# 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.



# 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.

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 |
|---|---|---|
| **Step 1** | **enable**<br>**Example:**<br>`Device> enable` | Enables privileged EXEC mode.<br>• Enter your password if prompted. |
| **Step 2** | **show redundancy** [**clients** \| **counters** \| **history** \| **switchover history** \| **states**<br>**Example:**<br>`Device# show redundancy` | Displays SSO configuration information. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 3** | **show redundancy states**<br>**Example:**<br>`Device# show redundancy states` | Verifies that the device is running in SSO mode. |
| **Step 4** | **show sampler broker** [**detail**] \| [**picture**]<br>**Example:**<br>`Device# show sampler broker detail` | Displays information about the state of the exporter broker for the Flexible Netflow sampler. |
| **Step 5** | **show flow exporter broker** [**detail**] \| [**picture**]<br>**Example:**<br>`Device# show flow exporter broker detail` | Displays information about the state of the broker for the Flexible Netflow flow exporter. |
| **Step 6** | **show flow record broker** [**detail**] \| [**picture**]<br>**Example:**<br>`Device# show flow record broker detail` | Displays information about the state of the broker for the Flexible Netflow flow record. |
| **Step 7** | **show flow monitor broker** [**detail**] \| [**picture**]<br>**Example:**<br>`Device# show flow monitor broker detail` | 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>'=sequenve of <n> Modify update records
 '-<n>'=sequenve of <n> Delete update records
 'C<<lc>:<vrf>>'=consume record for linecard(s) <lc> and VRF(s) <vrf> <*=all>
Borokers:
[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      DHCPC
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 preforming 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 | Cisco IOS Master Commands List, All Releases |
| Cisco IOS High Availability commands | *Cisco IOS High Availability Command Reference* |
| Cisco IOS debug commands | *Cisco IOS Debug Command Reference* |
| SSO - BFD | " Bidirectional Forwarding Detection " chapter in the *IP Routing Protocols Configuration Guide* |
| SSO HSRP | "Configuring HSRP" chapter in the *IP Application Services Configuration Guide* |
| 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 | *Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide* |
| SSO VRRP | "Configuring VRRP" chapter in the *Application Services Configuration Guide* |
| SNMP configuration tasks | "Configuring SNMP Support" module of *Network Management Configuration Guide* |
| SNMP commands | *Cisco IOS Network Management Command Reference* |

### 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:<br>http://www.cisco.com/go/mibs |

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

# 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.