



Nortel CS1000M Release 4.0 using T1 QSIG to Cisco Unified CallManager Express Release 4.0(3)

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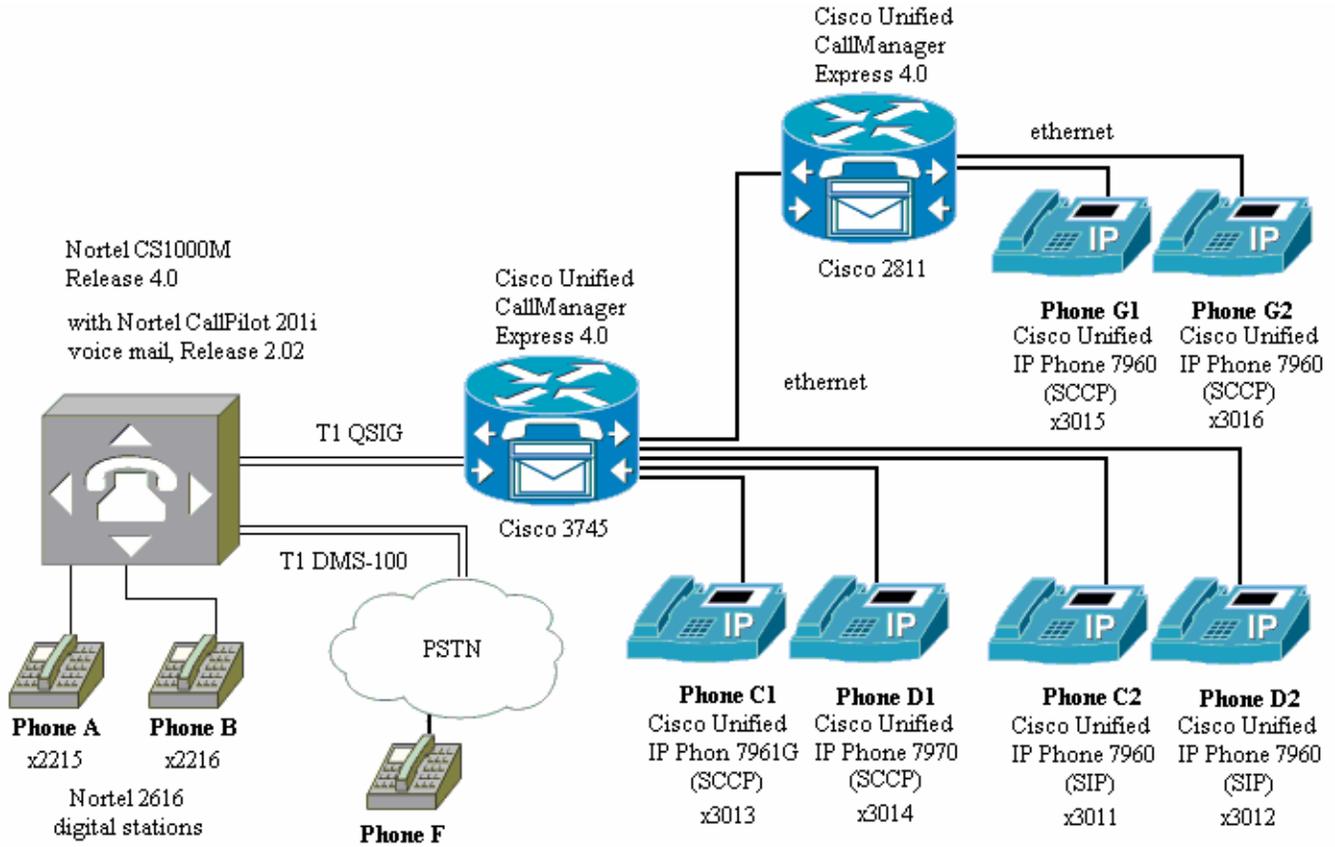


Introduction

- This is an Application Note for connectivity between a Nortel CS1000M Release 4.0 PBX and Cisco Unified CallManager Express Release 4.0(3) using a Cisco 3745 voice gateway with QSIG protocol.
- The network topology diagram (Figure 1) shows the test setup for end-to-end interoperability with Cisco Unified CallManager Express Release 4.0(3) connected to the PBX via the 3745 T1 QSIG link. The 3745 IOS voice gateway was connected via H.323 to a Cisco 2811 IOS voice gateway. The two gateways were running Cisco Unified CallManager Express 4.0(3). Cisco Unified IP phones (models 7960, 7961G, and 7970) were connected to the 2 Cisco Unified CallManager Express gateways via SIP and SCCP, as per the figure. A NM-HDV and VWIC-1MFT-T1 were used for the T1 QSIG interface. Calls were made to test basic call, caller ID, conference, transfer, forward, call back, reroute, and MWI features.
- This Application Note uses the 3745 voice gateway. However, the use of other Cisco voice gateways is also an option since Cisco Unified Call Manager Express QSIG implementation does not depend on the physical interface.
- The inclusion of Cisco SIP phones in this application note is for reference only. Cisco Unified Communications Manager Express 4.0(3) supports SIP end-points with limited number of features.

Network Topology

Figure 1. Test Network Topology.





Limitations

Basic Calls

- Cisco Unified CallManager Express does not support overlap sending. It supports overlap receiving.
- Connected Name and Alerting Name are not supported on calls between PBX and Cisco Unified IP Phone running SIP.
- Calling Name Restriction is not supported for calls originated from Cisco Unified CallManager Express 4.0(3).
- Connected Number/Name Restriction is not supported from Cisco Unified CallManager Express 4.0(3).

Call Transfers

- The Nortel PBX will not perform a true blind transfer. It can perform a consultation transfer or early attended transfer.
- A transfer originated from a call placed from a phone on the remote Cisco Unified CallManager Express to a SIP phone on the local Cisco Unified CallManager Express, and then transferred to a PBX phone (e.g., G1 calls C2, and C2 transfers to A) does not complete.
- For most call transfers, the original calling name and number are not displayed on the final destination. Specifically, this applies to all consultation and early attended network/external transfers, and all consultation and early attended local transfers that involve a transfer from a SCCP phone to a SIP phone. The remaining local transfers and all blind transfers result in the original calling name and number information displaying properly.
- For many call transfers, the called (connected) name and number are not updated on the original phone after the transfer.

Call Forwards

- For many call forwards, the original calling name and forwarding name and number are not displayed on the final destination.
- For many call forwards, the called (connected) name and number are not updated on the original phone.
- Forwarded calls originated from a PBX extension to a remote Cisco Unified CallManager Express SCCP extension, and forwarded to a local Cisco Unified CallManager Express extension (e.g., A calls G1, and G1 forwards to C2), Cisco Unified CallManager Express performs a QSIG reroute, even though a QSIG reroute is not in order (i.e., there is no QSIG "hairpin" or "trombone").
- The Nortel PBX does not support reroute on forwarded calls resulting in a hairpin (i.e., Cisco Unified CallManager Express 4.0(3) phone calls a PBX phone that forwards back to another Cisco Unified CallManager Express 4.0(3) phone).
- Forwarded calls hairpinned at a SIP extension (PBX phone calls Cisco Unified CallManager Express 4.0(3) SIP phone that forwards back to another PBX phone), the call completes, but Cisco Unified CallManager Express 4.0(3) does not perform a reroute, even if reroute is enabled.
- Forwarded calls originated from a PBX extension to a local Cisco Unified CallManager Express SCCP extension, and forwarded to another local Cisco Unified CallManager Express extension (e.g., A calls C1, and C1 forwards to D1 or D2), Cisco Unified CallManager Express performs a reroute, and even though a reroute is not in order (i.e., there is no "hairpin" or "trombone").
- For calls that are hairpinned at a SIP extension (PBX phone calls Cisco Unified CallManager Express 4.0(3) SIP phone that forwards unconditionally back to another PBX phone) when a CFNR number was set up resulted in a 3rd SETUP message from CME. The timeout is set under the CFNR command. If enough time passes before the final destination (B) answers, the CFNR is invoked, and the 3rd SETUP is sent from CME. A new (3rd) B-chan is set up. The 2nd one is then torn down.
- Forwarded calls that are initiated by overlap dialing from a PBX extension to a Cisco Unified CallManager Express extension, the call completes, but Cisco Unified CallManager Express does not perform a reroute, even if reroute is enabled and the call is eligible for a reroute.



MWI

- Cisco Unified Communications Manager Express 4.0(3) supports Cisco Unity integration with QSIG. However, in this instance, no testing was performed with Cisco Unified Communications Manager Express 4.0(3) as the message center PINX.
- MWI was not tested for SIP extensions on Cisco Unified CallManager Express 4.0(3) with the PBX as the message center PINX. It was tested for SCCP extensions only.

Path Replacement for Call Diversion by Forward Switch

- As of the publication of this Application Note, the Nortel did not initiate Path Replacement Proposal for Call Diversion by Forward to deflect a call that is meant for a Cisco Unified CallManager Express 4.0(3) station programmed to forward all calls to another Nortel station within the network (i.e. a station on Nortel PBX1 calls a Cisco Unified CallManager Express 4.0(3) station that forwards to a station on Nortel PBX2). Thus, although the call was completed, no Path Replacement Proposal was sent by Nortel during the call. The Nortel, however, will respond to a Path Replacement Proposal message sent by another node and respond by initiating a new SETUP message to an alternate route. (Note: Path Replacement for Call Diversion by Forward Switch did work in testing of prior Nortel Release).



System Components

Hardware Requirements

- Cisco 3745 IOS voice gateway
 - NM-HDV
 - VWIC-2MFT-T1
- Cisco 2811 IOS voice gateway
- (4) Cisco Unified IP phone 7960s
- (1) Cisco Unified IP phone 7961G
- (1) Cisco Unified IP phone 7970
- (1) Nortel Communication Server 1000
 - (2) Nortel 2616 digital station phones
 - (1) NTAK09BA, (Release 02) T1 trunk cards
 - (1) NTRH30AA, (Release 12) voice mail card
- Nortel CallPilot 201i voice mail system

Software Requirements

- Cisco Unified CallManager Express Release 4.0(3)
- Cisco IOS Software, 3700 Software (C3745-IPVOICE-M), Version 12.4(4)XC4
- Cisco IOS Software, 2800 Software (C2800NM-IPVOICE-M), Version 12.4(4)XC4
- Nortel CS1000M Release 4.0
- Nortel CallPilot 201i Release 2.02

G1, G2 – 7960 – SCCP

- Cisco7960 IP phone version 7.2(T0.23)
- Cisco 7960 IP phone app load P0030702T023
- Cisco 7960 IP phone boot load PC0303010200

C2, D2 – 7960 - SIP

- Cisco7960 DSP load ID PS03AT46
- Cisco 7960 IP phone app load P0S3-07-5-00
- Cisco 7960 IP phone boot load PC030301

C1 – 7961G – SCCP

- Cisco7961G IP phone load file: TERM61.DEFAULT
- Cisco 7961G IP phone app load ID: Jar41.2-9-1-45.sbn
- Cisco 7961G IP phone boot load ID: 7961G_64-020704128Amd64meg.bin

D1 – 7970 – SCCP



- Cisco7970 IP phone load file: SCCP70.8-0-3S
- Cisco 7970 IP phone app load ID: jar70sccp.8-0-2.25.sbn
- Cisco 7970 IP phone boot load ID: 7970_64060118.bin



Features

Features Supported

- Basic Call, ENBLOC
- Basic Call, Overlap (from PBX to Cisco Unified CallManager Express only)
- CLIP-Calling Line (Number) Identification Presentation
- CLIR-Calling Line (Number) Identification Restriction
- CNIP-Calling Name Identification Presentation
- CNIR-Calling Name Identification Restriction (from PBX to Cisco Unified CallManager Express only)
- COLP-Connected Line (Number) Identification Presentation on Basic Calls
- CONP-Connected Name Identification Presentation (for calls between PBX and Cisco Unified IP Phones running SCCP)
- Alerting Name (for calls between PBX and Cisco Unified IP Phones running SCCP)
- Tandem PSTN call
- Consultation Transfer – Local
- Consultation Transfer – Network/External (See Limitations Section)
- Early Attended Transfer – Local
- Early Attended Transfer – Network/External (See Limitations Section)
- Blind Transfer – Local (See Limitations Section)
- Blind Transfer – Network/External (See Limitations Section)
- Call Forward Unconditional by Join – Local (See Limitations Section)
- Call Forward Unconditional by Join – Network/External (See Limitations Section)
- Call Forward Busy by Join – Local (See Limitations Section)
- Call Forward Busy by Join – Network/External (See Limitations Section)
- Call Forward No Reply by Join – Local (See Limitations Section)
- Call Forward No Reply by Join – Network/External (See Limitations Section)
- Call Forward Unconditional by Reroute – Network/External (See Limitations Section)
- Call Forward Busy by Reroute – Network/External (See Limitations Section)
- Call Forward No Reply by Reroute – Network/External (See Limitations Section)
- MWI (See Limitations Section)



Features Not Supported

- Overlap dialing from Cisco Unified CallManager Express 4.0(3) to PBX
- CNIR-Calling Name Identification Restriction from Cisco Unified CallManager Express 4.0(3) to PBX
- COLR- Connected Line (Number) Identification Restriction
- CONR- Connected Name Identification Restriction
- CONP-Connected Name Identification Presentation (for calls between PBX and Cisco Unified IP Phones running SIP)
- Alerting Name (for calls between PBX and Cisco Unified IP Phones running SIP)
- Blind Transfers initiated from PBX
- H323/QSIG tandem transfers via SIP phone
- CLIP-Calling Line (Number) Identification Presentation on Transferred Calls
- CNIP-Calling Name Identification Presentation on Transferred Calls
- COLP-Connected Line (Number) Identification Presentation on Transferred Calls
- CONP-Connected Name Identification Presentation on Transferred Calls
- CNIP-Calling Line (Name) Identification Presentation on Forwarded Calls to a PBX station
- COLP-Connected Line (Number) Identification Presentation on Forwarded Calls
- CONP-Connected Name Identification Presentation on Forwarded Calls
- Call Forward by Reroute for QSIG "trombone" from a Cisco Unified CallManager Express SIP extension
- Call Forward by Reroute with overlap dialing
- Call Completion to Busy Subscriber (Call Back when Free)
- Call Completion on No Reply (Call Back Next Used)
- Path Replacement for Call Transfer by Join
- Path Replacement for Trombone Connection
- Path Replacement for Call Diversion by Forward Switch



Configuration

Configuring the sequence for the Nortel CS1000M PBX

1. Configure T1-PRI-QSIG.
2. Configure Route List.
3. Configure Coordinated Dial Plan
4. Configure TMDI card
5. Configure Digital Station Phone



Configuring the Nortel CS1000M

CONFIGURATION FOR TRUNKS

B-Channels for T1-QSIG trunk to Cisco Unified CallManager Express (PBX card slot 7)

LD 14

DES T1 ISGF

TN 007 01

TYPE TIE

CDEN SD

CUST 0

TRK PRI

PDCA 1

PCML MU

NCOS 0

RTMB 107 1

B-CHANNEL SIGNALING

TGAR 1

AST NO

IAPG 0

CLS CTD DIP WTA LPR APN THFD HKD

P10 VNL

TKID

AACR NO

DATE 26 SEP 2006



D-Channel for T1-QSIG trunk to Cisco Unified CallManager Express (PBX card slot 7)

LD 17

ADAN DCH 7

CTYP MSDL

CARD 07

PORT 1

DES t1qsig

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

PR_RTN NO

MBGA NO

OVLN NO

OVLS NO



T310 120

T200 3

T203 10

N200 3

N201 260

K 7



B-Channels for T1QSIG Trunk to adjacent Nortel PBX (Used for Path Replacement Testing) (PBX card slot 2)

LD 14

DES T1 ISGF

TN 002 01

TYPE TIE

CDEN SD

CUST 0

TRK PRI

PDCA 1

PCML MU

NCOS 0

RTMB 102 1

B-CHANNEL SIGNALING

TGAR 1

AST NO

IAPG 0

CLS UNR DTN WTA LPR APN THFD HKD

P10 VNL

TKID

AACR NO

DATE 15 SEP



D-Channel for T1QSIG Trunk to adjacent Nortel PBX (Used for Path Replacement Testing) (PBX card slot 2)

LD 17

ADAN DCH 12

CTYP MSDL

CARD 02

PORT 1

DES T1QSIG

USR PRI

DCHL 2

OTBF 32

PARM RS422 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



PAGE 003

OVLN NO

OVLN NO

T310 120

T200 3

T203 10

N200 3

N201 260

K



B-Channels For T1-DMS100 Trunk to PSTN (PBX card slot 5)

LD 14

DES T1_DMS100

TN 005 01

TYPE TIE

CDEN SD

CUST 0

TRK PRI

PDCA 1

PCML MU

NCOS 0

RTMB 105 1

B-CHANNEL SIGNALING

TGAR 1

AST NO

IAPG 0

CLS CTD DIP WTA LPR APN THFD HKD

P10 VNL

TKID

AACR NO

DATE 25 SEP 2006



D-Channel For T1-DMS100 Trunk to PSTN (PBX card slot 5)

LD 17

ADAN DCH 5

CTYP MSDL

CARD 05

PORT 1

DES dns100

USR PRI

DCHL 5

OTBF 32

PARM RS422 DTE

DRAT 64KC

CLOK EXT

IFC D100

SIDE USR

CNEG 1

RLS ID **

RCAP ND2

MBGA NO

OVLR NO

OVLS NO

T200 3

T203 10

N200 3

N201 260

K 7



ROUTE LIST

Route for card in slot 7 (T1-QSIG trunk to Cisco Unified CallManager Express)

LD 86

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 0

FCI 0

FSNI 0

SBOC NRR

IDBB DBD

IOHQ NO

OHQ NO

CBQ NO

ISSET 0

NALT 5

MFRL 0

OVLL 2



Route for card in slot 5 (T1-DMS100 Trunk to PSTN)

LD 86

RLI 5

ENTR 0

LTER NO

ROUT 105

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

ISSET 0

NALT 5

MFRL 0

OVLL 0



Route for card in slot 2 (T1QSIG Trunk to adjacent Nortel PBX)

LD 86

RLI 2

ENTR 0

LTER NO

ROUT 102

TOD 0 ON 1 ON 2 ON 3 ON

4 ON 5 ON 6 ON 7 ON

VNS NO

CNV NO

EXP NO

FRL 0

DMI 0

FCI 0

FSNI 0

SBOC NRR

IDBB DBD

IOHQ NO

OHQ NO

CBQ NO

ISET 0

NALT 5

MFRL 0

OVLL 1



CDP - COORDINATED DIAL PLAN

CDP for 30XX (toward T1-QSIG trunk to Cisco Unified CallManager Express)

LD 87

DSC 30

FLEN 0

DSP LSC

RLI 7

NPA

NXX

CDP for 430X (toward T1-DMS100 Trunk to PSTN)

LD 87

DSC 430

FLEN 0

DSP LSC

RLI 5

NPA

NXX

CDP for 52XX (toward adjacent Nortel PBX)

LD 87

DSC 521

FLEN 0

DSP LSC

RLI 2

NPA

NXX



CONFIGURATIONS FOR MERIDIAN PHONES x2215 AND x2216

LD 11

DES CS101A

TN 001 0 00 02

TYPE 2616

CDEN 8D

CUST 0

AOM 0

FDN 2216

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 OCBD FLXD FTTC DNDY DNO3 MCBN CDMR

CPND_LANG ENG

RCO 0

EFD 2216

HUNT 2216

EHT 2216

LHK 0

PLEV 02

CSDN

AST

IAPG 0

AACS NO

ITNA NO

DGRP

MLWU_LANG 0

DNDR 0

KEY 00 SCR 2215 0 MARP

CPND

NAME ZEUS15

XPLN 6

DISPLAY_FMT FIRST, LAST

01

02

03 CFW 4 3014

04 AO6

05 TRN

06

07

08



09

10

11

12

13

14

15 RGA

DATE 27 SEP 2006

DES CS101A

TN 001 0 00 03

TYPE 2616

CDEN 8D

CUST 0

AOM 0

FDN 6001

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 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 OCBF FLXD FTTC DNDY DNO3 MCBN CDMR

CPND_LANG ENG

RCO 0

EFD 6001

HUNT 6001

EHT 6001

LHK 0

PLEV 02

CSDN

AST

IAPG 0

AACS NO

ITNA NO

DGRP

MLWU_LANG 0

DNDR 0

KEY 00 SCR 2216 0 MARP

CPND

NAME ZEUS16

XPLN 6

DISPLAY_FMT FIRST, LAST

01

02

03 CFW 4 2500

04 AO6



05 TRN

06

07

08

09

10

11

12

13

14

15 RGA

DATE 6 DEC 2005



Configuring the Local Cisco Unified CallManager Express (Cisco 3745)

LOCAL-3745#sho ver

Cisco IOS Software, 3700 Software (C3745-IPVOICE-M), Version 12.4(4)XC4, RELEAS

Synched to technology version 12.4(5.13)T

Technical Support: <http://www.cisco.com/techsupport>

Copyright (c) 1986-2006 by Cisco Systems, Inc.

Compiled Mon 24-Jul-06 19:48 by ealyon

ROM: System Bootstrap, Version 12.2(8r)T2, RELEASE SOFTWARE (fc1)

ROM: Cisco IOS Software, 3700 Software (C3745-IPVOICE-M), Version 12.4(4)XC4, R)

LOCAL-3745 uptime is 3 days, 20 hours, 44 minutes

System returned to ROM by abort at PC 0x608D3DD4

System image file is "flash:c3745-ipvoice-mz.124-4.XC4.bin"

Cisco 3745 (R7000) processor (revision 2.0) with 241664K/20480K bytes of memory.

Processor board ID JMX0813L0Z3

R7000 CPU at 350MHz, Implementation 39, Rev 3.3, 256KB L2, 2048KB L3 Cache

2 FastEthernet interfaces

24 Serial interfaces

1 Channelized T1/PRI port

2 Voice FXS interfaces

2 Voice DID interfaces

DRAM configuration is 64 bits wide with parity enabled.

151K bytes of NVRAM.

62720K bytes of ATA System CompactFlash (Read/Write)

Configuration register is 0x0



LOCAL-3745#wr t

Building configuration...

Current configuration : 4630 bytes

!

version 12.4

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

!

hostname LOCAL-3745

!

boot-start-marker

boot system flash:c3745-ipvoice-mz.124-4.XC4.bin

boot-end-marker

!

logging buffered 9999999 debugging

enable password cisco

!

no aaa new-model

!

resource policy

!

no network-clock-participate slot 1

no network-clock-participate slot 3

voice-card 1

no dspfarm

!

voice-card 3

dspfarm



```
!  
ip cef  
!  
!  
no ip dhcp use vrf connected  
!  
ip dhcp pool ephone3  
  host 172.20.15.203 255.255.255.0  
  client-identifier 0100.170e.c858.d4  
  default-router 172.20.15.1  
  option 150 ip 172.20.15.196  
!  
ip dhcp pool ephone4  
  host 172.20.15.204 255.255.255.0  
  client-identifier 0100.15f9.c856.1a  
  default-router 172.20.15.1  
  option 150 ip 172.20.15.196  
!  
ip dhcp pool ephone1  
  host 172.20.15.201 255.255.255.0  
  client-identifier 0100.15fa.0cb1.dc  
  default-router 172.20.15.1  
  option 150 ip 172.20.15.196  
!  
ip dhcp pool ephone2  
  host 172.20.15.202 255.255.255.0  
  client-identifier 0100.15fa.0cb5.d9  
  default-router 172.20.15.1  
  option 150 ip 172.20.15.196
```



```
!  
!  
no ip domain lookup  
ip dhcp-server query lease retries 5  
ip dhcp-server 172.20.15.196  
isdn switch-type primary-qsig  
!  
!  
voice call carrier capacity active  
!  
voice service pots  
<supplementary-service qsig call-forward>1  
!  
voice service voip  
qsig decode  
allow-connections h323 to h323  
allow-connections h323 to sip  
allow-connections sip to h323  
allow-connections sip to sip  
supplementary-service h450.12  
< no supplementary-service h450.2>2  
<no supplementary-service h450.3 >2  
h323  
sip  
registrar server expires max 600 min 60  
!  
!
```

¹ Omitted to force QSIG call forward by join (no reroute).

² Inserted to force IP call forward by join (no reroute).



```
!  
!  
!  
voice register global  
mode cme  
source-address 172.20.15.196 port 5060  
max-dn 100  
load 7960-7940 POS3-07-5-00  
tftp-path flash:  
create profile sync 0011395025542089  
!  
voice register dn 1  
number 3011  
< call-forward b2bua busy 2216>3  
<call-forward b2bua noan 2216 timeout 7>4  
name Local IP1  
huntstop  
!  
voice register dn 2  
number 3012  
name Local IP2  
huntstop  
!  
voice register dn 3  
call-forward b2bua busy 3015  
!  
voice register pool 1
```

³ Inserted for call forward busy from SIP extension.

⁴ Inserted for call forward no reply from SIP extension.



```
id mac 0015.FA0C.B1DC
type 7960
number 1 dn 1
max registrations 42
dtmf-relay rtp-nte
description Cisco7960
codec g711ulaw
!
voice register pool 2
id mac 0015.FA0C.B5D9
type 7960
number 1 dn 2
max registrations 42
dtmf-relay rtp-nte
description Cisco7960
codec g711ulaw
!
!
!
controller T1 3/0
framing esf
linecode b8zs
pri-group timeslots 1-24
!
!
interface FastEthernet0/0
ip address 172.20.15.196 255.255.255.0
duplex auto
speed auto
```



```
!  
interface FastEthernet0/1  
  
no ip address  
  
shutdown  
  
duplex auto  
  
speed auto  
  
!  
interface Serial3/0:23  
  
no ip address  
  
encapsulation hdlc  
  
isdn switch-type primary-qsig  
  
isdn overlap-receiving  
  
isdn incoming-voice voice  
  
no cdp enable  
  
!  
ip route 0.0.0.0 0.0.0.0 172.20.15.1  
  
!  
ip http server  
  
ip http authentication local  
  
ip http path flash:  
  
!  
tftp-server flash:P003-07-5-00.bin  
tftp-server flash:P003-07-5-00.sbn  
tftp-server flash:POS3-07-5-00.bin  
tftp-server flash:POS3-07-5-00.sb2  
tftp-server flash:POS3-07-5-00.loads  
  
< tftp-server flash: any load file that is not on the phone and is needed >  
  
< tftp-server slot0: any load file that is not on the phone and is needed >
```



```
!  
control-plane  
!  
!  
voice-port 1/0/0  
  timing digit 75  
  timing inter-digit 65  
!  
voice-port 1/0/1  
!  
voice-port 1/1/0  
!  
voice-port 1/1/1  
!  
voice-port 3/0:23  
!  
!  
!  
dial-peer voice 3023 pots  
  destination-pattern 22..  
  incoming called-number ....  
  <clid restrict>5  
  <supplementary-service qsig call-forward >6  
  direct-inward-dial  
  port 3/0:23  
  forward-digits all  
!
```

⁵ Inserted for CLID restrict cases only.

⁶ Omitted to force QSIG call forward by join (no reroute).



```
dial-peer voice 1 voip
destination-pattern 30..
session target ipv4:172.20.15.159
dtmf-relay h245-alphanumeric
codec g711ulaw
no vad
!
dial-peer voice 7777 pots
shutdown
destination-pattern 2T
direct-inward-dial
port 3/0:23
forward-digits all
!
dial-peer voice 4300 pots
destination-pattern 43..
direct-inward-dial
port 3/0:23
forward-digits all
!
dial-peer voice 9 pots
destination-pattern 9T
port 3/0:23
!
!
sip-ua
!
!
telephony-service
```



```
load 7960-7940 P003-07-5-00
load 7961 Jar41.2-9-1-45.sbn
load 7970 jar70sccp.8-0-2.25.sbn
max-ephones 25
max-dn 50
ip source-address 172.20.15.196 port 2000
max-conferences 8 gain -6
call-forward pattern .T
transfer-system full-consult
transfer-pattern .... <blind>7
create cnf-files version-stamp 7960 Sep 11 2006 16:53:04
!
!
ephone-dn 3 dual-line
number 3013
name Local IP3
<call-forward busy 2216>8
<call-forward noan 2216 timeout 7>9
huntstop channel
!
!
ephone-dn 4 dual-line
number 3014
name Local IP4
huntstop channel
!
!
```

⁷ Inserted to enable blind transfers, as opposed to early attended transfers.

⁸ Inserted for call forward busy from SCCP extension.

⁹ Inserted for call forward no reply from SCCP extension.



```
ephone 3
  mac-address 0017.0EC8.58D4
  type 7961
  keep-conference
  button 1:3
  !
  !
  !
ephone 4
  mac-address 0015.F9C8.561A
  type 7970
  keep-conference
  button 1:4
  !
  !
  !
line con 0
  exec-timeout 0 0
line aux 0
line vty 0 4
  exec-timeout 0 0
  password cisco
  login
  transport input telnet
  !
  !
end
```

```
LOCAL-3745#
```



Configuring the Remote Cisco Unified CallManager Express (Cisco 2811)

REMOTE-2811#sho ver

Cisco IOS Software, 2800 Software (C2800NM-IPVOICE-M), Version 12.4(4)XC4, RELE

Synched to technology version 12.4(5.13)T

Technical Support: <http://www.cisco.com/techsupport>

Copyright (c) 1986-2006 by Cisco Systems, Inc.

Compiled Mon 24-Jul-06 18:33 by ealyon

ROM: System Bootstrap, Version 12.4(1r) [hqluong 1r], RELEASE SOFTWARE (fc1)

ROM: Cisco IOS Software, 2800 Software (C2800NM-IPVOICE-M), Version 12.4(4)XC4.)

REMOTE-2811 uptime is 1 week, 21 hours, 58 minutes

System returned to ROM by power-on

System restarted at 16:23:28 UTC Thu Sep 7 2006

System image file is "flash:c2800nm-ipvoice-mz.124-4.XC4.bin"

Cisco 2811 (revision 53.51) with 251904K/10240K bytes of memory.

Processor board ID FHK0946F0MZ

2 FastEthernet interfaces

2 Voice FXS interfaces

DRAM configuration is 64 bits wide with parity enabled.

239K bytes of non-volatile configuration memory.

62592K bytes of ATA CompactFlash (Read/Write)

Configuration register is 0x2



REMOTE-2811#wr t

Building configuration...

Current configuration : 3123 bytes

!

! Last configuration change at 11:41:01 UTC Fri Sep 22 2006

! NVRAM config last updated at 17:46:55 UTC Fri Sep 22 2006

!

version 12.4

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

!

hostname REMOTE-2811

!

boot-start-marker

boot system flash:c2800nm-ipvoice-mz.124-4.XC4.bin

boot-end-marker

!

enable password cisco

!

no aaa new-model

!

resource policy

!

!

!

ip cef



```
no ip dhcp use vrf connected
!
ip dhcp pool ephone5
  host 172.20.15.205 255.255.255.0
  client-identifier 0100.15fa.0cb7.46
  default-router 172.20.15.1
  option 150 ip 172.20.15.159
!
ip dhcp pool ephone6
  host 172.20.15.206 255.255.255.0
  client-identifier 0100.15fa.63bf.84
  default-router 172.20.15.1
  option 150 ip 172.20.15.159
!
!
no ip domain lookup
ip dhcp-server query lease retries 5
ip dhcp-server 172.20.15.159
!
!
voice-card 0
no dspfarm
!
!
!
```



```
voice service voip
  qsig decode
  allow-connections h323 to h323
  allow-connections h323 to sip
  allow-connections sip to h323
  allow-connections sip to sip
  supplementary-service h450.12
  < no supplementary-service h450.2 inserted here to force call by join>10
  <no supplementary-service h450.3 inserted here to force call by join> 10
  h323
  sip
  !
  !
  !
interface FastEthernet0/0
  ip address 172.20.15.159 255.255.255.0
  duplex auto
  speed auto
  !
interface FastEthernet0/1
  no ip address
  shutdown
  duplex auto
  speed auto
  !
ip route 0.0.0.0 0.0.0.0 172.20.15.1
!
```

¹⁰ Inserted to force IP call forward by join (no reroute).



```
ip http server
!
tftp-server flash:P0030702T023.bin
tftp-server flash:P0030702T023.loads
tftp-server flash:P0030702T023.sb2
tftp-server flash:P0030702T023.sbn
< tftp-server flash: any load file that is not on the phones and is needed >
< tftp-server slot0: any load file that is not on the phones and is needed>

!
control-plane
!
!
voice-port 0/1/0
!
voice-port 0/1/1
!
!
!
dial-peer voice 1 voip
destination-pattern 22..
session target ipv4:172.20.15.196
dtmf-relay h245-alphanumeric
codec g711ulaw
!
dial-peer voice 3011 voip
destination-pattern 3011
session target ipv4:172.20.15.196
dtmf-relay h245-alphanumeric
```



```
codec g711ulaw
!
dial-peer voice 3014 voip
destination-pattern 3014
session target ipv4:172.20.15.196
dtmf-relay h245-alphanumeric
codec g711ulaw
!
dial-peer voice 3012 voip
destination-pattern 3012
session target ipv4:172.20.15.196
dtmf-relay h245-alphanumeric
codec g711ulaw
!
dial-peer voice 3013 voip
destination-pattern 3013
session target ipv4:172.20.15.196
dtmf-relay h245-alphanumeric
codec g711ulaw
!
dial-peer voice 4300 voip
destination-pattern 43..
session target ipv4:172.20.15.196
dtmf-relay h245-alphanumeric
codec g711ulaw
!
!
sip-ua
!
```



```
!  
telephony-service  
load 7960-7940 P0030702T023  
max-ephones 25  
max-dn 50  
ip source-address 172.20.15.159 port 2000  
max-conferences 8 gain -6  
call-forward pattern .T  
transfer-system full-consult  
transfer-pattern .... <blind>11  
create cnf-files version-stamp Jan 01 2002 00:00:00  
!  
!  
ephone-dn 5 dual-line  
number 3015  
name Remote IP5  
<call-forward busy 2216>12  
< call-forward noan 2216 timeout 7>13  
!  
!  
ephone-dn 6 dual-line  
number 3016  
name Remote IP6  
!  
!  
ephone 5  
mac-address 0015.FA0C.B746
```

¹¹ Inserted to enable blind transfers, as opposed to early attended transfers.

¹² Inserted for call forward busy from SCCP extension.

¹³ Inserted for call forward no reply from SCCP extension.



```
type 7960
keep-conference
button 1:5
!
!
ephone 6
mac-address 0015.FA63.BF84
type 7960
keep-conference
button 1:6
!
!
!
line con 0
line aux 0
line vty 0 4
password cisco
login
!
scheduler allocate 20000 1000
!
end
```

REMOTE-2811#



Acronyms

Acronym	Definitions
BRI	Basic Rate ISDN
CAMA	Centralized Automatic Message Accounting
CAS	Channel Associated Signaling
CFB	Call Forward when Busy
CFNR	Call Forward when No Reply
CFU	Call Forward Unconditional
CO	Central Office
FGD	Feature Group "D"
FXO	Foreign Exchange – Office
FXS	Foreign Exchange – Station
IOS	Internetworking Operating System
MCID	Malicious Caller ID
MGCP	Media Gateway Control Protocol
MoH	Music on Hold
MWI	Message Waiting Indication
PBX	Private Branch Exchange
PRI	Primary Rate ISDN
PSAP	Public Service Access Point
SIP	Session Initiation Protocol
ToH	Tone on Hold



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