



# Avaya S8500 Communications Manager 3.0 with Cisco IOS Session Border Element for H323-to-H323 Calls

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## Introduction

This is an application note for connectivity of Avaya S8500 Communications Manager 3.0 with Cisco IOS Session Border Element (IPIPGW) via H323 (10/100baseT).

The network topology diagram (Figure 1) shows the test setup for end-to-end interoperability with the Cisco IOS Session Border Element connected to the IP PBX via H323 (10/100baseT). Connectivity is achieved by using the H.323 protocol.

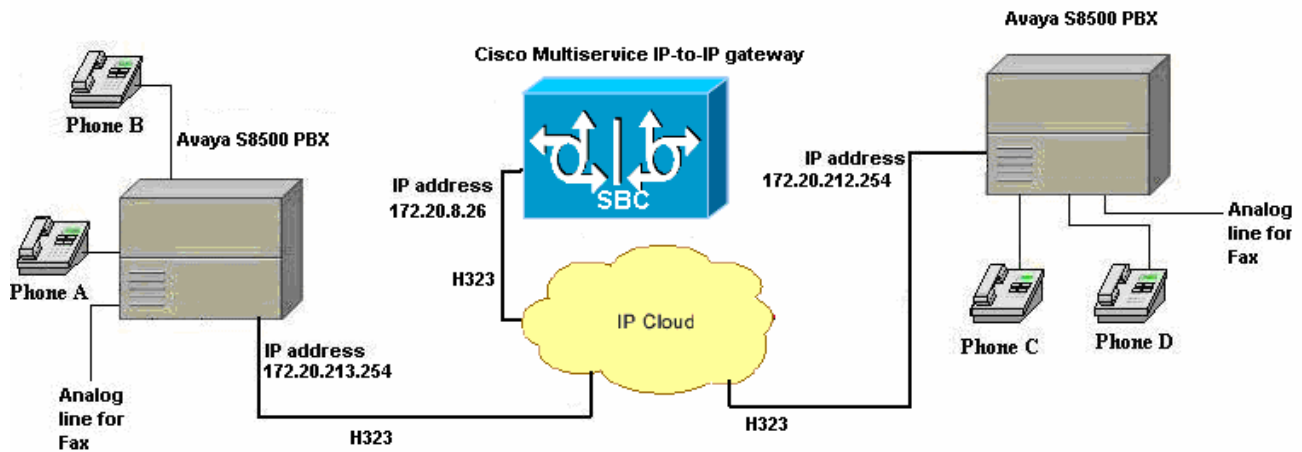
This Application Note uses the c3845 IOS-voice-gateway, however other Cisco voice gateways are also an option to use since IPIPGW implementation does not depend on the platform. Here is a list of Cisco Products capable of IPIPGW functionality:

- [Cisco 2800 Series Integrated Services Routers](#)
- [Cisco 3800 Series Integrated Services Routers](#)
- [Cisco 2600XM Series Multiservice Platforms](#)
- [Cisco 3700 Series Routers](#)
- [Cisco 7200VXR Routers](#)
- [Cisco 7301 Routers](#)
- [Cisco AS5350XM Universal Gateway](#)
- [Cisco AS5400XM Universal Gateway](#)



## Network Topology

Figure 1. Network Topology or Test Setup



## Limitations

Connected Name is not presented to the originating (calling) Phone display. IPIPGW relays the "Connected Number" info in a method not understood by Avaya S8500 PBX

Basic Call using G.726 codec fail. Avaya PBX rejects G.726 codec, even when the Avaya is set for G.726. (This limitation as of version G3V13 of the Avaya PBX)

Call Transfer Name and Number updates do not occur. Feature interoperability are not compatible between systems

End-to-end DTMF tones are not played if out-of-band signaling (H.245) is configured. Must use in-band signaling for DTMF tones to play across. H245 TerminalCapabilities negotiation are not initiated



## System Components

### Hardware Requirements

#### Cisco equipment

Cisco 3845 (Cisco 3800 family routers)

Cisco Catalyst 6500

#### Avaya equipment

Avaya S8500

TN2312BP IPSI

TN799DP C-LAN

TN2302AP IP Media Processor

TN746B Analog

TN2224B 2-wire Digital

2 - Digital stations 8410D

2 - Digital stations 6408D+

### Software Requirements

PBX Software: G3 version: V13

Cisco IOS Release: c3845-ipvoice\_ivs-mz.124-9.T

## Features

### Features Supported

G711u and A law, G729 and G723 codecs

Call Transfer blind and Call Transfer supervised

Call Conference

Call on-hold

Call Forward

FAX integrity

DTMF (in-band signaling only)

### Features Not Supported

Connected Name

Out-of-Band DTMF signaling (H.245)

Name and Number updates on a Call Transfer.



## Configuration

### Avaya S8500 Configuration

Voice System name: S8500SIP1 - TRUNK GROUP

Group Number: 7                      Group Type: isdn                      CDR Reports: y  
Group Name: IPIPGAteway test                      COR: 1                      TN: 1                      TAC: 808  
Direction: two-way                      Outgoing Display? n                      Carrier Medium: IP  
Dial Access? y                      Busy Threshold: 255                      Night Service:  
Queue Length: 0  
Service Type: tie                      Auth Code? n                      TestCall ITC: rest  
Far End Test Line No:

TestCall BCC: 4

#### TRUNK PARAMETERS

Codeset to Send Display: 0                      Codeset to Send National IEs: 6  
Max Message Size to Send: 260                      Charge Advice: none  
Supplementary Service Protocol: a                      Digit Handling (in/out): enbloc/enbloc  
  
Trunk Hunt: ascend                      QSIG Value-Added? n  
Digital Loss Group: 18  
Incoming Calling Number - Delete:                      Insert:                      Format: unk-unk  
Bit Rate: 1200                      Synchronization: async                      Duplex: full  
Disconnect Supervision - In? y                      Out? n  
Answer Supervision Timeout: 0

#### TRUNK FEATURES

ACA Assignment? n                      Measured: none                      Wideband Support? n  
Internal Alert? n                      Maintenance Tests? y  
Data Restriction? n                      NCA-TSC Trunk Member: 1  
Send Name: y                      Send Calling Number: y  
Used for DCS? n                      Hop Dgt? n  
Suppress # Outpulsing? n                      Format: unknown  
Outgoing Channel ID Encoding: preferred                      UII IE Treatment: service-provider  
  
Replace Restricted Numbers? n  
Replace Unavailable Numbers? n  
Send Connected Number: y  
Hold/Unhold Notifications? y  
Send UII IE? n                      Modify Tandem Calling Number? n  
Send UCID? n  
Send Codeset 6/7 LAI IE? y  
  
Path Replacement with Retention? n  
Path Replacement Method: better-route  
SBS? n                      Network (Japan) Needs Connect Before Disconnect? n



TRUNK GROUP Administered Members (min/max): 1/3  
GROUP MEMBER ASSIGNMENTS Total Administered Members: 3

Port	Code Sfx	Name	Night	Sig Grp
1:	T00056			7
2:	T00057			7
3:	T00058			7
4:				
5:				
6:				
7:				

Voice System name: S8500SIP1 - SIGNALING GROUP

Group Number: 7 Group Type: h.323  
Remote Office? n Max number of NCA TSC: 7  
SBS? n Max number of CA TSC: 7  
IP Video? n Trunk Group for NCA TSC: 7  
Trunk Group for Channel Selection: 7  
Supplementary Service Protocol: a  
T303 Timer(sec): 10

Near-end Node Name: **clan1** Far-end Node Name: **ipipgw**  
Near-end Listen Port: 1720 Far-end Listen Port: 1720  
Far-end Network Region: 1  
LRQ Required? n Calls Share IP Signaling Connection? n  
RRQ Required? n  
Media Encryption? n Bypass If IP Threshold Exceeded? n  
DTMF over IP: in-band Direct IP-IP Audio Connections? n  
IP Audio Hairpinning? n  
Interworking Message: PROGRESS  
DCP/Analog Bearer Capability: 3.1kHz



Voice System name: S8500SIP1 - IP NODE NAMES

Name	IP Address	
CCM4.1	172.20 .231.254	
CCM4.1.2	172.20 .236.2	
CM-POLARIS	172.20 .236.50	
avayasip1	172.20 .212.254	
<b>clan1</b>	<b>172.20 .212.253</b>	➔ Local IP address used in dial-peer 4150 (incoming-call)
clan1serverb	172.20 .213.253	
default	0 .0 .0 .0	
<b>ipipgw</b>	<b>172.20 .8 .26</b>	➔ Points to Cisco IPIP gateway (outgoing-call)
medpro1	172.20 .212.252	
procr	. . .	

( 10 of 10 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

Voice System name: S8500SIP1 - IP Codec Set

Codec Set: 3

Audio Codec	Silence Suppression	Frames Per Pkt	Packet Size(ms)	
1: G.711MU	n	1	30	➔ Codec type is changed under 'Audio Codec' field (i.e G.723, G.711A, G.729AB)

Media Encryption

1: none

2:

3:



## IP Codec Set

Allow Direct-IP Multimedia? n

	Mode	Redundancy	
FAX	t.38-standard	0	→ Fax mode is changed to Pass-through option when testing pass-through fax mode
Modem	off	0	
TDD/TTY	US	3	
Clear-channel	n	0	

Voice System name: S8500SIP1 - IP NETWORK REGION

Region: 1

Location: 1 Authoritative Domain: lab.com

Name: CiscoLAB

Intra-region IP-IP Direct Audio: no

MEDIA PARAMETERS

Inter-region IP-IP Direct Audio: no

Codec Set: 3

IP Audio Hairpinning? y

UDP Port Min: 2048

UDP Port Max: 3028

RTCP Reporting Enabled? y

DIFFSERV/TOS PARAMETERS

RTCP MONITOR SERVER PARAMETERS

Call Control PHB Value: 34

Use Default Server Parameters? y

Audio PHB Value: 46

Video PHB Value: 26

802.1P/Q PARAMETERS

Call Control 802.1p Priority: 7

Audio 802.1p Priority: 6

AUDIO RESOURCE RESERVATION PARAMETERS

H.323 IP ENDPOINTS

RSVP Enabled? n

H.323 Link Bounce Recovery? y

Idle Traffic Interval (sec): 20

Keep-Alive Interval (sec): 5

Keep-Alive Count: 5



Voice System name: S8500SIP1 - STATION

Extension: 4154	Lock Messages? n	BCC: 0
Type: 6408D+	Security Code:	TN: 1
Port: 01A0408	Coverage Path 1:	COR: 1
Name: SIP1 IPIGW1	Coverage Path 2:	COS: 1

Hunt-to Station:

STATION OPTIONS

Loss Group: 2	Personalized Ringing Pattern: 1
Data Module? n	Message Lamp Ext: 4154
Speakerphone: 2-way	Mute Button Enabled? y
Display Language: english	

Media Complex Ext:
IP SoftPhone? n
Remote Office Phone? n

STATION

FEATURE OPTIONS

LWC Reception: spe	Auto Select Any Idle Appearance? n
LWC Activation? y	Coverage Msg Retrieval? y
LWC Log External Calls? n	Auto Answer: none
CDR Privacy? n	Data Restriction? n
Redirect Notification? y	Idle Appearance Preference? n
Per Button Ring Control? n	Bridged Idle Line Preference? n
Bridged Call Alerting? n	Restrict Last Appearance? y
Active Station Ringing: single	Conf/Trans on Primary Appearance? n

H.320 Conversion? n	Per Station CPN - Send Calling Number?
Service Link Mode: as-needed	

Multimedia Mode: basic	Audible Message Waiting? n
MWI Served User Type:	Display Client Redirection? n
AUDIX Name:	Select Last Used Appearance? n
	Coverage After Forwarding? s
	Multimedia Early Answer? n
	Direct IP-IP Audio Connections? y

Emergency Location Ext: 4154	IP Audio Hairpinning? y
------------------------------	-------------------------





STATION

SITE DATA

Room:	Headset? n
Jack:	Speaker? n
Cable:	Mounting: d
Floor:	Cord Length: 0
Building:	Set Color:

ABBREVIATED DIALING

List1:            List2:            List3:

BUTTON ASSIGNMENTS

1: call-appr	6:
2: call-appr	7:
3:	8:
4:	9:
5:	10:

STATION

SOFTKEY BUTTON ASSIGNMENTS

1: lwc-store  
2: lwc-cancel  
3: auto-cback  
4: timer  
5: call-fwd Ext:  
6: call-park  
7: date-time  
8: priority  
9: abr-prog  
10: abr-spchar Char: ~p  
11: abr-spchar Char: ~m  
12: abr-spchar Char: ~w



Voice System name: S8500SIP1 - STATION

Extension: 4155	Lock Messages? n	BCC: 0
Type: 6408D+	Security Code:	TN: 1
Port: 01A0409	Coverage Path 1:	COR: 1
Name: SIP1 IPIPGW2	Coverage Path 2:	COS: 1

Hunt-to Station:

#### STATION OPTIONS

Loss Group: 2	Personalized Ringing Pattern: 1
Data Module? n	Message Lamp Ext: 4155
Speakerphone: 2-way	Mute Button Enabled? y
Display Language: english	

Media Complex Ext:  
IP SoftPhone? n  
Remote Office Phone? n

#### STATION

##### FEATURE OPTIONS

LWC Reception: spe	Auto Select Any Idle Appearance? n
LWC Activation? y	Coverage Msg Retrieval? y
LWC Log External Calls? n	Auto Answer: none
CDR Privacy? n	Data Restriction? n
Redirect Notification? y	Idle Appearance Preference? n
Per Button Ring Control? n	Bridged Idle Line Preference? n
Bridged Call Alerting? n	Restrict Last Appearance? y
Active Station Ringing: single	Conf/Trans on Primary Appearance? n

H.320 Conversion? n Per Station CPN - Send Calling Number?

Service Link Mode: as-needed

Multimedia Mode: basic Audible Message Waiting? n

MWI Served User Type: Display Client Redirection? n

AUDIX Name: Select Last Used Appearance? n

Coverage After Forwarding? s

Multimedia Early Answer? n

Direct IP-IP Audio Connections? y

Emergency Location Ext: 4155 IP Audio Hairpinning? y



STATION		
SITE DATA		
Room:		Headset? n
Jack:		Speaker? n
Cable:		Mounting: d
Floor:		Cord Length: 0
Building:		Set Color:
ABBREVIATED DIALING		
List1:	List2:	List3:
BUTTON ASSIGNMENTS		
1: call-appr		6:
2: call-appr		7:
3:		8:
4:		9:
5:		10:

STATION	
SOFTKEY BUTTON ASSIGNMENTS	
1: lwc-store	
2: lwc-cancel	
3: auto-cback	
4: timer	
5: call-fwd Ext:	
6: call-park	
7: date-time	
8: priority	
9: abr-prog	
10: abr-spchar Char: ~p	
11: abr-spchar Char: ~m	
12: abr-spchar Char: ~w	



Voice System name: S8500SIP1 - STATION

Extension: 4156      Lock Messages? n      BCC: 0  
Type: 2500 (analog port for fax)      Security Code:      TN: 1  
Port: 01A0701      Coverage Path 1:      COR: 1  
Name: IPIPGW test      Coverage Path 2:      COS: 1  
                                 Hunt-to Station:      Tests? y

STATION OPTIONS

Loss Group: 1      Message Waiting Indicator: none  
Off Premises Station? n

Survivable COR: internal  
Survivable Trunk Dest? y      Remote Office Phone? n

STATION

FEATURE OPTIONS

LWC Reception: spe  
LWC Activation? y      Coverage Msg Retrieval? y  
LWC Log External Calls? n      Auto Answer: none  
CDR Privacy? n      Data Restriction? n  
Redirect Notification? y      Call Waiting Indication? y  
Per Button Ring Control? n      Att. Call Waiting Indication? y  
Bridged Call Alerting? n      Distinctive Audible Alert? y  
Switchhook Flash? y      Adjunct Supervision? y  
Ignore Rotary Digits? n  
H.320 Conversion? n      Per Station CPN - Send Calling Number?  
Service Link Mode: as-needed  
Multimedia Mode: basic      Audible Message Waiting? n  
MWI Served User Type:  
AUDIX Name:  
                                 Coverage After Forwarding? s  
                                 Multimedia Early Answer? n  
                                 Direct IP-IP Audio Connections? y  
Emergency Location Ext: 4156      IP Audio Hairpinning? y



STATION

SITE DATA

Room:	Headset? n
Jack:	Speaker? n
Cable:	Mounting: d
Floor:	Cord Length: 0
Building:	Set Color:

ABBREVIATED DIALING

List1:	List2:	List3:
--------	--------	--------

HOT LINE DESTINATION

Abbreviated Dialing List Number (From above 1, 2 or 3):
Dial Code:

Line Appearance: call-appr



## Cisco 3845 Cisco IOS Configuration

```
tony3845#sh run
Building configuration...

Current configuration: 2011 bytes
!
Version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname tony3845
!
boot-start-marker
boot system flash:c3845-ipvoice_ivs-mz.124-3.9.PI3d
boot-end-marker
!
enable password cisco
!
no aaa new-model
!
resource policy
!
ip subnet-zero
ip cef
!
!
!
no ip domain lookup
voice-card 0
no dspfarm
!
!
!
voice service voip
allow-connections h323 to h323
allow-connections h323 to sip
allow-connections sip to h323
allow-connections sip to sip
signaling forward unconditional
fax protocol t38 ls-redundancy 0 hs-redundancy 0 fallback pass-through g711ulaw
no fax-relay sg3-to-g3
h323
h225 connect-passthru
!
!
!
voice class codec 1
codec preference 1 g711ulaw
codec preference 2 g711alaw
codec preference 3 g723r63
codec preference 4 g723ar63
codec preference 5 g729br
codec preference 6 g729r8
!
```



```
!  
interface GigabitEthernet0/0  
ip address 172.20.8.26 255.255.255.0  
duplex auto  
speed auto  
media-type rj45  
negotiation auto  
!  
interface GigabitEthernet0/1  
no ip address  
shutdown  
duplex auto  
speed auto  
media-type rj45  
negotiation auto  
!  
ip default-gateway 172.20.8.1  
ip classless  
ip route 0.0.0.0 0.0.0.0 172.20.8.1  
!  
ip http server  
!  
!  
!  
control-plane  
!  
dial-peer voice 3000 voip  
destination-pattern 30..  
voice-class codec 1  
session target ipv4:172.20.213.253  
dtmf-relay h245-alphanumeric  
fax-relay ecm disable  
no fax-relay sg3-to-g3  
no vad  
!  
dial-peer voice 4150 voip  
destination-pattern 41..  
voice-class codec 1  
session target ipv4:172.20.212.253  
dtmf-relay h245-alphanumeric  
fax-relay ecm disable  
no fax-relay sg3-to-g3  
no vad  
!  
dial-peer voice 1660 voip  
destination-pattern 16..  
voice-class codec 1  
session target ipv4:172.20.7.252  
dtmf-relay h245-alphanumeric  
fax-relay ecm disable  
no fax-relay sg3-to-g3  
no vad  
!  
!  
gatekeeper  
zone local IP2IP pbx.com  
shutdown  
!
```



```
!  
line con 0  
password cisco  
stopbits 1  
line aux 0  
stopbits 1  
line vty 0 4  
password cisco  
login  
!  
scheduler allocate 20000 1000  
!  
end  
  
tony3845#
```

### Acronyms

Acronym	Definitions
IPIPGW	IP-to-IP Gateway
Cisco IOS	Cisco Internetwork Operating System





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**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

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