



Avaya S8500 Version 4.0 to Cisco IOS Voice Gateway using H.323 with T1-PRI to PSTN

February 14, 2008

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Introduction

- This Application note provides basic call interoperability and documented steps and configurations necessary for H.323 integration between Avaya S8500 to Cisco IOS Voice Gateway providing PSTN (T1-NI2) connectivity.
- The H.323 protocol is used between Cisco IOS Voice gateway and Avaya S8500. The connection between Cisco IOS gateway and PSTN uses T1-PRI with NI2 as ISDN switch type.
- Features tested include Basic call, Call Transfer supervised, Call Transfer blind, Call Forward (Unconditional, Busy and No Answer), Three-way Conference, DTMF tones (in-band and relay via RFC2833), Digit Translation, and Call Hold.
- The Cisco IOS Voice Gateway offers the advantage of providing connectivity between Avaya S8500 and PSTN by offering H.323 to T1-NI2 inter-working functionality.
- The network topology diagram (Figure 1) shows the test setup for end-to-end interoperability with the Cisco IOS Voice Gateway connected to the Avaya S8500 (10/100baseT) and connected to the PSTN via T1-NI2.
- This Application Notes uses the Cisco 3845 IOS-voice-gateway, however other Cisco voice gateways are also an option to use since the voice gateway implementation does not depend on the platform. Below is a list of Cisco platforms capable of voice gateway functionality: Care must be taken when selecting a voice gateway platform depending on the capacity and capability required for the intended deployment.

[Cisco 1861 Integrated Services Router](#)

[Cisco IAD2400 Series Integrated Access Device](#)

[Cisco 2800 Series Integrated Services Routers](#)

[Cisco 3700 Series Routers](#)

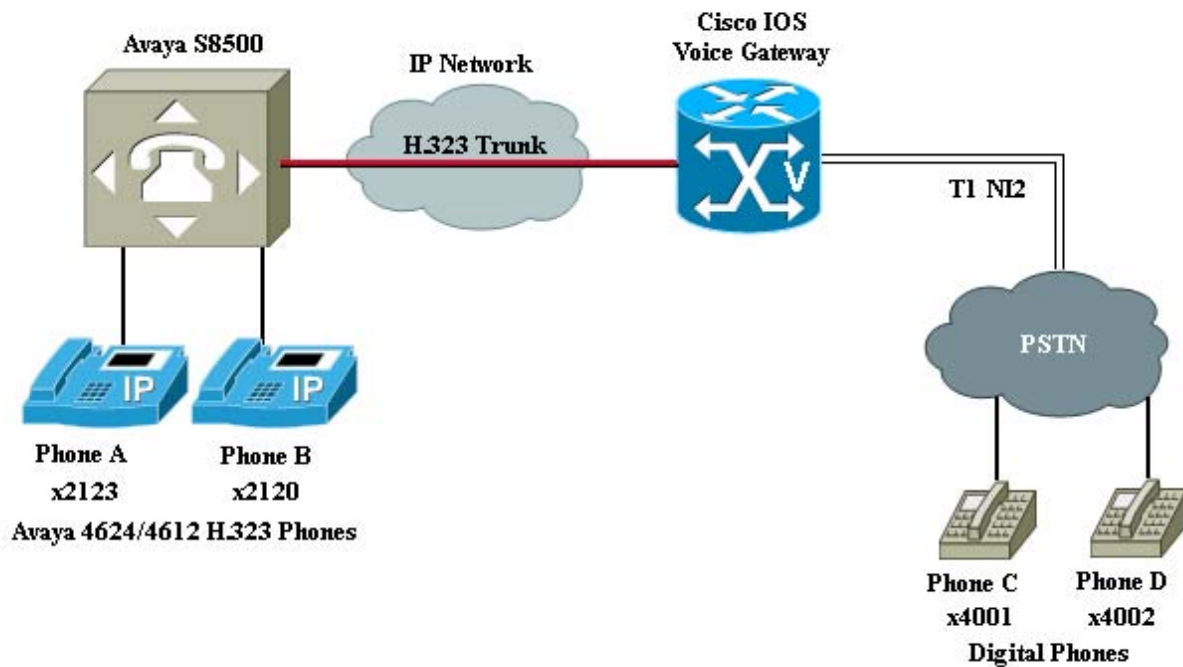
[Cisco 3800 Series Integrated Services Routers](#)

[Cisco AS5350XM Universal Gateway](#)

[Cisco AS5400XM Universal Gateway](#)

Network Topology

Figure 1. Network Topology



Limitations

- Basic call using G.726-32K and G.722-64K failed. Avaya rejects G.726 and G.722 codec, even when the Avaya is set for G.726 and G.722.
- The Avaya H323 phones did not work when the trunk codec was set to G.723-5.3K or G.723-6.3K.
- For inband DTMF, the Avaya "DTMF over IP" setting in the signalling group had to be set to "in-band", not "in-band-g711".
- RFC2833 DTMF relay is currently not supported in IOS. Support for this feature is in progress.



System Components

Hardware requirements

Cisco equipment

- Cisco 3845 (Cisco 3800 family routers)

Avaya equipment

- Avaya S8500
- (2) Avaya 4624/4612 IP phones
- TN2312BP IPSI
- TN799DP C-LAN
- TN2302AP IP Media Processor

Software Requirements

- Cisco IOS Voice Gateway: Cisco IOS Release – Cisco 3845 Version 12.4(15)T3: c3845-ipvoice-mz.124-15.T3.bin
- Avaya Communications Manager Release 4.0
- Avaya 4612/4624 (H.323 phones) load: def24rl_8_3.bin

Features

Features Supported

- Basic call with G.711alaw, G.711ulaw, G.729, G.729B
- CLID (name and number) on basic calls
- Call Transfer Blind and Call Transfer Supervised
- Call Conference
- Call on Hold
- Call Forward All
- Call Forward No Reply
- Call Forward Busy
- Digit Translation
- DTMF – in-band
- DTMF – H245 alphanumeric / signal

Features Not Supported

- DTMF – RFC2833



Configuration

Avaya S8500 Configuration

Figure 2. Signaling group (In band)

The screenshot shows the DEFINITY Site Administration interface for configuring a signaling group. The window title is "DEFINITY Site Administration - [SIP2 GEDI]". The main configuration area is titled "SIGNALING GROUP" and displays the following settings:

- Group Number:** 115 (highlighted with a red box)
- Group Type:** h.323
- Remote Office?** n
- SBS?** n
- IP Video?** n
- Trunk Group for Channel Selection:** 115
- TSC Supplementary Service Protocol:** a
- T303 Timer(sec):** 10
- Near-end Node Name:** clan1
- Far-end Node Name:** Chris-GW
- Near-end Listen Port:** 1720
- Far-end Listen Port:** 1720
- Far-end Network Region:** 1
- LRQ Required?** n
- RRQ Required?** n
- Media Encryption?** n
- DTMF over IP:** in-band (highlighted with a red box)
- Link Loss Delay Timer(sec):** 90
- Enable Layer 3 Test?** n
- Max number of NCA TSC:** 10
- Max number of CA TSC:** 10
- Trunk Group for NCA TSC:** 115
- Calls Share IP Signaling Connection?** n
- H245 Control Addr On FACility?** n
- Bypass If IP Threshold Exceeded?** n
- H.235 Annex H Required?** n
- Direct IP-IP Audio Connections?** n
- IP Audio Hairpinning?** n
- Interworking Message:** PROGRESS
- DCP/Analog Bearer Capability:** 3.1kHz

The interface includes a left-hand navigation pane with options like "Start GEDI", "Add User", "Change User Name", etc. At the bottom, there is a "History" tab showing a log of recent configuration changes, including "change signaling-group 115".



Figure 3. Signaling group (H245)

The screenshot shows the Cisco DEFINTY Site Administration interface for a SIP2 GEDI system. The main window displays the configuration for signaling group 115. The configuration is organized into several sections:

- General:** Includes fields for Group Number (115), Group Type (h.323), Remote Office?, SBS?, IP Video?, Trunk Group for Channel Selection (115), TSC Supplementary Service Protocol (a), and T303 Timer (10).
- Nodes:** Includes Near-end Node Name (clan1), Near-end Listen Port (1720), Far-end Node Name (Chris-GW), and Far-end Listen Port (1720).
- Advanced:** Includes fields for Far-end Network Region (1), Calls Share IP Signaling Connection?, H245 Control Addr On FACility?, Bypass If IP Threshold Exceeded?, H.235 Annex H Required?, Direct IP-IP Audio Connections?, IP Audio Hairpinning?, Interworking Message (PROGress), and DCP/Analog Bearer Capability (3.1kHz).
- Media:** Includes fields for LRQ Required?, RRQ Required?, Media Encryption?, and DTMF over IP (out-of-band).
- Link Loss:** Includes Link Loss Delay Timer (90).
- Testing:** Includes Enable Layer 3 Test?

The interface also features a left-hand navigation pane with options like Start GEDI, Add User, Change User Name, Remove User, Add Bridged Appearance, Browse Dial Ranges, Browse Stations, Browse Unused Ports, Find Unused Extension, and Print Button Labels. At the bottom, there is a History log showing recent system changes.

Severity	Date/Time	System	Description
Info	1/25/2008 3:01:15 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 3:00:24 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:50:33 PM	SIP2	change signaling-group 115
Info	1/25/2008 2:50:28 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:48:41 PM	SIP2	change signaling-group 115



Figure 4. Signaling group (RFC 2833)

DEFINITY® Site Administration - [SIP2 GEDI]

File Edit View System Action Tools Window Help

change signaling-group 115 send (return) help (f5) cancel (esc) enter (f3) schedule (f9) next (f7) previous (f8) next form (f6)

1 2 3 4 5

SIGNALING GROUP

Group Number: 115

Group Type: h.323

Remote Office? n

SBS? n

Max number of NCA TSC:

Max number of CA TSC:

Trunk Group for NCA TSC:

IP Video? n

Trunk Group for Channel Selection:

TSC Supplementary Service Protocol:

T303 Timer(sec):

Near-end Node Name: Far-end Node Name:

Near-end Listen Port: Far-end Listen Port:

Far-end Network Region:

LRQ Required? n

RRQ Required? n

Media Encryption? n

DTMF over IP:

Link Loss Delay Timer(sec):

Enable Layer 3 Test? n

Calls Share IP Signaling Connection? n

H245 Control Addr On FACility? n

Bypass IF IP Threshold Exceeded? n

H.235 Annex H Required? n

Direct IP-IP Audio Connections? n

IP Audio Hairpinning? n

Interworking Message:

DCP/Analog Bearer Capability:

Right-click in a field to see a list of valid entries or help text

Severity	Date/Time	System	Description
Info	1/25/2008 3:01:15 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 3:00:24 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:50:33 PM	SIP2	change signaling-group 115
Info	1/25/2008 2:50:28 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:48:41 PM	SIP2	change signaling-group 115

Ready NUM



Figure 5. Trunk group – p1 of 5 (trunk group number circled).

The screenshot shows the DEFINITY Site Administration interface for a SIP2 system. The main window displays the configuration for Trunk Group 115. The 'Group Number' field is circled in red. The configuration includes the following fields:

- Group Number: 115
- Group Type: isdn
- CDR Reports:
- Group Name: Chris's H323-GW
- COR: 1
- TN: 1
- TAC: 818
- Direction: two-way
- Outgoing Display?:
- Carrier Medium: H.323
- Dial Access?:
- Busy Threshold: 255
- Night Service:
- Queue Length: 0
- Service Type: tie
- Auth Code?:
- Member Assignment Method: manual

The interface also shows a left-hand navigation pane with options like 'Start GEDI', 'Add User', 'Change User Name', etc. At the bottom, there is a 'History' tab showing a list of events:

Severity	Date/Time	System	Description
Info	1/25/2008 3:01:15 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 3:00:24 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:50:33 PM	SIP2	change signaling-group 115
Info	1/25/2008 2:50:28 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:48:41 PM	SIP2	change signaling-group 115



Figure 6. Trunk group – p2 of 5

DEFINITY Site Administration - [SIP2 GEDI]

change trunk-group 115

Group Type: isdn

TRUNK PARAMETERS

Codeset to Send Display: 0 Codeset to Send National IEs: 6

Charge Advice: none

Supplementary Service Protocol: q Digit Handling (in/out): enbloc/enbloc

Digital Loss Group: 18

Incoming Calling Number - Delete: Insert: Format:

Disconnect Supervision - In? Out?

Answer Supervision Timeout: 0

Severity	Date/Time	System	Description
Info	1/25/2008 3:01:15 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 3:00:24 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:50:33 PM	SIP2	change signaling-group 115
Info	1/25/2008 2:50:28 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:48:41 PM	SIP2	change signaling-group 115



Figure 7. Trunk group – p3 of 5

The screenshot shows the 'DEFINITY Site Administration - [SIP2 GEDI]' window. The main configuration area is titled 'TRUNK FEATURES' and contains the following settings:

- ACA Assignment? n
- Measured:
- Internal Alert? n
- Maintenance Tests? y
- Data Restriction? n
- NCA-TSC Trunk Member:
- Send Name: y
- Send Calling Number: y
- Send EMU Visitor CPN? n
- Used for DCS? n
- Format:
- UI IE Treatment:
- Suppress # Outpulsing? n
- Replace Restricted Numbers? y
- Replace Unavailable Numbers? y
- Send Connected Number: y
- Hold/Unhold Notifications? n
- Modify Tandem Calling Number? n
- Send UUI IE? y
- Send UCID? n
- Send Codeset 6/7 LAI IE? y

The bottom pane shows a log of events:

Severity	Date/Time	System	Description
Info	1/25/2008 3:01:15 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 3:00:24 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:50:33 PM	SIP2	change signaling-group 115
Info	1/25/2008 2:50:28 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:48:41 PM	SIP2	change signaling-group 115



Figure 8. Trunk group – p4 of 5

The screenshot shows the DEFINITY Site Administration interface for SIP2 GEDI. The main window displays the configuration for 'change trunk-group 115'. The interface includes a navigation pane on the left with options like 'Start GEDI', 'Add User', and 'Change User Name'. The main content area shows 'QSIG TRUNK GROUP OPTIONS' with two input fields: 'SBS?' and 'QSIG Value-Added?'. Below the main window is a log window with the following data:

Severity	Date/Time	System	Description
Info	1/25/2008 3:01:15 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 3:00:24 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:50:33 PM	SIP2	change signaling-group 115
Info	1/25/2008 2:50:28 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:48:41 PM	SIP2	change signaling-group 115

The status bar at the bottom indicates 'Ready' and 'NUM'.



Figure 9. Trunk group – p5 of 5

DEFINITY® Site Administration - [SIP2 GEDI]

File Edit View System Action Tools Window Help

SIP2

change trunk-group 115 send (return) help (f5) cancel (esc) enter (f3) schedule (f9) next (f7) previous (f8) next form (f6)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

TRUNK GROUP
Administered Members (min/max): 1/4
Total Administered Members: 4

GROUP MEMBER ASSIGNMENTS

Port	Name	Night	Sig Grp
1: T00017			115
2: T00018			115
3: T00023			115
4: T00024			115
5:			
6:			
7:			
8:			
9:			
10:			
11:			
12:			
13:			
14:			
15:			

Right-click in a field to see a list of valid entries or help text

Severity	Date/Time	System	Description
Info	1/25/2008 3:01:15 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 3:00:24 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:50:33 PM	SIP2	change signaling-group 115
Info	1/25/2008 2:50:28 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:48:41 PM	SIP2	change signaling-group 115

History / Schedule / Connection Status

Ready NUM



Figure 10. Node-names IP

The screenshot shows the DEFINITY Site Administration interface for SIP2 GEDJ. The main window displays a list of IP Node Names with columns for Name and IP Address. The list includes entries such as CCH3.3, CCH4.1, CCH4.1.2, CCH5.0-UENUS, CM-KLINGON, CM-POLARIS, CM-cluster1_s, Chris-GW, IPIPGW, MAvantage, avayasip1, avayasip2, clan1, clan1server1, default, and medpro1. Below the list, a message indicates that 16 of 17 administered node-names were displayed and provides instructions on how to view all administered node-names and how to change or add a node-name.

Name	IP Address
CCH3.3	172.20.31.254
CCH4.1	172.20.231.254
CCH4.1.2	172.20.236.2
CCH5.0-UENUS	172.20.214.254
CM-KLINGON	172.20.32.254
CM-POLARIS	172.20.236.50
CM-cluster1_s	172.20.241.253
Chris-GW	172.20.15.123
IPIPGW	172.20.8.26
MAvantage	172.20.7.252
avayasip1	172.20.212.254
avayasip2	172.20.213.254
clan1	172.20.213.253
clan1server1	172.20.212.253
default	0.0.0.0
medpro1	172.20.213.252

(16 of 17 administered node-names were displayed)
 Use 'list node-names' command to see all the administered node-names
 Use 'change node-names ip xxx' to change a node-name 'xxx' or add a node-name

The bottom of the interface shows a log window with the following entries:

Severity	Date/Time	System	Description
Info	1/25/2008 3:39:20 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 3:01:15 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 3:00:24 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:50:33 PM	SIP2	change signaling-group 115
Info	1/25/2008 2:50:28 PM	SIP2	change ip-codec-set 3



Figure 12. IP codec set – 1 of 2 (G.711u shown).

DEFINITY® Site Administration - [SIP2 GEDI]

File Edit View System Action Tools Window Help

change ip-codec-set 3 send (return) help (f5) cancel (esc) enter (f3) schedule (f9) next (f7) previous (f8) next form (f6)

IP Codec Set

Codec Set: 3

	Audio Codec	Silence Suppression	Frames Per Pkt	Packet Size(ms)
1:	G.711MU	n	2	20
2:				
3:				
4:				
5:				
6:				
7:				

Media Encryption

1:	none
2:	
3:	

Right-click in a field to see a list of valid entries or help text

Severity	Date/Time	System	Description
Info	1/25/2008 3:39:20 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 3:01:15 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 3:00:24 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:50:33 PM	SIP2	change signaling-group 115
Info	1/25/2008 2:50:28 PM	SIP2	change ip-codec-set 3

Ready NUM



Figure 13. IP codec set – 2 of 2.

The screenshot shows the Cisco Definity Site Administration interface for SIP2 GEDI. The main window is titled "DEFINITY® Site Administration - [SIP2 GEDI]". The left sidebar contains a "General" section with options: Start GEDI, Add User, Change User Name, Remove User, Add Bridged Appearance, Browse Dial Ranges, Browse Stations, Browse Unused Ports, Find Unused Extension, and Print Button Labels. Below these are "Advanced" and "Fault & Performance" sections. The main content area is titled "IP Codec Set" and contains the question "Allow Direct-IP Multimedia?" with a help icon. Below this is a table with columns "Mode" and "Redundancy".

	Mode	Redundancy
FAX	relay	0
Modem	off	0
TDD/TTY	US	3
Clear-channel	n	0

At the bottom of the interface is a log window with the following data:

Severity	Date/Time	System	Description
Info	1/25/2008 3:39:20 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 3:01:15 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 3:00:24 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:50:33 PM	SIP2	change signaling-group 115
Info	1/25/2008 2:50:28 PM	SIP2	change ip-codec-set 3

The interface also includes a "Tasks" section with "Tree" and "Right-click in a field to see a list of valid entries or help text" instructions. The status bar at the bottom shows "Ready" and "NUM".



Figure 14. Uniform dialing plan (matching pattern for H323 trunk circled).

The screenshot shows the DEFINITY Site Administration interface for SIP2 GEDI. The main window displays the 'UNIFORM DIAL PLAN TABLE' with a 'Percent Full: 0' indicator. The table lists various matching patterns and their associated details. The row for matching pattern '30' is circled in red, indicating it is the matching pattern for H323 trunk.

Matching Pattern	Len	Del	Insert Digits	Net Conv	Node Num
16	4	0	201	aar	n
1600	4	0	213	aar	n
1612	4	0	216	aar	n
1613	4	0	216	aar	n
2200	4	0	204	aar	n
2201	4	0	204	aar	n
26	4	0	201	aar	n
29	4	0	201	aar	n
30	4	0	218	aar	n
3503	4	0	201	aar	n
3504	4	0	201	aar	n
36	4	0	214	aar	n
37	4	0	213	aar	n
40	4	0	201	aar	n
4131	4	0	201	aar	n
4132	4	0	201	aar	n

At the bottom of the interface, there is a log window showing system events:

Severity	Date/Time	System	Description
Info	1/25/2008 3:39:20 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 3:01:15 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 3:00:24 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:50:33 PM	SIP2	change signaling-group 115
Info	1/25/2008 2:50:28 PM	SIP2	change ip-codec-set 3



Figure 15. AAR analysis (dialed string for H323 trunk circled).

DEFINITY Site Administration - [SIP2 GEDI]

display aar analysis 218

AAR DIGIT ANALYSIS TABLE

Percent Full: 2

Dialed String	Total Min	Total Max	Route Pattern	Call Type	Node Num	ANI Read
218	7	7	115	aar		n
224	7	7	224	aar		n
3	7	7	999	aar		n
4	7	7	999	aar		n
5	7	7	999	aar		n
6	7	7	999	aar		n
7	7	7	999	aar		n
8	7	7	999	aar		n
9	7	7	999	aar		n

History | Schedule | Connection Status



Figure 16. Route Pattern (corresponding trunk group number circled).

DEFINITY® Site Administration - [SIP2 GEDI]

File Edit View System Action Tools Window Help

SIP2

display route-pattern 115 send (return) help (f5) cancel (esc) enter (f3) schedule (f9) next (f7) previous (f8) next form (f6)

General

- Start GEDI
- Add User
- Change User Name
- Remove User
- Add Bridged Appearance
- Browse Dial Ranges
- Browse Stations
- Browse Unused Ports
- Find Unused Extension
- Print Button Labels

Advanced

Fault & Performance

Tasks Tree

1 2 3

Pattern Number: 115 Pattern Name: Chris-H323-GW

SCCAN? n Secure SIP? n

Grp No	FRL	NPA	Pfx	Hop	Toll	No.	Inserted	DCS/	IXC
			Mrk	Lmt	List	Del	Digits	QSIG	
							Dgts	Intw	
1:	115	0					3	n	user
2:								n	user
3:								n	user
4:								n	user
5:								n	user
6:								n	user

	BCC	VALUE	TSC	CA-TSC	ITC	BCIE	Service/Feature	PARM	No.	Numbering	LAR
	0	1	2	M	4	W	Request		Dgts	Format	Subaddress
1:	y	y	y	y	n		as-needed		rest		none
2:	y	y	y	y	n				rest		none
3:	y	y	y	y	n				rest		none
4:	y	y	y	y	n				rest		none
5:	y	y	y	y	n				rest		none
6:	y	y	y	y	n				rest		none

Severity	Date/Time	System	Description
Info	1/25/2008 3:39:20 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 3:01:15 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 3:00:24 PM	SIP2	change ip-codec-set 3
Info	1/25/2008 2:50:33 PM	SIP2	change signaling-group 115
Info	1/25/2008 2:50:28 PM	SIP2	change ip-codec-set 3

History Schedule Connection Status

Ready NUM



Cisco IOS Voice Gateway (c3845) configuration

show version

Cisco IOS Software, 3800 Software (C3845-IPVOICE-M), Version 12.4(15)T3, RELEASE SOFTWARE (fc1)
Technical Support: <http://www.cisco.com/techsupport>
Copyright (c) 1986-2008 by Cisco Systems, Inc.
Compiled Fri 25-Jan-08 00:11 by prod_rel_team

ROM: System Bootstrap, Version 12.3(11r)T1, RELEASE SOFTWARE (fc1)

3845_West uptime is 1 week, 1 day, 6 hours, 32 minutes
System returned to ROM by reload at 18:17:14 UTC Wed Feb 6 2008
System image file is "flash:c3845-ipvoice-mz.124-15.T3.bin"

Cisco 3845 (revision 1.0) with 224256K/37888K bytes of memory.
Processor board ID FHK0847F136
2 Gigabit Ethernet interfaces
24 Serial interfaces
2 Channelized E1/PRI ports
2 Channelized T1/PRI ports
2 Voice FXS interfaces
DRAM configuration is 64 bits wide with parity enabled.
479K bytes of NVRAM.
62592K bytes of ATA System CompactFlash (Read/Write)

Configuration register is 0x2102

show run

```
!  
Current configuration : 3243 bytes  
!  
version 12.4  
service timestamps debug datetime msec  
service timestamps log datetime msec  
no service password-encryption  
!  
hostname 3845_West  
!  
boot-start-marker  
boot-end-marker  
!  
card type t1 0 0  
logging buffered 1000000 debugging  
no logging console  
enable secret 5 $1$MFhi$AqqpDsFeO4Sb/Ikzkrco/  
!  
no aaa new-model  
network-clock-participate wic 0  
network-clock-select 1 T1 0/0/0  
voice-card 0  
no dspfarm  
!  
!  
ip cef  
!
```



```
!  
no ip domain lookup  
!  
isdn switch-type primary-ni  
isdn gateway-max-interworking  
!  
!  
voice call carrier capacity active  
!  
voice service pots  
!  
voice service voip  
!  
!  
voice translation-rule 1 1  
rule 1 /30/ /40\1/  
!  
voice translation-rule 2  
rule 1 /11/ /21\1/  
!  
voice translation-profile PSTN-to-H323  
translate called 2  
!  
voice translation-profile H323-to-PSTN 2  
translate called 1  
!  
!  
controller T1 0/0/0  
framing esf  
linecode b8zs  
pri-group timeslots 1-24  
!  
controller T1 0/0/1  
framing esf  
linecode b8zs  
cablelength long 0db  
!  
!  
ip tcp synwait-time 13  
!  
!  
GigabitEthernet0/0  
description $ETH-LAN$$ETH-SW-LAUNCH$$INTF-INFO-GE 0/0$  
ip address 10.10.10.1 255.255.255.248  
shutdown  
duplex auto  
speed auto  
media-type rj45  
no keepalive  
!  
interface GigabitEthernet0/1  
ip address 172.20.15.123 255.255.255.0  
duplex auto  
speed auto
```

¹ The above translation rule replaces the number “30xx” with “40xx”

² This defines the translation profile for the called number. In this particular example, the called number “30xx” is converted to “40xx”.



```
media-type rj45
no keepalive
!
interface Serial0/0/0:23
no ip address
encapsulation hdlc
isdn switch-type primary-ni2c3
isdn incoming-voice voice
isdn bchan-number-order ascending
no cdp enable
!
!
ip forward-protocol nd
ip route 0.0.0.0 0.0.0.0 172.20.15.1
!
ip http server
ip http authentication local
!
control-plane
!
voice-port 0/0/0:23
!
voice-port 0/1/0
!
voice-port 0/1/1
!
voice-port 1/0/0:1
!
!
dial-peer voice 4000 pots
translation-profile incoming PSTN-to-H323
destination-pattern 4...
incoming called-number 1...
direct-inward-dial
port 0/0/0:23
forward-digits all
!
!
dial-peer voice 519 voip
translation-profile incoming H323-to-PSTN4
destination-pattern 2...
session target ipv4:172.20.213.253
incoming called-number 3...5
dtmf-relay h245-alphanumeric h245-signal6
codec g711ulaw7
!
!
banner login ^C
```

³ **Show running-config** command shows “**isdn switch-type primary-ni**” although “**isdn switch-type primary-ni2c**” was entered and is active.

⁴ This defines the call number translation profile for incoming calls. Here, a called number “30xx” is converted to “40xx” for an incoming call associated with this dial peer (i.e., via this H323 trunk).

⁵ This is to specify a digit string that can be matched by an incoming call to associate the call with a dial peer. For this example, user dials 3xxx will associate to this dial-peer.

⁶ This is for Dual-Tone Multifrequency (DTMF) tones to be sent out of band, as an H.245 message. It is omitted for inband DTMF.

⁷ Also changed to G.711A, G.729, and G.729B during the course of testing.



Cisco Router and Security Device Manager (SDM) is installed on this device. This feature requires the one time use, initial credentials, of username "cisco" with password "cisco".

Please change these publicly known initial credentials through SDM or IOS CLI. Here's the Cisco IOS command:

```
no username cisco
```

NOTE: Please add a new username to be able to launch SDM for router management.

For more information about SDM please follow the instructions in the QUICK START GUIDE for your router or at <http://www.cisco.com/go/sdm>

```
-----  
^C  
!  
line con 0  
  exec-timeout 600 0  
  password cisco  
  login  
line aux 0  
line vty 0 4  
  exec-timeout 600 0  
  privilege level 15  
  password cisco  
  login  
  transport input telnet  
line vty 5 15  
  privilege level 15  
  login local  
  transport input telnet  
!  
scheduler allocate 20000 1000  
!  
end
```

Acronyms

Acronym	Definitions
codec	compressor/decompressor
PBX	Private Branch Exchange
PSTN	Public Switched Telephone Network
IOS	Internetworking Operating System



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