Avaya Solution & Interoperability Test Lab

Configuring an ISDN Primary Rate Interface between an Avaya™ IP Office Server and a Nortel Meridian – Issue 1.0

Abstract

These Application Notes provide instructions for configuring ISDN PRI trunking between an Avaya™ IP412 Office Server and a Nortel Meridian Option 11C Mini. The configuration of both the IP Office server and the Nortel Meridian is described including the PRI settings and the basic call routing.

1. Introduction

The configuration depicted in **Figure 1** shows an Avaya IP412 Office Server networked to a Nortel Meridian Option 11 C Mini. The two systems are connected via an ISDN Primary Rate Interface.

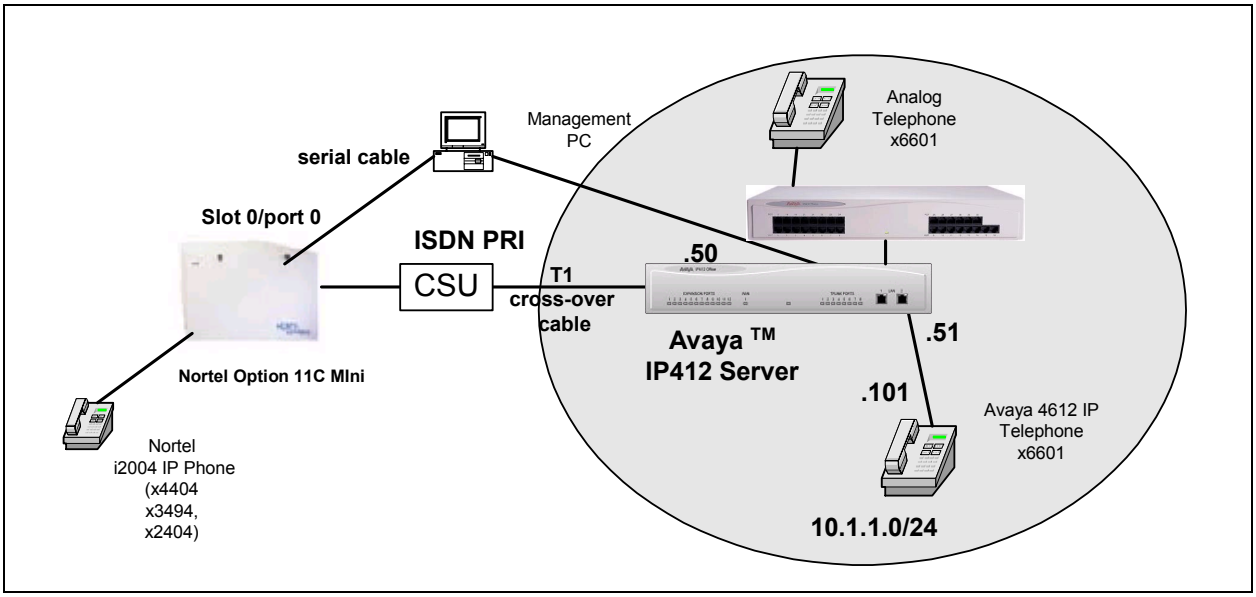

Figure 1: IP Office server – Nortel Configuration

The IP412 Office server and Nortel Meridian Option 11C are configured for National ISDN-2 with the IP412 Server as the "User" side and the Option 11C as the "Network" Side. Appendix B provides modifications to these instructions for an ETSI QSIG PRI. Calls are routed between systems via the Nortel Coordinated Dial Plan feature and the IP Office Short Codes.

Wiring note: Nortel uses a different wiring on their Amphenol connectors than Avaya. Be sure to use the Nortel adapters for connections to the Meridian system.

2. Equipment and Software Validated

The following equipment and software was used for the sample configuration provided:

Equipment	Version
Avaya™ IP412 server	1.4(22)
Avaya™ IP 4612 Telephone	1.73
Nortel Meridian Option 11C Mini - NTRB21 TMDI card	Version 2111, Release 25, Issue 40 B
Paradyne 3160 CSU	N/A
Nortel Meridian i2004 IP Telephone	N/A
Nortel Meridian Series 3xxx Digital Telephone	N/A

3. Configure the IP412 Office Server

This section describes the configuration of the IP412 Office server.

All steps after **Step 1** start from the configuration tree. It is important to note that changes to the Administration screens do not take effect until they have been saved to the IP412 Office server.

Step 1: Run the IP Office Manager from the Management PC and open the IP412 Office server to reach the Configuration Tree.

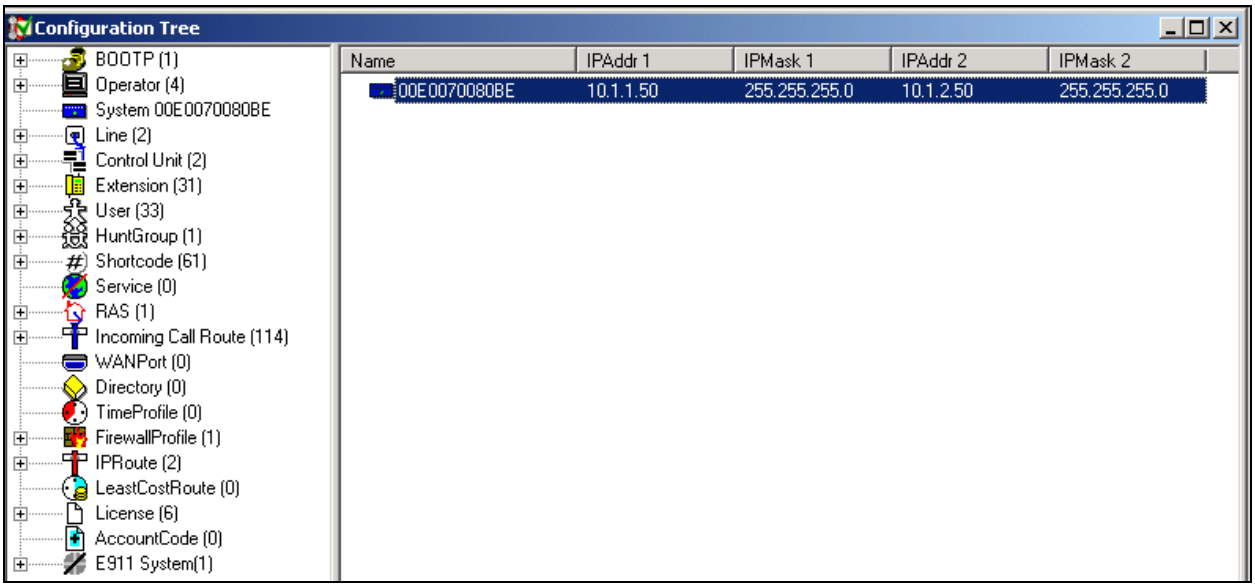

Figure 2: IP Office Manager Configuration Tree

Step 2: Select **System** and then the **System** tab to set the *Licence Server IP Address* and *Time Server IP Address* to the IP Office Management PC as shown in **Figure 3**.

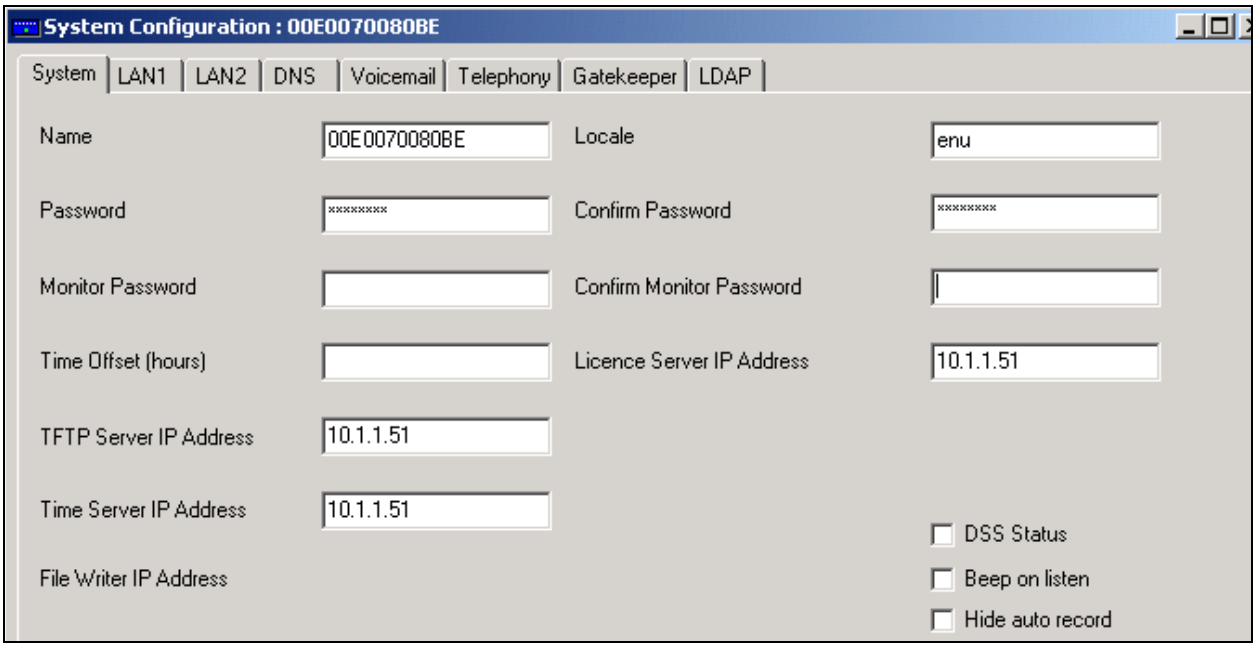

Figure 3: System→System Form

Step 3: From the Configuration Tree, select **System** and then the **LAN1** tab to set the *IP Address* and *IP Mask* of port LAN 1 and set the *DHCP Mode* to **Disabled**.

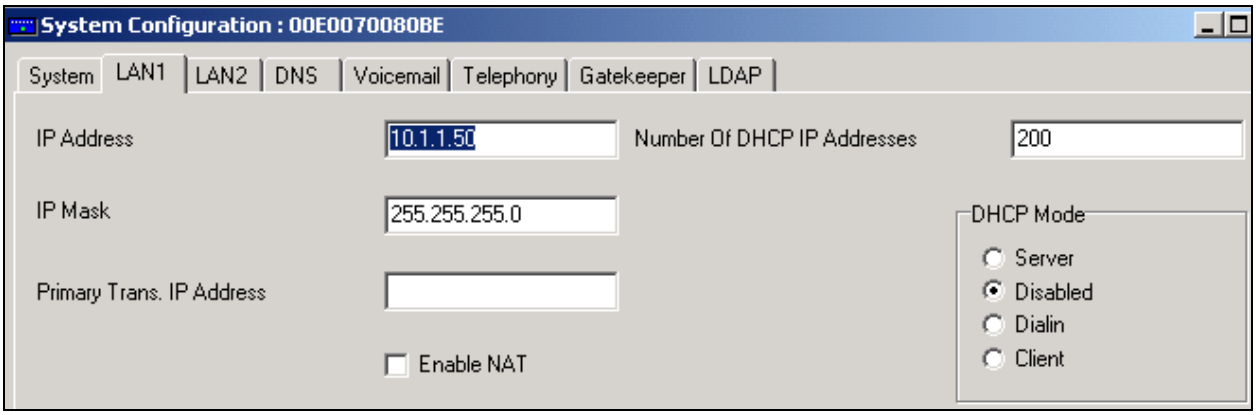

Figure 4: System-->LAN1 Form

Step 4: From the Configuration Tree, select **Line,** then **01** and then the **Line** tab for Line 1. Set the *Line Sub Type* and set the parameters as shown in **Figure 5**.

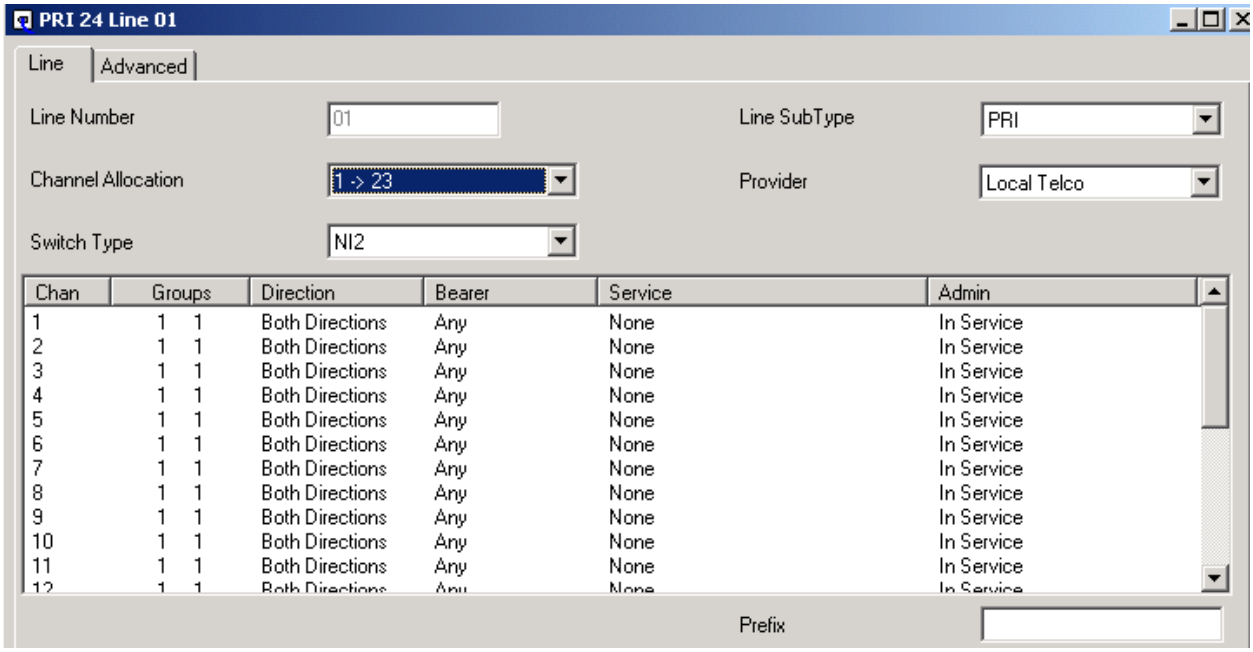

Figure 5: PRI Line

Step 5: Select the **Advanced** tab and set as shown in **Figure 6**.

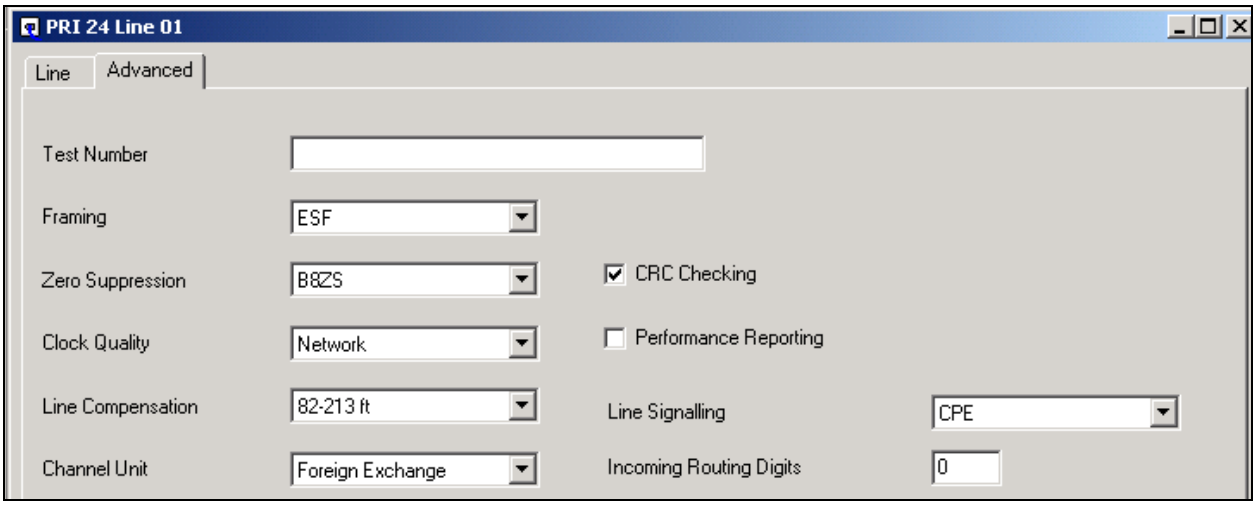

Figure 6: Advanced Tab

Step 6: From the Configuration Tree, select **Short Code** and **Add** a *short code* for sending calls to the 44xx range of extensions to the Nortel PRI as shown in **Figure 7**. Repeat for the 34xx and 24xx range.

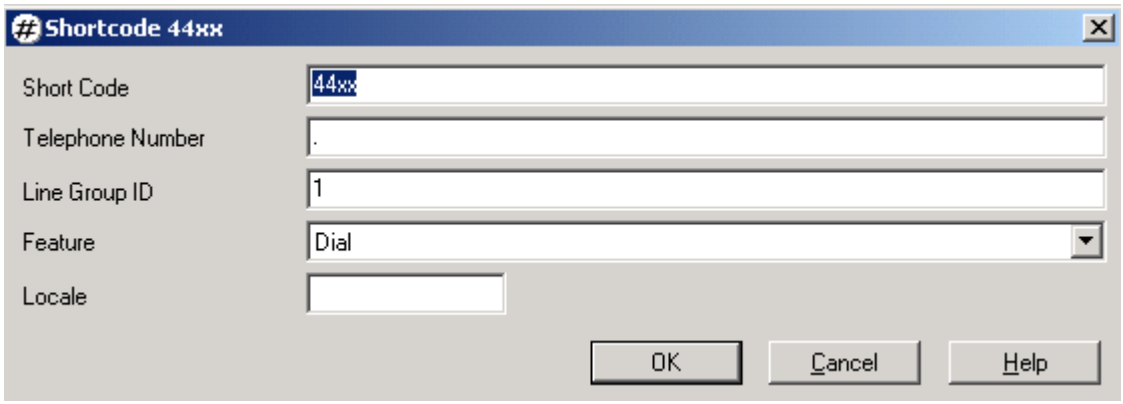

Figure 7: 44xx short code

Step 7: From the Configuration Tree, select **Incoming Call Route. Add** a new *Incoming Call Route* for each IP412 Office station that may be reached from the Nortel PRI.

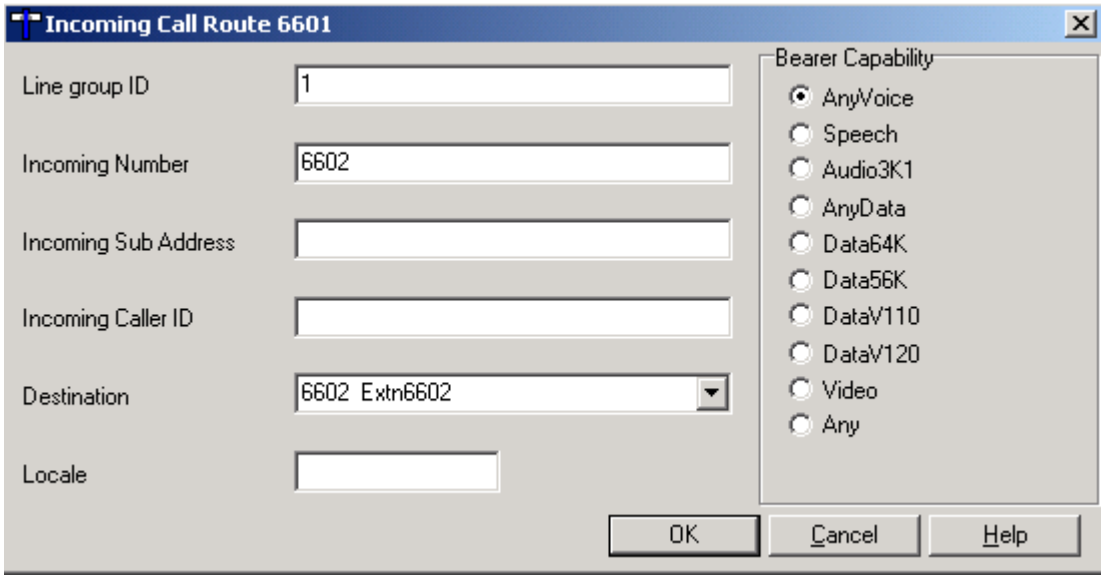

Figure 8: Incoming Call Route Form

Step 8: Select **Save** from the *File Menu* and **OK** at the *Sending Config to* dialog box to save the configuration to the IP412 server.

4. Configure the Nortel Option 11C Mini

This section documents the step-by-step procedure for provisioning the basic PRI connectivity and call routing in the Nortel Option 11C Mini. For this configuration, Hyperterminal was run on a PC with a serial cable connected to the Nortel Processor Port 0 serial port.

The Nortel command line has been trimmed to concentrate on the key settings for this configuration. Appendix A lists a printout of the Nortel Settings in each area.

For unspecified entries, the entry of a carriage return accepts the default setting.

Typing ******<cr>** at any time aborts the activity in progress and returns the user to the main prompt.

Step 1 Login and enter the password.

Commands	Comments
logi **admin1** PASS?	A successful entry will result in the response: TTY #00 LOGGED IN ADMIN1 11:18 1/8/2003 >

Step 2 *Skip this step if the system already has a synchronization plan implemented*.
Modify the "Digital Data Block" Synchronization parameters.

Commands	Comments
>**ld 73** … REQ **chg** TYPE **ddb** CC0 **x**	Ld 73 Modifies the Digital Data Block. Entering "x" at CC0 will cause the system to "free run" rather than synchronize to a particular T1.

Step 3 Define the TMDI PRI card as common equipment (cequ).

Commands	Comments
>**ld 17** . . . REQ **chg** TYPE **cequ** TDS CONF DLOP **1 23 ESF** MODE **PRI** TMDI **YES** LCMT YALM T1TE **01** TRSH **00** DLOP PRI2 DTI2	Define card 1 to use 23 channels and ESF signaling. The TMDI card will be used in PRI mode. Due to distance, Equalization Range 1 is used. The Threshold Group 00, defined in load 73 is applied.

Step 4 Configure the D channel.

Commands	Comments
>**ld 17** … REQ **chg** TYPE **adan** ADAN **new dch 17** CTYP **TMDI** CDNO **01** PORT 1 DES pri to ipo USR **PRI** IFC **NI2** CO TYPE **STD** ISDN_MCNT CLID DCHL **1** PRI OTBF DRAT **64KC** SIDE **NET**	Open an Action Device and Number (ADAN) gate to make a new or modify a D channel. In this configuration, a TMDI card in card slot 01 is used. Designate via USR that the card is for PRI. Set the Interface to NI-2 and the CO Type to Standard. The D channel rate (DRAT) is 64K clear channel. The Nortel is the “Network” side, while the IP412 Office server is the “User” side. Take the defaults for the rest of the parameters.

Step 5 Configure customer data.

>**ld 15** … REQ: **chg** TYPE: **NET_Data** CUST **0** OPT AC2 FNP CLID ISDN **YES** REQ: **chg** TYPE: **LDN_DATA** CUST **0** OPT DLDN LDN0 **4499** LDN1 ICI	Under "NET_DATA", ensure that ISDN is set to YES. Take the defaults for the rest of the Net_Data parameters. Under LDN_DATA, ensure that LDN0 is set to a value where the number of digits equals the DID range that the switch is meant to route on.

Step 6 Define a new service route for this PRI.

Command	Comments
>**ld 16** … REQ **new** TYPE **rdb** CUST **0** DMOD ROUT **51** DES **ipodid** TKTP **DID** SAT RCLS **ext** DTRK **yes** DGTP **PRI** ISDN **YES** MODE **PRA** IFC **NI2** CBCR PNI NCNA	This route will be referred to as Route 51. Trunk Type of DID will support two-way traffic. This is a Digital Trunk (DTRK) route of type PRI. Set ISDN to Yes and Mode as Primary Rate Access (PRA). Again, set the IFC to NI2.

Command	Comments
NCRD CHTY **BCH** NCOS CPFXS CPUB DAPC BCOT INTC DSEL **VOD** PTYP **PRI** AUTO DNIS DCDR IANI ICOG **IAO** RANX SRCH TRMB **YES** STEP ACOD **5051** CLEN TCPP PII TARG **1** …	Channel Type (CHTY) is B-channel. The DSEL field can be set for Voice or Data (VOD) and the Ptype to PRI. Set this to be an Incoming and Outgoing Trunk. Allows an incoming call to be routed back on the same route. Select a unique access code. Set the Trunk Access Restriction consistently with the system plan. Take the default values for the rest of the parameters.

Step 7 Define B-Channels for the PRI.

Commands	Comments
>ld 14 … EQ **new 23** TYPE **did** TN **1 1** DES **ipo** PDCA PCML CUST **0** NCOS RTMB **51 1** …	Enter ld 14 to define the B channels. “new 23” will define 23 B-channels with the same characteristics. Type DID supports two-way dialing service. Enter any designation. This is customer 0. Assign the first route member (RTMB) from the Service route created in load 16 to the first trunk. Take defaults for the rest of the parameters.

Step 8 Configure a Route List to point to the Route Created in the previous step.

Commands	Comments
> **ld 86** … REQ **new** CUST **0** FEAT **rlb** RLI **1** ENTR **0** LTER ROUT **51**	Configure a Route List to point to the Route Created in the previous step. Here we create Route List Index (RLI) 1 which will be referred to in the next step. Entry 0 corresponds to Route 51, which we created in **Step 6**. Take defaults for the rest of the parameters.

Step 9 Configure a CDP entry to steer calls to the 66xx range to the IP412 Office server.

Commands	Comments
>**ld 87** … REQ **new** CUST **0** FEAT **cdp** TYPE **dsc** DSC **66** FLEN **4** DSP **lsc** RLI **1**	The Coordinated Dial Plan (CDP) feature will route calls to a Distant Steering Code (DSC) of 66 with a length of 4 to Route List Index 1, created in the last step.

Step 10 Enable the TMDI card via load 96.

Commands	Comments
>**ld 60** . **ENLL 1**	Enable the TMDI card (Loop 1).

Step 11 Enable Automatic Establishment for the D-channel (e.g., for when the line recovers from a failure).

Commands	Comments
>**ld 96** . **ENL auto 17**	Enable Automatic Establishment for the D-channel (e.g., for when the line recovers from a failure)

Step 12 Check the status of the new card.

Commands	Comments
>**ld 60** .**stat 1**	Check the status of the new card. Each channel should show an entry like: CH 01 - IDLE DID VOD *
>**ld 96** . **stat dch 17**	Check the status of the D-channel through load 96. The output should look like: DCH 017 : OPER EST ACTV AUTO

Step 13 If needed, from ld 60, enable the clock and check its status.

Commands	Comments
>**ld 60** .**Enl CC 0** .**Ssck 0**	Enable the clock and check its status.

5. Verification Steps

The following tables summarize some Nortel status and configuration commands.

- General status and configuration

Ld#	REQ	Other input	Output
22	Iss	N/A	Version Numbers
22	Prt	Type:pkg	Installed Packages
22	Slt		General Resources
22	Tid		System ID
73	Prt	ddb	Clock synchronization
60	SSCK 0		Clock Status

- Numbering and Call routing

Ld#	REQ	Other input	Output
20	Prt	Type:ludn	Unused directory Numbers
21	Prt	Rdb	Routing data block
20	Prt	Dnb	Directory numbers
86	Prt	Cust:0, feat rlb, rli X	Route list
87	Prt	Cust:0, feat:cdp,type:dsc	Coordinated dial plan handling for a particular Dial Steering Code.

- PRI, ISDN and Trunking

Ld#	REQ	Other input	Output
22	Prt	Type:adan dch XX	D-channel Info
22	Prt	Cequ	Equipment, including PRI
20	Prt	Tnb	Trunks

- The following commands can be used to get PRI and D-channel Status

Ld#	CMD	Other input	Output
60	Stat c		PRI card status
96	Stat dch x		D-channel Status

- Examine the messages shown by the IP Office Monitor program. Under *Settings->ISDN,* enable layer 2 and layer 3, as appropriate. Verify that there are messages sent and received in both directions.
- Examine the messages shown by the Nortel management screen by entering **ld 96** and setting **enl msgo dch** or **enl msgi dch** to enable tracing of messages on a particular D-channel. Use **dis msgo dch** or **dis msgi dch** respectively, to disable tracing.

6. Conclusion

By following the steps of these Application Notes, the reader will have successfully configured ISDN trunking between an IP Office Server and a Nortel Meridian Option 11C.

Appendix A – Printout of Nortel Settings for NI-2

This appendix presents the printouts from the Option 11C Mini from the configurations created as described in this document.

Area	Printout
Synchronization	**>ld 73** DDB000 MEM AVAIL: (U/P): 1207960 USED U P: 122020 46275 TOT: 1376255 DISK RECS AVAIL: 457 REQ prt TYPE ddb TRSH 00 RALM 3 BIPC 2 LFAC 0 BIPV 4 3 SRTK 5 3600 SRNT 15 15 LFAL 17 10000 SRIM 1 SRMM 2 ICS TRSH 01 RALM 3 BIPC 2 LFAC 3 BIPV 3 2 SRTK 5 30 SRNT 15 3 LFAL 17 511 SRIM 1 SRMM 2
Common Equipment	**>ld 22** PT2000 REQ prt TYPE cequ

Area	Printout
	CEQU MPED 8D SUPL 000 004 008 012 016 032 036 040 044 048 064 068 072 V096 XCT 000 CONF 029 030 031 062 094 095 DLOP NUM DCH FRM LCMT YALM T1TE TRSH PRI 01 23 ESF B8S FDL 1 00 03 23 ESF B8S FDL 0 00 09 23 ESF B8S FDL 1 00 MISP
D-Channel Parameters	>ld 22 PT2000 REQ prt TYPE adan dch 17 ADAN DCH 17 CTYP TMDI CARD 01 PORT 1 DES proitoipo USR PRI DCHL 1 OTBF 32 PARM RS232 DTE DRAT 64KC CLOK EXT IFC NI2 ISDN_MCNT 300 CLID OPT0 CO_TYPE STD SIDE NET CNEG 1 RLS ID ** RCAP COLP MBGA NO OVLR NO OVLS NO T310 120

Area	Printout
	T200 3 T203 10 N200 3 N201 260 K 7 BSERV NO
Service Route	>**ld 21** PT1000 REQ: **prt** TYPE: **rdb** CUST **0** ROUT **51** TYPE RDB CUST 00 DMOD ROUT 51 DES IPODID TKTP DID NPID_TBL_NUM 0 SAT NO RCLS EXT DTRK YES BRIP NO DGTP PRI ISDN YES MODE PRA IFC NI2 CBCR NO NCOS 0 SBN NO PNI 00000 NCNA YES NCRD NO CHTY BCH CPFXS YES CPUB OFF DAPC NO BCOT 0 INTC NO DSEL VOD PTYP PRI AUTO NO

Area	Printout
	DNIS NO DCDR NO ICOG IAO RANX NO SRCH LIN TRMB YES STEP ACOD 5051 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 TFD 0 DRNG NO CDR NO MUS NO EQAR NO PAGE 002 FRL 0 0 FRL 1 0 FRL 2 0 FRL 3 0 FRL 4 0 FRL 5 0 FRL 6 0

Area	Printout
	FRL 7 0 OHQ NO OHQT 00 TTBL 0 ATAN NO PLEV 2 MCTS NO ALRM NO ART 0 SGRP 0 AACR NO
B-Channel	>**ld 20** PT0000 REQ: **prt** TYPE: **trk** TN **1 1** DATE PAGE DES IPO TN 001 01 TYPE DID CDEN SD CUST 0 TRK PRI PDCA 1 PCML MU NCOS 0 RTMB 51 1 B-CHANNEL SIGNALING NITE STRI/STRO OWK OWK AST NO IAPG 0 CLS UNR DIP CND WTA LPR APN THFD HKD P10 VNL TKID DATE 1 AUG 2003

Appendix B – QSIG Modifications

This section lists modifications that can be made to these procedures if QSIG interworking is desired, rather than National ISDN-2.

B. 1) Changes to IP412 Office Server (Section 3)

In **Section 3**, change **Step 4** as follows: For Line 1, Change the *Line Sub Type* to **QSIG B** and set the other settings as shown in **Figure 9**.

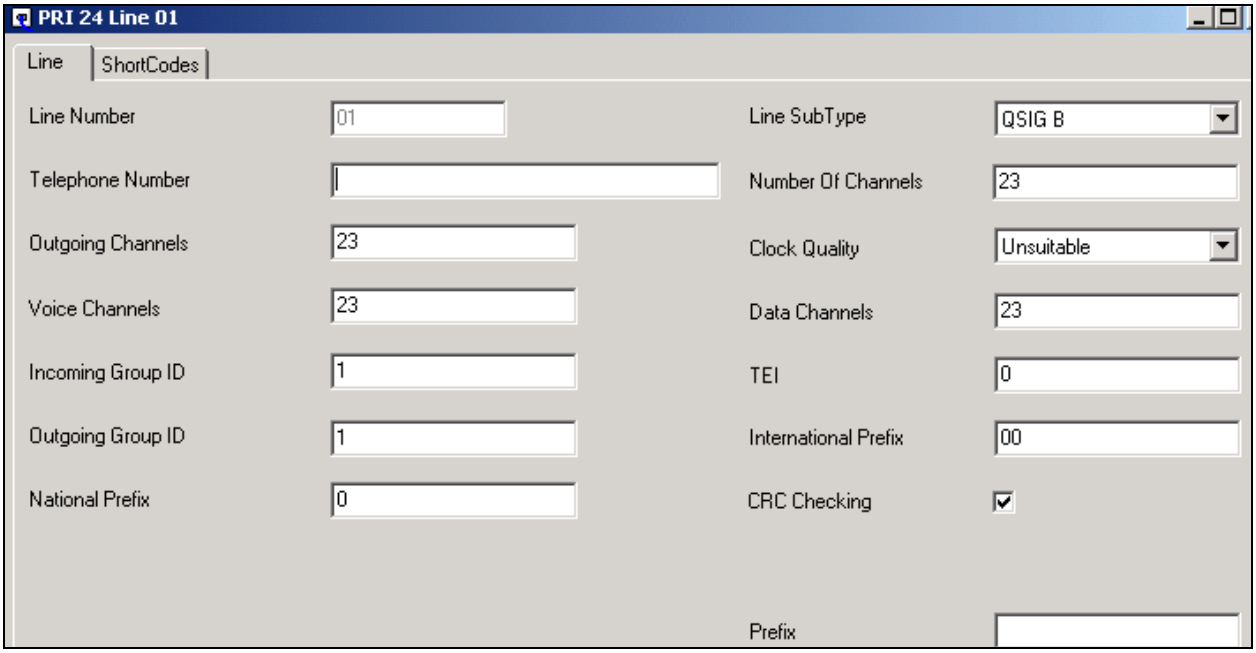

Figure 9: IP Office QSIG Form

Step 7 (the Incoming Call Route) can be skipped.

B.2) Changes to Nortel (Section 4)

In **Section 4**, for QSIG interworking, make the following changes to the instructions. Only the changes for QSIG operation are highlighted.

Step	Modification	Comments
4	>ld 17 … IFC ESIG … SIDE NET	In ld 17, Set the interface to ESIG, but keep the Nortel side set to Network.
6	>ld 16 … TKTP TIE … IFC ESIG …	In ld 16, set the Trunk Type to "TIE" rather than "DID" and the Interface to ESIG.
7	>ld 14 … TYPE tie …	In ld 14, set the Trunk Type to "TIE" rather than DID.

Please e-mail any questions or comments pertaining to these Application Notes along with the full title name and filename, located in the lower right corner, directly to the Avaya Solution & Interoperability Test Lab at interoplabnotes@list.avaya.com