

Cisco UCM 4.x H.323 Interworking to AT&T SIP with Acme Packet 3000-4000 Series SBC

A Technical Application Note





Disclaimer

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Emergency 911/E911 Services Limitations

While AT&T IP Flexible Reach services support E911/911 calling capabilities in certain circumstances, there are significant limitations on how these capabilities are delivered. Please review the AT&T IP Flexible Reach Service Guide in detail to understand these limitations and restrictions.

Specific IP endpoints Support

Specific IP endpoints are supported with IP Flex Reach. These endpoints must support SCCP and NTE. The Cisco IP endpoints that support SCCP and NTE are:

VG224 - 7902, 7905, 7911, 7912, 7931, 7937, 7940, 7941, 7942, 7945, 7960, 7961, 7962, 7965, 7970, 7971, 7975

Future new phone models

The Cisco IP endpoints that do NOT support NTE and thus are NOT supported with IP Flex Reach are: 7910, 7920, 7935, 7936 VG248 - DPA-7610, DPA-7630

Please refer to the following Cisco website for further information.

http://www.cisco.com/en/US/docs/voice_ip_comm/cucm/srnd/6x/media.html#wp1055031

HIPCS is not supported with Cisco Unified Communication Manager

If the customer is in a HIPCS serving area, Cisco Unified Communication Manager SIP is not supported. Please consult with your customer care or sales person to determine if you are in a HIPCS serving area.

AT&T IP Teleconferencing Service is not supported when G.729 is configured on Cisco Unified Communication Manager

Cisco Unified Communication Manager only supports a single codec on an IP trunk. Since the AT&T IP Teleconferencing (IPTC) Service supports G.711, a Cisco Unified Communication Manager configured for G.729 will not work with the IPTC service.

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Abstract

This application note defines an interworking configuration model suitable for the Oracle Communications Session Border Controllers connecting H.323 Trunks from Cisco Unified Communications Manager (UCM) to AT&T's IP Flex Reach service. The reference configuration presented was tested in AT&T's lab.

Introduction

Within the heterogeneous IP telephony networks deployed today, Enterprises cannot always migrate quickly from legacy H.323 IP-PBX trunks to SIP. Many have found it valuable to use the protocol interworking function (IWF) of the Oracle Communications Session Border Controller for passing VoIP traffic between their network and SIP carriers. The Oracle Communications Session Border Controller supports interworking capabilities between H.323 and SIP protocols. It enables an enterprise to take advantage of carrier SIP trunks while migrating to SIP at a slower pace on their IP-PBX. While transport of media is handled via RTP for both signaling protocols, interworking is required to setup the correct SDP and corresponding H.245 capabilities exchange.

The Cisco UCM (formerly Call Manager) is commonly deployed with version 4.1.x and as such, the protocol of choice for the phones is SCCP (Skinny) and for IP Trunks it has been H.323. This has been the best combination of protocols for access to the widest range of features and the ability to support toll by-pass over the corporate WAN. This also poses a number of problems when an Enterprise is looking to take advantage of service provider SIP trunking cost savings and disaster recovery benefits that can be realized over existing PSTN/PRI technology.

Since there is a protocol mismatch between the UCM H.323 implementation and carrier SIP trunks, a protocol interworking function is needed. There are also special considerations that need to be taken into account because of the manner in which SCCP negotiates the media stream at the end of the call setup sequence as opposed to the beginning. The resulting H.323 signaling uses the "SlowStart" method where the media channels are negotiated after the call Connect message.

Simply interworking H.323 SlowStart to SIP signaling without special consideration of the media negotiation will lead to a SIP INVITE request without SDP for RTP negotiation. The first negotiation of "delayed" SDP Offer in this case is typically in the 200OK call Connect message with the SDP Answer in the ACK to the 200OK. In between the 200OK and the ACK are the SlowStart H.323 and SCCP Connect messages and media setup. This delay can lead to clipping at the beginning of a call, most notably to an IVR or voice mail server. The Cisco solution requires MTP DSP resources in order to present the media offer at the call setup which can become very costly as it requires many servers for large scale deployments.

The SBC has the ability to interwork the UCM H.323 signaling to SIP and include SDP in the INVITE for "Early Offer" without the need for MTP resources.

This Oracle Technical Application Note outlines the recommended configuration for the Acme Packet 3000/4000 series Session Border Controllers, the industry leading Session Border Controllers, for

connecting H.323 Trunks from Cisco UCM 4.x to AT&T's IP Flex Reach service. This document is based on the Acme Packet OS version C5.1.0 but is applicable to images 4.x and higher.

Intended Audience

This document is intended for use by Oracle Systems Engineers, third party Systems Integrators, and end-users of the Oracle Communications Session Border Controller. It assumes that the reader is familiar with basic operations of the Oracle Communications Session Border Controller.

Support

Cisco Call Manager Guide is located at the following AT&T URL: http://www.corp.att.com/dna/support/

**The AT&T website is password protected. The ID and Password are provided to each customer when they place an order for IP Flexible Reach or IP Toll Free service.

Design Goals

The reference configuration represents the most common Cisco UCM (Cisco Call Manager) deployment model: UCM originating H.323 traffic and terminating to AT&T Flex Reach basic SIP trunk via the Oracle SBC. The config also supports bi-directional call-flows (H.323 to SIP and SIP to H.323) via Local-Policy routes. While not presented here, the configuration can be extended to add SIP to SIP Trunking traffic with UCM, which is a common migration strategy for most Enterprise UCM customer networks deploying the Oracle SBC [3].

There is considerable flexibility in configuring H.323 on the SBC. Possible modes include the h323stack registering as a gateway, acting as a static gateway or behaving as a peering gatekeeper. There are also multiple signaling methods (i.e. FastStart, SlowStart) within the SBC H.323/IWF configuration. This document recommends optimized settings for H.323 configurations whenever possible. Some of the h323-stack and or session-agent parameters MAY need to be modified for interoperability reasons.

This document will annotate each configuration with information on its general applicability. The intent is to:

- Minimize UCM H.323 interoperability issue's by standardizing field configurations
- Provide guidelines for new users for the Session Border Controller
- Provide a configuration template, baselining the H.323 to SIP IWF configuration (with accompanying diagram)
- Flexibility: how resilient the configuration is and how adaptable the configuration is when turning up new UCM H.323 to SIP networks
- Performance: minimize the use of unnecessary configuration objects

IWF Peering Scenario with UCM 4.x

This section includes a reference architecture diagram, where the Session Border Controller is integrated as an Enterprise CPE trunking Session Border Controller, performing interworking between the Enterprise (UCM) and the AT&T SIP trunk. This reference architecture must be confirmed or modified by the customer according to the specific project requirements.

The Enterprise H.323 UCM peers with the long distance SIP provider via the Oracle Communications Session Border Controller IWF function. Below is the network diagram and representative call-flow.



Diagram 1: Enterprise H.323 UCM 4.x to AT&T SIP Trunk via Oracle Communications Session Border Controller IWF



Cisco CCM H.323 Slow Start GW-GW IWF Call Setup via Oracle Communications Session Border Controller

Diagram 2: Call-Flow for Enterprise UCM H.323 4.x to AT&T SIP Trunk via Oracle Communications Session Border Controller IWF

Notes on Reference Configuration

The Enterprise UCM is configured for H.323 Trunking and acts as a H.323 gateway. The Oracle Communications Session Border Controller is configured to perform IWF function, converting H.323 to SIP signaling between the Enterprise and AT&T's network.

Enabling the SBC's interworking implementation is done via the iwf-config element. For H.323 SlowStart calls, it is required to configure the media-profiles parameter to provide a list of codecs that will be offered in the SIP SDP exchange. The SBC also requires the customary configuration of H.323 and SIP config objects to support IWF call-flows. H.323 endpoints (gateways, gatekeepers) should be configured as session-agents so that SIP to H.323 calls are correctly interworked.

The realm labeled *peer-h323* and its corresponding h323-stack (address 10.10.10.100) is where the H.323 signaling and RTP will enter/exit the SBC. The Enterprise UCM needs to signal to this target IP address.

The realm labeled *core-sip* and its corresponding sip-interface (address 192.168.1.100) is where the SIP signaling will enter/exit the SBC to/from the long distance SIP provider.

The Local-Policy configurations route sessions to/from the Enterprise H.323 UCM to the long distance SIP provider.



WF Peering Configuration

Diagram 3: Network Diagram for Reference Configuration

Normative References

[1] Acme Packet, "Net-Net 4000 S-C6.1.0 ACLI Configuration Guide", 400-0061-61, Jan 2009.

[2] Heyphets, S., "BCP - H.323-SIP Interworking (IWF) Peering Configuration", 520-0031-00, Aug
2008 [3] Walker, C., "Cisco UCM 6.x SIP to ATT SIP with Net-Net 3000-4000 Series SD Application Note", 510-0014-00, June 2009

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Appendix A: Reference Configuration

acmenacket# show run	
h323-config	
state	enabled
logalexel	WARNING
CERPORSE-SER.	4
concert.tmp.	180
ofc2833-payload	101
alternatescouting.	proxy
codec.fallback	disabled
options	ooRelavite
h323-stack	
0.2000	h323-stackcom
description.	
state	enabled
ispateway	disabled
cealm-id.	enterprise-core-ccm
assoc-stack.	
local-ip.	10.10.10.100
max-calls	1000
max-channels.	6
registration-ttl.	120
terminal-alias.	
	h323-IDaacme
prefixes.	
cas-port.	1719
auto-sk-discovery.	enabled
multicast	0.0.0.0:0
satekeeper.	0.0.0.0:0
sk-identifier.	
a931-port	1720
alternate-transport.	
o931-max-calls.	200
h245-tunneling	enabled
fs-in-first-mss.	disabled
call-start-fast	enabled
call-start-slow	disabled
media-profiles	
process-registration	disabled
allow-anonymous	all
options	inbandTone.
	suppress100rel
proxy-mode.	
h245-stage	alecting
o931-stant-port	0
a931-number-norts.	ē
dynamic-start-port	8192
dynamic-number-ports	1924
nfc2833-mode	transparent
filename	
tcp-keepalive	disabled

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		cost.		0
		app-protocol		SIP
		state		enabled
		media-profile	3	
media-m	anager			
a	tate			enabled
1	at ching			disabled
£	Low-time-	Limit.		86400

	initial-guard-timer	43200
	subsq-guard-timer	43200
	tcp-flow-time-limit	86400
	tcp-initial-guard-timer	300
	tcp-subsq-guard-timer	300
	tcp-number-of-ports-per-flow	2
	hnt-rtcp	disabled
	algd-log-level	NOTICE
	mbcd-log-level	NOTICE
	options	min-signal-duration=100
	rea-flow-port	1985
	red-mgcp-port	1986
	red-max-trans	10000
	ned sync comp time	1000
	media_policing	enabled
	max_signaling_bandwidth	1000000
	max-untrusted-signaling	100
	min-untrusted-signaling	30
	ann-signaling-bandwidth	0
	tolerance-window	30
	rtcp-rate-limit	0
	min-media-allocation	32000
	min-trusted-allocation	1000
	deny-allocation	1000
	anonymous-sdp	disabled
	arp-msg-bandwidth	32000
	fragment-msg-bandwidth	0
	rfc2833-timestamp default-2833-duration	enabled
	rfc2833_end_nkts_only_for_non_sig dis	abled
	translate-non-rfc2833-event disa	abled
network	-interface	
	name	M00
	sub-port-id	0
	description	AT&T/Peer Facing
	hostname	C C
	in-address	192 168 1 100
	nni-utility-addr	192 168 1 101
		102 168 1 102
	sec-utility-addr	192.168.1.102
	netmask	255.255.255.0
	gateway	192.168.1.1
	sec-gateway	
	gw-heartbeat	
	state	disabled
	heartbeat	0
	retry-count	0
	notry timoout	1
		1
	nearth-score	0
	dns-ip-primary	
	dns-ip-primary dns-ip-backup1	
	dns-ip-primary dns-ip-backup1 dns-ip-backup2	
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network-interface	
name	M10
sub-port-id	Ø
description	Enterprise/Core Eacing
hostname	, ee, p, ee, e , de
in-address	10 10 10 100
nni utility oddn	10.10.10.100
pri-utility-addr	10.10.10.101
sec-utility-addit	
netmask	255.255.255.0
gateway	10.10.10.1
sec-gateway	
gw-heartbeat	
state	disabled
heartbeat	0
retry-count	0
retry-timeout	1
health-score	0
dns-ip-primary	
dns-ip-backup1	
dns-ip-backup2	
dns-domain	
dns-timeout	11
hip-ip-list	10.10.10.100
ftp-address	
icmp-address	10.10.10.100
snmp-address	
telnet-address	
nhv-interface	
name	MØØ
operation-type	Media
port	0
slot	0
virtual-mac	anah]ad
auto-negotiation	enabled duplex-mode
speed	
phy-interface	
name	M10
operation-type	Media
port	0
slot	1
virtual-mac	anablad
	enabled
duplex-mode	enabieu
speed	
realm-config	
identifier	peer
addr-prefix	0.0.0.0

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	4005648652	mould and
	and and a second s	enabled
	am-in-network	enabled
	880:5880:139.	enabled
	am-in-system	enabled
	be-cac-non-am	disabled
	mam-release	disabled
	gos-enable	disabled
	max-handwidth	0
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	anye-tareney.	0
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	max-packet-loss	0
	observ-window-sise.	0
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	dns-realm	
	media-policy	
	in-translation id	
	out-translationid	
	in-manipulationid	
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	crass-prorrie	-
	average-rate-limit	0
	access-control-trust-level	
	invalid-signal-threshold	0
	maximm-signal-threshold	0
	untrusted-signal-threshold	0
	denv-ner i od	20
	summetric-latching	disabled
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	additional-prefixes	
	restricted-latching	none
	restriction-mask	32
	accounting-enable	enabled
	user-cac-mode	none
	user-cac-handwidth	0
	user-cac-sessions	ō
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	addr-prefix	0.0.0.0
	network-interfaces.	
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	nm-in-network	enabled
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	max-bandwidth	0
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wax-latency	0
max-jitter	0
nax-packet-loss	0
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parent-realm dns-	
realm media-policy	
in-translationid	
out-translationid	
in-manipulationid	
out-manipulationid	
class-profile	
average-rate-limit	0
access-control-trust-level	
invalid-signal-threshold	0
maximum-signal-threshold	0
untrusted-signal-threshold	0
deny-period	30
summetric-latching	disabled
pai-strip	disabled
trunk-context.	
early-media-allow	
additional-prefixes	
restricted-latching	none
restriction-mask	32
accounting-enable	enabled
user-cac-mode	none
user-gag-bandwidth	0
user-cac-sessions	0
net-management-control	disabled
delay-media-undate.	disabled

sessi 💠 agent.

hostname		192.168.1.20		
ip-address			1	
port	1	5060		
state	1	enabled	1	
app-protocol	1	SIP		
app-type	İ		1	
transport-method	1	TTTP		
realm-id	t	peer		
description		AT&T Session	Agent	Primary
carriers	1			
allow-next-hop-lp		enabled	[
constraints	1	enabled		
max-sessions	1	0	[
max-inbound-sessions	1	0		
max-outbound-sessions	1	0	[
max-burst-rate	†	0		
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eend-media-seesien	enabled
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ping-method	OFTIONS,hoga-0
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in-translationid	
Out-translationid	
trustame	enabled
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description	ATaT Session Acent Secondary
carriers	
allowsnewtokonola	enabled
constraints	enabled
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dialog-transparency	enabled
banecaelacid	peer
egreestreelmtid	enterprise-core-com
oatronade	Public
registrarodomain	
registrar-host	
oggietzacogect	0
registerservicercoute	always
initatime	500
maxatimer	4000
teanaeavoire	32
13 with a world wa	180
inactive-dynamic-com	32
anfr-compat-n-nfile	
nac-method	
naceinterral.	10
nacetestes	B-onDiot.
nac-load-weight	1
	-
	1
	-
ONCOLLEGOIL COLLEG	200
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- MACHARCONEL	1900
oggenganteane	5000
#364033040030.4#101.400	2000
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arbinesardsited	U
ener-sachmatch	disabled
extracmetoodcetate	disabled
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default-location-string	
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charging-function-address-mode	none
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001-246-999	
termoterpomade	none
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P-Asserted-Identity
manipulate
case-sensitive
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#### PAL Local IP

ari-host replace  $2n_{\rm Y}$ case-sensitive

#### SLOCAL IP

BRI Beader P-Preferred-Identity manipulate case-sensitive

#### 20.y

#### SPI Local IP

ari-host replace  $an_Y$ case-sensitive

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#### From Header From manipulate case-sensitive

#### request

#### Saam header

ogi-host replace any case-sensitive

ŞLOCAL IP

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To
manipulate
case-sensitive
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request

#### Ic_header

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replace
any
case-sensitive
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SREMOTE IP

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Remote-Party-ID
manipulate
case-sensitive
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#### $2n_{\rm Y}$

#### BPI_beader

eri-host replace any case-sensitive

#### \$LOCAL_IP

Referred-By manipulate case-sensitive

#### $\mathbf{an}_{\mathbf{Y}}$

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vri-host replace any case-sensitive

#### SLOCAL_IP

#### Baierradio Refer-To manipulate

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action	manipulate
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boatname	Enterprise
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location	
mih-system-contact.	
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min-system-location	
eamp-enabled	enabled
enable-engroauthetrape	disabled

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enable-somp-monitor-traps	enabled
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anmp-syslog-his-table-length	1
enno-exelogalevel	WARNING
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oraceastlogrieval	NOTICE
process-log-ip-address	0.0.0.0
2secess-log-post	0
callstrace	disabled
integnalotzace	disabled
lagofiltes	<b>all</b>
default-gateway	192.168.1.1
oggtast	enabled
exceptione	
telnet-timecot	0
caneolectimeout	0
#emotercontrol	enabled
link-redondanoy-state	disabled



Cisco UCM 4.x H.323 Interworking to AT&T SIP with Acme Packet 3000-4000 Series SBC February 2014

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