



Cisco Catalyst 6000 Series Gateway-PBX Interoperability: Nortel Meridian 1 Option 11C with T1 PRI Signaling

This document describes the interoperability and configuration of a Cisco Catalyst 6000 series voice gateway with a Nortel Meridian 1 Option 11C PBX using T1 PRI signaling. It includes the following sections:

- System Components
- Configuration Tasks
- Caveats

System Components

PBX Model	Nortel Meridian 1 Option 11C
PBX Release	Rel 25
Telephony Signaling	T1 PRI
Voice Gateway	Cisco Catalyst 6608
Gateway Release	5.5(6a)
Call Manager Release	3.1.1
VoX Protocol	MGCP

Configuration Tasks

See the following sections for configuration tasks for this feature:

- Set Up
- Nortel PBX Configuration
- Cisco Call Manager Configuration
- Cisco Catalyst 6608 Gateway Configuration

Set Up

This section includes the following information:

- Connectivity Diagrams
- Set Up Notes

Connectivity Diagrams

Figure 1: Test Configuration

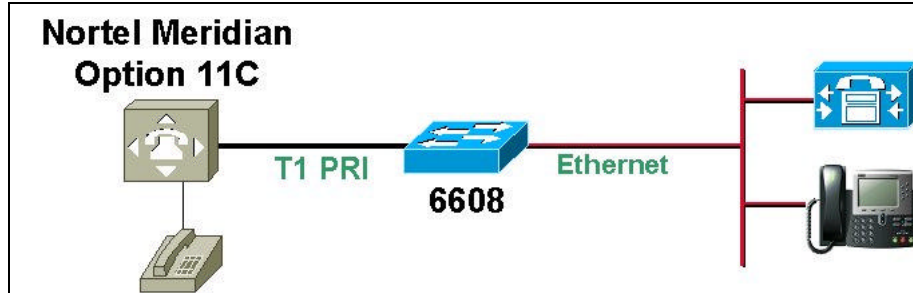


Figure 1 represents the configuration used for testing: a Nortel Meridian Opt11C PBX connected to a Cisco Catalyst 6608 voice gateway via a T1 PRI connection.

Set Up Notes

- The Cisco 6608-T1 Gateway with ISDN protocol type setting of PRI DMS-100 supports both protocol sides by selecting “Network/User” in the protocol side field when configuring the Gateway via CallManager.
- The Nortel Meridian Opt11C supports “USER” side only when the switch type is set to DMS-100. Therefore, the Cisco 6608 Gateway should be configured to emulate the “Network” side. This USER choice is set on the Nortel PBX by using LD 17.

Nortel PBX Configuration

Nortel PBX Version Information

- Software: Rel 25
- Hardware: NTAK09BA, 1.5 Mb DTI/PRI, Rlse 02.

Nortel PBX Sample Configuration

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

Configure 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

  MISP

REQ ****
>
```

Configure D-Channel

```
>LD 22

PT2000
MARP NOT ACTIVATED

REQ PRT

TYPE ADAN DCH 5

ADAN DCH 5
  CTYP MSDL
  CARD 05
  PORT 1
  DES DMS-100
  USR PRI
  DCHL 5
  OTBF 32
  PARM RS422 DTE
  DRAT 64KC
  CLOK EXT
  IFC D100
  SIDE USR
  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 105

TYPE RDB
CUST 00
DMOD
ROUT 105
DES DMS-100
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 D100
SBN NO
PNI 00000
NCNA YES
NCRD NO
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 705
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
TFD 0
DRNG NO
CDR NO
MUS NO

PAGE 002

OHQ NO
OHQT 00
CBQ NO
AUTH NO
TTBL 0
PLEV 2
ALRM NO
ART 0
SGRP 0
AACR NO

REQ: ****
>

Configure 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 13 MAR 2001

NACT ****
>

Configure Coordinated Dialing Plan

>LD 87

ESN000

MEM AVAIL: (U/P): 1302848 USED U P: 62313 27478 TOT: 1392639
DISK RECS AVAIL: 491
REQ PRT

CUST 0

FEAT CDP

TYPE DSC

DSC 50

DSC 50

FLEN 0

DSP LSC

RLI 5

NPA

NXX

MEM AVAIL: (U/P): 1302848 USED U P: 62313 27478 TOT: 1392639
DISK RECS AVAIL: 491
REQ ****

>

OVL000

>LD 86

ESN000

MEM AVAIL: (U/P): 1302848 USED U P: 62313 27478 TOT: 1392639
DISK RECS AVAIL: 491
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

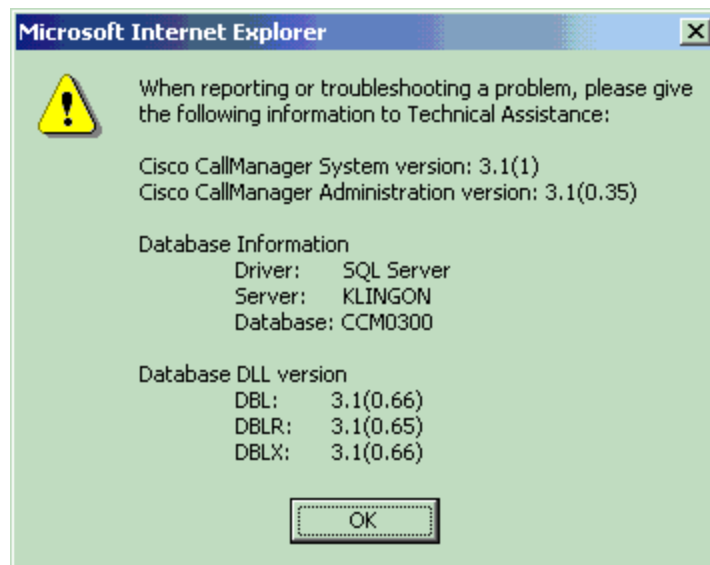
OVLL 0

MEM AVAIL: (U/P): 1302848 USED U P: 62313 27478 TOT: 1392639
DISK RECS AVAIL: 491
REQ
DTC103

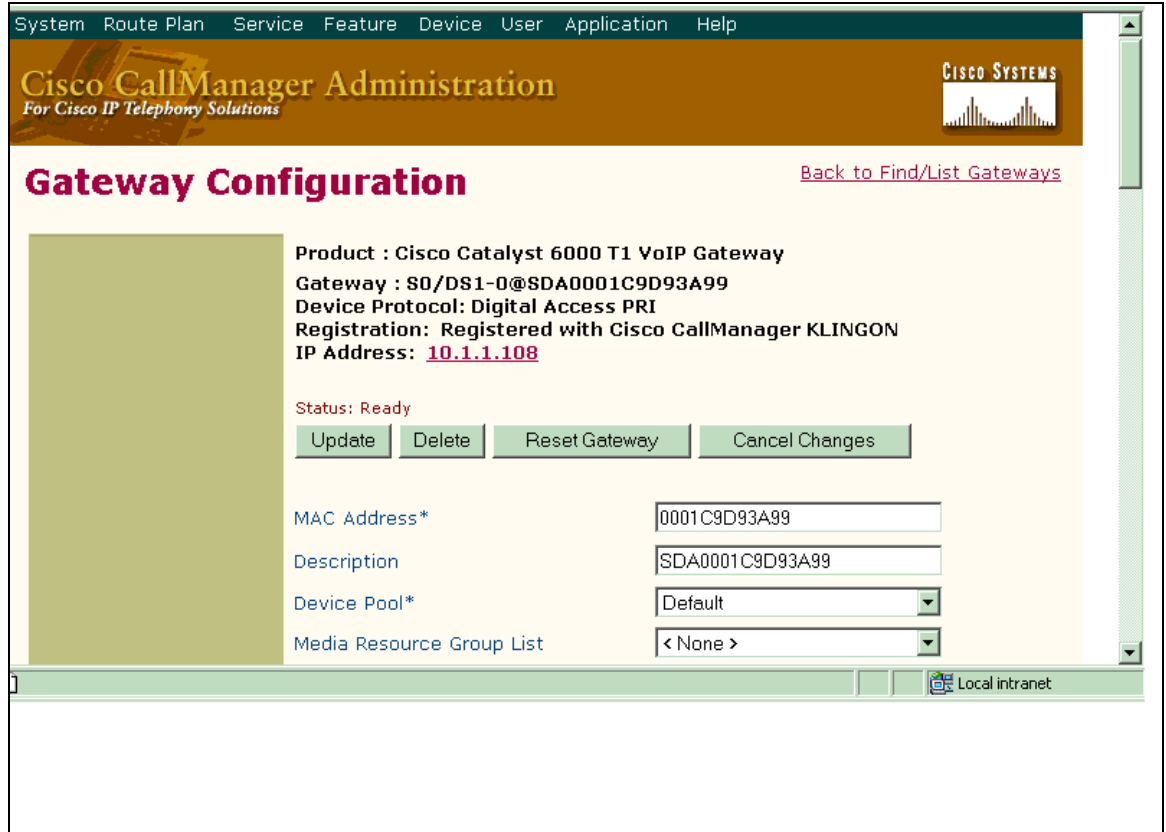
>

Call Manager Configuration

Call Manager Version Information



6608 Gateway Configuration



The screenshot shows the Cisco CallManager Administration web interface. At the top, there is a navigation menu with links for System, Route Plan, Service, Feature, Device, User, Application, and Help. The main header area contains the Cisco CallManager Administration logo and the Cisco Systems logo. The page title is "Gateway Configuration", and there is a link to "Back to Find/List Gateways".

The configuration details for the gateway are as follows:

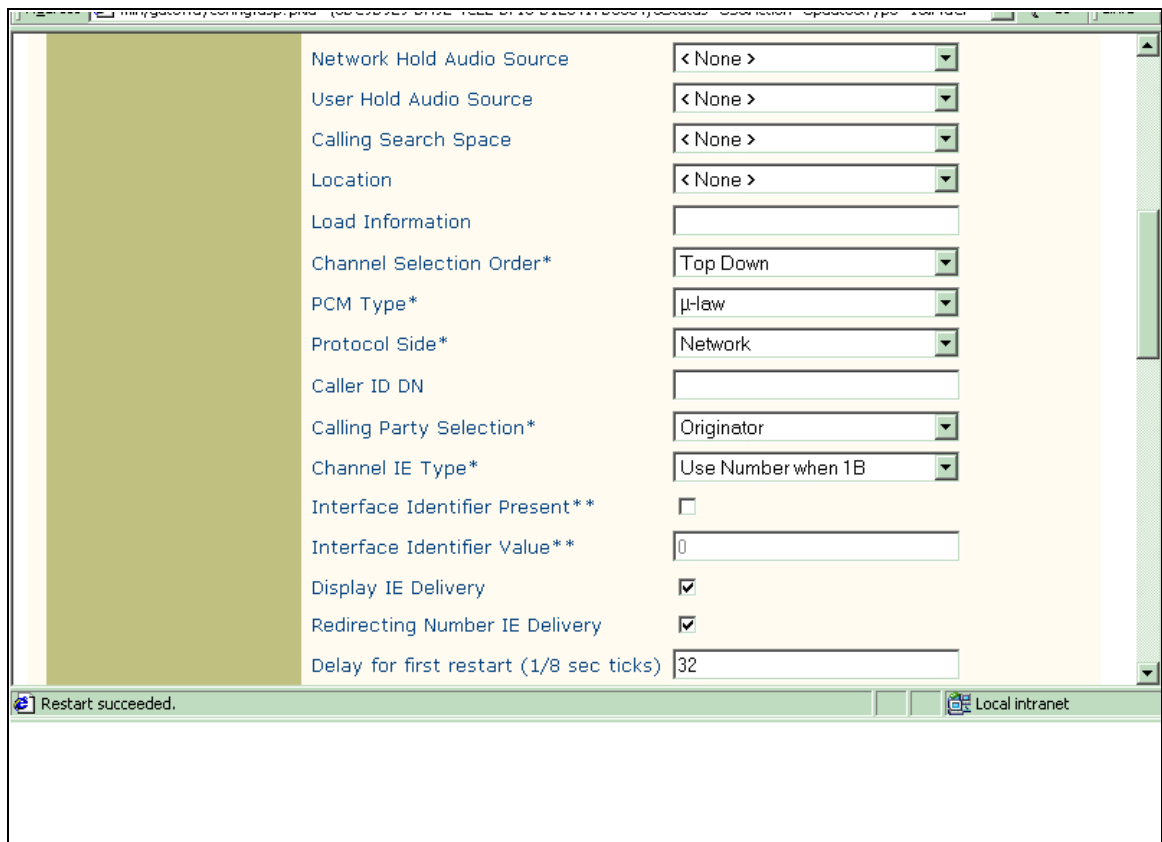
- Product : Cisco Catalyst 6000 T1 VoIP Gateway
- Gateway : S0/DS1-0@SDA0001C9D93A99
- Device Protocol: Digital Access PRI
- Registration: Registered with Cisco CallManager KLINGON
- IP Address: [10.1.1.108](#)

The status is "Ready". Below this, there are four buttons: Update, Delete, Reset Gateway, and Cancel Changes.

Configuration fields include:

- MAC Address*: 0001C9D93A99
- Description: SDA0001C9D93A99
- Device Pool*: Default
- Media Resource Group List: < None >

At the bottom right of the interface, there is a "Local intranet" icon.



Network Hold Audio Source	< None >
User Hold Audio Source	< None >
Calling Search Space	< None >
Location	< None >
Load Information	
Channel Selection Order*	Top Down
PCM Type*	μ-law
Protocol Side*	Network
Caller ID DN	
Calling Party Selection*	Originator
Channel IE Type*	Use Number when 1B
Interface Identifier Present**	<input type="checkbox"/>
Interface Identifier Value**	0
Display IE Delivery	<input checked="" type="checkbox"/>
Redirecting Number IE Delivery	<input checked="" type="checkbox"/>
Delay for first restart (1/8 sec ticks)	32

Restart succeeded. Local intranet

Delay between restarts (1/8 sec ticks)	4
Num Digits*	23
Sig Digits	<input checked="" type="checkbox"/>
Prefix DN	
Presentation Bit*	Allowed
Called party IE number type unknown*	Cisco CallManager
Calling party IE number type unknown*	Cisco CallManager
Called Numbering Plan*	Cisco CallManager
Calling Numbering Plan*	Cisco CallManager
PRI Protocol Type*	PRI DMS-100
Inhibit restarts at PRI initialization	<input checked="" type="checkbox"/>
Enable status poll	<input type="checkbox"/>
Number of digits to strip*	0
Country Code*	North America
Setup non-ISDN Progress Indicator IE Enable***	<input type="checkbox"/>

Restart succeeded. Local intranet

Product Specific Configuration

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

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

[Back to Find/List Gateways](#)

Local intranet

Route Pattern Configuration

The screenshot shows the Cisco CallManager Administration web interface. At the top, there is a navigation menu with items: System, Route Plan, Service, Feature, Device, User, Application, and Help. Below the menu is a header banner with the text "Cisco CallManager Administration For Cisco IP Telephony Solutions" and the Cisco Systems logo. The main heading is "Route Pattern Configuration".

On the right side, there are two links: "Add a New Route Pattern" and "Back to Find/List Route Patterns".

The configuration details for a route pattern are as follows:

- Route Pattern:** 6.XXXX
- Status:** Ready
- Note:** Any update to this route pattern automatically resets the associated gateway/route list
- Buttons:** Copy, Update, Delete, Cancel Changes

The "Pattern Definition" section contains the following fields:

- Route Pattern*:** 6.XXXX
- Partition:** < None >
- Numbering Plan*:** North American Numbering Plk
- Route Filter:** < None >
- Gateway/Route List*:** S0/DS1-0@SDA0001C9D93A99 (Edit)
- Route Option:** Route this pattern Block this pattern

At the bottom right of the interface, there is a "Local intranet" icon.

Route Pattern*	<input type="text" value="6XXXX"/>
Partition	< None >
Numbering Plan*	North American Numbering Plan
Route Filter	< None >
Gateway/Route List*	S0/DS1-0@SDA0001C9D93A99 (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	
	<input type="checkbox"/> Use Calling Party's External Phone Number Mask
Calling Party Transform Mask	<input type="text"/>
Prefix Digits (Outgoing Calls)	<input type="text"/>
Called Party Transformations	
Discard Digits	PreDot
Called Party Transform Mask	<input type="text"/>
Prefix Digits (Outgoing Calls)	<input type="text"/>
* indicates required item.	

Cisco Catalyst 6608 Gateway Configuration

The following is the configuration of the Cisco Catalyst 6608 voice gateway connected to the Nortel Meridian 1 Option 11C PBX T1 PRI interface.

Cisco Catalyst 6608 Voice Gateway Version Information

```

Console> (enable) sh version
WS-C6006 Software, Version NmpSW: 5.5(6a)
Copyright (c) 1995-2001 by Cisco Systems
NMP S/W compiled on Feb 23 2001, 10:23:18
  
```

System Bootstrap Version: 5.3(1)

Hardware Version: 2.0 Model: WS-C6006 Serial #: TBA04511172

Mod	Port	Model	Serial #	Versions
1	2	WS-X6K-SUP1A-2GE	SAD05010NBK	Hw : 7.0 Fw : 5.3(1) Fw1: 5.4(2) Sw : 5.5(6a) Sw1: 5.5(6a)

```

3 48 WS-F6K-PFC SAD05020221 Hw : 1.1
   WS-X6348-RJ-45 SAD04420N7B Hw : 1.4
                                     Fw : 5.4(2)
                                     Sw : 5.5(6a)
4 24 WS-F6K-VPWR SAD050203M8 Hw : 1.0
   WS-X6624-FXS SAD050203M8 Hw : 3.0
                                     Fw : 5.4(2)
                                     Sw : 5.5(6a)
                                     HP : A00203010010; DSP : A003E031 (3.3.
32)
5 8 WS-X6608-T1 SAD04400EM0 Hw : 1.1
                                     Fw : 5.4(2)
                                     Sw : 5.5(6a)
                                     HP1: D00403010017; DSP1: D005E031 (3.3.
32)
                                     HP2: D00403010017; DSP2: D005E031 (3.3.
32)
                                     HP3: D00403010017; DSP3: D005E031 (3.3.
32)
                                     HP4: D00403010017; DSP4: D005E031 (3.3.
32)
                                     HP5: D00403010017; DSP5: D005E031 (3.3.
32)
                                     HP6: D00403010017; DSP6: D005E031 (3.3.
32)
                                     HP7: D00403010017; DSP7: D005E031 (3.3.
32)
                                     HP8: D00403010017; DSP8: D005E031 (3.3.
32)
6 8 WS-X6608-E1 SAD04380DW1 Hw : 1.1
                                     Fw : 5.4(2)
                                     Sw : 5.5(6a)
                                     HP1: D00403010017; DSP1: D005E031 (3.3.
32)
                                     HP2: D00403010017; DSP2: D005E031 (3.3.
32)
                                     HP3: D00403010017; DSP3: D005E031 (3.3.
32)
                                     HP4: D00403010017; DSP4: D005E031 (3.3.
32)
                                     HP5: D00403010017; DSP5: D005E031 (3.3.
32)
                                     HP6: D00403010017; DSP6: D005E031 (3.3.
32)
                                     HP7: D00403010017; DSP7: D005E031 (3.3.
32)
                                     HP8: D00403010017; DSP8: D005E031 (3.3.
32)

```

Module	DRAM			FLASH			NVRAM		
	Total	Used	Free	Total	Used	Free	Total	Used	Free
1	65408K	37863K	27545K	16384K	11546K	4838K	512K	198K	314K

Uptime is 83 days, 2 hours, 34 minutes
 Console> (enable)

Cisco Catalyst 6608 Voice Gateway Sample Configuration

```

Console> (enable) sh 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-X6348-RJ-45	yes	ok
4	4	24	FXS		WS-X6624-FXS	no	ok
5	5	8	T1		WS-X6608-T1	no	ok
6	6	8	E1		WS-X6608-E1	no	ok

Mod	Module-Name	Serial-Num
1		SAD05010NBK
3		SAD04420N7B
4		SAD050203M8
5		SAD04400EM0
6		SAD04380DW1

Mod	MAC-Address(es)	Hw	Fw	Sw
1	00-04-c0-f8-42-02 to 00-04-c0-f8-42-03 00-04-c0-f8-42-00 to 00-04-c0-f8-42-01 00-04-9b-f0-78-00 to 00-04-9b-f0-7b-ff	7.0	5.3(1)	5.5(6a)
3	00-02-fc-20-5e-50 to 00-02-fc-20-5e-7f	1.4	5.4(2)	5.5(6a)
4	00-03-32-ba-2e-35	3.0	5.4(2)	5.5(6a)
5	00-01-c9-d9-3a-98 to 00-01-c9-d9-3a-9f	1.1	5.4(2)	5.5(6a)
6	00-01-c9-d8-63-3e to 00-01-c9-d8-63-45	1.1	5.4(2)	5.5(6a)

Mod	Sub-Type	Sub-Model	Sub-Serial	Sub-Hw
1	L3 Switching Engine	WS-F6K-PFC	SAD05020221	1.1
3	Inline Power Module	WS-F6K-VPWR		1.0

Console> (enable)

Console> (enable) **sh port 5**

Port	Name	Status	Vlan	Duplex	Speed	Type
5/1		notconnect	1	full	1.544	T1
5/2		connected	1	full	1.544	T1
5/3		notconnect	1	full	1.544	T1
5/4		notconnect	1	full	1.544	T1
5/5		notconnect	1	full	1.544	T1
5/6		notconnect	1	full	1.544	T1
5/7		notconnect	1	full	1.544	T1
5/8		notconnect	1	full	1.544	T1

Port	DHCP	MAC-Address	IP-Address	Subnet-Mask
5/1	enable	00-01-c9-d9-3a-98	10.1.1.107	255.255.255.0
5/2	enable	00-01-c9-d9-3a-99	10.1.1.108	255.255.255.0
5/3	enable	00-01-c9-d9-3a-9a	10.1.1.109	255.255.255.0
5/4	enable	00-01-c9-d9-3a-9b	10.1.1.110	255.255.255.0
5/5	enable	00-01-c9-d9-3a-9c	10.1.1.111	255.255.255.0
5/6	enable	00-01-c9-d9-3a-9d	10.1.1.112	255.255.255.0
5/7	enable	00-01-c9-d9-3a-9e	10.1.1.113	255.255.255.0
5/8	enable	00-01-c9-d9-3a-9f	10.1.1.114	255.255.255.0

Port	Call-Manager(s)	DHCP-Server	TFTP-Server	Gateway
5/1	10.1.1.2	10.1.1.2	10.1.1.2	10.1.1.7
5/2	10.1.1.2	10.1.1.2	10.1.1.2	10.1.1.7
5/3	10.1.1.2	10.1.1.2	10.1.1.2	10.1.1.7
5/4	10.1.1.2	10.1.1.2	10.1.1.2	10.1.1.7
5/5	10.1.1.2	10.1.1.2	10.1.1.2	10.1.1.7
5/6	10.1.1.2	10.1.1.2	10.1.1.2	10.1.1.7
5/7	10.1.1.2	10.1.1.2	10.1.1.2	10.1.1.7
5/8	10.1.1.2	10.1.1.2	10.1.1.2	10.1.1.7

Port	DNS-Server(s)	Domain
5/1	-	-

```
5/2 - -
5/3 - -
5/4 - -
5/5 - -
5/6 - -
5/7 - -
5/8 - -
```

```
Port CallManagerState DSP-Type
-----
5/1 registered C549
5/2 registered C549
5/3 registered C549
5/4 registered C549
5/5 registered C549
5/6 registered C549
5/7 registered C549
5/8 registered C549
```

```
Port NoiseRegen NonLinearProcessing
-----
5/1 enabled enabled
5/2 enabled enabled
5/3 enabled enabled
5/4 enabled enabled
5/5 enabled enabled
5/6 enabled enabled
5/7 enabled enabled
5/8 enabled enabled
Console> (enable)
```

Caveats

- Calling Name delivery and presentation features are supported by the Nortel PBX as of Release 25 for the DMS-100 switch-type.
- The Nortel Meridian Opt11C supports “USER” side only when the switch type is set to DMS-100. Therefore, the Cisco 6608 Gateway should be configured to emulate the “Network” side.
- When calling from a Cisco 7960 IP phone to a Nortel digital phone, the Calling/Called Name and Number are displayed on both phones after the call is answered. When calling from a Nortel digital phone to a Cisco 7960 IP phone, the IP phone displays the Connected Name and Number after the call is answered. The Nortel phone, however, does NOT get updated when the call is answered. The Nortel phone instead displays the numbers being dialed (namely, the Access Code + extension number).