Universal Voice Transcoding Support for Cisco Unified Border Elements

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Universal Transcoding allows transcoding from any supported codec to any other supported codec.

Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is supported, use the "Feature Information for Universal Voice Transcoding Support for Cisco Unified Border Elements" section on page 16.

Finding Support Information for Platforms and Cisco IOS and Catalyst OS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS and Catalyst OS software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

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Information About Universal Voice Transcoding Support for Cisco Unified Border Elements

Transcoding compresses and decompresses voice streams to match endpoint-device capabilities. Transcoding is required when an incoming voice stream is digitized and compressed (by means of a codec) to save bandwidth, but the local device does not support that type of compression.

Universal Transcoding employs a general transcoding facility where one supported codec is converted to any other supported codec. This functionality interconnects a diverse array of topologies. Universal Transcoding works between two voice sessions that are encoded by using different codecs, different packetization periods, or a combinationof the two. The Universal Transcoding channel operates only on RTP packets.

Although Universal Transcoding allows interconnection between endpoints that encode voice by using different codec algorithms, any transcoding causes distortion of the voice and reduces the quality of the received signal. Universal Transcoding causes the voice signal to be encoded and decoded two times. Each time that a voice signal is encoded and decoded, distortion is added and the listening quality is reduced. Additionally, transcoding adds additional dejitter delays to the voice path.

Note Consider Universal Transcoding as the last resort; make every attempt to coordinate the endpoints so that they use the same encoding algorithms.

How to Configure Universal Transcoding on a DSP Farm Profile

This section is an update to the "Configuring Enhanced Conferencing and Transcoding" in the *Cisco Unified CallManager and Cisco IOS Interoperability Guide*.

Determining DSP Capacity for Universal Transcoding

Channel density is limited when using the Universal Transcoding mode. As a general rule, the number of sessions needed for a Universal Transcoding channel is the sum of the session requirements for two separate voice channels, one running each of the configured codecs. For example, a channel running Universal Transcoding from a G.729a codec to iLBC would need the session capacity for a voice channel running the G.729a codec and MIPS for a voice channel running iLBC codec. See Table 1 for DSP session capacities.

Table 1 DSP Session Capacity

Transcoding Type	NM-HD-1V/2V (1 DSP)	NM-HD-2VE (3 DSPs)	NM-HDV2 (16 DSPs)	2801/2811 (2 PVDM2-64)	2821/2851 (3 PVDM2-64)	3825, 3845 (4 PVDM2-64)
G.711 a-law/u-law <-> Any (with high complexity codec in **dspfarm profile**)	6 sessions	18 sessions	96 sessions	48 sessions	72 sessions	96 sessions
G.711 a-law/u-law <-> Any (without high complexity codec in **dspfarm profile**)	8 sessions	24 sessions	128 sessions	64 sessions	96 sessions	128 sessions

Table 1 DSP Session Capacity (continued)

Transcoding Type	NM-HD-1V/2V (1 DSP)	NM-HD-2VE (3 DSPs)	NM-HDV2 (16 DSPs)	2801/2811 (2 PVDM2-64)	2821/2851 (3 PVDM2-64)	3825, 3845 (4 PVDM2-64)
Universal Transcoding (with high complexity codec in **dspfarm profile**)	3 sessions	9 sessions	48 sessions	24 sessions	36 sessions	48 sessions
Universal Transcoding (without high complexity codec in **dspfarm profile**)	4 sessions	12 sessions	64 sessions	32 sessions	48 sessions	64 sessions

For additional information, see the "Determining DSP Resource Requirements" section of the *Cisco Unified CallManager and Cisco IOS Interoperability Guide*.

Configuring a DSP Farm Profile

Perform this procedure to define a DSP farm on the NM-HDV2, NM-HD-1V, NM-HD-2V, NM-HD-2VE, or PVDM2. You must configure each conferencing, transcoding, and MTP profile separately.

Note Because a software-only MTP does not require DSP resources, you can configure a software-only MTP without a voice network module, or on the NM-HDV if you do not enable the **dsp services dspfarm** command for the voice card.

Prerequisites

Requires Cisco IOS Release 12.3(8)T or a later release. Universal transcoding requires Cisco IOS Release 12.4(11)XW or a later release.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **voice-card** *slot*
4. **dsp services dspfarm**
5. **exit**
6. **dspfarm profile** *profile-identifier* {**conference** | **mtp** | **transcode** [**universal**]}
7. **description** *text*
8. **codec** *codec-type*
9. **maximum sessions** *number*

   or

   maximum sessions {**hardware** | **software**} *number*
10. **associate application sccp**
11. **no shutdown**
12. **exit**

13. **gateway**
14. **timer receive-rtp** *seconds*
15. **exit**

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	**voice-card** *slot* **Example:** `Router(config)# voice-card 1`	Enters voice-card configuration mode for the network module on which you want to enable DSP-farm services.
Step 4	**dsp services dspfarm** **Example:** `Router(config-voicecard)# dsp services dspfarm`	Enables DSP-farm services for the voice card.
Step 5	**exit** **Example:** `Router(config-voicecard)# exit`	Exits voice-card configuration mode.
Step 6	**dspfarm profile** *profile-identifier* {**conference** | **mtp** | **transcode** [**universal**]} **Example:** `Router(config)# dspfarm profile 20 transcode universal`	Enters DSP farm profile configuration mode to define a profile for DSP farm services. **Note** The *profile-identifier* and service type uniquely identify a profile. If the service type and *profile-identifier* pair are not unique, you are prompted to choose a different *profile-identifier*.
Step 7	**description** *text* **Example:** `Router(config-dspfarm-profile)# description art_dept`	(Optional) Includes a specific description about the Cisco DSP farm profile.

	Command or Action	Purpose
Step 8	**codec** *codec-type* **Example:** `Router(config-dspfarm-profile)# codec ilbc`	Specifies the codecs supported by a DSP farm profile. **Note** Hardware MTPs support only G.711 a-law and G.711 u-law. If you configure a profile as a hardware MTP, and you want to change the codec to other than G.711, you must first remove the hardware MTP by using the **no maximum sessions hardware** command. **Note** Only one codec is supported for each MTP profile. To support multiple codecs, you must define a separate MTP profile for each codec.
Step 9	**maximum session**s *number* or **maximum sessions** {**hardware** | **software**} *number* **Example:** `Router(config-dspfarm-profile)# maximum sessions 4`	Specifies the maximum number of sessions that are supported by the profile. • *number*—Range is determined by the available registered DSP resources. Default is 0. **Note** The **hardware** and **software** keywords apply only to MTP profiles.
Step 10	**associate application sccp** **Example:** `Router(config-dspfarm-profile)# associate application sccp`	Associates the SCCP protocol to the DSP farm profile.
Step 11	**no shutdown** **Example:** `Router(config-dspfarm-profile)# no shutdown`	Enables the profile, allocates DSP farm resources, and associates the application.
Step 12	**exit** **Example:** `Router(config-dspfarm-profile)# exit`	Exits DSP farm profile configuration mode.
Step 13	**gateway** **Example:** `Router(config)# gateway`	Enters gateway configuration mode.
Step 14	**timer receive-rtp** *seconds* **Example:** `Router(config-gateway)# timer receive-rtp 600`	Sets the Real-Time Transport Protocol (RTP) timeout interval to clear hanging connections. • *seconds*—Range is 180 to 1800. Default is 1200.
Step 15	**exit** **Example:** `Router(config-gateway)# exit`	Exits to global configuration mode.

What to Do Next

See the the *Cisco Unified CallManager and Cisco IOS Interoperability Guide* for additional configuration information.

Configuration Examples for Universal Voice Transcoding

The following examples show configurations for both Cisco Universal Gateways and Cisco Integrated Services Routers:

- Universal Transcoding with an Inbox on a Universal Gateway: Example, page 6
- G.711 to Any Transcoding with an Inbox on a Universal Gateway: Example, page 7
- Universal and G.711 to Any Transcoding with an Inbox on a Universal Gateway: Example, page 9
- Universal and G.711 to Any Transcoding with an Inbox on an Integrated Services Router: Example, page 10

Note Universal transcoding using the AMR-NB codec in either direction is supported only on the Cisco AS5350XM and Cisco AS5450XM universal gateways.

Universal Transcoding with an Inbox on a Universal Gateway: Example

This example shows a universal transcoding configuration with an inbox on a Cisco Unified Border Element on a universal gateway. Universal gateways include the Cisco AS5350XM and Cisco AS5400XM platforms:

```
iLBC_UUT1#sh run
Building configuration...

Current configuration : 3244 bytes
!
!
voice-card 5
 dsp services dspfarm
!
voice-card 6
!
voice-card 7
 dsp services dspfarm
!
!
voice service voip
 allow-connections h323 to h323
 allow-connections h323 to sip
 allow-connections sip to h323
 fax protocol t38 ls-redundancy 0 hs-redundancy 0 fallback cisco
 modem passthrough none codec g729r8 pre-ietf
!
!
interface GigabitEthernet0/0
 ip address 10.10.10.2 255.255.0.0
 duplex auto
 speed auto
 negotiation auto
```

```
!
interface GigabitEthernet0/1
 ip address 10.20.20.2 255.255.0.0
 duplex auto
 speed auto
 negotiation auto
!
!
sccp local GigabitEthernet0/0
sccp ccm 10.10.10.2 identifier 1
sccp
!
sccp ccm group 1
 associate ccm 1 priority 1
 associate profile 10 register MTPNEWONE
!
dspfarm profile 10 transcode universal
 codec g711ulaw
 codec g711alaw
 codec ilbc
 codec g723r63
 codec g723r53
 codec g729ar8
 codec g729abr8
 maximum sessions 10
 associate application SCCP
!
!
dial-peer voice 10 voip
 destination-pattern 9991...
 session protocol sipv2
 session target ipv4:20.20.20.1

!
dial-peer voice 20 voip
 session target ipv4:10.10.10.1
 incoming called-number 9991...
 codec ilbc
!
!
telephony-service       ------------------------> Only Required for InBox
 sdspfarm units 1
 sdspfarm transcode sessions 128
 sdspfarm tag 1 MTPNEWONE
 ip source-address 10.10.10.2 port 2000
 max-conferences 8 gain -6
 transfer-system full-consult
!
```

G.711 to Any Transcoding with an Inbox on a Universal Gateway: Example

This example shows the configuration for transcoding for G.711 to any codec with an inbox on a Cisco Unified Border Element on a universal gateway. Universal gateways include the Cisco AS5350XM and Cisco AS5400XM platforms:

```
iLBC_UUT1#sh run
Building configuration...

Current configuration : 3244 bytes
```

```
!
!
voice-card 5
 dsp services dspfarm
!
voice-card 6
!
voice-card 7
 dsp services dspfarm
!
!
voice service voip
 allow-connections h323 to h323
 allow-connections h323 to sip
 allow-connections sip to h323
 fax protocol t38 ls-redundancy 0 hs-redundancy 0 fallback cisco
 modem passthrough none codec g729r8 pre-ietf
!
!
interface GigabitEthernet0/0
 ip address 10.10.10.2 255.255.0.0
 duplex auto
 speed auto
 negotiation auto
!
interface GigabitEthernet0/1
 ip address 10.20.20.2 255.255.0.0
 duplex auto
 speed auto
 negotiation auto
!
!
sccp local GigabitEthernet0/0
sccp ccm 10.10.10.2 identifier 1
sccp
!
sccp ccm group 1
 associate ccm 1 priority 1
 associate profile 20 register traditional
!
!
dspfarm profile 20 transcode
 codec g711ulaw
 codec g711alaw
 codec ilbc
 codec g723r63
 codec g723r53
 codec g729ar8
 codec g729abr8
 maximum sessions 20
 associate application SCCP
!
!
dial-peer voice 10 voip
 destination-pattern 9991...
 session protocol sipv2
 session target ipv4:10.20.20.1
 codec g711ulaw
!
dial-peer voice 20 voip
 session target ipv4:10.10.10.1
 incoming called-number 9991...
 codec ilbc
!
```

```
!
telephony-service ------------------------> Only Required for InBox
 sdspfarm units 1
 sdspfarm transcode sessions 128
 sdspfarm tag 1 traditional
 ip source-address 10.10.10.2 port 2000
 max-conferences 8 gain -6
 transfer-system full-consult
!
```

Universal and G.711 to Any Transcoding with an Inbox on a Universal Gateway: Example

This example shows the configuration for transcoding for both universal and G.711 to any codec with an inbox on a Cisco Unified Border Element on a universal gateway. Universal gateways include the Cisco AS5350XM and Cisco AS5400XM platforms:

```
iLBC_UUT1#sh run
Building configuration...

!
voice-card 5
 dsp services dspfarm
!
voice-card 6
!
voice-card 7
 dsp services dspfarm
!
voice service voip
 allow-connections h323 to h323
 allow-connections h323 to sip
 allow-connections sip to h323
 fax protocol t38 ls-redundancy 0 hs-redundancy 0 fallback cisco
 modem passthrough none codec g729r8 pre-ietf
!
!
interface GigabitEthernet0/0
 ip address 10.10.10.2 255.255.0.0
 duplex auto
 speed auto
 negotiation auto
!
interface GigabitEthernet0/1
 ip address 10.20.20.2 255.255.0.0
 duplex auto
 speed auto
 negotiation auto
!
!
sccp local GigabitEthernet0/0
sccp ccm 10.10.10.2 identifier 1
sccp
!
sccp ccm group 1
 associate ccm 1 priority 1
 associate profile 20 register traditional
 associate profile 10 register MTPNEWONE
!
dspfarm profile 10 transcode universal
```

```
 codec g711ulaw
 codec g711alaw
 codec ilbc
 codec g723r63
 codec g723r53
 codec g729ar8
 codec g729abr8
 maximum sessions 10
 associate application SCCP
!
dspfarm profile 20 transcode
 codec g711ulaw
 codec g711alaw
 codec ilbc
 codec g723r63
 codec g723r53
 codec g729ar8
 codec g729abr8
 maximum sessions 20
 associate application SCCP
!
dial-peer voice 10 voip
 destination-pattern 9991...
 session protocol sipv2
 session target ipv4:10.20.20.1
 codec g711ulaw
!
dial-peer voice 20 voip
 session target ipv4:10.10.10.1
 incoming called-number 9991...
 codec ilbc
!
!
telephony-service ------------------------> Only Required for InBox
 sdspfarm units 2
 sdspfarm transcode sessions 128
 sdspfarm tag 1 traditional
 sdspfarm tag 2 MTPNEWONE
 ip source-address 10.10.10.2 port 2000
 max-conferences 8 gain -6
 transfer-system full-consult
!
```

Universal and G.711 to Any Transcoding with an Inbox on an Integrated Services Router: Example

This example shows the configuration for transcoding for both universal and G.711 to any codec with an inbox on a Cisco Unified Border Element on an integrated services router. Integrated services routers include the Cisco 2800 and Cisco 3800 platforms:

```
crosby-3845#
!
voice-card 0
 no dspfarm
 dsp services dspfarm  !
!
voice service voip
 allow-connections h323 to h323
!
interface GigabitEthernet0/0
```

```
 ip address 10.3.65.102 255.255.0.0
 duplex auto
 speed auto
 media-type rj45
!
!
sccp local GigabitEthernet0/0
sccp ccm 10.3.65.102 identifier 1
sccp
!
sccp ccm group 1
 associate ccm 1 priority 1
 associate profile 20 register MTP000ABCD
 associate profile 10 register OLDONE
 keepalive retries 5
 switchback method immediate
!
dspfarm profile 10 transcode  ------------> for g711 to any
 codec g711ulaw
 codec g711alaw
 codec ilbc
 codec g723r63
 codec g723r53
 codec g729ar8
 codec g729abr8
 maximum sessions 10
 associate application SCCP
!
dspfarm profile 20 transcode universal  --------------> for Any to Any
 codec g711ulaw
 codec g711alaw
 codec ilbc
 codec g723r63
 codec g723r53
 codec g729ar8
 codec g729abr8
 maximum sessions 2
 associate application SCCP
!
!
dial-peer voice 10 voip
 destination-pattern 2...
 session target ipv4:1.3.65.12
 codec ilbc
!
dial-peer voice 11 voip
 destination-pattern 1...
 session target ipv4:10.3.65.11
 codec g711ulaw
!
!
telephony-service   -----------> Minimum config for telephony is required for InBox
 ip source-address 10.3.65.102 port 2000
 sdspfarm units 2
 sdspfarm transcode sessions 30
 sdspfarm tag 1 MTP000ABCD
 sdspfarm tag 2 OLDONE
 max-ephones 20
 max-dn 20
 max-conferences 12 gain -6
 transfer-system full-consult
 create cnf-files version-stamp 7960 Sep 27 2006 20:39:40
```

Additional References

The following sections provide references related to the Universal Transcoding Support for Cisco Unified Border Elements feature.

Related Documents

Related Topic	Document Title
Transcoding configuration	*Cisco Unified CallManager and Cisco IOS Interoperability Guide*
Codecs	*Dial Peer Configuration on Voice Gateway Routers*

Standards

Standard	Title
None	—

MIBs

MIB	MIBs Link
• None	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
None	—

Technical Assistance

Description	Link
The Cisco Technical Support & Documentation website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, tools, and technical documentation. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/techsupport

Command Reference

This section documents modified commands only.

- **dspfarm profile**

dspfarm profile

To enter DSP farm profile configuration mode and define a profile for digital signal processor (DSP) farm services, use the **dspfarm profile** command in global configuration mode. To delete a disabled profile, use the **no** form of this command.

dspfarm profile *profile-identifier* {**conference** | **mtp** | **transcode** [**universal**]}

no dspfarm profile *profile-identifier*

Syntax Description

profile-identifier	Number that uniquely identifies a profile. Range is 1 to 65535. There is no default.
conference	Enables profile for conferencing.
mtp	Enables profile for Media Termination Point (MTP).
transcode	Enables profile for transcoding.
universal	(Optional) Enables universal transcoding.

Defaults

No default behavior or values.

Command Modes

Global configuration

Command History

Release	Modification
12.3(8)T	This command was introduced.
12.4(11)XW	The **universal** keyword was added.

Usage Guidelines

Use this command to create a new profile or delete a disabled profile. If you create the profile successfully, you enter the DSP farm profile configuration mode. You can configure multiple profiles for the same service. If the profile is active, you cannot delete the profile.

The profile identifier uniquely identifies a profile. If the service type and profile identifier are not unique, you must choose a different profile identifier.

When the **universal** keyword is used, Universal Transcoding is activated. Universal Transcoding converts any supported codec to any other supported codec. This functionality allows a diverse array of interconnected topologies. Universal Transcoding works between two voice sessions that are encoded using different codecs, different packetization periods, or a combination. The Universal Transcoding channel only operates on RTP packets.

Examples

The following example shows how to enable DSP farm services profile 20 for conferencing:

```
Router(config)# dspfarm profile 20 conference
```

Note the response if the profile is already being used:

```
Router(config)# dspfarm profile 6 conference

Profile id 6 is being used for service TRANSCODING
 please select a different profile id
```

Related Commands

Command	Description
dsp service dspfarm	Configures DSP farm services for a specified voice card.
voice-card	Enters voice-card configuration mode.

Feature Information for Universal Voice Transcoding Support for Cisco Unified Border Elements

Table 2 lists the release history for this feature.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS and Catalyst OS 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.

Note Table 2 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 2 Feature Information for Universal Voice Transcoding Support for Cisco Unified Border Elements

Feature Name	Releases	Feature Information
Universal Voice Transcoding Support for Cisco Unified Border Elements	12.4(11)XW	Universal Transcoding allows transcoding from any supported codec to any other supported codec.