Configuring Video Transcoding

First Published: December 11, 2012

This chapter describes the video transcoding support that is available in Cisco Unified Communications Manager Express (Cisco Unified CME).

Finding Feature Information

Your Cisco Unified CME version may not support all of the features documented in this module. For a list of the versions in which each feature is supported, see the"Feature Information for Video Transcoding" section on page 501.

Contents

This chapter contains information on the following topics:

Prerequisites for Configuring Video Transcoding

The following section contains information on the supported platforms and the requirements for configuring video transcoding.

Platforms

This feature is supported on the following Cisco Integrated Services Routers:

- Cisco 2900 Series

- Cisco 3900 Series

The router with the DSP farm must have a PVDM3 module installed. See Table 43 for a list of the supported video service for the different PVDM3 modules.

Table 43 Support for Video Transcoding

PVDM3 Type	Video Transcoder
PVDM3-16	Not Supported
PVDM3-32	Not Supported
PVDM3-64	Not Supported
PVDM3-128	Supported
PVDM3-192	Supported
PVDM3-256	Supported

Software

- Cisco IOS 15.1(4)M
- Cisco Unified Communications Manager Express 8.6 and later

Information About Video Transcoding

This section covers the following topics:

Supported Protocols

This feature supports the following standards and protocol:

- International Telecommunication Union (ITU-T) standards and protocols:
  - H.320
  - H.323
  - H.324
- Internet Engineering Task Force (IETF) and Cisco-proprietary signaling protocol:
  - SCCP
  - SIP
- Video codecs:
  - H.263
  - H.264/AVC
- Audio codecs:
  - G.711alaw
  - G.711ulaw
  - G.722-64
  - G.729 abr8
  - G.729ar8
  - G.729br8
  - G.729r8
  - iLBC
  - iSAC

Supported Video

This feature supports the following:

- Frame rate of 15 and 30 frames per second (f/s).
- Video stream bit rate of 64 kb/s to 2 Mb/s.

- Video resolution listed in Table 44.

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Table 44 Supported Video Resolution

Resolution	Dimension
CIF[1]	352 x 288 pixels
SIF[2] **Note** If your phone supports SIF, configure your DSP farm profile with the CIF codec.	352 x 240 pixels
W360P	640 x 360 pixels
W448P	768 x 448 pixels
4CIF	704 x 576 pixels
4SIF	704 x 480 pixels
QCIF[3]	176 x 144 pixels
QSIF[4]	176 x 120 pixels
VGA[5]	640 x 480 pixels

1. CIF = Common Intermediate Format.
2. SIF = Source Interchange Format.
3. QCIF = One-Quarter Common Intermediate Format.
4. QSIF = One-Quarter Source Interchange Format.
5. VGA = Video Graphic Array.

Video Terminology

You should be familiar with the terminology in Table 45 before you configure video transcoding.

Table 45 Video Transcoding Terminology

Terminology	Description
Transcode	The process of converting one data stream using one codec format to another data stream with a different codec format, for example, converting H.263 to H.264.
Transrate	The process of converting one data stream using one bit rate to another data stream with a different bit rate, for example, converting from a high-speed data rate of 2 Mbps to a lower-speed data rate of 1 Mbps.
Transsize	The process of converting the resolution of a video transmission to another resolution, for example converting 4CIF to CIF.
Video Conversion	The process of transcoding, transrating, or transsizing a video stream.
Video Format	The attributes of the video stream (video codec, resolution, frame rate, bitrate, RTP payload protocol, and annex).

Overview of Point-to-Point Video Transcoding

If the video phones on a call support the same video format attributes, the router can pass the video data stream from one phone to another phone without altering the data stream. Video phones have many different video formats and phones that support different video formats cannot communicate directly with one another.

To enable the two phones that are using different video formats to communicate with one another, you can configure the router to dynamically convert (encode and decode) the video data stream between the two phones.

DSP Farm Profiles

To allocate DSP resources to support video transcoding, transrating, and transsizing on a video call, you must create DSP farm profiles and specify the video format that is supported. This ensures that the system has sufficient resources available for video stream conversion.

Table 46 and Table 47 list the supported video resolution, frame rate, and bit rate support for H.263 and H.264, respectively, for video transcoding on a video call.

Table 46 Support for H.263

Resolution	Frame Rate (frames per second)	Bit Rate (kilobits per second)
QCIF (QSIF)	15 f/s	64 kb/s to 704 kb/s
	30 f/s	64 kb/s to 704 kb/s
CIF (SIF)	15 f/s	64 kb/s to 704 kb/s
	30 f/s	64 kb/s to 704 kb/s

Table 47 Support for H.264

Resolution	Frame Rate (frames per second)	Bit Rate (kilobits per second)
QCIF (QSIF)	15 f/s	64 kb/s to 704 kb/s
	30 f/s	64 kb/s to 704 kb/s
CIF (SIF)	15 f/s	64 kb/s to 704 kb/s
	30 f/s	64 kb/s to 704 kb/s
4CIF (4SIF)	30 f/s	1 Mb/s to 2 Mb/s
VGA	30 f/s	1 Mb/s to 2 Mb/s
w360P	30 f/s	1 Mb/s to 2 Mb/s
w448P	30 f/s	1 Mb/s to 2 Mb/s

Calculating DSP Requirements

To determine whether you have sufficient PVDM modules, you can use the DSP Calculator at

http://www.cisco.com/web/applicat/dsprecal/dsp_calc.html.

How to Configure Video Transcoding on Cisco ISR G2

This section contains the following procedure:

Configuring DSP Farm Resources on the Router

Perform the following steps to define a DSP farm on the PVDM3 card for video transcoding on Cisco ISR G2.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **sccp local** *interface-type interface-number*
4. **sccp ccm** *ip-address* **identifier** *identifier-number*
5. **sccp**
6. **sccp ccm group** *group-number*
7. **associate ccm** *identifier-number* **priority** *priority-number*
8. **associate profile** *profile-identifier* **register** *device-name*
9. **exit**
10. **dspfarm profile** *profile-identifier* **transcode video**
11. **codec** {*codec-type* [*resolution*]}
12. **associate application sccp**
13. **no shutdown**
14. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.

	Command or Action	Purpose
Step 3	**sccp local** *interface-type interface-number* **Example:** `Router(config)# sccp local GigabitEthernet0/1`	Selects the local interface that the SCCP transcoding applications should use to register with Cisco Unified CME. • *interface-type*—Interface type that the SCCP application uses to register with Cisco Unified CME. The type can be an interface address or a virtual-interface address such as Ethernet. • *interface-number*—Interface number that the SCCP application uses to register with Cisco Unified CME.
Step 4	**sccp ccm** *ip-address* **identifier** *identifier-number* **Example:** `Router(config)# sccp ccm 1.4.211.35 identifier 2`	Specifies the Cisco Unified CME address. • *ip-address*—IP address of the Cisco Unified CME router. • **identifier** *identifier-number*—Number that identifies the Cisco Unified CME router. **Note** The value of the IP address should match the IP address in the **ip source-address** command that is configured in the Cisco Unified CME router that is used registered DSP resources.
Step 5	**sccp** **Example:** `Router(config)# sccp`	Enables SCCP and its associated transcoding applications.
Step 6	**sccp ccm group** *group-number* **Example:** `Router(config)# sccp ccm group 2`	Creates a Cisco Unified CME group and enters SCCP configuration mode for Cisco Unified CME. • *group-number*—Number that identifies the Cisco Unified CME group. **Note** A Cisco Unified CME group is a naming device under which data for the DSP farms is declared. Only one group is required.
Step 7	**associate ccm** *identifier-number* **priority** *priority-number* **Example:** `Router(config-sccp-ccm)# associate ccm 2 priority 1`	Associates a Cisco Unified CME router with a group and establishes its priority within the group. • *identifier-number*—Number that identifies the Cisco Unified CME router. • **priority**—The priority of the Cisco Unified CME router in the Cisco Unified CME group. Only one Cisco Unified CME group is possible. Default is 1. **Note** The identifier number should match the identifier number in the **sccp ccm** command in Step 4.

	Command or Action	Purpose
Step 8	**associate profile** *profile-identifier* **register** *device-name* **Example:** `Router(config-sccp-ccm)# associate profile 345 register 2851VXCODE`	Associates a DSP farm profile with a Cisco Unified CME group. • *profile-identifier*—Number that identifies the DSP farm profile. **Note** The profile identifier value should match the profile identifier value for the associated DSP farm profile. **Note** The device-name in this step must be the same as the device-name in the **sdspfarm tag** command in the Cisco Unified CME router.
Step 9	**exit** **Example:** `Router(config-sccp-ccm)# exit`	Exits SCCP configuration mode.
Step 10	**dspfarm profile** *profile-identifier* **transcode video** **Example:** `Router(config)# dspfarm profile 345 transcode video`	Enters DSP farm profile configuration mode.
Step 11	**codec** {*codec-type* [*resolution*]} **Example:** `Router(config)# codec h263 qcif`	Specifies the codecs supported by a DSP farm profile. Audio codecs are not automatically added to video transcoding DSP farm profiles. If audio transcoding is needed along with video transcoding, transrating, and transsizing, you must also specify the audio codecs.
Step 12	**associate application sccp** **Example:** `Router(config-dspfarm-profile)# associate application sccp`	Associates SCCP with the DSP farm profile.
Step 13	**no shutdown** **Example:** `Router(config-dspfarm-profile)# no shutdown`	Allocates the DSP farm resources and enables the DSP farm profile.
Step 14	**end** **Example:** `Router(config-dspfarm-profile)# end`	Returns to privileged EXEC mode.

Configuring a Cisco Unified CME Router to Use Registered DSP Resources

Perform the following steps to use registered DSP resources on Cisco ISR G2.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **telephony-service**
4. **sdspfarm units** *number*
5. **sdspfarm transcode sessions** *number*
6. **sdspfarm tag** *number device-name*
7. **ip source-address** [*ip-address* [**port** [*port-number*]]]
8. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**telephony-service** **Example:** `Router(config)# telephony-service`	Enters telephony-service configuration mode.
Step 4	**sdspfarm units** *number* **Example:** `Router(config-telephony)# sdspfarm units 5`	Specifies the maximum number of DSP farms that are allowed to be registered to the Cisco Unified CME router. • *number*—Range is 0 to 10. Default is 0.
Step 5	**sdspfarm transcode sessions** *number* **Example:** `Router(config-telephony)# sdspfarm transcode sessions 10`	Specifies the maximum number of transcoder sessions allowed by the router. • One transcoder session consists of two transcoding streams between callers using transcode. Use the maximum number of transcoding sessions and conference calls that you want your router to support at one time. • *number*—Declares the number of DSP farm sessions. Valid values are numbers from 1 to 128.

	Command or Action	Purpose
Step 6	**sdspfarm tag** *number device-name* **Example:** `Router(config-telephony)# sdspfarm tag 1 2581VXCODE`	Permits a DSP farm unit to be registered to the router and associates it with an SCCP client interface's MAC address. **Note** The device-name in this step must be the same as the device-name in the **associate profile** command when you are configuring the DSP farm resources.
Step 7	**ip source-address** [*ip-address* [**port** [*port-number*]]] **Example:** `Router(config-credentials)# ip source-address 1.4.211.35 port 2000`	Identifies the router that is sending SCCP messages. *ip-address*—Typically one of the addresses of the Ethernet port of the router. **port** *port-number*—TCP port for credentials service communication. Default is 2444. We recommend that you use the default value. **Note** The value of the IP address should match the IP address that is specified in the **sccp ccm** command when you are configuring the DSP farm.
Step 8	**end** **Example:** `Router(config-dspfarm-profile)# end`	Returns to privileged EXEC mode.

Configuring Video Transcoding on the PVDM3 DSPs

Perform the following steps when using the PVDM3 DSPs for video transcoding:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **voice service voip**
4. **sip**
5. **video screening**
6. **end**

DETAILED STEPS

Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**voice service voip** **Example:** `Router(config)# voice service voip`	Enters voice service configuration mode and specifies Voice over IP (VoIP) encapsulation.
Step 4	**sip** **Example:** `Router(config-voi-srv)# sip`	Enters SIP configuration mode.
Step 5	**video screening** **Example:** `Router(config-voi-sip)# video screening`	Detects codec mismatch and also detects and triggers video transcoding based on FMTP configuration under different codec profiles.
Step 6	**end** **Example:** `Router(config-voi-sip)# end`	Exits configuration mode and enters privileged EXEC mode.

Configuration Example for Video Transcoding

This section contains the following examples:

- Configuring Video Transcoding on Cisco Unified CME: Example, page 498
- Configuring Video Transcoding when the DSP Farm and Cisco Unified CME are on Different Routers: Example, page 498

Configuring Video Transcoding on Cisco Unified CME: Example

The following example shows a configuration for H.263 CIF to H.264 CIF transcoding.

```
voice service voip
  media transcoder sync-streams
  allow-connections sip to sip
  sip
    video screening
...
codec profile 1 h263
 fmtp "fmtp:34 CIF=1;MAXBR=7040"

codec profile 7 h264
 fmtp "fmtp:119 profile-level-id=42800D"

dial-peer voice 310 voip
video codec h263 profile 1
 session protocol sipv2
 incoming called-number 310..
 dtmf-relay sip-notify
 codec g711ulaw

dial-peer voice 3100 voip
 video codec h264 profile 7
 destination-pattern 310..
 session protocol sipv2
 session target ipv4:1.5.49.31
 voice-class sip bandwidth video tias-modifier 1000000
 dtmf-relay sip-notify
 codec g711ulaw
...
telephony-service
 sdspfarm units 10
 sdspfarm transcode sessions 10
 sdspfarm tag 3 XCODE002
 max-ephones 5
 max-dn 10
 ip source-address 1.5.49.32 port 2000
   ...
```

Configuring Video Transcoding when the DSP Farm and Cisco Unified CME are on Different Routers: Example

The following example shows the configurations for a DSP farm module and a Cisco Unified CME when the DSP Farm module is on a different router from the Cisco Unified CME router.

Router with the DSP farm module

```
sccp local GigabitEthernet0/1
sccp ccm 1.4.211.35 identifier 2 version 7.0
sccp
!
sccp ccm group 2
associate ccm 2 priority 1
associate profile 345 register 2851VXCODE
associate profile 346 register 2851VCONF
!
dspfarm profile 345 transcode video
```

```
 codec g729br8
 codec g729r8
 codec g729abr8
 codec g729ar8
 codec g711alaw
 codec g711ulaw
 codec h264 cif
 codec h264 w360p
 codec h264 vga
 codec h264 w448p
 codec h264 4cif
 codec h264 720p
 maximum sessions 1
 associate application SCCP
!
```

Cisco Unified CME Router

```
telephony-service
sdspfarm conference lecture-mode on 123 release 321
sdspfarm units 5
sdspfarm transcode sessions 10
sdspfarm tag 1 2851VXCODE
ip source-address 1.4.211.35 port 2000
max-conferences 12 gain -6
```

Additional References

The following sections provide references related to video transcoding.

Related Documents

Related Topic	Document Title
Cisco Unified CME configuration	• *Cisco Unified CME Command Reference* • *Cisco Unified CME Documentation Roadmap*
Cisco Unified Communications Manager	• *Cisco Unified Communications Manager Administration Guide* • *Cisco Unified Communications Manager System Guide*
Cisco IOS voice configuration	• *Cisco IOS Voice Configuration Library* • *Cisco IOS Voice Command Reference*

Standards

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

MIBs

MIB	MIBs Link
CISCO-VIDEO-SESSION-MIB CISCO-VOICE-DIAL-CONTROL-MIB	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at: http://www.cisco.com/go/mibs

RFCs

RFC	Title
RFC-2190 for H.263	*RTP Payload Format for H.263 Video Streams*
RFC-2429 for H.263	*RTP Payload Format for the 1998 Version of ITU-T Rec. H.263 Video (H.263+)*
RFC-3984	*RTP Payload Format for H.264 Video*

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/techsupport

Feature Information for Video Transcoding

To determine the correct Cisco IOS release to support a specific Cisco Unified CME version, see the *Cisco Unified CME and Cisco IOS Software Version Compatibility Matrix* at http://www.cisco.com/en/US/docs/voice_ip_comm/cucme/requirements/guide/33matrix.htm

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

For information about all Cisco IOS commands, use the Command Lookup Tool at http://tools.cisco.com/Support/CLILookup or the *Cisco IOS Master Command List, All Releases*, at http://www.cisco.com/en/US/docs/ios/mcl/allreleasemcl/all_book.htm

Table 48 lists the features in this module and enhancements to the features by version.

Table 48 Feature Information for Video Conferencing and Video Transcoding

Feature Name	Cisco Unified CME Version	Feature Information
Video Transcoding	8.6	Introduced point-to-point video transcoding, transrating, and transsizing.