



Nortel CS1000E Release 5.0 using T1 QSIG to Cisco Unified Communications Manager Express Release 7.1

May 29, 2009 - Initial Version

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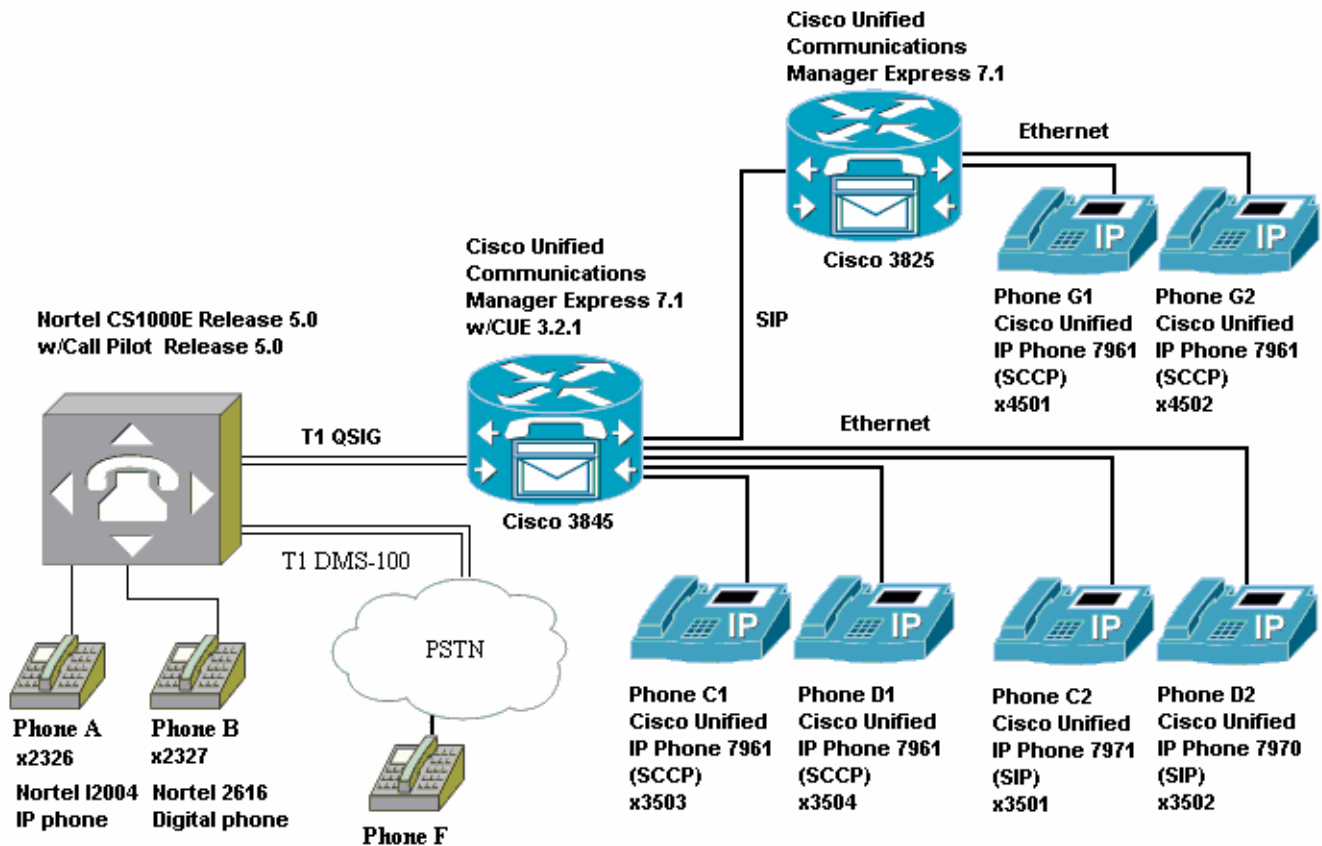
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Introduction

- This is an Application Note for connectivity between a Nortel CS1000E Release 5.0 PBX and Cisco Unified Communications Manager Express (CUCME) Release 7.1 using a Cisco 3845 voice gateway equipped with QSIG protocol.
- The network topology diagram (Figure 1) shows the test setup for end-to-end interoperability with Cisco Unified Communications Manager Express Release 7.1 connected to the PBX via the 3845 T1 QSIG link. The 3845 IOS voice gateway was connected via SIP to a Cisco 3825 IOS voice gateway. The two gateways were running Cisco Unified Communications Manager Express 7.1. Cisco Unified IP phones (models 7961G, 7970 and 7971) were connected to the 2 Cisco Unified Communications Manager Express gateways via SIP and SCCP, as per figure 1. A NM-HDV and VWIC2-2MFT-T1/E1 were used for the T1 QSIG interface and a Cisco Unity Express was used for central voicemail system. Calls were made to test basic call, caller ID, conference, transfer, forward, call back, reroute, and MWI features.
- This Application Note uses the 3845 and 3825 voice gateways. However, the use of other Cisco voice gateways is also an option since Cisco Unified Communications 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 7.1 supports SIP end-points with limited number of features.

Network Topology

Figure 1. Basic Call Setup



Limitations

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

Basic Calls

- Cisco Unified Communications Manager Express (CUCME) does not support overlap sending. It supports overlap receiving.
- Calling Name Restriction is not supported for calls originated from Cisco Unified Communications Manager Express 7.1.
- Connected Number/Name Restriction is not supported from Cisco Unified Communications Manager Express 7.1.



Call Transfers

- The Nortel PBX will not perform a true blind transfer. It can perform a consultation transfer or early attended transfer.
- For most call transfers, the called (connected) name and number are not updated on the original phone after the transfer.
- For most call transfers by join Network/external, 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. The remaining local transfers and all blind transfers result in the original calling name and number information displaying properly.
- CUCME TNP SIP phones does not support blind transfer external. Only support Early transfer and Full consults.

Call Forwards

- 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 Communications Manager Express SCCP extension, and forwarded to a local Cisco Unified Communications Manager Express extension (e.g., A calls G1, and G1 forwards to C2), Cisco Unified Communications Manager Express does not perform a QSIG reroute.
- The Nortel PBX does not support reroute on forwarded calls resulting in a hairpin (i.e, Cisco Unified Communications Manager Express 7.1 phone calls a PBX phone that forwards back to another Cisco Unified Communications Manager Express 7.1 phone).
- Forwarded calls originated from a Nortel PBX extension to a remote Cisco Unified Communications Manager Express SCCP extension, and forwarded to local Cisco Unified Communications Manager Express extension (e.g., A calls G1 forwards to C1 or D1), when using SIP trunk between local and Remote CUCMEs, Cisco Unified Communications Manager Express does not performs a reroute.
- Call Forwarded Universal (CFU) calls that are initiated by overlap dialing from a Nortel PBX extension to a Cisco Unified Communications Manager Express (CUCME) extension and forwarded to another Unified Communications Manager Express station. The call completes, but Cisco Unified Communications Manager Express does not perform a reroute, even if reroute is enabled and the call is eligible for a reroute. However, If for Call Forwarding Busy or No Answer, the Cisco Unified Communications Manager Express does perform a reroute.

MWI

- MWI does not work with SIP extensions on Cisco Unified Communications Manager Express 7.1 with the Nortel PBX as the message center PINX.
- MWI is not supported when a remote CUCME extensions uses the Nortel PBX as the message center PINX if a remote CUCME connects to a local CUCME using SIP trunk (i.e.station A on Nortel PBX calls a remote Cisco Unified Communications Manager Express 7.1 station G1 that forwards to Nortel PBX with Call Pilot. The station A is able to leave a message for station G1. But, MWI does not work when using SIP trunk between local and remote CUCMEs.

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 Communications Manager Express 7.1 station programmed to forward all calls to another Nortel station within the network (i.e. a station on Nortel PBX1 calls a Cisco Unified Communications Manager Express 7.1 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).

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System Components

Hardware Requirements

- Cisco 3845 IOS voice gateway
 - NM-HDV
 - VWIC2-2MFT-T1/E1



- NME-CUE 3.2.1
- Cisco 3825 IOS voice gateway
- (4) Cisco Unified IP phone 7961s
- (1) Cisco Unified IP phone 7971
- (1) Cisco Unified IP phone 7970
- (1) Nortel CS-1000E
 - (2) Nortel 2616 digital phones
 - (1) Nortel I2004 IP phone
 - (1) NTAK09BA T1 trunk card
- Nortel CallPilot voice mail system

Software Requirements

- Cisco Unified Communications Manager Express Release 7.1
- Cisco IOS Software, 3800 Software (C3845-IPVOICE-M), Version 12.4 (22) YB1
- Cisco IOS Software, 3800 Software (C3825-IPVOICE-M), Version 12.4(22) YB1
- Nortel CS1000E Release 5.0
- Nortel CallPilot Release 5.0

C2, D2 – 7970, 7971 - SIP

- Cisco 7970/7971 IP phone app load SIP70-8-4-2S

G1, G2 , C1, D1– 7961 – SCCP

- Cisco7961G IP phone load file: apps41.8-4-23.sbn

Features

This section lists supported and unsupported features.

Features Supported

- Basic Call, ENBLOC
- Basic Call, Overlap (from PBX to Cisco Unified Communications Manager 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 Communications Manager 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)
- Alerting Name (for calls between PBX and Cisco Unified IP Phones)
- 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 Communications Manager Express 7.1 to Nortel PBX
- CNIR-Calling Name Identification Restriction from Cisco Unified Communications Manager Express 7.1 to Nortel PBX
- COLR- Connected Line (Number) Identification Restriction
- CONR- Connected Name Identification Restriction
- CONP-Connected Name Identification Presentation (for calls between Nortel PBX and Cisco Unified IP Phones running SIP)
- Alerting Name (for calls between Nortel PBX and Cisco Unified IP Phones running SIP)
- Blind Transfers initiated from Nortel PBX
- 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 Name Identification Presentation on Forwarded Calls to a Nortel 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 Communications Manager 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

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

Configuring the Nortel CS 1000E PBX with Software Release 5.0

Configure in the following sequence:

1. The common equipment.
2. The D-channel.
3. The route data block.
4. The trunk data block.
5. The coordinated dialing plan.
6. The digital station phone.

Configuring the Nortel CS 1000E IP PBX

COMMON EQUIPMENT CONFIGURATION (LD 17)

```
>ld 22
PT2000
REQ prt
TYPE cequ
CEQU
MPED 8D
TERM
REMO
TERD
REMD
TERQ
REMQ
SUPL V000 V020
SUPC
SUPF
XCT
CONF
MGTD5 IPMG IPMG_TYPE
100 000 0 MGC
102 000 0 MGC
MGCONF IPMG PORTS IPMG_TYPE
101 000 0 30 MGC
103 000 0 30 MGC
MFSD * 100 * 102
DLOP NUM DCH FRM TMDI LCMT YALM T1TE TRSH MG_CARD
PRI 011 24 ESF NO B8S FDL - 00 000 0 01
012 24 ESF NO B8S FDL - 00 000 0 02
PRI2 MG_CARD
014 000 0 04
DTI2 MG_CARD
```



MISP MG_CARD
EXT0 3PE
EXT1 3PE
MCFN 011 MB
D-CHANNEL CONFIGURATION (LD 17)

LD 22
REQ prt
TYPE adan
ADAN DCH 11
CTYP MSDL
MG_CARD 000 0 01
PORT 1
DES T1QSIG
USR PRI
DCHL 11
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
OVLN YES
DIDD 0
OVLS NO
T310 120
T200 3
T203 10
N200 3
N201 260
K 7
REQ
ROUTE DATA BLOCK CONFIGURATION (LD 16)
>LD 21
PT1000
REQ: PRT
TYPE: RDB
CUST 0
ROUT 101
TYPE RDB



CUST 00
ROUT 101
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 705
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
REQ:

TRUNK DATA BLOCK CONFIGURATION (LD 14)

> Id 20
PT0000
REQ: prt
TYPE: tnb
TN 011 1
DATE
PAGE
DES
DES T1QSIG
TN 011 01 VIRTUAL
TYPE TIE
CDEN SD
CUST 0
TRK PRI
PDCA 1
PCML MU
NCOS 0
RTMB 101 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 6 JUN 2008
NACT

ROUTE LIST BLOCK (LD 86)

>ld 86
ESN000
MEM AVAIL: (U/P): 99165874 USED U P: 5049349 54598 TOT: 104269821
DISK SPACE NEEDED: 47 KBYTES
REQ prt
CUST 0
FEAT rlb
RLI 1
RLI 1
ENTR 0
LTER NO
ROUT 101
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): 99165874 USED U P: 5049349 54598 TOT: 104269821
DISK SPACE NEEDED: 47 KBYTES
REQ

COORDINATED DIALING PLAN (LD 87)

>LD 87
ESN000
MEM AVAIL: (U/P): 99166898 USED U P: 5049015 53908 TOT: 104269821
DISK SPACE NEEDED: 46 KBYTES
REQ PRT
CUST 0
FEAT CDP
TYPE DSC
DSC 350
DSC 350
FLEN 0



DSP LSC
RLI 1
NPA
NXX
MEM AVAIL: (U/P): 99166898 USED U P: 5049015 53908 TOT: 104269821
DISK SPACE NEEDED: 46 KBYTES

REQ prt
CUST 0
FEAT cdp
TYPE dsc
DSC 450
DSC 450
FLEN 0
DSP LSC
RLI 1
NPA
NXX

STATION CONFIGURATION (LD 11)

>ld 11
SL1000
MEM AVAIL: (U/P): 99139241 USED U P: 5064540 66040 TOT: 104269821
DISK SPACE NEEDED: 52 KBYTES
DIGITAL TELEPHONES AVAIL: 3 USED: 5 TOT: 8
IP USERS AVAIL: 17 USED: 7 TOT: 24
BASIC IP USERS AVAIL: 7 USED: 1 TOT: 8
TEMPORARY IP USERS AVAIL: 0 USED: 0 TOT: 0
ACD AGENTS AVAIL: 10 USED: 0 TOT: 10
PCA AVAIL: 4 USED: 1 TOT: 5
AST AVAIL: 5 USED: 0 TOT: 5
SIP CONVERGED DESKTOPS AVAIL: 0 USED: 0 TOT: 0
SIP CTI TR87 AVAIL: 5 USED: 0 TOT: 5
TNS AVAIL: 32530 USED: 230 TOT: 32760
DATA PORTS AVAIL: 32760 USED: 0 TOT: 32760

REQ: prt
TYPE: 2004p2
TN 020 0 0 3
DATE
PAGE
DES
MODEL_NAME
EMULATED
KEM_RANGE

DES CS2320
TN 020 0 00 03 VIRTUAL
TYPE 2004P2
CDEN 8D
CTYP XDLC
CUST 0
NUID



NHTN
CFG_ZONE 000
CUR_ZONE 000
ERL 0
ECL 0
FDN 3502
TGAR 0
LDN NO
NCOS 0
SGRP 0
RNPG 0
SCI 0
SSU
XLST
CLS UNR FBA WTA LPR MTD FNA HTA TDD HFA CRPD
MWA LMPN RMMD SMWD AAD IMD XHD IRD NID OLD VCE DRG1
POD DSX VMD SLKD CCSD SWD LND CNDA
CFTD 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
USMD USRD ULAD RTDD RBDD RBHD PGND FLXD FTTC DNDY DNO3 MCBN
VOLA VOUD CDMR ICRD MCDD T87D KEM2 MSNV FRA PKCH
CPND_LANG ENG
RCO 0
HUNT 3502
LHK 0
PLEV 02
DANI NO
AST
IAPG 0
AACS NO
ITNA NO
DGRP
MLWU_LANG 0
MLNG ENG
DNDR 0
KEY 00 SCR 2326 0 MARP
CPND
NAME ri2326
XPLN 13
DISPLAY_FMT FIRST, LAST
01 MIK
02
03
04
05
06
07
08
09



10
11
12
13
14
15
16
17 TRN
18 AO6
19 CFW 16 6800
20 RGA
21 PRK
22 RNP
23
24 PRS
25 CHG
26 CPN
27
28
29
30
31

DATE 28 MAY 2009

NACT
REQ: prt
TYPE: 2616
TN 000 0 7 2
DATE
PAGE
DES

DES T2325
TN 000 0 07 02 VIRTUAL
TYPE 2616
CDEN 8D
CTYP XDLC
CUST 0
AOM 0
ERL 0
FDN 6800
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 SLKD CCSD SWD LND CNDA



CFTA SFD MRD DDV CNID CDCA MSID DAPA BFED RCBD
ICDD CDMD LLCN MCTD CLBD AUTU
GPUD DPUA DNDA CFXA 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
EFD 6800
HUNT 6800
EHT 6800
LHK 0
PLEV 02
DANI NO
AST
IAPG 0
AACS NO
ITNA NO
DGRP
MLWU_LANG 0
DNDR 0
KEY 00 SCR 2327 0 MARP
CPND
NAME I1share9
XPLN 13
DISPLAY_FMT FIRST, LAST
01 MIK
02
03 CFW 4 2500
04 AO6
05 TRN
06 RGA
07
08
09
10
11
12
13
14
15
DATE 1 MAY 2009

NACT
REQ:

SOFTWARE RELEASE (LD 22)
>ld 22
PT2000
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 Unified Communications Manager Express (Local)

Ri_103# sh ver

Cisco IOS Software, 3800 Software (C3845-IPVOICEK9-M), Version 12.4(22)YB1, RELEASE SOFTWARE (fc1)
Technical Support: <http://www.cisco.com/techsupport>
Copyright (c) 1986-2009 by Cisco Systems, Inc.
Compiled Wed 18-Mar-09 22:45 by prod_rel_team

ROM: System Bootstrap, Version 12.3(11r)T1, RELEASE SOFTWARE (fc1)

Ri_103 uptime is 3 weeks, 2 days, 3 hours, 45 minutes
System returned to ROM by reload at 18:24:27 UTC Mon May 18 2009
System image file is "flash:c3845-ipvoicek9-mz.124-22.YB1.bin"

This product contains cryptographic features and is subject to United States and local country laws governing import, export, transfer and use. Delivery of Cisco cryptographic products does not imply third-party authority to import, export, distribute or use encryption. Importers, exporters, distributors and users are responsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
<http://www.cisco.com/www/export/crypto/tool/stqrg.html>

If you require further assistance please contact us by sending email to export@cisco.com.

Cisco 3845 (revision 1.0) with 216064K/46080K bytes of memory.
Processor board ID FHK0847F0W7
2 Gigabit Ethernet interfaces
48 Serial interfaces
1 terminal line
2 Channelized/Clear T1/PRI ports
2 Voice FXS interfaces
1 cisco Integrated Service Engine(s)
Cisco Unity Express 3.2.1 in slot 4
DRAM configuration is 64 bits wide with parity enabled.
479K bytes of NVRAM.
125440K bytes of ATA System CompactFlash (Read/Write)

Configuration register is 0x2102



Ri_103#sh run

Building configuration...

Current configuration : 7398 bytes

```
!  
version 12.4  
service timestamps debug datetime msec  
service timestamps log datetime msec  
no service password-encryption  
!  
hostname Ri_103  
!  
boot-start-marker  
boot-end-marker  
!  
card type t1 0 0  
logging message-counter syslog  
logging buffered 10000000  
no logging console  
enable password cisco  
!  
no aaa new-model  
no network-clock-participate slot 3  
network-clock-participate wic 0  
network-clock-select 1 T1 0/0/0  
!  
dot11 syslog  
ip source-route  
ip cef  
!  
!  
!  
no ip domain lookup  
no ipv6 cef  
multilink bundle-name authenticated  
!  
!  
!  
isdn switch-type primary-qsig  
!  
voice-card 0  
dspfarm  
!  
voice-card 3  
!  
!  
!  
voice service pots
```



supplementary-service qsig call-forward¹

```
!  
voice service voip  
  qsig decode2  
  allow-connections h323 to h323  
  allow-connections h323 to sip  
  allow-connections sip to h323  
  allow-connections sip to sip  
  supplementary-service h450.12  
  h323  
  sip  
  registrar server  
!  
!  
!  
voice class codec 1  
  codec preference 1 g729r8  
!  
!  
!  
!  
!  
!  
!  
!  
!  
!  
!  
voice register global  
  mode cme  
  source-address 172.20.192.103 port 5060  
  max-dn 100  
  max-pool 185  
  load 7971 SIP70.8-4-2S  
  load 7970 SIP70.8-4-2S  
  tftp-path flash:  
  create profile sync 000193233061543A3  
!  
voice register dn 1  
  number 3501  
  call-forward b2bua busy 23274  
  call-forward b2bua noan 2327 timeout 105  
  name SIP1 3501  
  refer target dial-peer  
  huntstop
```

¹ Insert this command for QSIG call forward by reroute

² Insert this command for QSIG conversion

³ This command is required to create/update the station profiles

⁴ Insert this command for Call Forward Busy feature testing

⁵ Insert this command for Call Forward No-Answer feature testing.



```
mwi6
!
voice register dn 2
  number 3502
  call-forward b2bua busy 2327
  call-forward b2bua noan 3504 timeout 7
  name SIP 3502
  huntstop
  mwi
!
voice register pool 1
  id mac 001F.9EAC.0D60
  type 7971
  number 1 dn 1
  dtmf-relay rtp-nte
  username ri3501 password cisco
  no call-waiting
  description SIP2X
  codec g711ulaw
!
voice register pool 2
  id mac 000E.84F6.00D6
  type 7970
  number 1 dn 2
  dtmf-relay rtp-nte
  username ri3502 password cisco
  no call-waiting
  description SIPD2
  codec g711ulaw
!
!
!
!
!
!
!
archive
  log config
  hidekeys
!
!
controller T1 0/0/0
  cablelength long 0db
  pri-group timeslots 1-24
!
controller T1 0/0/1
  clock source internal
  cablelength long 0db
  pri-group timeslots 1-24 service mgcp
!
!
```

⁶ This command is required for MWI to work on this DN.



```
!  
!  
!  
interface GigabitEthernet0/0  
ip address 172.20.192.103 255.255.255.0  
duplex auto  
speed auto  
media-type rj45  
no keepalive  
!  
interface GigabitEthernet0/1  
no ip address  
shutdown  
duplex auto  
speed auto  
media-type rj45  
!  
interface Serial0/0/0:23  
no ip address  
encapsulation hdlc  
isdn switch-type primary-qsig  
isdn overlap-receiving7  
isdn incoming-voice voice  
isdn send-alerting  
isdn bchan-number-order ascending  
no cdp enable  
!  
interface Serial0/0/1:23  
no ip address  
encapsulation hdlc  
shutdown  
isdn switch-type primary-qsig  
isdn timer T310 120000  
isdn overlap-receiving  
isdn protocol-emulate network  
isdn incoming-voice voice  
isdn bind-l3 ccm-manager  
isdn send-alerting  
no cdp enable  
!  
interface Integrated-Service-Engine4/0  
ip unnumbered GigabitEthernet0/0  
service-module ip address 172.20.192.199 255.255.255.0  
!Application: CUE Running on NME  
service-module ip default-gateway 172.20.192.103  
no keepalive  
!  
ip default-gateway 172.20.192.1  
no ip forward-protocol nd  
ip route 0.0.0.0 0.0.0.0 172.20.192.1  
ip route 172.20.192.199 255.255.255.255 Integrated-Service-Engine4/0
```

⁷ Insert this command for Overlap testing when CUCME is at the receiving end.



```
!  
ip http server  
no ip http secure-server  
!  
!  
!  
!  
!  
tftp-server flash:jar70sip.8-4-1-23.sbn  
tftp-server flash:dsp70.8-4-1-23.sbn  
tftp-server flash:cvm70sip.8-4-1-23.sbn  
tftp-server flash:cnu70.8-4-1-23.sbn  
tftp-server flash:apps70.8-4-1-23.sbn  
tftp-server flash:term61.default  
tftp-server flash:term41.default  
tftp-server flash:jar41sccp.8-4-1-23.sbn  
tftp-server flash:dsp41.8-4-1-23.sbn  
tftp-server flash:cvm41sccp.8-4-1-23.sbn  
tftp-server flash:cnu41.8-4-1-23.sbn  
tftp-server flash:apps41.8-4-1-23.sbn  
tftp-server flash:term71.default.loads  
tftp-server flash:term70.default.loads  
tftp-server flash:SIP70.8-4-2S.loads  
tftp-server flash:SCCP41.8-4-2S.loads  
tftp-server flash:term61.default.loads  
tftp-server flash:term41.default.loads  
!  
control-plane  
!  
!  
!  
voice-port 0/0/0:23  
mwi  
!  
voice-port 0/0/1:23  
!  
voice-port 3/0/0  
!  
voice-port 3/0/1  
station-id name RI-NGUYEN  
station-id number 6901  
caller-id enable  
!  
ccm-manager fax protocol cisco  
!  
no mgcp timer receive-rtcp  
mgcp fax t38 ecm  
!  
sccp local GigabitEthernet0/0  
sccp ccm 172.20.192.21 identifier 1 version 3.1  
sccp  
!  
sccp ccm group 1
```



```
associate ccm 1 priority 1
associate profile 1 register mtp0015f90d0990
!
dspfarm profile 1 transcode
!
!
dial-peer voice 2320 pots
destination-pattern 232.
incoming called-number ....
supplementary-service qosig call-forward1
no digit-strip
direct-inward-dial
port 0/0/0:23
forward-digits all
!
dial-peer voice 6900 pots
destination-pattern 690.
incoming called-number ....
no digit-strip
direct-inward-dial
port 3/0/1
forward-digits all
!
dial-peer voice 6888 voip
destination-pattern 680[09]
session protocol sipv2
session target ipv4:172.20.192.199
incoming called-number 6800
dtmf-relay rtp-nte8
codec g711ulaw
no vad
!
dial-peer voice 5702 pots
destination-pattern 570.
incoming called-number ....
no digit-strip
direct-inward-dial
port 0/0/0:23
forward-digits all
!
dial-peer voice 4500 voip
destination-pattern 450.
session protocol sipv2
session target ipv4:172.20.192.21
dtmf-relay rtp-nte
codec g711ulaw
no vad
!
dial-peer voice 6500 pots
destination-pattern 65..
incoming called-number ....
```

⁸ This command is required for DTMF sendings.



```
supplementary-service qsig call-forward
no digit-strip
direct-inward-dial
port 0/0/0:23
forward-digits all
!
dial-peer voice 2500 pots
destination-pattern 2500
incoming called-number ....
supplementary-service qsig call-forward
no digit-strip
direct-inward-dial
port 0/0/0:23
forward-digits all
!
!
sip-ua
mwi-server ipv4:172.20.192.199 expires 3600 port 5060 transport udp unsolicited
!
!
telephony-service
sdspfarm units 2
sdspfarm transcode sessions 10
sdspfarm tag 1 mtp0015f90d0990
em logout 0:0 0:0 0:0
max-ephones 10
max-dn 20
ip source-address 172.20.192.103 port 2000
load 7961 SCCP41.8-4-2S
time-zone 5
max-conferences 8 gain -6
call-forward pattern .T
moh music-on-hold.au
transfer-system full-consult9
transfer-pattern .... blind10
create cnf-files version-stamp Jan 01 2002 00:00:00
!
!
ephone-dn 3 dual-line
call-waiting ring
number 3503
label SCCP3503
description Pele
name SCCP3503
call-forward busy 2327
call-forward noan 2327 timeout 10
!
!
ephone-dn 4 dual-line
number 3504
```

⁹ Insert this command for Call Transfer consultation feature testing.

¹⁰ Insert this command for Call Transfer Blind feature testing



```
label SCCP3504
description SCCP 3504
name SCCP 3504
call-forward busy 2327
call-forward noan 3504 timeout 10
huntstop channel
!
!
ephone 3
conference drop-mode creator
mac-address 0016.C71B.F3F6
type 7961
keep-conference endcall
button 1:3
!
!
!
ephone 4
mac-address 0007.0E36.5339
type 7961
keep-conference endcall
button 1:4
!
!
!
line con 0
exec-timeout 0 0
password cisco
login
line aux 0
line 258
no activation-character
no exec
transport preferred none
transport input all
transport output pad telnet rlogin lapb-ta mop udptn v120 ssh
line vty 0 4
exec-timeout 0 0
password cisco
login
line vty 5 10
exec-timeout 0 0
password cisco
login
!
scheduler allocate 20000 1000
end
```

Ri_103#

Configuring the Cisco Unity Express

Ri_103#



se-172-20-192-199# sh run¹¹

Generating configuration:

clock timezone America/Los_Angeles

hostname se-172-20-192-199

ip domain-name pbxlab.org

system language preferred "en_US"

software download server url "ftp://127.0.0.1/ftp" credentials hidden "6u/dKTN/h

sEuSAEfw40XIF2eFHnZfyUTSd8ZZNgd+Y9J3xIk2B35j0nfGWTYHfmPSd8ZZNgd+Y9J3xIk2B35j0nfG
WTYHfmPSd8ZZNgd+Y9J3xIk2B35j0nfGWTYHfmP"

log trace local enable

site name local

end site

groupname Administrators create

groupname Broadcasters create

username cisco create

username user01 create¹²

username user02 create

username user03 create

username user04 create

username user05 create

username user06 create

username user07 create

username user08 create

username user09 create

username user01 phonenumber "2320"12

username user02 phonenumber "2327"

username user03 phonenumber "5702"

username user05 phonenumber "5703"

username user06 phonenumber "3503"

username user07 phonenumber "3501"

username user08 phonenumber "3502"

username user09 phonenumber "3504"

groupname Administrators member cisco

groupname Administrators privilege ManagePrompts

groupname Administrators privilege broadcast

groupname Administrators privilege local-broadcast

groupname Administrators privilege ManagePublicList

groupname Administrators privilege ViewPrivateList

groupname Administrators privilege vm-imap

groupname Administrators privilege ViewHistoricalReports

¹¹ CUE configuration settings.

¹² Create user 01 mailbox



```
groupname Administrators privilege ViewRealTimeReports
groupname Administrators privilege superuser
groupname Broadcasters privilege broadcast
```

```
restriction msg-notification create
restriction msg-notification min-digits 1
restriction msg-notification max-digits 30
restriction msg-notification dial-string preference 1 pattern * allowed
```

```
backup server url "ftp://127.0.0.1/ftp" credentials hidden "EWITygcMhYmjazXhE/VN
XHCkpIVV4KjescbDaLa4fl4WLSPFv1rWUnfGWTYHfmPSd8ZZNgd+Y9J3xlk2B35j0nfGWTYHfmPSd8Z
ZNgd+Y9J3xlk2B35j0nfGWTYHfmP"
```

```
calendar biz-schedule systemschedule
open day 1 from 00:00 to 24:00
open day 2 from 00:00 to 24:00
open day 3 from 00:00 to 24:00
open day 4 from 00:00 to 24:00
open day 5 from 00:00 to 24:00
open day 6 from 00:00 to 24:00
open day 7 from 00:00 to 24:00
end schedule
```

```
ccn application autoattendant aa
description "CiscoAA"
enabled
maxsessions 3
script "aa.aef"
parameter "busClosedPrompt" "AABusinessClosed.wav"
parameter "holidayPrompt" "AAHolidayPrompt.wav"
parameter "welcomePrompt" "AAWelcome.wav"
parameter "disconnectAfterMenu" "false"
parameter "dialByFirstName" "false"
parameter "allowExternalTransfers" "true"
parameter "MaxRetry" "3"
parameter "dialByExtnAnytime" "true"
parameter "busOpenPrompt" "AABusinessOpen.wav"
parameter "businessSchedule" "systemschedule"
parameter "dialByExtnAnytimeInputLength" "4"
parameter "operExtn" "6809"
end application
```

```
ccn application ciscomwiapplication aa
description "ciscomwiapplication"
enabled
maxsessions 8
script "setmwi.aef"
parameter "CallControlGroupID" "0"
parameter "strMWI_OFF_DN" "8001"
parameter "strMWI_ON_DN" "8000"
end application
```

```
ccn application msgnotification aa
```



```
description "msgnotification"  
enabled  
maxsessions 8  
script "msgnotify.aef"  
parameter "logoutUri" "http://localhost/voicemail/vxmlscripts/mbxLogout.jsp"  
parameter "DelayBeforeSendDTMF" "1"  
end application
```

```
ccn application promptmgmt aa  
description "promptmgmt"  
enabled  
maxsessions 1  
script "promptmgmt.aef"  
end application
```

```
ccn application voicemail aa  
description "voicemail"  
enabled  
maxsessions 8  
script "voicebrowser.aef"  
parameter "logoutUri" "http://localhost/voicemail/vxmlscripts/mbxLogout.jsp"  
parameter "uri" "http://localhost/voicemail/vxmlscripts/login.vxml"  
end application
```

```
ccn engine  
end engine
```

```
ccn reporting historical  
database local  
description "se-172-20-192-199"  
end reporting
```

```
ccn subsystem sip  
gateway address "172.20.192.103"  
dtmf-relay rtp-nte  
mwi sip unsolicited  
end subsystem
```

```
ccn trigger http urlname msgnotifytrg  
application "msgnotification"  
enabled  
maxsessions 2  
end trigger
```

```
ccn trigger http urlname mwiapp  
application "ciscomwiapplication"  
enabled  
maxsessions 1  
end trigger
```

ccn trigger sip phonenumber 6800¹³

¹³ General Voice mail box



```
application "voicemail"  
enabled  
maxsessions 4  
end trigger
```

ccn trigger sip phonenumber 6809¹⁴

```
application "autoattendant"  
enabled  
maxsessions 3  
end trigger
```

```
security password history depth 10  
security password lockout policy temp-lock  
security pin lockout policy temp-lock  
service phone-authentication  
end phone-authentication
```

```
service voiceview  
enable  
end voiceview
```

```
voicemail default mailboxsize 3000  
voicemail broadcast recording time 300  
voicemail default messagesize 240  
voicemail notification restriction msg-notification  
voicemail operator telephone 100  
voicemail capacity time 3000  
voicemail mailbox owner "user01" size 3000 12  
description "nortel2325"  
expiration time 10  
messagesize 120  
zerooutnumber "100"  
end mailbox
```

```
voicemail mailbox owner "user02" size 300  
description "nortel2327"  
expiration time 10  
messagesize 120  
end mailbox
```

```
voicemail mailbox owner "user03" size 300  
description "nortel2326"  
expiration time 10  
messagesize 120  
end mailbox
```

```
voicemail mailbox owner "user04" size 300  
description "nortel2320"  
expiration time 10  
messagesize 120  
end mailbox
```

¹⁴ Auto-Attendant Voice mail box



```
voicemail mailbox owner "user05" size 300
description "fxsport"
expiration time 21
end mailbox
```

```
voicemail mailbox owner "user06" size 300
description "CME3503"
expiration time 10
messagesize 120
end mailbox
```

```
voicemail mailbox owner "user07" size 300
description "CME3501"
expiration time 10
messagesize 120
end mailbox
```

```
voicemail mailbox owner "user08" size 300
description "CME3502"
expiration time 10
messagesize 120
end mailbox
```

```
voicemail mailbox owner "user09" size 300
description "CME3504"
expiration time 10
messagesize 120
end mailbox
```

```
end
se-172-20-192-199#
```



Configuring the Cisco Unified Communications Manager Express (Remote)

```
CME192.21#sh ver
Cisco IOS Software, 3800 Software (C3825-IPVOICEK9-M), Version 12.4(22)YB1, RELE
ASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2009 by Cisco Systems, Inc.
Compiled Wed 18-Mar-09 21:33 by prod_rel_team
```

```
ROM: System Bootstrap, Version 12.3(11r)T2, RELEASE SOFTWARE (fc1)
```

```
CME192.21 uptime is 3 weeks, 4 days, 23 hours, 15 minutes
System returned to ROM by reload at 21:22:55 UTC Fri May 15 2009
System image file is "flash:c3825-ipvoicek9-mz.124-22.YB1.bin"
```

This product contains cryptographic features and is subject to United States and local country laws governing import, export, transfer and use. Delivery of Cisco cryptographic products does not imply third-party authority to import, export, distribute or use encryption. Importers, exporters, distributors and users are responsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
<http://www.cisco.com/wwl/export/crypto/tool/stqrg.html>

If you require further assistance please contact us by sending email to export@cisco.com.

```
Cisco 3825 (revision 1.0) with 224256K/37888K bytes of memory.
Processor board ID FTX0946A1BT
2 Gigabit Ethernet interfaces
2 Channelized/Clear E1/PRI ports
1 Channelized/Clear T1/PRI port
2 Voice FXS interfaces
DRAM configuration is 64 bits wide with parity enabled.
479K bytes of NVRAM.
125440K bytes of ATA System CompactFlash (Read/Write)
```

```
Configuration register is 0x2102
```

```
CME192.21#
```

```
CME2 192.21
CME192.21#sh run
Building configuration...
```

```
Current configuration : 6878 bytes
!
version 12.4
service timestamps debug datetime msec
```



```
service timestamps log datetime msec
no service password-encryption
!
hostname CME192.21
!
boot-start-marker
boot system flash:c3825-ipvoicek9-mz.124-22.YB1.bin
boot-end-marker
!
card type t1 2 1
logging message-counter syslog
logging buffered 10000000
no logging console
enable password cisco
!
no aaa new-model
network-clock-participate slot 2
!
dot11 syslog
ip source-route
ip cef
!
!
!
!
no ip domain lookup
no ipv6 cef
multilink bundle-name authenticated
!
!
!
!
!
isdn switch-type primary-qsig
!
voice-card 0
!
voice-card 2
dspfarm
dsp services dspfarm
!
!
voice call send-alert
!
voice service pots
supplementary-service qsig call-forward
!
voice service voip
no notify redirect ip2ip
qsig decode
allow-connections h323 to h323
allow-connections h323 to sip
allow-connections sip to h323
allow-connections sip to sip
```




```
!  
!  
!  
!  
!  
!  
!  
archive  
  log config  
  hidekeys  
!  
!  
controller T1 2/0  
!  
controller E1 2/0/0  
!  
controller E1 2/0/1  
!  
!  
!  
!  
interface GigabitEthernet0/0  
  ip address 172.20.192.21 255.255.255.0  
  duplex auto  
  speed auto  
  media-type rj45  
!  
interface GigabitEthernet0/1  
  no ip address  
  shutdown  
  duplex auto  
  speed auto  
  media-type rj45  
!  
ip default-gateway 172.20.192.1  
ip forward-protocol nd  
ip route 0.0.0.0 0.0.0.0 172.20.192.1  
!  
ip http server  
ip http authentication local  
no ip http secure-server  
ip http path flash:  
!  
!  
!  
!  
!  
tftp-server flash:jar70sip.8-4-1-23.sbn  
tftp-server flash:dsp70.8-4-1-23.sbn  
tftp-server flash:cvm70sip.8-4-1-23.sbn  
tftp-server flash:cnu70.8-4-1-23.sbn  
tftp-server flash:apps70.8-4-1-23.sbn
```



```
tftp-server flash:jar41sccp.8-4-1-23.sbn
tftp-server flash:dsp41.8-4-1-23.sbn
tftp-server flash:cvm41sccp.8-4-1-23.sbn
tftp-server flash:cnu41.8-4-1-23.sbn
tftp-server flash:apps41.8-4-1-23.sbn
tftp-server flash:term70.default.loads
tftp-server flash:term71.default.loads
tftp-server flash:term61.default.loads
tftp-server flash:term41.default.loads
tftp-server flash:SCCP41.8-4-2S.loads
tftp-server flash:SIP70.8-4-2S.loads
!
control-plane
!
!
!
voice-port 0/1/0
!
voice-port 0/1/1
!
ccm-manager fax protocol cisco
!
mgcp fax t38 ecm
!
sccp local GigabitEthernet0/0
sccp ccm 172.20.192.21 identifier 1 version 3.1
sccp
!
sccp ccm group 1
  associate ccm 1 priority 1
  associate profile 1 register mtp0015f90d0990
!
dspfarm profile 1 transcode
  codec g711ulaw
  codec g711alaw
  codec g729ar8
  codec g729abr8
  codec g729r8
  codec g729br8
  maximum sessions 5
  associate application SCCP
!
!
dial-peer voice 9001 voip
  shutdown
  destination-pattern 45..
  rtp payload-type cisco-codec-fax-ind 98
  rtp payload-type nte 96
  voice-class codec 1
  no voice-class sip g729 annexb-all
  session protocol sipv2
  session target ipv4:172.20.239.252
  session transport udp
```



```
dtmf-relay rtp-nte
fax-relay ecm disable
!
dial-peer voice 5200 voip
description dial peer digital toward cs104
translation-profile incoming voip
shutdown
destination-pattern 23..
rtp payload-type cisco-codec-fax-ind 98
rtp payload-type nte 96
voice-class codec 1
no voice-class sip g729 annexb-all
session protocol sipv2
session target ipv4:172.30.11.100
session transport tcp
dtmf-relay rtp-nte
dtmf-interworking rtp-nte
fax-relay ecm disable
clid strip
no vad
!
dial-peer voice 2501 voip
destination-pattern 25..
voice-class codec 1
voice-class sip g729 annexb-all
session protocol sipv2
session target ipv4:172.20.192.103
session transport tcp
dtmf-relay rtp-nte
dtmf-interworking rtp-nte
fax-relay ecm disable
no vad
!
dial-peer voice 3500 voip
description dial peer digital toward CME
translation-profile incoming voip
shutdown
destination-pattern 35..
voice-class codec 1
no voice-class sip g729 annexb-all
session protocol sipv2
session target ipv4:172.20.192.103
session transport tcp
incoming called-number ....
dtmf-relay rtp-nte
dtmf-interworking rtp-nte
fax-relay ecm disable
no vad
!
dial-peer voice 3599 pots
shutdown
destination-pattern 3509
port 0/1/0
```



```
forward-digits all
!
dial-peer voice 2300 voip
description dial peer toward Nortel CS1000E
destination-pattern 23..
voice-class sip g729 annexb-all
session protocol sipv2
session target ipv4:172.20.192.103
session transport tcp
incoming called-number 23..
dtmf-relay rtp-nte
dtmf-interworking rtp-nte
codec g711ulaw
fax-relay ecm disable
no vad
!
dial-peer voice 6800 voip
destination-pattern 68..
session protocol sipv2
session target ipv4:172.20.192.199
incoming called-number ....
dtmf-relay rtp-nte
codec g711ulaw
no vad
!
dial-peer voice 3501 voip
destination-pattern 35..
session protocol sipv2
session target ipv4:172.20.192.103
incoming called-number ....
dtmf-relay rtp-nte
codec g711ulaw
no vad
!
dial-peer voice 6500 voip
destination-pattern 65..
voice-class sip g729 annexb-all
session protocol sipv2
session target ipv4:172.20.192.103
session transport tcp
incoming called-number 65..
dtmf-relay h245-alphanumeric
codec g711ulaw
fax-relay ecm disable
no vad
!
!
sip-ua
mwi-server ipv4:172.20.239.252 expires 3600 port 5060 transport udp unsolicited
!
!
telephony-service
sdspfarm units 2
```



```
sdspfarm transcode sessions 10
sdspfarm tag 1 mtp0015f90d0990
em logout 0:0 0:0 0:0
max-ephones 10
max-dn 20
ip source-address 172.20.192.21 port 2000
load 7961 SCCP41.8-4-2S
time-zone 5
max-conferences 8 gain -6
call-forward pattern .T
moh music-on-hold.au
transfer-system full-consult
transfer-pattern .... blind
create cnf-files version-stamp Jan 01 2002 00:00:00
!
!
ephone-dn 3 dual-line
call-waiting ring
number 4501
label SCCP4501
description Pele
name SCCP4501
call-forward all 2500
call-forward busy 3501
call-forward noan 2327 timeout 10
!
!
ephone-dn 4 dual-line
number 4502
label SCCP4502
description SCCP 4502
name SCCP 4502
call-forward busy 4503
huntstop channel
!
!
ephone 3
conference drop-mode creator
mac-address 001E.4A0B.FCD6
type 7961
keep-conference endcall
button 1:3
!
!
!
ephone 4
mac-address 001E.4A0B.FC85
type 7961
keep-conference endcall
button 1:4
!
!
!
```



```
line con 0
exec-timeout 0 0
password cisco
login
line aux 0
line vty 0 4
exec-timeout 0 0
password cisco
login
!
scheduler allocate 20000 1000
end
```

CME192.21#



Acronyms

Acronym	Definitions
CFB	Call Forward when Busy
CFNR	Call Forward when No Reply
CFU	Call Forward Unconditional
IOS	Internetworking Operating System
PBX	Private Branch Exchange
PRI	Primary Rate ISDN
ISR	Intergrated Services Routers
CUCME	Cisco Unify Communications Manager Express
SIP	Session Initiation Protocol
MWI	Message Waiting Indication
MGCP	Media Gateway Control Protocol
MoH	Music on Hold



Important Information

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Printed in the USA

