Nortel Communication Server 1000M Release 4.0 using T1 PRI DMS-100 to Cisco CallManager Release 4.1(3)

Introduction

- This is an application note for interoperability connectivity of Nortel Communication Server 1000 (formerly known as Succession 1000) PBX with Cisco CallManager Release 4.1(3) using a Cisco 2851 MGCP Gateway configured with T1 PRI DMS-100 switch-type.
- The network topology diagram (Figure 1) shows the test setup for end-to-end interoperability between the Nortel CS1000 PBX and Cisco CallManager using ISDN PRI DMS-100 switch-type protocol.
- Cisco CallManager must be configured as ISDN network-side signaling since Nortel CS1000 PBX only allows for ISDN user-side signaling for PRI DMS-100 switch-type protocol.
- Basic calls worked fine in both directions with calling/connected name feature. Both CCM and Nortel use the DISPLAY IE with the ISDN signaling messages to pass the phone’s name information across to each other. Please ensure the Display IE Delivery, Send Extra Leading Character In DisplayIE and MCDN Channel Number Extension Bit Set to Zero boxes are all checked.
- CCM does not support ISDN Overlapping Sending/Receiving feature with DMS-100 switch-type protocol.
**Network Topology**

Figure 1. Network Topology or Test Setup

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**Basic Call Setup End-to-End Configuration**

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**Limitations**

- Both Cisco CallManager and Nortel PBX support the passing of calling/called party name information across to each other. However, Nortel does not send out additional ISDN Notify message to update the display information once the call have entered the Connected state. Therefore, for call scenarios such as Call Transfer and Call Forward, called name information does not get updated on the originating side after the call-transfer/call-forward is completed when if Nortel PBX is the transferring/forwarding node.

- Cisco CallManager support the passing of the Connected Number IE within the ISDN Notify message during the Alerting or Connected state of the call, however, Nortel PBX doesn’t support this feature. This is an optional information element for DMS-100 switch-type protocol.

- For CLIR and CNIR features, both CCM and Nortel PBX just omit the sending of the Display IE information completed from the ISDN signaling messages. The reason is that the Display IE field doesn’t have any Presentation Bit indicator value associated with it.

- Cisco CallManager must have the **Display IE Delivery**, **Send Extra Leading Character In DisplayIE** and **MCDN Channel Number Extension Bit Set to Zero** boxes are all checked under the Gateway Configuration web page.

- The Nortel Meridian Opt11C supports “User” side only when switch type is set to DMS-100 but will support both User-side and Network-side when switch type is set to S100. Therefore, the Cisco CallManager should be configured as ISDN network-side signaling and ISDN user-side signaling for Nortel when ISDN PRI DMS-100 switch-type is used.

- CCM does not support ISDN Overlapping Sending/Receiving feature with DMS-100 switch-type protocol.
System Components

Hardware Requirements

- Cisco CallManager MCS server, Cisco 2851 ISR router and Cisco 7960 IP phones
- Nortel Communication System 1000 (which includes Call Server, Signaling Server and Media gateway) and Nortel’s 2616 digital phones

Software Requirements

- Cisco CallManager Release 4.1(3)
- Nortel Succession 4.0 Release

  >ld 22
  PT2000
  REQ  iss
  CALL SERVER/MAIN CAB
  VERSION 2121
  RELEASE 4
  ISSUE 00 T +
  IDLE_SET_DISPLAY NORTEL

- Cisco IOS Software for 2851 ISR Router: c2800nm-ipvoicek9-mz.124-1a.bin
Features

- CLIP-Calling Line (Number) Identification Presentation (Please see the Limitation section)
- CLIR-Calling Line (Number) Identification Restriction (Please see the Limitation section)
- CNIP-Calling Name Identification Presentation (Please see the Limitation section)
- CNIR-Calling Name Identification Restriction (Please see the Limitation section)
- Alerting Name

Not Supported Features

- COLP-Connected Line (Number) Identification Presentation (Please see the Limitation section)
- COLR-Connected Line (Number) Identification Restriction
- CONP-Connected Name Identification Presentation (Please see the Limitation section)
- CONR-Connected Name Identification Presentation
- MWI-Message Waiting Indication (lamp ON, lamp OFF) across the T1 PRI DMS-100 Trunk

Configuration

Nortel Communication Server 1000 PBX Configuration Sequence and Tasks

Call Server Setup via SSC card console
1. LD 17 – Configure the Common Equipment (CEQU) on the Call Server
2. LD 17 – Configure the D-channel signaling for T1 PRI and PSTN PRI
3. LD 16 – Configure the Route Data Block for the T1 PRI and PSTN PRI
4. LD 14 – Configure the Trunks Data Block for the PRI and PSTN PRI
5. LD 86 – Configure the Route List Block for the T1 PRI and PSTN PRI
6. LD 87 – Configure CDP steering codes
7. LD 90 – Configure AC1 for Tandem Trunk calls
8. LD 11 – Configure the Nortel 2616 digital phones

Cisco CallManager Setup
1. Add an MGCP gateway for the Cisco 2851 ISR router with T1 PRI to Nortel CS1000 PBX under the Device pull-down menu
2. Add a Route Pattern to reach the Nortel’s phone DN extensions and to access PSTN via the Nortel PBX
3. Configure Cisco 7960 phone and line DN
4. Configure the Cisco 2851 ISR router to communicate with Cisco CallManager using MGCP protocol

Configuration Menus and Commands

Nortel Communication Server 1000 (CS1000) Call Server Configuration
1. LD 17 – Configure the Common Equipment (CEQU) on the Call Server

>ld 22
PT2000

REQ prt
TYPE cequ

CEQU
MPED 8D
2. LD 17 – Configure the D-channel Signaling for T1 PRI and PSTN PRI

REQ prt
TYPE adan dch 7

ADAN DCH 7 ➔ Assign tag 7 to the dchannel
CTYP MSDL ➔ MSDL card type
CARD 07 ➔ MSDL card located in slot 7
PORT 1
DES dms100
USR PRI
DCHL 7 ➔ Slot7, D-channel to Cisco CallManager
OTBF 32
PARM RS422 DTE
DRAT 64KC ➔ 64K clear channel for the d-channel
CLOK EXT
IFC D100 ➔ DMS-100 Switchtype
SIDE USR ➔ user-side signaling
CNEG 1
RLS ID **
RCAP ND2 ➔ Name Display Method 2
MBGA NO
OVLR NO
OVLS NO
T200 3
T203 10
N200 3
N201 260
K 7

REQ  prt
TYPE adan dch 12

ADAN     DCH 12  ➔ Assign tag 12 to the d-channel
CTYP MSDL  ➔ MSDL card type
CARD 02    ➔ MSDL card located in slot 2
PORT 1
DES T1_NI2
USR PRI
DCHL 2  ➔ Slot2, D-channel to the PSTN
OTBF 32
PARM RS422 DTE
DRAT 64KC  ➔ 64K clear channel
CLOK EXT
IFC NI2  ➔ NI-2 switchtype protocol
    ISDN_MCNT 300
CLID OPT0
CO_TYPE STD  ➔ Central Office switch type, Bellcore standard
SIDE USR
CNEG 1
RLS ID **
RCAP COLP NDS  ➔ Connection Line Presentation (COLP), NI-2 Name Display (NDS)
MBGA NO
OVLR NO
OVLS NO
T310 120
T200 3
T203 10
N200 3

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3. LD 16 – Configure the Route Data Block for the T1 PRI and PSTN PRI

> ld 21
PT1000

REQ: prt
TYPE: rdb
CUST 0
ROUT 107

TYPE RDB
CUST 00
DMOD
ROUT 107 ➔ Route Data Block to Cisco CallManager
DES D100
TKTP TIE ➔ Tie-line trunk type
NPID_TBL_NUM 0
ESN NO
CNVT NO
SAT NO
RCLS EXT
VTRK NO
NODE
DTRK YES ➔ Digital Trunk
BRIP NO
DGTP PRI ➔ ISDN PRI Digital Trunk Type for the route
ISDN YES

MODE PRA
IFC D100 ➔ ISDN DMS-100 switchtype
SBN NO
PNI 00001
NCNA YES ➔ Network Calling Name Allow
NCRD YES ➤ Network Redirecting Name Allow
CHTY BCH ➤ Channel Type = B-channel
CTYP UKWN
INAC NO
ISAR NO
CPUB OFF
DAPC NO
BCOT 0
DSEL VOD ➤ Data Select = Voice or Data (VOD)
PTYP PRI
AUTO NO
DNIS NO
dcdr NO
ICOG IAO ➤ Incoming and Outgoing Trunk
SRCH RRB ➤ Round-ribbon search order
TRMB YES ➤ Trombone call allow
STEP
ACOD 207 ➤ Trunk Access code
TCPP NO
PII 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
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

REQ:
PT1000

REQ: prt
TYPE: rdb
CUST 0
ROUT 102

TYPE RDB
CUST 00
DMOD

ROUT 102 ➔ Route Data Block to the PSTN Switch

DES T1_NI2 ➔ Direct-Inward-Dial trunk type

TKTP DID
NPID_TBL_NUM 0 ➔ Digital Trunk

SAT NO
RCLS EXT
VTRK NO
NODE

DTRK YES ➔ ISDN PRI Digital Trunk type

BRIP NO
DGTP PRI
ISDN YES

MODE PRA ➔ ISDN NI-2 switchtype

IFC NI2
CBCR NO
NCOS 0
SBN NO
PNI 00000

NCNA YES ➔ Network Calling Name Allow
NCRD YES ➔ Network Redirecting Name Allow

CHTY BCH ➔ Channel Type = B-channel

CPFXS YES
CPUB OFF
DAPC NO
BCOT 0
INTC NO
DSEL VOD  ➤ Data Selection = Voice or Data (VOD)
PTYP PRI
AUTO NO
DNIS NO
DCDR NO
ICOG IAO  ➤ Incoming and Outgoing Trunk
RANX NO
SRCH RRB  ➤ Round-ribbon search order
TRMB YES  ➤ Trombone call allow
STEP
ACOD 202  ➤ Trunk Access code
TCPP NO
PII NO
TARG 01
CLEN 1
BILN NO
OABS
INST
ICIS YES
TIMR ICF 512
OGF 512
EOD 13952
NRD 10112
DDL 70
ODT 4096
RGV 640
FLH 510
GRD 896
SFB 3
NBS 2048
NBL 4096
IENB 5
VSS 0

PAGE 002
4. LD 14 – Configure the Trunk Data Block for the T1 PRI and PSTN PRI

>ld 20

PT0000
REQ: prt
TYPE: tnb

TN 71 ➤ Trunk Data Block for T1 PRI to Cisco CallManager
DES

DES  D100

TN  007 01 ➔ Terminal Number, need to configure 23 TNs (one for each b-ch)

TYPE TIE
CDEN SD
CUST 0
TRK PRI
PDCA 1

PCML MU ➔ u-law encoding scheme
NCOS 0

RTMB 107 1 ➔ Route Number and Member number

B-CHANNEL SIGNALING
TGAR 0
AST NO
IAPG 0

CLS  UNR DTN WTA LPR APN THFD HKD ➔ UNR = Unrestricted Digital, DTN = DigiTone
  P10 VNL
TKID
AACR NO
DATE 31 MAY 2005

NACT
PT0000
REQ: prt
TYPE: tnb

TN  2 1  ➔ Trunk Data Block for T1 PRI to the PSTN

DES  T1_NI2

TN  002 01  ➔ Terminal Number, need to configure 23 TNs (one for each b-ch)
TYPE DID  ➔ Direct-Inward-Dial Trunk Type

CDEN SD
CUST 0
TRK PRI
PDCA 1

PCML MU
NCOS 0

RTMB 102 1  ➔ Route Number and Member number

B-CHANNEL SIGNALING
NITE
STRI/STRO OWK OWK
AST NO
IAPG 0

CLS UNR DTN WTA LPR APN THFD HKD  ➔ UNR = Unrestricted Digital, DTN = DigiTone
  P10 VNL

TKID
AACR NO

DATE 10 JUN 2005

NACT
5. LD 86 – Configure the Route List Block for the T1 PRI and PSTN PRI

 LD 86

 ESN000

 MEM AVAIL: (U/P): 2821735    USED U P: 206155  68685    TOT: 3096575
 DISK RECS AVAIL: 1152
 REQ  prt
 CUST 0
 FEAT rlb
 RLI  7

 RLI  7 ➜ Route List Number
 ENTR 0 ➜ Route List Entry Number for CDP
 LTER NO
 ROUT  107 ➜ Route Number
 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): 2821735    USED U P: 206155  68685    TOT: 3096575
DISK RECS AVAIL: 1152
REQ  prt
CUST 0
FEAT rlb
RLI  2

RLI  2 ➔ Route List Number
ENTR 0 ➔ Route List Entry Number for CDP
LTER NO
ROUT 102 ➔ Route Number
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

6. LD 87 – Configure the CDP DSC steering codes

>ld 87
ESN000

MEM AVAIL: (U/P): 2821735 USED U P: 206155 68685 TOT: 3096575
DISK RECS AVAIL: 1152
REQ  prt
LD 90 – Configure the AC1 for the Tandem Trunk calls

>ld 90
ESN000

FEAT net ➔ Network Translation Table
TRAN acl ➔ Access code 1 (NARS/BARS)
TYPE npa

NPA
NPA 1408 ➔ NPA begins with 1408
RLI 2 ➔ send to Route List 2 which use Rout 102
SDRR NONE
ITEI NONE
DISK RECS AVAIL: 1152
REQ

8. LD 11 – Configure the Route Nortel 2616 Digital Phones

>>ld 11
SL1000
MEM AVAIL: (U/P): 2821735    USED U P: 206155 68685    TOT: 3096575
DISK RECS AVAIL: 1152
DIGITAL TELEPHONES AVAIL:     4    USED:     4    TOT:     8
IP USERS AVAIL:     6    USED:     2    TOT:     8
BASIC IP USERS AVAIL:     7    USED:     1    TOT:     8
ACD AGENTS AVAIL:     10    USED:     0    TOT:    10
PCA AVAIL:     0    USED:     0    TOT:     0
AST AVAIL:     1    USED:     0    TOT:     1
TNS AVAIL:  2304    USED:   196    TOT:  2500
DATA PORTS AVAIL:  2500    USED:     0    TOT:  2500

REQ: prt
TYPE: 2616

TN 1 0 0 2
DATE
PAGE
DES

DES  CS101A
TN  001 00 02
TYPE  2616
CDEN 8D
CUST 0
AOM 0
FDN  2321
TGAR 1
LDN NO
NCOS 0
SGRP 0
RNPG 0
SCI 0
SSU
XLST

CLS  CTD  FBA  WTA  LPR  MTD  FNA  HTA  ADD  HFD
MWD  LMPN  RMMO  SMWD  AAD  IMD  XHD  IRD  NID  OLD  VCE  DRG1
POD  DSX  VMD  CMSD  SLKD  CCSD  SWD  LND  CNDA
CFTD  SFD  MRD  DDV  CNIA  CDCA  MSID  DAPA  BFED  RCBD
ICDD  CDMA  LLCN  MCTD  CLBD  AUTU
GPUD  DPUD  DNDN  CFCA  ARHD  CLTD  ASCD
CPFN  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
HUNT  2321
LHK  0
PLEV  02
CSDN
AST
IAPG  0
AACS  NO
ITNA  NO
DGRP
MLWU_LANG  0
DNDR  0
KEY  00  SCR  2320  0  MARP

CPND
NAME  ZEUS20
XPLN  6
DISPLAY_FMT  FIRST, LAST
01
02
03  CFW  4  3415
04  AO6
05  TRN
06
NACT
REQ: prt
TYPE: 2616
TN 1 0 0 3
DATE
PAGE
DES

DES CS101A
TN 001 0 00 03
TYPE 2616
CDEN 8D
CUST 0
AOM 0
FDN
TGAR 1
LDN NO
NCOS 0
SGRP 0
RNPG 0
SCI 0
SSU
XLST
CLS CTD FBA WTA LPR MTD FNA HTA ADD HFD
  MWD LMPN RMMD SMWD AAD IMD XHD IRO NID ODL VCE DRG1
  POD DSX VMD CMSD SLKD CCSD SWD LND CNDA
CFTD SFD MRD DDV CNIA CDCA MSID DAPA BFED RCBD
ICDD CDMD LLCN MCTD CLBD AUTU
GPUD DPUD DND A 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
HUNT
PLEV 02
CSDN
AST
IAPG 0
AACS NO
ITNA NO
DGRP
MLWU_LANG 0
DNDR 0

KEY 00 SCR 2321 0 M ARP

CPND

NAME ZEUS21
XPLN 6

DISPLAY_FMT FIRST, LAST

01
02
03 CFW 4
04 AO6
05 TRN
06
07
08
09
10
11
12
13
14
15 RGA
Cisco CallManager Configuration

Add an MGCP gateway for the Cisco 2851 ISR router with T1 PRI

Gateway Configuration

Product: Cisco 2851
Gateway: 69/9/90/9H1-1@Router2051
Device Protocol: Digital Access PRI
Registration: Registered with Cisco CallManager 172.20.150.253
IP Address: 172.20.150.253

Status: Ready
Update Delete Reset Gateway

Device Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Device</th>
<th>Call Classification</th>
<th>Network Local</th>
<th>Signal Packet Capture Mode</th>
<th>Packet Capture Duration</th>
<th>Media Resource Group List</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default</td>
<td>Default</td>
<td>Use System Default</td>
<td>(None)</td>
<td>None</td>
<td>1</td>
<td>(None)</td>
</tr>
</tbody>
</table>
### Media Resource Control List

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>(None)</td>
</tr>
<tr>
<td>AAM Group</td>
<td>(None)</td>
</tr>
<tr>
<td>Load Information</td>
<td></td>
</tr>
<tr>
<td>VSID (sub Crit)</td>
<td></td>
</tr>
</tbody>
</table>

### Multilevel Precedence and Preemption (MLPP) Information

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLPP Domain (e.g., &quot;000000&quot;&quot;)</td>
<td></td>
</tr>
<tr>
<td>MLPP Indication</td>
<td>Default</td>
</tr>
<tr>
<td>MLPP Preemption</td>
<td>Default</td>
</tr>
</tbody>
</table>

### Interface Information

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRI Protocol Type*</td>
<td>PPI (S0S-160)</td>
</tr>
<tr>
<td>Protocol Side*</td>
<td>Network</td>
</tr>
<tr>
<td>Channel Selection Order*</td>
<td>Bottom Up</td>
</tr>
<tr>
<td>Channel IE Type*</td>
<td>Use Number when IS</td>
</tr>
<tr>
<td>DCM Type*</td>
<td>Prio</td>
</tr>
<tr>
<td>Delay for first restart (1/8 sec ticks)</td>
<td>1</td>
</tr>
<tr>
<td>Delay between restarts (1/8 sec ticks)</td>
<td>1</td>
</tr>
<tr>
<td>Inhibit restarts at PRI indication</td>
<td>Yes</td>
</tr>
<tr>
<td>Enable status poll</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Call Routing Information

#### Inbound Calls

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significant Digits*</td>
<td></td>
</tr>
<tr>
<td>Calling Search Space</td>
<td></td>
</tr>
<tr>
<td>AAM Calling Search Space</td>
<td></td>
</tr>
<tr>
<td>Pick On</td>
<td></td>
</tr>
</tbody>
</table>

#### Outbound Calls

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calling Line ID Presentation*</td>
<td></td>
</tr>
<tr>
<td>Calling Party Selection*</td>
<td></td>
</tr>
<tr>
<td>Called party IE number type unknown*</td>
<td></td>
</tr>
<tr>
<td>Called party IE number type unknown*</td>
<td></td>
</tr>
<tr>
<td>Called numbering Plan*</td>
<td></td>
</tr>
<tr>
<td>Calling Numbering Plan*</td>
<td></td>
</tr>
<tr>
<td>Number of digits to strip*</td>
<td></td>
</tr>
<tr>
<td>Caller ID DN</td>
<td></td>
</tr>
<tr>
<td>SHDI Base Port*</td>
<td></td>
</tr>
</tbody>
</table>

### PRI Protocol Type Specific Information

- [ ] Display IE Delivery
- [ ] Redacting Number IE Delivery - Outbound
- [ ] Redacting Number IE Delivery - Inbound
- [ ] Send Extra Leading Character In DisplayIE**
<table>
<thead>
<tr>
<th><strong>Setup non-3GPP Progress Indicator IE Enable</strong>**</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MCN Channel Number Extension Bit Set to Zero</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Switchover Name in Facility IE</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Interface Identifier Present</strong>*</td>
<td></td>
</tr>
<tr>
<td>Interface Identifier Value**</td>
<td></td>
</tr>
<tr>
<td>Connected Line ID Presentation (COSID Inbound Call)*</td>
<td></td>
</tr>
</tbody>
</table>

### LLIEE Configuration

- **Passing Precedence Level Through LLIEE**
- **Security Access Level**

### Product Specific Configuration

<table>
<thead>
<tr>
<th><strong>Line Coding</strong>*</th>
<th>B8ZS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Framing</strong>*</td>
<td>G.703</td>
</tr>
<tr>
<td><strong>Clock</strong>*</td>
<td>External</td>
</tr>
<tr>
<td><strong>Input Gain (-6..14 dB)</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>Output Attenuation (-6..14 dB)</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>Echo Cancellation Enable</strong>*</td>
<td>Enable</td>
</tr>
<tr>
<td><strong>Echo Cancellation Coverage (ms)</strong></td>
<td>Default</td>
</tr>
</tbody>
</table>

* indicates required item
** applicable to DMS-100 protocol only
*** applicable to DMS-100 protocol and DMS-500 protocol only
Add a Route Pattern to reach Nortel's digital phone DN extensions and to access the PSTN via the Nortel PBX.
Add an Cisco 7960 IP phones and assigned the DN extension (3414 and 3415)
### Directory Number Configuration

**Associated With**
- NE6003004C19083 (Line 1)

**Directory Number Number:** 3415

**Calling Search Space**
- X (None)

**AOR Group**
- X (None)

**User Hold Audio Source**
- X (None)

**Network Hold Audio Source**
- X (None)

**Auto Answer**
- Auto Answer: Off

**Call Forward and Pickup Settings**

<table>
<thead>
<tr>
<th>Description</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call Forward All</td>
<td>X (None)</td>
</tr>
</tbody>
</table>

**Directory Number Configuration**

**Directory Number:** 3415

**Directory Number Number:** 3415

**Directory Number:** 3415

**Partition**
- X (None)

**Directory Number Settings**

<table>
<thead>
<tr>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice Mail Profile</td>
</tr>
<tr>
<td>Calling Search Space</td>
</tr>
<tr>
<td>AOR Group</td>
</tr>
<tr>
<td>User Hold Audio Source</td>
</tr>
<tr>
<td>Network Hold Audio Source</td>
</tr>
<tr>
<td>Auto Answer</td>
</tr>
</tbody>
</table>

**Call Forward and Pickup Settings**

- **Forward All:** X (None)
### Call Forward and Pickup Settings

<table>
<thead>
<tr>
<th>Voice Mail</th>
<th>Coverage/Destination</th>
<th>Calling Search Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward All</td>
<td>🟡</td>
<td>🟡</td>
</tr>
<tr>
<td>Forward Busy Internal</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Forward Busy External</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Forward No Answer Internal</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Forward No Answer External</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Forward No Coverage Internal</td>
<td>🟢</td>
<td>🟢</td>
</tr>
<tr>
<td>Forward No Coverage External</td>
<td>🟢</td>
<td>🟢</td>
</tr>
</tbody>
</table>

- **No Answer Ring Duration**: 0 (seconds)
- **Call Pickup Group**: (None)
- **NLDIP Alternate Party Settings**
  - **Target (Destination)**: (None)
  - **Calling Search Space**: (None)
  - **No Answer Ring Duration**: (seconds)

### Line Settings for all Devices

- **Alerting Name**: Phone11_A

### Line Settings for this Device

- **Display (Internal Caller ID)**: Phone11_C
- **Line Text Label**:
- **External Phone Number Mask**:
- **Message Waiting Lamp Policy**: (None)
- **Ring Setting (Phone Active)**: (None)
- **Ring Setting (Phone Active)**: (None)

### Multiple Call/Call Waiting Settings

- **Maximum Number of Calls**: 4 (1 - 255)
- **Busy Trigger**: 0 (Max. Calls)

### Forwarded Call Information Display

- **Caller Name**
- **Caller Number**
- **Redirected Number**
- **Dialed Number**

* indicates required item; changes to Line or Directory Number settings require restart.

**Ring Setting (Phone Active)** appears to this line when any line on the phone has a call in progress.

**Notes:**
- If you are using a language other than English for Display (Internal Caller ID) or Line Text Label, make sure the correct character set (shown below) is selected. Text displays incorrectly if the wrong character set is selected. (English characters are included in all character sets.)

- **Character Set**: Proclaim European (Latin 1)
Configure the Cisco 2851 ISR router to communicate with Cisco CallManager using MGCP protocol

Router2851>en
Password:
Router2851#sh version
Cisco IOS Software, 2800 Software (C2800NM-IPVOICEK9-M), Version 12.4(1a), RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2005 by Cisco Systems, Inc.
Compiled Fri 27-May-05 21:02 by hqluong

ROM: System Bootstrap, Version 12.3(8r)T7, RELEASE SOFTWARE (fc1)

Router2851 uptime is 6 days, 5 hours, 45 minutes
System returned to ROM by reload at 10:07:59 PST Tue Jun 7 2005
System restarted at 10:08:49 PST Tue Jun 7 2005
System image file is "flash:c2800nm-ipvoicek9-mz.124-1a.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/ww1/export/crypto/tool/stqrq.html

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

Cisco 2851 (revision 53.51) with 249856K/12288K bytes of memory.
Processor board ID FHK0847F03X
16 FastEthernet interfaces
2 Gigabit Ethernet interfaces
48 Serial interfaces
2 Channelized T1/PRI ports
4 Voice FXO 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 0x2102

Router2851#term len 0
Router2851#sh run
Building configuration...

Current configuration : 5036 bytes
!
! Last configuration change at 13:22:53 PST Wed Jun 8 2005
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
!
hostname Router2851
!
boot-start-marker
boot system flash:c2800nm-ipvoicek9-mz.124-1a.bin
boot-end-marker
!
logging buffered 500000 debugging
enable secret 5 $1$voTv$DYoywWasCGS5us.1pzy6Th.
!
no aaa new-model
!
resource policy
!
clock timezone PST -8
network-clock-participate wic 0
**network-clock-select 1 T1 0/0/0**
ip subnet-zero
ip cef
no ip dhcp use vrf connected

no ip ftp passive
ip ftp username cisco
ip ftp password 7 01100F175804575D72
no ip domain lookup
isdn switch-type primary-ni

voice-card 0
no dspfarm

username chinh password 7 104D000A0618

controller T1 0/0/0
  shutdown
  framing esf
  linecode b8zs
  cablelength short 133
  pri-group timeslots 1-24 service mgcp

controller T1 0/0/1
framing esf
linecode b8zs
cablelength short 133
pri-group timeslots 1-24 service mgcp
!
translation-rule 1
!
!
!
interface GigabitEthernet0/0
  ip address 172.20.150.201 255.255.255.0
duplex auto
speed auto
!
interface GigabitEthernet0/1
  no ip address
  shutdown
duplex auto
speed auto
!
interface Serial0/0/0:23
  no ip address
  isdn switch-type primary-qsig
  isdn incoming-voice voice
  isdn bind-l3 ccm-manager
  no cdp enable
!
interface Serial0/0/1:23
  no ip address
  isdn switch-type primary-dms100
  isdn protocol-emulate network
  isdn incoming-voice voice
  isdn bind-l3 ccm-manager
  isdn channel-id invert extend-bit
  no cdp enable
!
interface FastEthernet1/0
  shutdown
! interface FastEthernet1/1
    shutdown
!
interface FastEthernet1/2
    shutdown
!
interface FastEthernet1/3
    shutdown
!
interface FastEthernet1/4
    shutdown
!
interface FastEthernet1/5
    shutdown
!
interface FastEthernet1/6
    shutdown
!
interface FastEthernet1/7
    shutdown
!
interface FastEthernet1/8
    shutdown
!
interface FastEthernet1/9
    shutdown
!
interface FastEthernet1/10
    shutdown
!
interface FastEthernet1/11
    shutdown
!
interface FastEthernet1/12
    shutdown
!
interface FastEthernet1/13
    shutdown
interface FastEthernet1/14
   shutdown

interface FastEthernet1/15
   shutdown

interface Vlan1
   no ip address

ip classless
ip route 0.0.0.0 0.0.0.0 172.20.150.1

ip http server
no ip http secure-server

! tftp-server flash:c2800nm-ipvoice-mz.123-12.11.T1

control-plane

! voice-port 0/0/0:23

voice-port 0/1/0
   station-id name FXS_PhoneE
   station-id number 14085232200
   caller-id enable

voice-port 0/1/1

! voice-port 0/0/1:23

! voice-port 0/2/0

! voice-port 0/2/1
voice-port 0/2/2
!
voice-port 0/2/3
!
ccm-manager mgcp
ccm-manager music-on-hold
ccm-manager config server 172.20.150.253
ccm-manager config
!
mgcp
mgcp call-agent 172.20.150.253 2427 service-type mgcp version 0.1
mgcp dtmf-relay voip codec all mode out-of-band
mgcp rtp unreachable timeout 1000 action notify
mgcp modem passthrough voip mode nse
mgcp package-capability rtp-package
no mgcp package-capability res-package
mgcp package-capability sst-package
no mgcp package-capability fxr-package
mgcp package-capability pre-package
no mgcp timer receive-rtcp
mgcp sdp simple
mgcp fax t38 inhibit
mgcp rtp payload-type g726r16 static
!
mgcp profile default
!
!
!
line con 0
line aux 0
line vty 0 4
  exec-timeout 0 0
  password 7 0822455D0A16
  login
line vty 5 10
  exec-timeout 0 0
  password 7 0822455D0A16
  login
!
scheduler allocate 20000 1000
ntp clock-period 17179609
ntp server 171.68.10.80
ntp server 171.68.10.150
!
end

Router2851#sh mgcp
MGCP Admin State ACTIVE, Oper State ACTIVE - Cause Code NONE
MGCP call-agent: 172.20.150.253 2427 Initial protocol service is MGCP 0.1
MGCP validate call-agent source-ipaddr DISABLED
MGCP block-newcalls DISABLED
MGCP send SGCP RSIP: forced/restart/graceful/disconnected DISABLED
MGCP quarantine mode discard/step
MGCP quarantine of persistent events is ENABLED
MGCP dtmf-relay voip codec all mode out-of-band
MGCP dtmf-relay for voAAL2 is SDP controlled
MGCP voip modem passthrough mode: NSE, codec: g711ulaw, redundancy: DISABLED,
MGCP voaal2 modem passthrough disabled
MGCP voip modem relay: Disabled.
MGCP TSE payload: 100
MGCP T.38 Named Signalling Event (NSE) response timer: 200
MGCP Network (IP/AAL2) Continuity Test timer: 200
MGCP 'RTP stream loss' timer disabled
MGCP request timeout 500
MGCP maximum exponential request timeout 4000
MGCP rtp unreachable timeout 1000 action notify
MGCP gateway port: 2427, MGCP maximum waiting delay 3000
MGCP restart delay 0, MGCP vad DISABLED
MGCP rtrcac DISABLED
MGCP system resource check DISABLED
MGCP xpc-codec: DISABLED, MGCP persistent hookflash: DISABLED
MGCP persistent offhook: ENABLED, MGCP persistent onhook: DISABLED
MGCP piggyback msg ENABLED, MGCP endpoint offset DISABLED
MGCP simple-sdp ENABLED
MGCP undotted-notation DISABLED
MGCP codec type g711ulaw, MGCP packetization period 20
MGCP JB threshold lwm 30, MGCP JB threshold hwm 150
MGCP LAT threshold lwm 150, MGCP LAT threshold hwm 300
MGCP PL threshold lwm 1000, MGCP PL threshold hwm 10000
MGCP CL threshold lwm 1000, MGCP CL threshold hwm 10000
MGCP playout mode is adaptive 60, 40, 200 in msec
MGCP Fax Playout Buffer is 300 in msec
MGCP media (RTP) dscp: ef, MGCP signaling dscp: af31
MGCP default package: trunk-package
MGCP supported packages: gm-package dtmf-package trunk-package line-package
                                                     hs-package rtp-package atm-package ms-package dt-package
                                                     mo-package mt-package sst-package pre-package
MGCP Digit Map matching order: shortest match
SGCP Digit Map matching order: always left-to-right
MGCP VoAAL2 ignore-lco-codec DISABLED
MGCP T.38 Max Fax Rate is DEFAULT
MGCP T.38 Fax is DISABLED
MGCP T.38 Fax ECM is ENABLED
MGCP T.38 Fax NSF Override is DISABLED
MGCP T.38 Fax Low Speed Redundancy: 0
MGCP T.38 Fax High Speed Redundancy: 0
MGCP control bind :DISABLED
MGCP media bind :DISABLED
MGCP Upspeed payload type for G711ulaw: 0, G711alaw: 8
MGCP Static payload type for G.726-16K codec
MGCP Dynamic payload type for G.726-24K codec
MGCP Dynamic payload type for G.Clear codec
MGCP Guaranteed scheduler time is disabled

Router2851#sh ccm
MGCP Domain Name: Router2851

<table>
<thead>
<tr>
<th>Priority</th>
<th>Status</th>
<th>Host</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Registered</td>
<td>172.20.150.253</td>
</tr>
<tr>
<td>First</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Second</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Current active Call Manager: 172.20.150.253
Backhaul/Redundant link port: 2428
Failover Interval: 30 seconds
Keepalive Interval: 15 seconds
Last keepalive sent: 15:54:11 PST Jun 13 2005 (elapsed time: 00:00:12)
Last MGCP traffic time: 15:54:11 PST Jun 13 2005 (elapsed time: 00:00:12)
Last failover time: None
Last switchback time: None
Switchback mode: Graceful
MGCP Fallback mode: Not Selected
Last MGCP Fallback start time: None
Last MGCP Fallback end time: None
MGCP Download Tones: Disabled

Backhaul Link info:
   Link Protocol: TCP
   Remote Port Number: 2428
   Remote IP Address: 172.20.150.253
   Current Link State: OPEN
Statistics:
   Packets recvd: 520
   Recv failures: 0
   Packets xmitted: 424
   Xmit failures: 0
PRI Ports being backhauled:
   Slot 0, port 1
   Slot 0, port 0

Configuration Auto-Download Information
=======================================
Current version-id: {DF50D6DF-A27D-4AFD-AAAD-2967DFD1DDBA}
Last config-downloaded: 00:00:00
Current state: Waiting for commands
Configuration Download statistics:
   Download Attempted    : 13
   Download Successful   : 13
   Download Failed       : 0
   Configuration Attempted : 1
   Configuration Successful : 1
   Configuration Failed(Parsing): 0
   Configuration Failed(config) : 0
Last config download command: New Registration
Configuration Error History:
FAX mode: cisco
Router2851#s isdn status s0/0/1:23
Global ISDN Switchtype = primary-ni

%Q.931 is backhauled to CCM MANAGER 0x0003 on DSL 1. Layer 3 output may not apply

ISDN Serial0/0/1:23 interface

******* Network side configuration *******

dsl 1, interface ISDN Switchtype = primary-dms100

L2 Protocol = Q.921 0x0000     L3 Protocol(s) = CCM MANAGER 0x0003

Layer 1 Status:
   ACTIVE

Layer 2 Status:
   TEI = 0, Ces = 1, SAPI = 0, State = MULTIPLE_FRAME_ESTABLISHED

Layer 3 Status:
   0 Active Layer 3 Call(s)

Active dsl 1 CCBs = 0

The Free Channel Mask:  0x807FFFFFFF

Number of L2 Discards = 0, L2 Session ID = 10

Total Allocated ISDN CCBs = 0

Router2851#

---

**Acronyms**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANF-PR</td>
<td>Additional Network Feature Path Replacement</td>
</tr>
<tr>
<td>CCM</td>
<td>Cisco CallManager</td>
</tr>
<tr>
<td>CCBS</td>
<td>Call Completion to Busy Subscriber</td>
</tr>
<tr>
<td>CCNR</td>
<td>Call Completion on No Reply</td>
</tr>
<tr>
<td>CFB</td>
<td>Call Forwarding on Busy</td>
</tr>
<tr>
<td>CFNR</td>
<td>Call Forwarding No Reply</td>
</tr>
<tr>
<td>CFU</td>
<td>Call Forwarding Unconditional</td>
</tr>
<tr>
<td>CLIP</td>
<td>Calling Line (Number) Identification Presentation</td>
</tr>
<tr>
<td>CLIR</td>
<td>Calling Line (Number) Identification Restriction</td>
</tr>
<tr>
<td>CMM</td>
<td>Communication Media Module (CMM) is a Cisco Catalyst® 6500 Series and Cisco 7600 Series line card that provides flexible and high-density T1/E1 gateways</td>
</tr>
<tr>
<td></td>
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<tr>
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<td>---</td>
</tr>
<tr>
<td>CNIP</td>
<td>Calling Name Identification Presentation</td>
</tr>
<tr>
<td>CNIR</td>
<td>Calling Name Identification Restriction</td>
</tr>
<tr>
<td>COLP</td>
<td>Connected Line (Number) Identification Presentation</td>
</tr>
<tr>
<td>COLR</td>
<td>Connected Line (Number) Identification Restriction</td>
</tr>
<tr>
<td>CONP</td>
<td>Connected Name Identification Presentation</td>
</tr>
<tr>
<td>CONR</td>
<td>Connected Name Identification Restriction</td>
</tr>
<tr>
<td>CT</td>
<td>Call Transfer</td>
</tr>
<tr>
<td>MWI</td>
<td>Message Waiting Indicator</td>
</tr>
<tr>
<td>PSTN</td>
<td>Public Switched Telephone Network</td>
</tr>
</tbody>
</table>
**Important Information**

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