AT&T IP Flexible Reach Service on AT&T VPN Service

Media Flow Around Addendum For Cisco Unified Border Element (CUBE) Customer Configuration Guide with AT&T Certified IP-PBX Solutions

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Cisco Unified Border Element (CUBE)
Customer Configuration Guide for
Media Flow Around with AT&T Certified IP-PBX Solutions
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Introduction

This Customer Configuration Guide ("CCG") provides recommended guidelines for configuring the customer-managed Cisco Unified Border Element (CUBE) for Media Flow Around (MFA) operation with AT&T IP Flexible Reach Service on AT&T VPN Service ("AT&T VPN") as the Underlying Transport Service, specific to the various AT&T Certified IP-PBX Solutions listed below. The CUBE can be either cascaded behind the Customer Edge Router (CER) or integrated with the CER. This CCG is to be used in conjunction with the appropriate IP-PBX/SBC CCG and the *AT&T IP Flexible Reach Service and AT&T IP Toll-Free on AT&T VPN Service Customer Edge Router CCG* which cover the additional configurations required for use with this service including, but not limited to, configuration of the IP PBX and SBC, the various access types and interfaces, Class of Service, and Voice Quality Monitor. See the References section below for links to the appropriate documents based on the solution being used.

MFA causes media to flow directly between customer end devices such as phones and the AT&T IP Border Element (IPBE) rather than being processed through the CUBE. There are several advantages to MFA including media flow directly to remote IP Phone sites (avoiding hub sites) and increased concurrent call capacity on the CUBE. Several prerequisites must be met to enable MFA. Your account team can help determine if this feature is available in your environment.

The following solutions are currently supported with a cascaded CUBE or integrated CER/CUBE and are covered in this guide:

- Cisco Unified Communications Manager with integrated ASR CER / CUBE
- Cisco Unified Communications Manager with cascaded Cisco CER / ASR CUBE
- Cisco Unified Communications Manager with integrated ISR G2 CER / CUBE
- Cisco Unified Communications Manager with cascaded ISR G2 CER / CUBE
- Cisco Unified Communications Manager with integrated ISR 4K CER / CUBE

- Cisco Unified Communications Manager with cascaded ISR 4K CER / CUBE

Please ensure your system set-up is consistent with the recommended specifications provided in this document. AT&T reserves the right to modify or update its guidelines at any time without notice, so please check the following link to be sure you have the latest version of this document (***http://www.corp.att.com/bvoip/avpn/implementation/*** *(login: att, password: attvoip)*). You may also wish to consult with your AT&T technical sales representative to have them verify that you have the latest document.

1 References

The document links below are hosted on either a public Cisco website not requiring authentication or an AT&T website requiring the following authentication; login: att, password: attvoip. Each certified solution is listed below with the required documentation to configure the CER and IP-PBX/CUBE.

1.1 Caveats

Note that the caveats described in the following documents also apply to the Media Flow Around (MFA) mode of operation. In addition, when the call forward unconditional (call forward all) feature of Cisco Unified Communications Manager is used and the forward number is a toll-free number that uses a network prompter (i.e., a valid response from the calling party is required before the toll-free number provides connect) the call fails with no audio. Typically, this type of toll-free number is used by large scale call handlers such as reservation systems and customer support lines. There is no issue with call forward unconditional to toll free numbers that don't employ a network prompter or any other destination.

1.2 Cisco Unified Communications Manager with integrated ASR CER / CUBE documentation

CER CCG for Integrated CER/CUBE with AT&T Certified IP-PBX Solutions

Application Notes CUCM 11.0 ASR 15.5.3 S1 with ATT IPFR IPV4

1.3 Cisco Unified Communications Manager with cascaded ASR CUBE documentation

Application Notes CUCM 11.0 ASR 15.5.3 S1 with ATT IPFR IPV4

1.4 Cisco Unified Communications Manager with integrated ISR G2 CER / CUBE documentation

CER CCG for AT&T IP Flexible Reach Service and AT&T IP Toll Free on AT&T VPN Service (Cisco ISR G2)

Cisco Unified Communication Manager 11.0.1 Configuration Guide with ISR G2/Cube 11.1

1.5 Cisco Unified Communications Manager with cascaded ISR G2 CUBE documentation

Cisco Unified Communication Manager 11.0.1 Configuration Guide with ISR G2/Cube 11.1

1.6 Cisco Unified Communications Manager with integrated ISR 4K CER / CUBE documentation

CER CCG for AT&T IP Flexible Reach Service and AT&T IP Toll Free on AT&T VPN Service (Cisco ISR 4k)

AT&T IP Flexible Reach Service with Enhanced Features Using MIS / PNT or AT&T Virtual Private Network Transport with Cisco Unified Communications Manager v. 11.0 and Cisco UBE v. 11.1.0 on an ISR 4431 Router with IPv6 SIP Interface MAR 2016

1.7 Cisco Unified Communications Manager with cascaded ISR 4K CUBE documentation

AT&T IP Flexible Reach Service with Enhanced Features Using MIS / PNT or AT&T Virtual Private Network Transport with Cisco Unified Communications Manager v. 11.0 and Cisco UBE v. 11.1.0 on an ISR 4431 Router with IPv6 SIP Interface MAR 2016

2 Overview

AT&T IP Flexible Reach Service over AT&T VPN as the Underlying Transport Service is an AT&T Business Voice over IP (BVoIP) Service.

This document should be used solely as a general configuration guideline. The Customer is solely responsible for determining the appropriate configuration for their specific environment; AT&T provides resources to assist with that configuration. Please contact your AT&T technical support representative for assistance if needed.

Configuration examples in this guide are provided for informational purposes only. The example configurations may be mapped to a variety of vendor implementations, check with your AT&T technical support representative if you have any questions.

Note: The configuration examples provided in this document are based upon Cisco IOS features, however, the features are NOT described in their entirety; and may vary across hardware platforms and versions of IOS. Please refer to the appropriate Cisco documentation relative to your IOS features.

3 Special Considerations

- The following TCP/IP ports must not be blocked by firewall or access lists:
  - AT&T IP Border Element signaling and media addresses.
  - SIP signaling traffic (UDP port 5060).
  - RTP/RTCP traffic (UDP port range 16384-32767).
- The configuration information in this CCG assumes a single primary CER. Any alternate routing configurations or remote branch connectivity to other sites, within the same or other AT&T VPN, requires proper configuration of the signaling and media paths. Routing configurations in all customer routers need to be set up to assure that the routing in the primary CER is not affected.

4 Cisco Unified Border Element Configurations for various IP-PBX Solutions

This section will assist in properly configuring Media Flow Around (MFA) on the Cisco Unified Border Element (CUBE) to insure interoperability with AT&T Certified IP-PBX solutions for use on AT&T IP Flexible Reach Service on AT&T VPN transport. Please review the section below that is applicable to your environment.

Important Note: The IP-PBX solutions below make reference to IP Border Element (IPBE) IP Addresses, Signaling IP Address, and Media IP Address which are provided to the Customer prior to the scheduled Pre-test date in a letter AT&T will send titled Customer Router Configuration Shipping/Confirmation. The Signaling IP Address and the Media IP Address can be Customer supplied or AT&T provided.

Throughout this document, AT&T provided IP Address is synonymous with IP Flexible Reach IP Address.

4.1 Cisco Unified Communications Manager with Cisco ISR G2 or ISR 4K CER and integrated CUBE or with Cisco ASR CER and integrated CUBE

This Cisco Unified Communications Manager (CUCM) solution works in conjunction with a CUBE that is combined with a Cisco CER (referred to as an "integrated CER/CUBE"). This section covers the CUBE and CUCM specific commands required for Media Flow Around (MFA). Please see the appropriate CCGs for CUBE, CUCM and CER specific configurations.

Note:

- Network Address Translation (NAT) of the Signaling Address is not an option for the integrated CER/CUBE solution.

4.1.1 Changes to Standard Solution (binding the signaling only to a loopback interface) to Support Media Flow Around

Step 1: Configure Media Flow Around

Configure the CUBE to support MFA.

```
voice service voip
 media flow-around
```

Step 2: Remove media binding(s)

Remove the media binding(s) if present. The media binding may be found in the global voice service voip -> sip section of the configuration and/or in the dial-peers. Both locations must be checked. For simplicity, only one dial–peer is shown in the example below.

```
voice service voip
 sip
 no bind media source-interface Loopback<appropriate loopback>

dial-peer voice 100 voip
 no voice-class sip bind media source-interface Loopback<appropriate loopback>
```

Router configuration output:

```
voice service voip
 address-hiding
 mode border-element
 media flow-around
 allow-connections sip to sip
 redirect ip2ip
 fax protocol pass-through g711ulaw
 sip
  bind control source-interface Loopback60000
  header-passing
  error-passthru
  asserted-id pai
  no update-callerid
  early-offer forced
  midcall-signaling passthru
  privacy-policy passthru
  g729 annexb-all

dial-peer voice 100 voip
 description "Outgoing To AT&T"-AT&T facing side
 destination-pattern 1T
 session protocol sipv2
 session target ipv4:207.242.225.210
 voice-class codec
 voice-class sip asymmetric payload full
 voice-class sip asserted-id pai
 voice-class sip privacy-policy passthru
```

```
voice-class sip early-offer forced
voice-class sip profiles 1
voice-class sip bind control source-interface Loopback60000
dtmf-relay rtp-nte
fax-relay sg3-to-g3
fax rate 14400
fax protocol pass-through g711ulaw
no vad
```

NOTE: Please remember to remove the media binding(s) if present.

4.2 Cisco Unified Communications Manager with Cisco ISR G2 or ISR 4K or ASR CER and cascaded ISR G2 or ISR 4K or ASR CUBE

This Cisco Unified Communications Manager (CUCM) solution works in conjunction with a CUBE that is separate from a Cisco CER (referred to as cascaded CUBE). This section covers the CUBE and CUCM specific commands. Please see the appropriate CCGs for CUCM and CER specific configurations.

Note:

- Network Address Translation (NAT) of the Signaling Address is not an option for the cascaded CUBE solution with MFA.

4.2.1 Changes to Standard Solution (binding the signaling only to a loopback interface) to Support Media Flow Around

Step 1: Configure media flow around

Configure the CUBE to support MFA.

```
voice service voip
 media flow-around
```

Step 2: Remove media binding

Remove the media binding(s) if present. The media binding may be found in the global voice service voip -> sip section of the configuration and/or in the dial-peers. Both locations must be checked. For simplicity, only one dial–peer is shown in the example below.

```
voice service voip
 sip
 no bind media source-interface <appropriate interface>

dial-peer voice 100 voip
 no voice-class sip bind media source-interface <appropriate interface>
```

Router configuration output:

```
voice service voip
 address-hiding
 mode border-element
 media flow-around
 allow-connections sip to sip
 redirect ip2ip
 fax protocol pass-through g711ulaw
 sip
  header-passing
  error-passthru
  asserted-id pai
  no update-callerid
  early-offer forced
  midcall-signaling passthru
  privacy-policy passthru
  g729 annexb-all

dial-peer voice 100 voip
 description "Outgoing To AT&T"-AT&T facing side
 destination-pattern 1T
 session protocol sipv2
 session target ipv4:207.242.225.210 23
 voice-class codec
 voice-class sip asymmetric payload full
 voice-class sip asserted-id pai
 voice-class sip privacy-policy passthru
 voice-class sip early-offer forced
 voice-class sip profiles 1
 voice-class sip bind control source-interface <appropriate interface>
 dtmf-relay rtp-nte
 fax-relay sg3-to-g3
 fax rate 14400
 fax protocol pass-through g711ulaw
```

```
no vad
```

NOTE: Please remember to remove the media binding(s) if present.

Acronyms

Acronym	Translation
ADSL	Asymmetric Digital Subscriber Line
AIM	Advanced Integration Module A
AS	Autonomous System
ATM	Asynchronous Transfer Mode
AT&T VPN	AT&T Virtual Private Network
BC	Committed Burst
BE	Excess Burst or Best Effort
BGP	Border Gateway Protocol
BH	Bursty High
BL	Bursty Low
BOE	Branch Office Extension
CAS	Channel Associated Signaling
CBWFQ	Class Based Weighted Fair Queuing
CCG	Customer Configuration Guide
CCS	Common Channel Signaling
CDR	Committed Data Rate
CEF	Cisco Express Forwarding
CER	Customer Edge Router
CHAP	Challenge Handshake Authentication Protocol
CIR	Committed Information Rate
CLI	Command Line Interface
CM	Communications Manager
COS	Class of Service
CPE	Customer Premise Equipment
CPU	Central Processing Unit

Acronym	Translation
CRC	Cyclic Redundancy Check
CRTP	Compress Real Time Protocol
CSU/DSU	Channel Service Unit / Data Service Unit
CUBE	Cisco Unified Border Element
CUCM	Cisco Unified Communications Manager
DID	Direct Inward Dial
DS	Down Stream
DSCP	Differentiated Service Code Point
DSL	Digital Subscriber Line
DSP	Digital Signal Processors
DTMF	Dual Tone Multi Frequency
E&M	Ear & Mouth
EF	Expedient Forwarding
ePVC	Enhanced Permanent Virtual Circuit
FR	Frame Relay
FXO	Foreign Exchange Office
FXS	Foreign Exchange Station
GSM FR	Global System for Mobile communications Full Rate
HDV	High Density Voice
HWIC	High-speed WAN Interface Card
IAR	Inbound Alternate Routing
IETF	Internet Engineering Task Force
IMA	Inverse Multiplexing over ATM
IOS	Internetwork Operation System
IP	Internet Protocol
IPBE	Internet Protocol Border Element
IPSEC	Internet Protocol Security
ISR	Integrated Services Router
ITU-T	International Telecommunication Union - Telecommunications

Acronym	Translation
GW	Gateway
LAN	Local Area Network
LFI	Link Fragmentation and Interleaving
LLQ	Low Latency Queuing
LD	Long Distance
MFA	Media Flow Around
MGCP	Media Gateway Control Protocol
MLPPP	Multi-Link Point-to-Point Protocol
MM	Multi Media
MOW	Most Of World
MRG	Media Resource Group
MRGL	Media Resource Group List
MTP	Media Termination Point
MTU	Maximum Transmission Unit
NAT	Network Address Translation
NET	Network Equipment Technologies
NM	Network Module
NPE	Network Processing Engine
NTE	Named Telephone Event
OAM	Operation Administration & Maintenance
OCS	Office Communication Server
PA	Port Adapter
PAT	Port Address Translation
PBX	Private Branch Exchange
PC	Personal Computer
PCR	Peak Cell Rate
PER	Provider Edge Router
POS	Packet over SONET
POTS	Plain Old Telephone Service

Acronym	Translation
PPP	Point-to-Point Protocol
PQ	Priority Queue
PRI	Primary Rate Interface
PSAP	Public Safety Answering Point
PSTN	Public Switched Telephone Network
PVC	Permanent Virtual Circuit
PVDM	Packet Voice DSP Module
QOS	Quality of Service
QSIG	Q Signaling
RC	Receive
RFC	Request for Comment
RT	Real Time
RTCP	Real Time Control Protocol
RTP	Real Time Protocol
SBC	Session Border Controller
SCCP	Skinny Call Control Protocol
SCR	Sustainable Cell Rate
SHDSL	Single-Pair High-Speed Digital Subscriber Line
SIP	Session Initiation Protocol
SM	Session Manager
SPE	Synchronous Payload Envelope
TAC	Technical Assistance Center
TC	Time Interval
TDM	Time Division Multiplexing
TN	Telephone Number
TX	Transmit
UDP	User Datagram Protocol
US	Up Stream or United States
VAD	Voice Activity Detection

Acronym	Translation
VCI	Virtual Circuit Identifier
VLAN	Virtual Local Area Network
VNI	Voice Network Infrastructure
VoIP	Voice over Internet Protocol
VPI	Virtual Path Identifier
VPN	Virtual Private Network
VT	Virtual Template
WAN	Wide Area Network
WFQ	Weighted Fair Queuing
WIC	WAN Interface Card

This Customer Configuration Guide ("CCG") is offered as a convenience to AT&T's customers. The specifications and information regarding the product in this CCG are subject to change without notice. All statements, information, and recommendations in this CCG are believed to be accurate but are presented without warranty of any kind, express or implied, and are provided “AS IS”. Users must take full responsibility for the application of the specifications and information in this CCG.

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