



Cisco 3640 Series Gateway-PBX Interoperability: Nortel Meridian 1 Option 11C PBX with E1 QSIG Signaling

This document describes the interoperability and configuration of a Cisco 3640 voice gateway to a Nortel Meridian 1 using E1 QSIG signaling. It includes the following sections:

- System Components
- Configuration Tasks
- Caveats

System Components

PBX Models	Nortel Meridian 1 Option 11C
PBX Releases	Release 24, Issue 24
Telephony Signaling	E1 QSIG
Voice Gateway	Cisco 3640
Gateway Release	IOS™ 12.2(1)T
VoX Protocol	H.323

Configuration Tasks

See the following sections for configuration tasks for this feature:

- Set Up
- Nortel PBX Configuration
- Cisco 3640 Gateway Configuration

Set Up

This section includes the following information:

- Connectivity Diagrams
- Set Up Notes

Connectivity Diagrams

Figure 1: *Test Configuration*

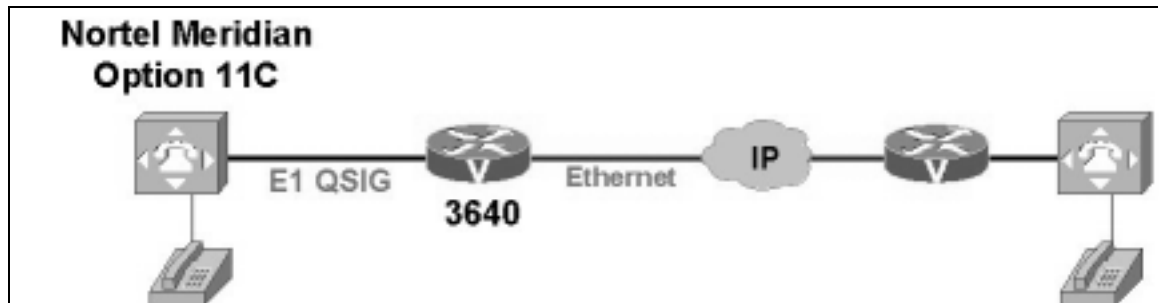


Figure 1 represents the configuration used for testing. A Nortel Meridian 1 Option 11C PBX connected to a Cisco 3640 voice gateway via an E1 QSIG connection.

Set Up Notes

- The Cisco 3640 gateway with ISDN switch type setting of **primary-qsig** supports both protocol sides by using the **isdn protocol-emulate network/user** command.
- The Nortel Meridian Option 11C, when set to ESIG, ISIG, ESGF or ISGF, supports both “USER” and “NETWORK” protocol sides. This USER/NETWORK choice is set on the Nortel by using LD 17.
- The Calling Name delivery function on the Nortel is only being supported under a special mechanism function called Generic Functional (GF) Procedures. GF platform allows non-QSIG messages to be passed through (end-to-end) on a QSIG link. To assure that Calling Name delivery and presentation is supported on both the Siemens and the Nortel side, the Siemens was configured for ECMA1 type of supplementary services.
- The ISDN command “isdn contiguous-bchan” may be necessary in the Cisco 3640 to support ESGF (ETSI QSIG) channel mapping standard.
- The Nortel allows QSIG channel coding for QSIG types ESGF and ISGF. This allows the capability to configure the mapping between the channel number field in the Channel Identification Information Element (IE) and the timeslot number for timeslots 17 to 31 on the Nortel. This is set at the QCHID prompt under LD 17.

Nortel PBX Configuration

```
ld 22PT2000
MARP NOT ACTIVATED
```

```
REQ prt
```

TYPE cfn
ADAN HIST
SIZE 5000
USER MTC SCH BUG
ADAN TTY 0
TTY_TYPE SDI
CAB 00
CARD 00
PORT 0
DES
FLOW NO
USER MTC SCH BUG
TTYLOG 0
BANR YES
ADAN TTY 1
TTY_TYPE SDI
CAB 00
CARD 00
PORT 1
DES
BPS 9600
BITL 8
STOP 1
PARY NONE
FLOW NO
USER MTC SCH BUG
TTYLOG 0
BANR YES
ADAN TTY 2
TTY_TYPE SDI
CAB 00
CARD 00
PORT 2
DES
BPS 9600
BITL 8
STOP 1
PARY NONE
FLOW NO
USER MTC SCH BUG
TTYLOG 0
BANR YES
ADAN DCH 3
CTYP MSDL
CARD 03
PORT 1
DES ESIG2_USR_TIE
USR PRI
DCHL 3
OTBF 32
PARM RS422 DTE
DRAT 64KC
CLOK EXT
IFC ESIG

ISDN_MCNT 300
CLID OPT0
CO_TYPE STD
SIDE USR
CNEG 1
RLS ID 22
RCAP COLP

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MBGA NO
OVLN NO
OVLS NO
T310 120
T200 3
T203 10
N200 3
N201 260
K 7
ADAN DCH 4
CTYP MSDL
CARD 04
PORT 1
DES ESIG2_NET_TIE
USR PRI
DCHL 4
OTBF 32
PARM RS422 DTE
DRAT 64KC
CLOK EXT
IFC ESIG
ISDN_MCNT 300
CLID OPT0
CO_TYPE STD
SIDE NET
CNEG 1
RLS ID 22
RCAP COLP
MBGA NO
OVLN NO
OVLS NO
T310 120
T200 3
T203 10
N200 3
N201 260
K 7
ADAN DCH 5
CTYP MSDL
CARD 05
PORT 1
DES esgf(user)

USR PRI
DCHL 5
OTBF 32
PARM RS422 DTE
DRAT 64KC
CLOK EXT
IFC ESGF
 PINX_CUST 0
 ISDN_MCNT 300
CLID OPT0
CO_TYPE STD
SIDE USR
CNEG 1
RLS ID **
QCHID YES
RCAP COLP NDO
MBGA NO
OVLN NO
OVLS NO

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T310 120
T200 3
T203 10
N200 3
N201 260
K 7
ADAN DCH 6
CTYP MSDL
CARD 06
PORT 1
DES ESGF2_NET_TIE
USR PRI
DCHL 6
OTBF 32
PARM RS422 DTE
DRAT 64KC
CLOK EXT
IFC ESGF
 PINX_CUST 0
 ISDN_MCNT 300
CLID OPT0
CO_TYPE STD
SIDE NET
CNEG 1
RLS ID 22
QCHID YES
RCAP COLP
MBGA NO
OVLN NO
OVLS NO

T310 120
T200 3
T203 10
N200 3
N201 260
K 7
PARM
LPIB 192
HPIB 32
500B 16
NCR 200
MGCR NULL
CFWS NO
PCML MU
ALRM YES
ERRM ERR BUG AUD
DTRB 100
TMRK 128
FCDR OLD
PCDR NO
TPO NO
TSO NO
CLID NO
DUR5 NO
MLDN YES
MARP NO
FRPT NEFR
DCUS NULL
MSCL 255
PMSI
MANU PMS1

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PMCR 20
PORT NONE
NDIS 20
OCAC NO
MTRO MR
SBA_ADM_INS 001
SBA_USER 010
BCAP SPEECH
NORTEL_BRAND NO
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

```
PRI2 03 04 05 06
      07 08
DTI2
MISP
OVLY
  SID 0
  BKGD 044
  PBXH 01
  TODR 01
  DROL 030 034 038 044 135
  MULTI_USER OFF
ATRN
  CODE 0
  SOLR 12
  ROLR +45.00
  AOLR +45.00
  TOLR -45.00
  AGCD NO
  VOLR NO
  HRLR +42.00
  HTLR -44.00

REQ ****
>
OVL000
```

Route Data Block Configuration

```
>ld 21PT1000

REQ: prt
TYPE: rdb
CUST 0
ROUT 105
TYPE RDB
CUST 00
DMOD
ROUT 105
DES ESGF(USER)
TKTP TIE
ESN NO
CNVT NO
SAT NO
RCLS EXT
DTRK YES
BRIP NO
DGTP PRI2
ISDN YES
  MODE PRA
  IFC ESGF
  SBN NO
  PNI 00001
  NCNA NO
  NCRD NO
```

CTYP UKWN
INAC NO
ISAR NO
CPFYS YES
DAPC NO
INTC NO
DSEL VOD
PTYP DTT
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
OHQ NO
OHQT 00
CBQ NO

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AUTH NO
TTBL 0
PLEV 2
ALRM NO
ART 0
SGRP 0
AACR NO

REQ: ****
>
OVL000

Trunk Configuration

>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 PRI2
PDCA 1
PCML A
NCOS 0
RTMB 105 1
B-CHANNEL SIGNALING
TGAR 1
AST NO
IAPG 0
CLS UNR DTN CND WTA LPR APN THFD
P10 VNL
TKID
DATE 22 APR 2001

NACT ****
>
OVL000

Digital Station Configuration

>ld 11SL1000
MARP NOT ACTIVATED

MEM AVAIL: (U/P): 1337098 USED U P: 105713 31748 TOT: 1474559
DISK RECS AVAIL: 477
TNS AVAIL: 55 USED: 145 TOT: 200
ACD AGENTS AVAIL: 300 USED: 0 TOT: 300
AST AVAIL: 100 USED: 0 TOT: 100
DIGITAL TELEPHONES AVAIL: 2498 USED: 2 TOT: 2500

REQ: prt
TYPE: 2616

MARP NOT ACTIVATED

TN 001 0 00 00
DATE PAGE DES
DES TEST1
TN 001 0 00 00
TYPE 2616
CDEN 8D
CUST 0
AOM 0
FDN
TGAR 0
LDN NO
NCOS 0
SGRP 0
RNPG 0
SCI 0
SSU
LNRS 16
XLST
CLS CTD FBD WTA LPR MTD FND HTD ADD HFA
MWD LMPN RMMD SMWD AAD IMD XHD IRD NID OLD VCE DRG1
POD DSX VMD CMSD CCSD SWD LNA CNDA
CFTD SFD MRD DDV CNID CDCA MSID DAPA BFED RCB
ICDD CDMD LLCN MCTD CLBD AUTU
GPUD DPUD DNDA CFXA ARHD CLTD ASCD
CPFA CPTA ABDD CFHD FICD NAID BUZZ AHD
DDGA NAMA
DRDD EXR0
USMD USRD ULAD RTDD RBDD RBHD PGND FLXD FTTC DNDY DNO3
CPND_LANG ENG
HUNT
PLEV 02
AST
IAPG 0
AACS NO
ITNA NO
DGRP
MLWU_LANG 0
DNDR 0
KEY 00 SCR 2001 0 MARP
CPND
NAME Nortel Testphone 1
XPLN 27
DISPLAY_FMT FIRST, LAST
01 SCR 2010 0 MARP
CPND
NAME Nortel Testphone 1B
XPLN 27
DISPLAY_FMT FIRST, LAST
02
03 CFW 12 5002
04 AO6

05 TRN
06 DSP
07
08 ADL 16
09 ADL 16
10 ADL 16
11 ADL 16
12 ADL 16
13 ADL 16
14 ADL 16
15
DATE 20 APR 2001

NACT ****

>

OVL000

Software Packages Installed (Release 24)

>ld 22PT2000

MARP NOT ACTIVATED

REQ	prt
TYPE	pkg
OPTF	1
CUST	2
CDR	4
CTY	5
RAN	7
TAD	8
DNDI	9
EES	10
INTR	11
ANI	12
ANIR	13
BRTE	14
DNDG	16
MSB	17
SS25	18
DDSP	19
ODAS	20
DI	21
CHG	23
CAB	24
BAUT	25
CASM	26
CASR	27
BQUE	28
NTRF	29
NCOS	32
CPRK	33
SSC	34
IMS	35

UST	35
UMG	35
ROA	36
NSIG	37
MCBQ	38
NSC	39
BACD	40
ACDB	41
ACDC	42
LMAN	43
MUS	44
ACDA	45
MWC	46
AAB	47
GRP	48
NFCR	49
ACDD	50
LNK	51
FCA	52
SR	53
AA	54
HIST	55
AOP	56
BARS	57
NARS	58
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CCOS	81
CDRQ	83
TENS	86
FTDS	87
DSET	88
TSET	89
LNR	90

DLT2 91
PXLT 92
SUPV 93
CPND 95
DNIS 98
BGD 99
RMS 100
MR 101
AWU 102
PMSI 103
LLC 105
MCT 107
ICDR 108
APL 109
TVS 110
TOF 111
IDC 113
AUXS 114
DCP 115
PAGT 116
CBC 117
CCDR 118
EMUS 119
SCMP 121
FTC 125
BKI 127
DTI2 129
TBAR 132
ENS 133
FFC 139
DCON 140
MPO 141
ISDN 145
PRA 146
ISL 147
NTWK 148
IEC 149
DNXP 150
CDRE 151
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SAR 162
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ARIE	170
CPGS	172
ECCS	173
AAA	174
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HVS	179
DKS	180
SACP	181
OVLP	184
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POVR	186
SECL	191
ORC-RVQ	192
AINS	200
IPRA	202
XPE	203
XCT0	204
XCT1	205
MLWU	206
NACD	207
HSE	208
MLM	209
MAID	210
VAWU	212
EAR	214
ECT	215
BRI	216
IVR	218
MWI	219
MSDL	222
FC68	223
M911	224
CWNT	225
SSAU	229
BRIT	233
FCDR	234
BRIL	235
MCMO	240
MULTI_USER	242
ALRM_FILTER	243
VMBA	246
CALL ID	247
DPNA	250
SCDR	251
ARFW	253
PHTN	254
ADMINSET	256
ATX	258
QSIG	263
NI-2	291
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MQA	297
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CPRKNET 306
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OPEN ALARM 315
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QTN 321
NGEN 324
RANBRD 327
MUSBRD 328
ESA 329
ESA_SUPP 330
ESA_CLMP 331
CNUMB 332
CNAME 333
NI-2 CBC 334
MEET 348
MC32 350
DBA 351
FDID 362
NMCE 364

REQ ****
>
OVL000
>

Cisco 3640 Gateway Configuration

The following is the configuration of the Cisco 3640 gateway connected to the Nortel Option 11C PBX E1 QSIG interface.

Cisco 3640 Voice Gateway Version Information

```
3640_B#sho ver
Cisco Internetwork Operating System Software
IOS (tm) 3600 Software (C3640-JS-M), Version 12.2(1), RELEASE SOFTWARE (fc2)
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Fri 27-Apr-01 05:00 by cmong
Image text-base: 0x60008950, data-base: 0x61492000
```

ROM: System Bootstrap, Version 11.1(19)AA, EARLY DEPLOYMENT RELEASE SOFTWARE (fc1)

3640_B uptime is 3 hours, 47 minutes
System returned to ROM by power-on
System image file is "flash:c3640-js-mz.122-1"

cisco 3640 (R4700) processor (revision 0x00) with 59392K/6144K bytes of memory.
Processor board ID 10620494
R4700 CPU at 100Mhz, Implementation 33, Rev 1.0
Channelized E1, Version 1.0.
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
Primary Rate ISDN software, Version 1.1.
2 Ethernet/IEEE 802.3 interface(s)
62 Serial network interface(s)
2 Channelized E1/PRI port(s)
2 Voice FXO interface(s)
2 Voice FXS interface(s)
DRAM configuration is 64 bits wide with parity disabled.
125K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read/Write)

Cisco 3640 Voice Gateway Sample Configuration

```
sho run
Building configuration...

Current configuration : 1741 bytes
!
version 12.2
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
no service dhcp
!
hostname 3640_A
!
boot system flash
logging rate-limit console 10 except errors
!
voice-card 1
!
ip subnet-zero
!
!
no ip finger
no ip domain-lookup
ip host whiz 171.69.1.162
ip host dirt 171.69.1.129
ip host danube 171.69.17.14
!
no ip dhcp-client network-discovery
isdn switch-type primary-qsig
call rsvp-sync
cns event-service server
!
!
!
!
!
!
!
controller E1 1/0
shutdown
framing NO-CRC4
ds0-group 1 timeslots 1 type r2-analog r2-compelled
cas-custom 1
!
controller E1 1/1
```



```

pri-group timeslots 1-31
!
!
interface Tunnell
no ip address
!
interface Ethernet0/0
ip address 100.100.100.1 255.255.255.0
no ip mroute-cache
half-duplex
no cdp enable
!
interface Ethernet0/1
ip address 171.69.231.23 255.255.255.0
no ip mroute-cache
half-duplex
no cdp enable
!
interface Serial1/1:15
no ip address
no logging event link-status
isdn switch-type primary-qsig
isdn incoming-voice voice
isdn T203 30000
isdn T310 60000
isdn bchan-number-order ascending
no cdp enable
!
ip kerberos source-interface any
ip classless
no ip http server
!
no cdp run
!
!
voice-port 1/0:1
!
voice-port 1/1:15
!
voice-port 2/0/0
!
voice-port 2/0/1
!
dial-peer cor custom
!
!
!
dial-peer voice 3 voip
destination-pattern 2...
session target ipv4:100.100.100.2
!
dial-peer voice 16 pots
destination-pattern 5...
direct-inward-dial
port 1/1:15
prefix 5
!
dial-peer voice 8 pots
destination-pattern 6000
port 2/0/0
!
dial-peer voice 9 voip
destination-pattern 9000
session target ipv4:100.100.100.2
!
!
line con 0
transport input none
line aux 0
line vty 0 4
no login
!

```

end

Caveats

- Although The Nortel Option 11C PBX is set for Overlap Sending, it still includes the entire Called Number in the SETUP packet.
- For Nortel QSIG type ESIG (ETSI QSIG), the loop status inquiry shows that channels 1-30 are used for B-channels while channel 31 is used for D-channel. The Cisco 3640, on the other hand, uses the ECMA QSIG standard. ECMA QSIG uses channel numbers 1-15 and 17-31 as B-channels, while channel 16 is allocated for the D-channel. Note that the Nortel actually uses physical/timeslot 16 even though it shows that it uses channel 31 as its D-channel. Logical channels 16-30 will need to be mapped to the Cisco 3640's 17-31 timeslots. However, it was found that calls made using channels 17-31 have no voice path. This may be due to a problem with mapping - resulting in a mismatch between the actual B-channels being used and the Channel ID Information Element being sent. Therefore, to alleviate this problem, ISDN command "isdn contiguous-bchan" must be issued to allow the 3640 router to support ETSI QSIG and correspond to Nortel channel mapping.
- As mentioned earlier, the Nortel Option 11C PBX allows channel coding for QSIG types ESGF and ISGF to be compatible with the ECMA QSIG standard. This allows the capability to configure the mapping between the channel number field in the Channel Identification IE and the timeslot number for timeslots 17 to 31 on the Nortel. This is done under LD 17's QCHID prompt. Responding YES to the QCHID prompt associates timeslots 17 to 31 with channel number 17 to 31, therefore the 3640 "isdn contiguous-bchan" command is not necessary. Responding NO associates timeslots 17 to 31 to channel number 16-30 of the Channel ID Information Element and this requires the "isdn contiguous-bchan" command to ensure voice path. Note: This QSIG Channel ID Coding/Mapping Nortel feature is only available in Generic Function (GF) QSIG platforms. ISDN command "isdn contiguous-bchan" must still be issued in the Cisco 3640 gateway-to support ESIG (ETSI QSIG) channel mapping standard.