



## Support for ISSU and SSO

High Availability (HA) support for Flexible Netflow is introduced by providing support for both In-Service Software Upgrade (ISSU) and Stateful Switchover (SSO).

These features are enabled by default when the redundancy mode of operation is set to SSO.

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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 <https://cfng.cisco.com/>. An account on Cisco.com is not required.

## Prerequisites for Flexible Netflow High Availability

- The Cisco ISSU process must be configured and working properly. See the “Cisco In-Service Software Upgrade Process” feature module for more information.
- SSO must be configured and working properly. See the “Stateful Switchover” feature module for more information.
- Nonstop Forwarding (NSF) must be configured and working properly. See the “Cisco Nonstop Forwarding” feature module for more information.

# Information About Flexible Netflow High Availability

## ISSU

The ISSU process allows Cisco software to be updated or otherwise modified while packet forwarding continues. In most networks, planned software upgrades are a significant cause of downtime. ISSU allows Cisco software to be modified while packet forwarding continues, which increases network availability and reduces downtime caused by planned software upgrades.

## SSO

SSO refers to the implementation of Cisco software that allows applications and features to maintain a defined state between an active and standby Route Processor (RP).

In specific Cisco networking devices that support dual RPs, SSO takes advantage of RP redundancy to increase network availability. The SSO feature takes advantage of RP redundancy by establishing one of the RPs as the active RP while the other RP is designated as the standby RP, and then synchronizing critical state information between them. Following an initial synchronization between the two processors, SSO dynamically maintains RP state information between them.

A switchover from the active to the standby processor occurs when the active RP fails, is removed from the networking device, or is manually taken down for maintenance.

# How to Configure Flexible Netflow High Availability

There are no configuration tasks specific to Flexible Netflow. All generalized configuration tasks for ISSU and SSO are described in the chapters referenced in the [Prerequisites for Flexible Netflow High Availability, on page 1](#).

The Flexible Netflow high availability features are enabled by default when the redundancy mode of operation is set to SSO.

# How to Verify Flexible Netflow High Availability

## SUMMARY STEPS

1. **enable**
2. **show redundancy** [clients | counters | history | switchover history | states]
3. **show redundancy** states
4. **show sampler broker** [detail] | [picture]
5. **show flow exporter broker** [detail] | [picture]
6. **show flow record broker** [detail] | [picture]
7. **show flow monitor broker** [detail] | [picture]

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> <pre>Device&gt; enable</pre>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>show redundancy [clients   counters   history   switchover history   states]</b> <b>Example:</b> <pre>Device# show redundancy</pre>	Displays SSO configuration information.
<b>Step 3</b>	<b>show redundancy states</b> <b>Example:</b> <pre>Device# show redundancy states</pre>	Verifies that the device is running in SSO mode.
<b>Step 4</b>	<b>show sampler broker [detail]   [picture]</b> <b>Example:</b> <pre>Device# show sampler broker detail</pre>	Displays information about the state of the exporter broker for the Flexible Netflow sampler.
<b>Step 5</b>	<b>show flow exporter broker [detail]   [picture]</b> <b>Example:</b> <pre>Device# show flow exporter broker detail</pre>	Displays information about the state of the broker for the Flexible Netflow flow exporter.
<b>Step 6</b>	<b>show flow record broker [detail]   [picture]</b> <b>Example:</b> <pre>Device# show flow record broker detail</pre>	Displays information about the state of the broker for the Flexible Netflow flow record.
<b>Step 7</b>	<b>show flow monitor broker [detail]   [picture]</b> <b>Example:</b> <pre>Device# show flow monitor broker detail</pre>	Displays information about the state of the broker for the Flexible Netflow flow monitor.

## What to do next

# Configuration Examples for Flexible Netflow High Availability

There are no configuration examples for Flexible Netflow high availability features.

All examples are for displaying the status of Flexible Netflow high availability.

## Example: Displaying Detailed Status for the Sampler Broker

The following example shows the status output for the Flexible Netflow flow record broker. This output is very similar to the output for the other Flexible Netflow brokers: the sampler broker, the flow exporter broker, and the flow monitor broker.

```
Device# show flow record broker detail
Brokering for Linecard 7 (0x80)
Multicast groups :-
  0x7F801C95D000
  Linecard 7 (0x80) enabled for download
  Consume report for Linecard 7 (0x80) (pos 1)
  24/0 completed/pending updates (all VRFs)
Update list ranges from pos 1 to pos 0 :-
1 - 24 updates
0 - 0 updates
Broker records :-
* - - Start of list
1 - - Flush
1 - Mod - Create netflow-v5
1 - Mod - Create options interface-table
1 - Mod - Create options exporter-statistics
1 - Mod - Create options vrf-id-name-table
1 - Mod - Create options sampler-table
1 - Mod - Create options applications-name
1 - Mod - Create netflow-original
1 - Mod - Create netflow ipv4 original-input
```

## Example: Displaying a Status Summary for the Flow Record Broker

The following example shows a status summary output for the Flexible Netflow flow record broker. This output is very similar to the output for the other Flexible Netflow brokers: the sampler broker, the flow exporter broker, and the flow monitor broker.

```
Device# show flow record broker picture
Key:
 '['=start record, ']'=end record, 'F'=flush record, 'D'=display record
 '+<n>'=sequence of <n> Modify update records
 '-<n>'=sequence of <n> Delete update records
 'C<<lc>:<vrf>>'=consume record for linecard(s) <lc> and VRF(s) <vrf> <*=all>
Brokers:
[FC<7 <0x80>:*>]
```

## Example: Verifying Whether SSO is Configured

The following sample output shows that SSO is configured on the device:

```
Device# show redundancy states
  my state = 13 -ACTIVE
  peer state = 8 -STANDBY HOT
  Mode = Duplex
  Unit ID = 49
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

```

## Example: Displaying which SSO Protocols and Applications are Registered

The following sample output shows a list of applications and protocols that have registered as SSO protocols or applications on the device:

```

Device# show redundancy clients
clientID = 0      clientSeq = 0      RF_INTERNAL_MSG
clientID = 29     clientSeq = 60      Redundancy Mode RF
clientID = 139    clientSeq = 62      IfIndex
clientID = 25     clientSeq = 69      CHKPT RF
clientID = 1340   clientSeq = 90      ASR1000-RP Platform
clientID = 1501   clientSeq = 91      Cat6k CWAN HA
clientID = 78     clientSeq = 95      TSPTUN HA
clientID = 305    clientSeq = 96      Multicast ISSU Conso
clientID = 304    clientSeq = 97      IP multicast RF Clie
clientID = 22     clientSeq = 98      Network RF Client
clientID = 88     clientSeq = 99      HSRP
clientID = 114    clientSeq = 100     GLBP
clientID = 1341   clientSeq = 102     ASR1000 DPIDX
clientID = 1505   clientSeq = 103     Cat6k SPA TSM
clientID = 1344   clientSeq = 110     ASR1000-RP SBC RF
clientID = 227    clientSeq = 111     SBC RF
clientID = 71     clientSeq = 112     XDR RRP RF Client
clientID = 24     clientSeq = 113     CEF RRP RF Client
clientID = 146    clientSeq = 114     BFD RF Client
clientID = 306    clientSeq = 120     MFIB RRP RF Client
clientID = 1504   clientSeq = 128     Cat6k CWAN Interface
clientID = 75     clientSeq = 130     Tableid HA
clientID = 401    clientSeq = 131     NAT HA
clientID = 402    clientSeq = 132     TPM RF client
clientID = 5      clientSeq = 135     Config Sync RF clien
clientID = 68     clientSeq = 149     Virtual Template RF
clientID = 23     clientSeq = 152     Frame Relay
clientID = 49     clientSeq = 153     HDLC
clientID = 72     clientSeq = 154     LSD HA Proc
clientID = 113    clientSeq = 155     MFI STATIC HA Proc
clientID = 20     clientSeq = 171     IPROUTING NSF RF cli
clientID = 100    clientSeq = 173     DHCP
clientID = 101    clientSeq = 174     DHCPD
clientID = 74     clientSeq = 183     MPLS VPN HA Client
clientID = 34     clientSeq = 185     SNMP RF Client
clientID = 52     clientSeq = 186     ATM
clientID = 69     clientSeq = 189     AAA
clientID = 118    clientSeq = 190     L2TP
clientID = 82     clientSeq = 191     CCM RF
clientID = 35     clientSeq = 192     History RF Client
clientID = 90     clientSeq = 204     RSVP HA Services
clientID = 70     clientSeq = 215     FH COMMON RF CLIENT
clientID = 54     clientSeq = 220     SNMP HA RF Client
clientID = 73     clientSeq = 221     LDP HA
clientID = 76     clientSeq = 222     IPRM
clientID = 57     clientSeq = 223     ARP
clientID = 50     clientSeq = 230     FH_RF_Event_Detector
clientID = 1342   clientSeq = 240     ASR1000 SpaFlow
clientID = 1343   clientSeq = 241     ASR1000 IF Flow
clientID = 83     clientSeq = 255     AC RF Client
clientID = 84     clientSeq = 257     ATOM manager

```

clientID = 85	clientSeq = 258	SSM
clientID = 102	clientSeq = 273	MQC QoS
clientID = 94	clientSeq = 280	Config Verify RF cli
clientID = 135	clientSeq = 289	IKE RF Client
clientID = 136	clientSeq = 290	IPSEC RF Client
clientID = 130	clientSeq = 291	CRYPTO RSA
clientID = 148	clientSeq = 296	DHCPv6 Relay
clientID = 4000	clientSeq = 303	RF_TS_CLIENT
clientID = 4005	clientSeq = 305	ISSU Test Client
clientID = 93	clientSeq = 309	Network RF 2 Client
clientID = 205	clientSeq = 311	FEC Client
clientID = 141	clientSeq = 319	DATA_DESCRIPTOR RF C
clientID = 4006	clientSeq = 322	Network Clock
clientID = 225	clientSeq = 326	VRRP
clientID = 65000	clientSeq = 336	RF_LAST_CLIENT

## Additional References

### Related Documents

Related Topic	Document Title
In-Service Software Upgrade process conceptual and configuration information	Cisco IOS XE In Service Software Upgrade Process module
Nonstop Forwarding conceptual and configuration information	Cisco Nonstop Forwarding module
Stateful switchover conceptual and configuration information	Stateful Switchover module
White paper on performing In-Service Software Upgrades.	High-Availability Overview, Cisco IOS Software: Guide to Performing In-Service Software Upgrades
Answer to questions about the In-Service Software Upgrade product and process.	Cisco IOS In-Service Software Upgrade, Questions and Answers
Cisco IOS commands	<a href="#">Cisco IOS Master Commands List, All Releases</a>
Cisco IOS High Availability commands	<i>Cisco IOS High Availability Command Reference</i>
Cisco IOS debug commands	<i>Cisco IOS Debug Command Reference</i>
SSO - BFD	"Bidirectional Forwarding Detection" chapter in the <i>IP Routing Protocols Configuration Guide</i>
SSO HSRP	"Configuring HSRP" chapter in the <i>IP Application Services Configuration Guide</i>
SSO - MPLS VPN 6VPE and 6PE SSO support	NSF/SSO and ISSU - MPLS VPN 6VPE and 6PE
SSO and RPR on the Cisco ASR 1000 Series Routers	<i>Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide</i>

Related Topic	Document Title
SSO VRRP	"Configuring VRRP" chapter in the <i>Application Services Configuration Guide</i>
SNMP configuration tasks	"Configuring SNMP Support" module of <i>Network Management Configuration Guide</i>
SNMP commands	<i>Cisco IOS Network Management Command Reference</i>

### Standards

Standard	Title
No new or modified standards are supported by this feature.	--

### MIBs

MIB	MIBs Link
None	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

### RFCs

RFC	Title
No new or modified RFCs are supported by this feature.	--
RFC 1907	Management Information Base for Version 2 of the Simple Network Management Protocol
RFC 2571	An Architecture for Describing SNMP Management Frameworks
RFC 2573	SNMP Applications
RFC 2574	User-Based Security Model (USM) for Version 3 of the Simple Network Management Protocol (SNMPv3)
RFC 2575	View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)
RFC 2863	The Interfaces Group MIB
RFC 4133	Entity MIB (Version 3)

**Technical Assistance**

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>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.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<a href="http://www.cisco.com/techsupport">http://www.cisco.com/techsupport</a>

## Glossary

**CPE** --customer premises equipment. Terminating equipment, such as terminals, telephones, and modems, supplied by the service provider, installed at customer sites, and connected to the network.

**ISSU** --In Service Software Upgrade. ISSU is a process that allows Cisco IOS software to be updated or otherwise modified while packet forwarding continues.

**RP** --Route Processor. A generic term for the centralized control unit in a chassis.

**SSO** --Stateful Switchover. SSO refers to the implementation of Cisco IOS software that allows applications and features to maintain a defined state between an active and standby RP. When a switching occurs, forwarding and sessions are maintained. SSO makes an RP failure undetectable to the network.