CHAPTER 6

H.248 Packages—Signaling and Control

The data border element (DBE) deployment of Cisco Unified Border Element (SP Edition) distributed model supports standard H.248 packages that are used to make the Cisco ASR 1000 Series Router function as the DBE in distributed mode. H.248 packages are described or cross-referenced in this chapter.

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 commands used in this chapter, see the *Cisco Unified Border Element (SP Edition) Command Reference: Distributed Model* at http://www.cisco.com/en/US/docs/ios/sbc/command/reference/sbc_book.html.

Contents

Enabling Optional H.248 Packages

H.248 profiles define option values, sets of packages, naming conventions, and other details for an entire set of applications. The Cisco Unified Border Element (SP Edition) DBE deployment for the Cisco ASR 1000 Series Routers currently supports only one such profile, SBC_GateControl. The SBC_GateControl profile, a Cisco internal profile based on ITU-T Recommendation H.248.1 Version 2, defines functionality between the DBE and the MGC.

While all mandatory items in the profile are supported automatically by the DBE, it is possible to configure the optional Enhanced Root (eroot) package to interoperate with the MGC/SBE. The eroot package is a proprietary package for the transport of the location ID and media gateway (MG) ID from the signaling border element (SBE).

For more information on the Cisco H.248 profile, see the "Cisco H.248 Profile" section on page 2-12.

Related Commands

The **package** command enables the DBE to use the optional eroot package.

H.248 Address Reporting Package

The H.248 Address Reporting Package is described in the "H.248 Address Reporting Package" section on page 8-2.

H.248 Gate Information (Ginfo) Package Becomes Optional

This enhancement removes the stipulation that the Gate Information (Ginfo) package properties are required in the DBE H.248 profile. The DBE continues to support the Ginfo package properties as optional properties and supplies default values if values are not specified.

The Ginfo package properties are the following:

- bill_corr property is defaulted to a value of 24 zero bytes.
- gate_state property is defaulted to COMMITTED. The termination is maintained across system failover and H.248 association loss at all times after the initial termination add. Changes to committed gates are replicated to the redundant card immediately. Therefore omitting this property has a minor performance overhead on redundant systems.
- gate_side property is defaulted to SIDE_A for the first termination in a stream and to SIDE_B for the second termination in a stream.

DBE Restrictions

The following is a restriction of DBE support for the H.248 Gate Information Package Becomes Optional feature:

- If one of the Ginfo properties is omitted when adding a termination, you cannot later specify a value for that property value on an Add termination request. An attempt to do fails with error 421 indicating "Unknown action or illegal combination of actions."

H.248 Protocol—Acknowledgment Support for Three-Way Handshake

The data border element (DBE) supports a three-way handshake for H.248 messages. The DBE supports sending of an acknowledgement (Ack) for a three-way handshake after receiving the transaction response from the media gateway controller (MGC), as described in Annex D.1.2 and Annex D.1.2.2 of H.248.1v3 Gateway Control Protocol: Version 3.

The TransactionResponseAcknowledgement parameter is part of an H.248 message. The acknowledgement is composed of a set of transactions, each of which is made up of a request and a response. The entity receiving the Ack (DBE or MGC) knows that its response has reached the other side. It can delete the response message stored in its memory for handling retransmissions.

The DBE understands and acts upon acknowledgment responses from the MGC.

From the H.248 protocol, the transaction response acknowledgment looks like the following:

```
transactionResponseAck = ResponseAckToken LBRKT transactionAck
*(COMMA transactionAck) RBRKT
transactionAck = TransactionID / (TransactionID "-" TransactionID)
ResponseAckToken = ("TransactionResponseAck" / "K")
```

An example of a response part of the acknowledgment looks like the following:

```
K { 1, 2, 4-6 }
```

H.248 Segmentation Package Support

When an H.248 association is established over the User Datagram Protocol (UDP), the H.248 message can be too big to fit inside one UDP packet, and as a result, H.248-based segmentation is required. The H.248 Segmentation (seg) package, defined in H.248.1v3 Annex E, defines the following four properties to use when performing this segmentation:

- MGSegmentationTimerValue
- MGCSegmentationTimerValue
- MGMaxPDUSize
- MGCMaxPDUSize

Segmentation package support includes the following functionality:

- If the media gateway controller (MGC) does not receive all the message segments or expected segmented responses, it sends error 459.
- If the MGC receives all the segmented responses, but the DBE does not receive a TransactionResponseAcknowledgement, then the DBE cannot send an error message because this behavior is not defined in the H.248 specification.

DBE Restrictions

The following are restrictions of DBE support for the Segmentation package:

- The DBE must support H.248 segmentation in addition to this package to negotiate the segmentation properties with MGC.

- The DBE only supports sending of segmented messages; the DBE does not support receiving of segmented messages from the MGC.
- The DBE can send segmented messages only over UDP and can send segmented messages to H.248.1v3 MGCs only. The DBE generates an error message when it receives segmented messages over Transmission Control Protocol (TCP) connections from MGCs. The DBE sends unsegmented messages over TCP or UDP.
- The maximum segment size is subject to the segmentation configuration and the maximum buffer size.

Related Commands

The **package segment max-pdu-size** command is used to enable the Segmentation package and specify the maximum PDU size that UDP should use for H.248 control signaling. The package is enabled by configuring the maximum PDU size to a value other than 0. A value of 0 disables the package. By default, the Segmentation package is disabled.

The **show sbc dbe controllers** command has been modified to include H.248 Segmentation statistics on the DBE.

H.248 Session Failure Reaction Package

The Session Failure Reaction (sfr) package enables a media gateway controller (MGC) to instruct a media gateway (MG) to put a specified termination in the OutOfService state (either gracefully or forcefully) at the point where the H.248 association between them is lost. Putting a termination in an OutOfService state is used to prevent signaling messages from reaching the call agent in case of failure or administrative shutdown of MGC and MG communication.

The sfr package includes the following functionality:

- The specifications on signaling pinholes, termination ID structure, and validation of termination name from the Termination State Control (tsc) package also apply to the sfr package.
- The deactivation timer is started when the H.248 association between the MGC and MG is lost. The deactivation timer is cancelled if an association is regained.
- Media timeout is always enabled when the H.248 association is down.
- The values of the sfr/td, sfr/db, sfr/aa, and sfr/dt properties are reported to the MGC in Audit responses.

DBE Restrictions

The following are restrictions of DBE support for the sfr package:

- Terminations can be associated by context, but not by VLAN because the VLAN value of the sfr/aa property is not supported. If a request includes the VLAN value, the request is rejected with error 501, “Not Implemented.”
- Properties in the sfr package cannot be manipulated by a wildcard Modify command.
- If a termination belongs to multiple streams, the sfr properties must be set consistently in all streams.

Note See the MultiService Forum Contribution document, Contribution Number: msf2006.117.03 for more information about the sfr package.

H.248 Termination State Control Package

The Termination State Control (tsc) package enhances the capabilities of the media gateway controller (MGC) to support the following two features:

- tsc-quiesce

  The MGC can instruct the media gateway (MG) to set the ServiceState property of a signaling pinhole to OutOfService state at the point where all associated (media) terminations are subtracted. The MG informs the MGC when this has occurred. This feature is known as tsc-quiesce.

- tsc-suspend

  The MGC can put a signaling pinhole out of action for a given period of time. The MG informs the MGC when the signaling pinhole becomes operational again, and the MGC can query the time remaining until the suspension ends. This feature is known as tsc-suspend.

A signaling pinhole is composed of two terminations. If either termination is out of service, the entire pinhole is out of service. It is up to the MGC whether to provision one or both terminations with the relevant properties. If the MGC chooses to provision only one termination, the MG does not impact the other termination.

The tsc-quiesce Feature

The tsc-quiesce feature includes the following functionality:

- Quiesce is not symmetrical. Adding a media termination does not cause a quiesced OutOfService signaling pinhole to automatically move to InService. The MGC must explicitly set the termination to InService.
- When tsc-quiesce takes effect, the gtd property is left as is, which means that the termination requiesces the next time all associated terminations are subtracted.
- Wildcard Subtracts on media terminations in multiple contexts result in multiple Deactivation Completed events to the MGC.
- The tsc/gtd and tsc/ata properties and the tsc/dc event (if subscribed for) are reported to the MGC in Audit responses.

The tsc-suspend Feature

The tsc-suspend feature includes the following functionality:

- Termination association (by context or VLAN) is not relevant to tsc-suspend.
- The trt property may be set to ON only when changing a termination to OutOfService. Modification of trt can cause the following error cases:
  - trt set to ON and ServiceState set to InService.
  - trt set to ON and ServiceState is not supplied (in which case it defaults to InService).

In each case, the transaction is failed with error 421, “Unknown action or illegal combination of actions.” This policing occurs before any other processing or checking.

- The MG ignores cases where the termination is already OutOfService when trt is set to ON.
- If the recovery timer is running and LocalControl is modified:
  - If trt is ON and the recovery timer (rt) is non-zero, the recovery timer will be cancelled and restarted with the new rt value.
  - If trt is OFF or rt is zero, the timer is stopped.
- If the MGC manually changes a suspended termination from OutOfService to InService, the recovery timer is stopped. However, if the MGC re-applies OutOfService state to an already suspended termination, this has no effect on the recovery timer and does not cancel recovery.
- The tsc/trt and tsc/rt properties and the tsc/rc event (if subscribed for) are reported to the MGC in Audit responses.

DBE Restrictions

The following is a restriction of DBE support for the tsc package:

- Terminations can be associated by context, but not by VLAN. This means that the VLAN value of the tsc/ata property is not supported. If a request includes the VLAN value, the request is rejected with error 501, “Not Implemented.”

Note See the MultiService Forum Contribution document, Contribution Number: msf2006.117.03 for more information about the tsc package.

Related Commands

The tsc/ttr statistic is reported in the **show sbc dbe media-flow-stats** and **show sbc dbe signaling-flow-stats** command outputs. The tsc/trt property is reported as ON if the termination is OutOfService with the recovery timer running, and OFF otherwise.

H.248 Traffic Management Package Support

The DBE supports the sustained data rate (tman/sdr), maximum burst size (tman/mbs), and policing (tman/pol) properties of the ETSI TS 102 333 Traffic Management (Tman) package.[1] Support of these tman properties allows additional pinhole programming in the Tman package to inform the DBE how to police media and signaling flows. These tman properties can be assigned to both media and signaling flows. The DBE performs asymmetric flow policing.

The Traffic Management package is described in the “H.248 Traffic Management Package Support” section on page 5-1.

1. ETSI TS 102 333 version 1.1.2 Traffic Management Package

H.248.1v3 Support

H.248.1v3 Support allows the DBE to interoperate with an SBE, which requires H.248.1v3 or Media Gateway Controller (MGC) version 3. The DBE can only accept version 3 once it is configured to support version 3.

On contacting an SBE, the DBE advertises for H.248.1 version 3 and confirms the version received in the response from the SBE. If the SBE supports a lower version than was advertised, the DBE logs the event, disconnects from the SBE, and tries an alternative SBE until an SBE with H.248.1v3 is found. A new field, bcaGalEntMegacoVersion, is added to the MG-Abstraction Layer entity MIB.

DBE Restrictions

The following is a restriction of H.248.1v3 Support:

- The DBE rejects attempts to negotiate with the MGC to a lower version once the DBE is configured to support version 3.

Related Commands

The **h248-version** command defines the version of the H.248 protocol which the DBE uses when forming associations with an H.248 controller.

H.248 VLAN Package Syntax-Level Support

The DBE provides syntax-level support of the H.248 VLAN package. The media gateway controller (MGC) can program up to two VLAN tags and associated Ethernet priorities, as defined in the H.248 VLAN package. The DBE can accept, store, and return VLAN tag and priority information, at the syntax level, for media streams.

DBE Restrictions

The following is a restriction of DBE support for the H.248 VLAN package:

- The DBE does not use the VLAN tag and priority information.

Related Commands

The VLAN tag and priority information is returned in the **show sbc dbe media-flow-stats** and **show sbc dbe signaling-flow-stats** command outputs.

MGC-Controlled Gateway-Wide Properties

This feature adds support for all of the properties in Version 2 of the H.248 Base Root package as defined in H.248.1v3.

The following properties of the Base Root Version 2 package can be modified and audited by the media gateway controller (MGC):

- normalMGExecutionTime
- normalMGCExecutionTime
- MGProvisionalResponseTimerValue
- MGCProvisionalResponseTimerValue
- MGOriginatedPendingLimit
- MGCOriginatedPendingLimit

In addition, the following read-only properties may be audited:

- maxNrOfContexts
- maxTerminationsPerContext

DBE Restrictions

The following is a restriction of DBE support for this feature:

- The property field values are stored where set by H.248 and returned on subsequent audits. However, the property values are not used by the DBE and do not affect the DBE's behavior.