Application Note

Siemens Hicom 300 E CS Rel 6.5 PBX with CallManager using 2621-T1 PRI NI-2 Gateway

This application note illustrates for connectivity of the Siemens Hicom 330 E Rel 3.1 PBX with Cisco CallManager using Cisco 2621-T1 PRI NI1 Gateway.

Integration Description

Connectivity is achieved by using the industry standard PRI NI-2 protocol. The Siemens Hicom 300 E CS can be configured as either NETWORK or USER side.

Cisco Systems Hardware and Software Requirements

- Hardware (Cisco 2621Gateway): 2MFT T1 Port
- Software: CallManager Release 3.1

PBX Hardware and Software Requirements

- Hardware: TMDN or TMDN 64
- Software: Version 6.5

Features Supported

Key Features Supported

Calling/Called Number

Key Features Not Supported

Calling/Called Name

Limitations

Calling Name and Number feature

- Calling Name delivery and presentation features are not supported by the Siemens Hicom 330 E CS PBX.
- When calling from Cisco 7960 IP phone to Siemens digital phone, Calling/Called Number is displayed on both phones after the call is answered.
- When calling from Siemens digital phone to Cisco 7960 IP phone, IP phone displays Connected Number after the call is answered. Siemens phone however does NOT get updated when the call is answered. It displays the dialed numbers instead. (i.e. Access Code + extension number). It was verified using ISDN protocol analyzer that the CallManager was not sending "Connected Number" information in the connect message back to PBX.
- When a call is answered, the display on the Siemens phone is only active (Calling Number displayed) for approximately 4 seconds. Thereafter, the screen goes blank. This could be caused by a timer feature that is expiring for the display.

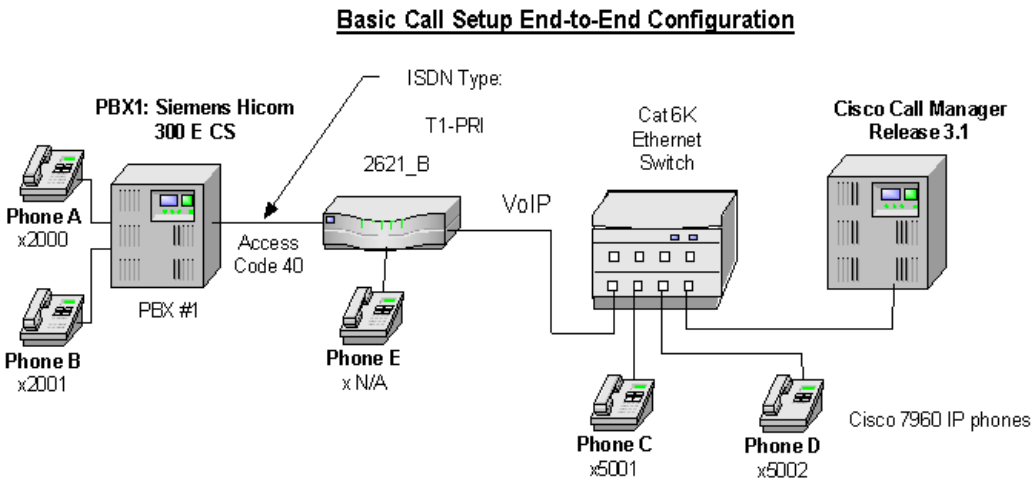
User/Network Settings

The Cisco 2621 router with ISDN switch type setting of primary-ni supports both protocol sides by using the “isdn protocol-emulate network/user” command. When the router is set to emulate Network side and the Siemens is set to emulate User

side, the Siemens PBX must send at least 10 digits for the router to properly route the call. Otherwise, the Cisco 2621 router sends back a release message containing a release cause of “Invalid Number Format”.

Network Topology

Figure 1 Basic Setup



Configuration

Configuringthe Siemens Hicom 300 E CS PBX

Use the following steps to configure the Siemens Hicom 300 E CS PBX:

Step 1. Add the new access code to DPLN.

Step 2. Add the new trunk board using BCSU.

Step 3. Configure COT.

Step 4. Configure COP.

Step 5. Add the new trunk group access code using TGACC.

Step 6. Add the channels using TCSU.

Step 7. Configure LROUT.

Step 8. Configure LODR.

Step 1. Add the new access code to DPLN.

```
<dis-dpln

TYPE = dgts

DGTS = ;

DIS-DPLN:DGTS,;

H500:  AMO DPLN  STARTED
```

DIGIT INTERPRETATION		VALID FOR DIAL PLAN 0		
DIRECTORY NUMBER	CALL PROGRESS STATE 1 11111 1111222 12345 67890 12345 6789012	DIGIT ANALYSIS RESULT (SKIP DIGIT)	RSVD	ROUTE
0	....*	GENANS		
1	.*.** *.*** **... ......*	CO		
2000 - 2002	.**** ***** ***.* ......*	STN		
2003 - 2024	.**** ***** ***.* ......*	STN	R	
2025 - 2026	.**** ***** ***.* ......*	STN		
2027 - 2099	.**** ***** ***.* ......*	STN	R	
37 - 41	.*.** *.*** **... ......*	CO		
43 - 48	.**** ***** **... ......*	TIE		
49 - 50	.*.** *.*** **... ......*	CO		
70000 - 70999	.**** ***** ***.* ......*	STN	R	
71000	.**** ***** ***.* ......*	STN		1
71001 - 79998	.**** ***** ***.* ......*	STN	R	

DIGIT INTERPRETATION		VALID FOR DIAL PLAN 0		
DIRECTORY NUMBER	CALL PROGRESS STATE 1 11111 1111222 12345 67890 12345 6789012	DIGIT ANALYSIS RESULT (SKIP DIGIT)	RSVD	ROUTE
79999	.**** ***** ***.* ......*	STN		
9	.*.** *.*** **... ......*	CO		
*0	*...* ..**. ....*	ACDWORK		
*2	*...* ..**. ....*	ACCTCODE		
*3	....* ..**. ....*	PUDIR		
*4	*...* ..**. ....*	CONFRNC		
*52	....*	MWCAN		
*530	....* ....*	PMCANCEL		
*532	....* ....*	PMCALLBK		
*563	*.... ..**.	BADLINE		
*564	*...* ..**. ....*	ACDLOGON		
*565	*...* ..**. ....*	ACDLOGOF		

DIGIT INTERPRETATION		VALID FOR DIAL PLAN 0		

	CALL PROGRESS STATE	DIGIT ANALYSIS		
DIRECTORY NUMBER	1 11111 1111222 12345 67890 12345 6789012	RESULT (SKIP DIGIT)	RSVD	ROUTE
*570	*...* ..**.	ACDPQ		
*571	*...* ..**.	ACDPS		
*572	....*	RING		
*580	*...* ..**.	ACDSQ		
*581	*...* ..**.	ACDSS		
*6	***** ..**.	ROLMPARK		
*7	*...* ..**.	CONSULT		
*80 - *89	.**** ..**.	PARK		
*9	....* ..**.	HOLD		
**0	.***.	BVSL		
**1	*.... ..**. ....*	TOGGLE		
**3	....* ..**. ....*	PU		

DIGIT INTERPRETATION — VALID FOR DIAL PLAN 0

	CALL PROGRESS STATE	DIGIT ANALYSIS		
DIRECTORY NUMBER	1 11111 1111222 12345 67890 12345 6789012	RESULT (SKIP DIGIT)	RSVD	ROUTE
**41 - **48	....*.. ....*	CONFRMV		
**50	*...* ..**.	CAFGRAVL		
**51	*...* ..**.	CAFGRUNA		
**6	....* ..**.	INTERCOM		
**8	....*	MWANS		
***4	....*	CONFRMVL		
***5	....*	MONSLNT		
**#65	*...* ..**.	CAFGROFF		
*#01	....*	RCHNL		
*#02	....*	RTERM		
*#03	....*	LTERM		
*#04	..... *.... *....	PRITEST		

DIGIT INTERPRETATION — VALID FOR DIAL PLAN 0

	CALL PROGRESS STATE	DIGIT ANALYSIS		
DIRECTORY NUMBER	1 11111 1111222 12345 67890 12345 6789012	RESULT (SKIP DIGIT)	RSVD	ROUTE
*#274	*...*	WS		
*#50	*...* ..**.	CAFAVLB		
*#51	*...* ..**.	CAFUNAV		
*#55	*...* ..**.	CAFFWD		
*#56	*...* ..**.	CAFFWDC		
*#57	....*	PIDON		
*#58	....*	PIDOFF		
*#590	....*	DCOSX		
*#591	....*	ACOSX		
*#63	***** ***** ***** *******	CLEAR		
*#65	*...* ..**.	CAFLOGOF		
*#735	....*	RELOCATE		

DIGIT INTERPRETATION — VALID FOR DIAL PLAN 0

	CALL PROGRESS STATE	DIGIT ANALYSIS		
DIRECTORY NUMBER	1 11111 1111222	RESULT	RSVD	ROUTE
	12345 67890 12345 6789012	(SKIP DIGIT)		
*#738	....*	SET		
*#97	..*.. *....	COXFER		
#0	*...* ..**. ....*	ACDUNAV		
#1	*.... ..*.. ....*	ACBK		
#2	*...* ..**.	PRION		
#3	.**.* ..**. ....*	SPDI		
#4	***.* ..**. ....* ......*	SNR		
#5	....*	ADND		
#61	.**** ..*** **... ......*	SPDC1		
#62	.**** ..*** **... ......*	SPDC2		
#80	*...* ..**.	BROADCST		
#81	*...* ..**.	SPKRCALL		

DIGIT INTERPRETATION — VALID FOR DIAL PLAN 0

	CALL PROGRESS STATE	DIGIT ANALYSIS		
DIRECTORY NUMBER	1 11111 1111222	RESULT	RSVD	ROUTE
	12345 67890 12345 6789012	(SKIP DIGIT)		
#8378	....*	HWTEST		
#91	....* ....*	CFWVABTH		
#92	....* ....*	CFWVAEXT		
#93	....* ....*	CFWVAINT		
#94	....* ....*	CFWVB		
#95	....* ....*	CFWVBNA		
#96	....* ....*	CFWVNA		
#*056	....* ..... *....	DATA56		
#*1	***** ..**.	MWACT		
#*2	*...* ..**.	BUZZ		
#*329	.**.* *.*** **...	FAX	R	
#*4	*...* ..**.	VCECALL		

DIGIT INTERPRETATION — VALID FOR DIAL PLAN 0

	CALL PROGRESS STATE	DIGIT ANALYSIS		
DIRECTORY NUMBER	1 11111 1111222	RESULT	RSVD	ROUTE
	12345 67890 12345 6789012	(SKIP DIGIT)		
#*75	....*	DIGIDAT		
#*76	....* *.**. ..*.*	SWITCH		
#*77	....* *.*** ***.*	DTE		
#*78	....* ..**. ....*	CODE		
#*79	....* ..**. ....*	SPEED		
#*8	***** ****. ..*** *****..	MWCANORI		
#*90	....* ....*	HUNTPROG		
#*92	....*	AHTVCE		
#*93	....*	DHTVCE		
#*94	....*	AHTDTE		
#*95	....*	DHTDTE		
#*96	....*	AHTFAX		

DIGIT INTERPRETATION — VALID FOR DIAL PLAN 0

```
|                  |  CALL PROGRESS STATE    | DIGIT ANALYSIS|     |       |
| DIRECTORY NUMBER|          1 11111 1111222|    RESULT     |RSVD | ROUTE|
|                  |12345 67890 12345 6789012|  (SKIP DIGIT) |     |       |
-------------------------------------------------------------------------
| #*97             |....* ..... ..... .......| DHTFAX        |     |       |
| #*99             |....* ..... ....* .......| HUNTCLR       |     |       |
| ##0              |*...* ..**. ..... ......*| ACDAVLB       |     |       |
| ##1              |....* ..... ..... .......| DCBK          |     |       |
| ##2              |*...* ..**. ..... .......| PRIOFF        |     |       |
| ##3              |....* ..... ....* .......| SPDIPROG      |     |       |
| ##4              |*...* ..**. ..... ......*| LNR           |     |       |
| ##5              |....* ..... ..... .......| DDND          |     |       |
| ##7              |*.... ..... ..... .....*.| KNOVR         |     |       |
| ##8              |***** ..**. ..... .......| DTA           |     |       |
| ##91             |....* ..... ....* .......| CFWVAOFF      |     |       |
| ##*78            |....* ..**. ....* .......| RESET         |     |       |
-------------------------------------------------------------------------
| DIGIT INTERPRETATION                    VALID FOR DIAL PLAN 0          |
-------------------------------------------------------------------------
|                  |  CALL PROGRESS STATE    | DIGIT ANALYSIS|     |       |
| DIRECTORY NUMBER|          1 11111 1111222|    RESULT     |RSVD | ROUTE|
|                  |12345 67890 12345 6789012|  (SKIP DIGIT) |     |       |
-------------------------------------------------------------------------
| ###1             |*.... ...*. ..... .......| TRACE         |     |       |
| ###20            |..... **..* **... .......| MILLWAT       |     |       |
| ###21            |..... **..* **... .......| LOOPBACK      |     |       |
| ###22            |..... **..* **... .......| SILENCE       |     |       |
| ###23            |..... **..* **... .......| COMBO         |     |       |
| ###4             |*.... ..... ..... .......| THRCONF       |     |       |
| ###6             |....* ..... ..... .......| MONTONE       |     |       |
-------------------------------------------------------------------------
```

```
AMO-DPLN -135       DIALING  PLANS, FEATURE ACCESS CODES

DISPLAY COMPLETED;
```

Step 2. Add the new trunk board using BCSU.

```
<dis-bcsu

TYPE = tmd;

DIS-BCSU:TMD;
H500:  AMO BCSU  STARTED
----------------------------------------------------------------
| DETAILS OF TMD BOARD AT ADDRESS (LTG.LTU.SLOT) = 1. 2.103   |
|                                                              |
|    CABTYP =    1      TIMTYP = SYST       SIGTYP = MOS      |
|     FRAME =  ESF        TABS =   NO       FCTID  =   2      |
|    BI8SUB =  YES      BIVDET =   NO                         |
|--------------------------------------------------------------|
|   RDRATIO =     6       RDTH =  2500      RDQUAL = 15000    |
|    YLSEND =  5000       YLTH =   400      YLQUAL =   100    |
|       LOS =   150        AOS =  4000                         |
|  SESDISTH =    10   SESREQTH =    10                         |
|  OESDISTH =    30   OESDISIN = 24-00-00                      |
|  OESREQTH =     4   OESREQIN = 04-00-00                      |
|--------------------------------------------------------------|
|    NETUSR = NETWK     ACKTIM = 1000       DLVTIM = 30000     |
|    OCTMAX =  260      RETMAX =    3       WINDOW =     1     |
|    CRIDC  =           TTSC   =            NSFIV  =           |
|    NSFTSC =           PFDGT  =                               |
|--------------------------------------------------------------|
|       IGN = 0          IID = 1                               |
----------------------------------------------------------------
AMO-BCSU -135       BOARD CONFIGURATION, SWITCHING UNIT
DISPLAY COMPLETED;
```

Step 3. Configure COT.

```
<dis-cot

COTNO = 0;

DIS-COT:0;
H500:  AMO COT   STARTED
       |D|A|D|D|D|M|S|V|E|E|A|R|
       |I|N|S|S|I|D|A|L|S|S|N|F|
       |T|S|A|A|S|R|T|S|P|P|I|L|
       | |R| |S| | | |A|A|D|D|A|
       | | | | | | | |T|N|N|N|S|
       | | | | | | | | |I|I|I|H|
   COT | | | | | | | | | |S|S| |
   ----+-+-+-+-+-+-+-+-+-+-+-+-+
     0 | | | | | | | | | | | | |
   ----+-+-+-+-+-+-+-+-+-+-+-+-+
AMO-COT  -135       CLASS OF TRUNK FOR CALL PROCESSING
DISPLAY COMPLETED;
```

Step 4. Configure Class of Parameter for device handler using COP.

```
<dis-cop

COPNO = 0;

DIS-COP:0;
H500:  AMO COP   STARTED
|   |                   |  |  |    |
|   | S           E A   |  |  |    |
|   | T         E S N   |  |  |    |
|   | A   S   V S P I D |DD| S|    |
|   | D   Z   L P D D T |TT| U|  P |
|   | I A A S S A N N O |MM| P|  D |
|COP| A N C A A N I I N |FF| V|  P |
|IDX| L S K T T I S S E | L|12|1234|
+---+-------------------+--+--+----+
|  0|                   |  |  |    |
+---+-------------------+--+--+----+
AMO-COP  -135       CLASS OF PARAMETER
DISPLAY COMPLETED;
```

Step 5. Add the new trunk group access code using TGACC.

```
<dis-tgacc

TGRP = 40;

DIS-TGACC:40;
H500:  AMO TGACC STARTED
+-------------------------------------------------------------------------------+
| TGRP NUMBER    :    40   TGRP NAME  : T1PRI           /N    MAXIMUM NO:   23 |
| SUBGROUP NUMBER:    11   DEVICE TYPE: PRI B                 DIR TYPE  : BOTH |
| ACD THRESHOLD  :     *   TRACENO    :          0           USAGE TYPE: TERR |
| ALLOCATED TO AT LEAST ONE ROUTE                             GDTR RULE :    0 |
| SELECTION      :  LOW    CFBLOCK    : DISABLED                               |
| THE FOLLOWING PORTS (LTG-LTU-SLOT-CIRCUIT) ARE ALLOCATED:                     |
+-------------------------------------------------------------------------------+
|  1- 2-103- 1| 1- 2-103- 2| 1- 2-103- 3| 1- 2-103- 4| 1- 2-103- 5| 1- 2-103- 6|
+-------------------------------------------------------------------------------+
|  1- 2-103- 7| 1- 2-103- 8| 1- 2-103- 9| 1- 2-103-10| 1- 2-103-11| 1- 2-103-12|
+-------------------------------------------------------------------------------+
|  1- 2-103-13| 1- 2-103-14| 1- 2-103-15| 1- 2-103-16| 1- 2-103-17| 1- 2-103-18|
+-------------------------------------------------------------------------------+
|  1- 2-103-19| 1- 2-103-20| 1- 2-103-21| 1- 2-103-22| 1- 2-103-23|  -  -   -  |
+-------------------------------------------------------------------------------+
AMO-TGACC-135       TRUNK GROUP ACCESS CODE
DISPLAY COMPLETED;
```

Step 6. Add the channels using TCSU.

TCSU – B Channel

```
<dis-tcsu

PEN1 = 1-2-103-1;

DIS-TCSU:1-2-103-1;
H500:  AMO TCSU  STARTED
 +-------------------------------------------------------------------------+
 | PEN:  1- 2-103- 1  INS: Y   BOARD: TMDN64P    DEV: PRIB      TGRP: 40  |
 +-------------------------------------------------------------------------+
 | TRKID  : 0040          TCCID    :                                       |
 | CCT    :         /0040                                                  |
 |                                                                         |
 | ACDATA : 0             DITIDX   : 0           LOCANA   :                |
 | ATNTYP : ISDN          DPLN     : 0           REMANA   :                |
 | COPNO  : 0             ITR      : 0           SIDANI   : N              |
 | COSNO  : 75            LCRCOSD  : 5           SRTIDX   : 3              |
 | COTNO  : 0             LCRCOSV  : 5           TRTBL    : DIDCR          |
 | DEDSVC : NONE          FACILITY : *                                     |
 +-------------------------------------------------------------------------+
AMO-TCSU -135       TRUNK CONFIGURATION, SWITCHING UNIT
DISPLAY COMPLETED;
```

TCSU – D Channel

```
      <dis-tcsu

PEN1 = 1-2-103-24;
DIS-TCSU:1-2-103-24;
H500:  AMO TCSU  STARTED
 +-------------------------------------------------------------------------+
 | PEN:  1- 2-103-24  INS: Y   BOARD: TMDN64P     DEV: PRID                |
 +-------------------------------------------------------------------------+
 | TCCID  :                                                                |
 | CCT    :                                                                |
 |                                                                         |
 | ACDATA : 0             DEDSCC   :             INTERFID :                |
 | COPNO  : 0             DITIDX   :             ITR      : 0              |
 | COTNO  : 0             DPLN     : 0           PROTOCOL : NI2            |
 |                                                                         |
 | TMR301 :   300 SEC.    TMR308   :     4 SEC.  TMR313   :     4 SEC.    |
 | TMR303 :     4 SEC.    TMR309   :    90 SEC.  TMR316   :    30 SEC.    |
 | TMR305 :    30 SEC.    TMR310   :    30 SEC.  TMR322   :     4 SEC.    |
 | TDELAY :  3000 MSEC.   BEARER:  ONE                                     |
 | NCT    : N          TNCT     :                                         |
 +-------------------------------------------------------------------------+
AMO-TCSU -135       TRUNK CONFIGURATION, SWITCHING UNIT
DISPLAY COMPLETED;
```

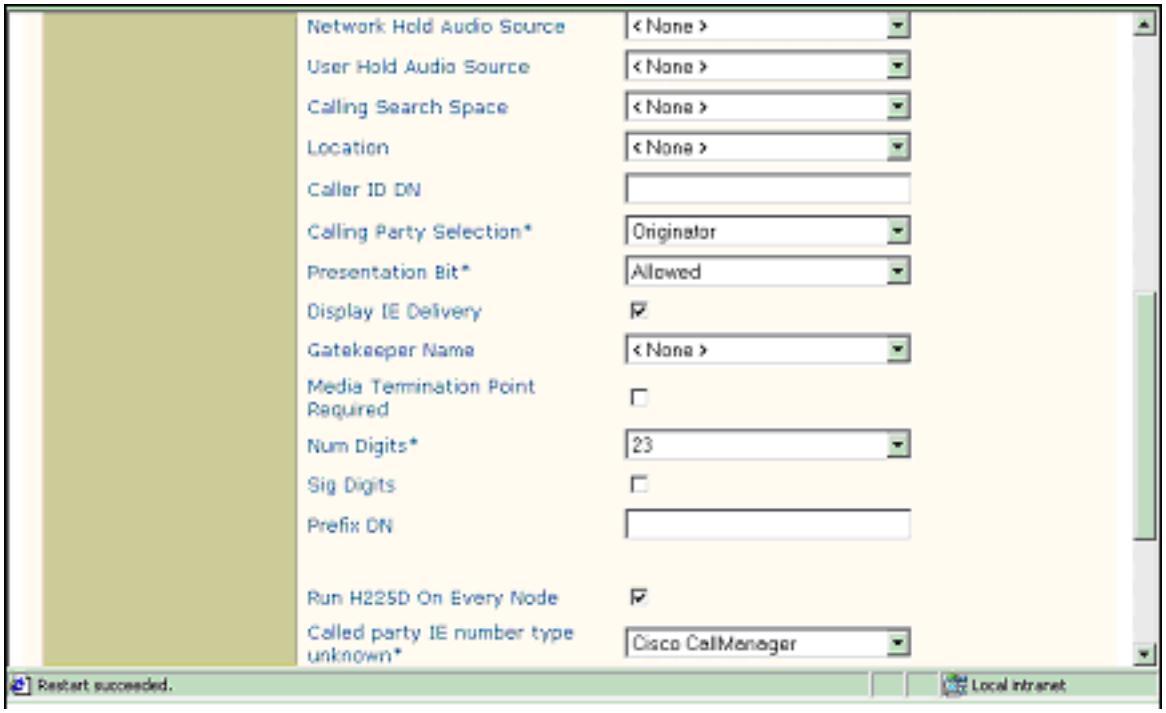
Step 7. Configure LROUT.

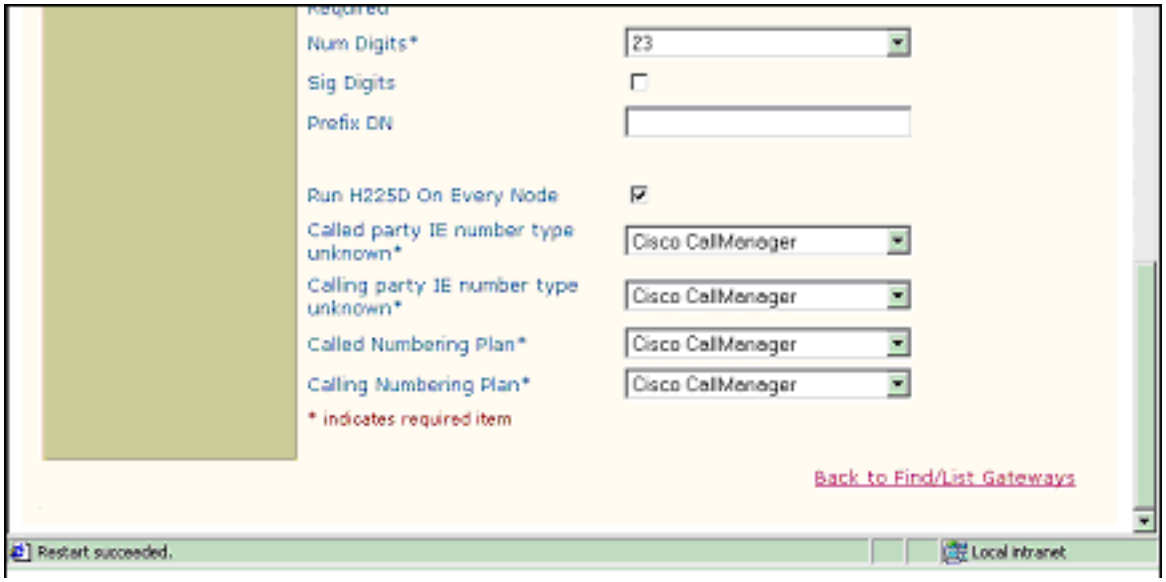
```
<dis-lrout

ROUTE = 40;

DIS-LROUT:40;
H500:  AMO LROUT STARTED
                  LCR ROUTE DEFINITION TABLE
                  --------------------------

------------------------------------------------------------------------
|ROUTENUM = 40          SCHED A = X  AORT   =       INFORMATION         |
|ROUTEELE = 1                B =    AUTH   = 1     TRANS CAP = S3V     |
|BEARER   = ONE              C =    ONHKQ  = Y     TRKSIG = PRI        |
|BANDWTH  = 1                D =    OFFHKQ = Y     SCCID  =            |
|TRUNKGRP = 40               E =    ODRNUM = 1     SVCVCE = NON        |
|MASTGRP  = 8                F =    APLTYP = VD    SVCN-V = NON        |
|ROUTSERV = N                G =                   FACNUM =            |
|                            H =                                       |
------------------------------------------------------------------------
END OF LCR ROUTE DEFINITION TABLE DISPLAY
AMO-LROUT-135       ROUTE DEFINITION DETERMINATION PACKAGE
DISPLAY COMPLETED;
```

Step 8. Configure LODR.

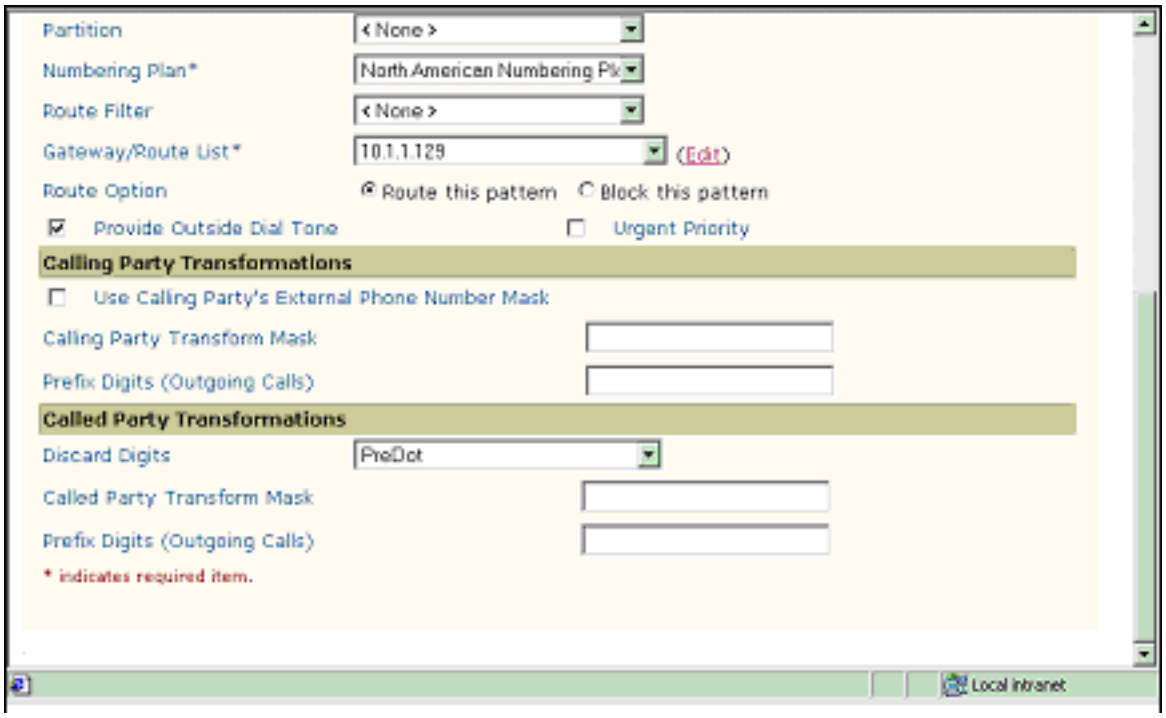
```
<dis-lodr

RANGE =
DIS-LODR:;
H500:  AMO LODR  STARTED
             << DISPLAY LCR OUTDIAL RULE >>

            ODR NO    COMMAND   BRANCH VALUE
            ------    -------   ------------
               1      ECHOALL
                      END                                    -------- END OF DISPLAY
--------AMO-LODR -135       AMO LCR ODR FOR SWITCHING UNIT
DISPLAY COMPLETED;
  <
```

Figure 1
Configuring the 6608-E1 Gateway



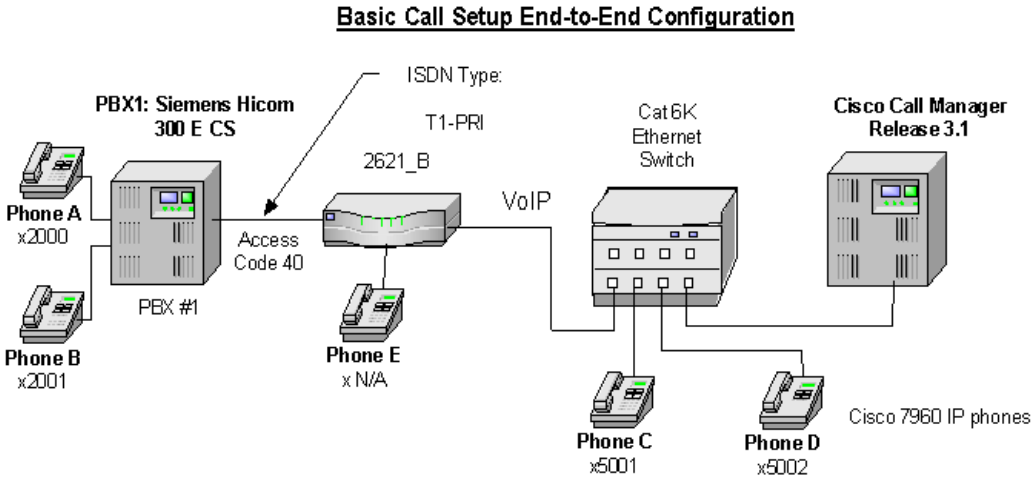


Route Pattern Configuration



Test Results

As shown in the diagram below, a Siemens Hicom 300 E CS PBX was connected via an ISDN T1 PRI link to a Cisco 2621, which in turn, was connected to an Ethernet switch. The interoperability testing involved Layers 1, 2 and 3 on the ISDN PRI link between a Cisco 2621 and the PBX.



Layer 1 (Physical Layer)

The Siemens configuration screen for the DS1 trunk interface is reached with the command:
<cha-bssu

Layers 2 & 3 (Q.921 and Q.931)

Layer 2 and 3 packet exchanges were monitored using an Acacia Clarinet protocol analyzer, bridged across the PRI link in high impedance mode.

Layer 2 Q.921 packets were monitored to ensure that each PBX/2621 software configuration properly exchanged SABME/UA packets to initialize the ISDN link, and then RR packets were exchanged every 30 seconds.

Layer 3 Q.931 packets were monitored to ensure that the appropriate call setup/teardown packets were exchanged for each configuration, and that the SETUP packets contained the mandatory Information Elements (IEs) with the necessary details, as well as optional IEs such as Calling Name and Number.

Telephone calls were made end-to-end in both directions through the Cisco 2621Gateway, and a check was made to ensure that there was an audio path in both directions for each call.

User/Network Settings

The Cisco 2621Gateway with ISDN protocol type setting of primary-ni supports both protocol sides by selecting “Network/User” in the protocol side field when configuring the Gateway via CallManager.

The “Network/user” choice for the Siemens Hicom 300 E PBX is made by deactivating the B channels/D-channel (<dea-dssu) and the DS1 board (<dea-bssu) consecutively. A change command is then issued to the Board Configuration Switching Unit (BCSU) to get to the “network/user” prompt (<cha-bcsu). The DS1 board by (<act-bssu), the D-channel, and B-channels are then reactivated (<act-dssu), after the settings are changed.

.

Table 1 PBX 1 - NI2 (Network) Cisco 2621 Gateway - primary-ni(User)

Siemens Hicom 330 E CS Switch-type/ Protocol side setting	Cisco Cisco 2621_B ISDN protocol-type/Protocol side setting
NI2 / Network	isdn switch-type primary-ni isdn protocol-emulate user

Table 2 Basic Calls: (Enbloc Sending)

Calls Made	Call Comp?	"Calling Number" Passed to Final Destination?	"Calling Name" Passed to Final Destination?	"Called Number" Passed to Orig. Side?	"Called Name" Passed to Orig. Side?	Notes
Phone A to Phone C	Yes	Yes	No	No [1]	No	[2]
Phone C to Phone A	Yes	Yes	No	Yes	No	[3]

1. CallManager is not sending "Connected Number" information in the connect message back to PBX.
2. The Siemens PRI interface with ETSI setting does not support "Calling Name" presentation Feature.
3. The display on the Siemens phone is oly active (Calling Number is displayed) for apporximately 4 seconds, thereafter the displays goes blank. This could be caused by a display timer feature that expires.

Table 3 Call Transfers: (Supervised Local Transfers)

Calls Made	Call Comp?	Orig. "Calling Number" displayed on Final Dest. phone?	Orig. "Calling Name" displayed on Final Dest. phone?	"Called Number" display on Orig. phone updated after transfer?	"Called Name" display on Orig. phone updated after transfer?	Notes
Phone C to Phone A Xfr to Phone B	Yes	Yes	No	No	No	
Phone A to Phone C Xfr to Phone D	Yes	Yes	No	No	No	

Table 4 Call Conferencing (Local)

Calls Made	Call Comp?	"Calling Number" Passed to remaining conferee when the conferencing phone drops out?	"Calling Name" displayed on remaining conferee when the conferencing phone drops out?	"Connected Number" updated on Orig. Caller phone display when a conferee drops out?	"Connected Name" updated on Orig. Caller phone display when a conferee drops out?	Notes
Phone C to Phone A, Phone A conf Phone B	Yes	(A Drops out) Yes	(A Drops out) No	(A Drops out) No	(A Drops out) No	
Phone C to Phone A, Phone C conf Phone D	Yes	(C Drops out) No	(C Drops out) No	(D Drops out) No	(D Drops out) No	
Phone A to Phone C, Phone C conf Phone D	Yes	(C Drops out) No	(C Drops out) No	(C Drops out) No	(C Drops out) No	
Phone A to Phone C, Phone A conf Phone B	Yes	(A Drops out) No	(A Drops out) No	(B Drops out) No	(B Drops out) No	

Table 5 Call Forward (Local)

Calls Made	Call Comp?	Original "Calling Number" Passed to Final Dest.?	Original "Calling Name" Passed to Final Dest.?	Forwarding "Called Number" Pased to Final Dest.?	Forwarding "Called Name" Displayed on Final Dest.?	Final dest. "Connected Number" updated at orig. side?	Final dest. "ConnectedName" updated at orig. side?	Notes
Phone C to Phone A fwd to Phone B	Yes	Yes	No	No	No	No	No	
Phone A to Phone C fwd to Phone D	Yes	Yes	No	No	No	No	No	

Test Setup 2

Setup was as follows:

- PBX1 configured as NI2, emulates User
- Cisco Cisco 2621Gateway configured as PRI NI2, emulates Network

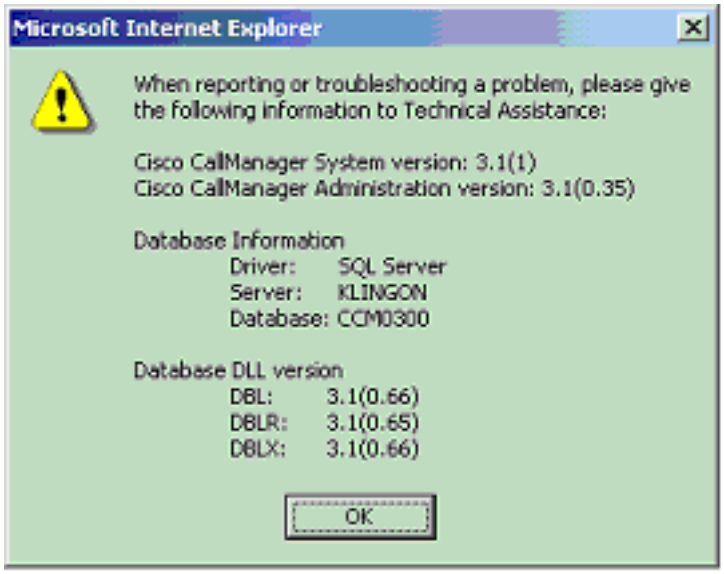
Table 6 Switch and Gateway Settings

Siemens Hicom 330 E CS Switch-type/ Protocol side setting	Cisco 2621_B ISDN protocol-type/ Protocol side setting
NI2/User	isdn switch-type—primary-ni isdn protocol—emulate network

When the Cisco 2621 router is set to emulate Network side, the Siemens PBX must send at least 10 digits for the router to properly route the call. Since the PBX is configured for 4 digit dialing, calls were tested in one direction only, from Cisco 7960 IP phone to Siemens digital phone. The test results are expected to be the same. Refer to the tables 2 - 7 for details.

Appendix A

Call Manager Software Release:



Siemens Hicom 330 E CS Software release

```
--------------------------------------------------------------------------------
TERMINAL 1                      L O G O N                    01-09-18    11:40:46
--------------------------------------------------------------------------------

  <dis-ansu

DIS-ANSU;
H500:  AMO ANSU  STARTED
       APS TYPE     | NAME     | SP REFERENCE NO.
       -------------+----------+------------------
       SWU RES-CODE | S0-ET0SC | P30252B6500S00101
       SWU AMO-CODE | B0-ET0BC | P30252B6500B00101
        SWU RES-TEXT | S0-TTDSD | P30252B650DS00101

       SYSTEM NUMBER     | DB SUBSYSTEM NAME
       ------------------+------------------
       00000000000095393 | DB_SUSY_ZDBCCDSF
       00000000000095393 | DB_SUSY_ZDBCCDS0
       00000000000095393 | DB_SUSY_ZDBCCDS1
       00000000000095393 | DB_SUSY_ZDBCCDS2
       00000000000095393 | DB_SUSY_ZDBCCDSB
       00000000000095393 | DB_SUSY_ZDBCCDSC
AMO-ANSU -135       ENTERING THE SYSTEM NUMBERS INTO THE SWU DATABASE
DISPLAY COMPLETED;
  <
```

Cisco 2621 Router Configuration

```
2621_B#sh ver
Cisco Internetwork Operating System Software
IOS (tm) C2600 Software (C2600-JS-M), Version 12.2(3.5)T,  MAINTENANCE INTERIM S
OFTWARE
TAC Support: http://www.cisco.com/tac
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Fri 03-Aug-01 22:45 by ccai
Image text-base: 0x80008088, data-base: 0x81631DD8

ROM: System Bootstrap, Version 12.1(3r)T2, RELEASE SOFTWARE (fc1)

2621_B uptime is 1 week, 4 days, 3 hours, 15 minutes
System returned to ROM by power-on
System image file is "flash:c2600-js-mz.122-3.5.T"

cisco 2621 (MPC860) processor (revision 0x200) with 56320K/9216K bytes of memory
.
Processor board ID JAD051516TX (503811939)
M860 processor: part number 0, mask 49
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
Primary Rate ISDN software, Version 1.1.
2 FastEthernet/IEEE 802.3 interface(s)
24 Serial network interface(s)
2 Channelized T1/PRI port(s)
32K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read/Write)

Configuration register is 0x2102

2621_B#
```

```
2621_B#sh diag
Slot 0:
        C2621 2FE Mainboard Port adapter, 2 ports
        Port adapter is analyzed
        Port adapter insertion time unknown
        EEPROM contents at hardware discovery:
        Hardware Revision        : 2.0
        PCB Serial Number        : JAD051516TX (503811939)
        Part Number              : 73-3200-08
        RMA History              : 00
        RMA Number               : 0-0-0-0
        Board Revision           : A0
        Deviation Number         : 0-21249
        EEPROM format version 4
        EEPROM contents (hex):
          0x00: 04 FF 40 00 A2 41 02 00 C1 17 4A 41 44 30 35 31
          0x10: 35 31 36 54 58 20 28 35 30 33 38 31 31 39 33 39
          0x20: 29 82 49 0C 80 08 04 00 81 00 00 00 00 42 41 30
```

```
          0x30: 80 00 00 53 01 FF FF FF FF FF FF FF FF FF FF FF
          0x40: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

Slot 1:
        High Density Voice Port adapter
        Port adapter is analyzed
        Port adapter insertion time unknown
        EEPROM contents at hardware discovery:
        Hardware Revision        : 1.1
        Top Assy. Part Number    : 800-03567-01
        Board Revision           : F1
        Deviation Number         : 0-0
        Fab Version              : 02
        PCB Serial Number        : JAB05080LU9
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        EEPROM format version 4
        EEPROM contents (hex):
          0x00: 04 FF 40 00 CC 41 01 01 C0 46 03 20 00 0D EF 01
          0x10: 42 46 31 80 00 00 00 00 02 02 C1 8B 4A 41 42 30
          0x20: 35 30 38 30 4C 55 39 03 00 81 00 00 00 00 04 00
          0x30: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x40: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
          0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

        VIC Slot 0:
        T1 (2 Port) Multi-Flex Trunk (Drop&Insert) WAN Daughter Card
        Hardware revision 1.0           Board revision B0
        Serial number     17759676      Part number    800-04614-01
        Test history      0x0           RMA number     00-00-00
        Connector type    PCI
        EEPROM format version 1
        EEPROM contents (hex):
          0x20: 01 24 01 00 01 0E FD BC 50 12 06 01 00 00 00 00
          0x30: 58 00 00 00 00 01 15 00 FF FF FF FF FF FF FF FF

        HDV firmware: Compiled Fri 23-Mar-01 00:20 by miriyala
        HDV memory size 524280 heap free 175065


2621_B#
```

```
2621_B#sh controllers t1 1/0
T1 1/0 is up.
  Applique type is Channelized T1
  Cablelength is long gain36 0db
  No alarms detected.
  alarm-trigger is not set
  Version info Firmware: 20010710, FPGA: 15
```

```
  Framing is ESF, Line Code is B8ZS, Clock Source is Line.
  Data in current interval (184 seconds elapsed):
     0 Line Code Violations, 0 Path Code Violations
     0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
     0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 0 Unavail Secs
2621_B#
```

```
2621_B#sh conf
2621_B#sh configuration
Using 1824 out of 29688 bytes
!
version 12.2
no parser cache
service timestamps debug datetime msec localtime show-timezone
service timestamps log uptime
no service password-encryption
!
hostname 2621_B
!
no logging buffered
enable password cisco
!
!
!
memory-size iomem 15
voice-card 1
 dspfarm
!
ip subnet-zero
!
!
no ip domain-lookup
!
isdn switch-type primary-ni
!
!
voice class codec 1
 codec preference 1 g729r8
 codec preference 2 g711ulaw
 codec preference 3 g711alaw
!
!
!
!
!
!
!
controller T1 1/0
 framing esf
 linecode b8zs
 pri-group timeslots 1-24
!
controller T1 1/1
 shutdown
 framing esf
```

```
 linecode b8zs
!
!
!
!
interface FastEthernet0/0
 ip address 192.168.100.2 255.255.255.0
 no ip mroute-cache
 load-interval 30
 no keepalive
 speed auto
 half-duplex
!
interface FastEthernet0/1
 ip address 10.1.1.129 255.255.255.0
 no ip mroute-cache
 duplex auto
 speed auto
!
interface Serial1/0:23
 no ip address
 no logging event link-status
 isdn switch-type primary-ni
 isdn incoming-voice voice
 isdn T309-enable
 isdn T306 30000
 isdn T310 40000
 no cdp enable
!
router rip
 network 1.0.0.0
 network 192.168.100.0
!
ip classless
no ip http server
ip pim bidir-enable
!
dialer-list 1 protocol ip permit
dialer-list 1 protocol ipx permit
!
!
snmp-server packetsize 4096
snmp-server manager
tftp-server nvram
call rsvp-sync
!
voice-port 1/0:23
!
!
mgcp profile default
!
dial-peer cor custom
!
!
!
dial-peer voice 1 pots
 destination-pattern 2...
```

```
 direct-inward-dial
 port 1/0:23
 prefix 2
!
dial-peer voice 3 voip
 destination-pattern 5...
 progress_ind setup enable 1
 voice-class codec 1
 session target ipv4:10.1.1.2
 dtmf-relay h245-alphanumeric
!
!
line con 0
 exec-timeout 0 0
line aux 0
 exec-timeout 0 0
line vty 0 4
 exec-timeout 0 0
 password cisco
 login
line vty 5 15
 exec-timeout 0 0
 login
!
scheduler allocate 3996 1000
!
end

2621_B#
```

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