



## Delayed-Offer to Early-Offer

The Delayed-Offer to Early-Offer (DO-EO) feature allows CUBE to convert a delayed offer that it receives into an early offer. This feature is supported in the Media Flow-Around mode.

This feature also supports high-density transcoding calls, where transcoding IP addresses and port numbers are exchanged between the sender and receiver. This feature also supports midcall renegotiation of codecs required if an exchange of parameters that is not end-to-end causes an inefficient media flow.

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## Feature Information for Delayed-Offer to Early-Offer

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to <https://cfngn.cisco.com/>. An account on Cisco.com is not required.

**Table 1: Feature Information for Delayed-Offer to Early-Offer**

Feature Name	Releases	Feature Information
Delayed-Offer to Early-Offer	Cisco IOS 12.4(3) Cisco IOS 12.4(24)T Cisco IOS 15.0(1)M	The Delayed-Offer to Early-Offer feature allows CUBE to convert a delayed offer it receives into an early offer.  The following commands were introduced by this feature: <b>voice-class sip early-offer forced</b> , <b>early-offer forced</b> and <b>media transcoder high-density</b> .
Delayed-Offer to Early-Offer Support for Video Calls	Cisco IOS 12.4(22)T	The Delayed-Offer to Early-Offer support was extended for video calls. The following command was introduced: <b>codec-profile</b>

Feature Name	Releases	Feature Information
Media Flow- Around with SIP Signaling control on CUBE	Cisco IOS 15.1(3)T	Support for Media Flow-Around for Delayed-Offer to Early-Offer audio calls on CUBE was introduced. No new commands were introduced or modified.
Midcall Renegotiation Support for DO-EO Calls	Cisco IOS 15.4(2)T Cisco IOS XE 3.12S	The Midcall renegotiation of codecs feature configures the midcall renegotiation of codecs, if an exchange of parameters that is not end-to-end causes an inefficient media flow.  The following commands were modified by this feature: <b>voice-class sip early-offer forced renegotiate [always],</b> <b>early-offer forced renegotiate [always].</b>

## Prerequisites for Delayed-Offer to Early-Offer

Configure delayed-offer to early-offer in media flow-around mode.

## Restrictions for Delayed-Offer to Early-Offer Media Flow-Around

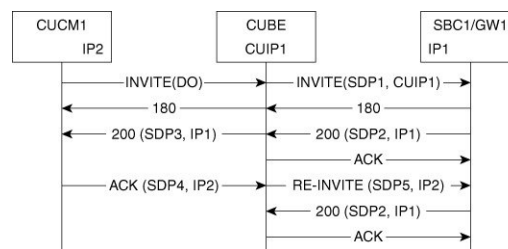
- CUBE does not support change in IP address or port number in the locally triggered RE-INVITE response.
- CUBE does not support DE-EO Media Flow-Around for video calls.

## Delayed-Offer to Early-Offer in Media Flow-Around Calls

Delayed-Offer to Early-Offer (DO-EO) allows CUBE to convert a delayed offer (DO) into an early offer (EO) in the media flow-around mode.

CUBE sends its local IP address in the initial EO INVITE Session Description Protocol (SDP) message. In the image, this is illustrated by INVITE (SDP1, CUIP1). Later, an additional RE-INVITE is locally generated by CUBE to communicate the SDP message details from the sender. This is illustrated by RE-INVITE (SDP5, IP2) in the below image. The RE-INVITE response is consumed by CUBE and not communicated to the sender.

**Figure 1: Delayed Offer to Early Offer in Media Flow-Around Calls**



CUBE supports delayed offer to early offer for SIP-to-SIP video calls. CUBE generates an outgoing Early Offer INVITE with the configured codec list, for an incoming Delayed Offer INVITE.

DO-EO video call is supported if both audio and video codecs are configured under a dial peer. **codec profile** command defines the codec attributes for Video (H263, H264) and Audio (AACLD) codecs. The codec attributes configured under codec-profile is used to generate the a=fmtp attribute line in the Early Offer SDP.

## Configuring Delayed Offer to Early Offer

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. Configure conversion of a delayed offer to an early offer:
  - In dial-peer configuration mode
    - voice-class sip early-offer forced**
  - In global VoIP SIP configuration mode
    - early-offer forced**
4. **end**

### DETAILED STEPS

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> enable	Enables privileged EXEC mode. Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	Configure conversion of a delayed offer to an early offer: <ul style="list-style-type: none"> <li>• In dial-peer configuration mode               <ul style="list-style-type: none"> <li><b>voice-class sip early-offer forced</b></li> </ul> </li> <li>• In global VoIP SIP configuration mode               <ul style="list-style-type: none"> <li><b>early-offer forced</b></li> </ul> </li> </ul> <b>Example:</b> In dial-peer configuration mode:  Device (config) <b>dial-peer voice 10 voip</b> Device (config-dial-peer) <b>voice-class sip</b>	

	Command or Action	Purpose
	<pre>early-offer forced Device (config-dial-peer) end</pre> <p><b>Example:</b> In global VoIP SIP mode:</p> <pre>Device(config)# voice service voip Device (config-voi-serv) sip Device (config-voi-sip) early-offer forced Device (config-voi-sip) end</pre>	
<b>Step 4</b>	<b>end</b>	Exits to privileged EXEC mode.

## Configuring Delayed Offer to Early Offer for Video Calls

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **codec profile** *tag profile*
4. **dial-peer voice number** *number voip*
5. **codec** *codec profile*
6. **video codec** *codec profile*
7. **voice-class sip early-offer forced**
8. **end**

### DETAILED STEPS

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<pre>enable</pre> <p><b>Example:</b> Device&gt; enable </p>	Enables privileged EXEC mode. Enter your password if prompted.
<b>Step 2</b>	<pre>configure terminal</pre> <p><b>Example:</b> Device# configure terminal </p>	Enters global configuration mode.
<b>Step 3</b>	<pre>codec profile tag profile</pre> <p><b>Example:</b></p>	Configures the audio and video codec profiles.

	Command or Action	Purpose
	<pre>codec profile 1 aacld codec profile 2 H264</pre>	
<b>Step 4</b>	<p><b>dial-peer voice number <i>number</i> voip</b></p> <p><b>Example:</b></p> <pre>Device(config)# dial-peer voice 1 voip</pre>	Enters dial peer configuration mode for the specified VoIP dial peer.
<b>Step 5</b>	<p><b>codec <i>codec profile</i></b></p> <p><b>Example:</b></p> <pre>Device(config-dial-peer)# profile 1 aacld</pre>	Audio codec profile is applied on the dial peer.
<b>Step 6</b>	<p><b>video codec <i>codec profile</i></b></p> <p><b>Example:</b></p> <pre>Device(config-dial-peer)# video codec h264 profile 2</pre>	Video codec profile is applied on the dial peer.
<b>Step 7</b>	<p><b>voice-class sip early-offer forced</b></p> <p><b>Example:</b></p> <pre>Device (config-dial-peer)# voice-class sip early-offer forced</pre>	
<b>Step 8</b>	<b>end</b>	Exits to privileged EXEC mode.

## Configuring Delayed Offer to Early Offer Medial Flow-Around

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **medial flow-around**
4. Configure conversion of a delayed offer to an early offer:
  - In dial-peer configuration mode

**voice-class sip early-offer forced**
  - In global VoIP SIP configuration mode

**early-offer forced**
5. **end**

## DETAILED STEPS

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> enable	Enables privileged EXEC mode. Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>medial flow-around</b> <b>Example:</b> Device(config-voi-serv)# media flow-around	Enables media flow-around.
<b>Step 4</b>	Configure conversion of a delayed offer to an early offer: <ul style="list-style-type: none"> <li>• In dial-peer configuration mode               <ul style="list-style-type: none"> <li><b>voice-class sip early-offer forced</b></li> </ul> </li> <li>• In global VoIP SIP configuration mode               <ul style="list-style-type: none"> <li><b>early-offer forced</b></li> </ul> </li> </ul> <b>Example:</b> In dial-peer configuration mode: <pre>Device (config) dial-peer voice 10 voip Device (config-dial-peer) voice-class sip early-offer forced Device (config-dial-peer) end</pre> <b>Example:</b> In global VoIP SIP mode: <pre>Device(config)# voice service voip Device (config-voi-serv) sip Device (config-voi-sip) early-offer forced Device (config-voi-sip) end</pre>	
<b>Step 5</b>	<b>end</b>	Exits to privileged EXEC mode.

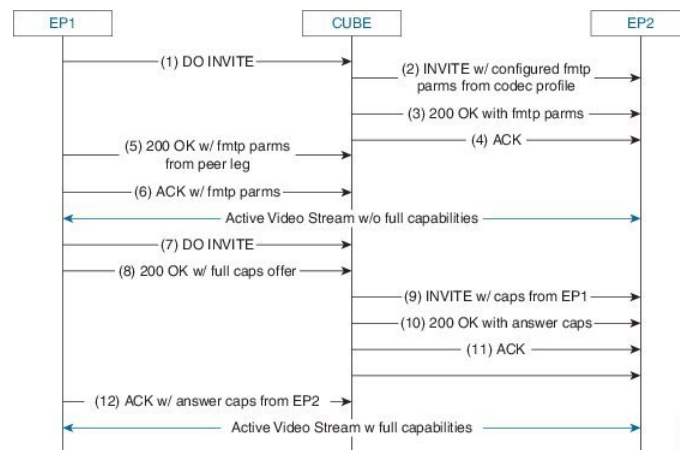
# MidCall Renegotiation Support for Delayed-Offer to Early-Offer Calls

When CUBE converts a delayed offer into an early offer, an incomplete exchange of Format specific parameters (FMTP) occurs during call establishment, resulting in either the noninitiation of media transmission or media transmission in a quality that may not be the best. This is especially a problem in video calls.

To overcome this situation, midcall renegotiation of capabilities can be configured.

The **early-offer forced renegotiate [always]** command is used to configure this in global VoIP configuration mode (config-voi-serv) and the **voice-class sip early-offer forced renegotiate** command is dial-peer configuration mode (config-dial-peer) and voice-class configuration mode (config-class).

**Figure 2: MidCall Renegotiation of Capabilities**



The **early-offer forced renegotiate** command triggers a delayed-offer RE-INVITE if the negotiated codecs are one of the following:

- aac1d—Audio codec AACLD 90000 bps
- h263—Video codec H263
- h263+—Video codec H263+
- h264—Video codec H264
- mp4a—Wideband audio codec

The **early-offer forced renegotiate always** command always triggers a delayed-offer RE-INVITE. This option can be used to support all other codecs.

## Restrictions for MidCall Renegotiation Support for DO-EO Calls

- If **midcall-signaling block** or **midcall-signaling passthru media-change** commands have been configured, the feature does not work because a midcall RE-INVITE is not triggered by CUBE.
- if initial call is transcoded , then midcall re-invite is not triggered by CUBE.



**Note** For EO to EO calls, the Delayed-Offer midcall RE-INVITE is not triggered by the CUBE, if either **midcall-signaling block** or **midcall-signaling passthru media-change** command is configured.

## Configuring Mid Call Renegotiation Support for Delayed-Offer to Early-Offer Calls

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **dial-peer voice *id* voip**
4. **media transcoder high-density**
5. **end**

### DETAILED STEPS

#### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b>  Device> enable	Enables privileged EXEC mode. Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b>  Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>dial-peer voice <i>id</i> voip</b>	Enters dial-peer configuration mode and configures the selected dial peer.
<b>Step 4</b>	<b>media transcoder high-density</b> <b>Example:</b>  Device (config) <b>dial-peer voice 10 voip</b> Device (config-dial-peer) <b>media transcoder high-density</b> Device (config-dial-peer) <b>end</b>	
<b>Step 5</b>	<b>end</b>	Exits to privileged EXEC mode.

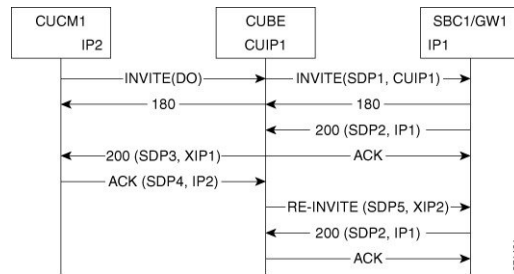


# High-Density Transcoding Calls in Delayed-Offer to Early-Offer

High-Density Transcoding Calls in the media flow-around DO-to-EO mode is a feature where the transcoding IP address and port number are exchanged between the originating and terminating user agents. For high-density transcoding calls, CUBE is in the media flow-through mode even if media flow-around is configured.

In the figure below, XIP1 is passed to CUCM1 when a 200 OK is received from SBC1. ACK from CUCM1 triggers new RE-INVITE with transcoding IP address and port number (XIP2) and this RE-INVITE has to be locally handled in CUBE.

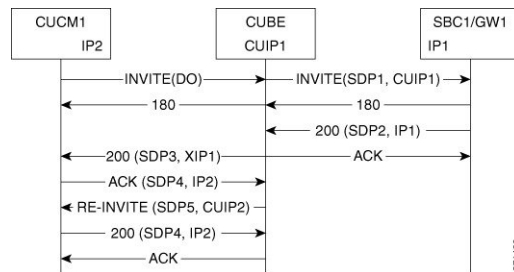
**Figure 3: High-Density Transcoding Calls in DO-to-EO**



The **media transcoder high-density** command is used to configure this feature in dial-peer configuration mode (config-dial-peer). Refer to “Modes for Configuring Dial Peers” section to enter these modes and configure this feature.

For high-density transcoding calls with a common codec, CUBE should be in Media Flow-Through mode even though media flow-around is configured.

**Figure 4: High-Density Transcoding Calls for Common Codecs in DO-to-EO**



## Restrictions for High-Density Transcoding DO-EO Calls

For high-density transcoding calls with a common codec, CUBE will be in Media Flow-through mode even though Media Flow-Around is configured.

## Configuring High-Density Transcoding

To configure High-Density Transcoding delayed offer to early offer calls in media flow-around mode, perform the following steps:

**SUMMARY STEPS**

1. **enable**
2. **configure terminal**
3. **voice service voip**
4. **media transcoder high-density**
5. **sip**
6. **early offer-forced**
7. **end**

**DETAILED STEPS****Procedure**

	<b>Command or Action</b>	<b>Purpose</b>
<b>Step 1</b>	<b>enable</b> <b>Example:</b>  Device> enable	Enables privileged EXEC mode. Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b>  Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>voice service voip</b> <b>Example:</b>  Device(config)# voice service voip	Enters voice service configuration mode.
<b>Step 4</b>	<b>media transcoder high-density</b> <b>Example:</b>  Device(config-voi-serv)# media transcoder high-density	Enables media transcoder high-density for transcoding high-density media calls.
<b>Step 5</b>	<b>sip</b> <b>Example:</b>  Device(config-voi-serv)# sip	Enters SIP configuration mode.
<b>Step 6</b>	<b>early offer-forced</b> <b>Example:</b>  Device(config-voi-sip)# early offer-forced	Forcefully sends SIP EO invites on the Out-Leg.
<b>Step 7</b>	<b>end</b> <b>Example:</b>  Device(config-voi-sip)# end	Exits the present configuration mode.