CISCO SYSTEMS

Cisco Unified CallManager 4.0-PBX Interoperability: Nortel Meridian-1 to a Cisco Catalyst 6608 Gateway using T1 PRI DMS-100 with MGCP

Introduction

This is an application note for connectivity of a Nortel Meridian-1 Opt11C Release 25 PBX with Cisco Unified CallManager Release 4.0 using a Cisco 6608-T1 PRI DMS100 as MGCP Gateway.
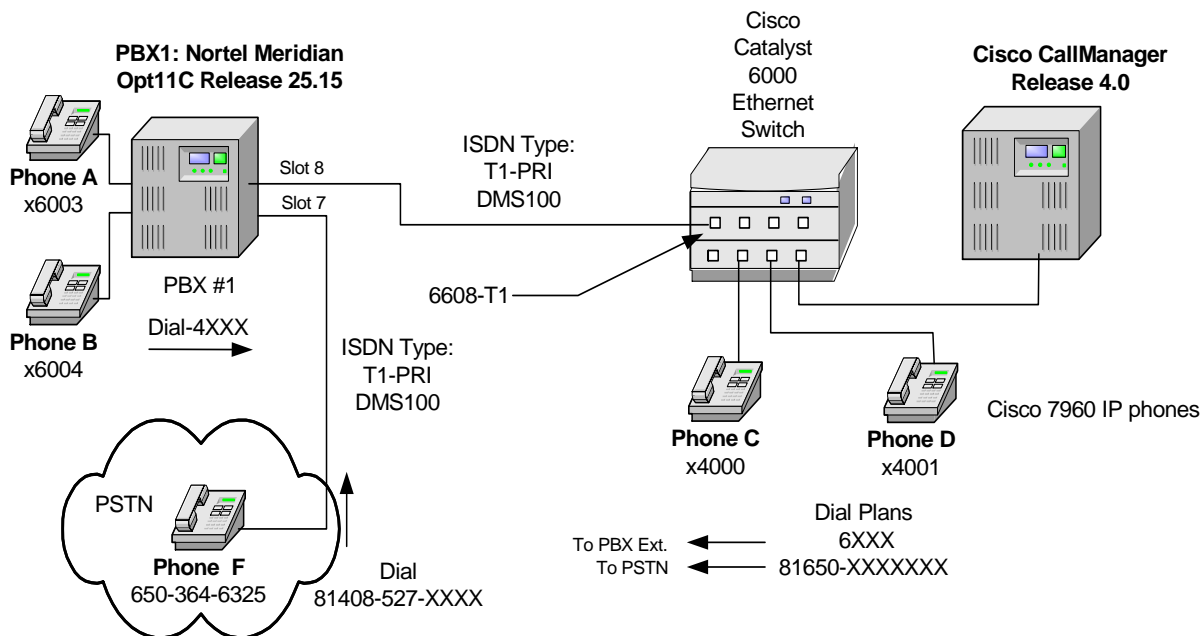
The network topology diagram shows a set-up for end-to-end interoperability between the Cisco Unified CallManager connected to the PBX using 6608-T1 link as MGCP Gateway.

Connectivity is achieved by using the PRI DMS-100 protocol type on the MGCP gateway and S100 switch type on the Nortel PBX.

Cisco Unified CallManager does not send "Connected Number" information in the connect message back to PBX.

Network Topology

Basic Call Setup End-to-End Configuration

EDCS# 362737

Limitations

User/Network Settings

The Nortel Meridian Opt11C supports "User" side only when switch type is set to DMS-100 but will support both "User" and "Network" side when switch type is set to S100. Therefore the Nortel Meridian Opt11C should be configured with switch type of S100.

Tandem Calls through PBX (Trunk-to-Trunk)

DMS100 or SL100 (S100) allows the TKTP (trunk type) to be TIE. And with TIE, Nortel allows trunk to trunk routing depending on the received digits by the Nortel PBX and with the proper programming of the dial plan. The Nortel actually wants to see the 9 (AC1) or 8 (AC2) plus the (11 or 7) digits for this to work. It will look up the received digits and compare it with the NARS and BARS table already set up and it will route the calls to the specified trunk accordingly. Of course calls into the PBX with TKTP=TIE can also recognize if the number being called is within that switch by programming it to recognize local DID numbers. With protocol type of NI2, on the other hand, the Nortel only allows TKTP (trunk type) = DID. Thus, the call has to terminate within the switch and cannot go out on another trunk.

Calling Name and Number Feature

When calling from Cisco 7960 IP phone to Nortel digital phone, Nortel phone display Calling Name and Number after the call is answered. Cisco 7960 IP phone however displays "Connected Name" but did not display "Connected Number". It was verified that Nortel was not sending "Connected Number" information in the connect message back to CallManager.

When calling from Nortel digital phone to Cisco 7960 IP phone, IP phone displays Calling Name and Number after the call is answered. Nortel phone however displays "Connected Name" but did not display "Connected Number". It displays the number being dialed instead. It was verified that the CallManager was not sending "Connected Number" information in the connect message back to PBX.

System Components

Hardware Requirements

Cisco Catalyst 6000 Series Switch with 6608-T1 gateway

Nortel Meridian O11c with NTAK09BA, 1.5 Mb DTI/PRI

▪ Cisco Unified CallManager server

Software Requirements

Cisco Unified CallManager Release 4.0

PBX Software: 25.15

Features

Key Features Supported

Calling Number

Calling Name

Connected Name

Key Features Not Supported

Connected Number

Configuration

Configuration Sequence and Tasks

Configure in the following sequence:

1. Configure Common Equipment.

2. Configure D-Channel.

3. Configure Route Data Block.

4. Configure Trunk.

5. Configure Coordinated Dialing Plan

6. Configure Dialing Plan for Tandem Call

Configuration Menus and Commands

Common Equipment

```
ld 22

PT2000
MARP NOT ACTIVATED


REQ  prt

TYPE cequ


CEQU
  MPED 8D
  SUPL  000  004  008  012
        016  032  036  040
        044  048  064  068
        072
  DDCS  04
  DTCS
  XCT   000
  CONF  029  030  031  062
        094  095

  DLOP  NUM DCH FRM LCMT YALM T1TE TRSH
   PRI  007 24  ESF B8S  FDL  -    00
        008 24  ESF B8S  FDL  -    00
  PRI2 05 06
  APVL
  DTI2  03
  MISP  002
REQ  ****
>
```

Configure D-Channel

```
>ld 22

PT2000
MARP NOT ACTIVATED


REQ  prt

TYPE adan dch 18


ADAN     DCH 18
  CTYP MSDL
  CARD 08
  PORT 1
  DES  t1_d100
  USR  PRI
  DCHL 8
  OTBF 32
  PARM RS422  DTE
  DRAT 64KC
  CLOK EXT
  IFC  S100
  SIDE NET
  CNEG 1
  RLS  ID  **
  RCAP ND2
  MBGA NO
  OVLR NO
  OVLS NO
  T200 3
  T203 10
  N200 3
  N201 260
  K    7
REQ  ****
>
```

Configure Route Data Block

```
>ld 21

PT1000

REQ: prt

TYPE: rdb

CUST 0

ROUT 108
```

```
TYPE RDB
CUST 00
DMOD
ROUT 108
DES  T1_S100
TKTP TIE
NPID_TBL_NUM   0
ESN  NO
RPA  NO
CNVT NO
SAT  NO
RCLS EXT
DTRK YES
BRIP NO
DGTP PRI
ISDN YES
     MODE PRA
     IFC  S100
     SBN  NO
     PNI  00000
     NCNA YES
     NCRD YES
     CHTY BCH
     CTYP UKWN
     INAC NO
     ISAR NO
     CPUB OFF
     DAPC NO
     BCOT 0
DSEL VOD
PTYP PRI
AUTO NO
DNIS NO
DCDR NO
ICOG IAO
SRCH RRB
TRMB YES
STEP
ACOD 508
TCPP NO
TARG 01
BILN NO
OABS
INST
SIGO STD
MFC  NO
ICIS YES
OGIS YES
TIMR ICF 1920
     OGF 1920
     EOD 13952
     LCT 256
     NRD 10112
     DDL 70
     ODT 4096
     RGV 640
```

```
      GTO 896
      GTI 896
      SFB 3
      PRPS 800
      NBS 2048
      NBL 4096
   IENB 5


PAGE 002

      TFD 0
      VSS 0
      VGD 6
DTD  NO
SCDT NO
2 DT NO
DRNG NO
CDR  NO
NATL YES
SSL
CFWR NO
IDOP NO
VRAT NO
MUS  NO
PANS YES
OHQ  NO
OHQT 00
CBQ  NO
AUTH NO
TTBL 0
PLEV 2
OPR  NO
ALRM NO
ART  0
TIDY 508 108
SGRP 0
AACR NO

REQ: ****
>
```

Configure Trunk

```
>ld 20


PT0000
MARP NOT ACTIVATED

REQ: prt

TYPE: tnb
```

```
TN    8 1

DATE

PAGE

DES


TN   008 01
TYPE TIE
CDEN SD
CUST 0
TRK  PRI
PDCA 1
PCML MU
NCOS 0
RTMB 108 1
B-CHANNEL SIGNALING
TGAR 0
AST  NO
IAPG 0
CLS  UNR DTN CND WTA LPR APN THFD XREP BARD HKD
     P10 VNL
TKID
DATE  4 MAR 2004

NACT ****
>
```

Configure Coordinated Dialing Plan

```
>>LD 87

ESN000

MEM AVAIL: (U/P): 1260909    USED U P: 92556 39174    TOT: 1392639
DISK RECS AVAIL: 463
REQ  PRT

CUST 0

FEAT CDP

TYPE DSC

DSC  4

DSC  4
FLEN 0
DSP  LSC
RRPA NO
```

```
RLI   18
NPA
NXX


MEM AVAIL: (U/P): 1260909    USED U P: 92556 39174    TOT: 1392639
DISK RECS AVAIL: 463
REQ  ****

>
OVL000
>LD 86

ESN000

MEM AVAIL: (U/P): 1260909    USED U P: 92556 39174    TOT: 1392639
DISK RECS AVAIL: 463
REQ  PRT

CUST 0

FEAT RLB

RLI  18


RLI  18
ENTR 0
LTER NO
ROUT 108
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
BNE  NO
SBOC NRR
IDBB DBD
IOHQ NO
OHQ  NO
CBQ  NO

ISET 0
NALT 5
MFRL 0
OVLL 0

MEM AVAIL: (U/P): 1260909    USED U P: 92556 39174    TOT: 1392639
DISK RECS AVAIL: 463
REQ
DTC105
```

```
ESN004

REQ  ****

>
```

Configure Dialing Plan for Tandem Call

```
Dial Plan Configuration when PBX received AC2 (8) + NPA (1408) digit string

>ld 90

ESN000

MEM AVAIL: (U/P): 1261180    USED U P: 92290 39169    TOT: 1392639
DISK RECS AVAIL: 463
REQ  prt

CUST 0

FEAT net

TRAN ac2

TYPE npa
```

NPA 1408

```
NPA  1408
RLI  8
SDRR NONE
ITEI NONE


MEM AVAIL: (U/P): 1261180    USED U P: 92290 39169    TOT: 1392639
DISK RECS AVAIL: 463
REQ  ****

>ld 86

ESN000

MEM AVAIL: (U/P): 1261180    USED U P: 92290 39169    TOT: 1392639
DISK RECS AVAIL: 463
REQ  prt

CUST 0

FEAT rlb

RLI  8
```

```
RLI  8
ENTR 0
LTER NO
ROUT 108
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  8
FCI  0
FSNI 0
BNE NO
SBOC NRR
IDBB DBD
IOHQ NO
OHQ  NO
CBQ  NO


ISET 0
NALT 5
MFRL 0
OVLL 0


MEM AVAIL: (U/P): 1261180    USED U P: 92290 39169    TOT: 1392639
DISK RECS AVAIL: 463
REQ  prt

CUST 0

FEAT dgt

DMI  8



DMI  8
```
DEL 7
```
CTYP UKWN

REQ  ****

>
Dial Plan Configuration when PBX received AC2 (8) + NPA (1650) digit string

>ld 90

ESN000

MEM AVAIL: (U/P): 1261180    USED U P: 92290 39169    TOT: 1392639
DISK RECS AVAIL: 463
REQ  prt
```

```
CUST 0

FEAT net

TRAN ac2

TYPE npa
```

NPA   1650

```
NPA  1650
RLI  7
SDRR NONE
ITEI NONE


MEM AVAIL: (U/P): 1261180    USED U P: 92290 39169    TOT: 1392639
DISK RECS AVAIL: 463
REQ  ****

>
OVL000
>ld 86

ESN000

MEM AVAIL: (U/P): 1261180    USED U P: 92290 39169    TOT: 1392639
DISK RECS AVAIL: 463
REQ  prt

CUST 0

FEAT rlb

RLI  7


RLI  7
ENTR 0
LTER NO
ROUT 107
TOD  0 ON  1 ON  2 ON  3 ON
     4 ON  5 ON  6 ON  7 ON
VNS  NO
CNV  NO
EXP  NO
FRL  0
DMI  7
FCI  0
FSNI 0
BNE  NO
SBOC NRR
IDBB DBD
IOHQ NO
```

```
OHQ   NO
CBQ   NO

ISET 0
NALT 5
MFRL 0
OVLL 0


MEM AVAIL: (U/P): 1261180    USED U P: 92290 39169    TOT: 1392639
DISK RECS AVAIL: 463
REQ  prt

CUST 0

FEAT dgt

DMI  7
DMI  7
DEL  1
CTYP NCHG


MEM AVAIL: (U/P): 1261180    USED U P: 92290 39169    TOT: 1392639
DISK RECS AVAIL: 463
REQ  ****
```

Configuring Cisco Unified CallManager

Cisco CallManager 4.0 Administration - Gateway Configuration - Microsoft Internet Explorer

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Address http://cm-klingon/CCMAdmin/gatewayconfig.asp?pkid={DF71136E-4975-4B2C-BDE6-C24A840B4ABC}&type=1   Go   Links

PCM Type*	µ-law
Delay for first restart (1/8 sec ticks)	32
Delay between restarts (1/8 sec ticks)	4
☑ Inhibit restarts at PRI initialization	
☑ Enable status poll	

Call Routing Information
Inbound Calls

Significant Digits*	All
Calling Search Space	Incoming Trunk
AAR Calling Search Space	< None >
Prefix DN	

Outbound Calls

Calling Line ID Presentation*	Allowed
Calling Party Selection*	Originator
Called party IE number type unknown*	National
Calling party IE number type unknown*	National
Called Numbering Plan*	ISDN
Calling Numbering Plan*	ISDN
Number of digits to strip*	0
Caller ID DN	
SMDI Base Port*	0

PRI Protocol Type Specific Information

☑ Display IE Delivery

☑ Redirecting Number IE Delivery - Outbound

☐ Redirecting Number IE Delivery - Inbound

☑ Send Extra Leading Character In DisplayIE***

☐ Setup non-ISDN Progress Indicator IE Enable****

Done   Local intranet

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Address   http://cm-klingon/CCMAdmin/gatewayconfig.asp?pkid={DF71136E-4975-4B2C-BDE6-C24A840B4ABC}&type=1   Go   Links

☑ MCDN Channel Number Extension Bit Set to Zero**

☑ Send Calling Name In Facility IE

☐ Interface Identifier Present**

Interface Identifier Value**	0
Connected Line ID Presentation (QSIG Inbound Call)*	Default
Connected PBX Model	None

Product Specific Configuration   ℹ️

Clock Reference*	Network
TX-Level CSU*	0dB
FDL Channel*	ATT 54016
Framing*	ESF
Audio Signal Adjustment into IP Network*	NoDbPadding
Audio Signal Adjustment from IP Network*	NoDbPadding
Yellow Alarm*	Bit2
Zero Suppression*	B8ZS
Digit On Duration(50-500ms)*	100
Interdigit Duration(50-500msec)*	100
SNMP Community String	public
Disable SNMP Set operations*	☐
Debug Port Enable*	☑
Hold Tone Silence Duration*	0
Port Used for Voice Calls*	☑
Port Used for Modem Calls*	☑
Port Used for Fax Calls*	☑

Fax and Modem Parameters

Fax Relay Enable*	☑
Fax Error Correction Mode Override*	☑
Maximum Fax Rate*	14400bps

Done   Local intranet

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Address 🗐 http://cm-klingon/CCMAdmin/gatewayconfig.asp?pkid={DF71136E-4975-4B2C-BDE6-C24A840B4ABC}&Status=US&Action= ▾   🔗Go   Links »

Maximum Fax Rate*	14400bps ▾
Fax Payload Size*	20
Non Standard Facilities Country Code*	65535
Non Standard Facilities Vendor Code*	65535
Fax/Modem Packet Redundancy*	☐
NSE Type*	Non-IOS Gateways ▾

Playout Delay Parameters

Initial Playout Delay*	40
Minimum Playout Delay*	20
Maximum Playout Delay*	150

Echo Canceller Configuration

Echo TailLength (ms)*	32 ms ▾
Minimum ERL (db)*	6 db ▾

* indicates required item
** applicable to DMS-100 protocol only
*** applicable to DMS-100 protocol and DMS-250 protocol only
**** may be required to force ringback from some PBXs

Back to Find/List Gateways

🗐 Reset succeeded.   🖳 Local intranet

Enbloc Route Pattern Configuration

Cisco CallManager 4.0 Administration - Route Pattern/Hunt Pilot Configuration - Microsoft Internet Explorer

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Address ⊠ http://cm-klingon/CCMAdmin/routepatternconfig.asp?pkid={3F08903A-3126-4CE1-95DF-9E01A95B7DC4}   ▾ ⏎ Go | Links »

Route Pattern/Hunt Pilot: 6XXX

Status: Ready
Note: Any update to this Route Pattern or Hunt Pilot automatically resets the associated gateway or Route/Hunt List

| Copy | Update | Delete |

Pattern Definition

Route Pattern/Hunt Pilot*	6XXX
Partition	< None >
Description	
Numbering Plan*	North American Numbering Plan
Route Filter	< None >
MLPP Precedence	Default
Gateway or Route/Hunt List*	S0/DS1-0@SDA0001C9D93A98 (Edit)
Route Option	◉ Route this pattern
	○ Block this pattern — Not Selected —

☑ Provide Outside Dial Tone   ☐ Allow Overlap Sending   ☐ Urgent Priority

Calling Party Transformations

☐ Use Calling Party's External Phone Number Mask

Calling Party Transform Mask	
Prefix Digits (Outgoing Calls)	
Calling Line ID Presentation	Default
Calling Name Presentation	Default

Connected Party Transformations

Connected Line ID Presentation	Default
Connected Name Presentation	Default

Called Party Transformations

Discard Digits	< None >
Called Party Transform Mask	
Prefix Digits (Outgoing Calls)	

ISDN Network-Specific Facilities Information Element

Carrier Identification Code	
Network Service Protocol	PRI DMS-100

Network Service	Service Parameter Name	Service Parameter Value
Private	< Not Exist >	

Done   Local intranet

Translation Pattern for Incoming Calls

Translation Pattern Configuration

Translation Pattern: 4XXX
Status: Ready

[Copy] [Update] [Delete]

Pattern Definition

Translation Pattern	4XXX
Partition	Incoming Trunk
Description	
Numbering Plan*	North American Numbering Plan
Route Filter	< None >
Calling Search Space	Phones
MLPP Precedence	Default
Route Option	⦿ Route this pattern
	○ Block this pattern — Not Selected —

☑ Provide Outside Dial Tone   ☑ Urgent Priority

Calling Party Transformations

☐ Use Calling Party's External Phone Number Mask

Calling Party Transform Mask	
Prefix Digits (Outgoing Calls)	
Calling Line ID Presentation	Default
Calling Name Presentation	Default

Connected Party Transformations

Connected Line ID Presentation	Default
Connected Name Presentation	Default

Called Party Transformations

Discard Digits	< None >
Called Party Transform Mask	
Prefix Digits (Outgoing Calls)	

* indicates required item.

PSTN Route Pattern Configuration

Route Pattern/Hunt Pilot: 81650XXXXXXX

Status: Ready
Note: Any update to this Route Pattern or Hunt Pilot automatically resets the associated gateway or Route/Hunt List

[Copy]   [Update]   [Delete]

Pattern Definition

Route Pattern/Hunt Pilot*	81650XXXXXX
Partition	< None >
Description	
Numbering Plan*	North American Numbering Plan
Route Filter	< None >
MLPP Precedence	Default
Gateway or Route/Hunt List*	S0/DS1-0@SDA0001C9D93A98 (Edit)
Route Option	⦿ Route this pattern
	○ Block this pattern — Not Selected —

☑ Provide Outside Dial Tone   ☐ Allow Overlap Sending   ☐ Urgent Priority

Calling Party Transformations

☐ Use Calling Party's External Phone Number Mask

Calling Party Transform Mask	
Prefix Digits (Outgoing Calls)	
Calling Line ID Presentation	Default
Calling Name Presentation	Default

Connected Party Transformations

Connected Line ID Presentation	Default
Connected Name Presentation	Default

Called Party Transformations

Discard Digits	< None >
Called Party Transform Mask	
Prefix Digits (Outgoing Calls)	

ISDN Network-Specific Facilities Information Element

Carrier Identification Code	
Network Service Protocol	— Not Selected —

Network Service	Service Parameter Name	Service Parameter Value
— Not Selected —	< Not Exist >	

Done   Local intranet

Cisco IP Phone 7960 Configuration

Cisco CallManager 4.0 Administration - Phone Configuration - Microsoft Internet Explorer

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Phone Configuration

Add a new phone
Add/Update Speed Dials
Subscribe/Unsubscribe Services
Dependency Records
Back to Find/List Phones

Directory Numbers

Base Phone

Line 1 - 4000 in Phones

Line 2 - Add new DN

Phone: SEP000B5FD22FE8 (Auto 4000)
Registration: Registered with Cisco CallManager 172.20.32.254
IP Address: 172.20.32.102
Status: Ready

| Copy | Update | Delete | Reset Phone |

Phone Configuration (Model = Cisco 7960)

Device Information

MAC Address*	000B5FD22FE8
Description	Auto 4000
Owner User ID	(Select User ID)
Device Pool*	Default ▼ (View details)
Calling Search Space	< None > ▼
AAR Calling Search Space	< None > ▼
Media Resource Group List	< None > ▼
User Hold Audio Source	< None > ▼
Network Hold Audio Source	< None > ▼
Location	< None > ▼
User Locale	< None > ▼
Network Locale	< None > ▼
Device Security Mode	Use System Default ▼
Built In Bridge	Default ▼
Privacy	Default ▼

Phone Button Template Information

Phone Button Template*	Standard 7960 ▼ (View button list)

Softkey Template Information

Softkey Template	< None > ▼

Expansion Module Information

Module 1	< None > ▼
Module 2	< None > ▼

Local intranet

Firmware Load Information (leave blank to use default)

Phone Load Name   [   ]

Module 1 Load Name   [   ] (Module 1 selection required)

Module 2 Load Name   [   ] (Module 2 selection required)

Cisco IP Phone - External Data Locations (leave blank to use default)

Information   [   ]

Directory   [   ]

Messages   [   ]

Services   [   ]

Authentication Server   [   ]

Proxy Server   [   ]

Idle   [   ]

Idle Timer (seconds)   [   ]

Extension Mobility (Device Profile) Information

☐ Enable Extension Mobility Feature

Log Out Profile   [— Not Selected —   ▾]

Log In User ID   < None >

Log In Time   < None >

Log Out Time   < None >

Multilevel Precedence and Preemption (MLPP) Information

MLPP Domain   [   ] (e.g., "0000FF")

MLPP Indication   [Default   ▾]

MLPP Preemption   [Default   ▾]

Product Specific Configuration   ⓘ

Disable Speakerphone   ☐

Disable Speakerphone and Headset   ☐

Forwarding Delay*   [Disabled   ▾]

PC Port*   [Enabled   ▾]

Settings Access*   [Enabled   ▾]

Gratuitous ARP*   [Enabled   ▾]

PC Voice VLAN Access*   [Enabled   ▾]

Cisco CallManager 4.0 Administration - Directory Number Configuration - Microsoft Internet Explorer

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Address ⚏ http://cm-klingon/CCMAdmin/directorynumber.asp?NumPlanMapID={FDF4C8AE-583C-4480-9C58-36FC82BAA685}   ▾ ⚫Go   Links »

Directory Number Configuration

Configure Device (SEP000B5FD22FE8)
Dependency Records

Associated With
☎ **SEP000B5FD22FE8**
7960 **(Line 1)**

Directory Number: 4000 (Phones)
Status: Ready
Note: Any update to this Directory Number automatically resets the associated devices

Update	Remove from Device	Reset Devices

Directory Number

Directory Number* | 4000 |

Partition | Phones ▾ |

Directory Number Settings

Voice Mail Profile | < None > ▾ |
                             (Choose <None> to use default)

Calling Search Space | Phones ▾ |

AAR Group | < None > ▾ |

User Hold Audio Source | < None > ▾ |

Network Hold Audio Source | < None > ▾ |

Auto Answer | Auto Answer Off ▾ |
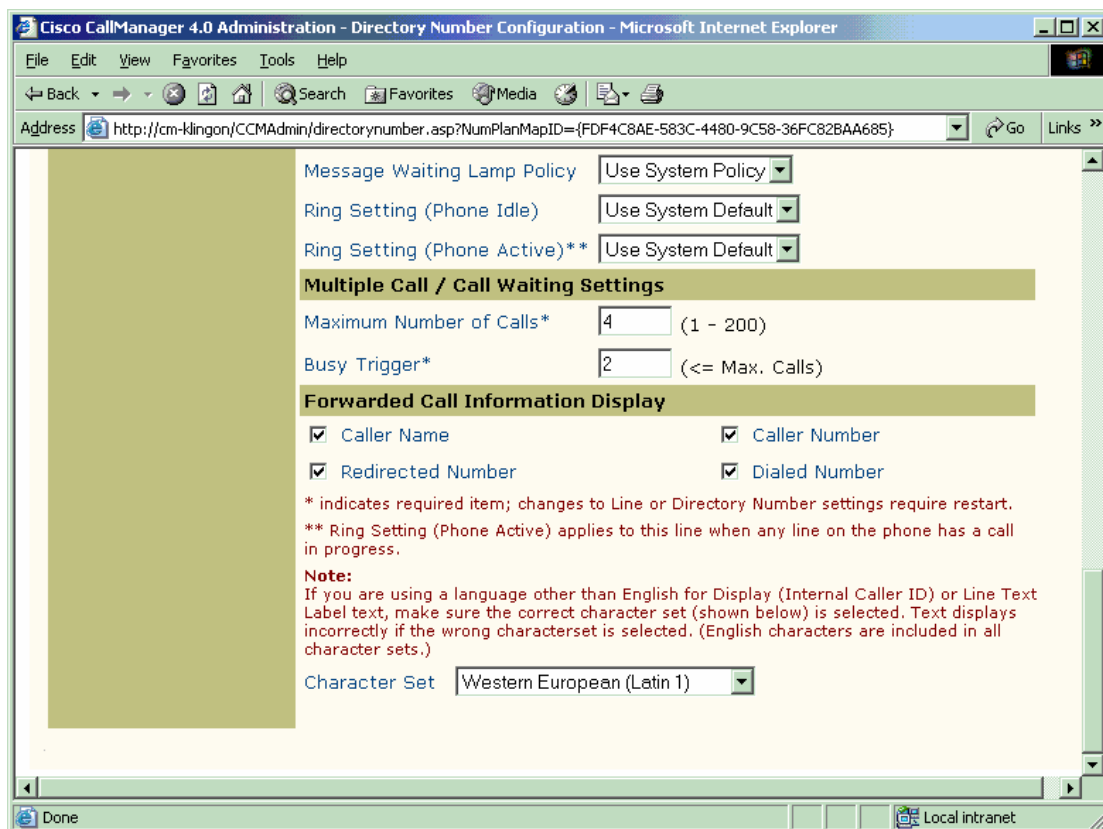
Call Forward and Pickup Settings

                    Voice Mail **Destination**   **Calling Search Space**

Forward All   ☐ | | | < None > ▾ |

Forward Busy   ☐ | | | < None > ▾ |

Forward No Answer   ☐ | | | < None > ▾ |

No Answer Ring Duration | | (seconds)

Call Pickup Group | < None > ▾ |

MLPP Alternate Party Settings

Target (Destination) | |

Calling Search Space | < None > ▾ |

No Answer Ring Duration | | (seconds)

Line Settings for this Device

Display (Internal Caller ID) | JOHN DOE |

Line Text Label | |

External Phone Number Mask | |

Done   Local intranet

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