

Cisco IOS In-Service Software Upgrade

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Cisco IOS® In-Service Software Upgrade (ISSU) lowers downtime due to planned maintenance and software upgrades—a new capability that will benefit many service providers and enterprises. This document addresses questions about this new capability.

Q. Which products currently support ISSU?

- A.** Cisco IOS ISSU was delivered first in Cisco IOS Software Release 12.2SB for the Cisco® 10000 Series routers. Other implementations include 12.2(31)SGA for the Catalyst® 4500 and 2.1.0 for the ASR1000. Cisco IOS ISSU offers a full-image ISSU capability, meaning the entire Cisco IOS Software image is upgraded from one version to another—often including new features. The Cisco CRS-1 Carrier Routing System routers and Cisco 12000 Series routers running Cisco IOS XR Software also support a form of ISSU that is different in some respects to the capabilities discussed herein. Cisco IOS Software Modularity for the Cisco Catalyst® 6500 also includes subsystem ISSU capability. Refer to Cisco Catalyst 6500 with IOS Modularity White Paper http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps708/prod_white_paper0900aecd80313e09.html for more specific information.

Q. Will other products support Cisco IOS ISSU?

- A.** Yes. Certain other products that feature redundant control plane hardware and support nonstop forwarding (NSF)/stateful switchover (SSO) will gain support for ISSU. The specific products to gain support and the release specifics will be announced at a later date.

Q. Will it be possible to perform Cisco IOS Software upgrades involving new features and functions in service or is this capability only for patches and maintenance?

- A.** The Cisco IOS ISSU infrastructure includes software versioning and supports true upgrades to a new Cisco IOS Software release that includes new features and functions. The Cisco IOS ISSU support goes beyond merely patching and maintenance; it relies on redundant control plane hardware and requires complete Cisco IOS Software image files.

Q. Is there some limit to the span between Cisco IOS Software releases that will allow an ISSU to be performed?

- A.** Yes. The stated goal is to support ISSU between releases within a rolling 18-month window. The window was chosen based on customer feedback. You should expect to be able to perform an in-service upgrade between Cisco IOS Software versions posted on Cisco.com up to 18 months after the Cisco.com post date of the currently running Cisco IOS Software version.

Q. What about Cisco engineering special releases or interim builds? Can an ISSU be performed to or from interim releases?

- A.** No. Only Cisco IOS Software versions released on Cisco.com have the necessary compatibility matrix data included for support of Cisco IOS ISSU. Contact the Cisco Technical Assistance Center (TAC) with any questions regarding special builds or releases.

Q. How will customers know if an ISSU is possible between two particular Cisco IOS Software versions?

A. Tools are available on Cisco.com to aid in planning for an upgrade. The Cisco IOS Software Selector tool and the Cisco IOS Feature Navigator tool have both been modified to display ISSU compatibility information. For more information, refer to Researching In-Service Software Upgrade Compatibility Document.

Q. Are there other documents that describe the operation and provide guidelines for performing ISSU?

A. Yes. Refer to ISSU Deployment Document and the Cisco Systems® documentation.

Q. Is ISSU a new redundancy mode of operation?

A. No. Cisco IOS ISSU is a process or procedure based on the Cisco IOS High Availability infrastructure. ISSU depends on Cisco NSF/SSO for products that run Cisco IOS Software Release 12.2S such as the Cisco 10000, Catalyst 4500, and ASR 1000. Cisco IOS ISSU takes advantage of the SSO redundancy mode and redundant control plane hardware to allow software upgrades to be performed while the device remains in service.

Q. Will there be any packet loss during a software upgrade?

A. The architecture is designed to support all Cisco products that offer redundant components. Each product is engineered to address the primary requirements defined for the market it serves, meaning each product exhibits certain performance characteristics according to the design. The Cisco 10000 Series routers, for example, can achieve less than 2 seconds of packet loss for supported protocols and features during an ISSU. Both the Catalyst 4500 and ASR 1000 experience even shorter periods of packet loss.

Q. Do you have to configure ISSU?

A. Not exactly. ISSU depends on NSF/SSO, so you do need to configure the proper redundancy mode and enable NSF for the routing protocols used. An ISSU is performed using a series of Cisco command-line interface (CLI) EXEC commands.

Q. Are there new CLI commands for performing ISSU?

A. Yes. The ISSU process involves issuing a series of EXEC commands to progress through the ISSU process.

The new commands follow:

```
issu loadversion
issu runversion
issu acceptversion
issu commitversion
issu abortversion
issu set rollback-timer
```

The new commands are described in the documentation and in the Cisco IOS ISSU Deployment Guide.

Q. What if the system crashes or a problem arises during the ISSU process?

A. Various problem scenarios were addressed during the design of the Cisco IOS high-availability infrastructure and the ISSU framework. The system attempts to recover itself if a problem is

seen and reverts back to the original state (before the upgrade process was started). Barring any unanticipated software defect, the effect on user traffic flow and service should be minimal.

Q. Can I upgrade from my current software release to the first Cisco IOS Software release that supports ISSU?

A. No. An ISSU can be performed only between two Cisco IOS Software releases that support the ISSU infrastructure. You will need to upgrade first to the Cisco IOS Software Release 12.2SB that supports ISSU and then perform subsequent upgrades using the ISSU procedures. Always refer to the release notes and information posted on Cisco.com relative to the Cisco IOS ISSU compatibility matrix.

Q. Do all features and functions available in Cisco IOS Software support ISSU?

A. No, not as of the time of this writing. Some features and functions will affect service more than others. It depends on the level of support for SSO included in a particular feature.

Q. Which features support ISSU?

A. There are a wide range of features that support ISSU and more are being added all the time. You can use Cisco Feature Navigator (CFN) to help you determine what features are currently supported on your platform. Additionally, CFN provides information regarding ISSU compatibility between specific releases. You can easily find the CFN by keying <http://www.cisco.com/go/fn>. For more information on researching ISSU compatibility, please see the “[Researching In Service Software Upgrade Compatibility](#)” white paper on Cisco.com.

Q. Will ISSU be supported across major releases (Cisco IOS Software Releases 12.2 through 12.3)?

A. Upgrades or downgrades across major releases may not be supported. Major release changes might be when significant critical infrastructure changes are implemented such that in-service upgrades would not be possible. That said, Cisco IOS Software Release 12.2S is expected to continue along with regular feature releases for at least the next few years, so you can expect to gain significant benefits from Cisco IOS ISSU. For more detailed information, refer to the Cisco IOS ISSU Deployment Guide.

Q. Will ISSU be supported on other Cisco IOS Software release trains? Will it be supported on Cisco IOS Software Release 12.0?

A. Cisco IOS ISSU will be supported in the Cisco IOS Software Release 12.2SB train beginning with the Cisco 10000 Series routers, 12.2 SG for the Catalyst 4500 and IOS-XE for the ASR 1000. A form of ISSU is also available in Cisco IOS XR Software and with the Cisco IOS Software Modularity for the Cisco Catalyst 6500 feature set available in Cisco IOS Software Release 12.2SX.

Q. Can I use ISSU to upgrade a Cisco 10000 Series Router from Performance Routing Engine-1 (PRE1) to Performance Routing Engine-2 (PRE2)?

A. No, the PRE1 does not run a version of Cisco IOS Software that supports ISSU. You would need to upgrade to PRE2 on the Cisco IOS Software Release 12.2S first and then subsequent upgrades would use ISSU.

Q. How long does an ISSU upgrade take?

A. It varies depending on the procedure followed and the configuration. Certain large configurations may take as much as 35 minutes to complete the entire ISSU upgrade process. The degree of network validation done by a network operator during the process is also a factor in the overall time.

Q. Is there any capability to automatically roll back to a previous Cisco IOS Software version?

- A.** Yes. It is possible to load a new Cisco IOS Software version, switch over to it, accept that version, and remain at this stage for some period of time. When at this stage, the active control plane processor (PRE, Supervisor, or RP) is running the new version of Cisco IOS Software while the standby control plane processor is still running the older Cisco IOS Software version. Any hardware or software problem encountered at this stage will result in a switchover to the standby control plane processor, effectively rolling back to the previous Cisco IOS Software version. Again, refer to the Cisco IOS ISSU Deployment Guide for more details.

Q. Where can I find more information about NSF/SSO?

- A.** Refer to the Cisco IOS Software documentation and the Cisco IOS NSF/SSO Deployment Guide on Cisco.com.

Q. Can an ISSU be performed when BGP Nonstop Routing (NSR) is being used?

- A.** Yes. Cisco IOS ISSU and BGP NSR are both available for the Cisco 10000 running Cisco IOS Software Release 12.2SB.



Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV
Amsterdam, The Netherlands

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