



Transcoding

Transcoding is a process of converting one voice codec to another. For example, transcoding between iLBC and G.711 or iLBC and G.729.



Note In every transcoding operation, media flows through CUBE.

LTI based Transcoding

- Internal API is used to access Digital Signaling Processor (DSP) resources for transcoding.
- Transcoding resources (DSPFARM) and CUBE must be on the same platform.
- Only DSPFARM profile configuration is required. Skinny Client Control Protocol (SCCP) configuration is not required.
- No TCP socket is opened and no registration is used.
- DSPFARM profile is associated to a new application type CUBE.

```
Device(config)# dspfarm profile 1 transcode
Device(config-dspfarm-profile)# associate application CUBE
```

- With LTI transcoding, higher performance is achieved since there is no need for extra SCCP legs and associated RTP streams. The performance is in line high-density mode that is offered with SCCP-based transcoding.
- **crypto pki trustpoint** configuration is not required for Secure Real-Time Transport Protocol (SRTP) to Real-Time Transport Protocol (RTP) calls.



Note The following support LTI-based transcoding:

- Cisco Aggregated Services Routers 1000 Series (ASR 1K)
 - Cisco-Integrated Services Generation 2 Routers (Cisco ISR G2)
 - Cisco 4000 Series-Integrated Services Routers (ISR G3)
 - Cisco 8200 Catalyst Edge Series
 - Cisco 8300 Catalyst Edge Series
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SCCP based Transcoding

- Skinny Client Control Protocol (SCCP) protocol is used for controlling Digital Signaling Processor (DSP) resources used for transcoding.
- Transcoding resources (DSPFARM) and CUBE can be on different platforms.
- SCCP client (For example, **sccp ccm** configuration and SCCP server (telephony service) configuration is required apart from DSPFARM profile configuration.
- DSPFARM registers with Cisco Unified Border Element over TCP Socket, using SCCP.
- DSPFARM profile is associated to SCCP using the following commands:

```
Device(config)# dspfarm profile 1 transcode
Device(config-dspfarm-profile)# associate application SCCP
```

- High density transcoding needs to be enabled for higher performance. High density transcoding will flow-around through the transcoder.
- Secure Real-time Transport Protocol (SRTP) to Real-time Transport Protocol (RTP) using transcoder requires **crypto pki trustpoint** configuration to establish the Transport Layer Security (TLS) connection with SCCP server.



Note Integrated Services Routers Generation 1 series and Integrated Services Routers Generation 2 Series devices support SCCP-based Transcoding only.

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Configure LTI-Based Transcoding



Note We recommend that you configure LTI-based Transcoding for Cisco Aggregated Services Routers (ASR), Cisco Integrated Services Generation 2 Routers (ISR G2), Cisco 4000 Series Integrated Services Routers (ISR G3), Cisco 8200 Catalyst Edge Series, and Cisco 8300 Catalyst Edge Series.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **voice-card** *voice-interface-slot-number*
4. **dspfarm services dspfarm**
5. **exit**

6. **dspfarm profile** *profile-identifier* **transcode**
7. **codec** *codec*
8. **maximum sessions** *sessions*
9. **associate application** **CUBE**
10. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none">• Enter your password if prompted.
Step 2	configure terminal Example: Device> configure terminal	Enters global configuration mode.
Step 3	voice-card <i>voice-interface-slot-number</i> Example: Device(config)# voice-card 1	Configures a voice card and enters voice-card configuration mode.
Step 4	dspfarm services dspfarm	Enable voice-only DSP farm services on the Voice Card.
Step 5	exit	Exits the voice-card configuration mode.
Step 6	dspfarm profile <i>profile-identifier</i> transcode Example: Device(config)# dspfarm profile 1 transcode	Enters configuration mode for a DSP farm profile and defines a profile for DSP farm services. <ul style="list-style-type: none">• <i>profile-identifier</i>- Number that uniquely identifies a profile. Range: 1–65535.• transcode- Enables profile for transcoding.
Step 7	codec <i>codec</i> Example: Device(config-dspfarm-profile)# codec ilbc	The codec rate to be attempted for SCCP-controlled connections. You can specify just the codec type, and the DSP uses the default codec parameter, such as independent mode, 32-kbps bit-rate, and 30-ms framesize.
Step 8	maximum sessions <i>sessions</i>	Configures maximum number of sessions.
Step 9	associate application CUBE Example: Device(config)# associate application CUBE	Configures an application to the profile for LTI-based transcoding.
Step 10	exit	Exits interface configuration mode.

Configuration Examples for LTI Based Transcoding

LTI-based Transcoding

```
! Enabling dspfarm services under voice-card
Device(config)# voice-card 0/1
Device(config-voicecard)# dspfarm
Device(config-voicecard)# dsp services dspfarm
Device(config-voicecard)# exit

! Configuring dspfarm profile
Device(config)# dspfarm profile 1 transcode
Device(config-dspfarm-profile)# codec g711ulaw
Device(config-dspfarm-profile)# codec g711alaw
Device(config-dspfarm-profile)# codec g729r8

Device(config-dspfarm-profile)# maximum sessions 10

Device(config-dspfarm-profile)# associate application CUBE

Device(config-dspfarm-profile)# exit

! Starting Service Engine
Device(config)# interface ServiceEngine0/1/0
Device(config-if)# no shutdown
Device(config-if)# exit
```

Example: Secure LTI-based Transcoding

```
!Client trustpoints use HTTP to receive certificate from CA.
Device(config)#ip http server

!Generate an RSA Keypair.
!(This step generates Private and Public keys. In this example, CUBE is just a label. It
can be anything.)

crypto key generate rsa general-keys label CUBE modulus 1024
The name for the keys will be: CUBE
% The key modulus size is 1024 bits
% Generating 1024 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 0 seconds)

!Configure IOS CA Server. In this example, CA Server is named cube-ca.

crypto pki server cube-ca
  database level complete
  no database archive
  grant auto
  lifetime certificate 1800
```

```
Secure-CUBE(cs-server)#no shut
%Some server settings cannot be changed after CA certificate generation.
% Please enter a passphrase to protect the private key
% or type Return to exit

Password:

Re-enter password:

% Generating 1024 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 0 seconds)

% Certificate Server enabled.

!Create PKI trustpoints for cube for TLS communication.

crypto pki trustpoint CUBE-TLS
 enrollment url http://X.X.X.X:80
 serial-number none
 fqdn none
 ip-address none
 subject-name CN=Secure-CUBE
 revocation-check none
 rsakeypair CUBE

!Authenticate the trustpoint with CA server and accept certificate of CA

crypto pki authenticate CUBE-TLS
Certificate has the following attributes:
  Fingerprint MD5: BCEBB5A1 1AC882F7 24BE476D 06537711
  Fingerprint SHA1: CE2FEEA5 42515B33 3EF6A8F6 7E31D6DF 8E32BEB6

% Do you accept this certificate? [yes/no]: yes
Trustpoint CA certificate accepted.

!Enroll the trustpoint with CA server.
!In this step the CUBE receives a signed certificate from CA.

Secure-CUBE(config)#crypto pki enroll CUBE-TLS
%
% Start certificate enrollment ..
% Create a challenge password. You will need to verbally provide this
password to the CA Administrator in order to revoke your certificate.
For security reasons your password will not be saved in the configuration.
Please make a note of it.

Password:
Re-enter password:

% The subject name in the certificate will include: CN=Secure-CUBE
% The fully-qualified domain name will not be included in the certificate
Request certificate from CA? [yes/no]: yes
% Certificate request sent to Certificate Authority
% The 'show crypto pki certificate verbose CUBE-TLS' command will show the
fingerprint.

!Configure TCP TLS as transport protocol
```

```

voice service voip
sip
session transport tcp tls

!Assign trustpoint for sip-ua, this trustpoint is used for all SIP signaling between CUBE
and CUCM.

sip-ua
crypto signaling remote-addr <cucm pub ip address> 255.255.255.255 trustpoint CUBE-TLS
crypto signaling remote-addr <cucm sub ip address> 255.255.255.255 trustpoint CUBE-TLS

!or or default trustpoint can be configured for all SIP signaling from CUBE.

sip-ua
crypto signaling default trustpoint CUBE-TLS

!Enable SRTP.

Voice service voip
srtp fallback

!Configure secure transcoder is required.

dspfarm profile 1 transcode universal security
codec g711ulaw
codec g711alaw
codec g729ar8
codec g729abr8
maximum sessions 10
associate application CUBE

```

Configuring SCCP-based Transcoding (ISR-G2 devices only)

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **voice-card** *voice-interface-slot-number*
4. **dspfarm**
5. **dsp service dspfarm**
6. **exit**
7. **telephony-service**
8. **sdspfarm units** *units*
9. **sdspfarm transcode sessions** *units*
10. **sdspfarm tag** *value Device-Name*
11. **max-ephones** *max-phones-to-be-supported*
12. **max-dn** *max-directorynumbers-to-be-supported*
13. **ip source-address** *CUBE-internal-ipv4-address* [**port** *port-number*]

14. **exit**
15. **sccp local** *interface-type number*
16. **sccp ccm** *CUBE-internal-ipv4-address identifier identifier-number version version-number*
17. **sccp**
18. **sccp ccm group** *group-id*
19. **associate ccm** *CCM-identifier priority priority*
20. **associate profile** *profile-identifier register Device-Name*
21. **exit**
22. **dspfarm profile** *profile-id transcode*
23. **codec** *codec*
24. **maximum sessions** *sessions*
25. **associate application** **sccp**
26. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Device> configure terminal	Enters global configuration mode.
Step 3	voice-card <i>voice-interface-slot-number</i> Example: Device(config)# voice-card 1	Configures a voice card and enters voice-card configuration mode.
Step 4	dspfarm	Enable voice card for DSP.
Step 5	dsp service dspfarm	Enable voice-only dspfarm services on the Voice Card.
Step 6	exit	Exits the voice-card configuration mode.
Step 7	telephony-service	Enters telephony-service configuration mode.
Step 8	sdspfarm units <i>units</i>	Define maximum number of dspfarm units.
Step 9	sdspfarm transcode sessions <i>units</i>	Define maximum number of dspfarm transcode session.
Step 10	sdspfarm tag <i>value Device-Name</i> Example: Device(config-telephony)# sdspfarm tag 1 CUBE-XCODE	Configures a name for the transcoder.
Step 11	max-ephones <i>max-phones-to-be-supported</i>	Configures the maximum number of phones that are to be supported.

	Command or Action	Purpose
Step 12	max-dn <i>max-directorynumbers-to-be-supported</i>	Configures the maximum number of directories to be supported.
Step 13	ip source-address <i>CUBE-internal-ipv4-address</i> [port <i>port-number</i>] Example: Device(config-telephony)# ip source-address 10.1.1.1 port 2000	Defines an IP address and port number for the telephony service.
Step 14	exit	Exits the telephony-service configuration mode.
Step 15	sccp local <i>interface-type number</i>	Configures the local gateway related parameters values.
Step 16	sccp ccm <i>CUBE-internal-ipv4-address identifier identifier-number version version-number</i>	Configures call manager related parameter values.
Step 17	sccp	Enable Skinny Client Control Protocol.
Step 18	sccp ccm group <i>group-id</i> Example: Device(config)#sccp ccm group 1	Configures Call Manager Group and enters SCCP CCM configuration mode.
Step 19	associate ccm <i>CCM-identifier priority priority</i> Example: Device(config-sccp-ccm)# associate ccm 1 priority 1	Configures Call Manager Group and enters SCCP CCM configuration mode.
Step 20	associate profile <i>profile-identifier register Device-Name</i> Example: Device(config-sccp-ccm)# associate profile 1 register CUBE-XCODE	Specifies the device name that needs to register.
Step 21	exit	Exits SCCP CCM configuration mode.
Step 22	dspfarm profile <i>profile-id transcode</i> Example: Device(config)# dspfarm profile 1 transcode	Configures a Transcoding profile and enters DSP profile configuration mode.
Step 23	codec <i>codec</i> Example: Device(config-dspfarm-profile)# codec ilbc	The codec rate to be attempted for SCCP-controlled connections.
Step 24	maximum sessions <i>sessions</i>	Configures maximum number of sessions.
Step 25	associate application sccp Example: Device(config-dspfarm-profile)# associate application sccp	Configures an application to the profile for SCCP-based transcoding.
Step 26	exit	Exits the telephony-service configuration mode.

TLS for SCCP Connection for DSP Services

The Cisco Unified Border Element supports Transport Layer Security (TLS) to be enabled or disabled between the Skinny Call Control Protocol (SCCP) server and the SCCP client. By default, TLS is enabled, which provides added protection at the transport level and ensures that SRTP keys are not easily accessible. Once TLS is disabled, the SRTP keys are not protected.

SRTP-RTP interworking is available with normal and universal transcoders. The transcoder on the Cisco Unified Border Element is invoked using SCCP messaging between the SCCP server and the SCCP client. SCCP messages carry the SRTP keys to the digital signal processor (DSP) farm at the SCCP client. The transcoder can be within the same router or can be located in a separate router. TLS should be disabled only when the transcoder is located in the same router. To disable TLS, configure the **no** form of the **tls** command in DSPFARM profile configuration mode. Disabling TLS improves CPU performance.

Configuring Secure Transcoding

Configuring the Certificate Authority

Perform the steps described in this section to configure the certificate authority.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip http server**
4. **crypto pki server** *cs-label*
5. **database level** **complete**
6. **grant auto**
7. **no shutdown**
8. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.

	Command or Action	Purpose
Step 3	ip http server Example: Device(config)# ip http server	Enables the HTTP server on your IPv4 or IPv6 system, including the Cisco web browser user interface.
Step 4	crypto pki server <i>cs-label</i> Example: Device(config)# crypto pki server 3854-cube	Enables a Cisco IOS certificate server and enters certificate server configuration mode. <ul style="list-style-type: none"> In the example, 3854-cube is specified as the name of the certificate server.
Step 5	database level complete Example: Device(cs-server)# database level complete	Controls what type of data is stored in the certificate enrollment database. <ul style="list-style-type: none"> In the example, each issued certificate is written to the database.
Step 6	grant auto Example: Device(cs-server)# grant auto	Specifies automatic certificate enrollment.
Step 7	no shutdown Example: Device(cs-server)# no shutdown	Reenables the certificate server. <ul style="list-style-type: none"> Create and enter a new password when prompted.
Step 8	exit Example: Device(cs-server)# exit	Exits certificate server configuration mode.

Configuring a Trustpoint for the Secure Universal Transcoder

Perform the task in this section to configure, authenticate, and enroll a trustpoint for the secure universal transcoder.

Before you begin

Before you configure a trustpoint for the secure universal transcoder, you should configure the certificate authority, as described in the [Configuring the Certificate Authority, on page 9](#).

SUMMARY STEPS

- enable**
- configure terminal**
- crypto pki trustpoint** *name*
- enrollment url** *url*

5. **serial-number**
6. **revocation-check** *method*
7. **rsakeypair** *key-label*
8. **end**
9. **crypto pki authenticate** *name*
10. **crypto pki enroll** *name*
11. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	crypto pki trustpoint <i>name</i> Example: Device(config)# crypto pki trustpoint secdsp	Declares the trustpoint that the router uses and enters ca-trustpoint configuration mode. <ul style="list-style-type: none"> • In the example, the trustpoint is named secdsp.
Step 4	enrollment url <i>url</i> Example: Device(ca-trustpoint)# enrollment url http://10.13.2.52:80	Specifies the enrollment parameters of a certification authority (CA). <ul style="list-style-type: none"> • In the example, the URL is defined as http://10.13.2.52:80.
Step 5	serial-number Example: Device(ca-trustpoint)# serial-number	Specifies whether the router serial number should be included in the certificate request.
Step 6	revocation-check <i>method</i> Example: Device(ca-trustpoint)# revocation-check crl	Checks the revocation status of a certificate. <ul style="list-style-type: none"> • In the example, the certificate revocation list checks the revocation status.
Step 7	rsakeypair <i>key-label</i> Example: Device(ca-trustpoint)# rsakeypair 3845-cube	Specifies which key pair to associate with the certificate. <ul style="list-style-type: none"> • In the example, the key pair 3845-cube generated during enrollment is associated with the certificate.

	Command or Action	Purpose
Step 8	end Example: Device(ca-trustpoint)# end	Exits ca-trustpoint configuration mode.
Step 9	crypto pki authenticate <i>name</i> Example: Device(config)# crypto pki authenticate secdsp	Authenticates the CA. <ul style="list-style-type: none"> • Accept the trustpoint CA certificate if prompted.
Step 10	crypto pki enroll <i>name</i> Example: Device(config)# crypto pki enroll secdsp	Obtains the certificate for the router from the CA. <ul style="list-style-type: none"> • Create and enter a new password if prompted. • Request a certificate from the CA if prompted.
Step 11	exit Example: Device(config)# exit	Exits global configuration mode.

Configuring DSPFARM Services

For configuration steps, see [Configure LTI-Based Transcoding](#).

Associating SCCP to the Secure DSPFARM Profile

Perform the task in this section to associate SCCP to the secure DSPFARM profile.

Before you begin

Before you associate SCCP to the secure DSPFARM profile, you should configure DSPFARM services, as described in the “Configuring DSPFARM Services”.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **sccp local** *interface-type interface-number*
4. **sccp ccm** *ip-address identifier identifier-number version version-number*
5. **sccp**
6. **associate ccm** *identifier-number priority priority-number*
7. **associate profile** *profile-identifier register device-name*
8. **dspfarm profile** *profile-identifier transcode universal security*
9. **trustpoint** *trustpoint-label*
10. **codec** *codec-type*

11. Repeat Step 10 to configure required codecs.
12. **maximum sessions** *number*
13. **associate application sccp**
14. **no shutdown**
15. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	sccp local <i>interface-type interface-number</i> Example: Device(config)# sccp local GigabitEthernet 0/0	Selects the local interface that SCCP applications (transcoding and conferencing) use to register with Cisco CallManager. <ul style="list-style-type: none"> • In the example, the following parameters are set: <ul style="list-style-type: none"> • GigabitEthernet is defined as the interface type that the SCCP application uses to register with Cisco CallManager. • The interface number that the SCCP application uses to register with Cisco CallManager is specified as 0/0.
Step 4	sccp ccm <i>ip-address identifier identifier-number version version-number</i> Example: Device(config)# sccp ccm 10.13.2.52 identifier 1 version 5.0.1	Adds a Cisco Unified Communications Manager server to the list of available servers. <ul style="list-style-type: none"> • In the example, the following parameters are set: <ul style="list-style-type: none"> • 10.13.2.52 is configured as the IP address of the Cisco Unified Communications Manager server. • The number 1 identifies the Cisco Unified Communications Manager server. • The Cisco Unified Communications Manager version is identified as 5.0.1.
Step 5	sccp Example: Device(config)# sccp	Enables SCCP and related applications (transcoding and conferencing) and enters SCCP Cisco CallManager configuration mode.

	Command or Action	Purpose
Step 6	associate ccm <i>identifier-number</i> priority <i>priority-number</i> Example: <pre>Device(config-sccp-ccm)# associate ccm 1 priority 1</pre>	Associates a Cisco Unified CallManager with a Cisco CallManager group and establishes its priority within the group. <ul style="list-style-type: none"> • In the example, the following parameters are set: <ul style="list-style-type: none"> • The number 1 identifies the Cisco Unified CallManager. • The Cisco Unified CallManager is configured with the highest priority within the Cisco CallManager group.
Step 7	associate profile <i>profile-identifier</i> register <i>device-name</i> Example: <pre>Device(config-sccp-ccm)# associate profile 1 register sxcoder</pre>	Associates a DSPFARM profile with a Cisco CallManager group. <ul style="list-style-type: none"> • In the example, the following parameters are set: <ul style="list-style-type: none"> • The number 1 identifies the DSPFARM profile. • Sxcoder is configured as the user-specified device name in Cisco Unified CallManager.
Step 8	dspfarm profile <i>profile-identifier</i> transcode universal security Example: <pre>Device(config-sccp-ccm)# dspfarm profile 1 transcode universal security</pre>	Defines a profile for DSPFARM services and enters DSPFARM profile configuration mode. <ul style="list-style-type: none"> • In the example, the following parameters are set: <ul style="list-style-type: none"> • Profile 1 is enabled for transcoding. • Profile 1 is enabled for secure DSPFARM services.
Step 9	trustpoint <i>trustpoint-label</i> Example: <pre>Device(config-dspfarm-profile)# trustpoint secdsp</pre>	Associates a trustpoint with a DSPFARM profile. <ul style="list-style-type: none"> • In the example, the trustpoint to be associated with the DSPFARM profile is labeled secdsp.
Step 10	codec <i>codec-type</i> Example: <pre>Device(config-dspfarm-profile)# codec g711ulaw</pre>	Specifies the codecs that are supported by a DSPFARM profile. <ul style="list-style-type: none"> • In the example, the g711ulaw codec is specified.
Step 11	Repeat Step 10 to configure required codecs.	--
Step 12	maximum sessions <i>number</i> Example: <pre>Device(config-dspfarm-profile)# maximum sessions 84</pre>	Specifies the maximum number of sessions that are supported by the profile. <ul style="list-style-type: none"> • In the example, a maximum of 84 sessions are supported by the profile. The maximum number of sessions depends on the number of DSPs available for transcoding.

	Command or Action	Purpose
Step 13	associate application sccp Example: <pre>Device(config-dspfarm-profile)# associate application sccp</pre>	Associates SCCP to the DSPFARM profile.
Step 14	no shutdown Example: <pre>Device(config-dspfarm-profile)# no shutdown</pre>	Allocates DSPFARM resources and associates them with the application.
Step 15	exit Example: <pre>Device(config-dspfarm-profile)# exit</pre>	Exits DSPFARM profile configuration mode.

Registering the Secure Universal Transcoder to the CUBE

Perform the task in this section to register the secure universal transcoder to the Cisco Unified Border Element. The Cisco Unified Border Element Support for SRTP-RTP Interworking feature supports both secure transcoders and secure universal transcoders.

Before you begin

Before you register the secure universal transcoder to the Cisco Unified Border Element, you should associated SCCP to the secure DSPFARM profile, as described in the [Associating SCCP to the Secure DSPFARM Profile, on page 12](#).

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **telephony-service**
4. **sdsfarm transcode sessions** *number*
5. **sdsfarm tag** *number device-name*
6. **em logout** *time1 time2 time3*
7. **max-ephones** *max-ephones*
8. **max-dn** *max-directory-numbers*
9. **ip source-address** *ip-address*
10. **secure-signaling trustpoint** *label*
11. **tftp-server-credentials trustpoint** *label*
12. **create cnf-files**
13. **no sccp**
14. **sccp**
15. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device> configure terminal	Enters global configuration mode.
Step 3	telephony-service Example: Device(config)# telephony-service	Enters telephony-service configuration mode.
Step 4	sdspfarm transcode sessions <i>number</i> Example: Device(config-telephony)# sdspfarm transcode sessions 84	Specifies the maximum number of transcoding sessions allowed per Cisco CallManager Express router. <ul style="list-style-type: none"> • In the example, a maximum of 84 DSPFARM sessions are specified.
Step 5	sdspfarm tag <i>number device-name</i> Example: Device(config-telephony)# sdspfarm tag 1 sxcoder	Permits a DSPFARM to be registered to Cisco Unified CallManager Express and associates it with an SCCP client interface's MAC address. <ul style="list-style-type: none"> • In the example, DSPFARM 1 is associated with the sxcoder device.
Step 6	em logout <i>time1 time2 time3</i> Example: Device(config-telephony)# em logout 0:0 0:0 0:0	Configures three time-of-day-based timers for automatically logging out all Extension Mobility feature users. <ul style="list-style-type: none"> • In the example, all users are logged out from Extension Mobility after 00:00.
Step 7	max-ephones <i>max-ephones</i> Example: Device(config-telephony)# max-ephones 4	Sets the maximum number of Cisco IP phones to be supported by a Cisco CallManager Express router. <ul style="list-style-type: none"> • In the example, a maximum of four phones are supported by the Cisco CallManager Express router.
Step 8	max-dn <i>max-directory-numbers</i> Example: Device(config-telephony)# max-dn 4	Sets the maximum number of extensions (ephone-dns) to be supported by a Cisco Unified CallManager Express router. <ul style="list-style-type: none"> • In the example, a maximum of four extensions is allowed.

	Command or Action	Purpose
Step 9	ip source-address <i>ip-address</i> Example: Device(config-telephony)# ip source-address 10.13.2.52	Identifies the IP address and port through which IP phones communicate with a Cisco Unified CallManager Express router. <ul style="list-style-type: none"> • In the example, 10.13.2.52 is configured as the router IP address.
Step 10	secure-signaling trustpoint <i>label</i> Example: Device(config-telephony)# secure-signaling trustpoint secdsp	Specifies the name of the Public Key Infrastructure (PKI) trustpoint with the certificate to be used for TLS handshakes with IP phones on TCP port 2443. <ul style="list-style-type: none"> • In the example, PKI trustpoint secdsp is configured.
Step 11	tftp-server-credentials trustpoint <i>label</i> Example: Device(config-telephony)# tftp-server-credentials trustpoint scme	Specifies the PKI trustpoint that signs the phone configuration files. <ul style="list-style-type: none"> • In the example, PKI trustpoint scme is configured.
Step 12	create cnf-files Example: Device(config-telephony)# create cnf-files	Builds the XML configuration files that are required for IP phones in Cisco Unified CallManager Express.
Step 13	no sccp Example: Device(config-telephony)# no sccp	Disables SCCP and its related applications (transcoding and conferencing) and exits telephony-service configuration mode.
Step 14	sccp Example: Device(config)# sccp	Enables SCCP and related applications (transcoding and conferencing).
Step 15	end Example: Device(config)# end	Exits global configuration mode.

Configuration Examples for SCCP Based Transcoding

Example: SCCP-based Transcoding

```
! Enabling dspfarm services under voice-card
```

```
Device(config)# voice-card 1

Device(config-voicecard)# dspfarm
Device(config-voicecard)# dsp services dspfarm
Device(config-voicecard)# exit

! Configuring Telephony Service
Device(config)# telephony-service
Device(config-telephony)# sdspfarm units 1
Device(config-telephony)# sdspfarm transcode sessions 128
Device(config-telephony)# sdspfarm tag 1 CUBE-XCODE
Device(config-telephony)# max-ephones 10
Device(config-telephony)# max-dn 10
Device(config-telephony)# ip source-address 10.1.1.1 port 2000
Device(config-telephony)# exit

! Configuring SCCP
Device(config)# no sccp
Device(config)# sccp local GigabitEthernet0/0
Device(config)# sccp ccm 10.1.1.1 identifier 1 version 4.0
Device(config)# sccp
Device(config)# sccp ccm group 1
Device(config-sccp-ccm)# associate ccm 1 priority 1
Device(config-sccp-ccm)# associate profile 1 register CUBE-XCODE
Device(config-sccp-ccm)# exit

! Configuring dspfarm profile
Device(config)# dspfarm profile 1 transcode
Device(config-dspfarm-profile)# codec g711ulaw
Device(config-dspfarm-profile)# codec g711alaw
Device(config-dspfarm-profile)# codec g729r8
Device(config-dspfarm-profile)# maximum sessions 10

Device(config-dspfarm-profile)# associate application SCCP
Device(config-dspfarm-profile)# exit
```