

Cisco 6608 - PBX Interoperability: Nortel Meridian Opt11C Release 25 PBX with CCM using T1 QSIG as MGCP Gateway

Introduction

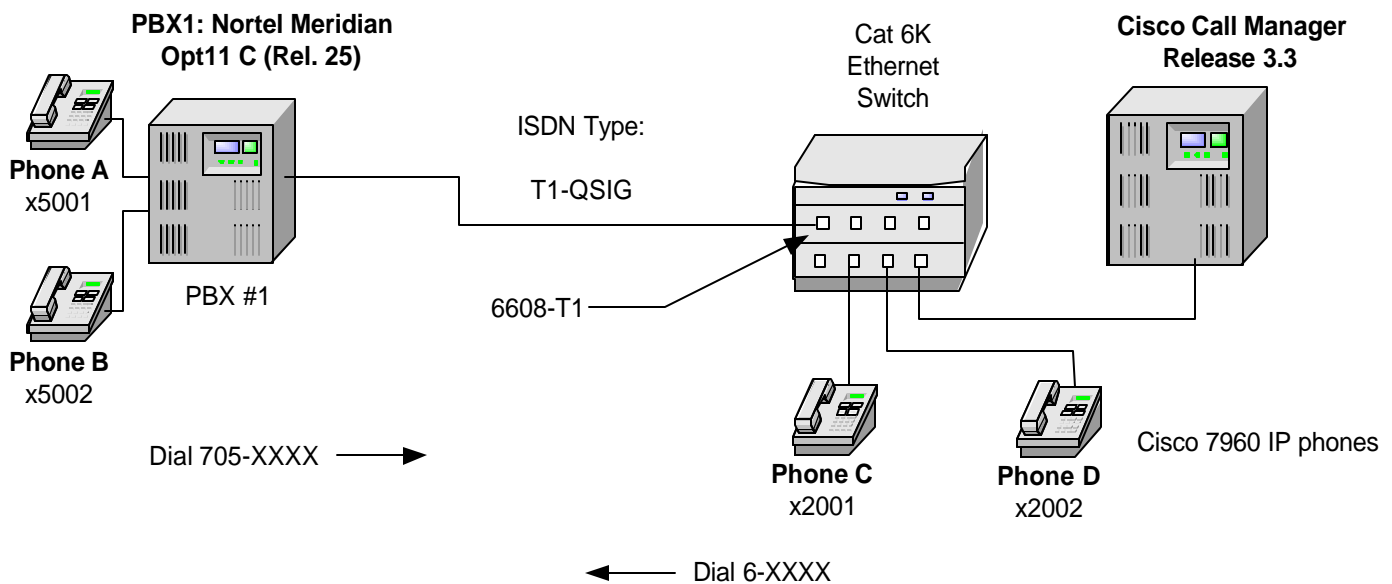
This is an application note for connectivity of Nortel Meridian Opt11C Release 25 PBX with Cisco CallManager using Cisco 6608-T1 QSIG as an MGCP Gateway.

Supported Features

- Calling Name Identification
- Calling Number Identification
- Connected Name Identification
- Connected Number Identification
- Connected Name Identification

Network Topology

Basic Call Setup End-to-End Configuration





As shown in the diagram above, a Nortel Meridian Opt 11C PBX is connected with an ISDN T1 PRI QSIG link to a Cisco 6608-T1 Gateway, which in turn, is connected to an Ethernet switch. The interoperability testing involves Layers 1, 2 and 3 on the ISDN PRI QSIG link between a Cisco 6608-T1 and the PBX.

Layer 1 (Physical Layer)

The Nortel PBX configuration screen for the T1 trunk interface is reached using **LD17** command, setting the CEQU (Common Equipment parameters).

Layers 2 & 3 (Q.921 and Q.931)

Layer 2 and 3 packet exchanges were monitored using an Acacia Clarinet protocol analyzer, bridged across the PRI link in high impedance mode.

Layer 2 Q.921 packets were monitored to ensure that each PBX/Cisco 6608-T1 software configuration properly exchanged SABME/UA packets to initialize the ISDN link, and then RR packets were exchanged every 30 seconds.

Layer 3 Q.931 packets were monitored to ensure that the appropriate call setup/teardown packets were exchanged for each configuration, and that the SETUP packets contained the mandatory Information Elements with the necessary details, as well as optional IEs such as Calling Name and Number.

Telephone calls were made end-to-end in both directions through the Cisco 6608-T1 Gateway, and a check was made to ensure that there was an audio path in both directions for each call.

Limitations

- CCM Seaview release does not support sending Alerting Name or Busy Name Identification information.
- CCM Seaview release does not send Restricted Calling Name Identification.
- CCM Seaview release does not send Restricted Connected Name Identification.
- CCM Seaview release does not send Restricted Connected Number Identification.

System Components

Hardware Requirements

- Cisco Catalyst 6000 switch with Cisco 6608-T1 Gateway
- Nortel Meridian Option 11C PBX, NTA09BA, 1.5 Mb DTI/PRI

Software Requirements

- Cisco IOS Software Release 6.1(4)
- PBX Software Release 25
- Cisco CallManager Release 3.3

Configuration

Configuring the Nortel Meridian Opt11C PBX

The Nortel Meridian Opt11C PBX supports both “USER” and “NETWORK” protocol sides when switch type is set to ISGF by using LD17 command.



Configure in the following sequence:

- Configure common equipment.
- Configure the D-Channel.
- Configure the route data block.
- Configure the trunk.
- Configure the coordinated dialing plan.

Configuring 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
```

```
XCT 000
```

```
CONF 029 030 031 062
```

```
094 095
```

```
DLOP NUM DCH FRM LCMT YALM T1TE TRSH
```

```
PRI 004 23 ESF B8S FDL - 00
```

```
005 23 ESF B8S FDL - 00
```

```
PRI2 03
```

```
DTI2
```



MISP

REQ ****

>

Configuring the D-Channel

>LD 22

PT2000

MARP NOT ACTIVATED

REQ prt

TYPE adan dch 5

ADAN DCH 5

CTYP MSDL

CARD 05

PORT 1

DES T1_ISGF

USR PRI

DCHL 5

OTBF 32

PARM RS422 DTE

DRAT 64KC

CLOK EXT

IFC ISGF

PINX_CUST 0

ISDN_MCNT 300



```
CLID OPT0
CO_TYPE STD
SIDE NET
CNEG 1
RLS ID **
RCAP COLP NDI CCBI CCNI PRI CTI
PR_TRIGS DIV 2 3
      CNG 2 3
PR_RTN NO
MBGA NO
OVLN YES
DIDD 0
OVLS YES
OVLT 0
T310 120
T200 3
T203 10
N200 3
N201 260
K 7
```

```
REQ ****
```

```
>
```

Configuring the Route Data Block

```
>LD 21
```

```
PT1000
```

```
REQ: PRT
```

```
TYPE: RDB
```



CUST 0

ROUT 105

TYPE RDB

CUST 00

DMOD

ROUT 105

DES T1_ISGF

TKTP TIE

NPID_TBL_NUM 0

ESN NO

CNVT NO

SAT NO

RCLS EXT

DTRK YES

BRIP NO

DGTP PRI

ISDN YES

MODE PRA

IFC ISGF

SEB NO

PNI 00000

NCNA NO

NCRD NO

CHTY BCH

CTYP UKWN

INAC NO

ISAR NO

CPFXS YES

DAPC NO



INTC NO
DSEL VCE
PTYF 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



TFD 0

DRNG NO

CDR NO

MUS NO

EQAR NO

PAGE 002

OHQ NO

OHQT 00

CBQ NO

AUTH NO

TTBL 0

PLEV 2

ALRM NO

ART 0

SGRP 0

AACR NO

REQ: ****

>

Configuring the Trunk

>LD 20

PT0000

MARP NOT ACTIVATED

REQ: PRT



TYPE: TNB

TN 5 1

DATE

PAGE

DES

TN 005 01

TYPE TIE

CDEN SD

CUST 0

TRK PRI

PDCA 1

PCML MU

NCOS 0

RTMB 105 1

B-CHANNEL SIGNALING

TGAR 1

AST NO

IAPG 0

CLS UNR DTN CND WTA LPR APN THFD HKD

P10 VNL

TKID

DATE 25 OCT 2002

NACT ****



>

Configuring the Coordinated Dialing Plan

>LD 87

ESN000

MEM AVAIL: (U/P): 1293414 USED U P: 69001 30224 TOT: 1392639

DISK RECS AVAIL: 486

REQ PRT

CUST 0

FEAT CDP

TYPE DSC

DSC 20

DSC 20

FLEN 0

DSP LSC

RLI 5

NPA

NXX

MEM AVAIL: (U/P): 1293414 USED U P: 69001 30224 TOT: 1392639

DISK RECS AVAIL: 486

REQ ****

>

>LD 86

ESN000

MEM AVAIL: (U/P): 1293414 USED U P: 69001 30224 TOT: 1392639



DISK RECS AVAIL: 486

REQ PRT

CUST 0

FEAT RLB

RLI 5

RLI 5

ENTR 0

LTER NO

ROUT 105

TOD 0 ON 1 ON 2 ON 3 ON

4 ON 5 ON 6 ON 7 ON

CNV NO

EXP NO

FRL 0

DMI 0

FCI 0

FSNI 0

SBOC NRR

OHQ NO

CBQ NO

ISET 0

NALT 5

MFRL 0

OVLL 0

MEM AVAIL: (U/P): 1293414 USED U P: 69001 30224 TOT: 1392639

DISK RECS AVAIL: 486

REQ ****



>

Configuring Cisco CallManager

Cisco 6608-T1 Gateway Configuration

The screenshot shows the Cisco CallManager 3.3 Administration interface for Gateway Configuration. The browser window title is "Cisco CallManager 3.3 Administration - Gateway Configuration - Microsoft Internet Explorer". The address bar shows the URL: <http://ferengj/CCMAdmin/gatewayconfig.asp?pkid={3466B2B5-3ACD-495D-B532-8926E45EFC65}&type=1>. The page header includes "Cisco CallManager Administration For Cisco IP Telephony Solutions" and the Cisco Systems logo. The main heading is "Gateway Configuration" with a link "Back to Find/List Gateways".

Product : Cisco Catalyst 6000 T1 VoIP Gateway
Gateway : S0/DS1-0@SDA0001C9D93A98
Device Protocol: Digital Access PRI
Registration: Registered with Cisco CallManager 10.10.10.1
IP Address: 10.10.10.116

Status: Ready

Device Information

MAC Address*	<input type="text" value="0001C9D93A98"/>
Description	<input type="text" value="SDA0001C9D93A98"/>
Device Pool*	<input type="text" value="Default"/>
Network Locale*	<input type="text" value="United States"/>
Media Resource Group List	<input type="text" value="< None >"/>
Location	<input type="text" value="< None >"/>
AAR Group	<input type="text" value="< None >"/>
Load Information	<input type="text"/>

Interface Information

PRI Protocol Type*	<input type="text" value="PRI ISO QSIG T1"/>
Protocol Side*	<input type="text" value="User"/>
Channel Selection Order*	<input type="text" value="Top Down"/>



Cisco CallManager 3.3 Administration - Gateway Configuration - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites History Print

Address <http://ferengi/CCMAdmin/gatewayconfig.asp?pkid={3466B2B5-3ACD-495D-B532-8926E45EFC65}&type=1> Go Links

Channel IE Type*	Timeslot Number
PCM Type*	μ-law
Delay for first restart (1/8 sec ticks)	32
Delay between restarts (1/8 sec ticks)	4
<input checked="" type="checkbox"/> Inhibit restarts at PRI initialization	
<input type="checkbox"/> Enable status poll	

Call Routing Information

Inbound Calls

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

Outbound Calls

Calling Party Presentation*	Allowed
Calling Party Selection*	Originator
Called party IE number type unknown*	Cisco CallManager
Calling party IE number type unknown*	Cisco CallManager
Called Numbering Plan*	Private
Calling Numbering Plan*	Cisco CallManager
Number of digits to strip*	0
Caller ID DN	

PRI Protocol Type Specific Information

<input type="checkbox"/> Display IE Delivery	
--	--

Local intranet



Cisco CallManager 3.3 Administration - Gateway Configuration - Microsoft Internet Explorer

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Back Forward Stop Home Search Favorites History Print

Address <http://ferengi/CCMAdmin/gatewayconfig.asp?pkid={3466B2B5-3ACD-495D-B532-8926E45EFC65}&type=1> Go Links

Redirecting Number IE Delivery - Outbound

Redirecting Number IE Delivery - Inbound

Send Extra Leading Character In DisplayIE***

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

MCDN Channel Number Extension Bit Set to Zero**

Interface Identifier Present**

Interface Identifier Value**

Product Specific Configuration

Clock Reference*	<input type="text" value="Network"/>
TX-Level CSU*	<input type="text" value="0dB"/>
FDL Channel*	<input type="text" value="ATT 54016"/>
Framing*	<input type="text" value="ESF"/>
Audio Signal Adjustment into IP Network*	<input type="text" value="NoDbPadding"/>
Audio Signal Adjustment from IP Network*	<input type="text" value="NoDbPadding"/>
Yellow Alarm*	<input type="text" value="Bit2"/>
Zero Suppression*	<input type="text" value="B8ZS"/>
Digit On Duration(50-500ms)*	<input type="text" value="100"/>
Interdigit Duration(50-500msec)*	<input type="text" value="100"/>
Adaptive Gain Control Enable*	<input type="checkbox"/>
SNMP Community String	<input type="text" value="public"/>
Debug Port Enable*	<input checked="" type="checkbox"/>
Hold Tone Silence Duration*	<input type="text" value="0"/>
Port Used for Voice Calls*	<input checked="" type="checkbox"/>

Local intranet



Cisco CallManager 3.3 Administration - Gateway Configuration - Microsoft Internet Explorer

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Address <http://ferengj/CCMAdmin/gatewayconfig.asp?pkid={3466B2B5-3ACD-495D-B532-8926E45EFC65}&type=1> Go Links

Port Used for Voice Calls*	<input checked="" type="checkbox"/>
Port Used for Modem Calls*	<input checked="" type="checkbox"/>
Port Used for Fax Calls*	<input checked="" type="checkbox"/>

Fax and Modem Parameters

Fax Relay Enable*	<input checked="" type="checkbox"/>
Fax Error Correction Mode Override*	<input checked="" type="checkbox"/>
Maximum Fax Rate*	14400bps
Fax Payload Size*	20
Non Standard Facilities Country Code*	65535
Non Standard Facilities Vendor Code*	65535
Fax/Modem Packet Redundancy*	<input type="checkbox"/>
V.21 Flag Sequence Detection Count*	4
NSE Type*	Non-IOS Gateways

Playout Delay Parameters

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

* 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](#)

Local intranet



Enbloc Route Pattern Configuration



Cisco CallManager 3.3 Administration - Route Pattern Configuration - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites History Print

Address <http://ferengi/CCMAdmin/routepatternconfig.asp?pkid={AB9DD1D1-A861-44F8-A286-72E0CA4426A1}&status=uc> Go Links

Cisco CallManager Administration
For Cisco IP Telephony Solutions

CISCO SYSTEMS

Route Pattern Configuration

[Add a New Route Pattern](#)
[Back to Find/List Route Patterns](#)

Route Pattern: 6.XXXX

Status: Update completed
Note: Any update to this route pattern automatically resets the associated gateway/route list

Pattern Definition

Route Pattern*	<input type="text" value="6.XXXX"/>
Partition	< None >
Description	<input type="text"/>
Numbering Plan*	North American Numbering Plan
Route Filter	< None >
Gateway/Route List*	S0/DS1-0@SDA0001C9D93A98 (Edit)
Route Option	<input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern
<input checked="" type="checkbox"/> Provide Outside Dial Tone	<input type="checkbox"/> Urgent Priority

Calling Party Transformations

Use Calling Party's External Phone Number Mask

Calling Party Transform Mask	<input type="text"/>
Prefix Digits (Outgoing Calls)	<input type="text"/>
Calling Party Presentation	Default

Called Party Transformations

Discard Digits	PreDot
Called Party Transform Mask	<input type="text"/>
Prefix Digits (Outgoing Calls)	<input type="text"/>

ISDN Network-Specific Facilities Information Element

Carrier Identification Code	<input type="text"/>	
Network Service Protocol	— Not Selected —	
Network Service	Service Parameter Name	Service Parameter Value
— Not Selected —	< Not Exist >	<input type="text"/>

Local intranet



Overlap Sending Route Pattern Configuration

Cisco CallManager 3.3 Administration - Route Pattern Configuration - Microsoft Internet Explorer

Address: http://ferengijCCMAdmin/routepatternconfig.asp?pkid={D2244682-022B-4947-9D29-4F8714BF6E0}

Cisco CallManager Administration

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CISCO SYSTEMS

Route Pattern Configuration

[Add a New Route Pattern](#)
[Back to Find/List Route Patterns](#)

Route Pattern: 9.X
Status: Ready
Note: Any update to this route pattern automatically resets the associated gateway/route list

Copy Update Delete

Pattern Definition

Route Pattern*	9.X
Partition	< None >
Description	
Numbering Plan*	North American Numbering Plan
Route Filter	< None >
Gateway/Route List*	S0/DS1-0@SDA0001C9D93A98 (Edit)
Route Option	<input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern
<input checked="" type="checkbox"/> Provide Outside Dial Tone	<input type="checkbox"/> Urgent Priority

Calling Party Transformations

Use Calling Party's External Phone Number Mask

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

Called Party Transformations

Discard Digits	PreDot
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



Configuring the Catalyst 6000 Switch

User/Network Settings

The Cisco 6608-T1 Gateway with ISDN protocol type setting of **PRI ISO QSIG T1** supports both protocol sides by selecting "Network/User" in the Protocol Side field when configuring the Gateway via CCM.

```
Console> (enable) show version
```

```
WS-C6506 Software, Version NmpSW: 6.1(4)
```

```
Copyright (c) 1995-2001 by Cisco Systems
```

```
NMP S/W compiled on May 15 2001, 12:27:20
```

```
System Bootstrap Version: 5.3(1)
```

```
Hardware Version: 2.0 Model: WS-C6506 Serial #: TBA04110341
```

Mod	Port	Model	Serial #	Versions
1	2	WS-X6K-SUP1A-2GE	SAD041504XL	Hw : 3.1 Fw : 5.3(1) Fw1: 5.1(1)CSX Sw : 6.1(4) Sw1: 6.1(4)
		WS-F6K-PFC	SAD0413097K	Hw : 1.1
3	48	WS-X6248-RJ-45	SAD04150CK1	Hw : 1.2 Fw : 5.1(1)CSX Sw : 6.1(4)
6	8	WS-X6608-T1	SAD04400EM0	Hw : 1.1 Fw : 5.4(2)



Sw : 6.1(4)

HP1: D00403030009; DSP1: D005D033 (3.6.

33)

HP2: D00403010044; DSP2: D005Q031 (3.6.

15)

HP3: D00403010044; DSP3: D005Q031 (3.6.

15)

HP4: D00403010044; DSP4: D005Q031 (3.6.

15)

HP5: D00403010044; DSP5: D005Q031 (3.6.

15)

HP6: D00403010044; DSP6: D005Q031 (3.6.

15)

HP7: D00403010044; DSP7: D005Q031 (3.6.

15)

HP8: D00403010044; DSP8: D005Q031 (3.6.

15)

Module	DRAM			FLASH			NVRAM		
	Total	Used	Free	Total	Used	Free	Total	Used	Free
1	65408K	43764K	21644K	16384K	5327K	11057K	512K	245K	267K

Uptime is 229 days, 22 hours, 39 minutes

Console> (enable)

Console> (enable) **show module**

Mod	Slot	Ports	Module-Type	Model	Sub Status
---	---	---	-----	-----	-----



1	1	2	1000BaseX Supervisor	WS-X6K-SUP1A-2GE	yes	ok
3	3	48	10/100BaseTX Ethernet	WS-X6248-RJ-45	no	ok
4	4	24	FXS	WS-X6624-FXS	no	ok
5	5	8	E1	WS-X6608-E1	no	ok
6	6	8	T1	WS-X6608-T1	no	ok

Mod	Module-Name	Serial-Num
1		SAD041504XL
3		SAD04150CK1
4		SAD050203M8
5		SAD043300AJ
6		SAD04400EM0

Mod	MAC-Address(es)	Hw	Fw	Sw
1	00-d0-d3-37-f9-8e to 00-d0-d3-37-f9-8f 00-d0-d3-37-f9-8c to 00-d0-d3-37-f9-8d 00-01-63-af-5c-00 to 00-01-63-af-5f-ff	3.1	5.3(1)	6.1(4)
3	00-01-97-4a-10-30 to 00-01-97-4a-10-5f	1.2	5.1(1)CSX	6.1(4)
4	00-03-32-ba-2e-35	3.0	5.4(2)	6.1(4)
5	00-01-64-12-22-80 to 00-01-64-12-22-87	1.1	5.4(2)	6.1(4)
6	00-01-c9-d9-3a-98 to 00-01-c9-d9-3a-9f	1.1	5.4(2)	6.1(4)

Mod	Sub-Type	Sub-Model	Sub-Serial	Sub-Hw
1	L3 Switching Engine	WS-F6K-PFC	SAD0413097K	1.1

Console> (enable)

Console> (enable) **show port 6/1**



Port	Name	Status	Vlan	Duplex	Speed	Type
6/1		connected	1	full	1.544	T1

Port	DHCP	MAC-Address	IP-Address	Subnet-Mask
6/1	enable	00-01-c9-d9-3a-98	10.10.10.116	255.255.255.0

Port	Call-Manager(s)	DHCP-Server	TFTP-Server	Gateway
6/1	10.10.10.1	10.10.10.1	10.10.10.1	10.10.10.125

Port	DNS-Server(s)	Domain
6/1	-	-

Port	CallManagerState	DSP-Type
6/1	registered	C549

Port	NoiseRegen	NonLinearProcessing
6/1	enabled	enabled

Port	Trap	IfIndex
6/1	disabled	98

Console> (enable)



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