

Performing an In Service Software Upgrade

This module describes the In Service Software Upgrade (ISSU) process and provides configuration examples for ISSU on Cisco ASR 1000 Series routers.

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

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

Information About Performing an ISSU

ISSU Process Overview

ISSU allows Cisco software to be upgraded or downgraded, at a router level, while the system continues to forward packets. ISSU takes advantage of the Cisco high availability infrastructure--Cisco NSF with SSO and hardware redundancy--and eliminates downtime associated with software upgrades or version changes by allowing updates while the system remains in service. Cisco high availability features combine to lower the impact that planned maintenance activities have on network service availability, with the results of less downtime and better access to critical systems.

SSO mode supports configuration synchronization. When images on the active and standby RPs are different, this feature allows the two Route Processors (RPs) to remain synchronized although they may support different sets of commands.

An ISSU-capable router consists of two RPs (active and standby) and one or more line cards. Before initiating the ISSU process, you must copy the Cisco IOS software into the file systems of both RPs

After you have copied the Cisco IOS software to both file systems, load the new version of Cisco IOS software onto the standby RP.

After switchover, the standby RP takes over as the new active RP.

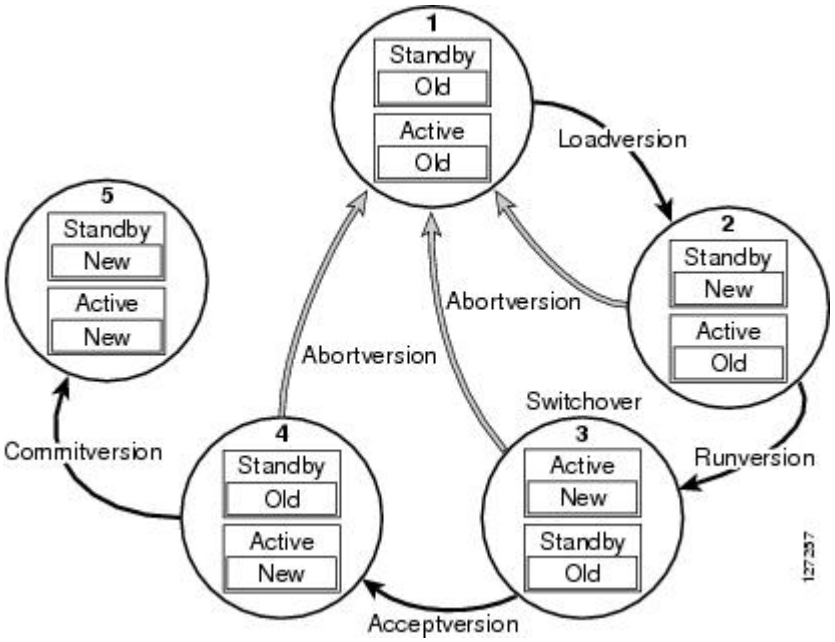
Then, the former active RP, which is now the new standby RP, is loaded with the new software.

The two RPs in a system can be in one of three different states during ISSU:

- Active--One RP is actively forwarding packets with old software. After the ISSU process is performed, the original active RP becomes the standby RP.
- Standby--Perform ISSU on the standby RP, loading it with new software. After the ISSU process is performed, the original standby RP is the new active RP.
- Hot standby--After the original standby RP becomes the new active RP, load the new software image into the new standby RP. Doing so makes the standby RP a hot standby RP.

The figure below shows the ISSU states during the ISSU process.

Figure 1: ISSU States During the ISSU Process



ISSU and the Cisco ASR 1000 Series Router

See the *Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide* for information about ISSU and Cisco ASR 1000 Series routers.

How to Perform an ISSU

Unlike SSO, which is a mode of operation for the device and a prerequisite for performing ISSU, the ISSU process is a series of steps performed while the router or switch is in operation. The steps result in the implementation of new or modified Cisco software, and have a minimal impact to traffic.

For information on performing Cisco IOS XE ISSU upgrades on the Cisco ASR 1000 Series Router, see the "Software Upgrade Process" section in the*Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide*.

Configuration Examples for Performing an ISSU

Example Verifying Redundancy Mode Before Beginning the ISSU Process

The following examples display verification that the system is in SSO mode and that slot R0 is the active RP1 and slot R1 is the standby RP1. Both RPs are running the same Cisco IOS XE Software image.

```
Router# show redundancy states
       my state = 13 -ACTIVE
     peer state = 8  -STANDBY HOT
           Mode = Duplex
        Unit ID = 48
Redundancy Mode (Operational) = sso
Redundancy Mode (Configured)  = sso
Redundancy State              = sso
     Maintenance Mode = Disabled
    Manual Swact = enabled
 Communications = Up
   client count = 67
 client_notification_TMR = 30000 milliseconds
          RF debug mask = 0x0
Router# show platform

Chassis type: ASR1006
Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
0         ASR1000-SIP10       ok                    02:48:56
 0/0      SPA-2X1GE-V2        ok                    02:46:38
 0/1      SPA-2XOC3-POS       ok                    02:46:38
R0        ASR1000-RP1         ok, active            02:48:56
R1        ASR1000-RP1         ok, standby           02:48:56
F0        ASR1000-ESP10       ok, active            02:48:56
F1        ASR1000-ESP10       ok, standby           02:48:56
P0        ASR1006-PWR-AC      ok                    02:47:55
P1        ASR1006-PWR-AC      ok                    02:47:55
Slot      CPLD Version        Firmware Version
--------- ------------------- ----------------------------------------
0         07091401            12.2(33r)XN2
R0        07062111            12.2(33r)XN2
R1        07062111            12.2(33r)XN2
F0        07051680            12.2(33r)XN2
F1        07051680            12.2(33r)XN2
```

Example Verifying the ISSU State

The following example displays and verifies the ISSU state:

```
Router# show issu state detail

--- Starting installation state synchronization ---
Finished installation state synchronization
No ISSU operation is in progress
```

The new version of the Cisco IOS XE Software must be present on both of the RPs. The directory information displayed for each of the RPs shows that the new version is present.

```
Router# dir harddisk:
Directory of harddisk:/
   11  drwx       16384  Jul 24 2008 15:04:47 +00:00  lost+found
1114113  drwx       65536  Nov 25 2008 16:58:36 +00:00  tracelogs
294913  drwx        4096  Jul 24 2008 15:14:39 +00:00  core
   12  -rw-   225308932  Nov 12 2008 15:50:37 +00:00
asr1000rp1-adventerprisek9.02.02.00.122-33.XNB-20080810_010002-mcp_dev_2.bin
   13  -rw-   209227980  Aug 20 2008 17:31:59 +00:00  asr1000special
   14  -rw-   222240972   Sep 8 2008 17:13:22 +00:00  rp_super.ppc.bin
   15  -rw-   209985740  Nov 25 2008 16:50:39 +00:00
asr1000rp1-adventerprisek9.02.01.02.122-33.XNA2.bin
39313059840 bytes total (38439649280 bytes free)
Router# dir stby-harddisk:
Directory of stby-harddisk:/
   11  drwx       16384  Jul 24 2008 15:05:35 +00:00  lost+found
1507329  drwx       73728  Nov 25 2008 16:58:50 +00:00  tracelogs
2424833  drwx        4096  Jul 24 2008 15:22:04 +00:00  core
   12  -rw-   225308932   Sep 8 2008 04:48:39 +00:00
asr1000rp1-adventerprisek9.02.02.00.122-33.XNB-20080810_010002-mcp_dev_2.bin
   13  -rw-   209227980  Aug 20 2008 17:41:21 +00:00  asr1000special
   14  -rw-   222240972   Sep 8 2008 18:04:26 +00:00  rp_super.ppc.bin
   15  -rw-   209985740  Nov 25 2008 16:55:11 +00:00
asr1000rp1-adventerprisek9.02.01.02.122-33.XNA2.bin
39313059840 bytes total (38438928384 bytes free)
```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
Cisco IOS High Availability commands	*Cisco IOS High Availability Command Reference*
FHRP and HSRP group shutdown	Configuring HSRP chapter of the *Cisco IOS XE IP Application Services Configuration Guide*
ISSU on the Cisco ASR 1000 Series Routers	In Service Software Upgrades chapter of the *Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide*
VRRP	Configuring VRRP chapter in the *Cisco IOS XE IP Application Services Configuration Guide*

Standards

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	--

MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco IOS XE Software releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	--

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/techsupport

Feature Information for Performing an XE ISSU

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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

Table 1: Feature Information for Performing an ISSU

Feature Name	Releases	Feature Information

In Service Software Upgrade (ISSU)	Cisco IOS XE Release 2.1	The following features were introduced:
		• Dual IOS processes on the same RP
		• In Service Software Upgrade (ISSU)
		  • ISSU - ARP
		  • ISSU - Frame Relay
		  • ISSU - GLBPv6
		  • ISSU - HSRPv6
		  • ISSU - HDLC
		  • ISSU - IGMP snooping
		  • ISSU - IPv6 uRPF
		  • ISSU - IS-IS
		  • ISSU - Managed LNS MPLS
		  • ISSU - MLD Access Group
		  • ISSU - NAT
		  • ISSU - PPP/MLP
		  • ISSU - QoS
		  • ISSU - SNMP
		
		The following commands were introduced or modified **issu abortversion**, **issu acceptversion**, **issu commitversion**, **issu loadversion**, **issu runversion**, **issu set rollback timer**, **show issu clients**, **show issu comp-matrix**, **show issu rollback timer**, **show issu sessions**, **show issu state**, **show redundancy.**

ISSU - ATM	Cisco IOS XE Release 2.3	This feature was introduced.
ISSU - HSRPv6 on VRF interfaces	Cisco IOS XE Release 3.1S	This feature was introduced for Cisco ASR 1000 Series Aggregation Services Routers.
ISSU - Multicast MPLS VPN	Cisco IOS XE Release 2.5	This feature was introduced.