



Cisco 2651 Series Gateway-PBX Interoperability: Siemens Hicom 330E PBX with E1-PRI Signaling

This document describes the interoperability and configuration of a Cisco 2651 voice gateway with a Siemens Hicom 330E PBX using E1-PRI signaling. It includes the following sections:

- System Components
- Configuration Tasks
- Caveats

System Components

PBX Model	Siemens Hicom 330E
PBX Release	Version 3.1
Telephony Signaling	E1-PRI
Voice Gateway	Cisco 2651
Gateway Release	IOS™ 12.2(1)T
VoX Protocol	H.323

Configuration Tasks

See the following sections for configuration tasks for this feature:

- Set Up
- Siemens Hicom PBX Configuration
- Cisco 2651 Gateway Configuration

Set Up

This section includes the following information:

- Connectivity Diagrams
- Set Up Notes

Connectivity Diagrams

Figure 1: *Test Configuration*

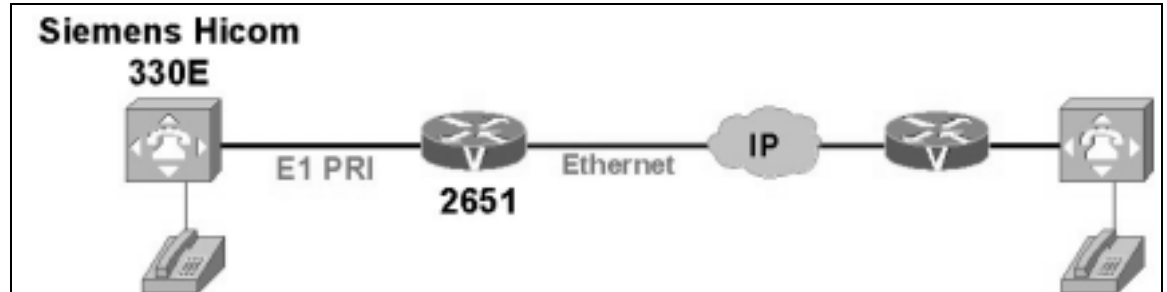


Figure 1 represents the configuration used for testing. A Siemens Hicom 330E PBX connected to a Cisco 2651 voice gateway via an E1 PRI NET5 connection.

Set Up Notes

- The Cisco 2651 gateway with ISDN switch type setting of **isdn switch-type primary-net5** supports both protocol sides by using the **isdn protocol-emulate network/user** command.
- Configuring the Siemens Hicom 330E operation to be Network side sets the Layers 2 & 3 protocol side setting to Network as well. Therefore, the Cisco 2651 gateway should be set to User protocol side by issuing the command: **isdn protocol-emulate user**.

Siemens Hicom PBX Configuration

TRUNK CONFIGURATION

```
<dis-tdcsu

PEN1 = 1-1-73-0

PEN2 = ;

DIS-TDCSU:1-1-73-0,;

H500: AMO TDCSU STARTED

+----- DIGITAL TRUNK (FORMAT=L) -----+
|          DEV = S2CONN          PEN = 1-01-073-0          |
+-----+
| COTNO   = 4          COPNO   = 4          DPLN   = 0          |
| ITR     = 0          COS     = 32         LCOSV  = 31         |
```

```
| LCOSD      = 31          CCT      = PRI          DESTNO     = 99          |
| PROTVAR    = ETSI       SEGMENT   = 1          TCHARG     = N          |
| SUPPRESS   = 0          DGTPR    =          CHIMAP     = N          |
| ISDNCC     =          ISDNAC    =          ISDNLC     =          |
| ISDNIP     =          ISDNNP    =          |
| PNPL2C     =          PNPL1C    =          PNPLC      =          |
| PNPL2P     =          PNPL1P    =          PNPAC     =          |
| TRACOUNT   = 31        SATCOUNT = MANY       NNO        = 1  -1  -999 |
| ALARMNO    = 2          FIDX      = 1          CARRIER   = 1          |
| ZONE       = EMPTY     COTX     = 4          FWDX       = 10         |
| DOMTYPE    =          DOMAINNO  =          TPROFNO    =          |
| INIGHT     =          |
| CCHDL      =          UUSCCX    = 16         UUSCCY     = 8          |
|-----|
| TGRP       = 37        SRCHMODE = CIR          BCNEG      = N          |
| BCGR       = 1          INS       = Y          LWPAR      = 4          |
| LWPP       = 0          LWLT     = 0          LWPS       = 0          |
| LWR1       = 0          LWR2     = 0          |
| BCHAN      1 && 30      |
|-----|
```

+-----+

AMOUNT OF B-CHANNELS IN THIS DISPLAY-OUTPUT: 30

AMO-TDCSU-210 DIGITAL TRUNKS

DISPLAY COMPLETED;

<dis-buend

TGRP = 37

FORMAT = 1

DIS-BUEND:37,L;

H500: AMO BUEND STARTED

+----- FORMAT = L -----+

```

| TGRP NUMBER : 37 TGRP NAME : PRI MAXIMUM NO. : 30 |
| SUBGROUP NO.: 10 DEVICE TYPE : S2CONN TRACENO : 0 |
| RESERVED : N SEARCH MODE : CIRCULAR ACD THRESHOLD : * |
| NUMBER OF ASSOCIATED ROUTES : 1 PRIORITY : 1 |
| THE FOLLOWING TRUNKS (LTG-LTU-SLOT-CCT) HAVE BEEN ALLOCATED: |

```

```

+-----+
| 1- 1- 73-0 B-CHL: 1 | 1- 1- 73-0 B-CHL: 2 | 1- 1- 73-0 B-CHL: 3 |
| 1- 1- 73-0 B-CHL: 4 | 1- 1- 73-0 B-CHL: 5 | 1- 1- 73-0 B-CHL: 6 |
| 1- 1- 73-0 B-CHL: 7 | 1- 1- 73-0 B-CHL: 8 | 1- 1- 73-0 B-CHL: 9 |
| 1- 1- 73-0 B-CHL: 10 | 1- 1- 73-0 B-CHL: 11 | 1- 1- 73-0 B-CHL: 12 |
| 1- 1- 73-0 B-CHL: 13 | 1- 1- 73-0 B-CHL: 14 | 1- 1- 73-0 B-CHL: 15 |
| 1- 1- 73-0 B-CHL: 16 | 1- 1- 73-0 B-CHL: 17 | 1- 1- 73-0 B-CHL: 18 |
| 1- 1- 73-0 B-CHL: 19 | 1- 1- 73-0 B-CHL: 20 | 1- 1- 73-0 B-CHL: 21 |
| 1- 1- 73-0 B-CHL: 22 | 1- 1- 73-0 B-CHL: 23 | 1- 1- 73-0 B-CHL: 24 |
| 1- 1- 73-0 B-CHL: 25 | 1- 1- 73-0 B-CHL: 26 | 1- 1- 73-0 B-CHL: 27 |
| 1- 1- 73-0 B-CHL: 28 | 1- 1- 73-0 B-CHL: 29 | 1- 1- 73-0 B-CHL: 30 |
+-----+

```

AMO-BUEND-210 TRUNK GROUP

DISPLAY COMPLETED;

<dis-refta

TYPE = circuit

PEN = 1-1-73-0

KIND = ;

DIS-REFTA:CIRCUIT,1-1-73-0,;

H500: AMO REFTA STARTED

```

+-----+
| REFERENCE CLOCK CIRCUITS |
+-----+-----+-----+-----+-----+-----+
| PEN | MODULE | DEVICE | PRI | ERROR | BLOCK | SUPP. | READY |
| | | | | | | | BUT |
| | | | | | | | ASYN. |

```

```

+-----+-----+-----+-----+-----+-----+-----+
| 1- 1- 73- 0 | DIU-N2 | S2CONN | 0 | 65535 | N | | N |
+-----+-----+-----+-----+-----+-----+-----+

```

AMO-REFTA-210 REFERENCE CLOCK TABLE

DISPLAY COMPLETED;

ROUTE CONFIGURATION

<dis-richt

MODE = all

DIS-RICT:ALL;

H500: AMO RICHT STARTED

```

+-----+
| LRTE = 1      NAME = CENTRAL OFFICE          SRVC = ALL |
| DNNO = 1 -1  -999  DESTNO = 99              |
| ROUTOPT = NO   REROUT = YES  PLB = NO      FWDBL = NO |
| MFV: CNV=FIX   DSP=WITHOUT TEXT=          PULS=PP300 |
| ROUTENO =     6  BUGS = LIN                 MAINGROUP = 6 |
| INFO =                                               |
+-----+
| TGRP = 30  LDAT   ANALOG TRUNKS             SUBGROUP = 3 |
+-----+
| LRTE = 37      NAME = PRI TEST              SRVC = ALL |
| DNNO = 1 -1  -999                              |
| ROUTOPT = NO   REROUT = YES  PLB = NO      FWDBL = NO |
| MFV: CNV=FIX   DSP=WITHOUT TEXT=          PULS=PP300 |
| ROUTENO =     4  BUGS = LIN                 MAINGROUP = 4 |
| INFO =                                               |
+-----+
| TGRP = 37  LDAT   PRI                       SUBGROUP = 10 |
| TGRP = 38  LDAT   QSIG                      SUBGROUP = 9 |
+-----+
| LRTE = 39      NAME = BRISLAVE              SRVC = ALL |

```

```
| DNNO = 1 -1 -1 |
| ROUTOPT = NO REROUT = YES PLB = NO FWDBL = NO |
| MFV: CNV=WITHOUT DSP=WITHOUT TEXT= PULS= |
| ROUTENO = 7 BUGS = LIN MAINGROUP = 7 |
| INFO = |
+-----+
| TGRP = 39 BRI SUBGROUP = 8 |
+-----+
| LRTE = 40 NAME = BRI TRUNK SRVC = ALL |
| DNNO = 1 -1 -999 DESTNO = 99 |
| ROUTOPT = NO REROUT = YES PLB = NO FWDBL = NO |
| MFV: CNV=FIX DSP=WITHOUT TEXT= PULS=PP300 |
| ROUTENO = 3 BUGS = LIN MAINGROUP = 3 |
| INFO = |
+-----+
| TGRP = 40 LDAT BRI MASTER SUBGROUP = 13 |
+-----+
+-----+-----+-----+
```

AMO-RICHT-210 TRUNK ROUTING
DISPLAY COMPLETED;

BOARD CONFIGURATION

```
<dis-bcsu

TYPE = tbl

LTG = 1

LTU = 1

SLOT = 73

DIS-BCSU:TBL,1,1,73;

H500: AMO BCSU STARTED

ADDRESS : LTG 1 LTU 1
```

```

-----+-----+-----+-----+-----+-----+-----+-----+
      | ASSIGNED | MODULE | FCT|HWY| | INSERTED | | | | MODULE | |
PEN | MODULE | TYPE | ID |BDL| | MODULE | |STATE| HW-INFO| STATUS | |
-----+-----+-----+-----+-----+-----+-----+-----+
    73 | Q2196-X   | DIU-N2 | 1  A | | Q2196-X   | | 1 | -04 - | READY | |
  
```

AMO-BCSU -210 BOARD CONFIGURATION, SWITCHING UNIT

DISPLAY COMPLETED;

STATION PHONE CONFIGURATION

<dis-sbcusu

STNO = 5001

TYPE = termdata

DIS-SBCSU:5001,TERMDATA;

H500: AMO SBCSU STARTED

```

----- USER DATA -----
STNO   =5001   OPT    =OPTI   COS1   =7     DPLN   =0     SPDI   =Y
MAINO  =5001   CONN   =DIR    COS2   =7     ITR    =0     SPDC1  =0
PEN    = 1- 1- 79- 2          LCOSV1 =31    COSX   =0     SPDC2  =1
INS    =Y      STD    =3     LCOSV2 =31    SERVID =0     CBKBMX =5
          SECR  =N     LCOSD1 =31    DSSTNA =N     RCBKB  =N
SSTNO  =N     DIGNODIS=N   LCOSD2 =31    DSSTNB =Y     RCBKNA =N
TRACE  =N     HFREE  =     ASYNCT =500  PERMACT=     CBKNAMB=Y
ALARMNO =0     HMUSIC =0     API    =N     TEXTSEL=ENGLISH
EXTBUS =     REP    =0     OPTICOM=N   OPTISPA:0     DLAUT  =
CALLOG =NONE  IDCR   =N     OPTICA  =0   OPTIS0A:0     DLMAN  =
          HEADSET =N   OPTIDA  =0   OPTIABA:0     PRIO   =
          HSKEY  =NORMAL ATMADDR=     VPI    =
          DFSVCANA=     TFAGRP  =     PATTERN=     VCI    =
DVCFIG =OPTISET TSI    =1     SOPTIDX=     SPROT  =
          DOPTIDX=     DPROT  =
  
```

```

FOPTIDX=      FPROT  =
TOPTIDX=      TPROT  =
VOPTIDX=      VPROT  =

----- ACTIVATION IDENTIFIERS FOR FEATURES -----
FWDS   :N      FWDT   :N      FWDV   :N      FWDF   :N      FWDD   :N
HTOS   :N      HTOT   :N      HTOV   :N      HTOF   :N      HTOD   :N
DND    :N      VCP    :Y      CWT    :N                                     TCLOGIN:N

----- FEATURES AND GROUP MEMBERSHIPS -----
ESSTN   :
PUGR    :      HUNTING GROUP   : N
KEYSYS  :N      NIGHT OPTION   : N      ASSOCIATED STN           : N

----- SUBSCRIBER ATTRIBUTES (AMO SDAT) -----
NONE

```

AMO-SBCSU-210 STATION AND S0-BUS CONFIGURATION OF SWITCHING UNIT
 DISPLAY COMPLETED;

LEAST COST ROUTING CONFIGURATION

```

<dis-ldat

TYPE = lcr

LROUTE = ;

DIS-LDAT:LCR, ;

H500: AMO LDAT STARTED

+-----+
| LROUTE = 1      LDPLN      NAME = CENTRAL OFFICE      SERVICE = ALL |
| TYPE = LCR                                           DNNO OF ROUTE = 1 -1 -999 |
| SERVICE INFO = |
+-----+-----+-----+-----+-----+-----+-----+-----+
|          |          |          |          | SCHEDULE | CARRIER  | BAND |          |
| LRTEL   | LVAL   | TGRP  | ODR   | LAUTH  | ABCDEFGH |     | ZONE | WIDTH | LATTR |
+-----+-----+-----+-----+-----+-----+-----+-----+

```

```

| 1 | 1 | 30 | 1 | 1 | ***** | 1 | EMPTY | 1 | NONE |
+-----+
| LROUTE = 31   LDPLN      NAME = E&M                SERVICE = VCE |
| TYPE = LCR                                DNNO OF ROUTE = 1 -1 -999 |
| SERVICE INFO =                               |
+-----+-----+-----+-----+-----+-----+-----+-----+
|           |           |           |           |           | SCHEDULE | CARRIER | BAND |           |
| LRTEL | LVAL | TGRP | ODR | LAUTH | ABCDEFGH | ZONE | WIDTH | LATTR |
+-----+-----+-----+-----+-----+-----+-----+-----+
| 1 | 1 | 31 | 1 | 1 | ***** | 1 | EMPTY | 1 | NONE |
+-----+
| LROUTE = 37   LDPLN      NAME = PRI TEST                SERVICE = ALL |
| TYPE = LCR                                DNNO OF ROUTE = 1 -1 -999 |
| SERVICE INFO =                               |
+-----+-----+-----+-----+-----+-----+-----+-----+
|           |           |           |           |           | SCHEDULE | CARRIER | BAND |           |
| LRTEL | LVAL | TGRP | ODR | LAUTH | ABCDEFGH | ZONE | WIDTH | LATTR |
+-----+-----+-----+-----+-----+-----+-----+-----+
| 1 | 1 | 37 | 1 | 1 | ***** | 1 | EMPTY | 1 | NONE |
| 2 | 1 | 38 | 1 | 1 | ***** | 1 | EMPTY | 1 | NONE |
+-----+
| LROUTE = 40   LDPLN      NAME = BRI TRUNK                SERVICE = ALL |
| TYPE = LCR                                DNNO OF ROUTE = 1 -1 -999 |
| SERVICE INFO =                               |
+-----+-----+-----+-----+-----+-----+-----+-----+
|           |           |           |           |           | SCHEDULE | CARRIER | BAND |           |
| LRTEL | LVAL | TGRP | ODR | LAUTH | ABCDEFGH | ZONE | WIDTH | LATTR |
+-----+-----+-----+-----+-----+-----+-----+-----+
| 1 | 1 | 40 | 1 | 1 | ***** | 1 | EMPTY | 1 | NONE |
+-----+

```

AMO-LDAT -210 LCR-DIRECTIONS

DISPLAY COMPLETED;

CLASS OF SERVICE

```
<dis-cot

COTNO = 4;

DIS-COT:4;

H500: AMO COT   STARTED

COT:   4  INFO: 4:Q931 EXTERNAL
DEVICE: INDEP          SOURCE: DB

PARAMETER:

      PRIORITY FOR AC WILL BE DETERMINED FROM MESSAGE          PRI
      RECALL IF USER HANGS UP IN CONSULTATION CALL            RCL
      TRUNK CALL TRANSFER                                       XFER
      TRUNK SIGNALING ANSWER                                    ANS
      CHANGEOVER FROM HOLD TO RING TONE                        CHRT
      KNOCKING OVERRIDE POSSIBLE                               KNOR
      CALL EXTEND FOR BUSY, RING OR CALL STATE                 CEBC
      NETWORKWIDE AUTOMATIC CALLBACK ON BUSY                   CBBN
      NETWORKWIDE AUTOMATIC CALLBACK ON FREE                   CBFN
      DON'T RELEASE CALL TO BUSY HUNT GROUP                    BSHT
      SEND NO NODE NUMBER TO PARTNER                           LWNC
      INCOMING CIRCUIT FROM SYSTEM WITHOUT LCR                 NLCR
      TSC-SIGNALING FOR NETWORKWIDE FEATURES (MANDATORY)      TSCS
      INCOMING CDR BY ZONE OR FROM LINE                         ICZL
      INCOMING CIRCUIT FROM SYSTEM WITHOUT LCR (DATA)         NLRD
      AOC PER CALL (AUTOMATICAL OR ON REQUEST), MAND. CORNET-NQ AOC
      CONTROLLED TRUNK AND LINE SELECTION                      CTLS
      NO TONE                                                  NTON

AMO-COT  -210          CLASS OF TRUNK FOR CALL PROCESSING

DISPLAY COMPLETED;

<dis-cossu

TYPE = cos
```

COS = 3

FORMAT = ;

DIS-COSSU: COS, 3, ;

H500: AMO COSSU STARTED

```

+-----+-----+-----+-----+-----+-----+
| COS | VOICE | FAX | TTX | VTX | DTE |
+-----+-----+-----+-----+-----+
| 3 |>3:STANDARD - FWDBSY | | | | |
| | TA | NOCO | NOCO | NOCO | TA |
| | TSUID | NOTIE | NOTIE | NOTIE | TNOTCR |
| | TNOTCR | | | | BASIC |
| | CDRINT | | | | MSN |
| | CDRS | | | | CDRINT |
| | CDRC | | | | MULTRA |
| | COSXCD | | | | |
| | VCE | | | | |
| | DATA | | | | |
| | FWDNWK | | | | |
| | MSN | | | | |
| | FWDBSY | | | | |
| | FWDEXT | | | | |
| | | | | | |
+-----+-----+-----+-----+-----+

```

AMO-COSSU-210 CLASSES OF SERVICE, SWITCHING UNIT

DISPLAY COMPLETED;

```

<dis-cossu
TYPE = cos

```

COS = 7;

DIS-COSSU: COS, 7;

H500: AMO COSSU STARTED

```

+-----+-----+-----+-----+-----+-----+

```


H500: AMO DBC STARTED

```
+-----+
| SYSTEM CLASSIFICATION : SYSTEM 80          (H80  ) |
| HARDWARE ASSEMBLY    : EXTENDED COMPACT CXE (CXE  ) |
| DEVELOPMENT LINE     : EUROPE DEVELOPMENT  (H300) |
| OPERATING MODE       : SIMPLEX              |
| RESTART TYPE         : SYM                  |
| HW-ARCHITECTURE      : 330E                |
| HW-ARCHITECTURE TYPE : 4                   |
|
| 'NO OF' HW VALUES
| LTG'S      : 1  LTU'S      : 4  LOG.LINES : 8000  MTS BD /GSN: 1 |
| SIUP'S/LTU: 4  TMD24'S PER LTU: 4  PHYS.PORTS: 2688  HWY /MTS BD: 64 |
| HDLC /DCL : 5  PBC /DCL   : 1  PBC'S     : 17      |
| LOG. SIU LINES      : 26                    |
| LOG. CONF LINES    : 35                    |
| LOG. DCL LINES     : 36                    |
| DB DIMENSIONING-NAME : 350EMSTD           CONF-TABLE VERSION: 1 |
| DB SUSY'S:
| SWITCH NUMBER : L31900Q2999A00001
| LOCATION      : CUSTOMER
| BAPPL         : 6ECXM48
| DBAPPL        : 6ECXM48
| SYSTEM_ID     : PKP091000
+-----+
```

AMO-DBC -210 DATABASE CONFIGURATION

DISPLAY COMPLETED;

Cisco 2651 Gateway Configuration

The following is the configuration of the Cisco 2651 gateway connected to the Siemens Hicom 330E PBX E1-PRI interface.

Cisco 2651 Voice Gateway Version Information

```
2651_A#sho ver
Cisco Internetwork Operating System Software
IOS (tm) C2600 Software (C2600-JS-M), Version 12.2(1), RELEASE SOFTWARE (fc2)
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Fri 27-Apr-01 11:41 by cmong
Image text-base: 0x80008088, data-base: 0x81370678

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

2651_A uptime is 23 hours, 40 minutes
System returned to ROM by power-on
System image file is "flash:c2600-js-mz.122-1"
```

```
cisco 2621 (MPC860) processor (revision 0x200) with 53248K/12288K bytes
of memory.
Processor board ID JAD051516TW (3874525999)
M860 processor: part number 0, mask 49
Channelized E1, Version 1.0.
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)
31 Serial network interface(s)
2 Channelized E1/PRI port(s)
32K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read/Write)
```

Cisco 2651 Voice Gateway Sample Configuration

```
2651_A#sho run
Building configuration...

Current configuration : 1270 bytes
!
version 12.2
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname 2651_A
!
logging rate-limit console 10 except errors
!
memory-size iomem 20
voice-card 1
!
ip subnet-zero
!
!
no ip finger
!
no ip dhcp-client network-discovery
isdn switch-type primary-net5
call rsvp-sync
!
!
!
```

```
!  
!  
!  
!  
controller E1 1/0  
  clock source internal  
  pri-group timeslots 1-31  
!  
controller E1 1/1  
  shutdown  
!  
!  
interface FastEthernet0/0  
  ip address 100.100.100.1 255.255.255.0  
  no ip mroute-cache  
  speed auto  
  half-duplex  
!  
interface FastEthernet0/1  
  ip address 10.1.1.207 255.255.255.0  
  duplex auto  
  speed auto  
!  
interface Serial1/0:15  
  no ip address  
  no logging event link-status  
  isdn switch-type primary-net5  
  isdn protocol-emulate network  
  isdn incoming-voice voice  
  no cdp enable  
!  
ip kerberos source-interface any  
ip classless  
no ip http server  
!  
!  
!  
voice-port 1/0:15  
!  
dial-peer cor custom  
!  
!  
!  
dial-peer voice 1 pots  
  destination-pattern 5...  
  direct-inward-dial  
  port 1/0:15  
  prefix 5  
!  
dial-peer voice 2 pots  
!  
dial-peer voice 4 voip  
  destination-pattern 3...  
  session target ipv4:100.100.100.2  
!  
!  
line con 0  
  transport input none  
line aux 0  
line vty 0 4  
  login  
line vty 5 15  
  login  
!  
end
```

Caveats

- The Siemens Hicom PBX does not support Overlap Signaling.