Xfr to Phone A	Yes	No[1]	No[1]	No[1]	No[1]
Phone C to Phone A Xfr to Phone D	Yes	No[2]	No[2]	No[2]	No[2]

Note1: Nortel calling party phone displays the original called party number 3013 with no name information.
Nortel final destination (Transferred-to) phone displays the ACOD number (2311-1)
CCM send out a H225 Notify message with the Transferred-to party's name and number using the DISPLAY IE and Connected Number field within the H.225 Notify message. However, Nortel does interpret/understand the message and thus didn't update it's phone display.
After the call was transferred, CCM again send out another transfer-update using H.225 Notify with Display IE and Connected number IE field to the calling party, but nothing happen. Nortel ignores it also.

*** Note, RTP streams are between the Nortel phone 2101 and CCM MTP for original call leg and CCM and phone 2102 for the network blind-transferred out call ==> Both systems doesn't support H.450.2 Supplementary Services.

Note2: CCM displays the original called party number (2101) and Nortel node name (SS_Node1_Ldr) and not the actual called party phone name. When the call is transferred, Nortel doesn't send out any H225 Transfer-update information message. As a result, CCM phone's display remains the same after the Transfer has occurred.
CCM final destination phone (Transferred-to) displays the transferring phone number (2101) and no name.

*** Nortel maintained the TCP H.323 signaling session up for the calls. It takes the IP address and port information received from CCM OLC_ACK message and transparently passes it across between the two call legs. As a result, both CCM phones RTP stream are communicating to the CCM SW MTP, but the H.323 signaling is between CCM and Nortel for each call leg.

Table 10. Call Forward Unconditional by join (Local)

Calls Made	Call Comp.?	Original Calling Number Displayed on Final Dest.?	Original Calling Name Displayed on Final Dest.?	Forwarding Called Number Displayed on Final Dest.?	Forwarding Called Name Displayed on Final Dest.?	Final Dest. Connected Number Updated at orig. Side?	Final Dest. "Connected Name" Updated at Orig. Side?
Phone A to Phone C-CFU to Phone D	Yes	Yes	No[1]	Yes	Yes	No[1]	No[1]
Phone C to Phone A-CFU to Phone B	Yes	Yes	No[2]	Yes	Yes	No[2]	No[2]

Note1: Nortel calling party phone displays the dialed number (3013) with no name information.
CCM sends out a H225 Notify message with the Forwarded-to party's name and number using the DISPLAY IE and Connected Number field within the H225 Notify message. However, Nortel does interpret/understand the message and thus it didn't update the phone display.
The forwarded-to party (3012) displays the forwarding phone information along with the calling party number only (no name). The reason is that the calling party name information is sent by Nortel using the "nonStandardData" field within the H225 SETUP message instead of the DISPLAY IE which CCM support.
The display of the forwarding phone information at the final destination is controlled by the "Retain Forward Information* " field in the CCM Advance Service Parameter page.

Note2: The CCM calling party phone displayed the original called party number (2101) with the CS1000 system node name (SS_Node1_Ldr) and not the actual called party phone name.
The system node name is received in the H225 CONNECT message via the DISPLAY IE field.

Nortel final destination phone (forwarded-to) displays the calling party number along with the forwarding phone number and name information (2101 and it's name) along with "CFWD" keyword
It does not have the calling party phone name information. CCM, however, does include the calling party name information with the H225 SETUP message using the DISPLAY IE field which Nortel ignored.

Table 11. Call Forward Unconditional by join (Network/External)

Calls Made	Call Comp.?	Original Calling Number Displayed on Final Dest.?	Original Calling Name Displayed on Final Dest.?	Forwarding Called Number Displayed on Final Dest.?	Forwarding Called Name Displayed on Final Dest.?	Final Dest. Connected Number Updated at Orig. Side?	Final Dest. Connected Name Updated at Orig. Side?
Phone A to Phone C-CFU to Phone B	Yes	Yes	No[1]	No[1]	No[1]	No[1]	No[1]
Phone C to Phone A-CFU to Phone D	Yes	No[2]	No[2]	No[2]	No[2]	No[2]	No[2]

Note1: Nortel calling party phone displays the dialed number (3013) with no name information.
CCM sent out a H225 Notify message with the Forwarded-to party's name and number using the DISPLAY IE and Connected Number field within the H225 Notify message. However, Nortel does interpret/understand the message and thus it didn't update the phone display.
The final destination phone (2102) displays the original calling party number only. This is because in the outbound diverted call setup from CCM, the calling party number field is set to be the original calling party number instead of the original called party number (forwarding device DN). When the final destination phone answers the call, there is no change to the display.
CCM does send out an H.225 Notify message to original calling party (2101) to update its display with the forwarded-to/final destination) phone number. However, Nortel ignores it and does not update the display of the calling party phone.
In the H225 CONNECT message for the outgoing diverted call, there is a DISPLAY IE field populated with Nortel node name (SS_Node1_Ldr). CCM receives it and does transparently pass onward and populates the H.225 Connect message with the same information using the same field for the original inbound call leg. However, Nortel doesn't interpret that information. It's expecting the information to be in the "nonStandardData" field within the H.225 CONNECT message.

*** RTP streams is between Nortel calling party and CCM SW MTP for the original call leg and CCM SW MTP and the final destination party for the outbound diverted call leg. So, even thought the two parties (calling and final destination) are both on the Nortel system, the RTP streams are directed to CCM MTP and redirected out.

Note2: Calling party phone display the original called party number (2102) and CS1000 Node name (SS_Nod1_Ldr) receive in the H225 CONNECT message via the DISPLAY IE field.
The final destination (forwarded-to) phone on CCM did sent out a H.225 Notify message (with it's name and number) to Nortel (forwarding station), but Nortel didn't interpret the information or forward them onward to the original calling party device.

The final destination phone display "Private and Unknown number" on it's screen. The reason is that Nortel didn't include the calling party ie field within the H225 SETUP message sent to CCM for the diverted call attempt.
Nortel acting as the forwarding node doesn't send out any update information to the calling or final destination devices

*** RTP streams are from CCM phones and CCM SW MTP. RTP streams are not directed through the Nortel node.
However, Nortel does maintain the TCP H.323 signaling session up for the calls. It takes the IP address and port information received from the CCM OLC_ACK message and transparently passed it across between the two call legs. As a result, both CCM phones RTP stream are communicating to the CCM SW MTP, but the H.323 signaling is between CCM and Nortel for each call leg.

Table 12. Call Forward Busy by join(Local)

Calls Made	Call Comp.?	Original Calling Number Displayed on Final Dest.?	Original Calling Name Displayed on Final Dest.?	Forwarding Called Number Displayed on Final Dest.?	Forwarding Called Name Displayed on Final Dest.?	Final Dest. Connected Number Updated at orig. Side?	Final Dest. "Connected Name" Updated at Orig. Side?

Calls Made	Call Comp.?	Original Calling Number Displayed on Final Dest.?	Original Calling Name Displayed on Final Dest.?	Forwarding Called Number Displayed on Final Dest.?	Forwarding Called Name Displayed on Final Dest.?	Final Dest. Connected Number Updated at orig. Side?	Final Dest. "Connected Name" Updated at Orig. Side?
Phone A to Phone C-CFB to Phone D	Yes	Yes	No[1]	Yes	Yes	No[1]	No[1]
Phone C to Phone A-CFB to Phone B	Yes	Yes	No[2]	Yes	Yes	No[2]	No[2]

Note1: Please see Call Forward Unconditional by Join (Local)

Note2: Please see Call Forward Unconditional by Join (Local)

Table 13. Call Forward Busy by join (Network/External)

Calls Made	Call Comp.?	Original Calling Number Displayed on Final Dest.?	Original Calling Name Displayed on Final Dest.?	Forwarding Called Number Displayed on Final Dest.?	Forwarding Called Name Displayed on Final Dest.?	Final Dest. Connected Number Updated at Orig. Side?	Final Dest. Connected Name Updated at Orig. Side?
Phone A to Phone C-CFB to Phone B	Yes	Yes	No[1]	No[1]	No[1]	No[1]	No[1]
Phone C to Phone A-CFB to Phone D	Yes	No[2]	No[2]	No[2]	No[2]	No[2]	No[2]

Note1: Please see Call Forward Unconditional by Join (Network)

Note2: Please see Call Forward Unconditional by Join (Network)

Table 14. Call Forward No Reply by join (Local)

Calls Made	Call Comp.?	Original Calling Number Displayed on Final Dest.?	Original Calling Name Displayed on Final Dest.?	Forwarding Called Number Displayed on Final Dest.?	Forwarding Called Name Displayed on Final Dest.?	Final Dest. Connected Number Updated at orig. Side?	Final Dest. "Connected Name" Updated at Orig. Side?
Phone A to Phone C-CFNR to Phone D	Yes	Yes	No[1]	Yes	Yes	No[1]	No[1]
Phone C to Phone A-CFNR to Phone B	Yes	Yes	No[2]	Yes	Yes	No[2]	No[2]

Note1: Please see Call Forward Unconditional by Join (Network)

Note2: Please see Call Forward Unconditional by Join (Network)

Table 15. Call Forward No Reply by join (Network/External)

Calls Made	Call Comp.?	Original Calling Number Displayed on Final Dest.?	Original Calling Name Displayed on Final Dest.?	Forwarding Called Number Displayed on Final Dest.?	Forwarding Called Name Displayed on Final Dest.?	Final Dest. Connected Number Updated at Orig. Side?	Final Dest. Connected Name Updated at Orig. Side?
Phone A to Phone C-CFNR to Phone B	Yes	Yes	No[1]	No[1]	No[1]	No[1]	No[1]
Phone C to Phone A-CFNR to Phone D	Yes	No[2]	No[2]	No[2]	No[2]	No[2]	No[2]

Note1: Please see Call Forward Unconditional by Join (Network)

Note2: Please see Call Forward Unconditional by Join (Network)

Table 16. Call Completion to Busy Subscriber

Calls Made	Call Back Comp.?	Original Calling Number Displayed on Final Dest.?	Original Calling Name Displayed on Final Dest.?	Final Dest. Connected Number Updated at Orig. Side?	Final Dest. Connected Name Updated at Orig. Side?
Phone A to Phone C-Busy Subscriber Invoke CallBAck feature from A	No	N/A	N/A	N/A	N/A
Phone C to Phone A-Busy Subscriber Invoke CallBAck feature from C	No	N/A	N/A	N/A	N/A

Note: Cisco CallManager doesn't support Call Completion across H323 gateway.
Nortel Call Completion is tunnel across H323 using their proprietary method.

Table 17. Call Completion on No Reply

Calls Made	CallBack Comp.?	Original Calling Number Displayed on Final Dest.?	Original Calling Name Displayed on Final Dest.?	Final Dest. Connected Number Updated at Orig. Side?	Final Dest. Connected Name Updated at Orig. Side?
Phone A to Phone C-No Reply Invoke CallBAck feature from A	No	N/A	N/A	N/A	N/A
Phone C to Phone A-No Reply Invoke CallBAck feature from C	No	N/A	N/A	N/A	N/A

Note: Cisco CallManager doesn't support Call Completion across H323 gateway.
Nortel Call Completion is tunnel across H323 using their proprietary method.

Table 18. QSIG MWI Activate

Calls Made	Message Sent?	MWI lamp turned ON?	Notes
Phone A to Phone C – CFU to Call Pilot Call Pilot send MWI activate message to user C	No	No	1
Phone A to Phone D – CFU to Unity Unity send MWI activate message to user D	Yes	Yes	
Phone C to Phone A – CFU to Unity Unity send MWI activate message to user C	No	NO	2
Phone C to Phone B – CFU to Call Pilot Call Pilot send MWI activate message to user B	Yes	Yes	

Calls Made	Message Sent?	MWI lamp turned ON?	Notes
Phone C to Phone D – CFU to Unity Unity send MWI activate message to user C	Yes	Yes	
Phone D to Phone C – CFU to Call Pilot Call Pilot send MWI activate message to user C	No	No	3
Phone A to Phone B – CFU to Call Pilot Call Pilot send MWI activate message to user C	Yes	Yes	
Phone B to Phone A – CFU to Unity Unity send MWI activate message to user C	No	No	4

Note1: Phone A hears Call Pilot Opening Greeting and not the Subscriber's Personal VM Greeting. No MWI and No DTMF capability.

Note2: Phone C hears Unity Opening Greeting and not the Subscriber's Personal VM Greeting. No MWI but DTMF works via dtmf-relay h.245-alphanumeric method.

Note3: Phone D hears Call Pilot Opening Greeting and not the Subscriber's Personal VM Greeting. No MWI but DTMF works via dtmf-relay h.245-alphanumeric method.

Note4: Phone B hears its own VM sign-in. When Phone A forwards the call to Unity, it populates the calling party number in the outgoing H.225 SETUP to Unity without any redirect information. Thus, Unity treats the call as a direct-call call-type and return the sign-in prompt since Unity have Phone B extension as a subscriber.

Table 19. QSIG MWI Deactivate

Calls Made	Message Sent?	MWI lamp turned OFF?	Notes
Phone A to Phone C – CFU to Call Pilot Call Pilot send MWI activate message to user C	No	No	1
Phone A to Phone D – CFU to Unity Unity send MWI activate message to user C	Yes	Yes	
Phone C to Phone A – CFU to Unity Unity send MWI activate message to user C	No	NO	2
Phone A to Phone B – CFU to Call Pilot Call Pilot send MWI activate message to user C	Yes	Yes	
Phone C to Phone D – CFU to Unity Unity send MWI activate message to user C	Yes	Yes	
Phone D to Phone C – CFU to Call Pilot Call Pilot send MWI activate message to user C	No	No	3
Phone A to Phone B – CFU to Call Pilot Call Pilot send MWI activate message to user C	Yes	Yes	
Phone B to Phone A – CFU to Unity Unity send MWI activate message to user C	No	No	4

For Note 1, 2, 3, 4: Please see comments in QSIG MWI Activation Section above.

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