



Siemens HiPath 4000 Release 1.0 to a Cisco IAD243X using E1-Q.SIG with SIP

January 11, 2007 Initial Version

Table of Contents

Introduction	1
Network Topology.....	2
Limitations.....	2
Hardware Requirements	3
Software Requirements	3
Features	3
Feature Supported.....	3
Features Not Supported	3
Configuration.....	4
Configuring the Siemens HiPath 4000 PBX.....	4
Configuring the Cisco IAD2432 24FXS	11
Acronyms	16

Introduction

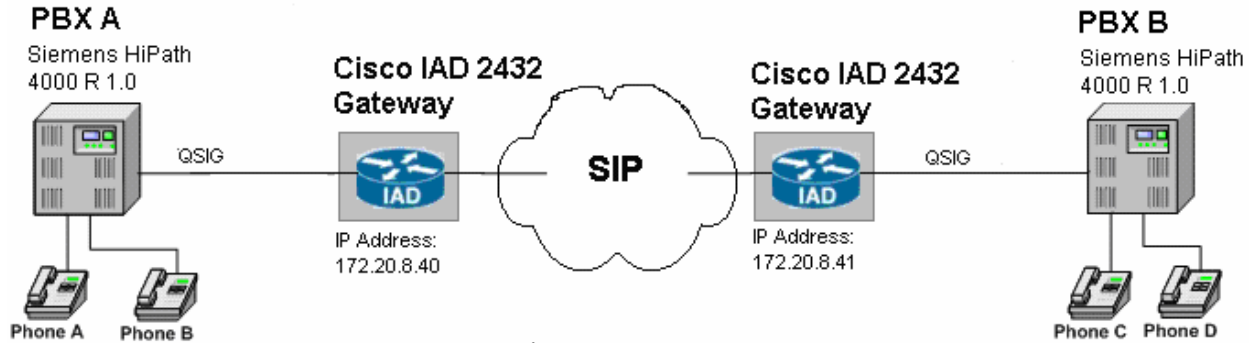
This is an application note for connectivity to a Siemens HiPath 4000 Release 1.0 with Cisco IAD243X Gateway via QSIG-to-SIP communication (10/100baseT).

The network topology diagram (Figure 1) shows the test setup for end-to-end interoperability with the Cisco IAD243X Gateway connected to the PBX via QSIG (E1 PRI). IP trunk connectivity between the Cisco IAD243X's is achieved by using SIP protocol.

Network Topology

Figure 1. Network Topology

Basic Call Setup End-to-End Configuration



Limitations

Calling Name (CNIP) feature does not interoperate. The limitation is due to the Cisco IAD2432 encoding the Calling Name using QSIG profile 'Rose' and gives an operation value of LocalValue=0, these parameters are unrecognized by the Avaya PBX and Calling Name presentation fails.

Connected Name (CONP) feature does not interoperate. The limitation is due to the Cisco IAD2432 not supporting this feature.

Connected Number does not follow the Call Forward feature (e.g. If Phone A calls Phone C, and Phone C is forwarded to Phone D, the connected number displayed on Phone A will be of Phone C's number, not of Phone D). The limitation is due to the Cisco IAD2432.

Connected Number restriction is not honored. The limitation is due to the Cisco IAD2432.

Alerting Name Presentation feature does not interoperate. The limitation is due to the Cisco IAD2432 not supporting this feature.

When Call Transfer or Call Forward features are invoked the name and number updates have limited functionality. The limitation is due to the Cisco IAD2432 not supporting the Q931 FACILITY message.



Hardware Requirements

2 Cisco IAD2432 24FXS

1 Cisco Catalyst switch (CAT6500)

(1) Siemens HiPath 40000

DIU-N2

Software Requirements

Siemens HiPath 4000 Release 1.0

Cisco IOS Release: c2430-ik9o3s-mz-124-9.T1

Features

Feature Supported

Basic end-to-end calls with CLIP (Calling Number) and COLP (Connected Number)

Calling Number Restricted (CLIR calling number only)

Overlap Receiving – IAD2432 can perform Overlap-Receiving, but outgoing call will be ENBLOC

Call Transfer – Local and Network/External

Call on-hold

Call Forward (Unconditional, Busy and No answer) – local , Call Forward Unconditional network/external

3-way Conference

DTMF end-to-end

Features Not Supported

Calling Name and Connected Name presentation

Alerting Name presentation

Call Forward No Answer and busy for network/external

Call Transfer Name/Number Facility updates

Call Forward Name/Number Facility updates

Overlap-Sending (Dialing out-from IAD)

QSIG-MWI



Configuration

Configuring the Siemens HiPath 4000 PBX

1. Add the new access code to Dialing Plans using WABE + LDPLN.
2. Add the new trunk board using BCSU.
3. Configure Class of Trunk using COT.
4. Configure Class of Parameter for device handler using COP.
5. Configure Class of Service using COSSU.
6. Add the new trunk group access code using BUEND.
7. Configure trunk using TDCSU.
8. Configure Reference Clock using REFTA.
9. Configure trunk Least Cost Routing using LDAT + RICHT.
10. Configure LCR Out-dial Rules using LODR.
11. Enable In-Band DTMF signaling for the Digital Stations using SBCSU.



DPLN

```
<dis-wabe:gen;
DIS-WABE:GEN;
H500: AMO WABE STARTED
```

DIGIT INTERPRETATION		VALID FOR ALL DIAL PLANS			
CODE	CALL PROGRESS STATE	DIGIT ANALYSIS	RESERVED/CONVERT		
	1 1111 1112 22		DNI/ADD-INFO		
	0 12345 67890 12345 67890 12	RESULT	*=OWN NODE		
0	. . . . . * . . . . . *	CO	R		
001 - 009	* * *	NETRTE			
111	. . . . . * . . . . . *	TIE			
12	. . . . . * . . . . . *	TIE	R		
13 - 14	. . . . . * . . . . . *	TIE			
21	. . . . . * . . . . . *	KNOVRKY			
22	. . . . . * . . . . . *	DNDKY			
222	. . . . . * . . . . . *	TIE			
23	. . . . . * . . . . . *	FWDKY			
24	. . . . . * . . . . . *	MBKY			
25	. . . . . * . . . . . *	MSGRKY			
26	. . . . . * . . . . . *	DAKY			
27	. . . . . * . . . . . *	DSSKY			
28	. . . . . * . . . . . *	VCRKY			
29	. . . . . * . . . . . *	VCKY			
30	. . . . . * . . . . . *	CONFKY			

DIGIT INTERPRETATION		VALID FOR ALL DIAL PLANS			
CODE	CALL PROGRESS STATE	DIGIT ANALYSIS	RESERVED/CONVERT		
	1 1111 1112 22		DNI/ADD-INFO		
	0 12345 67890 12345 67890 12	RESULT	*=OWN NODE		
3000 - 3010	. . . . . * . . . . . *	STN	DESTNO 30	DNNO 0- 0-222	
3011 - 3020	. . . . . * . . . . . *	STN	DESTNO 31	DNNO 0- 0- 31	
3021 - 3030	. . . . . * . . . . . *	STN	DESTNO 32	DNNO 0- 0- 32	
3031 - 3040	. . . . . * . . . . . *	STN	DESTNO 33	DNNO 0- 0- 33	
3041 - 3050	. . . . . * . . . . . *	STN	DESTNO 35	DNNO 0- 0- 35	
31	. . . . . * . . . . . *	NAMEKY			
32	. . . . . * . . . . . *	PARKKY			

DIGIT INTERPRETATION		VALID FOR ALL DIAL PLANS			
CODE	CALL PROGRESS STATE	DIGIT ANALYSIS	RESERVED/CONVERT		
	1 1111 1112 22		DNI/ADD-INFO		
	0 12345 67890 12345 67890 12	RESULT	*=OWN NODE		
33	. . . . . * . . . . . *	CCKY			
34	. . . . . * . . . . . *	HTKY			
35	. . . . . * . . . . . *	STKY			
36	. . . . . * . . . . . *	REMKY			
36 - 37	. . . . . * . . . . . *	CO			
38	. . . . . * . . . . . *	TIMEKY			
39	. . . . . * . . . . . *	TIE			



4000 - 4050	. **** * *	STN	DESTNO 111 DNNO 0- 0-111
4051 - 4566	. **** * *	STN	DESTNO 222 DNNO 0- 0-222
4567	. **** * *	STN	DESTNO 34 DNNO 0- 0-200

DIGIT INTERPRETATION VALID FOR ALL DIAL PLANS

CODE	CALL PROGRESS STATE 1 1111 11112 22 0 12345 67890 12345 67890 12	DIGIT	RESERVED/CONVERT
		ANALYSIS RESULT	DNI/ADD-INFO *=OWN NODE
4568 - 4999	. **** * *	STN	DESTNO 222 DNNO 0- 0-222
5000 - 5040	. **** * *	STN	DESTNO 0 DNNO 0- 0-555*
5500 - 5501	. **** * *	STN	DESTNO 56 DNNO 0- 0-560
555	. **** * *	OWNNODE	
560	. **** * *	TIE	
59	. **** * *	TIE	
6000 - 6009	. **** * *	STN	R DESTNO 0 DNNO 0- 0-555*

DIGIT INTERPRETATION VALID FOR ALL DIAL PLANS

CODE	CALL PROGRESS STATE 1 1111 11112 22 0 12345 67890 12345 67890 12	DIGIT	RESERVED/CONVERT
		ANALYSIS RESULT	DNI/ADD-INFO *=OWN NODE
7000 - 7002	. **** * *	STN	DESTNO 56 DNNO 0- 0-560
8000 - 8050	. **** * *	STN	DESTNO 222 DNNO 0- 0-222
8060	. **** * *	TIE	
8070	. **** * *	TIE	
83	. **** * *	SPDC1	
84	. **** * *	SPDC2	
88	. . . . . *	SCONSI	R
89	. . . . . *	SCONSCO	R
9	. **** * *	TIE	
*13	. . . . . *	AHTVCE	
*15	. * *	SPLIT	
*16	. . . . . *	AREM	
*17	. * *	TRACE	

DIGIT INTERPRETATION VALID FOR ALL DIAL PLANS

CODE	CALL PROGRESS STATE 1 1111 11112 22 0 12345 67890 12345 67890 12	DIGIT	RESERVED/CONVERT
		ANALYSIS RESULT	DNI/ADD-INFO *=OWN NODE
*18	. . . . . *	ACOSX	
*19	. * *	KNOVR	
*20	. . . . . *	ADND	
*25	. . . . . *	FWDTERM	
*29	. . . . . *	AFFWDVCE	



 AMO-WABE -111 DIALLING PLANS, FEATURE ACCESS CODES
 DISPLAY COMPLETED;

BCSU

PRI Board

<DISPLAY-BCSU:TYPE=TBL,LTG=1,LTU=2,SLOT=49;
 DISPLAY-BCSU:TYPE=TBL,LTG=1,LTU=2,SLOT=49;
 H500: AMO BCSU STARTED

ADDRESS : LTG 1 LTU 2 SOURCE GROUP 1

PEN	ASSIGNED MODULE	MODULE TYPE	FCT ID	HWY BDL	INSERTED MODULE	STATE	HW-INFO	MODULE STATUS
49	Q2196-X	DIU-N2	1	A	Q2196-X	1	-06 -	READY

AMO-BCSU -111 BOARD CONFIGURATION, SWITCHING UNIT
 DISPLAY COMPLETED;

Class of Trunk, COT

<dis-cot:21;
 DIS-COT:21;
 H500: AMO COT STARTED

COT: 21 INFO:
 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
CONNECTION TO ROUTE OPTIMIZATION NODE	ROPT
TSC-SIGNALING FOR NETWORKWIDE FEATURES (MANDATORY)	TSCS
INCOMING CDR BY ZONE OR FROM LINE	ICZL
AOC PER CALL (AUTOMATICAL OR ON REQUEST), MAND. CORNET-NQ	AOCC
LINE WITH IMPLICIT NUMBERS	LINO
NO TONE	NTON

AMO-COT -111 CLASS OF TRUNK FOR CALL PROCESSING
 DISPLAY COMPLETED;



Class of Parameter for Device Handler, COP

```

<DISPLAY-COP:COPNO=21;
DISPLAY-COP:COPNO=21;
H500: AMO COP STARTED

COP: 21 INFO:
DEVICE: INDEP SOURCE: DB
PARAMETER:
  LINE WITH END-OF-DIAL EOD
  SPECIAL MODE SFRM
  CODE CALLING RELEASE AFTER EVERY TASK CCR
  REGISTRATION OF LAYER 3 ADVISORIES L3AR
  MAKE/BREAK RATIO FOR DTMF 1 (PULSE=80MS,PAUSE=80MS) DTM1

CO TRUNK ACCESS:
  TRUNK ACCESS TA

TOLL ACCESS:
  TRUNK ACCESS TA

AMO-COP -111 CLASS OF PARAMETER FOR DEVICE HANDLER
DISPLAY COMPLETED;
  
```

Class of Service, COSSU

```

<DISPLAY-COSSU:TYPE=COS,COS=10;
DISPLAY-COSSU:TYPE=COS,COS=10;
H500: AMO COSSU STARTED
  
```

COS	VOICE	FAX	DTE
10	> TA TSUID TNOTCR RKOABS CDRINT CDRS CDRC COSXCD VCE FWDNWK MSN FWDECA CFB CFNR FWDEXT	NOCO NOTIE	NOCO NOTIE

```

AMO-COSSU-111 CLASSES OF SERVICE
DISPLAY COMPLETED;
  
```




```
<DISPLAY-COSSU:TYPE=LCOSV,LCOSV=1;
DISPLAY-COSSU:TYPE=LCOSV,LCOSV=1;
H500: AMO COSSU STARTED
```

```

+-----+-----+-----+-----+-----+-----+-----+
| LCOS |                                     LAUTH |
| V | 1 2 3 4 5 6 |
| 12345678901234567890123456789012345678901234 | COPIN |
| >SERVICE INFORMATION | NUM |
+-----+-----+-----+-----+-----+-----+-----+
| 1 | X..... | 0 |
| >LCR ATTENDANT FOR VOICE |
+-----+-----+-----+-----+-----+-----+

```

```
AMO-COSSU-111 CLASSES OF SERVICE
DISPLAY COMPLETED;
<DISPLAY-COSSU:TYPE=LCOSD,LCOSD=1;
DISPLAY-COSSU:TYPE=LCOSD,LCOSD=1;
H500: AMO COSSU STARTED
```

```

+-----+-----+-----+-----+-----+-----+-----+
| LCOS |                                     LAUTH |
| D | 1 2 3 4 5 6 |
| 12345678901234567890123456789012345678901234 | COPIN |
| >SERVICE INFORMATION | NUM |
+-----+-----+-----+-----+-----+-----+-----+
| 1 | X..... | . |
+-----+-----+-----+-----+-----+-----+

```

```
AMO-COSSU-111 CLASSES OF SERVICE
DISPLAY COMPLETED;
```

Trunk Group Access Code, BUEND

```
<DISPLAY-BUEND:TGRP=20,FORMAT=L;
DISPLAY-BUEND:TGRP=20,FORMAT=L;
H500: AMO BUEND STARTED
```

```

+-----+-----+-----+-----+-----+-----+-----+
| TGRP NUMBER : 20 TGRP NAME : PRI PSSV1 MAXIMUM NO. : 70 |
| CHARCON : NEUTRAL |
| SUBGROUP NO.: 3 DEVICE TYPE : S2CONN TRACENO : 0 |
| RESERVED : N SEARCH MODE : ASCENDING ACD THRESHOLD : * |
| NUMBER OF ASSOCIATED ROUTES : 2 PRIORITY : 2 |
| TDDRFLAG : ON TDDRTHRESHOLD: 3 SOURCEGROUPIDX : 1 |
| GDTRRULE : 0 ACDCMGRP : 0 |
| THE FOLLOWING TRUNKS (LTG-LTU-SLOT-CCT) HAVE BEEN ALLOCATED: |
+-----+-----+-----+-----+-----+-----+-----+
| 1- 2- 49-0 1 | 1- 2- 49-0 2 | 1- 2- 49-0 3 |
| 1- 2- 49-0 4 | 1- 2- 49-0 5 | 1- 2- 49-0 6 |
| 1- 2- 49-0 7 | 1- 2- 49-0 8 | 1- 2- 49-0 9 |
| 1- 2- 49-0 10 | 1- 2- 49-0 11 | 1- 2- 49-0 12 |
| 1- 2- 49-0 13 | 1- 2- 49-0 14 | 1- 2- 49-0 15 |
| 1- 2- 49-0 16 | 1- 2- 49-0 17 | 1- 2- 49-0 18 |
| 1- 2- 49-0 19 | 1- 2- 49-0 20 | 1- 2- 49-0 21 |
| 1- 2- 49-0 22 | 1- 2- 49-0 23 | 1- 2- 49-0 24 |
| 1- 2- 49-0 25 | 1- 2- 49-0 26 | 1- 2- 49-0 27 |
| 1- 2- 49-0 28 | 1- 2- 49-0 29 | 1- 2- 49-0 30 |
+-----+-----+-----+-----+-----+-----+-----+

```

```
AMO-BUEND-111 TRUNK GROUP
DISPLAY COMPLETED;
```



Trunk Configuration, TDCSU

For Master-side Configuration

<DISPLAY-TDCSU: PEN1=1-2-49-0;
DISPLAY-TDCSU: PEN1=1-2-49-0;
H500: AMO TDCSU STARTED

Table with columns: DEV, PEN, TGRP, INS, SRCHMODE, DPLN, COPNO, LCOSV, DESTNO, DEDSCC, DEDSVC, FACILITY, DITIDX, TRTBLE, SIDANI, ATNTYP, CBMATTR, NWMUXTIM, TCHARG, SUPPRESS, DGTPR, CHIMAP, ISDNIP, ISDNNP, PNPL2P, PNPL1P, PNPAC, TRACOUNT, SATCOUNT, NNO, ALARMNO, FIDX, CARRIER, ZONE, COTX, FWDX, DOMTYPE, DOMAINNO, TPROFNO, INIGHT, CCHDL, UUSCCX, UUSCCY, FNIDX, CLASSMRK, EC, G711, G729OPT, SRCGRP, TCCID, BCNEG, BCGR, LWPAR, LWPP, LWLT, LWPS, LWR1, LWR2, SVCDOM, BCHAN.

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

AMO-TDCSU-111 DIGITAL TRUNKS
DISPLAY COMPLETED;

<DISPLAY-LWPAR: FORMAT=L, TYPE=DIUS2, BLNO=1;
DISPLAY-LWPAR: FORMAT=L, TYPE=DIUS2, BLNO=1;
H500: AMO LWPAR STARTED

Table with columns: LOADWARE PARAMETERS, CIRCUIT TYPE: DIUS2, SOURCE:DB, BLOCK: 1. Rows include: LNTYPE, MASTER, PATTERN, SMD, CDG, TEIVERIF, DEV, INFO, VERSION, DCHAN1, QUAL1, PERMACT, FIXEDTEI, CRC4REP, QUAL, DCHAN2, QUAL2, FCBAB, CNTRNR.

AMO-LWPAR-111 LOADWARE PARAMETERS FOR NETWORKING MODULES
DISPLAY COMPLETED;



For Slave-side Configuration

<DISPLAY-TDCSU: PEN1=1-2-49-0;

DISPLAY-TDCSU: PEN1=1-2-49-0;

H500: AMO TDCSU STARTED

```

+-----+-----+-----+-----+-----+
| DEV      = S2CONN          PEN      = 1-02-049-0  TGRP      = 20
+-----+-----+-----+-----+
| PROTVAR  = PSS1V2          INS       = Y          SRCHMODE  = ASC
| COTNO    = 21              COPNO    = 21          DPLN      = 0
| ITR      = 1              COS       = 10          LCOSV     = 1
| LCOSD    = 1              CCT       = HICOM S2    DESTNO    = 1
| SEGMENT  = 1              DEDSCC  =          DEDSVC    = NONE
| FACILITY =          DITIDX  =          SRTIDX    =
| TRTBL    = GDTR           SIDANI   = N          ATNTYP    = TIE
| CBMATTR  = NONE          NWMUXTIM = 10        TCHARG    = N
| SUPPRESS = 0             DGTPR   =          CHIMAP    = N
| ISDNIP   =              ISDNNP  =
| PNPL2P   =              PNPL1P  =          PNPAC     =
| TRACOUNT = 31            SATCOUNT = MANY    NNO       = 1 -1 -300
| ALARMNO  = 0             FIDX    = 1          CARRIER  = 1
| ZONE     = EMPTY        COTX    = 21        FWDX     = 5
| DOMTYPE  =              DOMAINNO =          TPROFNO  =
| INIGHT   =              UUSCCY   = 8          CCHDL    =
| UUSCCX   = 16           UUSCCY   = 8          FNIDX    = 1
| CLASSMRK = EC          & G711  & G729OPT  SRCGRP    =
| TCCID    =
+-----+-----+-----+-----+
| BCNEG    = N             BCGR     = 1          LWPAR     = 0
| LWPP     = 0            LWLT     = 0          LWPS     = 0
| LWR1     = 0            LWR2     = 0
| SVCDOM   =
| BCHAN    = 1 && 30
+-----+-----+-----+-----+

```

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

AMO-TDCSU-111 DIGITAL TRUNKS

DISPLAY COMPLETED;

<DISPLAY-LWPAR: FORMAT=L, TYPE=DIUS2, BLNO=0;

DISPLAY-LWPAR: FORMAT=L, TYPE=DIUS2, BLNO=0;

H500: AMO LWPAR STARTED

```

+-----+-----+-----+-----+-----+
| LOADWARE PARAMETERS          CIRCUIT TYPE: DIUS2  SOURCE:DB  BLOCK: 0
+-----+-----+-----+-----+
| LNTYPE   = COPPER            VERSION    = S2          QUAL       = ON
| MASTER   = N                 DCHAN1    = 16          DCHAN2    = 0
| PATTERN  = D5H               QUAL1     = 10 SEC.    QUAL2     = 10 MIN.
| SMD      = N                 PERMACT   = Y          FCBAB     = DFH
| CDG      = N                 FIXEDTEI  = 0          CNTRNR    = 255
| TEIVERIF = N                 CRC4REP   = N
| DEV      = INDEP
| INFO     =
+-----+-----+-----+-----+

```

AMO-LWPAR-111 LOADWARE PARAMETERS FOR NETWORKING MODULES

DISPLAY COMPLETED;

Configuring the Cisco IAD2432 24FXS

IAD_HiPath#sh run

Building configuration...



```
controller E1 1/1
mode cas
framing NO-CRC4
!
!
!
!
!
interface FastEthernet0/0
ip address 172.20.8.41 255.255.255.0
duplex auto
speed auto
!
interface FastEthernet0/1
no ip address
shutdown
duplex auto
speed auto
!
interface Serial1/0:15
no ip address
encapsulation hdlc
isdn switch-type primary-qsig
isdn overlap-receiving
isdn incoming-voice voice
isdn supp-service name calling
isdn contiguous-bchan
no cdp enable
!
ip default-gateway 172.20.8.1
ip http server
no ip http secure-server
!
ip route 0.0.0.0 0.0.0.0 172.20.8.1
!
!
!
!
!
control-plane
!
!
!
voice-port 1/0:15
!
voice-port 2/0
!
voice-port 2/1
!
voice-port 2/2
!
voice-port 2/3
!
voice-port 2/4
!
voice-port 2/5
!
voice-port 2/6
```



```
!  
voice-port 2/7  
!  
voice-port 2/8  
!  
voice-port 2/9  
!  
voice-port 2/10  
!  
voice-port 2/11  
!  
voice-port 2/12  
!  
voice-port 2/13  
!  
voice-port 2/14  
!  
voice-port 2/15  
!  
voice-port 2/16  
!  
voice-port 2/17  
!  
voice-port 2/18  
!  
voice-port 2/19  
!  
voice-port 2/20  
!  
voice-port 2/21  
!  
voice-port 2/22  
!  
voice-port 2/23  
!  
!  
!  
!  
!  
dial-peer voice 8000 voip  
destination-pattern 8...  
session protocol sipv2  
session target ipv4:172.20.8.40  
dtmf-relay rtp-nte  
supplementary-service pass-through  
!  
dial-peer voice 5000 pots  
destination-pattern 5...  
supplementary-service pass-through  
direct-inward-dial  
port 1/0:15  
forward-digits all  
!  
!  
gateway  
timer receive-rtp 1200  
!  
sip-ua  
!  
!
```



```
!  
line con 0  
password cisco  
login  
line aux 0  
line vty 0 4  
exec-timeout 0 0  
password cisco  
login  
!  
end
```

IAD_HiPath#



Acronyms

Acronym	Definitions
IAD	Integrated Access Device
SIP	Session Initiation Protocol



Important Information

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.



**Corporate
Headquarters**

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

**European
Headquarters**

Cisco Systems International
BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: 31 0 20 357 1000
Fax: 31 0 20 357 1100

**Americas
Headquarters**

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

**Asia Pacific
Headquarters**

Cisco Systems, Inc.
Capital Tower
168 Robinson Road
#22-01 to #29-01
Singapore 068912
www.cisco.com
Tel: +65 317 7777
Fax: +65 317 7799

Cisco Systems has more than 200 offices in the following countries and regions. Addresses, phone numbers, and fax numbers are listed on the Cisco Web site at www.cisco.com/go/offices.

Argentina • Australia • Austria • Belgium • Brazil • Bulgaria • Canada • Chile • China PRC • Colombia • Costa Rica • Croatia • Czech Republic • Denmark • Dubai, UAE • Finland • France • Germany • Greece • Hong Kong SAR • Hungary • India • Indonesia • Ireland • Israel • Italy • Japan • Korea • Luxembourg • Malaysia • Mexico • The Netherlands • New Zealand • Norway • Peru • Philippines • Poland • Portugal • Puerto Rico • Romania • Russia • Saudi Arabia • Scotland • Singapore • Slovakia • Slovenia • South Africa • Spain • Sweden • Switzerland • Taiwan • Thailand • Turkey • Ukraine • United Kingdom • United States • Venezuela • Vietnam • Zimbabwe

© 2007 Cisco Systems, Inc. All rights reserved.

CCVP, the Cisco Logo, and the Cisco Square Bridge logo are trademarks of Cisco Systems, Inc.; Changing the Way We Work, Live, Play, and Learn is a service mark of Cisco Systems, Inc.; and Access Registrar, Aironet, BPX, Catalyst, CCDA, CCDP, CCIE, CCIP, CCNA, CCNP, CCSP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Cisco Unity, Enterprise/Solver, EtherChannel, EtherFast, EtherSwitch, Fast Step, Follow Me Browsing, FormShare, GigaDrive, GigaStack, HomeLink, Internet Quotient, IOS, iPhone, IP/TV, iQ Expertise, the iQ logo, iQ Net Readiness Scorecard, iQuick Study, LightStream, Linksys, MeetingPlace, MGX, Networking Academy, Network Registrar, Packet, PIX, ProConnect, RateMUX, ScriptShare, SlideCast, SMARTnet, StackWise, The Fastest Way to Increase Your Internet Quotient, and TransPath are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or Website are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0612R)

Printed in the USA