Nortel SL100 PBX using T1 DMS100 to Cisco Unified CallManager 4.1

January 28, 2008

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Introduction

This is an application note for connectivity of Nortel SL100 PBX with Cisco Unified CallManager Release 4.1 using Cisco 3725 MGCP gateway with T1 PRI DMS-100 ISDN switch-type.

The network topology diagram (Figure 1) shows the test setup for end-to-end interoperability with the Cisco Unified CallManager connected to the PBX via Cisco 3725 MGCP gateway with T1 PRI DMS-100 link.

This Application Note uses the 3725-T1 voice gateway, however other Cisco voice gateways can also be option since Cisco Unified CallManager PRI DMS-100 switch-type implementation does not depend on the type of voice gateway used.
Network Topology

Figure 1. Basic Call Setup

Basic Call Setup End-to-End Configuration

PBX1: Nortel SL100

Phone A
x8267

PBX #1

T1 PRI DMS100

Cisco 3725 Multiservice Router

Cisco Catalyst 3500 switch

Phone C
x3005
Cisco 7960 IP phones

Phone D
x3006

PSTN T1 PRI DMS-100

Dial Plan

934 - xxxx

6-720-xxxx (on-net)

9.@ (PSTN calls)

Phone B
x0338

PSTN

Phone F
1650-555-6325

Dial

1-650-432-xxxx

Limitations

System Components

Hardware Requirements

Cisco Hardware:

- Cisco Catalyst 3500 switch

- Cisco 3725 voice gateway with NM-HDV-2MFT-T1 network module
• Cisco Unified CallManager 4.1

Nortel DMS-100 Hardware:
• SL100 switch Hardware Version 6x50ab

Software Requirements

Nortel SL-100 Software Version ISD00023
Cisco Unified CallManager 4.1

Features

This section lists new and changed features and features that are not supported.

Features Supported

- CLIP-Calling Line (Number) Identification Presentation
- CLIR-Calling Line (Number) Identification Restriction
- CNIP-Calling Name Identification Presentation
- CNIR-Calling Name Identification Restriction
- COLP-Connected Line (Number) Identification Presentation
- COLR-Connected Line (Number) Identification Restriction
- CONP-Connected Name Identification Presentation
- CONR-Connected Name Identification Restriction
- Sending Alerting Name
- CT-Call Transfer (by join)
- CFU-Call Forwarding Unconditional (by join)
- CFB-Call Forwarding Busy (by join)
- CFNR-Call Forwarding No Reply (by join)

Features Not Supported

None
## Configuration

### Configuring the Nortel SL100 PBX

PRI Programming to Cisco Call Manager:

**PROGRAMMING**

<table>
<thead>
<tr>
<th>Table</th>
<th>Key: Sub</th>
<th>Tuple</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLLI</td>
<td>CALLMGR</td>
<td>171 23 T1_TO_CISCO_CALL_MGR</td>
</tr>
<tr>
<td>TRKGRT</td>
<td>CALLMGR</td>
<td>IBNT2 0 PRAC NCRT VISA_OCW 0 CCWCTH 240 N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ANSDISC 0 Y N N N N Y 0 0 N 0 0 0 0 N N N N N N N N N N N N NATL (LTID PRITRK 24) $</td>
</tr>
<tr>
<td>CLLIMTCE</td>
<td>CALLMGR</td>
<td>CALLMG 5 10 15 NSS 0 0 N N (23)</td>
</tr>
<tr>
<td>IBNRTE</td>
<td>235</td>
<td>(ISA N N N CALLMGR N PVT 1 PVT 235) $ $</td>
</tr>
<tr>
<td>IBNRTE3</td>
<td>235</td>
<td>(ISA N N N CALLMGR N PVT 1 PVT 2) $ $</td>
</tr>
<tr>
<td>TRKSGRP</td>
<td>CALLMGR</td>
<td>0 DS1SIG ISDN B 12 87Q931 2 N STAND NETWORK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PT_PT USER N UNEQ 7 Y CPND LTC 2 4 24 64K HDLC $ $</td>
</tr>
<tr>
<td>TRKMEM</td>
<td>CALLMGR</td>
<td>1 0 LTC 2 4 1</td>
</tr>
<tr>
<td>TRKMEM</td>
<td>CALLMGR</td>
<td>2 0 LTC 2 4 2</td>
</tr>
<tr>
<td>TRKMEM</td>
<td>CALLMGR</td>
<td>3 0 LTC 2 4 3</td>
</tr>
<tr>
<td>TRKMEM</td>
<td>CALLMGR</td>
<td>4 0 LTC 2 4 4</td>
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<td>CALLMGR</td>
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<td>TRKMEM</td>
<td>CALLMGR</td>
<td>22 0 LTC 2 4 22</td>
</tr>
<tr>
<td>TRKMEM</td>
<td>CALLMGR</td>
<td>23 0 LTC 2 4 23</td>
</tr>
<tr>
<td>TRKNAME</td>
<td>CALLMGR</td>
<td>171 CALLMGR</td>
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Total of 31 occurrences of CALLMGR

**TABLE: LTDEF**

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<tr>
<th>Table</th>
<th>Key: Sub</th>
<th>Tuple</th>
</tr>
</thead>
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<td>PRITRK</td>
<td>24</td>
<td>B</td>
</tr>
<tr>
<td>PRA</td>
<td>24 NTNAPRI V1 SL1PROFL (NOPMD ) $</td>
<td></td>
</tr>
</tbody>
</table>

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Dial Plan for Call Manager to PBX and vice versa:

1. **Call Manager to local PSTN via the SL100 PBX:**

   ```
   >traver tr callmgr 95040011 b
   TABLE TRKGRP
   CALLMGR IBNT2 0 PRAC NCRT VISA_OCW 0 CCWCTH 240 N ANSDISC 0 Y N N N N N Y 0 0 N
   0 0 0 0 N N N N N N N N N N N N N NATL (LTID PRTRK 24) $
   ```

   ```
   TABLE LTCALLS
   PRTRK 24 PUB XLAIBN 18 CCSA_SP18 NLCA_NIL VISA_OCW 0 240 $
   ```

   ```
   TABLE CUSTSTN
   TUPLE NOT FOUND
   TABLE OFCVAR
   AIN OFFICE TRIGGER NIL
   TABLE LINEATTR
   18 IBN NONE NT 0 0 NILSFC 0 NIL NIL 00 CCSA_SP18 NLCA_NIL $
   LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
   TABLE XLAPLAN
   CCSA_SP18 CCSA 650 SP18 AMRX N $ $
   ```

   ```
   TABLE RATEAREA
   NLCA_NIL NLCA NIL NILLATA $
   ```

   ```
   TABLE STDPRCT
   SP18 ( 1) ( 0) 1
   . SUBTABLE STDPR
   WARNING: CHANGES IN TABLE STDPR MAY ALTER OFFICE
   BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO
   DOCUMENTATION.
   . 95 99 T DD 0 IBNRT4 2 7 12 NONE
   ```
DIGIT TRANSLATION ROUTES

1 SBC_4 N CDN E164 IN 16505040011 NIL_NSF BC SPEECH
Outpulsing on this route is modified by the following options:
(DNIS)

TREATMENT ROUTES. TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++

2. Call Manager to long distance PSTN via the SL100 PBX:

>traver tr callmgr 914088346132 b
TABLE TRKGRP
CALLMGR IBNT2 0 PRAC NCRT VISA_OCW 0 CCWCTH 240 N ANSDISC 0 Y N N N N Y 0 0 N 0 0 0 0 N N N N N N N N N N N N N N N N N N N NATL (LTID PRITRK 24) $

TABLE LTCALLS
PRITRK 24 PUB XLAIBN 18 CCSA_SP18 NLCA_NIL VISA_OCW 0 240 $
TABLE CUSTSTN
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
TABLE LINEATTR
18 IBN NONE NT 0 0 NILSFC 0 NIL NIL 00 CCSA_SP18 NLCA_NIL $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE
TABLE XLAPLAN
CCSA_SP18 CCSA 650 SP18 AMRX N $ $
TABLE RATEAREA
NLCA_NIL NLCA_NIL NILLATA $
TABLE STDPRTCT

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SP18 (1) (0) 1

. SUBTABLE STDPR
WARNING: CHANGES IN TABLE STDPR MAY ALTER OFFICE BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.

. 91 91 T DD 0 IBNRT4 7 7 12 NONE

. . TABLE IBNRT4
. . . 7 ISA N N N SBC_4 N PUB NONE 0 N 917

. . . TABLE TRKGRP
. . . . SBC_4 IBNT2 0 PRAC NCRT VISA_OCW 0 MIDL 201 N ANSDISC 0 Y N N N N N Y 0 201 N 0

. . . . 0 0 1 N N N N N N N N NATL (LTID PRITRK 11) $

. . . . TABLE LTCALLS
. . . . . PRITRK 11 PUB XLAIBN 2 NSCR_TRK NLCA_NIL VISA_OCW 0 201 $

. . . . . TABLE DIGMAN
. . . . . . 917 (REM 1)
. . . . . . . EXIT TABLE DIGMAN
. . . . . . . EXIT TABLE IBNRT4

. . . . . . SUBTABLE AMAPRT
. . . . . . . KEY NOT FOUND

. . . . . . . DEFAULT VALUE IS: NONE OVRNONE N

LNP0100 SOC Option is IDLE.
AIN Info Collected TDP: no subscribed trigger.
AIN Info Analyzed TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 SBC_4                 N CDN E164 IN 14088346132 NIL_NSF BC SPEECH

Outpulsing on this route is modified by the following options:
(DNIS)

TREATMENT ROUTES. TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++

3. Call Manager to extension off the SL100 PBX (on-net call):

>traver tr callmgr 67208999 b

TABLE TRKGRP
CALLMGR IBNT2 0 PRAC NCRT VISA_OCW 0 CCWCTH 240 N ANSDISC 0 Y N N N N Y 0 0 N
0 0 0 0 N N N N N N NATL (LTID PRITRK 24) $

TABLE LTCALLS
PRITRK 24 PUB XLAIBN 18 CCSA_SP18 NLCA_NIL VISA_OCW 0 240 $

TABLE CUSTSTN
TUPLE NOT FOUND

TABLE OFCVAR
AIN OFFICE TRIGGRP NIL

TABLE LINEATTR
18 IBN NONE NT 0 0 NILSFC 0 NIL NIL 00 CCSA_SP18 NLCA_NIL $
LCABILL OFF - BILLING DONE ON BASIS OF CALLTYPE

TABLE XLPALN
CCSA_SP18 CCSA 650 SP18 AMRX N $ $

TABLE RATEAREA
NLCA NIL NLCA NIL NILLATA $

TABLE STDPRTCT
SP18 ( 1 ) ( 0 ) 1

.  SUBTABLE STDPRT
WARNING: CHANGES IN TABLE STDPRT MAY ALTER OFFICE BILLING. CALL TYPE DEFAULT IS NP. PLEASE REFER TO DOCUMENTATION.
.  6 6 T NP 0 IBNRTE 34 8 8 NONE
.  TABLE IBNRTE
.  .  34 RX VISA_OCW 0 11 2 $
.  .  .  TABLE DIGMAN
.  .  2
.  .  .  EXIT TABLE DIGMAN
.  .  EXIT TABLE IBNRTE
.  .  SUBTABLE AMAPRT
.  KEY NOT FOUND
.  DEFAULT VALUE IS: NONE OVRNONE N

LNP0100 SOC Option is IDLE.
AIN Info Collected TDP: no subscribed trigger.
AIN Info Analyzed TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 LINE   6504328999   ST

TREATMENT ROUTES. TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++

4.  SL100 PBX call to Cisco Call Manager extension:

>traver l 4328999 3004 b

TABLE KSETLINE
MTRO 04 0 11 14 1 MDN SCA 0 Y Y 4328999 VISA_OCW 0 17 650 (3WC) (LNR) (KSH) (AUTODISP) (CFX) (MWT) $ IVD

TABLE DNATTRS
650 432 8999
(PUBLIC ( NAME NEXTIRAONE) (MEMDISP ) (NONUNIQUE ) $)
(PRIVATE ( NAME NEXTIRAONE) (MEMDISP ) (NONUNIQUE ) $)$ $ $

TABLE DNGRPS
650 432 8999 8999
(PUBLIC ( ADDRESS 650 432 NNNN ) $)
(PRIVATE ( ADDRESS DDD 720 NNNN ) $)$

TABLE KSETFEAT
TUPLE NOT FOUND

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Page 8 of 14
TABLE CUSTSTN
TUPLE NOT FOUND
TABLE OFCVAR
AIN_OFFICE_TRIGGRP NIL
AIN Orig Attempt TDP: no subscribed trigger.
TABLE NCOS
VISA_OCW 17 0 0 CONF RM (XLAS PT17 NXLA NDGT) (CRL 1 BLOCKED)$
TABLE CUSTHEAD:
CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL
VISA_OCW CPT1 CT1 FT1 0 DGT1
TABLE DIGCOL
DGT1 3 COL S 3
TABLE IBNXLA:
XLANAME PT17
TUPLE NOT FOUND
Default is to go to next XLA name.
TABLE IBNXLA:
XLANAME CPT1
TUPLE NOT FOUND
Default is to go to next XLA name.
TABLE IBNXLA:
XLANAME CT1
CT1 30 EXTN N Y 650 432 4 $ $
TABLE TOFCNAME
650 432 $
TABLE DNINV
650 432 3004 T IBNRTE 235
TABLE DNFEAT
TUPLE NOT FOUND
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
650 432 3004 3004
(PUBLIC (ADDRESS 650 432 NNNN) $
(PRIVATE (ADDRESS DDD 720 NNNN) $
. TABLE IBNRTE
. 235 ISA N N N CALLMGR N PVT 1 PVT 235
. . TABLE TRKGRP
. . CALLMGR IBNT2 0 FRAC NCRT VISA OCW 0 CCWCTH 240 N ANSDISC 0 Y N N N N Y 0 0 N
. . 0 0 0 0 N N N N N N N NAVL (LTID PRTRK 24) $
. . TABLE LTRCALLS
. . PRTRK 24 PVT XLAIBN 18 CCSA_SP18 NLCA NIL VISA_OCW 0 240 $
. . TABLE DIGMAN
. . 235 (INC 934)
. . EXIT TABLE DIGMAN
. EXIT TABLE IBNRTE
AIN Info Collected TDP: no subscribed trigger.
AIN Info Analyzed TDP: no subscribed trigger.
AIN Term Attempt TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 CALLMGR N CDN PVT L 9343004 PRVT 1 BC SPEECH
Outpulsing on this route is modified by the following options:
(DNIS)
5. **PSTN call to SL100 PBX to Cisco Call Manager extension:**

```bash
>traver 1 4328999 69343004 b
```

---

**TABLE KSETLINE**

```
MTRO 04 0 11 14 1 MDN SCA 0 Y Y 4328999 VISA_OCW 0 17 650 (3WC) (LNR) (KSH) (AUTODISP) (CFX) (MWT) $ IVD
```

**TABLE DNATTRS**

```
650 432 8999
   (PUBLIC ( NAME NEXTIRAONE) (MEMDISP) (NONUNIQUE) $)
   (PRIVATE ( NAME NEXTIRAONE) (MEMDISP) (NONUNIQUE) $) $
```

**TABLE DNGRPS**

```
650 432 8999 8999
   (PUBLIC ( ADDRESS 650 432 NNNN) $)
   (PRIVATE ( ADDRESS DDD 720 NNNN) $)
```

**TABLE KSETFEAT**

```
TUPLE NOT FOUND
```

**TABLE CUSTSTN**

```
TUPLE NOT FOUND
```

**TABLE OFCVAR**

```
AIN_OFFICE_TRIGGRP NIL
```

**AIN Orig Attempt TDP: no subscribed trigger.**

**TABLE NCOS**

```
VISA_OCW 17 0 0 CONFIRM ( XLAS PT17 NXLA NDGT) ( CRL 1 BLOCKED) $
```

**TABLE CUSTHEAD:**

```
CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA, VACTRMT, AND DIGCOL CONFIRM ( XLAS PT17 NXLA NDGT) ( CRL 1 BLOCKED) $
```

**TABLE DIGCOL**

```
DGT1 6 RPT
```

**TABLE IBNXLA:**

```
XLANAME PT17
```

**TUPLE NOT FOUND**

Default is to go to next XLA name.

**TABLE IBNXLA:**

```
XLANAME CPT1
```

**TUPLE NOT FOUND**

Default is to go to next XLA name.

**TABLE IBNXLA:**

```
XLANAME CT1
```

```
CT1 6 NET N Y 1 N NDGT N Y PVT 006 LCL NSCR $
```

**TABLE DIGCOL**

NDGT specified: digits collected individually

**TABLE HNPACONT**

```
006 Y 666 1000 ( 113) ( 1) ( 0) ( 0) 1 $
   . SUBTABLE HNPACODE
   . 93430004 93430007 LRTE 235
   . SUBTABLE RTEREF
   . 235 T IBNRT3 235
   . . TABLE IBNRT3
   . . 235 ISA N N N CALLMGR N PVT 1 PVT 2
   . . . . TABLE TRKGRP
```

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. . . CALLMGR IBNT2 0 PRAC NCRT VISA_OCW 0 CCWCTH 240 N ANSDISC 0 Y N N N N Y 0 0 N
. . . 0 0 0 0 N N N N N N N N N N N N NATL (LTID PRITRK 24) $
. . . TABLE LTCALLS
. . . PRITRK 24 PVT XLAIBN 18 CCSA_SP18 NLCA_NIL VISA_OCW 0 240 $
. . . TABLE DIGMAN
. . . 2
. . . EXIT TABLE DIGMAN
. . . EXIT TABLE IBNRT3
. . EXIT TABLE RTEREF
EXIT TABLE HN PACONT
LNP00100 SOC Option is IDLE.
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
LNP00100 SOC Option is IDLE.
LNP Info: Called DN is not resident.
LNP Info: HNPA results are used.
AIN Info Collected TDP: no subscribed trigger.
TABLE FNPA7DIG
EMPTY TABLE: TUPLE NOT FOUND
AIN Info Analyzed TDP: no subscribed trigger.

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 CALLMGR N CDN PVT L 9343004 PRVT 1 BC SPEECH
Outpulsing on this route is modified by the following options:
(DNIS)

TREATMENT ROUTES. TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++
Configuring the Cisco Call Manager

- CUCM 4.1 Software Version
- CUCM 4.1-T1 Gateway Configuration
- Partitions Configuration
- Calling Search Space
- Enbloc Route Pattern Configuration
- Overlap Sending Route Pattern Configuration
- PSTN Route Pattern Configuration
- Translation Pattern for Incoming Calls
- CLIR and CNIR Route Pattern Configuration
- COLR and CONR Translation Pattern Configuration
- IP Phone Configuration
- Directory Number Configuration

Configuring the Cisco 3725 MGCP gateway:

Show version:
3725_T1#sh ver

Show diag:
3725_T1#sh diag

Show running:
3725_T1#sh run
Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANF-PR</td>
<td>Additional Network Feature Path Replacement</td>
</tr>
<tr>
<td>AOC</td>
<td>Advice-of-charge. Information element is sent with the connection setup information for incoming Euro-ISDN connections. The AOC IE is used for call charge calculation.</td>
</tr>
<tr>
<td>CUCM</td>
<td>Cisco Unified CallManager</td>
</tr>
<tr>
<td>CCBS</td>
<td>Call Completion to Busy Subscriber</td>
</tr>
<tr>
<td>CCNR</td>
<td>Call Completion on No Reply</td>
</tr>
<tr>
<td>CFB</td>
<td>Call Forwarding on Busy</td>
</tr>
<tr>
<td>CFNR</td>
<td>Call Forwarding No Reply</td>
</tr>
<tr>
<td>CFU</td>
<td>Call Forwarding Unconditional</td>
</tr>
<tr>
<td>CLIP</td>
<td>Calling Line (Number) Identification Presentation</td>
</tr>
<tr>
<td>CLIR</td>
<td>Calling Line (Number) Identification Restriction</td>
</tr>
<tr>
<td>CMM</td>
<td>Communication Media Module (CMM) is a Cisco Catalyst® 6500 Series and Cisco 7600 Series line card that provides flexible and high-density T1/E1 gateways</td>
</tr>
<tr>
<td>CNIP</td>
<td>Calling Name Identification Presentation</td>
</tr>
<tr>
<td>CNIR</td>
<td>Calling Name Identification Restriction</td>
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<tr>
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<td>Connected Name Identification Restriction</td>
</tr>
<tr>
<td>CT</td>
<td>Call Transfer</td>
</tr>
<tr>
<td>MWI</td>
<td>Message Waiting Indicator</td>
</tr>
<tr>
<td>PSTN</td>
<td>Public Switched Telephone Network</td>
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<th>Americas Headquarters</th>
<th>Asia Pacific Headquarters</th>
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<td>BV</td>
<td>170 West Tasman Drive</td>
<td>Capital Tower</td>
</tr>
<tr>
<td>San Jose, CA 95134-1706</td>
<td>Haarlerbergpark</td>
<td>San Jose, CA 95134-1706</td>
<td>168 Robinson Road</td>
</tr>
<tr>
<td>USA</td>
<td>Haarlerbergweg 13-19</td>
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