Application Note

Nortel CS1000M Release 4.0 using E1 ISO-QSIG to Cisco Unified CallManager Express 4.0(2)

November 1, 2007 Version 2

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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(2) using a Cisco 3845 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(2) connected to the PBX via the 3845 E1 QSIG link. The 3845 IOS voice gateway was connected via H.323 to a Cisco 2801 IOS voice gateway. The two gateways were running Cisco Unified CallManager Express 4.0(2). Cisco Unified IP phones (models 7960 and 7961G were connected to the 2 Cisco Unified CallManager Express gateways via SIP and SCCP, as per the figure. A NM-HDV and VWIC-2MFT-E1 were used for the E1 QSIG interface. Calls were made to test basic call, caller ID, conference, transfer, forward, call back, reroute, and MWI features.

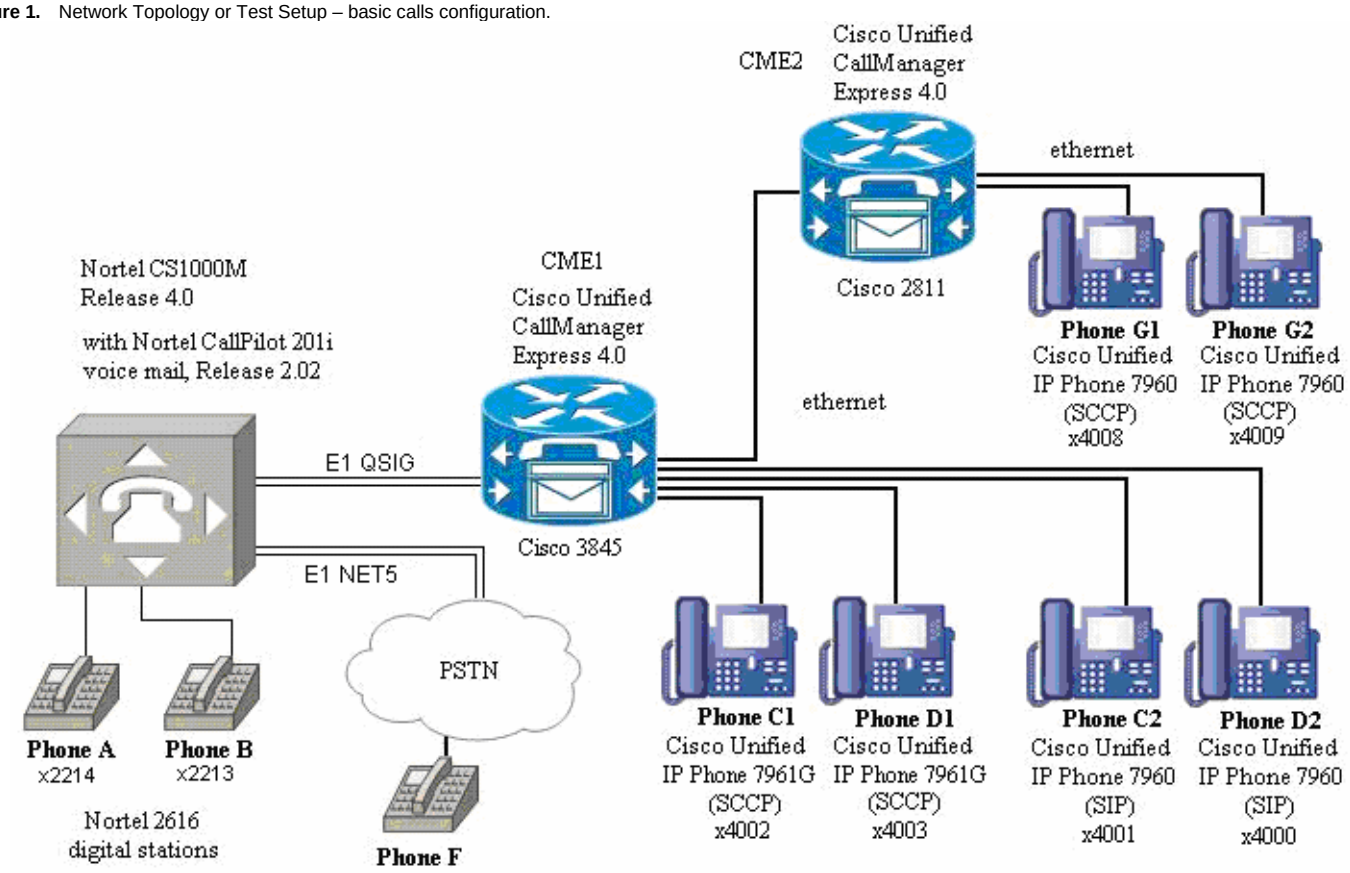
This Application Note uses the 3845 voice gateway. However, the use of other Cisco voice gateways is also an option since Cisco Unified Call Manager Express does not depend on platform. The listed gateway families, below, can run Cisco Unified CallManager Express, but each have different IP phone support capability. Please check the product specifications to ensure you are obtaining the proper device to support your IP phone deployment.

Cisco IAD 2430 Series Integrated Access Devices
Cisco 2801 Integrated Services Router, 1760-V and 1751-V Access Routers
Cisco 2811 Integrated Services Router, 261xXM and 262xXM Series Access Routers
Cisco 2821 Integrated Services Router, 265xXM Access Router
Cisco 2691 Multiservice Access Router
Cisco 2851 Integrated Services Router
Cisco 3725 Multiservice Access Router
Cisco 3745 Multiservice Access Router
Cisco 3825 Integrated Services Router
Cisco 3845 Integrated Services Router

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. Network Topology or Test Setup – basic calls configuration.



Limitations

Basic Calls

Cisco Unified CallManager Express (CME) 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. This is a CME SIP limitation

Calling Name Restriction is not supported for calls originated from Cisco Unified CallManager Express 4.0(3). This is a CME SIP limitation

Connected Number/Name Restriction is not supported from Cisco Unified CallManager Express 4.0(3). This is a CME SIP limitation

Call Transfers

A Consulted transfer or Early-attended transfer originated from a call placed from a phone on the remote Cisco Unified CallManager Express (CME2) to a SIP phone on the local Cisco Unified CallManager Express (CME1), and then transferred to a PBX phone (e.g., G1 calls C2, and C2 transfers to A) does not complete. This is a CME SIP limitation.

For local consulted and early-attended call transfers between SCCP phones and SIP phones, call originates from an external PBX phone, the Calling name and number updates are not supported. This is CME SIP to SCCP interworking limitation.

For local consulted, early attended and blind call transfers connected name and number are not supported. CME dos not support Facility IE for call update information.

For external consulted and early attended call transfers with call flow, (CME IP phone calls PBX phone, PBX phone transfers back to different IP phone on CME (trombone)) the called (connected) name and number are not updated on the original phone after the transfer is complete. (e.g. Phone C1 calls Phone A, Phone A transfers to Phone D1). CME dos not support Facility IE for call update information

Call Forwards

For local call forward calls involving SIP phones the forwarding name/number display is not supported. This is a CME SIP limitation.

For external Call forward calls the forwarding number is not supported on CME. CME does not support RedirectingName.

For external call forward calls, the called (connected) number is not updated on the original phone. This is a CME limitation.

For call forward calls, the called (connected) name is not updated on the SIP phone. This is a CME SIP limitation.

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(2) phone calls a PBX phone that forwards back to another Cisco Unified CallManager Express 4.0(2) phone).

Forwarded calls hairpinned at a SIP extension (PBX phone calls Cisco Unified CallManager Express 4.0(2) SIP phone that forwards back to another PBX phone), the call completes, but Cisco Unified CallManager Express 4.0(2) 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(2) 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-channel 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.

System Components

Hardware Requirements

Cisco 3845 IOS voice gateway

NM-HDV

VWIC-2MFT-E1

Cisco 2801 IOS voice gateway

(4) Cisco Unified IP phone 7960s

(2) Cisco Unified IP phone 7961G

(1) Nortel Communication Server 1000

(2) Nortel 2616 digital station phones

(1) NTBK50AA, (Release 06) E1 trunk cards

(1) NTRH30AA, (Release 12) voice mail card

Nortel CallPilot 201i voice mail system

Software Requirements

Cisco Unified CallManager Express Release 4.0(2)

Cisco IOS Software, 3800 Software (C3845-IPVOICE-M), Version 12.4(11)T

Cisco IOS Software, 2801 Software (C2801-IPVOICE-M), Version 12.4(11)T

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 P00308000400

Cisco 7960 IP phone boot load PC0303010001

C2, D2 – 7960 - SIP

Cisco7960 DSP load ID 4.0(2.0)[A0]

Cisco 7960 IP phone app load P0S3-08-4-00

Cisco 7960 IP phone boot load PC030301

C1 – 7961G – SCCP

Cisco7961G IP phone load file: SCCP41.8-0-3S

Cisco 7961G IP phone app load ID: Jar41sccp.8-0-2-25.sbn

Cisco 7961G IP phone boot load ID: 7961G_64-020704128Amd64meg.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(2) 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)

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

Cisco Unity integration with QSIG.

MWI with QSIG/SIP interworking

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

Configuration sequence for the Nortel CS1000M PBX

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

Configuring the Nortel CS1000M PBX

CONFIGURATION FOR TRUNKS

PRI config (PBX card slot 5)

```
>ld 22
PT2000

REQ  prt
TYPE cequ

CEQU
 MPED 8D
 SUPL  000  004  008  012
       016  032  036  040
       044  048  064  068
       072 V096 V100
 TDS   000
 CONF  029  030  031  062
       094  095

 DLOP  NUM DCH FRM TMDI LCMT YALM T1TE TRSH
  PRI  02   23  ESF NO   B8S  FDL  -    00
       04   24  ESF YES  B8S  DG2  0    00
 PRI2 05 06 07 11
 DTI2  12  13  21
 MISP
```

D-Channel for T1-QSIG trunk to Cisco Unified CallManager Express (PBX card slot 5)

```
ld 22
PT2000

REQ  prt
TYPE adan dch 5

ADAN     DCH 5
 CTYP MSDL
 CARD 05
 PORT 1
 DES  E1_QSIG_CME
 USR  PRI
 DCHL 5
 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  **
 QCHID YES
```

RCAP COLP NDI CCBI CCNI PRI DV3I CTI QMWI
PR_TRIGS DIV 2 3
        CNG 2 3
PR_RTN NO
MBGA NO
OVLR NO
OVLS YES
OVLT 0
T310 120
T200 3
T203 10
N200 3
N201 260
K   7

B-Channels for T1-QSIG route to Cisco Unified CallManager Express (PBX card slot 5)

>ld 21
PT1000

REQ: prt
TYPE: rdb
CUST 0
ROUT 105

TYPE RDB
CUST 00
DMOD
ROUT 105
DES E1_QSIG_CME
TKTP TIE
NPID_TBL_NUM   0
ESN NO
CNVT NO
SAT NO
RCLS EXT
VTRK NO
NODE
DTRK YES
BRIP NO
DGTP PRI2
ISDN YES
   MODE PRA
   IFC ISGF
   SBN NO
   PNI 00000
   NCNA NO
   NCRD NO
   CTYP UKWN
   INAC NO
   ISAR NO
   CPFXS YES
   DAPC NO
   INTC NO
DSEL VOD
PTYP DTT
AUTO NO
DNIS NO
DCDR NO
ICOG IAO

SRCH LIN
TRMB YES
STEP
ACOD 205
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
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
PLEV 2
ALRM NO
ART 0
SGRP 0
AACR NO

B-Channels for T1-QSIG trunk to Cisco Unified CallManager Express (PBX card slot 5)

ld 20

PT0000
REQ: prt
TYPE: tie
TN 5 1
DATE
PAGE

DES E1_QSIG_CME
TN 005 01
TYPE TIE
CDEN SD
CUST 0
TRK PRI2
PDCA 1
PCML A
NCOS 0
RTMB 105 1
B-CHANNEL SIGNALING
TGAR 1
AST NO
IAPG 0
CLS UNR DTN WTA LPR APN THFD
    P10 VNL
TKID
AACR NO
DATE 4 DEC 2006

ROUTE LIST

Route for card in slot 5 (T1-QSIG trunk to Cisco Unified CallManager Express)

```
>ld 86
ESN000

MEM AVAIL: (U/P): 2819884    USED U P: 205875 70816    TOT: 3096575
DISK RECS AVAIL: 1152
REQ  prt
CUST 0
FEAT rlb
RLI  5

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

ISET 0
NALT 5
MFRL 0
OVLL 2
```

CDP - COORDINATED DIAL PLAN

CDP for 40XX (toward T1-QSIG trunk to Cisco Unified CallManager Express)

```
>ld 87
ESN000

MEM AVAIL: (U/P): 2819884    USED U P: 205875 70816    TOT: 3096575
DISK RECS AVAIL: 1152
REQ  prt
CUST 0
FEAT cdp
TYPE dsc
DSC  40
DSC  40
FLEN 0
DSP  LSC
RLI  5
NPA
NXX
```

Nortel E1 MSDL card configuration

```
>ld 73
DDB000
MEM AVAIL: (U/P): 2819884    USED U P: 205875 70816    TOT: 3096575
DISK RECS AVAIL: 1152
REQ  prt
TYPE lpti
SCH0111
TYPE pri2
FEAT lpti
LOOP 5

MFF       CRC
ACRC      NO
ALRM      REG
RAIE      NO
G1OS      YES
SLP       5      24 H       30       1 H
BPV     128     122
CRC     201      97
FAP      28       1
RATS     10
GP2      20     100 S       12 S       12 S        4 S
MNG1     15 M
NCG1     15 M
OSG1     15 M
MNG2     15 S
NCG2     15 S
OSG2     15 S
PERS     50
CLRS     50
OOSC      5
```

CONFIGURATIONS FOR MERIDIAN PHONES x2213 AND x2214

LD 11

REQ PRT
TYPE:
TYPE 2616
TN 1 0
DATE
PAGE
DES

DES CS101A
TN 001 0 00 00
TYPE 2616
CDEN 8D
CUST 0
AOM 0
FDN 2500
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 CNIA CDCA MSID DAPA BFED RCBD
ICDD CDMD 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
USRD ULAD RTDD RBDD RBHD PGND OCBD FLXD FTTC DNDY DNO3 MCBN CDMR
CPND_LANG ENG
RCO 0
EFD 2500
HUNT 2500
EHT 2500
LHK 0
PLEV 02
CSDN
AST
IAPG 0
AACS NO
ITNA NO
DGRP
MLWU_LANG 0
DNDR 0
KEY 00 SCR 2213 0 MARP
CPND
NAME ZEUS13
XPLN 9
DISPLAY_FMT FIRST,LAST

```
   01 SCR 2212 0     MARP
     CPND
       NAME ZEUS12
       XPLN 6
       DISPLAY_FMT FIRST,LAST
   02
   03 CFW 4  5213
   04 AO6
   05 TRN
   06
   07
   08
   09
   10
   11
   12 XMWK 2217 2212
   13 MIK
   14 MCK
   15 RGA
DATE  9 JAN 2007


REQ: prt
TYPE: 2616

TN   1 1
DATE
PAGE
DES

DES  CS101A
TN   001 0 00 01
TYPE 2616
CDEN 8D
CUST 0
AOM  0
FDN  4000
TGAR 1
LDN  NO
NCOS 0
SGRP 0
RNPG 0
SCI  0
SSU
XLST
CLS  CTD FBD WTA LPR MTD FND 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 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 CDMR
CPND_LANG ENG
RCO  0
EFD  4000
HUNT 4000
```

```
EHT  4000
LHK  0
PLEV 02
CSDN
AST
IAPG 0
AACS NO
ITNA NO
DGRP
MLWU_LANG 0
DNDR 0
KEY  00 SCR 2214 0     MARP
       CPND
         NAME Zeus14
         XPLN 7
         DISPLAY_FMT FIRST,LAST
    01
    02
    03 CFW 4  4003
    04 AO6
    05 TRN
    06
    07
    08
    09
    10
    11
    12
    13 MIK
    14 MCK
    15 RGA
DATE  9 JAN 2007
```

Configuring the Local Cisco Unified CallManager Express (Cisco 3845)

```
c3845CME#sh run
Building configuration...

Current configuration : 4560 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname c3845CME
!
boot-start-marker
boot system flash:c3845-ipvoice-mz.124-11.T.bin
boot-end-marker
!
logging buffered 10000000
no logging console
enable password cisco
!
no aaa new-model
network-clock-participate wic 0
network-clock-select 1 E1 0/0/1
ip cef
!
!
no ip dhcp use vrf connected
ip dhcp excluded-address 200.1.1.1
!
ip dhcp pool phone
  network 200.1.1.0 255.255.255.0
  option 150 ip 200.1.1.1
  default-router 200.1.1.1
!
!
no ip domain lookup
multilink bundle-name authenticated
```

```
!
isdn switch-type primary-qsig
voice-card 0
 no dspfarm
!
!
!
voice call send-alert
!
voice service pots
 supplementary-service qsig call-forward
!
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
 h323
 sip
  bind control source-interface GigabitEthernet0/1
  bind media source-interface GigabitEthernet0/1
  rel1xx disable
  min-se  100
  ds0-num
  header-passing
  registrar server
!
!
!
!
!
!
!
!
!
!
!
!
voice register global
```

```
 mode cme
 source-address 200.1.1.1 port 5060
 max-dn 100
 max-pool 192
 load 7960-7940 POS3-07-5-00
 tftp-path flash:
 create profile sync 0012445613433369
!
voice register dn  1
 number 4000
 call-forward b2bua noan 2214 timeout 5
 name Zidane
 huntstop
!
voice register dn  2
 number 4001
 call-forward b2bua busy 2500
 call-forward b2bua noan 2500 timeout 5
 name Platini
 huntstop
!
voice register pool  1
 id mac 000F.9054.2FC2
 type 7960
 number 1 dn 1
 max registrations 240
 dtmf-relay rtp-nte
 description Zidane
!
voice register pool  2
 id mac 0012.4362.BF71
 type 7960
 number 1 dn 2
 max registrations 240
 dtmf-relay rtp-nte
 description Platini
!
!
!
```

```
!
!
!
!
controller E1 0/0/0
!
controller E1 0/0/1
 clock source line primary
 pri-group timeslots 1-31
!
!
!
!
interface GigabitEthernet0/0
 ip address 172.20.8.26 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
 no keepalive
!
interface GigabitEthernet0/1
 ip address 200.1.1.1 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
 no keepalive
!
interface Serial0/0/1:15
 no ip address
 encapsulation hdlc
 isdn switch-type primary-qsig
 isdn overlap-receiving
 isdn incoming-voice voice
 isdn bchan-number-order ascending
 no cdp enable
!
ip default-gateway 172.20.8.1
ip route 0.0.0.0 0.0.0.0 172.20.8.1
ip route 201.2.2.0 255.255.255.0 172.20.8.27
```

```
!
!
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:P0S3-07-5-00.bin
tftp-server flash:P0S3-07-5-00.sb2
tftp-server flash:P0S3-07-5-00.loads
tftp-server flash:TERM41.7-0-3-0S
tftp-server flash:P0030702T023
!
control-plane
!
!
!
voice-port 0/0/1:15
 mwi
!
!
!
!
!
dial-peer voice 6000 voip
 destination-pattern 4..[89]
 session target ipv4:201.2.2.1
 no vad
!
dial-peer voice 95558000 pots
 destination-pattern 3...
 direct-inward-dial
 port 0/0/1:15
 forward-digits all
!
dial-peer voice 2200 pots
```

```
 destination-pattern 2...
incoming called-number ....
 direct-inward-dial
 port 0/0/1:15
 forward-digits all
!
dial-peer voice 5200 voip
 destination-pattern 5...
 session target ipv4:201.2.2.1
 no vad
!
!
gateway
 timer receive-rtp 1200
!
sip-ua
 retry options 0
 mwi-server ipv4:200.1.1.1 expires 3600 port 5060 transport udp
!
!
telephony-service
 load 7960-7940 P0030702T023
 load 7961 TERM41.7-0-3-0S
 max-ephones 96
 max-dn 192
 ip source-address 200.1.1.1 port 2000
 system message ABC Corp
 mwi relay
 max-conferences 8 gain -6
 call-forward pattern .T
 moh music-on-hold.au
 dn-webedit
 time-webedit
 transfer-system full-blind
 transfer-pattern ....
 secondary-dialtone 9
 create cnf-files version-stamp Jan 01 2002 00:00:00
!
!
```

```
ephone-dn  3  dual-line
 call-waiting ring
 number 4002
 label 4002
 description Pele
 name Pele
 call-forward busy 2500
 call-forward noan 2500 timeout 5
 huntstop channel
!
!
ephone-dn  4  dual-line
 call-waiting ring
 number 4003
 label 4003
 description Beckenbauer
 name Beckenbauer
 huntstop channel
!
!
ephone-dn  5  dual-line
 call-waiting ring
 number 4004
 label 4004
 description H. Sanchez
 name Sanchez
 huntstop channel
!
!
ephone  3
 mac-address 0017.0EEE.2F5E
 type 7961
 keep-conference
 button  1:3
!
!
!
ephone  4
 mac-address 0015.2B8F.351B
```

```
 type 7961
 keep-conference
 button  1:4
!
!
!
ephone  5
 mac-address 0014.1C48.DE7A
 type 7960
 keep-conference
 button  1:5
!
!
!
line con 0
 password cisco
 login
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 exec-timeout 0 0
 password cisco
 login
!
scheduler allocate 20000 1000
!
end

c3845CME#
```

```
c2801CME#sh run
Building configuration...

Current configuration : 3139 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname c2801CME
!
boot-start-marker
boot system flash:c2801-ipvoice-mz.124-11.T.bin
boot-end-marker
!
logging buffered 100000000
no logging console
enable password cisco
!
no aaa new-model
network-clock-participate wic 1
network-clock-select 1 E1 0/1/1
ip cef
!
!
no ip dhcp use vrf connected
ip dhcp excluded-address 201.2.2.1
!
ip dhcp pool phone
  network 201.2.2.0 255.255.255.0
  option 150 ip 201.2.2.1
  default-router 201.2.2.1
!
!
no ip domain lookup
multilink bundle-name authenticated
```

```
!
isdn switch-type primary-qsig
!
voice-card 0
!
!
!
voice service pots
!
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
 h323
 sip
  registrar server expires max 600 min 60
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
!
controller E1 0/1/0
!
controller E1 0/1/1
 pri-group timeslots 1-31
```

```
!
!
!
!
interface FastEthernet0/0
 ip address 172.20.8.27 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 ip address 201.2.2.1 255.255.255.0
 duplex auto
 speed auto
!
interface Serial0/1/1:15
 no ip address
 encapsulation hdlc
 isdn switch-type primary-qsig
 isdn incoming-voice voice
 no cdp enable
!
ip default-gateway 172.20.8.1
ip route 0.0.0.0 0.0.0.0 172.20.8.1
ip route 200.1.1.0 255.255.255.0 172.20.8.26
!
!
ip http server
ip http authentication local
ip http path flash:
!
disable-eadi
!
!
tftp-server flash:P003-07-5-00.bin
tftp-server flash:P003-07-5-00.sbn
tftp-server flash:P0S3-07-5-00.bin
tftp-server flash:P0S3-07-5-00.sb2
tftp-server flash:P0S3-07-5-00.loads
tftp-server flash:TERM41.7-0-3-0S
```

```
tftp-server flash:P0030702T023
!
control-plane
!
!
!
voice-port 0/1/1:15
!
!
!
!
!
dial-peer voice 4000 voip
 destination-pattern 4..[0123]
 session target ipv4:200.1.1.1
 no vad
!
dial-peer voice 9 voip
 destination-pattern 3...
 session target ipv4:200.1.1.1
 no vad
!
dial-peer voice 5200 pots
 destination-pattern 5...
incoming called-number ....
 direct-inward-dial
 port 0/1/1:15
 forward-digits all
!
dial-peer voice 2200 voip
 destination-pattern 2...
 session target ipv4:200.1.1.1
 dtmf-relay rtp-nte
 no vad
!
!
!
telephony-service
 load 7960-7940 P0030702T023
```

```
 load 7961 TERM41.7-0-3-0S

 max-ephones 30
 max-dn 150
 ip source-address 201.2.2.1 port 2000
 system message CBA Corp
 max-conferences 8 gain -6
 call-forward pattern .T
 moh music-on-hold.au
 dn-webedit
 time-webedit
 transfer-system full-blind
 transfer-pattern ....
 secondary-dialtone 9
 create cnf-files version-stamp 7960 Oct 12 2006 11:41:08
!
!
ephone-dn  1  dual-line
 number 4008
 label 4008
 description Ronaldinho
 name Ronaldinho
 call-forward busy 2213
 call-forward noan 2500 timeout 5
 huntstop channel
!
!
ephone-dn  4  dual-line
 number 4009
 label 4009
 description Tevez
 name Tevez
 call-forward noan 5002 timeout 10
 huntstop channel
!
!
ephone  1
 mac-address 000F.9069.DB2C
 type 7960
```

```
 keep-conference
 button  1:1
!
!
!
ephone  4
 mac-address 0030.94C3.31AD
 type 7960
 keep-conference
 button  1:4
!
!
!
line con 0
 password cisco
 login
line aux 0
line vty 0 4
 exec-timeout 0 0
 password cisco
 login
!
scheduler allocate 20000 1000
end

c2801CME#
```

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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