Application Note

Nortel CS1000 Release 4.0 and 5.0 using Cisco IOS Voice Gateways to Tunnel QSIG over SIP

May 9, 2008

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Introduction

- This application note provides interoperability information and documented configurations for a toll bypass solution using Cisco IOS Voice Gateways tunneling QSIG over SIP between two Nortel CS1000 PBXs. The integration consists of two Cisco IOS Voice Gateways connecting to the Nortel CS1000 PBXs using T1 QSIG trunks. The IOS gateways establish the QSIG connection between the two PBXs via SIP. An end-to-end connection is thus established between Nortel CS1000 PBXs. The SIP protocol used between Cisco IOS Voice Gateways "tunnels" the T1 QSIG with Nortel PBX, resulting in a connection similar to connecting the PBXs directly. This integration also demonstrates use of the Cisco Unified Border Element (CUBE) in the SIP connection between the two Cisco IOS Voice Gateways. Figure 1 shows the integration topology.

- For the purposes of this application note, Cisco Unified Border Element (CUBE) is not used. It is assumed that the WAN between the Cisco IOS Voice Gateways is privately managed. The topology in Figure 1 reflects this deployment. CUBE is deployed in scenarios where a connection to a Service Provider exists; as opposed to a privately managed WAN between the Cisco IOS Voice Gateways. For that kind of deployment, please see the application note titled "Nortel CS1000 Release 4.0 and 5.0 using Cisco IOS Voice Gateways to Tunnel QSIG over SIP (with CUBE)". The feature verifications in this note were performed using a single CUBE. However, the outcome of limitations and features will not change by removing CUBE from the topology. Inserting CUBE requires simple modifications to CUBE and/or IOS Voice Gateway configurations to point VoIP dial-peers to the proper session target IP addresses, based upon the implemented dial plan.

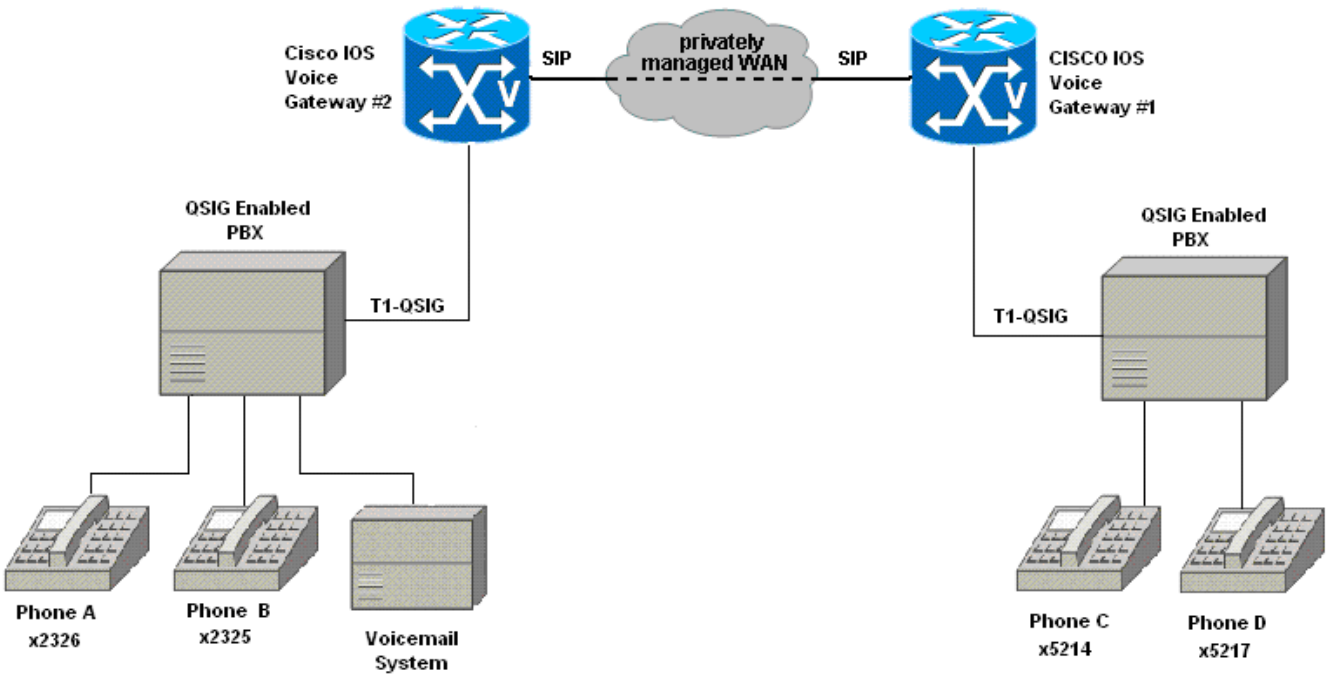
- The following basic call and supplementary services features were verified: proper establishing and disconnecting of calls; calling name and number presentation and restriction; alerting name; call transfer (consultation and early-attended); call forwarding (all, busy, and no reply); callback; path replacement on trombone call; and voicemail access with MWI activation and deactivation. All of the above features are tested with join or reroute schema in both internal (local) and external networks. Please note that this document does not address performance and scalability, which are part of a broader criterion for a deployment-ready solution.

- This application note uses the Cisco 3825 IOS Voice Gateways. However, the implementation is not platform-dependent, so you may also choose other Cisco IOS Voice Gateways. Below is a list of Cisco platforms capable of voice gateway and CUBE functions. Be careful when selecting a voice gateway platform and consider the capacity and capability required for the intended deployment.

  - Cisco 1861 Integrated Services Router
  - Cisco IAD2400 Series Integrated Access Device
  - Cisco 2800 Series Integrated Services Routers
  - Cisco 3700 Series Multi-service Access Routers
  - Cisco 3800 Series Integrated Services Routers
  - Cisco AS5350XM Universal Gateway
  - Cisco AS5400XM Universal Gateway

Network Topology

Figure 1. Basic Call Setup



Limitations

These are the known limitations, caveats, or integration issues.

- Call Forward Unconditional, Busy, and No Reply on Local and Network/External - Reroute

System Components

Hardware Requirements

The following hardware is required:

Cisco equipment

- Cisco 3825 (Cisco IOS Voice Gateway and CUBE)
- Cisco 3560 powered Ethernet switch

Nortel equipment

- Nortel CS1000
- (4) Meridian M2616

Software Requirements

The following software is required:

- IOS Gateway: Cisco IOS Release – flash: c3825-ipvoice_ivs-mz.124-15.XZ.bin
- PBX Software: Nortel CS1000 – Release 4.0 and Release 5.0

Features

This section lists supported and unsupported features.

Features Supported

- Basic Call – Local and Network/External
- Calling Number and Calling Name Restrictions on Basic Calls
- Connected Name and Connected Number Restrictions on Basic Calls, Alerting Name display on Basic Calls
- Consultative and Blind Transfer – Local and Network/External
- Call Forward Unconditional, Busy, and No Reply on Local and Network/External – by Join
- Callback feature on No Reply and Busy
- Voicemail access with MWI de/activation on call forwards no reply
- Path Replacement

Features Not Supported

- Call Forward Unconditional, Busy, and No Reply on Local and Network/External - Reroute

Configuration

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

Configuring the Nortel CS1000 Release 4.0 and 5.0

Call Server Setup Using SSC Card Console:

1. LD 87 – Configure CDP steering codes.
2. LD 86 – Configure the Route List Block for the Virtual Trunk route
3. LD 11 – Configure Digital Stations (Phones)
4. LD 22 – Configure the IP D-channel (signaling channel) between the Call Server and the Signaling Server.
5. LD 21 – Configure Route Data Block
6. LD 14 – Configure the SIP Virtual Trunks to the Signaling Server.
7. LD 22 – Equipped feature packages.
8. LD 22 – Software version installed.

Nortel CS1000 Release 4.0 Configurations:

1. LD 87 - Configuring CDP Steering codes

```
>LD 87
REQ  prt
CUST 0
FEAT cdp
TYPE dsc
DSC  23

ESN131
TYPE dsc
DSC  232
DSC  232
FLEN 0
DSP  LSC
RLI  7
NPA
NXX
```

2. LD 86 - Configuring the Route List Block for the Virtual Trunk route

```
>LD 86
ESN000

MEM AVAIL: (U/P): 2717342    USED U P: 344386 51231    TOT: 3112959
DISK RECS AVAIL: 1152
REQ  prt
CUST 0
FEAT rlb
RLI  7

RLI  7
ENTR 0
LTER NO
ROUT 107
TOD  0 ON  1 ON  2 ON  3 ON
    4 ON  5 ON  6 ON  7 ON
VNS  NO
```

CNV NO
EXP NO
FRL 0
DMI 7
FCI 0
FSNI 0
SBOC NRR
IDBB DBD
IOHQ NO
OHQ NO
CBQ NO

ISET 0
NALT 5
MFRL 0
OVLL 2

3. LD 11 - Digital Telephone Administration

>LD 11
SL1000
MEM AVAIL: (U/P): 2717342 USED U P: 344386 51231 TOT: 3112959
DISK RECS AVAIL: 1152
DIGITAL TELEPHONES AVAIL: 0 USED: 8 TOT: 8
IP USERS AVAIL: 1 USED: 7 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: 2303 USED: 197 TOT: 2500
DATA PORTS AVAIL: 2500 USED: 0 TOT: 2500

REQ: prt
TYPE: 2616

TN 1 0 0 1
DATE
PAGE
DES

DES CS102
TN 001 0 00 01
TYPE 2616
CDEN 8D
CUST 0
AOM 0
FDN 2215
TGAR 1
LDN NO
NCOS 0
SGRP 0
RNPG 0
SCI 0
SSU
LNRS 16
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 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 CFHA 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  2215
HUNT 2215
EHT  2215
LHK  0
PLEV 02
CSDN
AST
IAPG 0
AACS NO
ITNA NO
DGRP
MLWU_LANG 0
DNDR 0
KEY  00 SCR 5214 0     MARP
      CPND
        NAME ATHENA_5214
        XPLN 13
        DISPLAY_FMT FIRST,LAST
    01
    02 MCR 5215 0
      CPND
        NAME ATHENA_5215
        XPLN 13
        DISPLAY_FMT FIRST,LAST
    03 CFW 4  2500
    04 AO6
    05 TRN
    06
    07
    08
    09
    10
    11
    12
    13
    14
    15 RGA
DATE 25 APR 2008
```

4. LD 22 - Configuring the IP D-channel (signaling channel) between the Call Server and the Signaling Server

```
>LD 22
PT2000

REQ  prt
TYPE adan dch 7

ADAN     DCH 7
  CTYP MSDL
```

CARD 07
PORT 1
DES QSIGforCecily
USR PRI
DCHL 7
OTBF 32
PARM RS422 DTE
DRAT 64KC
CLOK EXT
IFC ISGF
  PINX_CUST 0
  ISDN_MCNT 300
CLID OPT0
CO_TYPE STD
SIDE NET
CNEG 1
RLS ID **
RCAP COLP NDI CCBI CCNI PRI DV3I CTI QMWI
PR_TRIGS DIV 2 3
        CNG 2 3
        CTR2 2 3
PR_RTN NO
MBGA NO
OVLR NO
OVLS NO
T310 120
T200 3
T203 10
N200 3
N201 260
K   7

5. LD 21 - Configuring the SIP route

>LD 21
PT1000

REQ: prt
TYPE: rdb
CUST 0
ROUT 107

TYPE RDB
CUST 00
DMOD
ROUT 107
DES QSIGFORCECILY
TKTP TIE
NPID_TBL_NUM   0
ESN NO
CNVT NO
SAT NO
RCLS EXT
VTRK NO
NODE
DTRK YES
BRIP NO
DGTP PRI

ISDN YES
MODE PRA
IFC ISGF
SBN NO
PNI 00001
NCNA NO
NCRD NO
CHTY BCH
CTYP UKWN
INAC NO
ISAR NO
CPFXS YES
DAPC NO
INTC NO
DSEL VOD
PTYP PRI
AUTO NO
DNIS NO
DCDR NO
ICOG IAO
SRCH RRB
TRMB YES
STEP
ACOD 707
TCPP NO
TARG 01
CLEN 1
BILN NO
OABS
INST
ANTK
SIGO STD
ICIS YES
TIMR ICF 512
OGF 512
EOD 13952
NRD 10112
DDL 70
ODT 4096
RGV 640
GRD 896
SFB 3
NBS 2048
NBL 4096

IENB 5
TFD 0

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VSS 0
VGD 6
DRNG NO
CDR NO
VRAT NO
MUS NO
OHQ NO
OHQT 00

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

6. LD 14 - Configuring the SIP virtual trunks to the Signaling Server (One trunk = one line connection)

>LD 20
REQ: prt
TYPE: tnb
TN   7 1
DATE
PAGE
DES

DES QSIGFORCECILY
TN   007 01
TYPE TIE
CDEN SD
CUST 0
TRK PRI
PDCA 1
PCML MU
NCOS 0
RTMB 107 1
B-CHANNEL SIGNALING
TGAR 0
AST NO
IAPG 0
CLS UNR DTN WTA LPR APN THFD HKD
    P10 VNL
TKID
AACR NO
DATE 16 APR 2008

7. LD 22 - Displaying Package (PKG) information

>LD 22
PT2000

REQ prt
TYPE pkg
OPTF 1
CUST 2
CDR 4
CTY 5
RAN 7
TAD 8
DNDI 9
EES 10
INTR 11
ANI 12
ANIR 13

PAGE 001

NI-2 291
IPEX 295
MAT 296
CPP 301

PAGE 003

QSIGGF 305
CPRKNET 306
PAGENET 307
CPCI 310
TATO 312
OPEN_ALARM 315
QSIG-SS 316
NGEN 324
RANBRD 327
MUSBRD 328
ESA 329
ESA_SUPP 330
ESA_CLMP 331
CNUMB 332
CNAME 333
NI-2_CBC 334
MEET 348
MC32 350
DBA 351
FDID 362
NMCE 364
STS_MSG 380
CDIR 381
VIRTUAL_OFFICE 382
ATAN 384
NI2NAME 385
M3900_PROD_ENH 386
VIR_OFF_ENH 387
OAS 394
ICON 397
PCA 398
H323_VTRK 399
LOCX 400
PVQM 401
SIP 406

8. LD 22 - Displaying Issue and Release (ISS)

REQ iss

CALL SERVER/MAIN CAB
VERSION 2121
RELEASE 4
ISSUE 00 T +
IDLE_SET_DISPLAY NORTEL

Nortel CS1000 Release 5.0 Configurations:

1. LD 87 - Configuring CDP Steering codes

```
>LD 87
ESN000

MEM AVAIL: (U/P): 99163053    USED U P: 5034838 54522    TOT: 104252413
DISK SPACE NEEDED: 46 KBYTES
REQ  prt
CUST 0
FEAT CDP
TYPE DSC
DSC
DCH: 11 MAINT INDICATION  TIME: 16:27:32
COUNTER VALUE
 3     255

52
DSC  52
FLEN 0
DSP  LSC
RLI  2
NPA
NXX
```

2. LD 86 - Configuring the Route List Block for the Virtual Trunk route

```
>LD 86
ESN000

MEM AVAIL: (U/P): 99163053    USED U P: 5034838 54522    TOT: 104252413
DISK SPACE NEEDED: 46 KBYTES
REQ  PRT
CUST 0
FEAT RLB
RLI  2

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

ISET 0
```

NALT 5
MFRL 0
OVLL 0

MEM AVAIL: (U/P): 99163053 USED U P: 5034838 54522 TOT: 104252413
DISK SPACE NEEDED: 46 KBYTES

3. LD 11 - Digital Telephone Administration

>LD 11
SL1000
MEM AVAIL: (U/P): 99163053 USED U P: 5034838 54522 TOT: 104252413
DISK SPACE NEEDED: 46 KBYTES
DIGITAL TELEPHONES AVAIL: 2 USED: 6 TOT: 8
IP USERS AVAIL: 6 USED: 2 TOT: 8
BASIC IP USERS AVAIL: 8 USED: 0 TOT: 8
TEMPORARY IP USERS AVAIL: 0 USED: 0 TOT: 0
ACD AGENTS AVAIL: 10 USED: 0 TOT: 10
PCA AVAIL: 0 USED: 0 TOT: 0
AST AVAIL: 1 USED: 0 TOT: 1
SIP CONVERGED DESKTOPS AVAIL: 0 USED: 0 TOT: 0
SIP CTI TR87 AVAIL: 0 USED: 0 TOT: 0
TNS AVAIL: 32545 USED: 215 TOT: 32760
DATA PORTS AVAIL: 32760 USED: 0 TOT: 32760

REQ: PRT
TYPE: 2616

TN 0 0 7 6
DATE
PAGE
DES

DES CS103
TN 000 0 07 06 VIRTUAL
TYPE 2616
CDEN 8D
CTYP XDLC
CUST 0
AOM 0
ERL 0
FDN 5214
TGAR 1
LDN NO
NCOS 0
SGRP 0
RNPG 0
SCI 0
SSU
XLST
CLS CTD FBD WTA LPR MTD FND HTD ADD HFD
MWA LMPN RMMD SMWD AAD IMD XHD IRD NID OLD VCE DRG1
POD DSX VMD SLKD CCSD SWD LND CNDA
CFTD SFD MRD DDV CNID CDCA MSID DAPA BFED RCBD
ICDD CDMA LLCN MCTD CLBD AUTU
GPUD DPUD DNDA CFXD ARHD CLTD ASCD

```
    CPFA CPTA ABDD CFHD FICD NAID BUZZ AGRD MOAD
    AHD DDGA NAMA
    DRDD EXR0
    USMD USRD ULAD RTDD RBDD RBHD PGND FLXD FTTC DNDY DNO3 MCBN
    CDMR MCDD T87D PKCH
CPND_LANG ENG
RCO  0
HUNT 5214
LHK  0
PLEV 02
DANI NO
AST
IAPG 0
AACS NO
ITNA NO
DGRP
MLWU_LANG 0
DNDR 0
KEY  00 SCR 2326 0     MARP
      CPND
        NAME CECILY_2326
        XPLN 13
        DISPLAY_FMT FIRST,LAST
    01 RGA
    02
    03 CFW 4  2325
    04 AO6
    05 TRN
    06
    07
    08
    09
    10
    11
    12
    13 MIK
    14 MCK
    15 TRN
DATE 29 APR 2008
```

4. LD 22 - Configuring the IP D-channel (signaling channel) between the Call Server and the Signaling Server

```
>LD 22
PT2000

REQ  PRT
TYPE ADAN DCH 13

ADAN     DCH 13
 CTYP TMDI
 MG_CARD  000  0  03
 PORT 1
 DES  t1qsig
 USR  PRI
 DCHL 13
 OTBF 32
 PARM RS232  DTE
 DRAT 64KC
```

CLOK EXT
IFC ISGF
  PINX_CUST 0
  ISDN_MCNT 300
CLID OPT0
CO_TYPE STD
SIDE USR
CNEG 1
RLS ID **
RCAP COLP NDI CCBI CCNI PRI DV3I CTI QMWI
PR_TRIGS DIV 2 3
        CNG 2 3
        CTR2 2 3
PR_RTN NO
MBGA NO
OVLR YES
DIDD 0
OVLS NO
T310 120
T200 3
T203 10
N200 3
N201 260
K   7

5. LD 21 - Configuring the SIP route

>LD 21
PT1000

REQ: PRT
TYPE: RDB
CUST 0
ROUT 103

TYPE RDB
CUST 00
ROUT 103
DES T1QSIG
TKTP TIE
M911P NO
ESN NO
CNVT NO
SAT NO
RCLS EXT
VTRK NO
NODE
DTRK YES
BRIP NO
DGTP PRI
ISDN YES
   MODE PRA
   IFC ISGF
   SBN NO
   PNI 00001
   NCNA NO
   NCRD NO
   CHTY BCH

CTYP UKWN
INAC NO
ISAR NO
CPFXS YES
DAPC NO
INTC NO
DSEL VOD
PTYP PRI
AUTO NO
DNIS NO
DCDR NO
ICOG IAO
SRCH RRB
TRMB YES
STEP
ACOD 563
TCPP NO
TARG 01
CLEN 1
BILN NO
OABS
INST
ANTK
SIGO STD
ICIS YES
TIMR ICF 512
OGF 512
EOD 13952
NRD 10112
DDL 70
ODT 4096
RGV 640
GRD 896
SFB 3
NBS 2048
NBL 4096

IENB 5
TFD 0
VSS 0

PAGE 002

VGD 6
DRNG NO
CDR NO
VRAT NO
MUS NO
OHQ NO
OHQT 00
CBQ NO
AUTH NO
TDET NO
TTBL 0
ATAN NO
PLEV 2
ALRM NO
ART 0

SGRP 0
ARDN NO
AACR NO

6. LD 14 - Configuring the SIP virtual trunks to the Signaling Server (One trunk = one line connection)

>LD 20

PT0000
REQ: PRT
TYPE: TNB
TN 13 1
DATE
PAGE
DES

DES T1QSIG
TN 013 01 VIRTUAL
TYPE TIE
CDEN SD
CUST 0
TRK PRI
PDCA 1
PCML MU
NCOS 0
RTMB 103 1
B-CHANNEL SIGNALING
TGAR 1
AST NO
IAPG 0
CLS UNR DTN CND ECD WTA LPR APN THFD HKD SPCD
P10 VNL
TKID
AACR NO
DATE 23 APR 2008

7. LD 22 - Displaying Package (PKG) information

>LD 22
PT2000

REQ PRT
TYPE PKG
OPTF 1
CUST 2
CDR 4
CTY 5
RAN 7
TAD 8
DNDI 9
EES 10
INTR 11
ANI 12
ANIR 13
BRTE 14

PAGE 001

PAGE 003

SOFTSWITCH 402
IPMG 403
GRPRIM 404
SIP 406
CAC 407
MS_CONV 408

8. LD 22 - Displaying Issue and Release (ISS)

REQ ISS

VERSION 4021
RELEASE 5
ISSUE 00 W +
IDLE_SET_DISPLAY NORTEL

IPMG TYPE CSP/SW MSP APP FPGA BOOT DBL1 DBL2

0 0 MGC AD31 AA06 AA04 AA12 AD27 DSP1AA07 N/A

Configuring the Cisco IOS Voice Gateways

Configuring the Cisco IOS Gateway#1

Banaras-Gateway1#sho ver
Cisco IOS Software, 3800 Software (C3825-IPVOICE_IVS-M), Version 12.4(15)XZ, REL
EASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2008 by Cisco Systems, Inc.
Compiled Fri 11-Apr-08 21:10 by prod_rel_team

ROM: System Bootstrap, Version 12.4(13r)T, RELEASE SOFTWARE (fc1)

Banaras-Gateway1 uptime is 1 week, 5 days, 21 hours, 22 minutes
System returned to ROM by reload at 12:50:36 UTC Thu Apr 17 2008
System image file is "flash:c3825-ipvoice_ivs-mz.124-15.XZ.bin"

Cisco 3825 (revision 1.1) with 226304K/35840K bytes of memory.
Processor board ID FTX1112A3WH
2 Gigabit Ethernet interfaces
24 Serial interfaces
2 Channelized T1/PRI ports
2 Channelized T1/PRI ports
DRAM configuration is 64 bits wide with parity enabled.
479K bytes of NVRAM.
62720K bytes of ATA System CompactFlash (Read/Write)

Configuration register is 0x2102

==========

Banaras-Gateway1#s run
Building configuration...

```
Current configuration : 1901 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Banaras-Gateway1
!
boot-start-marker
boot-end-marker
!
logging message-counter syslog
logging buffered 1000000
!
no aaa new-model
no network-clock-participate slot 2
no network-clock-participate wic 1
!
voice-card 0
 no dspfarm
!
voice-card 2
 dspfarm
!
ip cef
!
!
no ip domain lookup
multilink bundle-name authenticated
!
isdn switch-type primary-qsig[1]
!
!
!
voice service voip
 allow-connections sip to sip
 signaling forward rawmsg[2]
!
!
archive
 log config
  hidekeys
!
!
controller T1 0/1/0
!
controller T1 0/1/1
!
controller T1 2/0/0
 framing esf
 linecode b8zs
 pri-group timeslots 1-24
 description QSIG to Nortel CS102
!
controller T1 2/0/1
```

[1] Global switch type command to support QSIG (PRI).
[2] Raw message except GTD forwarding of the signaling payload.

```
 framing esf
 linecode b8zs
!
!
!
!
!
interface GigabitEthernet0/0
 ip address 172.20.172.60 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/1
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
interface Serial2/0/0:23
 no ip address
 encapsulation hdlc
 isdn switch-type primary-qsig
 isdn overlap-receiving
 isdn incoming-voice voice
 isdn send-alerting
 isdn outgoing display-ie[3]
 no cdp enable
!
ip forward-protocol nd
ip route 0.0.0.0 0.0.0.0 172.20.172.1
!
!
no ip http server
!
!
!
!
control-plane
!
!
!
voice-port 2/0/0:23
!
!
!
!
!
dial-peer voice 5200 pots
 destination-pattern 52..
 direct-inward-dial
 port 2/0/0:23
 forward-digits all
!
dial-peer voice 2000 voip
 destination-pattern 2...
```

[3] To display information element to be send in the outgoing ISDN message if provided by the upper layer, such as voice or modem.

```
 signaling forward rawmsg
 session protocol sipv2
 session target ipv4:172.20.174.30
 codec g711ulaw
!
!
!
gatekeeper
 shutdown
!
!
line con 0
 exec-timeout 0 0
 password cisco
 logging synchronous
 login
line aux 0
line vty 0 4
 exec-timeout 0 0
 password cisco
 logging synchronous
 login
!
scheduler allocate 20000 1000
end
```

Configuring the CUBE

```
Banaras-CUBE#sh ver
Cisco IOS Software, 3800 Software (C3825-IPVOICE_IVS-M), Version 12.4(15)XZ, REL
EASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2008 by Cisco Systems, Inc.
Compiled Fri 11-Apr-08 21:10 by prod_rel_team

ROM: System Bootstrap, Version 12.4(13r)T, RELEASE SOFTWARE (fc1)

Banaras-CUBE uptime is 1 week, 4 days, 21 hours, 42 minutes
System returned to ROM by reload at 23:27:37 UTC Fri Apr 18 2008
System image file is "flash:c3825-ipvoice_ivs-mz.124-15.XZ.bin"

Cisco 3825 (revision 1.2) with 489472K/34816K bytes of memory.
Processor board ID FTX1213A1LX
2 Gigabit Ethernet interfaces
DRAM configuration is 64 bits wide with parity enabled.
479K bytes of NVRAM.
126976K bytes of ATA System CompactFlash (Read/Write)

Configuration register is 0x2102

============================================================

Banaras-CUBE#s run
Building configuration...

Current configuration : 1414 bytes
!
version 12.4
```

```
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Banaras-CUBE
!
boot-start-marker
boot-end-marker
!
logging message-counter syslog
!
no aaa new-model
!
ip cef
!
!
!
!
no ip domain lookup
multilink bundle-name authenticated
!
!
voice-card 0
 no dspfarm
!
!
!
voice service voip
 allow-connections sip to sip
 signaling forward rawmsg[4]
 sip
  midcall-signaling passthru[5]
!
!
!
archive
 log config
  hidekeys
!
!
interface GigabitEthernet0/0
 ip address 172.20.174.30 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/1
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
ip forward-protocol nd
ip route 0.0.0.0 0.0.0.0 172.20.174.1
!
```

[4] Raw message except GTD forwarding of the signaling payload.
[5] SIP messages are passed from one IP leg to another IP leg.

```
!
no ip http server
!
!
!
!
control-plane
!
!
!
dial-peer voice 2300 voip
 destination-pattern 2...
 session protocol sipv2
 session target ipv4:172.20.174.20
 codec g711ulaw
 supplementary-service pass-through[6]
!
dial-peer voice 5200 voip
 destination-pattern 52..
 session protocol sipv2
 session target ipv4:172.20.172.60
 codec g711ulaw
 supplementary-service pass-through
!
!
!
gatekeeper
 shutdown
!
!
line con 0
 exec-timeout 0 0
 password cisco
 logging synchronous
 login
line aux 0
line vty 0 4
 exec-timeout 0 0
 password cisco
 logging synchronous
 login
!
scheduler allocate 20000 1000
end
```

Configuring the Cisco IOS Gateway#2

```
Banaras-Gateway2#sh ver
Cisco IOS Software, 3800 Software (C3825-IPVOICE_IVS-M), Version 12.4(15)XZ, REL
EASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2008 by Cisco Systems, Inc.
Compiled Fri 11-Apr-08 21:10 by prod_rel_team

ROM: System Bootstrap, Version 12.4(13r)T, RELEASE SOFTWARE (fc1)
```

[6] Configures supplementary service feature to transparently pass supplementary service to the next gateway.

Banaras-Gateway2 uptime is 1 week, 1 day, 23 hours, 11 minutes
System returned to ROM by power-on
System image file is "flash:c3825-ipvoice_ivs-mz.124-15.XZ.bin"

Cisco 3825 (revision 1.1) with 226304K/35840K bytes of memory.
Processor board ID FTX1112A3WR
2 Gigabit Ethernet interfaces
24 Serial interfaces
2 Channelized T1/PRI ports
DRAM configuration is 64 bits wide with parity enabled.
479K bytes of NVRAM.
62720K bytes of ATA System CompactFlash (Read/Write)

Configuration register is 0x2102

==========

Banaras-Gateway2#sh run
Building configuration...

Current configuration : 2180 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Banaras-Gateway2
!
boot-start-marker
boot-end-marker
!
logging message-counter syslog
logging buffered 100000000
no logging console
!
no aaa new-model
no network-clock-participate slot 1
!
voice-card 0
 no dspfarm
!
voice-card 1
 dspfarm
!
ip cef
!
!
!
!
no ip domain lookup
ip domain name yourdomain.com
multilink bundle-name authenticated
!
isdn switch-type primary-qsig
!
!
!
voice service voip

```
 allow-connections sip to sip
 signaling forward rawmsg
!
!
!
username cisco privilege 15 secret 5 $1$md8B$JERd1swBwUoEKE4aeV4dJ.
archive
 log config
  hidekeys
!
!
controller T1 1/0/0
 framing esf
 linecode b8zs
 pri-group timeslots 1-24
 description QSIG to Nortel CS103
!
controller T1 1/0/1
 framing esf
 linecode b8zs
!
!
!
!
!
interface GigabitEthernet0/0
 ip address 172.20.174.20 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
!
interface GigabitEthernet0/1
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
!
interface Serial1/0/0:23
 no ip address
 encapsulation hdlc
 isdn switch-type primary-qsig
 isdn timer T310 120000
 isdn protocol-emulate network
 isdn incoming-voice voice
 isdn send-alerting
 isdn outgoing display-ie
 no cdp enable
!
ip default-gateway 172.20.174.1
no ip forward-protocol nd
ip route 0.0.0.0 0.0.0.0 172.20.174.1
!
!
ip http server
ip http access-class 23
ip http authentication local
ip http timeout-policy idle 60 life 86400 requests 10000
!
```

```
!
!
!
control-plane
!
!
!
voice-port 1/0/0:23
!
!
!
!
!
dial-peer voice 2000 pots
 destination-pattern 2...
 direct-inward-dial
 port 1/0/0:23
 forward-digits all
!
dial-peer voice 5200 voip
 destination-pattern 52..
 signaling forward rawmsg
 session protocol sipv2
 session target ipv4:172.20.174.30
 codec g711ulaw
!
!
!
gatekeeper
 shutdown
!
!
line con 0
 password cisco
 logging synchronous
 login
line aux 0
line vty 0 4
 exec-timeout 0 0
 password cisco
 logging synchronous
 login
 transport input all
 transport output all
!
exception data-corruption buffer truncate
scheduler allocate 20000 1000
end
```

Acronyms

Acronym	Definition
codec	Coder/Decoder
PBX	Private Branch Exchange
PSTN	Public Switched Telephone Network
IOS	Internetworking Operating System

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