

Case Study: Nortel 61C PBX to Cisco IP Telephony Migration

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Introduction

This case study addresses the steps taken to migrate users from a Nortel Option 61C private branch exchange (PBX) to Cisco CallManager. The information in this case study was obtained using the voice system architecture and requirements of a company that is referred to as Generic Services, Inc. The information was gathered during the pilot phase of the IP Telephony deployment. This paper does not cover economic factors, nor does it address the integration of voice mail, video, or applications.

The Generic Services voice infrastructure operated on a Nortel Option 61C PBX system with most of their remote sites using Comdial key systems and Centrex type services. The data connectivity was dial-up with some sites having Frame Relay connections to headquarters.

The goal of the IP Telephony project is to build a nationwide Frame Relay network and consolidate all remote phones onto a centralized IP Telephony system.

This diagram shows the IP Telephony topology for Generic Services headquarters:

information from the Nortel PBX switch and analyze the data. You can perform basic print routines to verify the configuration of the Nortel Option 61C PBX. This section describes the steps that were taken during the Generic Services pilot, and explains how to analyze the data.

Before you print out the configuration information from the Nortel PBX switch, obtain a list of incoming digits or dialed number identification service (DNIS) from the service provider.

Step 1: Print Directory Number Block

By printing out the directory number block (DNB), you can see if the digits sent from the Public Switched Telephone Network (PSTN) match any of the directory numbers from the switch. The DNB prints out every directory number in the system that is used. Depending on the size of the switch, this can be a very large job. It is recommended to wait until the switch is under low utilization to perform the print routine.

Within the Nortel Option 61C, there are different modes in which you can administer the switch. These modes are often referred to as load or overlays.

In order to print a directory number block from load 20, complete these steps:

1. At the TYPE prompt, type **DNB**.
2. At the DN prompt, press the **Enter** key.

After you view the DNB printout, it is noticed that none of the digits sent from the PSTN matched any of the directory numbers in the switch. All of the numbers on the list were available. Since the numbers have four-digit extensions, 4000 was available. The printout shows an extension of 40, but since it is in a two-digit format, all numbers that start with 40 are available (401, 4001, 4099, 4011, and so on).

Step 2: Locate Phantom Extensions

In the DNB, the remote-user phantom extensions are found. The case workers located at the Waynesburg site have voice mailboxes without physical phones. There are 96 phantom extensions that are permanently forwarded to voice mail. These numbers are useful in verifying which remote users have voice mail.

Step 3: List Unused Directory Numbers (LUDNs)

You should also print out the available (unused) directory numbers in the system. This may be useful if you try to find a continuous string of extensions that are used in the Cisco CallManager. The unused directory numbers can be printed from load 20.

This example shows the unused directory numbers in the system:

```
CUSTOMER 00 - UNUSED DNS:
118 300 305 327 343 358 40 4100 4118 4164
4192 4207 4216 4235 4236 4251 4280 4285 4286 4291
4293 4297 4298 4299 4300 4301 4302 4303 4304 4305
4313 4314 4315 4320 4321 4327 4328 4331 4333 4335
4336 4338 4340 4342 4343 4344 4350 4351 4352 4353
4354 4355 4356 4358 4359 4360 4361 4362 4363 4364
4365 4366 4368 4373 4377 4378 4379 438 439 440
441 442 443 444 445 446 4470 4471 4472 4473
4474 4475 4477 4478 4479 448 449 45 460 461
462 463 464 465 466 467 468 4690 4691 4692
4693 4694 4695 4696 4697 4698 4702 4703 4704 4705
4706 4707 4708 4709 471 472 473 474 475 477
478 479 4800 4803 4811 4813 4814 4816 4817 4818
4819 4822 4828 4829 4830 4832 4833 4835 4836 4837
4838 4839 4841 4842 4843 4844 4845 4846 4847 4848
4849 485 486 487 488 489 4901 4902 4903 4904
```

```

4905 4919 4923 4924 4925 4926 4927 4928 4933 4943
4944 4946 4947 4950 4963 4989 4994 4995 4996 4997
4999 5001 5003 5007 5008 5009 5012

```

This table lists the LUDN prompts and responses.

Prompt	Response	Description
REQ:	PRT	Print.
TYPE:	LUDN	Lists unused directory numbers.
CUST		
DN	xxx-xxx	DN range or blank for all available.

Step 4: Print the Terminal Number Block Database

The terminal number block (TNB) database lists the configurations of all hardware in the switch. Print this information to determine:

- How many phones are built.
- The number of trunks that are configured.
- How the trunks are configured.

Depending on the size of the switch, printing the TNB database can take a few minutes as it lists every hardware location in the switch that has some sort of configuration built against it. It is recommended to wait until the switch is under low utilization to perform the print routine.

In order to print out a TNB database from load 20, complete these steps:

1. At the TYPE prompt, type **TNB**.
2. When you get to the TN prompt, leave it blank and press **Enter**.
3. Press **Enter** through the rest of the prompts.

Step 5: Print the Customer Database

The customer database contains specific information about each customer associated with the PBX. The Nortel Option 61C can be configured for up to 99 customers. The Generic Systems configuration is set to the default, CUST_0. The customer database is administered through load 15 and can be printed from load 21.

After viewing the customer database printout, you can determine what numbers were ringing in on the attendant console (operator).

The customer database is broken down into sections called gate openers, each with specific settings. This table describes each gate opener.

Load 21 Gate Opener	Description
AML	Application module link.
ANI	Automatic number identification.
ATT	Attendant console.
AWU	Automatic wake up data.
CAS	Centralized attendant service data.
CCS	Controlled class of service.
CDR	Call detail record.
FCR	Flexible code restriction.
FFC	Flexible feature control.
FTR	Features and options.
HSP	Hospitality management.
IMS	Integrated message service.
INT	Intercept treatments.
LDN	Listed directory numbers.

MPO	Multi-party operations.
NET	Networking.
NIT	Night service.
OAS	Off-hook alarm security.
PWD	Password.
RDR	Call redirection.
ROA	Recorded overflow announcement.
TIM	Timers.
TST	Test lines.

In order to print the customer database, complete these steps:

1. At the > prompt, type **LD 21**.
2. At the REQ prompt, type **PRT**.
3. At the TYPE prompt, type **CDB**.

As an alternative, you can enter the specific gate opener at the TYPE prompt. The customer database printout lists all of the gate openers in alphabetical order.

Note: Most systems only have one customer. To obtain the customer database from *all* enabled customers, leave the CUST prompt blank and press **Enter**.

These subsections show examples of the individual gate opener parameters. For a full printout of the customer database, see the [Customer Database Printout](#) section.

Attendant Console Gate Opener

From the ATT_DATA (Attendant Console) customer database screen, it is determined that LDNs 0, 1, and 2 are in use.

This example shows the ATT customer database gate opener:

```
ATT_DATA
OPT AHD BIND BIXA BLA
DNI ICL ITG IDP ILF XBL
```

```

    FKA MWUD LOD
    REA SYA
    ATDN 0
    NCOS 7
    CWUP YES
    CWCL 0 0
    CWTM 0 0
    CWBZ YES YES
    MATT NO
    LFTN 004 0 02 01
    LFFD 100
    RTIM 60 60 60
    ATIM 0
    SPVC 00
    SBLF NO
    RTSA RSAD
    SACP NO
    ABDN NO
    IRFR NO
    XRFR NO
    ICI 00 DLO
    ICI 01 RLL
    ICI 02 INT
    ICI 03 LD0

```

```
!--- Incoming call indicator: Listed Directory Number 0.
```

```
ICI 04 LD1
```

```
!--- Incoming call indicator: Listed Directory Number 1.
```

```
ICI 05 LD2
```

```
!--- Incoming call indicator: Listed Directory Number 2.
```

```
ICI 06 R000
ICI 07
ICI 08
ICI 09
RICK
```

List Directory Number Gate Opener

By looking at the computer database printout in this example, specifically the LDN gate openers, it is verified what calls are routed to the attendant consoles incoming call indicator (ICI) keys and what the LDN directory numbers actually are. Notice that the ICI 03 entry has LD0 assigned to it. The LDN0 entry above it lists 5100 as its directory number. After looking at the incoming digit conversion (IDC) tables, there is a match. Although 5100 is not on the service provider's list, it is in the IDC table with four separate listings.

```

LDN_DATA
OPT XLDN
DLDN NO
LDN0 5100
LDN1 164
LDN2 280
LDN3
LDN4
LDN5
ICI 00 DLO
ICI 01 RLL
ICI 02 INT
ICI 03 LD0
ICI 04 LD1
ICI 05 LD2
ICI 06 R000
ICI 07
ICI 08
ICI 09

```

FCR Gate Opener

The FCR gate opener is used to enable the new flexible code restriction (NFCR) trees, and to set the number of lists.

The incoming digit conversion is also enabled here. In this example, incoming digit conversion allowed (IDCA) is enabled, and digit conversion maximum number of tables (DCMX) is set to 15. The maximum allowable DCMX is 15. The NFCR is also enabled with a maximum of 10 lists. In order to use the IDC tables, NFCR and IDCA must be set to YES, and a maximum number set for each.

```
FCR_DATA
NFCR YES
MAXT 10
OCB1 255
OCB2 255
OCB3 255
IDCA YES
DCMX 15
```

New Flexible Code Restriction and Incoming Digit Conversion

The PBX accepts digits from the PSTN or other outside sources and converts them to different digits. Generic Services received four digits from the PSTN. The IDGT is the incoming digits and the CDGT is the converted digits. This example shows the IDC trees from the Nortel switch.

Load 49 has some information associated with it that cannot be printed in the print routines in loads 20, 21, and 22. This example shows the incoming digits and the converted digits:

```
REQ PRT
TYPE IDC
CUST 0
DCNO

DCNO 0
IDGT CDGT

DCNO 1
IDGT CDGT
9 3 0 0 2 9 9
9 3 0 1 2 9 9

DCNO 2
IDGT CDGT
1 0 0 5 1 0 0
4 7 0 5 1 0 0
5 6 9 0 5 3 8 8
5 9 0 5 1 0 0
9 6 0 5 1 0 0

DCNO 3
IDGT CDGT
2 1 9 5 7 5 7
5 0 5 2 9 0 9 1
5 7 5 6 5 7 9 9
5 7 5 7 5 7 5 7
9 0 5 0 2 8 0
9 0 5 1 9 0 9 0
9 0 5 3 2 9 1
9 0 5 4 2 9 3
9 0 5 5 2 9 1
9 0 5 6 2 9 0
9 0 5 7 9 0 5 7
9 0 5 8 2 8 0
9 0 5 9 2 9 3
```

Night Service Gate Opener

The NIT gate opener shows what happens to the calls at night. In this example, the NIT gate openers are forwarded to extension 350, which is the voice mail pilot number:

```
NIT_DATA
NIT1 350
TIM1
NIT2
```


TIM2
 NIT3
 TIM3
 NIT4
 TIM4
 ENS NO

Step 6: Get the Configuration Record

The configuration record (CFN) provides configuration information on the D-channels, digital circuits, and special links. This includes automatic call distribution (ACD), voice mail (VM), and TeleTYpewriters (TTYs). You can obtain the configuration record from load 22.

The system configuration defines system hardware and software parameters. The overlay program (load 17) is used to modify the system parameters such as the passwords, buffer sizes, voice and data loops, memory, and number of processors. The D-channel and associated digital loops are also configured here. In short, load 17 is where you provision the hardware.

Load 17 is also broken down into gate openers, as shown in this table. The sections are:

Load 17 Gate Opener	Description
ADAN	Action device and number.
PWD	Password.
PARM	System parameters.
CEQU	Common equipment.
OVLY	Overlay.
VAS	Value-added server.
ATRN	Aries transmission.
ALARM	Alarm filters. ROLR/TOLR/AOLR offsets and values. HRLR/HTLR offsets and values.

These tables list the gate openers that pertain to the migration of, or coexistence with, a Cisco CallManager. Also

listed in the table are some of the different types of devices and services you can configure with the gate opener.

Action Device and Number (ADAN)

This is where you configure all of the TTY terminals, modems, CDR printer, and D-channel configurations for the system.

<pre>ADAN TTY 2 CTYP CPSI DNUM 2 PORT 0 DES core BPS 9600 BITL 8 STOP 1 PARY NONE FLOW NO USER MTC TRF SCH BUG XSM NO TTYLOG 0</pre>	<pre>ADAN TTY 9 CTYP MSDL DNUM 9 PORT 0 DES CDR_OUTPUT BPS 9600 PARM RS232 DCE BITL 8 STOP 1 PARY NONE FUNC USER CTY XSM NO</pre>	<pre>ADAN DCH 2 CTYP MSDL DNUM 9 PORT 3 DES BELL-LOOP2 USR PRI DCHL 2 OTBF 32 PARM RS422 DTE DRAT 64KC CLOK EXT IFC NI2 CO_TYPE ATT SIDE USR CNEG 1 RLS ID ** RCAP</pre>
--	---	--

Parameters (PARM)

This is where you set a variety of system parameters such as the inclusion of a setting for a property management system, what type of information is output to the CDR, and the secondary password.

```
PARM
LPIB 1000
HPIB 1000
500B 1000
SL1B 250
NCR 3000
MGCR 26
CSQI 100
CSQO 100
CFWS YES
PCML MU
ALRM YES
ERRM ERR XBUG AUD
DTRB 100
FCDR OLD
PCDR NO
TPO NO
TSO NO
CLID YES
DUR5 NO
MLDN YES
NDRG YES
MARP YES
FRPT NEFR
DCUS 1
MSCL 499
PMSI
MANU PMS1
PMCR 0
PORT NONE
NDIS 20
OCAC NO
SBA_ADM_INS 000
SBA_USER 000
```

Common Equipment (CE)

This gate opener is where you set the parameters for the PRI channels, T1 channels such as the yellow alarm type,

thresholds, and line coding method.

```
CEQU
MPED 8D
TERM
REMO
TERD 018
REMD
TERQ N099
REMQ
SUPL 004 008
XCT 000 016
TDS * 000 * 016
CONF * 001 * 017
MFSD * 000 * 016

DLOP NUM DCH FRM LCMT YALM TRSH
TRK 012 24 D4 AMI DG2 00
    024 24 D4 AMI DG2 00
PRI 002 24 ESF B8S FDL 00
    003 24 ESF B8S FDL 00
    019 24 ESF B8S FDL 00 (new loop)
EXT0 3PE
CNI 012 000 000
EXT1 3PE
CNI 012 000 000
MCFN 004 004 004 004 016 016
```

In order to print the entire configuration, complete these steps:

1. At the > prompt, type **LD 22**.
2. At the REQ prompt, type **PRT**.
3. At the TYPE prompt, type **CFN**.

As an alternative, if you know exactly what information you are looking for, you can enter the specific gate opener at the TYPE prompt.

Step 7: Print Route Data Block Information

The route data block (RDB) stores all of the routes built in the switch. With this information, you can verify how calls are routed.

In order to print the contents of the route data block, complete these steps:

1. At the > prompt, type **ID 21**.
2. At the REQ prompt, type **PRT**.
3. At the TYPE prompt, type **RDB**.
4. At the ROUT prompt, type the route number or leave it blank for all routes.

Note: To get information about a specific route, enter the route number or the access code at the ROUTE or ACOD prompt, respectively.

All of the route groups (RDB) for the individual trunks are provisioned in load 16. When you build a route group, you configure:

- Trunk type.
- Signaling.

- Access to trunks.
- Direction.
- Details associated with a group of trunks.

Generic Systems has several types of trunks. Each trunk type requires a different RDB. To get a true picture of the trunk configuration, we started with the RDB. Generic Systems has 17 routes. However, only 12 routes are in use. This table shows the breakdown of the routes.

Trunk Type	Number of Trunks	Route Number	Use
PRI	23	0	DID—Incoming and outgoing in trunks that ring on the attendant.
PRI	12	2	DID—Route 2 is incoming only.
PRI	11	1	COT—Incoming and outgoing trunks.
PRI	23	19	TIE—Tied to the Cisco CallManager.
DTI (T1)	24	7	TIE—Incoming and outgoing trunks.
DTI (T1)	24	8	TIE—Incoming and outgoing trunks.
XEM (E&M)	12	20	TIE—Incoming and outgoing trunks.
COT (POTS)	7	3	COT—Outgoing route only.
COT (POTS)	7	4	COT—Incoming and outgoing trunks.
RAN	1	11	RAN—Recorded announcement device.

RAN	1	12	RAN—Recorded announcement device.
RAN	1	13	RAN—Recorded announcement device.

For the Generic Services migration, these non-default prompts from the new RDB were added to connect to the Cisco CallManager.

```

TYPE RDB
CUST 00
ROUT 19
TKTP TIE
RCLS EXT
DTRK YES
DGTP PRI
ISDN YES
  MODE PRA
  IFC D100
  SBN NO
  PNI 00000
  NCNA YES
  NCRD YES
  TGAR 0
PTYP PRI
AUTO NO
ICOG IAO
SRCH LIN
TRMB YES
ACOD 5719
TARG

```

Step 8: Get Trunk (TRK) Configuration Information

The Nortel X11 software provides two print routines for obtaining information regarding the trunk configuration: Hardware location (TNB) or by the trunk type. Both options contain the same information, and both methods can be printed from load 20.

This table lists the prompts you can use and what you should expect to see after you issue them. These are obtained from the TNB data for trunks.

Prompt	Response	Description
REQ:	PRT	Print.
TYPE:	TNB	Terminal number block.
TN	lscu	The loop, shelf, card, and unit hardware location in the switch.

CUST		
------	--	--

Note: In load 20, you must enter a specific terminal number block after the TN prompt. For example, if you type 004 after the TN prompt, this signifies that you want to print the configuration for TNB 004.

In this example, the prompts that are displayed in bold text contain most of the information you need to verify how the trunk is built. From this printout you can tell that this trunk is a ground start trunk with no supervision. You can also tell that this trunk is member number 7 of route 4.

```
TN 004 1 00 03
TYPE COT

!--- Central office trunk.

CDEN 8D (card density)
CUST 0
XTRK XUT

!--- Extended universal trunk card.

TIMP 600
BIMP 3COM
NCOS 0

!--- Network class of service.

RTMB 4 7

!--- Route number and member.

NITE
SIGL GRD

!--- Ground start trunk.

SUPN NO

!--- No supervision.

CLS UNR DTN WTA LPR APN THFD
  P10 NTC LOL
TKID
DATE 30 JAN 2001
```

The following trunk printout is a tie line, using EM4 signaling with the starting and stopping arrangements being immediate/immediate:

```
TN 008 0 01 00
TYPE TIE

!--- Tie trunk.

CUST 0
XTRK XEM

!--- Extended E&M card.

EMTY TY1

!--- E&M type 1.

CPAD COUT
NCOS 0
RTMB 20 5

!--- Route and member number.

TGAR 0

!--- Trunk group access restriction.

SIGL EM4
```

```
!--- Signaling.  
STRI/STRO IMM IMM  
!--- Starting and stopping arrangements.  
SUPN YES  
!--- Supervision.  
CLS UNR DTN ECD WTA LPR APN THFD  
    P10 NTC MID  
TKID  
DATE 30 JAN 2001
```

Once we had all of the system information, it was verified against the site survey. It was discovered that there were 11 analog lines that were not noted in the site survey. To ensure that the lines were indeed present, and functioning, we physically traced out where each jumper from the service provider's demarcation point (RJ-21X) was terminated.

Step 9: Automatic Call Distribution (ACD)

The call center for the Generic Services IT department is located in Waynesburg. The call center has approximately 45 phones in the ACD groups, which are broken down into seven different departments. The information was gathered from the PBX using the print routines. Since Cisco is still in the process of releasing the Cisco IP Integrated Contact Distribution (IPICD) product, the ACD function was not attempted in the pilot.

Add and Configure the PRI Card

For this migration, it was decided to order a new PRI card rather than disturb the existing one. However, when the new card arrived, it was slated for a network slot in the PBX that was unavailable. After working with the Telco vendor, it was discovered that a different slot would accommodate the existing card and swapped the placement of the existing and new PRI cards. A new loop and channel for the tie trunks was then added.

The new PRI card is dedicated for Cisco CallManager traffic only. This section discusses the steps taken to add and configure the PRI card.

Programming the Meridian 1 for a PRI card involves these seven steps:

1. [Define Error Detection Thresholds.](#)
2. [Add a PRI Loop.](#)
3. [Build the D-Channel.](#)
4. [Define a PRI Customer.](#)
5. [Build the PRI Route Data Block \(RDB\).](#)
6. [Build the PRI Trunks.](#)
7. [Define Clock Synchronization.](#)

Define Error Detection Thresholds

Generic Services already have three PRI cards installed in their system. Therefore, it is not necessary to set the error detection thresholds.

Add a PRI Loop

At the Waynesburg site, we added the new digital loop (DLOP) in load 17. This loop informs the system where the resources for this card are located. The new loop was numbered 19.

This example shows the new loop configuration:

```
CEQU
MPED 8D
TERM
REMO
TERD 018
REMD
TERQ N099
REMQ
SUPL 004 008
XCT 000 016
TDS * 000 * 016
CONF * 001 * 017
MFSD * 000 * 016

DLOP NUM DCH FRM LCMT YALM TRSH
TRK 012 24 D4 AMI DG2 00
    024 24 D4 AMI DG2 00
PRI 002 24 ESF B8S FDL 00
    003 24 ESF B8S FDL 00
    019 24 ESF B8S FDL 00

!--- New loop.

EXT0 3PE
CNI 012 000 000
EXT1 3PE
CNI 012 000 000
MCFN 004 004 004 004 016 016
```

Build the D-Channel

The D-channel is used for signaling between the two systems for call setup and teardown. You have to configure the new D-channel so that it knows:

- Clock source.
- Bandwidth allocation.
- Loop association.

The D-channel is built and administered in load 17. This example shows the new D-channel configuration. The bold text shows that the clock source is external, the new D-channel is associated with loop 19, and the bandwidth allocation for the D-channel is 64 KC.

Note: The bandwidth allocation for the D-channel is set with the D-channel transmission rate (DRAT) prompt.

```
ADAN DCH 1
CTYP MSDL
DNUM 9
PORT 2
DES CISCO-LOOP19
USR PRI
DCHL 19
OTBF 127
PARM RS422 DTE
DRAT 64KC
CLOK EXT
IFC D100
SIDE USR
CNEG 1
RLS ID **
```



```

RCAP ND2
T200 3
T203 10
N200 3
N201 260
K 7

```

Define a PRI Customer

In load 15, the Customer Database (CDB) is an option you must enable to use digital circuits within the system. To do this, set the ISDN prompt to **YES**. Since Generic Systems already uses the PRI service, it was previously configured in the CDB.

Build the PRI Route Data Block (RDB)

Twenty-three new trunks for connectivity were added between the Cisco CallManager and the Nortel PBX. Therefore, it was necessary to add a new route for which the trunks are associated. The RDB sets these parameters for a group of trunks:

- The manner in which the system searches for trunks (round robin or linear).
- The access code for direct access.
- The type of trunks.
- Tromboning.
- Whether this trunk should auto-terminate.

This is built in load 16. This example shows the RDB parameters:

```

TYPE RDB
CUST 00
ROUT 19
TKTP TIE

!--- Trunk type is TIE.

RCLS EXT
DTRK YES
DGTP PRI
ISDN YES
  MODE PRA
  IFC D100
  SBN NO
  PNI 00000
  NCNA YES
  NCRD YES
  TGAR 0
PTYP PRI
AUTO NO

!--- No auto-termination; terminate normally.

ICOG IAO
SRCH LIN
TRMB YES

!--- Tromboning is allowed.

ACOD 5719

!--- Access code for the trunk group is 5719.

TARG
INST

```

Build the PRI Trunks

The new trunks were added and associated them with the new route. This is done in load 14.

Note: In order to save time when adding multiple trunks that need to be built with the same configuration, perform these steps:

1. At the REQ prompt, type **NEW**.
2. Press the space bar and type the number of trunks you want to add.

This example shows how the trunks are configured:

```
TN 019 01
TYPE TIE
CDEM SD
CUST 0
NCOS 7
RTMB 19 1
B-CHANNEL SIGNALING
TGAR 0
CLS UNR DTN WTA LPR APN THFD HKD
P10 VNL
TKID
DATE 18 APR 2001
```

Define Clock Synchronization

Generic Services already has three PRI cards installed in their system. Therefore, it is not necessary to set the clock synchronization. The clock synchronization can be administered in load 73.

Build the Route List Index (RLI)

This section discusses the steps taken to build the route list index.

In load 86, a new RLI is added with which to associate the new distant steering codes (DSCs). The DSCs are used by the Nortel PBX to route calls to their intended destination.

You need to assign the route number you just built to a new RLI. The RLI is assigned later in the [Building Distant Steering Codes](#) section.

This example shows the RLI configuration:

```
RLI 19
ENTR 0
LTER N€O€
ROUT 19
TOD 0 ON 1 ON 2 ON 3 ON
4 ON 5 ON 6 ON 7 ON
CNV N€O€
EXP N€O€
FRL 0
DMI 0
FCI 0
```

Note: If you need a place for the overflow calls to go to, build more ENTR sections.

Changing Extension Numbers

Since only a pilot is implemented, and no new PRI or other connection to the PSTN is added, it is necessary to change the extension numbers of the end users. This is necessary so they can use their published direct inward dial (DID)

numbers on the new IP phones. The Nortel extensions need to be deleted from the system and added back as distant steering codes.

Note: The PRI circuit that was added was for connectivity between the Cisco CallManager and the Nortel PBX. All access to the PSTN for the Cisco CallManager goes through the Nortel PBX.

Building Distant Steering Codes

The challenge with the integration is to move specific users from the Nortel PBX to the Cisco CallManager. For example, if user 6511 moves from the Nortel PBX to Cisco CallManager, a route has to be placed on the Nortel PBX to point to the calls that need to be connected to the Cisco CallManager to the appropriate phones.

The Nortel PBX routes calls from the CallManager, or the PSTN, using the DSC feature. In Waynesburg, Generic Services uses DID numbers that ring directly to the users desk, bypassing the need for an attendant. The last three digits of the user's extension number is passed along from the PSTN. Since the circuits from the PSTN are going to remain in the Nortel PBX for the duration of the pilot, we had to set the Nortel PBX to send the digits over to the Cisco CallManager.

In order to have the Nortel PBX send the numbers to the Cisco CallManager, the existing directory number had to be deleted from the phones and added back into the Nortel PBX as a DSC that points to the PRI connected to the Cisco CallManager. The Nortel PBX does not allow you to create a DSC using a dialed number if it is in use somewhere in the switch. The prime directory number on each Meridian phone is changed from a three-digit number to an available four-digit directory number. This releases the extension number to be used as a DSC.

Change a Directory Number on the Nortel PBX to a Distant Steering Code

```
LD 20
REQ CHG
TYPE

!--- Depends on phone type.

TN

!--- Varies.

ECHG YES
ITEM KEY 0 SCR 6122

!--- 6122 is the new extension number.

KEY (CR)
ITEM (CR)

LD 87

REQ NEW
CUST 0
FEAT CDP

!--- Coordinated dial plan.

TYPE DSC

!--- Distant steering code.

DSC XXXX

!--- Old extension number.

FLEN 3

!--- Number of digits coming from the PSTN.

DSP (CR)
RLI
```

```
!--- Route number call should go to.

DSC

!--- If you need to add more extension numbers
!--- do so here, otherwise press Enter to finish.
```

Remove a DSC and Adding the Number Back to the Nortel PBX

```
LD 87

REQ OUT
CUST 0
FEAT CDP
TYPE DSC
DSC

!--- DSC number.

DSC

!--- Next one to be removed or enter to finish.
```

Once you have added the distant steering code, you need to verify that everything works. Call forward the old phone to voice mail and call it from the new IP phone. The call should forward to the user's personal voice mail greeting. Call the DID number and verify that it rings on the Cisco IP phone and then rolls to voice mail after the *ring no answer* threshold has been met.

Validate the Implementation

This section provides basic tests performed for the Implementation Acceptance. Successfully passing these tests assures that the migration was implemented according to customer requirements and Cisco specifications, and that it is ready for operation.

Nortel Tests

From the Nortel perspective, there are a few things that you can test while logged into the switch to verify your configuration. Load 60 allows you to verify that the circuit is up and running with all trunks idle. This example is how the configuration should appear.

```
DT017
PRI* TRK LOOP 19 - ENBL
FFMT/LCMT/YALMT: ESF/B8Z/FDL
SERVICE RESTORE: YES
YEL ALM PROCESS: YES
ALARM STATUS: NO ALARM
CH 01 - IDLE TIE *    CH 02 - IDLE TIE *
CH 03 - IDLE ITE *    CH 04 - IDLE TIE *
CH 05 - IDLE TIE *    CH 06 - IDLE TIE *
CH 07 - IDLE ITE *    CH 08 - IDLE TIE *
CH 09 - IDLE TIE *    CH 10 - IDLE TIE *
CH 11 - IDLE ITE *    CH 12 - IDLE TIE *
CH 13 - IDLE TIE *    CH 14 - IDLE TIE *
CH 15 - IDLE ITE *    CH 16 - IDLE TIE *
CH 17 - IDLE TIE *    CH 18 - IDLE TIE *
CH 19 - IDLE ITE *    CH 20 - IDLE TIE *
CH 21 - IDLE TIE *    CH 22 - IDLE TIE *
CH 23 - IDLE ITE *    CH 24 - DCH 1*
```

You can also look at the way the Nortel phone is built. Make sure that the trunk group access restriction (TGAR) matches the route group and trunks that you built. If these do not match, the phone is not allowed access to the trunk group.

Note: For a pilot implementation, you should set the TGAR to 0, no restrictions.

This route group Trunk Access Restriction Group (TARG) and phone Trunk Group Access Restriction (TGAR) examples show what you should verify:

Route Group TARG Example

```

TYPE RDB
CUST00
ROUT 19
TKTP TIE
ESN NO
CNVT NO
SAT NO
RCLS EXT
DTRK YES
DGTP PRI
ISDN YES
  MODE PRA
  IFC D100
  SBN NO
  PNI 00000
  NCNA YES
  NCRD YES
  CHTY BCH
  CTYP UKWN
  INAC NO
  ISAR NO
  TGAR 0
PTYT PRI
AUTO NO
DNIS NO
DCDR NO
ICOG IAO
SRCH LIN
TRMB YES
STEP
ACOD 5719
TCPP NO
TARG (blank = 0, no restrictions)
BILN NO
OABS
INST
IDC NO
DCNO 0 *
NDNO 0
DEXT NO
ANTK
SIGO STD
TIMR ICF 512
  OGF 512
  EOD 13952
  NRD 10112
  DDL 70
  ODT 4096
  RGV 640
  GRD 896

```

Phone TGAR Example

```

ES CA818
TN 004 0 14 02
TYPE 500
CDEN 4D
CUST 0
DN 398 MARP
  CPND
  NAME FAX-ACCOUNTS REC.
  XPLN 27
  DISPLAY_FMT FIRST, LAST
AST NO
IAPG 0
HUNT
TGAR 0 (0= no restrictions)
LDN NO

```

```

NCOS 7
SGRP 0
RNP 0
XLST
SCI 0
SCPW
CLS CTD DTN FBD XFD WTA THFD FND HTD ONS
LPR XRD CWD SWD MWD LPD XHD CCSD LND TVD
CFTD SFD C6D PDN CNID CLBD AUTU
ICDD CDMD EHTD MCTD
GPUD DPUD CFXD ARHD OVDD AGTD CLTD LDTD
ASCD
MBXD CPFA CPTA DDGA NAMA
SHL ABDD CFHD
USRD BNRD OCBD
PLEV 02
DATE 7 APR 1999 DCNO 0 *
NDNO 0
DEXT NO
ANTK
SIGO STD
TIMR ICF 512

```

Verify that DID Numbers Ring Through Nortel Phone to Cisco IP Phone

From one of the Nortel phones, access an outgoing trunk and dial the DID number that you have set to go to the Cisco IP phone. The IP phone should ring.

We were only installing a pilot at this time, so the Nortel voice mail was still in use. Use the Forward No Answer and Forward Busy settings to have the Cisco CallManager send the call back to the Nortel phone's new extension number for voice messaging.

You have to forward the Nortel phone to the voice mail system for the standard three or four rings to apply. Otherwise, the phone rings nine or ten times before the voice mail picks up, and the caller likely disconnects before waiting for the voice mail message. Once you have forwarded the Nortel phone to the voice mail system, call the IP phone and verify that the voice mail picks up.

Note: You also need to change the Message Waiting Indicator (MWI) DN in the Meridian voice mail system.

Customer Database Printout

This is an example of a customer database printout:

```

REQ: prt
TYPE: CDB
CUST 0

```

```

TYPE CDB
CUST 00
AML_DATA
OPT DNI
VSID 0
GP02
GP03
GP04
GP05
GP06
GP07
GP08
GP09
GP10
GP11
GP12
GP13
GP14
GP15
ANI_DATA
ANAT 964

```

```
ANLD 5100
ATT_DATA
OPT AHD BIND BIXA BLA
  DNI IC1 ITG IDP ILF XBL
  FKA MWUD LOD
  REA SYA
ATDN 0
NCOS 7
CWUP YES
CWCL 0 0
CWTM 0 0
CWBZ YES YES
MATT NO
LFTN 004 0 02 01
LFFD 100
RTIM 60 60 60
ATIM 0
SPVC 00
  SBLF NO
RTSA RSAD
SACP NO
ABDN NO
IRFR NO
XRFR NO
ICI 00 DLO
ICI 01 RLL
ICI 02 INT
ICI 03 LD0
ICI 04 LD1
ICI 05 LD2
ICI 06 R000
ICI 07
ICI 08
ICI 09
RICI
CCS_DATA
CCRS UNR
ECC1 UNR
ECC2 UNR
CNCS
PELK NO
CDR_DATA
CDR YES
  IMPH NO
  OMPH NO
  AXID YES
  TRCR YES
  CDPR NO
  ECDR NO
  PORT 9
  CHLN 0
  FCAF NO
FCR_DATA
NFCR YES
  MAXT 10
  OCB1 255
  OCB2 255
  OCB3 255
  IDCA YES
  DCMX 15
FFC_DATA
CCRS UNR
SCPL 4
SBUP YES
FFCS NO
  STRL 0
  STRG
ADLD 0
FTR_DATA
OPT AHD BIND BIXA BLA CFF CFRD
  COX CPA CTD DBA DNI DSX
  HTU HVD XBL IC1 IDP ILF
  IHD ITG FKA LOD LRA MCI
  MWUD PVCD REA RND
  RTR RTD ROX SBD SYA
  TTAD VOBD CWRD
DGRP 5
IRNG NO
PKND 1
SPRE 5919
LINK NO
```

```

PREO 0
SRCD 9901
EEST YES
  DTMF YES
MUS YES
  MUSR 10
ALDN
RECD NO
PORT 0
STCB NO
MDCD YES
NAUT NO
IMS_DATA
IMS YES
IMA YES
  APL NONE
UST NO
  APL NONE
UMG NO
  APL NONE
INT_DATA
ACCD OVF OVF OVF ATN
CTVN OVF OVF OVF ATN
MBNR OVF OVF OVF ATN
CTRC OVF NAP OVF NAP
CLDN NAP OVF NAP NAP
NINV OVF OVF OVF ATN
NITR OVF OVF OVF ATN
NRES OVF OVF OVF ATN
NBLK OVF OVF OVF ATN
RCLE ATN OVF ATN ATN
CONG OVF
LLT OVF
DNDT BSY
LDN_DATA
OPT XLDN
DLDN NO
LDN0 5100
LDN1 164
LDN2 280
LDN3
LDN4
LDN5
ICI 00 DLO
ICI 01 RLL
ICI 02 INT
ICI 03 LD0
ICI 04 LD1
ICI 05 LD2
ICI 06 R000
ICI 07
ICI 08
ICI 09
MPO_DATA
FMOP
  RGNA STD STD
  AOCs DIS DIS
  RY1 06
  RY2 04
  RALL NO
  CDTO 14
IFLS NO
MHLD NO
PCDS
  CNFD 1
  TGLD 2
  DISD 3
CCDO NO
AFCO NO
ACNS NO
NET_DATA
OPT RTD
AC2
ISDN YES
  PNI 1
  PINX_DN
  HNPA 610
  HNXX 964
  HLOC
  LSC
  CNTP PDN

```



```

RCNT 5
VNR NO
NIT 8
FOPT 14

NIT_DATA
NIT1 350
TIM1
NIT2
TIM2
NIT3
TIM3
NIT4
TIM4
ENS NO
OAS_DATA
ODN0
ODN1
ODN2
ODN3
ODN4
ODN5
ODN6
ODN7
ODN8
ODN9
ASTM 30
RDR_DATA
OPT CFF CFRD PVCD CWRD
FNAD FDN
FNAT FDN
FNAL FDN
CFTA YES
CCFWDN
CFN0 4
CFN1 5
CFN2 6
DFN0 4
DFN1 5
DFN2 6
MDID YES
NDID YES
MWFB NO
TRCL 0
ROA_DATA
OPT ROX
RICI
TIM_DATA
FLSH 45
PHDT 30
DIND 30
DIDT 14
LDTT 6
BOTO 14
DBRC 60
RTIM 60 60 60
ATIM 0
ADLD 0
NFNA 0
HWTT 300
NIT 8
FOPT 14
TST_DATA

```

Print Routines

This section provides the prompts and responses for the various print routines contained in loads 20, 21, and 22. Although this is not a complete list, the major topics are covered.

Load 20 Print Routines

Directory Number Block (DNB)



Prompt	Response	Description
REQ:	PRT	Print.
TYPE:	DNB	Directory number data block.
CUST		
DN	X...X	Enter specific DN, or blank for all.
DATE	(CR)	Carriage return.
PAGE	(CR)	Carriage return.

Pretranslation (PRE)

Prompt	Response	Description
REQ:	PRT	Print.
TYPE:	SCL	Pretranslation data.
CUST		

Speed Call Lists (SCL)

Prompt	Response	Description
REQ:	PRT	Print.
TYPE:	SCL	Regular and system speed call lists.

CUST		
LSNO	X..X	Enter specific list number, or blank for all.

Terminal Number Block (TNB) for Phones and Trunks

Prompt	Response	Description
REQ:	PRT	Print.
TYPE:	TNB	Terminal block number.
TN	lcsu	Hardware location. If no TN is entered, all phones and trunks are returned.
CUST		

Prompt	Response	Description
REQ:	PRT	Print.
TYPE:	TNB	Trunk data block.
TN	lcsu	Hardware location (loop, shelf, card, unit). If no TN is entered, all TNs are returned.
CUST		

Trunk Data: Specific Trunk Types

Prompt	Response	Description
REQ:	PRT	Print.

TYPE:	COT	Central office trunk.
	DID	Direct inward dial trunks.
	MUS	Music trunk.
	PAG	Paging trunks.
	RAN	Recorded announcement trunks.
	TIE	TIE trunks.
TN	lscu	Hardware location (loop, shelf, card, unit).
CUST		

Unused Card (LUC)

Prompt	Response	Description
REQ:	LUC	List unused card slots.
TN	lsc	Hardware location (loop, shelf, card).
	L ch	DTI/PRI loop and channel.

Unused Directory Number (LUDN)

Prompt	Response	Description
REQ:	PRT	Print.

TYPE:	LUDN	List unused directory numbers.
CUST		
DN	xxx-xxx	Enter specific DN range, or blank for all available.

Load 21 Print Routines

Customer Data Block

Prompt	Response	Description
REQ:	PRT	Print.
TYPE:	CDB	Customer data block. If you need data about the passwords, print PWD. PWD data is not provided by printing CDB.
CUST		

Route Data Block (RDB)

Prompt	Response	Description
REQ:	PRT	Print.
TYPE:	RDB	Route data block.
CUST		
ROUT	0-511	Route number you are looking for. If route is not entered, all routes will be returned.

ACOD	xxxx	Route access code.
------	------	--------------------

Trunk Members (LTM)

Prompt	Response	Description
REQ:	LTM	List trunk members.
CUST:		
ROUT	0-511	Route number of members.
ACOD	xxxx	Route access code.

Load 22 Print Routines

Common Equipment (CEQU)

Prompt	Response	Description
REQ:	PRT	Print.
TYPE:	CEQU	Common equipment data.

Configuration Record (CFN)

Prompt	Response	Description
REQ:	PRT	Print.
TYPE:	CFN	Configuration record.

Action Device and Number (ADAN)

Prompt	Response	Description
REQ:	PRT	Print.
TYPE:	ADAN	All I/O devices (D-channel and back-up D-channels).

Issue and Release (ISS)

Prompt	Response	Description
REQ:	ISS	Print issue and release of software.

Software Package (PKG)

Prompt	Response	Description
REQ:	PRT	Print.
TYPE:	PKG	Print software packages.

PRI Maintenance and Status

There are two loads that provide you with the most information about the real-time status of the PRI or digital trunk interface (DTI) trunks: LD 60 and LD 96. Load 96 also gets the status of the D-channels in a system.

PRI and DTI Trunk Information Commands

This table lists the commands to get information about the PRI and DTI trunks:

Command	Description
DISI loop	Disables loop when all channels are idle.

DISL loop	Disables network and PRI/DTI cards of loop.
DSCH 1 ch	Disables channel of loop.
ENCH 1 ch	Enables all channels of loop.
ENLL loop	Enables network and PRI/DTI cards of loop.
LCNT (loop)	Lists contents of alarm counters on one or all PRI/DTI loops.
LOVF c r	Lists threshold overflows for customer c and route r.
RCNT	Restarts alarm counters of all PRI/DTI loops.
RCNT loop	Resets alarm counters for loop.
STAT loop	Gets status of PRI/DTI loop.
STAT 1 ch	Gets status of channel ch.
STAT	Gets status of all PRI/DTI channels.

System Clock Controller and Status Commands

This table lists the commands used to get status or disable the system clock controllers.

Command	Description
DIS CC x (0,1)	Disables system clock controller x (0,1).
DSCK loop	Disables the clock for loop.
ENCK loop	Enables the clock for loop.

ENL CC x (0,1)	Enables system clock controller x (0,1).
SSCK x	Gets status of system clock x (0,1).

Load 96: D-channel Diagnostic Commands

This table lists the commands to enable or disable the D-channel and message monitoring. Enable message monitoring to see the real-time messages of calls into and out of the PBX.

Note: The x in this table designates the D-channel number.

Command	Description
ENL MSGI x	Enables monitoring of incoming messages.
ENL MSGO x	Enables monitoring of outgoing messages.
DIS MSGI x	Disables monitoring of incoming messages.
DIS MSGO x	Disables monitoring of outgoing messages.
DIS DCH x	Disables D-channel x.
ENL DCH x	Enables D-channel x.
STAT DCH x	Gets status of D-channel x.

Load 60: DTI and PRI Diagnostics

Load 60 is for the DTI and PRI diagnostics. Use this list of basic commands for the maintenance involved with the PRI:

Command	Description
ATLP (0), 1	Disables (default) or enables midnight auto loop test.

CDSP	Clears maintenance display to 00 or blank.
CMIN ALL	Clears minor alarm indication on all attendant consoles.
CMIN c	Clears minor alarm indication on attendant consoles for customer c.
DISI loop	Disables loop when all channels are idle.
DISL loop	Disables network and DTI/PRI cards of loop.
DLBK loop	Disables remote loopback test per the RLBK command.
DLBK I ch	Disable remote loopback test per the RLBK 1 ch command.
DSCH I ch	Disables channel ch of loop.
ENCH loop	Enables all channels on 2.0 MB per second DTI/PRI.
ENCH I ch	Enables channel ch of DTI/PRI loop.
ENLL loop	Enables network and DTI/PRI cards of loop.
LCNT (loop)	Lists contents of alarm counters on one or all DTI/PRI loops.
LOVF c r	Lists threshold overflows for customer c (0-99) and route r (0-511).

RCNT	Resets alarm counters of all DTI/PRI loops.
RCNT loop	Resets alarm counter of DTI/PRI loop.
RMST loop	Performs self test on loop.
RMST I ch	Performs self test on specified channel (2.0 MB per second DTI/PRI only).
RLBK loop	Closes loop at carrier interface point for testing.
RLBK I ch	Closes channel ch at carrier interface point.
RSET I ch	Resets thresholds for channel ch.
SLFT loop	Invokes hardware self test on loop.
SLFT I ch	Invokes partial hardware self test on channel ch.
STAT	Gets status of all loops.
STAT loop	Gets status of DTI/PRI loop.
STAT I ch	Gets status of channel ch.

This example shows the output if you administer the **LCNT** command with loop 19, and if the span is up and configured properly:

```
PRI TRK LOOP 19
TRSH CNT:
BPV -000
SLIPD -000
SLIPR -000
CRC -000
```

```
LOSFA -000
OS_BPV -000
OS_LOSFA-000
OS_YEL -000
```

Load 14: Trunk Data Block

Load 14 is where you build the individual trunks. In order to build a trunk, you must complete this:

- Assign the trunks to a route group.
- Set up the starting and stopping arrangements.
- Access on the trunk level.

These examples show printouts of several trunks:

Example 1

```
TN 002 03
TYPE DID
CDEN SD
CUST 0
NCOS 0
RTMB 0 3
B-CHANNEL SIGNALING
NITE
STRI/STRO OWK OWK
CLS UNR DTN WTA LPR APN THFD HKD
P10 VNL
```

Example 2

```
TN 004 0 00 00
TYPE COT
CDEN 8D
CUST 0
XTRK XUT
TIMP 600
BIMP 3COM
NCOS 7
RTMB 3 4
NITE
SIGL GRD
SUPN YES
STYP PSP
CLS UNR DTN WTA LPR APN THFD
P10 NTC LOL
TKID
DATE 6 JAN 2001
```

Example 3

```
TN 004 0 00 01
TYPE RAN
CUST 0
XTRK XUT
TIMP 1200
BIMP 600
RTMB 11 1
DATE 7 MAR 2001
```

Example 4

```
TN 008 0 02 01
TYPE TIE
CUST 0
XTRK XEM
EMTY TY1
CPAD COUT
```

```

NCOS 0
RTMB 20 10
TGAR 0
SIGL EM4
STRI/STRO IMM IMM
SUPN YES
CLS UNR DTN ECD WTA LPR APN THFD
P10 NTC MID
TKID
DATE 5 JAN 2001

```

To print out trunk information, use this example:

```

>LD_20
REQ_PRT
TYPE_<specify type of trunk>
TN_<specify terminal number block>

```

Load 86: Electronic Switched Network

Load 86 is where you set up the overflow outbound traffic. For instance, if you have more than one PRI, one for incoming and one for outgoing, you may want outgoing calls to use the second PRI in the event the first one is busy.

This example shows a route list index:

```

RLI 0
ENTR 0
LTER N€O€
ROUT 1
TOD 0 ON 1 ON 2 ON 3 ON
4 ON 5 ON 6 ON 7 ON
CNV N€O€
EXP N€O€
FRL 0
DMI 0
FCI 0
FSNI 0
OHQ N€O€
CBQ N€O€

ENTR 1
LTER N€O€
ROUT 0
TOD 0 ON 1 ON 2 ON 3 ON
4 ON 5 ON 6 ON 7 ON
CNV N€O€
EXP N€O€
FRL 0
DMI 0
FCI 0
FSNI 0
OHQ N€O€
CBQ N€O€

```

Configuration for the New PRI Circuit between the CallManager and the Nortel PBX

```

CEQU
MPED 8D
TERM
REMO
TERD 018
REMD
TERQ N099
REMQ
SUPL 004 008
XCT 000 016
TDS * 000 * 016
CONF * 001 * 017
MFSD * 000 * 016

DLOP NUM DCH FRM LCMT YALM TRSH
TRK 012 24 D4 AMI DG2 00
024 24 D4 AMI DG2 00
PRI 002 24 ESF B8S FDL 00

```

003 24 ESF B8S FDL 00
019 24 ESF B8S FDL 00
EXT0 3PE
CNI 012 000 000
EXT1 3PE
CNI 012 000 000
MCFN 004 004 004 004 016 016

REQ ****
OVL000
>LD 21
PT1000

REQ: PRT
TYPE: RDB
CUST 0
ROUT 19


TYPE RDB
CUST 00
ROUT 19
TKTP TIE
ESN NO
CNVT NO
SAT NO
RCLS EXT
DTRK YES
DGTP PRI
ISDN YES
MODE PRA
IFC D100
SBN NO
PNI 00000
NCNA YES
NCRD YES
CHTY BCH
CTYP UKWN
INAC NO
ISAR NO
TGAR 0
PTYPR PRI
AUTO NO
DNIS NO
DCDR NO
ICOG IAO
SRCH LIN
TRMB YES
STEP
ACOD 5719
TCPP NO
TARG
BILN NO
OABS
INST
IDC NO
DCNO 0 *
NDNO 0
DEXT NO
ANTK
SIGO STD
TIMR ICF 512
OGF 512
EOD 13952
NRD 10112
DDL 70
ODT 4096
RGV 640
GRD 896
SFB 3
NBS 2048
NBL 4096
NRAG 30
TFD 0
DRNG NO
CDR NO
MUS NO
RACD NO
EQAR NO
FRL 0 0
FRL 1 0
FRL 2 0

FRL 3 0
FRL 4 0
FRL 5 0
FRL 6 0
FRL 7 0
OHQ NO
OHQT 00
CBQ NO
AUTH NO
PLEV 2
ALRM NO
ART 0
SGRP

New trunk

TN 019 14
TYPE TIE
CDEB SD
CUST 0
NCOS 7
RTMB 19 14
B-CHANNEL SIGNALING
TGAR 0
CLS UNR DTN WTA LPR APN THFD HKD
P10 VNL
TKID
DATE 18 APR 2001

Related Information

- [Voice Technology Support](#)
- [Voice and Unified Communications Product Support](#)
- **Recommended Reading:** [Troubleshooting Cisco IP Telephony](#) 
- [Technical Support - Cisco Systems](#)

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