Application Note

Nortel CS1000 Succession 4.0 with Cisco Unified Border Element for SIP-to-SIP Calls

Table of Contents

Introduction 1
Network Topology 2
Limitations 2
System Components 3
  Hardware Requirements 3
  Software Requirements 3
Features 3
  Features Supported 3
  Features Not Supported 3
Configuration 4
  Configuration Sequence and Tasks 4
  Configuration Menus and Commands 4
Acronyms 35

Introduction

- This is an application note for connectivity of Nortel CS1000 Succession 4.0 with Cisco Unified Border Element via SIP (10/100baseT).
- The network topology diagram (Figure 1) shows the test setup for end-to-end interoperability with the Cisco Unified Border Element (CUBE) connected to the IP PBX via SIP (10/100baseT). Connectivity is achieved by using the SIP protocol.
- This Application Note uses the c3845 IOS-voice-gateway, however other Cisco voice gateways are also an option to use since CUBE implementation does not depend on the platform. Here is a list of Cisco Products capable of CUBE functionality:

Cisco 2800 Series Integrated Services Routers
Cisco 3800 Series Integrated Services Routers
Cisco AS5350XM Universal Gateway
Cisco AS5400XM Universal Gateway

Network Topology

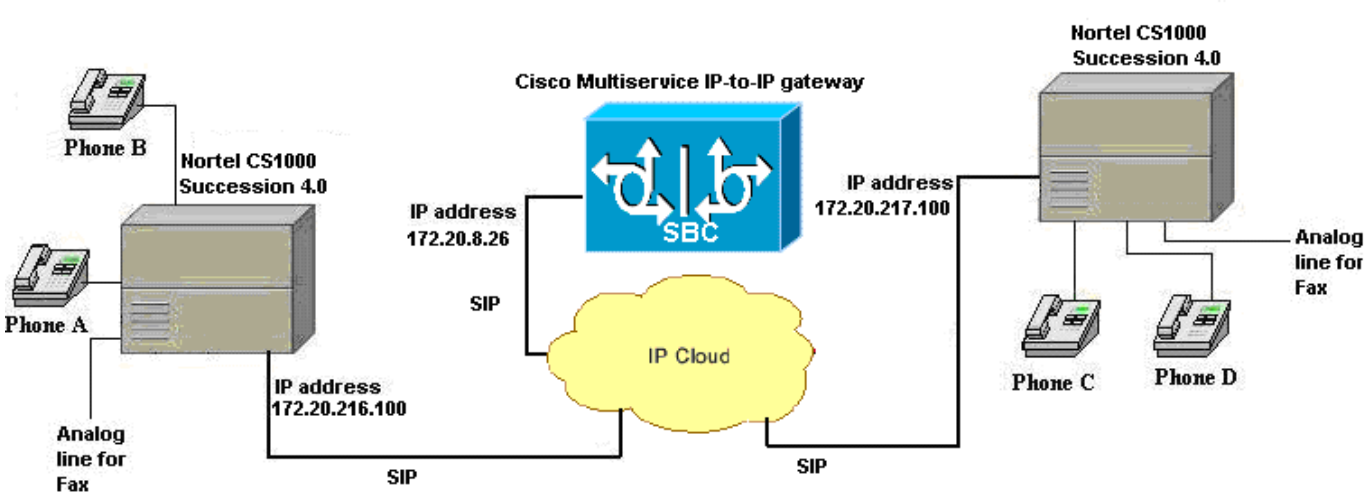


Figure 1. Network Topology or Test Setup

Limitations

- Connected Name is not presented at originating Phone. Nortel does not include Final destination NAME in the SIP ringing status, or in the OK status.
- Basic Call using G.726 codec is not supported on Nortel PBX
- Call Transfer Name and Number updates do not occur
- Call Forward Name and Number updates do not occur
- DTMF tones are not played across established call. Nortel PBX utilizes SIP “INFO” messages to signal DTMF tones, Cisco IOS does not support SIP INFO message as of version 124-7.9.PI4a.
- A fax call is supported using only codec G.711 (A or u-law).

System Components

Hardware Requirements

Cisco equipment

- Cisco 3845 (Cisco 3800 family routers)
- Cisco Catalyst 6500

Avaya equipment

- Nortel Communication System 1000 (which includes Call Server, Signaling Server and Media gateway)

Software Requirements

- PBX Software: Nortel Succession 4.0 Release
- Cisco IOS Release: c3845-ipvoice_ivs-mz.124-9.T

Features

Features Supported

- Basic call using G711u and A law, G729 and G723 codecs
- Call Transfer blind and Call Transfer supervised
- Call Conference
- Call on-hold
- Call Forward No Reply, Busy and All
- FAX integrity (only using G.711)

Features Not Supported

- Connected Name
- DTMF

Configuration

Configuration Sequence and Tasks

Configuration Menus and Commands

Nortel Configuration

Call Server Setup Using SSC Card Console:

1. LD 17 – Configure the IP 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 SIP Virtual Trunks to the Signaling Server
4. LD 14 – Configure the Virtual Gateway Trunks
5. LD 16 – Configure the SIP route
6. LD 86 – Configure the Route List Block for the Virtual Trunk route
7. LD 87 – Configure CDP steering codes
8. Configure Digital Stations (Phones)

Signaling Server Setup Using 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 SIP 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 SIP gateway
24. Configure the Routing Entries

Call Server Setup Using SSC Card Console:

1. LD 17 – Configure the IP 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 YES
IFC SL1
CNEG 1
RLS ID 4
RCAP ND2 CPK
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): 2718718    USED U P: 327039 50818    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 1  -- - -
036  STD  LEFT 07 0 1  -- - -
040  STD  LEFT 08 0 1  -- - -
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
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 SIP Virtual Trunks to the Signaling Server (One trunk = one line connection)

>ld 20

PT0000
REQ: prt
TYPE: tnb
TN 62 0 0 0 =➔ **SIP Virtual trunk to Signaling Server**

DATE
PAGE
DES

DES SIP_IP_VTRK
TN 062 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 10 1
CHID 1
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

NACT

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

```
>ld 20

PT0000
REQ: prt
TYPE: tnb
TN   3
CDEN
CUST
DATE
PAGE
DES

DES  192.168.21.2
TN   003 0 00 00
TYPE VGW
CUST 0
XTRK MC32
ZONE 000

DES  192.168.21.2
TN   003 0 00 01
TYPE VGW
CUST 0
XTRK MC32
ZONE 000
```

5. LD 16 – Configure the SIP route

```
>ld 21
PT1000

REQ: prt
TYPE: rdb
CUST 0
ROUT 10

TYPE RDB
CUST 00
DMOD
ROUT 10
DES  SIP_TIE
TKTP TIE
NPID_TBL_NUM   0
ESN  NO
```

CNVT NO
SAT NO
RCLS EXT
VTRK YES
ZONE 000
PCID SIP
CRID YES
NODE 102
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 710
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
OHQ NO
OHQT 00
CBQ NO
AUTH NO
TTBL 0
ATAN NO
OHTD NO
PLEV 2
ALRM NO
ART 0
SGRP 0
AACR NO

REQ:

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

>ld 86
ESN000

MEM AVAIL: (U/P): 2718718 USED U P: 327039 50818 TOT: 3096575
DISK RECS AVAIL: 1152
REQ prt
CUST 0
FEAT rlb
RLI 10

RLI 10
ENTR 0
LTER NO
ROUT 10

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 0

MEM AVAIL: (U/P): 2718718 USED U P: 327039 50818 TOT: 3096575
DISK RECS AVAIL: 1152
REQ

7. LD 87 – Configure CDP steering codes

>ld 87
ESN000

MEM AVAIL: (U/P): 2718718 USED U P: 327039 50818 TOT: 3096575
DISK RECS AVAIL: 1152
REQ prt
CUST 0
FEAT cdp
TYPE dsc
DSC 233
DSC 233 =➔ Note: Dialing plan
FLEN 0
DSP LSC
RLI 10 =➔ Note: SIP Route list used for DSC dialed numbers
NPA
NXX
>ld 87
ESN000

MEM AVAIL: (U/P): 2718718 USED U P: 327039 50818 TOT: 3096575
DISK RECS AVAIL: 1152
REQ prt
CUST 0

FEAT cdp
TYPE dsc
DSC 24
DSC 24 =➔ Note: Dialing plan
FLEN 0
DSP LSC
RLI 10 =➔ Note: SIP Route list used for DSC dialed numbers
NPA
NXX

8. LD 11 – Configure Digital Stations (Phones)

```
>ld 11
SL1000
MEM AVAIL: (U/P): 2718718    USED U P: 327039 50818    TOT: 3096575
DISK RECS AVAIL: 1152
DIGITAL TELEPHONES AVAIL:    0    USED:    8    TOT:    8
IP USERS AVAIL:    2    USED:    6    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:  2296    USED:   204    TOT:  2500
DATA PORTS AVAIL:  2500    USED:    0    TOT:  2500

REQ: prt
TYPE: 2616


TN   1 06
DATE
PAGE
DES

DES  CS102
TN   001 0 00 06
TYPE 2616
CDEN 8D
CUST 0
AOM  0
FDN  2332
TGAR 1
LDN  NO
NCOS 0
SGRP 0
RNPG 0
SCI  0
SSU
XLST
CLS  CTD FBA WTA LPR MTD FNA HTA ADD HFD
    MWA LMPN RMMD SMWD AAD IMD XHD IRD NID OLD VCE DRG1
    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 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 FLXD FTTC DNDY DNO3 MCBN CDMR
CPND_LANG ENG
RCO 0
EFD 2332
HUNT 2332
EHT 2332
LHK 0
PLEV 02
CSDN
AST
IAPG 0
AACS NO
ITNA NO
DGRP
MLWU_LANG 0
DNDR 0
KEY 00 SCR 5332 0 MARP
CPND
NAME ATHENA_5332
XPLN 13
DISPLAY_FMT FIRST,LAST
01
02
03 CFW 4 2332
04 AO6
05 TRN
06
07
08
09
10
11
12
13
14
15 RGA
DATE 16 MAR 2006

NACT
REQ:
REQ PRT
TYPE:
TYPE 2616
TN 1 07
DATE
PAGE

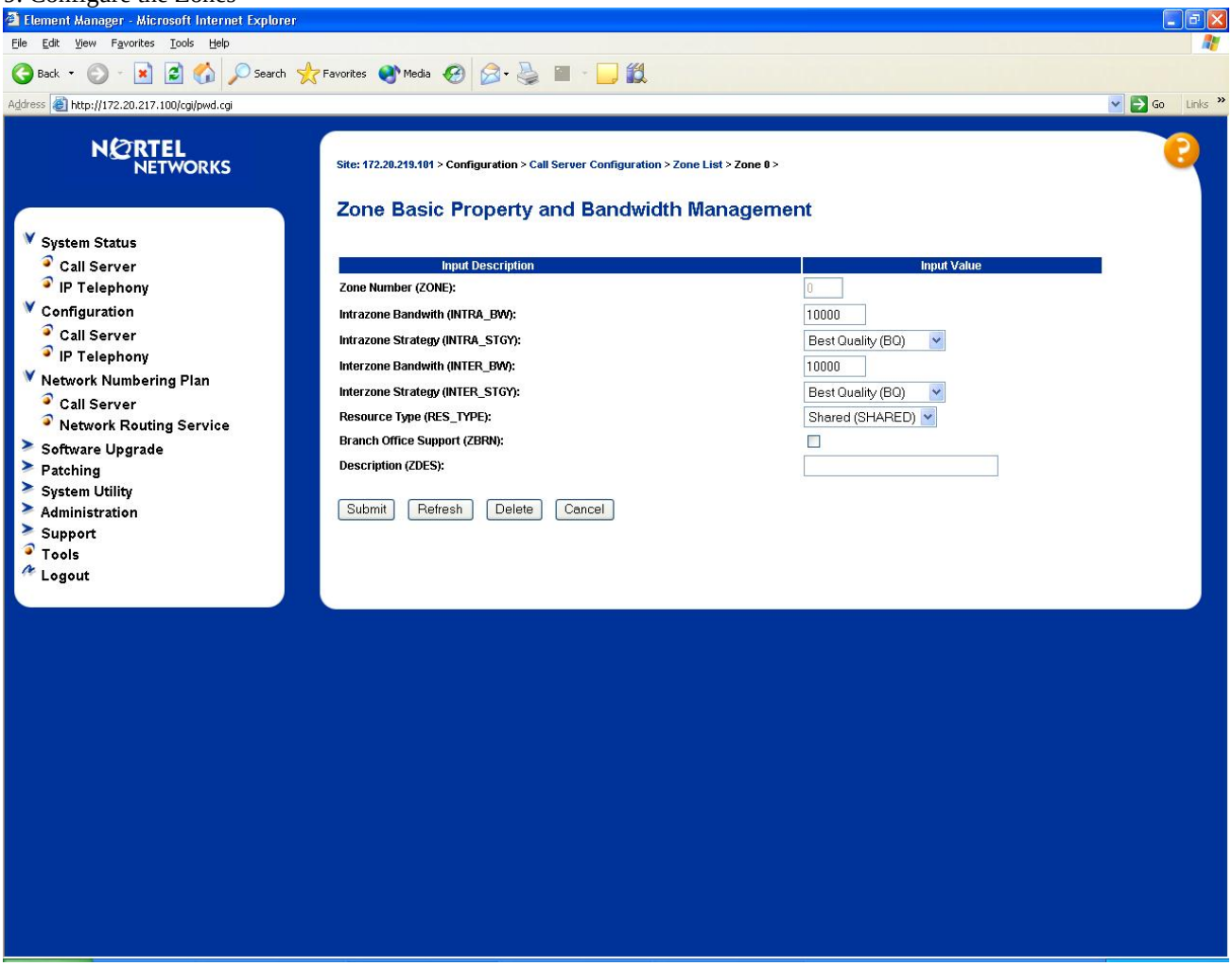
```
DES

DES  CS102
TN   001 0 00 07
TYPE 2616
CDEN 8D
CUST 0
AOM  0
FDN  2332
TGAR 1
LDN  NO
NCOS 0
SGRP 0
RNPG 0
SCI  0
SSU
XLST
CLS  CTD FBA WTA LPR MTD FNA HTA ADD HFD
     MWA LMPN RMMD SMWD AAD IMD XHD IRD NID OLD VCE DRG1
     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 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 FLXD FTTC DNDY DNO3 MCBN CDMR
CPND_LANG ENG
RCO  0
EFD  2332
HUNT 2332
EHT  2332
LHK  0
PLEV 02
CSDN
AST
IAPG 0
AACS NO
ITNA NO
DGRP
MLWU_LANG 0
DNDR 0
KEY  00 SCR 5333 0     MARP
       CPND
         NAME ATHENA_5333
         XPLN 13
         DISPLAY_FMT FIRST,LAST
     01
     02
     03 CFW 4  2333
     04 AO6
     05 TRN
     06
```

07
08
09
10
11
12
13
14
15 RGA
DATE 14 MAR 2006

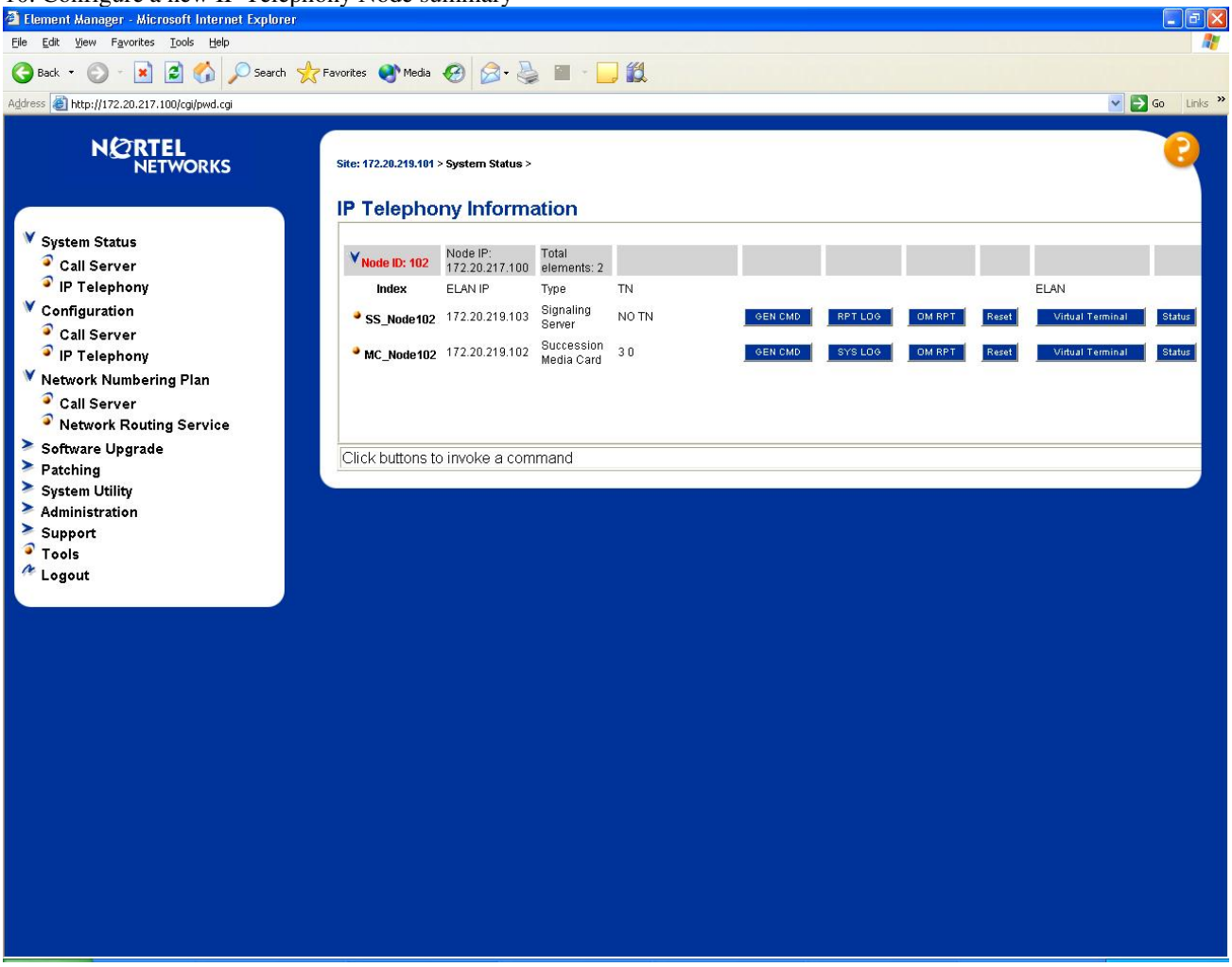
NACT

Signaling Server Setup Using the Nortel Element Manager:

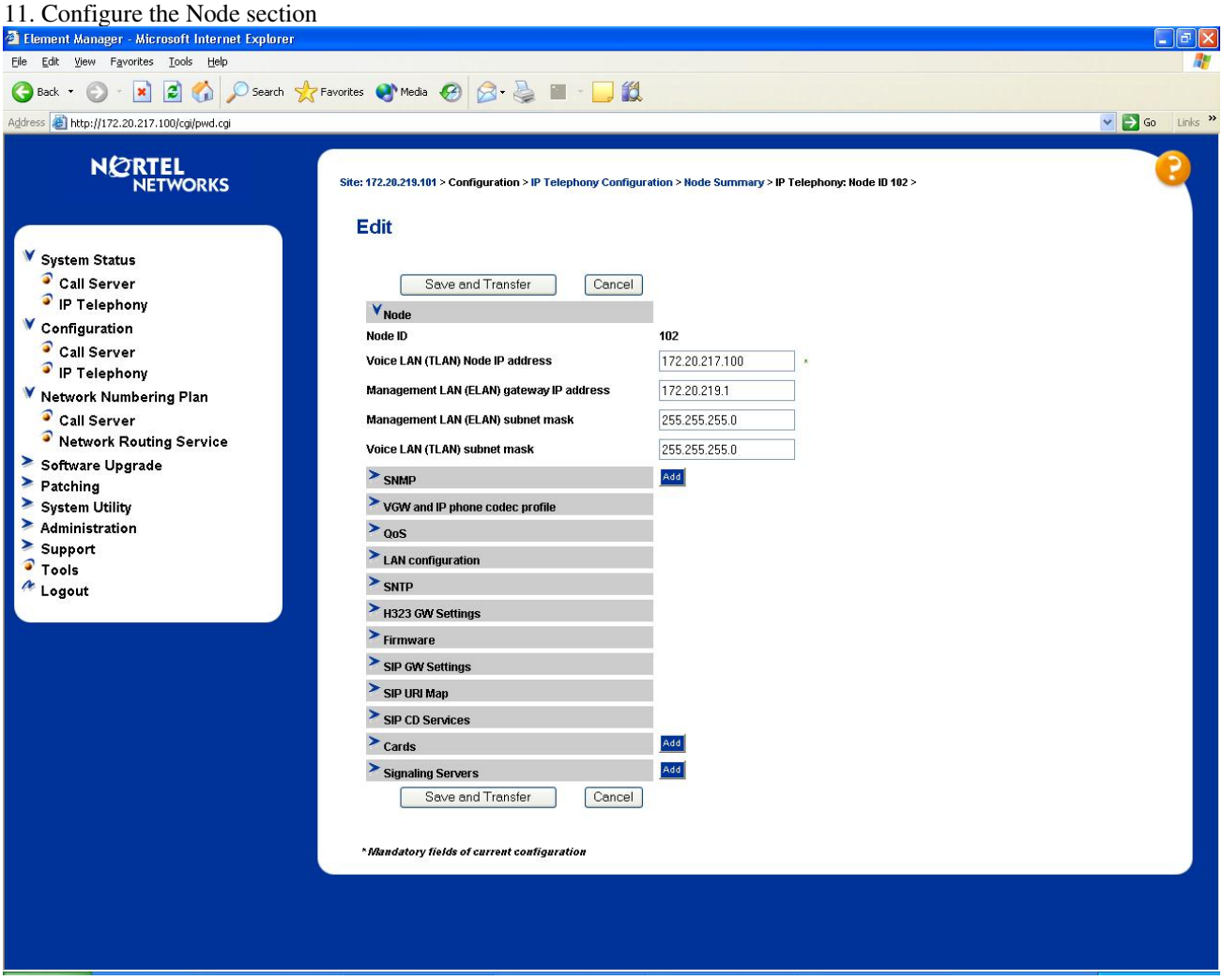
9. Configure the Zones



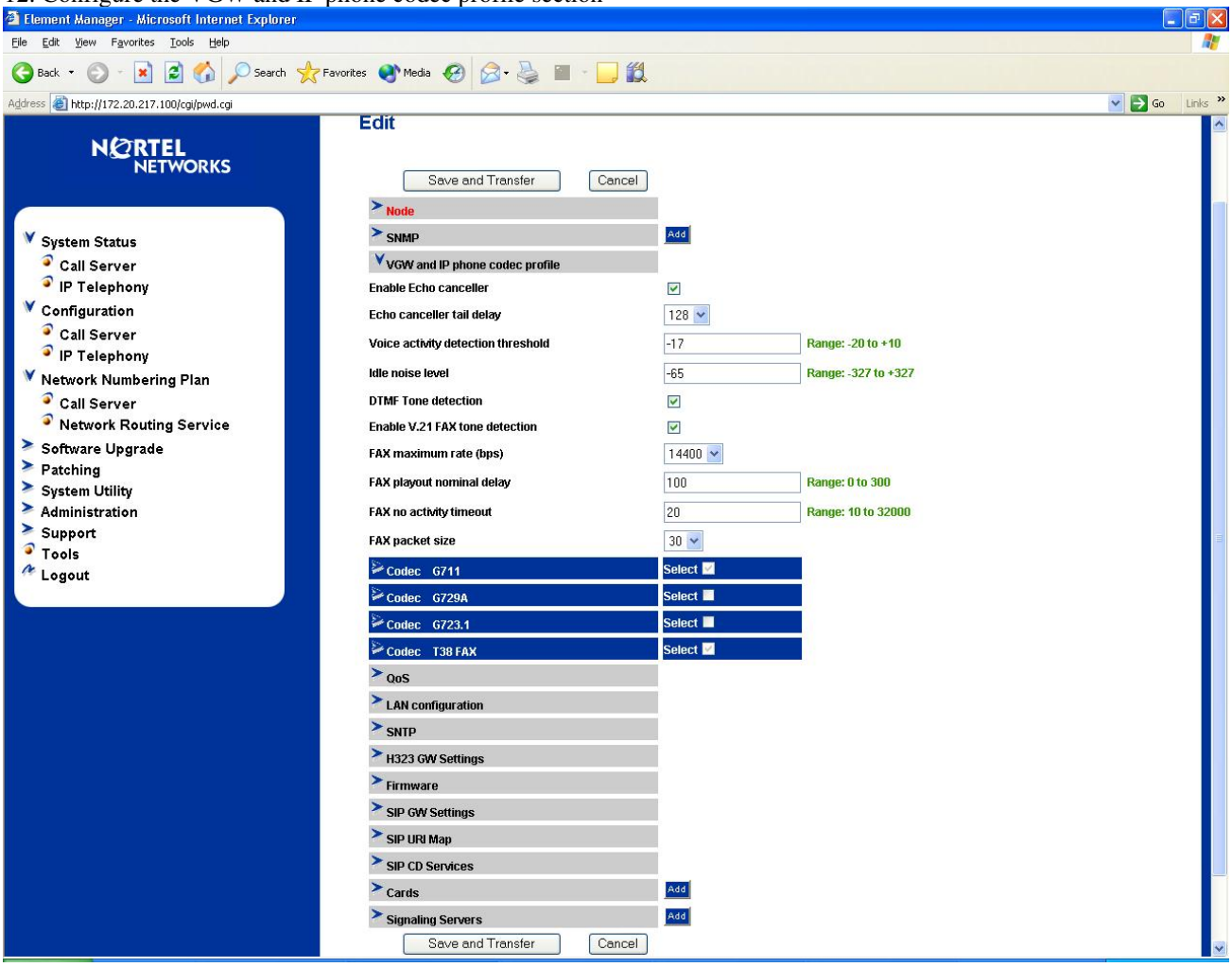
10. Configure a new IP Telephony Node summary

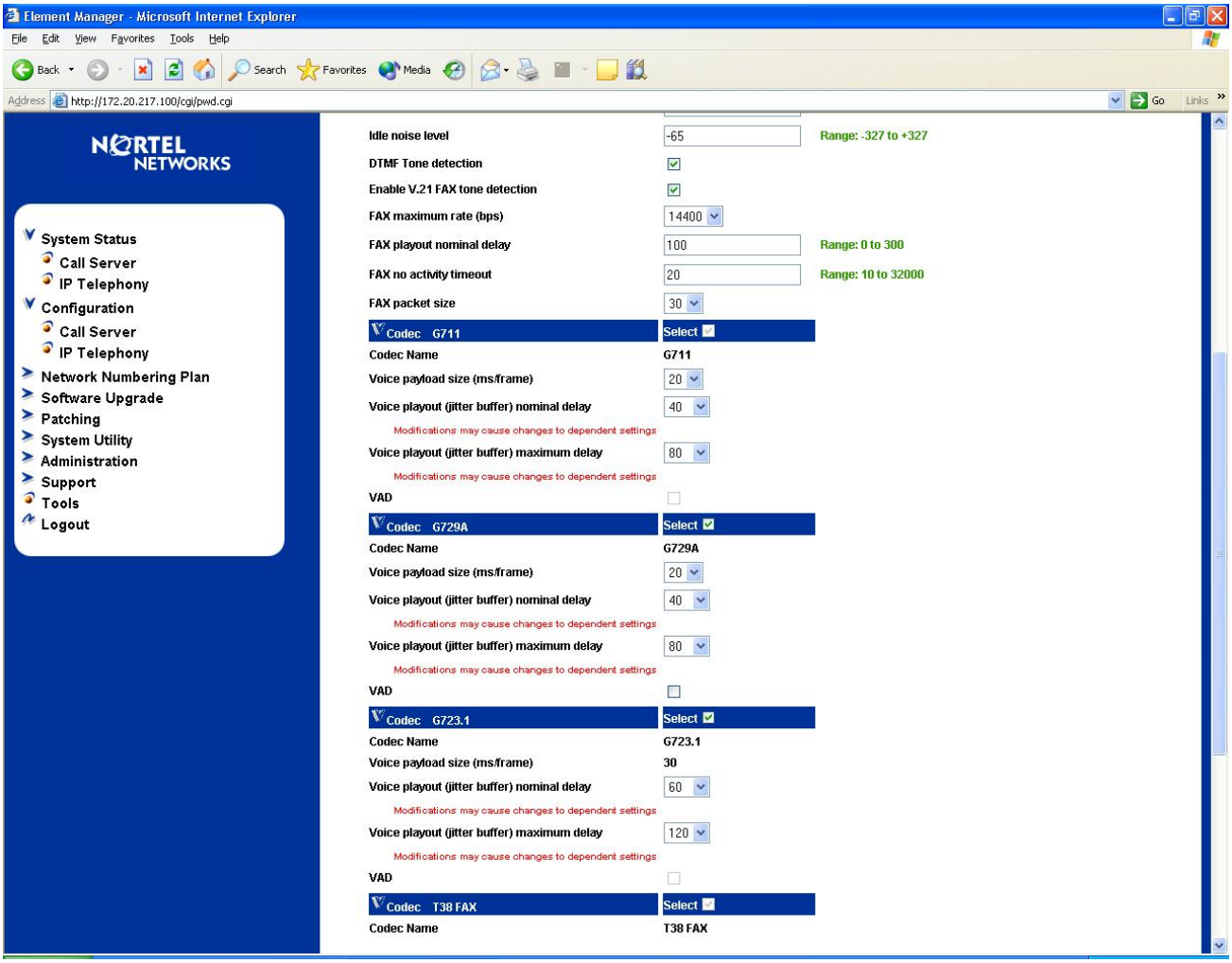


11. Configure the Node section

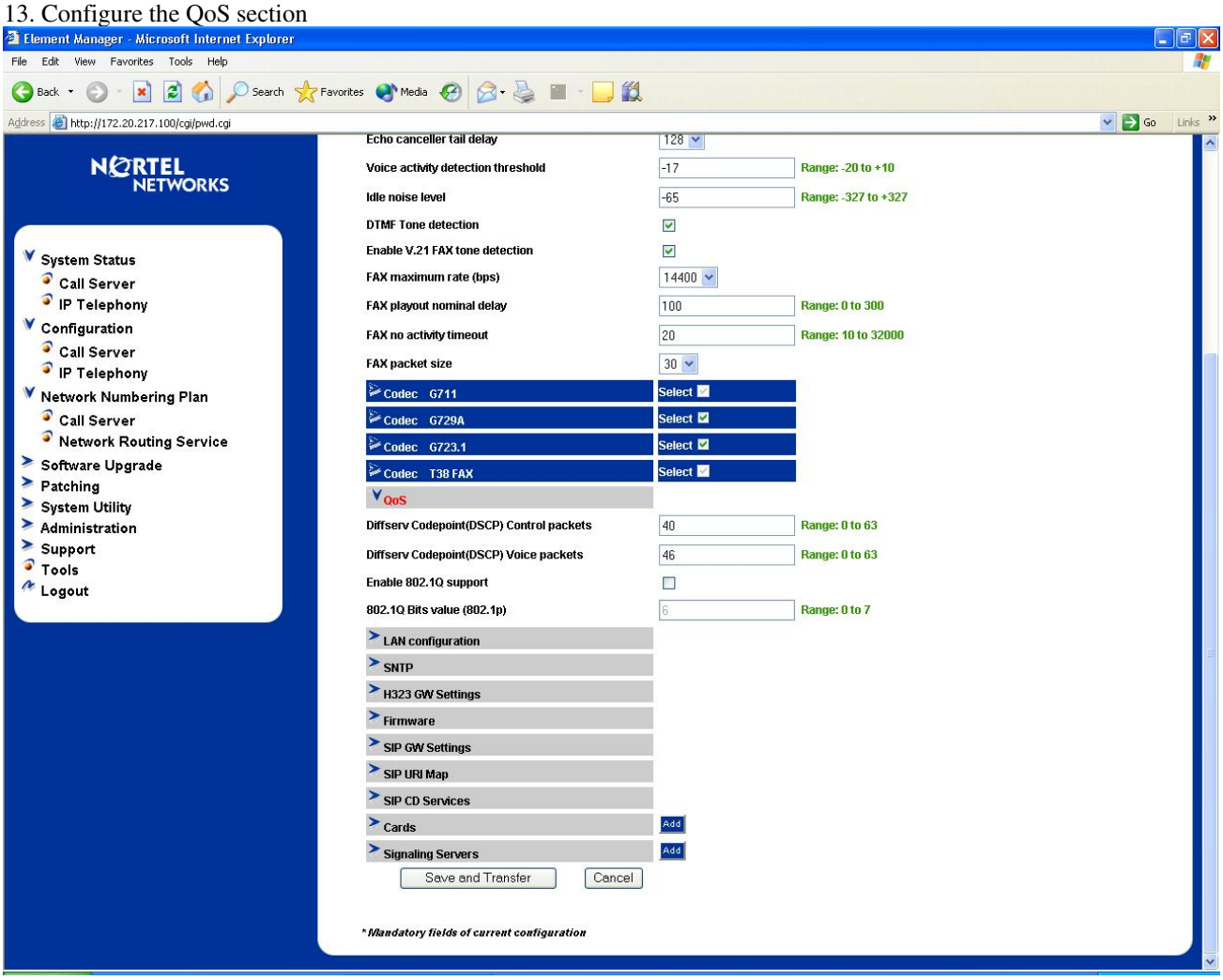


12. Configure the VGW and IP phone codec profile section

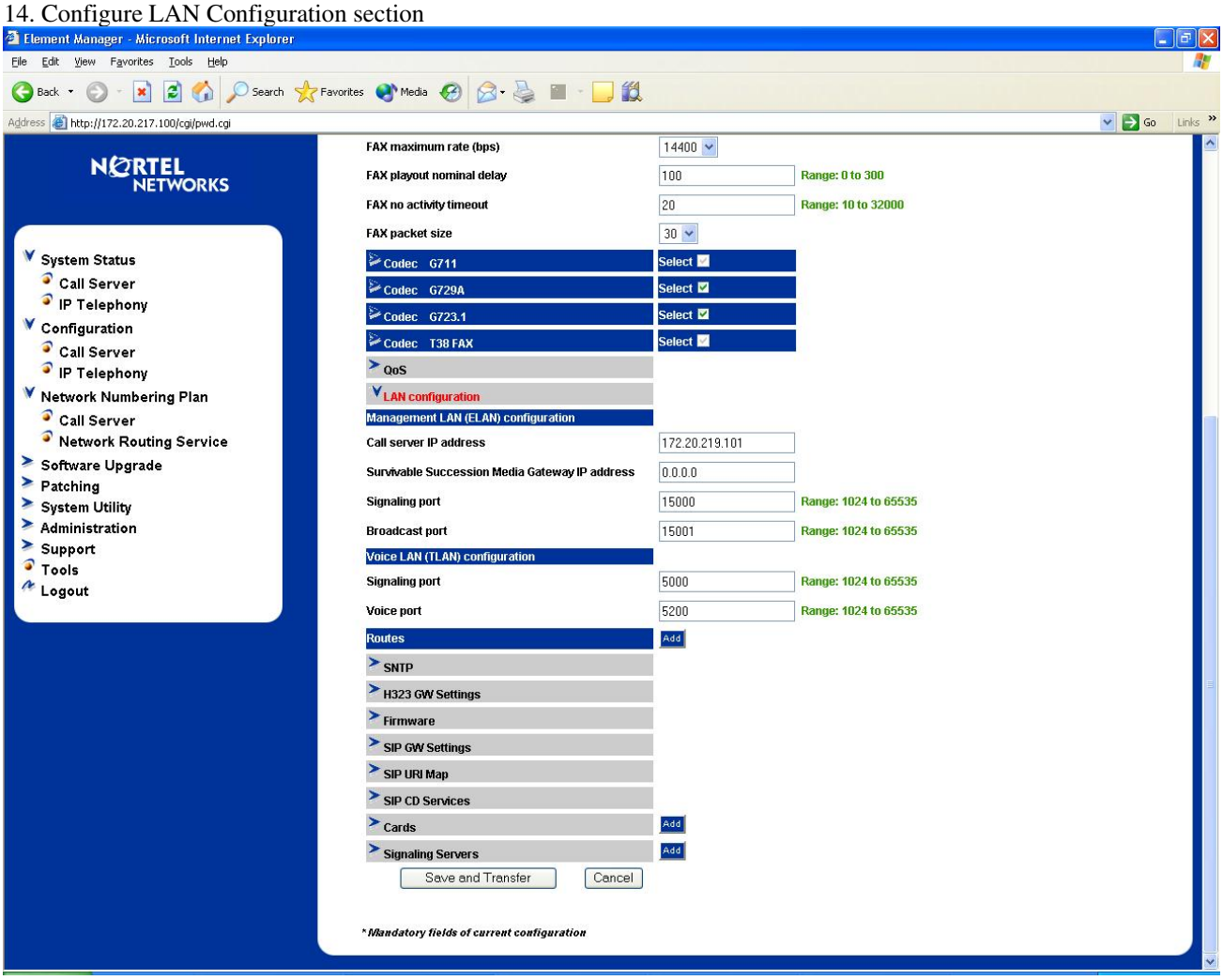




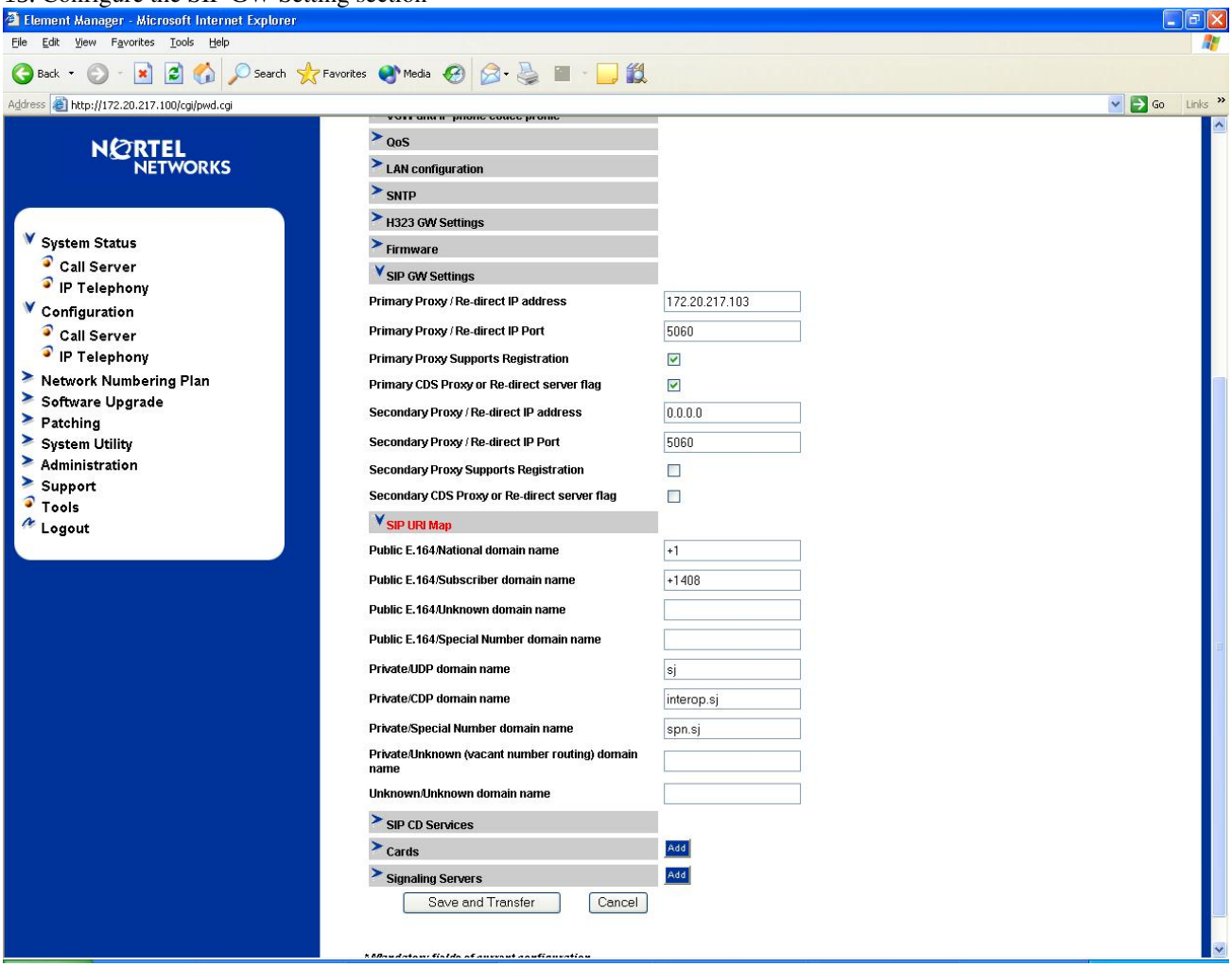
13. Configure the QoS section



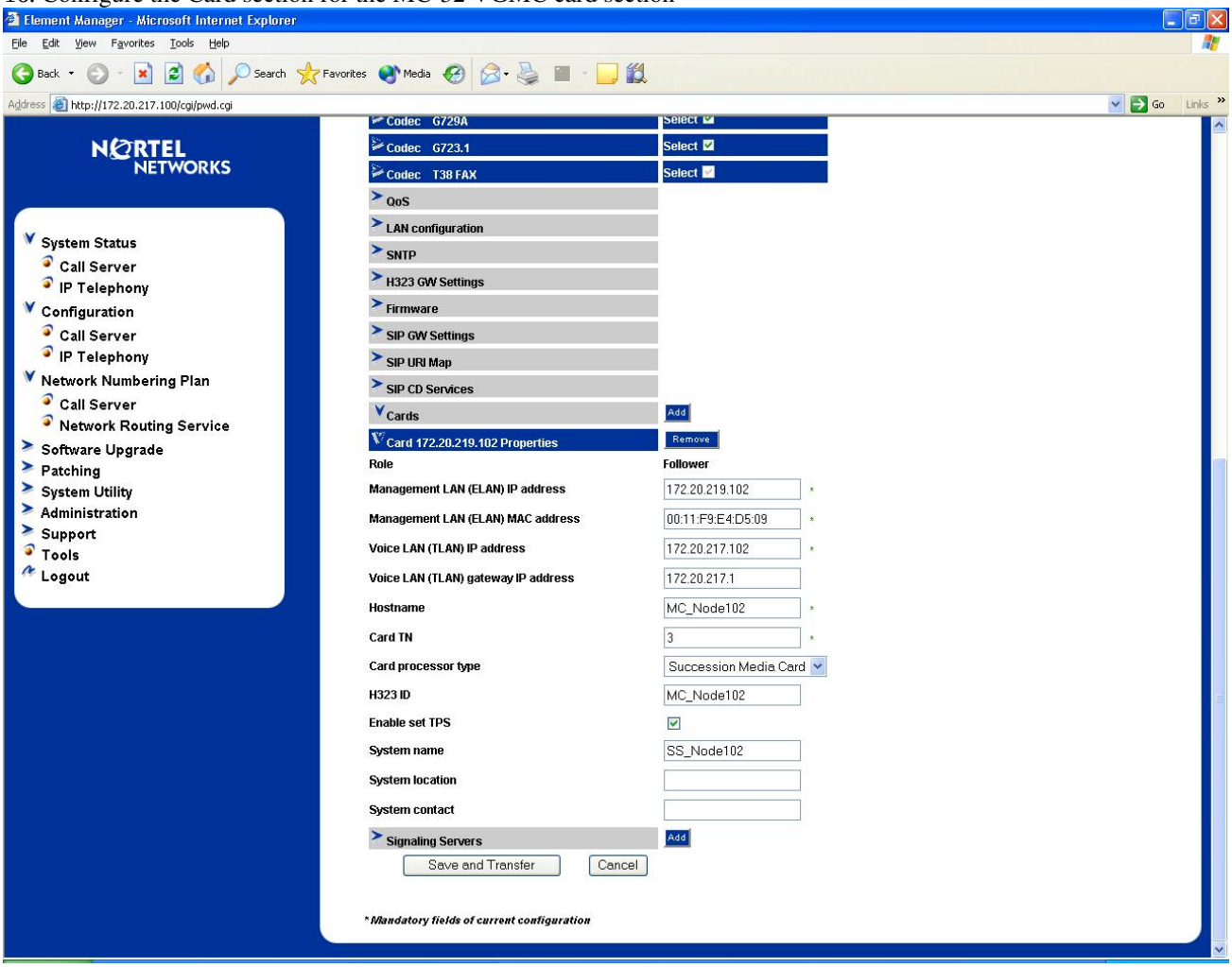
14. Configure LAN Configuration section



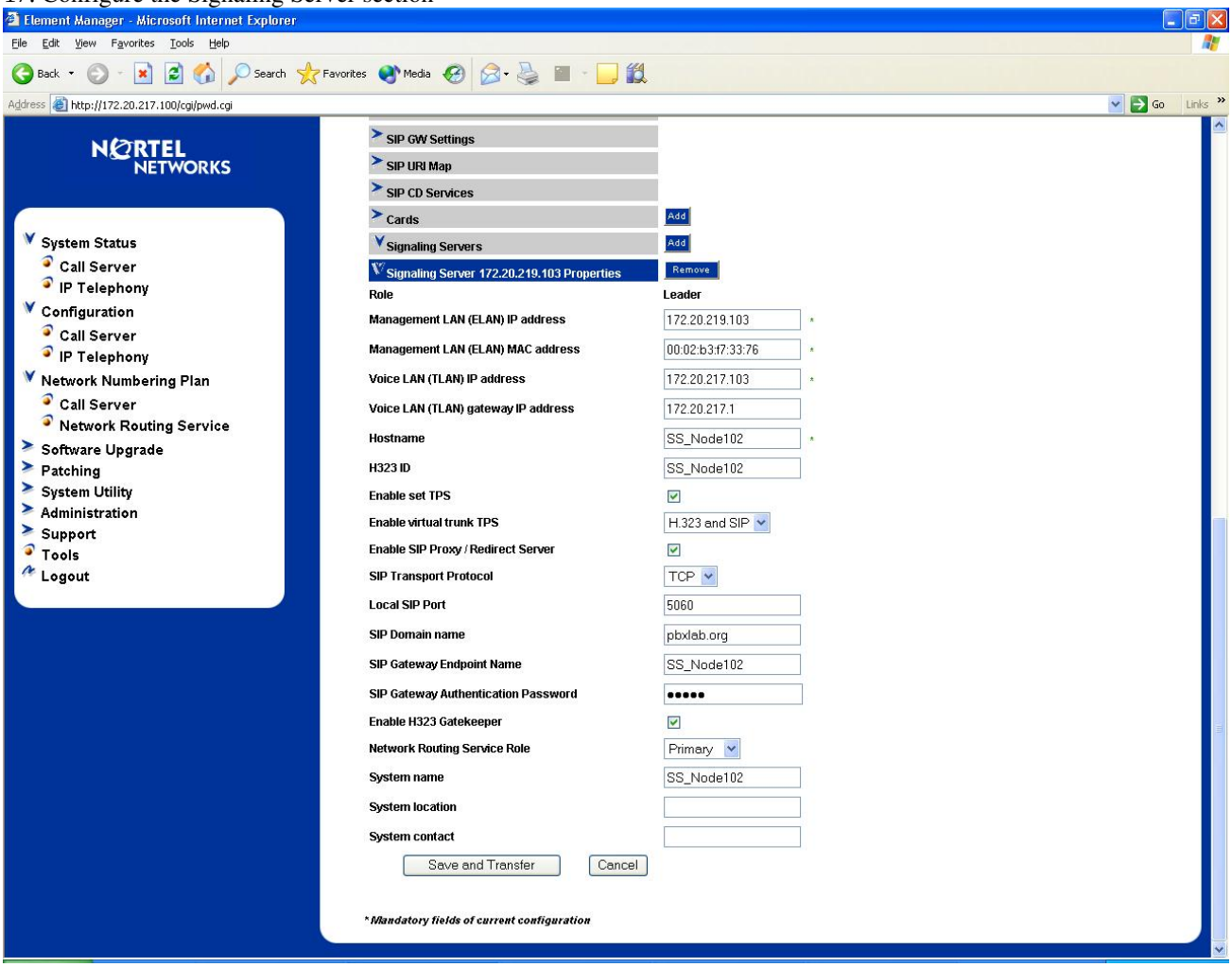
15. Configure the SIP GW Setting section



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

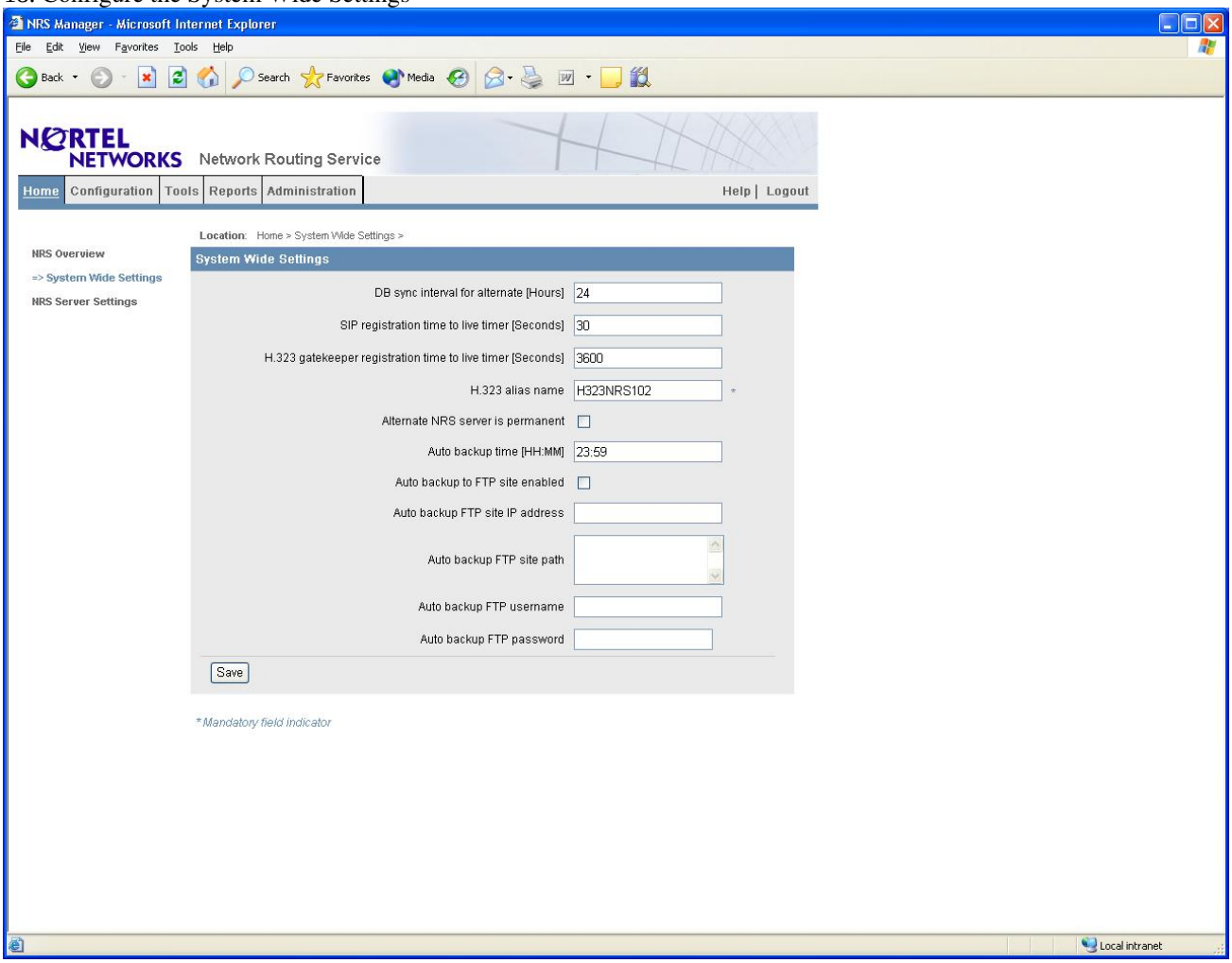


17. Configure the Signaling Server section

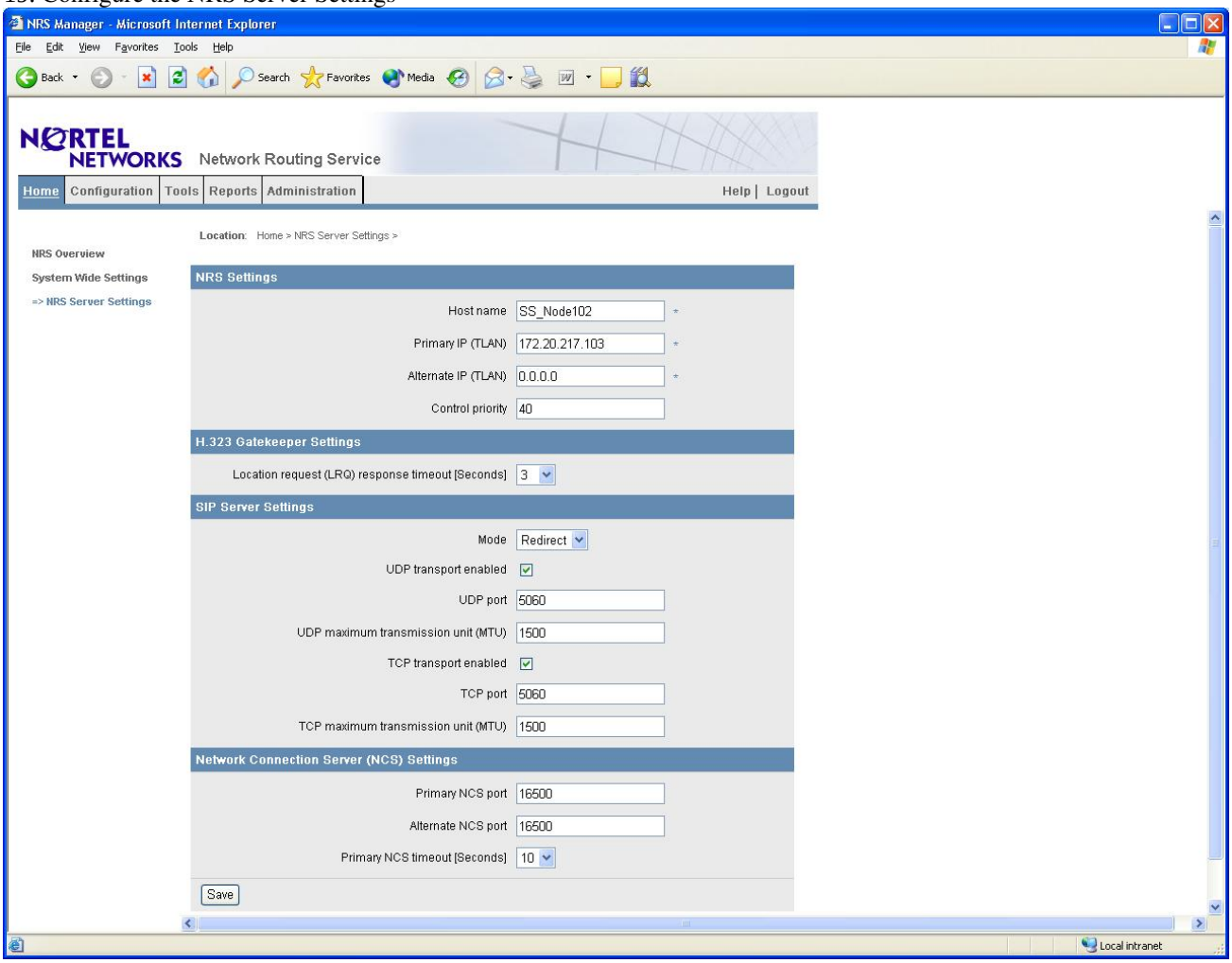


NRS (Network Routing Server):

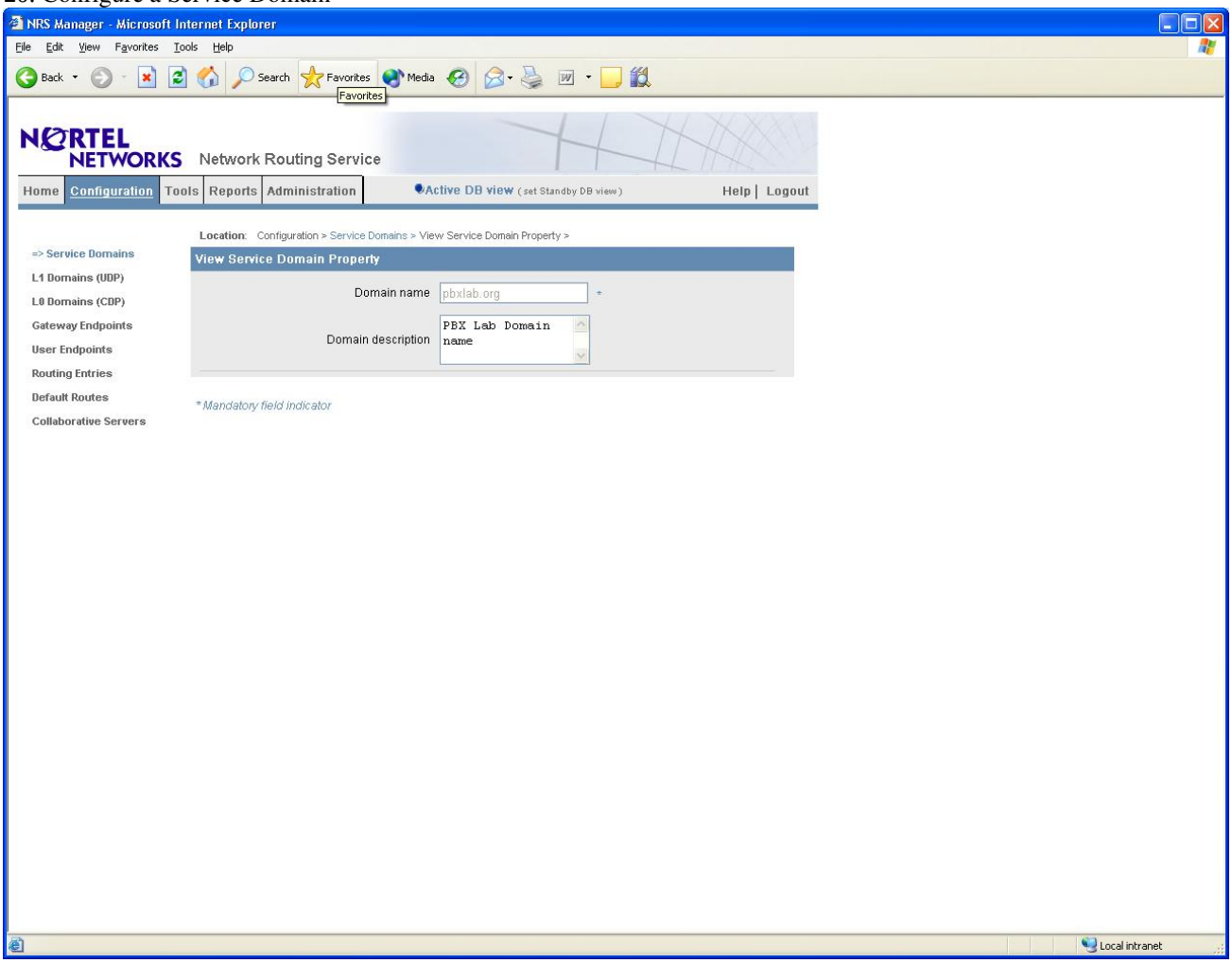
18. Configure the System Wide Settings



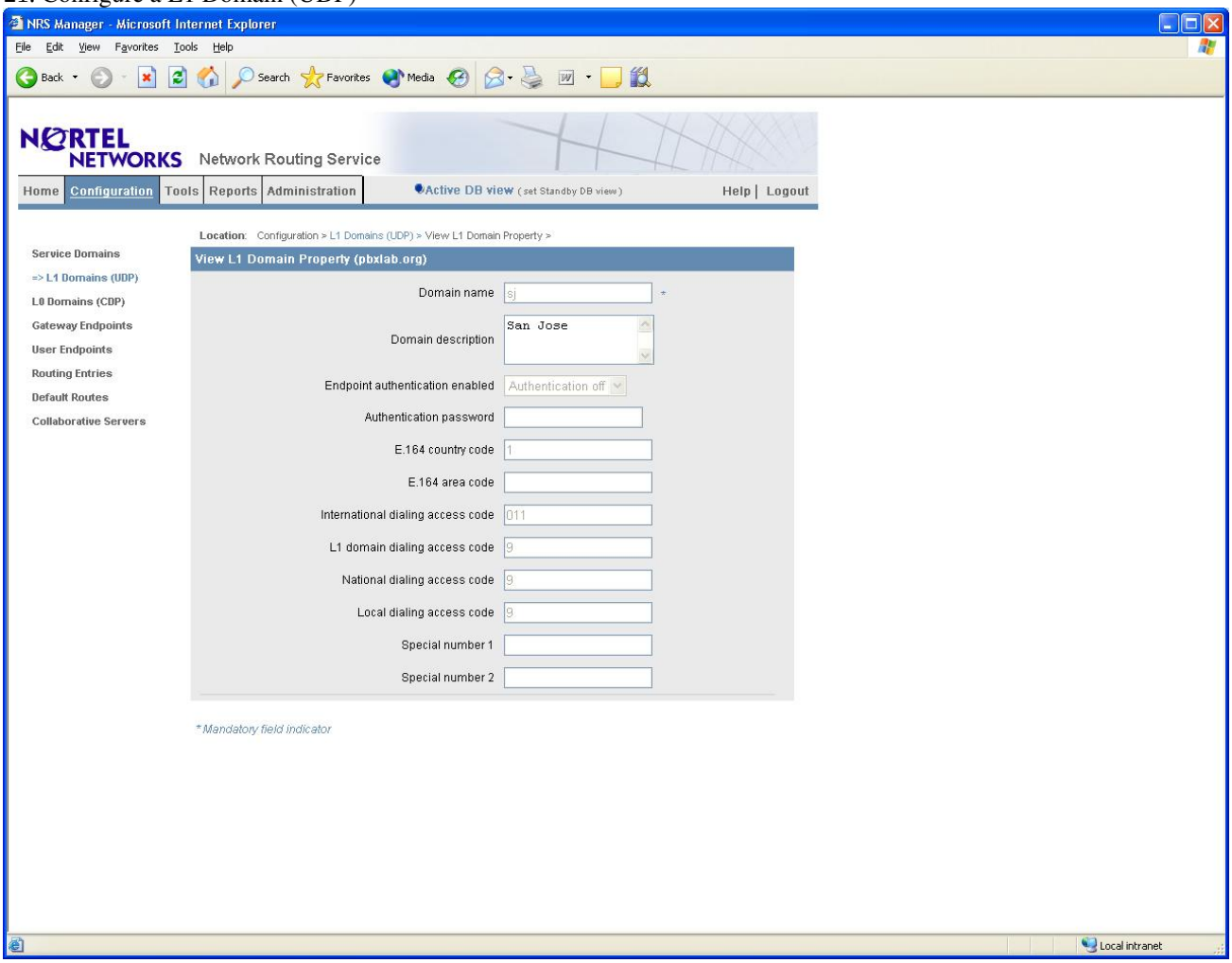
19. Configure the NRS Server Settings



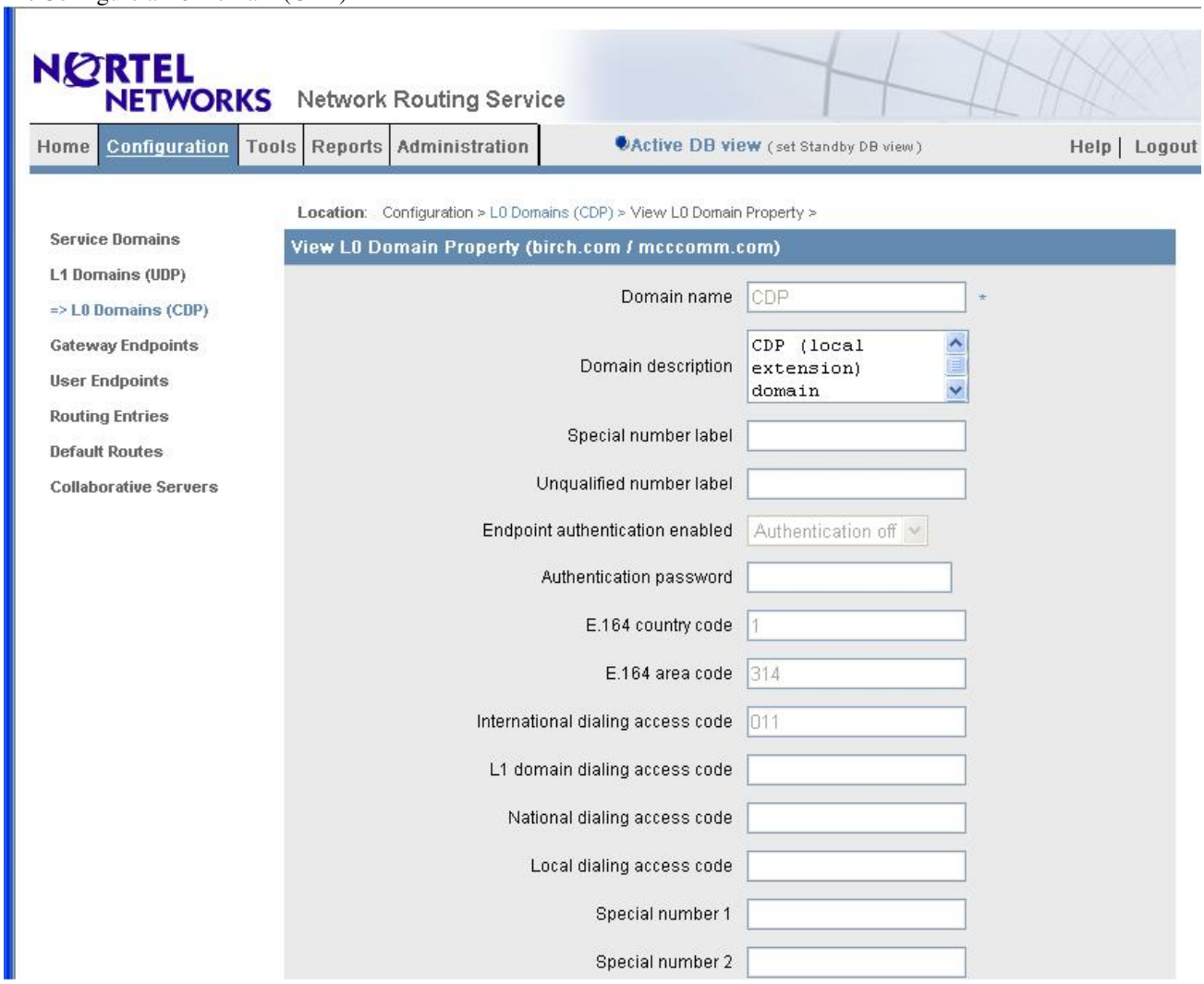
20. Configure a Service Domain



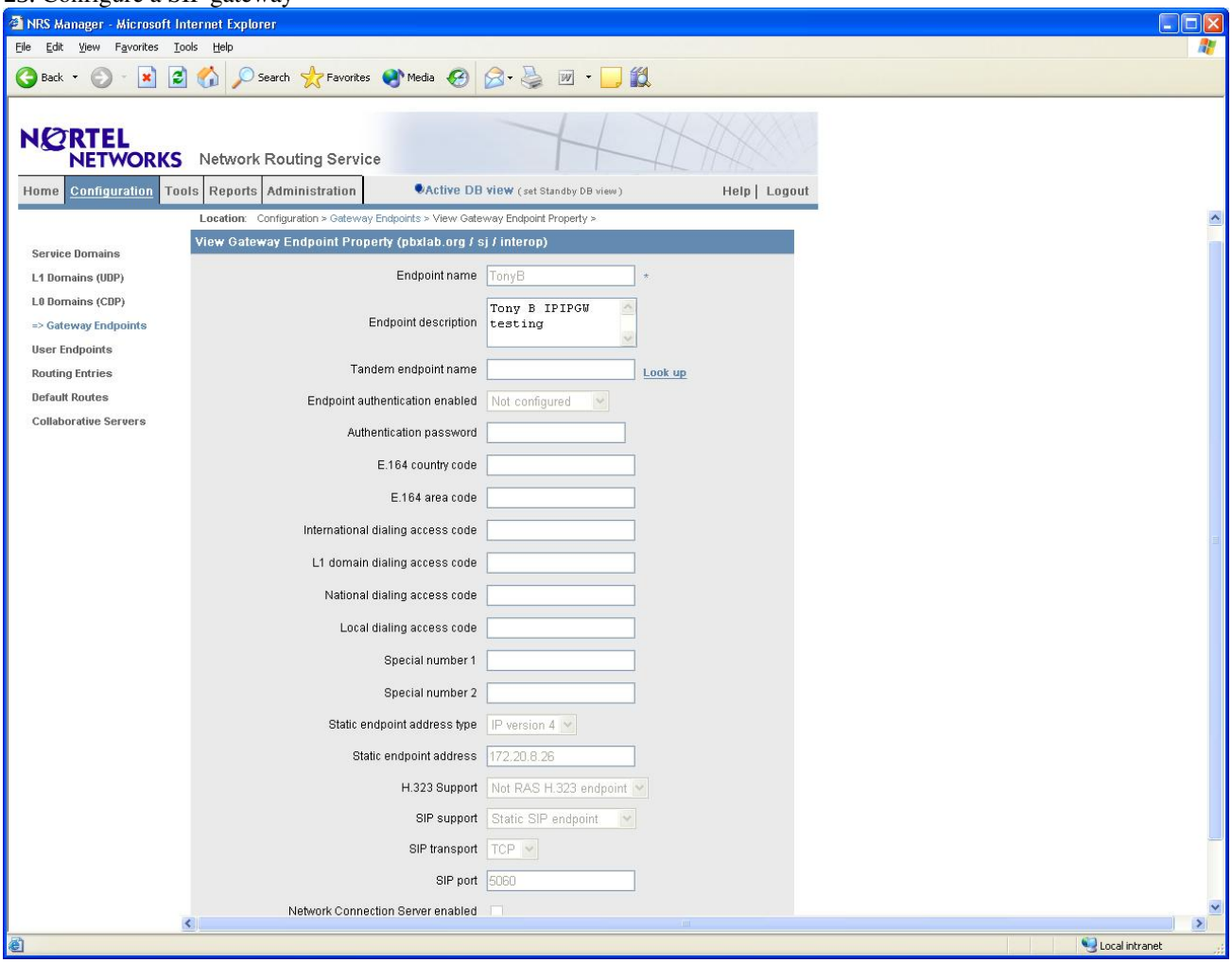
21. Configure a L1 Domain (UDP)



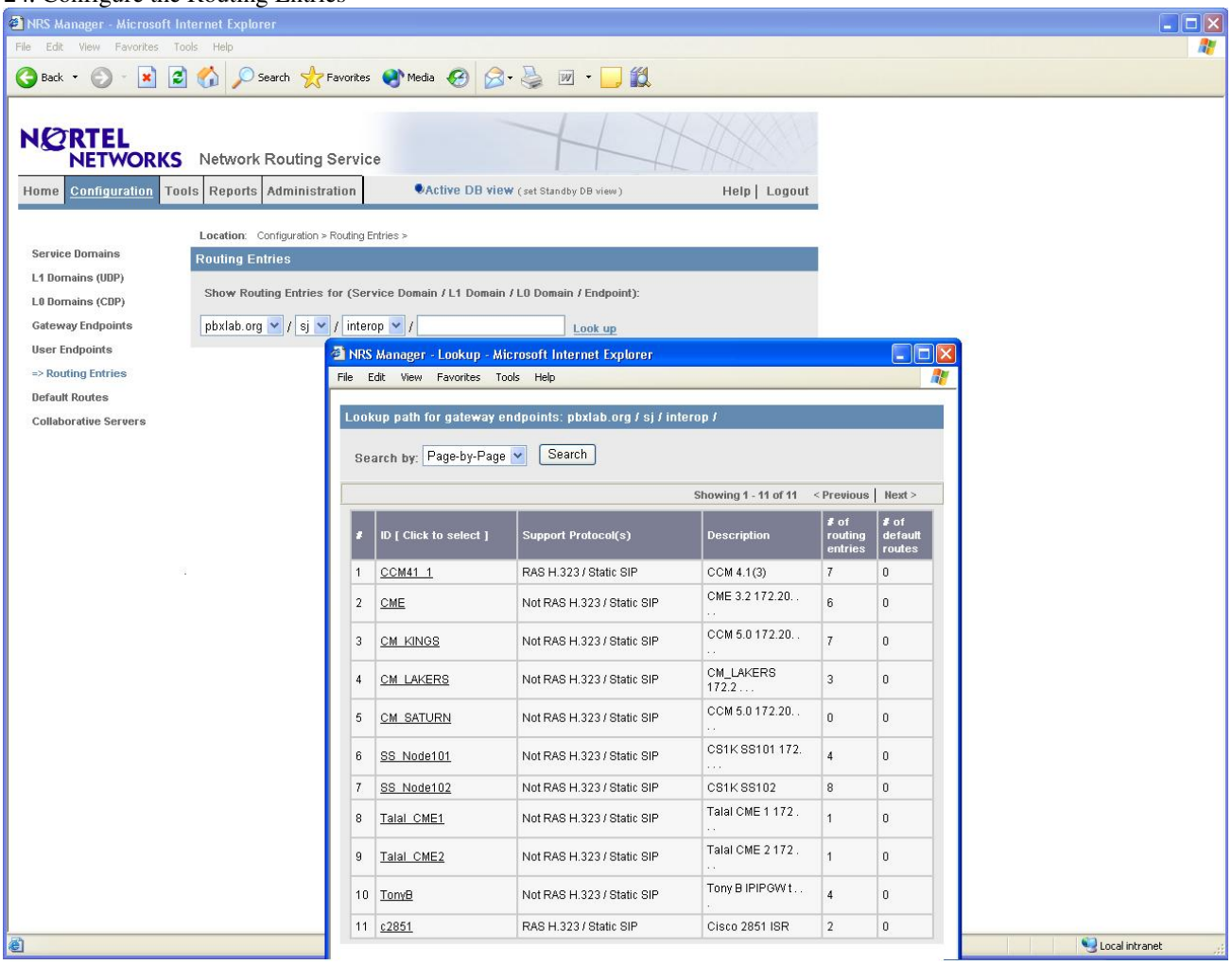
22. Configure a L0 Domain (CDP)



23. Configure a SIP gateway



24. Configure the Routing Entries



Cisco 3845 IOS Configuration

```
tony_3845#sh run
Building configuration...

Current configuration : 2286 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname tony_3845
!
boot-start-marker
boot system flash:c3845-ipvoice_ivs-mz.124-7.9.PI4a
boot-end-marker
!
logging buffered 100000000 debugging
no logging console
enable password cisco
!
no aaa new-model
!
resource policy
!
ip subnet-zero
ip cef
!
!
!
!
no ip domain lookup
voice-card 0
 no dspfarm
!
!
!
!
voice service voip
 allow-connections h323 to h323
 allow-connections h323 to sip
 allow-connections sip to h323
 allow-connections sip to sip
  h323
 sip
!
!
!
voice class codec 1
 codec preference 1 g711ulaw ===➔ Note: This is set to G.729 or G.723 to test voice quality and initiate T.38
!
!
!
!
!
!
!
```

```
!
!
!
!
!
!
!
interface GigabitEthernet0/0
 ip address 172.20.8.26 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
 negotiation auto
!
interface GigabitEthernet0/1
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
 negotiation auto
!
ip default-gateway 172.20.8.1
ip classless
ip route 0.0.0.0 0.0.0.0 172.20.8.1
!
ip http server
!
!
!
!
control-plane
!
!
!
!
!
!
!
dial-peer voice 3000 voip
 destination-pattern 30..
 voice-class codec 1
 session target ipv4:172.20.213.253
 dtmf-relay h245-alphanumeric
 fax-relay ecm disable
 no fax-relay sg3-to-g3
 no vad
!
dial-peer voice 4150 voip
 destination-pattern 41..
 voice-class codec 1
 session target ipv4:172.20.212.253
 dtmf-relay h245-alphanumeric
 fax-relay ecm disable
 no fax-relay sg3-to-g3
 no vad
!
dial-peer voice 1660 voip
 destination-pattern 16..
```

```
 voice-class codec 1
 session target ipv4:172.20.7.252
 dtmf-relay h245-alphanumeric
 fax-relay ecm disable
 no fax-relay sg3-to-g3
 no vad
!
dial-peer voice 5330 voip
 destination-pattern 5...
 signaling forward unconditional
 voice-class codec 1
 session protocol sipv2
 session target ipv4:172.20.217.100
 dtmf-relay rtp-nte
 no fax-relay sg3-to-g3
 fax protocol t38 ls-redundancy 0 hs-redundancy 0 fallback pass-through g711ulaw ➔ Note: must be removed for three party conference feature
to work
 no vad
 supplementary-service pass-through
!
dial-peer voice 2330 voip
 destination-pattern 2...
 signaling forward unconditional
 voice-class codec 1
 session protocol sipv2
 session target ipv4:172.20.216.100
 dtmf-relay rtp-nte
 no fax-relay sg3-to-g3
 fax protocol t38 ls-redundancy 0 hs-redundancy 0 fallback pass-through g711ulaw  ➔ Note: must be removed for three party conference
feature to work
 no vad
 supplementary-service pass-through
!
!
gatekeeper
 shutdown
!
!
line con 0
 password cisco
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 password cisco
 login
!
scheduler allocate 20000 1000
!
end

tony_3845#
```

Acronyms

Acronym	Definitions
CUBE	Cisco Unified Border Element
Cisco IOS	Cisco Internetwork Operating System
SIP	Session Initiation Protocol
RTP	Real-Time Protocol

Important Information

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Corporate Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters

Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: 31 0 20 357 1000
Fax: 31 0 20 357 1100

Americas Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

Asia Pacific Headquarters

Cisco Systems, Inc.
Capital Tower
168 Robinson Road
#22-01 to #29-01
Singapore 068912
www.cisco.com
Tel: +65 317 7777
Fax: +65 317 7799

Cisco Systems has more than 200 offices in the following countries and regions. Addresses, phone numbers, and fax numbers are listed on the Cisco Web site at www.cisco.com/go/offices.

Argentina • Australia • Austria • Belgium • Brazil • Bulgaria • Canada • Chile • China PRC • Colombia • Costa Rica • Croatia • Czech Republic • Denmark • Dubai, UAE • Finland • France • Germany • Greece • Hong Kong SAR • Hungary • India • Indonesia • Ireland • Israel • Italy • Japan • Korea • Luxembourg • Malaysia • Mexico • The Netherlands • New Zealand • Norway • Peru • Philippines • Poland • Portugal • Puerto Rico • Romania • Russia • Saudi Arabia • Scotland • Singapore • Slovakia • Slovenia • South Africa • Spain • Sweden • Switzerland • Taiwan • Thailand • Turkey Ukraine • United Kingdom • United States • Venezuela • Vietnam • Zimbabwe