Application Note

Cisco 3640 - PBX Interoperability: Ericsson MD-110 with 2MFT T1 card with T1-CAS

Introduction

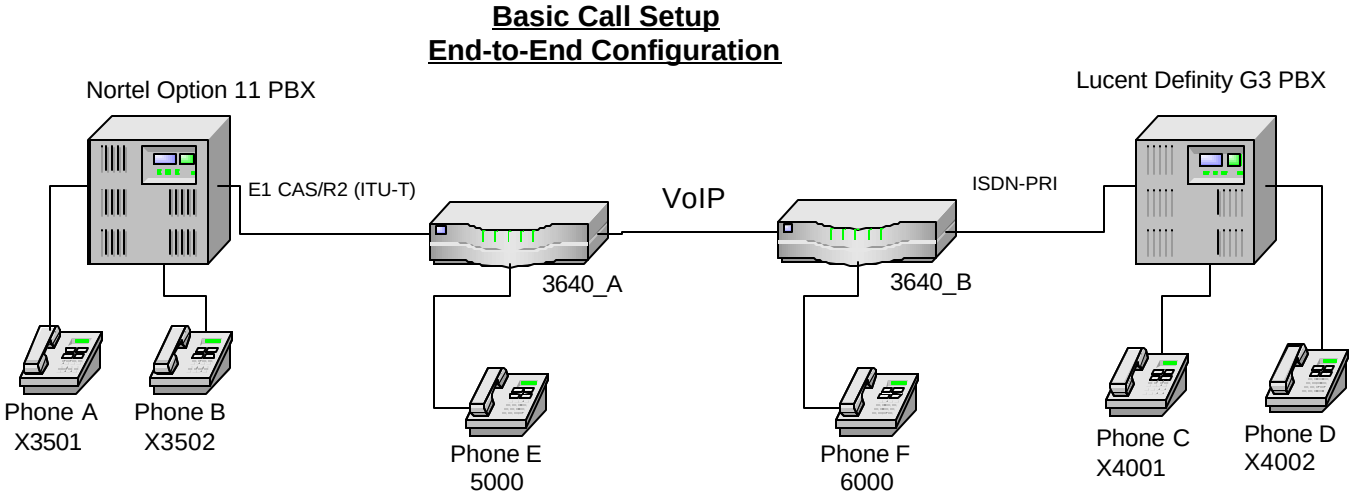
This document contains results of PBX interoperability testing with E1-R2 signaling on the Cisco 3640 with the 2MFT E1 card.

R2 signaling is an international signaling standard that is common to channelized E1 networks. However there is no single signaling standard for R2. The ITU-T Q.400-Q.490 recommendations define R2, but many countries and geographic regions have their own E1 R2 specifications, which deviate from the ITU-T recommendations.

There are two aspects of R2 signaling: line signaling and interregister signaling. R2 line signaling includes R2 digital, R2 analog, and R2 pulse. R2 interregister signaling includes R2 compelled, R2 non-compelled, and R2 semi-compelled. Most country variations in R2 signaling are in the interregister signaling portion.

This report covers the R2 analog, compelled signaling between the Cisco 3640 with the 2MFT E1 card and the Nortel Option 11E PBX.

Network Topology



As shown in the diagram above, testing was done using the toll by-pass operation mode. The interoperability testing was done on the R2 link between a Cisco 3640 (3640_A) router and the Nortel Option 11E PBX. The second Cisco 3640 (3640_B) router was connected to a Lucent PBX via an ISDN E1 PRI link. This set-up is to ensure that IOS translates the call status messages between R2 and ISDN PRI.

The Ericsson MD-110 DS1 line was set to provide clocking so Cisco 3640 needs to be set to derive its clock from the incoming DS1 line, i.e., “line clock”. The E&M trunk groups performed as expected for both inbound and outbound calls.

For interoperability testing purposes, it was not necessary to go through all the country specific R2 settings available on the Cisco 3640 to be tested against the Nortel PBX since the Nortel Multifrequency Incoming and Outgoing tables are user defined. The Nortel PBX was configured so that it matches the Cisco 3640 router defaults when set to country code ITU-T.

Limitations

- The Option 11C Controller Card does not need an External MFC Sender/Receiver card as it already comes with an internal MFC tone sender/receiver.
- An abnormal operation on the Cisco 3640 router was found when a call was made to a BUSY station on the Nortel PBX. Although the Nortel correctly sends a Level 2 Group B Signal number “3” (for BUSY), the 3640 does not seem recognize this as a BUSY state. The Cisco 3640 does not return a busy progress or any other tone to notify the caller of the current state. Refer to DDTS CSCdv90818.
- An abnormal operation on the Cisco 3640 was found when a call was made to an Invalid Number on the Nortel PBX. Although the Nortel correctly sends a Level 2 Group B Signal number “5” (for VACC or Vacant Number), the Cisco 3640 does not seem to recognize this state. The Cisco 3640 does not return any progress tone to notify the caller of the current state. Refer DDTS CSCdv90818.
- The Ericsson MD-110 PBX will not accept digits from a Loop-start or Ground-start CO trunk group. The Ericsson MD-110 PBX relies solely on the seizure of the trunk to generate a ring indication to the attendant.

System Components

Hardware Requirements

- Cisco 3640 (Cisco 2621 was used as the second router in the test case)
- Ericsson MD-110 PBX
- Nortel Meridian 1 Option 11C (Release 25) PBX
  - (2MB DTI card (NTAK10xx)
  - External MFC Sender/Receiver card (NT5K21xx)

Software Requirements

- Cisco IOS Software Release 12.2(6)
- Nortel PBX Option 11E Software Package 128

Configuring the PBX

This section contains configuration information for the Ericsson MD-110 PBX and the Nortel Meridian 1 Option 11C (Release 25) PBX.

Configuring the Ericsson MD-110 PBX

```
<CADAP;

CALENDAR DATA


IDENTITY=DANDS-EURO-TEST

VERSION=ASB50104-R6-SES-R9-BC90D/CNI80
```

19:44:04

THU 13 DEC 2001

END

<RODDP:DEST=ALL;

EXTERNAL DESTINATION ROUTE DATA

DEST	DRN	ROU	CHO	CUST	ADC	TRC	SRT	NUMACK	PRE
2	20				1005000000000025000	0	1	0	
30	1				1005000000000025000	0	3	0	
31	2				1005000000000025000	0	3	0	
32	3				1005000000000025000	0	3	0	
33	4				1005000000000025000	0	3	0	
34	5				1005000000000025000	0	3	0	
35	6				0005000000000025000	0	3	0	
36	7				0005000000000025000	0	3	0	
37	8				0005000000000025000	0	3	0	
39	21				1005000000000025000	0	3	0	
40	11				1005000000000025000	0	3	0	
41	12				0005000000000025000	0	3	0	
42	13				0005000000000025000	0	3	0	
45	15				0005000000000025000	0	3	0	
46	16				0005000000000025000	0	3	0	
47	17				0005000000000025000	0	3	0	
48	18				0005000000000025000	0	3	0	
49	19				0005000000000025000	0	3	0	

END

```
<ROCAP:ROU=ALL;
ROUTE CATEGORY DATA

ROU SEL          TRM SERV       NODG DIST DISL TRAF     SIG          BCAP

1   711000000000 7   3100000001  0   5    20   03151515 211100000031 111111
2   711000000700 7   3110000000  0   5    20   03151515 211100000031 111111
3   711000000000 7   3100000001  0   5    20   03151515 211100000031 111111
4   711000000000 7   3100000000  0   5    128  03151515 511000000000 001111
5   711000000000 7   3100000000  0   5    128  03151515 511000000000 001111
6   011000000000 7   0010000000  0   5    128  03151515 000000000000 001111
7   011000000000 7   0010000000  0   5    128  03151515 000000000000 001111
8   012000000000 7   0010000000  0   5    128  03151515 511000000000 001101
9   711000000000 4   3100000001  0   5    20   03151515 211100000031 111111
10  711000000000 4   3110000010  0   5    20   03151515 211100000031 111111
11  711000010000 7   3100000011  0   30   128  03151515 211100000050 111111
12  012000000000 7   0010000000  0   5    120  03151515 511000000000 001101
13  012000000000 7   0010000000  0   5    120  03151515 511000000000 001101
15  711000000000 5   3110000001  0   5    128  03151515 511010000000 001100
16  711000000000 5   3110000001  0   5    128  03151515 511010000000 001100
17  711000000000 5   3110000001  0   30   128  03151515 511010000000 001100
18  711000000000 7   3110000001  0   30   128  03151515 511010000000 001100
19  711000000000 5   3110000001  0   30   128  03151515 511010000000 001100
20  711000000000 7   3110000010  0   5    20   03151515 211100000031 111111
21  711000000700 4   3110000000  0   30   128  00151515 211100100031 001100

END

<ROEDP:ROU=15&&19,TRU=ALL;
ROUTE EQUIPMENT DATA
```

```
ROU             TRU             EQU             SQU             INDDAT

15              001-5           001-1-00-04                     H'000000000006
15              001-6           001-1-00-05                     H'000000000006
16              001-7           001-1-00-06                     H'000000000006
16              001-8           001-1-00-07                     H'000000000006
17              001-9           001-1-00-08                     H'000000000006
17              001-10          001-1-00-09                     H'000000000006
18              001-11          001-1-00-10                     H'000000000006
18              001-12          001-1-00-11                     H'000000000006
19              001-13          001-1-00-12                     H'000000000006
19              001-14          001-1-00-13                     H'000000000006

END
<SUSIP:ROU=15,TRU=ALL;
STATUS INFORMATION AT 19:45:36 13DEC01

ROU  TRU     TYPE   TRAFFIC STATE/PTR    LINE STATE/PTR     ADD INFO

15   001-5   TL45   IDLE          #00D7  FREE       #008B
15   001-6   TL45   IDLE          #00D6  FREE       #008C
END

<SUSIP:ROU=16,R U=ALL;
STATUS INFORMATION AT 19:45:50 13DEC01

ROU  TRU     TYPE   TRAFFIC STATE/PTR    LINE STATE/PTR     ADD INFO

16   001-7   TL45   IDLE          #00D5  FREE       #008E
16   001-8   TL45   IDLE          #00D4  FREE       #008D
END
```

```
<SUSIP:ROU=17,TRU=ALL;
STATUS INFORMATION AT 19:46:02 13DEC01

ROU  TRU     TYPE   TRAFFIC STATE/PTR    LINE STATE/PTR     ADD INFO
17   001-9   TL45   IDLE          #00D3  FREE       #008F
17   001-10  TL45   IDLE          #00D2  FREE       #0090
END

<SUSIP:ROU=18,TRU=ALL;
STATUS INFORMATION AT 19:46:16 13DEC01

ROU  TRU     TYPE   TRAFFIC STATE/PTR    LINE STATE/PTR     ADD INFO

18   001-11  TL45   IDLE          #00D1  FREE       #0092
18   001-12  TL45   IDLE          #00D0  FREE       #0091
END

<SUSIP:ROU=19,R U=ALL;
STATUS INFORMATION AT 19:46:35 13DEC01

ROU  TRU     TYPE   TRAFFIC STATE/PTR    LINE STATE/PTR     ADD INFO

19   001-13  TL45   IDLE          #00CF  FREE       #0093
19   001-14  TL45   IDLE          #00CE  FREE       #0094
END
<KSCAP:DIR=ALL;
KEY SYSTEM CATEGORY PRINT

DIR    TRAF      SERV      CDIV       ROC   ITYPE  TRM  ADC
```

```
5000   03151515  02001207  011011333  7237  21     1    00100013010
5001   03151515  02001207  011151333  7237  21     1    00100003010
5002   03151515  02001207  011151333  7237  21     1    00100003010
5003   03151515  02001207  011151333  7237  21     1    00100003010
5006   03151515  02001207  011011333  7237  21     1    00100013010
5007   03151515  02001207  011011333  7237  21     1    00100013010

END

<KSFKP:DIR=5000;
KEY SYSTEM FUNCTION KEY DATA PRINT

DIR = 5000

KEY          KTYPE        VALUE        DIG

 00          PGM
 01          FCN          TNS
 02          FCN          TNS
 03          FCN          CNF
 04          SKI          F1
 05          SKI          F2
 06          SKI          F3
 07          SKI          F4
 08          SKI          MENU
 09          ODN          5000
 10          ODN          5000
 11          ODN          5000
 13          FCN          TNS
 14          FCN          CAD
 15          FCN          TNS
```

```
 16          FCN          TNS
 17          FCN          TNS
 18          FCN          TNS
 19          FCN          TNS
 20          FCN          TNS
 21          FCN          TNS
22          FCN          TNS
 23          FCN          TNS
 24          FCN          TNS
 25          FCN          TNS
 26          FCN          TNS
 27          FCN          TNS
 28          FCN          TNS
 29          FCN          TNS
 30          FCN          TNS
 31          FCN          TNS
 32          FCN          TNS
 33          FCN          TNS
 34          FCN          TNS
 35          FCN          TNS
 36          FCN          TNS
 37          FCN          TNS
 38          FCN          TNS
 39          FCN          TNS
 40          FCN          TNS



<RODAP:ROU=15&&19;
ROUTE DATA
ROU   TYPE  VARC        VARI        VARO        FILTER
```

```
15    TL45  H'00000003  H'00000006  H'00000007  NO
16    TL45  H'00000003  H'00000005  H'00000007  NO
17    TL45  H'00000003  H'00000004  H'00000006  NO
18    TL45  H'00000000  H'00000004  H'00000006  NO
19    TL45  H'00000002  H'00000005  H'00000006  NO

END

<SYEDP:LIM=1;


     SYSTEM EQUIPMENT DATA

     EQU           BOARDID   TYPE     DIR     ROU/TRU

     001-0-00-00        71   SL 63             1/001-01
     001-0-00-01        71   SL 63             1/001-02
     001-0-00-02        71   SL 63             1/001-03
     001-0-00-03        71   SL 63             1/001-04
     001-0-00-04        71   SL 63             1/001-05
     001-0-00-05        71   SL 63             1/001-06
     001-0-00-06        71   SL 63             1/001-07
     001-0-00-07        71   SL 63             1/001-08
     001-0-00-08        71   SL 63             1/001-09
     001-0-00-09        71   SL 63             1/001-10
     001-0-00-10        71   SL 63             1/001-11
     001-0-00-11        71   SL 63             1/001-12
     001-0-00-12        71   SL 63             1/001-13
     001-0-00-13        71   SL 63             1/001-14
     001-0-00-14        71   SL 63             1/001-15
```

```
001-0-00-15        71   SL 63            1/001-16
001-0-00-16        71   SL 63            1/001-17
001-0-00-17        71   SL 63            1/001-18
001-0-00-18        71   SL 63            1/001-19
001-0-00-19        71   SL 63            1/001-20
001-0-00-20        71   SL 63            1/001-21
001-0-00-21        71   SL 63            1/001-22
001-0-00-22        71   SL 63            1/001-23
001-0-00-23        71    -
001-0-10-00       102   AD 0
001-0-10-01       102   AD 0
001-0-10-02       102   AD 0
001-0-10-03       102   AD 0
001-0-10-04       102   AD 0
001-0-10-05       102   AD 0
001-0-10-06       102   AD 0
001-0-10-07       102   AD 0
001-0-10-08       102   AD 0
001-0-10-09       102   AD 0
001-0-10-10       102   AD 0
001-0-10-11       102   AD 0
001-0-10-12       102   AD 0
001-0-10-13       102   AD 0
001-0-10-14       102   AD 0
001-0-10-15       102   AD 0
001-0-10-16       102   AD 0
001-0-10-17       102   AD 0
001-0-10-18       102   AD 0
001-0-10-19       102   AD 0
001-0-10-20       102   AD 0
001-0-10-21       102   AD 0
```

```
001-0-10-22       102   AD 0
001-0-10-23       102   AD 0
001-0-10-24       102   AD 0
001-0-10-25       102   AD 0
001-0-10-26       102   AD 0
001-0-10-27       102   AD 0
001-0-10-28       102   AD 0
001-0-10-29       102   AD 0
001-0-10-30       102   AD 0
001-0-10-31       102   AD 0
001-0-20-00        71   SL 63             2/001-01
001-0-20-01        71   SL 63             2/001-02
001-0-20-02        71   SL 63             2/001-03
001-0-20-03        71   SL 63             2/001-04
001-0-20-04        71   SL 63             2/001-05
001-0-20-05        71   SL 63             2/001-06
001-0-20-06        71   SL 63             2/001-07
001-0-20-07        71   SL 63             2/001-08
001-0-20-08        71   SL 63             2/001-09
001-0-20-09        71   SL 63             2/001-10
001-0-20-10        71   SL 63             2/001-11
001-0-20-11        71   SL 63             2/001-12
001-0-20-12        71   SL 63             2/001-13
001-0-20-13        71   SL 63             2/001-14
001-0-20-14        71   SL 63             2/001-15
001-0-20-15        71   SL 63             2/001-16
001-0-20-16        71   SL 63             2/001-17
001-0-20-17        71   SL 63             2/001-18
001-0-20-18        71   SL 63             2/001-19
001-0-20-19        71   SL 63             2/001-20
001-0-20-20        71   SL 63             2/001-21
```

```
001-0-20-21        71   SL 63            2/001-22
001-0-20-22        71   SL 63            2/001-23
001-0-20-23        71    -
001-0-30-00        71   SL 63            3/001-01
001-0-30-01        71   SL 63            3/001-02
001-0-30-02        71   SL 63            3/001-03
001-0-30-03        71   SL 63            3/001-04
001-0-30-04        71   SL 63            3/001-05
001-0-30-05        71   SL 63            3/001-06
001-0-30-06        71   SL 63            3/001-07
001-0-30-07        71   SL 63            3/001-08
001-0-30-08        71   SL 63            3/001-09
001-0-30-09        71   SL 63            3/001-10
001-0-30-10        71   SL 63            3/001-11
001-0-30-11        71   SL 63            3/001-12
001-0-30-12        71   SL 63            3/001-13
001-0-30-13        71   SL 63            3/001-14
001-0-30-14        71   SL 63            3/001-15
001-0-30-15        71   SL 63            3/001-16
001-0-30-16        71   SL 63            3/001-17
001-0-30-17        71   SL 63            3/001-18
001-0-30-18        71   SL 63            3/001-19
001-0-30-19        71   SL 63            3/001-20
001-0-30-20        71   SL 63            3/001-21
001-0-30-21        71   SL 63            3/001-22
001-0-30-22        71   SL 63            3/001-23
001-0-30-23        71    -
001-0-40-00        52   TL 45            4/001-01
001-0-40-01        52   TL 45            4/001-02
001-0-40-02        52   TL 45            4/001-03
001-0-40-03        52   TL 45            4/001-04
```

```
001-0-40-04        52   TL 45             4/001-05
001-0-40-05        52   TL 45             4/001-06
001-0-40-06        52   TL 45             4/001-07
001-0-40-07        52   TL 45             4/001-08
001-0-40-08        52   TL 45             4/001-09
001-0-40-09        52   TL 45             4/001-10
001-0-40-10        52   TL 45             4/001-11
001-0-40-11        52   TL 45             4/001-12
001-0-40-12        52   TL 45             4/001-13
001-0-40-13        52   TL 45             4/001-14
001-0-40-14        52   TL 45             4/001-15
001-0-40-15        52   TL 45             4/001-16
001-0-40-16        52   TL 45             4/001-17
001-0-40-17        52   TL 45             4/001-18
001-0-40-18        52   TL 45             4/001-19
001-0-40-19        52   TL 45             4/001-20
001-0-40-20        52   TL 45             4/001-21
001-0-40-21        52   TL 45             4/001-22
001-0-40-22        52   TL 45             4/001-23
001-0-40-23        52   TL 45             4/001-24
001-0-50-00        31   OL 1     5011
001-0-60-00        69    -
001-0-60-01        69    -
001-0-60-02        69    -
001-0-60-03        69    -
001-0-70-00        42    -
001-0-70-01        42    -
001-0-70-02        42    -
001-0-70-03        42    -
001-0-70-04        42    -
001-0-70-05        42    -
```

```
001-0-70-06        42    -
001-0-70-07        42    -
001-0-70-08        42    -
001-0-70-09        42    -
001-0-70-10        42    -
001-0-70-11        42    -
001-0-70-12        42    -
001-0-70-13        42    -
001-0-70-14        42    -
001-0-70-15        42    -
001-0-70-16        42    -
001-0-70-17        42    -
001-0-70-18        42    -
001-0-70-19        42    -
001-0-70-20        42    -
001-0-70-21        42    -
001-0-70-22        42    -
001-0-70-23        42    -
001-0-70-24        42    -
001-0-70-25        42    -
001-0-70-26        42    -
001-0-70-27        42    -
001-0-70-28        42    -
001-0-70-29        42    -
001-0-70-30        42    -
001-0-70-31        42    -
001-1-00-04        52    TL 45           15/001-05
001-1-00-05        52    TL 45           15/001-06
001-1-00-06        52    TL 45           16/001-07
001-1-00-07        52    TL 45           16/001-08
001-1-00-08        52    TL 45           17/001-09
```

```
001-1-00-09        52   TL 45          17/001-10
001-1-00-10        52   TL 45          18/001-11
001-1-00-11        52   TL 45          18/001-12
001-1-00-12        52   TL 45          19/001-13
001-1-00-13        52   TL 45          19/001-14
001-1-10-00       102   AD 0
001-1-10-01       102   AD 0
001-1-10-02       102   AD 0
001-1-10-03       102   AD 0
001-1-10-04       102   AD 0
001-1-10-05       102   AD 0
001-1-10-06       102   AD 0
001-1-10-07       102   AD 0
001-1-10-08       102   AD 0
001-1-10-09       102   AD 0
001-1-10-10       102   AD 0
001-1-10-11       102   AD 0
001-1-10-12       102   AD 0
001-1-10-13       102   AD 0
001-1-10-14       102   AD 0
001-1-10-15       102   AD 0
001-1-10-16       102   AD 0
001-1-10-17       102   AD 0
001-1-10-18       102   AD 0
001-1-10-19       102   AD 0
001-1-10-20       102   AD 0
001-1-10-21       102   AD 0
001-1-10-22       102   AD 0
001-1-10-23       102   AD 0
001-1-10-24       102   AD 0
001-1-10-25       102   AD 0
```

```
001-1-10-26       102   AD 0
001-1-10-27       102   AD 0
001-1-10-28       102   AD 0
001-1-10-29       102   AD 0
001-1-10-30       102   AD 0
001-1-10-31       102   AD 0
001-1-20-00        77   KL 1     5000
001-1-20-01        77   KL 1     5001
001-1-20-02        77   KL 1     5002
001-1-20-03        77   KL 1     5003
001-1-20-04        77   KL 1     5006
001-1-20-05        77   KL 1     5007
001-1-22-00        87   EL 6     5004
001-1-22-01        87   EL 6     5005
001-1-30-00        27    -
001-1-30-01        27   TL 30           11/001-01
001-1-30-02        27   TL 30           11/001-02
001-1-30-03        27   TL 30           11/001-03
001-1-30-04        27   TL 30           11/001-04
001-1-30-05        27   TL 30           11/001-05
001-1-30-06        27   TL 30           11/001-06
001-1-30-07        27   TL 30           11/001-07
001-1-30-08        27   TL 30           11/001-08
001-1-30-09        27   TL 30           11/001-09
001-1-30-10        27   TL 30           11/001-10
001-1-30-11        27   TL 30           11/001-11
001-1-30-12        27   TL 30           11/001-12
001-1-30-13        27   TL 30           11/001-13
001-1-30-14        27   TL 30           11/001-14
001-1-30-15        27   TL 30           11/001-15
001-1-30-17        27   TL 30           11/001-16
```

```
001-1-30-18        27   TL 30           11/001-17
001-1-30-19        27   TL 30           11/001-18
001-1-30-20        27   TL 30           11/001-19
001-1-30-21        27   TL 30           11/001-20
001-1-30-22        27   TL 30           11/001-21
001-1-30-23        27   TL 30           11/001-22
001-1-30-24        27   TL 30           11/001-23
001-1-30-25        27   TL 30           11/001-24
001-1-30-26        27   TL 30           11/001-25
001-1-30-27        27   TL 30           11/001-26
001-1-30-28        27   TL 30           11/001-27
001-1-30-29        27   TL 30           11/001-28
001-1-30-30        27   TL 30           11/001-29
001-1-30-31        27   TL 30           11/001-30
001-1-40-00        57    -
001-1-40-01        57   SL 60           20/001-01
001-1-40-02        57   SL 60           20/001-02
001-1-40-03        57   SL 60           20/001-03
001-1-40-04        57   SL 60           20/001-04
001-1-40-05        57   SL 60           20/001-05
001-1-40-06        57   SL 60           20/001-06
001-1-40-07        57   SL 60           20/001-07
001-1-40-08        57   SL 60           20/001-08
001-1-40-09        57   SL 60           20/001-09
001-1-40-10        57   SL 60           20/001-10
001-1-40-11        57   SL 60           20/001-11
001-1-40-12        57   SL 60           20/001-12
001-1-40-13        57   SL 60           20/001-13
001-1-40-14        57   SL 60           20/001-14
001-1-40-15        57   SL 60           20/001-15
001-1-40-17        57   SL 60           20/001-17
```

```
001-1-40-18        57   SL 60           20/001-18
001-1-40-19        57   SL 60           20/001-19
001-1-40-20        57   SL 60           20/001-20
001-1-40-21        57   SL 60           20/001-21
001-1-40-22        57   SL 60           20/001-22
001-1-40-23        57   SL 60           20/001-23
001-1-40-24        57   SL 60           20/001-24
001-1-40-25        57   SL 60           20/001-25
001-1-40-26        57   SL 60           20/001-26
001-1-40-27        57   SL 60           20/001-27
001-1-40-28        57   SL 60           20/001-28
001-1-40-29        57   SL 60           20/001-29
001-1-40-30        57   SL 60           20/001-30
001-1-40-31        57   SL 60           20/001-31
001-1-50-00        57    -
001-1-50-01        57   SL 60           21/001-01
001-1-50-02        57   SL 60           21/001-02
001-1-50-03        57   SL 60           21/001-03
001-1-50-04        57   SL 60           21/001-04
001-1-50-05        57   SL 60           21/001-05
001-1-50-06        57   SL 60           21/001-06
001-1-50-07        57   SL 60           21/001-07
001-1-50-08        57   SL 60           21/001-08
001-1-50-09        57   SL 60           21/001-09
001-1-50-10        57   SL 60           21/001-10
001-1-50-11        57   SL 60           21/001-11
001-1-50-12        57   SL 60           21/001-12
001-1-50-13        57   SL 60           21/001-13
001-1-50-14        57   SL 60           21/001-14
001-1-50-15        57   SL 60           21/001-15
001-1-50-17        57   SL 60           21/001-16
```

```
      001-1-50-18        57   SL 60           21/001-17
      001-1-50-19        57   SL 60           21/001-18
      001-1-50-20        57   SL 60           21/001-19
      001-1-50-21        57   SL 60           21/001-20
      001-1-50-22        57   SL 60           21/001-21
      001-1-50-23        57   SL 60           21/001-22
      001-1-50-24        57   SL 60           21/001-23
      001-1-50-25        57   SL 60           21/001-24
      001-1-50-26        57   SL 60           21/001-25
      001-1-50-27        57   SL 60           21/001-26
      001-1-50-28        57   SL 60           21/001-27
      001-1-50-29        57   SL 60           21/001-28
      001-1-50-30        57   SL 60           21/001-29
      001-1-50-31        57   SL 60           21/001-30
      001-1-60-00         7   TL 1             7/001-01
      001-1-60-01         7   TL 1             7/001-02
      001-1-60-02         7   TL 1             7/001-03
      001-1-60-03         7   TL 1             7/001-04
      001-1-62-00         8   TL 12            6/001-01
      001-1-62-01         8   TL 12            6/001-02
      001-1-62-02         8   TL 12            6/001-03
      001-1-62-03         8   TL 12            6/001-04
      001-1-63-00        26   TL 22           12/001-01
      001-1-63-01        26   TL 22           13/001-02
      001-1-63-02        26   TL 22            8/001-03

END

<

<
```

Configuring the Nortel Meridian 1 Option 11C (Release 25) PBX

```
System Configuration (NOTE: T1 CAS used in Slot 3)


>ld 22PT2000
MARP NOT ACTIVATED



REQ  prtTYPE 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
   TRK  003 23  ESF B8S  FDL  -    00
   PRI  004 23  ESF B8S  FDL  -    00
        005 23  ESF B8S  FDL  -    00
        006 23  ESF B8S  FDL  -    00
  MISP


REQ  ****
>


ROUTE DATA BLOCK CONFIGURATION:


FOR E&M IMMEDIATE:
```

```
>ld 21PT1000


REQ: prtTYPE: rdbCUST 0ROUT 103
TYPE RDB
CUST 00
DMOD
ROUT 103
DES  T1_CAS
TKTP TIE
NPID_TBL_NUM   0
ESN  NO
CNVT NO
SAT  NO
RCLS EXT
DTRK YES
BRIP NO
DGTP DTI
ISDN NO
DSEL VCE
PTYP DTT
AUTO NO
DNIS NO
ICOG IAO
SRCH RRB
TRMB YES
STEP
ACOD 703
TARG 01
CLEN 1
BILN NO
```

```
OABS
INST
ANTK
SIGO STD
STYP SDAT
TIMR ICF 512
     OGF 512
     EOD 13952
     DSI 34944
     NRD 10112
     DDL 70
     ODT 4096
     RGV 640
     GRD 896
     SFB 3
     TFD 0
SST  5 0
NEDC ETH
FEDC ETH
CPDC NO
DLTN NO
HOLD 02 02 40
SEIZ 02 02
SVFL 02 02
DRNG NO
CDR  NO
MUS  NO
MANO NO
EQAR NO
OHQ  NO
OHQT 00
```

```
CBQ  NO
AUTH NO
TTBL 0
OHTD NO
PLEV 2
ALRM NO
ART  0
SGRP 0
AACR NO

E&M Wink Configuration:

REQ: prtTYPE: rdbCUST 0ROUT 113
TYPE RDB
CUST 00
DMOD
ROUT 113
DES  T1_WNK
TKTP TIE
NPID_TBL_NUM   0
ESN  NO
CNVT NO
SAT  NO
RCLS EXT
DTRK YES
BRIP NO
DGTP DTI
ISDN NO
DSEL VCE
PTYP DTT
AUTO NO
```

```
DNIS NO
ICOG IAO
SRCH RRB
TRMB YES
STEP
ACOD 713
TARG 01
CLEN 1
BILN NO
OABS
INST
ANTK
SIGO STD
STYP SDAT
TIMR ICF 512
     OGF 512
     EOD 13952
     DSI 34944
     NRD 10112
     DDL 70
     ODT 4096
     RGV 640
     GRD 896
     SFB 3
     TFD 0
SST  5 0
NEDC ETH
FEDC ETH
CPDC NO
DLTN NO
HOLD 02 02 40
```

```
SEIZ 02 02
SVFL 02 02
DRNG NO
CDR  NO
MUS  NO
MANO NO
EQAR NO
OHQ  NO
OHQT 00
CBQ  NO
AUTH NO
TTBL 0
OHTD NO
PLEV 2
ALRM NO
ART  0
SGRP 0
AACR NO

Loop Start Configuration:

REQ: prtTYPE: rdbCUST 0ROUT 123
TYPE RDB
CUST 00
DMOD
ROUT 123
DES  T1_LOOP
TKTP FEX
NPID_TBL_NUM   0
SAT  NO
RCLS EXT
```

```
DTRK YES
BRIP NO
DGTP DTI
ISDN NO
PTYP DCO
AUTO NO
DNIS NO
ICOG IAO
SRCH RRB
TRMB YES
STEP
ACOD 723
CPP  NO
TARG 01
CLEN 1
BILN NO
OABS
TIMR ICF 512
     OGF 512
     EOD 13952
     DSI 34944
     NRD 10112
     DDL 70
     ODT 4096
     RGV 640
     FLH 510
     GRD 896
     SFB 3
     TFD 0
     LEXT 100
SST  3 0
```

```
NEDC ETH

FEDC ETH

CPDC NO

SPCT IMM

HOLD 02 02 40

SEIZ 02 02

RGFL 02 02

RVSD 08 31

ILLR 02 02

DRNG NO

CDR  NO

MUS  NO

MANO NO

EQAR NO

OHQ  NO

OHQT 00

TTBL 0

OHTD NO

PLEV 2

ALRM NO

ART  0

SGRP 0

AACR NO

Ground Start Configuration:

REQ: prtTYPE: rdbCUST 0ROUT 124

TYPE RDB

CUST 00

DMOD

ROUT 124

DES  T1_GRD
```

```
TKTP FEX
NPID_TBL_NUM   0
SAT  NO
RCLS EXT
DTRK YES
BRIP NO
DGTP DTI
ISDN NO
PTYP DCO
AUTO NO
DNIS NO
ICOG IAO
SRCH RRB
TRMB YES
STEP
ACOD 733
CPP  NO
TARG 01
CLEN 1
BILN NO
OABS
TIMR ICF 512
     OGF 512
     EOD 13952
     DSI 34944
     NRD 10112
     DDL 70
     ODT 4096
     RGV 640
     FLH 510
     GRD 896
```

```
     SFB 3
     TFD 0
     LEXT 100
SST  3 0
NEDC ETH
FEDC ETH
CPDC NO
SPCT IMM
HOLD 02 02 40
SEIZ 02 02
RGFL 02 02
RVSD 08 31
ILLR 02 02
DRNG NO
CDR  NO
MUS  NO
MANO NO
EQAR NO
OHQ  NO
OHQT 00
TTBL 0
OHTD NO
PLEV 2
ALRM NO
ART  0
SGRP 0
AACR NO

REQ: ****
>
```

Trunk Configuration

FOR E&M WINK:

```
>ld 20
PT0000
MARP NOT ACTIVATED

REQ: prt
TYPE: tieTN   3 5DATE PAGE
TN   003 05
TYPE TIE
CUST 0
TRK  DTI
PDCA 1
PCML MU
NCOS 0
RTMB 113 1
TGAR 1
SIGL EM4
STRI/STRO WNK WNK
SUPN YES
AST  NO
IAPG 0
CLS  UNR DTN CND ECD WTA LPR APN THFD HKD
     P10 VNL
TKID
DATE 15 MAY 2001
```

```
FOR E&M IMMEDIATE:

REQ: prtTYPE: tieTN   3 9DATE PAGE

TN   003 09

TYPE TIE

CUST 0

TRK  DTI

PDCA 1

PCML MU

NCOS 0

RTMB 103 1

TGAR 1

SIGL EM4 STRI/STRO IMM IMM

SUPN YES

AST  NO

IAPG 0

CLS  UNR DTN CND ECD WTA LPR APN THFD HKD

     P10 VNL MID

TKID

DATE 15 MAY 2001



NACT

FOR LOOP START:


REQ: prtTYPE: fexTN   3 11DATE PAGE DES
```

```
TN   003 11

TYPE FEX

CDEN SD

CUST 0

TRK  DTI

SFEX NO

PDCA 1

PCML MU

NCOS 0

RTMB 123 1

NITE

SIGL LOP

SUPN YES

AST  NO

IAPG 0

CLS  UNR DTN CND WTA LPR APN THFD

     P10 NTC

TKID

DATE 15 MAY 2001



NACT

FOR GROUND START:


REQ: prtTYPE: fexTN   3 13DATE PAGE DES

TN   003 13

TYPE FEX
```

```
CDEN SD

CUST 0

TRK  DTI

SFEX NO

PDCA 1

PCML MU

NCOS 0

RTMB 124 1

NITE

SIGL GRD

SUPN YES

AST  NO

IAPG 0

CLS  UNR DTN CND WTA LPR APN THFD

     P10 NTC

TKID

DATE 15 MAY 2001



NACT ****

>


DIGITAL STATION PHONE CONFIGURATION:


OVL000

>ld 11SL1000

MARP NOT ACTIVATED
```

```
MEM AVAIL: (U/P): 1290871    USED U P: 70305 31463    TOT: 1392639

DISK RECS AVAIL: 484

TNS     AVAIL:   113    USED:    87    TOT:   200

ACD AGENTS AVAIL:   300    USED:     0    TOT:   300

AST     AVAIL:   100    USED:     0    TOT:   100

DATA PORTS AVAIL:  2500    USED:     0    TOT:  2500

DIGITAL TELEPHONES AVAIL:  2498    USED:     2    TOT:  2500

INTERNET TELEPHONES AVAIL:     6    USED:     0    TOT:     6

REQ: prtTYPE: 2616


MARP NOT ACTIVATED


TN   001 0 0 00DATE 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

XLST

CLS  CTD FBD WTA LPR MTD FND HTD ADD HFD

     MWD LMPN RMMD SMWD AAD IMD XHD IRD NID OLD VCE DRG1

     POD DSX VMD CMSD CCSD SWD LND CNDA

     CFTD SFD MRD DDV CNID CDCA MSID DAPA BFED RCBD

     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 MCBN

CPND_LANG ENG

HUNT

PLEV 02

AST

IAPG 0

AACS NO

ITNA NO

DGRP

MLWU_LANG 0

DNDR 0

KEY  00 SCR 3501 0     MARP

        CPND

          NAME BIG BIRD

          XPLN 13

          DISPLAY_FMT FIRST,LAST
```

```
      01 SCR 3511 0     MARP
         CPND
           NAME SMALL BIRD
           XPLN 13
           DISPLAY_FMT FIRST,LAST
      02
      03 CFW 12  3502
      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 12 MAR 2001



NACT ****
>
```

Nortel PBX Software Load:

```
>ld 22

REQ  iss

VERSION 2111

RELEASE 25

ISSUE 15 +

PSWV VERSION: PSWV 33
```

Nortel Meridian 1 Option 11C (Rel. 25) PBX Configuration

```
REQ  prtTYPE pkgOPTF   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
CDP     59
PQUE    60
FCBQ    61
OHQ     62
NAUT    63
SNR     64
NXFR    67
HOT     70
DHLD    71
LSEL    72
SS5     73
DRNG    74
PBXI    75
DLDN    76
        CSL     77
OOD     79
SCI     80
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
IAP3P  153
PRI2   154
ACNT   155
THF    157
FGD    158
FNP    160
ISDN INTL SUP  161
SAR    162
LAPW   164
GPRI   167
ARIE   170
CPGS   172
ECCS   173
AAA    174
NMS    175
EOVF   178
HVS    179
DKS    180
SACP   181
OVLP   184
```

```
EDRG   185
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
M911 ENH   249
DPNA   250
SCDR   251
ARFW   253
PHTN   254
ADMINSET  256
ATX    258
QSIG   263
NI-2   291
MAT   296
MQA   297
CPP    301
QSIGGF   305
CPRKNET   306
PAGENET   307
CPCI   310
NGCC    311
TATO   312
OPEN ALARM  315
QSIG-SS   316
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
STS_MSG   380
CDIR   381
VIRTUAL_OFFICE   382

REQ  ****
>
OVL000

Loop 3 Status:

>ld 60DTI000

.stat 3
DTI TRK  LOOP 3 - ENBL
FFMT/LCMT/YALMT:  ESF/B8Z/FDL
SERVICE RESTORE: YES
YEL ALM PROCESS: YES
ALARM STATUS : NO ALARM
CH 01 - UNEQ                        CH 02 - UNEQ
CH 03 - UNEQ                        CH 04 - UNEQ
CH 05 - IDLE TIE   VCE              CH 06 - IDLE TIE   VCE
CH 07 - UNEQ                        CH 08 - UNEQ
CH 09 - IDLE TIE   VCE              CH 10 - IDLE TIE   VCE
CH 11 - IDLE FEX   VOD              CH 12 - IDLE FEX   VOD
CH 13 - IDLE FEX   VOD              CH 14 - IDLE FEX   VOD
```

```
CH 15 - UNEQ                        CH 16 - UNEQ

CH 17 - UNEQ                        CH 18 - UNEQ

CH 19 - UNEQ                        CH 20 - UNEQ

CH 21 - UNEQ                        CH 22 - UNEQ

CH 23 - UNEQ                        CH 24 - UNEQ

.****

>

OVL000

>ld 22PT2000

MARP NOT ACTIVATED



REQ  ****
```

Configuring Cisco CallManager

This is Body

Configuring the Cisco Router

This feature was tested on the Cisco 3640 and the Cisco 2621.

Configuring the Cisco 3640

```
3640_B# show running config

Building configuration...


Current configuration : 2079 bytes

!

version 12.2

service timestamps debug datetime msec

service timestamps log datetime msec

no service password-encryption

no service dhcp

!
```

```
hostname 3640_B
!
boot system flash c3640-js-mz.122-6
!
voice-card 3
!
ip subnet-zero
!
!
no ip domain-lookup
ip host danube 171.69.17.14
ip host dirt 171.69.1.129
ip host whiz 171.69.1.162
!
isdn switch-type primary-net5
call rsvp-sync!
!
!
!
!
!
controller T1 3/0
 framing esf
 linecode b8zs
 ds0-group 1 timeslots 5-6 type e&m-wink-start
 ds0-group 2 timeslots 7-8 type e&m-delay-dial
 ds0-group 3 timeslots 9-10 type e&m-immediate-start
 ds0-group 4 timeslots 11-12 type fxs-loop-start
 ds0-group 5 timeslots 13-14 type fxs-ground-start
```

```
!
controller T1 3/1
 shutdown
 framing sf
 linecode ami
!
!
!
interface Tunnel1
 no ip address
 no ip mroute-cache
!
interface Ethernet0/0
ip address 1.1.1.2 255.255.255.0
 no ip mroute-cache
 half-duplex
 no cdp enable
!
interface Ethernet0/1
 ip address 10.1.1.109 255.255.255.0
 no ip mroute-cache
 half-duplex
!
ip classless
no ip http server
ip pim bidir-enable
!
dialer-list 1 protocol ip permit
!
snmp-server packetsize 4096
tftp-server nvram
```

```
!
voice-port 2/0/0
!
voice-port 2/0/1
!
voice-port 2/1/0
 timing wait-wink 1500
 type 5
!
voice-port 2/1/1
 timing dialout-delay 70
 timing wink-duration 300
 type 5
 signal immediate
!
voice-port 3/0:1
!
voice-port 3/0:3
!
voice-port 3/0:2
!
voice-port 3/0:4
 output attenuation 0
!
voice-port 3/0:5
 output attenuation 0
!
dial-peer cor custom
!
!
!
```

```
dial-peer voice 10 pots
 destination-pattern 9000
 port 2/0/0
!
dial-peer voice 1 pots
 destination-pattern 15...
 port 3/0:1
 prefix 5
!
dial-peer voice 2 pots
 destination-pattern 25...
 port 3/0:2
prefix 5
!
dial-peer voice 3 pots
 destination-pattern 35...
 port 3/0:3
 prefix 5
!
dial-peer voice 4 pots
 destination-pattern 45...
 port 3/0:4
 prefix 5
!
dial-peer voice 5 pots
 destination-pattern 55...
 port 3/0:5
 prefix 5
!
dial-peer voice 11 voip
 destination-pattern [12345]3...
```

```
 session target ipv4:1.1.1.1
!
!
line con 0
 exec-timeout 0 0
line aux 0
line vty 0 4
 no login
!
end
```

Configuring the Cisco 2621

```
2621_A# show running config
Building configuration...

Current configuration : 2348 bytes
!
version 12.2
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname 2621_A
!
no logging buffered
!
memory-size iomem 15
voice-card 1
!
ip subnet-zero
!
```

```
!
no ip domain-lookup
!
isdn switch-type primary-ni
call rsvp-sync
!
!
!
!
!
!
controller T1 1/0
 framing esf
 clock source internal
 linecode b8zs
 ds0-group 1 timeslots 5-6 type e&m-wink-start
 ds0-group 2 timeslots 7-8 type e&m-delay-dial
ds0-group 3 timeslots 9-10 type e&m-immediate-start
 ds0-group 4 timeslots 11-12 type fxs-loop-start
 ds0-group 5 timeslots 13-14 type fxs-ground-start
!
controller T1 1/1
 shutdown
 framing esf
 linecode b8zs
 ds0-group 1 timeslots 5-6 type e&m-wink-start
 ds0-group 2 timeslots 7-8 type e&m-delay-dial
 ds0-group 3 timeslots 9-10 type e&m-immediate-start
 ds0-group 4 timeslots 11-12 type fxs-loop-start
 ds0-group 5 timeslots 13-14 type fxs-ground-start
!
!
```

```
!
interface FastEthernet0/0
 ip address 1.1.1.1 255.255.255.0
 no ip mroute-cache
 load-interval 30
 no keepalive
 speed auto
 half-duplex
!
interface Serial0/0
 no ip address
 no ip mroute-cache
 shutdown
!
interface FastEthernet0/1
 ip address 10.1.1.119 255.255.255.0
 no ip mroute-cache
 duplex auto
 speed auto
!
interface Serial0/1
 no ip address
 no ip mroute-cache
 shutdown
!
ip classless
ip http server
ip pim bidir-enable
!
!
snmp-server packetsize 4096
```

```
snmp-server manager
tftp-server nvram
!
voice-port 1/0:1
!
voice-port 1/0:2
!
voice-port 1/0:3
!
voice-port 1/0:4
 output attenuation 0
!
voice-port 1/0:5
 output attenuation 0
!
voice-port 1/1:1
!
voice-port 1/1:2
!
voice-port 1/1:3
!
voice-port 1/1:4
 output attenuation 0
!
voice-port 1/1:5
 output attenuation 0
!
dial-peer cor custom
!
!
!
```

```
dial-peer voice 1 pots
 destination-pattern 13...
 port 1/0:1
 prefix 3
!
dial-peer voice 2 pots
destination-pattern 23...
 port 1/0:2
 prefix 3
!
dial-peer voice 3 pots
 destination-pattern 33...
 port 1/0:3
 prefix 3
!
dial-peer voice 4 pots
 destination-pattern 43...
 port 1/0:4
 prefix 3
!
dial-peer voice 5 pots
 destination-pattern 53...
 port 1/0:5
 prefix 3
!
dial-peer voice 11 voip
 destination-pattern [12345]5...
 session target ipv4:1.1.1.2
!
!
line con 0
```

```
 exec-timeout 0 0
line aux 0
 exec-timeout 0 0
line vty 0 4
 exec-timeout 0 0
 login
line vty 5 15
 exec-timeout 0 0
 login
!
scheduler allocate 3996 1000
end
```