



Late-to-Early Media Interworking

The late-to-early media interworking feature is supported for Session Initiation Protocol (SIP) calls. In order to interwork between a late media caller and an early media callee, Cisco Unified Border Element (SP Edition) sends an invite to the callee that includes a Session Description Protocol (SDP) offer of media. Two implementations of late-to-early media interworking are available:

- By default, SBC generates the SDP with a single media line that specifies codecs common to both the caller and the callee's codec whitelists.
- SBC can also be configured with a media description using the **sip sdp-media-profile** command to generate a customized offer.

Cisco Unified Border Element (SP Edition) was formerly known as Integrated Session Border Controller and may be commonly referred to in this document as the session border controller (SBC).

For a complete description of the commands used in this chapter, refer to the *Cisco Unified Border Element (SP Edition) Command Reference: Unified Model* at:

http://www.cisco.com/en/US/docs/ios/sbc/command/reference/sbcu_book.html.

For information about all Cisco IOS commands, use the Command Lookup Tool at <http://tools.cisco.com/Support/CLILookup> or a Cisco IOS master commands list.

Feature History for Late-to-Early Media Interworking

Release	Modification
Cisco IOS XE Release 2.4	This feature was introduced on the Cisco IOS XR.
Cisco IOS XE Release 2.5	The customizable offer for late-to-early media interworking feature was introduced on the Cisco IOS XR.

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Restrictions for Late-to-Early Media Interworking Support

The restrictions for late-to-early media interworking are:

- This feature applies only to SIP-to-SIP calls, it does not apply to SIP-to-H.323 interworking calls.
- This feature applies only to IPv4; you cannot use it with IPv6 addressing.
- If the caller refines the media chosen by the callee, this is sent back to the callee in a PRACK. However, if the callee attempts to refine the media again, the event is logged but it is not passed back to the caller.
- Because Cisco Unified Border Element (SP Edition) generates SDPs, any calls using this feature cannot use media bypass.
- Cisco Unified Border Element (SP Edition) only generates SDPs offering a single audio stream. If the caller and callee want to negotiate video, fax, or other media streams, they can renegotiate this after the call has been established.
- If the callee attempts to send early media either before or without sending a reliable 1XX INVITE, Cisco Unified Border Element (SP Edition) will drop that media. It will not reach the caller.
- The callee must not send unreliable 1XX INVITE responses because the caller would interpret them as an out-of-sequence SDP offer. For late-to-early interworking calls, Cisco Unified Border Element (SP Edition) sets 100rel as mandatory in order to forbid the callee from sending unreliable responses only if the caller side supports 100rel.
- Late-to-early media interworking must not be used with the Gq IMS interface. This interface does not provide Cisco Unified Border Element (SP Edition) with the local media address necessary to create an SDP offer (and will likely result in calls with incorrect media paths).

Information about Late-to-Early Media Interworking

This section includes the following topics:

- [Late-to-Early Media Interworking Description, page 49-2](#)
- [Customizable Offer for Late-to-Early Media Interworking, page 49-3](#)

Late-to-Early Media Interworking Description

Early Media is the ability of two user agents to communicate before a call is actually established. Early Media can flow when the caller makes a media proposal on the initial call setup request and the callee responds to the offer before the call is connected. Cisco Unified Border Element (SP Edition) provides interoperability between SIP devices that do not provide SDP on their INVITEs and SIP devices that require SDP on INVITEs they receive. This occurs when:

- An endpoint caller wants to negotiate media after the INVITE has been accepted (late media) and does not include an SDP offer on the initial INVITE
- The callee that expects an SDP offer on the initial INVITE, which it then answers with a 1XX response (early media).

The normal negotiation for media is for the caller to include an SDP offer on the initial INVITE and for the callee to accept with a 200 response. However, the following might occur:

- Late media is used by some endpoints, such as call agents that want to allow the callee to select the media used.

- Early media is used by some more recent endpoints that need to support media flow before the call is accepted, such as a pre-call announcement or in-band tones from a Call Hold server.

In order to interwork between a late media caller and an early media callee, Cisco Unified Border Element (SP Edition) sends an invite to the callee that includes an SDP offer of media. Cisco Unified Border Element (SP Edition) then sends appropriate messages between the caller and callee, depending on the responses from each.

Cisco Unified Border Element (SP Edition) supports this interworking on a per-adjacency basis. You can configure each adjacency to require late-to-early media interworking for calls made to that adjacency and/or for calls made from that adjacency.

Customizable Offer for Late-to-Early Media Interworking

By default, SBC generates the SDP with a single media description that specifies codecs common to both the caller and callee's codec whitelists.

The Customizable Offer for Late-to-Early Media Interworking feature provides customized SDPs with one or more media descriptions. You configure the media descriptions in named profiles (SDP media profiles) and associate the profiles to signals by including the profile name in a CAC policy.

To enable a customized offer for late-to-early media interworking:

- Enable late-to-early media interworking per adjacency, as described in the [?\\$paranum>Configuring Late-to-Early Media Interworking Per Adjacency?](#) section on page 49-4.
- Create a named SDP media profile containing one or more media description lines which will be inserted into the SDP when SBC is generating the INVITE. SBC will insert the media description lines into the SDP per the sequence number configured.
- Associate this sdp-media-profile with a cac-policy table entry.

When a call requires late-to-early interworking, if the CAC policy entry for that call contains a valid SDP media profile name, then SBC generates a customized SDP. In the absence of such an association, SBC generates the default SDP. In the customized case, SBC inserts the media description lines in the media profile in the SDP when it generates the INVITE. Each entry in the media profile includes a sequence number, which controls the ordering of the lines in the generated SDP.

Rules for Media Lines in SDP Media Profiles

A section of SDP is configured as an entry in the SDP Media profile. An entry can have one or many media description lines. The format of an SDP Media profile is:

```
entry number
  media-line index "media_description"
  media-line index "media_description"
exit
```

For example:

```
entry 1
  media-line 1 "m=audio 0 RTP/AVP 0"
  media-line 2 "a=rtpmap:0 PCMU/8000"
exit
```

If more than one media description is created in the same profile, all of the entries are used to generate the same output SDP, in ascending order by entry number.

The *media_description* argument must be enclosed in quotes (" "). The value inside the quotes must be syntactically valid SDP as defined in RFC 2327. The following rules apply:

- An SDP entry must contain exactly one m-line. The m-line must appear first in the entry. The m-line port must be zero. SBC replaces the zero with the appropriate port.
- An SDP entry must not contain a c-line.

The Cisco command line interface handles the contents of *media_description* as a string value. It does not check the syntax of the configured information. If the syntax is incorrect, outbound offers by the SBC are rejected.

Configuring Late-to-Early Media Interworking

This section describes the following configuration scenarios for Late-to-Early Media Interworking:

- [Configuring Late-to-Early Media Interworking Per Adjacency, page 49-4](#)
- [Configuring Customized Offers for Late-to-Early Media Interworking, page 49-11](#)

Configuring Late-to-Early Media Interworking Per Adjacency

This task shows how to configure late-to-early media interworking per adjacency.



Note

The **caller** and **callee** commands have been used in this procedure. In some scenarios, the **branch** command can be used as an alternative to the **caller** and **callee** command pair. The **branch** command has been introduced in Release 3.5.0. See the [“Configuring Directed Nonlimiting CAC Policies” section on page 7-37](#) for information about this command.

SUMMARY STEPS

1. **configure terminal**
2. **sbc service-name**
3. **sbe**
4. **adjacency sip adjacency-name**
5. **nat force-off**
6. **preferred-transport udp**
7. **redirect-mode pass-through**
8. **authentication nonce timeout value**
9. **signaling-address ipv4**
10. **signaling-port**
11. **remote-address ipv4**
12. **signaling-peer**
13. **signaling-peer-port**
14. **dbe-location-id**
15. **account**

16. **reg-min-expiry**
17. **media-late-to-early-iw {incoming | outgoing}**
18. **attach**
19. **exit**
20. **exit**
21. **sip inherit profile**
22. **cac-policy-set**
23. **first-cac-table**
24. **first-cac-scope**
25. **averaging-period**
26. **cac-table**
27. **table-type limit** *list of limit tables*
28. **entry**
29. **match-value**
30. **action cac-complete**
31. **max-bandwidth**
32. **max-updates**
33. **max-channels**
34. **early-media-type**
35. **early-media-timeout**
36. **codec-restrict-to-list**
37. **caller-codec-list**
38. **callee-privacy**
39. **caller-privacy**
40. **exit**
41. **exit**
42. **complete**
43. **exit**
44. **active-cac-policy-set**

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure terminal Example: Router# configure terminal	Enables global configuration mode.
Step 2	sbc service-name Example: Router(config)# sbc mysbc	Enters the submode for configuring the method profile. Use the <i>service-name</i> argument to define the name of the service.
Step 3	sbe Example: Router(config-sbc)# sbe	Enters the mode of an SBE entity within an SBC service.
Step 4	adjacency sip adjacency-name Example: Router(config-sbc-sbe)# adjacency sip sipGW	Configures an adjacency.
Step 5	nat force-off Example: Router(config-sbe-adj-sip)# nat force-off	Configures a SIP adjacency to assume that all endpoints are behind a NAT device.
Step 6	preferred-transport udp Example: Router(config-sbc-sbe-adj-sip)# preferred-transport udp	Sets the preferred transport protocol for SIP signaling on an adjacency.
Step 7	redirect-mode pass-through Example: Router(config-sbc-sbe-adj-sip)# redirect-mode recurse	Configures the behavior of SBC on receipt of a 3xx response to an invite from the SIP adjacency.
Step 8	authentication nonce timeout value Example: Router(config-sbe-adj-sip)# authentication nonce timeout 10	Configures the authentication nonce timeout for a SIP adjacency.
Step 9	signaling-address ipv4 Example: Router(config-sbc-sbe-adj-sip)# signaling-address ipv4 10.10.10.10	Defines the local IPv4 signaling address of a SIP adjacency.

	Command or Action	Purpose
Step 10	signaling-port <i>signaling-port</i> Example: Router(config-sbc-sbe-adj-sip)# signaling-port 5000	Defines the local port of signaling address of a SIP adjacency.
Step 11	remote-address ipv4 Example: Router((config-sbc-sbe-adj-sip)# remote-address ipv4 36.36.36.20 255.255.255.0	Configures a SIP adjacency to restrict the set of remote signaling peers that can be contacted over the adjacency to those with the given IP address prefix.
Step 12	signaling-peer Example: Router(config-sbc-sbe-adj-sip)# signaling-peer gk andrew	Configures a SIP adjacency to use the given remote signaling-peer.
Step 13	signaling-peer-port Example: Router(config-sbc-sbe-adj-sip)# signaling-peer-port 123	Configures a SIP adjacency to use the given remote signaling-peer's port.
Step 14	dbe-location-id Example: Router(config-sbc-sbe-adj-sip)# dbe-location-id 1	Configures an adjacency to use a given media gateway DBE location when routing media.
Step 15	account Example: Router(config-sbc-sbe-adj-sip)# account isp42	Defines a SIP adjacency account on an SBE.
Step 16	reg-min-expiry Example: Router(config-sbc-sbe-adj-sip)# reg-min-expiry 300	Configures the minimum registration period in seconds on the SIP adjacency.
Step 17	media-late-to-early-iw {incoming outgoing} Example: Router(config-sbe-adj-sip)# media-late-to-early-iw incoming	Configures late-to-early media interworking (iw).
Step 18	attach Example: Router(config-sbc-sbe-adj-sip)# attach	Attaches an adjacency to an account on an SBE.

	Command or Action	Purpose
Step 19	exit Example: Router(config-sbc-sbe-adj-sip)# exit	Exits the current configuration mode.
Step 20	exit Example: Router(config-sbc-sbe-adj)# exit	Exits the current configuration mode.
Step 21	sip inherit profile Example: Router(config-sbc-sbe)# sip inherit profile preset-p-cscf-access	Configures a global inherit profile.
Step 22	cac-policy-set Example: Router(config-sbc-sbe)# cac-policy-set 1	Enters the submode of CAC policy set configuration within an SBE entity.
Step 23	first-cac-table Example: Router(config-sbc-sbe-cacpolicy)# first-cac-table RootCacTable	Configures the name of the first policy table to process when performing the admission control stage of policy.
Step 24	first-cac-scope Example: Router(config-sbc-sbe-cacpolicy)# first-cac-scope src-adjacency	Configures the scope at which to begin defining limits when performing the admission control stage of policy.
Step 25	averaging-period Example: Router(config-sbc-sbe-cacpolicy)# averaging-period 5	Configures the size of the averaging period used by CAC for its rate calculations.
Step 26	cac-table Example: Router(config-sbc-sbe-cacpolicy)# cac-table MyCacTable	Creates or configures an admission control table.
Step 27	table-type limit <i>list of limit tables</i> Example: Router(config-sbc-sbe-cacpolicy-cactable)# table-type limit call-priority	Configures a CAC Limit table type.

	Command or Action	Purpose
Step 28	entry <i>num</i> Example: Router(config-sbc-sbe-cacpolicy-cactable)# entry 1	Creates or modifies an entry in a table.
Step 29	match-value <i>value-keyword</i> Example: Router(config-sbc-sbe-cacpolicy-cactable-entry) # match-value routine	Configures the match-value of an entry in an admission control table. Use the ? to see a list of valid keywords.
Step 30	action cac-complete Example: Router(config-sbc-sbe-cacpolicy-cactable-entry) # action cac-complete	Specifies that when an event matches, this CAC policy is complete.
Step 31	max-bandwidth Example: Router(config-sbc-sbe-cacpolicy-cactable-entry) # max-bandwidth 6000000	Configures the maximum bandwidth for an entry in an admission control table.
Step 32	max-updates Example: Router(config-sbc-sbe-cacpolicy-cactable-entry) # max-updates 500	Configures the maximum call updates for an entry in an admission control table.
Step 33	max-channels Example: Router(config-sbc-sbe-cacpolicy-cactable-entry) # max-channels 50	Configures the maximum number of channels for an entry in an admission control table.
Step 34	early-media-type { backward-half-duplex forward-half-duplex full-duplex } Example: Router(config-sbc-sbe-cacpolicy-cactable-entry) # early-media-type full-duplex	Configures the direction of early media to allow for an entry in a call admission control table.
Step 35	early-media-timeout Example: Router(config-sbc-sbe-cacpolicy-cactable-entry) # early-media-timeout 90	Configures the amount of time for which to allow early-media before a call is established.
Step 36	codec-restrict-to-list Example: Router(config-sbc-sbe-cacpolicy-cactable-entry) # codec-restrict-to-list my_codecs	Configures the CAC to restrict the codecs used in signaling a call to the set of codecs given in the named list.

	Command or Action	Purpose
Step 37	caller-codec-list Example: Router(config-sbc-sbe-cacpolicy-cactable-entry) # caller-codec-list test	Lists the codecs which the caller leg of a call is allowed to use.
Step 38	callee-privacy Example: Router(config-sbc-sbe-cacpolicy-cactable-entry) # callee-privacy always	Configures the level of privacy processing to perform on messages sent from callee to caller.
Step 39	caller-privacy Example: Router(config-sbc-sbe-cacpolicy-cactable-entry) # caller-privacy always	Configures the level of privacy processing to perform on messages sent from caller to callee.
Step 40	exit Example: Router(config-sbc-sbe-cacpolicy-cactable-entry) # exit	Exits the current configuration mode.
Step 41	exit Example: Router(config-sbc-sbe-cacpolicy-cactable)# exit	Exits the current configuration mode.
Step 42	complete Example: Router(config-sbc-sbe-cacpolicy)# complete	Completes the CAC-policy or call-policy set after committing the full set.
Step 43	exit Example: Router(config-sbc-sbe-cacpolicy)# exit	Exits the current configuration mode.
Step 44	active-cac-policy-set Example: Router (config-sbc-sbe)# active-cac-policy-set 1	Sets the active CAC-policy-set within an SBE entity.
Step 45	show sbc sbc-name sbe sip essential-methods Example: Router(config-sbc-sbe)# show sbc mysbc sbe sip essential-methods	

Configuring Customized Offers for Late-to-Early Media Interworking

Prerequisites

Before performing this task, configure late-to-early media interworking per adjacency.

SUMMARY STEPS

1. **configure terminal**
2. **sbc *service-name***
3. **sbe**
4. **sip sdp-media-profile *profile-name***
5. **entry *entry-num***
6. **media-line *index* "*media_description*"**
7. (Optional) Repeat the previous step with a different *index* to add more media lines to this entry.
8. **exit**
9. (Optional) Repeat Steps 6 through 9 with a different *entry-num* in Step 6 to add another entry to this profile.
10. **exit**
11. **exit**
12. **cac-policy-set *policy-set-id***
13. **cac-table *cac-table-name***
14. **entry *entry-number***
15. **sip sdp-media-profile *profile-name***
16. **Ctrl Z**
17. **show sbc *sbc-name* sbe sip sdp-media-profile *profile-name***

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure terminal Example: Router# configure terminal	Enables global configuration mode.
Step 2	sbc <i>service-name</i> Example: Router(config)# sbc mysbc	Enters the submode for configuring the method profile. Use the <i>service-name</i> argument to define the name of the service.
Step 3	sbe Example: Router(config-sbc)# sbe	Enters the mode of an SBE entity within an SBC service.

	Command or Action	Purpose
Step 4	<p>Command: <code>sip sdp-media-profile profile-name</code></p> <p>Example: Router(config-sbc-sbe)# sip sdp-media-profile profile1</p>	Configures an SDP media profile for a customized offer. Enter into SIP SDP media profile configuration mode.
Step 5	<p>Command: <code>entry sequence-num</code></p> <p>Example: Router(config-sbc-sbe-sip-sdp-media)# entry 1</p>	Enters the submode for adding a section of media description to the profile. A section, or entry, can contain one or more media description lines.
Step 6	<p>Command: <code>media-line index "media_description"</code></p> <p>Example: Router(config-sbc-sbe-sip-sdp-media-ele)# media-line 1 "m=audio 0 RTP/AVP 0"</p>	Adds a media description line to the entry. Quotation marks must surround the media description. See ?\$paranum>Rules for Media Lines in SDP Media Profiles? section on page 49-3 .
Step 7	<p>(Optional) Repeat the previous step with a different <i>index</i> to add more media lines to this entry.</p> <p>Example: Router(config-sbc-sbe-sip-sdp-media-ele)# media-line 2 "a=rtpmap:12 H264/90000"</p>	Adds additional media descriptions to the entry. The index controls the ordering of the media descriptions.
Step 8	<p>Command: <code>exit</code></p> <p>Example: Router(config-sbc-sbe-sip-sdp-media-ele)# exit</p>	Exits the current configuration mode.
Step 9	<p>(Optional) Repeat Steps 5 through 8 with a different <i>entry-num</i> in Step 5.</p> <p>Example: Router(config-sbc-sbe-sip-sdp-media)# entry 2 Router(config-sbc-sbe-sip-sdp-media-ele)# media-line 1 "m=audio 0 RTP/AVP 0" Router(config-sbc-sbe-sip-sdp-media-ele)# media-line 2 "a=rtpmap:0 PCMU/8000" Router(config-sbc-sbe-sip-sdp-media-ele)# exit</p>	Adds another entry to this profile.
Step 10	<p>Command: <code>exit</code></p> <p>Example: Router(config-sbc-sbe-sip-sdp-media)# exit</p>	Exits the current configuration mode.
Step 11	<p>Command: <code>exit</code></p> <p>Example: Router(config-sbc-sbe-sip)# exit</p>	Exits the current configuration mode.
Step 12	<p>Command: <code>cac-policy-set policy-set-id</code></p> <p>Example: Router(config-sbc-sbe)# cac-policy-set 1</p>	Enters the submode to make a change to a previously configured CAC policy set. Changes are not permitted to the active policy set.

	Command or Action	Purpose
Step 13	<code>cac-table cac-table-name</code> Example: Router(config-sbc-sbe-cacpolicy)# cac-table MyCacTable	Enters the submode to make a change to a previously configured admission control table.
Step 14	<code>entry entry-number</code> Example: Router(config-sbc-sbe-cacpolicy-cactable)# entry 1	Enters the submode to modify an entry in an admission control table.
Step 15	<code>sip sdp-media-profile profile-name</code> Example: Router(config-sbc-sbe-cacpolicy-cactable-entry)#sip sdp-media-profile profile1	Associates an SDP media profile with an admission control table entry.
Step 16	<code>Ctrl Z</code> Example: Router(config-sbc-sbe-cacpolicy-cactable)# Ctrl Z	Returns to user EXEC mode.
Step 17	<code>show sbc sbc-name sbe sip sdp-media-profile profile-name</code> Example: Router# show sbc test sbe sip sdp-media-profile profile1	Shows the contents of the profile. It is important to check the contents of the profile to make sure it is syntactically valid SDP as defined in RFC 2327. The command line interface does not check the syntax of the <i>media_description</i> arguments.

Configuration Examples for the Late-to-Early Media Interworking Feature

This section includes the following examples:

- [Example: Late-to-Early Media Interworking, page 49-13](#)
- [Example: Customized Offer for Late-to-Early Media Interworking, page 49-16](#)

Example: Late-to-Early Media Interworking

The following example shows a configuration of the Late-to-Early Media Interworking feature.



Note

The **caller** and **callee** commands have been used in this procedure. In some scenarios, the **branch** command can be used as an alternative to the **caller** and **callee** command pair. The **branch** command has been introduced in Release 3.5.0. See the [“Configuring Directed Nonlimiting CAC Policies” section on page 7-37](#) for information about this command.

```
Router# configure terminal
```

```

Router(config)# sbc mySbc
Router(config-sbc)# sbe
Router(config-sbc-sbe)# adjacency sip SIPP-1
Router(config-sbe-adj-sip)# nat force-off
Router(config-sbe-adj-sip)# preferred-transport udp
Router(config-sbe-adj-sip)# redirect-mode pass-through
Router(config-sbe-adj-sip)# authentication nonce timeout 300
Router(config-sbe-adj-sip)# signaling-address ipv4 201.201.201.20
Router(config-sbe-adj-sip)# signaling-port 5060
Router(config-sbe-adj-sip)# remote-address ipv4 202.202.202.11 255.255.255.255
Router(config-sbe-adj-sip)# signaling-peer 202.202.202.11
Router(config-sbe-adj-sip)# signaling-peer-port 5060
Router(config-sbe-adj-sip)# db-location-id 4294967295
Router(config-sbe-adj-sip)# account SIPP-1
Router(config-sbe-adj-sip)# reg-min-expiry 3000
Router(config-sbe-adj-sip)# media-late-to-early-iw incoming
Router(config-sbe-adj-sip)# attach
Router(config-sbe-adj-sip)# exit
Router(config-sbe-adj)# exit
Router(config-sbc-sbe)# adjacency sip SIPP-2
Router(config-sbe-adj-sip)# nat force-off
Router(config-sbe-adj-sip)# preferred-transport udp
Router(config-sbe-adj-sip)# redirect-mode pass-through
Router(config-sbe-adj-sip)# authentication nonce timeout 300
Router(config-sbe-adj-sip)# signaling-address ipv4 201.201.201.20
Router(config-sbe-adj-sip)# signaling-port 5060
Router(config-sbe-adj-sip)# remote-address ipv4 201.201.201.11 255.255.255.255
Router(config-sbe-adj-sip)# signaling-peer 201.201.201.11
Router(config-sbe-adj-sip)# signaling-peer-port 5060
Router(config-sbe-adj-sip)# db-location-id 4294967295
Router(config-sbe-adj-sip)# account SIPP-2
Router(config-sbe-adj-sip)# reg-min-expiry 3000
Router(config-sbe-adj-sip)# media-late-to-early-iw outgoing
Router(config-sbe-adj-sip)# attach
Router(config-sbe-adj-sip)# exit
Router(config-sbe-adj)# exit
Router(config-sbc-sbe)# sip inherit profile preset-core
Router(config-sbc-sbe)# cac-policy-set 1
Router(config-sbc-sbe-cacpolicy)# first-cac-table table
Router(config-sbc-sbe-cacpolicy)# first-cac-scope call
Router(config-sbc-sbe-cacpolicy)# averaging-period 60
Router(config-sbc-sbe-cacpolicy)# cac-table table
Router(config-sbc-sbe-cacpolicy-cactable)# table-type limit adjacency
Router(config-sbc-sbe-cacpolicy-cactable)# entry 1
Router(config-sbc-sbe-cacpolicy-cactable-entry)# match-value SIPP-1
Router(config-sbc-sbe-cacpolicy-cactable-entry)# action cac-complete
Router(config-sbc-sbe-cacpolicy-cactable-entry)# max-bandwidth 64009 Gbps
Router(config-sbc-sbe-cacpolicy-cactable-entry)# max-updates 4294967295
Router(config-sbc-sbe-cacpolicy-cactable-entry)# max-channels 4294967295
Router(config-sbc-sbe-cacpolicy-cactable-entry)# early-media-type full-duplex
Router(config-sbc-sbe-cacpolicy-cactable-entry)# early-media-timeout 0
Router(config-sbc-sbe-cacpolicy-cactable-entry)# codec-restrict-to-list allowed_caller
Router(config-sbc-sbe-cacpolicy-cactable-entry)# caller-codec-list allowed_caller
Router(config-sbc-sbe-cacpolicy-cactable-entry)# callee-privacy never
Router(config-sbc-sbe-cacpolicy-cactable-entry)# caller-privacy never
Router(config-sbc-sbe-cacpolicy-cactable)# entry 2
Router(config-sbc-sbe-cacpolicy-cactable-entry)# match-value SIPP-2
Router(config-sbc-sbe-cacpolicy-cactable-entry)# action cac-complete
Router(config-sbc-sbe-cacpolicy-cactable-entry)# max-bandwidth 64009 Gbps
Router(config-sbc-sbe-cacpolicy-cactable-entry)# max-updates 4294967295
Router(config-sbc-sbe-cacpolicy-cactable-entry)# max-channels 4294967295
Router(config-sbc-sbe-cacpolicy-cactable-entry)# early-media-type full-duplex
Router(config-sbc-sbe-cacpolicy-cactable-entry)# early-media-timeout 0
Router(config-sbc-sbe-cacpolicy-cactable-entry)# codec-restrict-to-list allowed

```

```

Router(config-sbc-sbe-cacpolicy-cactable-entry)# callee-codec-list allowed
Router(config-sbc-sbe-cacpolicy-cactable-entry)# callee-privacy never
Router(config-sbc-sbe-cacpolicy-cactable-entry)# caller-privacy never
Router(config-sbc-sbe-cacpolicy-cactable-entry)# exit
Router(config-sbc-sbe-cacpolicy-cactable)# exit
Router(config-sbc-sbe-cacpolicy)# complete
Router(config-sbc-sbe-cacpolicy)# exit
Router(config-sbc-sbe)# active-cac-policy-set 1
Router(config-sbc-sbe)# retry-limit 3
Router(config-sbc-sbe)# call-policy-set 1
Router(config-sbc-sbe-rtgpolicy)# first-call-routing-table start-table
Router(config-sbc-sbe-rtgpolicy)# rtg-src-adjacency-table start-table
Router(config-sbc-sbe-rtgpolicy-entry)# entry 1
Router(config-sbc-sbe-rtgpolicy-entry)# action complete
Router(config-sbc-sbe-rtgpolicy-entry)# dst-adjacency SIPP-1
Router(config-sbc-sbe-rtgpolicy-entry)# match-adjacency SIPP-2
Router(config-sbc-sbe-rtgpolicy-entry)# exit
Router(config-sbc-sbe-rtgpolicy)# entry 2
Router(config-sbc-sbe-rtgpolicy-entry)# action complete
Router(config-sbc-sbe-rtgpolicy-entry)# dst-adjacency SIPP-2
Router(config-sbc-sbe-rtgpolicy-entry)# match-adjacency SIPP-1
Router(config-sbc-sbe-rtgpolicy-entry)# exit
Router(config-sbc-sbe-rtgpolicy)# complete
Router(config-sbc-sbe-rtgpolicy)# exit
Router(config-sbc-sbe)# active-call-policy-set 1
Router(config-sbc-sbe)# sip max-connections 2
Router(config-sbc-sbe)# sip timer
Router(config-sbc-sbe-tmr)# tcp-idle-timeout 120000
Router(config-sbc-sbe-tmr)# tls-idle-timeout 3600000
Router(config-sbc-sbe-tmr)# udp-response-linger-period 32000
Router(config-sbc-sbe-tmr)# udp-first-retransmit-interval 500
Router(config-sbc-sbe-tmr)# udp-max-retransmit-interval 4000
Router(config-sbc-sbe-tmr)# invite-timeout 180
Router(config-sbc-sbe-tmr)# exit
Router(config-sbc-sbe)# codec-list allowed
Router(config-sbc-sbe-codec-list)# description allowed codecs
Router(config-sbc-sbe-codec-list)# codec PCMA
Router(config-sbc-sbe-codec-list)# codec PCMU
Router(config-sbc-sbe-codec-list)# exit
Router(config-sbc-sbe)# codec-list allowed_caller
Router(config-sbc-sbe-codec-list)# description caller
Router(config-sbc-sbe-codec-list)# codec PCMA
Router(config-sbc-sbe-codec-list)# exit
Router(config-sbc-sbe)# h323
Router(config-sbc-sbe-h323)# ras timeout arq 5000
Router(config-sbc-sbe-h323)# ras retry arq 2
Router(config-sbc-sbe-h323)# ras timeout brq 3000
Router(config-sbc-sbe-h323)# ras retry brq 2
Router(config-sbc-sbe-h323)# ras timeout drq 3000
Router(config-sbc-sbe-h323)# ras retry drq 2
Router(config-sbc-sbe-h323)# ras timeout grq 5000
Router(config-sbc-sbe-h323)# ras retry grq 2
Router(config-sbc-sbe-h323)# ras timeout rrq 3000
Router(config-sbc-sbe-h323)# ras retry rrq 2
Router(config-sbc-sbe-h323)# ras rrq ttl 60
Router(config-sbc-sbe-h323)# ras timeout urq 3000
Router(config-sbc-sbe-h323)# ras retry urq 1
Router(config-sbc-sbe-h323)# h225 timeout proceeding 10000
Router(config-sbc-sbe-h323)# h225 timeout establishment 180000
Router(config-sbc-sbe-h323)# h225 timeout setup 4000
Router(config-sbc-sbe-h323)# exit
Router(config-sbc-sbe)# h323
Router(config-sbc-sbe-h323)# adjacency timeout 30000
Router(config-sbc-sbe-h323)# exit

```

```

Router(config-sbc-sbe)# redirect-limit 2
Router(config-sbc-sbe)# deact-mode normal
Router(config-sbc-sbe)# activate
Router(config-sbc-sbe)# exit
Router(config-sbc)# dbe
Router(config-sbc-dbe)# media-address ipv4 201.201.201.20
Router(config-sbc-dbe)# location-id 0
Router(config-sbc-dbe)# media-timeout 9000
Router(config-sbc-dbe)# deact-mode normal
Router(config-sbc-dbe)# activate

```

Example: Customized Offer for Late-to-Early Media Interworking

The following example configures a customized media description and assigns it to a CAC policy.

```

Router(config)# sbc test
Router(config-sbc)# sbe
Router(config-sbc-sbe)# sip sdp-media-profile MediaProfile
Router(config-sbc-sbe-sip-sdp-media)# entry 1
Router(config-sbc-sbe-sip-sdp-media-ele)# media-line 1 "m=audio 0 RTP/AVP 31"
Router(config-sbc-sbe-sip-sdp-media-ele)# media-line 2 "a=aaa:testing"
Router(config-sbc-sbe-sip-sdp-media-ele)# Ctrl Z
Router# show sbc test sbe sip sdp-media-profile MediaProfile
  SDP media profile "MediaProfile"
  Elements:
    Sequence Number : 1
      media-line 1 : m=audio 0 RTP/AVP 31
      media-Line 2 : a=aaa:testing

```

Not in use by any CAC table entries

```

Router# configure terminal
Router(config)# sbc test
Router(config-sbc)# sbe
Router(config-sbc-sbe)# cac-policy-set 1
Router(config-sbc-sbe-cacpolicy)# cac-table testpolicytable
Router(config-sbc-sbe-cacpolicy-cactable)# entry 1
Router(config-sbc-sbe-cacpolicy-cactable-entry)# sip sdp-media-profile MediaProfile
Router(config-sbc-sbe-cacpolicy-cactable-entry)# Ctrl Z
Router# show sbc test sbe sip sdp-media-profile MediaProfile
  SDP media profile "MediaProfile"
  Elements:
    Sequence Number : 1
      media-line 1 : m=audio 0 RTP/AVP 31
      media-line 2 : a=aaa:testing

```

In use by CAC table testpolicytable, entry 1

Verification

Use the commands listed in [Table 49-1](#) to verify operation.

Table 49-1 **Commands to Verify Operation**

Command	Purpose
<code>show sbc sbc-name sbe cac-policy-set id table name entries</code>	Lists a summary of the CAC policy tables associated with the given policy set.
<code>show sbc sbc-name sbe adjacencies</code>	Lists the adjacencies configured on SBEs.
<code>show sbc sbc-name sbe sdp-profiles</code>	Lists the SIP SDP media profiles defined under a named SBE and indicates whether they are currently associated with a CAC policy.
<code>show sbc sbc-name sbe sip sdp-media-profile [profile-name]</code>	Lists the SIP SDP media profiles defined under a named SBE and indicates whether they are currently associated with a CAC policy, or, if you include a profile name, shows the contents of the named profile.

The following example shows adjacencies.

```
Router# show sbc test sbe adjacencies asr1k-1 de

SBC Service "test"
Adjacency asr1k-1 (SIP)
  Status:                Attached
  Signaling address:    22.22.22.2:5060, VRF Admin
  Signaling-peer:       33.33.33.3:5060
  Remote address:       33.33.33.3 255.255.255.255
  Force next hop:       No
  Account:
  Group:                 None
  In header profile:    Default
  Out header profile:   Default
  In method profile:    Default
  Out method profile:   Default
  In UA option prof:    Default
  Out UA option prof:   Default
  In proxy opt prof:    Default
  Out proxy opt prof:   Default
  Priority set name:     None
  Local-id:              None
  Rewrite REGISTER:     Off
  Target address:       None
  NAT Status:           Auto Detect
  Reg-min-expiry:       3000 seconds
  Fast-register:        Enabled
  Fast-register-int:    30 seconds
  Authenticated mode:   None
  Authenticated realm:  None
  Auth. nonce life time: 300 seconds
  IMS visited NetID:    None
  Inherit profile:      Default
  Force next hop:       No
  Home network Id:      None
  UnEncrypt key data:   None
  SIPI passthrough:    No
```

```

Rewrite from domain:  Yes
Rewrite to header:    Yes
Media passthrough:    No
Hunting Triggers:     Global Triggers
Redirect mode:         Pass-through
Security:              Untrusted
Outbound-flood-rate:  None
Ping-enabled:         No
Signaling Peer Status: Not Tested
media-late-to-early-iw: incoming

```

```
Router# show sbc test sbe adjacencies asr1k-2 de
```

```

SBC Service "test"
Adjacency asr1k-2 (SIP)
  Status:                Attached
  Signaling address:     22.22.22.2:5061, VRF Admin
  Signaling-peer:        44.44.44.4:5061
  Remote address:        44.44.44.4 255.255.255.255
  Force next hop:        No
  Account:
  Group:                 None
  In header profile:     Default
  Out header profile:    Default
  In method profile:     Default
  Out method profile:    Default
  In UA option prof:     Default
  Out UA option prof:    Default
  In proxy opt prof:     Default
  Out proxy opt prof:    Default
  Priority set name:     None
  Local-id:              None
  Rewrite REGISTER:      Off
  Target address:        None
  NAT Status:            Auto Detect
  Reg-min-expiry:        3000 seconds
  Fast-register:         Enabled
  Fast-register-int:     30 seconds
  Authenticated mode:    None
  Authenticated realm:   None
  Auth. nonce life time: 300 seconds
  IMS visited NetID:     None
  Inherit profile:       Default
  Force next hop:        No
  Home network Id:       None
  UnEncrypt key data:    None
  SIPI passthrough:     No
  Rewrite from domain:   Yes
  Rewrite to header:     Yes
  Media passthrough:     No
  Hunting Triggers:     Global Triggers
  Redirect mode:         Pass-through
  Security:              Untrusted
  Outbound-flood-rate:  None
  Ping-enabled:         No
  Signaling Peer Status: Not Tested
  media-late-to-early-iw: outgoing

```

The following command lists a summary of the CAC policy tables associated with the given policy set:

```
Router# show sbc test sbe cac-policy-set 1 table table entry 1
```

```
SBC Service "test"
```

```

Policy set 1 table table entry 1
  Match value          SIPP-1
  Action               CAC policy complete
  Max updates         Unlimited
  Max bandwidth       Unlimited
  Max channels        Unlimited
  Transcoder          Allowed
  Caller privacy setting Never hide
  Callee privacy setting Never hide
  Early media         Allowed
  Early media direction Both
  Early media timeout 0
  Caller voice QoS profile default
  Caller video QoS profile default
  Caller sig QoS profile default
  Callee voice QoS profile default
  Callee video QoS profile default
  Callee sig QoS profile default
  Restrict codecs to list allowed_caller
  Restrict caller codecs to list allowed_caller
  Restrict callee codecs to list default
  Media bypass        Allowed
  Number of calls rejected by this entry 0

```

```
Router# show sbc test sbe cac-policy-set 1 table table entry 2
```

```

SBC Service "test"
Policy set 1 table table entry 2
  Match value          SIPP-2
  Action               CAC policy complete
  Max updates         Unlimited
  Max bandwidth       Unlimited
  Max channels        Unlimited
  Transcoder          Allowed
  Caller privacy setting Never hide
  Callee privacy setting Never hide
  Early media         Allowed
  Early media direction Both
  Early media timeout 0
  Caller voice QoS profile default
  Caller video QoS profile default
  Caller sig QoS profile default
  Callee voice QoS profile default
  Callee video QoS profile default
  Callee sig QoS profile default
  Restrict codecs to list allowed
  Restrict caller codecs to list default
  Restrict callee codecs to list allowed
  Media bypass        Allowed
  Number of calls rejected by this entry 0
Router#

```

The following example shows a list of SDP media profiles configured under an SBC service:

```

Router# show sbc test sbe sip sdp-media-profile
SDP Media profiles for SBC service "test"

  Name                               In use
  =====
MediaProfile                         Yes

```

The following example shows the contents of a named SDP media profile:

```
Router# show sbc test sbe sip sdp-media-profile MediaProfile
```

```
SDP media profile "MediaProfile"  
  Elements:  
    Sequence Number : 1  
      media-Line 1      : m=audio 0 RTP/AVP 31  
      media-Line 2      : a=aaa:testing  
  
In use by CAC table testpolicytable, entry 1
```