High Availability Overview

The High Availability (HA) feature allows Cisco UBE to preserve calls when system resources become unavailable. Cisco UBE is configured on two routers, where one router is active and the other a standby. When the active Cisco UBE becomes unavailable, standby Cisco UBE seamlessly takes over the call processing.

Figure 1: Cisco UBE High Availability

Information About High Availability

Inbox versus Box-to-Box Redundancy

Refer to the next section in this document. For detailed information about inbox and box-to-box redundancies, refer to the chapter titled “Stateful Switchover Between Redundancy Paired Intra- or Inter-box Devices” in the Cisco Unified Border Element Configuration Guide.

Route Processor Redundancy

Route Processor Redundancy (RPR) allows you to configure a standby RP. When you configure RPR, the standby RP loads the Cisco IOS software on bootup and initializes itself in standby mode. In the event of a fatal error on the active RP, the system switches to the standby RP, which reinitializes itself as the active RP. In this event, the entire system is rebooted, so the switchover with RPR is slower than with other High Availability switchover features such as Nonstop Forwarding/Stateful Switchover (NSF/SSO).
Stateful Switchover

Stateful switchover (SSO) provides media preservation of calls and post-switchover teardown of calls, in case of active RP failure. This means that the CUBE calls would continue to be active even after the active RP card goes down (provided a redundant RP is present). The standby RP would become active and service new CUBE(ENT) calls. The context of the CUBE (ENT) calls that were switched over from the Active card would be present on the new active card. Hold/Resume or any other supplementary services will work after switchover. In SSO, both media and signaling session context are preserved on failover.

**Note**
The terms failover and switchover are used interchangeably.

Nonstop Forwarding

Nonstop forwarding (NSF) helps to suppress routing flaps in devices that are enabled with stateful switchover (SSO), thereby reducing network instability. NSF allows forwarding of data packets to continue along the known routes while the routing protocol information is being restored after a switchover. Non Stop Forwarding (NSF) works together with SSO and allows the routing protocols to reestablish their routing information by requesting their network neighbors to resend all of the routing information when a switchover occurs.

HA Checkpointing

Checkpointing refers to the facility or architecture to implement stateful switchover (SSO). It provides the mechanisms to help synchronize state data between the active and standby route processors or chassis in a consistent, repeatable, and well-ordered manner.

From Cisco IOS Release 15.6(1)T and Cisco IOS-XE Release 3.17S onwards, checkpointing mechanism is enhanced to provide support for multimedia endpoints with larger SDP up to 6000 bytes. With the new enhancement, CUBE supports preservation of media up to a maximum of 6 m-lines/streams (audio, video, and application).

CUBE HA is enhanced to support the preservation of Record-Route and Contact header information. After SSO, all subsequent midcall SIP messages will be routed based on the correct Record-Route and Contact headers.

CUBE High Availability Options

The CUBE HA implementation supports full stateful failover for active SIP-to-SIP calls. Stateful failover means both media and signaling session information is preserved after switchover. CUBE supports three types of high availability (HA) options.

Hot Standby Routing Protocol

The Cisco Unified Border Element (CUBE) provides high availability (HA) using box-to-box redundancy configurations when implemented on a Cisco ISR-G2 platform. CUBE box-to-box redundancy on ISR-G2 is based on the Hot Standby Routing Protocol (HSRP) router technology, and HSRP is specific to ISR-G2.

HSRP technology provides high network availability by routing IP traffic from hosts on networks without relying on the availability of any single router. HSRP is used in a group of routers for selecting an Active router and a Standby router. HSRP monitors both the inside and outside interfaces—if any interface goes
down, the whole device is considered down, the standby device becomes active and takes over the responsibilities of the active router. Box-to-box high availability is supported using virtual IP addresses for the signaling and media.

**Redundancy Group Infrastructure**

Cisco ASR 1000 Series Router, Cisco 4000 Series ISR, and Cisco CSR 1000v with Cisco IOS XE Release 3.11S or later, use the Redundancy Group (RG) Infrastructure to form an active/standby pair of routers. The active/standby pair shares the same virtual IP address (VIP) and continually exchange status messages. CUBE session information is check-pointed across the active/standby pair of routers enabling the Standby router to take over immediately all CUBE call processing responsibilities if the Active router goes out of service. RG Infrastructure also is supported on ASR 1006 with a single Route Processor and an Embedded Services Processor (ESP).

**Considerations for Choosing an HA Configuration**

When considering HA design, the following VoIP aspects apply:

- Media preservation of active calls
- Calls that are currently being signaled
- Signaling protocol state preservation for active calls (supplementary services will work after switchover)
- Transcoded calls
- H323-to-SIP and H323-to-H323 calls
- Licensing implications

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**Note**

In High Availability deployments, CUBE uses physical IP address to communicate the Smart Licensing information.

**Restrictions for CUBE High Availability**

- IPv6 is not supported.
- All SCCP-based media resources (Conference bridge, Transcoding, Hardware MTP, and Software MTP) are not supported.
- Cisco Unified Survivable Remote Site Telephony (Unified SRST) or TDM Gateway co-location on Cisco UBE HA is not supported.