<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding Network Processor Bundling</td>
<td>48</td>
</tr>
<tr>
<td>Configuring IOC to NPC Mapping</td>
<td>49</td>
</tr>
<tr>
<td>Understanding Flow Processing on SRX5K-SPC3 Devices</td>
<td>50</td>
</tr>
<tr>
<td>Understanding SPC3 Software Architecture</td>
<td>51</td>
</tr>
<tr>
<td>Understanding Load Distribution</td>
<td>52</td>
</tr>
<tr>
<td>Understanding NP Session and Service Offload (SOF)</td>
<td>53</td>
</tr>
<tr>
<td>Understanding J-Flow support on SPC3</td>
<td>54</td>
</tr>
<tr>
<td>Understanding Datapath Debug SPU Support (E2E)</td>
<td>54</td>
</tr>
<tr>
<td>Understanding Fragmentation Handling, ISSU, and ISHU Support</td>
<td>54</td>
</tr>
<tr>
<td>Central Point Architecture in Security Devices Overview</td>
<td>55</td>
</tr>
<tr>
<td>Understanding SRX Series Services Gateways Central Point</td>
<td>55</td>
</tr>
<tr>
<td>Architecture</td>
<td>55</td>
</tr>
<tr>
<td>Load Distribution in mixed Mode</td>
<td>57</td>
</tr>
<tr>
<td>Sharing Processing Power and Memory in mixed Mode</td>
<td>57</td>
</tr>
<tr>
<td>Understanding Enhancements to Central Point Architecture for the SRX5000 Line</td>
<td>58</td>
</tr>
<tr>
<td>Understanding Central Point Session Limit Performance Enhancements</td>
<td>59</td>
</tr>
<tr>
<td>Understanding Central Point Architecture Flow Support for GTP and SCTP</td>
<td>59</td>
</tr>
<tr>
<td>Understanding the Flow Session Connection Filter Option</td>
<td>61</td>
</tr>
<tr>
<td>Chapter 2: Flow-Based Sessions</td>
<td>63</td>
</tr>
<tr>
<td>Flow-Based Sessions</td>
<td>63</td>
</tr>
<tr>
<td>Understanding Session Characteristics for SRX Series Services Gateways</td>
<td>63</td>
</tr>
<tr>
<td>Understanding Aggressive Session Aging</td>
<td>64</td>
</tr>
<tr>
<td>Example: Controlling Session Termination for SRX Series Services Gateways</td>
<td>64</td>
</tr>
<tr>
<td>Clearing Sessions for SRX Series Services Gateways</td>
<td>66</td>
</tr>
<tr>
<td>Terminating Sessions for SRX Series Services Gateways</td>
<td>67</td>
</tr>
<tr>
<td>Terminating a Specific Session for SRX Series Services Gateways</td>
<td>67</td>
</tr>
<tr>
<td>Using Filters to Specify the Sessions to Be Terminated for SRX Series Services Gateways</td>
<td>67</td>
</tr>
<tr>
<td>Configuring the Timeout Value for Multicast Flow Sessions</td>
<td>67</td>
</tr>
<tr>
<td>TCP Sessions</td>
<td>69</td>
</tr>
<tr>
<td>Understanding TCP Session Checks per Policy</td>
<td>69</td>
</tr>
<tr>
<td>Disabling TCP Packet Security Checks</td>
<td>70</td>
</tr>
<tr>
<td>Example: Configuring TCP Packet Security Checks Per Policy</td>
<td>70</td>
</tr>
<tr>
<td>Example: Disabling TCP Packet Security Checks for SRX Series Services Gateways</td>
<td>71</td>
</tr>
<tr>
<td>Example: Setting the Maximum Segment Size for All TCP Sessions for SRX Series Services Gateways</td>
<td>71</td>
</tr>
<tr>
<td>TCP Out-of-State Packet Drop Logging Overview</td>
<td>74</td>
</tr>
<tr>
<td>Understanding TCP Out-of-State Packet Drop Logging</td>
<td>75</td>
</tr>
<tr>
<td>Supported TCP Out-of-State Logging Features</td>
<td>76</td>
</tr>
<tr>
<td>Understanding How Preserving Incoming Fragmentation Characteristics Can Improve Throughput</td>
<td>77</td>
</tr>
</tbody>
</table>
Flow-Based and Packet-Based Processing Feature Guide for Security Devices

Chapter 3 Flow-Based Processing for IPv6 ........................................... 143
IPv6 Flow-Based Processing ......................................................... 143
IPv6 Advanced Flow ................................................................. 143
Understanding Sessions for IPv6 Flow ....................................... 145
Understanding IPv6 Flow Processing on SRX5400, SRX5600, and SRX5800
  devices ................................................................. 145
Enabling Flow-Based Processing for IPv6 Traffic ......................... 147
Flow-Based Processing for IPv6 Traffic on Security Devices .......... 149
Using Filters to Display IPv6 Session and Flow Information for SRX Series
  Services Gateways ........................................................... 150
IPv6 Packets Header Overview .................................................. 156
The IPv6 Packet Header and SRX Series Overview ...................... 156
Understanding IPv6 Packet Header Extensions .......................... 156
Understanding How SRX Series Devices Handle ICMPv6 Packets .... 157

Chapter 4 Monitoring Flow-Based Sessions and Establishing Parameters for Error
  Handling .................................................................................. 161
Monitoring Security Flow Sessions ............................................. 161
Monitoring Security Flow Sessions Overview ............................. 161
Understanding How to Obtain Session Information for SRX Series
  Services Gateways ................................................................. 162
Displaying Global Session Parameters for All SRX Series Services
  Gateways .............................................................................. 164
Displaying a Summary of Sessions for SRX Series Services Gateways . 164
Displaying Session and Flow Information About Sessions for SRX Series
  Services Gateways ................................................................. 165
Displaying Session and Flow Information About a Specific Session for SRX
  Series Services Gateways ........................................................ 165
Example: Configuring SRX5K-MPC3-100G10G (IOC3) and SRX5K-MPC3-40G10G (IOC3) on an SRX5000 Line Device to Support Express Path ........................................ 236
Example: Configuring Express Path on an SRX5000 Line Device with IOC3 ........................................ 239
Example: Configuring Low Latency ........................................ 243
Managing Packet Fragmentation in IPsec VPN Networks .............. 245
Fragmentation Counters Feature Overview ............................... 246
Understanding Fragmentation and MTU and MSS Sizes ................ 246
Using Fragmentation Counter Statistics to Tune Your System .......... 247

Chapter 6 Configuration Statements ........................................ 249

- aging ........................................ 251
- all-tcp ....................................... 252
- allow-dns-reply .................................. 252
- allow-embedded-icmp ................................ 253
- allow-reverse-ecmp ................................ 254
- application-services (Security Forwarding Process) ............... 255
- apply-to-half-close-state ................................ 256
- destination-header .................................. 257
- destination-port (Security Forwarding Options) ..................... 258
- destination-prefix (Security Forwarding Options) .................. 262
- early-ageout ....................................... 262
- error ............................................. 263
- fin-invalidate-session ................................ 266
- flow (Security Flow) ................................... 268
- force-ip-reassembly .................................. 272
- forwarding-process ................................... 273
- fpc error .......................................... 275
- fru-poweron-sequence ................................ 277
- gre-in ............................................. 278
- gre-out ............................................ 279
- high-watermark ...................................... 280
- hop-by-hop-header .................................... 281
- ipv4-template (Services) ................................ 285
- ipv6-extension-header .................................. 286
- ipv6-extension-header-limit ................................ 287
- ipv6-malformed-header .................................. 288
- ipv6-template (Services) ................................ 288
- low-latency .......................................... 289
- low-watermark ........................................ 290
- maximize-idp-sessions .................................. 291
- mirror-filter (Security Forwarding Options) ....................... 292
- mode (Security Forwarding Options) ............................... 294
Chapter 7 Operational Commands ..........................................333

no-sequence-check ............................................. 295
np-cache (Flexible PIC Concentrator) .......................... 296
output (Security Forwarding Options) .......................... 297
packet-filter .................................................. 298
packet-log (Security Flow) ..................................... 299
packet-ordering-mode (Application Services) .................. 300
pending-sess-queue-length ..................................... 301
per-session-statistics .......................................... 301
pre-id-default-policy ......................................... 302
preserve-incoming-fragment-size .............................. 304
propagate-settings ........................................... 305
protocol (Security Forwarding Options) ......................... 306
resource-manager ............................................. 307
reverse-route-packet-mode-vr ................................ 307
route-change-timeout ......................................... 308
rst-invalidate-session ........................................ 309
rst-sequence-check .......................................... 310
sampling ......................................................... 311
services-offload .............................................. 312
session (System Services) ...................................... 313
session-limit (System Services) ............................... 314
source-port (Security Forwarding Options) ...................... 315
source-prefix (Security Forwarding Options) .................... 319
syn-flood-protection-mode ..................................... 319
tcp-initial-timeout .......................................... 320
tcp-mss (Security Flow) ........................................ 321
tcp-session .................................................... 322
time-wait-state .............................................. 323
traceoptions (Security) ........................................ 324
traceoptions (Security Flow) ................................... 326
transport (Security Log) ....................................... 330
weight (Security) ............................................. 331

clear firewall .................................................. 336
clear monitor security flow filter ................................ 337
clear security flow ip-action ..................................... 338
clear security flow session all ................................... 340
clear security flow session application ......................... 342
clear security flow session application-traffic-control ........ 344
clear security flow session conn-tag ........................... 346
clear security flow session destination-port ..................... 347
clear security flow session destination-prefix ................. 349

clear security flow session family ................................ 351
clear security flow session IDP .................................. 352
clear security flow session interface .......................... 354
clear security flow ip-action .................................... 356
clear security flow session nat .................................. 358
clear security flow session protocol ......................... 361
<table>
<thead>
<tr>
<th>Command</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>show security flow session resource-manager</td>
<td>550</td>
</tr>
<tr>
<td>show security flow session services-offload</td>
<td>554</td>
</tr>
<tr>
<td>show security flow session session-identifier</td>
<td>559</td>
</tr>
<tr>
<td>show security flow session source-port</td>
<td>563</td>
</tr>
<tr>
<td>show security flow session source-prefix</td>
<td>567</td>
</tr>
<tr>
<td>show security flow session summary family</td>
<td>571</td>
</tr>
<tr>
<td>show security flow session summary node</td>
<td>573</td>
</tr>
<tr>
<td>show security flow session summary services-offload</td>
<td>579</td>
</tr>
<tr>
<td>show security flow session tunnel</td>
<td>583</td>
</tr>
<tr>
<td>show security flow statistics</td>
<td>592</td>
</tr>
<tr>
<td>show security flow status</td>
<td>596</td>
</tr>
<tr>
<td>show security forwarding-options mirror-filter</td>
<td>599</td>
</tr>
<tr>
<td>show security monitoring</td>
<td>602</td>
</tr>
<tr>
<td>show security policies</td>
<td>604</td>
</tr>
<tr>
<td>show security policies hit-count</td>
<td>617</td>
</tr>
<tr>
<td>show security resource-manager group active</td>
<td>620</td>
</tr>
<tr>
<td>show security resource-manager resource active</td>
<td>623</td>
</tr>
<tr>
<td>show security resource-manager settings</td>
<td>626</td>
</tr>
<tr>
<td>show security resource-manager summary</td>
<td>628</td>
</tr>
<tr>
<td>show security screen ids-option</td>
<td>629</td>
</tr>
<tr>
<td>show security screen statistics</td>
<td>635</td>
</tr>
<tr>
<td>show security softwires</td>
<td>646</td>
</tr>
<tr>
<td>show security zones</td>
<td>647</td>
</tr>
<tr>
<td>show security zones type</td>
<td>654</td>
</tr>
<tr>
<td>Chapter 1</td>
<td>Overview</td>
</tr>
<tr>
<td>-----------</td>
<td>----------</td>
</tr>
<tr>
<td>Figure 1: Traffic Flow for Flow-Based Processing</td>
<td>26</td>
</tr>
<tr>
<td>Figure 2: Deploying the SRX4600 Services Gateway at the Data Center Edge</td>
<td>36</td>
</tr>
<tr>
<td>Figure 3: Deploying the SRX4600 Services Gateway at the Data Center Core</td>
<td>37</td>
</tr>
<tr>
<td>Figure 4: First-Packet Processing</td>
<td>40</td>
</tr>
<tr>
<td>Figure 5: Fast-Path Processing</td>
<td>40</td>
</tr>
<tr>
<td>Figure 6: Session Creation: First-Packet Processing</td>
<td>45</td>
</tr>
<tr>
<td>Figure 7: Packet Walk for Fast-Path Processing</td>
<td>47</td>
</tr>
<tr>
<td>Figure 8: Packet flow on SPC3</td>
<td>51</td>
</tr>
<tr>
<td>Figure 9: Packet flow through flowd thread</td>
<td>52</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 2</th>
<th>Flow-Based Sessions</th>
<th>63</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 10: ECMP Routes</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td>Figure 11: Multiple L3VPNs</td>
<td>107</td>
<td></td>
</tr>
<tr>
<td>Figure 12:</td>
<td>107</td>
<td></td>
</tr>
<tr>
<td>Figure 13: VRF Movement within VRF Group</td>
<td>109</td>
<td></td>
</tr>
<tr>
<td>Figure 14: Traffic from Private Network to MPLS</td>
<td>114</td>
<td></td>
</tr>
<tr>
<td>Figure 15: Traffic Permit from MPLS to Private Network</td>
<td>118</td>
<td></td>
</tr>
<tr>
<td>Figure 16: Traffic Permit from Public Network to MPLS</td>
<td>121</td>
<td></td>
</tr>
<tr>
<td>Figure 17: Traffic Permit from MPLS to Public Network</td>
<td>127</td>
<td></td>
</tr>
<tr>
<td>Figure 18: Traffic between MPLS Networks</td>
<td>132</td>
<td></td>
</tr>
<tr>
<td>Figure 19: Traffic Permit between MPLS Networks with NAT</td>
<td>136</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 4</th>
<th>Monitoring Flow-Based Sessions and Establishing Parameters for Error Handling</th>
<th>161</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 20: SRX Series Device in an LTE Mobile Network</td>
<td>174</td>
<td></td>
</tr>
<tr>
<td>Figure 21: Monitoring X2 Traffic</td>
<td>175</td>
<td></td>
</tr>
<tr>
<td>Figure 22: Configuring Mirror Filters for X2 Traffic Monitoring</td>
<td>178</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 5</th>
<th>Packet Based Forwarding</th>
<th>181</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 23: Traffic Flow for Packet-Based Forwarding</td>
<td>182</td>
<td></td>
</tr>
<tr>
<td>Figure 24: Traffic Flow with Selective Stateless Packet-Based Services</td>
<td>183</td>
<td></td>
</tr>
<tr>
<td>Figure 25: Intranet Traffic Using End-to-End Packet-Based Services</td>
<td>187</td>
<td></td>
</tr>
<tr>
<td>Figure 26: Selective Stateless Packet-Based Services for Packet-Based Forwarding</td>
<td>198</td>
<td></td>
</tr>
<tr>
<td>Figure 27: Reverse Route Disabled</td>
<td>212</td>
<td></td>
</tr>
<tr>
<td>Figure 28: Reverse Route Enabled with Interface</td>
<td>212</td>
<td></td>
</tr>
<tr>
<td>Figure 29: Reverse Route Enabled with FBF</td>
<td>212</td>
<td></td>
</tr>
<tr>
<td>Figure 30: To-host Traffic on VR</td>
<td>213</td>
<td></td>
</tr>
<tr>
<td>Figure 31: IOC3 Intra-PFE Express Path</td>
<td>225</td>
<td></td>
</tr>
<tr>
<td>Figure 32: IOC3 Inter-PFE Express Path</td>
<td>226</td>
<td></td>
</tr>
<tr>
<td>Figure 33: Inter-IOC3 Express Path</td>
<td>226</td>
<td></td>
</tr>
</tbody>
</table>
List of Tables

About the Documentation ................................................. xix
Table 1: Notice Icons .......................................................... xxi
Table 2: Text and Syntax Conventions .................................... xxii

Chapter 1 Overview .......................................................... 25
Table 3: IOC to NPC Connectivity Options ............................... 49
Table 4: Load Distribution - Hash Methods .............................. 52
Table 5: Central Point Implementation on SRX Series Devices in Conjunction With Junos OS Releases .................................. 56
Table 6: mixed Mode Processing ............................................ 57

Chapter 2 Flow-Based Sessions ........................................... 63
Table 7: How the Final Egress MTU Size for Fragments Exiting the SRX Series Device Is Determined ...................................... 78
Table 8: Maximum Central Point Session Increases .................... 88

Chapter 3 Flow-Based Processing for IPv6 .................................. 143
Table 9: Device Status Upon Configuration Change ..................... 148
Table 10: IPv6 Extension Headers ........................................... 157
Table 11: ICMPv6 Packets That Junos OS Handles Differently from Other ICMPv6 Packets ........................................ 158

Chapter 4 Monitoring Flow-Based Sessions and Establishing Parameters for Error Handling ........................................ 161
Table 12: Session Create Log Fields ........................................ 166
Table 13: Session Close Log Fields .......................................... 167
Table 14: Session Deny Log Fields .......................................... 169
Table 15: X2 Traffic Terminology ........................................... 176

Chapter 5 Packet Based Forwarding ....................................... 181
Table 16: Session Cache Installation Bars ................................. 209
Table 17: Session Cache Table Utilization Bits Status .................. 210
Table 18: Express Path Support on SRX Series Device Cards ........ 216
Table 19: Total Number of Sessions per Wing in Network Processor Express Path Configuration Mode ................................. 218

Chapter 6 Configuration Statements ....................................... 249
Table 20: Ports Supported by Services Interfaces ........................ 259
Table 21: Value Ranges for Error Levels .................................... 264
Table 22: Terminating a Session with a 4-Way Handshake ............. 267
Table 23: Device Status Upon Configuration Change ................... 295
Table 24: Ports Supported by Services Interfaces ......................... 316
Table 25: Session Capacity and Resulting Throughput ................... 331

Copyright © 2019, Juniper Networks, Inc.
Table 74: show security flow session summary services-offload Output Fields .......................................................... 580
Table 75: show security flow session tunnel Output Fields .......................................................... 583
Table 76: show security flow statistics Output Fields .......................................................... 593
Table 77: show security flow status Output Fields .......................................................... 597
Table 78: show security forward-options mirror-filter .......................................................... 600
Table 79: show security policies Output Fields .......................................................... 606
Table 80: show security policies hit-count Output Fields .......................................................... 618
Table 81: show security resource-manager group Output Fields .......................................................... 620
Table 82: show security resource-manager resource Output Fields .......................................................... 623
Table 83: show security resource-manager settings Output Fields .......................................................... 626
Table 84: show security resource-manager summary Output Fields .......................................................... 628
Table 85: show security screen ids-option Output Fields .......................................................... 629
Table 86: show security screen statistics Output Fields .......................................................... 636
Table 87: show security zones Output Fields .......................................................... 648
Table 88: show security zones type Output Fields .......................................................... 654
About the Documentation

- Documentation and Release Notes on page xix
- Using the Examples in This Manual on page xix
- Documentation Conventions on page xxi
- Documentation Feedback on page xxiii
- Requesting Technical Support on page xxiii

Documentation and Release Notes

To obtain the most current version of all Juniper Networks® technical documentation, see the product documentation page on the Juniper Networks website at https://www.juniper.net/documentation/.

If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.

Juniper Networks Books publishes books by Juniper Networks engineers and subject matter experts. These books go beyond the technical documentation to explore the nuances of network architecture, deployment, and administration. The current list can be viewed at https://www.juniper.net/books.

Using the Examples in This Manual

If you want to use the examples in this manual, you can use the load merge or the load merge relative command. These commands cause the software to merge the incoming configuration into the current candidate configuration. The example does not become active until you commit the candidate configuration.

If the example configuration contains the top level of the hierarchy (or multiple hierarchies), the example is a full example. In this case, use the load merge command.

If the example configuration does not start at the top level of the hierarchy, the example is a snippet. In this case, use the load merge relative command. These procedures are described in the following sections.
Merging a Full Example

To merge a full example, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration example into a text file, save the file with a name, and copy the file to a directory on your routing platform.

   For example, copy the following configuration to a file and name the file `ex-script.conf`. Copy the `ex-script.conf` file to the `/var/tmp` directory on your routing platform.

   ```
   system {
     scripts {
       commit {
         file ex-script.xsl;
       }
     }
   }
   interfaces {
     fxp0 {
       disable;
       unit 0 {
         family inet {
           address 10.0.0.1/24;
         }
       }
     }
   }
   ```

2. Merge the contents of the file into your routing platform configuration by issuing the `load merge` configuration mode command:

   ```
   [edit]
   user@host# load merge /var/tmp/ex-script.conf
   load complete
   ```

Merging a Snippet

To merge a snippet, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration snippet into a text file, save the file with a name, and copy the file to a directory on your routing platform.

   For example, copy the following snippet to a file and name the file `ex-script-snippet.conf`. Copy the `ex-script-snippet.conf` file to the `/var/tmp` directory on your routing platform.

   ```
   commit {
     file ex-script-snippet.xsl;
   }
   ```
2. Move to the hierarchy level that is relevant for this snippet by issuing the following configuration mode command:

```plaintext
[edit]
user@host# edit system scripts
[edit system scripts]
```

3. Merge the contents of the file into your routing platform configuration by issuing the `load merge relative` configuration mode command:

```plaintext
[edit system scripts]
user@host# load merge relative /var/tmp/ex-script-snippet.conf
load complete
```

For more information about the `load` command, see CLI Explorer.

### Documentation Conventions

*Table 1 on page xxii* defines notice icons used in this guide.

**Table 1: Notice Icons**

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>📘</td>
<td>Informational note</td>
<td>Indicates important features or instructions.</td>
</tr>
<tr>
<td>⚠️</td>
<td>Caution</td>
<td>Indicates a situation that might result in loss of data or hardware damage.</td>
</tr>
<tr>
<td>⚠️</td>
<td>Warning</td>
<td>Alerts you to the risk of personal injury or death.</td>
</tr>
<tr>
<td>⚠️</td>
<td>Laser warning</td>
<td>Alerts you to the risk of personal injury from a laser.</td>
</tr>
<tr>
<td>💡</td>
<td>Tip</td>
<td>Indicates helpful information.</td>
</tr>
<tr>
<td>知らない</td>
<td>Best practice</td>
<td>Alerts you to a recommended use or implementation.</td>
</tr>
</tbody>
</table>

*Table 2 on page xxii* defines the text and syntax conventions used in this guide.
### Table 2: Text and Syntax Conventions

<table>
<thead>
<tr>
<th>Convention</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bold text like this</strong></td>
<td>Represents text that you type.</td>
<td>To enter configuration mode, type the <code>configure</code> command:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>user@host&gt; configure</td>
</tr>
<tr>
<td>Fixed-width text like this</td>
<td>Represents output that appears on the terminal screen.</td>
<td>user@host&gt; show chassis alarms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No alarms currently active</td>
</tr>
<tr>
<td><strong>Italic text like this</strong></td>
<td>• Introduces or emphasizes important new terms.</td>
<td>• A policy term is a named structure that defines conditions and actions.</td>
</tr>
<tr>
<td></td>
<td>• Identifies guide names.</td>
<td>• Junos OS CLI User Guide</td>
</tr>
<tr>
<td></td>
<td>• Identifies RFC and internet draft titles.</td>
<td>• RFC 1997, BGP Communities Attribute</td>
</tr>
<tr>
<td><strong>Italic text like this</strong></td>
<td>Represents variables (options for which you substitute a value) in commands</td>
<td>Configure the machine’s domain name:</td>
</tr>
<tr>
<td></td>
<td>or configuration statements.</td>
<td>[edit]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>root@# set system domain-name domain-name</td>
</tr>
<tr>
<td><strong>Text like this</strong></td>
<td>Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.</td>
<td>To configure a stub area, include the stub statement at the <code>[edit protocols ospf area area-id]</code> hierarchy level.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The console port is labeled CONSOLE.</td>
</tr>
<tr>
<td><code>&lt; &gt;</code> (angle brackets)</td>
<td>Encloses optional keywords or variables.</td>
<td>stub &lt;default-metric metric&gt;;</td>
</tr>
<tr>
<td></td>
<td>(pipe symbol)</td>
<td>Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.</td>
</tr>
<tr>
<td></td>
<td>(string1</td>
<td>string2</td>
</tr>
<tr>
<td></td>
<td>(pound sign)</td>
<td>Indicates a comment specified on the same line as the configuration statement to which it applies.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ ] (square brackets)</td>
<td>Encloses a variable for which you can substitute one or more values.</td>
<td>community name name members [</td>
</tr>
<tr>
<td></td>
<td></td>
<td>community-ids ]</td>
</tr>
<tr>
<td>Indentation and braces ( {} )</td>
<td>Identifies a level in the configuration hierarchy.</td>
<td>[edit] routing-options {</td>
</tr>
<tr>
<td></td>
<td></td>
<td>static {</td>
</tr>
<tr>
<td></td>
<td></td>
<td>route default {</td>
</tr>
<tr>
<td>: (semicolon)</td>
<td>Identifies a leaf statement at a configuration hierarchy level.</td>
<td>nexthop address;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>retain;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>}</td>
</tr>
<tr>
<td></td>
<td></td>
<td>}</td>
</tr>
</tbody>
</table>

**GUI Conventions**
Table 2: Text and Syntax Conventions (continued)

<table>
<thead>
<tr>
<th>Convention</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bold text like this</strong></td>
<td>Represents graphical user interface (GUI) items you click or select.</td>
<td>• In the Logical Interfaces box, select All Interfaces.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• To cancel the configuration, click Cancel.</td>
</tr>
<tr>
<td>&gt; (bold right angle bracket)</td>
<td>Separates levels in a hierarchy of menu selections.</td>
<td>In the configuration editor hierarchy, select Protocols &gt; Ospf.</td>
</tr>
</tbody>
</table>

Documentation Feedback

We encourage you to provide feedback so that we can improve our documentation. You can use either of the following methods:

- Online feedback system—Click TechLibrary Feedback, on the lower right of any page on the Juniper Networks TechLibrary site, and do one of the following:

  - Click the thumbs-up icon if the information on the page was helpful to you.
  - Click the thumbs-down icon if the information on the page was not helpful to you or if you have suggestions for improvement, and use the pop-up form to provide feedback.
  - E-mail—Send your comments to techpubs-comments@juniper.net. Include the document or topic name, URL or page number, and software version (if applicable).

Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active Juniper Care or Partner Support Services support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.


- Product warranties—For product warranty information, visit https://www.juniper.net/support/warranty/.

- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.
Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: https://www.juniper.net/customers/support/
- Search for known bugs: https://prsearch.juniper.net/
- Find product documentation: https://www.juniper.net/documentation/
- Find solutions and answer questions using our Knowledge Base: https://kb.juniper.net/
- Download the latest versions of software and review release notes: https://www.juniper.net/customers/csc/software/
- Search technical bulletins for relevant hardware and software notifications: https://kb.juniper.net/InfoCenter/
- Join and participate in the Juniper Networks Community Forum: https://www.juniper.net/company/communities/
- Create a service request online: https://myjuniper.juniper.net

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: https://entitlementsearch.juniper.net/entitlementsearch/

Creating a Service Request with JTAC

You can create a service request with JTAC on the Web or by telephone.

- Visit https://myjuniper.juniper.net.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see https://support.juniper.net/support/requesting-support/.
CHAPTER 1

Overview

- Traffic Processing on SRX Series Devices Overview on page 25
- Central Point Architecture in Security Devices Overview on page 55

Traffic Processing on SRX Series Devices Overview

Junos OS for security devices integrates network security and routing capabilities of Juniper Networks. Packets that enter and exit a device undergo both packet-based and flow-based processing.

- Understanding Traffic Processing on Security Devices on page 25
- Understanding the Default Processing Behavior for IPv4 Traffic on page 29
- Understanding Traffic Processing on SRX210 and SRX320 Devices on page 29
- Understanding Traffic Processing on SRX3000 Line and SRX1400 Devices on page 31
- Understanding Traffic Processing on SRX4600 Devices on page 35
- Understanding Traffic Processing on SRX5000 Line Devices on page 38
- Configuring IOC to NPC Mapping on page 49
- Understanding Flow Processing on SRX5K-SPC3 Devices on page 50

Understanding Traffic Processing on Security Devices

Junos OS for security devices integrates the world-class network security and routing capabilities of Juniper Networks. Junos OS includes a wide range of packet-based filtering, class-of-service (CoS) classifiers, and traffic-shaping features as well as a rich, extensive set of flow-based security features including policies, screens, network address translation (NAT), and other flow-based services.

Traffic that enters and exits a security device is processed according to features you configure, such as packet filters, security policies, and screens. For example, the software can determine:

- Whether the packet is allowed into the device
- Which firewall screens to apply to the packet
- The route the packet takes to reach its destination
- Which CoS to apply to the packet, if any
• Whether to apply NAT to translate the packet's IP address
• Whether the packet requires an Application Layer Gateway (ALG)

Packets that enter and exit a device undergo both packet-based and flow-based processing:

• Flow-based packet processing treats related packets, or a stream of packets, in the same way. Packet treatment depends on characteristics that were established for the first packet of the packet stream, which is referred to as a flow.

For the distributed processing architecture of the services gateway, all flow-based processing occurs on the SPU and sampling is multi-thread aware. Packet sequencing is maintained for the sampled packets.

• Packet-based, or stateless, packet processing treats packets discretely. Each packet is assessed individually for treatment.

For the distributed processing architecture of the services gateway, some packet-based processing, such as traffic shaping, occurs on the NPU. Some packet-based processing, such as application of classifiers to a packet, occurs on the SPU.

This topic includes the following sections:

• Understanding Flow-Based Processing on page 26
• Understanding Packet-Based Processing on page 27

Understanding Flow-Based Processing

A packet undergoes flow-based processing after packet-based filters and some screens have been applied to it. All flow-based processing for a single flow occurs on a single Services Processing Unit (SPU). An SPU processes the packets of a flow according to the security features and other services configured for the session.

Figure 1 on page 26 shows a conceptual view of how flow-based traffic processing occurs on services gateway.

Figure 1: Traffic Flow for Flow-Based Processing

A flow is a stream of related packets that meet the same matching criteria and share the same characteristics. Junos OS treats packets belonging to the same flow in the same manner.
Configuration settings that determine the fate of a packet—such as the security policy that applies to it, if it requires an Application Layer Gateway (ALG), if NAT is applied to translate the packet’s source and/or destination IP address—are assessed for the first packet of a flow.

To determine if a flow exists for a packet, the NPU attempts to match the packet’s information to that of an existing session based on the following match criteria:

- Source address
- Destination address
- Source port
- Destination port
- Protocol
- Unique session token number for a given zone and virtual router

**Zones and Policies**

The security policy to be used for the first packet of a flow is cached in a flow table for use with the same flow and closely related flows. Security policies are associated with zones. A zone is a collection of interfaces that define a security boundary. A packet’s incoming zone, as determined by the interface through which it arrived, and its outgoing zone, as determined by the forwarding lookup, together determine which policy is used for packets of the flow.

**Flows and Sessions**

Flow-based packet processing, which is stateful, requires the creation of sessions. A session is created for the first packet of a flow for the following purposes:

- To store most of the security measures to be applied to the packets of the flow.
- To cache information about the state of the flow.
  
  For example, logging and counting information for a flow is cached in its session. (Some stateful firewall screens rely on threshold values that pertain to individual sessions or across all sessions.)

- To allocate required resources for the flow for features such as NAT.

- To provide a framework for features such as ALGs and firewall features.

Most packet processing occurs in the context of a flow, including:

- Management of policies, NAT, zones, and most screens.
- Management of ALGs and authentication.

**Understanding Packet-Based Processing**

A packet undergoes packet-based processing when it is removed from the queue on its input interface and before it is added to the queue on its output interface.
Packet-based processing applies stateless firewall filters, CoS features, and some screens to discrete packets.

- When a packet arrives at an interface, sanity checks, packet-based filters, some CoS features, and some screens are applied to it.
- Before a packet leaves the device, any packet-based filters, some CoS features, and some screens associated with the interface are applied to the packet.

Filters and CoS features are typically associated with one or more interfaces to influence which packets are allowed to transit the system and to apply special actions to packets as necessary.

The following topics describe the kinds of packet-based features that you can configure and apply to transit traffic.

**Stateless Firewall Filters**

Also referred to as access control lists (ACLs), stateless firewall filters control access and limit traffic rates. They statically evaluate the contents of packets transiting the device from a source to a destination, or packets originating from or destined for the Routing Engine. A stateless firewall filter evaluates every packet, including fragmented packets.

You can apply a stateless firewall filter to an input or output interface, or to both. A filter contains one or more terms, and each term consists of two components—match conditions and actions. By default, a packet that does not match a firewall filter is discarded.

You can plan and design stateless firewall filters to be used for various purposes—for example, to limit traffic to certain protocols, IP source or destination addresses, or data rates. Stateless firewall filters are executed on the NPU.

**Class-of-Service Features**

CoS features allow you to classify and shape traffic. CoS features are executed on the NPU.

- Behavior aggregate (BA) classifiers—These classifiers operate on packets as they enter the device. Using behavior aggregate classifiers, the device aggregates different types of traffic into a single forwarding class to receive the same forwarding treatment. BA classifiers allow you to set the forwarding class and loss priority of a packet based on the Differentiated Service (DiffServ) value.
- Traffic shaping—You can shape traffic by assigning service levels with different delay, jitter, and packet loss characteristics to particular applications served by specific traffic flows. Traffic shaping is especially useful for real-time applications, such as voice and video transmission.

**Screens**

Some screens, such as denial-of-service (DoS) screens, are applied to a packet outside the flow process. They are executed on the Network Processing Unit (NPU).
Understanding the Default Processing Behavior for IPv4 Traffic

Flow-based processing mode is required for security features such as zones, screens, and firewall policies to function. By default, the SRX Series device is enabled for flow-based forwarding for IPv4 traffic on all devices, apart from the SRX300 Series and SRX550M devices that are set to drop mode. Starting with Junos OS Release 15.1X49-D70 and Junos OS Release 17.3R1, for the SRX1500 series, SRX4100, SRX4200, SRX5400, SRX5600, SRX5800 and vSRX devices, you do not need to reboot the device when you are switching modes between flow mode, packet mode, and drop mode. For SRX300 Series and SRX550M devices, you must reboot the device when switching between flow mode, packet mode, and drop mode.

SRX300 Series and SRX550M

For the SRX300 Series and the SRX550M devices, the default processing mode is set to drop mode because of memory constraints. In this case, you must reboot the device after changing the processing mode from the drop mode default to flow-based processing mode or packet-based processing mode—that is, between modes on these devices.

NOTE: For drop mode processing, the traffic is dropped directly, it is not forwarded. It differs from packet-mode processing for which the traffic is handled but no security processes are applied.

Configuring an SRX Series Device as a Border Router

When an SRX Series device of any type is enabled for flow-based processing or drop mode, to configure the device as a border router you must change the mode to packet-based processing for MPLS. In this case, to configure the SRX device to packet mode for MPLS, use the set security forwarding-options family mpls mode packet-based statement.

NOTE: As mentioned previously, for SRX300 Series and the SRX550M devices, whenever you change processing modes, you must reboot the device.

Understanding Traffic Processing on SRX210 and SRX320 Devices

This topic describes the process that the SRX210 and SRX320 Services Gateways undertake in establishing a session for packets belonging to a flow that transits the device. The flow services of the SRX210 and SRX320 devices are single-threaded and non-distributed. Although they differ from the other SRX Series devices in this respect, the same flow model is followed and the same command line interface (CLI) is implemented.
To illustrate session establishment and the packet “walk” including the points at which services are applied to the packets of a flow, the example described in the following sections uses the simple case of a unicast session:

- Understanding Flow Processing and Session Management on page 30
- Understanding First-Packet Processing on page 30
- Understanding Session Creation on page 30
- Understanding Fast-Path Processing on page 31

**Understanding Flow Processing and Session Management**

This topic explains how a session is set up to process the packets composing a flow. In the following topic, the SPU refers to the data plane thread of the SRX210 or SRX320 Services Gateway.

At the outset, the data plane thread fetches the packet and performs basic sanity checks on it. Then it processes the packet for stateless filters and CoS classifiers and applies some screens.

**Understanding First-Packet Processing**

To determine if a packet belongs to an existing flow, the device attempts to match the packet’s information to that of an existing session based on the following six match criteria:

- Source address
- Destination address
- Source port
- Destination port
- Protocol
- Unique token from a given zone and virtual router

The SPU checks its session table for an existing session for the packet. If no existent session is found, the SPU sets up a session for the flow. If a session match is found, the session has already been created, so the SPU performs fast-path processing on the packet.

**Understanding Session Creation**

In setting up the session, the SPU executes the following services for the packet:

- Screens
- Route lookup
- Policy lookup
- Service lookup
- NAT, if required
After a session is set up, it is used for all packets belonging to the flow. Packets of a flow are processed according to the parameters of its session. For the remainder of the steps entailed in packet processing, proceed to Step 1 in “Fast-Path Processing”. All packets undergo fast-path processing.

**Understanding Fast-Path Processing**

If a packet matches a session, Junos OS performs fast-path processing as described in the following steps. After a session has been set up for the first packet in a flow, also undergoes fast-path processing. All packets undergo fast-path processing.

1. The SPU applies flow-based security features to the packet.
   - Configured screens are applied.
   - TCP checks are performed.
   - Flow services, such as NAT, ALG, and IPsec are applied, if required.
2. The SPU prepares the packet for forwarding and transmits it.
   - Routing packet filters are applied.
   - Traffic shaping is applied.
   - Traffic prioritizing is applied.
   - Traffic scheduling is applied.
   - The packet is transmitted.

**Understanding Traffic Processing on SRX3000 Line and SRX1400 Devices**

Junos OS for the SRX1400, SRX3400 and SRX3600 Services Gateways integrates the world-class network security and routing capabilities of Juniper networks. Junos OS for these service gateways includes the wide range of security services including policies, screens, network address translation, class-of-service classifiers, and the rich, extensive set of flow-based services that are also supported on the other devices in the services gateways.

The distributed parallel processing architecture of the SRX1400, SRX3400 and SRX3600 devices includes multiple processors to manage sessions and run security and other services processing. This architecture provides greater flexibility and allows for high throughput and fast performance.

The following sections describe the processing architecture using SRX3400 and SRX3600 devices as an example:

This topic includes the following information:

- Components Involved in Setting Up a Session on page 32
- Understanding the Data Path for Unicast Sessions on page 32
- Session Lookup and Packet Match Criteria on page 33
Components Involved in Setting Up a Session

Here is an overview of the main components involved in setting up a session for a packet and processing the packets as they transit the SRX3400 and SRX3600 devices:

- **Services Processing Units (SPUs)**—The main processors of the SRX3400 and SRX3600 devices reside on Services Processing Cards (SPCs). They establish and manage traffic flows and perform most of the packet processing on a packet as it transits the device. Each SPU maintains a hash table for fast session lookup. The SPU performs all flow-based processing for a packet, including application of security services, classifiers, and traffic shapers. All packets that belong to the same flow are processed by the same SPU.

  The SPU maintains a session table with entries for all sessions that it established and whose packets it processes. When an SPU receives a packet from an NPU, it checks its session table to ensure that the packet belongs to it.

  For SRX3400 and SRX3600 devices, one SPU acts in concert performing its regular session management and flow processing functions and acting as a central point in which it arbitrates sessions and allocates resources. When an SPU performs in this manner it is said to be in combo mode.

- **Central Point**—The central point is used to allocate session management to SPUs based on load balancing criteria. It distributes sessions in an intelligent way to avoid occurrences in which multiple SPUs might wrongly handle the same flow. The central point follows load balancing criteria in allocating sessions to SPUs. If the session exists, the central point forwards packets for that flow to the SPU hosting it. It also redirects packets to the correct SPU in the event that the NPU fails to do so.

  For the SRX3400 and SRX3600 devices, one SPU always runs in what is referred to as combo mode in which it implements both the functionality of the central point and the flow and session management functionality. In combo mode, the SPU and the central point share the same load-balancing thread (LBT) and packet-ordering thread (POT) infrastructure.

- **Routing Engine (RE)**—The Routing Engine runs the control plane and manages the Control Plane Processor (CPP).

Understanding the Data Path for Unicast Sessions

Junos OS for the SRX3400 and SRX3600 Services Gateways is a distributed parallel processing high throughput and high performance system. This topic describes the process of establishing a session for packets belonging to a flow that transits the device.

To illustrate session establishment and the packet “walk” including the points at which services are applied to the packets of a flow, the following example uses the simple case of a unicast session. This packet “walk” brings together the packet-based processing and flow-based processing that the Junos OS performs on the packet.
Session Lookup and Packet Match Criteria

To determine if a packet belongs to an existing flow, the device attempts to match the packet’s information to that of an existing session based on the following six match criteria:

- Source address
- Destination address
- Source port
- Destination port
- Protocol
- Unique token from a given zone and virtual router

Understanding Session Creation: First Packet Processing

This topic explains how a session is set up to process the packets composing a flow. To illustrate the process, this topic uses an example with a source “a” and a destination “b”. The direction from source to destination for the packets of the flow is referred to as (a -> b). The direction from destination to source is referred to as (b -> a).

1. A packet arrives at an interface on the device and the IOC processes it.
   The IOC dequeues the packet and sends it to the NPU with which it communicates.

2. The NPU receives the packet from the IOC and processes it.
   - The NPU performs basic sanity checks on the packet and applies some screens configured for the interface to the packet.
   - If a session match is found, the session has already been created on an SPU that was assigned to it, so the NPU forwards the packet to the SPU for processing along with the session ID.

   Example: Packet (a -> b) arrives at NPU1 from IOC1. NPU1 performs sanity checks and applies DoS screens to the packet. NPU1 checks its session table for a tuple match and no existing session is found. NPU1 forwards the packet to the central point on SPU1 for assignment to an SPU.

3. The central point creates a session with a “Pending” state.
   The central point maintains a global session table that includes entries for all sessions that exist across all SPUs on the device. It participates in session creation and delegates and arbitrates session resources allocation.

   This process entails the following parts:

   a. The central point checks its session table and gate table to determine if a session or a gate exists for the packet it receives from the NPU. (An NPU has forwarded a packet to the central point because its table indicates there is no session for it. The central point verifies this information before allocating an SPU for the session.)
b. If there is no entry that matches the packet in either table, the central point creates a pending wing for the session and selects an SPU to be used for the session, based on its load-balancing algorithm.

c. The central point forwards the first packet of the flow to the selected SPU in a message telling it to set up a session locally to be used for the packet flow.

Example: The central point creates pending wing (a → b) for the session. It selects SPU1 to be used for the session. It sends SPU1 the (a → b) packet along with a message to create a session for it. (It happens to be the case that SPU1 is the SPU that runs in combo mode. Therefore, its session-management and flow-processing services are used for the session.

4. The SPU sets up the session.

Each SPU, too, has a session table, which contains information about its sessions. When the SPU receives a message from the central point to set up a session, it checks its session table to ensure that a session does not already exist for the packet.

a. If there is no existing session for the packet, the SPU sets up the session locally.

b. The SPU sends a message to the central point, telling it to install the session.

During first-packet processing, if NAT is enabled, the SPU allocates IP address resources for NAT. In this case, the first-packet processing for the session is suspended until the NAT allocation process is completed.

The SPU adds to the queue any additional packets for the flow that it might receive until the session has been installed.

Example: SPU1 creates the session for (a → b) and sends a message back to the central point (implemented on the same SPU) telling it to install the pending session.

5. The central point installs the session.

• It sets the state for the session's pending wing to active.

• It installs the reverse wing for the session as an active wing.

• It sends an ACK (acknowledge) message to the SPU, indicating that the session is installed.

Example: The central point receives a message from SPU1 to install the session for (a → b). It sets the session state for (a → b) wing to active. It installs the reverse wing (b → a) for the session and makes it active; this allows for delivery of packets from the reverse direction of the flow: destination (b) to be delivered to the source (a).

6. The SPU sets up the session on the ingress and egress NPUs.

NPUs maintain information about a session for packet forwarding and delivery. Session information is set up on the egress and ingress NPUs (which sometimes are the same) so that packets can be sent directly to the SPU that manages their flows and not to the central point for redirection.

7. Fast-path processing takes place.

For the remainder of the steps entailed in packet processing, proceed to Step 1 in “Understanding Fast-Path Processing”.


Understanding Fast-Path Processing

All packets undergo fast-path processing. However, if a session exists for a packet, the packet undergoes fast-path processing and bypasses the first-packet process. When there is already a session for the packet’s flow, the packet does not transit the central point.

Here is how fast-path processing works: NPUs at the egress and ingress interfaces contain session tables that include the identification of the SPU that manages a packet’s flow. Because the NPUs have this session information, all traffic for the flow, including reverse traffic, is sent directly to that SPU for processing.

On SRX1400, SRX3400, and SRX3600 devices, the iflset functionality is not supported for aggregated interfaces like reth.

Understanding Traffic Processing on SRX4600 Devices

The Juniper Networks SRX4600 Services Gateway integrates flow-based security and routing services, including advanced security and threat mitigation and traditional stateful firewall security. The Junos OS flow-based infrastructure provides the foundation and framework for Layer 4 through Layer 7 application-based services. The SRX4600 Services Gateway is designed to be deployed as an integrated firewall at the large enterprise data center edge and data center core, and the campus edge. It can also be deployed as an LTE security gateway and a Gi/Gi firewall.

This topic includes the following content:

- Understanding Deployment Scenarios for the SRX4600 Services Gateway and Its Features on page 35
- Flow-Based Processing and Session Fundamentals on page 37
- Flow and Session Underlying Components Implemented Across SRX Series Services Gateways on page 38

Understanding Deployment Scenarios for the SRX4600 Services Gateway and Its Features

The SRX4600 Services Gateway can be deployed in many areas to secure your environment and its resources. It is often used to protect the data center edge and core in the following ways:

- Deploying the SRX4600 Services Gateway as a Data Center Edge Firewall

  You can deploy the SRX4600 Services Gateway at the edge of your data center to provide the applications and services that it hosts with optimum protection. Every data center has an ingress point to allow clients access to the data center’s services, but malicious aggressors can take advantage of it to launch attacks against these services. A large amount of traffic coming into the data center is ingress internet traffic. For that reason alone, deploying robust, multi-layered security at the data center edge is essential. The SRX4600 Services Gateway effectively and reliably blocks attacks, and it allows you to configure the system to thwart specific kinds of attacks. The SRX4600 Services Gateway supports Juniper’s Software-Defined Secure Network
(SDSN) framework, including Sky Advanced Threat Prevention (Sky ATP), which is built around automated and actionable intelligence that can be shared quickly to recognize and mitigate threats. Figure 2 on page 36 shows the SRX4600 Services Gateway deployed at the data center edge in conjunction with an MX480 router and EX Series switches.

**Figure 2: Deploying the SRX4600 Services Gateway at the Data Center Edge**

![Diagram of SRX4600 Services Gateway deployment](image)

- **Deploying the SRX4600 Services Gateway at the Data Center Core**
  You can deploy the SRX4600 Services Gateway at the data center core to provide enhanced security and to ensure that compliance requirements are met. Data center processing has become increasingly dynamic necessitating clear network definition and compliance requirements enforcement. To ensure compliance, you can use the SRX4600 Services Gateway to segment your overall network into individual server networks and secure traffic within them. The SRX4600 Services Gateway provides high availability and automation, and its high performance Layer 3 and Layer 4 services meet the security requirements of the data center core. Figure 3 on page 37 shows the SRX4600 Services Gateway deployed as a multi-layered firewall at the data center core.
Figure 3: Deploying the SRX4600 Services Gateway at the Data Center Core

In addition to its advanced anti-malware features, the SRX4600 Services Gateway supports the following features:

- Stateful firewall
- Application security suite
- UTM (Sophos AV, Web filtering, antispam)
- IDP
- High availability (Chassis cluster)
  - Dual HA control ports (10G)
  - MACsec support for HA ports
- Ethernet interfaces through QSFP28 (100G/40G/4x10G modes), QSFP+ (40G/4x10G modes) and SFP+ (10G mode)
- IPsec VPN, including AutoVPN and Group VPNv2
- QoS and network services
- J-Web
- Routing policies with multicast

Flow-Based Processing and Session Fundamentals

To understand flow processing on the SRX4600 Services Gateway, it is important to understand the fundamentals of flow.

A flow is a stream of related packets that meet the same matching criteria and share the same characteristics. Junos OS treats packets that belong to the same flow in the same way. The architecture of an SRX Series services gateway and how it handles packet flows are tightly coupled. Consequently, in part, flow is implemented differently across the family of SRX Series services gateways because of their architectural differences.

Flow-based packet processing, which is stateful, requires the creation of sessions. Sessions are created based on routing and other traffic classification information to store information and allocate resources for a flow. Sessions cache information about the state of the flow, and they store most of the security measures to be applied to packets of the flow. Because of the architectural differences across devices, sessions are also managed differently by different devices.

Regardless of these differences, conceptually the flow process is the same across all services gateways, and sessions serve the same purposes and have the same features.
Flow and Session Underlying Components Implemented Across SRX Series Services Gateways

SRX Series services gateways use the same infrastructure components to support flow and manage sessions, but not all devices implement all of them.

To understand flow, it is essential to understand the following components and how they are used:

- **The Services Processing Unit (SPU)**
  
  An SPU manages the session for a packet flow. It applies security features and other services to the packet. It also applies packet-based stateless firewall filters, classifiers, and traffic shapers to the packet.

- **The central point (CP)**
  
  The central point is an SPU that the system uses to allocate resources and distribute session management among SPUs. When the first packet of a flow is processed, the central point determines which SPU to use for that packet's session. The SRX4600 Services Gateway does not implement a central point.

- **The Network Processing Unit (NPU) and the Network Processing session**
  
  An NPU is a processor that runs on an I/O card (IOC) and processes packets discretely. When a flow is created, subsequent packets of the flow are matched to the session on the NPU. The NPU handles additional processing such as TCP sequence check, time-to-live (TTL) processing, and Layer 2 header translation. An NPU improves performance in that extra packet forwarding between a session-SPU and a hash-SPU is avoided. The SRX4600 Services Gateway implements an NPU.

The SRX4600 Services Gateway flow architecture has been improved to optimize use of the SRX4600 device's advanced multi-core Xeon™ Processors. The SRX4600 Services Gateway implements the use of a dedicated session thread to circumvent problems such as management of out-of-order packets in a flow. It utilizes the network processing session to ensure that packets are forwarded to the right, dedicated thread. Packets are distributed to different threads in accord with the hash-based session distribution model.

Understanding Traffic Processing on SRX5000 Line Devices

Junos OS on SRX5000 devices is a distributed, parallel processing, high-throughput and high-performance system. The distributed parallel processing architecture of the SRX5000 line of services gateways includes multiple processors to manage sessions and run security and other services processing. This architecture provides greater flexibility and allows for high throughput and fast performance.
NOTE: In SRX1400, SRX3400, SRX3600, SRX5600, and SRX5800 devices, IKE negotiations involving NAT traversal do not work if the IKE peer is behind a NAT device that will change the source IP address of the IKE packets during the negotiation. For example, if the NAT device is configured with DIP, it changes the source IP because the IKE protocol switches the UDP port from 500 to 4500.

The I/O cards (IOCs) and Services Processing Cards (SPCs) on SRX5000 line devices contain processing units that process a packet as it traverses the device. An IOC has one or more Network Processing Units (NPUs) and one or more Services Processing Units (SPUs) run on an SPC.

These processing units have different responsibilities. All flow-based services for a packet are executed on a single SPU. The responsibilities of these NPUs are not clearly delineated in regard to the other kind of services that run on them."

For example:

- An NPU processes packets discretely. It performs sanity checks and applies some screens that are configured for the interface, such as denial-of-service (DoS) screens, to the packet.
- An SPU manages the session for the packet flow and applies security features and other services to the packet. It also applies packet-based stateless firewall filters, classifiers, and traffic shapers to the packet.
- An NPU forwards a packet to the SPU using the hash algorithm. However, for some applications, like ALG, the system will need to query the application central point to determine on which SPU the packet should be processed.

These discrete, cooperating parts of the system, including the central point, each store the information identifying whether a session exists for a stream of packets and the information against which a packet is matched to determine if it belongs to an existing session.

This architecture allows the device to distribute processing of all sessions across multiple SPUs. It also allows an NPU to determine if a session exists for a packet, to check the packet, and to apply screens to the packet. How a packet is handled depends on whether it is the first packet in a flow.

The following sections describe the processing architecture using SRX5600 and SRX5800 devices as an example:

- Understanding First-Packet Processing on page 40
- Understanding Fast-Path Processing on page 41
- Understanding the Data Path for Unicast Sessions on page 42
- Understanding Services Processing Units on page 47
- Understanding Scheduler Characteristics on page 48
- Understanding Network Processor Bundling on page 48
Understanding First-Packet Processing

If the packet matches an existing flow, processing for the packet is assessed in the context of its flow state. The SPU maintains the state for each session, and the settings are then applied to the rest of the packets in the flow. If the packet does not match an existing flow, it is used to create a flow state and a session is allocated for it.

Figure 4 on page 40 illustrates the path the first packet in a flow takes as it enters the device—the NPU determines that no session exists for the packet, and the NPU sends the packet to the distributed central point to set up a distributed central point session. The distributed central point then sends a message to the application central point to select the SPU to set up a session for the packet and to process the packet. The distributed central point then sends the packet to that SPU. The SPU processes the packet and sends it to the NPU for transmission from the device. (This high-level description does not address application of features to a packet.)

Figure 4: First-Packet Processing

After the first packet in a flow has traversed the system and a session has been established for it, it undergoes fast-path processing.

Subsequent packets in the flow also undergo fast-path processing; in this case, after each packet enters the session and the NPU finds a match for it in its session table, the NPU forwards the packet to the SPU that manages its session.

Figure 5 on page 40 illustrates fast-path processing. This is the path a packet takes when a flow has already been established for its related packets. (It is also the path that the first packet in a flow takes after the session for the flow that the packet initiated has been set up.) After the packet enters the device, the NPU finds a match for the packet in its session table, and it forwards the packet to the SPU that manages the packet’s session. Note that the packet bypasses interaction with the central point.

Figure 5: Fast-Path Processing
The following section explains how a session is created and the process a packet undergoes as it transits the device.

Understanding Fast-Path Processing

Here is an overview of the main components involved in setting up a session for a packet and processing packets both discretely and as part of a flow as they transit the SRX5600 and SRX5800 devices:

• Network Processing Units (NPUs)—NPUs reside on IOCs. They handle packet sanity checking and application of some screens. NPUs maintain session tables that they use to determine if a session exists for an incoming packet or for reverse traffic.

The NPU session table contains an entry for a session if the session is established on an SPU for a packet that had previously entered the device via the interface and was processed by this NPU. The SPU installs the session in the NPU table when it creates the session.

An NPU determines if a session exists for a packet by checking the packet information against its session table. If the packet matches an existing session, the NPU sends the packet and the metadata for it to the SPU. If there is no session, the NPUs sends the packet to one SPU which is calculated using the hash algorithm.

• Services Processing Units (SPUs)—The main processors of the SRX5600 and SRX5800 devices reside on SPCs. SPUs establish and manage traffic flows and perform most of the packet processing on a packet as it transits the device. Each SPU maintains a hash table for fast session lookup. The SPU applies stateless firewall filters, classifiers, and traffic shapers to traffic. An SPU performs all flow-based processing for a packet and most packet-based processing. Each multicore SPU processes packets independently with minimum interaction among SPUs on the same or different SPC. All packets that belong to the same flow are processed by the same SPU.

The SPU maintains a session table with entries for all sessions that it established and whose packets it processes. When an SPU receives a packet from an NPU, it checks its session table to ensure that the packet belongs to it. It also checks its session table when it receives a packet from the distributed central point and sends a message to establish a session for that packet to verify that there is not an existing session for the packet.

• Central point—The central point architecture is divided into two modules, the application central point and the distributed central point. The application central point is responsible for global resource management and loading balancing, while the distributed central point is responsible for traffic identification (global session matching). The application central point functionality runs on the dedicated central point SPU, while the distributed central point functionality is distributed to the rest of the SPUs. Now the central point sessions are no longer on the dedicated central point SPU, but with the distributed central point on other flow SPUs.

• Routing Engine—The Routing Engine runs the control plane.
Understanding the Data Path for Unicast Sessions

This section describes the process of establishing a session for packets belonging to a flow that transits the device.

To illustrate session establishment and the packet “walk” including the points at which services are applied to the packets in a flow, this example uses the simple case of a unicast session.

This packet “walk” brings together the packet-based processing and flow-based processing that Junos OS performs on the packet.

Session Lookup and Packet-Match Criteria

To determine if a packet belongs to an existing flow, the device attempts to match the packet’s information to that of an existing session based on the following six match criteria:

- Source address
- Destination address
- Source port
- Destination port
- Protocol
- Unique token from a given zone and virtual router

Understanding Session Creation: First-Packet Processing

This section explains how a session is set up to process the packets composing a flow. To illustrate the process, this section uses an example with a source “a” and a destination “b”. The direction from source to destination for the packets of the flow is referred to as (a->b). The direction from destination to source is referred to as (b->a).

Step 1. A Packet Arrives at an Interface on the Device And the NPU Processes It.

This section describes how a packet is handled when it arrives at an SRX Series device ingress IOC.

1. The packet arrives at the device’s IOC and is processed by the NPU on the IOC.
2. The NPU performs basic sanity checks on the packet and applies some screens configured for the interface to the packet.
3. The NPU checks its session table for an existing session for the packet. (It checks the packet’s tuple against those of packets for existing sessions in its session table.)
   a. If no existing session is found, the NPU forwards the packet to the hash SPU.
   b. If a session match is found, the session has already been created on an SPU that was assigned to it, so the NPU forwards the packet to the SPU for processing along with the session ID.
**Example:** Packet (a -> b) arrives at NPU1. NPU1 performs sanity checks and applies DoS screens to the packet. NPU1 checks its session table for a tuple match, and no existing session is found. NPU1 forwards the packet to an SPU.

**Step 2. The Distributed Central Point Creates a Session with a "Pending" State.**

When an NPU receives a packet, the NPU sends it to the distributed central point, based on the hash algorithm. The distributed central point then looks up the distributed central point session table and creates an entry if needed.

This process entails the following parts:

1. The distributed central point checks its session table to determine if a session exists for the packet received from the NPU. (An NPU forwards a packet to the distributed central point because it cannot find an existing session for the packet)

2. If there is no entry that matches the packet in the distributed central point session table, the distributed central point creates a pending wing for the session. The distributed central point then sends a query message to the application central point to select an SPU to be used for the session.

3. On receiving the query message, the application central point checks its gate table to determine if a gate exists for the packet. If a gate is matched or some other session distribution algorithm is triggered, the application central point selects another SPU to process the packet; otherwise, the SPU (that is, the distributed central point SPU) is selected. Finally, the application central point sends a query response to the distributed central point.

4. On receiving the query response, the distributed central point forwards the first packet in flow to the selected SPU in a message directing the SPU to set up a session locally to be used for the packet flow. For example, the distributed central point creates a pending wing (a -> b) for the session. The application central point selects SPU1 to be used for it. The distributed central point sends SPU1 the (a->b) packet along with a message to create a session for the distributed central point.

**Example:** The distributed central point creates a pending wing (a -> b) for the session. It selects SPU1 to be used for it. It sends SPU1 the (a->b) packet along with a message to create a session for it.

**Step 3. The SPU Sets Up the Session.**

Each SPU, too, has a session table, which contains information about its sessions. When the SPU receives a message from the distributed central point to set up a session, it checks its session table to ensure that a session does not already exist for the packet.

1. If there is no existing session for the packet, the SPU sets up the session locally.

2. The SPU sends a message to the distributed central point directing it to install the session.

**NOTE:** During first-packet processing, if NAT is enabled, the SPU allocates IP address resources for NAT. In this case, the first-packet processing for the session is suspended until the NAT allocation process is completed.
The SPU adds to the queue any additional packets for the flow that it might receive until the session has been installed.

**Example:** SPU1 creates the session for (a -> b) and sends a message back to the distributed central point directing it to install the pending session.

**Step 4. The Distributed Central Point Installs the Session.**
The distributed central point receives the install message from the SPU.

1. The distributed central point sets the state for the session's pending wing to active.
2. The distributed central point installs the reverse wing for the session as an active wing.

   **NOTE:** For some cases, such as NAT, the reverse wing may be installed on a different distributed central point from the init wing distributed central point.

3. It sends an acknowledge (ACK) message to the SPU, indicating that the session is installed.

**Example:** The distributed central point receives a message from SPU1 to install the session for the (a -> b) wing. It sets the session state for the (a -> b) wing to active. It installs the reverse wing (b -> a) for the session and makes it active; this allows for delivery of packets from the reverse direction of the flow: destination (b) to be delivered to the source (a).

**Step 5. The SPU Sets Up the Session on the Ingress and Egress NPUs.**
NPUs maintain information about a session for packet forwarding and delivery. Session information is set up on the egress and ingress NPUs (which sometimes are the same) so that packets can be sent directly to the SPU that manages their flows and not to the distributed central point for redirection.

**Step 6. Fast-Path Processing Takes Place.**
For the remainder of the steps entailed in packet processing, proceed to Step 1 in “Understanding Fast-Path Processing” on page 45.

**Figure 6 on page 45** illustrates the first part of the process that the first packet in a flow undergoes after it reaches the device. At this point a session is set up to process the packet and the rest of the packets belonging to its flow. Subsequently, it and the rest of the packets in the flow undergo fast-path processing.
Understanding Fast-Path Processing

All packets undergo fast-path processing. However, if a session exists for a packet, the packet undergoes fast-path processing and bypasses the first-packet process. When there is already a session for the packet’s flow, the packet does not transit the central point.

Here is how fast-path processing works: NPUs at the egress and ingress interfaces contain session tables that include the identification of the SPU that manages a packet’s flow. Because the NPUs have this session information, all traffic for the flow, including reverse traffic, is sent directly to that SPU for processing.

To illustrate the fast-path process, this section uses an example with a source “a” and a destination “b”. The direction from source to destination for the packets of the flow is referred to as (a->b). The direction from destination to source is referred to as (b->a).

Step 1. A Packet Arrives at the Device and the NPU Processes It.

This section describes how a packet is handled when it arrives at a services gateway’s IOC.

1. The packet arrives at the device’s IOC and is processed by the NPU on the card.

   The NPU performs sanity checks and applies some screens, such as denial-of-service (DoS) screens, to the packet.

2. The NPU identifies an entry for an existing session in its session table that the packet matches.

3. The NPU forwards the packet along with metadata from its session table, including the session ID and packet tuple information, to the SPU that manages the session for
the flow, applies stateless firewall filters and CoS features to its packets, and handles
the packet’s flow processing and application of security and other features.

**Example:** Packet (a -> b) arrives at NPU1. NPU1 performs sanity checks on the packet,
applies DoS screens to it, and checks its session table for a tuple match. It finds a match
and that a session exists for the packet on SPU1. NPU1 forwards the packet to SPU1 for
processing.

**Step 2. The SPU for the Session Processes the Packet.**
Most of a packet’s processing occurs on the SPU to which its session is assigned. The
packet is processed for packet-based features such as stateless firewall filters, traffic
shapers, and classifiers, if applicable. Configured flow-based security and related services
such as firewall features, NAT, ALGs, and so on, are applied to the packet. (For information
on how security services are determined for a session.

1. Before it processes the packet, the SPU checks its session table to verify that the
   packet belongs to one of its sessions.
2. The SPU processes the packet for applicable features and services.

**Example:** SPU1 receives packet (a->b) from NPU1. SPU1 checks its session table to verify
that the packet belongs to one of its sessions. Then it processes packet (a -> b) according
to input filters and CoS features that apply to its input interface. The SPU applies the
security features and services that are configured for the packet’s flow to it, based on its
zone and policies. If any are configured, it applies output filters, traffic shapers and
additional screens to the packet.

**Step 3. The SPU Forwards the Packet to the NPU.**
1. The SPU forwards the packet to the NPU.
2. The NPU applies any applicable screens associated with the interface to the packet.

**Example:** SPU1 forwards packet (a -> b) to NPU2, and NPU2 applies DoS screens.

**Step 4. The Interface Transmits the Packet from the Device.**

**Example:** The interface transmits packet (a->b) from the device.

**Step 5. A Reverse Traffic Packet Arrives at the Egress Interface and the NPU Processes
It.**
This step mirrors Step 1 exactly in reverse. See Step 1 in this section for details.

**Example:** Packet (b->a) arrives at NPU2. NPU2 checks its session table for a tuple match.
It finds a match and that a session exists for the packet on SPU1. NPU2 forwards the
packet to SPU1 for processing.

**Step 6. The SPU for the Session Processes the Reverse Traffic Packet.**
This step is the same as Step 2 except that it applies to reverse traffic. See Step 2 in this
section for details.

**Example:** SPU1 receives packet (b->a) from NPU2. It checks its session table to verify
that the packet belongs to the session identified by NPU2. Then it applies packet-based
features configured for the NPU1’s interface to the packet. It processes packet (b->a) according to the security features and other services that are configured for its flow, based on its zone and policies.

**Step 7. The SPU Forwards the Reverse Traffic Packet to the NPU.**

This step is the same as Step 3 except that it applies to reverse traffic. See Step 3 in this section for details.

**Example:** SPU1 forwards packet (b->a) to NPU1. NPU1 processes any screens configured for the interface.

**8. The Interface Transmits the Packet from the Device.**

This step is the same as Step 4 except that it applies to reverse traffic. See Step 4 in this section for details.

Example: The interface transmits packet (b->a) from the device.

Figure 7 on page 47 illustrates the process a packet undergoes when it reaches the device and a session exists for the flow that the packet belongs to.

**Figure 7: Packet Walk for Fast-Path Processing**

---

**Understanding Services Processing Units**

For a given physical interface, the SPU receives ingress packets from all network processors in the network processor bundle associated with the physical interface. The SPU extracts network processor bundle information from the physical interface and uses the same 5-tuple hash algorithm to map a flow to a network processor index. To
determine the network processor, the SPU does a lookup on the network processor index in the network processor bundle. The SPU sends egress packets to the physical interface's local Physical Interface Module (PIM) for the outward traffic.

NOTE: The network processor and the SPU use the same 5-tuple hash algorithm to get the hash values for the packets.

Understanding Scheduler Characteristics

For SRX5600 and SRX5800 devices, the IOC supports the following hierarchical scheduler characteristics:

- **IFL** – The configuration of the network processor bundle is stored in the physical interface data structure. For example, SRX5600 and SRX5800 devices have a maximum of 48 PIMs. The physical interface can use a 48-bit bit-mask to indicate the PIM, or the network processor traffic from this physical interface is distributed in addition to the physical interface's primary network processor.

  On SRX5000 line devices, the ifiset functionality is not supported for aggregated interfaces like `reth`.

- **IFD** – The logical interface associated with the physical interface of a network processor bundle is passed to all the IOCs that have a PIM in the network processor bundle.

Understanding Network Processor Bundling

The network processor bundling feature is available on SRX5000 line devices. This feature enables distribution of data traffic from one interface to multiple network processors for packet processing. A primary network processor is assigned for an interface that receives the ingress traffic and distributes the packets to several other secondary network processors. A single network processor can act as a primary network processor or as a secondary network processor to multiple interfaces. A single network processor can join only one network processor bundle.

**Network Processor Bundling Limitations**

Network processor bundling functionality has the following limitations:

- Network processor bundling allows a total of 16 PIMs per bundle and 8 different network processor bundle systems.

- You need to reboot the device to apply the configuration changes on the bundle.

- Network processor bundling is below the reth interface in the overall architecture. You can choose one or both interfaces from the network processor bundle to form the reth interface.

- If the IOC is removed from a network processor bundle, the packets forwarded to the PIM on that IOC are lost.

- When the network processor bundle is enabled, the ICMP, UDP, and TCP sync flooding thresholds no longer apply to an interface. Packets are distributed to multiple network
processors for processing. These thresholds apply to each network processor in the network processor bundle.

- Network processor bundling is not supported in Layer 2 mode.
- Because of memory constraints on the network processor, the number of network processor bundled ports that are supported per PIM is limited. Within the network processor bundle, each port needs to have a global port index. The global port index is calculated using the following formula:

\[
\text{Global} \_ \text{port} \_ \text{index} = (\text{global} \_ \text{pic} \times 16) + \text{port} \_ \text{offset}
\]

- Link aggregation groups (LAGs) and redundant Ethernet interface LAGs in chassis cluster implementations can coexist with network processor bundling. However, neither LAGs nor redundant Ethernet interface LAGs can overlap with or share physical links with a network processor bundle.

### Configuring IOC to NPC Mapping

An Input/Output card (IOC) to Network Processing Card (NPC) mapping requires you to map one IOC to one NPC. However, you can map multiple IOCs to a single NPC. To balance the processing power in the NPC on the SRX3400, SRX3600, and SRX4600 Services Gateways, the chassis process (daemon) runs an algorithm that performs the mapping. It maps an IOC to an NPC that has the least amount of IOCs mapped to it. You can also use the command-line interface (CLI) to assign a specific IOC to a specific NPC. When you configure the mapping, the chassis process will first use your configuration, then apply the least-number NPC algorithm for the rest of the IOCs.

**NOTE:** Platform support depends on the Junos OS release in your installation.

To configure the IOC to NPC mapping:

```mermaid
[edit]
set chassis ioc-npc-connectivity {
  ioc slot-number npc (none | slot-number);
}
```

See Table 3 on page 49 for a description of the `set chassis ioc-npc-connectivity` options.

### Table 3: IOC to NPC Connectivity Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ioc slot-number</td>
<td>Specify the IOC slot number. Range is 0 through 7 for SRX3400 devices and 0 through 12 for SRX3600 devices.</td>
</tr>
<tr>
<td>npc slot-number</td>
<td>Specify the NPC slot number. Range is 0 through 7 for SRX3400 devices and 0 through 12 for SRX3600 and SRX 4600 devices.</td>
</tr>
<tr>
<td>none</td>
<td>The chassis process maps the connection for the particular IOC.</td>
</tr>
</tbody>
</table>
Understanding Flow Processing on SRX5K-SPC3 Devices

The service processing card SRX5K-SPC3 is introduced to improve the performance of security services on the SRX5000 security services gateway. The SPC3 card supports higher throughput, maintains its reliability as it preserves the chassis cluster functionality and scalability for service processing.

The SPC3 card provides support for the following security features:

- Application layer gateway (ALG). [See ALG Overview]
- Advanced anti-malware (Juniper Sky ATP). [See Juniper Sky Advanced Threat Prevention Administration]
- Flow-based packet processing implementation
- Intrusion detection and prevention (IDP). [See Intrusion Detection and Prevention Overview]
- Stateful firewall
- SSL proxy. [See SSL Proxy]
- Firewall user authentication. [See Authentication and Integrated User Firewalls Feature Guide for Security Devices]

The security flow is enhanced to support SPC3 card with all the existing security features that are supported on the SPC2 card.

NOTE:
The following limitations apply for the SPC3 card in Junos OS Release 18.2R1-S1:

- Interoperability of SPC3 card and SPC2 card is not supported.
- IPsec VPN functionality is not supported with SPC3 card.
Starting in Junos OS Release 18.2R1-S1, a new service processing card (SPC3) is introduced for the SRX5000 Series devices. The introduction of the new card improves the scalability and performance of the device and maintains its reliability as it preserves the chassis cluster functionality. The SPC3 card supports higher throughput and scalability for service processing.

On SRX5000 Series devices, SPC3 card interoperates with I/O cards (IOC2, IOC3), Switch Control Board (SCB2, SCB3), Routing Engines and SPC2 cards.

Starting in Junos OS Release 18.4R1, a mix of of SPC3 and SPC2 cards is supported on SRX5000 Series devices.

If you are adding the SPC3 cards on SRX5000 line of devices, the new SPC3 card must installed in the lowest-numbered slot of any SPC. The SPC3 card is installed in the original lowest-numbered slot provides the central point (CP) functionality in mixed-mode. For example, if your services gateway contains a mix of SPC2 and SPC3 cards, an SPC3 must occupy the lowest-numbered slot of any SPC in the chassis. This configuration ensures that the central point (CP) functionality in mixed-mode is performed by the SPC3 card.

On SRX5000 Series devices operating in mixed-mode, flow processing is shared between SPC3 and SPC2 cards. Central Point processing takes place on the lowest number SPC slot for which an SPC3 card is installed.

**NOTE:** When SRX Series devices are operating in a chassis cluster mode, SPC3 and SPC2 cards must be installed in the same slot locations on each chassis.

**Understanding SPC3 Software Architecture**

SPC3 flow architecture is same as CP-Lite architecture. The SPC3 physically has two Services Processing Units (SPU) and each SPU has two CPUs.

The way the IOC hashes the packets to process the flow is changed. Figure shows the packet flow of SRX device with SPC3.

*Figure 8: Packet flow on SPC3*
On SPC3, packets are distributed from IOC to each core directly. Since the IOC directly hashes packets to the flowd RT thread, the original LBT thread is removed. The packets are now delivered to the flowd thread instead of SPU. If the security flow installs NP sessions, instead of SPU ID, the session thread ID is used by IOC to forward packets to correct thread associate with the session.

*Figure 9: Packet flow through flowd thread*

**Understanding Load Distribution**

All packets that come through a revenue port will be distributed to different SPUs based on hash algorithm, which is same as the existing SRX5000 Line devices hash based on CP-Lite architecture. The hash method varies for different types of traffic. The table below lists hash methods.

*Table 4: Load Distribution - Hash Methods*

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Ports</th>
<th>Hash Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP</td>
<td>L4 src port and dst port</td>
<td>Hashed by 5-tuple</td>
</tr>
<tr>
<td>UDP</td>
<td>Normal</td>
<td>L4 src port and dst port</td>
</tr>
<tr>
<td>GTP</td>
<td>L4 src port and dst port</td>
<td>Hashed by 5-tuple</td>
</tr>
<tr>
<td>IKE</td>
<td>L4 src port and dst port</td>
<td>Hashed by IP pair</td>
</tr>
</tbody>
</table>
Table 4: Load Distribution - Hash Methods (continued)

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Ports</th>
<th>Hash Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICMP</td>
<td>1. ICMP version 4 info message ICMP_ECHO/ICMP_ECHOREPLY id/seq ICMP_TSTAMP/ICMP_TSTAMPREPLY id/seq ICMP_INET/ICMP_INETREPLY id/seq ICMP_MASKREQ/ICMP MASKREPLY 0x00010001</td>
<td>ICMP info is hashed by 5-tuple; ICMP error is hashed by 3-tuple (no ports info)</td>
</tr>
<tr>
<td></td>
<td>2. ICMP version 6 info message ICMPv6_ECHO_REPLY/ICMPv6_ECHO_REQUEST id/seq</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. ICMP error message Match by embedded IP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. All others 0x00010001</td>
<td></td>
</tr>
<tr>
<td>SCTP</td>
<td>L4 src port and dst port</td>
<td>Hashed by 5-tuple</td>
</tr>
<tr>
<td>ESP</td>
<td>SPI</td>
<td>Hashed by IP pair</td>
</tr>
<tr>
<td>AH</td>
<td>SPI</td>
<td>Hashed by IP pair</td>
</tr>
<tr>
<td>GRE</td>
<td>If PPTP alg is enabled, sport = call id; dport = 0 By default, port is 0x00010001</td>
<td>Hashed by 3-tuple</td>
</tr>
<tr>
<td>PIM</td>
<td>By default, PIM ports 0x00010001</td>
<td>Hashed by 3-tuple</td>
</tr>
<tr>
<td>FRAGMENT</td>
<td>First fragment, has the normal ports None first fragment, no ports</td>
<td>Hashed by 3-tuple</td>
</tr>
<tr>
<td>Other IP packet</td>
<td>Ports 0x00010001</td>
<td>Hashed by 3-tuple</td>
</tr>
<tr>
<td>NONE IP</td>
<td>Not applicable</td>
<td>Hashed by Mac address and Ethernet Type (Vlan ID)</td>
</tr>
</tbody>
</table>

Understanding NP Session and Service Offload (SOF)

Network processor (NP) session is an IOC-based session that allows and establishes the SPU sessions. The packets that pass the NP session has the following advantages:

- Avoids session lookup on SPU to gain better performance.
- Avoids extra packet forwarding between session SPU and hash SPU.

Service offload is a special type of NP session to provide low-latency feature for session that needs basic firewall service. Packets that hits the SOF session on an IOC bypass the
packet processing on SPU and is directly forwarded by IOC. The following traffic types support service offload:

- Basic firewall (without plugin and fragments), IPv4 and IPv6 TCP, UDP traffic
- IPv4 NAT
- 1 Fan-in and 1 Fan-out Multicast
- ALGs such as FTP data session

**Understanding J-Flow support on SPC3**

J-Flow is the juniper version of industry standard traffic monitoring mechanism. It provides a feature to export snapshot of network traffic statistics to the remote server for network monitoring and further data processing. J-Flow supports v5, v8 and v9 format. All these three versions are supported on SPC3.

**Understanding Datapath Debug SPU Support (E2E)**

Datapath debug provides filter based end-to-end (E2E) packet debug feature on SRX5000 Line devices. It traces packet path and dump packet content.

On SPC3, JEXEC is the only E2E event type that is supported and the following E2E action types are supported:

- Count
- Dump
- Trace
- Trace-summary

**Understanding Fragmentation Handling, ISSU, and ISHU Support**

On SPC3, fragmented packets are forwarded to “fragment core” in a specific PFE based on its header tuple values. After receiving a fragmented packet, flow performs defragmentation and forwards the packet to its session core. The flow logic does not change and remains the same.

While performing the ISSU, the virtual SPUs are synchronized to related virtual SPU IDs. The ISHU support is based on CP-Lite architecture. Basically, two ISHU operations are supported:

- Insert a new SPC to secondary node.
- Replace an SPC on secondary node, and the number of SPCs should be same as that of primary node.

**Related Documentation**

- Understanding SRX Series Services Gateways Central Point Architecture on page 55
Release History Table

<table>
<thead>
<tr>
<th>Release</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.4R1</td>
<td>Starting in Junos OS Release 18.4R1, a mix of SPC3 and SPC2 cards is supported on SRX5000 Series devices.</td>
</tr>
<tr>
<td>18.2R1-S1</td>
<td>Starting in Junos OS Release 18.2R1-S1, a new service processing card (SPC3) is introduced for the SRX5000 Series devices. The introduction of the new card improves the scalability and performance of the device and maintains its reliability as it preserves the chassis cluster functionality. The SPC3 card supports higher throughput and scalability for service processing.</td>
</tr>
<tr>
<td>15.1X49-D70</td>
<td>By default, the SRX Series device is enabled for flow-based forwarding for IPv4 traffic on all devices, apart from the SRX300 Series and SRX550M devices that are set to drop mode. Starting with Junos OS Release 15.1X49-D70 and Junos OS Release 17.3R1, for the SRX1500 Series, SRX4100, SRX4200, SRX5400, SRX5600, SRX5800 and vSRX devices, you do not need to reboot the device when you are switching modes between flow mode, packet mode, and drop mode. For SRX300 Series and SRX550M devices, you must reboot the device when switching between flow mode, packet mode, and drop mode.</td>
</tr>
</tbody>
</table>

Related Documentation

- Flow-Based Sessions on page 63
- Central Point Architecture in Security Devices Overview

The central point delegates the session processing to one of the SPUs. When a session is not established, the central point selects an SPU to establish the session for the flow, based on load-balancing criteria. If the session already exists, the central point forwards packets for that flow to the SPU hosting it.

- Understanding SRX Series Services Gateways Central Point Architecture on page 55
- Understanding Enhancements to Central Point Architecture for the SRX5000 Line on page 58
- Understanding Central Point Architecture Flow Support for GTP and SCTP on page 59

Understanding SRX Series Services Gateways Central Point Architecture

The central point (CP) architecture has two basic flow functionalities: load balancing and traffic identification (global session matching). As described in this topic, the central point architecture is implemented either in centric mode, in which all session distribution and session matching is performed by the central point, or in mixed-mode, in which a percentage of Services Processing Unit (SPU) is dedicated to performing the central point functionality.

The central point’s main function is to delegate session processing to one of the SPUs. If the session has not yet been established, the central point selects an SPU to establish the session for the flow, based on load-balancing criteria. If the session already exists, the central point forwards packets for that flow to the SPU hosting it. It also redirects packets to the correct SPU in the event that the NPU fails to do so.
The central point maintains a global session table with information about the owner SPU of a particular session. It functions as a central repository and resource manager for the whole system.

**NOTE:** The central point architecture is also implemented in CP-lite mode in which session management is offloaded from the central point to SPUs for performance and session scaling improvement. CP-lite is not discussed in this topic.

The SRX Series device type in conjunction with the Junos OS release determine which mode is supported.

**Table 5 on page 56** identifies the central point architecture implementation that is supported on SRX Series devices for various releases.

<table>
<thead>
<tr>
<th>Junos OS Release 12.3X48 and Previous Releases</th>
<th>Mode Supported on SRX1400</th>
<th>Mode Supported On SRX3000 Series Devices</th>
<th>Mode Supported on SRX5000 Series Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>• CP centric</td>
<td>• CP centric</td>
<td>• CP centric</td>
<td></td>
</tr>
<tr>
<td>• mixed-mode</td>
<td>• mixed-mode</td>
<td>• mixed-mode</td>
<td></td>
</tr>
</tbody>
</table>

| Junos OS Release 15.1X49-D10                   | These SRX Series devices are no longer supported. | These SRX Series devices are no longer supported. | • CP centric |
| Junos OS Release 15.1X49-D15                   |                                                       |                                                        |              |
| Junos OS Release 15.1X49-D20                   |                                                       |                                                        |              |

| Junos OS Release 15.1X49-D30 and later releases | These SRX Series devices are no longer supported. | These SRX Series devices are no longer supported. | • CP-lite |
|                                               |                                                       |                                                        |              |

**NOTE:** NG-SPC renders combo mode obsolete.

The central point forwards a packet to its Services Processing Unit (SPU) upon session matching, or distributes traffic to an SPU for security processing if the packet does not match any existing session. The central point architecture is implemented in CP centric mode, in which all session distribution and session matching is performed by the CP or in combo mode.

On some SRX Series devices, an entire SPU cannot be dedicated for central point functionality, but a certain percentage of the SPU is automatically allocated for central point functionality and the rest is allocated for normal flow processing. When an SPU performs the function of central point as well as normal flow processing, it is said to be in combination, or *mixed*, mode.

The percentage of SPU dedicated to the central point functionality depends on the number of SPUs in the device. Based on the number of SPUs, there are three modes available on the SRX Series devices— small central point, medium central point, and large central point.
In small central point mode, a small percentage of an SPU is dedicated to central point functionality and the rest is dedicated to the normal flow processing. In medium central point mode, an SPU is almost equally shared for central point functionality and normal flow processing. In large central point mode, an entire SPU is dedicated to central point functionality. In mixed-mode, the central point and SPU share the same load-balancing thread (LBT) and packet-ordering thread (POT) infrastructure.

This topic includes the following sections:

- Load Distribution in mixed Mode on page 57
- Sharing Processing Power and Memory in mixed Mode on page 57

**Load Distribution in mixed Mode**

The central point maintains SPU mapping table (for load distribution) that lists live SPUs with the logic SPU IDs mapped to the physical Trivial Network Protocol (TNP) addresses mapping. In mixed-mode, the SPU that hosts the central point is included in the table. The load distribution algorithm is adjusted based on session capacity and processing power to avoid overloading of sessions.

**Sharing Processing Power and Memory in mixed Mode**

The CPU processing power in a mixed-mode SPU is shared based on the platform and the number of SPUs in the system. Similarly, the CPU memory is also shared between the central point and SPU.

An SPU has multiple cores (CPUs) for networking processing. In "small" SPU mixed-mode, CPU functionality takes a small portion of the cores, whereas "medium" SPU mixed-mode requires a larger portion of cores. The processing power for central point functionalities and flow processing is shared, based on the number of Services Processing Cards (SPC), as shown in Table 6 on page 57. Platform support depends on the Junos OS release in your installation.

**Table 6: mixed Mode Processing**

<table>
<thead>
<tr>
<th>SRX Series device</th>
<th>Central point mode with 1 SPC or SPC2</th>
<th>Central point mode with 2 or more SPCs or SPC2s</th>
<th>Central point mode with 1 or 2 SPC3s</th>
<th>Central point mode with more than 2 SPC3s</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRX1400</td>
<td>Small</td>
<td>Medium</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>SRX3400</td>
<td>Small</td>
<td>Medium</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>SRX3600</td>
<td>Small</td>
<td>Medium</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>SRX3400 (expanded performance and capacity license)</td>
<td>Small</td>
<td>Large</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>SRX3600 (expanded performance and capacity license)</td>
<td>Small</td>
<td>Large</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>
**Table 6: mixed Mode Processing (continued)**

<table>
<thead>
<tr>
<th>SRX Series device</th>
<th>Central point mode with 1 SPC or SPC2</th>
<th>Central point mode with 2 or more SPCs or SPC2s</th>
<th>Central point mode with 1 or 2 SPC3s</th>
<th>Central point mode with more than 2 SPC3s</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRX5600</td>
<td>Large</td>
<td>Large</td>
<td>Medium</td>
<td>Large</td>
</tr>
<tr>
<td>SRX5800</td>
<td>Large</td>
<td>Large</td>
<td>Medium</td>
<td>Large</td>
</tr>
<tr>
<td>SRX5400</td>
<td>Large</td>
<td>Large</td>
<td>Medium</td>
<td>Large</td>
</tr>
</tbody>
</table>

**NOTE:** The mixed-mode processing only exists with SPCI on SRX1400, SRX3400, SRX3600, and SRX5000 line devices.

### Understanding Enhancements to Central Point Architecture for the SRX5000 Line

Previously, for the SRX5000 line of services gateways, the central point was a bottleneck in device performance and scaling. When more Services Processing Cards (SPCs) were integrated into the system, the overall processing power increased linearly, but the system connections per second (cps) remained constant and could not be improved because of the single centralized point in the system. This severely impacted the overall system utilizations in both capacity and cps.

Starting with Junos OS Release 15.1X49-D30 and Junos OS Release 17.3R1, on SRX5000 line devices, the central point architecture is enhanced to handle higher connections per second (cps). The new central point architecture prevents data packets from going through the central point by off-loading session management functionalists to the Services Processing Unit (SPU). Therefore, data packets are directly forwarded from the network processing unit to the SPU instead of going through the central point.

The central point architecture is divided into two modules, the application central point and the distributed central point. The application central point is responsible for global resource management and loading balancing, while the distributed central point is responsible for traffic identification (global session matching). The application central point functionality runs on the dedicated central point SPU, while the distributed central point functionality is distributed to the rest of the SPUs. Now the central point sessions are no longer on the dedicated central point SPU, but with distributed central point on other flow SPUs.

**NOTE:** The central point for SRX5000 line refers to the application central point, or the distributed central point or both, with respect to global resource management and load balancing, it refers to the application central point, whereas with respect to traffic identification and session management, it refers to the distributed central point (sometimes referred to the SPU as well).
NOTE: The SNMP log and SNMP trap were generated by the central point with rate limit. Now, the SNMP log and SNMP trap are generated by the SPU or central point. As there is more than one SPU, the number of SNMP log and traps generated are more. To verify the number of connections per second (CPS) on the device run SNMP MIB walk nxJsNodeSessionCreationPerSecond command. The SNMP polling mechanism calculates the CPS value based on the average number of CPS in the past 96 seconds. So, if the CPS is not constant, the number of CPS reported is inaccurate.

Understanding Central Point Session Limit Performance Enhancements

Starting in Junos OS 15.1X49-D70 and Junos OS Release 17.3R1, a new session connection (conn-tag) tag option is available to allow you to add a flow filter to further distinguish GRPS tunneling protocol, user plane (GTP-U) flow sessions and Stream Control Transmission Protocol (SCTP) flow sessions.

The flow session connection tuple consists of a 32-bit connection tag that is used to uniquely identify GTP-U sessions and SCTP sessions that are not distinguishable by the six part tuple only. You can configure the system to include the session connection tag tuple to identify GTP-U sessions and SCTP sessions by adding the session connection tag to the standard six tuples that identify a session. The system determines the DCP for GTP-U/SCTP by hashing the session connection tag.

The central point architecture distributes GTP-U traffic handled by a gateway GPRS support node (GGSN) and SGSN pair on all SPUs by switching to tunnel endpoint identifier (TEID)-based hash distribution. To handle load-balancing issues, tag-based hash distribution is used to ensure even distribution of SCTP traffic from different associations among all SPUs. (The connection tag for GTP-U is the TEID and for SCTP is the vTag.)

Understanding Central Point Architecture Flow Support for GTP and SCTP

Starting in Junos OS Release 15.1X49-D40 and Junos OS Release 17.3R1, the central point architecture provides enhanced support for GPRS tunneling protocol, control (GTP-C), GPRS tunneling protocol, user plane (GTP-U), and Stream Control Transmission Protocol (SCTP).

The central point architecture, which is supported on the SRX5400, SRX5600, and SRX5800 devices, is enhanced to address the GTP-C message rate-limiting to protect gateway GPRS support node (GGSN) from GTP-C message flood, to prevent GTP-C packet drop issues during SGSN handover, and to distribute GTP-U traffic handled by a GGSN and SGSN pair on all SPUs by switching to tunnel endpoint identifier (TEID)-based hash distribution. Use the enable-gtpu-distribution command to enable or disable GTP-U session distribution. By default, the enable-gtpu-distribution command is disabled.

Connection-tag to flow session tuple is introduced to resolve GTP/SCTP load balance issue. All session including Distributed CP (DCP) session and SPU session are modified to accommodate connection-tag. The session creation have following tuple: src-ip, dst-ip, src-port, dst-port, protocol, session-token and connection tag.
The GTP ALG requires GTP-C sessions to be fixed by hashing GGSN IP addresses. The GTP ALG deny GTP-C session creation if the first packet is of uncertain direction, which will cause packet drop. To prevent the GTP-C packets from being dropped, a new flow session is created and the GTP-C traffic is allowed to pass even if the GGSN or SGSN direction is not determined. Later, the GGSN IP is determined using the correct SPU to create the flow session and age out the old session. The intermittent packets hitting the old session will be forwarded to the new SPU and be processed on the new session.

To handle load-balancing issues, tag-based hash distribution is used to ensure even distribution of GTP-U/SCTP traffic among all SPUs. A 32-bit connection tag is introduced that uniquely identifies the GTP-U and the SCTP sessions. The connection tag for GTP-U is the TEID and for SCTP is the vTag. The default connection-tag is 0. The connection tag remains 0 if it is not used by the sessions. Flow will determine connection tag for GTP-U/SCTP sessions and distribute them by hashing connection tag.

A SCTP association is a connection between two SCTP endpoints. Each SCTP endpoint identifies the association with a tag. During association setup (4-way handshakes), two SCTP endpoints exchange their own tags for packet receiving. During 4-way handshake, the receiver of INIT/INIT-ACK records the value of itag, and places into the vtag field of every SCTP packet that transmit within this association. Then the peer uses the vtag to validate the sender of this packet.

Flow sessions created after CP-Lite as follows:

SPU is selected by hash(tag), the Client to Server traffic is handled on hash (tagB) SPU then forwarded to hash (tagA) SPU. Server to Client traffic is handled on hash (tagA) SPU directly.

1. After receive INIT packet, on hash (tagA) SPU:
   DCP-session A1: client=>server, SCTP, Conn ID: 0x0;
   Session A1: client=>server, SCTP, Conn ID: 0x0;
   On hash (tagB) SPU: no session.

2. After receive INIT-ACK packet, on hash (tagA) SPU:
   DCP-session A1: client=>server, SCTP, Conn ID: 0x0;
   DCP-session A2: server => client, SCTP, Conn ID: tagA;
   Session A1: client=>server, SCTP, Conn ID: 0x0;
   Session A2: server => client, SCTP, Conn ID: tagA;
   On hash (tagB) SPU: no session.

3. After receive COOKIE-ECHO packet, on hash (tagA) SPU:
   DCP-session A1: client=>server, SCTP, Conn ID: 0x0;
   DCP-session A2: server => client, SCTP, Conn ID: tagA;
   Session A1: client=>server, SCTP, Conn ID: 0x0;
Session A2: server => client, SCTP, Conn ID: tagA;
Session A3: client => server, SCTP, Conn ID: tagB;
On hash (tagB) SPU:
DCP-session: client => server, SCTP, Conn ID: tag B

4. After receive COOKIE-ACK packet, flow sessions have no change.

5. After handshake succeeds, HEARBEAT will be send on all paths.

Understanding the Flow Session Connection Filter Option

Starting in Junos OS 15.1X49-D70 and Junos OS Release 17.3R1, a new session connection (conn-tag) tag option is available to allow you to add a flow filter to further distinguish GRPS tunneling protocol, user plane (GTP-U) flow sessions and Stream Control Transmission Protocol (SCTP) flow sessions.

The flow session connection tuple consists of a 32-bit connection tag that is used to uniquely identify GTP-U sessions and SCTP sessions that are not distinguishable by the six part tuple only. You can configure the system to include the session connection tag tuple to identify GTP-U sessions and SCTP sessions by adding the session connection tag to the standard six tuples that identify a session. The system determines the DCP for GTP-U/SCTP by hashing the session connection tag.

The central point architecture distributes GTP-U traffic handled by a gateway GPRS support node (GGSN) and SGSN pair on all SPUs by switching to tunnel endpoint identifier (TEID)-based hash distribution. To handle load-balancing issues, tag-based hash distribution is used to ensure even distribution of SCTP traffic from different associations among all SPUs. (The connection tag for GTP-U is the TEID and for SCTP is the vTag.)
### Release History Table

<table>
<thead>
<tr>
<th>Release</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.1X49-D70</td>
<td>Starting in Junos OS 15.1X49-D70 and Junos OS Release 17.3R1, a new session connection (conn-tag) tag option is available to allow you to add a flow filter to further distinguish GPRS tunneling protocol, user plane (GTP-U) flow sessions and Stream Control Transmission Protocol (SCTP) flow sessions.</td>
</tr>
<tr>
<td>15.1X49-D70</td>
<td>Starting in Junos OS 15.1X49-D70 and Junos OS Release 17.3R1, a new session connection (conn-tag) tag option is available to allow you to add a flow filter to further distinguish GPRS tunneling protocol, user plane (GTP-U) flow sessions and Stream Control Transmission Protocol (SCTP) flow sessions.</td>
</tr>
<tr>
<td>15.1X49-D40</td>
<td>Starting in Junos OS Release 15.1X49-D40 and Junos OS Release 17.3R1, the central point architecture provides enhanced support for GPRS tunneling protocol, control (GTP-C), GPRS tunneling protocol, user plane (GTP-U), and Stream Control Transmission Protocol (SCTP).</td>
</tr>
<tr>
<td>15.1X49-D30</td>
<td>Starting with Junos OS Release 15.1X49-D30 and Junos OS Release 17.3R1, on SRX5000 line devices, the central point architecture is enhanced to handle higher connections per second (cps).</td>
</tr>
</tbody>
</table>

### Related Documentation
- Flow-Based Sessions on page 63
Flow-Based Sessions

The Junos OS caches the session information that is triggered by the first packet of the flow. The cached session is used by subsequent packets of that same flow and the reverse flow of that session using the flow module, which is integrated into the forwarding path.

Understanding Session Characteristics for SRX Series Services Gateways

Sessions are created, based on routing and other classification information, to store information and allocate resources for a flow. Sessions have characteristics, some of which you can change, such as when they are terminated. For example, you might want to ensure that a session table is never entirely full to protect against an attacker’s attempt to flood the table and thereby prevent legitimate users from starting sessions.

Depending on the protocol and service, a session is programmed with a timeout value. For example, the default timeout for TCP is 1800 seconds. The default timeout for UDP is 60 seconds. When a session is terminated, it is marked as invalid, and its timeout is reduced from 20 to 4 seconds.
If no traffic uses the session before the service timeout, the session is aged out and freed to a common resource pool for reuse. You can affect the life of a session in the following ways:

- You can specify circumstances for terminating sessions by using any of the following methods:
  - Age out sessions based on how full the session table is
  - Set an explicit timeout for aging out TCP sessions
  - Configure a TCP session to be invalidated when it receives a TCP RST (reset) message
  - Configure the `fin-invalidate-session` statement to terminate sessions when either session endpoint sends a FIN(ish) message to its peer.

  When the peer endpoint receives the packet with the FIN flag set, it sends an ACK (nowlege) message. Typically, tearing down a session using this method involves transmission of a pair of FIN-ACK messages from each session.

- You can configure sessions to accommodate other systems as follows:
  - Disable TCP packet security checks
  - Change the maximum segment size

**Understanding Aggressive Session Aging**

The session table is a limited resource for SRX Series devices. If the session table is full, any new sessions will be rejected by the device.

The aggressive session-aging mechanism accelerates the session timeout process when the number of sessions in the session table exceeds the specified high-watermark threshold. This mechanism minimizes the likelihood that the SRX Series devices will reject new sessions when the session table becomes full.

Configure the following parameters to perform aggressive session aging:

- `high-watermark` – The device performs aggressive session aging when the number of sessions in the session table exceeds the `high-watermark` threshold.
- `low-watermark` – The device exits aggressive session aging and returns to normal when the number of sessions in the session table dips below the `low-watermark` threshold.
- `early-ageout` – During aggressive session aging, the sessions with an age-out time lower than the `early-ageout` threshold are marked as invalid.

On SRX1400, SRX3400, SRX3600, SRX5600, and SRX5800 devices, the SPU checks the session table, locates the sessions for which the timeout value is lower than the `early-ageout` time value, and then marks them as invalid. (Platform support depends on the Junos OS release in your installation.)

**Example: Controlling Session Termination for SRX Series Services Gateways**

This example shows how to terminate sessions for SRX Series devices based on aging out after a certain period of time, or when the number of sessions in the session table is
full or reaches a specified percentage. You specify a timeout value or the number of sessions in the session table.

- Requirements on page 65
- Overview on page 65
- Configuration on page 66
- Verification on page 66

Requirements

Before you begin, understand the circumstances for terminating sessions.

Overview

You can control session termination in certain situations—for example, after receiving a TCP FIN Close or receiving an RST message, when encountering ICMP errors for UDP, and when no matching traffic is received before the service timeout. When sessions are terminated, their resources are freed up for use by other sessions.

In this example, you configure the following circumstances to terminate the session:

- A timeout value of 20 seconds.

  

  NOTE: The minimum value you can configure for TCP session initialization is 4 seconds. The default value is 20 seconds; if required you can set the TCP session initialization value to less than 20 seconds.

- An explicit timeout value of 280 seconds, which changes the TCP session timeout during the three-way handshake.

  The command sets the initial TCP session timeout to 280 in the session table during the TCP three-way handshake. The timer is initiated when the first SYN packet is received, and reset with each packet during the three-way handshake. Once the three-way handshake is completed, the session timeout is reset to the timeout defined by the specific application. If the timer expires before the three-way handshake is complete, the session is removed from the session table.

- Any session that receives a TCP RST (reset) message is invalidated.
**Configuration**

**Step-by-Step Procedure**

To control session termination for SRX Series devices:

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see... *Using the CLI Editor in Configuration Mode* in the **CLI User Guide**.

To control session termination for SRX Series devices:

1. **Specify an age-out value for the session.**

   ```
   [edit security flow]  
   user@host# set aging early-ageout 20
   ```

2. **Configure an aging out value.**

   ```
   [edit security flow]  
   user@host# set tcp-session tcp-initial-timeout 280
   ```

3. **Invalidate any session that receives a TCP RST message.**

   ```
   [edit security flow]  
   user@host# set tcp-session rst-invalidate-session
   ```

4. **If you are done configuring the device, commit the configuration.**

   ```
   [edit ]  
   user@host# commit
   ```

**Verification**

To verify the configuration is working properly, enter the `show security flow` command.

**Clearing Sessions for SRX Series Services Gateways**

You can use the `clear` command to terminate sessions. You can clear all sessions, including sessions of a particular application type, sessions that use a specific destination port, sessions that use a specific interface or port, sessions that use a certain IP protocol, sessions that match a source prefix, and resource manager sessions.

- Terminating Sessions for SRX Series Services Gateways on page 67
- Terminating a Specific Session for SRX Series Services Gateways on page 67
- Using Filters to Specify the Sessions to Be Terminated for SRX Series Services Gateways on page 67
Terminating Sessions for SRX Series Services Gateways

You can use the following command to terminate all sessions except tunnel and resource manager sessions. The command output shows the number of sessions cleared. Be aware that this command terminates the management session through which the clear command is issued.

```
user@host> clear security flow session all
```

Terminating a Specific Session for SRX Series Services Gateways

You can use the following command to terminate the session whose session ID you specify.

```
user@host> clear security flow session session-identifier 40000381
```

Using Filters to Specify the Sessions to Be Terminated for SRX Series Services Gateways

You can terminate one or more sessions based on the filter parameter you specify for the clear command. The following example uses the protocol as a filter.

```
user@host> clear security flow session protocol 89
```

Configuring the Timeout Value for Multicast Flow Sessions

You can configure the timeout value for multicast flow sessions by configuring a custom application and associating the application with a policy.

Multicast flow sessions have one template session and one or more leaf sessions. Because these sessions are linked together, they can have only one timeout value. The timeout value for multicast flow sessions is determined by considering the timeout values configured in the leaf session policies and the IP protocol timeout values. The highest of these timeout values is selected as the multicast flow session timeout.

If no leaf session timeout values are configured, the IP protocol timeout value is automatically used as the timeout value for the multicast flow session. The IP protocol timeout is the default and is not configurable.

Configuring leaf session timeouts can be especially helpful for multicast streams that have a longer packet interval than the default IP protocol timeout. For example, multicast streams with a packet interval of more than 60 seconds would experience premature aging-out of flow sessions and packet drops with the UDP timeout value, which is always 60 seconds. For such streams, you can configure a higher leaf session timeout value and prevent packet drop.

To set the leaf session timeout value, configure a custom application and associate the application with a policy:

1. Create a custom application, specify its properties, and specify bypassing the application type.
2. Set the timeout value for the application protocol.

   [edit applications application my-udp]
   user@host# set inactivity-timeout 500

3. Create a policy.

   [edit]
   user@host# edit security policies from-zone vr-zone-1 to-zone junos-host policy my-policy
   my-policy

   [edit security policies from-zone vr-zone-1 to-zone junos-host policy my-policy]
   user@host# set match source-address 192.0.2.1
   user@host# set match destination-address any

4. Associate the custom application (with the configured timeout) to the policy.

   [edit security policies from-zone vr-zone-1 to-zone junos-host policy my-policy]
   user@host# set match application my-udp
   user@host# set then permit

5. If you are done configuring the device, commit the configuration.

   [edit]
   user@host# commit

6. To verify the updated session timeout value, enter the `show security flow session` command.

   user@host> show security flow session destination-prefix 203.0.113.0

   Session ID: 2363, Policy name: N/A, Timeout: 498, Valid
   In: 192.0.2.1/17767-->203.0.113.0/5000;udp, If: ge-0/0/1.0, Pkts:0, Bytes:0
   Out: 203.0.113.0/5000-->192.0.2.1/17767;udp, If:.local..4, Pkts:0, Bytes:0

   Session ID: 2364, Policy name: my-policy/4, Timeout: -1, Valid
   In: 192.0.2.1/17767-->203.0.113.0/5000;udp, If:ge-0/0/1.0, Pkts:1011,
Bytes:258816
Out: 203.0.113.0/5000--->192.0.2.1/17767;udp, If:ppe0.32769, Pkts:0, Bytes:0
Total sessions: 2

In this output, the session ID 2363 section displays a template session. A timeout value of 498 indicates that the template session timeout value is ticking down from the configured value of 500 seconds.

The session ID 2364 section displays a leaf session. The timeout value of -1 essentially indicates that the session will not age out unless the template session ages out.

In this example, the configured leaf session timeout value of 500 seconds is the highest timeout value and is accepted as the template session timeout value for the multicast flow session.

Related Documentation
• ECMP Flow-Based Forwarding on page 79
• Flow-Based Performance on page 87
• Flow Distribution and Packet-Ordering on page 90

TCP Sessions

To send data over TCP in a network, a three-way handshake session establishment process is followed. There is a process to start a session, and there is also a process to terminate the TCP session. This topic helps you to understand the process involved in processing a TCP session.

• Understanding TCP Session Checks per Policy on page 69
• Example: Configuring TCP Packet Security Checks Per Policy on page 70
• Example: Disabling TCP Packet Security Checks for SRX Series Services Gateways on page 71
• Example: Setting the Maximum Segment Size for All TCP Sessions for SRX Series Services Gateways on page 73
• TCP Out-of-State Packet Drop Logging Overview on page 74
• Understanding How Preserving Incoming Fragmentation Characteristics Can Improve Throughput on page 77

Understanding TCP Session Checks per Policy

By default, the TCP SYN check and sequence check options are enabled on all TCP sessions. The Junos operating system (Junos OS) performs the following operations during TCP sessions:

• Checks for SYN flags in the first packet of a session and rejects any TCP segments with non-SYN flags that attempt to initiate a session.
• Validates the TCP sequence numbers during stateful inspection.
The TCP session check per-policy feature enables you to configure SYN and sequence checks for each policy. Currently, the TCP options flags, no-sequence-check and no-syn-check, are available at a global level to control the behavior of services gateways. To support per-policy TCP options, the following two options are available:

- sequence-check-required: The sequence-check-required value overrides the global value no-sequence-check.
- syn-check-required: The syn-check-required value overrides the global value no-syn-check.

To configure per-policy TCP options, you must turn off the respective global options; otherwise, the commit check will fail. If global TCP options are disabled and SYN flood protection permits the first packet, then the per-policy TCP options will control whether SYN and/or sequence checks are performed.

NOTE:
- The per-policy syn-check-required option will not override the behavior of the set security flow tcp-session no-syn-check-in-tunnel CLI command.
- Disabling the global SYN check reduces the effectiveness of the device in defending against packet flooding.

CAUTION: Disabling the global SYN check and enforcing the SYN check after policy search will greatly impact the number of packets that the router can process. This in turn will result in intense CPU operations. When you disable global SYN check and enable per-policy SYN check enforcement, you should be aware of this performance impact.

Disabling TCP Packet Security Checks

On an SRX Series device, you can disable security checks on TCP packets to ensure interoperability with hosts and devices with faulty TCP implementations.

The **no-sequence-check** option disables TCP sequence checks. It also increases the throughput.

The **set security flow tcp-session no-sequence-check** command disables the TCP sequence checks on all TCP sessions in default or hash-based modes.

Example: Configuring TCP Packet Security Checks Per Policy

This example shows how to configure TCP packet security checks for each policy in the device.

- Requirements on page 71
- Overview on page 71
Configuration on page 71
Verification on page 71

Requirements

Before you begin, you must disable the tcp options, tcp-syn-check, and tcp-sequence-check that are configured at global level.

Overview

The SYN and sequence check options are enabled by default on all TCP sessions. In environments that need to support large file transfers, or that run nonstandard applications, it might be necessary to configure sequence and sync checks differently for each policy. In this example, you configure sequence and sync check for policy pol1.

Configuration

Step-by-Step Procedure

To configure TCP packet security checks at the policy level:

1. Configure the checking for the TCP SYN bit before creating a session.

   [edit]
   user@host# set security policies from-zone Zone-A to-zone Zone-B policy pol1 then permit tcp-options syn-check-required

2. Configure the checking for sequence numbers in TCP segments during stateful inspection.

   [edit]
   user@host# set security policies from-zone Zone-A to-zone Zone-B policy pol1 then permit tcp-options sequence-check-required

3. If you are done configuring the device, commit the configuration.

   [edit]
   user@host# commit

Verification

To verify that the configuration is working properly, enter the show security policies detail command.

Example: Disabling TCP Packet Security Checks for SRX Series Services Gateways

This example shows how to disable TCP packet security checks in the device.

• Requirements on page 72
• Overview on page 72
Requirements

Before you begin, understand the circumstances for disabling TCP packet security checks.

Overview

Junos OS provides a mechanism for disabling security checks on TCP packets to ensure interoperability with hosts and devices with faulty TCP implementations. During no-SYN-check the Junos OS does not look for the TCP SYN packet for session creation. No-sequence check disables TCP sequence checking validation. Also, increases throughput. SYN check and sequence check are enabled by default. The set security flow command disables TCP SYN checks and TCP sequence checks on all TCP sessions thus reduces security. This may be required in scenarios with customers like big transfer files, or with applications that do not correctly work with standards.

Configuration

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see Using the CLI Editor in Configuration Mode in the CLI User Guide.

To disable TCP packet security checks:

1. Disable the checking of the TCP SYN bit before creating a session.

   [edit security flow]
   user@host# set tcp-session no-syn-check

2. Disable the checking of sequence numbers in TCP segments during stateful inspection.

   [edit security flow]
   user@host# set tcp-session no-sequence-check

3. If you are done configuring the device, commit the configuration.

   [edit]
   user@host# commit

Verification

To verify the configuration is working properly, enter the show security flow command.
Example: Setting the Maximum Segment Size for All TCP Sessions for SRX Series Services Gateways

This example shows how to set the maximum segment size for all TCP sessions for SRX Series devices.

- Requirements on page 73
- Overview on page 73
- Configuration on page 73
- Verification on page 74

Requirements

Before you begin, understand the circumstances for setting the maximum segment size.

Overview

You can terminate all TCP sessions by changing the TCP maximum segment size (TCP-MSS). To diminish the likelihood of fragmentation and to protect against packet loss, you can use the tcp-mss to specify a lower TCP MSS value. This applies to all TCP SYN packets traversing the router’s ingress interfaces whose MSS value is higher than the one you specify.

If the DF bit is set, it will not fragment the packet and Junos OS will send ICMP error type 3 code 4 packet to the application server (Destination Unreachable; Fragmentation Needed and DF set). This ICMP error message contains the correct MTU (as defined in tcp-mss) to be used by the application server, which should receive this message and adjust the packet size accordingly. This is specifically required with VPNs, as IPSec has added packet overhead; thus tcp-mss must be lowered appropriately.

NOTE: When running SRX Series devices in packet mode, you use the set system internet-options tcp-mss to adjust the TCP-MSS value. All ports are affected by the TCP-MSS configuration; you cannot exclude a particular port. When running SRX Series devices in flow mode, although you can use the set system internet-options tcp-mss, we recommend using only the set security flow tcp-mss to adjust the TCP-MSS value. If both statements are configured, the lower of the two values will take effect.

Configuration

To configure the maximum segment size for all TCP sessions:

1. Set the TCP maximum segment size for all TCP sessions.

   [edit security flow]
   user@host# set tcp-mss all-tcp mss 1300

2. If you are done configuring the device, commit the configuration.
Results

From configuration mode, confirm your configuration by entering the `show security flow` command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

For brevity, this `show` command output includes only the configuration that is relevant to this example. Any other configuration on the system has been replaced with ellipses (...).

```
[edit]
user@host# show security flow
...
tcp-mss{
  all-tcp{
    mss 1300;
  }
}
...
```

Verification

To verify the configuration is working properly, enter the `show configuration security flow` command from operational mode.

```
user@host> show configuration security flow
tcp-mss{
  all-tcp{
    mss 1300;
  }
}
```

TCP Out-of-State Packet Drop Logging Overview

Within any packet-switched network, when demand exceeds available capacity, the packets are queued up to hold the excess packets until the queue fills, and then the packets are dropped. When TCP operates across such a network, it takes any corrective actions to maintain error-free end-to-end communications.

Flow modules already support generating RTLOG for session-based events like session creation and session close. SRX Series devices now support the generation of RTLOG for packet-based events like packet drop without a session existing.

SRX Series devices support logging of unsynchronized TCP out-of-state packets that are dropped by the flow module.
The TCP out-of-state packet drop logging feature avoids any packet loss and enables packet recovery by logging the out-of-sync packets for error free communication, and prevents the database servers from going out of sync. This feature is built on top of the security log (RTLOG) facility.

TCP out-of-state packet drop logging supports capturing of TCP packet drop logs under the following conditions:

- **Session ages out**—When there are cloud applications running on top of long TCP sessions, and when these applications do not refresh the TCP sessions after the session ages out, the TCP packets are dropped. This feature supports logging of these dropped TCP packets.

- **Unsynchronized first packets due to attacks or asymmetric routes**—When you deploy SRX Series devices at two sites, and when routing sometimes forces asymmetric traffic, the synchronization (SYN) packet is seen at one site but the synchronization acknowledgment (SYN_ACK) packets are seen at another site. This means that the SRX Series device sees a TCP ACK packet for which it does not have a matching state table entry. This might occur because the connection was inactive for a period of time or the connections tables were flushed (for example, because of a policy installation or restart).

  The SYN_ACK packets that are seen at another site in this case were denied by the SRX Series device but were not logged. This feature supports logging of the denied SYN_ACK packets.

- **Other out-of-state conditions (like TCP sequence check fail and synchronization packet received in FIN state)**—When an SRX Series device detects a sequence failure, if the device is in TCP four-way close state but receives SYN packets, or if there is a three-way handshake failure, the SRX Series device drops the TCP packets and these dropped packets are logged.

  **NOTE:** The unsynchronized TCP out-of-state packet drop log is a packet-based log, not a session-based log.

  TCP out-of-state packet drop logging is designed with a throttle mechanism to protect CPU from being attacked, and within each throttle interval some logs can be dropped.

  Only TCP out-of-state packets dropped by Flow module are logged. TCP packets dropped by TCP-proxy and IDP are not logged.

---

**Understanding TCP Out-of-State Packet Drop Logging**

To understand the implementation of TCP out-of-state packet drop logging, consider that you deploy SRX Series devices at two sites and that routing sometimes forces asymmetrical traffic, where the SYN packet is seen at one site but the SYN_ACK packet is seen at another site. The SYN_ACK packet in this case would be denied but not logged. The TCP out-of-state packet drop logging feature provides visibility into these unsynchronized packet drops.
Consider the scenario where databases within the data center keep their TCP sockets open, with no keepalives being sent. If no data is being transmitted, the SRX Series device will timeout the sessions. Although the databases will send some data through that TCP socket, when the traffic reaches the SRX Series device, the session is no longer there and the packet is dropped, but not logged. These out-of-state TCP packets that are dropped are now logged by the SRX Series device.

**Supported TCP Out-of-State Logging Features**

TCP out-of-state logging supports the following features:

- A packet filter component to filter target traffic.
- A throttle component to protect CPU from being overloaded by log messages.
- Flexibility to change the log generation rate.

**Packet Filter Component**

The logging filter leverages the current flow trace filter. It provides different ways to filter traffic. You must configure the filters to generate packet logs, otherwise logs will not be triggered.

This filter functionality avoids enabling logs unexpectedly. The maximum filters supported are 64.

Use the `set security flow packet-log packet-filter <filter-name>` command to enable the related filter components you want.

**Throttle Component**

Logging every TCP out-of-state packet can overload the device when traffic is heavy or when an attack occurs. If the CPU is idle and you want to log as many messages as possible, then this could lead to CPU overload.

The throttle mechanism allows you to configure the throttle interval from the CLI, so you can protect your CPU from being overloaded.

A hash table is introduced to map your logged data. The hash key is generated with the source-IP address, destination-IP address, source port, and destination port.

Within each throttle interval, only a limited number (more than one) of messages will be sent to RTLOG. The remaining log messages will be throttled.

The default throttle interval is 1 second. The throttle interval (at the millisecond level) needs to be configured as a power of two or zero (0, 1, 2, 4, 8, 16... $2^N$).

When the throttle interval is configured as 0, no throttle mechanism will be involved. This is suitable for scenarios where traffic is very light and you want to record all the packet drop logs.

Configuration of the throttle interval as $2^N$ makes the throttle mechanism lockless and provides good log capture performance.
Flexibility for Changing the Log Generation Rate

Based on the throttle interval set, the log generation rate can be modified and managed. This means that within each 32-millisecond (ms) interval, a limited number of logs could be generated and the remaining could be dropped. We recommend that you configure the interval as \((0, 1, 2, 4, 8, 16, 32 \ldots 2^N)\).

If the input value is not aligned to \(2^N\), it will be aligned to \(2^N\) automatically during flow processing. For example, if you configure a 10-ms interval it will be aligned to an 8-ms interval automatically.

Understanding How Preserving Incoming Fragmentation Characteristics Can Improve Throughput

This topic covers the benefits of using the SRX Series device to preserve the characteristics of incoming packet fragments.

When data is sent from one host to another, it is transmitted as a series of packets. Performance is improved and network resources are conserved when packets of the largest size can transit the path from the source node to the destination node without being fragmented at any link in the datapath. When a packet must be fragmented into smaller packets to transit a link in the path because the packet is larger than that of the maximum transmission unit (MTU) established for that link, each of the resulting fragments must contain packet header information, in addition to the payload, or data. The increased overhead can lower throughput and degrade network performance. Also, the packet fragments must bereassembled at the destination node, which consumes additional network resources.

On the other hand, network resources are wasted when a host sends packets that are much smaller than the path MTU (path maximum transmission unit), resulting in suboptimal throughput. The path MTU discovery process works to discover the optimal MTU size for fragments that transit the datapath from the source node to the destination node for a session. The optimal packet size, then, is that of the path MTU. Fragmentation occurs when the size of a packet exceeds the path MTU.

If application-layer services are configured on the SRX Series device, packet fragments at the ingress interface must be reassembled before the services can be applied and the content inspected. These reassembled packet fragments must be broken down again before the data is transmitted out the egress interface. Normally, it is the MTU size of the egress interface that determines the size of fragments transmitted out the SRX Series device to the next link. It could be the case that the egress MTU size on the SRX Series device is larger than the path MTU, which, again, would result in packet fragmentation in the datapath, reducing performance or causing packet drop. Packet fragments must be small enough to transit every link in the path from source to destination.

By default, the SRX Series device uses the MTU size configured for the egress interface to determine the size for packet fragments it transmits. However, if you enable the feature for preserving incoming fragment characteristics, the SRX Series device detects and saves the size of incoming packet fragments.
To diminish the likelihood of packet fragmentation in the datapath, the SRX Series device keep track of and adjust the egress MTU for that flow. It identifies the maximum size of all incoming fragments. It uses that information in conjunction with the existing MTU of the egress interface to determine the correct MTU size for fragmented packets sent out the egress interface. The SRX Series device compares the two numbers. It takes the smaller number and uses it for the egress interface MTU size.

Configure the device using the set security flow preserve-incoming-frag-size command to enable the feature that takes into account the size of incoming packet fragments.

Table 7 on page 78 summarizes how the SRX Series egress MTU size is determined.

### Table 7: How the Final Egress MTU Size for Fragments Exiting the SRX Series Device Is Determined

<table>
<thead>
<tr>
<th>Incoming Fragment Size</th>
<th>Existing Egress MTU Size</th>
<th>Final Egress MTU Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the largest fragment is smaller than the existing egress MTU size</td>
<td>largest incoming fragment size is used.</td>
<td></td>
</tr>
<tr>
<td>If the largest fragment is larger than the existing egress MTU size</td>
<td>existing egress interface MTU is used.</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** This feature is supported on SRX Series devices. It supports through-traffic and traffic exiting a tunnel. It applies to both IPv4 and IPv6 traffic.

The following two considerations affect fragment size:

- For stream-based applications, such as UTM and ALG, the applications themselves could change or reassemble packets even if there were no fragments received. In this case, the existing egress interface MTU is used.
- When a path MTU discovery packet is delivered to a session, the path MTU for that session is reset to the value established by the path MTU packet.

<table>
<thead>
<tr>
<th>Release</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.1X49-D100</td>
<td>Configure the device using the set security flow preserve-incoming-frag-size command to enable the feature that takes into account the size of incoming packet fragments.</td>
</tr>
</tbody>
</table>

**Related Documentation**
- Flow-Based Performance on page 87
- Flow Distribution and Packet-Ordering on page 90
This topic provides a brief overview of equal-cost multipath (ECMP) for forwarding and reverse side traffic on Junos OS SRX Series devices and vSRX instances. For comprehensive coverage of the ECMP implementation on Junos OS SRX Series devices and vSRX instances:

- Understanding ECMP Flow-Based Forwarding on page 79
- Example: Configuring ECMP Flow-Based Forwarding on page 82

### Understanding ECMP Flow-Based Forwarding

Equal-cost multipath (ECMP) is a network routing strategy that allows for traffic of the same session, or flow—that is, traffic with the same source and destination—to be transmitted across multiple paths of equal cost. It is a mechanism that allows you to load balance traffic and increase bandwidth by fully utilizing otherwise unused bandwidth on links to the same destination.

When forwarding a packet, the routing technology must decide which next-hop path to use. In making a determination, the device takes into account the packet header fields that identify a flow. When ECMP is used, next-hop paths of equal cost are identified based on routing metric calculations and hash algorithms. That is, routes of equal cost have the same preference and metric values, and the same cost to the network. The ECMP process identifies a set of routers, each of which is a legitimate equal cost next hop towards the destination. The routes that are identified are referred to as an ECMP set. Because it addresses only the next hop destination, ECMP can be used with most routing protocols.

An equal-cost multipath (ECMP) set is formed when the routing table contains multiple next-hop addresses for the same destination with equal cost. (Routes of equal cost have the same preference and metric values.) If there is an ECMP set for the active route, Junos OS uses a hash algorithm to choose one of the next-hop addresses in the ECMP set to install in the forwarding table.

You can configure Junos OS so that multiple next-hop entries in an ECMP set are installed in the forwarding table. On Juniper Networks devices, per-flow load balancing can be performed to spread traffic across multiple paths between routing devices. On Juniper Networks security devices, source and destination IP addresses and protocols are examined to determine individual traffic flows. Packets for the same flow are forwarded on the same interface; the interface does not change when there are additions or changes to the ECMP set. This is important for features such as source NAT, where the translation is performed only during the first path of session establishment for IDP, ALG, and route-based VPN tunnels. If a packet arrives on a given interface in an ECMP set, the security device ensures that reverse traffic is forwarded through the same interface.
NOTE: ECMP flow-based forwarding on security devices applies to IPv4 and IPv6 unicast traffic flows. Starting with Junos OS Release 15.1X49-D60, ECMP flow-based forwarding of IPv6 unicast traffic is supported on all SRX Series devices and vSRX instances. Multicast flow is not supported.

On Juniper Networks security devices, the maximum number of next-hop addresses in an ECMP set that can be installed in the forwarding table is 16. If there are more than 16 next-hop addresses in an ECMP set, only the first 16 addresses are used.

In a chassis cluster deployment, a local interface is an interface that is on the same node as the interface on which a packet arrives, and a remote interface is an interface that is on the other chassis cluster node. If an ECMP route has both local and remote interfaces in a chassis cluster, then the local interface is favored for the next hop.

If a next-hop address is no longer part of the ECMP set or if it is removed from the routing table because of a route change, a flow that uses the next hop is rerouted and the session is not affected. Rerouting of the flow also occurs if there is a configuration change that takes away the next-hop address or if an administrator takes down the next-hop interface without deleting it. If a next-hop address is removed from the routing table because the interface is deleted or the session is intentionally cleared, the session is killed without being rerouted.

NOTE: We recommend that interfaces in an ECMP set be in the same security zone. If a flow is rerouted and the rerouted flow uses an interface in a different security zone than the original route, the session is killed.

To configure ECMP flow-based forwarding on Juniper Networks security devices, first define a load-balancing routing policy by including one or more policy-statement configuration statements at the [edit policy-options] hierarchy level, with the action load-balance per-packet. Then apply the routing policy to routes exported from the routing table to the forwarding table. To do this, include the forwarding-table and export configuration statements at the [edit routing-options] hierarchy level.

**ECMP Implementation for Junos OS SRX Series Devices and vSRX Instances**

You can configure ECMP for SRX Series devices and vSRX instances to implement per-flow load balancing to spread traffic across multiple paths between routing devices. Routes of equal cost have the same preference and metric values. These devices examine the source IP address, the destination IP address, and the protocol to determine individual traffic flows. Traffic with the same source IP address, destination IP address, and protocol number that is permitted by a security policy is forwarded to the same next hop. Junos OS on these devices uses the flow information in its hashing logic.

For Junos OS SRX Series devices and vSRX instances, an ECMP set is formed when the routing table contains multiple next-hop addresses for the same destination with equal cost. ECMP allows for multiple next-hop entries in an ECMP set to be installed in the
forwarding table. Packets for the same flow are forwarded on the same interface; the interface does not change when there are additions or changes to the ECMP set.

If there is an ECMP set for the active route, Junos OS uses a hash algorithm to choose one of the next-hop addresses in the ECMP set to install in the forwarding table.

**NOTE:** ECMP flow-based forwarding on SRX Series devices and vSRX instances applies to IPv4 and IPv6 unicast traffic flows. Starting in Junos OS Release 15.1X49-D60 and Junos OS Release 17.3R1, ECMP flow-based forwarding of IPv6 unicast traffic is supported on all SRX Series devices and vSRX instances. Multicast flow is not supported.

### ECMP for Reverse Traffic

Starting in Junos OS Release 17.3, if you enable ECMP support for reverse traffic, the SRX Series device uses a hash algorithm to determine the interface to use for reverse traffic in a flow. This process is similar to asymmetric routing in which a packet traverses from a source to a destination in one path and takes a different path when it returns to the source.

If you do not enable this feature, the SRX Series device selects a route in the ECMP set to the incoming interface for reverse traffic, which is the default behavior.

You use the `allow-reverse-ecmp` configuration statement in the `[edit security flow]` hierarchy to configure ECMP flow-based forwarding to use a hash algorithm in selecting a route in the ECMP set for reverse traffic transit. That is, if you enable this function, rather than selecting a route to the incoming interface, the SRX Series device uses a hash algorithm to select a route in the ECMP set for reverse traffic.

Because the ECMP flow-based policy is zone-based, ECMP reverse lookup support ensures that the egress interface used for reverse traffic is in the same zone as the ingress interface used for arriving traffic.

**NOTE:** Interfaces in an ECMP set must be in the same security zone. If the egress interface zone is different from the ingress interface zone, a session can be created but the packets will be dropped.

**CAUTION:** If you decide to enable reverse ECMP, be aware of the following condition and take action to avoid it: When ECMP flow-based forwarding is used, the SRX Series device could cause upstream devices to see only one-way traffic of a session. Problems might ensue for upstream devices that maintain session state, for example, for TCP-proxy and SYN-proxy. The issue is similar to asynchronous routing behavior.
Example: Configuring ECMP Flow-Based Forwarding

This example shows how to configure ECMP flow-based forwarding.

- Requirements on page 82
- Overview on page 82
- Configuration on page 83
- Verification on page 87

Requirements

No special configuration beyond device initialization is required before configuring this feature.

Overview

This example configures three static ECMP routes on an SRX Series device. Each static route uses a different next-hop router to reach the destination server. The interfaces towards the routers are assigned to the untrust security zone. This example creates a load-balancing routing policy named `load-balancing-policy` and applies the policy to all routes exported from the routing table to the forwarding table.

Topology

Figure 10 on page 83 shows the topology used in this example.
CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the [edit] hierarchy level.

### Interfaces ###
set interfaces ge-0/0/2 unit 0 family inet address 192.168.4.1/24
set interfaces ge-0/0/4 unit 0 family inet address 192.168.11/24
set interfaces ge-0/0/6 unit 0 family inet address 192.168.21/24
set interfaces ge-0/0/7 unit 0 family inet address 192.168.31/24

### Static routes ###
set routing-options static route 172.16.1.0/24 next-hop 192.168.1.2
set routing-options static route 172.16.1.0/24 next-hop 192.168.2.2
set routing-options static route 172.16.1.0/24 next-hop 192.168.3.2

### Security zones, address book entry, and policy ###
set security zones security-zone trust interfaces ge-0/0/2
set security zones security-zone untrust interfaces ge-0/0/4
set security zones security-zone untrust interfaces ge-0/0/6
set security zones security-zone untrust interfaces ge-0/0/7
set security address-book global address FTP-servers 172.16.1.0/24
set security policies from-zone trust to-zone untrust policy permit-ftp match
source-address any
set security policies from-zone trust to-zone untrust policy permit-ftp match
destination-address FTP-servers
set security policies from-zone trust to-zone untrust policy permit-ftp match application
junos-ftp
set security policies from-zone trust to-zone untrust policy permit-ftp then permit
## ECMP routing policy ##
set policy-options policy-statement load-balancing-policy then load-balance per-packet
set routing-options forwarding-table export load-balancing-policy

**Step-by-Step Procedure**

The following example requires you to navigate various levels in the configuration hierarchy.

To configure ECMP flow-based forwarding:

1. Configure interfaces.

   [edit interfaces]
   user@host# set ge-0/0/2 unit 0 family inet address 192.168.4.1/24
   user@host# set ge-0/0/4 unit 0 family inet address 192.168.1.1/24
   user@host# set ge-0/0/6 unit 0 family inet address 192.168.2.1/24
   user@host# set ge-0/0/7 unit 0 family inet address 192.168.3.1/24

2. Configure static routes.

   [edit routing-options]
   user@host# set static route 172.16.1.0/24 next-hop 192.168.1.2
   user@host# set static route 172.16.1.0/24 next-hop 192.168.2.2
   user@host# set static route 172.16.1.0/24 next-hop 192.168.3.2

3. Create the **trust** and **untrust** security zones, and include the related interfaces.

   [edit security]
   user@host# set zones security-zone trust interfaces ge-0/0/2
   user@host# set zones security-zone untrust interfaces ge-0/0/4
   user@host# set zones security-zone untrust interfaces ge-0/0/6
   user@host# set zones security-zone untrust interfaces ge-0/0/7

4. Configure an address book entry for the server subnet.

   This entry is used in the security policy.

   [edit security address-book]
   user@host# set global address FTP-servers 172.16.1.0/24

5. Configure a security policy.
[edit security policies from-zone trust to-zone untrust]
user@host# set policy permit-ftp match source-address any
user@host# set policy permit-ftp match destination-address FTP-servers
user@host# set policy permit-ftp match application junos-ftp
user@host# set policy permit-ftp then permit

6. Create a load-balancing routing policy.

[edit policy-options]
user@host# set policy-statement load-balancing-policy then load-balance per-packet

7. Apply the routing policy to all routes exported from the routing table to the forwarding table.

[edit routing-options]
user@host# set forwarding-table export load-balancing-policy

Results From configuration mode, confirm your configuration by issuing the show interfaces, show security, show policy-options, and show routing-options commands. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

[edit]
user@host# show interfaces
ge-0/0/2 {
  unit 0 {
    family inet {
      address 192.168.4.1/24;
    }
  }
}
ge-0/0/4 {
  unit 0 {
    family inet {
      address 192.168.1.1/24;
    }
  }
}
ge-0/0/6 {
  unit 0 {
    family inet {
      address 192.168.2.1/24;
    }
  }
}
ge-0/0/7 {
  unit 0 {
    family inet {
      address 192.168.3.1/24;
    }
  }
}

Copyright © 2019, Juniper Networks, Inc


}  
}  
}  

user@host# show security  
address-book {  
global {  
    address FTP-servers 172.16.1.0/24;  
}  
}  
policies {  
from-zone trust to-zone untrust {  
policy permit-ftp {  
    match {  
        source-address any;  
        destination-address FTP-servers;  
        application junos-ftp;  
    }  
    then {  
        permit;  
    }  
}  
}  
}  
zones {  
security-zone trust {  
    interfaces {  
        ge-0/0/2.0;  
    }  
}  
security-zone untrust {  
    interfaces {  
        ge-0/0/4.0;  
        ge-0/0/6.0;  
        ge-0/0/7.0;  
    }  
}  
}  

user@host# show policy-options  
policy-statement load-balancing-policy {  
    then {  
        load-balance per-packet;  
    }  
}  

[edit]  
user@host# show routing-options  
static {  
    route 172.16.1.0/24 next-hop [ 192.168.1.2 192.168.2.2 192.168.3.2 ];  
}  
forwarding-table {  
    export load-balancing-policy;  
}  

If you are done configuring the device, enter commit from configuration mode.
Verification

**Verifying the Forwarding Table**

**Purpose**  
Verify that the route information for all ECMP routes appears in the forwarding table.

**Action**  
From operational mode, enter the `show route forwarding-table destination 172.16.1.0` command.

```bash
user@host> show route forwarding-table destination 172.16.1.0
Routing table: default.inet

Internet:  
Destination        Type RtRef Next hop           Type Index NhRef Netif
172.16.1.0/24      user     0                    ulst 262142     2
192.168.1.2        ucst   560     2 ge-0/0/4.0
192.168.2.2        ucst   561     2 ge-0/0/6.0
192.168.3.2        ucst   562     2 ge-0/0/7.0
...```

**Meaning**  
The output shows a next hop type of `ulst`, which means the route has multiple eligible next hops. Packets destined for the 172.16.1.0 network can use any next hop in the list.

**Release History Table**

<table>
<thead>
<tr>
<th>Release</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.1X49-D60</td>
<td>Starting with Junos OS Release 15.1X49-D60, ECMP flow-based forwarding of IPv6 unicast traffic is supported on all SRX Series devices and vSRX instances. Multicast flow is not supported.</td>
</tr>
<tr>
<td>15.1X49-D60</td>
<td>Starting in Junos OS Release 15.1X49-D60 and Junos OS Release 17.3R1, ECMP flow-based forwarding of IPv6 unicast traffic is supported on all SRX Series devices and vSRX instances. Multicast flow is not supported.</td>
</tr>
</tbody>
</table>

**Related Documentation**
- Flow-Based Sessions on page 63
- Flow Distribution and Packet-Ordering on page 90

**Flow-Based Performance**

This topic explains about the performance of the session capacity. Expanding the session capacity and reverting back to the default session capacity.

- Expanding Session Capacity by Device on page 88
- Verifying the Current Session Capacity on page 89
Expanding Session Capacity by Device

To take advantage of the processing potential of a fully loaded SRX5600, SRX5800 device, or vSRX, you can expand the maximum number of concurrent sessions for these devices.

Table 8 on page 88 shows the maximum number of concurrent sessions allowed on these devices by default and with expanded capacity. Platform support depends on the Junos OS release in your installation.

Table 8: Maximum Central Point Session Increases

<table>
<thead>
<tr>
<th>SRX Series Devices</th>
<th>Maximum Concurrent Sessions on a Fully Loaded System</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Default</td>
</tr>
<tr>
<td>SRX3400</td>
<td>2.25 million</td>
</tr>
<tr>
<td>SRX3600</td>
<td>2.25 million</td>
</tr>
<tr>
<td>SRX5400</td>
<td>42 million</td>
</tr>
<tr>
<td>SRX5600</td>
<td>114 million</td>
</tr>
<tr>
<td>SRX5800</td>
<td>258 million</td>
</tr>
</tbody>
</table>

The method used for expanding session capacity depends on the device:

- Central point session license installation and validation on an SRX3400 or SRX3600 device
- CLI optimization option on an SRX5800 device

Expanding Session Capacity on an SRX3400 or SRX3600 Device

Expanding session capacity on an SRX3400 or SRX3600 device requires validation of a central point session license on the device.

1. Obtain the central point session license key and install the license on the device.
2. Reboot the device to implement the expanded session capacity.

Reverting to Default Session Capacity on an SRX5800 Device

Reverting to the default session capacity on an SRX5800 device requires a CLI configuration change.

1. Enter the following command at the CLI configuration prompt to reestablish the default session capacity value:
user@host# set security gprs gtp enable

2. Commit the configuration.

   user@host# commit

3. Reboot the device to implement the new value.

Verifying the Current Session Capacity

**Purpose**  The central point session summary includes the maximum sessions setting for the device. From this value you can determine if the session capacity has been modified as you expected.

**Action**  To verify the current setting of the central point session capacity, enter the following CLI command.

   user@host> show security flow cp-session summary

```
DCP Flow Sessions on FPC10 PIC0:
Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0

DCP Flow Sessions on FPC10 PIC1:
Valid sessions: 2
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 2
Maximum sessions: 7549747
Maximum inet6 sessions: 7549747

DCP Flow Sessions on FPC10 PIC2:
Valid sessions: 2
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 2
Maximum sessions: 7549747
Maximum inet6 sessions: 7549747

DCP Flow Sessions on FPC10 PIC3:
Valid sessions: 1
Pending sessions: 0
Invalidated sessions: 0
```
Meaning  The **Maximum sessions** value reflects the current session capacity on your device. A value of 14000000 means that the SRX5800 device is configured for the expanded number of central point sessions.

### Flow Distribution and Packet-Ordering

This topic describes about the load distribution and the packet ordering on SRX5000 Line devices.

- Understanding Load Distribution in SRX5000 Line Devices on page 90
- Understanding Packet-Ordering Function on SRX5000 Line Devices on page 93
- Understanding Session Distribution on SRX5000 Line Devices in Adaptive Mode on page 95

#### Understanding Load Distribution in SRX5000 Line Devices

The load distribution algorithm, which is supported on the SRX5800, SRX5600, and SRX5400 devices, is adjusted based on session capacity and processing power. (Actual platform support depends on the Junos OS release in your installation.)

Hash-based session distribution uses a hash table. The SPU session weight table is used to assign an SPU ID to each hash index in the session distribution hash table. This way, the number of sessions created on each SPU using hash-based distribution is proportional to the SPU’s weight in the SPU session weight table. Each NPU also keeps an identical SPU session weight table and session distribution hash table that it uses to select an SPU to forward packets that do not match an NPU session.

In the event of a SPU failure, the Routing Engine will reset all of the cards on the dataplane including IOCs and NPCs in order to maintain hash table consistency for session distribution.

In hash-based session distribution, weights are based on session capacity. We recommend the hash session distribution mode when high session capacity is required.

---

**NOTE:** Load distribution on SRX5000 line devices is always hash-based.

Insertion and removal of SPCs causes recalculation of the SPU session weight table at central point initialization time because the chassis must reboot after insertion.

Starting in Junos OS Release 15.1X49-D30, the central point architecture is enhanced to handle higher concurrent sessions and connections per second (cps) for the SRX5000 Series device.
The central point architecture enhancements prevent data packets from going through the central point by offloading traffic management to SPU. The system session capacity is extended, as the session limit on the central point is removed.

**Calculating SPU ID**

The SPU ID for a device equipped with SRX3K-SPC-1-10-40, SRX5K-SPC-2-10-40, or SRX5K-SPC3 Services Processing Card (SPC) is calculated as follows:

\[
\text{SPU ID} = (\text{FPC ID} \times 4) + \text{PIC ID}
\]

The SRX3K-SPC-1-10-40, SRX5K-SPC-2-10-40, and SRX5K-SPC3 contains two PICs per card, four PICs per card (FPC), and two PICs per card respectively. For example, a device contains 2 cards in slot 1 (FPC ID 0) and slot 2 (FPC ID 1), the expected SPU IDs are as follows:

- For SPC1: (0, 1) and (4, 5), total 4 SPUs in 2 cards.
- For SPC2: (0, 1, 2, 3) and (4, 5, 6, 7), total 8 SPUs in 2 cards.
- For SPC3: (0, 1) and (4, 5), total 4 SPUs in 2 cards.

For FPC1 (the second card) and PIC1 (the second PIC in the card), the SPU ID is calculated as:

\[
\begin{align*}
\text{SPU ID} &= (\text{FPC ID} \times 4) + \text{PIC ID} \\
&= (1 \times 4) + 1 \\
&= 4 + 1 \\
&= 5
\end{align*}
\]

Use this convention while referring the SPU ID for CLI and SNMP.

**Hash-Based Forwarding on the SRX5K-MPC, SRX5K-MPC3-40G10G (IOC3), and the SRX5K-MPC3-100G10G (IOC3)**

On these SRX Series devices, a packet goes through a series of events involving different components as it progresses from ingress to egress processing. With the datapath packet forwarding feature, you can obtain quick delivery of I/O traffic over the SRX 5000 line of devices.

The SRX5K-MPC, SRX5K-MPC3-40G10G (IOC3), and SRX5K-MPC3-100G10G (IOC3) are interface cards supported on the SRX5400, SRX5600, and SRX5800 devices. The Modular Port Concentrator (MPC) provides load-balancing services for Services Processing Units (SPUs) by using the hash-based forwarding method.

In hash-based forwarding, the packet might be forwarded by the MPC to a selected SPU (DCP) instead of the central point. This approach enhances session scaling and prevents overloading of the central point.
Hash value calculation involves the following steps:

- For IPv4 packets, the hash-based forwarding module generates the hash value based on Layer 3 and Layer 4 information, depending on different Layer 4 protocol types.

- For Stream Control Transmission Protocol (SCTP), TCP, UDP, Authentication Header (AH), edge service provider (ESP), and Internet Control Message Protocol (ICMP) protocols, the hash module utilizes Layer 4 information to generate the hash value. For any other protocols, only Layer 3 information is used in hash generation.

- For IPv4 fragment packets, the hash value is calculated using only the Layer 3 information. This also applies to the first fragment of the packet.

- For non-IP packets, the hash-based forwarding module uses the Layer 2 information to calculate the hash value.

Once a hash value is calculated according to the packet’s Layer 2, Layer 3, or Layer 4 information, an SPU ID is assigned to each hash index in the session distribution hash table.

**NOTE:** The SRX5K-MPC (IOC2), SRX5K-MPC3-40G10G (IOC3), and SRX5K-MPC3-100G10G (IOC3) can only be used on SRX5400, SRX5600, and SRX5800 devices that are configured for hash-based session distribution.

When the hash-based session distribution mode is enabled, the system changes its behavior to high-session-capacity-based mode when the SRX5K-MPC, SRX5K-MPC3-40G10G (IOC3), and SRX5K-MPC3-100G10G (IOC3) are installed on the device.

**NOTE:** On SRX5000 line devices with an SRX5K-MPC, SRX5K-MPC3-40G10G (IOC3), or SRX5K-MPC3-100G10G (IOC3) installed, during a system or an SPU reboot, when the hash-based session distribution mode is enabled, traffic will pass only when all SPUs are up after the reboot.

The MPCs on the IOC3 provide load-balancing services for SPUs by performing hash-based datapath packet forwarding to interconnect with all existing IOCs and SPCs.

The IOC3 processes ingress and egress packets. The IOC3 parses the ingress packet and sends it to the SPU for further security processing, including flow session lookup, zone and policy check, VPN, ALG, and so on.

The IOC3 manages packet data memory and fabric queuing for packet lookup and encapsulation functions.
NOTE: Starting with Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1, hash-based session distribution is the default mode for the SRX5400, SRX5600, and SRX5800 devices. Selection of hash keys depends on application protocols.

Starting with Junos OS Release 17.4R1, traffic is hashed and distributed to different SPUs by the IOC, based on a hash-based session distribution algorithm. This enhancement provides an even hash distribution among all SPUs by using a larger fixed-length hash table. In earlier Junos OS releases, the traffic distribution was uneven among all SPUs due to a fixed-length hash table.

The IOC3 sets up a security flow table (IPv4 and IPv6) including key, result table, and packet memory.

The following functions are provided with the flow table:

- Flow lookup
- Flow insertion and deletion
- Security flow aging out
- Security flow statistics

Understanding Packet-Ordering Function on SRX5000 Line Devices

The packet-ordering function, which is supported on the SRX5400, SRX5600, and SRX5800, devices and vSRX, improves the performance of the device by activating the built-in packet-ordering function of the Packet Ordering Engine on the XLP processor on the application central point.

Two types of the packet ordering modes are supported: hardware and software.

If the packet-ordering function is set to hardware, the load-balancing thread (LBT) and the packet-ordering thread (POT) are offloaded to the packet ordering engine and resources are freed to perform packet processing. If the packet-ordering function is set to software, the load-balancing thread (LBT) and the packet-ordering thread (POT) are running on the SPU. By default, packet-ordering mode using the Packet Ordering Engine (hardware) is enabled on the device. You can disable it with a configuration change that requires a reboot.

The flow thread receives the packets, processes them, and sends or drops them. For packets that require no ordering, the flow thread notifies the Network Acceleration Engine (NAE) egress to send or drop the packets. For packets that require ordering, the flow thread notifies the Packet Ordering Engine to dequeue the packets from the ordering list and to send or drop the packets in order.
Changing Packet-Ordering Mode on SRX5000 Line Devices

The packet-ordering functionality using the Packet Ordering Engine is supported on SRX5400, SRX5800 and SRX5600 devices with next-generation SPCs. (Platform support depends on the Junos OS release in your installation.) By default, packet-ordering mode using the Packet Ordering Engine is enabled. To disable the packet-ordering functionality using the Packet Ordering Engine, you must update the packet-ordering mode on the device.

The following packet ordering modes are supported:

- **software**—Disables the packet-ordering mode using the Packet Ordering Engine.
- **hardware**—Enables the packet-ordering mode using the Packet Ordering Engine. This is the default option.

To disable the packet-ordering mode using the Packet Ordering Engine:

1. Enter the following command at the CLI configuration prompt to specify the packet-ordering mode.

   ```
   [edit]
   user@host# set security forwarding-process application-services
   packet-ordering-mode software
   ```

2. Use the `show security forwarding-process` command to review your configuration.

   ```
   [edit]
   user@host# show security forwarding-process
   application-services{    
   packet-ordering-mode software;
   }
   ```

3. Check your changes to the configuration before committing.

   ```
   [edit]
   user@host# commit check
   ```

   warning: System packet ordering mode changed, reboot is required to take effect.
   If you have deployed a cluster, be sure to reboot all nodes.

   configuration check succeeds

4. Commit the configuration.

   ```
   [edit]
   user@host# commit
   ```

   warning: System packet ordering mode changed, reboot is required to take effect.
   If you have deployed a cluster, be sure to reboot all nodes.

   commit complete
5. Reboot the device at an appropriate time.

6. Use the `show security flow status` command to verify the packet-ordering mode.

```
user@host> show security flow status
```

```
Flow forwarding mode:
   Inet forwarding mode: flow based
   Inet6 forwarding mode: drop
   MPLS forwarding mode: drop
   ISO forwarding mode: drop
Flow trace status
   Flow tracing status: off
Flow session distribution
   Distribution mode: RR-based
Flow packet ordering
   Ordering mode: Software (reboot needed to change to Software)
```

**Understanding Session Distribution on SRX5000 Line Devices in Adaptive Mode**

Starting in Junos OS Release 15.1X49-D30 and Junos OS Release 17.3R1, adaptive mode session distribution was replaced by enhancements to the central point architecture.

Adaptive mode session distribution is implemented on the SRX5000 series devices running in mixed mode prior to Junos OS Release 15.1X49-D30 and Junos OS Release 17.1R1. Adaptive mode session distribution maximizes use of system resources by taking into account a Services Processing Unit's (SPU) capacity and its available resources. It is enabled only on SRX5000 Series devices running in XLR/XLP mixed mode, that is in chassis deployments in which different types of SPUs are used in different combinations. If an SRX5600, SRX5600, or SRX5400 device contains a mix of next-generation services processing cards (SPCs) and existing SPCs, then adaptive mode session distribution is assumed as the default. For SRX5000 Series devices not running in mixed mode, hash-based load balancing is the default.

A Services Processing Card (SPC) contains one or more SPUs each of which processes the packets of a flow according to the security features and other services configured for sessions distributed to it by the central point (CP). An SPU’s CPU load changes from time to time. To fully utilize changing available capacity and adapt session distribution accordingly, in adaptive mode the system assigns a weight to all SPUs dynamically. It is the weight of the SPUs that determine the session distribution.

Each SPU sends its CPU usage information to the central point (CP) periodically. The central point checks these values, calculates the weight every 1 second, and distributes the sessions in such a way as to maximize overall system performance. In other words, in adaptive mode, session distribution is based on a dynamic weighted assignment system that is calculated in real time allowing for full capacity utilization of the CPUs of all SPUs, regardless of their type.

It is the dynamic calculation of weights that distinguishes adaptive mode session distribution from weighted round-robin (WRR) session distribution. While WRR differentiates SPUs and their CPU capacity by calculating and assigning weights to the
different types of SPUs, the calculation and assignment is static, that is, it is done only once, at initialization. Adaptive mode improves on the fixed ratio session distribution process of WRR. WRR leads to underutilization of system resources because session processing limits are set based only on the type of SPU and its CPU capacity, not taking into account its available processing power.

For adaptive mode session distribution, the following formula is used to calculate the weight assigned to an SPU:

\[ W_i = \frac{\text{Sum}(W1-n) \times C_i \times S_i}{\text{Sum}(C1-n \times S1-n)} \]

Where:

- \( W_i \) — weight assigned to the SPU.
- \( \text{Sum}(W1-n) \) — Total weight of system. This value is constant.
- \( n \) — total number of SPUs.
- \( C_i \) — available CPU computational power of the SPU.
- \( S_i \) — available session capacity of SPU.

In adaptive mode, when the CPU usage on one SPU is high, fewer sessions are distributed to that SPU. The following examples explain the calculation.

Consider a device with two SPUs. Each SPU's session capacity is 1 million.

For a certain time:

- When SPU1 has 500,000 sessions on it, CPU usage of it is 10 percent:
  - Available CPU capacity of SPU1 \((C1)\) = 1-10 percent = 90 (percent).
  - Available session capacity of SPU1 \((S1)\) = \(1-500,000/1M\) = 50 (percent).

- When SPU2 has 400,000 sessions on it, CPU usage of it is 20 percent:
  - Available capacity of SPU2 \((C2)\) = 1-20 percent = 80 (percent).
  - Available session capacity of SPU2 \((S2)\) = \(1-400,000/1M\) = 60 (percent).

If the weight of the whole system is 100, the separate weight values for each SPU are:

- Weight of SPU1 \((W1)\) = \(100 \times 90 \times 50/(50 \times 90 + 80 \times 60) = 48\)
- Weight of SPU2 \((W2)\) = \(100 \times 80 \times 60/(50 \times 90 + 80 \times 60) = 52\)

For the incoming sessions, 48 percent of session are allocated to SPU1 while 52 percent of packets are allocated to SPU2.

The weighted numbers might take effect on the system within a short period before the central point checks the runtime usage information and adjusts the weights to a new value.
### Release History Table

<table>
<thead>
<tr>
<th>Release</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.4R1</td>
<td>Starting with Junos OS Release 17.4R1, traffic is hashed and distributed to different SPUs by the IOC, based on a hash-based session distribution algorithm. This enhancement provides an even hash distribution among all SPUs by using a larger fixed-length hash table. In earlier Junos OS releases, the traffic distribution was uneven among all SPUs due to a fixed-length hash table.</td>
</tr>
<tr>
<td>15.1X49-D30</td>
<td>Starting in Junos OS Release 15.1X49-D30, the central point architecture is enhanced to handle higher concurrent sessions and connections per second (cps) for the SRX5000 Series device.</td>
</tr>
<tr>
<td>15.1X49-D30</td>
<td>Starting in Junos OS Release 15.1X49-D30 and Junos OS Release 17.3R1, adaptive mode session distribution was replaced by enhancements to the central point architecture.</td>
</tr>
<tr>
<td>15.1X49-D10</td>
<td>Starting with Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1, hash-based session distribution is the default mode for the SRX5400, SRX5600, and SRX5800 devices. Selection of hash keys depends on application protocols.</td>
</tr>
</tbody>
</table>

### Related Documentation
- Flow-Based Sessions on page 63
- TCP Sessions on page 69
- ECMP Flow-Based Forwarding on page 79

### Fragmentation Packets with PowerMode IPsec

PowerMode IPsec (PMI) is a new mode of operation for SRX4100, SRX4200, SRX4600, SRX5400, SRX5600, SRX5800, and vSRX instances to improve IPsec performance. Starting with Junos OS Release 19.1R1, the PMI is enhanced to handle the incoming and outgoing fragment packets using first path or fast path processing.

**NOTE:** You enable PMI processing by using the `set security flow power-mode-ipsec` command. You must reboot the device to apply the statement.

### Understanding PMI First Path and Fast Path Processing

In a PMI first path processing:
- The incoming first path packet is delivered to flow to create session.
- The incoming fragment packets are delivered to flow for reassembling.
- The incoming packets are delivered to flow for advanced security service processing.

In a PMI fast path processing, the PMI driver is used:
To encrypt and send out the incoming clear text directly.
To decrypt and send out the incoming ESP packets directly with session match.

**Switching between PMI First Path and Fast Path Processing**

The first path processing involves more features and instructions, while the PMI fast path processing provides better performance. In a PMI session, the packet processing switches between first path and fast path based on the packets flow in the session.

- The PMI session with both fragment and non-fragment packets are processed by first path.
- When the session only has non-fragmented packets, the session will switch from first path to fast past processing.

**NOTE:** On SRX5400, SRX5600, and SRX5800 devices, switching happens after the NP session timeout.

**Fragmentation for Incoming IP Packets**

To support fragmentation for incoming IP packets for PMI, following steps are used in first path:

- PMI transmits all the fragmented IP packets in a session to the flow module for processing.
- PMI transmits all the non-fragmented IP packets in the same session to the flow module for packet ordering.
- The Flow module completes reassembly of fragmented packets and transmits the packets back to PMI for encryption.

**Fragmentation for Outgoing IP Packets**

To support fragmentation for outgoing IP packets for PMI, following steps are used:

- PMI detects clear text packets that requires fragmentation during session lookup and delivers packets to the flow module.
- Flow module does fragmentation for outgoing packets.
- PMI encrypts the packets before transmitting them.

**NP session support**

On SRX4100, SRX4200, and vSRX devices, fragment and non-fragment packets are hashed to the same CPU core for processing. Hence, NP session is not supported.

On SRX4600 devices with SPC3, fragment and non-fragment packets are hashed to different CPU cores for processing. Hence, NP session is supported to deliver fragment or non-fragment packets to the same core for ordering.
NOTE: If a PMI session or non-PMI session has no NP session installed due to limited NP session capacity then the packet ordering for this PMI session may not be available.

Unified Policies Support for Flow

Starting in Junos OS Release 18.2R1, unified policies are supported on SRX Series devices, allowing granular control and enforcement of dynamic Layer 7 applications within the security policy. Unified policies are the security policies that enable you to use dynamic applications as match conditions as part of the existing 5-tuple or 6-tuple (5-tuple with user firewall) match conditions to detect application changes over time.

Unified policies allow you to use dynamic application as a policy match criteria in the application. On applying Application Identification (AppID) to the traffic, the AppID checks several packets and identifies the application. After the application is identified, the final policy is applied to the session. The policy actions such as permit, deny, reject, or redirect are applied to the traffic as per the policy.

During the initial policy lookup phase, which occurs prior to a dynamic application being identified, if there are multiple policies in the potential policy list, the SRX Series device applies the default security policy until a more explicit match has occurred. The policy that best matches the application is the final policy.

- Flow First Path for Unified Policies on page 99
- Understanding Flow Fast Path on page 100
- Configuring the Session Log for the Default Security Policy on page 101
- Configuring the Session Timeout for the Default Security Policy on page 101

Flow First Path for Unified Policies

When the device examines the first packet of a flow, it determines the corresponding security policy, and performs a security policy lookup. During this process following cases are observed:

- If the traffic matches a legacy security policy or the final policy, the session is created.
- If there are multiple policies in the potential policy list and there is a security policy conflict, then the default security policy is applied.
- If there are multiple policies in the potential policy list, and the policy action does not permit the traffic, then the session is closed. A log message is generated to indicate the reason for the session closure. The default security policy is required during policy conflict stage, because each policy in the potential policy list has different configuration values for MSS, TCP SYN check, session timeout interval, and so on. In this case, when the default security policy is applied, all the values configured in that policy are applied. When a default security policy is matched, the policy actions are applied for the session.
NOTE:

- The default security policy is system-defined policy. This policy cannot be deleted.
- The default policy is created on every logical system level, similar to the global default policy.
- The session timeout interval and session log values are leveraged from the default security policy and default values such as TCP-MSS and TCP SYN are leveraged from the flow configuration.

- When a default policy is applied, a potential metadata for the policy action is allocated. The potential metadata is updated according to the potential policy list.

NOTE:

- Having a default security policy helps in resolving in the potential policy list.
- There can be many sessions matching the default security policy; however, the application services defined in the policy for the permitted traffic can be different. The security flow information for each session is saved.
- When an SRX Series device is operating in chassis cluster mode, the information is synchronized from the primary node to the secondary node along with the flow session and the chassis cluster real time objects (RTO).

- When the final application is identified, the security policy matching with the final application is applied. The subsequent packets are processed according to the final policy.

Understanding Flow Fast Path

After the first packet in a flow has traversed the device and a session has been established for it, it undergoes fast path processing. When the device examines a security flow session with default policy, it performs a security policy lookup and following cases are observed:

- If the existing Application Identification requires an update, the policy lookup process in repeated. The process is repeated until an explicit policy is returned and replaced in the security flow session. If an implicit policy is returned, the traffic is denied and the session is closed.
- When the final application is identified, the final policy matching the traffic is applied. If the policy actions in the default and the final policy are similar, the final policy replaces the default policy in the security flow session. If the policy actions in the default and the final policy are different, default policy is retained and the security flow session is closed.
NOTE: When the final and the default policy with a deny action is matched, the security flow session is closed.

- To update a session, the session timeout, log, or counter configuration in the final policy is used.

Configuring the Session Log for the Default Security Policy

The default security policy is required to manage policy conflicts in the potential policy list. You can set the session logs for the required sessions in default security policy configurations:

You can enable logging at the end of a session and at the beginning of the session with the following commands:

1. Enable logging at the beginning of a session.

   [edit]
   user@host# set security policies pre-id-default-policy then log session-init

2. Enable logging at the end of a session.

   [edit]
   user@host# set security policies pre-id-default-policy then log session-close

Configuring the Session Timeout for the Default Security Policy

You can set the session timeout for the required sessions in default security policy configurations. You can specify the timeout values for UDP, TCP, ICMP, and ICMP6 sessions using the `set security policies pre-id-default-policy then session-timeout` command:

- Specify the timeout value in seconds for the TCP session:

   [edit]
   user@host# set security policies pre-id-default-policy then session-timeout tcp 1200

- Specify the timeout value in seconds for the UDP session:

   [edit]
   user@host# set security policies pre-id-default-policy then session-timeout udp 60

- Specify the timeout value in seconds for the ICMP session:

   [edit]
   user@host# set security policies pre-id-default-policy then session-timeout icmp 60
- Specify the timeout value in seconds for the ICMP6 session:

```bash
[edit]
user@host# set security policies pre-id-default-policy then session-timeout icmp6
120
```

### Release History Table

<table>
<thead>
<tr>
<th>Release</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.2R1</td>
<td>Starting in Junos OS Release 18.2R1, unified policies are supported on SRX Series devices, allowing granular control and enforcement of dynamic Layer 7 applications within the security policy. Unified policies are the security policies that enable you to use dynamic applications as match conditions as part of the existing 5-tuple or 6-tuple (5-tuple with user firewall) match conditions to detect application changes over time.</td>
</tr>
</tbody>
</table>

### Related Documentation
- [Flow-Based Sessions on page 63](#)
- [Understanding TAP Mode Support for Security Flow Sessions on page 102](#)
- [Example: Configuring Security Flow Sessions in TAP mode on page 103](#)

### TAP Mode for Flow Sessions

The Terminal Access Point (TAP) mode is a standby device, which checks the mirrored traffic through switch. The TAP mode inspects the incoming and outgoing traffic by configuring the TAP interface and generating a security log report to show the number of threats detected and the user usage. The security flow session configuration remains the same as non-TAP mode.

- [Understanding TAP Mode Support for Security Flow Sessions on page 102](#)
- [Example: Configuring Security Flow Sessions in TAP mode on page 103](#)

### Understanding TAP Mode Support for Security Flow Sessions

When you configure the SRX Series device to operate in TAP mode, the device generates security log information to display the information on threats detected and application usage. When the device is configured to operate in TAP mode, the SRX Series device receives packets only from the configured TAP interface. Except the configured TAP interface, other interface are configured to normal interface that is used as management interface or connected to the outside server. The SRX Series device will generate security report or log according to the incoming traffic.

Traffic with and without VLAN can be received by TAP interface. By default, on all SRX Series devices, the `FLOW SYN-check` and `sequence-check` options are disabled at `[set security]` hierarchy level.

---

**NOTE:** You can configure only one TAP interface when you operate the device in TAP mode.
Example: Configuring Security Flow Sessions in TAP mode

This example shows how to configure security flow sessions when the SRX device is configured in TAP (Terminal Access Point) mode.

- Requirements on page 103
- Overview on page 103
- Configuration on page 103
- Verification on page 104

Requirements

This example uses the following hardware and software components:

- An SRX Series device
- Junos OS Release 19.1R1

Before you begin:

- Read the SRX TAP Mode Support Overview to understand how and where this procedure fits in the overall support for security flow sessions.

Overview

In this example, you configure the security flow sessions when the SRX device is configured in TAP mode. Sessions are created when a TCP SYN packet is received and permitted by the security policy.

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter commit from configuration mode.

```
set security flow tcp-session no-syn-check
set security flow tcp-session no-sequence-check
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see Using the CLI Editor in Configuration Mode in the Junos OS CLI User Guide.

To configure security flow sessions in TAP mode:

1. Configure the security flow session.

```
user@host# set security flow tcp-session no-syn-check
user@host# set security flow tcp-session no-sequence-check
```
Results

From configuration mode, confirm your configuration by entering the `show security flow` command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
[edit]
user@host# show security flow
tcp-session {
    no-syn-check;
    no-sequence-check;
}
```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

To confirm that the configuration is working properly, perform these tasks:

-  [Verifying Security Session Configuration in TAP Mode on page 104](#)

**Verifying Security Session Configuration in TAP Mode**

**Purpose**

Verify information about security sessions.

**Action**

From operational mode, enter the `show security flow session` command.

```
user@host> show security flow session
node0:

Flow Sessions on FPC4 PIC0:
Total sessions: 0

Flow Sessions on FPC4 PIC1:
Total sessions: 0
```

**Meaning**

Displays information about all currently active security sessions on the device in TAP mode.

**See Also**

-  [SRX TAP Mode Support Overview](#)

Flow Management in SRX Series Devices Using VRF Routing Instance

-  [Virtual Routing and Forwarding Instances in SD-WAN Deployments on page 105](#)
-  [Flow Management Using VRF Routing Instance on page 105](#)
Virtual Routing and Forwarding Instances in SD-WAN Deployments

Virtual routing and forwarding (VRF) instances are required to separate the routes of each tenant from the route of other tenants and from other network traffic. SRX Series devices use VRF instances for segmenting networks for increased security and improved manageability in SD-WAN deployments. For example, you can create distinct routing domains called tenants to segment large corporate networks and segment traffic to support multiple customer networks. Each tenant has its own routing table, which enables the support for overlapping IP subnets. VRF can be used to manage routes and to forward traffic based on independent forwarding tables in VRF for a specific tenant.

In an SD-WAN deployments, a provider edge (PE) router can be both a hub device and a spoke device that receives and forwards MPLS traffic. A customer edge (CE) router is an SRX Series device that interacts with a PE router to transmit VPN traffic using VRF routing instances. The VRF instances forward each customer VPN traffic and each VRF instance contains one label to represent all the customer traffic that flows through that VRF.

Different sites that connect to a spoke-side SRX Series device can belong to the same tenant or to the same VRF routing instance. These sites send the IP traffic that is intended to reach either public Internet or remote tenant sites.

When the traffic reaches the spoke-side SRX Series device, the device identifies the VRF instance from the LAN interfaces that are connected to those sites. After security processing on this traffic, the traffic finds a route to the destination in that VRF routing table. If the destination is MPLS over next-hop-based generic routing encapsulation (GRE), the SRX Series device adds a corresponding MPLS label and forwards the packet to the hub-side device.

At the hub-side device, after receiving MPLS over GRE tunneled traffic, the SRX Series device associates the MPLS label to identify the corresponding VRF routing instance. After security processing of the traffic is complete, the device identifies whether the destination is on public Internet or reachable via MPLS next-hop.

If the destination is public Internet, Network Address Translation (NAT) converts VRF private IP address to a public IP address and establish the session. If the destination is a type of MPLS next-hop, corresponding MPLS label is added and the packet is forwarded to the remote spoke using a GRE overlay tunnel.

At the remote spoke side, after receiving the MPLS over GRE tunnel traffic, the device identifies the corresponding VRF routing-instance using the MPLS labels. Using that VRF routing instance, the SRX Series device finds the correct destination LAN interface in that VRF to forward the packet to the destination.

Flow Management Using VRF Routing Instance

An SRX Series device flow creates sessions based on 5-tuple data (source IP address, destination IP address, source port number, destination port number, and protocol
number) along with interface tokens of input interface and output interface of traffic. For example, the routing instance VRF-1 and the routing instance VRF-2 have the same 5-tuple traffic that can enter and exit through the same physical GRE tunnel. When these overlapping IP addresses from the same tunnel enter or exit through the SRX Series device, then SRX device flow cannot install multiple sessions in the database because of the conflict in session information. Additional information is required for the SRX Series device to differentiate sessions during the installation.

Starting in Junos OS Release 15.1X49-D160, SRX Series devices can use VRF information from the MPLS-tagged packets in the session key to differentiate sessions. To differentiate sessions from different VRF instances, flow uses VRF identification numbers to the existing session key to identify each VRF instance. This session key is used as one of the matching criteria during session look-up.

You can use the following matching criteria along with existing 5-tuple matching conditions in a security policy to permit or deny traffic based on given VRF:

- **Source VRF**—This is the VRF routing instance associated with the incoming interface of the packet. When an incoming MPLS packet containing a label arrives at an SRX Series device, the device decodes the label, and maps the label to the incoming interface.

- **Destination VRF**—This is the VRF routing instance associated with the final route to the destination. During the first packet processing for a new session, flow needs a destination route for routing a packet to the next-hop device or interface. Flow searches the initial routing table from either the incoming interface or from a separate RTT table until it finds the final next-hop device or interface. Once the final route entry is found, and if that route points to an MPLS next-hop device, then the destination VRF is assigned to the routing instance in which the final route is found.

**Virtual Routing and Forwarding Groups**

SD-WAN enterprise network is composed of multiple L3VPN networks as shown in Figure 11 on page 107.
L3VPN networks are identified at a site (CPE device) as a set of VRF instances. The VRF instances at a site belonging to a L3VPN network at a site are used for application policy based forwarding. SRX flow session handling has enhanced to support mid-stream traffic switching between these VRF instances based on application based steering policies. The VRF instances which are logically part of a given L3VPN network can be configured as a VRF group. Existing firewall, NAT configuration commands have been enhanced to support operations on VRF group.

The Figure 12 on page 107 describes how traffic steering within an L3VPN is done across multiple VRFs based on APBR policies.

Figure 12:
• **Security Policy** - For policy control.

• **Flow** - To search policies based on VRF group names, along with source or destination zone, source or destination IP address, and protocol. Hence, sessions are created using VRF groups as one of differentiator.

• **NAT** - To support NAT rules based on VRF group names.

• **ALG** - To create ALG sessions using VRF groups as one of differentiator.

The functionality of the VRF groups:

• It allows a session to switch between two MPLS VRFs.

• When the VRF instances are part of the same VRF group, security features such as flow, policy, NAT, or ALG modules treat the VRF instances similarly.

• When you configure the VRF groups using VRF instances, a VRF group-ID is generated. This group-ID is stored in session for identifying the VRF group of a particular VRF instance.

**Understanding VRF groups**

VRF group is introduced to support L3VPN MPLS based sessions in SD-WAN network. It is used to control the MPLS L3VPN traffic in policy, flow, NAT and ALG modules when there are overlapping or no overlapping IP network addresses in the MPLS L3VPN network.

If the traffic pass between non MPLS L3VPN networks, VRF groups are not configured. When VRF groups are not configured, the VRF group-ID will be zero or the policy will use the option `any` for VRF group.

The purpose of VRF groups is:

• To differentiate L3VPN sessions between MPLS L3VPN network.

• To have policy and NAT control between MPLS L3VPN network.

**Types of VRF groups**

There are two important VRF group in L3VPN network are:

• Source-VRF group

• Destination-VRF group

To understand which VRF instances can be grouped together for Source-VRF group or Destination-VRF group, use the following information:

• **Source-VRF instances**—List of VRF instances that negotiates different MPLS paths to the same in-bound destination.

• **Destination-VRF instances**— List of VRF instances that contain the destination routes for a given L3VPN traffic.
NOTE: If the traffic is initiated in the opposite direction, the VRF groups switch roles with respect to the direction of the traffic.

VRF Movement

From Figure 13 on page 109, the initial traffic flow for a session establishment is from left to right. The traffic enters GRE-Zone1, then enters Source-VRF group (A) and passes through Destination-VRF group (A') before it exits through GRE_Zone2.

Similarly, the policy search is initiated from GRE_Zone1->Source-VRF group(A)->Destination-VRF group->(A')->GRE_Zone2 and the flow sessions is set-up, using Source-VRF group (A) and Destination-VRF group (A') as an additional key values in sessions. When the flow sessions are done using VRF groups, traffic can switch (re-route) from one VRF to another VRF within Group.

Figure 13: VRF Movement within VRF Group

VRF group-ID

For storing the VRF group-ID, a 16-bits number is used in a session key data structure.

Configuring VRF groups

To configure a VRF group, use the following steps:

- List the VRF instances that needs to be grouped.
- Assign a name to the VRF group.
- Apply the VRF instances and the VRF group name in the CLI command `set security l3vpn vrf-group group-name vrf vrf1 vrf vrf2`

The source and destination VRF groups are configured separately based on different context.

- **Source VRF group**—The source VRF group for routing-instance is associated with MPLS packet. When the device receives a MPLS packet, the packet is decoded and...
mapped to LSI interface. The LSI interface contains the routing table information that helps in identifying the VRF group details.

- **Destination VRF group**—During first-path flow processing of packet for a new session, the destination route information is required to route the packet to the next-hop or interface. Flow searches the routing table to get the route information. When the received route information points to MPLS as next-hop, then the VRF of this route is used to identify the destination VRF group.

**NOTE:** The source and destination VRF groups are same in some cases when you prefer to control all the related VRFs in a L3VPN network.

### VRF group Operations

When a VRF group is configured, a Group-ID is created which is unique for different VRF groups. You can perform different operations such as adding, removing, or modifying a VRF to a VRF group.

**Adding VRF to a VRF group**

When a VRF is added to a VRF group, the corresponding VRF group-ID is assigned to the VRF. When you add a VRF to VRF group, remember the following:

- A VRF can be added to only one VRF group. It cannot be a part of multiple VRF groups.
- A maximum of 32 VRFs are be configured in a VRF group.
- When a VRF is added, it impacts the existing session and a new session is created as per policy.
- When new sessions are created after adding a new VRF to VRF group, the sessions use the new VRF group-ID of the new VRF.

**Removing VRF from a VRF group**

When a VRF is removed from a VRF group, the VRF group-ID of that VRF group changes to zero but the VRF will still be available in the device. When you remove a VRF from a VRF group, it impacts the existing sessions in two ways:

- **Impacting existing sessions**—When a VRF is removed from the VRF group, the existing session is removed and a new session will be created as per policy

- **Match Traffic**—When a VRF is removed from VRF group, the VRF group-ID for that VRF changes to zero and hence will not match the session. The packet drops and a new session is created as per policy.

When a VRF is removed from the VRF group, the new session that is processed using the impacted VRF installs a new VRF group-ID. This VRF group-ID will be zero, or a new Group-iD is created if you add the VRF to a new VRF group

**Modifying VRF group**

Modifying a VRF group involves the following operations:
• **Changing VRF group name:** When you change the VRF group name, the policy module scans the existing sessions to verify if the new VRF group name matches the existing rules.

• **Adding VRF to VRF group:** When a VRF is added to a VRF group, the corresponding VRF group-ID is assigned to the VRF.

• **Removing VRF from VRF group:** When a VRF is removed from a VRF group, the VRF group-ID of that VRF changes to zero and still the VRF will be available in the device.

**Removing VRF group**

When you remove a VRF group using CLI, a session scan will be performed on the existing sessions to match the VRF group that is removed. If the session match the removed VRF group, then that session is removed from the device by setting an invalid timeout. For sessions that does not match the removed VRP-Group-ID are not impacted.

**Related Documentation**

- Flow Processing using Virtual Routing and Forwarding Group on page 111

**Flow Processing using Virtual Routing and Forwarding Group**

- First Path Processing using VRF Group on page 111
- Fast Path Processing using VRF Group on page 113
- Example: Configuring a Security Policy to Permit VRF-Based Traffic from an IP Network to MPLS Network using VRF Group on page 114
- Example: Configuring a Security Policy to Permit VRF-Based Traffic from MPLS Network to an IP Network using VRF Group on page 117
- Example: Configuring a Security Policy to Permit VRF-Based Traffic from Public IP Network to MPLS Network using VRF Group on page 121
- Example: Configuring a Security Policy to Permit VRF-Based Traffic from MPLS Network to Public IP Network to using VRF Group on page 126
- Example: Configuring a Security Policy to Permit VRF-Based Traffic from MPLS Network to MPLS Network without NAT using VRF Group on page 132
- Example: Configuring a Security Policy to Permit VRF-Based Traffic from MPLS Network to MPLS Network using NAT and VRF Group on page 135

**First Path Processing using VRF Group**

To process a packet, the first path processing performs the following:

- **MPLS Decoder**—When flow receives a MPLS or non-MPLS packet, the packet is processed to retrieve the details of the incoming packet, interface, and routing-instance of the incoming interface.

- **FBF configuration**—When you configure FBF rules to re-direct the incoming packets to different routing-instance, the FBF rule finds the routing-instance information and pass the FBF routing-instance information instead of packet incoming interface routing-instance. This FBF VRF should be a part of VRF group to control the L3VPN network.
• **Initialize Routing-Table**—When the flow receives the packet, the initial routing-table for the packet is created. If the FBF configuration matches the firewall filters, then the routing-instance information from FBF is used for route look-up. Else, flow uses the incoming interface routing-instance information for route look-up.

• **Finding Source VRF group**—If the incoming packet is from MPLS network, then the packet is mapped to the VRF instance of source VRF group. If the incoming packet is not MPLS packet, then the source VRF group id is zero.

• **Destination NAT using VRF group**—Flow checks if the destination IP needs NAT translation. Destination NAT supports two types of match criteria for VRF:
  - NAT rule search using VRF routing-group.
  - NAT rule result using VRF routing-instance and NAT information.

• **Destination Route**—The route look-up which is done in initial route table is used to identify the outgoing interface and destination-VRF information. This information is used in policy search and session installation.

• **Final next-hop**—The first step in finding destination route is to find final the next-hop of the pointed route. Using this next-hop, flow will check if the next-hop points to MPLS network or not. If it is not pointing to MPLS network, the destination VRF group will be zero.

• **Destination VRF group**—When the destination VRF is identified, the destination VRF Group-ID is initialized. If the destination VRF is not assigned to any group, it is set to zero.

• **First Path Policy Search**—Flow performs policy search to check if the packet needs to be permitted or denied. Flow gathers the 5-tuple policy-key information and VRF information and this information is used by policy search module to find the appropriate VRF policy.

• **Source NAT using VRF group**—Flow session does source NAT using source VRF group NAT rule search. Source-NAT supports two types of NAT search criteria.
  - Source-NAT rule search using VRF group.
  - Static-NAT rule search using VRF group or VRF instance.

• **Static NAT using VRF group or VRF instance**—Static NAT supports routing-group in rule-set and routing-instance in rule with VRF type.
  - When static NAT matches as destination NAT translation for a given IP packet, the VRF routing-group will be one of the match criteria and the VRF routing-instance will be used as destination routing table.
  - When static NAT matches as source NAT translation for a given IP packet, the VRF routing-instance will be one of the match criteria.

• **Session Installation using VRF group**—During session installation process, source VRF group-ID is stored in forward-wing indicating that the wing points MPLS network. The
destination VRF group-ID that is found from route look-up is stored in reverse-wing indicating that the wing points MPLS network.

- Re-routing using VRF group—Once the session is established using VRF group information, re-route is initiated if the interface is down or initial route is not available. These changed routes should be part of same VRF group (Source-VRF group/Destination-VRF group), in which the session is initially established on either side. Else, traffic will not match session and future traffic of session might get dropped or create new sessions as per policy.

Fast Path Processing using VRF Group

The fast path processing performs the following steps to process a packet.

- **MPLS Decoder**—When a packet MPLS or non-MPLS packet is received, the packet undergoes MPLS processing. When the processing is complete, the flow receives the details of the incoming packet, interface, and routing-instance of the incoming interface.

- **FBF configuration**—When you configure FBF rules to re-direct the incoming packets to different routing-instance, the FBF rule finds the routing-instance information and pass the FBF routing-instance information instead of packet incoming interface routing-instance. This FBF VRF should be a part of VRF group to control the L3VPN network.

- **Session look-up using VRF Group-ID**—During session look-up process, flow checks whether to pass the VRF Group-ID in session key for look-up. If the incoming interface is MPLS, flow will pass the VRF Group-ID information of the mapped VRF routing-instance to session key along with other key tuple information. If the incoming interface is not MPLS, the VRF Group-ID will be zero.

- **Session Route change**—If the route changes for session in mid-stream, flow checks for the new VRF that belongs to this route. If the new VRF Group-ID differs from the VRF Group-ID of the session, then the route will not be processed and the future packets are dropped. Hence, for re-routing the new route should belong to a VRF that belongs to session VRF Group.

- **VRF Group policy change**—When VRF group session policy is changed due to policy attributes such as zone/interface/IP/Source-VRF group/Destination-VRF group, the policy will be re-matched for the same session by supplying policy 5-tuple along with source VRF group and destination VRF group values to check if the policy is valid or not. Upon re-match, if policy does not match the session information, then the session terminates.

- **VRF session display**—Source-VRF Group and Destination-VRF Group are displayed in session output display to differentiate different VRF group for the same tuple.

- **High Availability**—High availability is supported with no behavior change when additional VRF group-ID information is synchronized to the HA peer node for differentiating different VRF group in the session
Example: Configuring a Security Policy to Permit VRF-Based Traffic from an IP Network to MPLS Network using VRF Group

This example shows how to configure a security policy to permit traffic from a private IP network to MPLS network using VRF group.

- Requirements on page 114
- Overview on page 114
- Configuration on page 114

Requirements

- Understand how to create a security zone. See Example: Creating Security Zones.
- Supported SRX Series device with Junos OS Release 15.1X49-D170 or later. This configuration example is tested for Junos OS Release 15.1X49-D170.

Overview

In Junos OS, security policies enforce rules for transit traffic, in terms of what traffic can pass through the device and the actions that need to take place on the traffic as it passes through the device. In Figure 14 on page 114, an SRX Series device is deployed in an SD-WAN to permit the traffic from a private IP network to MPLS network using VRF group.

Figure 14: Traffic from Private Network to MPLS

This configuration example shows how to:

- Permit traffic from IP network (LAN-a) to VRF group
- Permit traffic from IP network (LAN-b) to VRF group

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter commit from configuration mode.
set security l3vpn vrf-group vpn-A vrf VRF-A1
set security l3vpn vrf-group vpn-A vrf VRF-A2
set security l3vpn vrf-group vpn-A1 vrf VRF-A1
set security l3vpn vrf-group vpn-A1 vrf VRF-A2
set security l3vpn vrf-group vpn-A1 vrf VRF-B1
set security l3vpn vrf-group vpn-A1 vrf VRF-B2
set security l3vpn vrf-group vpn-A1 vrf VRF-B1
set security l3vpn vrf-group vpn-A1 vrf VRF-B2
set security policies from-zone LAN-a Zone to-zone GRE_Zone policy vrf-a_policymatch
   source-address any
   set security policies from-zone LAN-a Zone to-zone GRE_Zone policy vrf-a_policymatch
   destination-address any
   set security policies from-zone LAN-a Zone to-zone GRE_Zone policy vrf-a_policymatch
   application any
   set security policies from-zone LAN-a Zone to-zone GRE_Zone policy vrf-a_policymatch
   destination-l3vpn-vrf-group vpn-A1
   set security policies from-zone LAN-a Zone to-zone GRE_Zone policy vrf-a_policy then
   permit
   set security policies from-zone LAN-b Zone to-zone GRE_Zone policy vrf-b_policymatch
   source-address any
   set security policies from-zone LAN-b Zone to-zone GRE_Zone policy vrf-b_policymatch
   destination-address any
   set security policies from-zone LAN-b Zone to-zone GRE_Zone policy vrf-b_policymatch
   application any
   set security policies from-zone LAN-b Zone to-zone GRE_Zone policy vrf-b_policymatch
   destination-l3vpn-vrf-group vpn-B1
   set security policies from-zone LAN-b Zone to-zone GRE_Zone policy vrf-b_policy then
   permit

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see Using the CLI Editor in Configuration Mode in the CLI User Guide.

1. Create VRF group vpn-A with VRF instances A1 and A2

   [edit security]
   user@host# set l3vpn vrf-group vpn-A vrf VRF-A1
   user@host# set l3vpn vrf-group vpn-A vrf VRF-A2

2. Create VRF group vpn-A1 with VRF instances A11, and A21

   [edit security]
   user@host# set l3vpn vrf-group vpn-A1 vrf VRF-A11
   user@host# set l3vpn vrf-group vpn-A1 vrf VRF-A21

3. Create VRF group vpn-B with VRF instances B1 and B2

   [edit security]
   user@host# set l3vpn VRF group vpn-B vrf VRF-B1
   user@host# set l3vpn VRF group vpn-B vrf VRF-B2
4. Create VRF group vpn-B1 with VRF instances B11 and B21

```
[edit security]
user@host# set l3vpn vrf-group vpn-B1 vrf VRF-B11
user@host# set l3vpn vrf-group vpn-B1 vrf VRF-B21
```

5. Create a security policy to permit vrf-a traffic.

```
[edit security policies from-zone LAN-a_Zone to-zone GRE_Zone]
user@host# set policy vrf-a_policy match source-address any
user@host# set policy vrf-a_policy match destination-address any
user@host# set policy vrf-a_policy match application any
user@host# set policy vrf-a_policy match destination-l3vpn-vrf-group vpn-A1
user@host# set policy vrf-a_policy then permit
```

6. Create a security policy to permit vrf-b traffic.

```
[edit security policies from-zone LAN-a_Zone to-zone GRE_Zone]
user@host# set policy vrf-b_policy match source-address any
user@host# set policy vrf-b_policy match destination-address any
user@host# set policy vrf-b_policy match application any
user@host# set policy vrf-b_policy match destination-l3vpn-vrf-group vpn-B1
user@host# set policy vrf-b_policy then permit
```

Results  From configuration mode, confirm your configuration by entering the `show security policies` command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show security policies
from-zone LAN-a_Zone to-zone GRE_Zone {
  policy vrf-a_policy {
    match {
      source-address any;
      destination-address any;
      application any;
      source-l3vpn-VRF group vpn-A1;
    }
    then {
      permit;
    }
  }
}
from-zone LAN-b_Zone to-zone GRE_Zone {
  policy vrf-b_policy {
    match {
      source-address any;
      destination-address any;
      application any;
      source-l3vpn-VRF group vpn-B1;
    }
  }
```

Copyright © 2019, Juniper Networks, Inc.
then {
    permit;
}

If you are done configuring the device, enter commit from configuration mode.

**Verification**

**Verifying Policy Configuration**

**Purpose**
Verify information about security policies.

**Action**
From operational mode, enter the `show security policies` command to display a summary of all the security policies configured on the device.

```
user@root> show security policies
Default policy: permit-all
From zone: LAN-a_Zone, To zone: GRE_Zone
    Policy: vrf-a_policy, State: enabled, Index: 4, Scope Policy: 0, Sequence number: 1
        Source L3VPN vrf-group: vpn-A1
        destination L3VPN VRF Group: any
        Source addresses: any
        Destination addresses: any
        Applications: any
        Action: permit
From zone: LAN-b_Zone, To zone: GRE_Zone
    Policy: vrf-b_policy, State: enabled, Index: 5, Scope Policy: 0, Sequence number: 2
        Source L3VPN vrf-group: vpn-B1
        destination L3VPN VRF Group: any
        Source addresses: any
        Destination addresses: any
        Applications: any
        Action: permit
```

**Example: Configuring a Security Policy to Permit VRF-Based Traffic from MPLS Network to an IP Network using VRF Group**

This example shows how to configure a security policy to permit traffic from MPLS to IP network using the VRF group.

- Requirements on page 117
- Overview on page 118
- Configuration on page 118

**Requirements**
- Understand how to create a security zone. See Example: Creating Security Zones.
• Supported SRX Series device with Junos OS Release 15.1X49-D170 or later. This configuration example is tested for Junos OS Release 15.1X49-D170.

Overview

In Junos OS, security policies enforce rules for transit traffic, in terms of what traffic can pass through the device and the actions that need to take place on the traffic as it passes through the device. In Figure 15 on page 118, an SRX Series device is deployed in an SD-WAN to permit traffic from a MPLS network to private network using VRF group.

Figure 15: Traffic Permit from MPLS to Private Network

This configuration example shows how to:
• Permit traffic from GRE MPLS to LAN-a
• Permit traffic from GRE MPLS to LAN-b

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter commit from configuration mode.

```
set security l3vpn vrf-group vpn-A vrf VRF-A1
set security l3vpn vrf-group vpn-A vrf VRF-A2
set security l3vpn vrf-group vpn-B vrf VRF-B1
set security l3vpn vrf-group vpn-B vrf VRF-B2
set security policies from-zone GRE_Zone to-zone LAN-a_Zone policy vrf-a_policy match source-address any
set security policies from-zone GRE_Zone to-zone LAN-a_Zone policy vrf-a_policy match destination-address any
set security policies from-zone GRE_Zone to-zone LAN-a_Zone policy vrf-a_policy match application any
```
set security policies from-zone GRE_Zone to-zone LAN-a_Zone policy vrf-a_policy
set security policies from-zone GRE_Zone to-zone LAN-a_Zone policy vrf-a_policy then
permit
set security policies from-zone GRE_Zone to-zone LAN-b_Zone policy vrf-b_policy
set security policies from-zone GRE_Zone to-zone LAN-b_Zone policy vrf-b_policy match
source-address any
set security policies from-zone GRE_Zone to-zone LAN-b_Zone policy vrf-b_policy match
destination-address any
set security policies from-zone GRE_Zone to-zone LAN-b_Zone policy vrf-b_policy match
application any
set security policies from-zone GRE_Zone to-zone LAN-b_Zone policy vrf-b_policy match
source-l3vpn-vrf-group vpn-B
set security policies from-zone GRE_Zone to-zone LAN-b_Zone policy vrf-b_policy then
permit

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see Using the CLI Editor in Configuration Mode in the CLI User Guide.

1. Create VRF group vpn-A with VRF instances A1 and A2.

   [edit security]
   user@host# set l3vpn vrf-group vpn-A vrf VRF-A1
   user@host# set l3vpn vrf-group vpn-A vrf VRF-A2

2. Create VRF group vpn-B with VRF instances B1 and B2.

   [edit security]
   user@host# set l3vpn vrf-group vpn-B vrf VRF-B1
   user@host# set l3vpn vrf-group vpn-B vrf VRF-B2

3. Create a security policy to permit VRF-a traffic.

   [edit security policies from-zone GRE_Zone to-zone LAN-a_Zone]
   user@host# set policy vrf-a_policy match source-address any
   user@host# set policy vrf-a_policy match destination-address any
   user@host# set policy vrf-a_policy match application any
   user@host# set policy vrf-a_policy match source-l3vpn-vrf-group vpn-A
   user@host# set policy vrf-a_policy then permit

4. Create a security policy to permit VRF-b traffic.

   [edit security policies from-zone GRE_Zone to-zone LAN-b_Zone]
   user@host# set policy vrf-b_policy match source-address any
   user@host# set policy vrf-b_policy match destination-address any
   user@host# set policy vrf-b_policy match application any
   user@host# set policy vrf-b_policy match destination-l3vpn-vrf-group vpn-B
   user@host# set policy vrf-b_policy then permit
Results  From configuration mode, confirm your configuration by entering the show security policies command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show security policies
from-zone GRE_Zone to-zone LAN-a_Zone {
  policy vrf-a_policy {
    match {
      source-address any;
      destination-address any;
      application any;
      destination-l3vpn-vrf-group vpn-A;
    }
    then {
      permit;
    }
  }
}
from-zone GRE_Zone to-zone LAN-b_Zone {
  policy vrf-b_policy {
    match {
      source-address any;
      destination-address any;
      application any;
      destination-l3vpn-vrf-group vpn-B;
    }
    then {
      permit;
    }
  }
}
```

If you are done configuring the device, enter commit from configuration mode.

Verification

Verifying Policy Configuration

Purpose  Verify information about security policies.

Action  From operational mode, enter the show security policies command to display a summary of all the security policies configured on the device.

```
user@root> show security policies
Default policy: permit-all
From zone: GRE_Zone, To zone: LAN-a_Zone
Policy: vrf-a_policy, State: enabled, Index: 4, Scope Policy: 0, Sequence number: 1
  Source L3VPN VRF-Group: any
destination L3VPN VRF Group: vpn-A
Source addresses: any
Destination addresses: any
Applications: any
```

Example: Configuring a Security Policy to Permit VRF-Based Traffic from Public IP Network to MPLS Network using VRF Group

This example describes how to configure the destination NAT rule to translate incoming public IP network to MPLS network using VRF group.

- Requirements on page 121
- Overview on page 121
- Configuration on page 122
- Verification on page 125

Requirements

- Understand how SRX Series devices work in an SD-WAN deployment for NAT.
- Understand Virtual Routing and Forwarding Instances. See “Virtual Routing and Forwarding Instances in SD-WAN Deployments” on page 105.

Overview

In Figure 16 on page 121, an SRX Series device is configured with destination NAT rule to translate incoming public IP network to per VRF based destination routing table and IP. The SRX Series device is configured with two VRF groups, vpn-A and vpn-B.

Figure 16: Traffic Permit from Public Network to MPLS
Flow-Based and Packet-Based Processing Feature Guide for Security Devices

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter commit from configuration mode.

```plaintext
set security l3vpn vrf-group vpn-A vrf VRF-A1
set security l3vpn vrf-group vpn-A vrf VRF-A2
set security l3vpn vrf-group vpn-B vrf VRF-B1
set security l3vpn vrf-group vpn-B vrf VRF-B2
set security nat destination pool vrf-a_p routing-instance VRF-a
set security nat destination pool vrf-a_p address 192.168.1.200
set security nat destination rule-set rs from interface ge-0/0/1.0
set security nat destination rule-set rs rule vrf-a_r match destination-address 203.0.113.200
set security nat destination rule-set rs rule vrf-a_r then destination-nat pool vrf-a_p
set security nat destination pool vrf-b_p routing-instance VRF-b
set security nat destination pool vrf-b_p address 192.168.1.201
set security nat destination rule-set rs from interface ge-0/0/1.1
set security nat destination rule-set rs rule vrf-b_r match destination-address 203.0.113.201
set security nat destination rule-set rs rule vrf-b_r then destination-nat pool vrf-b_p
set security policies from-zone GE_Zone to-zone GRE_Zone policy vrf-a_rule permit
source-address any
set security policies from-zone GE_Zone to-zone GRE_Zone policy vrf-a_rule permit
destination-address any
set security policies from-zone GE_Zone to-zone GRE_Zone policy vrf-a_rule permit
application any
set security policies from-zone GE_Zone to-zone GRE_Zone policy vrf-a_rule permit
source-l3vpn-vrf-group vpn-A
set security policies from-zone GE_Zone to-zone GRE_Zone policy vrf-a_rule permit
then permit
set security policies from-zone GE_Zone to-zone GRE_Zone policy vrf-b_rule permit
source-address any
set security policies from-zone GE_Zone to-zone GRE_Zone policy vrf-b_rule permit
destination-address any
set security policies from-zone GE_Zone to-zone GRE_Zone policy vrf-b_rule permit
application any
set security policies from-zone GE_Zone to-zone GRE_Zone policy vrf-b_rule permit
source-l3vpn-vrf-group vpn-B
set security policies from-zone GE_Zone to-zone GRE_Zone policy vrf-b_rule permit
then permit
```

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see Using the CLI Editor in Configuration Mode in the CLI User Guide.

To configure destination NAT mapping for a single VRF:

1. In Layer 3 VPNs create a VRF group vpn-A with VRF instances A1 and A2.

```
[edit security]
user@host#set l3vpn vrf-group vpn-A vrf VRF-A1
user@host#set l3vpn vrf-group vpn-A vrf VRF-A2
```
2. Create another VRF group vpn-B with VRF instances B1 and B2.

[edit security]
user@host# set l3vpn vrf-group vpn-B vrf VRF-B1
user@host# set l3vpn vrf-group vpn-B vrf VRF-B2

3. Specify a destination NAT IP address pool.

[edit security nat destination]
user@host# set pool vrf-a_p address 192.168.1.200
user@host# set pool vrf-b_p address 192.168.1.201

4. Assign the routing instance to the destination pool.

[edit security nat destination]
user@host# set pool vrf-a_p routing-instance VRF-a
user@host# set pool vrf-b_p routing-instance VRF-b

5. Create a destination NAT rule set.

[edit security nat destination]
user@host# set rule-set rs from routing-group vpn-A
user@host# set rule-set rs from routing-group vpn-B
user@host# set rule-set rs from interface ge-0/0/1.0
user@host# set rule-set rs from interface ge-0/0/1.1

6. Configure a rule that matches packets and translates the destination IP address to an IP address in the destination NAT IP address pool.

[edit security nat destination]
user@host# set rule-set rs rule vrf-a_r match destination-address 203.0.113.200
user@host# set rule-set rs rule vrf-a_r then destination-nat pool vrf-a_p
user@host# set rule-set rs rule vrf-b_r match destination-address 203.0.113.201
user@host# set rule-set rs rule vrf-b_r then destination-nat pool vrf-b_p

7. Create a security policy to permit VRF-a traffic.

[edit security policies from-zone GE_Zone to-zone GRE_Zone]
user@host# set policy vrf-a_policy match source-address any
user@host# set policy vrf-a_policy match destination-address any
user@host# set policy vrf-a_policy match application any
user@host# set policy vrf-a_policy match destination-l3vpn-vrf-group vpn-A
user@host# set policy vrf-a_policy then permit

8. Create a security policy to permit VRF-b traffic.

[edit security policies from-zone GE_Zone to-zone GRE_Zone]
user@host# set policy vrf-b_policy match source-address any
user@host# set policy vrf-b_policy match destination-address any
user@host# set policy vrf-b_policy match application any
user@host# set policy vrf-b_policy match destination-l3vpn-vrf-group vpn-B
user@host# set policy vrf-b_policy then permit

Results

From configuration mode, confirm your configuration by entering the `show security nat` and `show security policies` commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host# show security nat
destination {
pool vrf-a_p {
    routing-instance {
        VRF-a;
    }
    address 192.168.1.200/32;
}
pool vrf-b_p {
    routing-instance {
        VRF-b;
    }
    address 192.168.1.201/32;
}
rule-set rs {
    from interface [ ge-0/0/1.0 ge-0/0/1.1 ];
    rule vrf-a_r {
        match {
            destination-address 203.0.113.200/32;
        }
        then {
            destination-nat {
                pool {
                    vrf-a_p;
                }
            }
        }
    }
    rule vrf-b_r {
        match {
            destination-address 203.0.113.201/32;
        }
        then {
            destination-nat {
                pool {
                    vrf-b_p;
                }
            }
        }
    }
}
```
[edit]
user@host# show security policies
from-zone GE_Zone to-zone GRE_Zone {
    policy vrf-a_policy {
        match {
            source-address any;
            destination-address any;
            application any;
            destination-l3vpn-vrf-group vpn-A;
        }
        then {
            permit;
        }
    }
    policy vrf-b_policy {
        match {
            source-address any;
            destination-address any;
            application any;
            destination-l3vpn-vrf-group vpn-B;
        }
        then {
            permit;
        }
    }
}

If you are done configuring the device, enter commit from configuration mode.

Verification

Verifying Destination NAT Rule Usage and Security Policies

Purpose
Verify that there is traffic matching the destination NAT rule.

Action
From operational mode, enter the show security nat destination rule all command. In the Translation hits field, verify whether there is traffic that matches the destination NAT rule.

user@host> show security nat destination rule all
Total destination-nat rules: 2
Total referenced IPv4/IPv6 ip-prefixes: 2/0
Destination NAT rule: vrf-a_r                Rule-set: rs
Rule-Id                    : 1
Rule position              : 1
From interface            : ge-0/0/1.0
Destination addresses      : 203.0.113.200   - 203.0.113.200
Action                     : vrf-a_p
Translation hits           : 0
Successful sessions      : 0
Failed sessions          : 0
Number of sessions : 0
Destination NAT rule : vrf-b_r
Rule-set : rs
Rule-Id : 2
Rule position : 2
From interface : ge-0/0/1.1
Destination addresses : 203.0.113.201 - 203.0.113.201
Action : vrf-b_p
Translation hits : 0
Successful sessions : 0
Failed sessions : 0
Number of sessions : 0

From operational mode, enter the show security policies command to display a summary of all the security policies configured on the device.

user@root> show security policies
Default policy: permit-all
From zone: GE_Zone, To zone: GRE_Zone
  Policy: vrf-a_policy, State: enabled, Index: 4, Scope Policy: 0, Sequence number: 1
    Source L3VPN VRF Group: any
destination L3VPN VRF-Group: vpn-A
    Source addresses: any
    Destination addresses: any
    Applications: any
    Action: permit
From zone: GE_Zone, To zone: GRE_Zone
  Policy: vrf-b_policy, State: enabled, Index: 5, Scope Policy: 0, Sequence number: 2
    Source L3VPN VRF Group: any
destination L3VPN VRF-Group: vpn-B
    Source addresses: any
    Destination addresses: any
    Applications: any
    Action: permit

Example: Configuring a Security Policy to Permit VRF-Based Traffic from MPLS Network to Public IP Network to using VRF Group

This example describes how to configure the routing group to translate per VRF group network traffic to global IP pool.

- Requirements on page 126
- Overview on page 127
- Configuration on page 127
- Verification on page 130

Requirements

- Understand how SRX Series devices work in an SD-WAN deployment for NAT.
- Understand Virtual Routing and Forwarding Instances. See “Virtual Routing and Forwarding Instances in SD-WAN Deployments” on page 105.
Overview

In Figure 17 on page 127, an SRX Series device is configured with routing group to permit VRF group network traffic from MPLS to global IP pool. The SRX Series device is configured with two VRF groups, vpn-A and vpn-B.

Figure 17: Traffic Permit from MPLS to Public Network

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter commit from configuration mode.

```
set security l3vpn vrf-group vpn-A vrf VRF-A1
set security l3vpn vrf-group vpn-A vrf VRF-A2
set security l3vpn vrf-group vpn-B vrf VRF-B1
set security l3vpn vrf-group vpn-B vrf VRF-B2
set security nat source pool vrf-a_p address 203.0.113.200
set security nat source rule-set vrf-a_rs from routing-group vpn-A
set security nat source rule-set vrf-a_rs to zone GE_Zone
set security nat source rule-set vrf-a_rs rule1 match source-address 192.168.1.200
set security nat source rule-set vrf-a_rs rule1 then source-nat pool vrf-a_p
set security nat source pool vrf-b_p address 203.0.113.201
set security nat source rule-set vrf-b_rs from routing-group vpn-B
set security nat source rule-set vrf-b_rs to zone GE_Zone
set security nat source rule-set vrf-b_rs rule2 match source-address 192.168.1.201
set security nat source rule-set vrf-b_rs rule2 then source-nat pool vrf-b_p
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-a_policy match source-address any
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-a_policy match destination-address any
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-a_policy match application any
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-a_policy match source-l3vpn-vrf-group vpn-A
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-a_policy then permit
```
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-b_policy match source-address any
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-b_policy match destination-address any
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-b_policy match application any
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-b_policy match source-l3vpn-vrf-group vpn-B
set security policies from-zone GRE_Zone to-zone GE_Zone policy vrf-b_policy then permit

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see Using the CLI Editor in Configuration Mode in the CLI User Guide.

To configure source NAT mapping for a single VRF:

1. In Layer 3 VPNs create a VRF group vpn-A with VRF instances A1 and A2.

   [edit security]
   user@host# set l3vpn vrf-group vpn-A vrf VRF-A1
   user@host# set l3vpn vrf-group vpn-A vrf VRF-A2

2. Create another VRF group vpn-B with VRF instances B1 and B2.

   [edit security]
   user@host# set l3vpn vrf-group vpn-B vrf VRF-B1
   user@host# set l3vpn vrf-group vpn-B vrf VRF-B2

3. Specify a source NAT IP address pool.

   [edit security nat source]
   user@host# set pool vrf-a_p address 192.168.1.200
   user@host# set pool vrf-b_p address 192.168.1.201

4. Create a source NAT rule set.

   [edit security nat source]
   user@host# set rule-set rs from routing-group vpn-A
   user@host# set rule-set rs from routing-group vpn-B
   user@host# set rule-set rs to zone GE_Zone

5. Configure a rule that matches packets and translates per VRF group network traffic to global IP pool.

   [edit security nat source]
   user@host# set rule-set rs rule vrf-a_r match destination-address 203.0.113.200
   user@host# set rule-set rs rule vrf-a_r then destination-nat pool vrf-a_p
   user@host# set rule-set rs rule vrf-b_r match destination-address 203.0.113.201
   user@host# set rule-set rs rule vrf-b_r then destination-nat pool vrf-b_p
6. Create a security policy to permit vpn-A traffic.

[edit security policies from-zone GRE_Zone to-zone GE_Zone]
user@host# set policy vrf-a_policy match source-address any
user@host# set policy vrf-a_policy match destination-address any
user@host# set policy vrf-a_policy match application any
user@host# set policy vrf-a_policy match destination-l3vpn-vrf-group vpn-A
user@host# set policy vrf-a_policy then permit

7. Create a security policy to permit vpn-B traffic.

[edit security policies from-zone GRE_Zone to-zone GE_Zone]
user@host# set policy vrf-b_policy match source-address any
user@host# set policy vrf-b_policy match destination-address any
user@host# set policy vrf-b_policy match application any
user@host# set policy vrf-b_policy match destination-l3vpn-vrf-group vpn-B
user@host# set policy vrf-b_policy then permit

---

Results

From configuration mode, confirm your configuration by entering the `show security nat` and `show security policies` commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

[edit]
user@host# show security nat
source {
  pool vrf-a_p {
    address {
      203.0.113.200/32;
    }
  }
  pool vrf-b_p {
    address {
      203.0.113.201/32;
    }
  }
}
rule-set vrf-a_rs {
  from routing-group vpn-A;
  to zone GE_Zone1;
  rule rule1 {
    match {
      source-address 192.168.1.200/32;
    }
    then {
      source-nat {
        pool {
          vrf-a_p;
        }
      }
    }
  }
}
Flow-Based and Packet-Based Processing Feature Guide for Security Devices

}  
rule-set vrf-b_rs [  
    from routing-group vpn-B;  
    to zone GE_Zone;  
    match {  
        source-address 192.168.1.201/32;  
    }  
    then {  
        source-nat {  
            pool {  
                vrf-b_p;  
            }  
        }  
    }  
}  
]  
[edit]  
user@host# show security policies  
from-zone GRE_Zone to-zone GE_Zone {  
    policy vrf-a_policy [  
        match {  
            source-address any;  
            destination-address any;  
            application any;  
            destination-l3vpn-vrf-group vpn-A;  
        }  
        then {  
            permit;  
        }  
    }  
    policy vrf-b_policy [  
        match {  
            source-address any;  
            destination-address any;  
            application any;  
            destination-l3vpn-vrf-group vpn-B;  
        }  
        then {  
            permit;  
        }  
    }  
}  

If you are done configuring the device, enter commit from configuration mode.

Verification

Verifying Destination NAT Rule Usage and Security Policies

Purpose Verify that there is traffic matching the source NAT rule.
**Action**

From operational mode, enter the `show security nat source rule all` command. In the Translation hits field, verify whether there is traffic that matches the source NAT rule.

```bash
user@host> show security nat source rule all
Total source-nat rules: 2
Total referenced IPv4/IPv6 ip-prefixes: 2/0
Source NAT rule      : vrf-a_r
Rule-set: rs
  Rule-Id                   : 1
  Rule position             : 1
  From routing-group        : vpn-A
  To zone                   : GE_Zone1
  Source addresses          : 203.0.113.200 - 203.0.113.200
  Action                    : vrf-a_p
  Translation hits          : 0
  Successful sessions       : 0
  Failed sessions           : 0
  Number of sessions        : 0
Source NAT rule      : vrf-b_r
Rule-set: rs
  Rule-Id                   : 2
  Rule position             : 2
  From routing-group        : vpn-A
  To zone                   : GE_Zone
  Destination addresses     : 203.0.113.201 - 203.0.113.201
  Action                    : vrf-b_p
  Translation hits          : 0
  Successful sessions       : 0
  Failed sessions           : 0
  Number of sessions        : 0
```

From operational mode, enter the `show security policies` command to display a summary of all the security policies configured on the device.

```bash
user@root> show security policies
Default policy: permit-all
From zone: GRE_Zone, To zone: GE_Zone
Policy: vrf-a_policy, State: enabled, Index: 4, Scope Policy: 0, Sequence number: 1
  Source L3VPN VRF Group: any
destination L3VPN VRF Group: vpn-A
Source addresses: any
Destination addresses: any
Applications: any
Action: permit
From zone: GRE_Zone, To zone: GE_Zone
Policy: vrf-b_policy, State: enabled, Index: 5, Scope Policy: 0, Sequence number: 2
  Source L3VPN VRF Group: any
destination L3VPN VRF Group: vpn-B
Source addresses: any
Destination addresses: any
Applications: any
Action: permit
```
Example: Configuring a Security Policy to Permit VRF-Based Traffic from MPLS Network to MPLS Network without NAT using VRF Group

This example describes how to configure the routing group to permit traffic between MPLS networks without using NAT.

- Requirements on page 132
- Overview on page 132
- Configuration on page 132
- Verification on page 135

Requirements

- Understand how SRX Series devices work in an SD-WAN deployment for NAT.
- Understand Virtual Routing and Forwarding Instances. See “Virtual Routing and Forwarding Instances in SD-WAN Deployments” on page 105.

Overview

In Figure 18 on page 132, an SRX Series device is configured with routing group to permit traffic between MPLS networks without using NAT. The SRX Series device is configured with two VRF groups, vpn-A and vpn-B.

Figure 18: Traffic between MPLS Networks

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter commit from configuration mode.

```
set security l3vpn vrf-group vpn-A vrf VRF-A1
set security l3vpn vrf-group vpn-A vrf VRF-A2
set security l3vpn vrf-group vpn-A vrf VRF-A11
set security l3vpn vrf-group vpn-A vrf VRF-A12
```
Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see Using the CLI Editor in Configuration Mode in the CLI User Guide.

To configure source NAT mapping for a single VRF:

1. In Layer 3 VPNs create a VRF group vpn-A with VRF instances A1 and A2.

   ```
   [edit security]
   user@host#set l3vpn vrf-group vpn-A vrf VRF-A1
   user@host#set l3vpn vrf-group vpn-A vrf VRF-A2
   ```

2. In Layer 3 VPNs create a VRF group vpn-A1 with VRF instances A11 and A12.

   ```
   [edit security]
   user@host#set l3vpn vrf-group vpn-A1 vrf VRF-A11
   user@host#set l3vpn vrf-group vpn-A1 vrf VRF-A12
   ```

3. Create another VRF group vpn-B with VRF instances B1 and B2.

   ```
   [edit security]
   user@host#set l3vpn vrf-group vpn-B vrf VRF-B1
   user@host#set l3vpn vrf-group vpn-B vrf VRF-B2
   ```

4. Create another VRF group vpn-B1 with VRF instances B11 and B12.
5. Create a security policy to permit vpn-A1 traffic.

[edit security policies from-zone GRE-1_Zone to-zone GRE-2_Zone]
user@host# set policy vrf-a_policy match source-address any
user@host# set policy vrf-a_policy match destination-address any
user@host# set policy vrf-a_policy match application any
user@host# set policy vrf-a_policy match destination-l3vpn-vrf-group vpn-A1
user@host# set policy vrf-a_policy then permit

6. Create a security policy to permit vpn-B1 traffic.

[edit security policies from-zone GRE-1_Zone to-zone GRE-2_Zone]
user@host# set policy vrf-b_policy match source-address any
user@host# set policy vrf-b_policy match destination-address any
user@host# set policy vrf-b_policy match application any
user@host# set policy vrf-b_policy match destination-l3vpn-vrf-group vpn-B1
user@host# set policy vrf-b_policy then permit

Results

From configuration mode, confirm your configuration by entering the `show security policies` command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.
permit;
}
}
}

If you are done configuring the device, enter `commit` from configuration mode.

**Verification**

**Verifying Security Policies**

**Purpose**
Verify that configuration output of security policies.

**Action**
From operational mode, enter the `show security policies` command to display a summary of all the security policies configured on the device.

```
user@root> show security policies
Default policy: permit-all
From zone: GRE-1_Zone, To zone: GRE-2_Zone
  Policy: vrf-a_policy, State: enabled, Index: 4, Scope Policy: 0, Sequence number: 1
      Source L3VPN VRF Group: any
      destination L3VPN VRF-Group: vpn-A1
      Source addresses: any
      Destination addresses: any
      Applications: any
      Action: permit
From zone: GRE-1_Zone, To zone: GRE-2_Zone
  Policy: vrf-b_policy, State: enabled, Index: 5, Scope Policy: 0, Sequence number: 2
      Source L3VPN VRF Group: any
      destination L3VPN VRF-Group: vpn-B1
      Source addresses: any
      Destination addresses: any
      Applications: any
      Action: permit
```

**Example:** Configuring a Security Policy to Permit VRF-Based Traffic from MPLS Network to MPLS Network using NAT and VRF Group

This example describes how to configure the routing group and permit traffic between MPLS networks using NAT.

- Requirements on page 135
- Overview on page 136
- Configuration on page 136
- Verification on page 140

**Requirements**
- Understand how SRX Series devices work in an SD-WAN deployment for NAT.
- Understand Virtual Routing and Forwarding Instances. See “Virtual Routing and Forwarding Instances in SD-WAN Deployments” on page 105.

**Overview**

In Figure 19 on page 136, an SRX Series device is configured the routing group and permit traffic between MPLS networks using NAT. The SRX Series device is configured with the VRF groups, vpn-A, vpn-A1, vpn-B, and vpn-B1.

*Figure 19: Traffic Permit between MPLS Networks with NAT*

**Configuration**

**CLI Quick Configuration**

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set security l3vpn vrf-group vpn-A vrf VRF-A1
set security l3vpn vrf-group vpn-A vrf VRF-A2
set security l3vpn vrf-group vpn-A vrf VRF-A11
set security l3vpn vrf-group vpn-A1 vrf VRF-A112
set security l3vpn vrf-group vpn-B vrf VRF-B1
set security l3vpn vrf-group vpn-B vrf VRF-B2
set security l3vpn vrf-group vpn-B1 vrf VRF-B11
set security l3vpn vrf-group vpn-B1 vrf VRF-B12
set security nat source pool vrf-a_p address 203.0.113.200
set security nat source rule-set vrf-a_rs from routing-group vpn-A
set security nat source rule-set vrf-a_rs to routing-group vpn-A1
set security nat source rule-set vrf-a_rs rule rule1 match source-address 192.168.1.200
set security nat source rule-set vrf-a_rs rule rule1 then source-nat pool vrf-a_p
set security nat source pool vrf-b_p address 203.0.113.201
set security nat source rule-set vrf-b_rs from routing-group vpn-B
set security nat source rule-set vrf-b_rs to routing-group vpn-B1
set security nat source rule-set vrf-b_rs rule rule2 match source-address 192.168.1.201
set security nat source rule-set vrf-b_rs rule rule2 then source-nat pool vrf-b_p
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-a_policy match source-address any
```
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-a_policy match destination-address any
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-a_policy match application any
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-a_policy match source-l3vpn-vrf-group vpn-A1
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-a_policy then permit
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-b_policy match destination-address any
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-b_policy match source-address any
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-b_policy match destination-address any
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-b_policy match application any
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-b_policy match source-l3vpn-vrf-group vpn-B1
set security policies from-zone GRE-1_Zone to-zone GRE-2_Zone policy vrf-b_policy then permit

**Step-by-Step Procedure**

The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure source NAT mapping for a single VRF:

1. In Layer 3 VPNs create a VRF group vpn-A with VRF instances A1 and A2.

   [edit security]
   user@host#set l3vpn vrf-group vpn-A vrf VRF-A1
   user@host#set l3vpn vrf-group vpn-A vrf VRF-A2

2. In Layer 3 VPNs create a VRF group vpn-A1 with VRF instances A11 and A12.

   [edit security]
   user@host#set l3vpn vrf-group vpn-A1 vrf VRF-A11
   user@host#set l3vpn vrf-group vpn-A1 vrf VRF-A12

3. Create another VRF group vpn-B with VRF instances B1 and B2.

   [edit security]
   user@host#set l3vpn vrf-group vpn-B vrf VRF-B1
   user@host#set l3vpn vrf-group vpn-B vrf VRF-B2

4. Create another VRF group vpn-B1 with VRF instances B11 and B12.

   [edit security]
   user@host#set l3vpn vrf-group vpn-B1 vrf VRF-B11
   user@host#set l3vpn vrf-group vpn-B1 vrf VRF-B12
5. Specify a source NAT IP address pool.

[edit security nat source]
user@host# set pool vrf-a_p address 192.168.1.200
user@host# set pool vrf-b_p address 192.168.1.201

6. Create a source NAT rule set.

[edit security nat source]
user@host# set rule-set rs from routing-group vpn-A
user@host# set rule-set rs from routing-group vpn-B
user@host# set rule-set rs to routing-group vpn-A1
user@host# set rule-set rs to routing-group vpn-B1

7. Configure a rule that matches packets and translates per VRF group network traffic to global IP pool.

[edit security nat source]
user@host# set rule-set rs rule vrf-a_rs match destination-address 203.0.113.200
user@host# set rule-set rs rule vrf-a_rs then destination-nat pool vrf-a_p
user@host# set rule-set rs rule vrf-b_rs match destination-address 203.0.113.201
user@host# set rule-set rs rule vrf-b_rs then destination-nat pool vrf-b_p

8. Create a security policy to permit vpn-A1 traffic.

[edit security policies from-zone GRE-1_Zone to-zone GRE-2_Zone]
user@host# set policy vrf-a_policy match source-address any
user@host# set policy vrf-a_policy match destination-address any
user@host# set policy vrf-a_policy match application any
user@host# set policy vrf-a_policy match destination-l3vpn-vrf-group vpn-A1
user@host# set policy vrf-a_policy then permit

9. Create a security policy to permit vpn-B1 traffic.

[edit security policies from-zone GRE-1_Zone to-zone GRE-2_Zone]
user@host# set policy vrf-b_policy match source-address any
user@host# set policy vrf-b_policy match destination-address any
user@host# set policy vrf-b_policy match application any
user@host# set policy vrf-b_policy match destination-l3vpn-vrf-group vpn-B1
user@host# set policy vrf-b_policy then permit

Results

From configuration mode, confirm your configuration by entering the show security nat and show security policies commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.
user@host# show security nat
source {
    pool vrf-a_p {
        address {
            203.0.113.200/32;
        }
    }
    pool vrf-b_p {
        address {
            203.0.113.201/32;
        }
    }
}
rule-set vrf-a_rs {
    from routing-group vpn-A;
    to routing-group vpn-A1;
    rule rule1 {
        match {
            source-address 192.168.1.200/32;
        }
        then {
            source-nat {
                pool {
                    vrf-a_p;
                }
            }
        }
    }
}
rule-set vrf-b_rs {
    from routing-group vpn-B;
    to routing-group vpn-B1;
    match {
        source-address 192.168.1.201/32;
    }
    then {
        source-nat {
            pool {
                vrf-b_p;
            }
        }
    }
}
[edit]
user@host# show security policies
from-zone GRE-1_Zone to-zone GRE-2_Zone {
    policy vrf-a_policy {
        match {
            source-address any;
            destination-address any;
            application any;
            destination-l3vpn-vrf-group vpn-A1;
        }
    }
then {
    permit;
}
}
policy vrf-b_policy {
    match {
        source-address any;
        destination-address any;
        application any;
        destination-l3vpn-vrf-group vpn-B1;
    }
    then {
        permit;
    }
}

If you are done configuring the device, enter **commit** from configuration mode.

**Verification**

**Verifying Security Policies**

**Purpose**
Verify that there is traffic matching the source NAT rule.

**Action**
From operational mode, enter the **show security nat source rule all** command. In the Translation hits field, verify whether there is traffic that matches the destination NAT rule.

```plaintext
user@host> show security nat source rule all
Total source-nat rules: 2
Total referenced IPv4/IPv6 ip-prefixes: 2/0
Source NAT rule      : vrf-a_r
Rule-set          : rs
Rule-Id                    : 1
Rule position              : 1
From routing-group         : vpn-A
To zone                    : GE_Zone1
Source addresses         : 203.0.113.200   - 203.0.113.200
Action                     : vrf-a_p
Translation hits           : 0
Successful sessions      : 0
Failed sessions          : 0
Number of sessions         : 0
Source NAT rule      : vrf-b_r
Rule-set          : rs
Rule-Id                    : 2
Rule position              : 2
From routing-group         : vpn-A
To zone                    : GE_Zone
Destination addresses      : 203.0.113.201   - 203.0.113.201
Action                     : vrf-b_p
Translation hits           : 0
Successful sessions      : 0
```
Failed sessions : 0
Number of sessions : 0

From operational mode, enter the `show security policies` command to display a summary of all the security policies configured on the device.

```bash
user@root> show security policies
Default policy: permit-all
From zone: GRE-1_Zone, To zone: GRE-2_Zone
  Policy: vrf-a_policy, State: enabled, Index: 4, Scope Policy: 0, Sequence number: 1
    Source L3VPN VRF Group: any
    destination L3VPN VRF Group: vpn-A1
    Source addresses: any
    Destination addresses: any
    Applications: any
    Action: permit
From zone: GRE-1_Zone, To zone: GRE-2_Zone
  Policy: vrf-b_policy, State: enabled, Index: 5, Scope Policy: 0, Sequence number: 2
    Source L3VPN VRF Group: any
    destination L3VPN VRF Group: vpn-B1
    Source addresses: any
    Destination addresses: any
    Applications: any
    Action: permit
```

Related Documentation

- NAT for VRF Routing Instance
- Understanding ALG Support for VRF Routing Instance
- Configuring Security Policies for a VRF Routing Instance
CHAPTER 3

Flow-Based Processing for IPv6

- IPv6 Flow-Based Processing on page 143
- IPv6 Packets Header Overview on page 156

IPv6 Flow-Based Processing

This topic covers information on flow processing for IPv6 traffic and IPv6 sessions.

- IPv6 Advanced Flow on page 143
- Understanding IPv6 Flow Processing on SRX5400, SRX5600, and SRX5800 devices on page 145
- Enabling Flow-Based Processing for IPv6 Traffic on page 147
- Flow-Based Processing for IPv6 Traffic on Security Devices on page 149
- Using Filters to Display IPv6 Session and Flow Information for SRX Series Services Gateways on page 150

IPv6 Advanced Flow

IPv6 advanced flow adds IPv6 support for firewall, NAT, NAT-PT, multicast (local link and transit), IPsec, IDP, JSF framework, TCP Proxy, and Session manager on SRX Series devices. MIBs are not used in the IPv6 flow.

In order to avoid the impact on the current IPv4 environment, IPv6 security is used. If IPv6 security is enabled, extended sessions and gates are allocated. The existing address fields and gates are used to store the index of extended sessions or gates. If IPv6 security is disabled, IPv6 security-related resources are not allocated.

New logs are used for IPv6 flow traffic to prevent impact on performance in the existing IPv4 system.

The behavior and implementation of the IPv6 advanced flow are the same as those of IPv4 in most cases.

The implementations of sessions, gates, ip-actions, processing of multithread, distribution, locking, synchronization, serialization, ordering, packet queuing, asynchronous messaging, IKE traffic issues, sanity check, and queues for IPv6 are similar to IPv4 implementations.
Some of the differences are explained below:

- **Header Parse** IPv6 advanced flow stops parsing the headers and interprets the packet as the corresponding protocol packet if it encounters the following extension headers:
  - TCP/UDP
  - ESP/AH
  - ICMPv6

IPv6 advanced flow continues parsing headers if it encounters the following extension headers:
  - Hop-by-Hop
  - Routing and Destination, Fragment

IPv6 advanced flow interprets the packets as an unknown protocol packet if it encounters the extension header **No Next Header**

- **Sanity Checks**— IPv6 advanced flow supports the following sanity checks:
  - TCP length
  - UDP length
  - Hop-by-hop
  - IP data length error
  - Layer 3 sanity checks (for example, IP version and IP length)
  - **ICMPv6 Packets** in IPv6 advanced flow, the ICMPv6 packets share the same behavior as normal IPv6 traffic with the following exceptions:
    - Embedded ICMPv6 packet
    - Path MTU message

- **Host Inbound and Outbound Traffic** IPv6 advanced flow supports all route and management protocols running on the Routing Engine (RE), including OSPFv3, RIPng, Telnet, and SSH. Note that no flow label is used in the flow.

- **Tunnel Traffic** IPv6 advanced flow supports the following tunnel types:
  - IPv4 IP-IP
  - IPv4 GRE
  - IPv4 IPsec
  - Dual-stack lite

- **Events and Logs** The following logs are for IPv6-related flow traffic:
  - RT_FLOW_IPVX_SESSION_DENY
  - RT_FLOW_IPVX_SESSION_CREATE
• RT_FLOW_IPVX_SESSION_CLOSE

• Understanding Sessions for IPv6 Flow on page 145

**Understanding Sessions for IPv6 Flow**

This topic gives an overview of flow-based sessions.

Most packet processing occurs in the context of a flow, including management of policies, zones, and most screens. A session is created for the first packet of a flow for the following purposes:

• To store most of the security measures to be applied to the packets of the flow.
• To cache information about the state of the flow. For example, logging and counting information for a flow is cached in its session. (Also, some stateful firewall screens rely on threshold values that pertain to individual sessions or across all sessions.)
• To allocate resources required for features for the flow.
• To provide a framework for features such as Application Layer Gateways (ALGs).

**Understanding IPv6 Flow Processing on SRX5400, SRX5600, and SRX5800 devices**

This topic introduces the architecture for the SRX5400, SRX5600, and SRX5800 devices. Flow processing on these devices is similar to that on branch SRX Series devices.

These devices include I/O cards (IOCs) and Services Processing Cards (SPCs) that each contain processing units that process a packet as it traverses the device. These processing units have different responsibilities.

• A Network Processing Unit (NPU) runs on an IOC. An IOC has one or more NPUs. An NPU processes packets discretely and performs basic flow management functions.

When an IPv6 packet arrives at an IOC, the packet flow process begins.

• The NPU performs the following IPv6 sanity checks for the packet:
  • For the IPv6 basic header, it performs the following header checks:
    • Version. It verifies that the header specifies IPv6 for the version.
    • Payload length. It checks the payload length to ensure that the combined length of the IPv6 packet and the Layer 2 header is shorter than the Layer 2 frame length.
    • Hop limit. It checks to ensure that the hop limit does not specify 0 (zero).
    • Address checks. It checks to ensure that the source IP address does not specify ::0 or FF::00 and that the destination IP address does not specify ::0 or ::1.
  • The NPU performs IPv6 extension header checks, including the following:
    • Hop-by-hop options. It verifies that this is the first extension header to follow the IPv6 basic header.
    • Routing extension. It verifies that there is only one routing extension header.
- Destination options. It verifies that no more than two destination options extension headers are included.
- Fragment. It verifies that there is only one fragment header.

**NOTE:** The NPU treats any other extension header as a Layer 4 header.

- The NPU performs Layer 4 TCP, UDP, and ICMP6 protocol checks, including the following:
  - UDP. It checks to ensure that IP Payload Length packets, other than a first-fragment packet, are at least 8 bytes long.
  - TCP. It checks to ensure that IP Payload Length packets, other than a first-fragment packet, are at least 20 bytes long.
  - ICMPv6. It checks to ensure that IP Payload Length packets, other than a first-fragment packet, are at least 8 bytes long.

- If the packet specifies a TCP or a UDP protocol, the NPU creates a tuple from the packet header data using the following information:
  - Source IP address
  - Destination IP address
  - Source port
  - Destination port
  - Protocol
  - Virtual router identifier (VRID)

  The device looks up the VRID from a VRID table.

- For Internet Control Message Protocol version 6 (ICMPv6) packets, the tuple contains the same information as used for the TCP and the UDP search key, except for the source and destination port fields. The source and destination port fields are replaced with the following information extracted from the ICMPv6 packet:
  - For ICMP error packets: The pattern "0x00010001"
  - For ICMP information packets: The type, or code, field identifier

- For packets with an Authentication Header (AH) or an Encapsulating Security Payload (ESP) header, the search key is the same as that used for the TCP and the UDP tuple, except for the source and destination port fields. In this case, the security parameter index (SPI) field value is used instead of the source and destination ports. For Encapsulating Security Payload (ESP) header and Authentication Header (AH), before enhancements to the central point architecture it is hashed by the 3-tuple and the security parameter index (SPI) field, after enhancements to the central point architecture it is hashed by an IP pair.
• If a session exists for the packet's flow, the NPU sends the packet to the SPU that manages the session.

• If a matching session does not exist,
  • The NPU sends the packet information to the central point, which creates a pending session.
  • The central point selects an SPU to process the packet and create sessions for it.
  • The SPU then sends session creation messages to the central point and the ingress and egress NPUs, directing them to create a session for the packet flow.

• A central point, which can run on a dedicated SPU, or share the resources of one if there is only one SPU. A central point takes care of arbitration and allocation of resources, and it distributes sessions in an intelligent way. The central point assigns an SPU to be used for a particular session when the SPU processes the first packet of its flow.

• For SRX5000 line devices, the central point architecture is divided into two modules—the application central point and the distributed central point (DCP). The App-CP is responsible for global resource management and loading balancing, while DCP is responsible for traffic identification (global session matching). The App-CP functionality runs on the dedicated central point SPU, while the DCP functionality is distributed to the rest of the SPUs.

• One or more SPUs that run on a Services Processing Card (SPC). All flow-based services for a packet are executed on a single SPU, within the context of a session that is set up for the packet flow.

  The SPC for SRX5000 line devices has two SPUs.

  Several SPUs can be installed in a chassis.

Primarily, an SPU performs the following tasks:

• It manages the session and applies security features and other services to the packet.
• It applies packet-based stateless firewall filters, classifiers, and traffic shapers.
• If a session does not already exist for a packet, the SPU sends a request message to the NPU that performed the search for the packet's session, to direct it to add a session for it.

These discrete, cooperating parts of the system store the information identifying whether a session exists for a stream of packets and the information against which a packet is matched to determine if it belongs to an existing session.

Enabling Flow-Based Processing for IPv6 Traffic

You have the following options for handling IPv6 traffic:

• Drop—Do not forward IPv6 packets. This is the default behavior.
• Packet-based forwarding—Do not create a session and process according to packet-based features only (includes firewall filters and class of service).
Flow-based forwarding—Create a session and process according to packet-based features (including firewall filters and class of service) but also flow-based security features, such as screens and firewall security policy.

To enable flow-based processing for IPv6 traffic, modify the `mode` statement at the `[edit security forwarding-options family inet6]` hierarchy level:

```
security {
  forwarding-options {
    family {
      inet6 {
        mode flow-based;
      }
    }
  }
}
```

The following example shows the CLI commands you use to configure forwarding for IPv6 traffic:

```
[edit]
user@host# set security forwarding-options family inet6 mode?
Possible completions:
drop                 Disable forwarding
flow-based           Enable flow-based forwarding
packet-based         Enable packet-based forwarding

[edit]
user@host# set security forwarding-options family inet6 mode flow-based
user@host# show security forwarding-options
family {
  inet6 {
    mode flow-based;
  }
}
```

If you change the forwarding option mode for IPv6, you might need to perform a reboot to initialize the configuration change. Table 9 on page 148 summarizes device status upon configuration change.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Drop to flow-based</td>
<td>Yes</td>
<td>Yes</td>
<td>Dropped</td>
<td>Dropped</td>
</tr>
<tr>
<td>Drop to packet-based</td>
<td>No</td>
<td>No</td>
<td>Packet-based</td>
<td>Packet-based</td>
</tr>
<tr>
<td>Flow-based to packet-based</td>
<td>Yes</td>
<td>Yes</td>
<td>None</td>
<td>Flow sessions created</td>
</tr>
<tr>
<td>Flow-based to drop</td>
<td>Yes</td>
<td>Yes</td>
<td>None</td>
<td>Flow sessions created</td>
</tr>
</tbody>
</table>
### Table 9: Device Status Upon Configuration Change (continued)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Packet-based to flow-based</td>
<td>Yes</td>
<td>Yes</td>
<td>Packet-based</td>
<td>Packet-based</td>
</tr>
<tr>
<td>Packet-based to drop</td>
<td>No</td>
<td>No</td>
<td>Dropped</td>
<td>Dropped</td>
</tr>
</tbody>
</table>

**Flow-Based Processing for IPv6 Traffic on Security Devices**

Flow-based processing mode is required for security features such as zones, screens, and firewall policies to function. By default, the SRX Series device is enabled for flow-based forwarding for IPv6 traffic on all devices, apart from the SRX300 Series and SRX550M devices that are set to drop mode. Starting with Junos OS Release 15.1X49-D70 and Junos OS Release 17.3R1, for the SRX1500 series, SRX4100, SRX4200, SRX5400, SRX5600, SRX5800 and vSRX devices, you do not need to reboot the device when you are switching modes between flow mode, packet mode, and drop mode. For SRX300 Series and SRX550M devices, you must reboot the device when switching between flow mode, packet mode, and drop mode.

**SRX300 Series and the SRX550M Devices**

When IPv6 is configured on SRX300 Series and the SRX550M devices, the default behavior is set to drop mode because of memory constraints. In this case, you must reboot the device after changing the processing mode from the drop mode default to flow-based processing mode or packet-based processing mode—that is, between modes on these devices.

**NOTE:** For drop mode processing, the traffic is dropped directly, it is not forwarded. It differs from packet-mode processing for which the traffic is handled but no security processes are applied.

To process IPv6 traffic on SRX300 Series and the SRX550M devices, you need to configure IPv6 addresses for the transit interfaces that receive and forward the traffic. For information about the inet6 protocol family and procedures for configuring IPv6 addresses for interfaces.

**Configuring an SRX Series Device as a Border Router**

When an SRX Series device of any type is enabled for flow-based processing or drop mode, to configure the device as a border router you must change the mode to packet-based processing for MPLS. In this case, to configure the SRX device to packet mode for MPLS, use the `set security forwarding-options family mpls mode packet-based` statement.

**NOTE:** As mentioned, for SRX300 Series and the SRX550M devices, whenever you change processing modes, you must reboot the device.
Enabling Flow-Based Processing for IPv6 Traffic on SRX300 Series and SRX550M Devices

To enable flow-based forwarding for IPv6 traffic on SRX300 Series and the SRX550M devices, modify the mode at the [edit security forwarding-options family inet6] hierarchy level:

```ini
security {
    forwarding-options {
        family {
            inet6 {
                mode flow-based;
            }
        }
    }
}
```

To configure forwarding for IPv6 traffic on SRX300 Series or an SRX500M device:

1. Change the forwarding option mode for IPv6 to flow-based.

   ```
   [edit]
   user@host# security forwarding-options family inet6 mode flow-based
   ```

2. Review your configuration.

   ```
   [edit]
   user@host# show security forwarding-options family {
       inet6 {
           mode flow-based;
        }
    }
   ```

3. Commit the configuration.

   ```
   [edit]
   user@host# commit
   ```

4. Reboot the device.

   **NOTE:** For SRX300 Series and SRX500M devices, the device discards IPv6 type 0 Routing Header (RH0) packets.

Using Filters to Display IPv6 Session and Flow Information for SRX Series Services Gateways

**Purpose**

You can display flow and session information about one or more sessions with the `show security flow session` command. IPv6 sessions are included in aggregated statistics.
You can use the following filters with the `show security flow session` command: application, destination-port, destination-prefix, family, idp, interface, nat, protocol, resource-manager, session-identifier, source-port, source-prefix, and tunnel.

**NOTE:** Except for the session-identifier filter, the output of all the other filters can be viewed in brief, summary, and extensive mode. Brief mode is the default mode. The output of the session-identifier filter can be viewed only in the brief mode.

You can use the same filter options with the `clear security flow session` command to terminate sessions.

**Action** The following examples show how to use IPv6-related filters to display summaries and details for IPv6 sessions.

**NOTE:** Starting in Junos OS Release 15.1X49-D30 and Junos OS Release 17.3R1, many of these session summaries include CP session IDs.

**Filtered summary report based on family**

```
root> show security flow session summary family ?
Possible completions:
    inet     Show IPv4 sessions
    inet6    Show IPv6/IPv6-NATPT sessions
root> show security flow session summary family inet6
Flow Sessions on FPC10 PIC1:
  Valid sessions: 2
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 2
Flow Sessions on FPC10 PIC2:
  Valid sessions: 1
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 1
Flow Sessions on FPC10 PIC3:
  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 1
  Sessions in other states: 0
  Total sessions: 1
```
Filtered detailed report based on family

root> show security flow session family ?
Possible completions:
  inet                 Show IPv4 sessions
  inet6                Show IPv6/IPv6-NATPT sessions

root> show security flow session family inet6
Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Total sessions: 0

Flow Sessions on FPC10 PIC3:
Session ID: 430000026, Policy name: default-policy-00/2, Timeout: 1794, Valid
In: 2001:db8::10/64712 --> 2001:db8::4/21;tcp If: ge-7/1/0.0, Pkts: 8, Bytes: 562, CP Session ID: 430000025
Out: 2001:db8::4/21 --> 2001:db8::10/64712;tcp, If: ge-7/1/1.0, Pkts: 12, Bytes: 1014, CP Session ID: 430000025
Total sessions: 1

Filtered brief report based on family

root> show security flow session family inet brief
Flow Sessions on FPC10 PIC1:

Session ID: 410000031, Policy name: default-policy-00/2, Timeout: 48, Valid
In: 203.0.113.8/3 --> 198.51.100.11/43053;icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84, CP Session ID: 410000039
Out: 198.51.100.11/43053 --> 203.0.113.8/3;icmp, If: ge-7/1/1.0, Pkts: 0, Bytes: 0, CP Session ID: 410000039
Total sessions: 1

Flow Sessions on FPC10 PIC2:

Session ID: 420000034, Policy name: default-policy-00/2, Timeout: 48, Valid
In: 203.0.113.8/4 --> 198.51.100.11/43053;icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84, CP Session ID: 420000041
Out: 198.51.100.11/43053 --> 203.0.113.8/4;icmp, If: ge-7/1/1.0, Pkts: 0, Bytes: 0, CP Session ID: 420000041
Total sessions: 1

Flow Sessions on FPC10 PIC3:

Session ID: 430000042, Policy name: default-policy-00/2, Timeout: 44, Valid
In: 203.0.113.8/2 --> 198.51.100.11/43053;icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84, CP Session ID: 430000041
Out: 198.51.100.11/43053 --> 203.0.113.8/2;icmp, If: ge-7/1/1.0, Pkts: 0, Bytes: 0, CP Session ID: 430000041
Total sessions: 1

2001:dbf8::6:2/32
### Filtered detailed report based on an IPv6 source-prefix

```plaintext
root> show security flow session source-prefix 2001:db8:

Flow Sessions on FPC10 PIC1:

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Policy name</th>
<th>Timeout</th>
<th>Valid</th>
<th>In:</th>
<th>Out:</th>
</tr>
</thead>
<tbody>
<tr>
<td>410000066</td>
<td>default-policy-00/2</td>
<td>2</td>
<td>True</td>
<td>2001:dbf8::6:2/3 &gt; 2001:dbf8::6:2/3</td>
<td>2001:dbf8::6:2/2/7214 --&gt; 2001:dbf8::6:2/32;icmp6, If: .local..0</td>
</tr>
<tr>
<td>410000066</td>
<td>default-policy-00/2</td>
<td>2</td>
<td>True</td>
<td>2001:dbf8::6:2/4 --&gt; 2001:dbf8::6:2/4</td>
<td>2001:dbf8::6:2/2/7214 --&gt; 2001:dbf8::6:2/32;icmp6, If: .local..0</td>
</tr>
</tbody>
</table>

Total sessions: 2

Flow Sessions on FPC10 PIC2:

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Policy name</th>
<th>Timeout</th>
<th>Valid</th>
<th>In:</th>
<th>Out:</th>
</tr>
</thead>
</table>

Total sessions: 1

Flow Sessions on FPC10 PIC3:

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Policy name</th>
<th>Timeout</th>
<th>Valid</th>
<th>In:</th>
<th>Out:</th>
</tr>
</thead>
<tbody>
<tr>
<td>430000077</td>
<td>default-policy-00/2</td>
<td>28</td>
<td>True</td>
<td>2001:dbf8::6:2/3 --&gt; 2001:dbf8::6:2/3</td>
<td>2001:dbf8::6:2/2/7214 --&gt; 2001:dbf8::6:2/32;icmp6, If: .local..0</td>
</tr>
<tr>
<td>430000078</td>
<td>default-policy-00/2</td>
<td>30</td>
<td>True</td>
<td>2001:dbf8::6:2/5 --&gt; 2001:dbf8::6:2/5</td>
<td>2001:dbf8::6:2/2/7214 --&gt; 2001:dbf8::6:2/32;icmp6, If: .local..0</td>
</tr>
<tr>
<td>430000079</td>
<td>default-policy-00/2</td>
<td>2</td>
<td>True</td>
<td>2001:dbf8::6:2/5 --&gt; 2001:dbf8::6:2/5</td>
<td>2001:dbf8::6:2/2/7214 --&gt; 2001:dbf8::6:2/32;icmp6, If: .local..0</td>
</tr>
</tbody>
</table>

Total sessions: 3
```

### Multiple-filtered detailed report based on family, protocol and source-prefix

```plaintext
root> show security flow session family inet protocol icmp source-prefix 2001:db8:

Flow Sessions on FPC10 PIC1:

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Policy name</th>
<th>Timeout</th>
<th>Valid</th>
<th>In:</th>
<th>Out:</th>
</tr>
</thead>
<tbody>
<tr>
<td>410000074</td>
<td>default-policy-00/2</td>
<td>2</td>
<td>True</td>
<td>2001:dbf8::6:2/1 --&gt; 2001:dbf8::6:2/2/7214</td>
<td>2001:dbf8::6:2/2/26935;icmp, If: ge-7/1/0.0</td>
</tr>
</tbody>
</table>

```

Copyright © 2019, Juniper Networks, Inc.
Total sessions: 1

Flow Sessions on FPC10 PIC2:

Session ID: 420000075, Policy name: default-policy-00/2, Timeout: 2, Valid
In: 2001:dbf8::6:2/3 --> 2001:dbf8::6:2/26935;icmp, If: ge-7/1/0.0, Pkts: 1,
Bytes: 84, CP Session ID: 420000159
Out: 2001:dbf8::6:2/26935 --> 2001:dbf8::6:2/3;icmp, If: ge-7/1/1.0, Pkts: 1,
Bytes: 84, CP Session ID: 420000159
Total sessions: 1

Flow Sessions on FPC10 PIC3:

Session ID: 430000085, Policy name: default-policy-00/2, Timeout: 2, Valid
In: 2001:dbf8::6:2/4 --> 2001:dbf8::6:2/26935;icmp, If: ge-7/1/0.0, Pkts: 1,
Bytes: 84, CP Session ID: 430000083
Out: 2001:dbf8::6:2/26935 --> 2001:dbf8::6:2/4;icmp, If: ge-7/1/1.0, Pkts: 1,
Bytes: 84, CP Session ID: 430000083
Total sessions: 1

Clearing all sessions, including IPv6 sessions

root> clear security flow session all
This command may terminate the current session too.
Continue? [yes,no] (no) yes

0 active sessions cleared
1 active sessions cleared
1 active sessions cleared
1 active sessions cleared

Clearing only IPv6 sessions

root> clear security flow session family?
Possible completions:
inet    Clear IPv4 sessions
inet6   Clear IPv6/IPv6-NATPT sessions

root> clear security flow session family inet6

0 active sessions cleared
1 active sessions cleared
1 active sessions cleared
1 active sessions cleared
By default, the SRX Series device is enabled for flow-based forwarding for IPv6 traffic on all devices, apart from the SRX300 Series and SRX550M devices that are set to drop mode. Starting with Junos OS Release 15.1X49-D70 and Junos OS Release 17.3R1, for the SRX1500 series, SRX4100, SRX4200, SRX5400, SRX5600, SRX5800 and vSRX devices, you do not need to reboot the device when you are switching modes between flow mode, packet mode, and drop mode. For SRX300 Series and SRX550M devices, you must reboot the device when switching between flow mode, packet mode, and drop mode.

Starting in Junos OS Release 15.1X49-D30 and Junos OS Release 17.3R1, many of these session summaries include CP session IDs.

Related Documentation

- IPv6 Packets Header Overview on page 156
- The IPv6 Packet Header and SRX Series Overview on page 156
- Understanding IPv6 Packet Header Extensions on page 156
- Understanding How SRX Series Devices Handle ICMPv6 Packets on page 157

IPv6 Packets Header Overview

This topic identifies the IP version 6 (IPv6) packet header and its extensions and options.

- The IPv6 Packet Header and SRX Series Overview on page 156
- Understanding IPv6 Packet Header Extensions on page 156
- Understanding How SRX Series Devices Handle ICMPv6 Packets on page 157

The IPv6 Packet Header and SRX Series Overview

Every IPv6 packet at a minimum has a basic packet header, 40 bytes (320 bits) long. They optionally may have extension headers.

For IPv6 packets, flow processing parses the extension headers and transport layer headers in the following way:

- If the software encounters a TCP, a UDP, an ESP, an AH, or an ICMPv6 header, it parses the header and assumes that the packet payload corresponds to the specified protocol type.
- If the software encounters a hop-by-hop header, a routing and destination header, or a fragment header, it continues to parse the next extension header.
- If it encounters the no-next-header extension header, the software detects that the packet is that of an unknown protocol (protocol equals 0).
- For other extension headers, the software parses the header and identifies the packet as belonging to the protocol indicated by the extension header.

Understanding IPv6 Packet Header Extensions

IPv6 extension headers contain supplementary information used by network devices (such as routers, switches, and endpoint hosts) to decide how to direct or process an
IPv6 packet. The length of each extension header is an integer multiple of 8 octets. This allows subsequent extension headers to use 8-octet structures.

Any header followed by an extension header contains a Next Header value that identifies the extension header type. Extension headers always follow the basic IPv6 header in order as shown in Table 10 on page 157:

<table>
<thead>
<tr>
<th>Header Name</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hop-by-Hop Options</td>
<td>Specifies delivery parameters at each hop on the path to the destination host.</td>
</tr>
<tr>
<td></td>
<td>NOTE: A hop-by-hop option can appear only following the IPv6 basic header. If it is used, it should be the first extension header. It cannot appear after another extension header.</td>
</tr>
<tr>
<td>Destination Options</td>
<td>Specifies packet delivery parameters for either intermediate destination devices or the final destination host. When a packet uses this header, the Next Header value of the previous header must be 60.</td>
</tr>
<tr>
<td>Routing</td>
<td>Defines strict source routing and loose source routing for the packet. (With strict source routing, each intermediate destination device must be a single hop away. With loose source routing, intermediate destination devices can be one or more hops away.) When a packet uses this header, the Next Header value of the previous header must be 43.</td>
</tr>
<tr>
<td>Fragment</td>
<td>Specifies how to perform IPv6 fragmentation and reassembly services. When a packet uses this header, the Next Header value of the previous header must be 44.</td>
</tr>
<tr>
<td></td>
<td>A source node uses the fragment extension header to tell the destination node the size of the packet that was fragmented so that the destination node can reassemble the packet.</td>
</tr>
<tr>
<td>Authentication</td>
<td>Provides authentication, data integrity, and anti-replay protection. When a packet uses this header, the Next Header value of the previous header must be 51.</td>
</tr>
<tr>
<td>Encapsulating Security Payload</td>
<td>Provides data confidentiality, data authentication, and anti-replay protection for Encapsulated Security Payload (ESP) packets. When a packet uses this header, the Next Header value of the previous header must be 50.</td>
</tr>
<tr>
<td>Destination IP Address</td>
<td>Identifies the host device, or interface on a node, to which the IPv6 packet is to be sent.</td>
</tr>
<tr>
<td></td>
<td>NOTE: The destination address may appear twice, the first instance after the hop limit following the source IP address and the second instance after the final extension header.</td>
</tr>
</tbody>
</table>

Understanding How SRX Series Devices Handle ICMPv6 Packets

This topic explains Internet Control Message Protocol (ICMP), ICMP messages, and how Junos OS for SRX Series Services Gateways uses them.

ICMP provides a framework for reporting packet processing errors, for diagnostic purposes, and for implementation-specific functions. ICMP error messages make it possible for
one node to inform another node that something has gone wrong during the course of
data transfer. When IP version 6 (IPv6) was defined, the differences between IP version
4 (IPv4) and it were significant enough to require a new version of ICMP.

Every ICMPv6 message is preceded by an IPv6 header and zero or more IPv6 extension
headers. The ICMPv6 header is identified by a Next Header value of 58 in the immediately
preceding header. This is different from the value used to identify ICMP for IPv4. All
ICMPv6 error messages have 32 bits of type-specific data to help the packet recipient
locate the embedded invoking packet.

Most ICMPv6 packets have the same characteristics and behavior as normal IPv6 packets,
and the Junos OS flow module processes them through first path and fast-path processing
in the same way that it does normal IPv6 packets. Table 11 on page 158 shows the ICMPv6
embedded packet types that the flow module handles differently from normal ICMPv6
packets.

For these packets, the flow module uses a tuple that it creates from the embedded
ICMPv6 packet to search for a matching session. It continues to process the packet
without modifying the maximum transmission unit (MTU) until it finds a matching session,
unless it receives an ICMPv6 Packet Too Big message for the interface. In this case, it
modifies the MTU size for that interface. If the flow module does not find a matching
session or if it cannot obtain a valid IPv6 header from the embedded payload, it drops
the packet.

NOTE: A Packet Too Big message is the only kind of ICMPv6 packet that will
cause the flow module to modify an interface.

Table 11: ICMPv6 Packets That Junos OS Handles Differently from Other ICMPv6 Packets

<table>
<thead>
<tr>
<th>Message</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>01-Destination Unreachable</td>
<td>When a packet cannot be delivered because of a problem with the way it is being sent, it is useful to have a feedback mechanism that can tell the source about the problem, including the reason why delivery of the packet failed. For IPv6, the Destination Unreachable message serves this purpose. Each message includes a code that indicates the nature of the problem that caused the packet delivery to fail. It also includes all or part of the packet that could not be delivered, to help the source device resolve the problem. When the flow module encounters a Destination Unreachable ICMP packet whose embedded packet header data matches the 5-tuple data for a session, the software terminates the session.</td>
</tr>
</tbody>
</table>
Table 11: ICMPv6 Packets That Junos OS Handles Differently from Other ICMPv6 Packets (continued)

<table>
<thead>
<tr>
<th>Message</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>02-Packet Too Big</td>
<td>When the flow module receives an ICMPv6 Packet Too Big message intended for it, the flow module sends the packet to the ICMP protocol stack on the Routing Engine to engage the path maximum transmission unit (path MTU) discovery process.</td>
</tr>
<tr>
<td></td>
<td>If the Packet Too Big message does not pertain to the device but rather is a transit packet, the device attempts to match the embedded 5-tuple data with a session.</td>
</tr>
<tr>
<td></td>
<td>• If a matching session exists, the device delivers it to the source node.</td>
</tr>
<tr>
<td></td>
<td>• If a matching session does not exist, the device drops the packet</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> A Packet Too Big message is the only kind of ICMPv6 packet that will cause the flow module to modify an interface.</td>
</tr>
<tr>
<td>03-Time Exceeded</td>
<td>When the flow module receives a packet that cannot be delivered because it has exceeded the hop count specified in the basic header hop-by-hop field, it sends this message to inform the packet’s source node that the packet was discarded for this reason.</td>
</tr>
<tr>
<td>04-Parameter Problem</td>
<td>When the device finds a problem with a field in the IPv6 header or extension headers that makes it impossible for it to process the packet, the software discards it and sends this ICMPv6 message to the packet’s source node, indicating the type and location of the problem.</td>
</tr>
</tbody>
</table>
CHAPTER 4

Monitoring Flow-Based Sessions and Establishing Parameters for Error Handling

- Monitoring Security Flow Sessions on page 161
- Monitoring X2 Traffic on page 173

Monitoring Security Flow Sessions

This topic covers information for monitoring, displaying and verifying of flow sessions using operational mode commands. Thus, you can debug without having to commit or modify your running configuration.

- Monitoring Security Flow Sessions Overview on page 161
- Understanding How to Obtain Session Information for SRX Series Services Gateways on page 162
- Displaying Global Session Parameters for All SRX Series Services Gateways on page 164
- Displaying a Summary of Sessions for SRX Series Services Gateways on page 164
- Displaying Session and Flow Information About Sessions for SRX Series Services Gateways on page 165
- Displaying Session and Flow Information About a Specific Session for SRX Series Services Gateways on page 165
- Using Filters to Display Session and Flow Information for SRX Series Services Gateways on page 165
- Information Provided in Session Log Entries for SRX Series Services Gateways on page 166
- Error Handling Extensions on page 170

Monitoring Security Flow Sessions Overview

Junos OS allows you to configure and start the monitoring of flow sessions using operational mode commands. Thus, you can debug without having to commit or modify your running configuration. This approach can be especially useful when you do not want to change the state of your device by committing the configuration to turn on trace options.
To configure flow session monitoring, you must define flow filters, specify the output file, and start monitoring. Flow session monitoring does not start unless a filter (at least one) and an output file are specified. Also, defining the filters themselves does not trigger monitoring. You have to explicitly use the `monitor security flow start` and `monitor security flow stop` commands to enable and disable monitoring, respectively.

- Define flow filters—Define the flow sessions that you want to monitor using combinations of match criteria, such as source address, destination address, source port, destination port, IP protocol number, name of the incoming or outgoing interface, and the logical system name. You can delete filters using the `clear monitor security flow filter` command.

  **NOTE:** Unlike filters defined in the configuration mode, filters defined using operational mode commands are cleared when you reboot your system.

- Specify the output file—Create an output file in which the security flow monitoring information is to be saved. This file is saved in the `/var/log/` directory. You can view the contents of this file by using the `show log filename` command. Use the `monitor security flow file` command to specify output file characteristics, such as its maximum size, maximum number, and type.

- Start monitoring—Use the `monitor security flow start` command to start monitoring. Once monitoring starts, any traffic that matches the filters is saved in the specified output file in the `/var/log/` directory. The basic-datapath flag is the default flag and turns on as monitoring starts.

  Use the `monitor security flow stop` command to stop monitoring. Once monitoring stops, the basic-datapath flag is cleared.

- Display monitoring flow information—Use the `show monitoring security flow` command to display details about the monitoring operation.

  **NOTE:** You can configure flow session monitoring and debugging by using the monitoring operational mode commands and flow trace options configuration statements. These two operations cannot run in parallel. When you turn on security flow monitoring, the flow trace option session is blocked and when the flow trace option session is running, monitoring of the flow session is blocked.

### Understanding How to Obtain Session Information for SRX Series Services Gateways

You can obtain information about the sessions and packet flows active on your device, including detailed information about specific sessions. (The SRX Series device also displays information about failed sessions.) You can display this information to observe activity and for debugging purposes. For example, you can use the `show security flow session` command:

- To display a list of incoming and outgoing IP flows, including services
• To show the security attributes associated with a flow, for example, the policies that apply to traffic belonging to that flow

• To display the session timeout value, when the session became active, for how long it has been active, and if there is active traffic on the session

**NOTE:** If an interface NAT is configured and sessions are set up with the NAT using that interface IP address, whenever the interface IP address changes, the sessions set up with NAT get refreshed and new sessions will be setup with new IP address. This you can verify using `show security flow session CLI` command.

Session information can also be logged if a related policy configuration includes the logging option. For the flow session log on all SRX Series devices, policy configuration has been enhanced. Information on the packet incoming interface parameter in the session log for session-init and session-close and when a session is denied by a policy or by the application firewall is provided to meet Common Criteria (CC) Medium Robustness Protection Profiles (MRPP) compliance:

**Policy configuration**—To configure the policy for the session for which you want to log matches as log **session-init** or **session-close** and to record sessions in syslog:

- set security policies from-zone untrust to-zone trust zone policy policy13 match source-address extHost1
- set security policies from-zone untrust to-zone trust zone policy policy13 match source-address extHost1
- set security policies from-zone untrust to-zone trust zone policy policy13 match application junos-ping
- set security policies from-zone untrust to-zone trust zone policy policy13 then permit
- set security policies from-zone untrust to-zone trust zone policy policy13 then log session-init
- set security policies from-zone untrust to-zone trust zone policy policy13 then log session-close

**Example:** Flow match policy13 will record the following information in the log:

```plaintext
<14>1 2010-09-30T14:55:04.323+08:00 mrpp-srx550-dut01 RT_FLOW - RT_FLOW_SESSION_CREATE [junos@2626.192.0.2.1.40 source-address="192.0.2.1" source-port="1" destination-address="198.51.100.12" destination-port="46384" service-name="icmp" nat-source-address="192.0.2.1" nat-source-port="1" nat-destination-address="198.51.100.12" nat-destination-port="46384" src-nat-rule-name="None" dst-nat-rule-name="None" protocol-id="1" policy-name="policy1" source-zone-name="trustZone" destination-zone-name="untrustZone" session-id-32="41" packet-incoming-interface="ge-0/0/1.0"] session created
```
192.0.2.1/1 --> 198.51.100.12/46384 icmp 192.0.2.1/1 --> 198.51.100.12/46384 None None 1 policy1 trustZone untrustZone 41 ge-0/0/1.0

<14> 1 2010-09-30T14:55:07.188+08:00 mrpp-srx550-dut01 RT_FLOW - RT_FLOW_SESSION_CLOSE [junos@2626.192.0.2.1.40 reason="response received" source-address="192.0.2.1" source-port="1" destination-address="198.51.100.12" destination-port="46384" service-name="icmp" nat-source-address="192.0.2.1" nat-source-port="1" nat-destination-address="198.51.100.12" nat-destination-port="46384" src-nat-rule-name="None" dst-nat-rule-name="None" protocol-id="1" policy-name="policy1" source-zone-name="trustZone" destination-zone-name="untrustZone" session-id-32="41" packets-from-client="1" bytes-from-client="84" packets-from-server="1" bytes-from-server="84" elapsed-time="0" packet-incoming-interface="ge-0/0/1.0"] session closed response received: 192.0.2.1/1 --> 198.51.100.12/46384 icmp 192.0.2.1/1 --> 198.51.100.12/46384 None None 1 policy1 trustZone untrustZone 41 1(84) 1(84) 0 ge-0/0/1.0

Displaying Global Session Parameters for All SRX Series Services Gateways

Purpose
Obtain information about configured parameters that apply to all flows or sessions.

Action
To view session information in the CLI, enter the following command:

user@host# show security flow

Meaning
The `show security flow` configuration command displays the following information:

- **allow-dns-reply**—Identifies if unmatched incoming Domain Name System (DNS) reply packets are allowed.
- **route-change-timeout**—If enabled, displays the session timeout value to be used on a route change to a nonexistent route.
- **tcp-mss**—Shows the current configuration for the TCP maximum segment size value to be used for all TCP packets for network traffic.
- **tcp-session**—Displays all configured parameters that control session parameters.
- **syn-flood-protection-mode**—Displays the SYN Proxy mode.

Displaying a Summary of Sessions for SRX Series Services Gateways

Purpose
Determine the kinds of sessions on your device, how many of each kind there are—for example, the number of unicast sessions and multicast sessions—the number of failed sessions, the number of sessions that are currently used and the maximum number of sessions that the device supports. This command also displays the details of the sessions that are currently used. For example, valid sessions, pending sessions, invalidated sessions and sessions in other states.
Displaying Session and Flow Information About Sessions for SRX Series Services Gateways

**Purpose** Display information about all sessions on your device, including the session ID, the virtual system the session belongs to, the Network Address Translation (NAT) source pool (if source NAT is used), the configured timeout value for the session and its standard timeout, and the session start time and how long the session has been active. The display also shows all standard flow information, including the direction of the flow, the source address and port, the destination address and port, the IP protocol, and the interface used for the session.

**Action** To view session summary information in the CLI, enter the following CLI command:

```
user@host> show security flow session summary
```

Displaying Session and Flow Information About a Specific Session for SRX Series Services Gateways

**Purpose** When you know the session identifier, you can display all session and flow information for a specific session rather than for all sessions.

**Action** To view information about a specific session in the CLI, enter the following command:

```
user@host> show security flow session session-identifier 40000381
```

Using Filters to Display Session and Flow Information for SRX Series Services Gateways

**Purpose** You can display flow and session information about one or more sessions by specifying a filter as an argument to the `show security flow session` command. You can use the following filters: application, destination-port, destination-prefix, family, idp, interface, nat, protocol, resource-manager, session-identifier, source-port, source-prefix and tunnel. The device displays the information for each session followed by a line specifying the number of sessions reported on. Here is an example of the command using the source-prefix filter.

**Action** To view information about selected sessions using filters in the CLI, enter the following command:

```
user@host> show security flow session source-prefix 10/8
```
Information Provided in Session Log Entries for SRX Series Services Gateways

Session log entries are tied to policy configuration. Each main session event—create, close, and deny—will create a log entry if the controlling policy has enabled logging.

Different fields are logged for session create, session close, and session deny events as shown in Table 12 on page 166, Table 13 on page 167, and Table 14 on page 169. The same field name under each type indicates that the same information is logged, but each table is a full list of all data recorded for that type of session log.

The following table defines the fields displayed in session log entries.

Table 12: Session Create Log Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>source-address</td>
<td>Source IP address of the packet that created the session.</td>
</tr>
<tr>
<td>source-port</td>
<td>Source port of the packet that created the session.</td>
</tr>
<tr>
<td>destination-address</td>
<td>Destination IP address of the packet that created the session.</td>
</tr>
<tr>
<td>destination-port</td>
<td>Destination port of the packet that created the session.</td>
</tr>
<tr>
<td>service-name</td>
<td>Application that the packet traversed (for example, &quot;junos-telnet&quot; for Telnet traffic during the session allowed by a policy that permits native Telnet).</td>
</tr>
<tr>
<td>nat-source-address</td>
<td>The translated NAT source address if NAT was applied; otherwise, the source address as above.</td>
</tr>
<tr>
<td>nat-source-port</td>
<td>The translated NAT source port if NAT was applied; otherwise, the source port as above.</td>
</tr>
<tr>
<td>nat-destination-address</td>
<td>The translated NAT destination address if NAT was applied; otherwise, the destination address as above.</td>
</tr>
<tr>
<td>nat-destination-port</td>
<td>The translated NAT destination port if NAT was applied; otherwise, the destination port as above.</td>
</tr>
<tr>
<td>src-nat-rule-name</td>
<td>The source NAT rule that was applied to the session (if any). If static NAT is also configured and applied to the session and if source address translation takes place, then this field shows the static NAT rule name.*</td>
</tr>
<tr>
<td>dst-nat-rule-name</td>
<td>The destination NAT rule that was applied to the session (if any). If static NAT is also configured and applied to the session and if destination address translation takes place, then this field shows the static NAT rule name.*</td>
</tr>
<tr>
<td>protocol-id</td>
<td>The protocol ID of the packet that created the session.</td>
</tr>
<tr>
<td>policy-name</td>
<td>The name of the policy that permitted the session creation.</td>
</tr>
<tr>
<td>session-id-32</td>
<td>The 32-bit session ID.</td>
</tr>
</tbody>
</table>
### Table 12: Session Create Log Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Note that some sessions might have both destination and source NAT applied and the information logged.</td>
<td></td>
</tr>
</tbody>
</table>

Starting with Junos OS Release 12.1X47-D20 and Junos OS Release 17.3R1, the system log includes information about NAT rule type. Two new src-nat-rule-type and dst-nat-rule-type fileds are introduced in the NAT rule session.

### Table 13: Session Close Log Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>reason</td>
<td>The reason the session was closed.</td>
</tr>
<tr>
<td>source-address</td>
<td>Source IP address of the packet that created the session.</td>
</tr>
<tr>
<td>source-port</td>
<td>Source port of the packet that created the session.</td>
</tr>
<tr>
<td>destination-address</td>
<td>Destination IP address of the packet that created the session.</td>
</tr>
<tr>
<td>destination-port</td>
<td>Destination port of the packet that created the session.</td>
</tr>
<tr>
<td>service-name</td>
<td>Application that the packet traversed (for example, “junos-telnet” for Telnet traffic during the session allowed by a policy that permits native Telnet).</td>
</tr>
<tr>
<td>nat-source-address</td>
<td>The translated NAT source address if NAT was applied; otherwise, the source address as above.</td>
</tr>
<tr>
<td>nat-source-port</td>
<td>The translated NAT source port if NAT was applied; otherwise, the source port as above.</td>
</tr>
<tr>
<td>nat-destination-address</td>
<td>The translated NAT destination address if NAT was applied; otherwise, the destination address as above.</td>
</tr>
<tr>
<td>nat-destination-port</td>
<td>The translated NAT destination port if NAT was applied; otherwise, the destination port as above.</td>
</tr>
<tr>
<td>src-nat-rule-name</td>
<td>The source NAT rule that was applied to the session (if any). If static NAT is also configured and applied to the session and if source address translation takes place, then this field shows the static NAT rule name.*</td>
</tr>
<tr>
<td>dst-nat-rule-name</td>
<td>The destination NAT rule that was applied to the session (if any). If static NAT is also configured and applied to the session and if destination address translation takes place, then this field shows the static NAT rule name.*</td>
</tr>
<tr>
<td>protocol-id</td>
<td>The protocol ID of the packet that created the session.</td>
</tr>
<tr>
<td>policy-name</td>
<td>The name of the policy that permitted the session creation.</td>
</tr>
</tbody>
</table>
Table 13: Session Close Log Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>session-id-32</td>
<td>The 32-bit session ID.</td>
</tr>
<tr>
<td>packets-from-client</td>
<td>The number of packets sent by the client related to this session.</td>
</tr>
<tr>
<td>bytes-from-client</td>
<td>The number of data bytes sent by the client related to this session.</td>
</tr>
<tr>
<td>packets-from-server</td>
<td>The number of packets sent by the server related to this session.</td>
</tr>
<tr>
<td>bytes-from-server</td>
<td>The number of data bytes sent by the server related to this session.</td>
</tr>
<tr>
<td>elapsed-time</td>
<td>The total session elapsed time from permit to close, given in seconds.</td>
</tr>
<tr>
<td>unset</td>
<td>During the session creation, you can set the session close reason as unset.</td>
</tr>
<tr>
<td>TCP CLIENT RST</td>
<td>The session was closed by a TCP reset packet sent to it from the client.</td>
</tr>
<tr>
<td>TCP SERVER RST</td>
<td>The session was closed by a TCP reset packet sent to it from the server.</td>
</tr>
<tr>
<td>TCP FIN</td>
<td>FIN received from either end.</td>
</tr>
<tr>
<td>response received</td>
<td>Response received for a packet request (for example, ICMP req-reply).</td>
</tr>
<tr>
<td>ICMP error</td>
<td>ICMP error received.</td>
</tr>
<tr>
<td>aged out</td>
<td>Session aged out was reached.</td>
</tr>
<tr>
<td>ALG</td>
<td>ALG errors closed the session (for example, remote access server (RAS) maximum limit reached).</td>
</tr>
<tr>
<td>HA</td>
<td>HA message closed the session.</td>
</tr>
<tr>
<td>idle Timeout</td>
<td>There was no traffic for the session before the configured age-out time was reached.</td>
</tr>
<tr>
<td>auth</td>
<td>Authentication failed.</td>
</tr>
<tr>
<td>IDP</td>
<td>IDP closed the session because of security module (SM) internal error.</td>
</tr>
</tbody>
</table>
Table 13: Session Close Log Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>synproxy failure</td>
<td>SYN proxy failure closed the session.</td>
</tr>
<tr>
<td>synproxy limit</td>
<td>Reason for failure in allocating minor session, need to free original session.</td>
</tr>
<tr>
<td>parent closed</td>
<td>Parent session closed.</td>
</tr>
<tr>
<td>CLI</td>
<td>Session cleared by a CLI.</td>
</tr>
<tr>
<td>CP NACK</td>
<td>CP NACK response received.</td>
</tr>
<tr>
<td>CP delete</td>
<td>CP ACK deletion closed the session.</td>
</tr>
<tr>
<td>policy delete</td>
<td>Corresponding policy marked for deletion.</td>
</tr>
<tr>
<td>fwd session</td>
<td>Session closed because of forwarding session deletion.</td>
</tr>
<tr>
<td>multicast route change</td>
<td>Session closed because multicast route changed.</td>
</tr>
<tr>
<td>first path reroute, session recreated</td>
<td>The first path is rerouted and session is re-created.</td>
</tr>
<tr>
<td>source NAT allocation failure</td>
<td>SPU received ACK message from the central point but failed to receive the DIP resource. Therefore this packet is dropped and the session is closed.</td>
</tr>
<tr>
<td>other</td>
<td>Session closed because of all other reasons (for example, the pim reg tun needed refreshing).</td>
</tr>
<tr>
<td>error create IKE pass-through template</td>
<td>IKE pass-through template creation errors.</td>
</tr>
<tr>
<td>IKE pass-through child session ageout</td>
<td>Session is deleted because the IKE pass through template session has no child.</td>
</tr>
<tr>
<td>sess timeout on pending state</td>
<td>Pending session closed because time out timer reached the pending state.</td>
</tr>
<tr>
<td>unknown</td>
<td>Session closed because of unknown reasons.</td>
</tr>
</tbody>
</table>

* Note that some sessions might have both destination and source NAT applied and the information logged.

Table 14: Session Deny Log Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>source-address</td>
<td>Source IP address of the packet that attempted to create the session.</td>
</tr>
<tr>
<td>source-port</td>
<td>Source port of the packet that attempted to create the session.</td>
</tr>
</tbody>
</table>
Table 14: Session Deny Log Fields (continued)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>destination-address</td>
<td>Destination IP address of the packet that attempted to create the session.</td>
</tr>
<tr>
<td>destination-port</td>
<td>Destination port of the packet that attempted to create the session.</td>
</tr>
<tr>
<td>service-name</td>
<td>Application that the packet attempted to traverse.</td>
</tr>
<tr>
<td>protocol-id</td>
<td>The protocol ID of the packet that attempted to create the session.</td>
</tr>
<tr>
<td>icmp-type</td>
<td>The ICMP type if the denied packet was ICMP configured; otherwise, this field will be 0.</td>
</tr>
<tr>
<td>policy-name</td>
<td>The name of the policy that denied the session creation.</td>
</tr>
</tbody>
</table>

Error Handling Extensions

- Understanding Chassis Manager FPC Fault Detection and Error Handling Enhancements on page 170

Understanding Chassis Manager FPC Fault Detection and Error Handling Enhancements

The Junos OS Routing Engine and microkernel error detection and management feature on the SRX5400, SRX5600, and SRX5800 devices enables the Routing Engine and the ukernel to accumulate and store the history of all reported error activity and counters for various severity levels. You can configure how errors are handled and specify the severity levels and the actions to perform when an error is detected and a threshold is reached. You can generate and display reports for encountered errors based on stored information.

Starting with Junos OS Release 15.1X49-D30 and Junos OS Release 17.3R1, error detection enhancements are provided that detect additional errors on IOCs and SPCs and provide enhanced error management. This implementation extends the error detection and management covered in the `show chassis fpc error` topic.

NOTE: This feature is not supported on Routing Engine version 1.

- Error Handling on IOCs and SPCs on page 170
- Error Detection and Management on page 171
- Error Detection Processes on page 171
- Integration with Chassis Cluster on page 172
- Wedge Detection, Reporting, and Management on page 172

Error Handling on IOCs and SPCs

Starting with Junos OS Release 15.1-X49-D50 and Junos OS Release 17.3R1, the error management enhancements are supported on IOC2 and IOC3 I/O cards (IOCs) and SPC2
Services Processing Cards (SPCs). Some enhancement functions are particular to either the IOC2 and the IOC3 or the SPC2 FPCs, and the differences are called out in this topic.

**Error Detection and Management**

Error management entails:

- Detecting an error.

  Junos OS monitors the chassis component state to detect a set of error conditions. A detected error can belong to one of the preconfigured error severity levels:

  - Fatal
  - Major
  - Minor

- Identifying the action to take.

  When an error occurs, the system identifies the action to take based on the severity level of the error and the thresholds set and met.

  An FPC maintains a set of error counters for each error severity level. An error counter set consists of a counter that is cumulative across all errors and counters for individual errors and types. It is this information that is stored in the Routing Engine. Each occurrence counter is associated with an error occurrence threshold. There are two threshold levels: one based on the type and the other on severity.

- Executing the action.

  For these enhancements, the preconfigured actions that you can direct the device to take when the Routing Engine's error occurrence count for a given security level reaches the configured threshold are:

  - Reset
  - Offline
  - Alarm
  - Get-state
  - Log

---

**CAUTION:** Take care when setting the fault handling actions for SPC2 cards on the SRX5000 line of devices. Consider that if you set the fault handling action on an SPC2 card to offline or reset, when the card is either taken offline or the reboot occurs, the chassis daemon (chassisd) will reboot all of its FPC cards, both SPCs and IOCs—that is, the entire chassis will be rebooted.

---

**Error Detection Processes**

With these enhancements, the following error detection processes are enabled and supported:
- Error management on ukernel modules on SPC2 cards.
- Error management on the IOC2 and IOC3 cards.
- Driver checks for datapath error detection of wedge conditions.

**NOTE:** Wedge condition detection for the Trinity Offload Engine driver is supported only on SPC2 cards. That is, it is not supported on the IOC2 and IOC3 cards.

- Wedge detection for host loopback.

**NOTE:** Wedge condition detection for host loopback is supported only on SPC2 cards. That is, it is not supported on the IOC2 and IOC3 cards.

- Chassis Manager fabric error detection.
- Control path error detections on IOC2 and IOC3 cards.

**Integration with Chassis Cluster**

In a chassis cluster environment, when an alarm is raised for the first time because of a major or a fatal error, a Redundancy Group 1 (RG1) switchover is triggered. This is the standard behavior on SRX Series devices, and it remains unchanged. However, with these enhancements, the alarm is added to the default fault handling action list for a fatal error. Adding an alarm to the default fault handling list allows the chassis alarm to trigger the RG1 switchover as soon as the fatal error is detected.

**Wedge Detection, Reporting, and Management**

A wedge condition is caused by an error that blocks network traffic.

This feature detects several types of wedge conditions. It:

- Determines if the wedge is transient or irreversible.
- Records the wedge conditions in statistics and syslogs.
- Alerts network administrators to irreversible wedges by raising a chassis alarm on the Routing Engine.
- Verifies that the following datapath error detections are enabled for the IOC2, IOC3, and SPC2 cards:
  - Wedge detection for XM driver
  - Wedge detection for LU driver
  - Wedge detection for XL driver
- Wedge detection for TOE driver (SPC2 only)
- Wedge detection for host loopback (SPC2 only)

All datapath wedge conditions are detected and reported within 5 seconds. Each error detecting module records and reports the state and history of its identifiable wedge conditions.

### Release History Table

<table>
<thead>
<tr>
<th>Release</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.1X49-D50</td>
<td>Starting with Junos OS Release 15.1-X49-D50 and Junos OS Release 17.3R1, the error management enhancements are supported on IOC2 and IOC3 I/O cards (IOCs) and SPC2 Services Processing Cards (SPCs).</td>
</tr>
<tr>
<td>15.1X49-D30</td>
<td>Starting with Junos OS Release 15.1X49-D30 and Junos OS Release 17.3R1, error detection enhancements are provided that detect additional errors on IOCs and SPCs and provide enhanced error management.</td>
</tr>
<tr>
<td>12.1X47-D20</td>
<td>Starting with Junos OS Release 12.1X47-D20 and Junos OS Release 17.3R1, the system log includes information about NAT rule type.</td>
</tr>
</tbody>
</table>

### Related Documentation

- Monitoring X2 Traffic on page 173

### Monitoring X2 Traffic

This topic covers X2 traffic monitoring on SRX Series devices.

- Understanding X2 Traffic Monitoring on page 174
- Example: Configuring a Mirror Filter for X2 Traffic Monitoring on page 176
Understanding X2 Traffic Monitoring

In an LTE mobile network, SRX Series devices act as secure gateways connecting Evolved Node Bs (eNodeBs) for signal handover, monitoring, and radio coverage. SRX Series devices use IPsec tunnels to connect eNodeBs. The user plane and control plane traffic that flows from one eNodeB to the other eNodeB is called the X2 traffic.

- X2 Traffic Monitoring Overview on page 174
- Limitations of X2 Traffic Monitoring on page 175
- X2 Traffic Terminology on page 175

X2 Traffic Monitoring Overview

The X2 traffic passing through IPsec tunnels is encrypted. Because of this, mobile network operators need a way to monitor X2 traffic so that they can debug handover issues across eNodeBs. The Junos OS implementation allows monitoring of the X2 traffic by snooping into the cleartext X2 traffic as it flows through the SRX Series device coming out of one IPsec tunnel and going into the other IPsec tunnel—after traffic is decrypted and before it is encrypted again.

Figure 20 on page 174 shows the flow of X2 traffic within the SRX Series device. As the traffic reaches the SRX Series device on one st0.x interface, it gets decrypted. Then it is encrypted and forwarded to the destination eNodeB through its dedicated st0.y interface. Snooping is performed on the decrypted X2 traffic on the SRX Series device.

Figure 20: SRX Series Device in an LTE Mobile Network

Figure 21 on page 175 shows a mobile operators network with an SRX Series device providing IPsec tunnel connection between the two eNodeBs. The SRX Series device is connected to a packet analyzer (also called a sniffing device) that is used for collecting and monitoring the X2 traffic. The IPsec tunnel from each eNodeB terminates on a
dedicated secure tunnel interface on the SRX Series device. Inbound traffic coming out of the IPSec tunnel is decrypted while outbound traffic leaving the device is encrypted.

**Figure 21: Monitoring X2 Traffic**

To monitor the X2 traffic, you can configure up to 15 different mirror filters that specify unique sets of parameters against which traffic is matched. The filtered packets are duplicated and sent to a physical interface. To allow the packet analyzer to capture the filtered packets, you specify the output interface on the SRX Series device and the MAC address of the packet analyzer. Because the output interface is connected to the same Layer 2 network as the packet analyzer, once mirror filtering is turned on, the packet analyzer can collect and analyze the X2 traffic.

The SRX Series mirror filter feature is bidirectional, much like a session. X2 traffic flowing through an IPSec VPN that matches a mirror filter is mirrored and analyzed; traffic returning from those devices is also mirrored and analyzed.

Starting in Junos OS Release 18.4R1, if the output X2 interface of a mirror filter is configured for an st0 interface to filter traffic that you want to analyze, the packet is duplicated and encrypted by the IPSec tunnel bound to the st0 interface. This enhancement supports the SRX Series devices to send traffic mirrored from a port on an IPsec tunnel. Mirrored traffic includes unmodified Layer 3 headers.

**NOTE:** Although there is no minimum required number of parameters for a mirror filter, please be mindful that if you specify too few criteria or accidentally commit an incomplete filter, an over-proportional amount of traffic flow through the system could be mirrored.

#### Limitations of X2 Traffic Monitoring

For X2 traffic in a chassis cluster setup, mirrored packets cannot traverse through the data link (fabric interface).

#### X2 Traffic Terminology

Table 15 on page 176 lists some X2 traffic related terms and their descriptions.
Table 15: X2 Traffic Terminology

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evolved packet core (EPC)</td>
<td>Main component of System Architecture Evolution (SAE) and is also known as the SAE core. The EPC supports the IP network and serves as the equivalent of a General Packet Radio Service (GPRS) network, using the mobility management entity (MME), Serving Gateway (SGW), and Packet Data Network Gateway (PGW) subcomponents.</td>
</tr>
<tr>
<td>Evolved Universal Terrestrial Radio Access Network (E-UTRAN)</td>
<td>A radio access network standard. E-UTRAN is a new air interface system. It provides higher data rates and lower latency and is optimized for packet data. It uses Orthogonal Frequency-Division Multiple Access (OFDMA) for the downlink and Single-carrier Frequency Division Multiple Access for the uplink.</td>
</tr>
<tr>
<td>Evolved Node B (eNodeB)</td>
<td>A device connected to the mobile phone network that communicates directly with mobile handsets, like a base transceiver station in Global System for Mobile Communications (GSM) networks. An eNodeB is controlled by a radio network controller (RNC).</td>
</tr>
<tr>
<td>Long Term Evolution (LTE)</td>
<td>A standard for wireless communication of high-speed data for mobile phones and data terminals. It increases the capacity and speed using a different radio interface and makes core network improvements.</td>
</tr>
<tr>
<td>X2 interface</td>
<td>A point-to-point logical interface between two eNodeBs with the E-UTRAN. It supports the exchange of signaling information between two eNodeBs and supports the forwarding of protocol data units (PDUs) to the respective tunnel endpoints.</td>
</tr>
</tbody>
</table>
| X2 Application Protocol (X2AP) | Protocol used by the X2 interface. It is used for handling the user equipment mobility within the E-UTRAN and provides the following functions:  
  - Manages mobility and load  
  - Reports general error situations  
  - Sets and resets the X2 interface  
  - Updates the eNodeB configuration |

Example: Configuring a Mirror Filter for X2 Traffic Monitoring

This example shows how to configure a mirror filter to monitor X2 traffic between two eNodeBs in an LTE mobile network.

- Requirements on page 176
- Overview on page 177
- Configuration on page 178
- Verification on page 179

Requirements

Before you begin:

- Understand X2 traffic monitoring.
- Configure the interfaces, security zones, security policies, and the route-based VPN tunnels to allow data to be securely transferred between the SRX Series device and the two eNodeBs.
As a network operator, you need a way to monitor the X2 traffic to debug any handover issues across eNodeBs. The mirror filter feature allows you to do that. Traffic coming out of an IPsec tunnel is decrypted, mirrored and analyzed, and then encrypted again to go into the outbound IPsec tunnel.

More specifically, traffic that matches a mirror filter is mirrored and sent to an output interface that is connected to a packet analyzer (also called a sniffing device). The packet analyzer analyzes the X2 traffic, allowing you to monitor it. Then the traffic is encrypted again before it is sent to the outbound IPsec tunnel.

The SRX Series mirror filter feature is bidirectional, much like a session. X2 traffic flowing through an IPSec VPN that matches a mirror filter is mirrored and analyzed; traffic returning from those devices is also mirrored and analyzed.

To use the mirror filter feature to monitor X2 traffic, you configure mirror filters. You can configure up to 15 different mirror filters to be used concurrently to filter for various kinds of traffic. Each mirror filter contains a set of parameters and their values against which traffic is matched.

**NOTE:** Although there is no minimum required number of parameters for a mirror filter, please be mindful that if you specify too few criteria or accidentally commit an incomplete filter, an over-proportional amount of traffic flow through the system could be mirrored.

A mirror filter can contain some or all of the following parameters to filter traffic:

- destination IP address prefix
- destination port
- IP protocol
- source IP address prefix
- source port
- incoming and outgoing interfaces

You also specify the output interface and the MAC address of the packet analyzer as part of the configuration.

In this example, an SRX Series device uses IPsec tunnels to connect two eNodeBs in an LTE mobile network. The example configures a mirror filter called traffic-https.

**Figure 22 on page 178** shows the SRX Series device connecting to the eNodeBs using IPsec tunnels. The SRX Series device is also connected to a packet analyzer.
In this example, all HTTPS traffic is analyzed whose destination is to devices with IP addresses that have the prefix 203.0.113.0/24 and for which the destination port 443 is used, the default port for HTTPS traffic. Packets that match the traffic-https filter are mirrored and sent through the output interface ge-0/0/5 to the packet analyzer with the MAC address 00:50:56:87:20:5E. Returning traffic from these devices is also monitored.

**NOTE:** The output interface for mirror filter is that of the packet analyzer, which is why the HTTP protocol is used.

The output interface for the packet analyzer uses the HTTP protocol.

---

### Configuration

**CLI Quick Configuration**

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the `[edit]` hierarchy level, and then enter `commit` from configuration mode.

```cli
set security forwarding-options mirror-filter traffic-https
set security forwarding-options mirror-filter traffic-https destination-port 443
set security forwarding-options mirror-filter traffic-https destination-prefix 203.0.113.0/24
set security forwarding-options mirror-filter traffic-https protocol 6
set security forwarding-options mirror-filter traffic-http output interface ge-0/0/5
set security forwarding-options mirror-filter traffic-http output destination-mac 00:50:56:87:20:5E
```

**Step-by-Step Procedure**

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see *Using the CLI Editor in Configuration Mode* in the [CLI User Guide](#).

To configure a mirror filter for monitoring X2 traffic:

1. Create a mirror filter called traffic-https.
2. Specify the mirror filter parameters against which traffic is matched.

   [edit security forwarding-options mirror-filter traffic-https]
   user@host# set destination-port 443
   user@host# set destination-prefix 203.0.113.0/24
   user@host# set protocol 6

3. Specify the output interface for the mirrored packets to be sent to the packet analyzer.

   [edit security forwarding-options mirror-filter traffic-https]
   user@host# set output interface ge-0/0/5

4. Specify the MAC address of the packet analyzer as a destination for all mirrored
   packets, that is, those packets that match the mirror filters.

   [edit security forwarding-options mirror-filter traffic-https]
   user@host# set output destination-mac 00:50:56:87:20:5E

Results

   From configuration mode, confirm your configuration by entering the show security
   forwarding-options command. If the output does not display the intended configuration,
   repeat the configuration instructions in this example to correct it.

   user@host# show security forwarding-options
   mirror-filter traffic-https {
     protocol 6;
     destination-port 443;
     destination-prefix 203.0.113.0/24;
     output {
       interface ge-0/0/5;
       destination-mac 00:50:56:87:20:5E;
     }
   }

If you are done configuring the device, enter commit from configuration mode.

Verification

   Confirm that the configuration is working properly.

   Verifying the Status of Mirror Filter

Purpose

   Verify that mirror filter is active or not.
Action  From operational mode, enter the `show security forward-options mirror-filter` command for the specific mirror filter.

```
user@host> show security forward-options mirror-filter traffic-https
```

Security mirror status

```
mirror-filter-name: traffic-https
  protocol: 6
  destination-port: 443
  destination-prefix 203.0.113.0/24
  filter-counters: 2
  output-counters: 2
```

Meaning  The output provides the mirror filter status. It shows that a mirror filter called `traffic-https` is active. The `traffic-https` mirror filter specifies the protocol, destination prefix, and destination port that traffic must match in order for it to be mirrored and analyzed.

This output shows that two packets were mirrored.
CHAPTER 5

Packet Based Forwarding

• Packet-Based Forwarding on page 181
• Reverse Route Packet Mode using Virtual Router on page 211
• Express Path on page 214

Packet-Based Forwarding

An SRX device operate in two different modes: packet mode and flow mode. In flow mode, SRX processes all traffic by analyzing the state or session of traffic. This is also called stateful processing of traffic. In packet mode, SRX processes the traffic on a per-packet basis. This is also known as stateless processing of traffic.

• Understanding Packet-Based Processing on page 181
• Understanding Selective Stateless Packet-Based Services on page 182
• Selective Stateless Packet-Based Services Configuration Overview on page 184
• Example: Configuring Selective Stateless Packet-Based Services for End-to-End Packet-Based Forwarding on page 186
• Example: Configuring Selective Stateless Packet-Based Services for Packet-Based to Flow-Based Forwarding on page 197
• Understanding Session Cache on page 207

Understanding Packet-Based Processing

Packets that enter and exit a Juniper Networks device running Junos OS can undergo packet-based processing. Packet-based, or stateless, packet processing treats packets discretely. Each packet is assessed individually for treatment. Stateless packet-based forwarding is performed on a packet-by-packet basis without regard to flow or state information. Each packet is assessed individually for treatment.

Figure 23 on page 182 shows the traffic flow for packet-based forwarding.
As packets enter the device, classifiers, filters and policers are applied to it. Next, the egress interface for the packet is determined through a route lookup. Once the egress interface for the packet is found, filters are applied and the packet is sent to the egress interface where it is queued and scheduled for transmission.

Packet-based forwarding does not require any information about either previous or subsequent packets that belong to a given connection, and any decision to allow or deny traffic is packet specific. This architecture has the benefit of massive scaling because it forwards packets without keeping track of individual flows or state.

Starting with Junos OS Release 15.1X49-D100, for the SRX100, SRX110, SRX210, SRX220, SRX240, SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX650, the maximum capture size for packet captures is expanded to 1520 bytes to allow for captures of 1500 bytes of data and the 12-byte Juniper Ethernet header.

**Understanding Selective Stateless Packet-Based Services**

Selective stateless packet-based services allow you to use both flow-based and packet-based forwarding simultaneously on a system. You can selectively direct traffic that requires packet-based, stateless forwarding to avoid stateful flow-based forwarding by using stateless firewall filters, also known as access control lists (ACLs). The traffic not so directed follows the default flow-based forwarding path. Bypassing flow-based forwarding can be useful for traffic for which you explicitly want to avoid flow session-scaling constraints.

By default, Juniper Networks Security devices running Junos OS use flow-based forwarding. Selective stateless packet-based services allows you to configure the device to provide only packet-based processing for selected traffic based on input filter terms. Other traffic is processed for flow-based forwarding. Bypassing flow-based forwarding is useful for deployments where you want to avoid session-scaling constraints and session creation and maintenance costs.

When you configure the device for selective stateless packet-based processing, packets entering the system are treated differently depending on certain conditions:

- If a packet satisfies matching conditions specified in input filter terms, it is marked for packet mode and all configured packet mode features are applied to it. No flow-based security features are applied. It bypasses them.
- If a packet has not been flagged for packet-mode, it undergoes normal processing. All services except for MPLS can be applied to this traffic.
When the packet comes in on an interface, the input packet filters configured on the interface are applied.

- If the packet matches the conditions specified in the firewall filter, a **packet-mode** action modifier is set to the packet. The packet-mode action modifier updates a bit field in the packet key buffer—this bit field is used to determine if the flow-based forwarding needs to be bypassed. As a result, the packet with the packet-mode action modifier bypasses the flow-based forwarding completely. The egress interface for the packet is determined through a route lookup. Once the egress interface for the packet is found, filters are applied and the packet is sent to the egress interface where it is queued and scheduled for transmission.

- If the packet does not match the conditions specified in this filter term, it is evaluated against other terms configured in the filter. If, after all terms are evaluated, a packet matches no terms in a filter, the packet is silently discarded. To prevent packets from being discarded, you configure a term in the filter specifying an action to accept all packets.

A defined set of stateless services is available with selective stateless packet-based services:

- IPv4 routing (unicast and multicast protocols)
- Class of service (CoS)
- Link fragmentation and interleaving (LFI)
- Generic routing encapsulation (GRE)
- Layer 2 switching
- Multiprotocol Label Switching (MPLS)
- Stateless firewall filters
- Compressed Real-Time Transport Protocol (CRTP)
Although traffic requiring MPLS services must be processed in packet mode, under some circumstances it might be necessary to concurrently apply certain services to this traffic that can only be provided in flow mode, such as stateful inspection, NAT, and IPsec. To direct the system to process traffic in both flow and packet modes, you must configure multiple routing instances connected through a tunnel interface. One routing instance must be configured to process the packets in flow mode and the other routing instance must be configured to process the packets in packet mode. When you use a tunnel interface to connect routing instances, traffic between those routing instances is injected again into the forwarding path and it can then be reprocessed using a different forwarding method.

Selective Stateless Packet-Based Services Configuration Overview

This feature is supported on SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices. You configure selective stateless packet-based services using the stateless firewall filters, also known as access control lists (ACLs). You classify traffic for packet-based forwarding by specifying match conditions in the firewall filters and configure a packet-mode action modifier to specify the action. Once match conditions and actions are defined, firewall filters are applied to relevant interfaces.

To configure a firewall filter:

1. Define the address family—First define the address family of the packets that a firewall filter matches. To define the family name, specify inet to filter IPv4 packets. Specify mpls to filter MPLS packets. Specify ccc to filter Layer 2 switching cross-connects.

2. Define terms—Define one or more terms that specify the filtering criteria and the action to take if a match occurs. Each term consists of two components—match conditions and actions.
   - Match conditions—Specify certain characteristics that the packet must match for the action to be performed. You can define various match conditions, such as the IP source address field, IP destination address field, and IP protocol field.
   - Action—Specify what is to be done with the packet if it matches the match conditions. Possible actions are to accept, discard, or reject a packet; go to the next term; or take no action.

   You can specify only one action (or omit it) in a term, but you can specify any combination of action modifiers with it. Action modifiers include a default accept action. For example, if you specify an action modifier and do not specify an action, the specified action modifier is implemented and the packet is accepted.

   The packet-mode action modifier specifies traffic to bypass flow-based forwarding. Like other action modifiers, you can configure the packet-mode action modifier along with other actions, such as accept or count.

3. Apply firewall filters to interfaces—Apply the firewall filter to the interface to have the firewall filter take effect.
When the packet comes in on an interface, the input packet filters configured on the interface are applied. If the packet matches the specified conditions and `packet-mode` action is configured, the packet bypasses the flow-based forwarding completely.

When configuring filters, be mindful of the order of the terms within the firewall filter. Packets are tested against each term in the order in which it is listed in the configuration. When the first matching conditions are found, the action associated with that term is applied to the packet and the evaluation of the firewall filter ends, unless the `next term` action modifier is included. If the `next term` action is included, the matching packet is then evaluated against the next term in the firewall filter; otherwise, the matching packet is not evaluated against subsequent terms in the firewall filter.

When configuring firewall filters for selective stateless packet-based services:

- Accurately identify traffic that needs to bypass flow to avoid unnecessary packet drops.
- Make sure to apply the firewall filter with `packet-mode` action on all interfaces involved in the packet-based flow path.
- Make sure to configure host-bound TCP traffic to use flow-based forwarding—exclude this traffic when specifying match conditions for the firewall filter term containing the `packet-mode` action modifier. Any host-bound TCP traffic configured to bypass flow is dropped. Asynchronous flow-mode processing is not supported with selective stateless packet-based services.
- Configure input packet filters (not output) with the `packet-mode` action modifier.

**NOTE:** Nested firewall filters (configuring a filter within the term of another filter) are not supported with selective stateless packet-based services.

Some typical deployment scenarios where you can configure selective stateless packet-based services are as follows:

- Traffic flow between private LAN and WAN interfaces, such as for Intranet traffic, where end-to-end forwarding is packet-based
- Traffic flow between private LAN and not-so-secure WAN interfaces, where traffic uses packet-based and flow-based forwarding for secure and not so secure traffic respectively
- Traffic flow between the private LAN and WAN interface with failover to flow-based IPsec WAN when the private WAN link is down
- Traffic flow from flow-based LAN to packet-based MPLS WAN
Example: Configuring Selective Stateless Packet-Based Services for End-to-End Packet-Based Forwarding

This example shows how to configure selective stateless packet-based services for end-to-end packet-based forwarding. This feature is supported on the SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices

- Requirements on page 186
- Overview on page 186
- Configuration on page 187
- Verification on page 193

Requirements

Before you begin:

- Understand how to configure stateless firewall filters.
- Establish basic connectivity.

Overview

In this example, you configure the IP addresses for the interfaces on each of the devices. For R0 it is 10.1.1.2/24; for R1 they are 10.1.1.1/24, 10.2.1.1/24, and 203.0.113.1/30; for R2 it is 203.0.113.2/30; and for R3 it is 10.2.1.2/24. You create static routes and associate next-hop addresses for the devices as follows: R0 is 10.1.1.2, R1 is 198.51.100.2, R2 is 203.0.113.1, and R3 is 10.2.1.1.

Then on device R1 you configure a zone called untrust and assign it to interface ge-0/0/3. You also create a zone called trust and assign interfaces ge-0/0/1 and ge-0/0/2 to it. You configure trust and untrust zones to allow all supported application services as inbound services. You allow traffic from any source address, destination address, and application to pass between the zones.

You then create the firewall filter bypass-flow-filter and define the terms bypass-flow-term-1 and bypass-flow-term-2 that match the traffic between internal interfaces ge-0/0/1 and ge-0/0/2 and that contain the packet-mode action modifier. You define the term accept-rest to accept all remaining traffic. Finally, you apply the firewall filter bypass-flow-filter to internal interfaces ge-0/0/1 and ge-0/0/2 (not on the external interface). As a result, all internal traffic bypasses flow-based forwarding and the traffic to and from the Internet does not bypass flow-based forwarding.

Figure 25 on page 187 shows the network topology used in this example.
Your company’s branch offices are connected to each other through a private WAN. For this internal traffic, packet forwarding is required because security is not an issue. Hence for this traffic, you decide to configure selective stateless packet-based services to bypass flow-based forwarding. The remaining traffic, to and from the Internet, uses flow-based forwarding.

**Configuration**

**CLI Quick Configuration**

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter commit from configuration mode.

```
[device R0]
[edit]
set interfaces ge-0/0/1 description "Internal 1" unit 0 family inet address 10.1.1.2/24
set routing-options static route 0.0.0.0/0 next-hop 10.1.1.1

[device R1]
set interfaces ge-0/0/1 description "Internal 1" unit 0 family inet address 10.1.1.1/24
set interfaces ge-0/0/2 description "Internal 2" unit 0 family inet address 10.2.1.1/24
set interfaces ge-0/0/3 description "Internet" unit 0 family inet address 203.0.113.1/30
set routing-options static route 0.0.0.0/0 next-hop 203.0.113.2
set security zones security-zone untrust interfaces ge-0/0/3
set security zones security-zone trust interfaces ge-0/0/1
set security zones security-zone trust interfaces ge-0/0/2
set security zones security-zone trust host-inbound-traffic system-services all
set security zones security-zone untrust host-inbound-traffic system-services all
set security policies from-zone trust to-zone untrust policy Internet-traffic match source-address any destination-address any application any
set security policies from-zone trust to-zone untrust policy Internet-traffic then permit
set security policies from-zone untrust to-zone trust policy incoming-traffic match source-address any destination-address any application any
```
set security policies from-zone untrust to-zone trust policy incoming-traffic then permit
set security policies from-zone trust to-zone trust policy intrazone-traffic match
source-address any any application any
set security policies from-zone trust to-zone trust policy intrazone-traffic then permit
set firewall family inet filter bypass-flow-filter term bypass-flow-term-1 from
source-address 10.1.1.0/24
destination-address 10.2.1.0/24
set firewall family inet filter bypass-flow-filter term bypass-flow-term-1 then packet-mode
set firewall family inet filter bypass-flow-filter term bypass-flow-term-2 from
source-address 10.2.1.0/24
destination-address 10.1.1.0/24
set firewall family inet filter bypass-flow-filter term bypass-flow-term-2 then packet-mode
set firewall family inet filter bypass-flow-filter term accept-rest then accept
set interfaces ge-0/0/1 description "Internal 1" unit 0 family inet filter input
bypass-flow-filer
set interfaces ge-0/0/2 description "Internal 2" unit 0 family inet filter input
bypass-flow-filer

[device R2]
set interfaces ge-0/0/3 description "Internet" unit 0 family inet address 10.1.1.2/30
set routing-options static route 0.0.0.0/0 next-hop 10.1.1.1

[device R3]
[edit]
set interfaces ge-0/0/2 description "Internal 2" unit 0 family inet address 10.21.1.2/24
set routing-options static route 0.0.0.0/0 next-hop 10.2.1.1

Step-by-Step Procedure
The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see Using the CLI Editor in Configuration Mode in the CLI User Guide.

To configure selective stateless packet-based services for end-to-end packet-based forwarding:

1. Configure the IP addresses for the interfaces on devices R0, R1, R2, and R3.

[device R0]
[edit]
user@host# set interfaces ge-0/0/1 description "Internal 1" unit 0 family inet address 10.1.1.2/24

[device R1]
[edit]
user@host# set interfaces ge-0/0/1 description "Internal 1" unit 0 family inet address 10.1.1.2/24
user@host# set interfaces ge-0/0/2 description "Internal 2" unit 0 family inet address 10.2.1.2/24
user@host# set interfaces ge-0/0/3 description "Internet" unit 0 family inet address 203.0.113.1/30
2. Create static routes and associate the appropriate next-hop addresses for devices R0, R1, R2, and R3.

   [device R0]
   [edit]
   user@host# set routing-options static route 0.0.0.0/0 next-hop 10.1.1.1

   [device R1]
   [edit]
   user@host# set routing-options static route 0.0.0.0/0 next-hop 203.0.113.1

   [device R2]
   [edit]
   user@host# set routing-options static route 0.0.0.0/0 next-hop 203.0.113.2

   [device R3]
   [edit]
   user@host# set routing-options static route 0.0.0.0/0 next-hop 10.2.1.1

3. Configure security zones and assign interfaces.

   [device R1]
   [edit]
   user@host# set security zones security-zone untrust interfaces ge-0/0/3
   user@host# set security zones security-zone trust interfaces ge-0/0/1
   user@host# set security zones security-zone trust interfaces ge-0/0/2

4. Configure application services for zones.

   [device R1]
   [edit]
   user@host# set security zones security-zone trust host-inbound-traffic system-services all
   user@host# set security zones security-zone untrust host-inbound-traffic system-services all

5. Configure a security policy
6. Create a firewall filter and define terms for all the packet-based forwarding traffic.

   [device R1]
   [edit]
   user@host# set firewall family inet filter bypass-flow-filter term bypass-flow-term-1
   then packet-mode
   user@host# set firewall family inet filter bypass-flow-filter term bypass-flow-term-2
   then packet-mode

7. Specify another term for the remaining traffic.

   [device R1]
   [edit]
   user@host# set firewall family inet filter bypass-flow-filter term accept-rest then
   accept

8. Apply the firewall filter to relevant interfaces.

   [device R1]
   [edit]
   user@host# set interfaces ge-0/0/1 description "Internal 1" unit 0 family inet filter
   input bypass-flow-filer
   user@host# set interfaces ge-0/0/2 description "Internal 2" unit 0 family inet filter
   input bypass-flow-filer
Results From configuration mode, confirm your configuration by entering the `show interfaces`, `show routing-options`, and `show firewall` commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[device R0]
[edit]
user@host# show interfaces
ge-0/0/1 {
    description “Internal 1”
    unit 0 {
        family inet {
            address 10.1.1.2/24
        }
    }
}

[device R0]
[edit]
user@host# show routing-options
static {
    route 0.0.0.0/0 next-hop 10.1.1.1;
}

[device R2]
[edit]
user@host# show interfaces
ge-0/0/3 {
    description “Internet”
    unit 0 {
        family inet {
            address 203.0.113.2/30;
        }
    }
}

[device R2]
[edit]
user@host# show routing-options
static {
    route 0.0.0.0/0 next-hop 203.0.113.1;
}

[device R3]
[edit]
user@host# show interfaces
ge-0/0/2 {
    description “Internal 2”
    unit 0 {
        family inet {
            address 10.2.1.2/24;
        }
    }
```
[device R3]
user@host# show routing-options
static [
    route 0.0.0.0/0 next-hop 10.2.1.1;
]

[device R1]
[edit]
user@host# show interfaces
ge-0/0/1 {
    description “internal 1”
    unit 0 {
        family inet {
            filter {
                input bypass-flow-filter;
            }
            address 10.1.1.1/24;
        }
    }
}
ge-0/0/2 {
    description “Internal 2”
    unit 0 {
        family inet {
            filter {
                input bypass-flow-filter;
            }
            address 10.2.1.1/24;
        }
    }
}
ge-0/0/3 {
    description “Internet”
    unit 0 {
        family inet {
            address 203.0.113.1/30;
        }
    }
}

[device R1]
[edit]
user@host# show routing-options
static [
    route 0.0.0.0/0 next-hop 203.0.113.1;
]

[device R1]
[edit]
user@host# show firewall
family inet {
    filter bypass-flow-filter {
        term bypass-flow-term-1 {
from {
  source-address {
    10.1.1.0/24;
  }
  destination-address {
    10.2.1.0/24;
  }
}
then packet-mode;

term bypass-flow-term-2 {
  from {
    source-address {
      10.2.1.0/24;
    }
    destination-address {
      10.1.1.0/24;
    }
  }
  then packet-mode;
}
term accept-rest {
  then accept;
}

If you are done configuring the device, enter commit from configuration mode.

Verification

Confirm that the configuration is working properly.

- Verifying the End-to-End Packet-Based Configuration on page 193
- Verifying Session Establishment on Intranet Traffic on page 194
- Verifying Session Establishment on Internet Traffic on page 195

**Verifying the End-to-End Packet-Based Configuration**

**Purpose**

Verify that the selective stateless packet-based services are configured.

**Action**

From configuration mode, enter the show interfaces, show routing-options, show security zones, show security policies, and show firewall commands.

Verify that the output shows the intended configuration of the firewall filter, interfaces, and policies.

Verify that the terms are listed in the order in which you want the packets to be tested. You can move terms within a firewall filter by using the insert command.
Verifying Session Establishment on Intranet Traffic

**Purpose**
Verify that sessions are established when traffic is transmitted to interfaces within the Intranet.

**Action**
To verify that sessions are established, perform the following tasks:

1. On device R1, enter the operational mode `clear security flow session all` command to clear all existing security flow sessions.

2. On device R0, enter the operational mode `ping` command to transmit traffic to device R3.

3. On device R1, with traffic transmitting from devices R0 to R3 through R1, enter the operational mode `show security flow session` command.

```
Flow Sessions on FPC10 PIC1:
Total sessions: 0
Flow Sessions on FPC10 PIC2:
Total sessions: 0
Flow Sessions on FPC10 PIC3:
Total sessions: 0
```

**NOTE:** To verify established sessions, make sure to enter the `show security flow session` command while the `ping` command is sending and receiving packets.

Starting in Junos OS Release 15.1X49-D30 and Junos OS Release 17.3R1, the session flow summaries include CP session IDs.

```
{device R0}
user@host> ping 192.0.2.2 -c 10
PING 192.0.2.2 (192.0.2.2) 56(84) bytes of data.
64 bytes from 192.0.2.2: icmp_seq=1 ttl=63 time=6.07 ms
64 bytes from 192.0.2.2: icmp_seq=2 ttl=63 time=4.24 ms
64 bytes from 192.0.2.2: icmp_seq=3 ttl=63 time=2.85 ms
64 bytes from 192.0.2.2: icmp_seq=4 ttl=63 time=6.14 ms
...

{device R1}
```
user@host>show security flow session

Flow Sessions on FPC10 PIC1:
Session ID: 410000077, Policy name: Internet-traffic/5, Timeout: 2, Valid
  In: 198.51.100.1/3 --> 192.0.2.2/32055;icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84, CP Session ID: 410000198
  Out: 192.0.2.2/32055 --> 198.51.100.1/3;icmp, If: ge-7/1/1.0, Pkts: 1, Bytes: 84, CP Session ID: 410000198
Total sessions: 1

Flow Sessions on FPC10 PIC2:
Session ID: 420000079, Policy name: Internet-traffic/5, Timeout: 2, Valid
  In: 198.51.100.1/5 --> 192.0.2.2/32055;icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84, CP Session ID: 420000163
  Out: 192.0.2.2/32055 --> 198.51.100.1/5;icmp, If: ge-7/1/1.0, Pkts: 1, Bytes: 84, CP Session ID: 420000163
Total sessions: 1

Flow Sessions on FPC10 PIC3:
Session ID: 430000090, Policy name: Internet-traffic/5, Timeout: 4, Valid
  In: 198.51.100.1/7 --> 192.0.2.2/32055;icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84, CP Session ID: 430000088
  Out: 192.0.2.2/32055 --> 198.51.100.1/7;icmp, If: ge-7/1/1.0, Pkts: 1, Bytes: 84, CP Session ID: 430000088
Total sessions: 1

The output shows traffic transmitting from R0 to R3 and no sessions are established. In this example, you applied the bypass-flow-filter with the packet-mode action modifier on interfaces Internal1 and Internal2 for your company's Intranet traffic. This output verifies that the traffic between the two interfaces is correctly bypassing flow-based forwarding and hence no sessions are established.

**Verifying Session Establishment on Internet Traffic**

**Purpose**
Verify that sessions are established when traffic is transmitted to the Internet.

**Action**
To verify that traffic to the Internet is using flow-based forwarding and sessions are established, perform the following tasks:

1. On device R1, enter the operational mode `clear security flow session all` command to clear all existing security flow sessions.

2. On device R0, enter the operational mode `ping` command to transmit traffic to device R2.

3. On device R1, with traffic transmitting from R0 to R2 through R1, enter the operational mode `show security flow session` command.
NOTE: To verify established sessions, make sure to enter the `show security flow session` command while the `ping` command is sending and receiving packets.

```
[device R0]
user@host> ping 203.0.113.6

PING 203.0.113.6 (203.0.113.6): 56 data bytes
64 bytes from 203.0.113.6: icmp_seq=0 ttl=63 time=2.326 ms
64 bytes from 203.0.113.6: icmp_seq=1 ttl=63 time=2.569 ms
64 bytes from 203.0.113.6: icmp_seq=2 ttl=63 time=2.565 ms
64 bytes from 203.0.113.6: icmp_seq=3 ttl=63 time=2.563 ms
64 bytes from 203.0.113.6: icmp_seq=4 ttl=63 time=2.306 ms
64 bytes from 203.0.113.6: icmp_seq=5 ttl=63 time=2.560 ms
64 bytes from 203.0.113.6: icmp_seq=6 ttl=63 time=4.130 ms
64 bytes from 203.0.113.6: icmp_seq=7 ttl=63 time=2.316 ms
...
```

```
[device R1]
user@host> show security flow session

Flow Sessions on FPC10 PIC1:
  Total sessions: 0
Flow Sessions on FPC10 PIC2:
  Total sessions: 0
Flow Sessions on FPC10 PIC3:
  Total sessions: 0
```

The output shows traffic transmitting from devices R0 to R1 and established sessions. In this example, you did not apply the bypass-flow-filter with the packet-mode action modifier on interface Internet for your company’s Internet traffic. This output verifies that the traffic to the Internet is correctly using flow-based forwarding and hence sessions are established.

Transmit traffic from device R3 to R2 and use the commands in this section to verify established sessions.
Example: Configuring Selective Stateless Packet-Based Services for Packet-Based to Flow-Based Forwarding

This example shows how to configure selective stateless packet-based services for packet-based to flow-based forwarding. This feature is supported on SRX300, SRX320, SRX340, SRX345, SRX550M, and SRX1500 devices.

- Requirements on page 197
- Overview on page 197
- Configuration on page 198
- Verification on page 204

Requirements

Before you begin:

- Understand how to configure stateless firewall filters.
- Establish basic connectivity.

Overview

In this example, you configure the IP addresses for the interfaces on each of the devices. For device R0 as 198.51.100.9/24; for R1 are198.51.100.10/24 and 203.0.113.5/24; and for R2 it is 203.0.113.9/24. On device R1, you set an internal service interface lt-0/0/0 between routing instances and configure a peer relationship between two virtual devices. You then create two security zones, Master-VR-zone and Internet-VR-zone, assign related interfaces to them, and configure them to allow all supported applications and protocols.

Then you configure policies and specify that all packets are permitted. You configure a virtual device routing instance Internet-VR and assign interfaces for flow-based forwarding. You enable OSPF on devices R0, R1, and R2. On Device R2, you configure the filter bypass-flow-filter with the term bypass-flow-term that contains the packet-mode action modifier. Because you have not specified any match conditions, this filter applies to all traffic that traverses the interfaces on which it is applied.

Finally, on device R1 you apply the firewall filter bypass-flow-filter to internal interfaces ge-0/0/2.0 and lt-0/0/0.0. You do not apply the filter to the interfaces associated with the Internet-VR routing instance. As a result, all traffic that traverses the LAN interfaces associated with the master routing instance uses packet-based forwarding and all traffic that traverses the Internet-VR routing instance uses flow-based forwarding.

Figure 26 on page 198 shows the network topology used in this example.
The interface facing the private LAN does not need any security services, but the interface facing the WAN needs security. In this example, you decide to configure both packet-based and flow-based forwarding for secure and not so secure traffic by configuring two routing instances—one handling the packet-based forwarding and the other handling the flow-based forwarding.

**Configuration**

**CLI Quick Configuration** To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter commit from configuration mode.

```plaintext
{device R0}
set interfaces description "Connect to Master VR" ge-0/0/2 unit 0 family inet address 198.51.100.9/24
set protocols ospf area 0.0.0.0 interface ge-0/0/2.0

{device R1}
set interfaces description "Connect to R0" ge-0/0/2 unit 0 family inet address 198.51.100.10/24
set interfaces description "Connect to R2" ge-0/0/3 unit 0 family inet address 203.0.113.2/24
set interfaces lt-0/0/0/0 unit 0 encapsulation frame-relay dlci 100 peer-unit 1 family inet address 192.0.0.0/16
set interfaces lt-0/0/0/0 unit 0 encapsulation frame-relay dlci 100 peer-unit 0 family inet address 192.0.0.1/16
set security zones security-zone Master-VR-zone host-inbound-traffic system-services all
set security zones security-zone Master-VR-zone host-inbound-traffic protocols all
set security zones security-zone Master-VR-zone interfaces ge-0/0/2.0
```
set security zones security-zone Master-VR-zone interfaces lt-0/0/0.0
set security zones security-zone Internet-VR-zone host-inbound-traffic system-services all
set security zones security-zone Internet-VR-zone host-inbound-traffic protocols all
set security zones security-zone Internet-VR-zone interfaces ge-0/0/3.0
set security zones security-zone Internet-VR-zone interfaces lt-0/0/0.1
set security policies default-policy permit-all
set routing-instances Internet-VR instance-type virtual-router interface lt-0/0/0.1
set routing-instances Internet-VR instance-type virtual-router interface ge-0/0/3.0
set protocols ospf area 0.0.0.0 interface ge-0/0/2.0
set protocols ospf area 0.0.0.0 interface lt-0/0/0.0
set protocols ospf area 0.0.0.0 interface ge-0/0/3.0
set firewall family inet filter bypass-flow-filter term bypass-flow-term then accept
set firewall family inet filter bypass-flow-filter term bypass-flow-term then packet-mode
set interfaces ge-0/0/2 unit 0 family inet bypass-flow-filter
set interfaces lt-0/0/0/0 unit 0 family inet bypass-flow-filter

[device R2]
set interfaces description "Connect to Internet-VR" ge-0/0/3 unit 0 family inet address 203.0.113.9/24
set protocols ospf area 0.0.0.0 interface ge-0/0/3

Step-by-Step Procedure
The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see Using the CLI Editor in Configuration Mode in the CLI User Guide.

To configure selective stateless packet-based services for end-to-end packet-based forwarding:

1. Configure the IP addresses for the interfaces.

   [device R0]
   [edit]
   user@host# set interfaces description "Connect to Master VR" ge-0/0/2 unit 0 family inet address 198.51.100.9/24

   [device R1]
   [edit]
   user@host# set interfaces description "Connect to R0" ge-0/0/2 unit 0 family inet address 198.51.100.10/24
   user@host# set interfaces description "Connect to R2" ge-0/0/3 unit 0 family inet address 203.0.113.5/24

   [device R2]
   [edit]
   user@host# set interfaces description "Connect to Internet-VR" ge-0/0/3 unit 0 family inet address 203.0.113.9/24

2. Set an internal service interface between routing instances.
3. Configure security zones.

   [device R1]
   [edit]
   user@host# set security zones security-zone Master-VR-zone host-inbound-traffic system-services all
   user@host# set security zones security-zone Master-VR-zone host-inbound-traffic protocols all
   user@host# set security zones security-zone Master-VR-zone interfaces ge-0/0/2.0
   user@host# set security zones security-zone Master-VR-zone interfaces lt-0/0/0.0
   user@host# set security zones security-zone Internet-VR-zone host-inbound-traffic system-services all
   user@host# set security zones security-zone Internet-VR-zone host-inbound-traffic protocols all
   user@host# set security zones security-zone Internet-VR-zone interfaces ge-0/0/3.0
   user@host# set security zones security-zone Internet-VR-zone interfaces lt-0/0/0.1

4. Configure policies.

   [device R1]
   [edit]
   user@host# set security policies default-policy permit-all

5. Configure a virtual device routing instance.

   [device R1]
   [edit]
   user@host# set routing-instances Internet-VR instance-type virtual-router interface lt-0/0/0.1
   user@host# set routing-instances Internet-VR instance-type virtual-router interface ge-0/0/3.0

6. Enable OSPF on all interfaces in the network.

   [device R0]
   [edit]
   user@host# set protocols ospf area 0.0.0.0 interface ge-0/0/2.0

   [device R1 for Master-VR]
   [edit]
   user@host# set protocols ospf area 0.0.0.0 interface ge-0/0/2.0
   user@host# set protocols ospf area 0.0.0.0 interface lt-0/0/0.0
user@host# set routing-instances Internet-VR protocols ospf area 0.0.0.0 interface lt-0/0/0.1
user@host# set routing-instances Internet-VR protocols ospf area 0.0.0.0 interface ge-0/0/3.0

user@host# set protocols ospf area 0.0.0.0 interface ge-0/0/3

7. Create a firewall filter and define a term for packet-based forwarding traffic.

user@host# set firewall family inet filter bypass-flow-filter term bypass-flow-term then accept
user@host# set firewall family inet filter bypass-flow-filter term bypass-flow-term then packet-mode

8. Apply the firewall filter to relevant interfaces.

user@host# set interfaces ge-0/0/2 unit 0 family inet bypass-flow-filter
user@host# set interfaces lt-0/0/0 unit 0 family inet bypass-flow-filter

Results  From configuration mode, confirm your configuration by entering the show interfaces, show protocols, show security, show routing-instances, and show firewall commands. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

user@host# show interfaces ge-0/0/2 {
   description "Connect to Master-VR"
   unit 0 {
      family inet {
         address 198.51.100.9/24
      }
   }
}

user@host# show protocols ospf {
   area 0.0.0.0/0 {
interface ge-0/0/2.0;
}
}

[device R2]
[edit]
user@host# show interfaces
ge-0/0/3 {
    description “Connect to Internet-VR”
    unit 0 {
        family inet {
            address 203.0.113.9/24;
        }
    }
}

[device R2]
[edit]
user@host# show protocols
ospf {
    area 0.0.0.0/0 {
        interface ge-0/0/3.0;
    }
}

[device R1]
[edit]
user@host# show interfaces
ge-0/0/2 {
    description “Connect to R0”
    unit 0 {
        family inet {
            filter {
                input bypass-flow-filter;
            }
            address 198.51.100.10/24;
        }
    }
}
lt-0/0/0 {
    unit 0 {
        encapsulation frame-relay;
        dli 100;
        peer-unit 1;
        family inet {
            filter {
                input bypass-flow-filter
            }
            address 192.0.2.1/16;
        }
    }
    unit 1{
        encapsulation frame-relay;
dlci 100;
peer-unit 0;
family inet {
    address 192.0.2.2/16;
}
}
[device R1]
[edit]
user@host# show protocols
ospf {
    area 0.0.0.0/0 {
        interface ge-0/0/2.0;
        interface lt-0/0/0.0;
    }
}
[device R1]
[edit]
user@host# show firewall
filter bypass-flow-filter {
    term bypass-flow-term {
        then {
            packet-mode;
            accept;
        }
    }
}

[device R1]
[edit]
user@host# show routing-instances
Internet-VR {
    instance-type virtual-router;
    interface lt-0/0/0.1;
    interface ge-0/0/3.0;
    protocols {
        ospf {
            area 0.0.0.0 {
                interface ge-0/0/3.0;
                lt-0/0/0.1;
            }
        }
    }
}

[device R1]
[edit]
user@host# show security
security zone Master-VR-zone {
    host-inbound-traffic {
        system-services {
            all;
            protocols {
If you are done configuring the device, enter `commit` from configuration mode.

**Verification**

Confirm that the configuration is working properly.

- Verifying the Packet-Based to Flow-Based Configuration on page 204
- Verifying Session Establishment on LAN Traffic on page 205
- Verifying Session Establishment on Internet Traffic on page 206

**Verifying the Packet-Based to Flow-Based Configuration**

**Purpose**

Verify that the selective stateless packet-based services are configured for packet-based to flow-based forwarding.

**Action**

From configuration mode, enter the `show interfaces`, `show protocols`, `show security`, `show routing-instances`, and `show firewall` commands.

Verify that the output shows the intended configuration of the firewall filter, routing instances, interfaces, and policies.

Verify that the terms are listed in the order in which you want the packets to be tested. You can move terms within a firewall filter by using the `insert` command.
Verifying Session Establishment on LAN Traffic

Purpose
Verify that the sessions are established when traffic is transmitted on interfaces within the LAN.

Action
To verify that sessions are established, perform the following tasks:

1. On device R1, from operational mode enter the `clear security flow session all` command to clear all existing security flow sessions.

2. On device R0, from operational mode enter the `ping` command to transmit traffic to device Master-VR.

3. On device R1, with traffic transmitting from devices R0 through R1, from operational mode enter the `show security flow session` command.

**NOTE:** To verify established sessions, ensure that you enter the `show security flow session` command while the `ping` command is sending and receiving packets.

```
(device R0)
user@host> ping 192.0.2.1
PING 192.0.2.1 (192.0.2.1): 56 data bytes
64 bytes from 192.0.2.1: icmp_seq=0 ttl=63 time=2.208 ms
64 bytes from 192.0.2.1: icmp_seq=1 ttl=63 time=2.568 ms
64 bytes from 192.0.2.1: icmp_seq=2 ttl=63 time=2.573 ms
64 bytes from 192.0.2.1: icmp_seq=3 ttl=63 time=2.310 ms
64 bytes from 192.0.2.1: icmp_seq=4 ttl=63 time=1.566 ms
64 bytes from 192.0.2.1: icmp_seq=5 ttl=63 time=1.569 ms
...```

```
(device R1)
user@host> show security flow session
0 sessions displayed
```

The output shows traffic transmitting from R0 to Master-VR and no sessions are established. In this example, you applied the `bypass-flow-filter` with the `packet-mode` action modifier on interfaces ge-0/0/0 and lt-0/0/0.0 for your company's LAN traffic. This output verifies that the traffic between the two interfaces is correctly bypassing flow-based forwarding and hence no sessions are established.
Verifying Session Establishment on Internet Traffic

**Purpose**  
Verify that sessions are established when traffic is transmitted to the Internet.

**Action**  
To verify that traffic to the Internet is using flow-based forwarding and sessions are established, perform the following tasks:

1. **On device R1**, from operational mode enter the `clear security flow session all` command to clear all existing security flow sessions.

2. **On device R0**, from operational mode enter the `ping` command to transmit traffic to device R2.

3. **On device R1**, with traffic transmitting from R0 to R2 through R1, from operational mode enter the `show security flow session` command.

```
root@host> show security flow session
Flow Sessions on FPC10 PIC1:
Total sessions: 0
Flow Sessions on FPC10 PIC2:
Total sessions: 0
Flow Sessions on FPC10 PIC3:
Total sessions: 0
```

**NOTE:** To verify established sessions, ensure that you enter the `show security flow session` command while the `ping` command is sending and receiving packets.

```
{device R0}
user@host> ping 192.0.2.1 -c 10
PING 60.0.0.1 (60.0.0.1) 56(84) bytes of data.
64 bytes from 192.0.2.1: icmp_seq=1 ttl=64 time=1.98 ms
64 bytes from 192.0.2.1: icmp_seq=2 ttl=64 time=1.94 ms
64 bytes from 192.0.2.1: icmp_seq=3 ttl=64 time=1.92 ms
64 bytes from 192.0.2.1: icmp_seq=4 ttl=64 time=1.89 ms
...
```

{device R1}
user@host> show security flow session

Session ID: 189900, Policy name: default-policy/2, Timeout: 2
In: 198.51.100.9/0 --> 192.0.2.1/5924;icmp, If: lt-0/0/0.1
Out: 192.0.2.1/5924 --> 198.51.100.9/0;icmp, If: ge-0/0/3.0

Session ID: 189901, Policy name: default-policy/2, Timeout: 2
In: 198.51.100.9/1 --> 192.0.2.1/5924;icmp, If: lt-0/0/0.1
Out: 192.0.2.1/5924 --> 198.51.100.9/1;icmp, If: ge-0/0/3.0

Session ID: 189902, Policy name: default-policy/2, Timeout: 4
In: 198.51.100.9/2 --> 192.0.2.1/5924;icmp, If: lt-0/0/0.1
Out: 192.0.2.1/5924 --> 198.51.100.9/2;icmp, If: ge-0/0/3.0

3 sessions displayed

The output shows traffic transmitting from devices R0 to R2 and established sessions. In this example, you did not apply the bypass-flow-filter with the packet-mode action modifier on routing instance Internet-VR for your company’s Internet traffic. This output verifies that the traffic to the Internet is correctly using flow-based forwarding and hence sessions are established.

Note that sessions are established only when traffic is flowing between lt-0/0/0.1 and ge-0/0/3 and not when traffic is flowing between ge-0/0/2 and lt-0/0/0.

Understanding Session Cache

- Overview on page 207
- Selective Session Cache Installation on page 208
- IPsec VPN Session Affinity Enhancement Using Session Cache on page 210
- Fragmentation Packet Ordering Using NP Session Cache on page 210

Overview

The SRX5K-MPC (IOC2), SRX5K-MPC3-100G10G (IOC3), and SRX5K-MPC3-40G10G (IOC3) on SRX5400, SRX5600, and SRX5800 devices support session cache and selective installation of the session cache.

Session cache is used to cache a conversation between the network processor (NP) and the SPU on an IOC. A conversation could be a session, GTP-U tunnel traffic, IPsec VPN tunnel traffic, and so on. A conversation has two session cache entries, one for incoming traffic and the other for reverse traffic. Depending on where the traffic ingress and egress ports are, two entries might reside in the same network processor or in different network processors. IOCs support session cache for IPv6 sessions.

A session cache entry is also called a session wing.

Session cache on the IOC leverages Express Path (formerly known as services offloading) functionality and helps prevent issues such as high latency and IPsec performance drop.
A session cache entry records:

- To which SPU the traffic of the conversion should be forwarded
- To which egress port the traffic of the conversion should be forwarded in Express Path mode
- What processing to do for egress traffic, for example, NAT translation in Express Path mode

Starting with Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1, the session cache of the sessions in the IOC helps to solve certain performance issues. The SPU can now instruct the IOC session cache to forward subsequent traffic to a specific anchor SPU.

Starting with Junos OS Release 15.1X49-D10, the SRX5K-MPC (IOC2) and the IOC3 support VPN session affinity through improved flow module and session cache. Starting in Junos OS Release 12.3X48-D30, on the IOC2, VPN session affinity through session cache is supported.

Other traffic was hashed to SPUs based on their 5-tuple key information. VPN traffic employed the concept of the anchored SPU, which did not necessarily coincide with the functions of the flow SPU. The network processor could only forward the packets to the flow SPU based on the 5-tuple hash. The flow SPU then forwarded the packet to the anchored SPU. This created an extra hop for VPN traffic, which wasted the switch fabric bandwidth and reduced the VPN throughput roughly by half. This performance reduction occurred because the traffic still had to go back to the flow SPU after processing on the anchored SPU.

The session cache table is now extended on IOC to support the NP sessions. Express Path traffic and NP traffic share the same session cache table on IOCs. Express Path traffic is forwarded by the IOC itself either locally or to another IOC, because the traffic does not require any services from the SPU. NP traffic is forwarded to the SPU specified in the session cache for further processing. All the session cache entries are shared by both Express Path session traffic and NP traffic.

To enable session cache on the IOCs you need to run the `set chassis fpc <fpc-slot> np-cache` command.

---

**NOTE:** The IOC2 and the IOC3 utilize the delay sessions delete mechanism. The same sessions (sessions with the same five tuples) that are deleted and then reinstalled immediately are not cached on the IOCs.

---

**Selective Session Cache Installation**

To avoid high latency, improve IPSec performance, and to better utilize the valuable resources, certain priority mechanisms are applied to both flow module and the IOC.

The IOCs maintain and monitor session cache usage threshold levels. The IOCs also communicate the session cache usage to the SPU, so that when a certain session cache
usage threshold is reached, the SPU only sends session cache installation requests for selective high-priority traffic sessions.

Applications like IDP, ALG need to process packets in order. One SPU has multiple flow threads to handle packets belong to one session, LBT, POT packet order can make sure traffic pass through firewall in order, it cannot guarantee application to process packets that belong to same session in order. Flow serialization provides the method that only one SPU flow thread processing packets belong to the same session at one time, so applications can receive, process and send out packet in order. Other flow threads can do flow serialization processing for other sessions at the same time.

The following three priority levels are used to determine which type of traffic can install session cache on the IOCs:

- **Priority 1 (P1)**—Express Path qualified traffic
- **Priority 2 (P2)**—IPsec tunneling, Fragmentation ordering, and NAT/SZ (Session serialization) traffic
- **Priority 3 (P3)**—All other types of traffic

The IOCs maintain and monitor the threshold levels for session cache usage and update the current real-time session cache usage to the SPU. The SPU requests the IOC to install the session cache for certain high-priority traffic sessions. Session cache usage for high-priority traffic sessions is defined in table:

**Table 16: Session Cache Installation Bars**

<table>
<thead>
<tr>
<th>Traffic Type</th>
<th>Green</th>
<th>Yellow</th>
<th>Orange</th>
<th>Red</th>
</tr>
</thead>
<tbody>
<tr>
<td>Express Path traffic</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>IPsec Fragmentation traffic</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>NAT/SZ traffic</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Other traffic</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

To conserve session entries on the IOC, the flow module selectively installs sessions on the IOC. To facilitate the session install selection, the IOC maintains corresponding thresholds to provide an indication to the flow module (on how full the session cache table is on the IOCs). Two bits in the meta header (see Table 17 on page 210) are added to indicate the current cache table utilization status. All packets going to the SPU will carry these two status bits to inform the flow module of the utilization of the cache table on the IOC.

**Table 17 on page 210** shows the cache table utilization (CTU) bits and the respective session cache table utilization.
Table 17: Session Cache Table Utilization Bits Status

<table>
<thead>
<tr>
<th>Session Cache Table Utilization (CTU) Bits</th>
<th>IOC Session Cache/Express Path Table Utilization</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>0% &lt; utilization &lt; 25%</td>
<td>Flowd installs any eligible session.</td>
</tr>
<tr>
<td>01</td>
<td>25% &lt; utilization &lt; 50%</td>
<td>Flowd installs only high-priority sessions, such as Express Path, IPSec, IPSec clear-text, NAT, SZ, and fragmented sessions.</td>
</tr>
<tr>
<td>10</td>
<td>50% &lt; utilization &lt; 75%</td>
<td>Flowd installs only Express Path sessions, IPSec, IPSec clear-text, and fragmented sessions.</td>
</tr>
<tr>
<td>11</td>
<td>75% &lt; utilization &lt; 100%</td>
<td>Flowd installs only the Express Path sessions.</td>
</tr>
</tbody>
</table>

IPsec VPN Session Affinity Enhancement Using Session Cache

SRX Series devices are fully distributed systems, and an IPsec tunnel is allocated and anchored to a specific SPU. All the traffic that belongs to an IPsec tunnel is encrypted and decrypted on its tunnel-anchored SPU. In order to achieve better IPsec performance, IOC improves the flow module to create sessions for IPsec tunnel-based traffic (before encryption and after decryption) on its tunnel-anchored SPU, and installs session cache for the sessions so that the IOC can redirect the packets directly to the same SPU to minimize packet-forwarding overhead. Express Path traffic and NP traffic share the same session cache table on IOCs.

You need to enable session cache on the IOCs and set the security policy to determine whether a session is for Express Path (formerly known as services offloading) mode on the selected Flexible PIC Concentrator (FPC).

To enable IPsec VPN affinity use, the `set security flow load-distribution session-affinity ipsec` command.

**NOTE:** To enable IPsec VPN affinity, you must also enable the session cache on IOCs by using the `set chassis fpc <fpc-slot> np-cache` command.

Fragmentation Packet Ordering Using NP Session Cache

A session might consist of both normal and fragmented packets. With hash-based distribution, 5-tuple and 3-tuple key can be used to distribute normal and fragmented packets to different SPUs, respectively. On SRX Series devices, all the packets of the session are forwarded to a processing SPU. Due to forwarding and processing latency, the processing SPU might not guarantee packet ordering of the session.

Session cache on the IOCs ensure ordering of packets of a session with fragmented packets. A session cache entry is allocated for normal packets of the session and a 3-tuple
key is used to find the fragmented packets. On receipt of the first fragmented packet of the session, the flow module allows the IOC to update the session cache entry to remember the fragmented packets for the SPU. Later, IOC forwards all subsequent packets of the session to the SPU to ensure ordering of packets of a session with fragmented packets.

### Release History Table

<table>
<thead>
<tr>
<th>Release</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.1X49-D30</td>
<td>Starting in Junos OS Release 15.1X49-D30 and Junos OS Release 17.3R1, the session flow summaries include CP session IDs.</td>
</tr>
<tr>
<td>15.1X49-D10</td>
<td>Starting with Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1, the session cache of the sessions in the IOC helps to solve certain performance issues.</td>
</tr>
<tr>
<td>15.1X49-D10</td>
<td>Starting with Junos OS Release 15.1X49-D10, the SRX5K-MPC (IOC2) and the IOC3 support VPN session affinity through improved flow module and session cache</td>
</tr>
<tr>
<td>12.1X48-D30</td>
<td>Starting in Junos OS Release 12.1X48-D30, on the IOC2, VPN session affinity through session cache is supported</td>
</tr>
</tbody>
</table>

### Related Documentation

- Express Path on page 214

### Reverse Route Packet Mode using Virtual Router

During flow processing, when the traffic route between the server and client is changed, the traffic reroutes using the virtual router (VR). The VR used in rerouting is available in the interface or the filter-based forwarding (FBF). The behavior of the reroute is monitored using the `set security flow advanced-options reverse-route-packet-mode-vr` command.

**NOTE:** The `reverse-route-packet-mode-vr` command works on root logical system and is enabled globally.

When the reverse route option is enabled, there is no change in the packet flow. When the reverse route option is disabled, the route lookup uses the VR from the packet incoming interface. If the VR in the route is incorrectly configured, then the traffic between the server and client is dropped.

**NOTE:** The resolve reserve route in the flow first path is not configured as the VR information from the client to the server packet is not available.

For example, Figure 27 on page 212 shows the behavior of the packet flow when the `reverse-route-packet-mode-vr` command is not configured. The client to server traffic uses the routing instance VR2 of incoming interface ge-0/0/0.0 to route the traffic. The
server to client traffic also uses the routing instance VR2 of incoming interface ge-0/0/0.0 to route the traffic.

*Figure 27: Reverse Route Disabled*

```
Figure 27 on page 212 shows the behavior of the packet flow when the reverse-route-packet-mode-vr command is configured using interface. The client to server traffic uses the routing instance VR2 of incoming interface ge-0/0/0.0 to route the traffic. The server to client traffic uses the routing instance VR3 of interface ge-0/0/1.0 to route the traffic.

*Figure 28: Reverse Route Enabled with Interface*

```

```
2. S2C traffic route lookup on VR2.

Figure 28 on page 212 shows the behavior of the packet flow when the reverse-route-packet-mode-vr command is configured using FBF. The client to server traffic uses the packet incoming interface ge-0/0/0.0 in VR2 to route the traffic. Configuring FBF on the interface ge-0/0/1.0 changes VR3 to VR4. The server to client traffic uses VR4 to route the traffic.

*Figure 29: Reverse Route Enabled with FBF*

```

```
2. S2C traffic route lookup on VR3.

Figure 29 on page 212 shows the behavior of the packet flow when the reverse-route-packet-mode-vr command is configured using FBF. The client to server traffic uses the packet incoming interface ge-0/0/0.0 in VR2 to route the traffic. Configuring FBF on the interface ge-0/0/1.0 changes VR3 to VR4. The server to client traffic uses VR4 to route the traffic.

*Figure 29: Reverse Route Enabled with FBF*

```

```
2. S2C traffic route lookup on VR4.

Understanding To-host Traffic on Virtual Router

On a SRX Series device, all the traffic that passes the firewall filter is referred as to-host traffic. The traffic from the firewall to the device is referred as the from-host traffic. The to-host traffic uses an egress interface and the from-host traffic uses an ingress interface.
If both the interfaces are not in the same routing instance, there will be a session mismatched. To overcome this issue, the to-host and the from-host traffic choose interfaces that are available in the same routing instance.

**Figure 30 on page 213** shows the to-host traffic using the routing instance VR5 of interface ge-0/0/0.0 and the routing instance VR6 of destination interface lo0.1.

**Figure 30: To-host Traffic on VR**

For example, if the to-host traffic uses a local interface (such as local....X) that is in routing instance 5 (VR5), and the from-host traffic uses the interface in routing instance 6 (VR6). The session output displaying the interface information of the to-host traffic is:

```
Session ID: 10000179, Policy name: pol1/4, Timeout: 2, Valid
In: 192.168.90.1/4 --> 192.168.91.1/19050;icmp, Conn Tag: 0x0, If: xe-9/0/3.0, Pkts: 1, Bytes: 84, CP Session ID: 10000178
Out: 192.168.91.1/19050 --> 192.168.90.1/4;icmp, Conn Tag: 0x0, If: .local..5, Pkts: 1, Bytes: 84, CP Session ID: 10000178
```

**NOTE:** The session output displays the local interface of the to-host traffic as local....5.

To synchronize the to-host and from-host traffics, the to-host traffic uses traffic destination IP interface (lo0.1) that is available in VR6. As the from-host traffic is using the interface available in VR6, the session matches. The session output displaying the interface information of the to-host traffic is:

```
Session ID: 10000179, Policy name: pol1/4, Timeout: 2, Valid
In: 192.168.90.1/4 --> 192.168.91.1/19050;icmp, Conn Tag: 0x0, If: xe-9/0/3.0, Pkts: 1, Bytes: 84, CP Session ID: 10000178
Out: 192.168.91.1/19050 --> 192.168.90.1/4;icmp, Conn Tag: 0x0, If: .local..6, Pkts: 1, Bytes: 84, CP Session ID: 10000178
```

**NOTE:** The session output displays the local interface of the to-host traffic as local....6.

**Related Documentation**

- Packet-Based Forwarding on page 181
Express Path

Express Path (formerly known as services offloading) is a mechanism for processing fast-path packets in the network processor instead of in the Services Processing Unit (SPU). This method reduces the packet-processing latency that arises when packets are forwarded from network processors to SPUs for processing and back to I/O cards (IOCs) for transmission.

- Express Path Overview on page 214
- Understanding the Express Path Solution on page 228
- Enabling and Disabling Express Path on page 229
- Example: Enabling Express Path in Security Policies on page 230
- Example: Configuring an IOC on SRX5000 Line Devices to Support Express Path on page 232
- Example: Configuring an SRX5K-MPC on an SRX5000 Line Device to Support Express Path on page 233
- Example: Configuring SRX5K-MPC3-100G10G (IOC3) and SRX5K-MPC3-40G10G (IOC3) on an SRX5000 Line Device to Support Express Path on page 236
- Example: Configuring Express Path on an SRX5000 Line Device with IOC3 on page 239
- Example: Configuring Low Latency on page 243
- Managing Packet Fragmentation in IPsec VPN Networks on page 245

Express Path Overview

- Understanding Express Path Functionality on page 214
- Understanding Express Path Support on SRX Series Devices on page 215
- Understanding Express Path Features on page 217
- Express Path Limitations on page 221
- Express Path Support on NP-IoC Card on page 222
- Express Path Support on SRX5K Modular Port Concentrator on page 223
- Express Path Support on SRX5K-MPC3-100G10G (IOC3) and SRX5K-MPC3-40G10G (IOC3) on page 224
- IPv6 Flow in Express Path Mode for IOC2 and IOC3 on page 226
- IPv6 Flow in Express Path Mode on page 227

Understanding Express Path Functionality

This feature is supported on SRX5400, SRX5600, and SRX5800 devices.

Express Path considerably reduces packet-processing latency by 500–600 percent.

When the first packet arrives at the interface, the network processor forwards it to the SPU. If the SPU verifies that the traffic is qualified for Express Path, an Express Path session is created on the network processor. If the traffic does not qualify for Express Path, a normal session is created on the network processor. If an Express Path session
When an Express Path session is created on the network processor, subsequent packets of the flow match the session on the network processors. The network processor then processes and forwards the packet. The network processor also handles additional processing such as TCP sequence check, time to live (TTL) processing, Network Address Translation (NAT), and Layer 2 header translation.

The network processor forwards packets to the SPU in the following cases:

- When the first packet arrives at the interface, the network processor forwards it to the central point (CP). The central point in turn forwards the packet to the SPU. The SPU then creates a session on the network processor.
- When an SPU session exists even if no network processor session exists, the network processor forwards a packet to the central point, which in turn forwards the packet to the SPU. The SPU then creates a session on the network processor.
- When a packet matches a normal session on the network processor, it is forwarded to the SPU.

Starting with Junos OS Release 12.3X48-D10 and Junos OS Release 17.3R1, a license is no longer required to enable Express Path functionality. Your previously acquired license will not be effective anymore. (Prior to Junos OS Release 12.3X48-D10, Express Path was a licensed software feature.)

Starting with Junos OS Release 15.1X49-D60 and Junos OS Release 17.3R1, SRX5400, SRX5600, and SRX5800 devices with the SRX5K-MPC (IOC2), SRX5K-MPC3-100G10G (IOC3), and SRX5K-MPC3-40G10G (IOC3) support Express Path (formerly known as services offloading) for ALG traffic.

The following ALG data traffic that supports Express Path—FTP, H.323 (only RTP/RTCP sessions are offloaded), MGCP, MS RPC, RSH, RTSP, SCCP, SIP (only RTP/RTCP sessions are offloaded), SUN RPC, TALK (only TCP sessions are offloaded), and TFTP.

DNS, IKE and ESP, PPTP, and SQL-NET ALG data traffic do not support Express Path.

Once an Express Path session is setup, packets cannot be sent to the SPU again.

**Understanding Express Path Support on SRX Series Devices**

Table 18 on page 216 provides details about the Express Path support on different SRX Series cards.
### Table 18: Express Path Support on SRX Series Device Cards

<table>
<thead>
<tr>
<th>SRX Series Device</th>
<th>Card Name and Model Number</th>
<th>Earliest Supported Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRX5000 Line Devices I/O Cards (IOCs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRX5600, SRX5800</td>
<td>SRX5K-40GE-SFP</td>
<td>Junos OS Release 11.4</td>
</tr>
<tr>
<td>SRX5600, SRX5800</td>
<td>SRX5K-4XGE-XFP</td>
<td>Junos OS Release 11.4</td>
</tr>
<tr>
<td>SRX5600, SRX5800</td>
<td>SRX5K-FPC-IoC containing one of the following cards:</td>
<td>Junos OS Release 11.4</td>
</tr>
<tr>
<td></td>
<td>• SRX-IOC-16GE-TX</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• SRX-IOC-4XGE-XFP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• SRX-IOC-16GE-SFP</td>
<td></td>
</tr>
<tr>
<td>SRX5400, SRX5600, SRX5800</td>
<td>SRX5K-MPC containing one of the following MICs:</td>
<td>Junos OS Release 12.3X48-D10</td>
</tr>
<tr>
<td></td>
<td>• SRX-MIC-10XGE-SFP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• SRX-MIC-2X40GE-OSFP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• SRX-MIC-1X100GE-CFP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• SRX-MIC-20GE-SFP</td>
<td></td>
</tr>
<tr>
<td>SRX5400, SRX5600, SRX5800</td>
<td>SRX5K-MPC3 (IOC3) containing one of the following MPCs:</td>
<td>Junos OS Release 15.1X49-D10</td>
</tr>
<tr>
<td></td>
<td>• SRX5K-MPC3-40G10G (24x10GE + 6x40GE MPC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• SRX5K-MPC3-100G10G (2x100GE + 4x10GE MPC)</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Different Express Path features are supported on different cards for different Junos OS releases. See the Junos OS Release Notes for details.

**NOTE:** On the SRX5600 and SRX5800 Services Gateways, the Express Path sessions for traffic that traverse between legacy IOC cards and the SRX5K-MPC or the SRX5K-MPC3 are not supported.

The Express Path sessions traversing only on legacy IOC cards or only on the SRX5K-MPC (IOC2), the SRX5K-MPC3-100G10G (IOC3), or the SRX5K-MPC3-40G10G (IOC3) are supported. However, the SRX5K-MPC (IOC2), the SRX5K-MPC3-100G10G (IOC3), the SRX5K-MPC3-40G10G (IOC3), and the legacy IOCs can still be present on the same chassis.
Understanding Express Path Features

Wing Statistics Counter

The network processor in Express Path mode provides the option for each flow entry to keep a per-wing bytes counter. The counter captures the number of bytes that the network processor sends out over the wing.

When the counter is enabled, for every ingress packet, the network processor searches its flow entry (a session wing). If the packet belongs to an established flow entry, the network processor increases the byte counter of the flow entry by byte count in the packet. The network processor periodically copies a packet (called a copy-packet) of each flow entry to its associated SPU, allowing the SPU to maintain the session. The network processor sends flow byte counter values in the header of copy-packet packets. The SPU accumulates and keeps per-wing statistics counters.

NOTE: The counter value carried to the SPU is always one packet short to allow the SPU to add the current packet’s byte count to the counter to get the correct total. For example, if packet N’s copy carries a counter value to the SPU, the counter value is the total bytes received in the flow up to packet N-1.

The counter value does not include packets that were sent before the session was set up on the network processor. Therefore, the SPU might need to account for the three-way handshake packet and other packets sent through the SPU. The actual session byte counter shown on the SPU might be short by the amount of bytes sent by the client during the copy interval. This discrepancy results because these bytes can be counted locally by the network processor, but have not yet been reported to the SPU.

NOTE: You cannot change the statistics configuration during the life cycle of a live session. Disabling or enabling the per-wing statistics configuration while a session is alive at the network processor invalidates the session statistics on the current session. The new sessions statistics can be valid only after the configuration changes are committed. Network processor per-wing counters cannot be cleared.

NOTE: Wing statistics counter configuration is enabled, by default, on SRX5800 devices with the SRX5K-MPC (IOC2) and the SRX 5K-MPC3 (IOC3).

Sessions per Wing Statistics

The NP-IOC has a larger static RAM (SRAM) to accommodate session resources, thus hosting more sessions per PIC. Table 19 on page 218 displays the total number of session wings, including both Express Path and non-Express Path.
Table 19: Total Number of Sessions per Wing in Network Processor Express Path Configuration Mode

<table>
<thead>
<tr>
<th>Total Number of Wings</th>
<th>Number of Express Path UDP Wings</th>
<th>Number of Express Path TCP Wings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cards and SRX Series Device Non-Express Path Mode Sessions</td>
<td>Without Statistics</td>
<td>With Statistics</td>
</tr>
<tr>
<td>IOC</td>
<td>1.3 million</td>
<td>1.3 million</td>
</tr>
<tr>
<td>FIOC</td>
<td>2.3 million</td>
<td>198,000</td>
</tr>
<tr>
<td>SRX5000 line device SRX5K-MPC</td>
<td>NA</td>
<td>1.8 million</td>
</tr>
<tr>
<td>SRX5000 line device SRX5K-MPC (IOC3)</td>
<td>NA</td>
<td>2.0 million</td>
</tr>
</tbody>
</table>

Cross-Network Traffic

Express Path provides additional cross-network-processor support; therefore, it is no longer restricted to the ports of the same network processor. If network processors for both the ingress and egress ports are in Express Path mode, then Express Path packets are directly forwarded from the ingress network processor to the egress network processor in the fast-flow path. Packets cross switch fabric when they are forwarded from one network processor to another, thus increasing the latency of the packet. In Express Path mode, the latency of cross-network-processor packets is higher than the packets that are forwarded within an individual network processor.

NOTE: The SRX5K-MPC receives session messages from the SPU. The session messages carry the information to support inter- and intra-Packet Forwarding Engine Express Path for IPv4.

LAG Support in Express Path Mode

Ethernet link aggregation groups (LAGs) combine links and provide increased bandwidth and link availability. Express Path reduces packet latency by processing and forwarding packets in the network processor instead of in the Services Processing Unit (SPU). Supporting LAG in the Express Path mode combines the benefits of both these features and provides enhanced throughput, link redundancy, and reduced packet latency.

LAG Links Qualifying for Express Path Mode

You can use the links in a LAG as ingress or egress interfaces in Express Path mode. The LAG links can include links from different network processors (in case of legacy cards such as IOCs or Flex IOCs) or from the same modular port concentrator (in case of SRX5K-MPC). For a LAG link to qualify for Express Path, all its member links should be...
connected to Express Path-enabled network processors. If Express Path is disabled on any of the member links in a LAG, a regular session (non-Express Path session) is created. Also, LAG links are not supported between legacy cards such as IOCs or Flex IOCs and the SRX5K-MPC.

**LAG and Network Processor Wings**

The network processor checks the egress interface in the Express Path mode for each wing. Per-wing traffic distribution over a LAG interface is achieved by letting the SPU install wings pointing to egress interfaces with a balanced distribution.

The network processor periodically copies a packet (called a *copy-packet*) to the SPU, allowing it to maintain the session. The copy-packet contains the egress interface information, which the SPU uses to handle LAG member change cases; for example, when a link is down or disabled. When there is no member interface that can be used as an egress interface for transmitting traffic, the network processor session is updated from Express Path to non-Express Path and the packet is sent to the SPU. A new Express Path network processor session is then installed using a new, valid egress interface.

- **First wing**—On the egress interface, the SPU selects one LAG active member link as the outgoing interface for a specific fast-forward session. The SPU treats this active member interface just like any physical interface in the Express Path mode and records the interface to the network processor fast-forward session. After that, all traffic that matches this network processor session is directly transmitted through that member link.

- **Reverse wing**—the reverse network processor session is installed only when all LAG member links are connected to a single network processor. When member links of a LAG are from multiple network processors, the reverse network processor session is initiated by reverse traffic later (it is not preinstalled).

The Express Path network processor session needs to have outgoing interface information to send traffic. If the incoming interface is a physical interface, then it can be used as an outgoing interface for the reverse wing. However, if the incoming interface is an aggregated Ethernet interface, the SPU selects a member interface to be the outgoing interface.

**LAG and Network Processor Session Updates**

Some changes in the LAG interfaces can cause network processor session updates:

- **LAG interface status changes**—The LAG interface status can change due to several reasons—for example, when member interfaces are deleted, when an interface is down, or when an active LAG member is removed. In such cases, a session scan is triggered and network processor sessions related to the LAG interface are removed. The packet then installs a new network processor session, which could be a fast-forward session, if it qualifies.

- **An active member is deactivated or removed from the LAG**—In cases when the LAG still has an active member, neither a reroute nor session scan is triggered. The traffic is redistributed on the failed LAG member by monitoring outgoing logical interface status in the SPU.


- A new member is added to the LAG—The network processor session is not updated. A new network processor session is created, which might use the newly added interface or not, depending on the member selection algorithm for the LAG.

**Redistribution of Traffic on a Failed LAG Interface**

When a LAG member fails, the traffic needs to be redistributed. To redistribute traffic, the system monitors the status of the egress interface in the SPU. When the system detects a failure, it updates the Routing Engine kernel, and passes the physical interface information down to all SPLUs. On receiving a copy of the session, the SPU extracts the egress interface index and checks the physical interface information. If the physical interface is down, the SPU uninstalls the session and the ingress network processor deletes the session cache.

For the next ingress packet of the same conversation, the network processor forwards the packet to the SPU to select an active member interface in the LAG as an egress interface. The SPU performs the distribution algorithm to select a new egress interface. A new session with the new egress interface index is installed in the ingress network processor and a new fast-flow path is created.

**End-to-End Debugging**

For regular flow packets, end-to-end debugging functions are the same as in the non-Express Path mode; packet filter and action items are supported in this flow mode. For traffic that matches Express Path sessions, the end-to-end debugging function supports one packet copy to the host CPU when the filter and the action are both affirmative in the end-to-end search results.

---

**NOTE:** End-to-end debugging is not supported on the SRX5K-MPC when Express Path mode is enabled.

---

**Per-Session Statistics CLI**

To enable the per-session statistics, copy and paste the following command into the CLI at the [edit] hierarchy level.

```bash
set chassis fpc <fpc-slot> pic <pic_slot> services-offload per-session-statistics
```

Verify that the `services-offload per-session-statistics` command is enabled.

```
show configuration chassis
```

```bash
user@host> show configuration chassis
fpc 1 {
  pic 1 {
    services-offload {
      per-session-statistics;
    }
  }
}
```
NOTE: The services-offload per-session-statistics command is not applicable for the SRX5K modular port concentrators when Express Path is configured, because every session has statistics by default.

Use the `show chassis hardware` command to display hardware information.

```
show chassis fpc pic-status (SRX5600 and SRX5800 devices When Express Path [Services-Offload] is Configured)
```

```
Slot 0 Online SRX5k DPC 40x 1GE
PIC 0 Online 10x 1GE RichQ
PIC 1 Online 10x 1GE RichQ
PIC 2 Online 10x 1GE RichQ
PIC 3 Online 10x 1GE RichQ
Slot 2 Online SRX5k IOC II
PIC 0 Online 12x 10GE SFP+- np-cache/services-offload
Slot 3 Online SRX5k IOC II
PIC 0 Online 10x 10GE SFP+- np-cache/services-offload
PIC 2 Online 10x 10GE SFP+- np-cache/services-offload
Slot 5 Online SRX5k SPC
PIC 0 Online SPU Cp-Flow
PIC 1 Online SPU Flow
```

**Express Path Limitations**

The Junos OS Express Path implementation has the following limitations.

- **Unsupported features**—The following features are not supported with Express Path:
  - Transparent mode is not supported. If transparent mode is configured, a normal (non-Express Path) session is installed.
  - Only multicast sessions with one fan-out are supported. If a multicast session with more than one fan-out exists, a normal session is installed.
  - Only active/passive chassis cluster configuration is supported. Active/active chassis cluster configuration is not supported.
  - Fragmented packets are not supported. If fragmented packets exist, a normal session is installed.
  - Express Path is not supported in IPsec VPN, and IDP configurations. Normal flow sessions will be used in these scenarios.
  - Express Path does not support cross logical system traffic, regular flow sessions are used for cross logical system traffic processing and forwarding.
  - Starting in Junos OS 15.1X49-D40 and Junos OS Release 17.3R1, IPv6 is supported. Prior to Junos OS 15.1X49-D40, IPv6 support is limited, and if IPv6 is configured, a normal session is installed.
  - When Express Path mode is enabled on an SRX5K-MPC, you might not be able to enable the firewall filter. In general, all processes related to J-Flow (versions 5, 8,
and 9) in an SRX Series device take place in the SPU. In Express Path security flow sessions, the J-Flow configuration will not take effect.

- Class of service (CoS) on egress interfaces is not supported.
- Configuration of protection against a teardrop (Screen) attack is not supported when Express Path is enabled.
- Configuring different MTU size values is not supported on the SRX5K-MPC when Express Path is enabled.

- Performance drop—The following drops in performance occur when Express Path is enabled:
  - Normal (non-Express Path) sessions—When Express Path is enabled, for normal sessions, the performance can drop by approximately 20 percent for connections per second (CPS) and 15 percent for packets per second (pps) when compared with normal sessions.
  - Express Path sessions—When Express Path is enabled, for fast-forward sessions, the performance can drop by approximately 13 percent for connections per second (CPS).

- Chassis cluster—When the device is operating in chassis cluster mode:
  - Asymmetric IOC configuration is not supported when Express Path is enabled on a device operating in chassis cluster mode.
  - If a child link goes down from the LACP-enabled redundant Ethernet interface of an IOC with Express Path enabled on its FPC, all traffic on this link is distributed to other active child links of the interface. If the child link comes up and rejoins the redundant Ethernet interface, then the existing traffic or sessions might not be redistributed over this newly rejoined active child link. New sessions might however traverse through this link.
  - If a new child link is added on the LACP-enabled redundant Ethernet interface of an IOC with Express Path enabled on its FPC, then the existing traffic or sessions might not be redistributed over this new child link. New sessions might however traverse through this link.

- For the normal flow sessions, the `show security flow session` command displays bytes counters based on IP header length. However for sessions in Express Path mode, the statistics is collected from IOC2 and IOC3 ASIC hardware engine, and includes full packet length with L2 headers. So the `show security flow session` command output displays slightly larger bytes counters for sessions in Express Path mode than the normal flow session.

**Express Path Support on NP-IOC Card**

The NP-IOC card integrates an existing I/O card (IOC) with a Network Processing Card (NPC) in one card with simplified Layer 2 functions in the hardware. This new hardware changes the way the interface is interpreted in the system.
NOTE: Each interface in the NP-IOC card can only be attached to the network processor on the NP-IOC card. This fixed attachment setup requires the network processor to manage the interfaces as local or relative interfaces, instead of systemwide global interfaces.

Besides providing physical layer network connections, another function of the NP-IOC card is to distribute packets coming into the physical ports to the Services Processing Units (SPUs) and to forward packets out of the physical ports. For parallel security processing, flow sessions are assigned to multiple SPUs, based on a load balance algorithm. The network processor on the NP-IOC is responsible for directing traffic to the proper SPU based on the session table installed in its local memory.

In Express Path mode, the first packet is processed as is, meaning the packet is forwarded to the central point and the central point assigns an SPU and passes the packet to the SPU. For packets in fast-path, instead of forwarding all packets to the SPU, the network processor forwards the packets to an egress network processor, which can be different from or the same as the ingress network processor.

Express Path Support on SRX5K Modular Port Concentrator

The SRX5K-MPC is a Modular Port Concentrator (MPC) that is supported on the SRX5400, SRX5600, and SRX5800.

The SRX5K-MPC is an interface card with two slots that accept MICs, which add Ethernet ports to your services gateway. An MPC with MICs installed functions in the same way as a regular I/O card (IOC) but allows you to add different types of Ethernet ports to your device.

Each MPC is equipped with Trio chipsets, which perform control functions tailored to the MPC’s media type.

When a Trio chipset receives the first packet, the packet is forwarded to an SPU based on the hash value (which is determined by a hash function of the 5 tuples of the session).

If the SPU verifies that the traffic is qualified for Express Path (formerly known as services offload), an Express Path session is created on the Trio chipset. If the traffic does not qualify for Express Path, it is forwarded by default hash-based forwarding to SPUs. If an Express Path session is created, the subsequent fast-path packets are processed in the Trio chipset itself.

The Trio chipset performs all the necessary checks to forward the packet, including TTL checking and decreasing, TCP sequence check, NAT translation, and Layer 2 header encapsulation. In addition, the Trio chipset sends a session refresh message to the SPU every second. This message is used to refresh the SPU session, detect the current state of the Trio chip set and update SPU session statistics.

The session table on the SRX5K-MPC, managed by the SPU, provides the following functions:
- Flow insert or delete
- Flow lookup
- Flow aging
- Flow statistics

The SPU inserts and deletes flow entries in the session table based on policy matching results.

**NOTE:** Configuring the screen options on an SRX5K-MPC when operating in Express Path mode is the same as when the card is operating in normal mode.

---

### Express Path Support on SRX5K-MPC3-100G10G (IOC3) and SRX5K-MPC3-40G10G (IOC3)

Express Path (formerly known as services offload) on the IOC3 is based on processing fast-path packets through the Trio chipset instead of in the SPU to offload some basic firewall functions to the IOC3.

When the Express Path feature is enabled, the IOC3 provides much lower latency, and also supports higher throughput by removing the overload on the SPU. The IOC3 supports both intra-card traffic flow and inter-card traffic flow. To achieve the best latency results, both the ingress port and egress port of a traffic flow need to be on the same XM chip of the IOC3.

Starting with Junos OS Release 15.1X49-D80, two new system log messages have been added to indicate memory-related problems on the interfaces to the DDR3 memory.

These system log messages are:

- XMCHIP_CMERROR_DDRIF_INT_REG_CHKSUM_ERR_MINOR
- XMCHIP_CMERROR_DDRIF_INT_REG_CHKSUM_ERR_MAJOR

The error messages indicate that the XMCHIP on an Flexible PIC Concentrator (FPC) has detected a checksum error, which is causing packet drops. The following error threshold values classify the error as a major error or a minor error:

- Minor error —> 5 errors per second
- Major error —> 255 errors per second (maximum count)

The flow table on the IOC3 is managed by the SPU of the flow module. The SPU inserts and deletes flow entries in the flow table based on policy matching results. In the data plane, the IOC3 parses packets, and looks them up in the flow table. If the IOC3 finds a match in the flow table, then it forwards packets based on the instructions given in the flow table. The IOC3 can perform NAT, encapsulate the Level 2 (L2) header, and forward the packets out of the egress interface. The egress interface can be located on the same IOC3 (intra-card case) or on another IOC3 (inter-card case).
NOTE: Flow table lookup in the IOC3 occurs only in ingress. Egress datapath packet handling is the same as supported in the previous release.

When the IOC3 receives the first packet, it does not match any existing fast-forward session. The default hash-based forwarding is performed to send the first packet to the SPU. The SPU then creates the security session. If the SPU finds that the traffic is qualified for fast forwarding, and the related IOC3 supports fast forwarding, it will install fast-forward session to the IOC3. If fast forwarding cannot be applied to the traffic, no session message is sent, and the IOC3 uses the default hash-based forwarding to forward the packets to the SPU.

In fast-forward IOC3 processing, if a fast-forward session is matched, the packet can be directly forwarded according to the session flow result. The IOC3 takes all the necessary actions, including forwarding the packet, TTL checking and decreasing, NAT translation, L2 header encapsulation and so on.

In addition, the XL chip sends one copy of the forwarding packet to the SPU at every predefined time. This copy is used to refresh the SPU session, detect the current XL chip state, and so on. The SPU consumes this packet and does not forward it, because the real packet has been processed and transmitted.

Expres Path support on IOC3 is illustrated in Figure 31 on page 225, Figure 32 on page 226, and Figure 33 on page 226.

Figure 31: IOC3 Intra-PFE Express Path
IPv6 Flow in Express Path Mode for IOC2 and IOC3

IPv6 traffic is supported on SRX5000 line devices with the SRX5K-MPC (IOC2), the SRX5K-MPC3-100G10G (IOC3), or the SRX5K-MPC3-40G10G (IOC3) in Express Path mode.

On SRX5000 line devices, Express Path for IPv6 traffic is not supported on legacy IOC cards. However, IPv6 regular flow mode is supported on legacy IOCs.

When an Express Path session is created on the network processor, subsequent packets of the flow match the session on the network processors. The network processor then processes and forwards the packet. The network processor also handles additional processing such as TCP sequence check, time-to-live (TTL) processing, and Layer 2 header translation.
The following features are not supported in Express Path mode:

- IPv6 NAT
- Transparent mode
- Configuring different MTU size values
- Class of Service (CoS) on egress interfaces

Note the following limitations:

- Express Path sessions for IPv6 traffic traversing on legacy IOC cards is not supported. IOC2 and IOC3 does not support IPv6 traffic in Express Path sessions when traffic traverse between legacy IOC and IOC2 or IOC3. Normal IPv6 traffic is still supported in this scenario.

- A redundant Ethernet interface must contain both child interfaces from the same IOC type. For example, if one child link is from 10-Gigabit Ethernet on IOC2, the second child link should also be from the IOC2. Similarly, both child interfaces can be from IOC3. Configuring child interfaces by mixing the links from both IOC2 and IOC3 is not supported.

**IPv6 Flow in Express Path Mode**

IPv6 traffic is supported on SRX5000 line devices with SRX5K-MPC (IOC2), the SRX5K-MPC3-100G10G (IOC3), or the SRX5K-MPC3-40G10G (IOC3). All IPv6 traffic is handled in regular flow mode, meaning that packets are forwarded to the SPU for flow processing. Egress IPv6 traffic is also forwarded from the SPU to the network processor, and then the network processor handles this traffic as regular flow traffic in the egress path.

When an Express Path session is created on the network processor, subsequent packets of the flow match the session on the network processors. The network processor then processes and forwards the packet. The network processor also handles additional processing such as TCP sequence check, time to live (TTL) processing, Network Address Translation (NAT), and Layer 2 header translation.

**NOTE:** On the SRX5000 line devices, the Express Path sessions for IPv6 traffic that traverse between legacy IOC cards and not supported.

The Express Path sessions for IPv6 traffic traversing only on legacy IOC cards or only on the SRX5K-MPC (IOC2), the SRX5K-MPC3-100G10G (IOC3), or the SRX5K-MPC3-40G10G (IOC3) are supported.
Understanding the Express Path Solution

The high-end SRX Series devices have long packet-processing latency because the packets are processed through the Services Processing Unit (SPU) and through several stages of buffers in the data path.

This feature introduces a local forwarding solution where the fast-path packets are processed by the network processor on the I/O Card (IOC), without going through the switch fabric or the SPU. This solution reduces the packet-processing latency.

The behavior of the network processor in different scenarios is as follows:

- **First-path flow**—The first-path flow is the same as the current network processor flow process. When the first packet arrives at the network processor, the network processor parses the TCP or the UDP packet to extract a 5-tuple key and then performs session lookup in the flow table. The network processor then forwards the first packet to the central point. The central point cannot find a match at this time, because this is the first packet. The central point and the SPU create a session and match it against user-configured policies to determine if the session is a normal session or a services-offload session.

  If the user has specified the session to be handled with services offload, the SPU creates a session entry in the network processor flow table, enabling the services-offload flag in the session entry table; otherwise, the SPU creates a normal session entry in the network processor without the services-offload flag.

- **Fast-path flow**—After the session entry is created in the network processor, subsequent packets of the session will match the session entry table.
  - If the services-offload flag is not set, then the network processor forwards the packet to the SPU specified in the session entry table. The packet goes through the normal flow process.
  - If the network processor finds the services-offload flag in the session entry table, it will process the packet locally and send the packet out directly.

  **NOTE:** The fast-forwarding function on the network processor supports one-fanout multicast sessions. The egress port in the session must also be associated with the same network processor of the ingress port. All other multicast cases need to be handled as normal sessions.

- **NAT process**—The SPU is responsible for mapping between the internal IP address or port and the external IP address or port. When the first packet of the session arrives, the SPU allocates the IP address or port mapping and stores the information in the network processor session entry. The network processor does the actual packet modification if the NAT flag is set.

- **Session age-out**—To improve traffic throughput for services-offload sessions, a copy of a packet is sent to the SPU at every predefined time period to reduce the packet processing demand on the SPU. To limit the number of packet copies sent to the SPU,
A timestamp is implemented for each services-offload session. This enables the network processor to calculate the elapsed time since the last session match. If the elapsed time is greater than the predefined time period, then the network processor sends a copy of the packet to the SPU, and updates the session timestamp.

- **Session termination and deletion**—If the network processor receives an IP packet with a FIN (finished data) or a RST (reset connection) flag, it forwards the packet to the SPU. The SPU then deletes the session cache on network processor. The network processor continues to receive and forward any packets to the SPU during state transition.

### Enabling and Disabling Express Path

Express Path (formerly known as services offloading) is a mechanism for processing fast-path packets in the network processor instead of in the Services Processing Unit (SPU). This method reduces the packet-processing latency that arises when packets are forwarded from network processors to SPUs for processing and back to I/O cards (IOCs) for transmission.

**NOTE:** Starting with Junos OS Release 12.3X48-D10 and Junos OS Release 17.3R1, the Express Path license is no longer required to enable the Express Path functionality. Your previously acquired Express Path license will not be effective anymore. (Prior to Junos OS Release 12.3X48-D10, Express Path was a licensed software feature, formerly known as “services offloading.”)

- When device is operating in chassis cluster mode, you need to reboot both the nodes when changing FPC(s) to Express Path mode.
- During initialization, when a network processor is configured to perform Express Path, then the FPC CPU will load a special image to the network processor.

You can enable Express Path mode as follows:

- Set the Express Path mode on the selected card.
- Reboot the device containing the Express Path network processor to load the Express Path firmware image on the network processors.
- Configure a policy to define the traffic that should take fast-path.

To configure the Express Path mode:

- For configuring Express Path on an SRX5000 line device with a IOC1 or FIOC cards, use the `set chassis fpc fpc-number pic pic-number services-offload` command.
- For configuring Express Path on an SRX5000 line device with Modular Port Concentrator (MPC), enable NP cache on the IOC using the `set chassis fpc fpc-number np-cache` command.
NOTE: The set or delete chassis fpc fpc-number services-offload command is deprecated.

- To disable Express Path on an SRX5000 line device with Modular Port Concentrator (MPC), use the delete chassis fpc fpc-number np-cache command.
- Reboot the device when Express Path is disabled.

See Also
- Understanding the Express Path Solution on page 228
- Example: Configuring an IOC on SRX5000 Line Devices to Support Express Path on page 232
- Example: Configuring an SRX5K-MPC on an SRX5000 Line Device to Support Express Path on page 233

Example: Enabling Express Path in Security Policies

This example shows how to enable Express Path (formerly known as services offloading) in security policies.

- Requirements on page 230
- Overview on page 230
- Configuration on page 230
- Verification on page 231

Requirements

Before you begin, understand the Express Path overview.

Overview

In this example, you enable Express Path in security policies to specify whether the traffic qualifies for Express Path.

Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter commit from configuration mode.

set security policies from-zone untrust to-zone trust policy services-offload-poll match source-address 192.0.2.2
set security policies from-zone untrust to-zone trust policy services-offload-poll match destination-address 198.51.100.10
set security policies from-zone untrust to-zone trust policy services-offload-poll match application junos-http
set security policies from-zone untrust to-zone trust policy services-offload-pol1 then permit services-offload

Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For instructions on how to do that, see Using the CLI Editor in Configuration Mode in the CLI User Guide.

To configure Express Path in policies:

1. Configure a policy to process the traffic that goes to the HTTP static ports.

   [edit security policies from-zone untrust to-zone trust policy services-offload-pol1]
   user@host# set match source-address 192.0.2.2
   user@host# set match destination-address 198.51.100.10
   user@host# set match application junos-http

2. Enable Express Path in the security policy.

   [edit security policies from-zone untrust to-zone trust policy services-offload-pol1]
   user@host# set then permit services-offload

Results

From configuration mode, confirm your configuration by entering the show security policies command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

   [edit]
   user@host# show security policies from-zone untrust to-zone trust {
   policy services-offload-pol1 {
      match {
         source-address 192.0.2.2;
         destination-address 198.51.100.10;
         application junos-http;
      }
      then {
         permit {
            services-offload;
         }
      }
   }
   }

If you are done configuring the device, enter commit from configuration mode.

Verification

Verifying Express Path in Policies

Purpose

Verify that Express Path is enabled.
Action  From operational mode, enter the `show security policies` command.

Example: Configuring an IOC on SRX5000 Line Devices to Support Express Path

This example shows how to configure an IOC on SRX5000 line of devices to support Express Path (formerly known as services offloading).

- Requirements on page 232
- Overview on page 232
- Configuration on page 232
- Verification on page 233

Requirements

Before you begin, understand the Express Path overview.

Overview

In this example, you configure the IOC on SRX5000 line devices to perform Express Path.

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set chassis fpc 3 pic 0 services-offload
```

NOTE: For SRX5000 line devices, the IOC slot number is 3.

Step-by-Step Procedure

To configure the IOC you need to run the following commands:

1. Set the services offload mode on the IOC.
   
   ```bash
   [edit]
   user@host# set chassis fpc 3 pic 0 services-offload
   ```

2. Commit the configuration.
   
   ```bash
   [edit]
   user@host# commit
   warning: System restart is required after fpc 3 pic 0 changed to services-offload mode.
   commit complete
   ```

3. Reboot the device.
## Results
From configuration mode, confirm your configuration by entering the `show chassis` command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host> show chassis fpc pic-status
```

<table>
<thead>
<tr>
<th>Slot</th>
<th>Online</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Online</td>
<td>SRX5k SPC</td>
</tr>
<tr>
<td>PIC 0</td>
<td>Online</td>
<td>SPU Cp-Flow</td>
</tr>
<tr>
<td>PIC 1</td>
<td>Online</td>
<td>SPU Flow</td>
</tr>
<tr>
<td>1</td>
<td>Online</td>
<td>SRX5k FIOC</td>
</tr>
<tr>
<td>PIC 0</td>
<td>Online</td>
<td>4x 10GE XFP</td>
</tr>
<tr>
<td>PIC 1</td>
<td>Online</td>
<td>16x 1GE SFP</td>
</tr>
<tr>
<td>3</td>
<td>Online</td>
<td>SRX5k DPC 4X 10GE</td>
</tr>
<tr>
<td>PIC 0</td>
<td>Online</td>
<td>1x 10GE(LAN/WAN) RichQ- services-offload</td>
</tr>
<tr>
<td>PIC 1</td>
<td>Online</td>
<td>1x 10GE(LAN/WAN) RichQ</td>
</tr>
<tr>
<td>PIC 2</td>
<td>Online</td>
<td>1x 10GE(LAN/WAN) RichQ</td>
</tr>
<tr>
<td>PIC 3</td>
<td>Online</td>
<td>1x 10GE(LAN/WAN) RichQ</td>
</tr>
<tr>
<td>5</td>
<td>Online</td>
<td>SRX5k DPC 40x 1GE</td>
</tr>
<tr>
<td>PIC 0</td>
<td>Online</td>
<td>10x 1GE RichQ</td>
</tr>
<tr>
<td>PIC 1</td>
<td>Online</td>
<td>10x 1GE RichQ</td>
</tr>
<tr>
<td>PIC 2</td>
<td>Online</td>
<td>10x 1GE RichQ</td>
</tr>
<tr>
<td>PIC 3</td>
<td>Online</td>
<td>10x 1GE RichQ</td>
</tr>
</tbody>
</table>

If you are done configuring the device, enter `commit` from configuration mode.

## Verification

### Verifying the Configuration of IOC for Express Path

**Purpose**  Verify that the IOC was configured properly for Express Path.

**Action**  From operational mode, enter the `show chassis fpc pic-status` command.

### Example: Configuring an SRX5K-MPC on an SRX5000 Line Device to Support Express Path

This example shows how to configure an SRX5K-MPC on an SRX5000 line device to support Express Path (formerly known as services offloading).

- Requirements on page 233
- Overview on page 234
- Configuration on page 234
- Verification on page 235

### Requirements

This example uses the following hardware and software components:

- One SRX5000 line device with an SRX5K-MPC
- Junos OS Release 12.3X48 or later for SRX Series devices

Before you begin, understand Express Path overview.
No special configuration beyond device initialization is required before configuring this feature.

**Overview**

In this example, you configure the SRX5K-MPC on an SRX5000 line device to perform NP cache and Express Path.

**Configuration**

**CLI Quick Configuration**

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the `[edit]` hierarchy level, and then enter `commit` from configuration mode.

```plaintext
set chassis fpc 2 np-cache
set chassis fpc 3 np-cache
set security policies from-zone untrust to-zone trust policy services-offload-pol1 match source-address 198.51.100.20
set security policies from-zone untrust to-zone trust policy services-offload-pol1 match destination-address 192.0.2.11
set security policies from-zone untrust to-zone trust policy services-offload-pol1 match application junos-http
set security policies from-zone untrust to-zone trust policy services-offload-pol1 then permit services-offload
```

**Step-by-Step Procedure**

To configure an SRX5K-MPC on an SRX5000 line device to perform Express Path:

1. Set NP cache mode on the SRX5K-MPC on FPC 1 and FPC 2.
   
   ```plaintext
   [edit]
   user@host# set chassis fpc 2 np-cache
   user@host# set chassis fpc 3 np-cache
   ```

2. Configure a policy to process the traffic that goes to the HTTP static ports.
   
   ```plaintext
   [edit security policies from-zone untrust to-zone trust policy services-offload-pol1]
   user@host# set match source-address 198.51.100.20
   user@host# set match destination-address 192.0.2.11
   user@host# set match application junos-http
   ```

3. Enable Express Path in the security policy.
   
   ```plaintext
   [edit security policies from-zone untrust to-zone trust policy services-offload-pol1]
   user@host# set then permit services-offload
   ```

4. Commit the configuration.
   
   ```plaintext
   [edit]
   user@host# commit
   ```
warning: System or cluster nodes need to reboot after fpc 3 changed to np-cache mode.

5. Reboot the device.

Results  From configuration mode, confirm your configuration by entering the `show chassis` command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

For brevity, this `show` command output includes only the configuration that is relevant to this example. Any other configuration on the system has been replaced with ellipses (...).

```
... fpc 2 {
    np-cache;
} 
 fpc 3 {
    np-cache;
}
... 
```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

Confirm that the configuration is working properly.

**Verifying the Configuration of an SRX5K-MPC for Express Path**

**Purpose**  Verify that the SRX5K-MPC was configured properly for Express Path.

**Action**  From operational mode, enter the `show chassis fpc pic-status` command.

<table>
<thead>
<tr>
<th>Slot</th>
<th>Online</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Online</td>
<td>SRX5k DPC 40x 1GE</td>
</tr>
<tr>
<td>PIC 0</td>
<td>Online</td>
<td>10x 1GE RichQ</td>
</tr>
<tr>
<td>PIC 1</td>
<td>Online</td>
<td>10x 1GE RichQ</td>
</tr>
<tr>
<td>PIC 2</td>
<td>Online</td>
<td>10x 1GE RichQ</td>
</tr>
<tr>
<td>PIC 3</td>
<td>Online</td>
<td>10x 1GE RichQ</td>
</tr>
<tr>
<td>Slot 2</td>
<td>Online</td>
<td>SRX5k IOC II</td>
</tr>
<tr>
<td>PIC 0</td>
<td>Online</td>
<td>2x 40GE QSFP+- np-cache/services-offload</td>
</tr>
<tr>
<td>Slot 3</td>
<td>Online</td>
<td>SRX5k IOC II</td>
</tr>
<tr>
<td>PIC 0</td>
<td>Online</td>
<td>10x 10GE SFP+- np-cache/services-offload</td>
</tr>
<tr>
<td>PIC 2</td>
<td>Online</td>
<td>10x 10GE SFP+- np-cache/services-offload</td>
</tr>
<tr>
<td>Slot 5</td>
<td>Online</td>
<td>SRX5k SPC</td>
</tr>
<tr>
<td>PIC 0</td>
<td>Online</td>
<td>SPU Cp-Flow</td>
</tr>
<tr>
<td>PIC 1</td>
<td>Online</td>
<td>SPU Flow</td>
</tr>
</tbody>
</table>
Meaning

The output provides the status of PICs with Express Path enabled on them.

Example: Configuring SRX5K-MPC3-100G10G (IOC3) and SRX5K-MPC3-40G10G (IOC3) on an SRX5000 Line Device to Support Express Path

This example shows how to configure an SRX5K-MPC3-100G10G (IOC3) or an SRX5K-MPC3-40G10G (IOC3) on an SRX5000 line device to support Express Path (formerly known as services offloading).

- Requirements on page 236
- Overview on page 236
- Configuration on page 236
- Verification on page 238

Requirements

This example uses the following hardware and software components:

- One SRX5000 line device with an SRX5K-MPC3-40G10G (IOC3)
- Junos OS Release 15.1X49-D10 or later for SRX Series devices

Before you begin, understand Express Path overview.

No special configuration beyond device initialization is required before configuring this feature.

Overview

In this example, you configure an SRX5K-MPC3-40G10G (IOC3) on an SRX5000 line device to perform Express Path.

Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter `commit` from configuration mode.

```
set chassis fpc 4 np-cache
set chassis fpc 5 np-cache
set security policies from-zone untrust to-zone trust policy services-offload-poll match source-address 192.0.2.41
set security policies from-zone untrust to-zone trust policy services-offload-poll match destination-address 203.0.113.10
set security policies from-zone untrust to-zone trust policy services-offload-poll match application junos-http
set security policies from-zone untrust to-zone trust policy services-offload-poll then permit services-offload
```
To configure an SRX5K-MPC3-40G10G (IOC3) on an SRX5000 line device to perform Express Path:

1. Set the Express Path mode on the SRX5K-MPC3 on FPC 4 and FPC 5.

   ```
   [edit]
   user@host# set chassis fpc 4 np-cache
   user@host# set chassis fpc 5 np-cache
   ```

2. Configure a policy to process the traffic that goes to the HTTP static ports.

   ```
   [edit security policies from-zone untrust to-zone trust policy services-offload-pol1]
   user@host# set match source-address 192.0.2.41
   user@host# set match destination-address 203.0.113.10
   user@host# set match application junos-http
   ```

3. Enable Express Path in the security policy.

   ```
   [edit security policies from-zone untrust to-zone trust policy services-offload-pol1]
   user@host# set then permit services-offload
   ```

4. Commit the configuration.

   ```
   [edit]
   user@host# commit
   ```

   Warning: System or cluster nodes need to reboot after fpc 3 changed to np-cache mode.

5. Reboot the device.

Results From configuration mode, confirm your configuration by entering the `show chassis` command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

For brevity, this `show` command output includes only the configuration that is relevant to this example. Any other configuration on the system has been replaced with ellipses (...).

```
... fpc 4{
   services-offload;
 }
 fpc 5{
   services-offload;
 }
...
```
from-zone <fzone> to-zone <tzone> {
  policy <policy-name> {
    match {
      <match-tuples>
    }
    then {
      action {
        permit {
          services-offload
        }
        reject
        deny
        log
      };
    }
    scheduler-name <scheduler-name>;
  }
  ...;
}

If you are done configuring the device, enter commit from configuration mode.

Verification

Confirm that the configuration is working properly.

Verifying the Configuration of an SRX5K-MPC3 (IOC3) for Express Path

Purpose Verify that the SRX5K-MPC3-40G10G (IOC3) was configured properly for Express Path.

Action From operational mode, enter the show chassis fpc pic-status command.

<table>
<thead>
<tr>
<th>Slot</th>
<th>Offline/Online</th>
<th>PIC Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Offline</td>
<td>SRX5k DPC 40x 1GE</td>
</tr>
<tr>
<td>1</td>
<td>Online</td>
<td>SRX5k SPC II</td>
</tr>
<tr>
<td>2</td>
<td>Online</td>
<td>SPU Cp</td>
</tr>
<tr>
<td>3</td>
<td>Online</td>
<td>SPU Flow</td>
</tr>
<tr>
<td>4</td>
<td>Offline</td>
<td>SRX5k SPC</td>
</tr>
<tr>
<td>5</td>
<td>Online</td>
<td>SRX5k IOC3 24XGE+6XLG</td>
</tr>
<tr>
<td>2</td>
<td>Online</td>
<td>3x 40GE QSFP+- np-cache/services-offload</td>
</tr>
<tr>
<td>3</td>
<td>Online</td>
<td>3x 40GE QSFP+- np-cache/services-offload</td>
</tr>
<tr>
<td>0</td>
<td>Online</td>
<td>SRX5k IOC II</td>
</tr>
<tr>
<td>1</td>
<td>Online</td>
<td>10x 1GE(LAN) SFP- np-cache/services-offload</td>
</tr>
<tr>
<td>2</td>
<td>Online</td>
<td>10x 10GE SFP+- np-cache/services-offload</td>
</tr>
</tbody>
</table>

Meaning The output provides the status of PICs with Express Path enabled on them.
Example: Configuring Express Path on an SRX5000 Line Device with IOC3

This example shows how to configure Express Path (formerly known as services offloading) on an SRX5K-MPC3-100G10G (IOC3) or an SRX5K-MPC3-40G10G (IOC3) on an SRX5000 line device.

Express Path is a mechanism for processing fast-path packets in the network instead of in the Services Processing Unit (SPU). This method reduces the long packet-processing latency that arises when packets are forwarded from network processors to SPUs for processing and back to IOCs for transmission.

Starting in Junos OS Release 15.1X49-D40, the configuration is valid for IPv6 traffic, whereas before it was supported for IPv4 traffic only.

- Requirements on page 239
- Overview on page 239
- Configuration on page 239
- Verification on page 242

Requirements

This example uses the following hardware and software components:

- One SRX5000 line device with an IOC3 card
- Junos OS Release 15.1X49-D40 or later for SRX Series devices

Before you begin, understand the Express Path overview.

No special configuration beyond device initialization is required before configuring this feature.

Overview

In this example, you configure Express Path on IOC3 on an SRX5000 line device for IPv6 traffic.

You configure two interfaces on IOC3 card and assign IPv6 addresses to them. Then you enable flow-based processing for IPv6 traffic. Next, you set up zones and add interfaces to them. Then you provide communication between the two different zones by configuring a security policy to allow traffic between two zones. You also enable Express Path in security policies to specify whether the traffic qualifies for Express Path.

Configuration

CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter commit from configuration mode.

```
set interfaces et-2/1/0 unit 0 family inet6 address 2001:db8::4:12/32
```
To configure an SRX5K-MPC3-40G10G (IOC3) on an SRX5000 line device to perform Express Path:

1. Configure Ethernet interface and assign an IPv6 address to it.

   [edit]  
   user@host# set interfaces et-2/1/0 unit 0 family inet6 address 2001:db8::4:12/32  
   user@host# set interfaces et-2/3/0 unit 0 family inet6 address 2001:db8::6:11/32

2. Enable flow-based processing for IPv6 traffic.

   [edit]  
   user@host# set security forwarding-options family inet mode flow-based  
   user@host# set security forwarding-options family inet6 mode flow-based

3. Configure security zones and add interfaces and allow all system services and interfaces. Configure a security zone and specify the types of traffic and protocols that are allowed on interface et-2/1/0.0.

   [edit]  
   user@host# set zones security-zone zone-1 host-inbound-traffic system-services all  
   user@host# set security-zone zone-1 host-inbound-traffic protocols all  
   user@host# set zones security-zone zone-2 hosts interface et-2/3/0.0  
   user@host# set zones security-zone zone-2 host-inbound-traffic system-services all  
   user@host# set zones security-zone zone-2 host-inbound-traffic protocols all  
   user@host# set chassis fpc 2 np-cache
4. Configure security zones and add interfaces and allow all system services and interfaces. Configure a security zone and specify the types of traffic and protocols that are allowed on interface et-2/3/0.0.

```
[edit]
user@host# set zones security-zone zone-2 host-inbound-traffic system-services all
user@host# set zones security-zone zone-2 host-inbound-traffic protocols all
user@host# set zones security-zone zone-2 interfaces et-2/3/0.0
```

5. Create a policy and specify the match criteria for that policy. The match criteria specifies that the device can allow traffic from any source, to any destination, and on any application. Enable Express Path in the security policy.

```
[edit security policies from-zone zone-2 to-zone zone-1 policy express-path-policy-2]
user@host# set security policies from-zone zone-2 to-zone zone-1 policy express-path-policy-2 match source-address any
user@host# set security policies from-zone zone-2 to-zone zone-1 policy express-path-policy-2 match destination-address any
user@host# set security policies from-zone zone-2 to-zone zone-1 policy express-path-policy-2 match application any
user@host# set security policies from-zone zone-2 to-zone zone-1 policy express-path-policy-2 then permit services-offload
```

```
[edit]
user@host# set security policies from-zone zone-1 to-zone zone-2 policy express-path-policy-1 match source-address any
user@host# set security policies from-zone zone-1 to-zone zone-2 policy express-path-policy-1 match destination-address any
user@host# set security policies from-zone zone-1 to-zone zone-2 policy express-path-policy-1 match application any
user@host# set security policies from-zone zone-1 to-zone zone-2 policy express-path-policy-1 then permit services-offload
```

6. Set the Express Path mode on IOC3.

```
[edit]
user@host# set chassis fpc 2 np-cache
```
Results  From configuration mode, confirm your configuration by entering the `show chassis` command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

    from-zone zone-1 to-zone zone-2 {
        policy express-path-policy--1 {
            match {
                source-address any;
                destination-address any;
                application any;
            }
            then {
                permit {
                    services-offload;
                }
            }
        }
    }

    from-zone express-path-policy--2 {
        policy policy-2 {
            match {
                source-address any;
                destination-address any;
                application any;
            }
            then {
                permit {
                    services-offload;
                }
            }
        }
    }

If you are done configuring the device, enter `commit` from configuration mode.

Verification

Confirm that the configuration is working properly.

**Verifying the Configuration of an SRX5K-MPC3 (IOC3) for Express Path**

**Purpose**  Verify that the IOC3 was configured properly for Express Path.

**Action**  From operational mode, enter the `show chassis fpc pic-status` command.

<table>
<thead>
<tr>
<th>Slot</th>
<th>PIC</th>
<th>Status</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot 1</td>
<td>0</td>
<td>Online</td>
<td>SRX5k SPC II</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Online</td>
<td>SPU Cp</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Online</td>
<td>SPU Flow</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Online</td>
<td>SPU Flow</td>
</tr>
<tr>
<td>Slot 2</td>
<td>0</td>
<td>Online</td>
<td>SRX5k IOC3 2CGE+4XGE</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Online</td>
<td>2x 10GE SFP+- np-cache/services-offload</td>
</tr>
<tr>
<td>PIC 1</td>
<td>Online</td>
<td>1x 100GE CFP2- np-cache/services-offload</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>--------</td>
<td>--------------------------------------</td>
<td></td>
</tr>
<tr>
<td>PIC 2</td>
<td>Online</td>
<td>2x 10GE SFP+- np-cache/services-offload</td>
<td></td>
</tr>
<tr>
<td>PIC 3</td>
<td>Online</td>
<td>1x 100GE CFP2- np-cache/services-offload</td>
<td></td>
</tr>
<tr>
<td>Slot 3</td>
<td>Online</td>
<td>SRX5k IOC3 24XGE+6XLG</td>
<td></td>
</tr>
<tr>
<td>PIC 0</td>
<td>Offline</td>
<td>12x 10GE SFP+</td>
<td></td>
</tr>
<tr>
<td>PIC 1</td>
<td>Offline</td>
<td>12x 10GE SFP+</td>
<td></td>
</tr>
<tr>
<td>PIC 2</td>
<td>Online</td>
<td>3x 40GE QSFP+- np-cache/services-offload</td>
<td></td>
</tr>
<tr>
<td>PIC 3</td>
<td>Online</td>
<td>3x 40GE QSFP+- np-cache/services-offload</td>
<td></td>
</tr>
<tr>
<td>Slot 4</td>
<td>Offline</td>
<td>SRX5k IOC3 24XGE+6XLG</td>
<td></td>
</tr>
</tbody>
</table>

**Meaning**  
The output provides the status of PICs with Express Path enabled on them.

**Verifying All Active Sessions on the Device**

**Purpose**  
Display information about all currently active Express Path security sessions on the device.

**Action**  
From operational mode, enter the `show security flow session services-offload` command.

**Flow Sessions on FPCL PIC1:**

Session ID: 50000002, **Policy name: express-path-policy-2/5**, Timeout: 60, Valid

  In: 2001:db8::4:12/32 --> 2001:db8::6:11/32;udp, If: et-2/3/0.0, Conn ID: 0x0, Pkts: 181
  29505, Bytes: 1740432530, CP Session ID: 50000002

  Out: 2001:db8::6:11/32 --> 2001:db8::4:12/32;udp, If: et-2/1/0.0, Conn ID: 0x0, Pkts: 18
  129505, Bytes: 1740432530, CP Session ID: 50000002

**Total sessions: 1**

**Meaning**  
The output provides the policy details for sessions on which Express Path was enabled.

**Example: Configuring Low Latency**

The low latency feature allows you to configure the mode of the network processor’s traffic manager (TM) on the egress path. If low latency is enabled, the network processor is initialized without the traffic manager, thus reducing the overall latency in the Express Path (formerly known as services offloading).

**NOTE:** Because all SRX Series CoS functions are supported by the traffic manager, CoS functions are not supported when low latency is enabled.

Low latency reduces the total NPC integrated with an existing IOC (NP-IOC) latency by 0.7 us. This latency reduction brings the NP-IOC card total latency to 8.7 us. The low-latency feature is supported for intra-NP-IOC card traffic only; it is not applicable to inter-NP traffic.
In the low-latency mode, the network processor does not have an egress buffer at the traffic manager. Packets are delivered directly to the system packet interface (SPI) for the field-programmable gate array (FPGA) to process.

**NOTE:** The low latency feature is only applicable to the NP-IOC card.

- Requirements on page 244
- Overview on page 244
- Configuration on page 244
- Verification on page 245

**Requirements**

Before you begin, understand Express Path overview.

This example uses the following software and hardware components:

- Junos OS Release 12.1X44-D10
- One SRX Series device
- One Services Processing Card (SPC)

**Overview**

In this example, you configure the network processor for low latency mode.

**Configuration**

**CLI Quick Configuration**

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the [edit] hierarchy level, and then enter commit from configuration mode.

```
set chassis fpc 7 pic 0 services-offload low-latency
```

**Step-by-Step Procedure**

To enable low-latency mode:

1. Enable the Express Path mode on the NP-IOC.
   ```
   [edit]
   user@host# set chassis fpc 7 pic 0 services-offload low-latency
   ```

2. Commit the configuration.
   ```
   [edit]
   user@host# commit
   
   warning: System restart is required after fpc 7 pic 0 changed to services-offload mode.
   commit complete
   ```
3. Reboot the device.

Results
From configuration mode, confirm your configuration by entering the `show configuration chassis` command. If the output does not display the intended configuration, repeat the configuration instructions in this example to correct it.

```
[edit]
user@host> show configuration chassis
fpc 7 {
    pic 0 {
        services-offload {
            low-latency;
        }
    }
}
```

If you are done configuring the device, enter `commit` from configuration mode.

Verification

**Verifying Low Latency Configuration**

Purpose
Verify that low latency was enabled.

Action
From operational mode, enter the `show chassis fpc pic-status` command.

```
root@kg04> show chassis fpc pic-status
Slot 0   Online       SRX5k SFB 12GE
PIC 0    Online       8x 1GE-TX 4x 1GE-SFP
Slot 1   Online       SRX5k 2x10GE XFP
PIC 0    Online       2x 10GE-XFP
Slot 2   Online       SRX5k SPC
PIC 0    Online       SPU Cp-Flow
Slot 7   Online       SRX5k 2x10GE NP-IOC
PIC 0    Online       2x 10GE-SFP+ services-offload low-latency
```

Managing Packet Fragmentation in IPsec VPN Networks

Packet fragmentation degrades system performance in IPsec VPN networks. The SRX Series packet fragmentation counters feature allows you to monitor the amount of packet fragmentation incurred in processing traffic for IPsec tunnels on your device and throughout your network. It counts fragmentated packets that can occur before tunnel encapsulation and afterward for individual tunnels. It also counts overall the number of fragmented packets for tunnel sessions on a Services Processing Unit (SPU).

To understand the amount of packet fragmentation in your network in order to prevent it from occurring, it is helpful to be able to measure it. After you tune your system for improvement, it is useful to be able to verify the results.
The fragmentation counters feature provides output through the `show security flow` commands that you can use to display fragmentation counter statistics. You can display fragmented packet numbers collectively for individual IPSec tunnels. You can also obtain a summary of the number of fragmented packets based on the SPU.

You can use the fragmentation information provided through `show` commands as input to your iterative tuning process to decrease the likelihood of fragmentation occurrence. Use of this feature allows you to achieve optimum SRX Series performance otherwise limited by packet fragmentation.

- Fragmentation Counters Feature Overview on page 246
- Understanding Fragmentation and MTU and MSS Sizes on page 246
- Using Fragmentation Counter Statistics to Tune Your System on page 247

**Fragmentation Counters Feature Overview**

Datagrams are fragmented when a packet is larger than the maximum transmission unit (MTU) size established for a device’s egress interface. The egress interface’s MTU size determines the size of the packets sent to the receiving device. A datagram could also be fragmented into smaller packets to transit a link in the datapath because the packet is larger than the amount of data that the receiving device can accept or larger than the MTU of any link in the datapath. In any case, the packet header of the original datagram that was broken into fragments is added to each of the fragmented packets, in addition to the parts of the payload that the fragment carries.

It is important to understand the degree and kinds of fragmentation occurring on your device in order to tune your system to avoid it. The Junos OS for SRX Series fragmentation counters feature counts packet fragments for IPSec tunnels that can occur before and after a packet is encapsulated with an IPSec encryption header.

The fragmentation counters feature takes into account the following kinds of packet fragmentation:

**Pre-fragmentation**—Self-generated packet fragmentation that occurs prior to encapsulation

**Post-fragmentation**—Packets that are received by the SRX Series device and packets that are fragmented after encryption.

For an individual tunnel, a counter is increased whenever a fragment is encountered. Fragments that occur before packet encapsulation are counted separately from fragments that occur because of encapsulation. When a counter is increased for an individual tunnel, the SPU fragmentation counter is also increased.

**Understanding Fragmentation and MTU and MSS Sizes**

Packet fragmentation can negatively impact performance of the entire IPSec VPN, and it must be avoided for that reason. Fragmentation is likely to occur when a datagram approximates the MTU size set for the egress interface of the sending device. When IPSec VPN datagrams are fragmented, the resulting fragment packets are encapsulated with IPSec ESP or AH headers in addition to the datagram’s original TCP header. Fragmentation negatively impacts the IPSec peers at either end of the IPSec VPN tunnel.
Fragmentation—breaking a datagram into smaller packets to be reassembled later—incurrs CPU and memory overhead on both the sending peer and the receiving peer. The impact on the sending peer is minimal. It must break down the datagram. The impact on the receiving peer is far greater because it must allocate memory for incoming packets and reassemble them into the complete datagram before it can decrypt the cohesive datagram.

The size of a packet to be transmitted to the receiving peer is based on two values: the MTU size and maximum segment size (MSS). The MTU size established for the egress interface determines the size of the datagram that the sending peer transmits to the receiving peer. Although a larger MTU size can result in greater efficiency, it can have a negative impact, resulting in packet fragmentation downstream.

The MSS of a device specifies the maximum amount of information that the device can accept in a single IP datagram. In IPsec VPNs, each peer compares its outgoing interface MTU size with its own MSS buffer size. It must send the smaller of the two values to the receiving peer as its MSS. During the three-way handshake negotiation between the two IPsec VPN peers, the smaller MSS value is selected to be used in sending packets. The MSS value is sent as a TCP header option in TCP SYN segments.

Using Fragmentation Counter Statistics to Tune Your System

There are a number of methods that you can use to limit the degree of fragmentation that can occur when IPsec VPN tunnels are used. Regardless of the method that you use, it is helpful to be able to observe and measure the volume of fragmentation that is being transmitted before and after you iteratively tune your network. The SRX Series fragmentation counters feature provides that information in the following show commands output:

• To see fragmentation information for individual tunnels, use the `show security flow session tunnel extensive` command.
• To see overall fragmentation information based on an SPU, use the `show security flow session tunnel summary` command.
• To see statistics on the number of pre-fragments and post-fragments on an SPU, use the `show security flow statistics` command.

Here are two of the basic approaches that you can take to manage fragmentation between the two IPsec VPN peers:

1. Manipulate the MSS of the sending peer to establish the appropriate MTU size for its egress interface.

   **NOTE:** The sending peer device should not send packets that are larger than the receiving peer device can accept, as determined by the receiving peer’s MSS value.

   For details on changing the MSS setting on the sending peer’s device to effect a smaller MTU size on that device.
Use the fragmentation counters statistics displayed by the related show commands to iteratively tune the MSS value on the sending peer until fragmentation between the peers is eliminated.

To get the fragmentation statistics result of your tuning, you must renegotiate the MSS value with the receiving peer.

Before you renegotiate with the receiving peer, you must clear the show commands to reset their counters. If further tuning is required, you must clear the show commands before changing the MSS value and renegotiating again with the receiving peer.

To clear the fragmentation counters for the show security flow statistics command, use the following command:

```
user@host# clear security flow statistics
```

To clear the fragmentation counters for the show security flow session tunnel extensive and the show security flow session tunnel summary commands, you must deactivate the IPsec tunnel and then reactivate it.

Use the following statements to deactivate the IPsec VPN:

```
user@host# deactivate security ipsec
user@host# commit
```

Use the following statements to reactivate the IPsec VPN to enact the three-way handshake with the peer device in which the MSS values of the peers are exchanged:

```
user@host# activate security ipsec
user@host# commit
```

2. Use the ping command

You could use the ICMP ping command to determine the correct packet size to use in establishing the appropriate MTU size. To find the proper MTU size, you must send the ping repeatedly to the receiving peer until no fragmentation message is returned.

You could start at 1450 and if you receive a fragmentation message, you could decrease the size by 10 each time you issue the ping command. If you do not get a fragmented packet reply message, you could incrementally increase the MTU size.

Although you can control fragmentation between the two IPsec VPN endpoint peers, it can happen that a link in the datapath between them cannot accept a packet because its MSS value is too small or a link could have a smaller MTU size than the size of the packet that it received and must break it down the before transmitting it. Technologies are available such as path maximum transmission unit (PMTU) that can be used to dynamically determine the MTU size to avoid fragmentation along the datapath.

See Also

- show security flow session tunnel on page 583
- show security flow statistics on page 592
CHAPTER 6

Configuration Statements

- aging on page 251
- all-tcp on page 252
- allow-dns-reply on page 252
- allow-embedded-icmp on page 253
- allow-reverse-ecmp on page 254
- application-services (Security Forwarding Process) on page 255
- apply-to-half-close-state on page 256
- destination-header on page 257
- destination-port (Security Forwarding Options) on page 258
- destination-prefix (Security Forwarding Options) on page 262
- early-ageout on page 262
- error on page 263
- fin-invalidate-session on page 266
- flow (Security Flow) on page 268
- force-ip-reassembly on page 272
- forwarding-process on page 273
- fpc error on page 275
- fru-poweron-sequence on page 277
- gre-in on page 278
- gre-out on page 279
- high-watermark on page 280
- hop-by-hop-header on page 281
- icmpv6-malformed on page 282
- idle-timeout (System Services) on page 283
- inline-tap on page 284
- interface-in (Security Forwarding Options) on page 284
- interface-out (Security Forwarding Options) on page 285
- ipv4-template (Services) on page 285
• ipv6-extension-header on page 286
• ipv6-extension-header-limit on page 287
• ipv6-malformed-header on page 288
• ipv6-template (Services) on page 288
• low-latency on page 289
• low-watermark on page 290
• maximize-idp-sessions on page 291
• mirror-filter (Security Forwarding Options) on page 292
• mode (Security Forwarding Options) on page 294
• no-sequence-check on page 295
• np-cache (Flexible PIC Concentrator) on page 296
• output (Security Forwarding Options) on page 297
• packet-filter on page 298
• packet-log (Security Flow) on page 299
• packet-ordering-mode (Application Services) on page 300
• pending-sess-queue-length on page 301
• per-session-statistics on page 301
• pre-id-default-policy on page 302
• preserve-incoming-fragment-size on page 304
• propagate-settings on page 305
• protocol (Security Forwarding Options) on page 306
• resource-manager on page 307
• reverse-route-packet-mode-vr on page 307
• route-change-timeout on page 308
• rst-invalidate-session on page 309
• rst-sequence-check on page 310
• sampling on page 311
• services-offload on page 312
• session (System Services) on page 313
• session-limit (System Services) on page 314
• source-port (Security Forwarding Options) on page 315
• source-prefix (Security Forwarding Options) on page 319
• syn-flood-protection-mode on page 319
• tcp-initial-timeout on page 320
• tcp-mss (Security Flow) on page 321
• tcp-session on page 322
• time-wait-state on page 323
aging

Syntax

```plaintext
aging {
  early-ageout seconds;
  high-watermark percent;
  low-watermark percent;
}
```

Hierarchy Level  [edit security flow]

Release Information Statement introduced in Junos OS Release 8.5.

Description Direct the device to begin aggressively aging out sessions when the percentage of entries in the session table exceeds the high-watermark setting and then stops when the percentage of sessions falls below the low-watermark setting.

Options The remaining statements are explained separately. See the CLI Explorer.

Required Privilege Level
- security—To view this in the configuration.
- security-control—To add this to the configuration.

Related Documentation
- Understanding Traffic Processing on Security Devices on page 25
all-tcp

Syntax all-tcp mss value;

Hierarchy Level [edit security flow tcp-mss]

Release Information Statement introduced in Junos OS Release 8.5.

Description Set the TCP maximum segment size (MSS) value to enable MSS override for all TCP packets in network traffic.

Options mss value—TCP MSS value.
  Range: 64 through 65,535 bytes

Required Privilege Level security—To view this in the configuration.
  security-control—To add this to the configuration.

Related Documentation • tcp-mss (Security Flow) on page 321
  • Understanding Traffic Processing on Security Devices on page 25

allow-dns-reply

Syntax allow-dns-reply;

Hierarchy Level [edit security flow]

Release Information Statement introduced in Junos OS Release 8.5.

Description Allow an incoming Domain Name Service (DNS) reply packet without a matched request. By default, if an incoming UDP first-packet has dst-port 53, the device checks the DNS message packet header to verify that the query bit (QR) is 0, which denotes a query message. If the QR bit is 1, which denotes a response message, the device drops the packet, does not create a session, and increments the illegal packet flow counter for the interface. Using the allow-dns-reply directs the device to skip the check.

Required Privilege Level security—To view this in the configuration.
  security-control—To add this to the configuration.

Related Documentation • Understanding Traffic Processing on Security Devices on page 25
allow-embedded-icmp

Syntax  allow-embedded-icmp;

Hierarchy Level  [edit security flow]


Description  Allow ICMP error packets to pass through the device even when there is no session match for the embedded packet. Once enabled, all packets encapsulated in ICMP pass through and no policy affects this behavior. This feature is useful when you have asymmetric routing in your network and you want to use traceroute and other ICMP applications on your device.

The default behavior is to inspect the IP packet which is embedded in the ICMP error packet. If the embedded packet is part of an existing session, the ICMP packet is allowed to pass through. If there is no match, it is dropped. Without the allow-embedded-icmp option configured, the default behavior applies.

Required Privilege  Level
security—To view this in the configuration.
security-control—To add this to the configuration.

Related Documentation  • Understanding Traffic Processing on Security Devices on page 25
allow-reverse-ecmp

Syntax
allow-reverse-ecmp

Hierarchy Level
[edit security flow]

Release Information
Statement introduced in Junos OS Release 17.3.

Description
Enable ECMP support for reverse traffic. In this case, Junos OS for SRX Series devices and vSRX instances use a hash algorithm to determine the interface to use for reverse traffic in a flow. This process is similar to asymmetric routing in which a packet traverses from a source to a destination in one path and takes a different path when it returns to the source.

If you do not enable this feature, the software selects a route in the ECMP set to the incoming interface for reverse traffic, which is the default behavior.

Required Privilege
security—To view this in the configuration.
security-control—To add this to the configuration.

Related Documentation
• Understanding ECMP Flow-Based Forwarding on page 79
• Understanding ECMP Flow-Based Forwarding for Reverse Traffic on SRX Series Devices and vSRX Instances
application-services (Security Forwarding Process)

**Syntax**

```
application-services {
    enable-gtpu-distribution;
    maximize-alg-sessions;
    maximize-idp-sessions {
        weight (firewall | idp);
    }
    packet-ordering-mode {
        (hardware | software);
    }
}
```

**Hierarchy Level**

[edit security forwarding-process]

**Release Information**


**Description**

You can configure SRX4100, SRX4200, SRX5400, SRX5600, and SRX5800 devices to switch from an integrated firewall mode to maximize Intrusion Detection and Prevention (IDP) mode to run IDP processing in tap mode and increase the capacity of processing with the `maximize-idp-sessions` option. Inline tap mode can only be configured if the forwarding process mode is set to `maximize-idp-sessions`, which ensures stability and resiliency for firewall services. You also do not need a separate tap or span port to use inline tap mode. When you maximize IDP, you are decoupling IDP processes from firewall processes, allowing the device to support the same number of firewall and IDP sessions, also run the IDP processing in tap mode.

You can configure maximum Application Layer Gateway (ALG) sessions by using the `maximize-alg-sessions` option. The session capacity number for Real-Time Streaming Protocol (RTSP), FTP, and Trivial File Transfer Protocol (TFTP) ALG varies per flow SPU. For SRX5000 series devices the session capacity is 10,240 per flow SPU. You must reboot the device (and its peer in chassis cluster mode) for the configuration to take effect. The `maximize-alg-sessions` option now enables you to increase defaults as follows:

- TCP proxy connection capacity: 40,000 per flow SPU
  
  Flow session capacity is reduced to half per flow SPU; therefore the aforementioned capacity numbers will not change on central point flow.

Enable GPRS tunneling protocol. GTP-U session distribution is a UE (User equipment) based distribution, generating tunnel based GTP-U session and distributing them across SPU's on a UE basis.

Earlier, GTP-U sessions are distributed by GGSN IP address always.

Starting from Junos OS Release 15.1X49-D40, the GTP-U distribution is disabled and fat GTP-U sessions are distributed as normal UDP.
Use the `enable-gtpu-distribution` command to enable GTP-U session distribution.

**Options**
The remaining statements are explained separately. See the CLI Explorer.

**Required Privilege**
- security—To view this in the configuration.
- security-control—To add this to the configuration.

**Related Documentation**
- Understanding Traffic Processing on Security Devices on page 25

---

**apply-to-half-close-state**

**Syntax**
```
apply-to-half-close-state;
```

**Hierarchy Level**
```
[edit security flow tcp-session time-wait-state]
```

**Release Information**
Statement introduced in Junos OS Release 12.1X46-D10.

**Description**
Configure the TCP session timeout in a half-closed state. This enables the system to apply the configured session timeout on receiving only one FIN packet (either client-to-server or server-to-client). When this is not configured, the default behavior takes effect—applying the configured TCP session timeout on receiving both the FIN packets. The default session timeout remains 150 seconds.

**Required Privilege**
- security—To view this in the configuration.
- security-control—To add this to the configuration.

**Related Documentation**
- Understanding Traffic Processing on Security Devices on page 25
destination-header

Syntax
destination-header {
  ILNP-nonce-option;
  home-address-option;
  line-identification-option;
  tunnel-encapsulation-limit-option;
  user-defined-option-type low | <to high>;
}

Hierarchy Level
[edit security screen ids-option screen-name ip ipv6-extension-header]

Release Information
Statement introduced in Junos OS Release 12.1X46-D10.

Description
Define the IPv6 destination header screen option.

Options
  ILNP-nonce-option—Enable the Identifier-Locator Network Protocol nonce screen option.
  home-address-option—Enable the home address screen option.
  line-identification-option—Enable the line identification screen option.
  tunnel-encapsulation-limit-option—Enable the tunnel encapsulation limit screen option.
  user-defined-header-type low | <to high>—Define the type of header range.
                  Range: 1 through 255.

Required Privilege
  security—To view this in the configuration.
  security-control—To add this to the configuration.

Related Documentation
  • Understanding IPv6 Support for Screens
  • ipv6-extension-header on page 286
  • hop-by-hop-header on page 281
destination-port (Security Forwarding Options)

Syntax  
destination-port port-number;

Hierarchy Level  
[edit security forwarding-options mirror-filter filter-name]

Release Information  
Statement introduced in Junos OS Release 12.1X46-D10.

Description  
Specify a Transmission Control Protocol (TCP) or User Datagram Protocol (UDP) destination port number to be matched for mirroring. You can specify a numeric value or one of the text synonyms listed in Table 20 on page 259.
### Table 20: Ports Supported by Services Interfaces

<table>
<thead>
<tr>
<th>Port Name</th>
<th>Corresponding Port Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>afs</td>
<td>1483</td>
</tr>
<tr>
<td>bgp</td>
<td>179</td>
</tr>
<tr>
<td>biff</td>
<td>512</td>
</tr>
<tr>
<td>bootpc</td>
<td>68</td>
</tr>
<tr>
<td>bootps</td>
<td>67</td>
</tr>
<tr>
<td>cmd</td>
<td>514</td>
</tr>
<tr>
<td>cvspserver</td>
<td>2401</td>
</tr>
<tr>
<td>dhcp</td>
<td>67</td>
</tr>
<tr>
<td>domain</td>
<td>53</td>
</tr>
<tr>
<td>eklogin</td>
<td>2105</td>
</tr>
<tr>
<td>ekshell</td>
<td>2106</td>
</tr>
<tr>
<td>excc</td>
<td>512</td>
</tr>
<tr>
<td>finger</td>
<td>79</td>
</tr>
<tr>
<td>ftp</td>
<td>21</td>
</tr>
<tr>
<td>ftp-data</td>
<td>20</td>
</tr>
<tr>
<td>http</td>
<td>80</td>
</tr>
<tr>
<td>https</td>
<td>443</td>
</tr>
<tr>
<td>ident</td>
<td>113</td>
</tr>
<tr>
<td>imap</td>
<td>143</td>
</tr>
<tr>
<td>kerberos-sec</td>
<td>88</td>
</tr>
<tr>
<td>klogin</td>
<td>543</td>
</tr>
<tr>
<td>kpasswd</td>
<td>761</td>
</tr>
<tr>
<td>krb-prop</td>
<td>754</td>
</tr>
<tr>
<td>krbupdate</td>
<td>760</td>
</tr>
</tbody>
</table>
### Table 20: Ports Supported by Services Interfaces (continued)

<table>
<thead>
<tr>
<th>Port Name</th>
<th>Corresponding Port Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>kshell</td>
<td>544</td>
</tr>
<tr>
<td>ldap</td>
<td>389</td>
</tr>
<tr>
<td>ldp</td>
<td>646</td>
</tr>
<tr>
<td>login</td>
<td>513</td>
</tr>
<tr>
<td>mobileip-agent</td>
<td>434</td>
</tr>
<tr>
<td>mobilip-mn</td>
<td>435</td>
</tr>
<tr>
<td>msdp</td>
<td>639</td>
</tr>
<tr>
<td>netbios-dgm</td>
<td>138</td>
</tr>
<tr>
<td>netbios-ns</td>
<td>137</td>
</tr>
<tr>
<td>netbios-ssn</td>
<td>139</td>
</tr>
<tr>
<td>nfsd</td>
<td>2049</td>
</tr>
<tr>
<td>nntp</td>
<td>119</td>
</tr>
<tr>
<td>ntalk</td>
<td>518</td>
</tr>
<tr>
<td>ntp</td>
<td>123</td>
</tr>
<tr>
<td>pop3</td>
<td>110</td>
</tr>
<tr>
<td>pptp</td>
<td>1723</td>
</tr>
<tr>
<td>printer</td>
<td>515</td>
</tr>
<tr>
<td>radacct</td>
<td>1813</td>
</tr>
<tr>
<td>radius</td>
<td>1812</td>
</tr>
<tr>
<td>rip</td>
<td>520</td>
</tr>
<tr>
<td>rkinit</td>
<td>2108</td>
</tr>
<tr>
<td>smtp</td>
<td>25</td>
</tr>
<tr>
<td>snmp</td>
<td>161</td>
</tr>
<tr>
<td>snmp-trap</td>
<td>162</td>
</tr>
</tbody>
</table>
Table 20: Ports Supported by Services Interfaces (continued)

<table>
<thead>
<tr>
<th>Port Name</th>
<th>Corresponding Port Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>snpp</td>
<td>444</td>
</tr>
<tr>
<td>socks</td>
<td>1080</td>
</tr>
<tr>
<td>ssh</td>
<td>22</td>
</tr>
<tr>
<td>sunrpc</td>
<td>111</td>
</tr>
<tr>
<td>syslog</td>
<td>514</td>
</tr>
<tr>
<td>tacacs</td>
<td>49</td>
</tr>
<tr>
<td>tacacs-ds</td>
<td>65</td>
</tr>
<tr>
<td>talk</td>
<td>517</td>
</tr>
<tr>
<td>telnet</td>
<td>23</td>
</tr>
<tr>
<td>tftp</td>
<td>69</td>
</tr>
<tr>
<td>timed</td>
<td>525</td>
</tr>
<tr>
<td>who</td>
<td>513</td>
</tr>
<tr>
<td>xdmcp</td>
<td>177</td>
</tr>
</tbody>
</table>

**Required Privilege Level**

- security—To view this in the configuration.
- security-control—To add this to the configuration.

**Related Documentation**

- mirror-filter (Security Forwarding Options) on page 292
- show security forwarding-options mirror-filter on page 599
**destination-prefix (Security Forwarding Options)**

Syntax: destination-prefix destination-prefix;

Hierarchy Level: [edit security forwarding-options mirror-filter filter-name]


Description: Specify the destination IP prefix or address to be matched for mirroring.

Required Privilege Level: security—To view this in the configuration.
security-control—To add this to the configuration.

Related Documentation:
- mirror-filter (Security Forwarding Options) on page 292
- show security forwarding-options mirror-filter on page 599

**early-ageout**

Syntax: early-ageout seconds;

Hierarchy Level: [edit security flow aging]

Release Information: Statement introduced in Junos OS Release 8.5.

Description: Define the value before the device aggressively ages out a session from its session table.

Options: seconds—Amount of time that elapses before the device aggressively ages out a session.
- Range: 1 through 65,535 seconds
- Default: 20 seconds

Required Privilege Level: security—To view this in the configuration.
security-control—To add this to the configuration.

Related Documentation:
- Understanding Traffic Processing on Security Devices on page 25
error

Syntax

```plaintext
error {  (fatal | major | minor) {  threshold threshold-number;  action (alarm | disable-pfe | offline-pic | log | get-state | offline | reset);  }
}
```

Hierarchy Level

```plaintext
[edit chassis]
[edit chassis fpc slot-number]
```

Release Information

Statement introduced in Junos OS Release 15.1X49-D40.

Description

Configure the threshold at which FPC errors will take the action you configure to be performed by the device.

Some devices include an internal framework for detecting and correcting FPC errors that can have the potential to affect services. You can classify FPC errors according to severity, set an automatic recovery action for each severity, and set a threshold (the number of times the error must occur before the action is triggered).

However, the alarm is added to the default fault handling action list for a fatal error. Adding an alarm to the default fault handling list will allow the chassis alarm to trigger the RGI switchover as soon as the fatal error is detected.

Starting with Junos OS Release 15.1-X49-D50 and Junos OS Release 17.3R1, this feature supports I/O cards (IOCs) and Services Processing Cards (SPCs) on the Junos OS SRX5000 line of devices. The following cards are supported:

- IOC2
- IOC3
- SPC2

CAUTION: Take care when setting the fault handling actions for SPC2 cards on the SRX5000 line of devices. Consider that if you set the fault handling action on an SPC2 card to offline or reset, when the card is either taken offline or the reboot occurs, the chassis daemon (chassisd) will reboot all of its FPC cards, both SPCs and IOCs—that is, the entire chassis will be rebooted.

Options

You can configure the threshold for the following severity levels:
You cannot change the severity level of an error.

- **fatal**—Fatal error on the FPC. An error that results in the blockage of a considerable amount of traffic across modules is a fatal error. (default: raise an alarm and reset the FPC)

- **major**—Major error on the FPC. An error that results in continuing loss of packet traffic but does not affect other modules is a major error. (default: get the current state of the FPC and raise an alarm)

- **minor**—Minor error on the FPC. An error that results in the loss of a single packet but is fully recoverable is a minor error. (default: write a log for the event.)

- **threshold threshold-value**—Configure the threshold value at which to take action. If the severity level of the error is fatal, the action is carried out only once when the total number of errors exceeds the threshold value. If the severity level of the error is major, the action is carried out once after the occurrence exceeds the threshold. If the severity level is minor, the action is carried out as many times as the value specified by the threshold. For example, when the severity level is minor, and you have configured the threshold value as 10, the action is carried out after the tenth occurrence.

You can set the threshold value to 0 for errors with a severity level of minor. This implies that no action is taken for that error. You cannot set the threshold value to 0 for errors with a severity level of major or fatal.

Reset and offline are not listed as default actions for the minor error level for safety purposes.

The alarm and reset default action is included in the implementation for the SRX5000 line of devices. It is required to trigger the RGI switchover in a chassis cluster environment when an FPC fatal error occurs and the alarm being raised is a major alarm.

Default: The error count for fatal and major actions is 1. The default error count for minor actions is 10.

*Table 21 on page 264* shows the range of values for each error level.

<table>
<thead>
<tr>
<th>Error Level</th>
<th>Default Threshold</th>
<th>Value Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatal</td>
<td>1</td>
<td>1 through 1024</td>
</tr>
<tr>
<td>Major</td>
<td>1</td>
<td>1 through 1024</td>
</tr>
<tr>
<td>Minor</td>
<td>10</td>
<td>0 through 1024</td>
</tr>
</tbody>
</table>
The available detection and recovery actions are as follows:

- **alarm**—Raise an alarm.
- **disable-pfe**—Disable the Packet Forwarding Engine interfaces on the FPC.
- **get-state**—Get the current state of the FPC.
- **log**—Generate a log for the event.
- **offline**—Take the FPC offline.
- **offline-pic**—Take the PIC (installed in the FPC) offline.
- **reset**—Reset the FPC.

**Required Privilege Level**

- **interface**—To view this in the configuration.
- **interface-control**—To add this to the configuration.

**Related Documentation**

- [fpc error on page 275](#)
fin-invalidate-session

Syntax  fin-invalidate-session;

Hierarchy Level  [edit security flow tcp-session]


Description  Invalidates a TCP session after the 4-way or 3-way handshake completes, with each session endpoint signalling conclusion of the session independently. New incoming SYN packets will need to establish a new TCP session.

When either session endpoint wants to terminate the session, it sends a Fin(ish) message. When the other session endpoint receives the packet with the Fin flag set, it sends an Acknowledge message. Typically, tearing down a session involves transmission of a pair of FIN-ACK messages from each session endpoint.

After the side that sent the first FIN responds with the final ACK, it waits for a time-out period to expire before closing the connection. During the time-out period, the local port cannot be used for new connections. The time-out period protects against delayed packets from the terminating session being delivered during subsequent connections.

NOTE: On SRX Series devices with fin-invalidate-session configured the invalidation of the session occurs immediately whereas without fin-invalidate-session configured the session is set to time out 2 seconds after the 4-way or 3-way handshake completes.

Table 22 on page 267 shows the sequence of packets for a 4-way handshake to terminate a session. In this case, the client signals the server that it is terminating the session. The server responds with an ACK message signaling acknowledgement of the client’s FIN message. The ACK is followed immediately by a FIN message that the server sends to the client, signaling that it is terminating the session connection on its end. Finally, the client sends an ACK message to the server signalling that it received the server’s FIN message.
### Table 22: Terminating a Session with a 4-Way Handshake

<table>
<thead>
<tr>
<th>Step</th>
<th>Client</th>
<th>Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>FIN</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>ACK</td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>FIN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Sets session timer to 150 seconds.</td>
</tr>
<tr>
<td>4.</td>
<td>ACK</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Sets session timer to 2 seconds.</td>
<td></td>
</tr>
</tbody>
</table>

A session can be terminated by a 3-way handshake. In this case, the client sends a FIN message to the server. The server responds with a message that combines the FIN and ACK messages. The sequence of packet exchange for a three-way handshake session close is as follows:

<table>
<thead>
<tr>
<th>Step</th>
<th>Client</th>
<th>Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>FIN</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>FIN/ ACK</td>
</tr>
<tr>
<td></td>
<td>• sets session timer to 150 seconds</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>ACK</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• sets session timer to 2 seconds</td>
<td></td>
</tr>
</tbody>
</table>

**Required Privilege**
- security—To view this in the configuration.
- security-control—To add this to the configuration.

**Related Documentation**
- Understanding Traffic Processing on Security Devices on page 25
Flow-Based and Packet-Based Processing Feature Guide for Security Devices

**flow (Security Flow)**

**Syntax**

```plaintext
flow {
  advanced-options {
    drop-matching-link-local-address;
    drop-matching-reserved-ip-address;
    reverse-route-packet-mode-vr;
  }
  aging {
    early-ageout seconds;
    high-watermark percent;
    low-watermark percent;
  }
  allow-dns-reply;
  allow-embedded-icmp;
  allow-reverse-ecmp;
  enable-reroute-uniform-link-check {
    nat;
  }
  enhanced-routing-mode;
  ethernet-switching {
    block-non-ip-all;
    bpdu-vlan-flooding;
    bypass-non-ip-unicast;
    no-packet-flooding {
      no-trace-route;
    }
  }
  force-ip-reassembly;
  ipsec-performance-acceleration (Security Flow);
  load-distribution {
    session-affinity {
      ipsec;
    }
  }
  mcast-buffer-enhance;
  packet-log (Security Flow) {
    enable;
    packet-filter name {
      conn-tag conn-tag;
      destination-port (afs | bgp | biff | bootpc | bootps | cmd | cvspsrver | dhcp | domain | eklogin | ekshell | exec | finger | ftp | ftp-data | http | https | ident | imap | kerberos-sec | klogin | kpasswd | krb-prop | krbupdate | kshell | ldap | ldap | login | mobileip-agent | mobilip-mn | msdp | netbios-dgm | netbios-ns | netbios-ssn | nfd | nntp | ntalk | ntp | pop3 | ptp | printer | radacct | radius | range | rip | rinit | smtp | snmp | snmptrap | snmp | socks | ssh | sunrpc | syslog | tacacs | tacacs-ads | talk | telnet | tftp | timed | who | xdmcp | zephyr-clt | zephyr-hm | zephyr-srv);
      destination-prefix destination-prefix;
      interface interface;
      logical-system logical-system;
      protocol (ah | egp | esp | gre | icmp | icmp6 | igmp | ipip | number | ospf | pim | rsvp | sctp | tcp | udp);
```
source-port (afs | bgp | biff | bootpc | bootps | cmd | cvspserver | dhcp | domain | eklogin | ekshell | exec | finger | ftp | ftp-data | http | https | ident | imap | kerberos-sec | klogin | kpasswd | krb-prop | krbupdate | kshell | ldap | ldp | login | mobileip-agent | mobilip-mn | msdp | netbios-dgm | netbios-ns | netbios-ssn | nfsd | nntp | ntalk | ntp | pop3 | pptp | printer | radacct | radius | range | rip | rkit | smtp | smmp | snmptrap | snmp | socks | ssh | sunrpc | syslog | tacacs | tacacs-ds | talk | telnet | tftp | timed | who | xdmcp | zephyr-clt | zephyr-hm | zephyr-srv); source-prefix

throttle-interval milliseconds;
}

pending-sess-queue-length (high | moderate | normal);

power-mode-ipsec;
preserve-incoming-fragment-size;

route-change-timeout seconds;
syn-flood-protection-mode (syn-cookie | syn-proxy);
sync-icmp-session;
tcp-mss (Security Flow) {
  all-tcp {
    mss mss;
  }
  gre-in {
    mss mss;
  }
  gre-out {
    mss mss;
  }
  ipsec-vpn (Security Flow) {
    mss mss;
  }
}

tcp-session {
  fin-invalidate-session;
  maximum-window (128K | 1M | 256K | 512K | 64K);
  no-sequence-check;
  no-syn-check;
  no-syn-check-in-tunnel;
  rst-invalidate-session;
  rst-sequence-check;
  strict-syn-check;
tcp-initial-timeout seconds;
  time-wait-state {
    (session-ageout | session-timeout seconds);
    apply-to-half-close-state;
  }
}
traceoptions (Security Flow) {
  file <filename> <files files> <match match> <size size> <(world-readable | no-world-readable)>;
  flag name;
  no-remote-trace;
  packet-filter name {
    conn-tag conn-tag;
    destination-port (afs | bgp | biff | bootpc | bootps | cmd | cvspserver | dhcp | domain |
      eklogin | ekshell | exec | finger | ftp | ftp-data | http | https | ident | imap | kerberos-sec |
      klogin | kpasswd | krb-prop | krbupdate | kshell | ldap | ldp | login | mobileip-agent |
      mobilip-mn | msdp | netbios-dgm | netbios-ns | netbios-ssn | nfsd | nntp | ntalk | ntp | op3 | pptp | printer | radacct | radius | range | rip | rkit | smtp | sntp | smtptrap |
      snpp | socks | ssh | snrpc | syslog | tacacs | tacacs-ds | talk | telnet | tftp | timed |
      who | xdmcp | zephyr-clt | zephyr-hm | zephyr-srv);
    destination-prefix destination-prefix;
    interface interface;
    logical-system logical-system;
    protocol (ah | egp | esp | gre | icmp | icmp6 | igmp | ipip | number | ospf | pim | rsvp |
      sctp | tcp | udp);
    source-port (afs | bgp | biff | bootpc | bootps | cmd | cvspserver | dhcp | domain | eklogin | ekshell | exec | finger | ftp | ftp-data | http | https | ident | kerberos-sec |
      klogin | kpasswd | krb-prop | krbupdate | kshell | ldap | ldp | login | mobileip-agent |
      mobilip-mn | msdp | netbios-dgm | netbios-ns | netbios-ssn | nfsd | nntp | ntalk | ntp | pop3 | pptp | printer | radacct | radius | range | rip | rkit | smtp | sntp | smtptrap |
      snpp | socks | ssh | snrpc | syslog | tacacs | tacacs-ds | talk | telnet | tftp | timed |
      who | xdmcp | zephyr-clt | zephyr-hm | zephyr-srv);
    source-prefix source-prefix;
  }
  rate-limit rate-limit;
  trace-level {
    (brief | detail | error);
  }
}

Hierarchy Level  [edit security]

Release Information  Statement modified in Junos OS Release 9.5. The power-mode-ipsec option added in
Junos OS Release 18.3R1 for vSRX instances, in Junos OS Release 18.4R1 for SRX4100
and SRX4200 devices, and in Junos OS Release 18.2R2 for SRX5400, SRX5600, and
SRX5800 devices.

Description  Determine how the device manages packet flow. The device can regulate packet flow
in the following ways:
Options  

advanced-options—Flow configuration advanced options.

Values:
- close-matching-icmp-session—Allow icmp sessions to be invalidated immediately.
- drop-matching-link-local-address—Drop matching link local address.
- drop-matching-reserved-ip-address—Drop matching reserved source IP address.
- reverse-route-packet-mode-vr—Allow reverse route lookup with packet mode vr.

allow-dns-reply—Allow unmatched incoming DNS reply packet.

allow-embedded-icmp—Allow embedded ICMP packets not matching a session to pass through.

allow-reverse-ecmp—Allow reverse ECMP route lookup.

enable-reroute-uniform-link-check—Enable reroute check with uniform link.

Values:
- nat—Enable NAT check.

enhanced-routing-mode—Enable enhanced route scaling.

force-ip-reassembly—Force to reassemble IP fragments.

ipsec-performance-acceleration—Accelerate the IPSec traffic performance.

mcast-buffer-enhance—Allow to hold more packets during multicast session creation.

pending-sess-queue-length—Maximum queued length per pending session.

Values:
- high—Maximum number of queued sessions.
- moderate—Allow more queued sessions than normal.
- normal—Normal number of sessions queued.

power-mode-ipsec—Enable power mode ipsec processing.

preserve-incoming-fragment-size—Preserve incoming fragment size for egress MTU.

route-change-timeout—Timeout value for route change to nonexistent route (seconds).

Default: 6

Range: 6 through 1800

syn-flood-protection-mode—TCP SYN flood protection mode.

Values:
- syn-cookie—Enable SYN cookie protection.
- syn-proxy—Enable SYN proxy protection.

sync-icmp-session—Allow icmp sessions to sync to peer node.
force-ip-reassembly

Syntax  force-ip-reassembly;

Hierarchy Level  [edit security flow]

Release Information  Statement introduced in Junos OS Release 11.2.

Description  Reassemble all IP fragmented packets before forwarding.

This option is disabled by default. You can disable this option by deleting this flag from the CLI.

Required Privilege Level  security—To view this statement in the configuration.

security-control—To add this statement to the configuration.

Related Documentation  • Understanding Traffic Processing on Security Devices on page 25

• Understanding Session Characteristics for SRX Series Services Gateways on page 63

• Understanding Packet Flow in Logical Systems for SRX Series Devices
### forwarding-process

**Syntax**

```pseudo
forwarding-process {
    application-services {
        enable-gtpu-distribution;
        maximize-alg-sessions;
        maximize-idp-sessions {
            weight (firewall | idp);
        }
        packet-ordering-mode {
            (hardware | software);
        }
    }
}
```

**Hierarchy Level**

[edit security]

**Release Information**

Statement introduced in Junos OS Release 9.6. This statement is supported on the SRX1500, SRX5400, SRX5600, and SRX5800 devices and vSRX instances.

**Description**

You can configure SRX5400, SRX5600, and SRX5800 devices to switch from an integrated firewall mode to maximize Intrusion Detection and Prevention (IDP) mode to run IDP processing in tap mode and increase the capacity of processing with the `maximize-idp-sessions` option. Inline tap mode can only be configured if the forwarding process mode is set to `maximize-idp-sessions`, which ensures stability and resiliency for firewall services. You also do not need a separate tap or span port to use inline tap mode. When you maximize IDP, you are decoupling IDP processes from firewall processes, allowing the device to support the same number of firewall and IDP sessions, also run the IDP processing in tap mode.

You can configure maximum Application Layer Gateway (ALG) sessions by using the `maximize-alg-sessions` option. By default, the session capacity number for Real-Time Streaming Protocol (RTSP), FTP, and Trivial File Transfer Protocol (TFTP) ALG sessions is 10,000 per flow Services Processing Unit (SPU). You must reboot the device (and its peer in chassis cluster mode) for the configuration to take effect. The `maximize-alg-sessions` option now enables you to increase defaults as follows:

- RTSP, FTP, and TFTP ALG session capacity: 25,000 per flow SPU
- TCP proxy connection capacity: 40,000 per flow SPU

**NOTE:** Flow session capacity is reduced to half per flow SPU; therefore the aforementioned capacity numbers will not change on central point flow.
Enable GPRS tunneling protocol, user plane (GTP-U) session distribution to distribute GTP-U traffic handled by a Gateway GPRS Support Node (GGSN) and a Serving GPRS Support Node (SGSN) pair on all Services Processing Units (SPUs). You can configure tunnel-base distribution to distribute GTP-U traffic to multiple SPUs by the `enable-gtpu-distribution` option on SRX5400, SRX5600, and SRX5800 devices, which helps to resolve the GTP-U fat session issue. Also, `enable-gtpu-distribution` command is must for enabling stateful GTP-U inspection.

**Options**
The remaining statements are explained separately. See the CLI Explorer.

**Required Privilege**
- **Level**
  - security—To view this in the configuration.
  - security-control—To add this to the configuration.

**Related Documentation**
- application-services (Security Forwarding Process) on page 255
- Understanding Traffic Processing on Security Devices on page 25
fpc error

Syntax

```
fpc slot number { error { (fatal | major | minor) { threshold threshold-value; action (alarm | disable-pfe | offline-pic | log | get-state | offline | reset); } } }
```

Hierarchy Level

[edit chassis]

Release Information

Statement introduced in Junos OS Release 15.1X49-D40. This command is supported on the SRX5400, SRX5600, and SRX5800 devices.

Description

Configure the threshold at which FPC errors will take the action you configure to be performed by the device.

Some devices include an internal framework for detecting and correcting FPC errors that can have the potential to affect services. For each FPC on the device, you can classify errors according to severity, set an automatic recovery action for each severity, and set a threshold (the number of times the error must occur before the action is triggered).

Options

You can configure the threshold for the following severity levels:

- **fatal**—Fatal error on the FPC. An error that results in the blockage of a considerable amount of traffic across modules is a fatal error.
- **major**—Major error on the FPC. An error that results in continuing loss of packet traffic but does not affect other modules is a major error.
- **minor**—Minor error on the FPC. An error that results in the loss of a single packet but is fully recoverable is a minor error.
- **threshold threshold-value**—Configure the threshold value at which to take action. If the severity level of the error is fatal, the action is carried out only once when the total number of errors exceeds the threshold value. If the severity level of the error is major, the action is carried out once after the occurrence exceeds the threshold. If the severity level is minor, the action is carried out as many times as the value specified by the threshold. For example, when the severity level is minor, and you have configured the threshold value as 10, the action is carried out after the tenth occurrence.

**NOTE:** You cannot change the severity level of an error.
NOTE: You can set the threshold value to 0 for errors with a severity level of minor. This implies that no action is taken for that error. You cannot set the threshold value to 0 for errors with a severity level of major or fatal.

Default: The error count for fatal and major actions is 1. The default error count for minor actions is 10.

Range: 0—429,496,729

The available detection and recovery actions are as follows:

- **alarm**—Raise an alarm.
- **disable-pfe**—Disable the Packet Forwarding Engine interfaces on the FPC.
- **get-state**—Get the current state of the FPC.
- **log**—Generate a log for the event.
- **offline**—Take the FPC offline.
- **offline-pic**—Take the PIC (installed in the FPC) offline.
- **reset**—Reset the FPC.

**Required Privilege Level**
- routing—To view this in the configuration.
- routing-control—To add this to the configuration.

**Related Documentation**
- error on page 263
fru-poweron-sequence

Syntax  fru-poweron-sequence fru-poweron-sequence;

Hierarchy Level  [edit chassis]


Description  Configure the power-on sequence for FPCs installed in the chassis. SRX5400, SRX5600, and SRX5800 devices.

Options  fru-poweron-sequence—Power-on sequence for the FPCs in the chassis. The numbers indicate the slot number of the FPCs.

NOTE: If the power-on sequence is not configured by including the fru-poweron-sequence, Junos OS uses the ascending order of the FPC slot numbers as the sequence for powering on the FPCs.

NOTE: The FPC online sequence is not dependent on the FPC power-on sequence.

Required Privilege Level  security—To view this in the configuration.
security-control—To add this to the configuration.

Related Documentation  • Understanding Traffic Processing on Security Devices on page 25
gre-in

Syntax

```
gre-in {
  mss value;
}
```

Hierarchy Level
[edit security flow tcp-mss]

Release Information
Statement introduced in Junos OS Release 8.5.

Description
Enable and specify the TCP maximum segment size (TCP MSS) for Generic Routing Encapsulation (GRE) packets that are coming out from an IPsec VPN tunnel. If the device receives a GRE-encapsulated TCP packet with the SYN bit and TCP MSS option set and the TCP MSS option specified in the packet exceeds the TCP MSS specified by the device, the device modifies the TCP MSS value accordingly. By default, a TCP MSS for GRE packets is not set.

Options
```
mss value —TCP MSS for GRE packets. Value is optional.
```

Range: 64 through 63535 bytes
Default: 1320 bytes, if no value is specified

Required Privilege
security—To view this in the configuration.
security-control—To add this to the configuration.

Related Documentation
- Understanding Traffic Processing on Security Devices on page 25
**gre-out**

**Syntax**
```
gre-out {
  mss value;
}
```

**Hierarchy Level**
```
[edit security flow tcp-mss]
```

**Release Information**
Statement introduced in Junos OS Release 8.5.

**Description**
Enable and specify the TCP maximum segment size (TCP MSS) for Generic Routing Encapsulation (GRE) packets that are going into an IPsec VPN tunnel. If the device receives a GRE-encapsulated TCP packet with the SYN bit and TCP MSS option set and the TCP MSS option specified in the packet exceeds the TCP MSS specified by the device, the device modifies the TCP MSS value accordingly. By default, a TCP MSS for GRE packets is not set.

**Options**
- **mss value**—TCP MSS for GRE packets. Value is optional.
  - **Range:** 64 through 65,535 bytes
  - **Default:** 1320 bytes

**Required Privilege**
- **Level**
  - security—To view this in the configuration.
  - security-control—To add this to the configuration.

**Related Documentation**
- Understanding Traffic Processing on Security Devices on page 25
**high-watermark**

**Syntax**

```
high-watermark percent;
```

**Hierarchy Level**

[edit security flow aging]

**Release Information**

Statement introduced in Junos OS Release 8.5.

**Description**

Sets the point at which the aggressive aging-out process begins.

**Options**

- **percent** —Percentage of session-table capacity at which aggressive aging-out starts.
  
  **Range:** 1 through 100 percent
  
  **Default:** 100 percent

**Required Privilege Level**

security—To view this in the configuration.

security-control—To add this to the configuration.

**Related Documentation**

- Understanding Traffic Processing on Security Devices on page 25
hop-by-hop-header

Syntax

hop-by-hop-header {
  CALIPSO-option;
  RPL-option;
  SFM-DPD-option;
  jumbo-payload-option;
  quick-start-option;
  router-alert-option;
  user-defined-option-type low | <to high>;
}

Hierarchy Level  [edit security screen ids-option screen-name ip ipv6-extension-header]


Description  Define the IPv6 hop-by-hop screen option.


RPL-option—Enable the Routing Protocol for Low-Power and Lossy Networks screen option.

SMF-DPD-option—Enable the Simplified Multicast Forwarding IPv6 Duplicate Packet Detection screen option.

jumbo-payload-option—Enable the IPv6 jumbo payload screen option.

quick-start-option—Enable the IPv6 quick start screen option.

router-alert-option—Enable the IPv6 router alert screen option.

user-defined-header-type low | <to high>—Define the type of header range.

  Range: 1 through 255.

Required Privilege  security—To view this in the configuration.

Level  security-control—To add this to the configuration.

Related Documentation  •  Understanding IPv6 Support for Screens

  •  ipv6-extension-header on page 286

  •  destination-header on page 257
icmpv6-malformed

Syntax  icmpv6-malformed;

Hierarchy Level  [edit security screen ids-option screen-name icmp]


Description  Enable the ICMPv6 malformed intrusion detection service (IDS) option.

Options  This has no options.

Required Privilege

Level  security—To view this in the configuration.

security-control—To add this to the configuration.

Related Documentation  • Understanding IPv6 Support for Screens

• ipv6-extension-header on page 286
idle-timeout (System Services)

Syntax idle-timeout;

Hierarchy Level [edit system services web-management session]

Release Information Statement introduced in Junos OS Release 9.0.

Description Configure in minutes the idle-timeout parameter for web-management sessions. The idle-timeout parameter, which applies to all sessions, specifies the length of time a session can be idle before it is terminated. The web-management feature allows you to configure the device using the J-Web interface.

You can also configure the maximum allowed number of concurrent web management sessions using the session-limit parameter.

Options

idle-timeout—minutes
Default: 30
Range: 1 to 1440

Required Privilege Level

system—To view this in the configuration.
system-control—To add this to the configuration.

Related Documentation

• Firewall User Authentication Overview
• Dynamic VPN Overview
**inline-tap**

Syntax: inline-tap;

Hierarchy Level: [edit security forwarding-process application-services maximize-idp-sessions]

Release Information: Statement introduced in Junos OS Release 10.2.

Description: Enable IDP inline tap mode. The inline tap feature provides passive, inline detection of application layer threats for traffic matching security policies which have the IDP application service enabled. When a device is in inline tap mode, packets pass through firewall inspection and are also copied to the independent IDP module.

This statement is supported in SRX1500, SRX 5800, SRX 5600, and SRX 5400 devices and vSRX.

Required Privilege Level: security—To view this in the configuration. security-control—To add this to the configuration.

Related Documentation: • Understanding Traffic Processing on Security Devices on page 25

**interface-in (Security Forwarding Options)**

Syntax: interface-in interface-name;

Hierarchy Level: [edit security forwarding-options mirror-filter filter-name]


Description: Specify the incoming logical interface to be matched for mirroring.

Required Privilege Level: security—To view this in the configuration. security-control—To add this to the configuration.

Related Documentation: • mirror-filter (Security Forwarding Options) on page 292 • show security forwarding-options mirror-filter on page 599
interface-out (Security Forwarding Options)

Syntax

interface-out interface-name;

Hierarchy Level
[edit security forwarding-options mirror-filter filter-name]

Release Information
Statement introduced in Junos OS Release 12.1X46-D10.

Description
Specify the outgoing logical interface to be matched for mirroring.

Required Privilege
security—To view this in the configuration.
security-control—To add this to the configuration.

Related Documentation
• mirror-filter (Security Forwarding Options) on page 292
• show security forwarding-options mirror-filter on page 599

ipv4-template (Services)

Syntax
ipv4-template;

Hierarchy Level
[edit services flow-monitoring version9 template template-name]

Release Information
Statement introduced in Junos OS Release 10.4.

Description
Specify that the flow monitoring version 9 template is used only for IPv4 records.

Required Privilege
services—To view this in the configuration.
services-control—To add this to the configuration.

Related Documentation
• Understanding Traffic Processing on Security Devices on page 25
• Understanding Interfaces
ipv6-extension-header

Syntax
ipv6-extension-header {
    AH-header;
    ESP-header
    HIP-header;
    destination-header {
        ILNP-nonce-option;
        home-address-option;
        line-identification-option;
        tunnel-encapsulation-limit-option;
        user-defined-option-type low | <to high>;
    }
    fragment-header;
    hop-by-hop-header {
        CALIPSO-option;
        RPL-option;
        SFM-DPD-option;
        jumbo-payload-option;
        quick-start-option;
        router-alert-option;
        user-defined-option-type low | <to high>;
    }
    mobility-header;
    no-next-header;
    routing-header;
    shim6-header
    user-defined-option-type low | <to high>;
}

Hierarchy Level  [edit security screen ids-option screen-name ip]


Description  Define the IPv6 extension header for the intrusion detection service (IDS).

Options  

AH-header—Enable the IPv6 Authentication Header screen option.

ESP-header—Enable the IPv6 Encapsulating Security Payload header screen option.

HIP-header—Enable the IPv6 Host Identify Protocol header screen option.

fragment-header—Enable the IPv6 fragment header screen option.

mobility-header—Enable the IPv6 mobility header screen option.

no-next-header—Enable the IPv6 no next header screen option.

routing-header—Enable the IPv6 routing header screen option.

shim6-header—Enable the IPv6 shim header screen option.
user-defined-header-type low | <to high>—Define the type of header range.

Range: 0 through 255.

The remaining statements are explained separately. See the CLI Explorer.

Required Privilege Level
security—To view this in the configuration.
security-control—To add this to the configuration.

Related Documentation
• Understanding IPv6 Support for Screens
• hop-by-hop-header on page 281
• destination-header on page 257

ipv6-extension-header-limit

Syntax
ipv6-extension-header-limit limit;

Hierarchy Level
[edit security screen ids-option screen-name ip]

Release Information
Statement introduced in Junos OS Release 12.1X46-D10.

Description
Define the IPv6 extension header number limit for screen options. The screen blocks packets that have more than the defined number of extension headers.

Options
limit—Set the number of IPv6 extension headers that can pass through the screen.

Range: 0 through 32.

Required Privilege Level
security—To view this in the configuration.
security-control—To add this to the configuration.

Related Documentation
• Understanding IPv6 Support for Screens
• ipv6-extension-header on page 286
ipv6-malformed-header

Syntax ipv6-malformed-header;

Hierarchy Level [edit security screen ids-option screen-name ip]


Description Enable the IPv6 malformed header intrusion detection service (IDS) option.

Options This has no options.

Required Privilege Level security—To view this in the configuration.

services—To add this to the configuration.

Related Documentation
  • Understanding IPv6 Support for Screens
  • ipv6-extension-header on page 286

ipv6-template (Services)

Syntax ipv6-template;

Hierarchy Level [edit services flow-monitoring version9 template template-name]


Description Specify that the flow monitoring version 9 template is used only for IPv6 records.

Required Privilege Level services—To view this in the configuration.

services-control—To add this to the configuration.

Related Documentation
  • Understanding Traffic Processing on Security Devices on page 25
  • Understanding Interfaces
low-latency

Syntax  low-latency

Hierarchy Level  [edit chassis fpc fpc-slot-number pic pic-slot-number services-offload]


Description  Enables the low-latency mode on the selected NP-IOC. Low-latency is not enabled by default. The low latency allows you to configure the mode of the network processor’s traffic manager (TM) on the egress path. If low latency is enabled, the network processor is initialized without the traffic manager, thus reducing the overall latency in the Express Path (formerly known as services offloading).

NOTE: Because all SRX Series CoS functions are supported by the traffic manager, CoS functions are not supported when low latency is enabled.

Required Privilege

Level  security—To view this in the configuration.

security-control—To add this to the configuration.

Related Documentation

• Understanding Traffic Processing on Security Devices on page 25

• Example: Configuring Low Latency on page 243
**low-watermark**

**Syntax**  
`low-watermark percent;`

**Hierarchy Level**  
[edit security flow aging]

**Release Information**  
Statement introduced in Junos OS Release 8.5.

**Description**  
Set the point at which the aggressive aging-out process ends.

**Options**  
`percent` — Percentage of session-table capacity at which aggressive aging-out ends.  
**Range:** 0 through 100 percent  
**Default:** 100 percent

**Required Privilege Level**  
security—To view this in the configuration.  
security-control—To add this to the configuration.

**Related Documentation**  
- Understanding Traffic Processing on Security Devices on page 25
maximize-idp-sessions

Syntax
maximize-idp-sessions {
  weight (equal | firewall | idp);
}

Hierarchy Level
[edit security forwarding-process application-services]

Release Information

Description
If you are deploying IDP policies, you can tune the device to increase IDP session capacity. By using the provided commands to change the way the system allocates resources, you can achieve a higher IDP session capacity. See weight for information about the options provided.

This statement is supported on SRX1500, SRX 5800, SRX 5600, and SRX 5400 devices and vSRX.

NOTE: The IDP session capacity is restricted to 100,000 sessions per SPU.

Options
The remaining statements are explained separately. See CLI Explorer.

Required Privilege
security—to view this in the configuration.
security-control—to add this to the configuration.

Related Documentation
- Understanding Traffic Processing on Security Devices on page 25
mirror-filter (Security Forwarding Options)

Syntax

```
mirror-filter filter-name {
    destination-port port-number;
    destination-prefix destination-prefix;
    interface-in interface-name;
    interface-out interface-name;
    output {
        destination-mac mac-address;
        interface interface-name;
    }
    protocol protocol;
    source-port port-number;
    source-prefix set source-prefix;
}
```

Hierarchy Level
[edit security forwarding-options]

Release Information
Statement introduced in Junos OS Release 12.1X46-D10.

Description
Configure a mirror filter for filtering X2 packets to be mirrored and sent to a packet analyzer.

As a network operator, you need a way to monitor X2 traffic to debug any handover issues across eNodeBs. The mirror filter feature allows you to do that. Traffic coming out of an IPSec tunnel is decrypted, mirrored and analyzed, and then encrypted again to go into the outbound IPsec tunnel.

To use the mirror filter feature to monitor X2 traffic, you configure mirror filters. You can configure up to 15 different mirror filters to be used concurrently to filter for various kinds of traffic. Each mirror filter contains a set of parameters and their values against which traffic is matched.

**NOTE:** The SRX Series mirror filter feature is bidirectional, much like a session. X2 traffic flowing through an IPSec VPN from devices that match the configured filter conditions is mirrored and analyzed.

Starting in Junos OS Release 18.4R1, if the output X2 interface of a mirror filter is configured for an st0 interface to filter traffic that you want to analyze, the packet is duplicated and encrypted by the IPsec tunnel bound to the st0 interface. This enhancement supports the SRX Series devices to send traffic mirrored from a port on an IPsec tunnel.

In addition to the following parameters for a mirror filter, you specify the output interface and the MAC address of the packet analyzer as part of the configuration.
NOTE: Although there is no minimum required number of parameters for a mirror filter, please be mindful that if you specify too few criteria or accidentally commit an incomplete filter, an over-proportional amount of traffic flow through the system could be mirrored.

- destination IP address prefix
- destination port
- IP protocol
- source IP address prefix
- source port
- incoming and outgoing interfaces

Options  The remaining statements are explained separately. See CLI Explorer.

Required Privilege  Level
security—To view this in the configuration.
security-control—To add this to the configuration.

Related Documentation
- show security forwarding-options mirror-filter on page 599
- clear security forward-options mirror filter on page 376
mode (Security Forwarding Options)

Syntax  mode (drop | flow-based | packet-based);

Hierarchy Level  [edit security forwarding-options family inet6]

Release Information  Support on SRX Series devices for flow-based mode for family inet6 added in Junos OS Release 10.2.

Description  Specify forwarding options for IPv6 traffic.

Options  
- drop—Drop IPv6 packets. This is the default setting.
- flow-based—Perform flow-based packet forwarding.
- packet-based—Perform simple packet forwarding.

NOTE: Packet-based processing is not supported on the following SRX Series devices: SRX5400, SRX5600, and SRX5800.

Starting with Junos OS Release 15.1X49-D70, on SRX1500, SRX4100, SRX4200, SRX5400, SRX5600, SRX5800 devices, the default mode is changed from drop mode to flow based mode.

If you change the forwarding option mode for IPv6, you might have to perform a reboot to initialize the configuration change. Table 23 on page 295 summarizes device status upon configuration change.

Starting with Junos OS Release 15.1X49-D70, on SRX5400, SRX5600, and SRX5800 devices, reboot is not required when you change the modes between flow-based mode and drop mode.
### Table 23: Device Status Upon Configuration Change

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Drop to flow-based</td>
<td>Yes</td>
<td>Yes</td>
<td>Dropped</td>
<td>Dropped</td>
</tr>
<tr>
<td>Drop to packet-based</td>
<td>No</td>
<td>No</td>
<td>Packet-based</td>
<td>Packet-based</td>
</tr>
<tr>
<td>Flow-based to packet-based</td>
<td>Yes</td>
<td>Yes</td>
<td>None</td>
<td>Flow sessions created</td>
</tr>
<tr>
<td>Flow-based to drop</td>
<td>Yes</td>
<td>Yes</td>
<td>None</td>
<td>Flow sessions created</td>
</tr>
<tr>
<td>Packet-based to flow-based</td>
<td>Yes</td>
<td>Yes</td>
<td>Packet-based</td>
<td>Packet-based</td>
</tr>
<tr>
<td>Packet-based to drop</td>
<td>No</td>
<td>No</td>
<td>Dropped</td>
<td>Dropped</td>
</tr>
</tbody>
</table>

**Required Privilege Level**
- security—To view this in the configuration.
- security-control—To add this to the configuration.

**Related Documentation**
- [Understanding Traffic Processing on Security Devices on page 25](#)

### no-sequence-check

**Syntax**

```
no-sequence-check;
```

**Hierarchy Level**

```
[edit security flow tcp-session]
```

**Release Information**

Statement introduced in Junos OS Release 8.5.

**Description**

Specify that the device does not check sequence numbers in TCP segments during stateful inspection. By default, the device monitors the sequence numbers in TCP segments. The device detects the window scale specified by source and destination hosts in a session and adjusts a window for an acceptable range of sequence numbers according to their specified parameters. The device then monitors the sequence numbers in packets sent between these hosts. If the device detects a sequence number outside this range, it drops the packet.

**Required Privilege Level**
- security—To view this in the configuration.
- security-control—To add this to the configuration.

**Related Documentation**
- [Understanding Traffic Processing on Security Devices on page 25](#)
np-cache (Flexible PIC Concentrator)

Syntax np-cache;

Hierarchy Level
[edit chassis fpc fpc-slot-number]

Release Information
Statement introduced in Junos OS Release 15.1X49-D10.

Description
Enable session cache table on IOC.

Starting with Junos OS Release 15.1X49-D10 and and Junos OS Release 17.3R1, NP cache is supported on the SRx5K-MPC (IOC2), SRX5K-MPC3-100G10G (IOC3), and SRX5K-MPC3-40G10G (IOC3) for SRX5400, SRX5600, and SRX5800 devices.

The security policy determines whether a session is for Express Path (formerly known as services offloading) mode on the selected Flexible PIC Concentrator (FPC).

NOTE: The IOC2 and the IOC3 utilize the delay sessions delete mechanism. The same sessions (sessions with the same five tuples) that are deleted and then reinstalled immediately are not cached on the IOCs.

NOTE: To enable IPsec VPN affinity, you must also enable the session cache on IOCs (IOC2 and IOC3) by using the set chassis fpc <fpc-slot> np-cache command.

Required Privilege Level
security—To view this in the configuration.
security-control—To add this to the configuration.

Related Documentation
• Example: Configuring an SRX5K-MPC on an SRX5000 Line Device to Support Express Path on page 233
• Example: Configuring SRX5K-MPC3-100G10G (IOC3) and SRX5K-MPC3-40G10G (IOC3) on an SRX5000 Line Device to Support Express Path on page 236
output (Security Forwarding Options)

Syntax

```
output {
  destination-mac mac-address;
  interface interface-name;
}
```

Hierarchy Level

```
[edit security forwarding-options mirror-filter]
```

Release Information

Statement introduced in Junos OS Release 12.1X46-D10.

Description

Specify the MAC address or interface for mirrored traffic. Starting in Junos OS Release 18.4R1, if the output X2 interface of a mirror filter is configured for an st0 interface to filter traffic that you want to analyze, the packet is duplicated and encrypted by the IPsec tunnel bound to the st0 interface. This enhancement supports the SRX Series devices to send traffic mirrored from a port on an IPsec tunnel.

Options

- `destination-mac mac-address`—Specify the MAC address for the mirrored traffic.
- `interface interface-name`—Specify the logical interface for the mirrored traffic.

Required Privilege Level

- security—To view this in the configuration.
- security-control—To add this to the configuration.

Related Documentation

- `mirror-filter (Security Forwarding Options) on page 292`
- `show security forwarding-options mirror-filter on page 599`
packet-filter

**Syntax**

```plaintext
packet-filter packet-filter-name {
  action-profile profile-name {
    destination-port (port-range | protocol-name);
    destination-prefix destination-prefix;
    interface logical-interface-name;
    protocol (protocol-number | protocol-name);
    source-port (port-range | protocol-name);
    source-prefix source-prefix;
  }
}
```

**Hierarchy Level**

```
[edit security datapath-debug]
```

**Release Information**

Command introduced in Junos OS Release 9.6; Support for IPv6 addresses for the destination-prefix and source-prefix options added in Junos OS Release 10.4.

**Description**

Set packet filter for taking the datapath-debug action. A filter is defined to filter traffic, then an action profile is applied to the filtered traffic. Be sure to configure multiple packet filters to capture the traffic. One packet filter only captures the traffic as specified in it, such as from one source to one destination. The same packet filter will not capture the traffic in the reverse direction. You need to configure another packet filter to capture the traffic in reverse direction and specify the source and destination according to the response packet in it. The action profile specifies a variety of actions on the processing unit. A maximum of four filters are supported at the same time. Packet filters can be configured with source and destination prefix and port (including ranges), and protocol.

Action-profile settings have no specific minimum setting, it is based on trace, count, packet summary and packet-dump. Enabling end-to-end debugging without or with a very broad filter is not recommended. This could result in a high PFE CPU usage. Therefore when selecting what to capture through a filter care must be taken. List as many and specific criteria which then results in the minimum amount of traffic to be captured.

**NOTE:** Packet filter is supported on SRX1400, SRX3400, SRX3600, SRX5400, SRX5600, and SRX5800 devices.

**Options**

- **action-profile profile-name**—Identify the action profile to use. You can specify the name of the action profile to use. Using the request security action-profile command, you can set the action for the packet match for a specified filter. Action-profile must be defined.
- **destination-port (port-range | protocol name)**—Specify a destination port to match TCP/UDP destination port.
- **destination-prefix destination-prefix**—Specify a destination IPv4/IPv6 address prefix.
• `interface logical-interface-name`—Specify a logical interface name.

• `protocol (protocol-number | protocol-name)`—Match IP protocol type.

• `source-port (port-range | protocol-name)`—Match TCP/UDP source port.

• `source-prefix source-prefix`—Specify a source IP address prefix.

**packet-log (Security Flow)**

**Syntax**

```
packet-log {
  enable;
  throttle-interval;
  packet-filter <filter-name>;
}
```

**Hierarchy Level**

[edit security flow ]

**Release Information**

Statement introduced in Junos OS Release 17.3R1.

**Description**

Configure flow packet log.

Starting in Junos OS Release 17.3R1, SRX Series devices support logging of unsynchronized out-of-state TCP packets that are dropped by the flow module.

The logging functionality will allow notifications to the administrators (or automated systems) about any of TCP out-of-state packets drops.

**Options**

- `enable`—Enable log for dropped packets.
- `packet-filter`—Configure packet log filter.
- `throttle-interval`—Configure the interval as a power of two (0..32768 milliseconds).

**Required Privilege**

- `security`—To view this in the configuration.
- `security-control`—To add this to the configuration.
**packet-ordering-mode (Application Services)**

**Syntax**

```
packet-ordering-mode {
  (hardware | software);
}
```

**Hierarchy Level**

[edit security forwarding-process application-services]

**Release Information**

Statement introduced in Junos OS Release 12.1X45-D10. This statement is supported on the SRX5400, SRX5600, and SRX5800 devices and vSRX.

**Description**

Enables or disables the packet-ordering functionality using the PacketOrdering Engine. By default, packet-ordering functionality using the PacketOrdering Engine (hardware) is enabled.

A system reboot is required when this feature is enabled or disabled, and a warning message is displayed during the commit.

---

**NOTE:** Packet-ordering functionality using PacketOrdering Engine is supported on SRX5800 and SRX5600 devices with next-generation SPCs. Starting from Junos OS release 12.1X46-D10, SRX5400 device with next-generation SPCs also supports this feature.

---

**Options**

- **hardware**— Enables packet-ordering functionality using the PacketOrdering Engine.
- **software**— Disables packet-ordering functionality using the PacketOrdering Engine.

**Required Privilege Level**

- security—To view this in the configuration.
- security-control—To add this to the configuration.

**Related Documentation**

- Understanding Traffic Processing on Security Devices on page 25
pending-sess-queue-length

Syntax
pending-sess-queue-length (high | moderate | normal);

Hierarchy Level
[edit security flow]

Release Information
Statement introduced in Junos OS Release 11.4.

Description
Configure the maximum queued length per pending session.

Options
- high—Allow the maximum number of queued sessions.
- moderate—Allow more queued sessions than the normal number.
- normal—Allow the normal number of queued session.

Required Privilege Level
- security—To view this in the configuration.
- security-control—To add this to the configuration.

Related Documentation
- Understanding Traffic Processing on Security Devices on page 25

per-session-statistics

Syntax
per-session-statistics;

Hierarchy Level
[edit chassis fpc name name pic name services-offload]

Release Information
Statement introduced in Junos OS Release 11.4.

Description
Keeps per session statistics in NPC monitoring.

In services offload, once the session is established, packet no longer goes to Services Processing Unit (SPU). The Network Processing Card (NPC) will send the packet statistics periodically (1 second interval) to SPU. This means in services offload session, NPC will store packet statistics on per session basis.

Required Privilege Level
security—To view this in the configuration.
security-control—To add this to the configuration.

Related Documentation
- Understanding Traffic Processing on Security Devices on page 25
- services-offload on page 312
**pre-id-default-policy**

Syntax

```bash
pre-id-default-policy {
  then {
    log {
      session-close;
      session-init;
    }
    session-timeout {
      icmp seconds;
      icmp6 seconds;
      ospf seconds;
      others seconds;
      tcp seconds;
      udp seconds;
    }
  }
}
```

Hierarchy Level

[edit security policies]

Release Information

Statement introduced in Junos OS Release 18.2R1.

Description

During the initial policy lookup phase, which occurs prior to a dynamic application being identified, if there are multiple policies present in the potential policy list, the SRX Series device applies the default security policy until a more explicit match has occurred. Configures default policy actions that occur prior to dynamic application identification (AppID).

**CAUTION:** Configure the pre-id-default-policy option for troubleshooting purposes only, as this option applies to all traffic transiting the SRX Series device.

Options

**then**—Specifies the policy action that has to be taken when the packet matches the criteria.

**log**—Specifies the log details at session close time and session initialization time.

Values:

- **session-close**—Log at the closure of a session
- **session-init**—Log at the beginning of a session

**session-timeout**—When you update a session, the session timeout is configured, which specifies the session timeout details in seconds.

Values: icmp—Timeout value for ICMP sessions (seconds)
Range: 4 through 86,400
Values: icmp6—Timeout value for ICMP6 sessions (seconds)
Range: 4 through 86,400
Values: ospf—Timeout value for OSPF sessions (seconds)
Range: 4 through 86,400
Values: others—Timeout value for other sessions (seconds)
Range: 4 through 86,400
Values: tcp—Timeout value for TCP sessions (seconds)
Range: 4 through 86,400
Values: udp—Timeout value for UDP sessions (seconds)
Range: 4 through 86,400

Required Privilege
Level
security—To view this statement in the configuration.
security-control—To add this statement to the configuration.

Related Documentation
- Understanding Advanced Policy-Based Routing
**preserve-incoming-fragment-size**

**Syntax**  
preserve-incoming-fragment-size;

**Hierarchy Level**  
[edit security flow]

**Release Information**  
Statement introduced in Junos OS Release 15.1X49-D100.

**Description**  
Enable the preserve incoming fragment size feature that allows the SRX Series device to preserve the size of incoming fragments to be used in determining the best maximum transmission unit (MTU) size for the egress interface.

When data is sent from one host to another, it is transmitted as a series of packets. Performance is improved and network resources are conserved when packets of the largest size can transit the path from the source node to the destination node without being fragmented at any link in the datapath.

If application-layer services are configured on the SRX Series device, packet fragments at the ingress interface must be reassembled before the services can be applied and the content inspected. These reassembled packet fragments must be broken down again before the data is transmitted out the egress interface.

When a packet must be fragmented into smaller packets to transit a link in the path because the packet is larger than the MTU size established for that link, each of the resulting fragments must contain packet header information, in addition to the payload, or data. The increased overhead can lower throughput and degrade network performance. Also, the packet fragments must be reassembled at the destination node, which consumes additional network resources.

By default, the SRX Series device uses the MTU size configured for the egress interface to determine the size for the packet fragments it transmits. However, if you enable the preserve incoming fragment size feature, the SRX Series device detects and saves the size of incoming packet fragments and takes that into account. To diminish the likelihood of packet fragmentation in the datapath, the SRX Series device sets the egress interface MTU size to the smaller of two values: It identifies the maximum size of all incoming fragments and it compares that size to the existing MTU size of the egress interface. The SRX Series device takes the smaller number and uses it for the egress interface MTU size.

**Required Privilege Level**  
security—To view this statement in the configuration.  
security-control—To add this statement to the configuration.

**Related Documentation**  
- Understanding How Preserving Incoming Fragmentation Characteristics Can Improve Throughput on page 77
propagate-settings

Syntax  propagate-settings interface-name;

Hierarchy Level  [edit system services dhcp]
                 [edit system services dhcp pool]

Release Information  Statement introduced in Junos OS Release 8.5.

Description  Enable or disable the propagation of TCP/IP settings received on the device acting as Dynamic Host Configuration Protocol (DHCP) client. The settings can be propagated to the server pool running on the device. Use the system services dhcp to set this feature globally. Use the system services dhcp pool to set the feature for the address pool and override the global setting.

Options  logical-interface-name — Name of the logical interface to receive TCP/IP settings from the external network for propagation to the DHCP pool running on the device.

Required Privilege  Level  system—To view this in the configuration.
                                  system-control—To add this to the configuration.

Related Documentation  • Understanding Traffic Processing on Security Devices on page 25
**protocol (Security Forwarding Options)**

**Syntax**

```
protocol protocol;
```

**Hierarchy Level**

```
[edit security forwarding-options mirror-filter filter-name]
```

**Release Information**

Statement introduced in Junos OS Release 12.1X46-D10.

**Description**

Specify the networking protocol name or number to be matched for mirroring.

**Options**

`protocol-name`—Networking protocol name or number. The following text values are supported. For a complete list of possible numeric values, see RFC 1700, *Assigned Numbers (for the Internet Protocol Suite).*

- `ah`—IP Security Authentication header
- `egp`—Exterior gateway protocol
- `esp`—IPsec Encapsulating Security Payload
- `gre`—Generic routing encapsulation
- `icmp`—Internet Control Message Protocol
- `icmp6`—Internet Control Message Protocol version 6
- `igmp`—Internet Group Management Protocol
- `pip`—IP over IP
- `ospf`—Open Shortest Path First
- `pim`—Protocol Independent Multicast
- `rsvp`—Resource Reservation Protocol
- `sctp`—Stream Control Transmission Protocol
- `tcp`—Transmission Control Protocol
- `udp`—User Datagram Protocol

**Required Privilege Level**

- `security`—To view this in the configuration.
- `security-control`—To add this to the configuration.

**Related Documentation**

- `mirror-filter (Security Forwarding Options)` on page 292
- `show security forwarding-options mirror-filter` on page 599
resource-manager

Syntax
resource-manager {
traceoptions {
flag flag;
}
}

Hierarchy Level [edit security]


Description Configure resource manager security options.

Options The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level security—To view this in the configuration.
security-control—To add this to the configuration.

Related Documentation • Understanding Traffic Processing on Security Devices on page 25

reverse-route-packet-mode-vr

Syntax reverse-route-packet-mode-vr;

Hierarchy Level [edit security flow advanced-options]

Release Information Statement introduced in Junos OS Release 18.2R1.

Description When processing a server to client traffic, if the route is changed, the server to client traffic is rerouted. The traffic is rerouted using the virtual router from the first incoming session interface. The command allows reverse route lookup with packet mode using virtual router.

Required Privilege Level security—To view this statement in the configuration.
security-control—To add this statement to the configuration.

Related Documentation • Understanding Packet-Based Processing on page 181
**route-change-timeout**

**Syntax**

route-change-timeout seconds;

**Hierarchy Level**

[edit security flow]

**Release Information**


**Description**

Specify the session timeout when a session is rerouted but there is a reroute failure (for example, the new route uses a different egress zone from the previous route).

**Options**

seconds — Amount of time before sessions are timed out.

- **Range:** 6 through 1800 seconds
- **Default:** 6 seconds

**Required Privilege**

security—To view this in the configuration.

security-control—To add this to the configuration.

**Related Documentation**

- Understanding Traffic Processing on Security Devices on page 25
rst-invalidate-session

Syntax rst-invalidate-session;

Hierarchy Level [edit security flow tcp-session]

Release Information Statement introduced in Junos OS Release 8.5.

Description Enable the device to mark a session for immediate termination when it receives a TCP reset (RST) message. By default, this feature is disabled.

NOTE: On SRX Series devices with rst-invalidate-session configured the invalidation of the session occurs immediately whereas without rst-invalidate-session configured the session is set to time out 2 seconds after a TCP reset (RST) message has been received.

Required Privilege

Level security—to view this in the configuration.

security-control—to add this to the configuration.

Related Documentation

• Understanding Traffic Processing on Security Devices on page 25
rst-sequence-check

Syntax  rst-sequence-check;

Hierarchy Level  [edit security flow tcp-session]

Release Information  Statement introduced in Junos OS Release 8.5.

Description  Verify that the TCP sequence number in a TCP segment with the RST bit enabled matches the previous sequence number for a packet in that session or is the next higher number incrementally. If the sequence number does not match either of these expected numbers, the device drops the packet and sends the host a TCP ACK message with the correct sequence number. By default, this check is disabled.

Required Privilege  Level
security—To view this in the configuration.
security-control—To add this to the configuration.

Related Documentation  • Understanding Traffic Processing on Security Devices on page 25
sampling

Syntax

```plaintext
sampling {
    command binary-file-path;
    disable;
    failover (alternate-media | other-routing-engine);
}
```

Hierarchy Level  [edit system processes]

Release Information  Statement introduced in Junos OS Release 8.5.

Description  Perform packet sampling based on particular input interfaces and various fields in the packet header.

Options

- **command binary-file-path**—Path to the binary process.
- **disable**—Disable the traffic sampling control process.
- **failover**—Configure the device to reboot if the software process fails four times within 30 seconds, and specify the software to use during the reboot.
- **alternate-media**—Configure the device to switch to backup media that contains a version of the system if a software process fails repeatedly.
- **other-routing-engine**—Instruct the secondary Routing Engine to take mastership if a software process fails. If this is configured for a process, and that process fails four times within 30 seconds, then the device reboots from the secondary Routing Engine.

Required Privilege

- **system**—To view this in the configuration.
- **system-control**—To add this to the configuration.

Related Documentation

- Understanding Traffic Processing on Security Devices on page 25
services-offload

Syntax

services-offload {
  low-latency;
  per-session-statistics;
}

Hierarchy Level

[edit chassis fpc fpc-slot-number pic pic-slot-number]

Release Information

Statement introduced in Junos OS Release 11.4.

Description

Enables the Express Path mode (formerly known as services offloading) mode on the selected network processor. Services-offload is not enabled by default.

When services-offload is enabled, only the first packets of a session goes to the Services Processing Unit (SPU), rest of packets in services-offload mode does not go to SPU, therefore some security features such as stateful screen are not supported. Only TCP and UDP packets can be services offloaded.

Options

The remaining statements are explained separately. See CLI Explorer.

Required Privilege

security—To view this in the configuration.
security-control—To add this to the configuration.

Related Documentation

- Understanding Traffic Processing on Security Devices on page 25
session (System Services)

Syntax

```plaintext
session {
  idle-timeout minutes;
  session-limit number;
}
```

Hierarchy Level

[edit system services web-management]

Release Information

Statement introduced in Junos OS Release 9.0.

Description

Configure parameters for web-management sessions. Web management allows for configuration of the SRX Series device using the J-Web interface. You can configure the idle-timeout parameter for web-management sessions and the maximum number of concurrent sessions.

Options

- **idle-timeout minutes**—Configure in minutes the time-out parameter for all web-management sessions. The idle-timeout parameter specifies the length of time that a session can be idle before it is terminated.
  - **Default:** 1440
  - **Range:** 1 to 1440

- **session-limit number**—Configure the maximum allowed number of concurrent web management sessions. By default, an unlimited number of users can log in to the J-Web interface on a Juniper Networks device, and each session remains open for 24 hours (1440 minutes).
  - **Default:** unlimited
  - **Range:** 1 to 1024

Required Privilege Level

- system—To view this in the configuration.
- system-control—To add this to the configuration.

Related Documentation

- Firewall User Authentication Overview
- Dynamic VPN Overview
**session-limit (System Services)**

**Syntax**

```
session-limit;
```

**Hierarchy Level**

```
[edit system services web-management session]
```

**Release Information**

Statement introduced in Junos OS Release 9.0.

**Description**

Configure the maximum allowed number of concurrent web management sessions. Using the CLI, you can limit the number of concurrent sessions from 1 to 1024. Each session remains open for 24 hours (1440 minutes).

You can also set an idle time-out parameter to override the default to specify the length of time a session can be idle before it is terminated.

**Options**

```
options session-limit—number
```

- **Default**: unlimited sessions
- **Range**: 1 to 1024 sessions

**Required Privilege**

```
Level system—to view this in the configuration.
Level system-control—to add this to the configuration.
```

**Related Documentation**

- *Firewall User Authentication Overview*
- *Dynamic VPN Overview*
source-port (Security Forwarding Options)

Syntax

source-port port-number;

Hierarchy Level

[edit security forwarding-options mirror-filter filter-name]

Release Information

Statement introduced in Junos OS Release 12.1X46-D10.

Description

Specify a Transmission Control Protocol (TCP) or User Datagram Protocol (UDP) source port number to be matched for mirroring. You can specify a numeric value or one of the text synonyms listed in Table 24 on page 316.
### Table 24: Ports Supported by Services Interfaces

<table>
<thead>
<tr>
<th>Port Name</th>
<th>Corresponding Port Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>afs</td>
<td>1483</td>
</tr>
<tr>
<td>bgp</td>
<td>179</td>
</tr>
<tr>
<td>biff</td>
<td>512</td>
</tr>
<tr>
<td>bootpc</td>
<td>68</td>
</tr>
<tr>
<td>bootps</td>
<td>67</td>
</tr>
<tr>
<td>cmd</td>
<td>514</td>
</tr>
<tr>
<td>cvspserver</td>
<td>2401</td>
</tr>
<tr>
<td>dhcp</td>
<td>67</td>
</tr>
<tr>
<td>domain</td>
<td>53</td>
</tr>
<tr>
<td>eklogin</td>
<td>2105</td>
</tr>
<tr>
<td>ekshell</td>
<td>2106</td>
</tr>
<tr>
<td>excc</td>
<td>512</td>
</tr>
<tr>
<td>finger</td>
<td>79</td>
</tr>
<tr>
<td>ftp</td>
<td>21</td>
</tr>
<tr>
<td>ftp-data</td>
<td>20</td>
</tr>
<tr>
<td>http</td>
<td>80</td>
</tr>
<tr>
<td>https</td>
<td>443</td>
</tr>
<tr>
<td>ident</td>
<td>113</td>
</tr>
<tr>
<td>imap</td>
<td>143</td>
</tr>
<tr>
<td>kerberos-sec</td>
<td>88</td>
</tr>
<tr>
<td>klogin</td>
<td>543</td>
</tr>
<tr>
<td>kpasswd</td>
<td>761</td>
</tr>
<tr>
<td>krb-prop</td>
<td>754</td>
</tr>
<tr>
<td>krbupdate</td>
<td>760</td>
</tr>
</tbody>
</table>
### Table 24: Ports Supported by Services Interfaces (continued)

<table>
<thead>
<tr>
<th>Port Name</th>
<th>Corresponding Port Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>kshell</td>
<td>544</td>
</tr>
<tr>
<td>ldap</td>
<td>389</td>
</tr>
<tr>
<td>ldap</td>
<td>646</td>
</tr>
<tr>
<td>login</td>
<td>513</td>
</tr>
<tr>
<td>mobileip-agent</td>
<td>434</td>
</tr>
<tr>
<td>mobilip-mn</td>
<td>435</td>
</tr>
<tr>
<td>msdp</td>
<td>639</td>
</tr>
<tr>
<td>netbios-dgm</td>
<td>138</td>
</tr>
<tr>
<td>netbios-ns</td>
<td>137</td>
</tr>
<tr>
<td>netbios-ssn</td>
<td>139</td>
</tr>
<tr>
<td>nfsd</td>
<td>2049</td>
</tr>
<tr>
<td>nntp</td>
<td>119</td>
</tr>
<tr>
<td>ntalk</td>
<td>518</td>
</tr>
<tr>
<td>ntp</td>
<td>123</td>
</tr>
<tr>
<td>pop3</td>
<td>110</td>
</tr>
<tr>
<td>pptp</td>
<td>1723</td>
</tr>
<tr>
<td>printer</td>
<td>515</td>
</tr>
<tr>
<td>radacct</td>
<td>1813</td>
</tr>
<tr>
<td>radius</td>
<td>1812</td>
</tr>
<tr>
<td>rip</td>
<td>520</td>
</tr>
<tr>
<td>rkinit</td>
<td>2108</td>
</tr>
<tr>
<td>smtp</td>
<td>25</td>
</tr>
<tr>
<td>snmp</td>
<td>161</td>
</tr>
<tr>
<td>snmp-trap</td>
<td>162</td>
</tr>
</tbody>
</table>
Table 24: Ports Supported by Services Interfaces (continued)

<table>
<thead>
<tr>
<th>Port Name</th>
<th>Corresponding Port Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>snpp</td>
<td>444</td>
</tr>
<tr>
<td>socks</td>
<td>1080</td>
</tr>
<tr>
<td>ssh</td>
<td>22</td>
</tr>
<tr>
<td>sunrpc</td>
<td>111</td>
</tr>
<tr>
<td>syslog</td>
<td>514</td>
</tr>
<tr>
<td>tacacs</td>
<td>49</td>
</tr>
<tr>
<td>tacacs-ds</td>
<td>65</td>
</tr>
<tr>
<td>talk</td>
<td>517</td>
</tr>
<tr>
<td>telnet</td>
<td>23</td>
</tr>
<tr>
<td>tftp</td>
<td>69</td>
</tr>
<tr>
<td>timed</td>
<td>525</td>
</tr>
<tr>
<td>who</td>
<td>513</td>
</tr>
<tr>
<td>xdmcp</td>
<td>177</td>
</tr>
</tbody>
</table>

**Required Privilege Level**
- security—To view this in the configuration.
- security-control—To add this to the configuration.

**Related Documentation**
- mirror-filter (Security Forwarding Options) on page 292
- show security forwarding-options mirror-filter on page 599
source-prefix (Security Forwarding Options)

Syntax source-prefix source-prefix;

Hierarchy Level [edit security forwarding-options mirror-filter filter-name]


Description Specify the source IP prefix or address to be matched for mirroring.

Required Privilege Level security—To view this in the configuration.

security-control—To add this to the configuration.

Related Documentation • mirror-filter (Security Forwarding Options) on page 292

• show security forwarding-options mirror-filter on page 599

syn-flood-protection-mode

Syntax syn-flood-protection-mode (syn-cookie | syn-proxy);

Hierarchy Level [edit security flow]

Release Information Statement introduced in Junos OS Release 8.5; support for IPv6 addresses added in Junos OS Release 10.4.

Description Enable SYN cookie or SYN proxy defenses against SYN attacks. SYN flood protection mode is enabled globally on the device and is activated when the configured syn-flood attack-threshold value is exceeded.

Options • syn-cookie—Uses a cryptographic hash to generate a unique Initial Sequence Number (ISN). This is enabled by default.

• syn-proxy—Uses a proxy to handle the SYN attack.

Required Privilege Level security—To view this in the configuration.

security-control—To add this to the configuration.
**tcp-initial-timeout**

**Syntax**

tcp-initial-timeout seconds;

**Hierarchy Level**

[edit security flow tcp-session]

**Release Information**

Statement introduced in Junos OS Release 8.5.

**Description**

Define the length of time (in seconds) that the device keeps an initial TCP session in the session table before dropping it, or until the device receives a FIN (no more data) or RST (reset packet). The FIN flag indicates the end of data transmission to finish a TCP connection.

**Options**

- **seconds**—Number of seconds that the device keeps an initial TCP session in the session table before dropping it.
  
  **Range:** 4 through 300 seconds
  
  **Default:** 20 seconds

**NOTE:** The minimum value you can configure for TCP session initialization is 4 seconds. The default value is 20 seconds; if required you can set the TCP session initialization value to less than 20 seconds.

**Required Privilege**

- **Level**
  
  security—To view this in the configuration.
  
  security-control—To add this to the configuration.

**Related Documentation**

- Understanding Traffic Processing on Security Devices on page 25
tcp-mss (Security Flow)

Syntax

tcp-mss {
  all-tcp mss value;
  gre-in {
    mss value;
  }
  gre-out {
    mss value;
  }
  ipsec-vpn {
    mss value;
  }
}

Hierarchy Level [edit security flow]

Release Information Statement introduced in Junos OS Release 8.5.

Description Configure TCP maximum segment size (TCP MSS) for the following packet types:

- All TCP packets for network traffic.
- GRE packets entering the IPsec VPN tunnel.
- GRE packets exiting the IPsec VPN tunnel.
- TCP packets entering the IPsec VPN tunnel.

If all the four TCP MSS options are configured simultaneously, then the order of preference is as follows:

- If TCP packet enters an IPsec VPN tunnel, then an ipsec-vpn mss value has high priority over all-tcp mss value, hence ipsec-vpn mss value is set.
- If TCP packet enters GRE, then gre-in mss value overrides all-tcp mss value, hence gre-in mss value is set.
- If TCP packet exits GRE, then all-tcp mss value overrides gre-in mss value, hence all-tcp mss value is set.

Options The remaining statements are explained separately. See CLI Explorer.

Required Privilege Level security—To view this in the configuration.
security-control—To add this to the configuration.

Related Documentation
- all-tcp on page 252
- gre-in on page 278
- gre-out on page 279
- ipsec-vpn (Security Flow)
- Understanding Traffic Processing on Security Devices on page 25

**tcp-session**

**Syntax**
```
tcp-session {
    no-sequence-check;
    no-syn-check;
    no-syn-check-in-tunnel;
    rst-invalidate-session;
    rst-sequence-check;
    strict-syn-check;
    tcp-initial-timeout seconds;
    time-wait-state {
        (session-ageout | session-timeout seconds);
    }
}
```

**Hierarchy Level** [edit security flow]

**Release Information** Statement introduced in Junos OS Release 8.5.

**Description** Configure TCP session attributes:
- TCP sequence number checking.
- TCP SYN bit checking.
- Reset (RST) checking.
- Initial TCP session timeout—The minimum value you can configure for TCP session initialization is 4 seconds. The default value is 20 seconds; if required you can set the TCP session initialization value to less than 20 seconds.
- Strict TCP SYN checking.
- TCP session timeout for time-wait state.

**Options** The remaining statements are explained separately. See CLI Explorer.

**Required Privilege Level**
- security—To view this in the configuration.
- security-control—To add this to the configuration.

**Related Documentation**
- Understanding Traffic Processing on Security Devices on page 25
time-wait-state

Syntax
time-wait-state {
  (session-ageout | session-timeout seconds);
}

Hierarchy Level [edit security flow tcp-session]


Description Defines the length of time (in seconds) that the device keeps the defined TCP session in the session table. The default is 150 seconds.

Options
  • session-ageout—Set a TCP session to age out, using the service based timeout value.
  • session-timeout seconds—Set the session timeout value allowed before the device ages out a session from its session table.
    Range: 2 through 600 seconds

Required Privilege
  Level security—to view this in the configuration.
  security-control—to add this to the configuration.

Related Documentation
  • Understanding Traffic Processing on Security Devices on page 25
traceoptions (Security)

Syntax
traceoptions {
  file {
    filename;
    files number;
    match regular-expression;
    size maximum-file-size;
    (world-readable | no-world-readable);
  }
  flag flag;
  no-remote-trace;
  rate-limit messages-per-second;
}

Hierarchy Level [edit security]

Release Information Statement modified in Junos OS Release 8.5.

Description Configure security tracing options.

Options
  • file—Configure the trace file options.
    • filename—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory /var/log. By default, the name of the file is the name of the process being traced.
    • files number—Maximum number of trace files. When a trace file named trace-file reaches its maximum size, it is renamed to trace-file.0, then trace-file.1, and so on, until the maximum number of trace files is reached. The oldest archived file is overwritten.
      If you specify a maximum number of files, you also must specify a maximum file size with the size option and a filename.
      Range: 2 through 1000 files
      Default: 10 files
    • match regular-expression—Refine the output to include lines that contain the regular expression.
    • size maximum-file-size—Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named trace-file reaches this size, it is renamed trace-file.0. When the trace-file again reaches its maximum size, trace-file.0 is renamed trace-file.1 and trace-file is renamed trace-file.0. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.
      If you specify a maximum file size, you also must specify a maximum number of trace files with the files option and a filename.
Syntax: `x K` to specify KB, `x m` to specify MB, or `x g` to specify GB

Range: 10 KB through 1 GB
Default: 128 KB

- `world-readable | no-world-readable`—By default, log files can be accessed only by the user who configures the tracing operation. The `world-readable` option enables any user to read the file. To explicitly set the default behavior, use the `no-world-readable` option.

- `flag`—Trace operation to perform. To specify more than one trace operation, include multiple `flag` statements.
  - `all`—Trace all security events
  - `compilation`—Trace security compilation events
  - `configuration`—Trace security configuration events
  - `routing-socket`—Trace routing socket events
  - `no-remote-trace`—Set remote tracing as disabled.
  - `rate-limit messages-per-second`—Limit the incoming rate of trace messages.

**Required Privilege**

- `trace`—To view this in the configuration.
- `trace-control`—To add this to the configuration.

**Related Documentation**

- Understanding Traffic Processing on Security Devices on page 25
**traceoptions (Security Flow)**

Syntax

```plaintext
traceoptions {
    file {
        filename;
        files number;
        match regular-expression;
        size maximum-file-size;
        (world-readable | no-world-readable);
    }
    flag flag;
    no-remote-trace;
    packet-filter filter-name {
        conn-tag session-conn
        destination-port port-identifier;
        destination-prefix address;
        interface interface-name;
        protocol protocol-identifier;
        source-port port-identifier;
        source-prefix address;
    }
    rate-limit messages-per-second;
    trace-level (brief | detail | error);
}
```

Hierarchy Level  [edit security flow]

Release Information  Statement introduced in Junos OS Release 8.5. Statement updated in Junos OS Release 12.1X46-D10 with the `trace-level` option and additional flags. The was updated in Junos OS Release 15.1X49-D70 with the addition of the conn-tag filter parameter.

Description  Configure flow tracing options.

Options  file—Configure the trace file options.

- **filename**—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory `/var/log`. By default, the name of the file is the name of the process being traced.

- **files number**—Maximum number of trace files. When a trace file named `trace-file` reaches its maximum size, it is renamed to `trace-file.0`, then `trace-file.1`, and so on, until the maximum number of trace files is reached. The oldest archived file is overwritten.

    If you specify a maximum number of files, you also must specify a maximum file size with the `size` option and a filename.

    **Range:** 2 through 1000 files
    **Default:** 10 files
match regular-expression—Refine the output to include lines that contain the regular expression.

size maximum-file-size—Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named trace-file reaches this size, it is renamed trace-file.0. When the trace-file again reaches its maximum size, trace-file.0 is renamed trace-file.1 and trace-file is renamed trace-file.0. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum file size, you also must specify a maximum number of trace files with the files option and a filename.

Syntax: \x K to specify KB, \x m to specify MB, or \x g to specify GB

Range: 0 KB through 1 GB
Default: 128 KB
world-readable | no-world-readable—By default, log files can be accessed only by the user who configures the tracing operation. The world-readable option enables any user to read the file. To explicitly set the default behavior, use the no-world-readable option.

flag—Trace operation to perform. To specify more than one trace operation, include multiple flag statements.

all—Trace with all flags enabled

basic-datapath—Trace basic packet flow activity

fragmentation—Trace IP fragmentation and reassembly events

high-availability—Trace flow high-availability information

host-traffic—Trace flow host traffic information

multicast—Trace multicast flow information

route—Trace route lookup information

session—Trace session creation and deletion events

session-scan—Trace session scan information

tcp-basic—Trace TCP packet flow information

tunnel—Trace tunnel information

no-remote-trace—Set remote tracing as disabled.

packet-filter filter-name—Packet filter to enable during the tracing operation. Configure the filtering options.

destination-port port-identifier—Match TCP/UDP destination port

destination-prefix address—Destination IP address prefix

interface interface-name—Logical interface

protocol protocol-identifier—Match IP protocol type

source-port port-identifier—Match TCP/UDP source port

source-prefix address—Source IP address prefix

rate-limit messages-per-second—Limit the incoming rate of trace messages.
trace-level—Set the level for trace logging. This option is available only when the flag is set.

brief—Trace key flow information, such as message types sent between SPU and central point, policy match, and packet drop reasons.

detail—Trace extensive flow information, such as detailed information about sessions and fragments. Detail is the default level.

error—Trace error information, such as system failure, unknown message type, and packet drop.

Required Privilege
Level
trace—to view this in the configuration.
trace-control—to add this to the configuration.

Related Documentation
• Understanding Traffic Processing on Security Devices on page 25
transport (Security Log)

Syntax

```plaintext
transport {
  protocol (udp | tcp | tls);
  tls-profile tls-profile-name;
  tcp-connections tcp-connections;
}
```

Hierarchy Level

[edit security log]
[edit logical-systems name security log]
[edit tenants tenant-name security log]

Release Information


Description

Configure security log transport options.

Options

- **protocol**—Specify the type of transport protocol to be used to log the data.
  - **UDP**—Set the transport protocol to UDP.
  - **TCP**—Set the transport protocol to TCP.
  - **TLS**—Set the transport protocol to TLS.
  
  Default: UDP.

- **tls-profile tls-profile-name**—Specify the TLS profile name.

- **tcp-connections tcp-connections**—Specify the number of TCP connections per SPU.
  
  Range: 1 through 5.
  
  Default: 1.

Required Privilege Level

- security—To view this in the configuration.
- security-control—To add this to the configuration.

Related Documentation

- Understanding AppTrack
weight (Security)

Syntax

weight (equal | firewall | idp);

Hierarchy Level
[edit security forwarding-process application-services maximize-idp-sessions]

Release Information

Description
If you are deploying IDP policies, you can tune the device to increase IDP session capacity. By using the provided commands to change the way the system allocates resources, you can achieve a higher IDP session capacity.

Devices ship with an implicit default session capacity setting. This default value gives more weight to firewall sessions. You can manually override the default by using the maximize-idp-sessions command. The command allows you to choose between these weight values: equal, firewall, and idp. The following table displays the available session capacity weight and approximate throughput for each.

Table 25: Session Capacity and Resulting Throughput

<table>
<thead>
<tr>
<th>Weight Value</th>
<th>Firewall Capacity</th>
<th>IDP Capacity</th>
<th>Firewall Throughput</th>
<th>IDP Throughput</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default</td>
<td>1,000,000</td>
<td>256,000</td>
<td>10 Gbps</td>
<td>2.4 Gbps</td>
</tr>
<tr>
<td>equal</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>8.5 Gbps</td>
<td>2 Gbps</td>
</tr>
<tr>
<td>firewall</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>10 Gbps</td>
<td>2.4 Gbps</td>
</tr>
<tr>
<td>idp</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>5.5 Gbps</td>
<td>1.4 Gbps</td>
</tr>
</tbody>
</table>

This statement is supported on SRX1500, SRX 5800, SRX 5600, and SRX 5400 devices and vSRX.

Required Privilege Level
security—To view this in the configuration.
security-control—To add this to the configuration.

Related Documentation
• Understanding Traffic Processing on Security Devices on page 25
 Operational Commands

- clear firewall
- clear monitor security flow filter
- clear security flow ip-action
- clear security flow session all
- clear security flow session application
- clear security flow session application-traffic-control
- clear security flow session conn-tag
- clear security flow session destination-port
- clear security flow session destination-prefix
- clear security flow session family
- clear security flow session IDP
- clear security flow session interface
- clear security flow ip-action
- clear security flow session nat
- clear security flow session protocol
- clear security flow session resource-manager
- clear security flow session services-offload
- clear security flow session session-identifier
- clear security flow session source-port
- clear security flow session source-prefix
- clear security flow session tunnel
- clear security forward-options mirror filter
- monitor security flow file
- monitor security flow filter
- monitor security flow start
- monitor security flow stop
- show chassis environment (Security)
- show chassis fpc (View)
- show chassis fpc errors
- show chassis hardware (View)
- show chassis pic (Security)
- show chassis power
- show chassis power sequence
- show firewall (View)
- show interfaces (View Aggregated Ethernet)
- show interfaces diagnostics optics
- show interfaces flow-statistics
- show interfaces swfxb
- show monitor security flow
- show security flow cp-session
- show security flow cp-session destination-port
- show security flow cp-session destination-prefix
- show security flow cp-session family
- show security flow cp-session protocol
- show security flow cp-session source-port
- show security flow cp-session source-prefix
- show security flow gate
- show security flow ip-action
- show security flow gate brief node
- show security flow gate destination-port
- show security flow gate destination-prefix
- show security flow gate protocol
- show security flow gate summary node
- show security flow pmi statistics
- show security flow session
- show security flow session brief node
- show security flow session destination-port
- show security flow session destination-prefix
- show security flow session extensive node
- show security flow session family
- show security flow session interface
- show security flow session nat
- show security flow session policy-id
- show security flow session protocol
- show security flow session resource-manager
- show security flow session services-offload
- show security flow session session-identifier
- show security flow session source-port
- show security flow session source-prefix
- show security flow session summary family
- show security flow session summary node
- show security flow session summary services-offload
- show security flow session tunnel
- show security flow statistics
- show security flow status
- show security forwarding-options mirror-filter
- show security monitoring
- show security policies
- show security policies hit-count
- show security resource-manager group active
- show security resource-manager resource active
- show security resource-manager settings
- show security resource-manager summary
- show security screen ids-option
- show security screen statistics
- show security softwires
- show security zones
- show security zones type
clear firewall

Syntax

```
clear firewall
<all>
<counter counter-name>
<filter filter-name>
```

Release Information

Command introduced in Junos OS Release 10.0.

Description

Clear statistics about configured firewall filters.

NOTE: The clear firewall command cannot be used to clear the Routing Engine filter counters on a backup Routing Engine that is enabled for GRES.

If you clear statistics for firewall filters that are applied to Trio-based DPCs and that also use the prefix-action action on matched packets, wait at least 5 seconds before you enter the `show firewall prefix-action-stats` command. A 5-second pause between issuing the clear firewall and show firewall prefix-action-stats commands avoids a possible timeout of the show firewall prefix-action-stats command.

Options

- **all**—Clear the packet and byte counts for all filters.
- **counter counter-name**—Clear the packet and byte counts for a filter counter that has been configured with the counter firewall filter action.
- **filter filter-name**—Clear the packet and byte counts for the specified firewall filter.

Required Privilege Level

```
clear
```

Related Documentation

- [show firewall (View)](page 420)

List of Sample Output

```
clear firewall all
```

Output Fields

When you enter this command, you are provided feedback on the status of your request.

Sample Output

```
clear firewall all
```

```
user@host> clear firewall all
```
clear monitor security flow filter

Syntax  
clear monitor security flow filter <filter-name>

Release Information  
Command introduced in Junos OS Release 12.1X46-D10.

Description  
Specify the security flow filters to be deleted. Once deleted, the filters are removed from the Packet Forwarding Engine and the Routing Engine.

NOTE: Specifying the filter name is optional. If no filter is specified, all filters are deleted.

Options  
This command has no options.

Required Privilege Level  
clear

Related Documentation  
- Monitoring Security Flow Sessions Overview on page 161
- monitor security flow start on page 381
- monitor security flow filter on page 379

Output Fields  
When you enter this command, you are provided feedback on the status of your request.

Sample Output
clear security flow ip-action

Syntax

```
clear security flow ip-action [filter]
```

Release Information

Command introduced in Junos OS Release 10.4. Logical systems option introduced in Junos OS Release 11.2.

Description

Clear IP-action entries, based on filtered options, for IP sessions running on the device.

Options

- `filter`—Filter the display based on the specified criteria.

The following filters display those sessions that match the criteria specified by the filter. Refer to the sample output for filtered output examples.

- `all | [filter]`—All active sessions on the device.
- `destination-port destination-port`—Destination port number of the traffic. Range is 1 through 65,535.
- `destination-prefix destination-prefix`—Destination IP prefix or address.
- `family (inet | inet6) [filter]`—IPv4 traffic or IPv6-NATPT traffic and filtered options.
- `logical-system logical-system-name | all [filter]`—Specified logical system or all logical systems.
- `protocol protocol-name | protocol-number [filter]`—Protocol name or number and filtered options.

- `ah` or `51`
- `egp` or `8`
- `esp` or `50`
- `gre` or `47`
- `icmp` or `1`
- `icmp6` or `58`
- `ipip` or `4`
- `ospf` or `89`
- `pim` or `103`
- `rsvp` or `46`
- `sctp` or `132`
- `tcp` or `6`
- `udp` or `17`
root-logical-system [filter]—Default logical system information and filtered options.

source-port source-port—Source port number of the traffic. Range is 1 through 65,535.

source-prefix source-prefix—Source IP prefix or address of the traffic.

Required Privilege
Level clear

Related
Documentation
• show security flow ip-action on page 472

List of Sample Output
clear security flow ip-action all on page 339
clear security flow ip-action destination-prefix on page 339
clear security flow ip-action family inet on page 339
clear security flow ip-action protocol udp on page 339

Output Fields
When you enter this command, the system responds with the status of your request.

Sample Output
clear security flow ip-action all

user@host> clear security flow ip-action all
1008 ip-action entries cleared

clear security flow ip-action destination-prefix

user@host> clear security flow ip-action destination-prefix 192.0.2.5/24
87 ip-action entries cleared

clear security flow ip-action family inet

user@host> clear security flow ip-action family inet
2479 ip-action entries cleared

clear security flow ip-action protocol udp

user@host> clear security flow ip-action protocol udp
270 ip-action entries cleared
clear security flow session all

Syntax

```
clear security flow session all
<node (node-id | all | local | primary)>
```

Release Information

Command introduced in Junos OS Release 8.5; node options added in Junos OS Release 9.0.

Description

Clear all currently active security sessions on the device.

Options

- **all**—Clear information about all active sessions.
- **node**—(Optional) For chassis cluster configurations, clear all security sessions on a specific node (device) in the cluster.
  - **node-id**—Identification number of the node. It can be 0 or 1.
  - **all**—Clear all nodes.
  - **local**—Clear the local node.
  - **primary**—Clear the primary node.

Required Privilege

```
clear
```

Related Documentation

- show security flow session on page 503

List of Sample Output

- clear security flow session all on page 340
- clear security flow session all node 0 on page 341

Output Fields

When you enter this command, you are provided feedback on the status of your request.

Sample Output

```
clear security flow session all

user@host> clear security flow session all
node0:
----------------------------------------------------------------------------------
1 active sessions cleared
node1:
----------------------------------------------------------------------------------
0 active sessions cleared
```
Sample Output

clear security flow session all node 0

    user@host> clear security flow session all node 0
    node0:
    -----------------------------------------------
    0 active sessions cleared
clear security flow session application

Syntax

clear security flow session application
application-name
<node (node-id | all | local | primary)>

Release Information
Command introduced in Junos OS Release 8.5. The node options added in Junos OS Release 9.0.

Description
Clear currently active sessions for application types or application sets.

Options
- **application-name** — Name of the specified application type or application set.
  - **dns** — Domain Name System
  - **ftp** — File Transfer Protocol
  - **ignore** — Ignore application type
  - **mgcp-ca** — Media Gateway Control Protocol with Call Agent
  - **mgcp-ua** — MGCP with User Agent
  - **ms-rpc** — Microsoft RPC
  - **pptp** — Point-to-Point Tunneling Protocol
  - **q931** — ISDN connection control protocol
  - **ras** — RAS
  - **realaudio** — RealAudio
  - **rsh** — UNIX remote shell services
  - **rtsp** — Real-Time Streaming Protocol
  - **sccp** — Skinny Client Control Protocol
  - **sip** — Session Initiation Protocol
  - **sqlnet-v2** — Oracle SQLNET
  - **sun-rpc** — Sun Microsystems RPC
  - **talk** — TALK program
  - **tftp** — Trivial File Transfer Protocol

- **node** — (Optional) For chassis cluster configurations, clear sessions for applications on a specific node (device) in the cluster.
  - **node-id** — Identification number of the node. It can be 0 or 1.
  - **all** — Clear all nodes.
• **local**—Clear the local node.
• **primary**—Clear the primary node.

**Required Privilege**

**Level**

clear

**Related Documentation**

• *show security flow session application*

**List of Sample Output**

clear security flow session application dns on page 343  
clear security flow session application dns node 0 on page 343

**Output Fields**

When you enter this command, you are provided feedback on the status of your request.

**Sample Output**

clear security flow session application dns

```
user@host> clear security flow session application dns
node0:
--------------------------------------------------------------
0 active sessions cleared
node1:
--------------------------------------------------------------
0 active sessions cleared
```

clear security flow session application dns node 0

```
user@host> clear security flow session application dns node 0
node0:
--------------------------------------------------------------
0 active sessions cleared
```
clear security flow session application-traffic-control

Syntax

```
clear security flow session application-traffic-control [Enter] |
application-traffic-control-session-options
```

Release Information

Command introduced in Junos OS Release 11.4.

Description

Clear all application traffic control sessions or the session associated with the specified option.

Application traffic control enables application-aware quality of service, as specified in the rules of the rules set defined for it.

Options

application—Name of the application or application set.

- dns—Domain Name System
- ftp—File Transfer Protocol
- ignore—Ignore application type
- mgcp-ca—Media Gateway Control Protocol with Call Agent
- mgcp-ua—MGCP with User Agent
- ms-rpc—Microsoft RPC
- pptp—Point-to-Point Tunneling Protocol
- q931—ISDN connection control protocol
- ras—RAS
- realaudio—RealAudio
- rsh—UNIX remote shell services
- rtsp—Real-Time Streaming Protocol
- sccp—Skinny Client Control Protocol
- sip—Session Initiation Protocol
- sqlnet-v2—Oracle SQLNET
- sun-rpc—Sun Microsystems RPC
- talk—TALK program
- tftp—Trivial File Transfer Protocol

To display the supported applications list on an SRX Series device, enter the following command from configuration mode:

```
user@host# show groups junos-default applications
```
**conn-tag**—A 32-bit connection tag that uniquely identifies the GPRS tunneling protocol, user plane (GTP-U), and the Stream Control Transmission Protocol (STCP) sessions.

The connection tag for GTP-U is the tunnel endpoint identifier (TEID). For SCTP, it is the vTag. The connection ID remains 0 if the connection tag is not used by the sessions.

**Range:** 0 through 4294967295

**destination-port**—Destination port.

**Range:** 1 through 65535.

**destination-prefix**—Destination IP prefix or address.

**family**—Protocol family:

- inet—Clear IPv4 sessions.
- inet6—Clear IPv6 sessions.

**interface**—Name of incoming or outgoing interface.

**protocol**—IP protocol number.

**source-port**—Source port.

**Range:** 1 through 65535.

**source-prefix**—Source IP prefix or address.

**Required Privilege**

**Level**
clear

**Related Documentation**

- show security flow session on page 503

**Output Fields**

- When you enter this command, you are provided feedback on the status of your request.
- The same output is displayed when you enter an option for this command.

**Sample Output**

```
user@host> clear security flow session application-traffic-control
number active sessions cleared
```
clear security flow session conn-tag

Syntax

```
clear security flow session conn-tag conn-tag-id-number
```

Release Information

Command introduced in Junos OS Release 15.1X49-D40.

Description

Clear the session identified by the session connection (conn-tag) identification tag.

The flow session connection tag allows you to add a filter to further distinguish GRSP tunneling protocol, user plane (GTP-U) flow sessions, and Stream Control Transmission Protocol (SCTP) flow sessions.

Options

**conn-tag**—A 32-bit connection tag that uniquely identifies the GPRS tunneling protocol, user plane (GTP-U) and the Stream Control Transmission Protocol (STCP) sessions. The connection tag for GTP-U is the tunnel endpoint identifier (TEID) and for SCTP is the vTag. The connection ID remains 0 if the connection tag is not used by the sessions.

You can configure the system to include the session connection tag tuple to identify GTP-U session and SCTP sessions by adding the session connection tag to the standard six tuples that identify a session. The system determines the DCP for GTP-U/SCTP by hashing the session connection tag.

The central point architecture distributes GTP-U traffic handled by a gateway GPRS support node (GGSN) and SGSN pair on all SPUs by switching to tunnel endpoint identifier (TEID)-based hash distribution. To handle load-balancing issues, tag-based hash distribution is used to ensure even distribution of SCTP traffic from different associations among all SPUs. (The connection tag for GTP-U is the TEID and for SCTP is the vTag.)

**Range:** 0 through 4294967295.

Required Privilege

**Level**

clear

Related Documentation

• show-security-flow

Output Fields

When you enter this command, you are provided feedback on the status of your request.

Sample Output

```
user@host> clear-security-flow-session conn-tag conn-tag-id-number

number active sessions cleared
```
clear security flow session destination-port

**Syntax**
clear security flow session destination-port

- `destination-port-number`
- `<node (node-id | all | local | primary)>`

**Release Information**
Command introduced in Junos OS Release 8.5; `node` options added in Junos OS Release 9.0.

**Description**
Clear each session that uses the specified destination port.

**Options**
- `destination-port-number` — Number of the destination port.
- `node` — (Optional) For chassis cluster configurations, clear security sessions on the port on a specific node (device) in the cluster.
  - `node-id` — Identification number of the node. It can be 0 or 1.
  - `all` — Clear all nodes.
  - `local` — Clear the local node.
  - `primary` — Clear the primary node.

**Required Privilege Level**
clear

**Related Documentation**
- show security flow session destination-port on page 514

**List of Sample Output**
clear security flow session destination-port 1 on page 347

clear security flow session destination-port 1 node 0 on page 348

**Output Fields**
When you enter this command, you are provided feedback on the status of your request.

**Sample Output**
clear security flow session destination-port 1

```
user@host> clear security flow session destination-port 1
node0:
---------------------------------------------------------------------
0 active sessions cleared
node1:
---------------------------------------------------------------------
0 active sessions cleared
```
**Sample Output**

clear security flow session destination-port 1 node 0

```
user@host> clear security flow session destination-port 1 node 0
node0:
--------------------------------------------------------------------------
0 active sessions cleared
```
clear security flow session destination-prefix

Syntax

```
clear security flow session destination-prefix
  destination-IP-prefix
  <node (node-id | all | local | primary)>
```

Release Information

Command introduced in Release 8.5 of Junos OS.
The node options added in Release 9.0 of Junos OS.
Support for IPv6 addresses added in Release 10.2 of Junos OS.

Description

Clear sessions that match this destination IP prefix or address.

Options

- **destination-IP-prefix**—Destination IP prefix or address.
- **node**—(Optional) For chassis cluster configurations, clear sessions that match the IP prefix or address on a specific node (device) in the cluster.
  - **node-id**—Identification number of the node. It can be 0 or 1.
  - **all**—Clear all nodes.
  - **local**—Clear the local node.
  - **primary**—Clear the primary node.

Required Privilege

level clear

Related Documentation

- show security flow session destination-prefix on page 518

List of Sample Output

- clear security flow session destination-prefix 100.0.0.1 on page 349
- clear security flow session destination-prefix 10::10 on page 350
- Clear security flow session destination-prefix 100.0.0.1 node 0 on page 350

Output Fields

When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear security flow session destination-prefix 100.0.0.1

```
clear security flow session destination-prefix 100.0.0.1

node0:
----------------------------------------------
0 active sessions cleared
node1:
----------------------------------------------
0 active sessions cleared
```
clear security flow session destination-prefix 10::10

```
user@host> clear security flow session destination-prefix 10::10
1 active sessions cleared
```

**Sample Output**

Clear security flow session destination-prefix 100.0.0.1 node 0

```
user@host> clear security flow session destination-prefix 100.0.0.1 node 0
node0:
--------------------------------------------------------------------------
0 active sessions cleared
```
clear security flow session family

Syntax  
clear security flow session family (inet | inet6)

Release Information
Command introduced in Junos OS Release 10.2.

Description
Clear sessions that match the specified protocol family.

Options
- **inet**—Clear IPv4 sessions.
- **inet6**—Clear IPv6 sessions.

Required Privilege Level  
clear

Related Documentation
- show security flow session family on page 529

List of Sample Output
- **clear security flow session family inet** on page 351
- **clear security flow session family inet6** on page 351

Output Fields
When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear security flow session family inet

```
user@host> clear security flow session family inet
1 active sessions cleared
```

clear security flow session family inet6

```
user@host> clear security flow session family inet6
1 active sessions cleared
```
clear security flow session IDP

Syntax

```
clear security flow session IDP [Enter] | idp-session-parameters
```

Release Information

Command introduced in Junos OS Release 10.2.

Description

Clear all active Intrusion Detection and Prevention (IDP) sessions or an IDP session based on the specified session parameter.

IDP allows you to enforce various attack detection and prevention techniques on network traffic passing through the SRX Series device. The SRX Series offers the same set of IDP signatures that are available on Juniper Networks IDP Series Intrusion Detection and Prevention Appliances to secure networks against attacks.

Options

- **application**—Name of the application or application set.
- **dns**—Domain Name System
- **ftp**—File Transfer Protocol
- **ignore**—Ignore application type
- **mgcp-ca**—Media Gateway Control Protocol with Call Agent
- **mgcp-ua**—MGCP with User Agent
- **ms-rpc**—Microsoft RPC
- **pptp**—Point-to-Point Tunneling Protocol
- **q931**—ISDN connection control protocol
- **ras**—RAS
- **realaudio**—RealAudio
- **rsh**—UNIX remote shell services
- **rtsp**—Real-Time Streaming Protocol
- **sccp**—Skinny Client Control Protocol
- **sip**—Session Initiation Protocol
- **sqlnet-v2**—Oracle SQLNET
- **sun-rpc**—Sun Microsystems RPC
- **talk**—TALK program
- **tftp**—Trivial File Transfer Protocol

To display the supported applications list on an SRX Series device, enter the following command from configuration mode:
user@host# show groups junos-default applications

**conn-tag**—A 32-bit connection tag that uniquely identifies the GPRS tunneling protocol, user plane (GTP-U), and the Stream Control Transmission Protocol (STCP) sessions.

The connection tag for GTP-U is the tunnel endpoint identifier (TEID). For SCTP, it is the vTag. The connection ID remains 0 if the connection tag is not used by the sessions.

**Range:** 0 through 4294967295

**destination-port**—Destination port.

**Range:** 1 through 65535.

**destination-prefix**—Destination IP prefix or IP address.

**family**—Protocol family:

- `inet`—Clear IPv4 sessions.
- `inet6`—Clear IPv6 sessions.

**interface**—Name of incoming or outgoing interface.

**protocol**—IP protocol number.

**source-port**—Source port.

**Range:** 1 through 65535.

**source-prefix**—Source IP prefix or address.

**Required Privilege Level**  
`clear`

**Related Documentation**
- show security flow session on page 503

**Output Fields**  
When you enter this command, you are provided feedback on the status of your request. The same output is displayed when you enter an option for this command.

**Sample Output**

```plaintext
user@host> clear security flow session idp
number active sessions cleared
```
clear security flow session interface

Syntax

```plaintext
clear security flow session interface
interface-name
<node (node-id | all | local | primary)>
```

Release Information

Command introduced in Junos OS Release 8.5; `node` options added in Junos OS Release 9.0.

Description

Clear sessions that use the specified interface.

Options

- `interface-name` — Name of a specific incoming or outgoing interface.
- `node` — (Optional) For chassis cluster configurations, clear security sessions on the interface on a specific node (device) in the cluster.
  - `node-id` — Identification number of the node. It can be 0 or 1.
  - `all` — Clear all nodes.
  - `local` — Clear the local node.
  - `primary` — Clear the primary node.

Required Privilege

Level clear

Related Documentation

- show security flow session interface on page 534

List of Sample Output

- clear security flow session interface ge-0/0/0.0 on page 354
- clear security flow session interface ge/0/0.0 node 0 on page 355

Output Fields

When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear security flow session interface ge-0/0/0.0

```
user@host> clear security flow session interface ge-0/0/0.0
node0:
--------------------------------------------------------------------------
0 active sessions cleared
node1:
--------------------------------------------------------------------------
0 active sessions cleared
```
Sample Output

clear security flow session interface ge/0/0.0 node 0

```
user@host> clear security flow session interface ge-0/0/0.0 node 0
node0:
--------------------------------------------------------------------------
0 active sessions cleared
```
**clear security flow ip-action**

**Syntax**

```
clear security flow ip-action [filter]
```

**Release Information**

Command introduced in Junos OS Release 10.4. Logical systems option introduced in Junos OS Release 11.2.

**Description**

Clear IP-action entries, based on filtered options, for IP sessions running on the device.

**Options**

- `filter`—Filter the display based on the specified criteria.

  The following filters display those sessions that match the criteria specified by the filter. Refer to the sample output for filtered output examples.

  - `all | [filter]`—All active sessions on the device.
  - `destination-port destination-port`—Destination port number of the traffic. Range is 1 through 65,535.
  - `destination-prefix destination-prefix`—Destination IP prefix or address.
  - `family (inet | inet6) [filter]`—IPv4 traffic or IPv6-NATPT traffic and filtered options.
  - `logical-system logical-system-name | all [filter]`—Specified logical system or all logical systems.
  - `protocol protocol-name | protocol-number [filter]`—Protocol name or number and filtered options.
    - `ah` or `51`
    - `egp` or `8`
    - `esp` or `50`
    - `gre` or `47`
    - `icmp` or `1`
    - `icmp6` or `58`
    - `ipip` or `4`
    - `ospf` or `89`
    - `pim` or `103`
    - `rsvp` or `46`
    - `sctp` or `132`
    - `tcp` or `6`
    - `udp` or `17`
**root-logical-system [filter]**—Default logical system information and filtered options.

**source-port source-port**—Source port number of the traffic. Range is 1 through 65,535.

**source-prefix source-prefix**—Source IP prefix or address of the traffic.

**Required Privilege**

**Level**
clear

**Related Documentation**

- show security flow ip-action on page 472

**List of Sample Output**

clear security flow ip-action all on page 357

clear security flow ip-action destination-prefix on page 357

clear security flow ip-action family inet on page 357

clear security flow ip-action protocol udp on page 357

**Output Fields**

When you enter this command, the system responds with the status of your request.

**Sample Output**

clear security flow ip-action all

```
user@host>clear security flow ip-action all
1008 ip-action entries cleared
```

clear security flow ip-action destination-prefix

```
user@host>clear security flow ip-action destination-prefix 192.0.2.5/24
87 ip-action entries cleared
```

clear security flow ip-action family inet

```
user@host>clear security flow ip-action family inet
2479 ip-action entries cleared
```

clear security flow ip-action protocol udp

```
user@host>clear security flow ip-action protocol udp
270 ip-action entries cleared
```
clear security flow session nat

Syntax

clear security flow session nat <Enter> | nat-session-parameter

Release Information

Command introduced in Junos OS Release 10.2.

Description

Clear all active sessions with NAT configurations or the active NAT session identified by a session parameter.

Network Address Translation (NAT) is now used primarily to improve traffic security. But it also offers solutions to IP address constraints prior to the advent and implementation of IPv6. NAT allows you to remap one IP address space to another. Network address information in the IP datagram packet headers are modified to achieve the translation.

Options

application—Name of the application protocol

- dns—Domain Name System
- ftp—File Transfer Protocol
- ignore—Ignore application type
- mgcp-ca—Media Gateway Control Protocol with Call Agent
- mgcp-ua—MGCP with User Agent
- ms-rpc—Microsoft RPC
- pptp—Point-to-Point Tunneling Protocol
- q931—ISDN connection control protocol
- ras—RAS
- realaudio—RealAudio
- rsh—UNIX remote shell services
- rtsp—Real-Time Streaming Protocol
- sccp—Skinny Client Control Protocol
- sip—Session Initiation Protocol
- sqlnet-v2—Oracle SQLNET
- sun-rpc—Sun Microsystems RPC
- talk—TALK program
- tftp—Trivial File Transfer Protocol

To display a list of the supported applications on an SRX Series device, enter the following command from configuration mode:
user@host# show groups junos-default applications

**conn-tag**—Session identified by the specified conn-tag.

A conn-tag is a 32-bit connection tag that uniquely identifies the GPRS tunneling protocol, user plane (GTP-U), and the Stream Control Transmission Protocol (STCP) sessions.

The connection tag for GTP-U is the tunnel endpoint identifier (TEID). For SCTP, it is the vTag. The connection ID remains 0 if the connection tag is not used by the sessions.

Session connection identifiers are in the following range:

**Range:** 0 through 4294967295

**destination-port**—Destination port.

**Range:** 1 through 65535

**destination-prefix**—Destination IP prefix or address.

**family**—Protocol family:

- **inet**—Clear IPv4 sessions
- **inet6**—Clear IPv6 sessions

**interface**—Name of incoming or outgoing interface.

**protocol**—IP protocol number.

**source-port**—Source port.

**Range:** 1 through 65535.

**source-prefix**—Source IP prefix or IP address.

**Required Privilege**

**Level**

**clear**

**Related Documentation**

- [show security flow session on page 503](#)

**Output Fields**

Displays a message reporting the number of active sessions cleared. The same message is displayed when any specific option is entered.

**Sample Output**

```
user@host> clear security flow session nat
number active sessions cleared
```
clear security flow session protocol

Syntax
clear security flow session protocol  protocol-name | protocol-number
           <node ( node-id | all | local | primary)>

Release Information
Command introduced in Junos OS Release 8.5; node options added in Junos OS Release 9.0.

Description
Clear each session that uses the specified IP protocol.

Options
- **protocol-name** — (Optional) Networking protocol name. The following text values are supported.
  - ah—IP Security Authentication Header
  - egp—Exterior gateway protocol
  - esp—IPsec Encapsulating Security Payload
  - gre—Generic routing encapsulation
  - icmp—Internet Control Message Protocol
  - igmp—Internet Group Management Protocol
  - ipip—IP over IP
  - ospf—Open Shortest Path First
  - pim—Protocol Independent Multicast
  - rsvp—Resource Reservation Protocol
  - sctp—Stream Control Transmission Protocol
  - tcp—Transmission Control Protocol
  - udp—User Datagram Protocol

- **protocol-number** — (Optional) Numeric protocol value. For a complete list of possible numeric values, see RFC 1700, Assigned Numbers (for the Internet Protocol Suite).
  
  **Range:** 0 through 255

- **node** — (Optional) For chassis cluster configurations, clear security on a specific node (device) in the cluster for the user with this identification number.
  - **node-id** — Identification number of the node. It can be 0 or 1.
  - **all** — Clear all nodes.
• **local** — Clear the local node.
• **primary** — Clear the primary node.

**Required Privilege**

- **clear**

**Related Documentation**

- show security flow session protocol on page 545

**List of Sample Output**

- clear security flow session protocol pim on page 362
- clear security flow session protocol 0 on page 362

**Output Fields**

- When you enter this command, you are provided feedback on the status of your request.

**Sample Output**

**clear security flow session protocol pim**

```
user@host> clear security flow session protocol pim
node0:
---------------------------------------------------------------------
0 active sessions cleared
node1:
---------------------------------------------------------------------
0 active sessions cleared
```

**Sample Output**

**clear security flow session protocol 0**

```
user@host> clear security flow session protocol 0
node0:
---------------------------------------------------------------------
0 active sessions cleared
node1:
---------------------------------------------------------------------
0 active sessions cleared
```
**clear security flow session resource-manager**

**Syntax**
```
clear security flow session resource-manager <node (node-id | all | local | primary)>
```

**Release Information**
Command introduced in Junos OS Release 8.5; **node** options added in Junos OS Release 9.0.

**Description**
Clear resource-manager sessions.

**Options**
- **node**—(Optional) For chassis cluster configurations, clear the resource manager sessions on a specific node (device) in the cluster.
  - **node-id**—Identification number of the node. It can be 0 or 1.
  - **all**—Clear all nodes.
  - **local**—Clear the local node.
  - **primary**—Clear the primary node.

**Required Privilege Level**
clear

**Related Documentation**
- show security flow session resource-manager on page 550

**List of Sample Output**
clear security flow session resource-manager on page 363
clear security flow session resource-manager node 0 on page 363

**Output Fields**
When you enter this command, you are provided feedback on the status of your request.

**Sample Output**
clear security flow session resource-manager
```
user@host> clear security flow session resource-manager
node0:-----------------------------------------------------------------------
0 active sessions cleared
node1:-----------------------------------------------------------------------
0 active sessions cleared
```

clear security flow session resource-manager node 0
```
user@host> clear security flow session resource-manager node 0
```
node0:
-----------------------------------------------------------------------------------------------------------------
0 active sessions cleared
clear security flow session services-offload

Syntax  clear security flow session services-offload [filter]

Release Information  Command introduced in Junos OS Release 11.4. Starting with Junos OS Release 15.1X49-D10 and and Junos OS Release 17.3R1, the SRX5K-MPC3-100G10G (IOC3) and the SRX5K-MPC3-40G10G (IOC3) with Express Path (formerly known as services offloading) support are introduced for SRX5400, SRX5600, and SRX5800 devices.

Description  Clear services-offload security sessions, based on filtered options, on the device. This command also clears a services-offload security session from both the network processor and the Services Processing Unit (SPU) on which the specified session was installed.

Options  filter—Filter the display based on the specified criteria.

The following filters clear those sessions that match the criteria specified by the filter. Refer to the sample output for filtered output examples.

application application-name—Application name.

destination-port destination-port—Destination port number. Range is from 1 through 65,535.

destination-prefix destination-prefix—Destination IP prefix or address.

family (inet | inet6)—IPv4 traffic or IPv6-NAT-PT traffic.

interface interface-name—Incoming or outgoing interface name.

logical-system logical-system-name | all—Specified logical system name or all logical systems.

protocol protocol-name | protocol-number—Protocol name or number.

  • ah or 51
  • egp or 8
  • esp or 50
  • gre or 47
  • icmp or 1
  • icmp6 or 58
  • igmp or 2
  • ipip or 4
  • ospf or 89
• pim or 103
• rsvp or 46
• sctp or 132
• tcp or 6
• udp or 17

root-logical-system [filter]—Root logical system information and filtered options.

clear security flowsessions-services-offload on page 366

source-port—Source port number of the traffic. Range is from 1 through 65,535.

source-prefix—Source IP prefix or address of the traffic.

clear security flowsessions-services-offload on page 366

Required Privilege Level

clear

Related Documentation
• show security flow session services-offload on page 554

List of Sample Output

clear security flowsessions-services-offload on page 366
clear security flowsessions-services-offload application on page 366
clear security flowsessions-services-offload destination-port on page 366
clear security flowsessions-services-offload destination-prefix on page 367
clear security flowsessions-services-offload family on page 367
clear security flowsessions-services-offload interface on page 367
clear security flowsessions-services-offload logical-system on page 367
clear security flowsessions-services-offload protocol on page 367
clear security flowsessions-services-offload root-logical-system on page 367

clear security flowsessions-services-offload source-port on page 367
clear security flowsessions-services-offload source-prefix on page 367

Output Fields

When you enter this command, you are provided feedback on the status of your request.

Sample Output

clear security flowsessions-services-offload

user@host> clear security flow session services-offload

0 active sessions cleared

clear security flowsessions-services-offload application

user@host> clear security flow session services-offload dns

0 active sessions cleared

clear security flowsessions-services-offload destination-port

user@host> clear security flow session services-offload destination-port 1
clear security flow session services-offload destination-prefix
user@host> clear security flow session services-offload destination-prefix 10.0.0.1
0 active sessions cleared

clear security flow session services-offload family
user@host> clear security flow session services-offload family inet
1 active sessions cleared

clear security flow session services-offload interface
user@host> clear security flow session services-offload interface ge-0/0/0.0
0 active sessions cleared

clear security flow session services-offload logical-system
user@host> clear security flow session services-offload logical-system all
0 active sessions cleared

clear security flow session services-offload protocol
user@host> clear security flow session services-offload protocol pim
0 active sessions cleared

clear security flow session services-offload root-logical-system
user@host> clear security flow session services-offload root-logical-system application dns
0 active sessions cleared

clear security flow session services-offload source-port
user@host> clear security flow session services-offload source-port 1
0 active sessions cleared

clear security flow session services-offload source-prefix
user@host> clear security flow session services-offload source-prefix 10.0.0.1
0 active sessions cleared
clear security flow session session-identifier

**Syntax**
clear security flow session session-identifier

```plaintext
session-identifier
<node (node-id | all | local | primary)>
```

**Release Information**
Command introduced in Junos OS Release 8.5; node options added in Junos OS Release 9.0.

**Description**
Clear the session with the specific identifier.

**Options**
- **session-identifier** — Number from 1 through 4,294,967,295 that identifies the security session.
- **node** — (Optional) For chassis cluster configurations, clear the specified session on a specific node (device) in the cluster.
  - **node-id** — Identification number of the node. It can be 0 or 1.
  - **all** — Clear all nodes.
  - **local** — Clear the local node.
  - **primary** — Clear the primary node.

**Required Privilege**
clear

**Related Documentation**
- show security flow session session-identifier on page 559

**List of Sample Output**
clear security flow session session-identifier 1 on page 368
clear security flow session session-identifier 1 node 0 on page 368

**Output Fields**
When you enter this command, you are provided feedback on the status of your request.

**Sample Output**
clear security flow session session-identifier 1

```plaintext
user@host> clear security flow session session-identifier 1
0 active sessions cleared
```

clear security flow session session-identifier 1 node 0

```plaintext
user@host> clear security flow session session-identifier 1 node 0
```
node0:
---------------------------------------------------------------------------------------------------------------------------------
0 active sessions cleared
clear security flow session source-port

Syntax

```
clear security flow session source-port
source-port-number
<node (node-id | all | local | primary)>
```

Release Information

Command introduced in Junos OS Release 8.5; `node` options added in Junos OS Release 9.0.

Description

Clear each session that uses the specified source port.

Options

- `source-port-number` — Number that identifies the source port.
  
  **Range:** 1 through 65,535
- `node` — (Optional) For chassis cluster configurations, clear sessions on the specified source port on a specific node (device) in the cluster.
  
  - `node-id` — Identification number of the node. It can be 0 or 1.
  - `all` — Clear all nodes.
  - `local` — Clear the local node.
  - `primary` — Clear the primary node.

Required Privilege

```
clear
```

Related Documentation

- `show security flow session source-port` on page 563

List of Sample Output

- `clear security flow session source-port` on page 370
- `clear security flow session source-port node 0` on page 371

Output Fields

When you enter this command, you are provided feedback on the status of your request.

Sample Output

```
clear security flow session source-port 1
user@host> clear security flow session source-port 1
node0:
---------------------------------------------------------------
0 active sessions cleared
node1:
---------------------------------------------------------------
0 active sessions cleared
```
Sample Output

clear security flow session source-port 1 node 0

    user@host> clear security flow session source-port 1 node 0
    node0:
    ----------------------------------------------------------------------------------------------------------------------------------
    0 active sessions cleared
**clear security flow session source-prefix**

**Syntax**

```plaintext
clear security flow session source-prefix
source-prefix-number
<node (node-id | all | local | primary)>
```

**Release Information**

Command introduced in Release 8.5 of Junos OS.  
The `node` options added in Release 9.0 of Junos OS.  
Support for IPv6 addresses added in Release 10.2 of Junos OS.

**Description**

Clear sessions that match the source prefix.

**Options**

- `source-prefix-number`—Source IP prefix or address.
  
- `node`—(Optional) For chassis cluster configurations, clear security sessions matching the source prefix on a specific node (device) in the cluster.
  
  - `node-id`—Identification number of the node. It can be 0 or 1.
  
  - `all`—Clear all nodes.
  
  - `local`—Clear the local node.
  
  - `primary`—Clear the primary node.

**Required Privilege**

`clear`

**Related Documentation**

- `show security flow session source-prefix` on page 567

**List of Sample Output**

- `clear security flow session source-prefix 10.0.0.1` on page 372
- `clear security flow session source-prefix 10::10` on page 373
- `clear security flow session source-prefix 10.0.0.1 node 0` on page 373

**Output Fields**

When you enter this command, you are provided feedback on the status of your request.

**Sample Output**

`clear security flow session source-prefix 10.0.0.1`

```
user@host> clear security flow session source-prefix 10.0.0.1
node0:
--------------------------------------------------------------------------------
0 active sessions cleared
node1:
--------------------------------------------------------------------------------
0 active sessions cleared
```
clear security flow session source-prefix 10::10

user@host> clear security flow session source-prefix 10::10
1 active sessions cleared

Sample Output

clear security flow session source-prefix 10.0.0.1 node 0

user@host> clear security flow session source-prefix 10.0.0.1 node 0
node0:
-------------------------------------------------------------------------
0 active sessions cleared

Copyright © 2019, Juniper Networks, Inc.
clear security flow session tunnel

Syntax  
```
clear security flow session tunnel [Enter] | tunnel-session-parameters
```

Release Information  
Command introduced in Junos OS Release 8.5.

Description  
Clear all active tunnel sessions by entering the command without parameters, or clear the tunnel session whose session parameters are specified.

Options  
**application**—Name of the application or application set.

- **dns**—Domain Name System
- **ftp**—File Transfer Protocol
- **ignore**—Ignore application type
- **mgcp-ca**—Media Gateway Control Protocol with Call Agent
- **mgcp-ua**—MGCP with User Agent
- **ms-rpc**—Microsoft RPC
- **pptp**—Point-to-Point Tunneling Protocol
- **q931**—ISDN connection control protocol
- **ras**—RAS
- **realaudio**—RealAudio
- **rsh**—UNIX remote shell services
- **rtsp**—Real-Time Streaming Protocol
- **sccp**—Skinny Client Control Protocol
- **sip**—Session Initiation Protocol
- **sqlnet-v2**—Oracle SQLNET
- **sun-rpc**—Sun Microsystems RPC
- **talk**—TALK program
- **tftp**—Trivial File Transfer Protocol

To display the supported applications list on an SRX Series device, enter the following command from configuration mode:

```
user@host# show groups junos-default applications
```

**conn-tag**—session connection identifiers are in the following range:

**Range**: 0 through 4294967295
destination-port—Destination port.
   Range: 1 through 65535

destination-prefix—Destination IP prefix or address.

family—Protocol family:
   • inet—Clear IPv4 sessions
   • inet6—Clear IPv6 sessions

interface—Name of incoming or outgoing interface.

protocol—IP protocol number.

source-port—Source port.
   Range: 1 through 65535.

source-prefix—Source IP prefix or address.

Required Privilege Level
   clear

Related Documentation
   • show security flow session tunnel

Output Fields
   When you enter this command, you are provided feedback on the status of your request.
   The same output is displayed when you enter an option for this command.

Sample Output

user@host> clear security flow session tunnel
number active sessions cleared
clear security forward-options mirror filter

Syntax

```
clear security forward-options mirror-filter (all | filter-name)
```

Release Information

Command introduced in Junos OS Release 12.1X46-D10.

Description

Clear statistics about configured mirror filters.

Options

- **all**—Clear statistics for all configured mirror filters.
- **filter-name**—Clear statistics for the specified mirror filter.

Required Privilege

- clear

Related Documentation

- mirror-filter (Security Forwarding Options) on page 292
- show security forwarding-options mirror-filter on page 599
monitor security flow file

Syntax

`monitor security flow file
   <file-name>
   <files number>
   <match regular-expression>
   <size maximum-file-size>
   <(world-readable | no-world-readable)>

Release Information

Command introduced in Junos OS Release 12.1X46-D10.

Description

Configure options for the security flow monitoring output.

Options

- **filename**—Name of the file to receive the output of the monitoring operation. All output is saved in the `/var/log/` directory.

- **files number**—Maximum number of output files. If you specify a maximum number of files, you must also specify a maximum file size with the `size` option.
  
  Range: 2 through 1000 files
  
  Default: 10 files

- **match regular-expression**—Refine the output to include lines that contain the regular expression.

- **size maximum-file-size**—Maximum size of each output file. When an output file named `output` reaches this size, it is renamed `output.0`. When the output file again reaches its maximum size, `output.0` is renamed `output.1` and `output` file is renamed `output.0`. This renaming scheme continues until the maximum number of output files is reached. Then the oldest output file is overwritten.
  
  If you specify a maximum file size, you also must specify a maximum number of output files with the `files` option.
  
  Range: 10 KB through 1 GB
  
  Default: 128 KB

- **(world-readable | no-world-readable)**—By default, the output files can be accessed only by the user who configures the monitoring operation. The `world-readable` option enables all users to read the file. To explicitly set the default behavior, use the `no-world-readable` option.

Required Privilege

- **trace**
Related Documentation

- Monitoring Security Flow Sessions Overview on page 161
- monitor security flow filter on page 379
- monitor security flow start on page 381
- show monitor security flow on page 445

Output Fields

This command produces no output.
monitor security flow filter

Syntax

```
monitor security flow filter filter-name
<conn-tag session-connection-tag>
<destination-port (port-range | protocol-name)>
<destination-prefix destination-prefix>
<interface interface-name>
<logical-system logical-system-name>
<protocol (protocol name | protocol number)>
<source-port (port-range | protocol-name)>
<source-prefix source-prefix>
```

Release Information

Command introduced in Junos OS Release 12.1X46-D10. The was updated in Junos OS Release 15.1X49-D70 with the addition of the conn-tag filter parameter.

Description

Set security flow filters to define flow sessions that you want to monitor. A maximum of 64 filters is supported at a time.

Defining the filters themselves does not trigger monitoring. You must explicitly use the `monitor security flow start` command to enable monitoring. Once monitoring starts, any traffic that matches the specified filters is saved in an output file in the `/var/log/` directory.

NOTE: Unlike filters defined in the configuration mode, these filters defined using operational mode commands are cleared when you reboot your system. They are used expressly for debugging purposes.

Options

- **filter filter-name**—Specify a name for the filter. The filter name can contain letters, numbers, underscores (_) and hyphens (-) and can be up to 64 characters long.
- **conn-tag**—Specify the session connection tag. The session connection tag uniquely identifies a session.
- **destination-port (port-range | protocol-name)**—Specify the TCP or UDP destination port to match. You can also specify a range of TCP or UDP destination ports and monitor all traffic in this group.
- **destination-prefix destination-prefix**—Specify the destination IPv4 or IPv6 address prefix to match.
- **interface interface-name**—Specify the logical interface name to match.
- **logical-system logical-system-name**—Specify the logical system name to match.
- **protocol (protocol name | protocol number)**—Specify the IP protocol type to match.
- **root-logical-system**—(Default) Specify the root logical system to match.
source-port (port-range | protocol-name)—Specify the TCP or UDP source port to match. You can also specify a range of TCP or UDP source ports and monitor all traffic in this group.

source-prefix source-prefix—Specify the source IP address prefix to match.
### `monitor security flow start`

<table>
<thead>
<tr>
<th>Syntax</th>
<th><code>monitor security flow start</code></th>
</tr>
</thead>
</table>

**Release Information**  
Command introduced in Junos OS Release 12.1X46-D10.

**Description**  
Start the monitoring of security flow session. Once monitoring starts, any traffic that matches the specified filters is saved in an output file in the `var/log/` directory. At least one filter must be defined for the monitoring to start.

Use the `monitor security flow stop` command to stop the monitoring of flow sessions.

**Options**  
This command has no options.

**Required Privilege Level**  
trace

**Related Documentation**
- Monitoring Security Flow Sessions Overview on page 161
- show monitor security flow on page 445
- monitor security flow filter on page 379
- monitor security flow stop on page 382

**Output Fields**  
This command produces no output.
monitor security flow stop

Syntax

monitor security flow stop

Release Information

Command introduced in Junos OS Release 12.1X46-D10.

Description

Stop monitoring the security flow session. Use the monitor security flow start command to start the monitoring of flow sessions.

Options

This command has no options.

Required Privilege Level

trace

Related Documentation

• Monitoring Security Flow Sessions Overview on page 161
• monitor security flow start on page 381

Output Fields

This command produces no output.
show chassis environment (Security)

Syntax

```
show chassis environment
```

Release Information

Command introduced in Junos OS Release 9.2.

Description

Display environmental information about the services gateway chassis, including the temperature and information about the fans, power supplies, and Routing Engine.

Options

- `none`—Display environmental information about the device.
- `cb slot-number`—Display chassis environmental information for the Control Board.
- `fpc fpc-slot`—Display chassis environmental information for a specified Flexible PIC Concentrator.
- `fpm`—Display chassis environmental information for the craft interface (FPM).
- `node`—Display node specific chassis information.
- `pem slot-number`—Display chassis environmental information for the specified Power Entry Module.
- `routing-engine slot-number`—Display chassis environmental information for the specified Routing Engine.

Required Privilege

view

Related Documentation

- show chassis hardware (View) on page 399

List of Sample Output

- show chassis environment on page 384
- show chassis environment fpc (SRX5800, SRX5400, and SRX5600) on page 387

Output Fields

Table 26 on page 383 lists the output fields for the `show chassis environment` command. Output fields are listed in the approximate order in which they appear.

### Table 26: `show chassis environment` Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp</td>
<td>Temperature of air flowing through the chassis in degrees Celsius (C) and Fahrenheit (F).</td>
</tr>
<tr>
<td>Fan</td>
<td>Fan status: OK, Testing (during initial power-on), Failed, or Absent.</td>
</tr>
</tbody>
</table>
### Sample Output

```bash
user@host> show chassis environment

Class | Item                     | Status | Measurement           |
----- | ------------------------- | ------ | --------------------- |
Temp  | PEM 0                     | OK     | 40 degrees C / 104 degrees F |
      | PEM 1                     | OK     | 40 degrees C / 104 degrees F |
      | PEM 2                     | OK     | 40 degrees C / 104 degrees F |
      | PEM 3                     | OK     | 45 degrees C / 113 degrees F |
      | Routing Engine 0          | OK     | 31 degrees C / 87 degrees F |
      | Routing Engine 0 CPU      | OK     | 27 degrees C / 80 degrees F |
      | Routing Engine 1          | Absent |                     |
      | Routing Engine 1 CPU      | Absent |                     |
      | CB 0 Intake               | OK     | 28 degrees C / 82 degrees F |
      | CB 0 Exhaust A            | OK     | 27 degrees C / 80 degrees F |
      | CB 0 Exhaust B            | OK     | 29 degrees C / 84 degrees F |
      | CB 0 ACBC                 | OK     | 29 degrees C / 84 degrees F |
      | CB 0 SF A                 | OK     | 36 degrees C / 96 degrees F |
      | CB 0 SF B                 | OK     | 31 degrees C / 87 degrees F |
      | CB 1 Intake               | OK     | 27 degrees C / 80 degrees F |
      | CB 1 Exhaust A            | OK     | 26 degrees C / 78 degrees F |
      | CB 1 Exhaust B            | OK     | 29 degrees C / 84 degrees F |
      | CB 1 ACBC                 | OK     | 27 degrees C / 80 degrees F |
      | CB 1 SF A                 | OK     | 36 degrees C / 96 degrees F |
      | CB 1 SF B                 | OK     | 31 degrees C / 87 degrees F |
      | CB 2 Intake               | Absent |                     |
      | CB 2 Exhaust A            | Absent |                     |
      | CB 2 Exhaust B            | Absent |                     |
      | CB 2 ACBC                 | Absent |                     |
      | CB 2 XF A                 | Absent |                     |
      | CB 2 XF B                 | Absent |                     |
      | FPC 0 Intake              | OK     | 47 degrees C / 116 degrees F |
      | FPC 0 Exhaust A           | OK     | 44 degrees C / 111 degrees F |
      | FPC 0 Exhaust B           | OK     | 52 degrees C / 125 degrees F |
      | FPC 0 xlp0 TSen           | OK     | 51 degrees C / 123 degrees F |
      | FPC 0 xlp0 Chip           | OK     | 46 degrees C / 114 degrees F |
      | FPC 0 xlp1 TSen           | OK     | 51 degrees C / 123 degrees F |
      | FPC 0 xlp1 Chip           | OK     | 47 degrees C / 116 degrees F |
      | FPC 0 xlp2 TSen           | OK     | 44 degrees C / 111 degrees F |
      | FPC 0 xlp2 Chip           | OK     | 42 degrees C / 107 degrees F |
      | FPC 0 xlp3 TSen           | OK     | 48 degrees C / 118 degrees F |
      | FPC 0 xlp3 Chip           | OK     | 43 degrees C / 109 degrees F |
      | FPC 1 Intake              | OK     | 41 degrees C / 105 degrees F |
      | FPC 1 Exhaust A           | OK     | 41 degrees C / 105 degrees F |
      | FPC 1 Exhaust B           | OK     | 51 degrees C / 123 degrees F |
      | FPC 1 LU TSen             | OK     | 46 degrees C / 114 degrees F |
      | FPC 1 LU Chip             | OK     | 45 degrees C / 113 degrees F |
      | FPC 1 XM TSen             | OK     | 46 degrees C / 114 degrees F |
      | FPC 1 XM Chip             | OK     | 52 degrees C / 125 degrees F |
      | FPC 1 xlp0 TSen           | OK     | 49 degrees C / 120 degrees F |
      | FPC 1 xlp0 Chip           | OK     | 42 degrees C / 107 degrees F |
      | FPC 1 xlp1 TSen           | OK     | 49 degrees C / 120 degrees F |
      | FPC 1 xlp1 Chip           | OK     | 44 degrees C / 111 degrees F |
      | FPC 1 xlp2 TSen           | OK     | 38 degrees C / 100 degrees F |
      | FPC 1 xlp2 Chip           | OK     | 39 degrees C / 102 degrees F |
      | FPC 1 xlp3 TSen           | OK     | 44 degrees C / 111 degrees F |
      | FPC 1 xlp3 Chip           | OK     | 42 degrees C / 107 degrees F |
```
<table>
<thead>
<tr>
<th>Component</th>
<th>Status</th>
<th>Temperature C</th>
<th>Temperature F</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPC 2 Intake</td>
<td>OK</td>
<td>29</td>
<td>84</td>
</tr>
<tr>
<td>FPC 2 Exhaust A</td>
<td>OK</td>
<td>34</td>
<td>93</td>
</tr>
<tr>
<td>FPC 2 Exhaust B</td>
<td>OK</td>
<td>40</td>
<td>104</td>
</tr>
<tr>
<td>FPC 2 I3 0 TSensor</td>
<td>OK</td>
<td>42</td>
<td>107</td>
</tr>
<tr>
<td>FPC 2 I3 0 Chip</td>
<td>OK</td>
<td>41</td>
<td>105</td>
</tr>
<tr>
<td>FPC 2 I3 1 TSensor</td>
<td>OK</td>
<td>40</td>
<td>104</td>
</tr>
<tr>
<td>FPC 2 I3 1 Chip</td>
<td>OK</td>
<td>39</td>
<td>102</td>
</tr>
<tr>
<td>FPC 2 I3 2 TSensor</td>
<td>OK</td>
<td>38</td>
<td>100</td>
</tr>
<tr>
<td>FPC 2 I3 2 Chip</td>
<td>OK</td>
<td>37</td>
<td>98</td>
</tr>
<tr>
<td>FPC 2 I3 3 TSensor</td>
<td>OK</td>
<td>35</td>
<td>95</td>
</tr>
<tr>
<td>FPC 2 I3 3 Chip</td>
<td>OK</td>
<td>35</td>
<td>95</td>
</tr>
<tr>
<td>FPC 2 IA 0 TSensor</td>
<td>OK</td>
<td>45</td>
<td>113</td>
</tr>
<tr>
<td>FPC 2 IA 0 Chip</td>
<td>OK</td>
<td>42</td>
<td>107</td>
</tr>
<tr>
<td>FPC 2 IA 1 TSensor</td>
<td>OK</td>
<td>41</td>
<td>105</td>
</tr>
<tr>
<td>FPC 2 IA 1 Chip</td>
<td>OK</td>
<td>43</td>
<td>109</td>
</tr>
<tr>
<td>FPC 9 Intake</td>
<td>OK</td>
<td>29</td>
<td>84</td>
</tr>
<tr>
<td>FPC 9 Exhaust A</td>
<td>OK</td>
<td>41</td>
<td>105</td>
</tr>
<tr>
<td>FPC 9 Exhaust B</td>
<td>OK</td>
<td>48</td>
<td>118</td>
</tr>
<tr>
<td>FPC 9 LU TSen</td>
<td>OK</td>
<td>48</td>
<td>118</td>
</tr>
<tr>
<td>FPC 9 LU Chip</td>
<td>OK</td>
<td>47</td>
<td>116</td>
</tr>
<tr>
<td>FPC 9 XM TSen</td>
<td>OK</td>
<td>48</td>
<td>118</td>
</tr>
<tr>
<td>FPC 9 XM Chip</td>
<td>OK</td>
<td>54</td>
<td>129</td>
</tr>
<tr>
<td>FPC 9 xlp0 TSen</td>
<td>OK</td>
<td>45</td>
<td>113</td>
</tr>
<tr>
<td>FPC 9 xlp0 Chip</td>
<td>OK</td>
<td>42</td>
<td>107</td>
</tr>
<tr>
<td>FPC 9 xlp1 TSen</td>
<td>OK</td>
<td>49</td>
<td>120</td>
</tr>
<tr>
<td>FPC 9 xlp1 Chip</td>
<td>OK</td>
<td>46</td>
<td>114</td>
</tr>
<tr>
<td>FPC 9 xlp2 TSen</td>
<td>OK</td>
<td>37</td>
<td>98</td>
</tr>
<tr>
<td>FPC 9 xlp2 Chip</td>
<td>OK</td>
<td>40</td>
<td>104</td>
</tr>
<tr>
<td>FPC 9 xlp3 TSen</td>
<td>OK</td>
<td>45</td>
<td>113</td>
</tr>
<tr>
<td>FPC 9 xlp3 Chip</td>
<td>OK</td>
<td>41</td>
<td>105</td>
</tr>
<tr>
<td>FPC 10 Intake</td>
<td>OK</td>
<td>32</td>
<td>89</td>
</tr>
<tr>
<td>FPC 10 Exhaust A</td>
<td>OK</td>
<td>44</td>
<td>111</td>
</tr>
<tr>
<td>FPC 10 Exhaust B</td>
<td>OK</td>
<td>53</td>
<td>127</td>
</tr>
<tr>
<td>FPC 10 LU 0 TSen</td>
<td>OK</td>
<td>43</td>
<td>109</td>
</tr>
<tr>
<td>FPC 10 LU 0 Chip</td>
<td>OK</td>
<td>52</td>
<td>125</td>
</tr>
<tr>
<td>FPC 10 LU 1 TSen</td>
<td>OK</td>
<td>43</td>
<td>109</td>
</tr>
<tr>
<td>FPC 10 LU 1 Chip</td>
<td>OK</td>
<td>44</td>
<td>111</td>
</tr>
<tr>
<td>FPC 10 LU 2 TSen</td>
<td>OK</td>
<td>43</td>
<td>109</td>
</tr>
<tr>
<td>FPC 10 LU 2 Chip</td>
<td>OK</td>
<td>50</td>
<td>122</td>
</tr>
<tr>
<td>FPC 10 LU 3 TSen</td>
<td>OK</td>
<td>43</td>
<td>109</td>
</tr>
<tr>
<td>FPC 10 LU 3 Chip</td>
<td>OK</td>
<td>58</td>
<td>136</td>
</tr>
<tr>
<td>FPC 10 XM 0 TSen</td>
<td>OK</td>
<td>43</td>
<td>109</td>
</tr>
<tr>
<td>FPC 10 XM 0 Chip</td>
<td>OK</td>
<td>53</td>
<td>127</td>
</tr>
<tr>
<td>FPC 10 XF 0 TSen</td>
<td>OK</td>
<td>43</td>
<td>109</td>
</tr>
<tr>
<td>FPC 10 XF 0 Chip</td>
<td>OK</td>
<td>64</td>
<td>147</td>
</tr>
<tr>
<td>FPC 10 PLX Switch TSen</td>
<td>OK</td>
<td>43</td>
<td>109</td>
</tr>
<tr>
<td>FPC 10 PLX Switch Chip</td>
<td>OK</td>
<td>44</td>
<td>111</td>
</tr>
<tr>
<td>FPC 11 Intake</td>
<td>OK</td>
<td>32</td>
<td>89</td>
</tr>
<tr>
<td>FPC 11 Exhaust A</td>
<td>OK</td>
<td>41</td>
<td>105</td>
</tr>
<tr>
<td>FPC 11 Exhaust B</td>
<td>OK</td>
<td>56</td>
<td>132</td>
</tr>
<tr>
<td>FPC 11 LU 0 TSen</td>
<td>OK</td>
<td>45</td>
<td>113</td>
</tr>
<tr>
<td>FPC 11 LU 0 Chip</td>
<td>OK</td>
<td>50</td>
<td>122</td>
</tr>
<tr>
<td>FPC 11 LU 1 TSen</td>
<td>OK</td>
<td>45</td>
<td>113</td>
</tr>
<tr>
<td>FPC 11 LU 1 Chip</td>
<td>OK</td>
<td>47</td>
<td>116</td>
</tr>
<tr>
<td>FPC 11 LU 2 TSen</td>
<td>OK</td>
<td>45</td>
<td>113</td>
</tr>
<tr>
<td>FPC 11 LU 2 Chip</td>
<td>OK</td>
<td>52</td>
<td>125</td>
</tr>
<tr>
<td>FPC 11 LU 3 TSen</td>
<td>OK</td>
<td>45</td>
<td>113</td>
</tr>
<tr>
<td>FPC 11 LU 3 Chip</td>
<td>OK</td>
<td>60</td>
<td>140</td>
</tr>
<tr>
<td>FPC 11 XM 0 TSen</td>
<td>OK</td>
<td>45</td>
<td>113</td>
</tr>
<tr>
<td>FPC 11 XM 0 Chip</td>
<td>OK</td>
<td>56</td>
<td>132</td>
</tr>
</tbody>
</table>
When you enter the `show chassis environment pem` command, the sample output is shown for DC PEM.

```
user@host> show chassis environment pem
node0:
--------------------------------------------------------------------------
PEM 0 status:
  State          Online
  Temperature    OK
  DC Input:      OK
  DC Output      Voltage(V) Current(A)  Power(W)  Load(%) 
                  50        12            600      24
PEM 1 status:
  State          Online
  Temperature    OK
  DC Input:      OK
  DC Output      Voltage(V) Current(A)  Power(W)  Load(%) 
                  50        31            1550     63
	node1:
--------------------------------------------------------------------------
PEM 0 status:
  State          Online
  Temperature    OK
  DC Input:      OK
  DC Output      Voltage(V) Current(A)  Power(W)  Load(%) 
                  50        12            600      24
```
### PEM 1 status:
- **State**: Online
- **Temperature**: OK
- **DC Input**: OK
- **DC Output**:
  - Voltage (V): 49
  - Current (A): 31
  - Power (W): 1519
  - Load (%): 62

---

**show chassis environment fpc (SRX5800, SRX5400, and SRX5600)**

```
user@host> show chassis environment fpc
```

### FPC 1 status:
- **State**: Online
- **Temperature Intake**: 34 degrees C / 93 degrees F
- **Temperature Exhaust A**: 48 degrees C / 118 degrees F
- **Temperature Exhaust B**: 48 degrees C / 118 degrees F
- **Temperature CPU0 DTS**: 55 degrees C / 131 degrees F
- **Temperature CPU1 DTS**: 60 degrees C / 140 degrees F
- **Temperature CPU2 DTS**: 54 degrees C / 129 degrees F
- **Temperature CPU3 DTS**: 70 degrees C / 158 degrees F
- **Temperature Talus 0**: 106 degrees C / 222 degrees F
- **Temperature Middle 0**: 40 degrees C / 104 degrees F
- **Temperature Talus 1**: 76 degrees C / 168 degrees F
- **Temperature Middle 1**: 67 degrees C / 152 degrees F
- **Power**:
  - **TALUS0-1.20V**: 1199 mV, 14187 mA, 17010 mW
  - **TALUS0-0.90V**: 900 mV, 5000 mA, 4500 mW
  - **BIAS0-3.30V**: 3299 mV, 3769 mA, 12433 mW
  - **PIC0_CPU_memory_CD-1.20**: 1199 mV, 3781 mA, 4533 mW
  - **USB0-5.00V**: 5000 mV, 155 mA, 775 mW
  - **PIC0_CPU_memory_AB-1.20**: 1200 mV, 5820 mA, 6984 mW
  - **PCH0-1.05V**: 1050 mV, 3582 mA, 3761 mW
  - **TALUS1-1.20V**: 1199 mV, 13640 mA, 16354 mW
  - **TALUS1-0.90V**: 899 mV, 4679 mA, 4206 mW
  - **BIAS1-3.30V**: 3300 mV, 3175 mA, 10477 mW
  - **PIC1_CPU_memory_GH-1.20**: 1200 mV, 4648 mA, 5577 mW
  - **USB1-5.00V**: 4999 mV, 346 mA, 1729 mW
  - **PIC1_CPU_memory_EF-1.20**: 1200 mV, 5218 mA, 6261 mW
  - **PCH1-1.05V**: 1050 mV, 3328 mA, 3494 mW
  - **TPS53641-CPU0**: 1750 mV, 46062 mA, 80608 mW
  - **TPS53641-CPU1**: 1739 mV, 47437 mA, 82492 mW
  - **TPS53641-CPU2**: 1750 mV, 45250 mA, 79187 mW
  - **TPS53641-CPU3**: 1739 mV, 46875 mA, 81515 mW
  - **ETH-1.00V**: 994 mV, 2674 mA, 2657 mW
  - **TALUS0_Core-0.85V**: 849 mV, 37750 mA, 32049 mW
  - **TALUS1_Core-0.85V**: 849 mV, 26750 mA, 22710 mW
  - **Power_Brick1-12.00V**: 12001 mV, 21000 mA, 252021 mW
  - **Power_Brick2-12.00V**: 11998 mV, 23125 mA, 277453 mW
  - **PIM4820_48V0-48.00V**: 58392 mV, 10286 mA, 600620 mW
  - **I2C Slave Revision**: 0

---

Copyright © 2019, Juniper Networks, Inc.
show chassis fpc (View)

Syntax

```
show chassis fpc
<detail < fpc-slot >| <node ( node-id | local | primary)>> |
<node ( node-id | local | primary)> |
<pic-status < fpc-slot >| <node ( node-id | local | primary)>>
```

Release Information

Command modified in Junos OS Release 9.2.
Starting with Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1, the SRX5K-MPC3-100G10G (IOC3) and the SRX5K-MPC3-40G10G (IOC3) are introduced.

NOTE: On SRX5K-MPC3-40G10G (IOC3), all four PICs cannot be powered on. A maximum of two PICs can be powered on at the same time. By default, PIC0 and PIC1 are online.

Use the `set chassis fpc <slot> pic <pic> power off` command to choose the PICs you want to power on.
When you use the `set chassis fpc <slot> pic <pic> power off` command to power off PIC0 and PIC1, PIC2 and PIC3 are automatically turned on.
When you switch from one set of PICs to another set of PICs using the `set chassis fpc <slot> pic <pic> power off` command again, ensure that there is 60 seconds duration between the two actions, otherwise core files are seen during the configuration. The Table 27 on page 388 summarizes the SRX5K-MPC3-40G10G (IOC3) PICs selected for various configuration scenarios.

Table 27: SRX5K-MPC3-40G10G (IOC3) PIC Selection Summary

<table>
<thead>
<tr>
<th>CLI Configuration</th>
<th>PIC Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default (i.e. no CLI configuration)</td>
<td>Online: PIC-0, PIC-1</td>
</tr>
<tr>
<td></td>
<td>Offline: PIC-2, PIC-3</td>
</tr>
<tr>
<td>PIC-1, PIC-2 and PIC-3 powered OFF</td>
<td>Online: PIC-0</td>
</tr>
<tr>
<td></td>
<td>Offline: PIC-1, PIC-2, PIC-3</td>
</tr>
<tr>
<td>PIC-0, PIC-2 and PIC-3 powered OFF</td>
<td>Online: PIC-1</td>
</tr>
<tr>
<td></td>
<td>Offline: PIC-0, PIC-2, PIC-3</td>
</tr>
<tr>
<td>PIC-0, PIC-1 and PIC-3 powered OFF</td>
<td>Online: PIC-2</td>
</tr>
<tr>
<td></td>
<td>Offline: PIC-0, PIC-1, PIC-3</td>
</tr>
<tr>
<td>PIC-0, PIC-1 and PIC-2 powered OFF</td>
<td>Online: PIC-3</td>
</tr>
<tr>
<td></td>
<td>Offline: PIC-0, PIC-1, PIC-2</td>
</tr>
</tbody>
</table>
Table 27: SRX5K-MPC3-40G10G (IOC3) PIC Selection Summary (continued)

<table>
<thead>
<tr>
<th>CLI Configuration</th>
<th>PIC Selection</th>
</tr>
</thead>
</table>
| PIC-2 and PIC-3 powered OFF | Online: PIC-0, PIC-1  
Offline: PIC-2, PIC-3 |
| PIC-2 and PIC-3 powered OFF | Online: PIC-0, PIC-1  
Offline: PIC-2, PIC-3 |
| PIC-1 and PIC-2 powered OFF | Online: PIC-0, PIC-3  
Offline: PIC-1, PIC-2 |
| PIC-0 and PIC-3 powered OFF | Online: PIC-2, PIC-1  
Offline: PIC-0, PIC-3 |
| PIC-0 and PIC-1 powered OFF | Online: PIC-2, PIC-3  
Offline: PIC-0, PIC-1 |

All other combinations of PICs being powered OFF (Invalid)  
Online: PIC-0, PIC-1  
Offline: PIC-2, PIC-3  
Default PICs will be selected for the invalid combinations. Also, a system log message will be displayed to indicate the invalid combination PIC selection.

Description: Display status information about the installed Flexible PIC Concentrators (FPCs) and PICs.

Options:
- none—Display status information for all FPCs.
- detail—(Optional) Display detailed FPC status information.
- fpc-slot —(Optional) Display information about the FPC in this slot.
- node—(Optional) For chassis cluster configurations, display status information for all FPCs or for the specified FPC on a specific node (device) in the cluster.
  - node-id —Identification number of the node. It can be 0 or 1.
  - local—Display information about the local node.
  - primary—Display information about the primary node.
• **pic-status**—(Optional) Display status information for all FPCs or for the FPC in the specified slot (see *fpc-slot*).

**Required Privilege Level**

view

**Related Documentation**

- Understanding Interfaces

**List of Sample Output**

- show chassis fpc on page 391
- show chassis fpc (SRX5600 and SRX5800 devices) on page 391
- show chassis fpc (SRX5400, SRX5600, and SRX5800 devices with SRX5K-MPC3-100G10G (IOC3) or SRX5K-MPC3-40G10G (IOC3) on page 392
- show chassis fpc detail 2 on page 392
- show chassis fpc pic-status (SRX5600 and SRX5800 devices) on page 392
- show chassis fpc pic-status (SRX5600 and SRX5800 devices with SPC2) on page 392
- show chassis fpc pic-status (SRX5600 and SRX5800 devices with SRX5K-MPC) on page 393
- show chassis fpc pic-status (SRX5600 and SRX5800 devices when Express Path [formerly known as services offloading] is configured) on page 393
- show chassis fpc pic-status (with 20-Gigabit Ethernet MIC with SFP) on page 394
- show chassis fpc pic-status(SRX5400, SRX5600, and SRX5800 devices with SRX5K-MPC3-100G10G (IOC3) or SRX5K-MPC3-40G10G (IOC3 and when Express Path [formerly known as services offloading] is configured) on page 394
- show chassis fpc pic-status for HA (SRX5600 and SRX5800 devices) on page 395
- show chassis fpc pic-status for HA(SRX5400, SRX5600, and SRX5800 devices with SRX5K-MPC3-100G10G (IOC3) or SRX5K-MPC3-40G10G (IOC3) on page 395

**Output Fields**

Table 28 on page 390 lists the output fields for the show chassis fpc command. Output fields are listed in the approximate order in which they appear.

**Table 28: show chassis fpc Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Slot or Slot State</strong></td>
<td>Slot number and state. The state can be one of the following conditions:</td>
</tr>
<tr>
<td></td>
<td>- <strong>Dead</strong>—Held in reset because of errors.</td>
</tr>
<tr>
<td></td>
<td>- <strong>Diag</strong>—Slot is being ignored while the device is running diagnostics.</td>
</tr>
<tr>
<td></td>
<td>- <strong>Dormant</strong>—Held in reset.</td>
</tr>
<tr>
<td></td>
<td>- <strong>Empty</strong>—No FPC is present.</td>
</tr>
<tr>
<td></td>
<td>- <strong>Online</strong>—FPC is online and running.</td>
</tr>
<tr>
<td></td>
<td>- <strong>Present</strong>—FPC is detected by the device, but is either not supported by the current version of Junos OS or inserted in the wrong slot. The output also states either Hardware Not Supported or Hardware Not In Right Slot. FPC is coming up but not yet online.</td>
</tr>
<tr>
<td></td>
<td>- <strong>Probed</strong>—Probe is complete; awaiting restart of the Packet Forwarding Engine (PFE).</td>
</tr>
<tr>
<td></td>
<td>- <strong>Probe-wait</strong>—Waiting to be probed.</td>
</tr>
<tr>
<td><strong>Temp (C) or Temperature</strong></td>
<td>Temperature of the air passing by the FPC, in degrees Celsius or in both Celsius and Fahrenheit.</td>
</tr>
</tbody>
</table>
Table 28: show chassis fpc Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total CPU Utilization (%)</td>
<td>Total percentage of CPU being used by the FPC’s processor.</td>
</tr>
<tr>
<td>Interrupt CPU Utilization (%)</td>
<td>Of the total CPU being used by the FPC’s processor, the percentage being used for interrupts.</td>
</tr>
<tr>
<td>Memory DRAM (MB)</td>
<td>Total DRAM, in megabytes, available to the FPC’s processor.</td>
</tr>
<tr>
<td>Heap Utilization (%)</td>
<td>Percentage of heap space (dynamic memory) being used by the FPC’s processor. If this number exceeds 80 percent, there may be a software problem (memory leak).</td>
</tr>
<tr>
<td>Buffer Utilization (%)</td>
<td>Percentage of buffer space being used by the FPC’s processor for buffering internal messages.</td>
</tr>
<tr>
<td>Start Time</td>
<td>Time when the Routing Engine detected that the FPC was running.</td>
</tr>
<tr>
<td>Uptime</td>
<td>How long the Routing Engine has been connected to the FPC and, therefore, how long the FPC has been up and running.</td>
</tr>
<tr>
<td>PIC type</td>
<td><em>(pic-status output only)</em> Type of FPC.</td>
</tr>
</tbody>
</table>

Sample Output

show chassis fpc

```
user@host> show chassis fpc

<table>
<thead>
<tr>
<th>Slot</th>
<th>State</th>
<th>Temp (°C)</th>
<th>CPU Utilization (%)</th>
<th>Memory DRAM (MB)</th>
<th>Heap Utilization (%)</th>
<th>Buffer Utilization (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Online</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Online</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Online</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

show chassis fpc (SRX5600 and SRX5800 devices)

```
user@host> show chassis fpc

<table>
<thead>
<tr>
<th>Slot</th>
<th>State</th>
<th>Temp (°C)</th>
<th>CPU Utilization (%)</th>
<th>Memory DRAM (MB)</th>
<th>Heap Utilization (%)</th>
<th>Buffer Utilization (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Empty</td>
<td>37</td>
<td>3</td>
<td>1024</td>
<td>7</td>
<td>42</td>
</tr>
<tr>
<td>1</td>
<td>Empty</td>
<td>30</td>
<td>8</td>
<td>1024</td>
<td>23</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>Empty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Empty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Empty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Empty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Empty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Empty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Empty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Empty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Empty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Empty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```
show chassis fpc
(SRX5400, SRX5600, and SRX5800 devices with SRX5K-MPC3-100G10G (IOC3) or SRX5K-MPC3-40G10G (IOC3))

```
user@host> show chassis fpc

<table>
<thead>
<tr>
<th>Slot</th>
<th>State</th>
<th>Temp (°C)</th>
<th>CPU Utilization (%)</th>
<th>Memory DRAM (MB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Online</td>
<td>36</td>
<td>20</td>
<td>1024</td>
</tr>
<tr>
<td>1</td>
<td>Online</td>
<td>35</td>
<td>8</td>
<td>2048</td>
</tr>
<tr>
<td>2</td>
<td>Online</td>
<td>40</td>
<td>21</td>
<td>3584</td>
</tr>
</tbody>
</table>

Sample Output

show chassis fpc detail 2

```

```
user@host> show chassis fpc detail 2

Slot 2 information:

<table>
<thead>
<tr>
<th>State</th>
<th>Online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temp</td>
<td>37</td>
</tr>
<tr>
<td>Total CPU DRAM</td>
<td>1024 MB</td>
</tr>
<tr>
<td>Total RLDRAM</td>
<td>0 MB</td>
</tr>
<tr>
<td>Total DDR DRAM</td>
<td>0 MB</td>
</tr>
<tr>
<td>Start time:</td>
<td>2012-07-18 07:18:50 PDT</td>
</tr>
<tr>
<td>Uptime:</td>
<td>4 days, 21 hours, 51 minutes, 59 seconds</td>
</tr>
</tbody>
</table>

Sample Output

show chassis fpc pic-status (SRX5600 and SRX5800 devices)

```

```
user@host> show chassis fpc pic-status

Slot 3 Online SRX5k SPC
PIC 0 Online SPU Cp
PIC 1 Online SPU Flow
Slot 6 Online SRX5k DPC 4x 10GE
PIC 0 Online 1x 10GE(LAN/WAN) RichQ
PIC 1 Online 1x 10GE(LAN/WAN) RichQ
PIC 2 Online 1x 10GE(LAN/WAN) RichQ
PIC 3 Online 1x 10GE(LAN/WAN) RichQ

show chassis fpc pic-status (SRX5600 and SRX5800 devices with SPC2)

```

```
user@host> show chassis fpc pic-status

```
show chassis fpc pic-status (SRX5600 and SRX5800 devices with SRX5K-MPC)

user@host> show chassis fpc pic-status

Slot 0   Online       SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 1   Online       SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 2   Online       SRX5k DPC 4X 10GE
PIC 0   Online       1x 10GE(LAN/WAN) RichQ
PIC 1   Online       1x 10GE(LAN/WAN) RichQ
PIC 2   Online       1x 10GE(LAN/WAN) RichQ
PIC 3   Online       1x 10GE(LAN/WAN) RichQ

Slot 3   Online       SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 4   Offline      SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 5   Online       SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 6   Offline      SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 7   Online       SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 8   Online       SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 9   Online       SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 10  Online       SRX5k IOC II
PIC 0   Online       10x 10GE SFP+
PIC 2   Online       1x 100GE CFP

Slot 11  Online       SRX5k IOC II
PIC 0   Online       1x 100GE CFP
PIC 2   Online       2x 40GE QSFP+

show chassis fpc pic-status (SRX5600 and SRX5800 devices when Express Path [formerly known as services offloading] is configured)

user@host> show chassis fpc pic-status

Slot 0   Online       SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 1   Online       SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 2   Online       SRX5k DPC 4X 10GE
PIC 0   Online       1x 10GE(LAN/WAN) RichQ
PIC 1   Online       1x 10GE(LAN/WAN) RichQ
PIC 2   Online       1x 10GE(LAN/WAN) RichQ
PIC 3   Online       1x 10GE(LAN/WAN) RichQ

Slot 3   Online       SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 4   Offline      SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 5   Online       SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 6   Offline      SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 7   Online       SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 8   Online       SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 9   Online       SRX5k SPC II
PIC 0   Online       SPU Flow
PIC 1   Online       SPU Flow
PIC 2   Online       SPU Flow
PIC 3   Online       SPU Flow

Slot 10  Online       SRX5k IOC II
PIC 0   Online       10x 10GE SFP+
PIC 2   Online       1x 100GE CFP

Slot 11  Online       SRX5k IOC II
PIC 0   Online       1x 100GE CFP
PIC 2   Online       2x 40GE QSFP+
<table>
<thead>
<tr>
<th>Slot 0</th>
<th>Offline</th>
<th>SRX5k DPC 40x 1GE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot 1</td>
<td>Online</td>
<td>SRX5k SPC II</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPU Cp</td>
</tr>
<tr>
<td>PIC 1</td>
<td>Online</td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 2</td>
<td>Online</td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 3</td>
<td>Online</td>
<td>SPU Flow</td>
</tr>
<tr>
<td>Slot 2</td>
<td>Offline</td>
<td>SRX5k SPC</td>
</tr>
<tr>
<td>Slot 4</td>
<td>Online</td>
<td>SRX5k IOC3 24XGE+6XLG</td>
</tr>
<tr>
<td>PIC 2</td>
<td>Online</td>
<td>3x 40GE QSFP++ np-cache/services-offload</td>
</tr>
<tr>
<td>PIC 3</td>
<td>Online</td>
<td>3x 40GE QSFP++ np-cache/services-offload</td>
</tr>
<tr>
<td>Slot 5</td>
<td>Online</td>
<td>SRX5k IOC II</td>
</tr>
<tr>
<td>PIC 0</td>
<td>Online</td>
<td>10x 1GE(LAN) SFP- np-cache/services-offload</td>
</tr>
<tr>
<td>PIC 1</td>
<td>Online</td>
<td>10x 1GE(LAN) SFP- np-cache/services-offload</td>
</tr>
<tr>
<td>PIC 2</td>
<td>Online</td>
<td>10x 10GE SFP++ np-cache/services-offload</td>
</tr>
</tbody>
</table>

**show chassis fpc pic-status (with 20-Gigabit Ethernet MIC with SFP)**

```
user@host> show chassis fpc pic-status
```

```
node0:
-------------------------------------------------------------------------
Slot 0 Online | SRX5k SPC II
PIC 0 Online  | SPU Cp
PIC 1 Online  | SPU Flow
PIC 2 Online  | SPU Flow
PIC 3 Online  | SPU Flow
Slot 1 Offline| SRX5k SPC II
Slot 2 Online  | SRX5k DPC 4X 10GE
PIC 0 Online  | 1x 10GE(LAN/WAN) RichQ
PIC 1 Online  | 1x 10GE(LAN/WAN) RichQ
PIC 2 Online  | 1x 10GE(LAN/WAN) RichQ
PIC 3 Online  | 1x 10GE(LAN/WAN) RichQ
Slot 9 Online  | SRX5k IOC II
PIC 0 Online  | 10x 1GE(LAN) SFP
PIC 1 Online  | 10x 1GE(LAN) SFP
PIC 2 Online  | 10x 1GE(LAN) SFP
PIC 3 Online  | 10x 1GE(LAN) SFP
Slot 10 Online| SRX5k IOC II
PIC 0 Online  | 10x 10GE SFP+
PIC 2 Online  | 1x 100GE CFP
Slot 11 Offline| SRX5k IOC II
```

**show chassis fpc pic-status**
(SRX5400, SRX5600, and SRX5800 devices with SRX5K-MPC3-100G10G (IOC3) or SRX5K-MPC3-40G10G (IOC3 and when Express Path [formerly known as services offloading] is configured)

```
user@host> show chassis fpc pic-status
```

```
Slot 0 Offline | SRX5k DPC 40x 1GE
Slot 1 Online  | SRX5k SPC II
PIC 0 Online  | SPU Cp
PIC 1 Online  | SPU Flow
PIC 2 Online  | SPU Flow
PIC 3 Online  | SPU Flow
Slot 2 Offline | SRX5k SPC
Slot 4 Online  | SRX5k IOC3 24XGE+6XLG
PIC 2 Online  | 3x 40GE QSFP++ np-cache/services-offload
```
### Sample Output

**show chassis fpc pic-status for HA (SRX5600 and SRX5800 devices)**

```bash
user@host> show chassis fpc pic-status

node0:
-------------------------------------------------------------------------------------
Slot 4   Online       SRX5k DPC 40x 1GE
PIC 0  Online       10x 1GE RichQ
PIC 1  Online       10x 1GE RichQ
PIC 2  Online       10x 1GE RichQ
PIC 3  Online       10x 1GE RichQ
Slot 5   Online       SRX5k SPC
PIC 0  Online       SPU Cp-Flow
PIC 1  Online       SPU Flow

node1:
-------------------------------------------------------------------------------------
Slot 4   Online       SRX5k DPC 40x 1GE
PIC 0  Online       10x 1GE RichQ
PIC 1  Online       10x 1GE RichQ
PIC 2  Online       10x 1GE RichQ
PIC 3  Online       10x 1GE RichQ
```

**show chassis fpc pic-status for HA (SRX5400, SRX5600, and SRX5800 devices with SRX5K-MPC3-100G10G (IOC3) or SRX5K-MPC3-40G10G (IOC3))**

```bash
user@host> show chassis fpc pic-status

node0:
-------------------------------------------------------------------------------------
Slot 2   Online       SRX5k IOC3 24XGE+6XLG
PIC 0  Online       12x 10GE SFP+
PIC 1  Online       12x 10GE SFP+
PIC 2  Offline      3x 40GE QSFP+
PIC 3  Offline      3x 40GE QSFP+
Slot 4   Online       SRX5k IOC II
PIC 0  Online       10x 10GE SFP+
PIC 1  Online       10x 10GE SFP+
PIC 2  Offline      3x 40GE QSFP+
PIC 3  Offline

node1:
-------------------------------------------------------------------------------------
```
<table>
<thead>
<tr>
<th>Slot</th>
<th>Online</th>
<th>PIC 0 Online</th>
<th>PIC 1 Online</th>
<th>PIC 2 Offline</th>
<th>PIC 3 Offline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot 2 Online</td>
<td>SRX5k IOC3 24XGE+6XLG</td>
<td>12x 10GE SFP+</td>
<td>12x 10GE SFP+</td>
<td>3x 40GE QSFP+</td>
<td>3x 40GE QSFP+</td>
</tr>
<tr>
<td>Slot 4 Online</td>
<td>SRX5k IOC II</td>
<td>10x 10GE SFP+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slot 5 Online</td>
<td>SRX5k SPC II</td>
<td>SPU Cp</td>
<td>SPU Flow</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
show chassis fpc errors

Syntax

```
show chassis fpc errors;
```

Release Information

Command introduced in Junos OS Release 15.1X49-D40.

Description

Display chassis error information including FPC number, severity of error, number of error occurred, cleared, threshold, and corresponding action.

<table>
<thead>
<tr>
<th>Error Severity Level</th>
<th>Default Threshold</th>
<th>Default Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatal</td>
<td>1</td>
<td>Get the current state and reset the FPC.</td>
</tr>
<tr>
<td>Major</td>
<td>1</td>
<td>Get the current state of the FPC and raise an alarm.</td>
</tr>
<tr>
<td>Minor</td>
<td>10</td>
<td>Write a log for the event.</td>
</tr>
</tbody>
</table>

Required Privilege Level

view

Related Documentation

- fpc error on page 275

List of Sample Output

show chassis fpc errors on page 398

Output Fields

Table 29 on page 397 lists the output fields for the `show chassis fpc errors` command. Output fields are listed in the approximate order in which they appear.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPC</td>
<td>The FPC number.</td>
</tr>
<tr>
<td>Level</td>
<td>The severity of the error. It can be configured as follows:</td>
</tr>
<tr>
<td></td>
<td>• fatal—Fatal error on the FPC.</td>
</tr>
<tr>
<td></td>
<td>• major—Major error on the FPC.</td>
</tr>
<tr>
<td></td>
<td>• minor—Minor error on the FPC.</td>
</tr>
<tr>
<td>Occurred</td>
<td>Number of error instances that have occurred.</td>
</tr>
<tr>
<td>Cleared</td>
<td>Number of error instances that have been cleared.</td>
</tr>
<tr>
<td>Threshold</td>
<td>Configured threshold value. The associated detection and recovery actions are triggered when this threshold value is exceeded.</td>
</tr>
</tbody>
</table>
### Table 29: show chassis fpc errors Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action</strong></td>
<td>The detection and recovery actions that are triggered when the threshold value is exceeded.</td>
</tr>
<tr>
<td>• Restart the FPC.</td>
<td></td>
</tr>
<tr>
<td>• Get the current state of the FPC and raise an alarm.</td>
<td></td>
</tr>
<tr>
<td>• Write a log for the event.</td>
<td></td>
</tr>
</tbody>
</table>

### Sample Output

```bash
show chassis fpc errors
```

```
user@host> show chassis fpc errors

<table>
<thead>
<tr>
<th>FPC</th>
<th>Level</th>
<th>Occurred</th>
<th>Cleared</th>
<th>Threshold</th>
<th>Action-Taken Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Minor</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>LOG</td>
</tr>
<tr>
<td></td>
<td>Major</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>GET STATE</td>
</tr>
<tr>
<td></td>
<td>Fatal</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>RESET</td>
</tr>
<tr>
<td></td>
<td>Pfe-State: pfe-0 -ENABLED</td>
<td>pfe-1 -ENABLED</td>
<td>pfe-2 -ENABLED</td>
<td>pfe-3 -ENABLED</td>
<td>pfe-4 -ENABLED</td>
</tr>
<tr>
<td>1</td>
<td>Minor</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>LOG</td>
</tr>
<tr>
<td></td>
<td>Major</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>GET STATE</td>
</tr>
<tr>
<td></td>
<td>Fatal</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>RESET</td>
</tr>
<tr>
<td></td>
<td>Pfe-State: pfe-0 -ENABLED</td>
<td>pfe-1 -ENABLED</td>
<td>pfe-2 -ENABLED</td>
<td>pfe-3 -ENABLED</td>
<td>pfe-4 -ENABLED</td>
</tr>
<tr>
<td>2</td>
<td>Minor</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>LOG</td>
</tr>
<tr>
<td></td>
<td>Major</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>GET STATE</td>
</tr>
<tr>
<td></td>
<td>Fatal</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>RESET</td>
</tr>
<tr>
<td></td>
<td>Pfe-State: pfe-0 -ENABLED</td>
<td>pfe-1 -ENABLED</td>
<td>pfe-2 -ENABLED</td>
<td>pfe-3 -ENABLED</td>
<td>pfe-4 -ENABLED</td>
</tr>
<tr>
<td>3</td>
<td>Minor</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>LOG</td>
</tr>
<tr>
<td></td>
<td>Major</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>GET STATE</td>
</tr>
<tr>
<td></td>
<td>Fatal</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>RESET</td>
</tr>
<tr>
<td></td>
<td>Pfe-State: pfe-0 -ENABLED</td>
<td>pfe-1 -ENABLED</td>
<td>pfe-2 -ENABLED</td>
<td>pfe-3 -ENABLED</td>
<td>pfe-4 -ENABLED</td>
</tr>
</tbody>
</table>
```

**Pfe-State: pfe-0 -ENABLED | pfe-1 -ENABLED | pfe-2 -ENABLED | pfe-3 -ENABLED | pfe-4 -ENABLED | pfe-5 -ENABLED | pfe-6 -ENABLED | pfe-7 -ENABLED**
show chassis hardware (View)

Syntax

show chassis hardware
<cli-models | detail | extensive | models | node (node-id | all | local | primary)>

Release Information
Command introduced in Junos OS Release 9.2. Command modified in Junos OS Release 9.2 to include node option.

Description
Display chassis hardware information.

Options

- **cli-models**—(Optional) Display Common Language Equipment Identifier Code (CLEI) barcode and model number for orderable field-replaceable units (FRUs).
- **detail** | **extensive**—(Optional) Display the specified level of output.
- **models**—(Optional) Display model numbers and part numbers for orderable FRUs.
- **node**—(Optional) For chassis cluster configurations, display chassis hardware information on a specific node (device) in the cluster.
  - **node-id**—Identification number of the node. It can be 0 or 1.
  - **local**—Display information about the local node.
  - **primary**—Display information about the primary node.

Required Privilege Level
view

Related Documentation
- Understanding Traffic Processing on Security Devices on page 25
- Interface Naming Conventions

Output Fields
Table 30 on page 399 lists the output fields for the show chassis hardware command. Output fields are listed in the approximate order in which they appear.

Table 30: show chassis hardware Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>Chassis component—Information about the backplane; power supplies; fan trays; Routing Engine; each Physical Interface Module (PIM)—reported as FPC and PIC—and each fan, blower, and impeller.</td>
</tr>
<tr>
<td>Version</td>
<td>Revision level of the chassis component.</td>
</tr>
<tr>
<td>Part Number</td>
<td>Part number for the chassis component.</td>
</tr>
</tbody>
</table>
### Table 30: show chassis hardware Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Serial Number</strong></td>
<td>Serial number of the chassis component. The serial number of the backplane is also the serial number of the device chassis. Use this serial number when you need to contact Juniper Networks Customer Support about the device chassis.</td>
</tr>
<tr>
<td><strong>Assb ID or Assembly ID</strong></td>
<td>Identification number that describes the FRU hardware.</td>
</tr>
<tr>
<td><strong>FRU model number</strong></td>
<td>Model number of FRU hardware component.</td>
</tr>
<tr>
<td><strong>CLEI code</strong></td>
<td>Common Language Equipment Identifier code. This value is displayed only for hardware components that use ID EEPROM format v2. This value is not displayed for components that use ID EEPROM format v1.</td>
</tr>
<tr>
<td><strong>EEPROM Version</strong></td>
<td>ID EEPROM version used by hardware component: 0x01 (version 1) or 0x02 (version 2).</td>
</tr>
</tbody>
</table>
Table 30: show chassis hardware Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td></td>
</tr>
</tbody>
</table>
Table 30: show chassis hardware Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Brief description of the hardware item:</td>
</tr>
<tr>
<td></td>
<td>• Type of power supply.</td>
</tr>
<tr>
<td></td>
<td>• Switch Control Board (SCB)</td>
</tr>
<tr>
<td></td>
<td>Starting with Junos OS Release 12.1X47-D15 and Junos OS Release 17.3R1, the SRX5K-SCBE (SCB2) is introduced.</td>
</tr>
<tr>
<td></td>
<td>• There are three SCB slots in SRX5800 devices. The third slot can be used for an SCB or an FPC. When an SRX5K-SCB was used, the third SCB slot was used as an FPC. SCB redundancy is provided in chassis cluster mode.</td>
</tr>
<tr>
<td></td>
<td>• With an SCB2, a third SCB is supported. If a third SCB is plugged in, it provides intra-chassis fabric redundancy.</td>
</tr>
<tr>
<td></td>
<td>• The Ethernet switch in the SCB2 provides the Ethernet connectivity among all the FPCs and the Routing Engine. The Routing Engine uses this connectivity to distribute forwarding and routing tables to the FPCs. The FPCs use this connectivity to send exception packets to the Routing Engine.</td>
</tr>
<tr>
<td></td>
<td>• Fabric connects all FPCs in the data plane. The Fabric Manager executes on the Routing Engine and controls the fabric system in the chassis. Packet Forwarding Engines on the FPC and fabric planes on the SCB are connected through HSL2 channels.</td>
</tr>
<tr>
<td></td>
<td>• SCB2 supports HSL2 with both 3.11 Gbps and 6.22 Gbps (SerDes) link speed and various HSL2 modes. When an FPC is brought online, the link speed and HSL2 mode are determined by the type of FPC.</td>
</tr>
<tr>
<td></td>
<td>Starting with Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1, the SRX5K-SCB3 (SCB3) with enhanced midplane is introduced.</td>
</tr>
<tr>
<td></td>
<td>• All existing SCB software that is supported by SCB2 is supported on SCB3.</td>
</tr>
<tr>
<td></td>
<td>• SRX5K-RE-1800X4 mixed Routing Engine use is not supported.</td>
</tr>
<tr>
<td></td>
<td>• SCB3 works with the SRX5K-MPC (IOC2), SRX5K-MPC3-100G10G (IOC3), SRX5K-MPC3-40G10G (IOC3), and SRX5K-SPC-4-15-320 (SPC2) with current midplanes and the new enhanced midplanes.</td>
</tr>
<tr>
<td></td>
<td>• Mixed SCB use is not supported. If an SCB2 and an SCB3 are used, the system will only power on the master Routing Engine's SCB and will power off the other SCBs. Only the SCB in slot 0 is powered on and a system log is generated.</td>
</tr>
<tr>
<td></td>
<td>• SCB3 supports up to 400 Gbps per slot with old midplanes and up to 500 Gbps per slot with new midplanes.</td>
</tr>
<tr>
<td></td>
<td>• SCB3 supports fabric intra-chassis redundancy.</td>
</tr>
<tr>
<td></td>
<td>• SCB3 supports the same chassis cluster function as the SRX5K-SCB (SCB1) and the SRX5K-SCBE (SCB2), except for in-service software upgrade (ISSU) and in-service hardware upgrade (ISHU).</td>
</tr>
<tr>
<td></td>
<td>• SCB3 has a second external Ethernet port.</td>
</tr>
<tr>
<td></td>
<td>• Fabric bandwidth increasing mode is not supported.</td>
</tr>
<tr>
<td></td>
<td>Starting in Junos OS 19.3R1, SRX5K-SCB4 is supported on SRX5600 and SRX5800 devices along with SRX5K-SPC3.</td>
</tr>
<tr>
<td>SRX5K-SCB4:</td>
<td>• Interoperate with SRX5K-RE3-128G, SRX5K-RE-1800X4, IOC2, IOC3, IOC4, SPC2, and SPC3. SCB4 is compatible with all midplanes and interoperate with existing PEMs, fan trays, and front panel displays.</td>
</tr>
<tr>
<td></td>
<td>• Does not interoperate with SCB, SCB2, and SCB3.</td>
</tr>
<tr>
<td></td>
<td>• Supports 480-Gbps link speed per slot.</td>
</tr>
</tbody>
</table>
Table 30: `show chassis hardware` Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>•</td>
<td>Supports 1-Gigabit Ethernet interfaces speed with SRX5K-RE-1800X4 and 1-Gigabit, 2.5-Gigabit, and 10-Gigabit Ethernet speeds with SRX5K-RE3-128G.</td>
</tr>
<tr>
<td>•</td>
<td>Support ISHU and ISSU in chassis cluster.</td>
</tr>
<tr>
<td>•</td>
<td>Supports fabric bandwidth mode and redundant fabric mode on SRX5600 and SRX5800 devices. The bandwidth mode is the new default mode which is necessary to configure redundant mode in setting up the chassis cluster successfully.</td>
</tr>
</tbody>
</table>
Table 30: show chassis hardware Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Type of Flexible PIC Concentrator (FPC), Physical Interface Card (PIC), Modular Interface Cards (MICs), and PIMs.</td>
<td></td>
</tr>
<tr>
<td>• IOCs</td>
<td></td>
</tr>
<tr>
<td>Starting with Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1, the SRX5K-MPC3-100G10G (IOC3) and the SRX5K-MPC3-40G10G (IOC3) are introduced.</td>
<td></td>
</tr>
<tr>
<td>• IOC3 has two types of IOC3 MPCs, which have different built-in MICs: the 24x10GE + 6x40GE MPC and the 2x100GE + 4x10GE MPC.</td>
<td></td>
</tr>
<tr>
<td>• IOC3 supports SCB3 and SRX5000 line backplane and enhanced backplane.</td>
<td></td>
</tr>
<tr>
<td>• IOC3 can only work with SRX5000 line SCB2 and SCB3. If an SRX5000 line SCB is detected, IOC3 is offline, an FPC misconfiguration alarm is raised, and a system log message is generated.</td>
<td></td>
</tr>
<tr>
<td>• IOC3 interoperates with SCB2 and SCB3.</td>
<td></td>
</tr>
<tr>
<td>• IOC3 interoperates with the SRX5K-SPC-4-15-320 (SPC2) and the SRX5K-MPC (IOC2).</td>
<td></td>
</tr>
<tr>
<td>• The maximum power consumption for one IOC3 is 645W. An enhanced power module must be used.</td>
<td></td>
</tr>
<tr>
<td>• The IOC3 does not support the following command to set a PIC to go offline or online:</td>
<td></td>
</tr>
<tr>
<td>request chassis pic fpc-slot &lt;fpc-slot&gt; pic-slot &lt;pic-slot&gt; &lt;offline</td>
<td>online&gt; .</td>
</tr>
<tr>
<td>• IOC3 supports 240 Gbps of throughput with the enhanced SRX5000 line backplane.</td>
<td></td>
</tr>
<tr>
<td>• Chassis cluster functions the same as for the SRX5000 line IOC2.</td>
<td></td>
</tr>
<tr>
<td>• IOC3 supports intra-chassis and inter-chassis fabric redundancy mode.</td>
<td></td>
</tr>
<tr>
<td>• IOC3 supports ISSU and ISHU in chassis cluster mode.</td>
<td></td>
</tr>
<tr>
<td>• IOC3 supports intra-FPC and and Inter-FPC Express Path (previously known as services offloading) with IPv4.</td>
<td></td>
</tr>
<tr>
<td>• NAT of IPv4 and IPv6 in normal mode and IPv4 for Express Path mode.</td>
<td></td>
</tr>
<tr>
<td>• All four PICs on the 24x10GE + 6x40GE cannot be powered on. A maximum of two PICs can be powered on at the same time.</td>
<td></td>
</tr>
<tr>
<td>Use the set chassis fpc &lt;slot&gt; pic &lt;pic&gt; power off command to choose the PICs you want to power on.</td>
<td></td>
</tr>
<tr>
<td>• Fabric bandwidth increasing mode is not supported on IOC3.</td>
<td></td>
</tr>
<tr>
<td>• SRX Clustering Module (SCM)</td>
<td></td>
</tr>
<tr>
<td>• Fan tray</td>
<td></td>
</tr>
<tr>
<td>Starting in Junos OS Release 19.3R1, the SRX5K-IOC4-10G and SRX5K-IOC4-MRAT line cards are supported along with SRX5K-SPC3 on the SRX5000 series devices.</td>
<td></td>
</tr>
<tr>
<td>SRX5K-IOC4-10G:</td>
<td></td>
</tr>
<tr>
<td>• Supports 480-Gbps speed.</td>
<td></td>
</tr>
<tr>
<td>• Supports 40X10GE Interfaces with SCB3.</td>
<td></td>
</tr>
<tr>
<td>• 40 10-Gigabit Ethernet port provides 10-Gigabit Ethernet MACsec support.</td>
<td></td>
</tr>
<tr>
<td>• Supports reth and aggregated interfaces on the chassis cluster.</td>
<td></td>
</tr>
<tr>
<td>• Supports ISSU and logical system on the chassis cluster.</td>
<td></td>
</tr>
<tr>
<td>• Does not support SCB2.</td>
<td></td>
</tr>
<tr>
<td>• SRX5K-IOC4-MRAT with SCB3 supports 10-Gigabit, 40-Gigabit, and 100-Gigabit Ethernet Interfaces.</td>
<td></td>
</tr>
</tbody>
</table>
Table 30: show chassis hardware Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>• For hosts, the Routing Engine type. Starting with Junos OS Release 12.1X47-D15 and Junos OS Release 17.3R1, the SRX5K-RE-1800X4 Routing Engine is introduced.</td>
<td></td>
</tr>
<tr>
<td>• The SRX5K-RE-1800X4 has an Intel Quad core Xeon processor, 16 GB of DRAM, and a 128-GB solid-state drive (SSD). The number 1800 refers to the speed of the processor (1.8 GHz). The maximum required power for this Routing Engine is 90W.</td>
<td></td>
</tr>
<tr>
<td>NOTE: The SRX5K-RE-1800X4 provides significantly better performance than the previously used Routing Engine, even with a single core.</td>
<td></td>
</tr>
<tr>
<td>Starting in Junos OS Release 19.3R1, SRX5K-RE3-128G Routing Engine is supported along with SRX5K-SPC3 on the SRX5000 series devices.</td>
<td></td>
</tr>
<tr>
<td>SRX5K-RE3-128G:</td>
<td></td>
</tr>
<tr>
<td>• Provides improved control plane performance and scalability. SRX5K-RE3-128G has Intel's Haswell-EP based processor with six cores.</td>
<td></td>
</tr>
<tr>
<td>• Supports two 200G SSDs to store log files and 128-GB of memory for storing routing and forwarding tables and for other routing engines.</td>
<td></td>
</tr>
<tr>
<td>• Interoperates with SCB3, SCB4, SRX5K-RE3-128G, SPC2, SPC3, IOC2, IOC3, and IOC4.</td>
<td></td>
</tr>
<tr>
<td>• Does not support SCB2 and SRX5K-RE-1800X4.</td>
<td></td>
</tr>
</tbody>
</table>

show chassis hardware

show chassis hardware (SRX5800)

user@host> show chassis hardware

node0:

Hardware inventory:

<table>
<thead>
<tr>
<th>Item</th>
<th>Version</th>
<th>Part number</th>
<th>Serial number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis</td>
<td>REV 42</td>
<td>760-063937</td>
<td>JN1267B0FAGA</td>
<td>SRX5800 Backplane</td>
</tr>
<tr>
<td>Midplane</td>
<td>REV 42</td>
<td>760-062722</td>
<td>CAHE4860</td>
<td>Front Panel Display</td>
</tr>
<tr>
<td>FPM Board</td>
<td>REV 05</td>
<td>760-063049</td>
<td>QCS2209509D</td>
<td>Power Distribution Module</td>
</tr>
<tr>
<td>PDM</td>
<td>Rev 01</td>
<td>740-034724</td>
<td>QCS171002016</td>
<td>PS 4.1kW; 200–240V AC in</td>
</tr>
<tr>
<td>PEM 0</td>
<td>Rev 04</td>
<td>740-037760</td>
<td>QCS1825N07S</td>
<td>PS 4.1kW; 200–240V AC in</td>
</tr>
<tr>
<td>PEM 1</td>
<td>Rev 11</td>
<td>740-037760</td>
<td>QCS1825N07S</td>
<td>PS 4.1kW; 200–240V AC in</td>
</tr>
<tr>
<td>Routing Engine 0</td>
<td>REV 01</td>
<td>750-095568</td>
<td>CALK8884</td>
<td>SRX5k RE–2000x6</td>
</tr>
<tr>
<td>Routing Engine 1</td>
<td>REV 01</td>
<td>750-095568</td>
<td>CADZ9076</td>
<td>SRX5k RE–2000x6</td>
</tr>
<tr>
<td>CB 0</td>
<td>REV 26</td>
<td>750-031391</td>
<td>CALV3002</td>
<td>SRX5k SCB4</td>
</tr>
<tr>
<td>CB 1</td>
<td>REV 26</td>
<td>750-031391</td>
<td>CALV3009</td>
<td>SRX5k SCB4</td>
</tr>
<tr>
<td>FPC 2</td>
<td>REV 26</td>
<td>750-073435</td>
<td>CALS4630</td>
<td>SPC3</td>
</tr>
<tr>
<td>Item</td>
<td>Version</td>
<td>Part number</td>
<td>Serial number</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>---------</td>
<td>-------------</td>
<td>---------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>CPU</td>
<td></td>
<td></td>
<td></td>
<td>SRX5k vCPP Broadwell</td>
</tr>
<tr>
<td>PIC 0</td>
<td></td>
<td></td>
<td></td>
<td>SPU Cp-Flow</td>
</tr>
<tr>
<td>PIC 1</td>
<td></td>
<td></td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>FPC 3</td>
<td>REV 17</td>
<td>750-044175</td>
<td>CABE7777</td>
<td>SRX5k SPC II</td>
</tr>
<tr>
<td>CPU</td>
<td></td>
<td></td>
<td></td>
<td>SRX5k DPC PPC</td>
</tr>
<tr>
<td>PIC 0</td>
<td></td>
<td></td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 1</td>
<td></td>
<td></td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 2</td>
<td></td>
<td></td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 3</td>
<td></td>
<td></td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>FPC 4</td>
<td>REV 08</td>
<td>750-061262</td>
<td>CAFD8147</td>
<td>SRX5k IOC II</td>
</tr>
<tr>
<td>CPU</td>
<td>REV 02</td>
<td>711-061263</td>
<td>CAFV7488</td>
<td>SRX5k MPC PMB</td>
</tr>
<tr>
<td>PIC 0</td>
<td></td>
<td></td>
<td></td>
<td>20x 1GE(LAN) SFP</td>
</tr>
<tr>
<td>Xcvr 0</td>
<td>REV 02</td>
<td>740-011613</td>
<td>PNB1GJR</td>
<td>SFP-SX</td>
</tr>
<tr>
<td>PIC 1</td>
<td></td>
<td></td>
<td></td>
<td>10x 1GE(LAN) SFP</td>
</tr>
<tr>
<td>FPC 5</td>
<td>REV 10</td>
<td>750-062242</td>
<td>CAXX2328</td>
<td>SRX5k IOC 3 2GE+4XGE</td>
</tr>
<tr>
<td>PIC 0</td>
<td></td>
<td></td>
<td></td>
<td>2x 10GE SFP+</td>
</tr>
<tr>
<td>Xcvr 0</td>
<td>REV 01</td>
<td>740-021308</td>
<td>ANA07RE</td>
<td>SFP+-10G-SR</td>
</tr>
<tr>
<td>Xcvr 1</td>
<td>REV 01</td>
<td>740-031980</td>
<td>AQFORB3</td>
<td>SFP+-10G-SR</td>
</tr>
<tr>
<td>PIC 1</td>
<td></td>
<td></td>
<td></td>
<td>1x 100GE CFP2</td>
</tr>
<tr>
<td>PIC 2</td>
<td></td>
<td></td>
<td></td>
<td>2x 10GE SFP+</td>
</tr>
<tr>
<td>Xcvr 0</td>
<td>REV 01</td>
<td>740-031980</td>
<td>AA1650304RF</td>
<td>SFP+-10G-SR</td>
</tr>
<tr>
<td>Xcvr 1</td>
<td>REV 01</td>
<td>740-021308</td>
<td>AQ93BDK</td>
<td>SFP+-10G-SR</td>
</tr>
<tr>
<td>PIC 3</td>
<td></td>
<td></td>
<td></td>
<td>1x 100GE CFP2</td>
</tr>
<tr>
<td>FPC 8</td>
<td>REV 46</td>
<td>750-056519</td>
<td>CALC4514</td>
<td>SRX5k IOC 4 MRAT</td>
</tr>
<tr>
<td>CPU</td>
<td>REV 21</td>
<td>750-057177</td>
<td>CALC3494</td>
<td>SMPC PMB</td>
</tr>
<tr>
<td>PIC 0</td>
<td></td>
<td></td>
<td></td>
<td>MRATE-6xQSFP-PGE-XGE-XLGE-CGE</td>
</tr>
<tr>
<td>Xcvr 0</td>
<td>REV 01</td>
<td>740-059437</td>
<td>000T20128</td>
<td>QSFP28-LPBK</td>
</tr>
<tr>
<td>Xcvr 1</td>
<td>REV 01</td>
<td>740-067443</td>
<td>1ACP13450KH</td>
<td>QSFP+-40G-SR4</td>
</tr>
<tr>
<td>PIC 1</td>
<td></td>
<td></td>
<td></td>
<td>MRATE-6xQSFP-PGE-XGE-XLGE-CGE</td>
</tr>
<tr>
<td>Xcvr 0</td>
<td>REV 01</td>
<td>740-059437</td>
<td>000T3443</td>
<td>QSFP28-LPBK</td>
</tr>
<tr>
<td>Fan Tray 0</td>
<td>REV 06</td>
<td>740-035409</td>
<td>ACAE9390</td>
<td>Enhanced Fan Tray</td>
</tr>
<tr>
<td>Fan Tray 1</td>
<td>REV 06</td>
<td>740-035409</td>
<td>ACAE9386</td>
<td>Enhanced Fan Tray</td>
</tr>
</tbody>
</table>

node1:

Hardware inventory:

<table>
<thead>
<tr>
<th>Item</th>
<th>Version</th>
<th>Part number</th>
<th>Serial number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis</td>
<td></td>
<td></td>
<td></td>
<td>SRX5800</td>
</tr>
<tr>
<td>Midplane</td>
<td>REV 42</td>
<td>760-063937</td>
<td>ACRL3068</td>
<td>Enhanced SRX5800 Backplane</td>
</tr>
<tr>
<td>FPM Board</td>
<td>REV 05</td>
<td>760-061272</td>
<td>CAJX9988</td>
<td>Front Panel Display</td>
</tr>
<tr>
<td>PDM</td>
<td>Rev 01</td>
<td>740-063049</td>
<td>QCS2209507A</td>
<td>Power Distribution Module</td>
</tr>
<tr>
<td>PEM 0</td>
<td>Rev 11</td>
<td>740-027760</td>
<td>QCS1822NOEY</td>
<td>PS 4.1kW; 200–240V AC</td>
</tr>
<tr>
<td>PEM 1</td>
<td>Rev 03</td>
<td>740-034724</td>
<td>QCS17020203F</td>
<td>PS 4.1kW; 200–240V AC</td>
</tr>
<tr>
<td>Routing Engine 0</td>
<td>REV 01</td>
<td>750-095568</td>
<td>CALK8904</td>
<td>SRX5k RE-2000x6</td>
</tr>
<tr>
<td>Routing Engine 1</td>
<td>REV 01</td>
<td>750-095568</td>
<td>CADZ9076</td>
<td>SRX5k RE-2000x6</td>
</tr>
<tr>
<td>CB 0</td>
<td>REV 26</td>
<td>750-031391</td>
<td>CALV3010</td>
<td>SRX5k SCB4</td>
</tr>
<tr>
<td>CB 1</td>
<td>REV 26</td>
<td>750-031391</td>
<td>CALV3000</td>
<td>SRX5k SCB4</td>
</tr>
<tr>
<td>FPC 2</td>
<td>REV 28</td>
<td>750-073435</td>
<td>CACK9620</td>
<td>SPC3</td>
</tr>
<tr>
<td>CPU</td>
<td></td>
<td></td>
<td></td>
<td>SRX5k vCPP Broadwell</td>
</tr>
<tr>
<td>PIC 0</td>
<td></td>
<td></td>
<td></td>
<td>SPU Cp-Flow</td>
</tr>
<tr>
<td>PIC 1</td>
<td></td>
<td></td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>FPC 3</td>
<td>REV 18</td>
<td>750-054877</td>
<td>CACH4082</td>
<td>SRX5k SPC II</td>
</tr>
<tr>
<td>CPU</td>
<td></td>
<td></td>
<td></td>
<td>SRX5k DPC PPC</td>
</tr>
<tr>
<td>PIC 0</td>
<td></td>
<td></td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 1</td>
<td></td>
<td></td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>Item</td>
<td>Version</td>
<td>Part number</td>
<td>Serial number</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------</td>
<td>-------------</td>
<td>---------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>Chassis</td>
<td></td>
<td></td>
<td>JN12170EAAGA</td>
<td>SRX 5800</td>
</tr>
<tr>
<td>Midplane</td>
<td>REV 01</td>
<td>710-041799</td>
<td>ACAX3849</td>
<td>SRX 5800 Backplane</td>
</tr>
<tr>
<td>FPM Board</td>
<td>REV 01</td>
<td>710-024632</td>
<td>CAAX7297</td>
<td>Front Panel Display</td>
</tr>
<tr>
<td>PDM</td>
<td>Rev 03</td>
<td>740-031110</td>
<td>QCS170250DU</td>
<td>Power Distribution Module</td>
</tr>
<tr>
<td>PEM 0</td>
<td>Rev 03</td>
<td>740-034724</td>
<td>QCS17020203F</td>
<td>PS 4.1kW; 200–240V AC in</td>
</tr>
<tr>
<td>PEM 1</td>
<td>Rev 03</td>
<td>740-034724</td>
<td>QCS17020203C</td>
<td>PS 4.1kW; 200–240V AC in</td>
</tr>
<tr>
<td>PEM 2</td>
<td>Rev 04</td>
<td>740-034724</td>
<td>QCS17100200A</td>
<td>PS 4.1kW; 200–240V AC in</td>
</tr>
<tr>
<td>PEM 3</td>
<td>Rev 03</td>
<td>740-034724</td>
<td>QCS17100200M</td>
<td>PS 4.1kW; 200–240V AC in</td>
</tr>
<tr>
<td>Routing Engine 0</td>
<td>REV 11</td>
<td>740-023530</td>
<td>9012047437</td>
<td>SRX5k RE-13-20</td>
</tr>
<tr>
<td>CB 0</td>
<td>REV 09</td>
<td>710-024802</td>
<td>CAAX7202</td>
<td>SRX5k SCB</td>
</tr>
<tr>
<td>CB 1</td>
<td>REV 09</td>
<td>710-024802</td>
<td>CAAX7157</td>
<td>SRX5k SCB</td>
</tr>
<tr>
<td>FPC 0</td>
<td>REV 07</td>
<td>750-044175</td>
<td>CAAD0791</td>
<td>SRX5k SPC II</td>
</tr>
<tr>
<td>CPU</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SRX5k DPC PPC</td>
</tr>
<tr>
<td>PIC 0</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SPU Cp</td>
<td></td>
</tr>
<tr>
<td>PIC 1</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SPU Flow</td>
<td></td>
</tr>
<tr>
<td>PIC 2</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SPU Flow</td>
<td></td>
</tr>
<tr>
<td>PIC 3</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SPU Flow</td>
<td></td>
</tr>
<tr>
<td>FPC 1</td>
<td>REV 07</td>
<td>750-044175</td>
<td>CAAD0751</td>
<td>SRX5k SPC II</td>
</tr>
<tr>
<td>CPU</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SRX5k DPC PPC</td>
</tr>
<tr>
<td>PIC 0</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SPU Flow</td>
<td></td>
</tr>
<tr>
<td>PIC 1</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SPU Flow</td>
<td></td>
</tr>
</tbody>
</table>
show chassis hardware (with 20-Gigabit Ethernet MIC with SFP)

user@host> show chassis hardware

Hardware inventory:

<table>
<thead>
<tr>
<th>Item</th>
<th>Version</th>
<th>Part number</th>
<th>Serial number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis</td>
<td>JN108DASAAGA</td>
<td>SRX 5800</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midplane</td>
<td>REV 02</td>
<td>710-013698</td>
<td>TR0037</td>
<td>SRX 5600 Midplane</td>
</tr>
<tr>
<td>FPM Board</td>
<td>REV 02</td>
<td>710-014974</td>
<td>JY4635</td>
<td>Front Panel Display</td>
</tr>
<tr>
<td>PDM</td>
<td>REV 02</td>
<td>740-013110</td>
<td>QCS10465005</td>
<td>Power Distribution Module</td>
</tr>
<tr>
<td>PEM 0</td>
<td>Rev 03</td>
<td>740-023514</td>
<td>QCS11154040</td>
<td>PS 1.7kW; 200-240VAC in</td>
</tr>
<tr>
<td>PEM 2</td>
<td>Rev 02</td>
<td>740-023514</td>
<td>QCS10504014</td>
<td>PS 1.7kW; 200-240VAC in</td>
</tr>
<tr>
<td>Routing Engine</td>
<td>Rev 05</td>
<td>740-015113</td>
<td>1000681023</td>
<td>RE-S-1300</td>
</tr>
<tr>
<td>CB 0</td>
<td>REV 05</td>
<td>710-013835</td>
<td>JY4775</td>
<td>SRX5k SCB</td>
</tr>
<tr>
<td>FPC 0</td>
<td>REV 17</td>
<td>750-020751</td>
<td>WZ6349</td>
<td>SRX5k DPC 4x10GE</td>
</tr>
<tr>
<td>CPU 0</td>
<td>REV 02</td>
<td>710-024633</td>
<td>WZ0718</td>
<td>SRX5k DPC PMB</td>
</tr>
<tr>
<td>Xcvr 0</td>
<td></td>
<td></td>
<td></td>
<td>1x 10GE (LAN/WAN) RichQ</td>
</tr>
<tr>
<td>PIC 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xcvr 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIC 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xcvr 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIC 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
show chassis hardware
(SRX5600 and SRX5800 devices with SRX5000 line SRX5K-SCBE [SCB2] and SRX5K-RE-1800X4 [RE2])

user@host> show chassis hardware

node0:

Hardware inventory:

<table>
<thead>
<tr>
<th>Item</th>
<th>Version</th>
<th>Part number</th>
<th>Serial number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis</td>
<td></td>
<td>JN1251EA1AGB</td>
<td></td>
<td>SRX5600</td>
</tr>
<tr>
<td>Midplane</td>
<td>REV 01</td>
<td>760-063936</td>
<td>ACRE2657</td>
<td>Enhanced SRX5600 Midplane</td>
</tr>
<tr>
<td>PEM 0</td>
<td>REV 03</td>
<td>740-034701</td>
<td>QCS13380901P</td>
<td>PS 1.4-2.6kW; 90-264V</td>
</tr>
<tr>
<td>PEM 1</td>
<td>REV 03</td>
<td>740-034701</td>
<td>QCS133809019</td>
<td>PS 1.4-2.6kW; 90-264V</td>
</tr>
<tr>
<td>Routing Engine 0</td>
<td>REV 02</td>
<td>740-056658</td>
<td>9009210105</td>
<td>SRX5k RE-1800X4</td>
</tr>
<tr>
<td>Routing Engine 1</td>
<td>REV 02</td>
<td>740-056658</td>
<td>9013115551</td>
<td>SRX5k RE-1800X4</td>
</tr>
<tr>
<td>CB 0</td>
<td>REV 01</td>
<td>750-062257</td>
<td>CADW3663</td>
<td>SRX5k SCB3</td>
</tr>
<tr>
<td>CB 1</td>
<td>REV 01</td>
<td>750-062257</td>
<td>CADZ3263</td>
<td>SRX5k SCB3</td>
</tr>
<tr>
<td>FPC 0</td>
<td>REV 18</td>
<td>750-054877</td>
<td>CABG6043</td>
<td>SRX5k SPC II</td>
</tr>
<tr>
<td>CPU</td>
<td></td>
<td>BUILTIN</td>
<td></td>
<td>SRX5k DPC PPC</td>
</tr>
<tr>
<td>PIC 0</td>
<td></td>
<td>BUILTIN</td>
<td></td>
<td>SPU Cp</td>
</tr>
<tr>
<td>PIC 1</td>
<td></td>
<td>BUILTIN</td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 2</td>
<td></td>
<td>BUILTIN</td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 3</td>
<td></td>
<td>BUILTIN</td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>FPC 1</td>
<td>REV 01</td>
<td>750-062243</td>
<td>CAAA5918</td>
<td>SRX5K IOC3 24XGE+6XLG</td>
</tr>
<tr>
<td>CPU</td>
<td>REV 02</td>
<td>711-062244</td>
<td>CADX8509</td>
<td>RMPC PMB</td>
</tr>
<tr>
<td>PIC 0</td>
<td></td>
<td>BUILTIN</td>
<td></td>
<td>12x 10GE SFP+</td>
</tr>
<tr>
<td>Xcvr 0</td>
<td>REV 01</td>
<td>740-031980</td>
<td>273363A01891</td>
<td>SFP+-10G-SR</td>
</tr>
<tr>
<td>Xcvr 1</td>
<td>REV 01</td>
<td>740-031980</td>
<td>273363A01915</td>
<td>SFP+-10G-SR</td>
</tr>
<tr>
<td>Xcvr 2</td>
<td>REV 01</td>
<td>740-031980</td>
<td>ANA08K6</td>
<td>SFP+-10G-SR</td>
</tr>
<tr>
<td>Xcvr 3</td>
<td>REV 01</td>
<td>740-031980</td>
<td>AP407GA</td>
<td>SFP+-10G-SR</td>
</tr>
<tr>
<td>Xcvr 9</td>
<td>REV 01</td>
<td>740-021308</td>
<td>MUC20G1</td>
<td>SFP+-10G-SR</td>
</tr>
<tr>
<td>PIC 1</td>
<td></td>
<td>BUILTIN</td>
<td></td>
<td>12x 10GE SFP+</td>
</tr>
<tr>
<td>PIC 2</td>
<td></td>
<td>BUILTIN</td>
<td></td>
<td>3x 40GE QSFP+</td>
</tr>
<tr>
<td>PIC 3</td>
<td></td>
<td>BUILTIN</td>
<td></td>
<td>3x 40GE QSFP+</td>
</tr>
<tr>
<td>WAN MEZZ</td>
<td>REV 15</td>
<td>750-049136</td>
<td>CAEE5845</td>
<td>MPCSE 24XGE OTN Mezz</td>
</tr>
<tr>
<td>FPC 3</td>
<td>REV 11</td>
<td>750-043157</td>
<td>CAC17452</td>
<td>SRX5k IOC II</td>
</tr>
<tr>
<td>CPU</td>
<td>REV 04</td>
<td>711-043360</td>
<td>CACP1977</td>
<td>SRX5k MPC PMB</td>
</tr>
<tr>
<td>MIC 0</td>
<td>REV 04</td>
<td>750-049488</td>
<td>CABL4759</td>
<td>10x 10GE SFP+</td>
</tr>
<tr>
<td>PIC 0</td>
<td></td>
<td>BUILTIN</td>
<td></td>
<td>10x 10GE SFP+</td>
</tr>
</tbody>
</table>
## Hardware inventory:

<table>
<thead>
<tr>
<th>Item</th>
<th>Version</th>
<th>Part number</th>
<th>Serial number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midplane</td>
<td>REV 01</td>
<td>760-063936</td>
<td>ACRE2970</td>
<td>Enhanced SRX5600 Midplane</td>
</tr>
<tr>
<td>FPM Board</td>
<td>REV 01</td>
<td>710-024631</td>
<td>CABY3552</td>
<td>Front Panel Display</td>
</tr>
<tr>
<td>PEM 0</td>
<td>Rev 03</td>
<td>740-034701</td>
<td>QCS133809028</td>
<td>PS 1.4-2.6kw; 90-264V</td>
</tr>
<tr>
<td>PEM 1</td>
<td>Rev 03</td>
<td>740-034702</td>
<td>QCS133809027</td>
<td>PS 1.4-2.6kw; 90-264V</td>
</tr>
<tr>
<td>Routing Engine 0</td>
<td>REV 02</td>
<td>740-056658</td>
<td>9009218294</td>
<td>SRX5k RE-1800X4</td>
</tr>
<tr>
<td>Routing Engine 1</td>
<td>REV 02</td>
<td>740-056658</td>
<td>9013104758</td>
<td>SRX5k RE-1800X4</td>
</tr>
<tr>
<td>CB 0</td>
<td>REV 01</td>
<td>750-062257</td>
<td>CAEB88180</td>
<td>SRX5k SCA3</td>
</tr>
<tr>
<td>CB 1</td>
<td>REV 01</td>
<td>750-062257</td>
<td>CADZ3334</td>
<td>SRX5k SCB3</td>
</tr>
<tr>
<td>FPC 0</td>
<td>REV 18</td>
<td>750-054877</td>
<td>CACJ9834</td>
<td>SRX5k SPC II</td>
</tr>
<tr>
<td>CPU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIC 0</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
</tr>
<tr>
<td>PIC 1</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 2</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 3</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SPU Flow</td>
</tr>
<tr>
<td>FPC 1</td>
<td>REV 01</td>
<td>750-062243</td>
<td>CAEB0981</td>
<td>SRX5k IOC3 24XGE+6XLG</td>
</tr>
<tr>
<td>CPU</td>
<td>REV 02</td>
<td>711-062244</td>
<td>CAEA4644</td>
<td>RMPC PMB</td>
</tr>
<tr>
<td>PIC 0</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
</tr>
<tr>
<td>Xcrr 0</td>
<td>REV 01</td>
<td>740-031980</td>
<td>AP41BLH</td>
<td>12x 10GE SFP+</td>
</tr>
<tr>
<td>Xcrr 1</td>
<td>REV 01</td>
<td>740-031980</td>
<td>AP41BLH</td>
<td>SFP+-10G-SR</td>
</tr>
<tr>
<td>Xcrr 2</td>
<td>REV 01</td>
<td>740-031980</td>
<td>AP41BLH</td>
<td>SFP+-10G-SR</td>
</tr>
<tr>
<td>Xcrr 3</td>
<td>REV 01</td>
<td>740-021308</td>
<td>CACJ9834</td>
<td>SRX5k SPC II</td>
</tr>
<tr>
<td>PIC 1</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 2</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 3</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SPU Flow</td>
</tr>
<tr>
<td>WAN MEZZ</td>
<td>REV 15</td>
<td>750-049136</td>
<td>CAEA4837</td>
<td>MPC5E 24XGE OTN Mezz</td>
</tr>
<tr>
<td>FPC 3</td>
<td>REV 11</td>
<td>750-043157</td>
<td>CAA8784</td>
<td>SRX5k IOC II</td>
</tr>
<tr>
<td>CPU</td>
<td>REV 04</td>
<td>711-043360</td>
<td>CAAC820</td>
<td>SRX5k MPC PMB</td>
</tr>
<tr>
<td>MIC 0</td>
<td>REV 05</td>
<td>750-049488</td>
<td>CADP0521</td>
<td>10x 10GE SFP+</td>
</tr>
<tr>
<td>PIC 0</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>10x 10GE SFP+</td>
</tr>
<tr>
<td>Xcrr 0</td>
<td>REV 01</td>
<td>740-030658</td>
<td>A01200A00PV</td>
<td>SFP+-10G-USR</td>
</tr>
<tr>
<td>Xcrr 1</td>
<td>REV 01</td>
<td>740-031980</td>
<td>AN04MVV</td>
<td>SFP+-10G-SR</td>
</tr>
<tr>
<td>Xcrr 2</td>
<td>REV 01</td>
<td>740-021308</td>
<td>CF30KM13</td>
<td>SFP+-10G-SR</td>
</tr>
<tr>
<td>Xcrr 3</td>
<td>REV 01</td>
<td>740-021308</td>
<td>AD153830DSZ</td>
<td>SFP+-10G-SR</td>
</tr>
<tr>
<td>MIC 1</td>
<td>REV 01</td>
<td>750-049487</td>
<td>CAB85961</td>
<td>2x 40GE QSFP+</td>
</tr>
<tr>
<td>PIC 2</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>2x 40GE QSFP+</td>
</tr>
<tr>
<td>Xcrr 1</td>
<td>REV 01</td>
<td>740-032986</td>
<td>QUB160513</td>
<td>SFP+-40G-SR4</td>
</tr>
<tr>
<td>FPC 5</td>
<td>REV 02</td>
<td>750-044175</td>
<td>ZY2569</td>
<td>SRX5k SPC II</td>
</tr>
<tr>
<td>CPU</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SRX5k SPC II</td>
</tr>
<tr>
<td>PIC 0</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 1</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SPU Flow</td>
</tr>
</tbody>
</table>
show chassis hardware
(SRX5400, SRX5600, and SRX5800 devices with SRX5000 line SRX5K-SCB3 [SCB3] with enhanced midplanes and SRX5K-MPC3-100G10G [IOC3] or SRX5K-MPC3-40G10G [IOC3])

```
user@host> show chassis hardware
node0:
------------------------------------------------------------------------
Hardware inventory:
<table>
<thead>
<tr>
<th>Item</th>
<th>Version</th>
<th>Part number</th>
<th>Serial number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis</td>
<td></td>
<td></td>
<td>JN1250870AGB</td>
<td>SRX5600</td>
</tr>
<tr>
<td>Midplane</td>
<td>REV 01</td>
<td>760-063936</td>
<td>ACRE2578</td>
<td>Enhanced SRX5600 Midplane</td>
</tr>
<tr>
<td>FPM Board</td>
<td>REV 02</td>
<td>710-017254</td>
<td>KD9027</td>
<td>Front Panel Display</td>
</tr>
<tr>
<td>PEM 0</td>
<td>Rev 03</td>
<td>740-034701</td>
<td>QCS13090900T</td>
<td>PS 1.4–2.6kW; 90–264V A C in</td>
</tr>
<tr>
<td>PEM 1</td>
<td>Rev 03</td>
<td>740-034701</td>
<td>QCS13090904T</td>
<td>PS 1.4–2.6kW; 90–264V A C in</td>
</tr>
<tr>
<td>Routing Engine 0</td>
<td>REV 01</td>
<td>740-056658</td>
<td>9009196496</td>
<td>SRX5k RE-1800X4</td>
</tr>
<tr>
<td>CB 0</td>
<td>REV 01</td>
<td>750-062257</td>
<td>CAEC2501</td>
<td>SRX5k SCB3</td>
</tr>
<tr>
<td>FPC 0</td>
<td>REV 10</td>
<td>750-056758</td>
<td>CADC8067</td>
<td>SRX5k SPC II</td>
</tr>
<tr>
<td>CPU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIC 0</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SPU Cop</td>
</tr>
<tr>
<td>PIC 1</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 2</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 3</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>FPC 2</td>
<td>REV 01</td>
<td>750-062243</td>
<td>CAEE5924</td>
<td>SRX5k IOC3 24XG+6XLG</td>
</tr>
<tr>
<td>CPU</td>
<td>REV 01</td>
<td>711-062244</td>
<td>CAEB4890</td>
<td>SRX5k IOC3 PMB</td>
</tr>
<tr>
<td>PIC 0</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>12x 10GE SFP+</td>
</tr>
<tr>
<td>PIC 1</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>12x 10GE SFP+</td>
</tr>
<tr>
<td>PIC 2</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>3x 40GE QSFP+</td>
</tr>
<tr>
<td>Xcvr 0</td>
<td>REV 01</td>
<td>740-038623</td>
<td>MOC13156230449</td>
<td>QSF+–40G-CU1M</td>
</tr>
<tr>
<td>Xcvr 2</td>
<td>REV 01</td>
<td>740-038623</td>
<td>MOC13156230449</td>
<td>QSF+–40G-CU1M</td>
</tr>
<tr>
<td>PIC 3</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>3x 40GE QSFP+</td>
</tr>
<tr>
<td>WAN MEZZ</td>
<td>REV 01</td>
<td>750-062682</td>
<td>CAEE5817</td>
<td>24x 10GE SFP+ Mezz</td>
</tr>
<tr>
<td>FPC 4</td>
<td>REV 11</td>
<td>750-043157</td>
<td>CACY1595</td>
<td>SRX5k IOC II</td>
</tr>
<tr>
<td>CPU</td>
<td>REV 04</td>
<td>711-043360</td>
<td>CAC28879</td>
<td>SRX5k MPC PMB</td>
</tr>
<tr>
<td>MIC 1</td>
<td>REV 04</td>
<td>750-049488</td>
<td>CAC6062</td>
<td>10x 10GE SFP+</td>
</tr>
<tr>
<td>Xcvr 7</td>
<td>REV 01</td>
<td>740-021308</td>
<td>AD1439301TU</td>
<td>SFP+–10G–SR</td>
</tr>
<tr>
<td>Xcvr 8</td>
<td>REV 01</td>
<td>740-021308</td>
<td>AD1439301SD</td>
<td>SFP+–10G–SR</td>
</tr>
<tr>
<td>Xcvr 9</td>
<td>REV 01</td>
<td>740-021308</td>
<td>AD1439301TS</td>
<td>SFP+–10G–SR</td>
</tr>
<tr>
<td>FPC 5</td>
<td>REV 05</td>
<td>750-044175</td>
<td>ZZ1371</td>
<td>SRX5k SPC II</td>
</tr>
<tr>
<td>CPU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIC 0</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 1</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 2</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 3</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>Fan Tray</td>
<td></td>
<td></td>
<td></td>
<td>Enhanced Fan Tray</td>
</tr>
</tbody>
</table>
------------------------------------------------------------------------
node1:
------------------------------------------------------------------------
Hardware inventory:
<table>
<thead>
<tr>
<th>Item</th>
<th>Version</th>
<th>Part number</th>
<th>Serial number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midplane</td>
<td>REV 01</td>
<td>760-063936</td>
<td>ACRE2578</td>
<td>Enhanced SRX5600 Midplane</td>
</tr>
<tr>
<td>FPM Board</td>
<td>REV 02</td>
<td>710-017254</td>
<td>KD9027</td>
<td>Front Panel Display</td>
</tr>
<tr>
<td>PEM 0</td>
<td>Rev 03</td>
<td>740-034701</td>
<td>QCS13090900T</td>
<td>PS 1.4–2.6kW; 90–264V A C in</td>
</tr>
<tr>
<td>PEM 1</td>
<td>Rev 03</td>
<td>740-034701</td>
<td>QCS13090904T</td>
<td>PS 1.4–2.6kW; 90–264V A C in</td>
</tr>
<tr>
<td>Routing Engine 0</td>
<td>REV 01</td>
<td>740-056658</td>
<td>9009196496</td>
<td>SRX5k RE-1800X4</td>
</tr>
<tr>
<td>CB 0</td>
<td>REV 01</td>
<td>750-062257</td>
<td>CAEC2501</td>
<td>SRX5k SCB3</td>
</tr>
<tr>
<td>FPC 0</td>
<td>REV 10</td>
<td>750-056758</td>
<td>CADC8067</td>
<td>SRX5k SPC II</td>
</tr>
<tr>
<td>CPU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIC 0</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SPU Cop</td>
</tr>
<tr>
<td>PIC 1</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 2</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 3</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>FPC 2</td>
<td>REV 01</td>
<td>750-062243</td>
<td>CAEE5924</td>
<td>SRX5k IOC3 24XG+6XLG</td>
</tr>
<tr>
<td>CPU</td>
<td>REV 01</td>
<td>711-062244</td>
<td>CAEB4890</td>
<td>SRX5k IOC3 PMB</td>
</tr>
<tr>
<td>PIC 0</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>12x 10GE SFP+</td>
</tr>
<tr>
<td>PIC 1</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>12x 10GE SFP+</td>
</tr>
<tr>
<td>PIC 2</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>3x 40GE QSFP+</td>
</tr>
<tr>
<td>Xcvr 0</td>
<td>REV 01</td>
<td>740-038623</td>
<td>MOC13156230449</td>
<td>QSF+–40G-CU1M</td>
</tr>
<tr>
<td>Xcvr 1</td>
<td>REV 01</td>
<td>740-038623</td>
<td>MOC13156230449</td>
<td>QSF+–40G-CU1M</td>
</tr>
<tr>
<td>PIC 3</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>3x 40GE QSFP+</td>
</tr>
<tr>
<td>WAN MEZZ</td>
<td>REV 01</td>
<td>750-062682</td>
<td>CAEE5817</td>
<td>24x 10GE SFP+ Mezz</td>
</tr>
<tr>
<td>FPC 4</td>
<td>REV 11</td>
<td>750-043157</td>
<td>CACY1595</td>
<td>SRX5k IOC II</td>
</tr>
<tr>
<td>CPU</td>
<td>REV 04</td>
<td>711-043360</td>
<td>CAC28879</td>
<td>SRX5k MPC PMB</td>
</tr>
<tr>
<td>MIC 1</td>
<td>REV 04</td>
<td>750-049488</td>
<td>CAC6062</td>
<td>10x 10GE SFP+</td>
</tr>
<tr>
<td>PIC 0</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>10x 10GE SFP+</td>
</tr>
<tr>
<td>PIC 1</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>10x 10GE SFP+</td>
</tr>
<tr>
<td>PIC 2</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SFP+–10G–SR</td>
</tr>
<tr>
<td>PIC 3</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SFP+–10G–SR</td>
</tr>
<tr>
<td>FPC 5</td>
<td>REV 05</td>
<td>750-044175</td>
<td>ZZ1371</td>
<td>SRX5k SPC II</td>
</tr>
<tr>
<td>CPU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIC 0</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 1</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 2</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>PIC 3</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td></td>
<td>SPU Flow</td>
</tr>
<tr>
<td>Fan Tray</td>
<td></td>
<td></td>
<td></td>
<td>Enhanced Fan Tray</td>
</tr>
</tbody>
</table>
------------------------------------------------------------------------
### Item Description

#### Chassis
- **Version**: REV 01
- **Part number**: 760-063936
- **Serial number**: ACRE2946
- **Description**: Enhanced SRX5600 Midplane

#### Midplane Module
- **Version**: REV 01
- **Part number**: 760-063936
- **Serial number**: ACRE2946
- **Description**: Enhanced SRX5600 Midplane

#### FPM Board
- **Version**: test
- **Part number**: 710-017254
- **Description**: Front Panel Display

#### PEM 0 Module
- **Version**: Rev 01
- **Part number**: 740-038514
- **Serial number**: QCS114111003
- **Description**: DC 2.6kW Power Entry Module

#### PEM 1 Module
- **Version**: Rev 01
- **Part number**: 740-038514
- **Serial number**: QCS12031100J
- **Description**: DC 2.6kW Power Entry Module

#### Routing Engine 0
- **Version**: REV 01
- **Part number**: 740-056658
- **Serial number**: 9009186342
- **Description**: SRX5k RE-1800X4

#### CB 0
- **Version**: REV 01
- **Part number**: 750-062257
- **Serial number**: CAEB8178
- **Description**: SRX5k SCB3

#### FPC 0
- **Version**: REV 07
- **Part number**: 750-044175
- **Serial number**: CAAD0769
- **Description**: SRX5k SPC II

#### CPU 0
- **Version**: BUILTIN
- **Part number**: BUILTIN
- **Serial number**: BUILTIN
- **Description**: SRX5k DPC PPC

#### PIC 0
- **Version**: BUILTIN
- **Part number**: BUILTIN
- **Serial number**: BUILTIN
- **Description**: SPU Cp

#### PIC 1
- **Version**: BUILTIN
- **Part number**: BUILTIN
- **Serial number**: BUILTIN
- **Description**: SPU Flow

#### PIC 2
- **Version**: BUILTIN
- **Part number**: BUILTIN
- **Serial number**: BUILTIN
- **Description**: SPU Flow

#### PIC 3
- **Version**: BUILTIN
- **Part number**: BUILTIN
- **Serial number**: BUILTIN
- **Description**: SPU Flow

#### FPC 4
- **Version**: REV 11
- **Part number**: 750-043157
- **Serial number**: CACY1592
- **Description**: SRX5k IOC II

#### CPU 0
- **Version**: REV 04
- **Part number**: 711-043360
- **Serial number**: CACZ8831
- **Description**: SRX5k MPC PMB

#### PIC 2
- **Version**: BUILTIN
- **Part number**: BUILTIN
- **Serial number**: BUILTIN
- **Description**: 10x 10G-SFP+

#### Xcvr 7
- **Version**: REV 01
- **Part number**: 740-031980
- **Serial number**: ARN23HW
- **Description**: SFP+-10G-SR

#### Xcvr 8
- **Version**: REV 01
- **Part number**: 740-031980
- **Serial number**: ARN2FVW
- **Description**: SFP+-10G-SR

#### Xcvr 9
- **Version**: REV 01
- **Part number**: 740-031980
- **Serial number**: ARN2YVM
- **Description**: SFP+-10G-SR

#### FPC 5
- **Version**: REV 10
- **Part number**: 750-056758
- **Serial number**: CADA8736
- **Description**: SRX5k SPC II

#### CPU 0
- **Version**: BUILTIN
- **Part number**: BUILTIN
- **Serial number**: BUILTIN
- **Description**: SRX5k DPC PPC

#### PIC 0
- **Version**: BUILTIN
- **Part number**: BUILTIN
- **Serial number**: BUILTIN
- **Description**: SPU Flow

#### PIC 1
- **Version**: BUILTIN
- **Part number**: BUILTIN
- **Serial number**: BUILTIN
- **Description**: SPU Flow

#### PIC 2
- **Version**: BUILTIN
- **Part number**: BUILTIN
- **Serial number**: BUILTIN
- **Description**: SPU Flow

#### PIC 3
- **Version**: BUILTIN
- **Part number**: BUILTIN
- **Serial number**: BUILTIN
- **Description**: SPU Flow

#### Fan Tray
- **Version**: BUILTIN
- **Part number**: BUILTIN
- **Serial number**: BUILTIN
- **Description**: Enhanced Fan Tray

---

### show chassis hardware (SRX4200)

**user@host>** show chassis hardware

#### Hardware inventory:

<table>
<thead>
<tr>
<th>Item</th>
<th>Version</th>
<th>Part number</th>
<th>Serial number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis</td>
<td>REV 01</td>
<td>650-071675</td>
<td>16061032317</td>
<td>SRX4200</td>
</tr>
<tr>
<td>Mainboard</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>SRX Routing Engine</td>
</tr>
<tr>
<td>Routing Engine 0</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>FEB</td>
</tr>
<tr>
<td>PIC 0</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>BUILTIN</td>
<td>8x10G-SFP</td>
</tr>
<tr>
<td>Xcvr 0</td>
<td>REV 01</td>
<td>740-038153</td>
<td>M011151530020</td>
<td>SFP+-10G-CU3M</td>
</tr>
<tr>
<td>Xcvr 1</td>
<td>REV 01</td>
<td>740-038153</td>
<td>M011151530020</td>
<td>SFP+-10G-CU3M</td>
</tr>
<tr>
<td>Xcvr 2</td>
<td>REV 01</td>
<td>740-038153</td>
<td>M011151530020</td>
<td>SFP+-10G-CU3M</td>
</tr>
<tr>
<td>Xcvr 3</td>
<td>REV 01</td>
<td>740-038153</td>
<td>M011151530020</td>
<td>SFP+-10G-CU3M</td>
</tr>
<tr>
<td>Xcvr 4</td>
<td>REV 01</td>
<td>740-031980</td>
<td>04DZ06A00364</td>
<td>SFP+-10G-CU3M</td>
</tr>
<tr>
<td>Xcvr 5</td>
<td>REV 01</td>
<td>740-031980</td>
<td>233363A03066</td>
<td>SFP+-10G-CU3M</td>
</tr>
<tr>
<td>Xcvr 6</td>
<td>REV 01</td>
<td>740-031980</td>
<td>AL705WE</td>
<td>SFP+-10G-CU3M</td>
</tr>
<tr>
<td>Xcvr 7</td>
<td>REV 01</td>
<td>740-031980</td>
<td>ALN036C</td>
<td>SFP+-10G-CU3M</td>
</tr>
<tr>
<td>Power Supply 0</td>
<td>REV 04</td>
<td>740-041741</td>
<td>1GA26241849</td>
<td>JPSU-650W-AC-AFO</td>
</tr>
<tr>
<td>Power Supply 1</td>
<td>REV 04</td>
<td>740-041741</td>
<td>1GA26241846</td>
<td>JPSU-650W-AC-AFO</td>
</tr>
<tr>
<td>Fan Tray 0</td>
<td>REV 04</td>
<td>740-041741</td>
<td>1GA26241849</td>
<td>JPSU-650W-AC-AFO</td>
</tr>
<tr>
<td>Fan Tray 1</td>
<td>REV 04</td>
<td>740-041741</td>
<td>1GA26241846</td>
<td>JPSU-650W-AC-AFO</td>
</tr>
<tr>
<td>Fan Tray 2</td>
<td>REV 04</td>
<td>740-041741</td>
<td>1GA26241849</td>
<td>JPSU-650W-AC-AFO</td>
</tr>
</tbody>
</table>
Airflow - AFO
Fan Tray 3                                               SRX4200 3, Front to Back
Airflow - AFO

show chassis hardware clei-models

show chassis hardware clei-models
(SRX5600 and SRX5800 devices with SRX5000 line SRX5K-SCBE [SCB2] and SRX5K-RE-1800X4 [RE2])

user@host> show chassis hardware clei-models node 1

node1:
--------------------------------------------------------------------------
Hardware inventory:
Item             Version  Part number  CLEI code         FRU model number
Midplane         REV 01   710-024803                     SRX5800-BP-A
FPM Board        REV 01   710-024632                     SRX5800-CRAFT-A
PEM 0            Rev 04   740-034724                     SRX5800-Pwr-4100-AC
PEM 1            Rev 05   740-034724                     SRX5800-Pwr-4100-AC
Routing Engine 0 REV 01   740-056658   COUCATTBAA        SRX5K-RE-1800X4
CB 0             REV 01   750-056587   COUCATSBAA        SRX5K-SCBE
CB 1             REV 01   750-056587   COUCATSBAA        SRX5K-SCBE
CB 2             REV 01   750-056587   COUCATSBAA        SRX5K-SCBE
FPC 0            REV 18   750-054877   COUCATLBAA        SRX5K-SPC-4-15-320
CPU                     BUILTIN
FPC 1            REV 18   750-054877   COUCATLBAA        SRX5K-SPC-4-15-320
CPU                     BUILTIN
FPC 2            REV 18   750-054877   COUCATLBAA        SRX5K-SPC-4-15-320
CPU                     BUILTIN
FPC 3            REV 11   750-043157   COUIBCWBAA        SRX5K-MPC
MIC 0          REV 05   750-049486   COUIBCYBAA        SRX-MIC-1X100G-CFP
MIC 1          REV 04   750-049488   COUIBCXBAR        SRX-MIC-10XG-SFP
FPC 4            REV 18   750-054877   COUCATLBAA        SRX5K-SPC-4-15-320
CPU                     BUILTIN
FPC 7            REV 18   750-054877   COUCATLBAA        SRX5K-SPC-4-15-320
CPU                     BUILTIN
FPC 8            REV 11   750-043157   COUIBCWBAA        SRX5K-MPC
MIC 0          REV 05   750-049486   COUIBCYBAA        SRX-MIC-1X100G-CFP
FPC 9            REV 18   750-054877   COUCATLBAA        SRX5K-SPC-4-15-320
CPU                     BUILTIN
FPC 10           REV 18   750-054877   COUCATLBAA        SRX5K-SPC-4-15-320
CPU                     BUILTIN
Fan Tray 0       REV 04   740-035409                     SRX5800-HC-FAN
Fan Tray 1       REV 04   740-035409                     SRX5800-HC-FAN

Copyright © 2019, Juniper Networks, Inc.
**show chassis pic (Security)**

**Syntax**  
show chassis pic fpc-slot slot-number pic-slot slot-number

**Release Information**  
Command introduced in Junos OS Release 9.2.

**Description**  
Display status information about the PIC installed in the specified Flexible PIC Concentrator (FPC) and PIC slot.

**Options**  
- **fpc-slot slot-number** — Display information about the FPC in the slot.
- **pic-slot slot-number** — Display information about the PIC in this particular FPC slot.

**Required Privilege Level**  
view

**Related Documentation**  
- *Interfaces Feature Guide for Security Devices*
- *Understanding Traffic Processing on Security Devices on page 25*

**List of Sample Output**  
show chassis pic fpc-slot pic-slot on page 415

**Output Fields**  
Table 31 on page 414 lists the output fields for the show chassis pic command. Output fields are listed in the approximate order in which they appear.

**Table 31: show chassis pic Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>PIC type.</td>
</tr>
<tr>
<td>State</td>
<td>Status of the PIC. State is displayed only when a PIC is in the slot.</td>
</tr>
<tr>
<td></td>
<td>• Online — PIC is online and running.</td>
</tr>
<tr>
<td></td>
<td>• Offline — PIC is powered down.</td>
</tr>
<tr>
<td>PIC version</td>
<td>PIC hardware version.</td>
</tr>
<tr>
<td>Uptime</td>
<td>How long the PIC has been online.</td>
</tr>
<tr>
<td>Port Number</td>
<td>Port number for the PIC.</td>
</tr>
<tr>
<td>Cable Type</td>
<td>Type of cable connected to the port: LH, LX, or SX.</td>
</tr>
</tbody>
</table>
### Table 31: show chassis pic Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PIC Port Information</strong></td>
<td>Port-level information for the PIC.</td>
</tr>
<tr>
<td></td>
<td>• Port—Port number</td>
</tr>
<tr>
<td></td>
<td>• Cable type—Type of transceiver installed.</td>
</tr>
<tr>
<td></td>
<td>• Fiber type—Type of fiber.</td>
</tr>
<tr>
<td></td>
<td>• Xcvr vendor—Transceiver vendor name.</td>
</tr>
<tr>
<td></td>
<td>• Xcvr vendor part number—Transceiver vendor part number.</td>
</tr>
<tr>
<td></td>
<td>• Wavelength—Wavelength of the transmitted signal.</td>
</tr>
</tbody>
</table>

---

**Sample Output**

**show chassis pic fpc-slot pic-slot**

```plaintext
user@host> show chassis pic fpc-slot10 pic-slot 0
FPC slot 10, PIC slot 0 information:
Type                             10x 10GE SFP+
State                            Online
PIC version                  1.1
Uptime                         6 days, 7 hours, 29 minutes, 28 seconds
PIC port information:

<table>
<thead>
<tr>
<th>Fiber</th>
<th>Xcvr vendor</th>
<th>part number</th>
<th>Wavelength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td>Cable type</td>
<td>type</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>10GBASE SR</td>
<td>MM</td>
<td>FTLX8571D3BNL-J1 850 nm</td>
</tr>
</tbody>
</table>

Xcvr vendor firmware version
0.0

PIC port information:

<table>
<thead>
<tr>
<th>Fiber</th>
<th>Xcvr vendor</th>
<th>part number</th>
<th>Wavelength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port</td>
<td>Cable type</td>
<td>type</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>10GBASE SR</td>
<td>MM</td>
<td>FTLX8571D3BNL-J1 850 nm</td>
</tr>
</tbody>
</table>

Xcvr vendor firmware version
0.0
```
show chassis power

Syntax  
show chassis power

Release Information  
Command modified in Junos OS Release 12.1X44-D10.

Description  
Display power limits and usage information for the Power Entry Modules (PEMs).

Options  
node— Displays information specific to the chassis.

sequence— Shows the chassis fru power on sequence.

Required Privilege_LEVEL  
view

Related Documentation  
• Understanding Traffic Processing on Security Devices on page 25
• show chassis power sequence on page 419

List of Sample Output  
show chassis power on page 417

Output Fields  
Table 32 on page 416 lists the output fields for the show chassis power command. Output fields are listed in the approximate order in which they appear.

Table 32: show chassis power Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEM number</td>
<td>AC or DC PEM number on the chassis. The following output fields are displayed for the PEM:</td>
</tr>
<tr>
<td></td>
<td>• State—State of the PEM:</td>
</tr>
<tr>
<td></td>
<td>• Online—PEM is present in the slot and online.</td>
</tr>
<tr>
<td></td>
<td>• Empty—PEM is not present in the slot.</td>
</tr>
<tr>
<td></td>
<td>• Present—PEM is present in the slot, but not online.</td>
</tr>
<tr>
<td></td>
<td>• AC Input —State of the AC input power feed with the number of active and expected feeds (1 or 2).</td>
</tr>
<tr>
<td></td>
<td>• Capacity—Actual power input capacity with maximum capacity displayed (in parentheses) in watts.</td>
</tr>
<tr>
<td></td>
<td>• DC Output—DC power output, in watts, for the specified zone, at the specified amps and voltage (A @ V), and load and percentage utilization of the maximum capacity for the zone.</td>
</tr>
</tbody>
</table>
Table 32: show chassis power Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System</td>
<td>Overall power statistics for the system zone:</td>
</tr>
<tr>
<td></td>
<td>• Zone number:</td>
</tr>
<tr>
<td></td>
<td>• Capacity—Maximum power capacity available for the zone, in watts.</td>
</tr>
<tr>
<td></td>
<td>• Allocated power—Actual capacity allocated for the zone, in watts, with remaining power displayed in parentheses.</td>
</tr>
<tr>
<td></td>
<td>• Actual usage—Actual power usage for the zone, in watts.</td>
</tr>
<tr>
<td></td>
<td>• Total system capacity—Cumulative power capacity of all the zones, in watts.</td>
</tr>
<tr>
<td></td>
<td>• Total remaining capacity—Difference between the total system capacity and cumulative allocated power of all zones, in watts.</td>
</tr>
</tbody>
</table>

Sample Output

show chassis power

When you enter the `show chassis power` command, the sample output is shown for DC PEM.

```
user@host> show chassis power

node0:---------------------------------------------------------------------
PEM 0:
  State:     Online
  DC input:  OK (1 feed expected, 1 feed connected)
  Capacity:  2440 W (maximum 2440 W)
  DC output: 600 W (zone 0, 12 A at 50 V, 24% of capacity)

PEM 1:
  State:     Online
  DC input:  OK (1 feed expected, 1 feed connected)
  Capacity:  2440 W (maximum 2440 W)
  DC output: 1550 W (zone 1, 31 A at 50 V, 63% of capacity)

PEM 2:
  State:     Empty
  Input:     Absent

PEM 3:
  State:     Empty
  Input:     Absent

System:
  Zone 0:
    Capacity:          2440 W (maximum 2440 W)
    Allocated power:   1050 W (1390 W remaining)
    Actual usage:      600 W

  Zone 1:
    Capacity:          2440 W (maximum 2440 W)
    Allocated power:   2310 W (130 W remaining)
    Actual usage:      1550 W

Total system capacity: 4880 W (maximum 4880 W)
```
Total remaining power: 1520 W

---

PEM 0:
- **State:** Online
- **DC input:** OK (1 feed expected, 1 feed connected)
- **Capacity:** 2440 W (maximum 2440 W)
- **DC output:** 600 W (zone 0, 12 A at 50 V, 24% of capacity)

PEM 1:
- **State:** Online
- **DC input:** OK (1 feed expected, 1 feed connected)
- **Capacity:** 2440 W (maximum 2440 W)
- **DC output:** 1519 W (zone 1, 31 A at 49 V, 62% of capacity)

PEM 2:
- **State:** Empty
- **Input:** Absent

PEM 3:
- **State:** Empty
- **Input:** Absent

System:
- **Zone 0:**
  - **Capacity:** 2440 W (maximum 2440 W)
  - **Allocated power:** 1050 W (1390 W remaining)
  - **Actual usage:** 600 W
- **Zone 1:**
  - **Capacity:** 2440 W (maximum 2440 W)
  - **Allocated power:** 2310 W (130 W remaining)
  - **Actual usage:** 1519 W

**Total system capacity:** 4880 W (maximum 4880 W)
**Total remaining power:** 1520 W
show chassis power sequence

Syntax

show chassis power sequence

Release Information

Command modified in Junos OS Release 12.1X44-D10.

Description

Display the power-on sequence for the FPCs in the chassis. The numbers indicate the slot number of the FPCs. This document is supported on the SRX5400, SRX5600, and SRX5800 devices.

Options

This command has no options.

Required Privilege

view

Related Documentation

- Understanding Traffic Processing on Security Devices on page 25
- fru-poweron-sequence on page 277

List of Sample Output

show chassis power sequence on page 419

Output Fields

Table 33 on page 419 lists the output fields for the show chassis power sequence command. Output fields are listed in the approximate order in which they appear.

Table 33: show chassis power sequence Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis FRU Power Sequence</td>
<td>Power-on sequence for the FPCs in the chassis. The numbers indicate the slot number of the FPCs.</td>
</tr>
</tbody>
</table>

Sample Output

show chassis power sequence

user@host> show chassis power sequence

Chassis FRU Power On Sequence: 0 1 2 3 4 5 6 7 8 9 10 11
**show firewall (View)**

**Syntax**

```
show firewall
<filter filter-name>
<counter counter-name>
<log>
<prefix-action-stats>
<terse>
```

**Release Information**

Command introduced before Junos OS Release 10.0.

**Description**

Display statistics about configured firewall filters.

**Options**

- `none`—Display statistics about configured firewall filters.
- `filter filter-name`—Name of a configured filter.
- `counter counter-name`—Name of a filter counter.
- `log`—Display log entries for firewall filters.
- `prefix-action-stats`—Display prefix action statistics for firewall filters.
- `terse`—Display firewall filter names only.

**Required Privilege**

view

**Related Documentation**

- `firewall`

**List of Sample Output**

show firewall on page 421

**Output Fields**

Table 34 on page 420 lists the output fields for the `show firewall` command. Output fields are listed in the approximate order in which they appear.

**Table 34: show firewall Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filter</td>
<td>Name of a filter that has been configured with the <code>filter</code> at the <code>[edit firewall]</code> hierarchy level.</td>
</tr>
<tr>
<td></td>
<td>When an interface-specific filter is displayed, the name of the filter is followed by the full interface name and by either <code>-i</code> for an input filter or <code>-o</code> for an output filter.</td>
</tr>
<tr>
<td></td>
<td>When dynamic filters are displayed, the name of the filter is followed by the full interface name and by either <code>-in</code> for an input filter or <code>-out</code> for an output filter. When a logical system–specific filter is displayed, the name of the filter is prefixed with two underscore (_) characters and the name of the logical system (for example, <code>__ls1/filter</code>).</td>
</tr>
</tbody>
</table>
Table 34: show firewall Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counters</td>
<td>Display filter counter information:</td>
</tr>
<tr>
<td></td>
<td>• <strong>Name</strong>—Name of a filter counter that has been configured with the <code>counter</code> firewall filter action.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Bytes</strong>—Number of bytes that match the filter term under which the <code>counter</code> action is specified.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Packets</strong>—Number of packets that matched the filter term under which the <code>counter</code> action is specified.</td>
</tr>
<tr>
<td>Policers</td>
<td>Display policer information:</td>
</tr>
<tr>
<td></td>
<td>• <strong>Name</strong>—Name of policer.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Bytes</strong>—Number of bytes that match the filter term under which the policer action is specified. This is only the number out-of-specification (out-of-spec) byte counts, not all the bytes in all packets policed by the policer.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Packets</strong>—Number of packets that matched the filter term under which the policer action is specified. This is only the number of out-of-specification (out-of-spec) packet counts, not all packets policed by the policer.</td>
</tr>
</tbody>
</table>

Sample Output

`show firewall`

```
user@host> show firewall
Filter: ef_path
Counters:
Name            Bytes  Packets
def-count       0       0
video-count     0       0
voice-count     0       0

Filter: __default_bpdu_filter__

Filter: deep
Counters:
Name            Bytes  Packets
deep2           302076  5031

Filter: deep-flood
Counters:
Name            Bytes  Packets
deep_flood_def  302136  5032
deep1           0       0

Policers:
Name            Packets
deep-pol-op-first 0
```
show interfaces (View Aggregated Ethernet)

Syntax

```
show interfaces <aenumber | rethnumber >
<brief | detail | extensive | terse>
<descriptions>
<media>
<snmp-index snmp-index>
<statistics>
```

Release Information

Command modified in Junos OS Release 10.2.

Description

Display status information about the specified aggregated Ethernet interface or redundant Ethernet interface. If you do not specify an interface name, status information for all interfaces is displayed.

NOTE: This command only provides interface statistics for a redundant ethernet interface (reth) when executed on the node which has the active members/links of the redundant ethernet interface.

Options

- `aenumber | rethnumber`—(Optional) Display standard information about the specified aggregated Ethernet interface or redundant Ethernet interface.
- `brief | detail | extensive | terse`—(Optional) Display the specified level of output.
- `descriptions`—(Optional) Display interface description strings.
- `media`—(Optional) Display media-specific information.
- `snmp-index snmp-index`—(Optional) Display information for the specified SNMP index of the interface.

Required Privilege

```
view
```

Related Documentation

- Understanding Traffic Processing on Security Devices on page 25

List of Sample Output

- `show interfaces extensive (Aggregated Ethernet)` on page 429

Output Fields

Table 35 on page 423 lists the output fields for the `show interfaces` (Aggregated Ethernet) command. Output fields are listed in the approximate order in which they appear.
### Table 35: Aggregated Ethernet show interfaces Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Interface</td>
<td>Name of the physical interface and state of the interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>Physical interface</td>
<td>Name of the physical interface and state of the interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>Enabled</td>
<td>State of the physical interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>Interface index</td>
<td>Index number of the physical interface, which reflects its initialization sequence.</td>
<td>All levels</td>
</tr>
<tr>
<td>SNMP ifIndex</td>
<td>SNMP index number for the physical interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Link-level type</td>
<td>Encapsulation being used on the physical interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>MTU</td>
<td>Maximum transmission unit size on the physical interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>Speed</td>
<td>Speed at which the interface is running.</td>
<td>All levels</td>
</tr>
<tr>
<td>Loopback</td>
<td>Loopback status: Enabled or Disabled. If loopback is enabled, type of loopback:</td>
<td>All levels</td>
</tr>
<tr>
<td></td>
<td>Local or Remote</td>
<td></td>
</tr>
<tr>
<td>Source filtering</td>
<td>Source filtering status: Enabled or Disabled.</td>
<td>All levels</td>
</tr>
<tr>
<td>Flow control</td>
<td>Flow control status: Enabled or Disabled.</td>
<td>All levels</td>
</tr>
<tr>
<td>Minimum links needed</td>
<td>Number of child links that must be operational for the aggregate interface to</td>
<td>All levels</td>
</tr>
<tr>
<td></td>
<td>be operational.</td>
<td></td>
</tr>
<tr>
<td>Device flags</td>
<td>Information about the physical device.</td>
<td>All levels</td>
</tr>
<tr>
<td>Interface flags</td>
<td>Information about the interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>Current address</td>
<td>Configured MAC address.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Hardware address</td>
<td>Hardware MAC address.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Last flapped</td>
<td>Date, time, and how long ago the interface went from down to up or up to down.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>The format is Last flapped: year-month-day hours:minutes:seconds timezone</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(hours:minutes:seconds ago). For example, Last flapped: 2002-04-26 10:52:40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PDT (04:33:20 ago).</td>
<td></td>
</tr>
<tr>
<td>Input Rate</td>
<td>Input rate in bits per second (bps) and packets per second (pps).</td>
<td>None specified</td>
</tr>
<tr>
<td>Output Rate</td>
<td>Output rate in bps and pps.</td>
<td>None specified</td>
</tr>
<tr>
<td>Statistics last cleared</td>
<td>Time when the statistics for the interface were last set to zero.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Field Name</td>
<td>Field Description</td>
<td>Level of Output</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Traffic statistics</td>
<td>Number and rate of bytes and packets received and transmitted on the physical interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Input bytes—Number of bytes received on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output bytes—Number of bytes transmitted on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Input packets—Number of packets received on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output packets—Number of packets transmitted on the interface.</td>
<td></td>
</tr>
<tr>
<td>IPv6 transit</td>
<td>Number of IPv6 transit bytes and packets received and transmitted on the physical interface if IPv6 statistics tracking is enabled.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>statistics</td>
<td>• Input bytes—Number of bytes received on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output bytes—Number of bytes transmitted on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Input packets—Number of packets received on the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Output packets—Number of packets transmitted on the interface.</td>
<td></td>
</tr>
<tr>
<td>Input errors</td>
<td>Input errors on the interface:</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Errors—Sum of incoming frame aborts and frame check sequence (FCS) errors.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Drops—Number of packets dropped by the input queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC’s RED mechanism.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Framing errors—Number of packets received with an invalid FCS.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Runt—Number of frames received that are smaller than the runt threshold.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Giants—Number of frames received that are larger than the giant threshold.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Policed discards—Number of frames that the incoming packet match code discarded because they were not recognized or not of interest. Usually, this field reports protocols that the Junos OS does not handle.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Resource errors—Sum of transmit drops.</td>
<td></td>
</tr>
<tr>
<td>Output errors</td>
<td>Output errors on the interface. The following paragraphs explain the counters whose meaning might not be obvious:</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Carrier transitions—Number of times the interface has gone from down to up. This number does not normally increment quickly, increasing only when the cable is unplugged, the far-end system is powered down and then up, or another problem occurs. If the number of carrier transitions increments quickly (perhaps once every 10 seconds), the cable, the far-end system, or the PIC is malfunctioning.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Errors—Sum of the outgoing frame aborts and FCS errors.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Drops—Number of packets dropped by the output queue of the I/O Manager ASIC. If the interface is saturated, this number increments once for every packet that is dropped by the ASIC’s RED mechanism.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• MTU errors—Number of packets whose size exceeded the MTU of the interface.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Resource errors—Sum of transmit drops.</td>
<td></td>
</tr>
<tr>
<td>Egress queues</td>
<td>Total number of egress queues supported on the specified interface</td>
<td>detail extensive</td>
</tr>
</tbody>
</table>

Table 35: Aggregated Ethernet show interfaces Output Fields (continued)
Table 35: Aggregated Ethernet show interfaces Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queue counters</td>
<td>CoS queue number and its associated user-configured forwarding class name.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Queued packets—Number of queued packets.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Transmitted packets—Number of transmitted packets.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Dropped packets—Number of packets dropped by the ASIC's RED mechanism.</td>
<td></td>
</tr>
<tr>
<td>Logical Interface</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index</td>
<td>Index number of the logical interface (which reflects its initialization sequence).</td>
<td>detail extensive</td>
</tr>
<tr>
<td>SNMP ifIndex</td>
<td>SNMP interface index number of the logical interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Flags</td>
<td>Information about the logical interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>VLAN-Tag</td>
<td>Tag Protocol Identifier (TPID) and VLAN identifier.</td>
<td>All levels</td>
</tr>
<tr>
<td>Demux</td>
<td>IP demultiplexing (demux) value that appears if this interface is used as the demux underlying interface. The output is one of the following:</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Source Family Inet</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>• Destination Family Inet</td>
<td></td>
</tr>
<tr>
<td>Encapsulation</td>
<td>Encapsulation on the logical interface.</td>
<td>All levels</td>
</tr>
<tr>
<td>Statistics</td>
<td>Information about the number of packets, packets per second, number of bytes, and bytes per second on this aggregate interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Bundle—Information about input and output bundle rates.</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>• Link—(detail and extensive only) Information about specific links in the aggregate, including link state and input and output rates.</td>
<td></td>
</tr>
<tr>
<td>LACP info</td>
<td>Link Aggregation Control Protocol (LACP) information for each aggregated interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• Role can be one of the following:</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>• Actor—Local device participating in LACP negotiation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Partner—Remote device participating in LACP negotiation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• System priority—Priority assigned to the system (by management or administrative policy), encoded as an unsigned integer.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• System identifier—Actor or partner system ID, encoded as a MAC address.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Port priority—Priority assigned to the port by the actor or partner (by management or administrative policy), encoded as an unsigned integer.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Port number—Port number assigned to the port by the actor or partner, encoded as an unsigned integer.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Port key—Operational key value assigned to the port by the actor or partner, encoded as an unsigned integer.</td>
<td></td>
</tr>
</tbody>
</table>
## Table 35: Aggregated Ethernet show interfaces Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>LACP Statistics</td>
<td>LACP statistics for each aggregated interface.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td></td>
<td>• <strong>LACP Rx</strong>—LACP received counter that increments for each normal hello.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>LACP Tx</strong>—Number of LACP transmit packet errors logged.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Unknown Rx</strong>—Number of unrecognized packet errors logged.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Illegal Rx</strong>—Number of invalid packets received.</td>
<td></td>
</tr>
<tr>
<td>Marker Statistic</td>
<td><em>(detail and extensive only)</em> Information about 802.3ad marker protocol statistics on the specified links.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td></td>
<td>• <strong>Marker Rx</strong>—Number of valid marker PDUs received on this aggregation port.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Resp Tx</strong>—Number of marker response PDUs transmitted on this aggregation port.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Unknown Rx</strong>—Number of frames received that either carry the slow protocols Ethernet type value (43B.4) but contain an unknown protocol data unit (PDU), or are addressed to the slow protocols group MAC address (43B.3) but do not carry the slow protocols Ethernet type.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Illegal Rx</strong>—Number of frames received that carry the slow protocols Ethernet type value (43B.4) but contain a badly formed PDU or an illegal value of protocol subtype (43B.4).</td>
<td></td>
</tr>
<tr>
<td>Flow Statistics</td>
<td>Flow statistics for each aggregated interface.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Flow input statistics</td>
<td>Statistics for packets received by the flow module.</td>
<td>detail extensive none</td>
</tr>
<tr>
<td>Flow Output statistics</td>
<td>Statistics for packets sent by the flow module.</td>
<td>detail extensive none</td>
</tr>
</tbody>
</table>
Table 35: Aggregated Ethernet show interfaces Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flow error statistics</strong></td>
<td>Packet drop statistics for the flow module.</td>
<td><strong>detail extensive none</strong></td>
</tr>
<tr>
<td>(Packets dropped due to)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Address spoofing</strong>—Packet dropped when the screen module detected address spoofing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Authentication failed</strong>—Packet dropped because the IPsec Encapsulating Security Payload (ESP) or Authentication Header (AH) authentication failed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Incoming NAT errors</strong>—Packet dropped because the source NAT rule search failed, an invalid source NAT binding was found, or the NAT allocation failed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Invalid zone received packet</strong>—This counter is not currently in use.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Multiple user authentications</strong>—Packet dropped if it matches more than one policy that specifies user authentication. (Sometimes packets are looped through the system more than once. Each time a packet passes through the system, that packet must be permitted by a policy.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>Multiple incoming NAT</strong>—Packet dropped if source NAT is specified more than once. (Sometimes packets are looped through the system more than once.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>No parent for a gate</strong>—This counter is not currently in use.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <strong>No one interested in self packets</strong>—This counter is incremented for one of the following reasons:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• The outbound interface is a self interface, but the packet is not marked as a to-self packet and the destination address is in a source NAT pool.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• No service is interested in the to-self packet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• When a zone has ident-reset service enabled, the TCP RST to IDENT request for port 113 is sent back and this counter is incremented.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 35: Aggregated Ethernet show interfaces Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow error statistics (Packets dropped due to)</td>
<td>Packet drop statistics for the flow module (continued).</td>
<td>detail extensive</td>
</tr>
<tr>
<td></td>
<td>• No minor session—Packet dropped because no minor sessions are available and a minor session was requested. Minor sessions are allocated for storing additional TCP state information.</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>• No more sessions—Packet dropped because there were no more free sessions available.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• No NAT gate—This counter is not currently in use.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• No route present—Packet dropped because a valid route was not available to forward the packet.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• No SA for incoming SPI—Packet dropped because the incoming IPsec packet’s security parameter index (SPI) does not match any known SPI.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• No tunnel found—Packet dropped because a valid tunnel could not be found.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• No session for a gate—Packet dropped by an ALG.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• No zone or NULL zone binding—Packet dropped because its incoming interface was not bound to any zone.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Policy denied—The error counter is incremented for one of the following reasons:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Source or destination NAT (or both) has occurred and policy says to drop the packet.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Policy specifies user authentication, which failed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Policy was configured to deny this packet.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Security association not active—Packet dropped because an IPsec packet was received for an inactive SA.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• TCP sequence number out of window—TCP packet with a sequence number failed the TCP sequence number check that was received.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Syn-attack protection—Packet dropped because of SYN attack protection or SYN cookie protection.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• User authentication errors—Packet dropped because policy requires authentication; however:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Only Telnet, FTP, and HTTP traffic can be authenticated.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The corresponding authentication entry could not be found, if web-auth is specified.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The maximum number of authenticated sessions per user was exceeded.</td>
<td></td>
</tr>
<tr>
<td>protocol-family</td>
<td>Protocol family configured on the logical interface.</td>
<td>brief</td>
</tr>
<tr>
<td>Protocol</td>
<td>Protocol family configured on the logical interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>MTU</td>
<td>Maximum transmission unit size on the logical interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Maximum labels</td>
<td>Maximum number of MPLS labels configured for the MPLS protocol family on the logical interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Route Table</td>
<td>Routing table in which the logical interface address is located. For example, 0 refers to the routing table ipv4.</td>
<td>detail extensive</td>
</tr>
</tbody>
</table>
Table 35: Aggregated Ethernet show interfaces Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flags</td>
<td>Information about protocol family flags.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Mac-Validate Failures</td>
<td>Number of MAC address validation failures for packets and bytes. This field is displayed when MAC address validation is enabled for the logical interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Addresses, Flags</td>
<td>Information about address flags.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Destination</td>
<td>IP address of the remote side of the connection.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Local</td>
<td>IP address of the logical interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Broadcast</td>
<td>Broadcast address of the logical interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Policer</td>
<td>Policer to be evaluated when packets are received or transmitted on the interface.</td>
<td>detail extensive</td>
</tr>
<tr>
<td>Generation</td>
<td>Unique number for use by Juniper Networks technical support only.</td>
<td>detail extensive</td>
</tr>
</tbody>
</table>

Sample Output

show interfaces extensive (Aggregated Ethernet)

```
user@host> show interfaces ae0 extensive

Physical interface: ae0, Enabled, Physical link is Up
  Interface index: 1973, SNMP ifIndex: 501, Generation: 2176
  Link-level type: Ethernet, MTU: 1518, Speed: 3Gbps, BPDU Error: None, MAC-REWRITE Error: None, Loopback: Disabled,
  Source filtering: Disabled, Flow control: Disabled, Minimum links needed: 1,
  Minimum bandwidth needed: 0
  Device flags : Present Running
  Interface flags: SNMP-Traps Internal: 0x4000
  Current address: 00:1f:12:8c:af:c0, Hardware address: 00:1f:12:8c:af:c0
  Last flapped : 2010-04-16 14:25:36 PDT (00:02:50 ago)
  Statistics last cleared: Never
  Traffic statistics:
    Input bytes : 64 0 bps
    Output bytes : 9816525824 463779840 bps
    Input packets : 1 0 pps
    Output packets : 38345804 226455 pps
  IPv6 transit statistics:
    Input bytes : 0
    Output bytes : 0
    Input packets : 0
    Output packets : 0
  Dropped traffic statistics due to STP State:
    Input bytes : 0
    Output bytes : 0
    Input packets : 0
    Output packets : 0
  Input errors:
```

Copyright © 2019, Juniper Networks, Inc.
Errors: 0, Drops: 0, Framing errors: 0, Runts: 0, Giants: 0, Policed discards: 0, Resource errors: 0
Output errors:
Carrier transitions: 0, Errors: 0, Drops: 0, MTU errors: 0, Resource errors: 0

Egress queues: 8 supported, 4 in use
Queue counters: Queued packets Transmitted packets Dropped packets
0 best-effort 38270790 38270790 0
1 expedited-f0 0 0 0
2 assured-forw 0 0 0
3 network-cont 526 526 0

Logical interface ae0.0 (Index 69) (SNMP ifIndex 502) (Generation 692)
Flags: SNMP-Traps 0x4000 VLAN-Tag [ 0x8100.11 ] Encapsulation: ENET2
Statistics Packets pps Bytes bps
Bundle: Input : 1 0 64 0
Output: 38572259 226453 9874497884 463775744

Link:
ge-5/0/1.0 Input : 0 0 0 0
Output: 12743866 75484 3262429696 154591232

ge-5/2/0.0 Input : 1 0 64 0
Output: 13043256 75484 3339073116 154591232

ge-5/2/1.0 Input : 0 0 0 0
Output: 12785137 75485 3272995072 154593280

Marker Statistics: Marker Rx Resp Tx Unknown Rx Illegal Rx
ge-5/0/1.0 0 0 0 0 0 0
ge-5/2/0.0 0 0 0 0 0 0
ge-5/2/1.0 0 0 0 0 0 0

Security: Zone: HOST
Allowed host-inbound traffic: bootp bfd bgp dns dvmrp igmp ldp msdp nhrp ospf pgm pim rip router-discovery rsvp sap vrrp dhcp finger ftp tftp ident-reset http https ike netconf ping reverse-telnet reverse-ssh rlogin rpm rsh snmp snmp-trap ssh telnet traceroute xnm-clear-text xnm-ssl lsping ntp sip

Flow Statistics:
Flow Input statistics:
Self packets : 0
ICMP packets : 0
VPN packets : 0
Multicast packets : 0
Bytes permitted by policy : 0
Connections established : 0
Flow Output statistics:
Multicast packets : 0
Bytes permitted by policy : 8976842784

Flow error statistics (Packets dropped due to):
Address spoofing: 0
Authentication failed: 0
Incoming NAT errors: 0
Invalid zone received packet: 0
Multiple user authentications: 0
Multiple incoming NAT: 0
### No parent for a gate: 0
No one interested in self packets: 0
No minor session: 0
No more sessions: 0
No NAT gate: 0
No route present: 0
No SA for incoming SPI: 0
No tunnel found: 0
No session for a gate: 0
No zone or NULL zone binding 0
Policy denied: 0
Security association not active: 0
TCP sequence number out of window: 0
Syn-attack protection: 0
User authentication errors: 0

**Protocol inet, MTU: 1500, Generation: 841, Route table: 0**
Flags: Send broadcast pkt-to-re
Addresses, Flags: Is-Preferred Is-Primary
Destination: 10.1.1/24, Local: 10.1.1.2, Broadcast: 10.1.1.255, Generation: 422

**Protocol multiservice, MTU: Unlimited, Generation: 842, Route table: 0**
Flags: Is-Primary
Policer: Input: __default_arp_policer_

Logical interface ae0.32767 (Index 83) (SNMP ifIndex 503) (Generation 693)
Flags: SNMP-Traps 0x4004000 VLAN-Tag [ 0x0000.0 ] Encapsulation: ENET2

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Bundle:</th>
<th>Link: ge-5/0/1.32767</th>
<th>ge-5/2/0.32767</th>
<th>ge-5/2/1.32767</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Input:</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
</tr>
<tr>
<td></td>
<td>Output:</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
</tr>
</tbody>
</table>

**LACP info:**

<table>
<thead>
<tr>
<th>Role</th>
<th>System</th>
<th>System</th>
<th>Port</th>
<th>Port</th>
<th>Port</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>priority</td>
<td>identifier</td>
<td>priority</td>
<td>number</td>
<td>key</td>
</tr>
<tr>
<td>ge-5/0/1.32767</td>
<td>Actor</td>
<td>127 00:1f:12:8c:af:c0</td>
<td>127</td>
<td>833</td>
<td>1</td>
</tr>
<tr>
<td>ge-5/0/1.32767</td>
<td>Partner</td>
<td>127 00:1f:12:8f:d7:c0</td>
<td>127</td>
<td>641</td>
<td>1</td>
</tr>
<tr>
<td>ge-5/2/0.32767</td>
<td>Actor</td>
<td>127 00:1f:12:8c:af:c0</td>
<td>127</td>
<td>848</td>
<td>1</td>
</tr>
<tr>
<td>ge-5/2/0.32767</td>
<td>Partner</td>
<td>127 00:1f:12:8f:d7:c0</td>
<td>127</td>
<td>656</td>
<td>1</td>
</tr>
<tr>
<td>ge-5/2/1.32767</td>
<td>Actor</td>
<td>127 00:1f:12:8c:af:c0</td>
<td>127</td>
<td>849</td>
<td>1</td>
</tr>
<tr>
<td>ge-5/2/1.32767</td>
<td>Partner</td>
<td>127 00:1f:12:8f:d7:c0</td>
<td>127</td>
<td>657</td>
<td>1</td>
</tr>
</tbody>
</table>

**LACP Statistics:**

<table>
<thead>
<tr>
<th>ge-5/0/1.32767</th>
<th>LACP Rx</th>
<th>LACP Tx</th>
<th>Unknown Rx</th>
<th>Illegal Rx</th>
</tr>
</thead>
<tbody>
<tr>
<td>342</td>
<td>511</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Marker Statistics:**

<table>
<thead>
<tr>
<th>ge-5/0/1.32767</th>
<th>Marker Rx</th>
<th>Resp Tx</th>
<th>Unknown Rx</th>
<th>Illegal Rx</th>
</tr>
</thead>
<tbody>
<tr>
<td>344</td>
<td>498</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
ge-5/0/1.32767 0 0 0 0 0
ge-5/2/0.32767 0 0 0 0 0
ge-5/2/1.32767 0 0 0 0 0

Security: Zone: HOST
Allowed host-inbound traffic: bootp bfd bgp dns dvmrp igmp ldp msdp nhrp ospf pgm pim rip router-discovery rsvp sap vrrp dhcp finger ftp tftp ident-reset http https ike netconf ping reverse-telnet reverse-ssh rlogin rpm rsh snmp snmp-trap ssh telnet traceroute xnm-clear-text xnm-ssl lspaning ntp sip

Flow Statistics:
Flow Input statistics:
  Self packets: 0
  ICMP packets: 0
  VPN packets: 0
  Multicast packets: 0
  Bytes permitted by policy: 0
  Connections established: 0

Flow Output statistics:
  Multicast packets: 0
  Bytes permitted by policy: 0

Flow error statistics (Packets dropped due to):
  Address spoofing: 0
  Authentication failed: 0
  Incoming NAT errors: 0
  Invalid zone received packet: 0
  Multiple user authentications: 0
  Multiple incoming NAT: 0
  No parent for a gate: 0
  No one interested in self packets: 0
  No minor session: 0
  No more sessions: 0
  No NAT gate: 0
  No route present: 0
  No SA for incoming SPI: 0
  No tunnel found: 0
  No session for a gate: 0
  No zone or NULL zone binding: 0
  Policy denied: 0
  Security association not active: 0
  TCP sequence number out of window: 0
  Syn-attack protection: 0
  User authentication errors: 0

Protocol multiservice, MTU: Unlimited, Generation: 843, Route table: 0
Flags: None
Policer: Input: __default_arp_policer__
**show interfaces diagnostics optics**

**Syntax**
show interfaces diagnostics optics *interface-name*

**Release Information**
Command introduced in Junos OS Release 10.1.

**Description**
Display diagnostics data and alarms for Gigabit Ethernet optical transceivers (SFP) installed in SRX Series Services Gateways. The information provided by this command is known as digital optical monitoring (DOM) information.

Thresholds that trigger a high alarm, low alarm, high warning, or low warning are set by the transponder vendors. Generally, a high alarm or low alarm indicates that the optics module is not operating properly. This information can be used to diagnose why a transceiver is not working.

**NOTE:** In a chassis cluster, the `show interfaces diagnostics optics` command works only on the node that is primary in redundancy group 0 (RG0).

**Options**
*interface-name*—Name of the interface associated with the port in which the transceiver is installed: `ge-fpc/pic/port`.

**Required Privilege Level**
view

**Related Documentation**
- *Understanding Interfaces*

**List of Sample Output**
show interfaces diagnostics optics on page 436

**Output Fields**
Table 36 on page 433 lists the output fields for the `show interfaces diagnostics optics` command. Output fields are listed in the general order in which they appear.

**Table 36: show interfaces diagnostics optics Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical interface</td>
<td>Displays the name of the physical interface.</td>
</tr>
<tr>
<td>Laser bias current</td>
<td>Displays the magnitude of the laser bias power setting current, in milliamperes. The laser bias provides direct modulation of laser diodes and modulates currents.</td>
</tr>
<tr>
<td>Laser output power</td>
<td>Displays the laser output power, in milliwatts (mW) and decibels referred to 1.0 mW (dBm).</td>
</tr>
</tbody>
</table>
### Table 36: `show interfaces diagnostics optics` Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module temperature</td>
<td>Displays the temperature, in Celsius and Fahrenheit.</td>
</tr>
<tr>
<td>Module voltage</td>
<td>Displays the voltage, in Volts.</td>
</tr>
<tr>
<td>Receiver signal average optical power</td>
<td>Displays the receiver signal average optical power, in milliwatts (mW) and decibels referred to 1.0 mW (dBm).</td>
</tr>
<tr>
<td>Laser bias current high alarm</td>
<td>Displays whether the laser bias power setting high alarm is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>Laser bias current low alarm</td>
<td>Displays whether the laser bias power setting low alarm is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>Laser bias current high warning</td>
<td>Displays whether the laser bias power setting high warning is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>Laser bias current low warning</td>
<td>Displays whether the laser bias power setting low warning is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>Laser output power high alarm</td>
<td>Displays whether the laser output power high alarm is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>Laser output power low alarm</td>
<td>Displays whether the laser output power low alarm is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>Laser output power high warning</td>
<td>Displays whether the laser output power high warning is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>Laser output power low warning</td>
<td>Displays whether the laser output power low warning is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>Module temperature high alarm</td>
<td>Displays whether the module temperature high alarm is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>Module temperature low alarm</td>
<td>Displays whether the module temperature low alarm is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>Module temperature high warning</td>
<td>Displays whether the module temperature high warning is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>Module temperature low warning</td>
<td>Displays whether the module temperature low warning is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>Module voltage high alarm</td>
<td>Displays whether the module voltage high alarm is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
<tr>
<td>Module voltage low alarm</td>
<td>Displays whether the module voltage low alarm is <strong>On</strong> or <strong>Off</strong>.</td>
</tr>
</tbody>
</table>
**Table 36: show interfaces diagnostics optics Output Fields (continued)**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module voltage high warning</td>
<td>Displays whether the module voltage high warning is On or Off.</td>
</tr>
<tr>
<td>Module voltage low warning</td>
<td>Displays whether the module voltage low warning is On or Off.</td>
</tr>
<tr>
<td>Laser rx power high alarm</td>
<td>Displays whether the receive laser power high alarm is On or Off.</td>
</tr>
<tr>
<td>Laser rx power low alarm</td>
<td>Displays whether the receive laser power low alarm is On or Off.</td>
</tr>
<tr>
<td>Laser bias current high alarm threshold</td>
<td>Displays the vendor-specified threshold for the laser bias current high alarm.</td>
</tr>
<tr>
<td>Laser bias current low alarm threshold</td>
<td>Displays the vendor-specified threshold for the laser bias current low alarm.</td>
</tr>
<tr>
<td>Laser bias current high warning threshold</td>
<td>Displays the vendor-specified threshold for the laser bias current high warning.</td>
</tr>
<tr>
<td>Laser bias current low warning threshold</td>
<td>Displays the vendor-specified threshold for the laser bias current low warning.</td>
</tr>
<tr>
<td>Laser output power high alarm threshold</td>
<td>Displays the vendor-specified threshold for the laser output power high alarm.</td>
</tr>
<tr>
<td>Laser output power low alarm threshold</td>
<td>Displays the vendor-specified threshold for the laser output power low alarm.</td>
</tr>
<tr>
<td>Laser output power high warning threshold</td>
<td>Displays the vendor-specified threshold for the laser output power high warning.</td>
</tr>
<tr>
<td>Laser output power low warning threshold</td>
<td>Displays the vendor-specified threshold for the laser output power low warning.</td>
</tr>
</tbody>
</table>
### Table 36: show interfaces diagnostics optics Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module temperature low warning threshold</td>
<td>Displays the vendor-specified threshold for the module temperature low warning.</td>
</tr>
<tr>
<td>Module voltage high alarm threshold</td>
<td>Displays the vendor-specified threshold for the module voltage high alarm.</td>
</tr>
<tr>
<td>Module voltage low alarm threshold</td>
<td>Displays the vendor-specified threshold for the module voltage low alarm.</td>
</tr>
<tr>
<td>Module voltage high warning threshold</td>
<td>Displays the vendor-specified threshold for the module voltage high warning.</td>
</tr>
<tr>
<td>Module voltage low warning threshold</td>
<td>Displays the vendor-specified threshold for the module voltage low warning.</td>
</tr>
<tr>
<td>Laser rx power high alarm threshold</td>
<td>Displays the vendor-specified threshold for the laser rx power high alarm.</td>
</tr>
<tr>
<td>Laser rx power low alarm threshold</td>
<td>Displays the vendor-specified threshold for the laser rx power low alarm.</td>
</tr>
<tr>
<td>Laser rx power high warning threshold</td>
<td>Displays the vendor-specified threshold for the laser rx power high warning.</td>
</tr>
<tr>
<td>Laser rx power low warning threshold</td>
<td>Displays the vendor-specified threshold for the laser rx power low warning.</td>
</tr>
</tbody>
</table>

### Sample Output

```plaintext
show interfaces diagnostics optics

user@host> show interfaces diagnostics optics ge-2/0/0

Physical interface: ge-2/0/0

<table>
<thead>
<tr>
<th>Laser bias current</th>
<th>7.408 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laser output power</td>
<td>0.3500 mW / -4.56 dBm</td>
</tr>
<tr>
<td>Module temperature</td>
<td>23 degrees C / 73 degrees F</td>
</tr>
<tr>
<td>Module voltage</td>
<td>3.3450 V</td>
</tr>
<tr>
<td>Receiver signal average optical power</td>
<td>0.0002 mW / -36.99 dBm</td>
</tr>
<tr>
<td>Laser bias current high alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Laser bias current low alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Laser bias current high warning</td>
<td>Off</td>
</tr>
<tr>
<td>Laser bias current low warning</td>
<td>Off</td>
</tr>
<tr>
<td>Laser output power high alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Laser output power low alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Laser output power high warning</td>
<td>Off</td>
</tr>
<tr>
<td>Laser output power low warning</td>
<td>Off</td>
</tr>
<tr>
<td>Module temperature high alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Module temperature low alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Module temperature high warning</td>
<td>Off</td>
</tr>
<tr>
<td>Module temperature low warning</td>
<td>Off</td>
</tr>
<tr>
<td>Module voltage high alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Module voltage low alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Module voltage high warning</td>
<td>Off</td>
</tr>
<tr>
<td>Module voltage low warning</td>
<td>Off</td>
</tr>
</tbody>
</table>
```

436 Copyright © 2019, Juniper Networks, Inc.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module voltage low alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Module voltage high warning</td>
<td>Off</td>
</tr>
<tr>
<td>Module voltage low warning</td>
<td>Off</td>
</tr>
<tr>
<td>Laser rx power high alarm</td>
<td>Off</td>
</tr>
<tr>
<td>Laser rx power low alarm</td>
<td>On</td>
</tr>
<tr>
<td>Laser rx power high warning</td>
<td>Off</td>
</tr>
<tr>
<td>Laser rx power low warning</td>
<td>On</td>
</tr>
<tr>
<td>Laser bias current high alarm threshold</td>
<td>17.000 mA</td>
</tr>
<tr>
<td>Laser bias current low alarm threshold</td>
<td>1.000 mA</td>
</tr>
<tr>
<td>Laser bias current high warning threshold</td>
<td>14.000 mA</td>
</tr>
<tr>
<td>Laser bias current low warning threshold</td>
<td>2.000 mA</td>
</tr>
<tr>
<td>Laser output power high alarm threshold</td>
<td>0.6310 mW/ -2.00 dBm</td>
</tr>
<tr>
<td>Laser output power low alarm threshold</td>
<td>0.0670 mW/ -11.74 dBm</td>
</tr>
<tr>
<td>Laser output power high warning threshold</td>
<td>0.6310 mW/ -2.00 dBm</td>
</tr>
<tr>
<td>Laser output power low warning threshold</td>
<td>0.0790 mW/ -11.02 dBm</td>
</tr>
<tr>
<td>Module temperature high alarm threshold</td>
<td>95 degrees C / 203 degrees F</td>
</tr>
<tr>
<td>Module temperature low alarm threshold</td>
<td>-25 degrees C / -13 degrees F</td>
</tr>
<tr>
<td>Module temperature high warning threshold</td>
<td>90 degrees C / 194 degrees F</td>
</tr>
<tr>
<td>Module temperature low warning threshold</td>
<td>-20 degrees C / -4 degrees F</td>
</tr>
<tr>
<td>Module voltage high alarm threshold</td>
<td>3.900 V</td>
</tr>
<tr>
<td>Module voltage low alarm threshold</td>
<td>2.700 V</td>
</tr>
<tr>
<td>Module voltage high warning threshold</td>
<td>3.700 V</td>
</tr>
<tr>
<td>Module voltage low warning threshold</td>
<td>2.900 V</td>
</tr>
<tr>
<td>Laser rx power high alarm threshold</td>
<td>1.2590 mW/ 1.00 dBm</td>
</tr>
<tr>
<td>Laser rx power low alarm threshold</td>
<td>0.0100 mW/ -20.00 dBm</td>
</tr>
<tr>
<td>Laser rx power high warning threshold</td>
<td>0.7940 mW/ -1.00 dBm</td>
</tr>
<tr>
<td>Laser rx power low warning threshold</td>
<td>0.0158 mW/ -18.01 dBm</td>
</tr>
</tbody>
</table>
show interfaces flow-statistics

Syntax  
\[\text{show interfaces flow-statistics} \ {<interface-name>}\]

Release Information  
Command introduced in Junos OS Release 9.2.

Description  
Display interfaces flow statistics.

Options  
\[\text{Interface-name} \]—(Optional) Display flow statistics about the specified interface. Following is a list of typical interface names. Replace \textit{pim} with the PIM slot and \textit{port} with the port number. For a complete list, see the Interface Naming Conventions.

- \textit{at-pim}/0/\textit{port}—ATM-over-ADSL or ATM-over-SHDSL interface.
- \textit{br-pim}/0/\textit{port}—Basic Rate Interface for establishing ISDN connections.
- \textit{ce1-pim}/0/\textit{port}—Channelized E1 interface.
- \textit{ct1-pim}/0/\textit{port}—Channelized T1 interface.
- \textit{dl0}—Dialer Interface for initiating ISDN and USB modem connections.
- \textit{e1-pim}/0/\textit{port}—E1 interface.
- \textit{e3-pim}/0/\textit{port}—E3 interface.
- \textit{fe-pim}/0/\textit{port}—Fast Ethernet interface.
- \textit{ge-pim}/0/\textit{port}—Gigabit Ethernet interface.
- \textit{se-pim}/0/\textit{port}—Serial interface.
- \textit{t1-pim}/0/\textit{port}—T1 (also called DS1) interface.
- \textit{t3-pim}/0/\textit{port}—T3 (also called DS3) interface.
- \textit{wx-slot}/0/0—WAN acceleration interface, for the WXC Integrated Services Module (ISM 200).

Required Privilege Level  
view

Related Documentation  
- Understanding Traffic Processing on Security Devices on page 25
- Understanding Interfaces

List of Sample Output  
show interfaces flow-statistics (Gigabit Ethernet) on page 441

Output Fields  
Table 37 on page 439 lists the output fields for the show interfaces flow-statistics command. Output fields are listed in the approximate order in which they appear.
### Table 37: show interfaces flow-statistics Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic statistics</td>
<td>Number of packets and bytes transmitted and received on the physical interface.</td>
</tr>
<tr>
<td>Local statistics</td>
<td>Number of packets and bytes transmitted and received on the physical interface.</td>
</tr>
<tr>
<td>Transit statistics</td>
<td>Number of packets and bytes transiting the physical interface.</td>
</tr>
<tr>
<td>Flow input statistics</td>
<td>Statistics on packets received by flow module.</td>
</tr>
<tr>
<td>Flow output statistics</td>
<td>Statistics on packets sent by flow module.</td>
</tr>
</tbody>
</table>

For further details, see Table 38 on page 439.

### Table 38: Flow Error Statistics (Packet Drop Statistics for the Flow Module)

<table>
<thead>
<tr>
<th>Error</th>
<th>Error Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen:</td>
<td></td>
</tr>
<tr>
<td>Address spoofing</td>
<td>The packet was dropped when the screen module detected address spoofing.</td>
</tr>
<tr>
<td>Syn-attack protection</td>
<td>The packet was dropped because of SYN attack protection or SYN cookie protection.</td>
</tr>
<tr>
<td>VPN:</td>
<td></td>
</tr>
<tr>
<td>Authentication failed</td>
<td>The packet was dropped because the IPsec Encapsulating Security Payload (ESP) or Authentication Header (AH) authentication failed.</td>
</tr>
<tr>
<td>No SA for incoming SPI</td>
<td>The packet was dropped because the incoming IPsec packet’s security parameter index (SPI) does not match any known SPI.</td>
</tr>
<tr>
<td>Security association not active</td>
<td>The packet was dropped because an IPsec packet was received for an inactive SA.</td>
</tr>
<tr>
<td>NAT:</td>
<td></td>
</tr>
<tr>
<td>Incoming NAT errors</td>
<td>The source NAT rule search failed, an invalid source NAT binding was found, or the NAT allocation failed.</td>
</tr>
<tr>
<td>Multiple incoming NAT</td>
<td>Sometimes packets are looped through the system more than once; if source NAT is specified more than once, the packet will be dropped.</td>
</tr>
<tr>
<td>Auth:</td>
<td></td>
</tr>
<tr>
<td>Multiple user authentications</td>
<td>Sometimes packets are looped through the system more than once. Each time a packet passes through the system, that packet must be permitted by a policy. If the packet matches more than one policy that specifies user authentication, then it will be dropped.</td>
</tr>
</tbody>
</table>
Table 38: Flow Error Statistics (Packet Drop Statistics for the Flow Module) (continued)

<table>
<thead>
<tr>
<th>User authentication errors</th>
<th>Packet was dropped because policy requires authentication; however:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Only Telnet, FTP, and HTTP traffic can be authenticated.</td>
</tr>
<tr>
<td></td>
<td>• The corresponding authentication entry could not be found, if web-auth is specified.</td>
</tr>
<tr>
<td></td>
<td>• The maximum number of authenticated sessions per user was exceeded.</td>
</tr>
</tbody>
</table>

Flow:

<table>
<thead>
<tr>
<th>No one interested in self packets</th>
<th>This counter is incremented for one of the following reasons:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• The outbound interface is a self interface, but the packet is not marked as a to-self packet and the destination address is in a source NAT pool.</td>
</tr>
<tr>
<td></td>
<td>• No service is interested in the to-self packet</td>
</tr>
<tr>
<td></td>
<td>• When a zone has ident-reset service enabled, the TCP RST to IDENT request for port 113 is sent back and this counter is incremented.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No minor session</th>
<th>The packet was dropped because no minor sessions are available and a minor session was requested. Minor sessions are allocated for storing additional TCP state information.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>No more sessions</th>
<th>The packet was dropped because there were no more free sessions available.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>No route present</th>
<th>The packet was dropped because a valid route was not available to forward the packet.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For new sessions, the counter is incremented for one of the following reasons:</td>
</tr>
<tr>
<td></td>
<td>• No valid route was found to forward the packet.</td>
</tr>
<tr>
<td></td>
<td>• A discard or reject route was found.</td>
</tr>
<tr>
<td></td>
<td>• The route could not be added due to lack of memory.</td>
</tr>
<tr>
<td></td>
<td>• The reverse path forwarding check failed for an incoming multicast packet.</td>
</tr>
<tr>
<td></td>
<td>For existing sessions, the prior route was changed or deleted, or a more specific route was added. The session is rerouted, and this reroute could fail because:</td>
</tr>
<tr>
<td></td>
<td>• A new route could not be found; either the previous route was removed, or the route was changed to discard or reject.</td>
</tr>
<tr>
<td></td>
<td>• Multiple packets may concurrently force rerouting to occur, and only one packet can successfully complete the rerouting process. Other packets will be dropped.</td>
</tr>
<tr>
<td></td>
<td>• The route table was locked for updates by the Routing Engine. Packets that match a new session are retried, whereas packets that match an existing session are not.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No tunnel found</th>
<th>The packet was dropped because a valid tunnel could not be found</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>No session for a gate</th>
<th>This counter is incremented when a packet is destined for an ALG, and the ALG decides to drop this packet.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>No zone or NULL zone binding</th>
<th>The packet was dropped because its incoming interface was not bound to any zone.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Policy denied</th>
<th>The error counter is incremented for one of the following reasons:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Source and/or destination NAT has occurred and policy says to drop the packet.</td>
</tr>
<tr>
<td></td>
<td>• Policy specifies user authentication, which failed.</td>
</tr>
<tr>
<td></td>
<td>• Policy was configured to deny this packet.</td>
</tr>
</tbody>
</table>
Table 38: Flow Error Statistics (Packet Drop Statistics for the Flow Module) (continued)

<table>
<thead>
<tr>
<th>TCP sequence number out of window</th>
<th>A TCP packet with a sequence number failed the TCP sequence number check that was received.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counters Not Currently in Use</td>
<td></td>
</tr>
<tr>
<td>No parent for a gate</td>
<td>-</td>
</tr>
<tr>
<td>Invalid zone received packet</td>
<td>-</td>
</tr>
<tr>
<td>No NAT gate</td>
<td>-</td>
</tr>
</tbody>
</table>

Sample Output

show interfaces flow-statistics (Gigabit Ethernet)

```
user@host> show interfaces flow-statistics ge-0/0/1.0
Logical interface ge-0/0/1.0 (Index 70) (SNMP ifIndex 49)
  Flags: SNMP-Traps Encapsulation: ENET2
  Input packets : 5161
  Output packets: 83
  Security: Zone: zone2
  Allowed host-inbound traffic : bootp bfd bgp dns dvmrp igmp ldp msdp nhrp ospf pgm
                                pim rip router-discovery rsvp sap vrrp dhcp finger ftp tftp ident-reset http
                                https ike
                                netconf ping rlogin rpm rsh snmp snmp-trap ssh telnet traceroute xnm-clear-text
                                xnm-ssl
                                lping
  Flow Statistics :
  Flow Input statistics :
    Self packets :                     0
    ICMP packets :                     0
    VPN packets :                      2564
    Bytes permitted by policy :        3478
    Connections established :          1
  Flow Output statistics:            
    Multicast packets :               0
    Bytes permitted by policy :        16994
  Flow error statistics (Packets dropped due to):
    Address spoofing:                  0
    Authentication failed:             0
    Incoming NAT errors:               0
    Invalid zone received packet:      0
    Multiple user authentications:     0
    Multiple incoming NAT:             0
    No parent for a gate:              0
    No one interested in self packets: 0
    No minor session:                  0
    No more sessions:                  0
    No NAT gate:                       0
    No route present:                  0
    No SA for incoming SPI:            0
    No tunnel found:                   0
    No session for a gate:             0
    No zone or NULL zone binding       0
    Policy denied:                     0
```
<table>
<thead>
<tr>
<th>Feature</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security association not active</td>
<td>0</td>
</tr>
<tr>
<td>TCP sequence number out of window</td>
<td>0</td>
</tr>
<tr>
<td>Syn-attack protection</td>
<td>0</td>
</tr>
<tr>
<td>User authentication errors</td>
<td>0</td>
</tr>
<tr>
<td>Protocol inet, MTU: 1500</td>
<td></td>
</tr>
<tr>
<td>Addresses, Flags: Is-Preferred Is-Primary</td>
<td></td>
</tr>
<tr>
<td>Destination: 203.0.113.1/24, Local: 203.0.113.2, Broadcast: 2.2.2.255</td>
<td></td>
</tr>
</tbody>
</table>
**show interfaces swfabx**

**Syntax**

```
show interfaces (swfab0 | swfab1)
```

**Release Information**

Command introduced in Junos OS Release 11.1.

**Description**

Display the configured interfaces for each swfab interface. The swfab interface can contain one or more members because it is an aggregated interface.

**Required Privilege Level**

view

**Related Documentation**

- `clear interfaces statistics swfabx`

**List of Sample Output**

- `show interfaces swfab0 on page 443`
- `show interfaces swfab1 on page 443`

**Output Fields**

Table 39 on page 443 lists the output fields for the `show interfaces <swfab0 | swfab1>` command. Output fields are listed in the approximate order in which they appear.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>fabric-options</code></td>
<td>The fabric-options hierarchy is configured to be in sync with the fab interfaces.</td>
</tr>
<tr>
<td><code>member-interfaces</code></td>
<td>Interfaces specified under member-interfaces are single aggregate interfaces.</td>
</tr>
<tr>
<td></td>
<td>This interface carries internode switching traffic.</td>
</tr>
</tbody>
</table>

**Sample Output**

**show interfaces swfab0**

```
user@host# show interfaces swfab0
fabric-options {
    member-interfaces {
        ge-0/0/9;
        ge-0/0/10;
    }
}
```

**show interfaces swfab1**

```
user@host# show interfaces swfab1
fabric-options {
    member-interfaces {
```
ge-7/0/9;
ge-7/0/10;
}
}
show monitor security flow

Syntax

```
show monitor security flow
```

Release Information

Command introduced in Junos OS Release 12.1X46-D10. This topic was updated to include the flow session conn-tag filter in Junos OS Release 15.1X49-D70.

Description

Display information about the security flow session monitoring.

Required Privilege

`view`

Related Documentation

- Monitoring Security Flow Sessions Overview on page 161
- monitor security flow filter on page 379
- monitor security flow start on page 381
- clear monitor security flow filter on page 337

List of Sample Output

```
show monitor security flow on page 446
```

Output Fields

Lists the output fields for the `show monitor security flow` command. Output fields are listed in the approximate order in which they appear.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor security flow session status</td>
<td>State of the security flow session monitoring: active or inactive.</td>
</tr>
<tr>
<td>Monitor security flow trace file</td>
<td>Name of the file for monitoring output.</td>
</tr>
</tbody>
</table>
| Monitor security flow filters      | • conn-tag—Tag that uniquely identifies a session. The session key is expanded to include this tuple.  
                                         • Destination Address—Address of the destination to be matched.  
                                         • Destination Port—Name of the destination port to be matched.  
                                         • Interface Name—Interface name to be matched.  
                                         • Logical System Name—Logical system name to be matched.  
                                         • Name—Name of the security flow filter.  
                                         • Protocol—Name of the protocol to be matched.  
                                         • Source Address—Address of the source to be matched.  
                                         • Source Port—Name of the source port to be matched.  
                                         • Status—State of the security flow filter: active or inactive. |
Sample Output

show monitor security flow

user@host> show monitor security flow

Monitor security flow session status: Active
Monitor security flow trace file: flow
Monitor security flow filters:
  Name: server-sql
      Status: Active
      source: 10.2.2.1 (port *), destination: 10.20.30.40 (port 1433)
      protocol: TCP
      conn-tag: 0
  Name: internet-access
      Status: Active
      source: * (port *), destination: * (port 80)
      protocol: TCP
      conn-tag: 0
show security flow cp-session

Syntax

```
show security flow cp-session [ <filter> ] [ summary | terse ]
<node ( node-id | all | local | primary)>
```

Release Information

Command introduced in Junos OS Release 10.2. Support for connection tag added in Junos OS Release 15.1X49-D40.

Description

Display central point session-related flow information. This command is supported on the SRX5800, SRX5600, and SRX5400 devices.

Options

- conn-tag — Session connection tag (0..4294967295)
- destination-port — Destination port (1..65535)
- destination-prefix — Destination prefix
- family — Display session by family.
- logical-system — Logical-system name
- node — (Optional) For chassis cluster configurations, display security flow cp-session information on a specific node (device) in the cluster.
  - node-id — Identification number of the node. It can be 0 or 1.
  - all — Display information about all nodes.
  - local — Display information about the local node.
  - primary — Display information about the primary node.
- protocol — IP protocol number
- root-logical-system — Root logical-system (default)
- source-port — Source port (1..65535)
- source-prefix — Source IP prefix or address
- summary | terse — Display the specified level of output.

Required Privilege

- Level view

Related Documentation

- Understanding Traffic Processing on Security Devices on page 25

List of Sample Output

- show security flow cp-session on page 448
- show security flow cp-session summary on page 449
- show security flow cp-session terse on page 449
Output Fields  

Table 41 on page 448 lists the output fields for the `show security flow cp-session` command. Output fields are listed in the approximate order in which they appear.

**Table 41: show security flow cp-session Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid gates</td>
<td>Number of valid central point sessions.</td>
</tr>
<tr>
<td>Pending gates</td>
<td>Number of pending central point sessions.</td>
</tr>
<tr>
<td>Invalidated gates</td>
<td>Number of invalid central point sessions.</td>
</tr>
<tr>
<td>Gates in other states</td>
<td>Number of central point sessions in other states.</td>
</tr>
<tr>
<td>Total gates</td>
<td>Number of central point sessions in total.</td>
</tr>
<tr>
<td>Maximum sessions</td>
<td>Number of maximum central point sessions.</td>
</tr>
<tr>
<td>Maximum inet6 sessions</td>
<td>Number of maximum inet6 central point sessions.</td>
</tr>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. Use this ID to get more information about the session.</td>
</tr>
<tr>
<td>Conn Tag</td>
<td>A 32-bit connection tag that uniquely identifies the GPRS tunneling protocol, user plane (GTP-U) and the Stream Control Transmission Protocol (SCTP) sessions. The connection tag for GTP-U is the tunnel endpoint identifier (TEID) and for SCTP is the vTag. The connection ID remains 0 if the connection tag is not used by the sessions.</td>
</tr>
<tr>
<td>SPU</td>
<td>Services Processing Unit.</td>
</tr>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses).</td>
</tr>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses).</td>
</tr>
</tbody>
</table>

**Sample Output**

```
show security flow cp-session

root> show security flow cp-session

DCP Flow Sessions on FPC0 PIC0:
Total sessions: 0

DCP Flow Sessions on FPC0 PIC1:

Session ID: 10320276, SPU: 1, Valid
   In: 203.0.113.1/1000 --> o 203.0.113.2/2000;udp, Conn Tag: 0x0,
   Out: 0.0.0.0/0 --> 0.0.0.0/0;0, Conn Tag: 0x0,
Total sessions: 1
```
## Sample Output

### show security flow cp-session summary

```bash
root> show security flow cp-session summary

DCP Flow Sessions on FPC10 PIC0:

Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0

DCP Flow Sessions on FPC10 PIC1:

Valid sessions: 2
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 2
Maximum sessions: 7549747
Maximum inet6 sessions: 7549747

DCP Flow Sessions on FPC10 PIC2:

Valid sessions: 2
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 2
Maximum sessions: 7549747
Maximum inet6 sessions: 7549747

DCP Flow Sessions on FPC10 PIC3:

Valid sessions: 1
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 1
Maximum sessions: 7549747
Maximum inet6 sessions: 7549747
```

### show security flow cp-session terse

```bash
root> show security flow cp-session terse

DCP Flow Sessions on FPC0 PIC1:

Session ID: 10000038, SPU: 1, Valid
  In: 203.0.113.6/1 --> 198.51.100.13/1;pim, Conn Tag: 0x0,
  Out: 198.51.100.13/1 --> 203.0.113.6/1;pim, Conn Tag: 0x0,

Total sessions: 1
```
show security flow cp-session destination-port

Syntax

```
show security flow cp-session destination-port destination-port-number [summary | terse]
```

Release Information

Command introduced in Junos OS Release 10.2. This command is supported on the SRX1500, SRX5400, SRX5600, and SRX5800 devices.

Description

Display central point session-related flow information for the specified destination port.

Options

- `destination-port-number` — Number of the destination port for which to display central point session information.
  - Range: 1 through 65,535
  - `summary | terse` — Display the specified level of output.

Required Privilege Level

view

Related Documentation

- show security flow cp-session on page 447
- show security flow cp-session destination-prefix on page 453

List of Sample Output

- show security flow cp-session destination-port summary on page 451
- show security flow cp-session destination-port terse on page 451

Output Fields

Table 42 on page 450 lists the output fields for the `show security flow cp-session destination-port` command. Output fields are listed in the approximate order in which they appear.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid gates</td>
<td>Number of valid central point sessions.</td>
</tr>
<tr>
<td>Pending gates</td>
<td>Number of pending central point sessions.</td>
</tr>
<tr>
<td>Invalidated gates</td>
<td>Number of invalid central point sessions.</td>
</tr>
<tr>
<td>Gates in other states</td>
<td>Number of central point sessions in other states.</td>
</tr>
<tr>
<td>Total gates</td>
<td>Number of central point sessions in total.</td>
</tr>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. Use this ID to get more information about the session.</td>
</tr>
<tr>
<td>SPU</td>
<td>Services Processing Unit.</td>
</tr>
</tbody>
</table>
### Sample Output

**show security flow cp-session destination-port summary**

```
root> show security flow cp-session destination-port 21 summary
DCP Flow Sessions on FPC10 PIC0:
  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 0
DCP Flow Sessions on FPC10 PIC1:
  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 0
DCP Flow Sessions on FPC10 PIC2:
  Valid sessions: 1
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 1
DCP Flow Sessions on FPC10 PIC3:
  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 0
```

**show security flow cp-session destination-port terse**

```
root> show security flow cp-session destination-port 21 terse
DCP Flow Sessions on FPC10 PIC0:
  Total sessions: 0

DCP Flow Sessions on FPC10 PIC1:

DCP Flow Sessions on FPC10 PIC2:
  Session ID: 410003298, SPU: 41, Valid
  In: 203.0.113.10/26182 --&gt; 198.51.100.1/21;tcp,
  Out: 198.51.100.1/21 --&gt; 203.0.113.10/26182;tcp,
```
<table>
<thead>
<tr>
<th>Description</th>
<th>Total Sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total sessions: 1</td>
<td></td>
</tr>
<tr>
<td>DCP Flow Sessions on FPC10 PIC2:</td>
<td>0</td>
</tr>
<tr>
<td>Total sessions: 0</td>
<td></td>
</tr>
<tr>
<td>DCP Flow Sessions on FPC10 PIC3:</td>
<td>0</td>
</tr>
<tr>
<td>Total sessions: 0</td>
<td></td>
</tr>
</tbody>
</table>
show security flow cp-session destination-prefix

Syntax

show security flow cp-session destination-prefix destination-IP-prefix [summary | terse]

Release Information

Command introduced in Junos OS Release 10.2. This command is supported on the SRX1500, SRX5400, SRX5600, and SRX5800 devices.

Description

Display central point session-related flow information for the specified destination prefix.

Options

- destination-IP-prefix — Destination IP prefix or address for which to display central point session information.
  
  Range: 1 through 65,535.

- summary | terse — Display the specified level of output.

Required Privilege Level

view

Related Documentation

- show security flow cp-session on page 447
- show security flow cp-session destination-port on page 450

List of Sample Output

- show security flow cp-session destination-prefix summary on page 454
- show security flow cp-session destination-prefix terse on page 454

Output Fields

Table 43 on page 453 lists the output fields for the show security flow cp-session destination-prefix command. Output fields are listed in the approximate order in which they appear.

Table 43: show security flow cp-session destination-prefix Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid gates</td>
<td>Number of valid central point sessions.</td>
</tr>
<tr>
<td>Pending gates</td>
<td>Number of pending central point sessions.</td>
</tr>
<tr>
<td>Invalidated gates</td>
<td>Number of invalid central point sessions.</td>
</tr>
<tr>
<td>Gates in other states</td>
<td>Number of central point sessions in other states.</td>
</tr>
<tr>
<td>Total gates</td>
<td>Number of central point sessions in total.</td>
</tr>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. Use this ID to get more information about the session.</td>
</tr>
<tr>
<td>SPU</td>
<td>Services Processing Unit.</td>
</tr>
</tbody>
</table>
### Table 43: show security flow cp-session destination-prefix Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses).</td>
</tr>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses).</td>
</tr>
</tbody>
</table>

### Sample Output

**show security flow cp-session destination-prefix summary**

```
root> show security flow cp-session destination-prefix 60/8 summary

DCP Flow Sessions on FPC10 PIC0:
  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 0

DCP Flow Sessions on FPC10 PIC1:
  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 0

DCP Flow Sessions on FPC10 PIC2:
  Valid sessions: 1
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 1

DCP Flow Sessions on FPC10 PIC3:
  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 0
```

**show security flow cp-session destination-prefix terse**

```
root> show security flow cp-session destination-prefix 60/8 terse

DCP Flow Sessions on FPC10 PIC0:
  Total sessions: 0

DCP Flow Sessions on FPC10 PIC1:
  Total sessions: 0

DCP Flow Sessions on FPC10 PIC2:
```


Session ID: 420002660, SPU: 42, Valid
In: 203.0.113.10/26183 --> 192.0.2.1/21;tcp,
Out:192.0.2.1/21 --> 203.0.113.10/26183;tcp,
Total sessions: 1

DCP Flow Sessions on FPC10 PIC3:
Total sessions: 0
show security flow cp-session family

Syntax

show security flow cp-session family family [summary | terse]

Release Information

Command introduced in Junos OS Release 10.2. This command is supported on the SRX1500, SRX5400, SRX5600, and SRX5800 devices and vSRX.

Description

Display central point session-related flow information for the specified family.

Options

• family—Display session by family.
  • inet—Display IPv4 sessions.
  • inet6—Display IPv6 and IPv6-NATPT sessions.
• summary | terse—Display the specified level of output.

Required Privilege

level view

Related Documentation

• show security flow cp-session on page 447

List of Sample Output

show security flow cp-session family summary on page 457
show security flow cp-session family terse on page 457

Output Fields

Table 44 on page 456 lists the output fields for the show security flow cp-session family command. Output fields are listed in the approximate order in which they appear.

Table 44: show security flow cp-session family Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid gates</td>
<td>Number of valid central point sessions.</td>
</tr>
<tr>
<td>Pending gates</td>
<td>Number of pending central point sessions.</td>
</tr>
<tr>
<td>Invalidated gates</td>
<td>Number of invalid central point sessions.</td>
</tr>
<tr>
<td>Gates in other states</td>
<td>Number of central point sessions in other states.</td>
</tr>
<tr>
<td>Total gates</td>
<td>Number of central point sessions in total.</td>
</tr>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. Use this ID to get more information about the session.</td>
</tr>
<tr>
<td>SPU</td>
<td>Services Processing Unit.</td>
</tr>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses).</td>
</tr>
</tbody>
</table>
Table 44: show security flow cp-session family Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses).</td>
</tr>
</tbody>
</table>

Sample Output

show security flow cp-session family summary

```
root> show security flow cp-session family inet summary
DCP Flow Sessions on FPC10 PIC0:

Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0

DCP Flow Sessions on FPC10 PIC1:

Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0

DCP Flow Sessions on FPC10 PIC2:

Valid sessions: 1
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 1

DCP Flow Sessions on FPC10 PIC3:

Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0
```

show security flow cp-session family terse

```
root> show security flow cp-session family inet terse
DCP Flow Sessions on FPC10 PIC0:
Total sessions: 0

DCP Flow Sessions on FPC10 PIC1:
Total sessions: 0

DCP Flow Sessions on FPC10 PIC2:

Session ID: 420002660, SPU: 42, Valid
In: 198.51.100.1/26183 --> 203.0.113.2/21;tcp,
Out: 203.0.113.2/21 --> 198.51.100.1/26183;tcp,
```
<table>
<thead>
<tr>
<th>Total sessions: 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCP Flow Sessions on FPC10 PIC3:</td>
</tr>
<tr>
<td>Total sessions: 0</td>
</tr>
</tbody>
</table>
show security flow cp-session protocol

Syntax

```
show security flow cp-session protocol protocol-name [summary | terse]
```

Release Information

Command introduced in Junos OS Release 10.2.

Description

Display central point session-related flow information for the specified protocol. This command is supported on the SRX1500, SRX5400, SRX5600, and SRX5800 devices and vSRX.

Options

- `protocol-name` — Protocol to use as a central point session filter. Information about the central point session that uses this protocol is displayed.

Possible protocols are:

- ah—IP Security Authentication Header
- egp—Exterior gateway protocol
- esp—IPsec Encapsulating Security Payload
- gre—Generic routing encapsulation
- icmp—Internet Control Message Protocol
- icmp6—Internet Control Message Protocol
- igmp—Internet Group Management Protocol
- ipip—IP over IP
- ospf—Open Shortest Path First
- pim—Protocol Independent Multicast
- rsvp—Resource Reservation Protocol
- sctp—Stream Control Transmission Protocol
- tcp—Transmission Control Protocol
- udp—User Datagram Protocol
- summary | terse—Display the specified level of output.

Required Privilege

view

Related Documentation

- show security flow cp-session on page 447
- show security flow cp-session protocol summary on page 460
- show security flow cp-session protocol terse on page 461
## Output Fields

Table 45 on page 460 lists the output fields for the `show security flow cp-session protocol` command. Output fields are listed in the approximate order in which they appear.

### Table 45: `show security flow cp-session protocol` Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid gates</td>
<td>Number of valid central point sessions.</td>
</tr>
<tr>
<td>Pending gates</td>
<td>Number of pending central point sessions.</td>
</tr>
<tr>
<td>Invalidated</td>
<td>Number of invalid central point sessions.</td>
</tr>
<tr>
<td>Gates in other states</td>
<td>Number of central point sessions in other states.</td>
</tr>
<tr>
<td>Total gates</td>
<td>Number of central point sessions in total.</td>
</tr>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. Use this ID to get more information about the session.</td>
</tr>
<tr>
<td>SPU</td>
<td>Services Processing Unit.</td>
</tr>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses).</td>
</tr>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses).</td>
</tr>
</tbody>
</table>

## Sample Output

### `show security flow cp-session protocol summary`

```
root> show security flow cp-session protocol tcp summary
DCP Flow Sessions on FPC10 PIC0:
Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0
DCP Flow Sessions on FPC10 PIC1:
Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0
DCP Flow Sessions on FPC10 PIC2:
Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0
```
DCP Flow Sessions on FPC10 PIC3:

Valid sessions: 1
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 1

show security flow cp-session protocol terse

root> show security flow cp-session protocol tcp terse

Session ID: 160000015, SPU: 17, Valid
In: 203.0.113.9/32838 --> 198.51.100.26/21;tcp,
Out: 198.51.100.26/21 --> 203.0.113.2/32838;tcp,
Total sessions: 1
show security flow cp-session source-port

Syntax

show security flow cp-session source-port source-port-number [summary | terse]

Release Information

Command introduced in Junos OS Release 10.2.

Description

Display central point session-related flow information for the specified source-port. This command is supported on the SRX1500, SRX5400, SRX5600, and SRX5800 devices and vSRX.

Options

source-port-number—Number of the source port about which to display central point session information.

Range: 1 through 65,535

summary | terse—Display the specified level of output.

Required Privilege Level

view

Related Documentation

• show security flow cp-session on page 447
• show security flow cp-session source-prefix on page 465

List of Sample Output

show security flow cp-session source-port summary on page 463
show security flow cp-session source-port terse on page 463

Output Fields

Table 46 on page 462 lists the output fields for the show security flow cp-session source-port command. Output fields are listed in the approximate order in which they appear.

Table 46: show security flow cp-session source-port Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid gates</td>
<td>Number of valid central point sessions.</td>
</tr>
<tr>
<td>Pending gates</td>
<td>Number of pending central point sessions.</td>
</tr>
<tr>
<td>Invalidated gates</td>
<td>Number of invalid central point sessions.</td>
</tr>
<tr>
<td>Gates in other states</td>
<td>Number of central point sessions in other states.</td>
</tr>
<tr>
<td>Total gates</td>
<td>Number of central point sessions in total.</td>
</tr>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. Use this ID to get more information about the session.</td>
</tr>
<tr>
<td>SPU</td>
<td>Services Processing Unit.</td>
</tr>
</tbody>
</table>
Table 46: show security flow cp-session source-port Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses).</td>
</tr>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses).</td>
</tr>
</tbody>
</table>

Sample Output

show security flow cp-session source-port summary

```
root> show security flow cp-session source-port 7000 summary
DCP Flow Sessions on FPC10 PIC0:
  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 0
DCP Flow Sessions on FPC10 PIC1:
  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 0
DCP Flow Sessions on FPC10 PIC2:
  Valid sessions: 1
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 1
DCP Flow Sessions on FPC10 PIC3:
  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 0
```

show security flow cp-session source-port terse

```
root> show security flow cp-session source-port 7000 terse
DCP Flow Sessions on FPC10 PIC0:
  Total sessions: 0

DCP Flow Sessions on FPC10 PIC1:
  Total sessions: 0

DCP Flow Sessions on FPC10 PIC2:
```

Copyright © 2019, Juniper Networks, Inc.
<table>
<thead>
<tr>
<th>Session ID: 420002661, SPU: 42, Valid</th>
</tr>
</thead>
<tbody>
<tr>
<td>In: 203.0.113.64/7000 --&gt; 192.0.2.9/8000;udp,</td>
</tr>
<tr>
<td>Out: 192.0.2.9/8000 --&gt; 203.0.113.64/7000;udp,</td>
</tr>
<tr>
<td><strong>Total sessions:</strong> 1</td>
</tr>
</tbody>
</table>

DCP Flow Sessions on FPC10 PIC3:  
**Total sessions:** 0
show security flow cp-session source-prefix

Syntax
show security flow cp-session source-prefix source-IP-prefix [summary | terse]

Release Information
Command introduced in Junos OS Release 10.2.

Description
Display central point session related flow information for the specified source-prefix. This is supported on the SRX1500, SRX5400, SRX5600, and SRX5800 devices and vSRX.

Options
- source-IP-prefix—Source IP prefix or address for which to display central point session information.
- summary | terse—Display the specified level of output.

Required Privilege
view

Related Documentation
- show security flow cp-session on page 447
- show security flow cp-session source-port on page 462

List of Sample Output
show security flow cp-session source-prefix summary on page 466
show security flow cp-session source-prefix terse on page 466

Output Fields
Table 47 on page 465 lists the output fields for the show security flow cp-session source-prefix command. Output fields are listed in the approximate order in which they appear.

Table 47: show security flow cp-session source-prefix Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid gates</td>
<td>Number of valid central point sessions.</td>
</tr>
<tr>
<td>Pending gates</td>
<td>Number of pending central point sessions.</td>
</tr>
<tr>
<td>Invalidated gates</td>
<td>Number of invalid central point sessions.</td>
</tr>
<tr>
<td>Gates in other states</td>
<td>Number of central point sessions in other states.</td>
</tr>
<tr>
<td>Total gates</td>
<td>Number of central point sessions in total.</td>
</tr>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. Use this ID to get more information about the session.</td>
</tr>
<tr>
<td>SPU</td>
<td>Services Processing Unit.</td>
</tr>
</tbody>
</table>
Table 47: show security flow cp-session source-prefix Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses).</td>
</tr>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses).</td>
</tr>
</tbody>
</table>

Sample Output

show security flow cp-session source-prefix summary

```
root> show security flow cp-session source-prefix 203/8 summary
DCP Flow Sessions on FPC10 PIC0:
  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions on FPC10 PIC1: 0
DCP Flow Sessions on FPC10 PIC1:
  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 0
DCP Flow Sessions on FPC10 PIC2:
  Valid sessions: 1
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 1
DCP Flow Sessions on FPC10 PIC3:
  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 0
```

show security flow cp-session source-prefix terse

```
root> show security flow cp-session source-prefix 203/8 terse
DCP Flow Sessions on FPC10 PIC0:
  Total sessions: 0

DCP Flow Sessions on FPC10 PIC1:
  Total sessions: 0

DCP Flow Sessions on FPC10 PIC2:
  Total sessions: 0
```
Session ID: 420002663, SPU: 42, Valid
  In: 203.0.113.10/7000 --> 198.51.100.2/8000;udp,
  Out: 198.51.100.2/8000 --> 203.0.113.10/7000;udp,
Total sessions: 1

DCP Flow Sessions on FPC10 PIC3:
Total sessions: 0
**show security flow gate**

**Syntax**

```
show security flow gate
[ <filter> ] [ brief | summary]
```

**Release Information**

Command introduced in Junos OS Release 8.5; Filter and display options added in Junos OS Release 10.2.

**Description**

Display information about temporary openings known as pinholes or gates in the security firewall.

Pinholes are used by applications that commonly have both control and data sessions and must create openings in the firewall for the data sessions based on information from the parent sessions.

**Options**

- destination-port—Destination port
- destination-prefix—Destination IP prefix or address
- protocol—IP protocol number
- source-port—Source port
- source-prefix—Source IP prefix or address
- brief | summary—Display the specified level of output.

**Required Privilege**

view

**Related Documentation**

- show security flow gate brief node on page 481
- show security flow gate destination-port on page 487
- show security flow gate destination-prefix on page 490
- show security flow gate protocol on page 493
- show security flow gate summary node on page 496

**List of Sample Output**

- show security flow gate on page 469
- show security flow gate brief on page 470
- show security flow gate summary on page 471

**Output Fields**

Table 48 on page 469 lists the output fields for the `show security flow gate` command. Output fields are listed in the approximate order in which they appear.
### Table 48: show security flow gate Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hole</td>
<td>Range of flows permitted by the pinhole.</td>
</tr>
<tr>
<td>Translated</td>
<td>Tuples used to create the session if it matches the pinhole.</td>
</tr>
<tr>
<td></td>
<td>• Source address and port</td>
</tr>
<tr>
<td></td>
<td>• Destination address and port</td>
</tr>
<tr>
<td>Protocol</td>
<td>Application protocol, such as UDP or TCP.</td>
</tr>
<tr>
<td>Application</td>
<td>Name of the application.</td>
</tr>
<tr>
<td>Age</td>
<td>Idle timeout for the pinhole.</td>
</tr>
<tr>
<td>Flags</td>
<td>Internal debug flags for the pinhole.</td>
</tr>
<tr>
<td>Zone</td>
<td>Incoming zone.</td>
</tr>
<tr>
<td>Reference count</td>
<td>Number of resource manager references to the pinhole.</td>
</tr>
<tr>
<td>Resource</td>
<td>Resource manager information about the pinhole.</td>
</tr>
<tr>
<td>Valid gates</td>
<td>Number of valid gates.</td>
</tr>
<tr>
<td>Pending gates</td>
<td>Number of pending gates.</td>
</tr>
<tr>
<td>Invalidated gates</td>
<td>Number of invalid gates.</td>
</tr>
<tr>
<td>Gates in other states</td>
<td>Number of gates in other states.</td>
</tr>
<tr>
<td>Total gates</td>
<td>Number of gates in total.</td>
</tr>
<tr>
<td>Maximum gates</td>
<td>Number of maximum gates</td>
</tr>
</tbody>
</table>

### Sample Output

**show security flow gate**

```
user@host> show security flow gate

Hole: 0.0.0.0-0.0.0.0/0-40.1.1.198.51.100.252/64515-64515
Translated: 0.0.0.0/0->10.0.31.161/25415
Protocol: udp
Application: none/0
Age: 101 seconds
Flags: 0xe001
Zone: untrust
Reference count: 1
Resource: 5-1024-8185
Hole: 0.0.0.0-0.0.0.0/0-198.51.100.252/1046-1046
```

Copyright © 2019, Juniper Networks, Inc.
show security flow gate brief

root> show security flow gate brief

Flow Gates on FPC4 PIC1:

Hole: 192.0.2.1-192.0.2.1/0->192.0.2.2.100-192.0.2.100/38143-38143
   Translated: 192.0.2.1->192.0.2.2.100/38143
   Protocol: tcp
   Application: FTP ALG/79
   Age: 65532 seconds
   Flags: 0x0080
   Zone: trust
   Reference count: 1
   Resource: 1-24576-86016

Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1

Flow Gates on FPC5 PIC0:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0

Flow Gates on FPC5 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0

Flow Gates on FPC4 PIC1:
Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1
Maximum gates: 131072

Flow Gates on FPC5 PIC0:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Maximum gates: 131072

Flow Gates on FPC5 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Maximum gates: 131072

show security flow gate summary

root> show security flow gate summary

Flow Gates on FPC4 PIC1:
Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1
Maximum gates: 131072

Flow Gates on FPC5 PIC0:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Maximum gates: 131072

Flow Gates on FPC5 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Maximum gates: 131072
show security flow ip-action

Syntax  
show security flow ip-action [ <filter> ] [ summary family (inet | inet6) ]

Release Information  

Description  
Display the current IP-action settings, based on filtered options, for IP sessions running on the device.

Options  
- filter—Filter the display based on the specified criteria.
  The following filters display those sessions that match the criteria specified by the filter. Refer to the sample output for filtered output examples.
  - all | [filter]—All active sessions on the device.
  - destination-port destination-port—Destination port number of the traffic. Range is 1 through 65,535.
  - destination-prefix destination-prefix—Destination IP prefix or address.
  - family (inet | inet6) [filter]—IPv4 traffic or IPv6-NATPT traffic and filtered options.
  - logical-system logical-system-name | all [filter]—Specified logical system or all logical systems.
  - protocol protocol-name | protocol-number [filter]—Protocol name or number and filtered options.
    - ah or 51
    - egp or 8
    - esp or 50
    - gre or 47
    - icmp or 1
    - icmp6 or 58
    - ipip or 4
    - ospf or 89
    - pim or 103
    - rsvp or 46
    - sctp or 132
    - tcp or 6
    - udp or 17
  - root-logical-system [filter]—Default logical system information and filtered options.
**source-port source-port**—Source port number of the traffic. Range is 1 through 65,535.

**source-prefix source-prefix**—Source IP prefix or address of the traffic.

- **summary**—Summary information about IP-action entries.

- **family**—Display summary of IP-action entries by family. This option is used to filter the output.
  - **inet**—Display summary of IPv4 entries.
  - **inet6**—Display summary of IPv6 entries.

**Required Privilege Level**

- **view**

**Related Documentation**

- Understanding Traffic Processing on Security Devices on page 25
- clear security flow ip-action on page 338
- clear security flow session destination-port on page 347

**List of Sample Output**

- show security flow ip-action on page 474
- show security flow ip-action destination-port on page 475
- show security flow ip-action destination-prefix on page 476
- show security flow ip-action family inet protocol on page 476
- show security flow ip-action family inet logical-system all on page 477
- show security flow ip-action source-prefix on page 478
- show security flow ip-action summary on page 479
- show security flow ip-action summary family inet on page 479
- show security flow ip-action summary family inet6 on page 479

**Output Fields**

Table 49 on page 473 lists the output fields for the `show security flow ip-action` command. Output fields are listed in the approximate order in which they appear.

**Table 49: show security flow ip-action Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Src-Addr</td>
<td>Source address of outbound IP traffic.</td>
</tr>
<tr>
<td>Src-Port</td>
<td>Source port number of outbound IP traffic.</td>
</tr>
<tr>
<td>Dst-Addr</td>
<td>Destination address of inbound IP traffic.</td>
</tr>
<tr>
<td>Dst-Port/Proto</td>
<td>Destination port number and protocol type of inbound IP traffic.</td>
</tr>
<tr>
<td>Timeout (sec)</td>
<td>Configured timeouts and time remaining for an IP session.</td>
</tr>
<tr>
<td>Zone</td>
<td>Security zone associated with an IP session.</td>
</tr>
<tr>
<td>Action</td>
<td>Configured action type, for example, block, close, and notify.</td>
</tr>
</tbody>
</table>
Table 49: show security flow ip-action Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>The active mode and passive mode describe the states of the ip-action entry.</td>
</tr>
<tr>
<td>IPv4 action count</td>
<td>The total number of IPv4 entries.</td>
</tr>
<tr>
<td>IPv6 action count</td>
<td>The total number of IPv6 entries.</td>
</tr>
</tbody>
</table>

Sample Output

```
show security flow ip-action
```

```
user@host> show security flow ip-action

<table>
<thead>
<tr>
<th>Action</th>
<th>State</th>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(sec)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>close</td>
<td>Passive</td>
<td>203.0.113.1</td>
<td></td>
<td>203.0.113.4</td>
<td>21/tcp</td>
<td>293/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td>203.0.113.1</td>
<td></td>
<td>203.0.113.4</td>
<td>21/tcp</td>
<td>293/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td>203.0.113.1</td>
<td></td>
<td>203.0.113.4</td>
<td>21/tcp</td>
<td>293/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td>203.0.113.1</td>
<td></td>
<td>203.0.113.4</td>
<td>21/tcp</td>
<td>292/300</td>
<td>*</td>
</tr>
</tbody>
</table>
```

IPv4 action count: Active mode 1 on all PICs
IPv6 action count: 0 on FPC0.PIC1
IPv6 action count: 0 on FPC0.PIC2
IPv6 action count: 0 on FPC0.PIC3
IPv6 action count: 0 on FPC1.PIC0
IPv6 action count: 0 on FPC1.PIC1
IPv6 action count: 0 on FPC1.PIC2
IPv6 action count: 0 on FPC1.PIC3
IPv6 action count: Active mode 0 on all PICs

show security flow ip-action destination-port

user@host> show security flow ip-action destination-port 21

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(sec)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>203.0.113.4</td>
<td>21/tcp</td>
<td>274/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC0.PIC1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(sec)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>203.0.113.4</td>
<td>21/tcp</td>
<td>274/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC0.PIC2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(sec)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>203.0.113.4</td>
<td>21/tcp</td>
<td>274/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC0.PIC3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(sec)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>203.0.113.4</td>
<td>21/tcp</td>
<td>274/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC1.PIC0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(sec)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>203.0.113.4</td>
<td>21/tcp</td>
<td>274/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC1.PIC1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(sec)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>203.0.113.4</td>
<td>21/tcp</td>
<td>274/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC1.PIC2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(sec)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>203.0.113.4</td>
<td>21/tcp</td>
<td>273/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Active</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC1.PIC3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPv4 action count: Active mode 1 on all PICs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
IPv6 action count: 0 on FPC1.PIC1
IPv6 action count: 0 on FPC1.PIC2
IPv6 action count: 0 on FPC1.PIC3
IPv6 action count: Active mode 0 on all PICs

**show security flow ip-action destination-prefix**

```
user@host> show security flow ip-action destination-prefix 203.0.113.4/8
```

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(sec)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>203.0.113.4</td>
<td>21/tcp</td>
<td>245/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

IPv4 action count: 1 on FPC0.PIC1
IPv4 action count: 1 on FPC0.PIC2
IPv4 action count: 1 on FPC0.PIC3
IPv4 action count: 1 on FPC1.PIC0
IPv4 action count: 1 on FPC1.PIC1
IPv4 action count: 1 on FPC1.PIC2
IPv4 action count: 1 on FPC1.PIC3
IPv4 action count: Active mode 1 on all PICs

**show security flow ip-action family inet protocol**

```
user@host> show security flow ip-action family inet protocol udp
```

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(sec)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>203.0.113.4</td>
<td>21/tcp</td>
<td>245/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Copyright © 2019, Juniper Networks, Inc.
show security flow ip-action family inet logical-system all

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(sec)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>203.0.113.4</td>
<td>69/udp</td>
<td>287/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC0.PIC1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>203.0.113.4</td>
<td>69/udp</td>
<td>287/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC0.PIC2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>203.0.113.4</td>
<td>69/udp</td>
<td>287/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC0.PIC3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>203.0.113.4</td>
<td>69/udp</td>
<td>287/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC1.PIC0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>203.0.113.4</td>
<td>69/udp</td>
<td>287/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC1.PIC1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>203.0.113.4</td>
<td>69/udp</td>
<td>287/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC1.PIC2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>203.0.113.4</td>
<td>69/udp</td>
<td>287/300</td>
<td>*</td>
</tr>
<tr>
<td>close</td>
<td>Passive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC1.PIC3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPv4 action count: Active mode 1 on all PICs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### show security flow ip-action source-prefix

**user@host> show security flow ip-action source-prefix 192.0.2.3/8**

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(s)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>192.0.2.4</td>
<td>69/udp</td>
<td>244/300</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>close</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Passive</td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC0.PIC1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(s)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>192.0.2.4</td>
<td>69/udp</td>
<td>244/300</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>close</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Passive</td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC0.PIC2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(s)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>192.0.2.4</td>
<td>69/udp</td>
<td>244/300</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>close</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Passive</td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC0.PIC3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(s)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>192.0.2.4</td>
<td>69/udp</td>
<td>244/300</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>close</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Passive</td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC1.PIC0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(s)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>192.0.2.4</td>
<td>69/udp</td>
<td>244/300</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>close</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Passive</td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC1.PIC1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(s)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>192.0.2.4</td>
<td>69/udp</td>
<td>244/300</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>close</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Passive</td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC1.PIC2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(s)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>192.0.2.4</td>
<td>69/udp</td>
<td>244/300</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>close</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Passive</td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC1.PIC3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Src-Addr</th>
<th>Src-Port</th>
<th>Dst-Addr</th>
<th>Dst-Port/Proto</th>
<th>Timeout(s)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>203.0.113.1</td>
<td>*</td>
<td>192.0.2.4</td>
<td>69/udp</td>
<td>244/300</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>close</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Active</td>
</tr>
<tr>
<td>IPv4 action count: 1 on FPC1.PICO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
IPv4 action count: 1 on FPC1.PIC1
IPv4 action count: 1 on FPC1.PIC2
IPv4 action count: 1 on FPC1.PIC3
IPv4 action count: Active mode 1 on all PICs

IPv6 action count: 0 on FPC0.PIC1
IPv6 action count: 0 on FPC0.PIC2
IPv6 action count: 0 on FPC0.PIC3
IPv6 action count: 0 on FPC1.PIC0
IPv6 action count: 0 on FPC1.PIC1
IPv6 action count: 0 on FPC1.PIC2
IPv6 action count: 0 on FPC1.PIC3
IPv6 action count: Active mode 0 on all PICs

show security flow ip-action summary

IPv4 action count: 1 on FPC0.PIC1
IPv4 action count: 1 on FPC0.PIC2
IPv4 action count: 1 on FPC0.PIC3
IPv4 action count: 1 on FPC1.PIC0
IPv4 action count: 1 on FPC1.PIC1
IPv4 action count: 1 on FPC1.PIC2
IPv4 action count: 1 on FPC1.PIC3
IPv4 action count: Active mode 1 on all PICs
IPv6 action count: 0 on FPC0.PIC1
IPv6 action count: 0 on FPC0.PIC2
IPv6 action count: 0 on FPC0.PIC3
IPv6 action count: 0 on FPC1.PIC0
IPv6 action count: 0 on FPC1.PIC1
IPv6 action count: 0 on FPC1.PIC2
IPv6 action count: 0 on FPC1.PIC3
IPv6 action count: Active mode 0 on all PICs

show security flow ip-action summary family inet

IPv4 action count: 1 on FPC0.PIC1
IPv4 action count: 1 on FPC0.PIC2
IPv4 action count: 1 on FPC0.PIC3
IPv4 action count: 1 on FPC1.PIC0
IPv4 action count: 1 on FPC1.PIC1
IPv4 action count: 1 on FPC1.PIC2
IPv4 action count: 1 on FPC1.PIC3
IPv4 action count: Active mode 1 on all PICs

show security flow ip-action summary family inet6

IPv6 action count: 1 on FPC0.PIC1
<table>
<thead>
<tr>
<th>IPv6 action count:</th>
<th>1 on FPC0.PIC2</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPv6 action count:</td>
<td>1 on FPC0.PIC3</td>
</tr>
<tr>
<td>IPv6 action count:</td>
<td>1 on FPC1.PIC0</td>
</tr>
<tr>
<td>IPv6 action count:</td>
<td>1 on FPC1.PIC1</td>
</tr>
<tr>
<td>IPv6 action count:</td>
<td>1 on FPC1.PIC2</td>
</tr>
<tr>
<td>IPv6 action count:</td>
<td>1 on FPC1.PIC3</td>
</tr>
<tr>
<td>IPv6 action count:</td>
<td>Active mode 1 on all PICs</td>
</tr>
</tbody>
</table>
show security flow gate brief node

Syntax

```
show security flow gate brief node (node-id | all | local | primary)
```

Release Information


Description

Display information about temporary openings known as pinholes or gates in the security firewall for the specified node options in brief mode.

Options

```
node—(Optional) For chassis cluster configurations, display gate information on a specific node.

• node-id —Identification number of the node. It can be 0 or 1.
• all—Display information about all nodes.
• local—Display information about the local node.
• primary—Display information about the primary node.
```

Required Privilege Level

view

Related Documentation

- show security flow gate on page 468
- show security flow gate summary node on page 496

List of Sample Output

- show security flow gate brief node 0 on page 482
- show security flow gate brief node 1 on page 483
- show security flow gate brief node all on page 483
- show security flow gate brief node local on page 485
- show security flow gate brief node primary on page 485

Output Fields

Table 50 on page 481 lists the output fields for the `show security flow gate brief node` command. Output fields are listed in the approximate order in which they appear.

**Table 50: show security flow gate brief node Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid Gates</td>
<td>Number of valid gates.</td>
</tr>
<tr>
<td>Pending gates</td>
<td>Number of pending gates.</td>
</tr>
<tr>
<td>Invalidated gates</td>
<td>Number of invalid gates.</td>
</tr>
<tr>
<td>Gates in other states</td>
<td>Number of gates in other states.</td>
</tr>
</tbody>
</table>
### Table 50: show security flow gate brief node Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total gates</td>
<td>Number of gates in total.</td>
</tr>
<tr>
<td>Hole</td>
<td>Range of flows permitted by the pinhole.</td>
</tr>
<tr>
<td>Translated</td>
<td>Tuples used to create the session if it matches the pinhole.</td>
</tr>
<tr>
<td></td>
<td>• Source address and port</td>
</tr>
<tr>
<td></td>
<td>• Destination address and port</td>
</tr>
<tr>
<td>Protocol</td>
<td>Application protocol, such as UDP or TCP.</td>
</tr>
<tr>
<td>Application</td>
<td>Name of the application.</td>
</tr>
<tr>
<td>Age</td>
<td>Idle timeout for the pinhole.</td>
</tr>
<tr>
<td>Flags</td>
<td>Internal debug flags for the pinhole.</td>
</tr>
<tr>
<td>Zone</td>
<td>Incoming zone.</td>
</tr>
<tr>
<td>Reference count</td>
<td>Number of resource manager references to the pinhole.</td>
</tr>
<tr>
<td>Resource</td>
<td>Resource manager information about the pinhole.</td>
</tr>
</tbody>
</table>

### Sample Output

```
show security flow gate brief node 0

root@antbert> show security flow gate brief node 0
node0:
--------------------------------------------------
Flow Gates on FPC3 PIC1:

Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0

Flow Gates on FPC4 PIC0:

Hole: 1.0.0.100-1.0.0.100/0-0->2.0.0.100-2.0.0.100/32707-32707
   Translated: 1.0.0.100/0->2.0.0.100/32707
Protocol: tcp
Application: FTP ALG/79
Age: 65518 seconds
Flags: 0x0080
Zone: trust
Reference count: 1
Resource: 1-24576-86016
```
Valid gates: 1  
Pending gates: 0  
Invalidated gates: 0  
Gates in other states: 0  
Total gates: 1  

Flow Gates on FPC4 PIC1:
Valid gates: 0  
Pending gates: 0  
Invalidated gates: 0  
Gates in other states: 0  
Total gates: 0

show security flow gate brief node 1

root@antbert> show security flow gate brief node 1
node1:

Flow Gates on FPC3 PIC1:
Valid gates: 0  
Pending gates: 0  
Invalidated gates: 0  
Gates in other states: 0  
Total gates: 0

Flow Gates on FPC4 PIC0:
Hole: 1.0.0.100-1.0.0.100/0-0->2.0.0.100-2.0.0.100/32707-32707  
Translated: 1.0.0.100/0->2.0.0.100/32707  
Protocol: tcp  
Application: FTP ALG/79  
Age: 65514 seconds  
Flags: 0x0080  
Zone: trust  
Reference count: 1  
Resource: 1-24576-86016  

Valid gates: 1  
Pending gates: 0  
Invalidated gates: 0  
Gates in other states: 0  
Total gates: 1

Flow Gates on FPC4 PIC1:
Valid gates: 0  
Pending gates: 0  
Invalidated gates: 0  
Gates in other states: 0  
Total gates: 0

show security flow gate brief node all

root@antbert> show security flow gate brief node all

Copyright © 2019, Juniper Networks, Inc.
node0:

Flow Gates on FPC3 PIC1:

Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0

Flow Gates on FPC4 PIC0:

Hole: 1.0.0.100-1.0.0.100/0-0->2.0.0.100-2.0.0.100/32707-32707
Translated: 1.0.0.100/0->2.0.0.100/32707
Protocol: tcp
Application: FTP ALG/79
Age: 65512 seconds
Flags: 0x0080
Zone: trust
Reference count: 1
Resource: 1-24576-86016

Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1

Flow Gates on FPC4 PIC1:

Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0

node1:

Flow Gates on FPC3 PIC1:

Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0

Flow Gates on FPC4 PIC0:

Hole: 1.0.0.100-1.0.0.100/0-0->2.0.0.100-2.0.0.100/32707-32707
Translated: 1.0.0.100/0->2.0.0.100/32707
Protocol: tcp
Application: FTP ALG/79
Age: 65510 seconds
Flags: 0x0080
Zone: trust
Reference count: 1
Resource: 1-24576-86016
Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1

Flow Gates on FPC4 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0

show security flow gate brief node local
root@antbert> show security flow gate brief node local
node0:
------------------------------------------------------------------------
Flow Gates on FPC3 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Flow Gates on FPC4 PIC0:
Hole: 1.0.0.100-1.0.0.100/0-0->2.0.0.100-2.0.0.100/32707-32707
Translated: 1.0.0.100/0->2.0.0.100/32707
Protocol: tcp
Application: FTP ALG/79
Age: 65504 seconds
Flags: 0x0080
Zone: trust
Reference count: 1
Resource: 1-24576-86016
Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1
Flow Gates on FPC4 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0

show security flow gate brief node primary
root@antbert> show security flow gate brief node primary
Flow Gates on FPC3 PIC1:

Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0

Flow Gates on FPC4 PIC0:

Hole: 1.0.0.100-1.0.0.100/0-0->2.0.0.100-2.0.0.100/32707-32707
Translated: 1.0.0.100/0->2.0.0.100/32707
Protocol: tcp
Application: FTP ALG/79
Age: 65500 seconds
Flags: 0x0080
Zone: trust
Reference count: 1
Resource: 1-24576-86016

Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1

Flow Gates on FPC4 PIC1:

Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
show security flow gate destination-port

Syntax

```
show security flow gate destination-port destination-port-number [brief | summary]
```

Release Information

Command introduced in Junos OS Release 10.2.

Description

Display information about temporary openings known as pinholes or gates in the security firewall that for the specified destination port.

NOTE: Destination port filter matches the gate only if the given port falls within the range of ports specified in the gate.

Options

- `destination-port-number`—Number of the destination port for which to display gate information.
  - Range: 1 through 65,535
- brief | summary—Display the specified level of output.

Required Privilege

view

Related Documentation

- show security flow gate on page 468
- show security flow gate destination-prefix on page 490

List of Sample Output

- show security flow gate destination-port brief on page 488
- show security flow gate destination-port summary on page 489

Output Fields

`Table 51 on page 487 lists the output fields for the show security flow gate destination-port command. Output fields are listed in the approximate order in which they appear.`

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hole</td>
<td>Range of flows permitted by the pinhole.</td>
</tr>
<tr>
<td>Translated</td>
<td>Tuples used to create the session if it matches the pinhole.</td>
</tr>
</tbody>
</table>
  - Source address and port
  - Destination address and port
| Protocol            | Application protocol, such as UDP or TCP.              |
| Application         | Name of the application.                               |

Table 51: show security flow gate destination-port Output Fields
**Table 51: show security flow gate destination-port Output Fields (continued)**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Idle timeout for the pinhole.</td>
</tr>
<tr>
<td>Flags</td>
<td>Internal debug flags for the pinhole.</td>
</tr>
<tr>
<td>Zone</td>
<td>Incoming zone.</td>
</tr>
<tr>
<td>Reference count</td>
<td>Number of resource manager references to the pinhole.</td>
</tr>
<tr>
<td>Resource</td>
<td>Resource manager information about the pinhole.</td>
</tr>
<tr>
<td>Valid gates</td>
<td>Number of valid gates.</td>
</tr>
<tr>
<td>Pending gates</td>
<td>Number of pending gates.</td>
</tr>
<tr>
<td>Invalidated gates</td>
<td>Number of invalid gates.</td>
</tr>
<tr>
<td>Gates in other states</td>
<td>Number of gates in other states.</td>
</tr>
<tr>
<td>Total gates</td>
<td>Number of gates in total.</td>
</tr>
<tr>
<td>Maximum gates</td>
<td>Number of maximum gates.</td>
</tr>
</tbody>
</table>

**Sample Output**

```
show security flow gate destination-port brief

root> show security flow gate destination-port 33253 brief
Flow Gates on FPC4 PIC1:
Hole: 40.0.0.111-40.0.0.111/0-0->30.0.0.100-30.0.0.100/33253-33253
Translated: 40.0.0.111/0->30.0.0.100/33253
Protocol: tcp
Application: FTP ALG/79
Age: 65526 seconds
Flags: 0x0080
Zone: trust
Reference count: 1
Resource: 1-24576-86016
Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1

Flow Gates on FPC5 PIC0:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
```
<table>
<thead>
<tr>
<th>Gates in other states: 0</th>
<th>Total gates: 0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flow Gates on FPC5 PIC1:</strong></td>
<td></td>
</tr>
<tr>
<td>Valid gates: 0</td>
<td>Pending gates: 0</td>
</tr>
<tr>
<td>Pending gates: 0</td>
<td>Invalidated gates: 0</td>
</tr>
<tr>
<td>Gates in other states: 0</td>
<td>Total gates: 0</td>
</tr>
<tr>
<td>Maximum gates: 131072</td>
<td></td>
</tr>
</tbody>
</table>

**show security flow gate destination-port summary**

```shell
root> show security flow gate destination-port 33253 summary
```

**Flow Gates on FPC4 PIC1:**

- Valid gates: 1
- Pending gates: 0
- Invalidated gates: 0
- Gates in other states: 0
- Total gates: 1
- Maximum gates: 131072

**Flow Gates on FPC5 PIC0:**

- Valid gates: 0
- Pending gates: 0
- Invalidated gates: 0
- Gates in other states: 0
- Total gates: 0
- Maximum gates: 131072

**Flow Gates on FPC5 PIC1:**

- Valid gates: 0
- Pending gates: 0
- Invalidated gates: 0
- Gates in other states: 0
- Total gates: 0
- Maximum gates: 131072
show security flow gate destination-prefix

Syntax

show security flow gate destination-prefix destination-IP-prefix [brief | summary]

Release Information

Command introduced in Junos OS Release 10.2.

Description

Display information about temporary openings known as pinholes or gates in the security firewall for the specified destination prefix.

NOTE: Destination prefix must match both the starting and ending address in the gate.

Options

destination-IP-prefix—Destination IP prefix or address for which to display gate information.

brief | summary—Display the specified level of output.

Required Privilege

view

Related Documentation

show security flow gate on page 468
show security flow gate destination-port on page 487

List of Sample Output

show security flow gate destination-prefix brief on page 491
show security flow gate destination-prefix summary on page 492

Output Fields

Table 52 on page 490 lists the output fields for the show security flow gate destination-prefix command. Output fields are listed in the approximate order in which they appear.

Table 52: show security flow gate destination-prefix Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hole</td>
<td>Range of flows permitted by the pinhole.</td>
</tr>
<tr>
<td>Translated</td>
<td>Tuples used to create the session if it matches the pinhole.</td>
</tr>
<tr>
<td>Protocol</td>
<td>Application protocol, such as UDP or TCP.</td>
</tr>
<tr>
<td>Application</td>
<td>Name of the application.</td>
</tr>
</tbody>
</table>
### Table 52: show security flow gate destination-prefix Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Idle timeout for the pinhole.</td>
</tr>
<tr>
<td>Flags</td>
<td>Internal debug flags for the pinhole.</td>
</tr>
<tr>
<td>Zone</td>
<td>Incoming zone.</td>
</tr>
<tr>
<td>Reference count</td>
<td>Number of resource manager references to the pinhole.</td>
</tr>
<tr>
<td>Resource</td>
<td>Resource manager information about the pinhole.</td>
</tr>
<tr>
<td>Valid gates</td>
<td>Number of valid gates.</td>
</tr>
<tr>
<td>Pending gates</td>
<td>Number of pending gates.</td>
</tr>
<tr>
<td>Invalidated gates</td>
<td>Number of invalid gates.</td>
</tr>
<tr>
<td>Gates in other states</td>
<td>Number of gates in other states.</td>
</tr>
<tr>
<td>Total gates</td>
<td>Number of gates in total.</td>
</tr>
</tbody>
</table>

### Sample Output

```bash
show security flow gate destination-prefix brief

root> show security flow gate destination-prefix 192.0.2.1 brief
  Hole: 203.0.113.1-203.0.113.1/0-0->192.0.2.1-192.0.2.1/37308-37308
    Translated: 203.0.113.1/0->192.0.2.1/37308
    Protocol: tcp
    Application: FTP ALG/79
    Age: 65456 seconds
    Flags: 0x0080
    Zone: trust
    Reference count: 1
    Resource: 1-24575-86015

  Valid gates: 1
  Pending gates: 0
  Invalidated gates: 0
  Gates in other states: 0
  Total gates: 1

Flow Gates on FPC5 PIC0:

  Valid gates: 0
  Pending gates: 0
  Invalidated gates: 0
  Gates in other states: 0
  Total gates: 0

Flow Gates on FPC5 PIC1:
```
show security flow gate destination-prefix summary

root> show security flow gate destination-prefix 192.0.2.1 summary

Flow Gates on FPC4 PIC1:
Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1

Flow Gates on FPC5 PIC0:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0

Flow Gates on FPC5 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
show security flow gate protocol

Syntax

```
show security flow gate protocol protocol-name [brief | summary]
```

Release Information

Command introduced in Junos OS Release 10.2.

Description

Display information about temporary openings known as pinholes or gates in the security firewall for the specified protocol.

Options

- `protocol-name` — Protocol to use as a gate filter. Information about gates that use this protocol is displayed.

Possible protocols are:

- `ah`—IP Security Authentication Header
- `egp`—Exterior gateway protocol
- `esp`—IPsec Encapsulating Security Payload
- `gre`—Generic routing encapsulation
- `icmp`—Internet Control Message Protocol
- `icmp6`—Internet Control Message Protocol
- `igmp`—Internet Group Management Protocol
- `ipip`—IP over IP
- `ospf`—Open Shortest Path First
- `pim`—Protocol Independent Multicast
- `rsvp`—Resource Reservation Protocol
- `sctp`—Stream Control Transmission Protocol
- `tcp`—Transmission Control Protocol
- `udp`—User Datagram Protocol

- `brief | summary`—Display the specified level of output.

Required Privilege

`view`

Related Documentation

- `show security flow gate on page 468`

List of Sample Output

- `show security flow gate protocol brief on page 494`
- `show security flow gate protocol summary on page 495`
Table 53 on page 494 lists the output fields for the show security flow gate protocol command. Output fields are listed in the approximate order in which they appear.

### Table 53: show security flow gate protocol Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hole</td>
<td>Range of flows permitted by the pinhole.</td>
</tr>
<tr>
<td>Translated</td>
<td>Tuples used to create the session if it matches the pinhole.</td>
</tr>
<tr>
<td></td>
<td>• Source address and port</td>
</tr>
<tr>
<td></td>
<td>• Destination address and port</td>
</tr>
<tr>
<td>Protocol</td>
<td>Application protocol, such as UDP or TCP.</td>
</tr>
<tr>
<td>Application</td>
<td>Name of the application.</td>
</tr>
<tr>
<td>Age</td>
<td>Idle timeout for the pinhole.</td>
</tr>
<tr>
<td>Flags</td>
<td>Internal debug flags for the pinhole.</td>
</tr>
<tr>
<td>Zone</td>
<td>Incoming zone.</td>
</tr>
<tr>
<td>Reference count</td>
<td>Number of resource manager references to the pinhole.</td>
</tr>
<tr>
<td>Resource</td>
<td>Resource manager information about the pinhole.</td>
</tr>
<tr>
<td>Valid gates</td>
<td>Number of valid gates.</td>
</tr>
<tr>
<td>Pending gates</td>
<td>Number of pending gates.</td>
</tr>
<tr>
<td>Invalidated gates</td>
<td>Number of invalid gates.</td>
</tr>
<tr>
<td>Gates in other states</td>
<td>Number of gates in other states.</td>
</tr>
<tr>
<td>Total gates</td>
<td>Number of gates in total.</td>
</tr>
</tbody>
</table>

### Sample Output

**show security flow gate protocol brief**

```plaintext
root> root> show security flow gate protocol tcp brief
Hole: 203.0.113.1-40.0.0.111/0-0->192.0.2.1-192.0.2.1/37308-37308
Translated: 203.0.113.1/0->30.0.0.100/37308
Protocol: tcp
Application: FTP ALG/79
Age: 65414 seconds
Flags: 0x0080
Zone: trust
Reference count: 1
Resource: 1-24575-86015
```

Copyright © 2019, Juniper Networks, Inc.
Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1
Flow Gates on FPC5 PIC0:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Flow Gates on FPC5 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0

show security flow gate protocol summary

root> show security flow gate protocol tcp summary
Flow Gates on FPC4 PIC1:
Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1
Flow Gates on FPC5 PIC0:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Flow Gates on FPC5 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
show security flow gate summary node

**Syntax**

show security flow gate summary node (node-id | all | local | primary)

**Release Information**


**Description**

Display information about temporary openings known as pinholes or gates in the security firewall for the specified node options in summary mode.

**Options**

- **node**—(Optional) For chassis cluster configurations, display gate information on a specific node.
  - **node-id**—Identification number of the node. It can be 0 or 1.
  - **all**—Display information about all nodes.
  - **local**—Display information about the local node.
  - **primary**—Display information about the primary node.

**Required Privilege**

view

**Related Documentation**

- show security flow gate
- show security flow gate brief node on page 481

**List of Sample Output**

show security flow gate summary node 0 on page 497
show security flow gate summary node 1 on page 498
show security flow gate summary node all on page 498
show security flow gate summary node local on page 499
show security flow gate summary node primary on page 500

**Output Fields**

Table 54 on page 496 lists the output fields for the show security flow gate summary node command. Output fields are listed in the approximate order in which they appear.

Table 54: show security flow gate summary node Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid gates</td>
<td>Number of valid gates.</td>
</tr>
<tr>
<td>Pending gates</td>
<td>Number of pending gates.</td>
</tr>
<tr>
<td>Invalidated gates</td>
<td>Number of invalid gates.</td>
</tr>
<tr>
<td>Gates in other states</td>
<td>Number of gates in other states.</td>
</tr>
<tr>
<td>Field Name</td>
<td>Field Description</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Total gates</td>
<td>Number of gates in total.</td>
</tr>
<tr>
<td>Hole</td>
<td>Range of flows permitted by the pinhole.</td>
</tr>
<tr>
<td>Translated</td>
<td>Tuples used to create the session if it matches the pinhole.</td>
</tr>
<tr>
<td></td>
<td>• Source address and port</td>
</tr>
<tr>
<td></td>
<td>• Destination address and port</td>
</tr>
<tr>
<td>Protocol</td>
<td>Application protocol, such as UDP or TCP.</td>
</tr>
<tr>
<td>Application</td>
<td>Name of the application.</td>
</tr>
<tr>
<td>Age</td>
<td>Idle timeout for the pinhole.</td>
</tr>
<tr>
<td>Flags</td>
<td>Internal debug flags for the pinhole.</td>
</tr>
<tr>
<td>Zone</td>
<td>Incoming zone.</td>
</tr>
<tr>
<td>Reference count</td>
<td>Number of resource manager references to the pinhole.</td>
</tr>
<tr>
<td>Resource</td>
<td>Resource manager information about the pinhole.</td>
</tr>
</tbody>
</table>

**Sample Output**

```
show security flow gate summary node 0
root@antbert> show security flow gate summary node 0
node0:

---

Flow Gates on FPC3 PIC1:

Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Maximum gates: 131072

Flow Gates on FPC4 PIC0:

Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1
Maximum gates: 131072

Flow Gates on FPC4 PIC1:
```
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Maximum gates: 131072

show security flow gate summary node 1

root@antbert> show security flow gate summary node 1
node1:
---------------------------------------
Flow Gates on FPC3 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Maximum gates: 131072
Flow Gates on FPC4 PIC0:
Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1
Maximum gates: 131072
Flow Gates on FPC4 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Maximum gates: 131072

show security flow gate summary node all

root@antbert> show security flow gate summary node all
node0:
---------------------------------------
Flow Gates on FPC3 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Maximum gates: 131072
Flow Gates on FPC4 PIC0:
Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1
Maximum gates: 131072
Flow Gates on FPC4 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Maximum gates: 131072

Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1
Maximum gates: 131072

Flow Gates on FPC4 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Maximum gates: 131072

node1:
--------------------------------------------------------------------------

Flow Gates on FPC3 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Maximum gates: 131072

Flow Gates on FPC4 PIC0:
Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1
Maximum gates: 131072

Flow Gates on FPC4 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Maximum gates: 131072

show security flow gate summary node local
root@antbert> show security flow gate summary node local
node0:
--------------------------------------------------------------------------

Flow Gates on FPC3 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Maximum gates: 131072

Flow Gates on FPC4 PIC0:
Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1
Maximum gates: 131072

Flow Gates on FPC4 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Maximum gates: 131072

show security flow gate summary node primary

root@antbert> show security flow gate summary node primary

node0:
----------------------------------------------------------
Flow Gates on FPC3 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Maximum gates: 131072

Flow Gates on FPC4 PIC0:
Valid gates: 1
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 1
Maximum gates: 131072

Flow Gates on FPC4 PIC1:
Valid gates: 0
Pending gates: 0
Invalidated gates: 0
Gates in other states: 0
Total gates: 0
Maximum gates: 131072
show security flow pmi statistics

Syntax

```
show security flow pmi statistics
<node (node-id | all | local | primary)>
```

Release Information

Command introduced in Junos OS Release 19.2R1.

Description

The `show security flow statistics` command displays information for individual PIC.

Options

- `none`—Display the security flow statistics information.
- `node`—(Optional) For chassis cluster configurations, display all security flow statistics on a specific node (device) in the cluster.
  - `node-id`—Identification number of the node. It can be 0 or 1.
  - `all`—Display information about all nodes.
  - `local`—Display information about the local node.
  - `primary`—Display information about the primary node.

Required Privilege

`view`

Related Documentation

- Understanding Traffic Processing on Security Devices on page 25
- List of Sample Output show security flow statistics on page 502

Output Fields

Table 55 on page 501 lists the output fields for the `show security flow pmi statistics` command. Output fields are listed in the approximate order in which they appear.

**Table 55: show security flow statistics Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMI received packets</td>
<td>Number of PMI inbound packets received.</td>
</tr>
<tr>
<td>PMI transmitted packets</td>
<td>Number of PMI outbound packets transmitted.</td>
</tr>
<tr>
<td>PMI regular flow path</td>
<td>Number of PMI packets returned using flow path.</td>
</tr>
<tr>
<td>PMI dropped packets</td>
<td>Number of PMI packets dropped</td>
</tr>
<tr>
<td>PMI encapsulation bytes</td>
<td>Number of PMI bytes encapsulated.</td>
</tr>
<tr>
<td>PMI decapsulation bytes</td>
<td>Number of PMI bytes decapsulated.</td>
</tr>
</tbody>
</table>
Table 55: show security flow statistics Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMI encapsulation packets</td>
<td>Number of PMI packets encapsulated.</td>
</tr>
<tr>
<td>PMI decapsulation packets</td>
<td>Number of PMI packets decapsulated.</td>
</tr>
</tbody>
</table>

Sample Output

```
show security flow statistics

user@host> show security flow pmi statistics

show security flow pmi statistics
Flow power-mode-IPSec statistics:
PMI statistics of FPC2 PIC0:
   PMI received packets:          0
   PMI transmitted packets:       0
   PMI regular flow path:         0
   PMI dropped packets:           0
   PMI encapsulation bytes:       0
   PMI decapsulation bytes:       0
   PMI encapsulation packets:     0
   PMI decapsulation packets:     0

PMI statistics of FPC2 PIC1:
   PMI received packets:          0
   PMI transmitted packets:       0
   PMI regular flow path:         0
   PMI dropped packets:           0
   PMI encapsulation bytes:       0
   PMI decapsulation bytes:       0
   PMI encapsulation packets:     0
   PMI decapsulation packets:     0

PMI statistics summary:
   PMI received packets:          0
   PMI transmitted packets:       0
   PMI regular flow path:         0
   PMI dropped packets:           0
   PMI encapsulation bytes:       0
   PMI decapsulation bytes:       0
   PMI encapsulation packets:     0
   PMI decapsulation packets:     0
```

show security flow session

**Syntax**

```
show security flow session [ <filter> ] [ brief | extensive | summary ]
<node ( node-id | all | local | primary )>
```

**Release Information**


**Description**

Display information about all currently active security sessions on the device.

---

**NOTE:** For the normal flow sessions, the `show security flow session` command displays byte counters based on IP header length. However, for sessions in Express Path mode, the statistics are collected from the IOC2 (SRX5K-MPC), IOC3 (SRX5K-MPC3-100G10G and SRX5K-MPC3-40G10G), and IOC4 (SRX5K-IOC4-MRAT and SRX5K-IOC4-10G) ASIC hardware engines and include full packet length with L2 headers. Because of this, the output displays slightly larger byte counters for sessions in Express Path mode than for the normal flow session.

---

**Options**

- `filter`—Filter the display by the specified criteria.

  The following filters reduce the display to those sessions that match the criteria specified by the filter. Refer to the specific `show` command for examples of the filtered output.

  - `advanced-anti-malware`—Show advanced-anti-malware sessions. For details on the `advanced-anti-malware` option, see the Sky Advanced Threat Prevention CLI Reference Guide.
  
  - `all-logical-systems-tenants`—All multitenancy systems.
  
  - `application`—Predefined application name.
  
  - `application-firewall`—Application firewall enabled.
  
  - `application-firewall-rule-set`—Application firewall enabled with the specified rule set.
  
  - `application-traffic-control`—Application traffic control session.
  
  - `application-traffic-control-rule-set`—Application traffic control rule set name and rule name.
conn-tag—Session connection tag (0..4294967295).

destination-port—Destination port.

destination-prefix—Destination IP prefix or address.

dynamic-application—Dynamic application.

dynamic-application-group—Dynamic application.

encrypted—Encrypted traffic.

family—Display session by family.

idp—IDP-enabled sessions.

interface—Name of incoming or outgoing interface.

logical-system (all | logical-system-name)—Name of a specific logical system or all to display all logical systems.

nat—Display sessions with network address translation.

node—(Optional) For chassis cluster configurations, display security flow session information on a specific node (device) in the cluster.

• node-id—Identification number of the node. It can be 0 or 1.
• all—Display information about all nodes.
• local—Display information about the local node.
• primary—Display information about the primary node.

policy-id—Display session information based on policy ID; the range is 1 through 4,294,967,295.

protocol—IP protocol number.

resource-manager—Resource manager.

root-logical-system—Display root logical system as default.

security-intelligence—Display security intelligence sessions.

services-offload—Display services offload sessions.

session-identifier—Display session with specified session identifier.

source-port—Source port.

source-prefix—Source IP prefix.

tenant—Displays the security flow session information for a tenant system.

tunnel—Tunnel sessions.
brief | extensive | summary—Display the specified level of output.
none—Display information about all active sessions.

**Required Privilege**

**Level**
view

**Related Documentation**

- Understanding Traffic Processing on Security Devices on page 25
- clear security flow session all on page 340

**List of Sample Output**

- show security flow session on page 507
- show security flow session (with default policy) on page 507
- show security flow session brief on page 508
- show security flow session extensive on page 508
- show security flow session summary on page 508

**Output Fields**

Table 56 on page 505 lists the output fields for the `show security flow session` command. Output fields are listed in the approximate order in which they appear.

### Table 56: show security flow session Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. Use this ID to get more information about the session.</td>
<td>brief</td>
</tr>
<tr>
<td>If</td>
<td>Interface name.</td>
<td>brief</td>
</tr>
<tr>
<td>State</td>
<td>Status of security flow session.</td>
<td>brief</td>
</tr>
<tr>
<td>Conn Tag</td>
<td>A 32-bit connection tag that uniquely identifies the GPRS tunneling protocol, user plane (GTP-U) and the Stream Control Transmission Protocol (STCP) sessions. The connection tag for GTP-U is the tunnel endpoint identifier (TEID) and for SCTP is the vTag. The connection ID remains 0 if the connection tag is not used by the sessions.</td>
<td>brief</td>
</tr>
<tr>
<td>CP Session ID</td>
<td>Number that identifies the central point session. Use this ID to get more information about the central point session.</td>
<td>brief</td>
</tr>
</tbody>
</table>
Table 56: show security flow session Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy name</td>
<td>Name and ID of the policy that the first packet of the session matched.</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Timeout</td>
<td>Idle timeout after which the session expires.</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Bytes</td>
<td>Number of received and transmitted bytes.</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Pkts</td>
<td>Number of received and transmitted packets.</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Total sessions</td>
<td>Total number of sessions.</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
<td>brief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Status</td>
<td>Session status.</td>
<td>extensive</td>
</tr>
<tr>
<td>Flag</td>
<td>Internal flag depicting the state of the session, used for debugging purposes.</td>
<td>extensive</td>
</tr>
<tr>
<td>Source NAT pool</td>
<td>The name of the source pool where NAT is used.</td>
<td>extensive</td>
</tr>
<tr>
<td>Dynamic application</td>
<td>Name of the application.</td>
<td>extensive</td>
</tr>
<tr>
<td>Application traffic control rule-set</td>
<td>AppQoS rule set for this session.</td>
<td>extensive</td>
</tr>
</tbody>
</table>
Table 56: show security flow session Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rule</td>
<td>AppQoS rule for this session.</td>
<td>extensive</td>
</tr>
<tr>
<td>Maximum timeout</td>
<td>Maximum session timeout.</td>
<td>extensive</td>
</tr>
<tr>
<td>Current timeout</td>
<td>Remaining time for the session unless traffic exists in the session.</td>
<td>extensive</td>
</tr>
<tr>
<td>Session State</td>
<td>Session state.</td>
<td>extensive</td>
</tr>
<tr>
<td>Start time</td>
<td>Time when the session was created, offset from the system start time.</td>
<td>extensive</td>
</tr>
<tr>
<td>Unicast-sessions</td>
<td>Number of unicast sessions.</td>
<td>Summary</td>
</tr>
<tr>
<td>Multicast-sessions</td>
<td>Number of multicast sessions.</td>
<td>Summary</td>
</tr>
<tr>
<td>Services-offload-sessions</td>
<td>Number of services-offload sessions.</td>
<td>Summary</td>
</tr>
<tr>
<td>Failed-sessions</td>
<td>Number of failed sessions.</td>
<td>Summary</td>
</tr>
<tr>
<td>Sessions-in-use</td>
<td>Number of sessions in use.</td>
<td>Summary</td>
</tr>
<tr>
<td></td>
<td>• Valid sessions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Pending sessions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Invalidated sessions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Sessions in other states</td>
<td></td>
</tr>
<tr>
<td>Maximum-sessions</td>
<td>Maximum number of sessions permitted.</td>
<td>Summary</td>
</tr>
</tbody>
</table>

Sample Output

show security flow session

```
root> show security flow session
Flow Sessions on FPC0 PIC1:

Session ID: 10115977, Policy name: SG/4, State: Active, Timeout: 56, Valid
    In: 203.0.113.1/1000 --> 203.0.113.1/2000;udp, Conn Tag: 0x0, If: reth1.0,
Pkts: 1, Bytes: 86, CP Session ID: 10320276
    Out: 203.0.113.11/2000 --> 203.0.113.1/1000;udp, Conn Tag: 0x0, If: reth0.0,
Pkts: 0, Bytes: 0, CP Session ID: 10320276

Total sessions: 1
```

show security flow session (with default policy)

```
root> show security flow session
Session ID: 36, Policy name: pre-id-default-policy/n, Timeout: 2, Valid
    In: 10.10.1.2/61606 --> 10.10.1.179;tcp, Conn Tag: 0x0, If: ge-0/0/2.0,
Pkts: 154, Bytes: 1510, CP Session ID: 10320276

Total sessions: 1
```
show security flow session brief

root> show security flow session brief
Flow Sessions on FPC0 PIC1:

Session ID: 10115977, Policy name: SG/4, State: Active, Timeout: 62, Valid
  In: 203.0.113.11/1000 --> 203.0.113.1/2000;udp, Conn Tag: 0x0, If: reth1.0,
   Pkts: 1, Bytes: 86
   Out: 203.0.113.1/2000 --> 203.0.113.11/1000;udp, Conn Tag: 0x0, If: reth0.0,
   Pkts: 0, Bytes: 0
CP Session ID: 10320276
Total sessions: 1

show security flow session extensive

root> show security flow session extensive
Flow Sessions on FPC0 PIC1:

Session ID: 10115977, Status: Normal, State: Active
Flags: 0x8000040/0x18000000/0x12000003
Policy name: SG/4
Source NAT pool: Null, Application: junos-gprs-gtp-v0-udp/76
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: 90, Current timeout: 54
Session State: Valid
Start time: 6704, Duration: 35
  In: 203.0.113.11/1000 --> 201.11.0.100/2000;udp,
    Conn Tag: 0x0, Interface: reth1.0,
    Session token: 0x6, Flag: 0x40000021
    Route: 0x86053c2, Gateway: 201.10.0.100, Tunnel: 0
    Port sequence: 0, FIN sequence: 0,
    FIN state: 0,
    Pkts: 1, Bytes: 86
    CP Session ID: 10320276
  Out: 203.0.113.1/2000 --> 203.0.113.11/1000;udp, Conn Tag: 0x0, If: reth0.0,
    Pkts: 0, Bytes: 0
    CP Session ID: 10320276
Total sessions: 1

show security flow session summary

root> show security flow session summary
Flow Sessions on FPC10 PIC1:
Unicast-sessions: 1
Multicast-sessions: 0
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services-offload-sessions</td>
<td>0</td>
</tr>
<tr>
<td>Failed-sessions</td>
<td>0</td>
</tr>
<tr>
<td>Sessions-in-use</td>
<td>1</td>
</tr>
<tr>
<td>Valid sessions</td>
<td>1</td>
</tr>
<tr>
<td>Pending sessions</td>
<td>0</td>
</tr>
<tr>
<td>Invalidated sessions</td>
<td>0</td>
</tr>
<tr>
<td>Sessions in other states</td>
<td>0</td>
</tr>
<tr>
<td>Maximum-sessions</td>
<td>6291456</td>
</tr>
</tbody>
</table>

Flow Sessions on FPC10 PIC2:
- Unicast-sessions: 0
- Multicast-sessions: 0
- Services-offload-sessions: 0
- Failed-sessions: 0
- Sessions-in-use: 0
  - Valid sessions: 0
  - Pending sessions: 0
  - Invalidated sessions: 0
  - Sessions in other states: 0
- Maximum-sessions: 6291456

Flow Sessions on FPC10 PIC3:
- Unicast-sessions: 0
- Multicast-sessions: 0
- Services-offload-sessions: 0
- Failed-sessions: 0
- Sessions-in-use: 0
  - Valid sessions: 0
  - Pending sessions: 0
  - Invalidated sessions: 0
  - Sessions in other states: 0
- Maximum-sessions: 6291456
show security flow session brief node

Syntax

show security flow session brief node (node-id | all | local | primary)

Release Information


Description

Display information about all currently active security sessions on the device for the specified node options in brief mode.

Options

node—(Optional) For chassis cluster configurations, display session information on a specific node.

- **node-id**—Identification number of the node. It can be 0 or 1.
- **all**—Display information about all nodes.
- **local**—Display information about the local node.
- **primary**—Display information about the primary node.

Required Privilege

view

Related Documentation

- Understanding Traffic Processing on Security Devices on page 25
- show security flow session

List of Sample Output

show security flow session brief node 0 on page 511
show security flow session brief node 1 on page 511
show security flow session brief node all on page 512
show security flow session brief node local on page 512
show security flow session brief node primary on page 513

Output Fields

Table 57 on page 510 lists the output fields for the show security flow session brief node command. Output fields are listed in the approximate order in which they appear.

Table 57: show security flow session brief node Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. Use this ID to get more information about the session.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Policy that permitted the traffic.</td>
</tr>
<tr>
<td>State</td>
<td>Session state.</td>
</tr>
<tr>
<td>Timeout</td>
<td>Idle timeout after which the session expires.</td>
</tr>
</tbody>
</table>
Table 57: show security flow session brief node Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In</strong></td>
<td>Incoming flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td><strong>Out</strong></td>
<td>Reverse flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td><strong>CP Session ID</strong></td>
<td>Number that identifies the central point session. Use this ID to get more information about the central point session.</td>
</tr>
<tr>
<td><strong>Total sessions</strong></td>
<td>Total number of sessions.</td>
</tr>
</tbody>
</table>

Sample Output

show security flow session brief node 0

```
root@host> show security flow session brief node 0
node0:---------------------------------------------------------------------
Flow Sessions on FPC0 PIC1:
Session ID: 10000001, Policy name: default-policy-00/2, State: Active, Timeout: 1696, Valid
Resource information : FTP ALG, 1, 0
  In: 203.0.113.1/60059 --> 203.0.113.2/21;tcp, If: reth0.0, Pkts: 14, Bytes: 626, CP Session ID: 10000001
  Out: 203.0.113.2/21 --> 203.0.113.1/60059;tcp, If: reth1.0, Pkts: 13, Bytes: 744, CP Session ID: 10000001
Total sessions: 1
Flow Sessions on FPC0 PIC2:
Total sessions: 0
Flow Sessions on FPC0 PIC3:
Total sessions: 0
```

show security flow session brief node 1

```
root@host> show security flow session brief node 1
node1:---------------------------------------------------------------------
Flow Sessions on FPC0 PIC1:
Session ID: 10000001, Policy name: default-policy-00/2, State: Active, Timeout: 1696, Valid
Resource information : FTP ALG, 1, 0
```
In: 203.0.113.1/60059 --> 203.0.113.2/21; tcp, If: reth0.0, Pkts: 14, Bytes: 626, CP Session ID: 10000001
Out: 203.0.113.2/21 --> 203.0.113.1/60059; tcp, If: reth1.0, Pkts: 13, Bytes: 744, CP Session ID: 10000001
Total sessions: 1

Flow Sessions on FPC0 PIC2:
Total sessions: 0

Flow Sessions on FPC0 PIC3:
Total sessions: 0

show security flow session brief node all

root@host> show security flow session brief node all
node0:
--------------------------------------------------------------------------
Session ID: 10000001, Policy name: default-policy-00/2, State: Active, Timeout: 1696, Valid
Resource information : FTP ALG, 1, 0
In: 203.0.113.1/60059 --> 203.0.113.2/21; tcp, If: reth0.0, Pkts: 14, Bytes: 626, CP Session ID: 10000001
Out: 203.0.113.2/21 --> 203.0.113.1/60059; tcp, If: reth1.0, Pkts: 13, Bytes: 744, CP Session ID: 10000001
Total sessions: 1

Flow Sessions on FPC0 PIC2:
Total sessions: 0

Flow Sessions on FPC0 PIC3:
Total sessions: 0

node1:
--------------------------------------------------------------------------
Flow Sessions on FPC0 PIC1:
Session ID: 10000001, Policy name: default-policy-00/2, State: Active, Timeout: 1696, Valid
Resource information : FTP ALG, 1, 0
In: 203.0.113.1/60059 --> 203.0.113.2/21; tcp, If: reth0.0, Pkts: 14, Bytes: 626, CP Session ID: 10000001
Out: 203.0.113.2/21 --> 203.0.113.1/60059; tcp, If: reth1.0, Pkts: 13, Bytes: 744, CP Session ID: 10000001
Total sessions: 1

Flow Sessions on FPC0 PIC2:
Total sessions: 0

Flow Sessions on FPC0 PIC3:
Total sessions: 0

show security flow session brief node local

root@host> show security flow session brief node local
Flow Sessions on FPC0 PIC1:

Session ID: 10000001, Policy name: default-policy-00/2, State: Active, Timeout: 1696, Valid
Resource information: FTP ALG, 1, 0
In: 203.0.113.1/60059 --> 203.0.113.2/21; tcp, If: reth0.0, Pkts: 14, Bytes: 626, CP Session ID: 10000001
Out: 203.0.113.2/21 --> 203.0.113.1/60059; tcp, If: reth1.0, Pkts: 13, Bytes: 744, CP Session ID: 10000001

Total sessions: 1

Flow Sessions on FPC0 PIC2:
Total sessions: 0

Flow Sessions on FPC0 PIC3:
Total sessions: 0

show security flow session brief node primary

root@host> show security flow session brief node primary

Flow Sessions on FPC0 PIC1:

Session ID: 10000001, Policy name: default-policy-00/2, State: Active, Timeout: 1696, Valid
Resource information: FTP ALG, 1, 0
In: 203.0.113.1/60059 --> 203.0.113.2/21; tcp, If: reth0.0, Pkts: 14, Bytes: 626, CP Session ID: 10000001
Out: 203.0.113.2/21 --> 203.0.113.1/60059; tcp, If: reth1.0, Pkts: 13, Bytes: 744, CP Session ID: 10000001

Total sessions: 1

Flow Sessions on FPC0 PIC2:
Total sessions: 0

Flow Sessions on FPC0 PIC3:
Total sessions: 0
show security flow session destination-port

Syntax

show security flow session destination-port
destination-port-number [brief | extensive | summary]

Release Information

Command introduced in Junos OS Release 8.5; Filter and view options added in Junos OS Release 10.2.

Description

Display information about each session that uses the specified destination port.

Options

- destination-port-number — Number of the destination port for which to display sessions information.
- Range: 1 through 65,535
- brief | extensive | summary — Display the specified level of output.

Required Privilege

view

Related Documentation

- Understanding Traffic Processing on Security Devices on page 25
- clear security flow session destination-port on page 347

List of Sample Output

- show security flow session destination-port 23 on page 515
- show security flow session destination-port 23 brief on page 516
- show security flow session destination-port 23 extensive on page 516
- show security flow session destination-port 23 summary on page 517

Output Fields

Table 58 on page 514 lists the output fields for the show security flow session destination-port command. Output fields are listed in the approximate order in which they appear.

Table 58: show security flow session destination-port Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. You can use this ID to get additional information about the session.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Policy that permitted the traffic.</td>
</tr>
<tr>
<td>Timeout</td>
<td>Idle timeout after which the session expires.</td>
</tr>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td>Field Name</td>
<td>Field Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td>Total sessions</td>
<td>Total number of sessions.</td>
</tr>
<tr>
<td>Status</td>
<td>Session status.</td>
</tr>
<tr>
<td>Flag</td>
<td>Internal flag depicting the state of the session, used for debugging purposes.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Name and ID of the policy that the first packet of the session matched.</td>
</tr>
<tr>
<td>Source NAT pool</td>
<td>The name of the source pool where NAT is used.</td>
</tr>
<tr>
<td>Application</td>
<td>Name of the application.</td>
</tr>
<tr>
<td>Maximum timeout</td>
<td>Maximum session timeout.</td>
</tr>
<tr>
<td>Current timeout</td>
<td>Remaining time for the session unless traffic exists in the session.</td>
</tr>
<tr>
<td>Session State</td>
<td>Session state.</td>
</tr>
<tr>
<td>Start time</td>
<td>Time when the session was created, offset from the system start time.</td>
</tr>
<tr>
<td>Unicast-sessions</td>
<td>Number of unicast sessions.</td>
</tr>
<tr>
<td>Multicast-sessions</td>
<td>Number of multicast sessions.</td>
</tr>
<tr>
<td>Failed-sessions</td>
<td>Number of failed sessions.</td>
</tr>
<tr>
<td>Sessions-in-use</td>
<td>Number of sessions in use.</td>
</tr>
<tr>
<td></td>
<td>• Valid sessions</td>
</tr>
<tr>
<td></td>
<td>• Pending sessions</td>
</tr>
<tr>
<td></td>
<td>• Invalidated sessions</td>
</tr>
<tr>
<td></td>
<td>• Sessions in other states</td>
</tr>
<tr>
<td>Maximum-sessions</td>
<td>Number of maximum sessions.</td>
</tr>
</tbody>
</table>

**Sample Output**

```
show security flow session destination-port 23

root> show security flow session destination-port 23
Flow Sessions on FPC10 PIC1:
Total sessions: 0
```
Flow Sessions on FPC10 PIC2:
Total sessions: 0

Flow Sessions on FPC10 PIC3:

Session ID: 430000098, Policy name: default-policy-00/2, Timeout: 1778, Valid
In: 198.51.100.10/15190 --> 198.51.100.2/23; tcp, If: ge-7/1/0.0, Pkts: 109,
Bytes: 5874, CP Session ID: 430000093
Out: 198.51.100.2/23 --> 198.51.100.10/15190; tcp, If: ge-7/1/1.0, Pkts: 64,
Bytes: 4015, CP Session ID: 430000093
Total sessions: 1

show security flowsession destination-port 23 brief

root> show security flow session destination-port 23 brief
Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Total sessions: 0

Flow Sessions on FPC10 PIC3:

Session ID: 430000098, Policy name: default-policy-00/2, Timeout: 1778, Valid
In: 198.51.100.10/15190 --> 198.51.100.2/23; tcp, If: ge-7/1/0.0, Pkts: 109,
Bytes: 5874, CP Session ID: 430000093
Out: 198.51.100.2/23 --> 198.51.100.10/15190; tcp, If: ge-7/1/1.0, Pkts: 64,
Bytes: 4015, CP Session ID: 430000093
Total sessions: 1

show security flowsession destination-port 23 extensive

root> show security flow session destination-port 23 extensive
Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Total sessions: 0

Flow Sessions on FPC10 PIC3:

Session ID: 430000098, Status: Normal
Flags: 0x40/0x0/0x2008003
Policy name: default-policy-00/2
Source NAT pool: Null, Application: junos-telnet/10
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: 1800, Current timeout: 1630
Session State: Valid
Start time: 65490, Duration: 207
In: 198.51.100.10/15190 --> 198.51.100.2/23; tcp
Interface: ge-7/1/0.0,
Session token: Ox6, Flag: Oxc0001021
Route: Oxao010, Gateway: 200.0.0.10, Tunnel: 0
Port sequence: 0, FIN sequence: 0,
FIN state: 0,
show security flow session destination-port 23 summary

root> show security flow session destination-port 23 summary

Flow Sessions on FPC10 PIC1:

  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 0

Flow Sessions on FPC10 PIC2:

  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 0

Flow Sessions on FPC10 PIC3:

  Valid sessions: 1
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
  Total sessions: 1
show security flow session destination-prefix

Syntax

```
show security flow session destination-prefix
destination-IP-prefix [brief | extensive | summary]
```

Release Information


Description

Display information about each session that matches the specified IP destination prefix.

Options

- `destination-IP-prefix`—Destination IP prefix or address for which to display session information.
- `brief | extensive | summary`—Display the specified level of output.

Required Privilege

View

Related Documentation

- Understanding Traffic Processing on Security Devices on page 25
- clear security flow session destination-port on page 347

List of Sample Output

- show security flow session destination-prefix 60/8 on page 520
- show security flow session destination-prefix 60/8 brief on page 520
- show security flow session destination-prefix 60/8 extensive on page 520
- show security flow session destination-prefix 60/8 summary on page 521
- show security flow session destination-prefix 10::10 on page 521

Output Fields

Table 59 on page 518 lists the output fields for the `show security flow session destination-prefix` command. Output fields are listed in the approximate order in which they appear.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. You can use this ID to get additional information about the session.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Policy that permitted the traffic.</td>
</tr>
<tr>
<td>Timeout</td>
<td>Idle timeout after which the session expires.</td>
</tr>
</tbody>
</table>
Table 59: show security flow session destination-prefix Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td>Total sessions</td>
<td>Total number of sessions.</td>
</tr>
<tr>
<td>Status</td>
<td>Session status.</td>
</tr>
<tr>
<td>Flag</td>
<td>Internal flag depicting the state of the session, used for debugging purposes.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Name and ID of the policy that the first packet of the session matched.</td>
</tr>
<tr>
<td>Source NAT pool</td>
<td>The name of the source pool where NAT is used.</td>
</tr>
<tr>
<td>Application</td>
<td>Name of the application.</td>
</tr>
<tr>
<td>Maximum timeout</td>
<td>Maximum session timeout.</td>
</tr>
<tr>
<td>Current timeout</td>
<td>Remaining time for the session unless traffic exists in the session.</td>
</tr>
<tr>
<td>Session State</td>
<td>Session state.</td>
</tr>
<tr>
<td>Start time</td>
<td>Time when the session was created, offset from the system start time.</td>
</tr>
<tr>
<td>Unicast-sessions</td>
<td>Number of unicast sessions.</td>
</tr>
<tr>
<td>Multicast-sessions</td>
<td>Number of multicast sessions.</td>
</tr>
<tr>
<td>Failed-sessions</td>
<td>Number of failed sessions.</td>
</tr>
<tr>
<td>Sessions-in-use</td>
<td>Number of sessions in use.</td>
</tr>
<tr>
<td></td>
<td>• Valid sessions</td>
</tr>
<tr>
<td></td>
<td>• Pending sessions</td>
</tr>
<tr>
<td></td>
<td>• Invalidated sessions</td>
</tr>
<tr>
<td></td>
<td>• Sessions in other states</td>
</tr>
<tr>
<td>Maximum-sessions</td>
<td>Number of maximum sessions.</td>
</tr>
</tbody>
</table>
Sample Output

show security flow session destination-prefix 60/8

root> show security flow session destination-prefix 60/8

Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Total sessions: 0

Flow Sessions on FPC10 PIC3:
Session ID: 430000098, Policy name: default-policy-00/2, Timeout: 1450, Valid
In: 192.0.2.10/15190 --> 198.51.100.1/23; tcp, If: ge-7/1/0.0, Pkts: 109, Bytes: 5874, CP Session ID: 430000093
Out: 198.51.100.1/23 --> 192.0.2.10/15190; tcp, If: ge-7/1/1.0, Pkts: 64, Bytes: 4015, CP Session ID: 430000093
Total sessions: 1

show security flow session destination-prefix 60/8 brief

root> show security flow session destination-prefix 60/8 brief

Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Total sessions: 0

Flow Sessions on FPC10 PIC3:
Session ID: 430000098, Policy name: default-policy-00/2, Timeout: 1450, Valid
In: 192.0.2.10/15190 --> 198.51.100.1/23; tcp, If: ge-7/1/0.0, Pkts: 109, Bytes: 5874, CP Session ID: 430000093
Out: 198.51.100.1/23 --> 192.0.2.10/15190; tcp, If: ge-7/1/1.0, Pkts: 64, Bytes: 4015, CP Session ID: 430000093
Total sessions: 1

show security flow session destination-prefix 60/8 extensive

root> show security flow session destination-prefix 60/8 extensive

Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Total sessions: 0

Flow Sessions on FPC10 PIC3:
Session ID: 430000098, Status: Normal
Flags: 0x40/0x0/0x2008003
Policy name: default-policy-00/2
Source NAT pool: Null, Application: junos-telnet/10
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
show security flow session destination-prefix 60/8 summary

root> show security flow session destination-prefix 60/8 summary

Flow Sessions on FPC10 PIC1:

Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0

Flow Sessions on FPC10 PIC2:

Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0

Flow Sessions on FPC10 PIC3:

Valid sessions: 1
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 1

show security flow session destination-prefix 10::10

user@host> show security flow session destination-prefix 5001::2

Session ID: 50000004, Policy name: self-traffic-policy/1, Timeout: 2
In: 10::11/42756 --> 10::10/0;icmp, If: .local..0
Out: 10::10/0 --> 10::11/42756;icmp, If: ge-0/3/0.0

Valid sessions: 1
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 1
**show security flow session extensive node**

**Syntax**
show security flow session extensive node (node-id | all | local | primary)

**Release Information**

**Description**
Display information about all currently active security sessions on the device for the specified node options in extensive mode.

**Options**
- **node**—(Optional) For chassis cluster configurations, display session information on a specific node.
  - **node-id**—Identification number of the node. It can be 0 or 1.
  - **all**—Display information about all nodes.
  - **local**—Display information about the local node.
  - **primary**—Display information about the primary node.

**Required Privilege Level**
view

**Related Documentation**
- Understanding Traffic Processing on Security Devices on page 25
- show security flow session on page 503

**List of Sample Output**
- show security flow session extensive node 0 on page 524
- show security flow session extensive node 1 on page 525
- show security flow session extensive node all on page 526
- show security flow session extensive node local on page 527
- show security flow session extensive node primary on page 528

**Output Fields**
Table 60 on page 523 lists the output fields for the show security flow session extensive node command. Output fields are listed in the approximate order in which they appear.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. You can use this ID to get additional information about the session.</td>
</tr>
<tr>
<td>Status</td>
<td>Session status.</td>
</tr>
<tr>
<td>State</td>
<td>Session state.</td>
</tr>
</tbody>
</table>
Table 60: show security flow session extensive node Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flag</td>
<td>Internal flag depicting the state of the session, used for debugging purposes.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Policy that permitted the traffic.</td>
</tr>
<tr>
<td>Source NAT pool</td>
<td>The name of the source pool where NAT is used.</td>
</tr>
<tr>
<td>Maximum timeout</td>
<td>Maximum session timeout.</td>
</tr>
<tr>
<td>Current timeout</td>
<td>Remaining time for the session unless traffic exists in the session.</td>
</tr>
<tr>
<td>Start time</td>
<td>Time when the session was created, offset from the system start time.</td>
</tr>
<tr>
<td>Duration</td>
<td>Length of time for which the session is active.</td>
</tr>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses, application protocol, interface, session token, flag, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses, application protocol, interface, session token, flag, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td>Total sessions</td>
<td>Total number of sessions.</td>
</tr>
<tr>
<td>CP Session ID</td>
<td>Number that identifies the central point session. Use this ID to get more information about the central point session.</td>
</tr>
</tbody>
</table>

Sample Output

show security flow session extensive node 0

root@host> show security flow session extensive node 0

node0:
---------------------------------------------------------------------------------------------------
Flow Sessions on FPC0 PIC1:

Session ID: 10000003, Status: Normal, State: Active
Flags: 0x8000042/0x8000000/0x110103
Policy name: default-policy-00/2
Source NAT pool: Null, Application: junos-ftp/1
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: 1800, Current timeout: 1778
Session State: Valid
Start time: 6466, Duration: 28
  In: 10.0.2.1/52080 --> 203.0.113.1/24;tcp,
    Interface: reth0.0,
    Session token: 0x6, Flag: 0x40002621
Route: 0x86193c2, Gateway: 100.0.0.2, Tunnel: 0
Port sequence: 0, FIN sequence: 0,
Pkts: 9, Bytes: 414
CP Session ID: 10000004
Out: 203.0.113.1/24 --> 10.0.2.1/52080;tcp,
Interface: reth1.0,
Session token: 0x6, Flag: 0x40002620
Route: 0x86033c2, Gateway: 120.0.0.2, Tunnel: 0
Port sequence: 0, FIN sequence: 0,
Pkts: 8, Bytes: 420
CP Session ID: 10000004
Total sessions: 1

Flow Sessions on FPC0 PIC2:
Total sessions: 0

Flow Sessions on FPC0 PIC3:
Total sessions: 0

show security flow session extensive node1

root@host> show security flow session extensive node1
node1:
-------------------------------------------------------------------------
Flow Sessions on FPC0 PIC1:
Session ID: 10000003, Status: Normal, State: Backup
Flags: 0x10000042/0x0/0x10103
Policy name: default-policy-00/2
Source NAT pool: Null, Application: junos-ftp/1
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: 1800, Current timeout: 14324
Session State: Valid
Start time: 6248, Duration: 90
In: 110.0.2.1/52080 --> 203.0.113.1/24;tcp,
Interface: reth0.0,
Session token: 0x6, Flag: 0x60002621
Route: 0x86193c2, Gateway: 100.0.0.2, Tunnel: 0
Port sequence: 0, FIN sequence: 0,
Pkts: 0, Bytes: 0
CP Session ID: 10000003
Out: 203.0.113.1/24 --> 10.0.2.1/52080;tcp,
Interface: reth1.0,
Session token: 0x6, Flag: 0x40002620
Route: 0x86033c2, Gateway: 120.0.0.2, Tunnel: 0
Port sequence: 0, FIN sequence: 0,
Pkts: 0, Bytes: 0
CP Session ID: 10000004
Total sessions: 1
Flow Sessions on FPC0 PIC2:
Total sessions: 0
Flow Sessions on FPC0 PIC3:
Total sessions: 0

show security flow session extensive node all

root@host> show security flow session extensive node all
node0:
-------------------------------------------------------------------
Flow Sessions on FPC0 PIC1:

Session ID: 10000003, Status: Normal, State: Active
Flags: 0x8000042/0x8000000/0x110103
Policy name: default-policy-00/2
Source NAT pool: Null, Application: junos-ftp/1
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: 1800, Current timeout: 1692
Session State: Valid
Start time: 6466, Duration: 113
In: 10.0.2.1/52080 --> 203.0.113.1/21;tcp,
  Interface: reth0.0,
  Session token: 0x6, Flag: 0x40002621
  Route: 0x86193c2, Gateway: 100.0.0.2, Tunnel: 0
  Port sequence: 0, FIN sequence: 0,
  FIN state: 0,
  Pkts: 9, Bytes: 414
  CP Session ID: 10000004
Out: 203.0.113.1/21 --> 10.0.2.1/52080;tcp,
  Interface: reth1.0,
  Session token: 0x6, Flag: 0x40002620
  Route: 0x86033c2, Gateway: 120.0.0.2, Tunnel: 0
  Port sequence: 0, FIN sequence: 0,
  FIN state: 0,
  Pkts: 8, Bytes: 420
  CP Session ID: 10000004
Total sessions: 1

Flow Sessions on FPC0 PIC2:
Total sessions: 0

Flow Sessions on FPC0 PIC3:
Total sessions: 0

node1:
-------------------------------------------------------------------
Flow Sessions on FPC0 PIC1:

Session ID: 10000003, Status: Normal, State: Backup
Flags: 0x10000042/0x0/0x10103
Policy name: default-policy-00/2
Source NAT pool: Null, Application: junos-ftp/1
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: 1800, Current timeout: 14298

Flow Sessions on FPC0 PIC2:
Total sessions: 0

Flow Sessions on FPC0 PIC3:
Total sessions: 0
show security flow session extensive node local

node0:

Flow Sessions on FPC0 PIC1:

Session ID: 10000003, Status: Normal, State: Active
Flags: 0x8000042/0x8000000/0x110103
Policy name: default-policy-00/2
Source NAT pool: Null, Application: junos-ftp/1
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: 1800, Current timeout: 1584
Session State: Valid
Start time: 6466, Duration: 221
In: 100.0.0.2/52080 --> 120.0.0.2/21;tcp,
  Interface: reth0.0,
  Session token: 0x6, Flag: 0x40002621
  Route: 0x86193c2, Gateway: 100.0.0.2, Tunnel: 0
  Port sequence: 0, FIN sequence: 0,
  FIN state: 0,
  Pkts: 9, Bytes: 414
  CP Session ID: 10000004
Out: 120.0.0.2/21 --> 100.0.0.2/52080;tcp,
  Interface: reth1.0,
  Session token: 0x6, Flag: 0x40002620
  Route: 0x86033c2, Gateway: 120.0.0.2, Tunnel: 0
  Port sequence: 0, FIN sequence: 0,
  FIN state: 0,
  Pkts: 8, Bytes: 420
show security flow session extensive node primary

root@host> show security flow session extensive node primary
node0:
--------------------------------------------------------------------------
Flow Sessions on FPC0 PIC1:
Session ID: 10000003, Status: Normal, State: Active
Flags: 0x8000042/0x8000000/0x110103
Policy name: default-policy-00/2
Source NAT pool: Null, Application: junos-ftp/1
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: 1800, Current timeout: 1554
Session State: Valid
Start time: 6466, Duration: 252
  In: 100.0.0.2/52080 --> 120.0.0.2/21;tcp,
    Interface: reth0.0,
    Session token: 0x6, Flag: 0x40002621
    Route: 0x86193c2, Gateway: 100.0.0.2, Tunnel: 0
    Port sequence: 0, FIN sequence: 0,
    FIN state: 0,
    Pkts: 9, Bytes: 414
CP Session ID: 10000004
Out: 120.0.0.2/21 --> 100.0.0.2/52080;tcp,
    Interface: reth1.0,
    Session token: 0x6, Flag: 0x40002620
    Route: 0x86033c2, Gateway: 120.0.0.2, Tunnel: 0
    Port sequence: 0, FIN sequence: 0,
    FIN state: 0,
    Pkts: 8, Bytes: 420
CP Session ID: 10000004
Total sessions: 1
Flow Sessions on FPC0 PIC2:
Total sessions: 0
Flow Sessions on FPC0 PIC3:
Total sessions: 0
show security flow session family

Syntax

show security flow session family (inet | inet6)
[brief | extensive | summary]

Release Information

Command introduced in Junos OS Release 10.2.

Description

Display filtered summary of information about existing sessions, including types of sessions, active and failed sessions, and the maximum allowed number of sessions.

Options

- **inet**—Display details summary of IPv4 sessions.
- **inet6**—Display details summary of IPv6 sessions.
- **brief | extensive | summary**—Display the specified level of output.

Required Privilege

Level

(view)

Related Documentation

- Understanding Traffic Processing on Security Devices on page 25
- clear security flow session family on page 351

List of Sample Output

- show security flow session family inet on page 530
- show security flow session family inet brief on page 531
- show security flow session family inet extensive on page 531
- show security flow session family inet summary on page 533

Output Fields

Table 61 on page 529 lists the output fields for the show security flow session family command. Output fields are listed in the approximate order in which they appear.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. Use this ID to get more information about the session.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Policy that permitted the traffic.</td>
</tr>
<tr>
<td>Timeout</td>
<td>Idle timeout after which the session expires.</td>
</tr>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
</tbody>
</table>
Table 61: show security flow session family Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total sessions</td>
<td>Total number of sessions.</td>
</tr>
<tr>
<td>Status</td>
<td>Session status.</td>
</tr>
<tr>
<td>Flag</td>
<td>Internal flag depicting the state of the session, used for debugging purposes.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Name and ID of the policy that the first packet of the session matched.</td>
</tr>
<tr>
<td>Source NAT pool</td>
<td>The name of the source pool where NAT is used.</td>
</tr>
<tr>
<td>Application</td>
<td>Name of the application.</td>
</tr>
<tr>
<td>Maximum timeout</td>
<td>Maximum session timeout.</td>
</tr>
<tr>
<td>Current timeout</td>
<td>Remaining time for the session unless traffic exists in the session.</td>
</tr>
<tr>
<td>Session State</td>
<td>Session state.</td>
</tr>
<tr>
<td>Start time</td>
<td>Time when the session was created, offset from the system start time.</td>
</tr>
<tr>
<td>Unicast-sessions</td>
<td>Number of unicast sessions.</td>
</tr>
<tr>
<td>Multicast-sessions</td>
<td>Number of multicast sessions.</td>
</tr>
<tr>
<td>Failed-sessions</td>
<td>Number of failed sessions.</td>
</tr>
<tr>
<td>Sessions-in-use</td>
<td>Number of sessions in use.</td>
</tr>
<tr>
<td></td>
<td>• Valid sessions</td>
</tr>
<tr>
<td></td>
<td>• Pending sessions</td>
</tr>
<tr>
<td></td>
<td>• Invalidated sessions</td>
</tr>
<tr>
<td></td>
<td>• Sessions in other states</td>
</tr>
<tr>
<td>Maximum-sessions</td>
<td>Number of maximum sessions.</td>
</tr>
</tbody>
</table>

Sample Output

show security flow session family inet

root> show security flow session family inet
Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Session ID: 420000107, Policy name: default-policy-00/2, Timeout: 4, Valid
In: 203.0.113.0/3 --> 203.0.113.5/24;icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84,
<table>
<thead>
<tr>
<th>CP Session ID: 420000202</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out: 203.0.113.4/24 --&gt; 203.0.113.6/24; icmp, If: .local..0, Pkts: 1, Bytes: 84, CP Session ID: 420000202</td>
</tr>
<tr>
<td>Total sessions: 1</td>
</tr>
<tr>
<td>Flow Sessions on FPC10 PIC3:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session ID: 430000115, Policy name: default-policy-00/2, Timeout: 2, Valid</th>
</tr>
</thead>
<tbody>
<tr>
<td>In: 203.0.113.0/4 --&gt; 203.0.113.5/24; icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84, CP Session ID: 430000110</td>
</tr>
<tr>
<td>Out: 203.0.113.5/24 --&gt; 203.0.113.6/24; icmp, If: .local..0, Pkts: 1, Bytes: 84, CP Session ID: 430000110</td>
</tr>
<tr>
<td>Session ID: 430000117, Policy name: default-policy-00/2, Timeout: 4, Valid</td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>In: 203.0.113.0/4 --&gt; 203.0.113.5/24; icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84, CP Session ID: 430000111</td>
</tr>
<tr>
<td>Out: 203.0.113.5/24 --&gt; 203.0.113.6/24; icmp, If: .local..0, Pkts: 1, Bytes: 84, CP Session ID: 430000111</td>
</tr>
<tr>
<td>Total sessions: 2</td>
</tr>
</tbody>
</table>

show security flow session family inet brief

root> show security flow session family inet brief

<table>
<thead>
<tr>
<th>Flow Sessions on FPC10 PIC1:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total sessions: 0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flow Sessions on FPC10 PIC2:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID: 420000115, Policy name: default-policy-00/2, Timeout: 2, Valid</td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>In: 203.0.113.0/4 --&gt; 203.0.113.5/24; icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84, CP Session ID: 420000206</td>
</tr>
<tr>
<td>Out: 203.0.113.4/24 --&gt; 203.0.113.6/24; icmp, If: .local..0, Pkts: 1, Bytes: 84, CP Session ID: 420000206</td>
</tr>
<tr>
<td>Session ID: 420000117, Policy name: default-policy-00/2, Timeout: 2, Valid</td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>In: 203.0.113.0/4 --&gt; 203.0.113.5/24; icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84, CP Session ID: 420000207</td>
</tr>
<tr>
<td>Out: 203.0.113.5/24 --&gt; 203.0.113.6/24; icmp, If: .local..0, Pkts: 1, Bytes: 84, CP Session ID: 420000207</td>
</tr>
<tr>
<td>Total sessions: 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flow Sessions on FPC10 PIC3:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID: 430000119, Policy name: default-policy-00/2, Timeout: 2, Valid</td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>In: 203.0.113.0/4 --&gt; 203.0.113.5/24; icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84, CP Session ID: 430000112</td>
</tr>
<tr>
<td>Out: 203.0.113.5/24 --&gt; 203.0.113.6/24; icmp, If: .local..0, Pkts: 1, Bytes: 84, CP Session ID: 430000112</td>
</tr>
<tr>
<td>Total sessions: 1</td>
</tr>
</tbody>
</table>

show security flow session family inet extensive

root> show security flow session family inet extensive

<table>
<thead>
<tr>
<th>Flow Sessions on FPC10 PIC1:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID: 410000111, Status: Normal</td>
</tr>
<tr>
<td>Flags: 0x80400040/0x0/0x2800023</td>
</tr>
</tbody>
</table>
Policy name: default-policy-00/2
Source NAT pool: Null
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: 4, Current timeout: 4
Session State: Valid
Start time: 76455, Duration: 0
  In: 203.0.113.0/24 --> 203.0.113.1/24; icmp,
      Interface: ge-7/1/0.0,
      Session token: 0x6, Flag: 0xc0000021
      Route: 0xa0010, Gateway: 203.0.113.10, Tunnel: 0
      Port sequence: 0, FIN sequence: 0,
      FIN state: 0,
      Pkts: 1, Bytes: 84
      CP Session ID: 410000242
  Out: 203.0.113.1/24 --> 203.0.113.10/4; icmp,
      Interface: .local..0,
      Session token: 0x2, Flag: 0x40000030
      Route: 0xfffb0006, Gateway: 203.0.113.1, Tunnel: 0
      Port sequence: 0, FIN sequence: 0,
      FIN state: 0,
      Pkts: 1, Bytes: 84
      CP Session ID: 410000242
Total sessions: 1

Flow Sessions on FPC10 PIC2:

Session ID: 420000123, Status: Normal
Flags: 0x80400040/0x0/0x2800023
Policy name: default-policy-00/2
Source NAT pool: Null
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: 4, Current timeout: 2
Session State: Valid
Start time: 76454, Duration: 2
  In: 203.0.113.10/24 --> 203.0.113.11/24; icmp,
      Interface: ge-7/1/0.0,
      Session token: 0x6, Flag: 0xc0000021
      Route: 0xa0010, Gateway: 20010, Tunnel: 0
      Port sequence: 0, FIN sequence: 0,
      FIN state: 0,
      Pkts: 1, Bytes: 84
      CP Session ID: 420000210
  Out: 203.0.113.11/24 --> 203.0.113.12/24; icmp,
      Interface: .local..0,
      Session token: 0x2, Flag: 0x40000030
      Route: 0xfffb0006, Gateway: 203.0.113.1, Tunnel: 0
      Port sequence: 0, FIN sequence: 0,
      FIN state: 0,
      Pkts: 1, Bytes: 84
      CP Session ID: 420000210
Total sessions: 1

Flow Sessions on FPC10 PIC3:

Session ID: 430000131, Status: Normal
Flags: 0x80400040/0x0/0x2800023
Policy name: default-policy-00/2  
Source NAT pool: Null  
Dynamic application: junos:UNKNOWN  
Encryption: Unknown  
Application traffic control rule-set: INVALID, Rule: INVALID  
Maximum timeout: 4, Current timeout: 4  
Session State: Valid  
Start time: 76421, Duration: 1  
  In: 203.0.113.10/24 --> 203.0.113.11/24;icmp,  
    Interface: ge-7/1/0.0,  
    Session token: 0x6, Flag: 0xc0000021  
    Route: 0xa0010, Gateway: 203.0.113.10, Tunnel: 0  
    Port sequence: 0, FIN sequence: 0,  
    FIN state: 0,  
    Pkts: 1, Bytes: 84  
    CP Session ID: 430000118  
Out: 203.0.113.12/24 --> 203.0.113.13/24;icmp,  
    Interface: .local..0,  
    Session token: 0x2, Flag: 0x40000030  
    Route: 0xfffb0006, Gateway: 203.0.113.1, Tunnel: 0  
    Port sequence: 0, FIN sequence: 0,  
    FIN state: 0,  
    Pkts: 1, Bytes: 84  
    CP Session ID: 430000118  
Total sessions: 1

show security flow session family inet summary

root> show security flow session family inet summary

Flow Sessions on FPC10 PIC1:
  Valid sessions: 2  
  Pending sessions: 0  
  Invalidated sessions: 2  
  Sessions in other states: 0  
  Total sessions: 4

Flow Sessions on FPC10 PIC2:
  Valid sessions: 2  
  Pending sessions: 0  
  Invalidated sessions: 2  
  Sessions in other states: 0  
  Total sessions: 4

Flow Sessions on FPC10 PIC3:
  Valid sessions: 2  
  Pending sessions: 0  
  Invalidated sessions: 2  
  Sessions in other states: 0  
  Total sessions: 4
show security flow session interface

Syntax

```
show security flow session interface
interface-name [brief | extensive | summary]
```

Release Information

Command introduced in Junos OS Release 8.5; Filter and view options added in Junos OS Release 10.2.

Description

Display information about each session that uses the specified interface. The interface name can be a session's incoming or outgoing interface.

Options

- `interface-name`—Name of the interface on the device for which to display sessions information.
- `brief | extensive | summary`—Display the specified level of output.

Required Privilege Level

view

Related Documentation

- Understanding Traffic Processing on Security Devices on page 25
- clear security flow session interface on page 354

List of Sample Output

- `show security flow session interface ge-0/0/2.0` on page 535
- `show security flow session interface ge-0/0/2.0 brief` on page 536
- `show security flow session interface ge-0/0/2.0 extensive` on page 536
- `show security flow session interface ge-7/1/1.0 summary` on page 537

Output Fields

`Table 62 on page 534 lists the output fields for the show security flow session interface command. Output fields are listed in the approximate order in which they appear.

### Table 62: show security flow session interface Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. You can use this ID to get additional information about the session.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Policy that permitted the traffic.</td>
</tr>
<tr>
<td>Timeout</td>
<td>Idle timeout after which the session expires.</td>
</tr>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
</tbody>
</table>
Table 62: show security flow session interface Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td>Total sessions</td>
<td>Total number of sessions.</td>
</tr>
<tr>
<td>Status</td>
<td>Session status.</td>
</tr>
<tr>
<td>Flag</td>
<td>Internal flag depicting the state of the session, used for debugging purposes.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Name and ID of the policy that the first packet of the session matched.</td>
</tr>
<tr>
<td>Source NAT pool</td>
<td>The name of the source pool where NAT is used.</td>
</tr>
<tr>
<td>Application</td>
<td>Name of the application.</td>
</tr>
<tr>
<td>Maximum timeout</td>
<td>Maximum session timeout.</td>
</tr>
<tr>
<td>Current timeout</td>
<td>Remaining time for the session unless traffic exists in the session.</td>
</tr>
<tr>
<td>Session State</td>
<td>Session state.</td>
</tr>
<tr>
<td>Start time</td>
<td>Time when the session was created, offset from the system start time.</td>
</tr>
<tr>
<td>Unicast-sessions</td>
<td>Number of unicast sessions.</td>
</tr>
<tr>
<td>Multicast-sessions</td>
<td>Number of multicast sessions.</td>
</tr>
<tr>
<td>Failed-sessions</td>
<td>Number of failed sessions.</td>
</tr>
<tr>
<td>Sessions-in-use</td>
<td>Number of sessions in use.</td>
</tr>
<tr>
<td>Max-sessions</td>
<td>Number of maximum sessions.</td>
</tr>
</tbody>
</table>

Sample Output

show security flow session interface ge-0/0/2.0

  root> show security flow session interface ge-7/1/1.0

Flow Sessions on FPC10 PIC1:
Total sessions: 0
Flow Sessions on FPC10 PIC2:
Session ID: 420000146, Policy name: default-policy-00/2, Timeout: 58, Valid
In: 200.0.0.10/9 --> 60.0.0.2/21562;icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84,
CP Session ID: 420000247
Out: 60.0.0.2/21562 --> 200.0.0.10/9;icmp, If: ge-7/1/1.0, Pkts: 0, Bytes: 0,
CP Session ID: 420000247
Total sessions: 1
Flow Sessions on FPC10 PIC3:
Session ID: 4300000146, Policy name: default-policy-00/2, Timeout: 56, Valid
In: 200.0.0.10/8 --> 60.0.0.2/21562;icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84,
CP Session ID: 430000131
Out: 60.0.0.2/21562 --> 200.0.0.10/8;icmp, If: ge-7/1/1.0, Pkts: 0, Bytes: 0,
CP Session ID: 430000131
Total sessions: 1

show security flow session interface ge-0/0/2.0 brief

root> show security flow session interface ge-7/1/1.0 brief
Flow Sessions on FPC10 PIC1:
Session ID: 410000137, Policy name: default-policy-00/2, Timeout: 2, Valid
In: 200.0.0.10/5 --> 60.0.0.2/23354;icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84,
CP Session ID: 410000269
Out: 60.0.0.2/23354 --> 200.0.0.10/5;icmp, If: ge-7/1/1.0, Pkts: 1, Bytes: 84,
CP Session ID: 410000269
Total sessions: 1
Flow Sessions on FPC10 PIC2:
Session ID: 420000151, Policy name: default-policy-00/2, Timeout: 54, Valid
In: 200.0.0.10/1 --> 60.0.0.2/23354;icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84,
CP Session ID: 420000252
Out: 60.0.0.2/23354 --> 200.0.0.10/1;icmp, If: ge-7/1/1.0, Pkts: 0, Bytes: 0,
CP Session ID: 420000252
Total sessions: 1
Flow Sessions on FPC10 PIC3:
Total sessions: 0

show security flow session interface ge-0/0/2.0 extensive

root> show security flow session interface ge-7/1/1.0 extensive
Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Session ID: 420000151, Status: Normal
Flags: 0x40/0x0/0x2000003
Policy name: default-policy-00/2
Source NAT pool: Null
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
### show security flow session interface ge-7/1/1.0 summary

```
root> show security flow session interface ge-7/1/1.0 summary

Flow Sessions on FPC10 PIC1:

- Valid sessions: 1
- Pending sessions: 0
- Invalidated sessions: 0
- Sessions in other states: 0
- Total sessions: 1

Flow Sessions on FPC10 PIC2:

- Valid sessions: 1
- Pending sessions: 0
- Invalidated sessions: 0
- Sessions in other states: 0
- Total sessions: 1

Flow Sessions on FPC10 PIC3:

- Valid sessions: 2
- Pending sessions: 0
- Invalidated sessions: 0
- Sessions in other states: 0
- Total sessions: 2
```
show security flow session nat

**Syntax**
show security flow session nat [brief | extensive | summary]

**Release Information**
Command introduced in Junos OS Release 10.2.

**Description**
Display sessions with network address translation.

**Options**
brief | extensive | summary—Display the specified level of output.

**Required Privilege Level**
view

**Related Documentation**
- Understanding Traffic Processing on Security Devices on page 25
- show security flow session on page 503

**List of Sample Output**
- show security flow session nat brief on page 539
- show security flow session nat extensive on page 539
- show security flow session nat summary on page 540

**Output Fields**
Table 63 on page 538 lists the output fields for the show security flow session nat command. Output fields are listed in the approximate order in which they appear.

**Table 63: show security flow session nat Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. You can use this ID to get additional information about the session.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Policy that permitted the traffic.</td>
</tr>
<tr>
<td>Timeout</td>
<td>Idle timeout after which the session expires.</td>
</tr>
<tr>
<td>Resource information</td>
<td>Information about the session particular to the resource manager, including the name of the ALG, the group ID, and the resource ID.</td>
</tr>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td>Total sessions</td>
<td>Total number of sessions.</td>
</tr>
</tbody>
</table>
Table 63: show security flow session nat Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Session status.</td>
</tr>
<tr>
<td>Flag</td>
<td>Internal flag depicting the state of the session, used for debugging purposes.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Name and ID of the policy that the first packet of the session matched.</td>
</tr>
<tr>
<td>Source NAT pool</td>
<td>The name of the source pool where NAT is used.</td>
</tr>
<tr>
<td>Application</td>
<td>Name of the application.</td>
</tr>
<tr>
<td>Maximum timeout</td>
<td>Maximum session timeout.</td>
</tr>
<tr>
<td>Current timeout</td>
<td>Remaining time for the session unless traffic exists in the session.</td>
</tr>
<tr>
<td>Session State</td>
<td>Session state.</td>
</tr>
<tr>
<td>Start time</td>
<td>Time when the session was created, offset from the system start time.</td>
</tr>
<tr>
<td>Valid sessions</td>
<td>Number of valid sessions.</td>
</tr>
<tr>
<td>Pending sessions</td>
<td>Number of pending sessions.</td>
</tr>
<tr>
<td>Invalidated sessions</td>
<td>Number of invalidated sessions.</td>
</tr>
</tbody>
</table>

Sample Output

show security flow session nat brief

```
root> show security flow session nat brief
Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Session ID: 420000390, Policy name: default-policy-00/2, Timeout: 1778, Valid
In: 200.0.0.10/41043 --> 60.0.0.2/21;tcp, If: ge-7/1/0.0, Pkts: 9, Bytes: 414,
CP Session ID: 4200001090
Out: 60.0.0.2/21 --> 60.0.0.1/19473;tcp, If: ge-7/1/1.0, Pkts: 8, Bytes: 479,
CP Session ID: 430000964
Total sessions: 1

Flow Sessions on FPC10 PIC3:
Total sessions: 0
```

show security flow session nat extensive

```
root> show security flow session nat extensive
```
### Flow Sessions on FPC10 PIC1:
Total sessions: 0

### Flow Sessions on FPC10 PIC2:

- Session ID: 420000390, Status: Normal
- Flags: 0x2/0x0/0x2010103
- Policy name: default-policy-00/2
- Source NAT pool: interface, Application: junos-ftp/1
- Dynamic application: junos:UNKNOWN,
- Encryption: Unknown
- Application traffic control rule-set: INVALID, Rule: INVALID
- Maximum timeout: 1800, Current timeout: 1770
- Session State: Valid
- Start time: 151971, Duration: 55
  - In: 200.0.0.10/41043 --> 60.0.0.2/21;tcp,
  - Interface: ge-7/1/0.0,
  - Session token: 0x6, Flag: 0xc0002621
  - Route: 0x70010, Gateway: 200.0.0.10, Tunnel: 0
  - Port sequence: 0, FIN sequence: 0,
  - FIN state: 0,
  - Pkts: 9, Bytes: 414
  - CP Session ID: 420001090
  - Out: 60.0.0.2/21 --> 60.0.0.1/19473;tcp,
  - Interface: ge-7/1/1.0,
  - Session token: 0x7, Flag: 0xe0002620
  - Route: 0x80010, Gateway: 60.0.0.2, Tunnel: 0
  - Port sequence: 0, FIN sequence: 0,
  - FIN state: 0,
  - Pkts: 8, Bytes: 479
  - CP Session ID: 430000964
- Total sessions: 1

### Flow Sessions on FPC10 PIC3:
Total sessions: 0

---

**show security flow session nat summary**

```
root> show security flow session nat summary
Flow Sessions on FPC10 PIC1:

- Valid sessions: 0
- Pending sessions: 0
- Invalidated sessions: 0
- Sessions in other states: 0
- Total sessions: 0

Flow Sessions on FPC10 PIC2:

- Valid sessions: 1
- Pending sessions: 0
- Invalidated sessions: 0
- Sessions in other states: 0
- Total sessions: 1

Flow Sessions on FPC10 PIC3:

- Valid sessions: 0
- Pending sessions: 0
```
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0
show security flow session policy-id

Syntax
show security flow session policy-id policy-id-number [brief | extensive | summary ]

Release Information
Command introduced in Junos OS Release 12.3X48-D10.

Description
Display information about each session by using policy id of the session.

Options
- policy-id-number — ID of the policy that the first packet of the session matches with.
  - Range: 1 through 4294967295
  - brief | extensive | summary — Display the specified level of output.

Required Privilege
view

Related Documentation
- Understanding Traffic Processing on Security Devices on page 25
- clear security flow session protocol on page 361

List of Sample Output
show security flow session policy-id 4 on page 543
show security flow session policy-id 4 extensive on page 543

Output Fields
Table 64 on page 542 lists the output fields for the show security flow session policy-id command. Output fields are listed in the approximate order in which they appear.

Table 64: show security flow session policy-id Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. You can use this ID to get additional information about the session.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Policy that permitted the traffic.</td>
</tr>
<tr>
<td>Timeout</td>
<td>Idle timeout after which the session expires.</td>
</tr>
</tbody>
</table>

For the input flow:
- Source and destination addresses and protocol tuple for the input flow.
- Interface: Input flow interface.
- Session token: Internal token derived from the virtual routing instance.
- Flag: Internal debugging flags.
- Route: Internal next hop of the route to be used by the flow.
- Gateway: Next-hop gateway of the flow.
- Tunnel: If the flow is going into a tunnel, the tunnel ID. Otherwise, 0 (zero).
- Port Sequence, FIN sequence, FIN state, Cookie: Internal TCP state tracking information.
Table 64: show security flow session policy-id Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out</td>
<td>For the reverse flow:</td>
</tr>
<tr>
<td></td>
<td>• Source and destination addresses, and protocol tuple for the reverse flow.</td>
</tr>
<tr>
<td></td>
<td>• Interface: Reverse flow interface.</td>
</tr>
<tr>
<td></td>
<td>• Session token: Internal token derived from the virtual routing instance.</td>
</tr>
<tr>
<td></td>
<td>• Flag: Internal debugging flags.</td>
</tr>
<tr>
<td></td>
<td>• Route: Internal next hop of the route to be used by the flow.</td>
</tr>
<tr>
<td></td>
<td>• Gateway: Next-hop gateway of the flow.</td>
</tr>
<tr>
<td></td>
<td>• Tunnel: If the flow is going into a tunnel, the tunnel ID. Otherwise, 0 (zero).</td>
</tr>
<tr>
<td></td>
<td>• Port Sequence, FIN sequence, FIN state, Cookie: Internal TCP state tracking information.</td>
</tr>
</tbody>
</table>

### Table 64: show security flow session policy-id Output Fields (continued)

<table>
<thead>
<tr>
<th>Total Sessions</th>
<th>Total number of sessions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Session status.</td>
</tr>
<tr>
<td>Flag</td>
<td>Internal flag depicting the state of the session, used for debugging purposes.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Name and ID of the policy that the first packet of the session matched.</td>
</tr>
<tr>
<td>Source NAT pool</td>
<td>The name of the source pool where NAT is used.</td>
</tr>
<tr>
<td>Dynamic application</td>
<td>Name of the application.</td>
</tr>
<tr>
<td>Maximum timeout</td>
<td>Maximum session timeout.</td>
</tr>
<tr>
<td>Current timeout</td>
<td>Remaining time for the session unless traffic exists in the session.</td>
</tr>
<tr>
<td>Session State</td>
<td>Session state.</td>
</tr>
<tr>
<td>Start time</td>
<td>Time when the session was created, offset from the system start time.</td>
</tr>
</tbody>
</table>

### Sample Output

**show security flow session policy-id 4**

```
root> show security flow session policy-id 4
Flow Sessions on FPC1 PIC0:

Session ID: 20093273, Policy name: p1/4, Timeout: 1784, Valid
In: 101.0.0.2/1 --> 111.0.0.3/1;0, If: ge-0/0/0.0, Pkts: 1, Bytes: 84
Out: 111.0.0.3/1 --> 201.0.0.1/22643;0, If: ge-0/0/1.0, Pkts: 0, Bytes: 0
Total sessions: 1
```

**show security flow session policy-id 4 extensive**

```
root> show security flow session policy-id 4 extensive
```
Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:

Session ID: 420000428, Status: Normal
Flags: 0x0/0x0/0x2008003
Policy name: p1/4
Source NAT pool: interface, Application: junos-telnet/10
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: 1800, Current timeout: 1740
Session State: Valid
Start time: 152305, Duration: 64
In: 200.0.0.10/15192 --> 60.0.0.2/23;tcp,
   Interface: ge-7/1/0.0,
   Session token: 0x6, Flag: 0xc0001021
   Route: 0x70010, Gateway: 200.0.0.10, Tunnel: 0
   Port sequence: 0, FIN sequence: 0,
   FIN state: 0,
  Pkts: 40, Bytes: 2251
CP Session ID: 420001128
Out: 60.0.0.2/23 --> 60.0.0.1/8078;tcp,
   Interface: ge-7/1/1.0,
   Session token: 0x7, Flag: 0xe0001020
   Route: 0x80010, Gateway: 60.0.0.2, Tunnel: 0
   Port sequence: 0, FIN sequence: 0,
   FIN state: 0,
   Pkts: 28, Bytes: 1714
CP Session ID: 430000965
Total sessions: 1

Flow Sessions on FPC10 PIC3:
Total sessions: 0
show security flow session protocol

Syntax

show security flow session protocol (protocol-name | protocol-number) [brief | extensive | summary]

Release Information

Command introduced in Junos OS Release 8.5; Filter and view options introduced in Junos OS Release 10.2.

Description

Display information about each session that uses the specified protocol.

Options

 protocol-name — (Optional) Protocol to use as a sessions filter. Information about sessions that use this protocol is displayed. Possible protocols are:

- ah—IP Security Authentication Header
- egp—Exterior gateway protocol
- esp—IPsec Encapsulating Security Payload
- gre—Generic routing encapsulation
- icmp—Internet Control Message Protocol
- igmp—Internet Group Management Protocol
- ipip—IP over IP
- ospf—Open Shortest Path First
- pim—Protocol Independent Multicast
- rsvp—Resource Reservation Protocol
- sctp—Stream Control Transmission Protocol
- tcp—Transmission Control Protocol
- udp—User Datagram Protocol

 protocol-number — (Optional) Numeric protocol value. For a complete list of possible numeric values, see RFC 1700, Assigned Numbers (for the Internet Protocol Suite).

Range: 0 through 255

brief | extensive | summary—Display the specified level of output.

Required Privilege

Level: view

Related Documentation

- Understanding Traffic Processing on Security Devices on page 25
- clear security flow session protocol on page 361
### List of Sample Output

- `show security flow session protocol icmp` on page 547
- `show security flow session protocol icmp brief` on page 547
- `show security flow session protocol icmp extensive` on page 548
- `show security flow session protocol icmp summary` on page 548

### Output Fields

Table 65 on page 546 lists the output fields for the `show security flow session protocol` command. Output fields are listed in the approximate order in which they appear.

**Table 65: show security flow session protocol Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. You can use this ID to get additional information about the session.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Policy that permitted the traffic.</td>
</tr>
<tr>
<td>Timeout</td>
<td>Idle timeout after which the session expires.</td>
</tr>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td>Total sessions</td>
<td>Total number of sessions.</td>
</tr>
<tr>
<td>Status</td>
<td>Session status.</td>
</tr>
<tr>
<td>Flag</td>
<td>Internal flag depicting the state of the session, used for debugging purposes.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Name and ID of the policy that the first packet of the session matched.</td>
</tr>
<tr>
<td>Source NAT pool</td>
<td>The name of the source pool where NAT is used.</td>
</tr>
<tr>
<td>Application</td>
<td>Name of the application.</td>
</tr>
<tr>
<td>Maximum timeout</td>
<td>Maximum session timeout.</td>
</tr>
<tr>
<td>Current timeout</td>
<td>Remaining time for the session unless traffic exists in the session.</td>
</tr>
<tr>
<td>Session State</td>
<td>Session state.</td>
</tr>
<tr>
<td>Start time</td>
<td>Time when the session was created, offset from the system start time.</td>
</tr>
<tr>
<td>Unicast-sessions</td>
<td>Number of unicast sessions.</td>
</tr>
<tr>
<td>Multicast-sessions</td>
<td>Number of multicast sessions.</td>
</tr>
<tr>
<td>Failed-sessions</td>
<td>Number of failed sessions.</td>
</tr>
</tbody>
</table>
### Table 65: show security flow session protocol Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sessions-in-use</td>
<td>Number of sessions in use.</td>
</tr>
<tr>
<td></td>
<td>• Valid sessions</td>
</tr>
<tr>
<td></td>
<td>• Pending sessions</td>
</tr>
<tr>
<td></td>
<td>• Invalidated sessions</td>
</tr>
<tr>
<td></td>
<td>• Sessions in other states</td>
</tr>
<tr>
<td>Maximum-sessions</td>
<td>Number of maximum sessions.</td>
</tr>
</tbody>
</table>

### Sample Output

**show security flow session protocol icmp**

```plaintext
root> show security flow session protocol icmp
Flow Sessions on FPC10 PIC1:
  Session ID: 410000654, Policy name: p1/4, Timeout: 2, Valid
    In: 200.0.0.10/2 --> 60.0.0.2/15685;icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84,
        CP Session ID: 410001264
    Out: 60.0.0.2/15685 --> 200.0.0.10/2;icmp, If: ge-7/1/1.0, Pkts: 1, Bytes: 84,
        CP Session ID: 410001264
  Total sessions: 1
Flow Sessions on FPC10 PIC2:
  Total sessions: 0
Flow Sessions on FPC10 PIC3:
  Session ID: 430000399, Policy name: p1/4, Timeout: 2, Valid
    In: 200.0.0.10/3 --> 60.0.0.2/15685;icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84,
        CP Session ID: 430001053
    Out: 60.0.0.2/15685 --> 200.0.0.10/3;icmp, If: ge-7/1/1.0, Pkts: 1, Bytes: 84,
        CP Session ID: 430001053
  Total sessions: 1
```

**show security flow session protocol icmp brief**

```plaintext
root> show security flow session protocol icmp brief
Flow Sessions on FPC10 PIC1:
  Session ID: 410000658, Policy name: p1/4, Timeout: 4, Valid
    In: 200.0.0.10/4 --> 60.0.0.2/16453;icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84,
        CP Session ID: 410001268
    Out: 60.0.0.2/16453 --> 200.0.0.10/4;icmp, If: ge-7/1/1.0, Pkts: 1, Bytes: 84,
        CP Session ID: 410001268
  Total sessions: 1
Flow Sessions on FPC10 PIC2:
  Session ID: 420000612, Policy name: p1/4, Timeout: 2, Valid
    In: 200.0.0.10/5 --> 60.0.0.2/16453;icmp, If: ge-7/1/0.0, Pkts: 1, Bytes: 84,
        CP Session ID: 420001316
```

Copyright © 2019, Juniper Networks, Inc.
show security flow session protocol icmp extensive

root> show security flow session protocol icmp extensive
Flow Sessions on FPC10 PIC1:

Session ID: 410000660, Status: Normal
Flags: 0x80000040/0x0/0x2800003
Policy name: p1/4
Source NAT pool: Null
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: 4, Current timeout: 2
Session State: Valid
Start time: 153201, Duration: 3
In: 200.0.0.10/8 --> 60.0.0.2/16453;icmp,
  Interface: ge-7/1/0.0,
  Session token: 0x6, Flag: 0xc0000021
  Route: 0x70010, Gateway: 200.0.0.10, Tunnel: 0
  Port sequence: 0, FIN sequence: 0,
  FIN state: 0,
  Pkts: 1, Bytes: 84
  CP Session ID: 410001270
Out: 60.0.0.2/16453 --> 200.0.0.10/8;icmp,
  Interface: ge-7/1/1.0,
  Session token: 0x7, Flag: 0xc0000020
  Route: 0x80010, Gateway: 60.0.0.2, Tunnel: 0
  Port sequence: 0, FIN sequence: 0,
  FIN state: 0,
  Pkts: 1, Bytes: 84
  CP Session ID: 410001270
Total sessions: 1

Flow Sessions on FPC10 PIC2:
Total sessions: 0

Flow Sessions on FPC10 PIC3:
Total sessions: 0

show security flow session protocol icmp summary

root> show security flow session protocol icmp summary
Flow Sessions on FPC10 PIC1:
Valid sessions: 2
Pending sessions: 0
Invalidated sessions: 1
Sessions in other states: 0
Total sessions: 3

Flow Sessions on FPC10 PIC2:

Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0

Flow Sessions on FPC10 PIC3:

Valid sessions: 2
Pending sessions: 0
Invalidated sessions: 1
Sessions in other states: 0
Total sessions: 3
show security flow session resource-manager

Syntax

show security flow session resource-manager
[brief | extensive | summary]

Release Information
Command introduced in Junos OS Release 8.5; Filter and view options introduced in Junos OS Release 10.2.

Description
Display information about sessions created by the resource manager.

Options
none—Display all resource manager sessions.
brief | extensive | summary—Display the specified level of output.

Required Privilege
view

Related Documentation
- Understanding Traffic Processing on Security Devices on page 25
- clear security flow session resource-manager on page 363

List of Sample Output
- show security flow session resource-manager on page 551
- show security flow session resource-manager brief on page 552
- show security flow session resource-manager extensive on page 552
- show security flow session resource-manager summary on page 553

Output Fields
Table 66 on page 550 lists the output fields for the show security flow session resource-manager command. Output fields are listed in the approximate order in which they appear.

Table 66: show security flow session resource-manager Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. You can use this ID to get additional information about the session.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Policy that permitted the traffic.</td>
</tr>
<tr>
<td>Timeout</td>
<td>Idle timeout after which the session expires.</td>
</tr>
<tr>
<td>Resource information</td>
<td>Information about the session particular to the resource manager, including the name of the ALG, the group ID, and the resource ID.</td>
</tr>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
</tbody>
</table>
Table 66: show security flow session resource-manager Output Fields  (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td>Total sessions</td>
<td>Total number of sessions.</td>
</tr>
<tr>
<td>Status</td>
<td>Session status.</td>
</tr>
<tr>
<td>Flag</td>
<td>Internal flag depicting the state of the session, used for debugging purposes.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Name and ID of the policy that the first packet of the session matched.</td>
</tr>
<tr>
<td>Source NAT pool</td>
<td>The name of the source pool where NAT is used.</td>
</tr>
<tr>
<td>Application</td>
<td>Name of the application.</td>
</tr>
<tr>
<td>Maximum timeout</td>
<td>Maximum session timeout.</td>
</tr>
<tr>
<td>Current timeout</td>
<td>Remaining time for the session unless traffic exists in the session.</td>
</tr>
<tr>
<td>Session State</td>
<td>Session state.</td>
</tr>
<tr>
<td>Start time</td>
<td>Time when the session was created, offset from the system start time.</td>
</tr>
<tr>
<td>Valid sessions</td>
<td>Number of valid sessions.</td>
</tr>
<tr>
<td>Pending sessions</td>
<td>Number of pending sessions.</td>
</tr>
<tr>
<td>Invalidated sessions</td>
<td>Number of invalidated sessions.</td>
</tr>
<tr>
<td>Sessions in other states</td>
<td>Number of sessions in other states.</td>
</tr>
<tr>
<td>CP Session ID</td>
<td>Number that identifies the central point session. Use this ID to get more information about the central point session.</td>
</tr>
</tbody>
</table>

Sample Output

show security flow session resource-manager

```
  Flow Sessions on FPC10 PIC1:
  Session ID: 410000664, Policy name: p1/4, Timeout: 1734, Valid
Resource information : FTP ALG, 1, 0
  In: 200.0.0.10/41047 --> 60.0.0.2/21;tcp, If: ge-7/1/0.0, Pkts: 13, Bytes: 586, CP Session ID: 4100001274
  Out: 60.0.0.2/21 --> 200.0.0.10/41047;tcp, If: ge-7/1/1.0, Pkts: 13, Bytes: 803, CP Session ID: 4100001274
```
show security flow session resource-manager brief

root> show security flow session resource-manager brief

Flow Sessions on FPC10 PIC1:
Session ID: 410000664, Policy name: p1/4, Timeout: 1704, Valid
Resource information: FTP ALG, 1, 0
In: 200.0.0.10/41047 --> 60.0.0.2/21;tcp, If: ge-7/1/0.0, Pkts: 13, Bytes: 586,
CP Session ID: 410001274
Out: 60.0.0.2/21 --> 200.0.0.10/41047;tcp, If: ge-7/1/1.0, Pkts: 13, Bytes: 803,
CP Session ID: 410001274
Total sessions: 1

Flow Sessions on FPC10 PIC2:
Total sessions: 0

Flow Sessions on FPC10 PIC3:
Total sessions: 0

show security flow session resource-manager extensive

root> show security flow session resource-manager extensive

Flow Sessions on FPC10 PIC1:
Session ID: 410000664, Status: Normal
Flags: 0x42/0x0/0x2010103
Policy name: p1/4
Source NAT pool: Null, Application: junos-ftp/1
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: 1800, Current timeout: 1682
Session State: Valid
Start time: 160496, Duration: 153
Client: FTP ALG, Group: 1, Resource: 0
In: 200.0.0.10/41047 --> 60.0.0.2/21;tcp,
Interface: ge-7/1/0.0,
Session token: 0x6, Flag: 0xc0002621
Route: 0x70010, Gateway: 200.0.0.10, Tunnel: 0
Port sequence: 0, FIN sequence: 0,
FIN state: 0,
Pkts: 13, Bytes: 586
CP Session ID: 410001274
Out: 60.0.0.2/21 --> 200.0.0.10/41047;tcp,
Interface: ge-7/1/1.0,
Session token: 0x7, Flag: 0xc0002620
Route: 0x80010, Gateway: 60.0.0.2, Tunnel: 0
Port sequence: 0, FIN sequence: 0,
FIN state: 0,
show security flow session resource-manager summary

root> show security flow session resource-manager summary

Flow Sessions on FPC10 PIC1:
Valid sessions: 1
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 1

Flow Sessions on FPC10 PIC2:
Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0

Flow Sessions on FPC10 PIC3:
Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0
show security flow session services-offload

Syntax  
show security flow session services-offload  
 [filter] [brief | extensive | summary]

Description  
Display information about all currently active services-offload security sessions on the device.

Options  
- filter—Filter the display by the specified criteria.

The following filters reduce the display to those sessions that match the criteria specified by the filter:

- application—Application name.
- application-firewall-rule-set—Application firewall enabled with the specified rule set.
- application-traffic-control-rule-set—Application traffic control enabled with the specified rule set.
- destination-port—Destination port.
- destination-prefix—Destination IP prefix or address.
- dynamic-application—Dynamic application name.
- dynamic-application-group—Dynamic application group name.
- encrypted—Show encrypted traffic.
- family—Protocol family.
- interface—Name of incoming or outgoing interface.
- logical-system—Logical system name.
- protocol—IP protocol number.
- root-logical-system—Root logical system name.
- source-port—Source port.
- source-prefix—Source IP prefix or address.

Release Information  
Starting with Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1, the SRX5K-MPC3-100G10G (IOC3) and the SRX5K-MPC3-40G10G (IOC3) with Express Path (formerly known as services offloading) support are introduced for SRX5400, SRX5600, and SRX5800 devices.  
This command is supported on SRX 5800, SRX 5600, SRX 5400 devices and vSRX.
• brief | extensive | summary—Display the specified level of output.

Required Privilege Level

view

Related Documentation

- Understanding Traffic Processing on Security Devices on page 25
- clear security flow session services-offload on page 365

List of Sample Output

show security flow session services-offload on page 556
show security flow session services-offload brief on page 556
show security flow session services-offload extensive on page 557
show security flow session services-offload summary on page 557

Output Fields

Table 67 on page 555 lists the output fields for the show security flow session services-offload command. Output fields are listed in the approximate order in which they appear.

Table 67: show security flow session services-offload Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID</td>
<td>Number that identifies the services-offload session. Use this ID to get more information about the session.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Policy that permits the services-offload traffic.</td>
</tr>
<tr>
<td>Timeout</td>
<td>Idle timeout period after which the services-offload session expires.</td>
</tr>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets, and bytes).</td>
</tr>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets, and bytes).</td>
</tr>
<tr>
<td>Total sessions</td>
<td>Total number of services-offload sessions.</td>
</tr>
<tr>
<td>Status</td>
<td>Services-offload session status.</td>
</tr>
<tr>
<td>Flag</td>
<td>Internal flag depicting the state of the services-offload session, used for debugging purposes.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Name and ID of the policy that the first packet of the services-offload session matched.</td>
</tr>
<tr>
<td>Source NAT pool</td>
<td>The name of the source pool where NAT is used.</td>
</tr>
<tr>
<td>Application</td>
<td>Name of the application.</td>
</tr>
<tr>
<td>Dynamic application</td>
<td>Name of the dynamic application.</td>
</tr>
</tbody>
</table>
Table 67: show security flow session services-offload Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum timeout</td>
<td>Maximum amount of idle time allowed for the services-offload session.</td>
</tr>
<tr>
<td>Current timeout</td>
<td>Number of seconds that the current services-offload session has been idle.</td>
</tr>
<tr>
<td>Session State</td>
<td>Services-offload session state.</td>
</tr>
<tr>
<td>Start time</td>
<td>Time when the services-offload session was created, offset from the system start time.</td>
</tr>
<tr>
<td>Duration</td>
<td>Duration of the services-offload session.</td>
</tr>
<tr>
<td>Valid sessions</td>
<td>Number of valid services-offload sessions.</td>
</tr>
<tr>
<td>Pending sessions</td>
<td>Number of pending services-offload sessions.</td>
</tr>
<tr>
<td>Invalidated sessions</td>
<td>Number of invalidated services-offload sessions.</td>
</tr>
<tr>
<td>Sessions in other states</td>
<td>Number of services-offload sessions in other states.</td>
</tr>
<tr>
<td>Total sessions</td>
<td>Total number of services-offload sessions.</td>
</tr>
</tbody>
</table>

Sample Output

`show security flow session services-offload`  

```
user@host> show security flow session services-offload
Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Session ID: 420000002, Policy name: p1/4, Timeout: 1788, Valid
  In: 200.0.0.10/15198 --> 60.0.0.2/23;tcp, If: ge-7/1/0.0, Pkts: 9, Bytes: 507, CP Session ID: 420000002
  Out: 60.0.0.2/23 --> 200.0.0.10/15198;tcp, If: ge-7/1/1.0, Pkts: 8, Bytes: 462, CP Session ID: 420000002
Total sessions: 1

Flow Sessions on FPC10 PIC3:
Total sessions: 0
```

`show security flow session services-offload brief`  

```
user@host> show security flow session services-offload brief
Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Session ID: 420000002, Policy name: p1/4, Timeout: 1748, Valid
```

Copyright © 2019, Juniper Networks, Inc.
show security flow session services-offload extensive

user@host> show security flow session services-offload extensive
Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Session ID: 420000002, Status: Normal
Flags: 0x40/0x0/0x2408003, services-offload
Policy name: p1/4
Source NAT pool: Null, Application: junos-telnet/10
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: 1800, Current timeout: 1718
Session State: Valid
Start time: 165, Duration: 89
  In: 200.0.0.10/15198 --> 60.0.0.2/23;tcp,
    Interface: ge-7/1/0.0,
    Session token: 0x6, Flag: 0x42001021
    Route: 0x80010, Gateway: 200.0.0.10, Tunnel: 0
    Port sequence: 0, FIN sequence: 0,
    FIN state: 0,
    Pkts: 9, Bytes: 507
  CP Session ID: 420000002
Out: 60.0.0.2/23 --> 200.0.0.10/15198;tcp,
  Interface: ge-7/1/1.0,
  Session token: 0x7, Flag: 0x42001020
  Route: 0x70010, Gateway: 60.0.0.2, Tunnel: 0
  Port sequence: 0, FIN sequence: 0,
  FIN state: 0,
  Pkts: 8, Bytes: 462
  CP Session ID: 420000002
Total sessions: 1

Flow Sessions on FPC10 PIC3:
Total sessions: 0

show security flow session services-offload summary

user@host> show security flow session services-offload summary
Flow Sessions on FPC10 PIC1:
Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
<table>
<thead>
<tr>
<th>Total sessions: 0</th>
</tr>
</thead>
</table>

**Flow Sessions on FPC10 PIC2:**

| Valid sessions: 0 |
| Pending sessions: 0 |
| Invalidated sessions: 0 |
| Sessions in other states: 0 |
| Total sessions: 0 |

**Flow Sessions on FPC10 PIC3:**

| Valid sessions: 1 |
| Pending sessions: 0 |
| Invalidated sessions: 0 |
| Sessions in other states: 0 |
| Total sessions: 1 |
show security flow session session-identifier

**Syntax**

```
show security flow session session-identifier session-identifier
```

**Release Information**

Command introduced in Junos OS Release 8.5. Output changed to support natflag2 and flag in Junos OS Release 12.3X48-D10.

**Description**

Display detailed information for the identified session.

**Options**

`session-identifier` — Identifier of the session about which to display information.

**Required Privilege**

`view`

**Related Documentation**

- Understanding Traffic Processing on Security Devices on page 25
- clear security flow session session-identifier on page 368

**List of Sample Output**

`show security flow session session-identifier 20595 on page 562`

**Output Fields**

Table 68 on page 559 lists the output fields for the `show security flow session session-identifier` command. Output fields are listed in the approximate order in which they appear.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID</td>
<td>A unique number that a server assigns a specific user for the duration of that session.</td>
</tr>
</tbody>
</table>
| Flags            | Internal flag depicting the state of the session, used for debugging purposes. It is internal. The three available flags are:  
                      Flags: 0x42/0x0/0x1/0x8103  
                      - natflag:  
                      - natflag2:  
                      - natflag3:  
                      - flag:  |
| Policy name      | Name and ID of the policy that the first packet of the session matched and that permitted the traffic.  
                      Session log entries are tied to policy configuration. Each main session event—create, close, and deny—creates a log entry if the controlling policy has enabled logging. |
### Table 68: show security flow session session-identifier Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source NAT pool</td>
<td>The name of the source pool where NAT is used.</td>
</tr>
<tr>
<td></td>
<td>A NAT pool is a user-defined set of IP addresses that are used for translation. Unlike static NAT, where there is a one-to-one mapping that includes destination IP address translation in one direction and source IP address translation in the reverse direction, with source NAT, the original source IP address is translated to an IP address in the address pool.</td>
</tr>
<tr>
<td></td>
<td>Source NAT is used to allow hosts with private IP addresses to access a public network.</td>
</tr>
<tr>
<td>Dynamic application</td>
<td>Dynamic application: INCONCLUSIVE.</td>
</tr>
<tr>
<td></td>
<td>If the dynamic application has yet to be determined, the output indicates Pending. If the dynamic application cannot be determined, the output indicates junos: UNKNOWN.</td>
</tr>
<tr>
<td></td>
<td>Traffic with an application ID of junos: UNKNOWN matches a dynamic application of junos: UNKNOWN. If there is no such rule defined, the default rule is applied.</td>
</tr>
<tr>
<td></td>
<td>The term junos: UNKNOWN is a reserved keyword.</td>
</tr>
<tr>
<td>Encryption</td>
<td>Type of encryption, if the application traffic is encrypted.</td>
</tr>
<tr>
<td></td>
<td>Encryption: Unknown.</td>
</tr>
<tr>
<td>Application traffic control rule-set</td>
<td>Name of the application traffic control rule set.</td>
</tr>
<tr>
<td></td>
<td>Application traffic control rule-set: INVALID.</td>
</tr>
<tr>
<td>Maximum timeout</td>
<td>Maximum session timeout, in seconds.</td>
</tr>
<tr>
<td>Session state</td>
<td>Session state: Valid.</td>
</tr>
<tr>
<td>Start time</td>
<td>Time, in seconds, when the session was created, offset from the system start time.</td>
</tr>
</tbody>
</table>

**In**

- Source and destination addresses, ports, and protocol tuple for the input flow.
- Interface: Input flow interface.
- Session token: Internal token derived from the virtual routing instance.
- Flag: Internal debugging flags.
- Route: Internal next hop of the route to be used by the flow.
- Gateway: Next-hop gateway of the flow.
- Tunnel: Used for internal debugging. If the flow is going into a tunnel, the decimal format of the tunnel ID, plus the tunnel type. Otherwise, 0 (zero). See Table 69 on page 562 for tunnel type identification.
- Port Sequence, FIN sequence, FIN state, Cookie: Internal TCP state tracking information.
- Pkts, Bytes, CP Session ID: Packets and bytes matched on the wing, and the associated CP session ID of the wing.
- Conn tag: Session connection tag for GRPS tunneling protocol, user plane (GTP-U) flow sessions and Stream Control Transmission Protocol (SCTP) flow sessions.
### Table 68: show security flow session session-identifier Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Out</strong></td>
<td>For the reverse flow:</td>
</tr>
<tr>
<td></td>
<td>• Source and destination IP addresses, and application protocol for the reverse flow.</td>
</tr>
<tr>
<td></td>
<td>• Interface: Reverse flow interface.</td>
</tr>
<tr>
<td></td>
<td>• Session token: Internal token derived from the virtual routing instance.</td>
</tr>
<tr>
<td></td>
<td>• Flag: Internal debugging flags.</td>
</tr>
<tr>
<td></td>
<td>• Route: Internal next hop of the route to be used by the flow.</td>
</tr>
<tr>
<td></td>
<td>• Gateway: Next-hop gateway of the flow.</td>
</tr>
<tr>
<td></td>
<td>• Tunnel: Tunnel type identifier. Used for internal debugging. If the flow is going into a tunnel, species the decimal format of the tunnel ID, plus the tunnel type. Otherwise, 0 (zero). See Table 69 on page 562 for tunnel type identification.</td>
</tr>
<tr>
<td></td>
<td>• Port Sequence, FIN sequence, FIN state, Cookie: Internal TCP state tracking information.</td>
</tr>
<tr>
<td></td>
<td>• Pkts, Bytes, CP Session ID: Packets and bytes matched on the wing, and the associated CP session ID of the wing.</td>
</tr>
<tr>
<td></td>
<td>• Conn tag: Session connection tag for GRPS tunneling protocol, user plane (GTP-U) flow sessions and Stream Control Transmission Protocol (SCTP) flow sessions.</td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>Session status:</td>
</tr>
<tr>
<td></td>
<td>• Auth (NAT flag with NAT_AUTH)</td>
</tr>
<tr>
<td></td>
<td>• Transparent (NAT flag with NAT_TRANSPARENT)</td>
</tr>
<tr>
<td></td>
<td>• Expired (NAT flag with NAT_INVALID)</td>
</tr>
<tr>
<td></td>
<td>• Normal (no flag)</td>
</tr>
<tr>
<td><strong>Virtual system</strong></td>
<td>Virtual system to which the session belongs (it is optional).</td>
</tr>
<tr>
<td><strong>Application</strong></td>
<td>Application match for applying the rule.</td>
</tr>
<tr>
<td><strong>Rule</strong></td>
<td>Name of the application traffic control rule.</td>
</tr>
<tr>
<td></td>
<td>Rule: INVALID.</td>
</tr>
<tr>
<td><strong>Current timeout</strong></td>
<td>Remaining time for the session unless traffic exists in the session.</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>Length of time, in seconds, for which the session is active.</td>
</tr>
<tr>
<td><strong>Client</strong></td>
<td>Name of the ALG, if there is resource manager.</td>
</tr>
<tr>
<td><strong>Group</strong></td>
<td>Group identification number, if there is resource manager.</td>
</tr>
<tr>
<td><strong>Resource</strong></td>
<td>Resource identification number, if there is resource manager.</td>
</tr>
</tbody>
</table>
Table 69: Tunnel Type Identification

<table>
<thead>
<tr>
<th>Binary (first 3 bits)</th>
<th>Hexadecimal (the first 4 bits)</th>
<th>Tunnel Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x000</td>
<td>0x0</td>
<td>no tunnel</td>
</tr>
<tr>
<td>0x001</td>
<td>0x2</td>
<td>TUNNEL_TYPE_IPSEC</td>
</tr>
<tr>
<td>0x010</td>
<td>0x4</td>
<td>TUNNEL_TYPE_L2TP</td>
</tr>
<tr>
<td>0x011</td>
<td>0x6</td>
<td>TUNNEL_TYPE_NATT</td>
</tr>
<tr>
<td>0x100</td>
<td>0xB</td>
<td>TUNNEL_TYPE_DS_LITE</td>
</tr>
<tr>
<td>0x101</td>
<td>0xA</td>
<td>TUNNEL_TYPE_MCNH</td>
</tr>
</tbody>
</table>

Sample Output

show security flow session session-identifier 20595

```
root> show security flow session session-identifier 20595
Flow Sessions on FPC10 PIC2:

Session ID: 20595, Status: Normal
Flags: 0x42/0x0/0x1/0x8103
Policy name: pre-id-default-policy-logical-system-00/3
Source NAT pool: Null, Application: junos-http/6
Dynamic application: INCONCLUSIVE,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: 1800, Current timeout: 1788
Session State: Valid
Start time: 247736, Duration: 14
  In: 4.0.0.1/47931 --> 5.0.0.2/80;tcp,
    Conn Tag: 0x0, Interface: ge-0/0/2.0,
    Session token: 0x7, Flag: 0x3621
    Route: 0xe0010, Gateway: 4.0.0.1, Tunnel: 0
    Port sequence: 0, FIN sequence: 0,
    FIN state: 0,
    Pkts: 3, Bytes: 176
  Out: 5.0.0.2/80 --> 4.0.0.1/47931;tcp,
    Conn Tag: 0x0, Interface: ge-0/0/3.0,
    Session token: 0x8, Flag: 0x3620
    Route: 0xc0010, Gateway: 5.0.0.2, Tunnel: 0
    Port sequence: 0, FIN sequence: 0,
    FIN state: 0,
    Pkts: 2, Bytes: 120
Total sessions: 1
```
**show security flow session source-port**

**Syntax**

`show security flow session source-port`  
`source-port-number`  
`[brief | extensive | summary]`

**Release Information**

Command introduced in Junos OS Release 8.5; Filter and view options introduced in Junos OS Release 10.2.

**Description**

Display information about each session that uses the specified source port.

**Options**

- `source-port-number` — Number of the source port about which to display sessions information.
- `brief | extensive | summary` — Display the specified level of output.

**Required Privilege Level**

`view`

**Related Documentation**

- Understanding Traffic Processing on Security Devices on page 25
- `clear security flow session source-port` on page 370

**List of Sample Output**

- `show security flow session source-port 15198` on page 564
- `show security flow session source-port 15198 brief` on page 565
- `show security flow session source-port 15198 extensive` on page 565
- `show security flow session source-port 15198 summary` on page 566

**Output Fields**

Table 70 on page 563 lists the output fields for the `show security flow session source-port` command. Output fields are listed in the approximate order in which they appear.

### Table 70: `show security flow session source-port` Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. You can use this ID to get additional information about the session.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Policy that permitted the traffic.</td>
</tr>
<tr>
<td>Timeout</td>
<td>Idle timeout after which the session expires.</td>
</tr>
<tr>
<td>Resource information</td>
<td>Information about the session particular to the resource manager, including the name of the ALG, the group ID, and the resource ID.</td>
</tr>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
</tbody>
</table>
Table 70: show security flow session source-port Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td>Total sessions</td>
<td>Total number of sessions.</td>
</tr>
<tr>
<td>Status</td>
<td>Session status.</td>
</tr>
<tr>
<td>Flag</td>
<td>Internal flag depicting the state of the session, used for debugging purposes.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Name and ID of the policy that the first packet of the session matched.</td>
</tr>
<tr>
<td>Source NAT pool</td>
<td>The name of the source pool where NAT is used.</td>
</tr>
<tr>
<td>Application</td>
<td>Name of the application.</td>
</tr>
<tr>
<td>Maximum timeout</td>
<td>Maximum session timeout.</td>
</tr>
<tr>
<td>Current timeout</td>
<td>Remaining time for the session unless traffic exists in the session.</td>
</tr>
<tr>
<td>Session State</td>
<td>Session state.</td>
</tr>
<tr>
<td>Start time</td>
<td>Time when the session was created, offset from the system start time.</td>
</tr>
<tr>
<td>Valid sessions</td>
<td>Number of valid sessions.</td>
</tr>
<tr>
<td>Pending sessions</td>
<td>Number of pending sessions.</td>
</tr>
<tr>
<td>Invalidated sessions</td>
<td>Number of invalidated sessions.</td>
</tr>
<tr>
<td>Sessions in other states</td>
<td>Number of sessions in other states.</td>
</tr>
</tbody>
</table>

Sample Output

```bash
show security flow session source-port 15198

root> show security flow session source-port 15198
Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:

Session ID: 420000002, Policy name: p1/4, Timeout: 770, Valid
In: 200.0.0.10/15198 --> 60.0.0.2/23;tcp, If: ge-7/1/0.0, Pkts: 9, Bytes: 507, CP Session ID: 420000002
Out: 60.0.0.2/23 --> 200.0.0.10/15198;tcp, If: ge-7/1/1.0, Pkts: 8, Bytes: 462, CP Session ID: 420000002
Total sessions: 1
```
Flow Sessions on FPC10 PIC3:
Total sessions: 0

text

show security flow session source-port 15198 brief

root> show security flow session source-port 15198 brief
Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:

Session ID: 420000002, Policy name: p1/4, Timeout: 740, Valid
   In: 200.0.0.10/15198 --> 60.0.0.2/23;tcp, If: ge-7/1/0.0, Pkts: 9, Bytes: 507, CP Session ID: 420000002
   Out: 60.0.0.2/23 --> 200.0.0.10/15198;tcp, If: ge-7/1/1.0, Pkts: 8, Bytes: 462, CP Session ID: 420000002
Total sessions: 1

Flow Sessions on FPC10 PIC3:
Total sessions: 0

show security flow session source-port 15198 extensive

root> show security flow session source-port 15198 extensive
Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:

Session ID: 420000002, Status: Normal
   Flags: 0x40/0x0/0x2408003, services-offload
   Policy name: p1/4
   Source NAT pool: Null, Application: junos-telnet/10
   Dynamic application: junos:UNKNOWN,
   Encryption: Unknown
   Application traffic control rule-set: INVALID, Rule: INVALID
   Maximum timeout: 1800, Current timeout: 750
   Session State: Valid
   Start time: 165, Duration: 1056
      In: 200.0.0.10/15198 --> 60.0.0.2/23;tcp,
         Interface: ge-7/1/0.0,
         Session token: 0x6, Flag: 0x42001021
         Route: 0x80010, Gateway: 200.0.0.10, Tunnel: 0
         Port sequence: 0, FIN sequence: 0,
         FIN state: 0,
         Pkts: 9, Bytes: 507
         CP Session ID: 420000002
      Out: 60.0.0.2/23 --> 200.0.0.10/15198;tcp,
         Interface: ge-7/1/1.0,
         Session token: 0x7, Flag: 0x42001020
         Route: 0x70010, Gateway: 60.0.0.2, Tunnel: 0
         Port sequence: 0, FIN sequence: 0,
         FIN state: 0,
         Pkts: 8, Bytes: 462
         CP Session ID: 420000002
Total sessions: 1
Flow Sessions on FPC10 PIC3:
Total sessions: 0

show security flow session source-port 15198 summary

```
root> show security flow session source-port 15198 summary

Flow Sessions on FPC10 PIC1:
Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Valid sessions: 1
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 1

Flow Sessions on FPC10 PIC3:
Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0
```
show security flow session source-prefix

Syntax

```
show security flow session source-prefix
source-prefix-number
[brief | extensive | summary]
```

Release Information


Description

Display information about each session that uses the specified source prefix.

Options

- `source-prefix-number`—Source IP prefix or address for which to display sessions information.
- `brief | extensive | summary`—Display the specified level of output.

Required Privilege

- view

Related Documentation

- Understanding Traffic Processing on Security Devices on page 25
- clear security flow session source-prefix on page 372

List of Sample Output

- show security flow session source-prefix 200.0.0.10 on page 568
- show security flow session source-prefix 200.0.0.10 brief on page 569
- show security flow session source-prefix 200.0.0.10 extensive on page 569
- show security flow session source-prefix 200.0.0.10 summary on page 570

Output Fields

Table 71 on page 567 lists the output fields for the `show security flow session source-prefix` command. Output fields are listed in the approximate order in which they appear.

**Table 71: show security flow session source-prefix Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. You can use this ID to get additional information about the session.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Policy that permitted the traffic.</td>
</tr>
<tr>
<td>Timeout</td>
<td>Idle timeout after which the session expires.</td>
</tr>
<tr>
<td>In</td>
<td>Incoming flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
</tbody>
</table>
Table 71: show security flow session source-prefix Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out</td>
<td>Reverse flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td>Total sessions</td>
<td>Total number of sessions.</td>
</tr>
<tr>
<td>Status</td>
<td>Session status.</td>
</tr>
<tr>
<td>Flag</td>
<td>Internal flag depicting the state of the session, used for debugging purposes.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Name and ID of the policy that the first packet of the session matched.</td>
</tr>
<tr>
<td>Source NAT pool</td>
<td>The name of the source pool where NAT is used.</td>
</tr>
<tr>
<td>Application</td>
<td>Name of the application.</td>
</tr>
<tr>
<td>Maximum timeout</td>
<td>Maximum session timeout.</td>
</tr>
<tr>
<td>Current timeout</td>
<td>Remaining time for the session unless traffic exists in the session.</td>
</tr>
<tr>
<td>Session State</td>
<td>Session state.</td>
</tr>
<tr>
<td>Start time</td>
<td>Time when the session was created, offset from the system start time.</td>
</tr>
<tr>
<td>Valid sessions</td>
<td>Number of valid sessions.</td>
</tr>
<tr>
<td>Pending sessions</td>
<td>Number of pending sessions.</td>
</tr>
<tr>
<td>Invalidated sessions</td>
<td>Number of invalidated sessions.</td>
</tr>
<tr>
<td>Sessions in other states</td>
<td>Number of sessions in other states.</td>
</tr>
</tbody>
</table>

Sample Output

```
show security flow session source-prefix 200.0.0.10
```

```
root> show security flow session source-prefix 200.0.0.10

Flow Sessions on FPC10 PIC1:
  Total sessions: 0

Flow Sessions on FPC10 PIC2:
  Session ID: 420000002, Policy name: p1/4, Timeout: 488, Valid
  In: 200.0.0.10/15198 --> 60.0.0.2/23;tcp, If: ge-7/1/0.0, Pkts: 9, Bytes: 507, CP Session ID: 420000002
  Out: 60.0.0.2/23 --> 200.0.0.10/15198;tcp, If: ge-7/1/1.0, Pkts: 8, Bytes: 462, CP Session ID: 420000002
  Total sessions: 1
```
Flow Sessions on FPC10 PIC3:
Total sessions: 0

```
show security flowsessions source-prefix 200.0.0.10 brief
```

Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Session ID: 420000002, Policy name: p1/4, Timeout: 482, Valid
- In: 200.0.0.10/15198 --> 60.0.0.2/23; tcp, If: ge-7/1/0.0, Pkts: 9, Bytes: 507, CP Session ID: 420000002
- Out: 60.0.0.2/23 --> 200.0.0.10/15198; tcp, If: ge-7/1/1.0, Pkts: 8, Bytes: 462, CP Session ID: 420000002
Total sessions: 1

Flow Sessions on FPC10 PIC3:
Total sessions: 0

```
show security flowsessions source-prefix 200.0.0.10 extensive
```

Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Session ID: 420000002, Status: Normal
- Flags: 0x40/0x0/0x2408003, services-offload
- Policy name: p1/4
- Source NAT pool: Null, Application: junos-telnet/10
- Dynamic application: junos:UNKNOWN,
- Encryption: Unknown
- Application traffic control rule-set: INVALID, Rule: INVALID
- Maximum timeout: 1800, Current timeout: 436
- Session State: Valid
- Start time: 165, Duration: 1370
  - In: 200.0.0.10/15198 --> 60.0.0.2/23; tcp,
    Interface: ge-7/1/0.0,
    Session token: 0x6, Flag: 0x42001021
    Route: 0x80010, Gateway: 200.0.0.10, Tunnel: 0
    Port sequence: 0, FIN sequence: 0,
    FIN state: 0,
    Pkts: 9, Bytes: 507
    CP Session ID: 420000002
  - Out: 60.0.0.2/23 --> 200.0.0.10/15198; tcp,
    Interface: ge-7/1/1.0,
    Session token: 0x7, Flag: 0x42001020
    Route: 0x70010, Gateway: 60.0.0.2, Tunnel: 0
    Port sequence: 0, FIN sequence: 0,
    FIN state: 0,
    Pkts: 8, Bytes: 462
    CP Session ID: 420000002
Total sessions: 1
show security flow session source-prefix 200.0.0.10 summary

root> show security flow session source-prefix 200.0.0.10 summary

Flow Sessions on FPC10 PIC1:
Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Valid sessions: 1
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 1

Flow Sessions on FPC10 PIC3:
Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0
show security flow session summary family

Syntax

show security flow session summary family (inet | inet6)

Release Information

Command introduced in Junos OS Release 10.2. Support on SRX Series devices for flow-based mode for family inet6 added in Junos OS Release 10.2. Support for IPv6 addresses in active/active chassis cluster configurations (in addition to the existing support of active/passive chassis cluster configurations) added in Junos OS Release 10.4.

Description

Display filtered summary of information about existing sessions, including types of sessions, active and failed sessions, and the maximum allowed number of sessions.

Options

- **inet**—Display details summary of IPv4 sessions.
- **inet6**—Display details summary of IPv6 sessions.

Required Privilege

view

Related Documentation

- Understanding Traffic Processing on Security Devices on page 25
- clear security flow session all on page 340

List of Sample Output

show security flow session summary family inet on page 572
show security flow session summary family inet6 on page 572

Output Fields

Table 72 on page 571 lists the output fields for the show security flow session summary family command. Output fields are listed in the approximate order in which they appear.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid sessions</td>
<td>Count of valid sessions.</td>
</tr>
<tr>
<td>Pending sessions</td>
<td>Count of pending sessions.</td>
</tr>
<tr>
<td>Invalidated sessions</td>
<td>Count of sessions the security device has determined to be invalid.</td>
</tr>
<tr>
<td>Sessions in other states</td>
<td>Count of sessions not in valid, pending, or invalidated state.</td>
</tr>
<tr>
<td>Total sessions</td>
<td>Total of the above counts.</td>
</tr>
</tbody>
</table>
### Sample Output

```
show security flow session summary family inet

user@host> show security flow session summary family inet

Flow Sessions on FPC10 PIC1:
Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Valid sessions: 1
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 1

Flow Sessions on FPC10 PIC3:
Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0
```

```
show security flow session summary family inet6

user@host> show security flow session summary family inet6

Flow Sessions on FPC10 PIC1:
Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0

Flow Sessions on FPC10 PIC3:
Valid sessions: 1
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 1
```
show security flow session summary node

Syntax  

show security flow session summary node (node-id | all | local | primary)

Release Information  


Description  

Display information about all currently active security sessions on the device for the specified node options in summary mode.

Options  

- **node**—(Optional) For chassis cluster configurations, display session information on a specific node.
  - **node-id**—Identification number of the node. It can be 0 or 1.
  - **all**—Display information about all nodes.
  - **local**—Display information about the local node.
  - **primary**—Display information about the primary node.

Required Privilege  

- Level view

Related Documentation  

- Understanding Traffic Processing on Security Devices on page 25
- show security flow session on page 503

List of Sample Output  

- show security flow session summary node 0 on page 574
- show security flow session summary node 1 on page 575
- show security flow session summary node all on page 575
- show security flow session summary node local on page 577
- show security flow session summary node primary on page 577

Output Fields  

Table 73 on page 573 lists the output fields for the show security flow session summary node command. Output fields are listed in the approximate order in which they appear.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unicast-sessions</td>
<td>Number of unicast sessions.</td>
</tr>
</tbody>
</table>

Table 73: show security flow session summary node Output Fields
Table 73: show security flow session summary node Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multicast-sessions</td>
<td>Number of multicast sessions.</td>
</tr>
<tr>
<td>Failed-sessions</td>
<td>Number of failed sessions.</td>
</tr>
<tr>
<td>Sessions-in-use</td>
<td>Number of sessions in use.</td>
</tr>
<tr>
<td></td>
<td>• Valid sessions</td>
</tr>
<tr>
<td></td>
<td>• Pending sessions</td>
</tr>
<tr>
<td></td>
<td>• Invalidated sessions</td>
</tr>
<tr>
<td></td>
<td>• Sessions in other states</td>
</tr>
<tr>
<td>Maximum-sessions</td>
<td>Maximum number of sessions permitted.</td>
</tr>
</tbody>
</table>

Sample Output

show security flow session summary node 0

```
root@host> show security flow session summary node 0
node0:
--------------------------------------------------------------------------------------------------------
Flow Sessions on FPC0 PIC1:
 Unicast-sessions: 1
 Multicast-sessions: 0
 Services-offload-sessions: 0
 Failed-sessions: 0
 Sessions-in-use: 1
   Valid sessions: 1
   Pending sessions: 0
   Invalidated sessions: 0
   Sessions in other states: 0
 Maximum-sessions: 6291456

Flow Sessions on FPC0 PIC2:
 Unicast-sessions: 0
 Multicast-sessions: 0
 Services-offload-sessions: 0
 Failed-sessions: 0
 Sessions-in-use: 0
   Valid sessions: 0
   Pending sessions: 0
   Invalidated sessions: 0
   Sessions in other states: 0
 Maximum-sessions: 6291456

Flow Sessions on FPC0 PIC3:
 Unicast-sessions: 0
 Multicast-sessions: 0
 Services-offload-sessions: 0
 Failed-sessions: 0
 Sessions-in-use: 0
   Valid sessions: 0
```
### show security flow session summary node 1

```bash
root@host> show security flow session summary node 1
node1:

<table>
<thead>
<tr>
<th>Flow Sessions on FPC0 PIC1:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unicast-sessions: 1</td>
</tr>
<tr>
<td>Multicast-sessions: 0</td>
</tr>
<tr>
<td>Services-offload-sessions: 0</td>
</tr>
<tr>
<td>Failed-sessions: 0</td>
</tr>
<tr>
<td>Sessions-in-use: 1</td>
</tr>
<tr>
<td>Valid sessions: 1</td>
</tr>
<tr>
<td>Pending sessions: 0</td>
</tr>
<tr>
<td>Invalidated sessions: 0</td>
</tr>
<tr>
<td>Sessions in other states: 0</td>
</tr>
<tr>
<td>Maximum-sessions: 6291456</td>
</tr>
</tbody>
</table>

Flow Sessions on FPC0 PIC2:
- Unicast-sessions: 0
- Multicast-sessions: 0
- Services-offload-sessions: 0
- Failed-sessions: 0
- Sessions-in-use: 0
- Valid sessions: 0
- Pending sessions: 0
- Invalidated sessions: 0
- Sessions in other states: 0
- Maximum-sessions: 6291456

Flow Sessions on FPC0 PIC3:
- Unicast-sessions: 0
- Multicast-sessions: 0
- Services-offload-sessions: 0
- Failed-sessions: 0
- Sessions-in-use: 0
- Valid sessions: 0
- Pending sessions: 0
- Invalidated sessions: 0
- Sessions in other states: 0
- Maximum-sessions: 6291456
```

### show security flow session summary node all

```bash
root@host> show security flow session summary node all
node0:

<table>
<thead>
<tr>
<th>Flow Sessions on FPC0 PIC1:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unicast-sessions: 1</td>
</tr>
<tr>
<td>Multicast-sessions: 0</td>
</tr>
<tr>
<td>Services-offload-sessions: 0</td>
</tr>
</tbody>
</table>
```

Copyright © 2019, Juniper Networks, Inc.
Failed-sessions: 0
Sessions-in-use: 1
   Valid sessions: 1
   Pending sessions: 0
   Invalidated sessions: 0
   Sessions in other states: 0
Maximum-sessions: 6291456

Flow Sessions on FPC0 PIC2:
Unicast-sessions: 0
Multicast-sessions: 0
Services-offload-sessions: 0
Failed-sessions: 0
Sessions-in-use: 0
   Valid sessions: 0
   Pending sessions: 0
   Invalidated sessions: 0
   Sessions in other states: 0
Maximum-sessions: 6291456

Flow Sessions on FPC0 PIC3:
Unicast-sessions: 0
Multicast-sessions: 0
Services-offload-sessions: 0
Failed-sessions: 0
Sessions-in-use: 0
   Valid sessions: 0
   Pending sessions: 0
   Invalidated sessions: 0
   Sessions in other states: 0
Maximum-sessions: 6291456

node1:

Flow Sessions on FPC0 PIC1:
Unicast-sessions: 1
Multicast-sessions: 0
Services-offload-sessions: 0
Failed-sessions: 0
Sessions-in-use: 1
   Valid sessions: 1
   Pending sessions: 0
   Invalidated sessions: 0
   Sessions in other states: 0
Maximum-sessions: 6291456

Flow Sessions on FPC0 PIC2:
Unicast-sessions: 0
Multicast-sessions: 0
Services-offload-sessions: 0
Failed-sessions: 0
Sessions-in-use: 0
   Valid sessions: 0
   Pending sessions: 0
   Invalidated sessions: 0
   Sessions in other states: 0
Maximum-sessions: 6291456

Flow Sessions on FPC0 PIC3:
### show security flow session summary node local

```plaintext
root@host> show security flow session summary node local

node0:

<table>
<thead>
<tr>
<th>Sessions Summary</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unicast-sessions</td>
<td>1</td>
</tr>
<tr>
<td>Multicast-sessions</td>
<td>0</td>
</tr>
<tr>
<td>Services-offload-sessions</td>
<td>0</td>
</tr>
<tr>
<td>Failed-sessions</td>
<td>0</td>
</tr>
<tr>
<td>Sessions-in-use</td>
<td>1</td>
</tr>
<tr>
<td>Valid sessions</td>
<td>1</td>
</tr>
<tr>
<td>Pending sessions</td>
<td>0</td>
</tr>
<tr>
<td>Invalidated sessions</td>
<td>0</td>
</tr>
<tr>
<td>Sessions in other states</td>
<td>0</td>
</tr>
<tr>
<td>Maximum-sessions</td>
<td>6291456</td>
</tr>
</tbody>
</table>

Flow Sessions on FPC0 PIC1:
- Unicast-sessions: 1
- Multicast-sessions: 0
- Services-offload-sessions: 0
- Failed-sessions: 0
- Sessions-in-use: 1
  - Valid sessions: 1
  - Pending sessions: 0
  - Invalidated sessions: 0
  - Sessions in other states: 0
- Maximum-sessions: 6291456

Flow Sessions on FPC0 PIC2:
- Unicast-sessions: 0
- Multicast-sessions: 0
- Services-offload-sessions: 0
- Failed-sessions: 0
- Sessions-in-use: 0
  - Valid sessions: 0
  - Pending sessions: 0
  - Invalidated sessions: 0
  - Sessions in other states: 0
- Maximum-sessions: 6291456

Flow Sessions on FPC0 PIC3:
- Unicast-sessions: 0
- Multicast-sessions: 0
- Services-offload-sessions: 0
- Failed-sessions: 0
- Sessions-in-use: 0
  - Valid sessions: 0
  - Pending sessions: 0
  - Invalidated sessions: 0
  - Sessions in other states: 0
- Maximum-sessions: 6291456
```

### show security flow session summary node primary

```plaintext
root@host> show security flow session summary node primary

<table>
<thead>
<tr>
<th>Sessions Summary</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unicast-sessions</td>
<td>0</td>
</tr>
<tr>
<td>Multicast-sessions</td>
<td>0</td>
</tr>
<tr>
<td>Services-offload-sessions</td>
<td>0</td>
</tr>
<tr>
<td>Failed-sessions</td>
<td>0</td>
</tr>
<tr>
<td>Sessions-in-use</td>
<td>0</td>
</tr>
<tr>
<td>Valid sessions</td>
<td>0</td>
</tr>
<tr>
<td>Pending sessions</td>
<td>0</td>
</tr>
<tr>
<td>Invalidated sessions</td>
<td>0</td>
</tr>
<tr>
<td>Sessions in other states</td>
<td>0</td>
</tr>
<tr>
<td>Maximum-sessions</td>
<td>6291456</td>
</tr>
</tbody>
</table>
```
Flow Sessions on FPC0 PIC1:
Unicast-sessions: 1
Multicast-sessions: 0
Services-offload-sessions: 0
Failed-sessions: 0
Sessions-in-use: 1
  Valid sessions: 1
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
Maximum-sessions: 6291456

Flow Sessions on FPC0 PIC2:
Unicast-sessions: 0
Multicast-sessions: 0
Services-offload-sessions: 0
Failed-sessions: 0
Sessions-in-use: 0
  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
Maximum-sessions: 6291456

Flow Sessions on FPC0 PIC3:
Unicast-sessions: 0
Multicast-sessions: 0
Services-offload-sessions: 0
Failed-sessions: 0
Sessions-in-use: 0
  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
Maximum-sessions: 6291456
show security flow session summary services-offload

**Syntax**

`show security flow session summary services-offload [filter]`

**Release Information**

Command introduced in Junos OS Release 11.4. Starting with Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1, the SRX5K-MPC3-100G10G (IOC3) and the SRX5K-MPC3-40G10G (IOC3) with Express Path (formerly known as services offloading) support are introduced for SRX5400, SRX5600, and SRX5800 devices. This command is supported on the SRX1500, SRX 5800, SRX 5600, and SRX 5400 devices, and vSRX.

**Description**

Display information about all currently active services-offload security sessions on the device in summary mode.

**Options**

- `filter`—Filter the display by the specified criteria.
  
  The following filters reduce the display to those sessions that match the criteria specified by the filter:
  
  - `application`—Application name.
  - `application-firewall-rule-set`—Application firewall enabled with the specified rule set.
  - `application-traffic-control-rule-set`—Application traffic control enabled with the specified rule set.
  - `destination-port`—Destination port.
  - `destination-prefix`—Destination IP prefix or address.
  - `dynamic-application`—Dynamic application name.
  - `dynamic-application-group`—Dynamic application group name.
  - `family`—Protocol family.
  - `interface`—Name of incoming or outgoing interface.
  - `logical-system`—Logical system name.
  - `protocol`—IP protocol number.
  - `root-logical-system`—Root logical system name.
  - `source-port`—Source port.
  - `source-prefix`—Source IP prefix or address.
Required Privilege Level

Related Documentation
- Understanding Traffic Processing on Security Devices on page 25
- clear security flow session services-offload on page 365

List of Sample Output
- show security flow session summary services-offload on page 580
- show security flow session summary services-offload application on page 581
- show security flow session summary services-offload destination-port on page 582

Output Fields
Table 74 on page 580 lists the output fields for the show security flow session summary services-offload command. Output fields are listed in the approximate order in which they appear.

Table 74: show security flow session summary services-offload Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unicast-sessions</td>
<td>Number of unicast sessions.</td>
</tr>
<tr>
<td>Multicast-sessions</td>
<td>Number of multicast sessions.</td>
</tr>
<tr>
<td>Services-offload-sessions</td>
<td>Number of services-offload sessions.</td>
</tr>
<tr>
<td>Failed-sessions</td>
<td>Number of failed sessions.</td>
</tr>
<tr>
<td>Sessions-in-use</td>
<td>Number of sessions in use:</td>
</tr>
<tr>
<td></td>
<td>• Valid</td>
</tr>
<tr>
<td></td>
<td>• Pending</td>
</tr>
<tr>
<td></td>
<td>• Invalidated</td>
</tr>
<tr>
<td></td>
<td>• Sessions in other states</td>
</tr>
<tr>
<td>Maximum-sessions</td>
<td>Maximum number of sessions.</td>
</tr>
</tbody>
</table>

Sample Output

show security flow session summary services-offload

user@host> show security flow session summary services-offload
Flow Sessions on FPC1 PIC0:
Unicast-sessions: 0
Multicast-sessions: 0
Services-offload-sessions: 0
Failed-sessions: 0
Sessions-in-use: 0
  Valid sessions: 0
  Pending sessions: 0
  Invalidated sessions: 0
  Sessions in other states: 0
show security flow session summary services-offload application

user@host> show security flow session summary services-offload application telnet

Flow Sessions on FPC10 PIC1:
Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Valid sessions: 0
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 0

Flow Sessions on FPC10 PIC3:

Chapter 7: Operational Commands
Valid sessions: 1
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 1

show security flow session summary services-offload destination-port

user@host> show security flow session summary services-offload destination-port 23

Flow Sessions on FPC10 PIC1:
Total sessions: 0

Flow Sessions on FPC10 PIC2:
Total sessions: 0

Flow Sessions on FPC10 PIC3:
Session ID: 430000004, Policy name: p1/4, Timeout: 1500, Valid
  In: 200.0.0.10/15200 --> 60.0.0.2/23;tcp, If: ge-7/1/0.0, Pkts: 13, Bytes: 718,
    CP Session ID: 430000003
  Out: 60.0.0.2/23 --> 200.0.0.10/15200;tcp, If: ge-7/1/1.0, Pkts: 12, Bytes: 677,
    CP Session ID: 430000003
Total sessions: 1
show security flow session tunnel

Syntax

show security flow session tunnel
[brief | extensive | summary]

Release Information

Command introduced in Junos OS Release 8.5; Filter and view options introduced in Junos OS Release 10.2. Fragmentation counters options introduced in Junos OS Release 15.1X49-90.

NOTE: Only show security flow session tunnel extensive and show security flow session tunnel summary provide fragmentation counters output.

Description

Display information about all tunnel sessions.

Options

none—Display the brief (default) level of output.

brief | extensive | summary—Display the specified level of output.

Required Privilege Level

view

Related Documentation

• Understanding Traffic Processing on Security Devices on page 25

List of Sample Output

show security flow session tunnel on page 585
show security flow session tunnel brief on page 585
show security flow session tunnel extensive on page 586
show security flow session tunnel summary extensive (with fragmentation counters output) on page 588
show security flow session tunnel summary on page 589
show security flow session tunnel summary (with fragmentation counters output) on page 590

Output Fields

Table 75 on page 583 lists the output fields for the show security flow session tunnel command. Output fields are listed in the approximate order in which they appear.

Table 75: show security flow session tunnel Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session ID</td>
<td>Number that identifies the session. You can use this ID to get additional information about the session.</td>
</tr>
<tr>
<td>Policy name</td>
<td>Policy that permitted the traffic. NA (Not Applicable) for a tunnel session.</td>
</tr>
</tbody>
</table>
**Table 75: show security flow session tunnel Output Fields (continued)**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Source NAT pool</strong></td>
<td>The name of the source pool where NAT is used.</td>
</tr>
<tr>
<td><strong>Timeout</strong></td>
<td>Idle timeout after which the session expires. NA (Not Applicable) for a tunnel session.</td>
</tr>
<tr>
<td><strong>In</strong></td>
<td>Incoming flow (source and destination IP addresses, application protocol, interface, session token, route, gateway, tunnel, encapsulation and authentication header fragments generated, inner IPv4 fragments generated, inner IPv6 fragments generated, port sequence, FIN sequence, FIN state, packets and bytes).</td>
</tr>
<tr>
<td><strong>Total sessions</strong></td>
<td>Total number of sessions.</td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>Session status.</td>
</tr>
<tr>
<td><strong>Flags</strong></td>
<td>Internal flag depicting the state of the session, used for debugging purposes.</td>
</tr>
<tr>
<td><strong>Source NAT pool</strong></td>
<td>The name of the source pool where NAT is used.</td>
</tr>
<tr>
<td><strong>Application</strong></td>
<td>Name of the application.</td>
</tr>
<tr>
<td><strong>Maximum timeout</strong></td>
<td>Maximum session timeout.</td>
</tr>
<tr>
<td><strong>Current timeout</strong></td>
<td>Remaining time for the session unless traffic exists in the session.</td>
</tr>
<tr>
<td><strong>Encryption</strong></td>
<td>Encryption traffic name.</td>
</tr>
<tr>
<td><strong>Session State</strong></td>
<td>Session state.</td>
</tr>
<tr>
<td><strong>Start time</strong></td>
<td>Time when the session was created, offset from the system start time.</td>
</tr>
<tr>
<td><strong>Session token</strong></td>
<td>Internal token derived from the virtual routing instance.</td>
</tr>
<tr>
<td><strong>Route</strong></td>
<td>Internal next hop of the route to be used by the flow.</td>
</tr>
<tr>
<td><strong>Valid sessions</strong></td>
<td>Number of valid sessions.</td>
</tr>
<tr>
<td><strong>Pending sessions</strong></td>
<td>Number of pending sessions.</td>
</tr>
<tr>
<td><strong>Invalidated sessions</strong></td>
<td>Number of invalidated sessions.</td>
</tr>
<tr>
<td><strong>Sessions in other states</strong></td>
<td>Number of sessions in other states.</td>
</tr>
<tr>
<td><strong>ESP/AH frag Rx: number, Generated: number</strong></td>
<td>For IPSec tunnels, the number of Encapsulating Security Payload (ESP) or Authentication Header (AH) fragments that were received and the number that were generated.</td>
</tr>
<tr>
<td><strong>Inner IPv4 frag Rx: number, Tx: number, Generated: number</strong></td>
<td>For tunnels with IPv4 fragments, the number of fragments associated with the tunnel that were received, transmitted, and generated.</td>
</tr>
</tbody>
</table>
Table 75: show security flow session tunnel Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner IPv6 frag Rx: number, Tx: number, Generated: number</td>
<td>For tunnels with IPv6 fragments, the number of fragments associated with the tunnel that were received, transmitted, and generated.</td>
</tr>
</tbody>
</table>

Sample Output

show security flow session tunnel

root> show security flow session tunnel

Flow Sessions on FPC10 PIC1:

  Session ID: 410000001, Policy name: N/A, Timeout: N/A, Valid
  In: 60.0.0.2/43405 --> 60.0.0.3/494;esp, If: ge-7/1/1.0, Pkts: 0, Bytes: 0, CP
  Session ID: 420000000

  Session ID: 410000002, Policy name: N/A, Timeout: N/A, Valid
  In: 60.0.0.2/0 --> 60.0.0.3/0;esp, If: ge-7/1/1.0, Pkts: 0, Bytes: 0, CP Session
  ID: 420000000

Total sessions: 2

Flow Sessions on FPC10 PIC2:

  Session ID: 420000003, Policy name: N/A, Timeout: N/A, Valid
  In: 60.0.0.2/0 --> 60.0.0.3/0;esp, If: ge-7/1/1.0, Pkts: 0, Bytes: 0, CP Session
  ID: 420000000

Flow Sessions on FPC10 PIC3:

  Session ID: 430000005, Policy name: N/A, Timeout: N/A, Valid
  In: 60.0.0.2/0 --> 60.0.0.3/0;esp, If: ge-7/1/1.0, Pkts: 0, Bytes: 0, CP Session
  ID: 420000000

Total sessions: 2

show security flow session tunnel brief

root> show security flow session tunnel brief

Flow Sessions on FPC10 PIC1:

  Session ID: 410000001, Policy name: N/A, Timeout: N/A, Valid
  In: 60.0.0.2/43405 --> 60.0.0.3/494;esp, If: ge-7/1/1.0, Pkts: 0, Bytes: 0, CP
  Session ID: 420000000

  Session ID: 410000002, Policy name: N/A, Timeout: N/A, Valid
  In: 60.0.0.2/0 --> 60.0.0.3/0;esp, If: ge-7/1/1.0, Pkts: 0, Bytes: 0, CP Session
  ID: 420000000

Copyright © 2019, Juniper Networks, Inc.
| Session ID     | Policy name | Timeout | Status  | Flags       | Source NAT pool | Dynamic application | Encryption | Application traffic control rule-set | Maximum timeout | Current timeout | Start time | Duration | In/Out                  | Interface            | Session token | ESP/AH frag Rx | Inner IPv4 frag Rx | Inner IPv6 frag Rx | Port sequence | FIN sequence | FIN state | Pkts | Bytes |
|---------------|-------------|---------|---------|------------|----------------|--------------------|---------------------|------------|--------------------------------------|------------------|----------------|------------|----------|-------------------------|----------------------|---------------|----------------|-------------------|-------------------|----------------|----------------|-----------|-----|------|
| 420000003     | N/A         | N/A     | Normal  | 0x10000/0x0/0x1 | Null            | junos:UNKNOWN     | Unknown           | INVALID    | Rule: INVALID                      | N/A              | N/A            | 3548       | 797      | 60.0.0.2/0 --> 60.0.0.3/0;esp, If: ge-7/1/1.0, | ge-7/1/1.0         | 0x7           | 0             | 4                 | 0                 | 0              | 0           | 0         | 0    | 0    |
| 420000004     | N/A         | N/A     | Normal  | 0x10000/0x0/0x1 | Null            | junos:UNKNOWN     | Unknown           | INVALID    | Rule: INVALID                      | N/A              | N/A            | 0          | 0        | 60.0.0.2/0 --> 60.0.0.3/0;ah, If: ge-7/1/1.0, | ge-7/1/1.0         | 0x80100621     | 0             | 0                 | 0                 | 0              | 0           | 0         | 0    | 0    |
Session State: Valid
Start time: 3548, Duration: 797
  In: 60.0.0.2/0 --> 60.0.0.3/0; esp,
  Interface: ge-7/1/1.0,
  Session token: 0x7, Flag: 0x621
  Route: 0x60010, Gateway: 60.0.0.2, Tunnel: 0
  Port sequence: 0, FIN sequence: 0,
  FIN state: 0,
  Pkts: 0, Bytes: 0
  CP Session ID: 420000000
Total sessions: 2

Flow Sessions on FPC10 PIC2:

Session ID: 420000003, Status: Normal
  Flags: 0x10000/0x0/0x1
  Policy name: N/A
  Source NAT pool: Null
  Dynamic application: junos:UNKNOWN,
  Encryption: Unknown
  Application traffic control rule-set: INVALID, Rule: INVALID
  Maximum timeout: N/A, Current timeout: N/A
  Session State: Valid
Start time: 3513, Duration: 798
  In: 60.0.0.2/0 --> 60.0.0.3/0; esp,
  Interface: ge-7/1/1.0,
  Session token: 0x7, Flag: 0x621
  Route: 0x0, Gateway: 60.0.0.2, Tunnel: 0
  Port sequence: 0, FIN sequence: 0,
  FIN state: 0,
  Pkts: 0, Bytes: 0
  CP Session ID: 420000000

Session ID: 420000004, Status: Normal
  Flags: 0x10000/0x0/0x1
  Policy name: N/A
  Source NAT pool: Null
  Dynamic application: junos:UNKNOWN,
  Encryption: Unknown
  Application traffic control rule-set: INVALID, Rule: INVALID
  Maximum timeout: N/A, Current timeout: N/A
  Session State: Valid
Start time: 3513, Duration: 798
  In: 60.0.0.2/0 --> 60.0.0.3/0; ah,
  Interface: ge-7/1/1.0,
  Session token: 0x7, Flag: 0x621
  Route: 0x0, Gateway: 60.0.0.2, Tunnel: 0
  Port sequence: 0, FIN sequence: 0,
  FIN state: 0,
  Pkts: 0, Bytes: 0
  CP Session ID: 420000000
Total sessions: 2

Flow Sessions on FPC10 PIC3:

Session ID: 430000005, Status: Normal
  Flags: 0x10000/0x0/0x1
  Policy name: N/A
  Source NAT pool: Null
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: N/A, Current timeout: N/A
Session State: Valid
Start time: 3513, Duration: 799
  In: 60.0.0.2/0 --> 60.0.0.3/0;esp,
  Interface: ge-7/1/1.0,
  Session token: 0x7, Flag: 0x621
  Route: 0x0, Gateway: 60.0.0.2, Tunnel: 0
  Port sequence: 0, FIN sequence: 0,
  FIN state: 0,
  Pkts: 0, Bytes: 0
  CP Session ID: 420000000
Session ID: 430000006, Status: Normal
  Flags: 0x10000/0x0/0x1
Policy name: N/A
Source NAT pool: Null
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: N/A, Current timeout: N/A
Session State: Valid
Start time: 3513, Duration: 799
  In: 60.0.0.2/0 --> 60.0.0.3/0;ah,
  Interface: ge-7/1/1.0,
  Session token: 0x7, Flag: 0x621
  Route: 0x0, Gateway: 60.0.0.2, Tunnel: 0
  Port sequence: 0, FIN sequence: 0,
  FIN state: 0,
  Pkts: 0, Bytes: 0
  CP Session ID: 420000000
Total sessions: 2

show security flow session tunnel summary extensive (with fragmentation counters output)

root> show security flow session tunnel extensive

node0:
Flow Sessions on FPC2 PIC1:
  Session ID: 90000004, Status: Normal, State: Active
  Flags: 0x10000/0x0/0x1
Policy name: N/A
Source NAT pool: Null
Dynamic application: junos:UNKNOWN,
Encryption: Unknown
Application traffic control rule-set: INVALID, Rule: INVALID
Maximum timeout: N/A, Current timeout: N/A
Session State: Valid
Start time: 6251, Duration: 167168
  In: 2.2.2.2/0 --> 2.2.2.1/10203;esp,
  Conn Tag: 0x0, Interface: reth1.0,
  Session token: 0x7, Flag: 0x80100621
  Route: 0x867f3c1, Gateway: 2.2.2.2, Tunnel: 0
  ESP/AH frag Rx: 0, Generated: 0
  Inner IPv4 frag Rx: 27, Tx: 27, Generated: 18
  Inner IPv6 frag Rx: 0, Tx: 0, Generated: 0
  Port sequence: 0, FIN sequence: 0,
  FIN state: 0,
show security flow session tunnel summary

root> show security flow session tunnel summary

Flow Sessions on FPC10 PIC1:

Valid sessions: 2
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 2

Flow Sessions on FPC10 PIC2:

Valid sessions: 2
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 2

Flow Sessions on FPC10 PIC3:

Valid sessions: 2
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 2
show security flow session tunnel summary (with fragmentation counters output)

root> show security flow session tunnel summary

node0:
Flow Sessions on FPC2 PIC1:

Valid sessions: 2
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 2

Tunnel fragment summary:
Tunnels with ESP/AH frag Rx: 0 (0)
Tunnels with ESP/AH frag generated: 0 (0)
Tunnels with IPv4 frag Rx: 1 (27)
Tunnels with IPv4 frag Tx: 1 (27)
Tunnels with IPv4 frag generated: 1 (18)
Tunnels with IPv6 frag Rx: 0 (0)
Tunnels with IPv6 frag Tx: 0 (0)
Tunnels with IPv6 frag generated: 0 (0)

Flow Sessions on FPC2 PIC1:

Valid sessions: 2
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 2

Tunnel fragment summary:
Tunnels with ESP/AH frag Rx: 0 (0)
Tunnels with ESP/AH frag generated: 0 (0)
Tunnels with IPv4 frag Rx: 0 (0)
Tunnels with IPv4 frag Tx: 0 (0)
Tunnels with IPv4 frag generated: 0 (0)
Tunnels with IPv6 frag Rx: 0 (0)
Tunnels with IPv6 frag Tx: 0 (0)
Tunnels with IPv6 frag generated: 0 (0)

Flow Sessions on FPC2 PIC3:

Valid sessions: 2
Pending sessions: 0
Invalidated sessions: 0
Sessions in other states: 0
Total sessions: 2

Tunnel fragment summary:
Tunnels with ESP/AH frag Rx: 0 (0)
Tunnels with ESP/AH frag generated: 0 (0)
Tunnels with IPv4 frag Rx: 0 (0)
Tunnels with IPv4 frag Tx: 0 (0)
Tunnels with IPv4 frag generated: 0 (0)
Tunnels with IPv6 frag Rx: 0 (0)
Tunnels with IPv6 frag Tx: 0 (0)
Tunnels with IPv6 frag generated: 0 (0)
Tunnel fragment summary:
Tunnels with ESP/AH frag Rx: 0 (0)
Tunnels with ESP/AH frag generated: 0 (0)
Tunnels with IPv4 frag Rx: 1 (27)
Tunnels with IPv4 frag Tx: 1 (27)
Tunnels with IPv4 frag generated: 1 (18)
Tunnels with IPv6 frag Rx: 0 (0)
Tunnels with IPv6 frag Tx: 0 (0)
Tunnels with IPv6 frag generated: 0 (0)
### show security flow statistics

**Syntax**

```
show security flow statistics
<node (node-id | all | local | primary)>
```

**Release Information**

Command introduced in Junos OS Release 10.2. Fragmentation counters options introduced in Junos OS Release 15.1X49-90.

**Description**

Display security flow statistics on a specific SPU. A flow is a stream of related packets that meet the same matching criteria and share the same characteristics.

A packet undergoes flow-based processing after packet-based filters and some screens have been applied to it. A System Processing Unit (SPU) processes the packets of a flow according to the security features and other services configured for the session. Flow-based packet processing treats related packets, or a stream of packets, in the same way. Packet treatment depends on characteristics that were established for the first packet of the packet stream.

The `show security flow statistics` command displays information for individual SPUs. For each SPU, the active sessions on the SPU, packets received, packets transmitted, packets forwarded/queued, packets copied, packets dropped, packet fragments received in a flow on the SPU, pre-fragmented packets generated, and post-fragmented packets generated are displayed in terms of numbers.

There are many conditions that can cause a packet to be dropped. Here are some of them:

- A screen module detects IP spoofing
- The IPSec Encapsulating Security Payload (ESP) or the Authentication Header (AH) authentication failed. For example, incoming NAT errors could cause this to happen.
- A packet matches more than one security policy that specifies user authentication. (Sometimes packets are looped through the system more than once. Each time a packet passes through the system, that packet must be permitted by a policy.)
- A time constraint setting expires. For example, multicast streams with a packet interval of more than 60 seconds would experience premature aging-out of flow sessions. (In most cases, you can configure higher time-out value to prevent packet drop.)

Packet fragmentation can occur for a number of reasons, and, in some cases, it can be controlled through a configuration setting. Every link has a maximum transmission unit (MTU) size that specifies the size of the largest packet that the link can transmit. A larger MTU size means that fewer packets are required to transmit a certain amount of data. However, for a packet to successfully traverse the path from the source node to the destination node, the MTU size of the source node egress interface must be no larger than that of the smallest MTU size of all nodes on the path between the source and destination. This value is referred to as the path maximum transmission unit (path MTU).
When a packet is larger that the MTU size on any link in the data path, the link might fragment it or drop it.

- For IPv4, if a node within the path between a source node and a destination node receives a packet that is larger than its MTU size, it can fragment the packet and transmit the resulting smaller packets.

- For IPv6, an intermediate node cannot fragment a packet. If a packet is larger than a link’s MTU size, it is likely that the link will drop it. However, the source node (the node that sent the packet) can fragment a packet, and this is done to accommodate a path MTU size-adjustment requirement. Nodes along the path of a packet cannot fragment the packet to transmit it.

The fragmentation counters feature for IPsec tunnels provides the show output information for the pre-fragments generated and post-fragments generated fields.

Starting in Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1, SRX5K-MPC3-100G10G (IOC3) and SRX5K-MPC3-40G10G (IOC3) are introduced for SRX5400, SRX5600, and SRX5800 devices that perform hash-based datapath packet forwarding to interconnect with all existing IOC and SPC cards using the XL chip (packet-processing chip). The IOC3 XL chip uses a hash-based method to distribute ingress traffic to a pool of SPUs by default.

**Options**

- none—Display the security flow statistics information.
- node—(Optional) For chassis cluster configurations, display all security flow statistics on a specific node (device) in the cluster.
  - node-id—Identification number of the node. It can be 0 or 1.
- all—Display information about all nodes.
- local—Display information about the local node.
- primary—Display information about the primary node.

**Required Privilege**

view

**Related Documentation**

- Understanding Traffic Processing on Security Devices on page 25
- List of Sample Output show security flow statistics on page 594

**Output Fields**

Table 76 on page 593 lists the output fields for the show security flow statistics command. Output fields are listed in the approximate order in which they appear.

**Table 76: show security flow statistics Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current sessions</td>
<td>Number of active sessions on the SPU.</td>
</tr>
</tbody>
</table>
Table 76: show security flow statistics Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packets received</td>
<td>Number of packets received in a security flow of a specific SPU. The packets are processed and forwarded on that SPU.</td>
</tr>
<tr>
<td>Packets transmitted</td>
<td>Number of packets returned to Jexec for transmission.</td>
</tr>
<tr>
<td>Packets forwarded/queued</td>
<td>Number of packets forwarded or number of packets queued up by other modules. The packets are received in the flow. However, during processing, the system discovers sanity check errors, security violations, or other conditions that caused the packet to be dropped.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Dropped packets are not captured by this field.</td>
</tr>
<tr>
<td>Packets copied</td>
<td>Number of packets copied by other modules including fragmentation and tcp proxy.</td>
</tr>
<tr>
<td>Packets dropped</td>
<td>Number of packets dropped in a flow on a specific SPU. The packets are received in the flow. However, during processing, the system discovers sanity check errors, security violations, or other conditions that caused the packet to be dropped.</td>
</tr>
<tr>
<td></td>
<td>See the description for some of the conditions and events that can cause a packet to be dropped.</td>
</tr>
<tr>
<td>Fragment packets</td>
<td>Number of fragments received in a flow on the SPU. See the description for information about packet fragments.</td>
</tr>
<tr>
<td>Pre fragments generated</td>
<td>For IPsec tunnels, the number of fragments that are self-generated by the SRX Series device before it encapsulates the packet with the IPsec encryption header.</td>
</tr>
<tr>
<td>Post fragments generated</td>
<td>For IPsec tunnels, the number of fragments that are received by the SRX Series device and packets that are fragmented after encryption.</td>
</tr>
</tbody>
</table>

Sample Output

```
show security flow statistics

user@host> show security flow statistics

node0:

Current sessions: 0
Packets received: 2677
Packets transmitted: 2278
Packets forwarded/queued: 0
```
Packets copied: 99
Packets dropped: 300
Fragment packets: 0
Pre fragments generated: 0
Post fragments generated: 0

node1:

Current sessions: 0
Packets received: 1267
Packets transmitted: 904
Packets forwarded/queued: 0
Packets copied: 0
Packets dropped: 363
Fragment packets: 0
Pre fragments generated: 0
Post fragments generated: 0
show security flow status

Syntax

show security flow status

Release Information

Command introduced in Junos OS Release 10.2; session distribution mode option added in Junos OS Release 12.1X44-D10; enhanced route scaling mode option added in Junos OS Release 12.1X45-D10. GTP-U distribution option added in Junos OS Release 15.1X49-D40.

Starting in Junos OS Release 15.1X49-D10 and Junos OS Release 17.3R1, SRX5K-MPC3-100G10G (IOC3) and SRX5K-MPC3-40G10G (IOC3) are introduced for SRX5400, SRX5600, and SRX5800 devices that perform hash-based data path packet forwarding to interconnect with all existing IOC and SPC cards using the XL chip (packet-processing chip).

The IOC3 XL chip uses a hash-based method to distribute ingress traffic to a pool of SPUs by default. Selection of hash keys depends on application protocols.

Starting in Junos OS Release 18.3R1, flow PowerMode IPsec support is introduced on vSRX instances.

Starting in Junos OS Release 18.4R1, flow PowerMode IPsec support is introduced on SRX4100 and SRX 4200 devices.

Starting in Junos OS Release 18.2R2, flow PowerMode IPsec support is introduced on SRX5400, SRX5600, and SRX5800 devices.

Starting in Junos OS Release 19.1R1, flow PowerMode IPsec support is introduced on SRX4600 devices.

Description

Display the flow processing modes and logging status.

Required Privilege

view

Related Documentation

• Understanding Traffic Processing on Security Devices on page 25

List of Sample Output

show security flow status on page 597
show security flow status (IPsec Performance Acceleration) on page 598
show security flow status (for hash-based datapath forwarding using SRX5K-MPC3-40G10G (IOC3) and SRX5K-MPC3-100G10G (IOC3) on page 598

Output Fields

Table 77 on page 597 lists the output fields for the show security flow status command. Output fields are listed in the approximate order in which they appear.
Table 77: show security flow status Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow forwarding mode</td>
<td>Flow processing mode.</td>
</tr>
<tr>
<td>• Inet forwarding mode</td>
<td></td>
</tr>
<tr>
<td>• Inet6 forwarding mode</td>
<td></td>
</tr>
<tr>
<td>• MPLS forwarding mode</td>
<td></td>
</tr>
<tr>
<td>• ISO forwarding mode</td>
<td></td>
</tr>
<tr>
<td>• Session distribution mode</td>
<td></td>
</tr>
<tr>
<td>• Enhanced route scaling mode</td>
<td></td>
</tr>
<tr>
<td>Flow trace status</td>
<td>Flow logging status.</td>
</tr>
<tr>
<td>• Flow tracing status</td>
<td></td>
</tr>
<tr>
<td>• Flow tracing options</td>
<td></td>
</tr>
<tr>
<td>flow session distribution</td>
<td>SPU load distribution mode.</td>
</tr>
<tr>
<td>• RR-based</td>
<td></td>
</tr>
<tr>
<td>• Hash-based</td>
<td></td>
</tr>
<tr>
<td>GTP-U distribution</td>
<td></td>
</tr>
<tr>
<td>• Enabled</td>
<td></td>
</tr>
<tr>
<td>Flow packet ordering</td>
<td>packet-ordering mode.</td>
</tr>
<tr>
<td>• Hardware</td>
<td></td>
</tr>
<tr>
<td>• Software</td>
<td></td>
</tr>
<tr>
<td>Flow ipsec performance</td>
<td>IPsec VPN performance acceleration status.</td>
</tr>
<tr>
<td>acceleration</td>
<td></td>
</tr>
<tr>
<td>Flow power mode IPsec</td>
<td>Flow PowerMode IPsec status.</td>
</tr>
</tbody>
</table>

Sample Output
show security flow status

```
user@host> show security flow status
Flow forwarding mode:
Inet forwarding mode: flow based
Inet6 forwarding mode: flow based
MPLS forwarding mode: drop
ISO forwarding mode: drop
Tap mode: disabled (default)
Flow trace status
Flow tracing status: off
Flow session distribution
Distribution mode: Hash-based
GTP-U distribution: Disabled
Flow ipsec performance acceleration: off
Flow packet ordering
```
### Ordering mode: Hardware
Flow power mode IPsec: Enabled

#### show security flow status (IPsec Performance Acceleration)

```bash
user@host> show security flow status
Flow forwarding mode:
  Inet forwarding mode: flow based
  Inet6 forwarding mode: drop
  MPLS forwarding mode: drop
  ISO forwarding mode: drop
  TAP mode: enabled
Flow trace status
Flow tracing status: off
Flow session distribution
  Distribution mode: RR-based
  GTP-U distribution: Enabled Flow packet ordering
  Ordering mode: Software (reboot needed to change to software)
Flow power mode IPsec: Enabled
```

#### show security flow status (for hash-based datapath forwarding using SRX5K-MPC3-40G10G (IOC3) and SRX5K-MPC3-100G10G (IOC3))

```bash
user@host> show security flow status
node0:
-----------------------------------------------------------------------------------------------------------------
Flow forwarding mode:
  Inet forwarding mode: flow based
  Inet6 forwarding mode: drop
  MPLS forwarding mode: drop
  ISO forwarding mode: drop
Flow trace status
Flow tracing status: off
Flow session distribution
  Distribution mode: Hash-based
  GTP-U distribution: Enabled
Flow ipsec performance acceleration: off
Flow packet ordering
  Ordering mode: Hardware
Flow power mode IPsec: Enabled
node1:
-----------------------------------------------------------------------------------------------------------------
Flow forwarding mode:
  Inet forwarding mode: flow based
  Inet6 forwarding mode: drop
  MPLS forwarding mode: drop
  ISO forwarding mode: drop
Flow trace status
Flow tracing status: off
Flow session distribution
  Distribution mode: Hash-based
  GTP-U distribution: Enabled
Flow ipsec performance acceleration: off
Flow packet ordering
  Ordering mode: Hardware
Flow power mode IPsec: Enabled
```
**show security forwarding-options mirror-filter**

**Syntax**
show security forwarding-options mirror-filter (all | filter-name)

**Release Information**
Command introduced in Junos OS Release 12.1X46-D10.

**Description**
Displays status information about all configured mirror filters or that of a specific mirror filter. Each mirror filter contains a set of parameters against which traffic is matched. For each mirror filter, the output identifies the number of packets that were matched by the filter for mirroring and the number of packets that were sent to the packet analyzer. It also shows the parameters that were configured for the mirror filter.

Network operators need a way to monitor X2 traffic to debug any handover issues across eNodeBs. The mirror filter feature allows you to do that. To use the mirror filter feature to monitor X2 traffic, you configure mirror filters. Traffic coming out of an IPsec tunnel is decrypted, mirrored, and analyzed by a packet analyzer, and then encrypted again to go into the outbound IPsec tunnel.

**NOTE:** The SRX Series mirror filter feature is bidirectional, much like a session. X2 traffic flowing through an IPsec VPN from devices that match the configured filter conditions is mirrored and analyzed.

Starting in Junos OS Release 18.4R1, if the output X2 interface of a mirror filter is configured for an st0 interface to filter traffic that you want to analyze, the packet is duplicated and encrypted by the IPsec tunnel bound to the st0 interface. This enhancement supports the SRX Series devices to send traffic mirrored from a port on an IPsec tunnel.

You can configure up to 15 different mirror filters to be used concurrently.

**Options**
- all—Display counters for all mirror filters.
- filter-name—Name of the mirror filter for which the counters are displayed.

**Required Privilege**
- view
List of Sample Output: show security forward-options mirror-filter on page 600

Output Fields: Lists the output fields for the `show security forward-options mirror-filter` command. Output fields are listed in the approximate order in which they appear in the output.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mirror-filter-name</td>
<td>Name of the mirror filter configured on the device.</td>
</tr>
<tr>
<td>interface-in</td>
<td>Name of the incoming logical interface to be matched for mirroring.</td>
</tr>
<tr>
<td>interface-out</td>
<td>Name of the outgoing logical interface to be matched for mirroring.</td>
</tr>
<tr>
<td>protocol</td>
<td>Networking protocol name or number to be matched for mirroring.</td>
</tr>
<tr>
<td>source-port</td>
<td>Transmission Control Protocol (TCP) or User Datagram Protocol (UDP) source port number to be matched for mirroring.</td>
</tr>
<tr>
<td>source-prefix</td>
<td>Source IP prefix or address to be matched for mirroring.</td>
</tr>
<tr>
<td>destination-port</td>
<td>Transmission Control Protocol (TCP) or User Datagram Protocol (UDP) destination port number to be matched for mirroring.</td>
</tr>
<tr>
<td>destination-prefix</td>
<td>Destination IP prefix or address to be matched for mirroring.</td>
</tr>
<tr>
<td>filter-counters</td>
<td>Number of packets matched for mirroring.</td>
</tr>
<tr>
<td>output-counter</td>
<td>Number of packets sent to the packet analyzer.</td>
</tr>
</tbody>
</table>

Sample Output

show security forward-options mirror-filter

```
user@host> show security forward-options mirror-filter traffic-https

Security Mirror status

mirror-filter-name: traffic-https
interface-in: st0.1
interface-out: st0.2
destination-port: 443
protocol: 132
source-prefix: 192.0.2.0
destination-prefix: 203.0.113.0
filter-counters: 2
output-counters: 2
```
**show security monitoring**

**Syntax**

```
show security monitoring
```

**Release Information**

Command introduced in Junos OS Release 10.2.

**Description**

Displays a count of security flow and central point (CP) sessions, CPU utilization (as a percentage of maximum), and memory in use (also as a percentage of maximum) at the moment the command is run. This command is supported on SRX1400, SRX1500, SRX5400, SRX5600, and SRX5800 devices and vSRX.

**Required Privilege Level**

View

**Related Documentation**

- `show security monitoring fpc fpc-number`
- `show security monitoring performance session`
- `show security monitoring performance spu`

**show security monitoring**

```
user@host> show security monitoring
```

```
user@host> show security monitoring
```

```
+-----------------+-----------------+-----------------+-----------------+
| FPC PIC CPU Mem | Flow session current | Flow session maximum | CP session current | CP session maximum |
|-----------------+-----------------+-----------------+-----------------+-----------------|
| 1 0 0 11         | 0               | 6291456         | 0               | 7549747         |
| 1 1 0 5          | 3               | 6291456         | 1               | 7549747         |
| 1 2 0 5          | 2               | 6291456         | 0               | 7549747         |
| 1 3 0 5          | 3               | 6291456         | 1               | 7549747         |
| 8 0 0 65         | 4               | 6963            | 2               | 8355            |
| 8 1 0 65         | 2               | 6963            | 0               | 8355            |
| Total Sessions:  | 14              | 18888294        | 4               | 22665951        |

**show security monitoring (SRX1400)**

```
user@host> show security monitoring
```

```
user@host> show security monitoring
```

```
+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+
| FPC PIC CPU Mem | Flow session current | Flow session maximum | CP session current | CP session maximum | CP session maximum |
|-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------|
| 1 0 0 75         | 0               | 1048576         | 0               | 1048576         |

Copyright © 2019, Juniper Networks, Inc.
**show security monitoring (vSRX)**

```
user@host> show security monitoring
```

```
user@host> show security monitoring

<table>
<thead>
<tr>
<th>FPC</th>
<th>PIC</th>
<th>CPU</th>
<th>Mem</th>
<th>Flow session current</th>
<th>Flow session maximum</th>
<th>CP session current</th>
<th>CP session maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>68</td>
<td>2</td>
<td>524288</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
```

**show security monitoring (vSRX in a Chassis Cluster)**

```
user@host> show security monitoring

node0:
```

```
<table>
<thead>
<tr>
<th>FPC</th>
<th>PIC</th>
<th>CPU</th>
<th>Mem</th>
<th>Flow session current</th>
<th>Flow session maximum</th>
<th>CP session current</th>
<th>CP session maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>67</td>
<td>0</td>
<td>524288</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
```

node1:

```
<table>
<thead>
<tr>
<th>FPC</th>
<th>PIC</th>
<th>CPU</th>
<th>Mem</th>
<th>Flow session current</th>
<th>Flow session maximum</th>
<th>CP session current</th>
<th>CP session maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>67</td>
<td>0</td>
<td>524288</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
show security policies

**Syntax**

```
show security policies
application-firewall
count
detail
from-zone <zone-name>
global
hit-count
interface
logical-system <logical-system-name>
policy <policy-name>
root-logical-system
service-set
start
tenant <tenant-name>
to-zone <zone-name>
unknown-source-identity
zone-context
```

**Release Information**

Command modified in Junos OS Release 9.2.
Support for IPv6 addresses is added in Junos OS Release 10.2.
Support for wildcard addresses is added in Junos OS Release 11.1.
Support for global policy and services offloading is added in Junos OS Release 11.4.
Support for source-identities and the **Description** output field is added in Junos OS Release 12.1.
Support for negated address added in Junos OS Release 12.1X45-D10.
The output fields for Policy Statistics expanded, and the output fields for the **global** and **policy-name** options are expanded to include from-zone and to-zone global match criteria in Junos OS Release 12.1X47-D10.
Support for the **initial-tcp-mss** and **reverse-tcp-mss** options is added in Junos OS Release 12.3X48-D20.
Output field and description for **source-end-user-profile** option is added in Junos OS Release 15.1x49-D70.
Output field and description for **dynamic-applications** option is added in Junos OS Release 15.1x49-D100.
Output field and description for **dynapp-redir-profile** option is added in Junos OS Release 18.2R1.
The **tenant** option is introduced in Junos OS Release 18.3R1.

**Description**

Displays a summary of all security policies configured on the device. If a particular policy is specified, display information specific to that policy. The existing show commands for displaying the policies configured with multiple tenant support are enhanced. A security policy controls the traffic flow from one zone to another zone. The security policies allow you to deny, permit, reject (deny and send a TCP RST or ICMP port unreachable message to the source host), encrypt and decrypt, authenticate, prioritize, schedule, filter, and monitor the traffic attempting to cross from one security zone to another.
Options

- **application-firewall**—Displays the information of application-firewall.
- **count**—Displays the number of policies. Range is 1 through 65,535.
- **detail**—(Optional) Displays a detailed view of all of the policies configured on the device.
- **from-zone**—Displays the policy information matching the given source zone.
- **global**—(Optional) Displays information about global policies.
- **hit-count**—Displays the policies hit count.
- **interface**—Displays the name of the adaptive services interface.
- **logical-system**—Displays the logical system name.
- **policy-name**—(Optional) Displays the information about a specified policy.
- **root-logical-system**—Displays root logical system as default.
- **service-set**—Displays the name of the service set.
- **start**—Displays the policies from a given position. Range is 1 through 65,535.
- **tenant**—Displays the name of the tenant system.
- **to-zone**—Displays the policy information matching the given destination zone.
- **unknown-source-identity**—Displays the unknown-source-identity of a policy.
- **zone-context**—Displays the count of policies in each context (from-zone and to-zone).

**Required Privilege Level**

- view

**Related Documentation**

- Security Policies Overview
- Understanding Security Policy Rules
- Understanding Security Policy Elements
- Unified Policies Configuration Overview

**List of Sample Output**

- show security policies on page 608
- show security policies (Dynamic Applications) on page 609
- show security policies policy-name detail on page 610
- show security policies (Services-Offload) on page 611
- show security policies (Device Identity) on page 611
- show security policies detail on page 611
- show security policies detail (TCP Options) on page 614
- show security policies policy-name (Negated Address) on page 614
- show security policies policy-name detail (Negated Address) on page 614
- show security policies global on page 615
- show security policies detail tenant on page 615
### Output Fields

Table 79 on page 606 lists the output fields for the `show security policies` command. Output fields are listed in the approximate order in which they appear.

**Table 79: show security policies Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>From zone</td>
<td>Name of the source zone.</td>
</tr>
<tr>
<td>To zone</td>
<td>Name of the destination zone.</td>
</tr>
<tr>
<td>Policy</td>
<td>Name of the applicable policy.</td>
</tr>
<tr>
<td>Description</td>
<td>Description of the applicable policy.</td>
</tr>
<tr>
<td>State</td>
<td>Status of the policy:</td>
</tr>
<tr>
<td></td>
<td>• <strong>enabled</strong>: The policy can be used in the policy lookup process, which determines access rights for a packet and the action taken in regard to it.</td>
</tr>
<tr>
<td></td>
<td>• <strong>disabled</strong>: The policy cannot be used in the policy lookup process, and therefore it is not available for access control.</td>
</tr>
<tr>
<td>Index</td>
<td>Internal number associated with the policy.</td>
</tr>
<tr>
<td>Sequence number</td>
<td>Number of the policy within a given context. For example, three policies that are applicable in a from-zoneA-to-zoneB context might be ordered with sequence numbers 1, 2, 3. Also, in a from-zoneC-to-zoneD context, four policies might have sequence numbers 1, 2, 3, 4.</td>
</tr>
<tr>
<td>Source addresses</td>
<td>For standard display mode, the names of the source addresses for a policy. Address sets are resolved to their individual names.</td>
</tr>
<tr>
<td></td>
<td>For detail display mode, the names and corresponding IP addresses of the source addresses for a policy. Address sets are resolved to their individual address name-IP address pairs.</td>
</tr>
<tr>
<td>Destination addresses</td>
<td>Name of the destination address (or address set) as it was entered in the destination zone’s address book. A packet’s destination address must match this value for the policy to apply to it.</td>
</tr>
<tr>
<td>source-end-user-profile</td>
<td>Name of the device identity profile (referred to as <code>end-user-profile</code> in the CLI) that contains attributes, or characteristics of a device. Specification of the device identity profile in the <code>source-end-user-profile</code> field is part of the device identity feature. If a device matches the attributes specified in the profile and other security policy parameters, then the security policy’s action is applied to traffic issuing from the device.</td>
</tr>
<tr>
<td>Source addresses (excluded)</td>
<td>Name of the source address excluded from the policy.</td>
</tr>
<tr>
<td>Destination addresses (excluded)</td>
<td>Name of the destination address excluded from the policy.</td>
</tr>
<tr>
<td>Source identities</td>
<td>One or more user roles specified for a policy.</td>
</tr>
</tbody>
</table>
Table 79: show security policies Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications</td>
<td>Name of a preconfigured or custom application whose type the packet matches, as specified at configuration time.</td>
</tr>
<tr>
<td></td>
<td>• IP protocol: The Internet protocol used by the application—for example, TCP, UDP, ICMP.</td>
</tr>
<tr>
<td></td>
<td>• ALG: If an ALG is explicitly associated with the policy, the name of the ALG is displayed. If application-protocol ignore is configured, ignore is displayed. Otherwise, 0 is displayed. However, even if this command shows ALG: 0, ALGs might be triggered for packets destined to well-known ports on which ALGs are listening, unless ALGs are explicitly disabled or when application-protocol ignore is not configured for custom applications.</td>
</tr>
<tr>
<td></td>
<td>• Inactivity timeout: Elapsed time without activity after which the application is terminated.</td>
</tr>
<tr>
<td></td>
<td>• Source port range: The low-high source port range for the session application.</td>
</tr>
<tr>
<td>Dynamic Applications</td>
<td>Application identification-based Layer 7 dynamic applications.</td>
</tr>
<tr>
<td>Destination Address Translation</td>
<td>Status of the destination address translation traffic:</td>
</tr>
<tr>
<td></td>
<td>• drop translated—Drop the packets with translated destination addresses.</td>
</tr>
<tr>
<td></td>
<td>• drop untranslated—Drop the packets without translated destination addresses.</td>
</tr>
<tr>
<td>Application Firewall</td>
<td>An application firewall includes the following:</td>
</tr>
<tr>
<td></td>
<td>• Rule-set—Name of the rule set.</td>
</tr>
<tr>
<td></td>
<td>• Rule—Name of the rule.</td>
</tr>
<tr>
<td></td>
<td>• Dynamic applications—Name of the applications.</td>
</tr>
<tr>
<td></td>
<td>• Dynamic application groups—Name of the application groups.</td>
</tr>
<tr>
<td></td>
<td>• Action—The action taken with respect to a packet that matches the application firewall rule set. Actions include the following:</td>
</tr>
<tr>
<td></td>
<td>• permit</td>
</tr>
<tr>
<td></td>
<td>• deny</td>
</tr>
<tr>
<td></td>
<td>• Default rule—The default rule applied when the identified application is not specified in any rules of the rule set.</td>
</tr>
<tr>
<td>Action or Action-type</td>
<td>The action taken for a packet that matches the policy’s tuples. Actions include the following:</td>
</tr>
<tr>
<td></td>
<td>• permit</td>
</tr>
<tr>
<td></td>
<td>• firewall-authentication</td>
</tr>
<tr>
<td></td>
<td>• tunnel ipsec-vpn vpn-name</td>
</tr>
<tr>
<td></td>
<td>• pair-policy pair-policy-name</td>
</tr>
<tr>
<td></td>
<td>• source-nat pool pool-name</td>
</tr>
<tr>
<td></td>
<td>• pool-set pool-set-name</td>
</tr>
<tr>
<td></td>
<td>• interface</td>
</tr>
<tr>
<td></td>
<td>• destination-nat name</td>
</tr>
<tr>
<td></td>
<td>• deny</td>
</tr>
<tr>
<td></td>
<td>• reject</td>
</tr>
<tr>
<td></td>
<td>• services-offload</td>
</tr>
</tbody>
</table>
Table 79: show security policies Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session log</td>
<td>Session log entry that indicates whether the <code>at-create</code> and <code>at-close</code> flags were set at configuration time to log session information.</td>
</tr>
<tr>
<td>Scheduler name</td>
<td>Name of a preconfigured scheduler whose schedule determines when the policy is active and can be used as a possible match for traffic.</td>
</tr>
</tbody>
</table>
| Policy statistics | - **Input bytes**—The total number of bytes presented for processing by the device.  
  - **Initial direction**—The number of bytes presented for processing by the device from the initial direction.  
  - **Reply direction**—The number of bytes presented for processing by the device from the reply direction.  
  - **Output bytes**—The total number of bytes actually processed by the device.  
  - **Initial direction**—The number of bytes from the initial direction actually processed by the device.  
  - **Reply direction**—The number of bytes from the reply direction actually processed by the device.  
  - **Input packets**—The total number of packets presented for processing by the device.  
  - **Initial direction**—The number of packets presented for processing by the device from the initial direction.  
  - **Reply direction**—The number of packets presented for processing by the device from the reply direction.  
  - **Output packets**—The total number of packets actually processed by the device.  
  - **Initial direction**—The number of packets actually processed by the device from the initial direction.  
  - **Reply direction**—The number of packets actually processed by the device from the reply direction.  
  - **Session rate**—The total number of active and deleted sessions.  
  - **Active sessions**—The number of sessions currently present because of access control lookups that used this policy.  
  - **Session deletions**—The number of sessions deleted since system startup.  
  - **Policy lookups**—The number of times the policy was accessed to check for a match. |
| dynapp-redir-profile | Displays unified policy redirect profile. See `profile(dynamic-application)`. |
| Per policy TCP Options | Configured syn and sequence checks, and the configured TCP MSS value for the initial direction, the reverse direction or, both. |

Sample Output

```
user@host> show security policies

From zone: trust, To zone: untrust
Policy: p1, State: enabled, Index: 4, Sequence number: 1
Source addresses:
  sa-1-ipv4: 198.51.100.11/24
```
show security policies (Dynamic Applications)

user@host> show security policies

Policy: p1, State: enabled, Index: 4, Scope Policy: 0, Sequence number: 1
Source addresses: any
Destination addresses: any
Applications: any
Dynamic Applications: junos:YAHOO
Action: deny, log

Policy: p2, State: enabled, Index: 5, Scope Policy: 0, Sequence number: 2
Source addresses: any
Destination addresses: any
Applications: any
Action: permit, log

Policy: p3, State: enabled, Index: 6, Scope Policy: 0, Sequence number: 3
Source addresses: any
Destination addresses: any
Applications: any
Dynamic Applications: junos:HTTP, junos:SSL
Action: permit, application services, log

The following example displays the output with unified policies configured.

user@host> show security policies

Default policy: deny-all
Pre ID default policy: permit-all
From zone: trust, To zone: untrust
Policy: p2, State: enabled, Index: 4, Scope Policy: 0, Sequence number: 1
Source addresses: any
show security policies policy-name detail

user@host> show security policies policy-name p1 detail

Policy: p1, action-type: permit, State: enabled, Index: 4, Scope Policy: 0
Description: The policy p1 is for the sales team
Sequence number: 1
From zone: trust, To zone: untrust
Source addresses:
  sa-1-ipv4: 198.51.100.11/24
  sa-2-ipv6: 2001:db8:a0b:12f0::1/32
  sa-3-ipv6: 2001:db8:a0b:12f0::9/32
  sa-4-wc: 203.0.113.1/255.255.0.255
Destination addresses:
  da-1-ipv4: 192.0.2.0/24
  da-2-ipv6: 2001:db8:a0b:12f0::1/32
  da-3-ipv6: 2001:db8:a0b:12f0::9/32
  da-4-wc: 192.168.22.11/255.255.0.255
Source identities:
  role1
  role2
  role4
Application: any
IP protocol: 0, ALG: 0, Inactivity timeout: 0
Source port range: [0-0]
Destination port range: [0-0]
Destination Address Translation: drop translated
Application firewall :
Rule-set: my_ruleset1
Rule: rule1
  Dynamic Applications: junos:FACEBOOK-ACCESS, junos:YMSG
  Dynamic Application groups: junos:web, junos:chat
  Action: deny
Default rule: permit
Session log: at-create, at-close
Scheduler name: sch20
Per policy TCP Options: SYN check: No, SEQ check: No
Policy statistics:
Input bytes : 18144 545 bps
  Initial direction: 9072 272 bps
  Reply direction : 9072 272 bps
Output bytes  : 18144 545 bps
  Initial direction: 9072 272 bps
  Reply direction : 9072 272 bps
Input packets : 216 6 pps
  Initial direction: 108 3 bps
  Reply direction : 108 3 bps
Output packets: 216 6 pps
  Initial direction: 108 3 bps
  Reply direction : 108 3 bps
Session rate  : 108 3 sps
Active sessions: 93
Session deletions: 15
Policy lookups : 108
The following example displays the output with unified policies configured.

```
user@host> show security policies policy-name p1 detail

Default policy: permit-all
Pre ID default policy: permit-all
From zone: trust, To zone: trust
Policy: p1, State: enabled, Index: 4, Scope Policy: 0, Sequence number: 1
Source addresses: any
Destination addresses: any
Applications: any
Action: reject
dynapp-redir-profile: profile1
```

```
show security policies (Services-Offload)

user@host> show security policies

Policy: p1, action-type: reject, State: enabled, Index: 4, Scope Policy: 0
Policy Type: Configured
Sequence number: 1
From zone: trust, To zone: trust
Source addresses:
  any-ipv4(global): 0.0.0.0/0
  any-ipv6(global): ::/0
Destination addresses:
  any-ipv4(global): 0.0.0.0/0
  any-ipv6(global): ::/0
Application: any
  IP protocol: 0, ALG: 0, Inactivity timeout: 0
  Source port range: [0-0]
  Destination port range: [0-0]
  dynapp-redir-profile: profile1(1)
Per policy TCP Options: SYN check: No, SEQ check: No, Window scale: No
```

```
show security policies (Device Identity)

user@host> show security policies

From zone: trust, To zone: untrust
Policy: dev-id-marketing, State: enabled, Index: 5, Scope Policy: 0,
Sequence number: 1
Source addresses: any
Destination addresses: any
source-end-user-profile: marketing-profile
Applications: any
Action: permit
```

```
show security policies detail

user@host> show security policies detail

Default policy: deny-all
Policy: p1, action-type: permit, services-offload:enabled, State: enabled, Index: 4, Scope Policy: 0
Policy Type: Configured
Description: The policy p1 is for the sales team
```
<table>
<thead>
<tr>
<th>Source addresses:</th>
<th>Destination addresses:</th>
<th>Source identities:</th>
<th>Application: any</th>
</tr>
</thead>
<tbody>
<tr>
<td>any-ipv4(global): 0.0.0.0/0</td>
<td>any-ipv6(global): ::/0</td>
<td>role1 role2 role4</td>
<td>IP protocol: 0, ALG: 0, Inactivity timeout: 0</td>
</tr>
<tr>
<td>any-ipv6(global): ::/0</td>
<td></td>
<td></td>
<td>Source port range: [0-0] Destination port range: [0-0]</td>
</tr>
</tbody>
</table>

Per policy TCP Options: SYN check: No, SEQ check: No

Policy statistics:

<table>
<thead>
<tr>
<th>Input bytes</th>
<th>Initial direction:</th>
<th>Reply direction:</th>
<th>Output bytes</th>
<th>Initial direction:</th>
<th>Reply direction:</th>
<th>Input packets</th>
<th>Initial direction:</th>
<th>Reply direction:</th>
<th>Output packets</th>
<th>Initial direction:</th>
<th>Reply direction:</th>
<th>Session rate</th>
<th>Active sessions</th>
<th>Session deletions</th>
<th>Policy lookups</th>
</tr>
</thead>
<tbody>
<tr>
<td>18144</td>
<td>9072</td>
<td>9072</td>
<td>18144</td>
<td>9072</td>
<td>9072</td>
<td>216</td>
<td>108</td>
<td>108</td>
<td>216</td>
<td>108</td>
<td>108</td>
<td>108</td>
<td>93</td>
<td>15</td>
<td>108</td>
</tr>
</tbody>
</table>

Policy: p2, action-type: permit, services-offload:enabled, State: enabled, Index: 5, Scope Policy: 0

Policy Type: Configured

Description: The policy p2 is for the sales team

Sequence number: 1
From zone: untrust, To zone: trust

Source addresses:
| any-ipv4(global): 0.0.0.0/0 | any-ipv6(global): ::/0 |
| Destination addresses: | any-ipv6(global): ::/0 |

Source identities: role1 role2 role4
Application: any
IP protocol: 0, ALG: 0, Inactivity timeout: 0
Source port range: [0-0] Destination port range: [0-0]
Per policy TCP Options: SYN check: No, SEQ check: No

The following example displays the output with unified policies configured.

```
user@host> show security policies detail
```
Default policy: deny-all
Pre ID default policy: permit-all
Policy: p2, action-type: reject, State: enabled, Index: 4, Scope Policy: 0
  Policy Type: Configured
  Sequence number: 1
  From zone: trust, To zone: untrust
  Source addresses:
    any-ipv4(global): 0.0.0.0/0
    any-ipv6(global): ::/0
  Destination addresses:
    any-ipv4(global): 0.0.0.0/0
    any-ipv6(global): ::/0
  Application: junos-defaults
  IP protocol: 6, ALG: 0, Inactivity timeout: 1800
    Source port range: [0-0]
    Destination port range: [443-443]
  IP protocol: 6, ALG: 0, Inactivity timeout: 1800
    Source port range: [0-0]
    Destination port range: [5432-5432]
  IP protocol: 6, ALG: 0, Inactivity timeout: 1800
    Source port range: [0-0]
    Destination port range: [80-80]
  IP protocol: 6, ALG: 0, Inactivity timeout: 1800
    Source port range: [0-0]
    Destination port range: [3128-3128]
  IP protocol: 6, ALG: 0, Inactivity timeout: 1800
    Source port range: [0-0]
    Destination port range: [8000-8000]
  IP protocol: 6, ALG: 0, Inactivity timeout: 1800
    Source port range: [0-0]
    Destination port range: [8080-8080]
  IP protocol: 17, ALG: 0, Inactivity timeout: 60
    Source port range: [0-0]
    Destination port range: [1-65535]
  IP protocol: 6, ALG: 0, Inactivity timeout: 1800
    Source port range: [0-0]
    Destination port range: [443-443]
  IP protocol: 6, ALG: 0, Inactivity timeout: 1800
    Source port range: [0-0]
    Destination port range: [5432-5432]
  IP protocol: 6, ALG: 0, Inactivity timeout: 1800
    Source port range: [0-0]
    Destination port range: [80-80]
  IP protocol: 6, ALG: 0, Inactivity timeout: 1800
    Source port range: [0-0]
    Destination port range: [3128-3128]
  IP protocol: 6, ALG: 0, Inactivity timeout: 1800
    Source port range: [0-0]
    Destination port range: [8000-8000]
  IP protocol: 6, ALG: 0, Inactivity timeout: 1800
    Source port range: [0-0]
    Destination port range: [8080-8080]
  IP protocol: 17, ALG: 0, Inactivity timeout: 60
    Source port range: [0-0]
    Destination port range: [1-65535]
Dynamic Application:
  junos:FACEBOOK-CHAT: 10704
  junos:GMAIL: 51
dynapp-redir-profile: profile1
Per policy TCP Options: SYN check: No, SEQ check: No, Window scale: No

### show security policies detail (TCP Options)

```
user@host> show security policies policy-name p2 detail
node0:
Policy: p2, action-type: permit, State: enabled, Index: 4, Scope Policy: 0
  Policy Type: Configured
  Sequence number: 1
  From zone: trust, To zone: trust
  Source addresses:
     any-ipv4(global): 0.0.0.0/0
     any-ipv6(global): ::/0
  Destination addresses:
     any-ipv4(global): 0.0.0.0/0
     any-ipv6(global): ::/0
  Application: junos-defaults
  IP protocol: tcp, ALG: 0, Inactivity timeout: 0
  Source port range: [0-0]
  Destination port range: [80-80]
  Per policy TCP Options: SYN check: No, SEQ check: No, Window scale: No
  Dynamic-application: junos:HTTP
```

### show security policies policy-name (Negated Address)

```
user@host> show security policies policy-name p1
node0:
Policy: p1, State: enabled, Index: 4, Scope Policy: 0
  From zone: trust, To zone: untrust
  Source addresses(excluded):
     ad1(ad): 255.255.255.255/32
     ad2(ad): 198.51.100.1/24
     ad3(ad): 198.51.100.6 ~ 198.51.100.56
     ad4(ad): 192.0.2.8/24
     ad5(ad): 198.51.100.99 ~ 198.51.100.199
     ad6(ad): 203.0.113.9/24
     ad7(ad): 203.0.113.23/24
  Destination addresses(excluded):
     ad13(ad2): 198.51.100.76/24
```

### show security policies policy-name detail (Negated Address)

```
user@host> show security policies policy-name p1 detail
node0:
Policy: p1, action-type: permit, State: enabled, Index: 4, Scope Policy: 0
  Sequence number: 1
  From zone: trust, To zone: untrust
  Source addresses(excluded):
     ad1(ad): 255.255.255.255/32
     ad2(ad): 198.51.100.1/24
     ad3(ad): 198.51.100.6 ~ 198.51.100.56
     ad4(ad): 192.0.2.8/24
     ad5(ad): 198.51.100.99 ~ 198.51.100.199
     ad6(ad): 203.0.113.9/24
     ad7(ad): 203.0.113.23/24
  Destination addresses(excluded):
     ad13(ad2): 198.51.100.76/24
```
show security policies global

user@host> show security policies global policy-name Pa
node0:

Global policies:
Policy: Pa, State: enabled, Index: 6, Scope Policy: 0, Sequence number: 1
  From zones: any
  To zones: any
  Source addresses: H0
  Destination addresses: H1
  Applications: junos-http
  Action: permit

show security policies detail tenant

user@host> show security policies detail tenant TN1

Default policy: deny-all
Pre ID default policy: permit-all
Policy: p1, action-type: permit, State: enabled, Index: 4, Scope Policy: 0
Policy Type: Configured
Sequence number: 1
  From zone: trust, To zone: untrust
  Source addresses: any
  Destination addresses: any
  Application: junos-ping
  IP protocol: 1, ALG: 0, Inactivity timeout: 60
  ICMP Information: type=255, code=0
  Application: junos-telnet
  IP protocol: tcp, ALG: 0, Inactivity timeout: 1800
  Source port range: [0-0]
  Destination port range: [23-23]
  Application: app_udp
  IP protocol: udp, ALG: 0, Inactivity timeout: 1800
  Source port range: [0-0]
  Destination port range: [5000-5000]
  Application: junos-icmp6-all
  IP protocol: 58, ALG: 0, Inactivity timeout: 60
  ICMP Information: type=255, code=0
Per policy TCP Options: SYN check: No, SEQ check: No, Window scale: No
Session log: at-create, at-close
Policy statistics:
Input bytes : 0
Initial direction: 0 0 bps
<table>
<thead>
<tr>
<th>Metric</th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reply direction</td>
<td>0</td>
<td>0 bps</td>
</tr>
<tr>
<td>Output bytes</td>
<td>0</td>
<td>0 bps</td>
</tr>
<tr>
<td>Initial direction</td>
<td>0</td>
<td>0 bps</td>
</tr>
<tr>
<td>Reply direction</td>
<td>0</td>
<td>0 bps</td>
</tr>
<tr>
<td>Input packets</td>
<td>0</td>
<td>0 pps</td>
</tr>
<tr>
<td>Initial direction</td>
<td>0</td>
<td>0 bps</td>
</tr>
<tr>
<td>Reply direction</td>
<td>0</td>
<td>0 bps</td>
</tr>
<tr>
<td>Output packets</td>
<td>0</td>
<td>0 pps</td>
</tr>
<tr>
<td>Initial direction</td>
<td>0</td>
<td>0 bps</td>
</tr>
<tr>
<td>Reply direction</td>
<td>0</td>
<td>0 bps</td>
</tr>
<tr>
<td>Session rate</td>
<td>0</td>
<td>0 sps</td>
</tr>
<tr>
<td>Active sessions</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Session deletions</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Policy lookups</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
show security policies hit-count

Syntax
show security policies hit-count
<ascending>
<descending>
<from-zone zone-name>
<greater-than count>
<less-than count>
<logical-system (logical-system-name | all)>
<root-logical-system>
<tenant (tenant-name | all)>
<to-zone zone-name>

Release Information
Command introduced in Junos OS Release 12.1.
The index output field is added to the show security policies hit-count command to display the number of sessions redirected in Junos OS Release 18.2R1.
The tenant option is introduced in Junos OS Release 18.3R1.

Description
Display the utility rate of security policies according to the number of hits they receive. The number of hits can be listed without an order or sorted in either ascending or descending order, and they can be restricted to the number of hits that fall above or below a specific count or within a range. Data is shown for all zones associated with the policies or named zones.

In a cluster, the count is a sum of all the Services Processing Cards (SPC) hit counts; it is cluster-wide. If a Packet Forwarding Engine (PFE) in a node is in failover mode, but does not reboot, the counter persists. If a node reboots, the PFE in the node also reboots, and the counter is cleared. During an in-service software upgrade (ISSU), all PFES reboot, therefore all counters are cleared.

Use this command without options to display the number of hits in random order for all security policies and for all zones.

Options
- **ascending**—(Optional) Displays the number of hits for security policies in ascending order.
- **descending**—(Optional) Displays the number of hits for security policies in descending order.
- **from-zone zone-name**—(Optional) Displays the number of hits for security policies associated with the named source zone.
- **greater-than count**—(Optional) Displays security policies for which the number of hits is greater than the specified number.
  Range: 0 through 4,294,967,295
- **less-than count**—(Optional) Displays security policies for which the number of hits is less than the specified number.
  Range: 0 through 4,294,967,295
• **logical-system**—Displays the logical system name.
• **root-logical-system**—Displays root logical system as default.
• **tenant**—Displays the name of the tenant system.
• **to-zone zone-name**—(Optional) Displays the number of hits for security policies associated with the named destination zone.

**Required Privilege**

**Level** view

**Related Documentation**

• clear security policies hit-count
• Security Policies Overview
• Unified Policies Configuration Overview

**List of Sample Output**

show security policies hit-count on page 618
show security policies hit-count ascending on page 619
show security policies hit-count descending greater-than 70 less-than 100 on page 619
show security policies hit-count from-zone untrust to-zone trust on page 619
show security policies hit-count tenant all on page 619

**Output Fields**

Table 80 on page 618 lists the output fields for the show security policies hit-count command. Output fields are listed in the approximate order in which they appear.

**Table 80: show security policies hit-count Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>index</td>
<td>Displays the policy sequence number</td>
</tr>
<tr>
<td>from-zone</td>
<td>Name of the source zone</td>
</tr>
<tr>
<td>to-zone</td>
<td>Name of the destination zone</td>
</tr>
<tr>
<td>name</td>
<td>Name of the security policy</td>
</tr>
<tr>
<td>policy count</td>
<td>Number of hits for each security policy</td>
</tr>
<tr>
<td>tenant</td>
<td>Displays the name of the tenant system.</td>
</tr>
</tbody>
</table>

**Sample Output**

show security policies hit-count

<table>
<thead>
<tr>
<th>index</th>
<th>from zone</th>
<th>to zone</th>
<th>name</th>
<th>policy count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>untrust</td>
<td>vrtrust</td>
<td>policy1</td>
<td>40</td>
</tr>
<tr>
<td>2</td>
<td>untrust</td>
<td>trust</td>
<td>policy2</td>
<td>20</td>
</tr>
</tbody>
</table>
Sample Output

show security policies hit-count ascending

show security policies hit-count descending greater-than 70 less-than 100

show security policies hit-count from-zone untrust to-zone trust

show security policies hit-count tenant all
**show security resource-manager group active**

**Syntax**
```
show security resource-manager group active
<group-number>
<node (node-id | all | local | primary)>
```

**Release Information**
Command introduced in Junos OS Release 8.5; node options added in Junos OS Release 9.0.

**Description**
Display security information about active groups created through the resource manager.

**Options**
- none—Display resource manager group service information for all active groups.
- **group-number**—(Optional) Display resource manager group service information for a specific group identification number.
- **node**—(Optional) For chassis cluster configurations, display active resource manager group service information on a specific node.
  - **node-id**—Identification number of the node. It can be 0 or 1.
  - **all**—Display information about all nodes.
  - **local**—Display information about the local node.
  - **primary**—Display information about the primary node.

**Required Privilege Level**
view

**Related Documentation**
- Understanding Traffic Processing on Security Devices on page 25

**List of Sample Output**
- show security resource-manager group active on page 621
- show security resource-manager group active 2048 on page 621
- show security resource-manager group active node primary on page 621
- show security resource-manager group active node all on page 621
- show security resource-manager group active node 1024 node all on page 622

**Output Fields**
Table 81 on page 620 lists the output fields for the show security resource-manager group command. Output fields are listed in the approximate order in which they appear.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total groups</td>
<td>Total number of groups in the system.</td>
</tr>
<tr>
<td>active groups</td>
<td>Number of active groups.</td>
</tr>
</tbody>
</table>

Flow-Based and Packet-Based Processing Feature Guide for Security Devices
Table 81: show security resource-manager group Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group ID</td>
<td>Identification number whose group information is displayed.</td>
</tr>
</tbody>
</table>

Sample Output

**show security resource-manager group active**

```
user@host> show security resource-manager group active
Total groups 32, active groups 0
```

Sample Output

**show security resource-manager group active 2048**

```
user@host> show security resource-manager group active 2048
Total groups 2048, active groups 1
Group ID 2048: state - Active
  : Virtual System - root
  : Application - SIP ALG
  : Group Timeout - 65535
  : Number of resources - 3
    Resource ID - 8190
    Resource ID - 8188
    Resource ID - 8187
```

Sample Output

**show security resource-manager group active node primary**

```
user@host> show security resource-manager group active node primary
node0:

Group ID 1024: Application - SIP ALG
Total groups 1024, active groups 1
```

Sample Output

**show security resource-manager group active node all**

```
user@host> show security resource-manager group active node all
node0:

Group ID 1024: Application - SIP ALG
Total groups 1024, active groups 1
node1:

Group ID 1024: Application - SIP ALG
Total groups 1024, active groups 1
```
Sample Output

show security resource-manager group active 1024 node all

user@host> show security resource-manager group active 1024 node all

node0:
Group ID 1024: state - Active
  : Application         - SIP ALG
  : Group Timeout       - 65535
  : Number of resources - 3
    Resource ID - 8192
    Resource ID - 8188
    Resource ID - 8187

node1:
Group ID 1024: state - Active
  : Application         - SIP ALG
  : Group Timeout       - 65535
  : Number of resources - 3
    Resource ID - 8187
    Resource ID - 8186
    Resource ID - 8190
show security resource-manager resource active

Syntax
show security resource-manager resource active
<resource-id>
<node (node-id | all | local | primary)>

Release Information
Command introduced in Junos OS Release 8.5; node options added in Junos OS Release 9.0.

Description
Display security information about active resources created through the resource manager.

Options
- none—Display information for all active resources.
- resource-id—(Optional) Display information for a resource with a specific identification number.
- node—(Optional) For chassis cluster configurations, display active resource manager information on a specific node.
  - node-id—Identification number of the node. It can be 0 or 1.
  - all—Display information about all nodes.
  - local—Display information about the local node.
  - primary—Display information about the primary node.

Required Privilege Level
view

Related Documentation
- Understanding Traffic Processing on Security Devices on page 25

List of Sample Output
- show security resource-manager resource active on page 624
- show security resource-manager resource active 5 on page 624
- show security resource-manager resource active node local on page 624
- show security resource-manager resource active node primary on page 625

Output Fields
Table 82 on page 623 lists the output fields for the show security resource-manager resource active command. Output fields are listed in the approximate order in which they appear.

Table 82: show security resource-manager resource Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total resources</td>
<td>Total number of resources in the system.</td>
</tr>
<tr>
<td>active resources</td>
<td>Number of active resources.</td>
</tr>
<tr>
<td>Resource ID</td>
<td>Identification number whose resource information is displayed.</td>
</tr>
</tbody>
</table>
**Sample Output**

`show security resource-manager resource active`

```
user@host> show security resource-manager resource active

<table>
<thead>
<tr>
<th>Resource ID</th>
<th>Group ID</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>2</td>
<td>JSF_sip</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>JSF_sip</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>JSF_sip</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>JSF_sip</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>JSF_sip</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>JSF_sip</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>JSF_sip</td>
</tr>
</tbody>
</table>

Total Resources 4326, active resources 7
```

**Sample Output**

`show security resource-manager resource active 5`

```
user@host> show security resource-manager resource active 5

<table>
<thead>
<tr>
<th>Resource ID</th>
<th>Group ID</th>
<th>Application</th>
<th>State</th>
<th>Parent group</th>
<th>Policy</th>
<th>From zone</th>
<th>To zone</th>
<th>Resource timeout</th>
<th>Number of sessions</th>
<th>Number of Holes</th>
<th>Source IP range</th>
<th>Source port range</th>
<th>Destination IP range</th>
<th>Destination port range</th>
<th>Translated</th>
<th>Protocol</th>
<th>Reference count</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>2</td>
<td>asl_client</td>
<td>Active</td>
<td>2</td>
<td>5</td>
<td>untrust</td>
<td>trust</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>{0.0.0.0, 0.0.0.0}</td>
<td>{0, 0}</td>
<td>{33.1.0.200, 33.1.0.200}</td>
<td>{5060, 5060}</td>
<td>0</td>
<td>17</td>
<td>1</td>
</tr>
</tbody>
</table>
```

**Sample Output**

`show security resource-manager resource active node local`

```
node0:

<table>
<thead>
<tr>
<th>Resource ID</th>
<th>Group ID</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>8192</td>
<td>1024</td>
<td>SIP ALG</td>
</tr>
<tr>
<td>8188</td>
<td>1024</td>
<td>SIP ALG</td>
</tr>
<tr>
<td>8187</td>
<td>1024</td>
<td>SIP ALG</td>
</tr>
</tbody>
</table>

Total Resources 8192, active resources 3
```
Sample Output

display security resource-manager resource active node primary

user@host> display security resource-manager resource active node primary
	node0:

<table>
<thead>
<tr>
<th>Resource ID</th>
<th>Group ID</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>8192</td>
<td>1024</td>
<td>SIP ALG</td>
</tr>
<tr>
<td>8188</td>
<td>1024</td>
<td>SIP ALG</td>
</tr>
<tr>
<td>8187</td>
<td>1024</td>
<td>SIP ALG</td>
</tr>
</tbody>
</table>

Total Resources 8192, active resources 3
show security resource-manager settings

Syntax

show security resource-manager settings
<node (node-id | all | local | primary)>

Release Information

Command introduced in Junos OS Release 8.5; node options added in Junos OS Release 9.0.

Description

Display resource manager settings.

Options

node—(Optional) For chassis cluster configurations, display resource manager settings on a specific node.

• node-id—Identification number of the node. It can be 0 or 1.
• all—Display information about all nodes.
• local—Display information about the local node.
• primary—Display information about the primary node.

Required Privilege

view

Related Documentation

• Understanding Traffic Processing on Security Devices on page 25

List of Sample Output

show security resource-manager settings on page 627
show security resource-manager settings node primary on page 627
show security resource-manager settings node all on page 627

Output Fields

Table 83 on page 626 lists the output fields for the show security resource-manager settings command. Output fields are listed in the approximate order in which they appear.

Table 83: show security resource-manager settings Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client Heartbeat</td>
<td>Time after which idle an resource manager client is timed out.</td>
</tr>
<tr>
<td>Count</td>
<td>Number of active clients.</td>
</tr>
<tr>
<td>Pinhole age</td>
<td>Duration for which the temporary opening in the security firewall (pinhole) is open for specified traffic. If the specified traffic does not exist during this time period, the pinhole is timed out.</td>
</tr>
</tbody>
</table>
Sample Output

```
show security resource-manager settings

user@host> show security resource-manager settings
Client Heartbeat: timeout 600 seconds, count 5
Pinhole age: 32 seconds

Sample Output

show security resource-manager settings node primary

user@host> show security resource-manager settings node primary
node0:

ので |
\- Client Heartbeat: timeout 600 seconds, count 5
\- Pinhole age: 120 seconds

Sample Output

show security resource-manager settings node all

user@host> show security resource-manager settings node all
node0:

ので |
\- Client Heartbeat: timeout 600 seconds, count 5
\- Pinhole age: 120 seconds

node1:

ので |
\- Client Heartbeat: timeout 600 seconds, count 5
\- Pinhole age: 120 seconds
```
**show security resource-manager summary**

**Syntax**
show security resource-manager summary

**Release Information**
Command introduced in Junos OS Release 11.4.

**Description**
Display summary information about active resources, clients, groups, and sessions created through the resource manager.

**Required Privilege Level**
view

**Related Documentation**
- Understanding Traffic Processing on Security Devices on page 25

**List of Sample Output**
show security resource-manager summary on page 628

**Output Fields**
Table 84 on page 628 lists the output fields for the show security resource-manager summary command. Output fields are listed in the approximate order in which they appear.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active resource-manager clients</td>
<td>Number of active resource manager clients.</td>
</tr>
<tr>
<td>Active resource-manager groups</td>
<td>Number of active resource manager groups.</td>
</tr>
<tr>
<td>Active resource-manager resources</td>
<td>Number of active resource manager resources.</td>
</tr>
<tr>
<td>Active resource-manager sessions</td>
<td>Number of active resource manager sessions.</td>
</tr>
</tbody>
</table>

**Sample Output**

show security resource-manager summary

```
user@host> show security resource-manager summary

Active resource-manager clients : 15
Active resource-manager groups   : 1
Active resource-manager resources: 1
Active resource-manager sessions  : 0
```
**show security screen ids-option**

**Syntax**
```
show security screen ids-option
screen-name
logical-system
root-logical-system
tenant
```

**Release Information**

**Description**
Display the configuration information about the specified security screen. You can configure a ids-option to enable screen protection on the SRX Series devices.

**Options**
- `screen-name` — Name of the screen.
- `logical-system` — Name of the logical system.
- `root-logical-system` — Displays root logical system as default.
- `tenant` — Name of the tenant system.

**Required Privilege Level**
view

**Related Documentation**
- ids-option
- *Example: Configuring Multiple Screening Options*

**List of Sample Output**
- `show security screen ids-option jscreen on page 632`
- `show security screen ids-option jscreen (IPv6) on page 632`
- `show security screen ids-option jscreen1 node all on page 632`
- `show security screen ids-option jscreen tenant TN1 on page 633`
- `show security screen ids-option jscreen tenant all on page 633`

**Output Fields**
`Table 85 on page 629` lists the output fields for the `show security screen ids-option` command. Output fields are listed in the approximate order in which they appear.

**Table 85: show security screen ids-option Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP address sweep threshold</td>
<td>Number of microseconds for which the device accepts 10 TCP packets from the same remote source to different destination addresses.</td>
</tr>
<tr>
<td>Field Name</td>
<td>Field Description</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>TCP port scan threshold</td>
<td>Number of microseconds during which the device accepts packets from the same remote source with up to 10 different port numbers.</td>
</tr>
<tr>
<td>ICMP address sweep threshold</td>
<td>Number of microseconds during which up to 10 ICMP echo requests from the same host are allowed into the device.</td>
</tr>
<tr>
<td>UDP flood threshold</td>
<td>Number of UDP packets per second allowed to ping the same destination address before the device rejects further UDP packets.</td>
</tr>
<tr>
<td>UDP port scan threshold</td>
<td>Number of microseconds during which the device accepts packets from the same remote source IP with up to 10 different destination port numbers.</td>
</tr>
<tr>
<td>TCP winnuke</td>
<td>Enable or disable the detection of TCP WinNuke attacks.</td>
</tr>
<tr>
<td>TCP SYN flood attack threshold</td>
<td>Number of SYN packets per second required to trigger the SYN proxy response.</td>
</tr>
<tr>
<td>TCP SYN flood alarm threshold</td>
<td>Number of half-complete proxy connections per second at which the device makes entries in the event alarm log.</td>
</tr>
<tr>
<td>TCP SYN flood source threshold</td>
<td>Number of SYN segments to be received per second before the device begins dropping connection requests.</td>
</tr>
<tr>
<td>TCP SYN flood destination threshold</td>
<td>Number of SYN segments received per second before the device begins dropping connection requests.</td>
</tr>
<tr>
<td>TCP SYN flood timeout</td>
<td>Maximum length of time before a half-completed connection is dropped from the queue.</td>
</tr>
<tr>
<td>TCP SYN flood queue size</td>
<td>Number of proxy connection requests that can be held in the proxy connection queue before the device begins rejecting new connection requests.</td>
</tr>
<tr>
<td>ICMP large packet</td>
<td>Enable or disable the detection of any ICMP frame with an IP length greater than 1024 bytes.</td>
</tr>
<tr>
<td>UDP address sweep threshold</td>
<td>Number of microseconds for which the device accepts 10 UDP packets from the same remote source to different destination addresses.</td>
</tr>
<tr>
<td>IPv6 extension routing</td>
<td>Enable or disable the IPv6 extension routing screen option.</td>
</tr>
<tr>
<td>IPv6 extension shim6</td>
<td>Enable or disable the IPv6 extension shim6 screen option.</td>
</tr>
<tr>
<td>IPv6 extension fragment/IP block fragment</td>
<td>Enable or disable the IPv6 extension fragment screen option.</td>
</tr>
<tr>
<td>IPv6 extension AH</td>
<td>Enable or disable the IPv6 extension Authentication Header Protocol screen option.</td>
</tr>
<tr>
<td>IPv6 extension ESP</td>
<td>Enable or disable the IPv6 extension Encapsulating Security Payload screen option.</td>
</tr>
<tr>
<td>IPv6 extension mobility</td>
<td>Enable or disable the IPv6 extension mobility screen option.</td>
</tr>
</tbody>
</table>
Table 85: show security screen ids-option Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPv6 extension HIP</td>
<td>Enable or disable the IPv6 extension Host Identify Protocol screen option.</td>
</tr>
<tr>
<td>IPv6 extension no next</td>
<td>Enable or disable the IPv6 extension no-next screen option.</td>
</tr>
<tr>
<td>IPv6 extension user-defined</td>
<td>Enable or disable the IPv6 extension user-defined screen option.</td>
</tr>
<tr>
<td>IPv6 extension HbyH jumbo</td>
<td>Enable or disable the IPv6 extension HbyH jumbo screen option.</td>
</tr>
<tr>
<td>IPv6 extension HbyH RPL</td>
<td>Enable or disable the IPv6 extension HbyH RPL screen option.</td>
</tr>
<tr>
<td>IPv6 extension HbyH router alert</td>
<td>Enable or disable the IPv6 extension HbyH router screen option.</td>
</tr>
<tr>
<td>IPv6 extension HbyH quick start</td>
<td>Enable or disable the IPv6 extension HbyH quick-start screen option.</td>
</tr>
<tr>
<td>IPv6 extension HbyH CALIPSO</td>
<td>Enable or disable the IPv6 extension HbyH Common Architecture Label IPv6 Security Screen option.</td>
</tr>
<tr>
<td>IPv6 extension HbyH SMF DPD</td>
<td>Enable or disable the IPv6 extension HbyH Simplified Multicast Forwarding IPv6 Duplicate Packet Detection screen option.</td>
</tr>
<tr>
<td>IPv6 extension HbyH user-defined</td>
<td>Enable or disable the IPv6 extension HbyH user-defined screen option.</td>
</tr>
<tr>
<td>IPv6 extension Dst tunnel encaps limit</td>
<td>Enable or disable the IPv6 extension distributed (network) storage tunnel encapsulation limit screen option.</td>
</tr>
<tr>
<td>IPv6 extension Dst home address</td>
<td>Enable or disable the IPv6 extension DST home address screen option.</td>
</tr>
<tr>
<td>IPv6 extension Dst ILNP nonce</td>
<td>Enable or disable the IPv6 extension DST Identifier-Locator Network Protocol nonce screen option.</td>
</tr>
<tr>
<td>IPv6 extension Dst line-id</td>
<td>Enable or disable the IPv6 extension DST line-ID screen option.</td>
</tr>
<tr>
<td>IPv6 extension Dst user-defined</td>
<td>Enable or disable the IPv6 extension DST user-defined screen option.</td>
</tr>
<tr>
<td>IPv6 extension header limit</td>
<td>Threshold for the number of IPv6 extension headers that can pass through the screen.</td>
</tr>
<tr>
<td>IPv6 malformed header</td>
<td>Enable or disable the IPv6 malformed header screen option.</td>
</tr>
<tr>
<td>ICMPv6 malformed header</td>
<td>Enable or disable the ICMPv6 malformed packet screen option.</td>
</tr>
<tr>
<td>UDP flood white-list</td>
<td>Whitelist of IP addresses to bypass UDP flood detection.</td>
</tr>
<tr>
<td>Session source limit threshold</td>
<td>Limit the number of concurrent sessions the device can initiate from a single source IP address or the number of sessions it can direct to a single destination IP address.</td>
</tr>
<tr>
<td>Logical system/Tenant</td>
<td>Name of the logical system or tenant system.</td>
</tr>
</tbody>
</table>
Sample Output

show security screen ids-option jscreen

```
user@host> show security screen ids-option jscreen
```

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP port scan threshold</td>
<td>5000</td>
</tr>
<tr>
<td>UDP port scan threshold</td>
<td>10000</td>
</tr>
<tr>
<td>ICMP address sweep threshold</td>
<td>5000</td>
</tr>
</tbody>
</table>

Sample Output

show security screen ids-option jscreen (IPv6)

```
user@host> show security screen ids-option jscreen
```

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICMP ping of death</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension routing</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension shim6</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension fragment</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension AH</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension ESP</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension mobility</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension HIP</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension no next</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension user-defined</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension HbyH jumbo</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension HbyH RPL</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension HbyH router alert</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension HbyH quick start</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension HbyH CALIPSO</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension HbyH SMF DPD</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension HbyH user-defined</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension Dst tunnel encap limit</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension Dst home address</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension Dst ILNP nonce</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension Dst line-id</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension Dst user-defined</td>
<td>enabled</td>
</tr>
<tr>
<td>IPv6 extension header limit</td>
<td>20</td>
</tr>
<tr>
<td>IPv6 Malformed header</td>
<td>enabled</td>
</tr>
<tr>
<td>ICMPv6 Malformed packet</td>
<td>enabled</td>
</tr>
</tbody>
</table>

Sample Output

show security screen ids-option jscreen1 node all

```
user@host> show security screen ids-option jscreen1 node all
```

node0:
### Screen object status:

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UDP flood threshold</td>
<td>1000</td>
</tr>
<tr>
<td>TCP winnuke</td>
<td>enabled</td>
</tr>
<tr>
<td>TCP SYN flood attack threshold</td>
<td>200</td>
</tr>
<tr>
<td>TCP SYN flood alarm threshold</td>
<td>512</td>
</tr>
<tr>
<td>TCP SYN flood source threshold</td>
<td>4000</td>
</tr>
<tr>
<td>TCP SYN flood destination threshold</td>
<td>4000</td>
</tr>
<tr>
<td>TCP SYN flood timeout</td>
<td>20</td>
</tr>
<tr>
<td>TCP SYN flood queue size</td>
<td>1024</td>
</tr>
<tr>
<td>ICMP large packet</td>
<td>enabled</td>
</tr>
</tbody>
</table>

### Screen object status:

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UDP flood threshold</td>
<td>1000</td>
</tr>
<tr>
<td>TCP winnuke</td>
<td>enabled</td>
</tr>
<tr>
<td>TCP SYN flood attack threshold</td>
<td>200</td>
</tr>
<tr>
<td>TCP SYN flood alarm threshold</td>
<td>512</td>
</tr>
<tr>
<td>TCP SYN flood source threshold</td>
<td>4000</td>
</tr>
<tr>
<td>TCP SYN flood destination threshold</td>
<td>4000</td>
</tr>
<tr>
<td>TCP SYN flood timeout</td>
<td>20</td>
</tr>
<tr>
<td>TCP SYN flood queue size</td>
<td>1024</td>
</tr>
<tr>
<td>ICMP large packet</td>
<td>enabled</td>
</tr>
</tbody>
</table>

### show security screen ids-option jscreen tenant TN1

```
user@host> show security screen ids-option jscreen tenant TN1

Screen object status:

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UDP flood threshold</td>
<td>1000</td>
</tr>
<tr>
<td>UDP flood white-list</td>
<td>a1</td>
</tr>
<tr>
<td>UDP flood white-list</td>
<td>a2</td>
</tr>
</tbody>
</table>
```

### show security screen ids-option jscreen tenant all

```
user@host> show security screen ids-option jscreen tenant all

Logical system: root-logical-system
Screen object status:

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UDP flood threshold</td>
<td>1</td>
</tr>
<tr>
<td>UDP flood white-list</td>
<td>a1</td>
</tr>
<tr>
<td>UDP flood white-list</td>
<td>a2</td>
</tr>
<tr>
<td>IP block fragment</td>
<td>enabled</td>
</tr>
<tr>
<td>Session source limit threshold</td>
<td>5</td>
</tr>
</tbody>
</table>

Tenant: TN1
Screen object status:

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UDP flood threshold</td>
<td>1000</td>
</tr>
<tr>
<td>UDP flood white-list</td>
<td>a1</td>
</tr>
<tr>
<td>UDP flood white-list</td>
<td>a2</td>
</tr>
</tbody>
</table>
**show security screen statistics**

**Syntax**
```
show security screen statistics <zone zone-name | interface interface-name>
logical-system <logical-system-name | all>
root-logical-system
tenant <tenant-name>
```

**Release Information**
Command introduced in Junos OS Release 8.5.
The node option added in Junos OS Release 9.0.
The logical-system all option added in Junos OS Release 11.2R6.
The tenant option is introduced in Junos OS Release 18.3R1.

**Description**
Display intrusion detection service (IDS) security screen statistics.

**Options**
- `zone zone-name`—Display screen statistics for this security zone.
- `interface interface-name` —Display screen statistics for this interface.
- `logical-system-name` —Display screen statistics for the named logical system.
- `root-logical-system` —(Optional) Display screen statistics for the master logical system only.
- `tenant` —Display the name of the tenant system.

**Required Privilege Level**
view

**Related Documentation**
- `clear security screen statistics`
- `clear security screen statistics interface`
- `clear security screen statistics zone`
- `Example: Configuring Multiple Screening Options`

**List of Sample Output**
- `show security screen statistics zone scrzone on page 638`
- `show security screen statistics zone untrust (IPv6) on page 638`
- `show security screen statistics interface ge-0/0/3 on page 639`
- `show security screen statistics interface ge-0/0/1 (IPv6) on page 639`
- `show security screen statistics interface ge-0/0/1 node primary on page 640`
- `show security screen statistics zone trust logical-system all on page 640`
- `show security screen statistics zone trust tenant TN1 on page 642`
- `show security screen statistics zone trust tenant all on page 643`

**Output Fields**
Table 86 on page 636 lists the output fields for the `show security screen statistics` command.
Output fields are listed in the approximate order in which they appear.
### Table 86: show security screen statistics Output Fields

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICMP flood</td>
<td>Internet Control Message Protocol (ICMP) flood counter. An ICMP flood typically occurs when ICMP echo requests use all resources in responding, such that valid network traffic can no longer be processed.</td>
</tr>
<tr>
<td>UDP flood</td>
<td>User Datagram Protocol (UDP) flood counter. UDP flooding occurs when an attacker sends IP packets containing UDP datagrams with the purpose of slowing down the resources, such that valid connections can no longer be handled.</td>
</tr>
<tr>
<td>TCP port scan</td>
<td>Number of TCP port scans. The purpose of this attack is to scan the available services in the hopes that at least one port will respond, thus identifying a service to target.</td>
</tr>
<tr>
<td>ICMP address sweep</td>
<td>Number of ICMP address sweeps. An IP address sweep can occur with the intent of triggering responses from active hosts.</td>
</tr>
<tr>
<td>IP tear drop</td>
<td>Number of teardrop attacks. Teardrop attacks exploit the reassembly of fragmented IP packets.</td>
</tr>
<tr>
<td>TCP SYN flood</td>
<td>Number of TCP SYN attacks.</td>
</tr>
<tr>
<td>IP spoofing</td>
<td>Number of IP spoofs. IP spoofing occurs when an invalid source address is inserted in the packet header to make the packet appear to come from a trusted source.</td>
</tr>
<tr>
<td>ICMP ping of death</td>
<td>ICMP ping of death counter. Ping of death occurs when IP packets are sent that exceed the maximum legal length (65,535 bytes).</td>
</tr>
<tr>
<td>IP source route option</td>
<td>Number of IP source route attacks.</td>
</tr>
<tr>
<td>TCP address sweep</td>
<td>Number of TCP address sweeps.</td>
</tr>
<tr>
<td>TCP land attack</td>
<td>Number of land attacks. Land attacks occur when an attacker sends spoofed SYN packets containing the IP address of the victim as both the destination and source IP address.</td>
</tr>
<tr>
<td>TCP SYN fragment</td>
<td>Number of TCP SYN fragments.</td>
</tr>
<tr>
<td>TCP no flag</td>
<td>Number of TCP headers without flags set. A normal TCP segment header has at least one control flag set.</td>
</tr>
<tr>
<td>IP unknown protocol</td>
<td>Number of IPs.</td>
</tr>
<tr>
<td>IP bad options</td>
<td>Number of invalid options.</td>
</tr>
<tr>
<td>IP record route option</td>
<td>Number of packets with the IP record route option enabled. This option records the IP addresses of the network devices along the path that the IP packet travels.</td>
</tr>
<tr>
<td>IP timestamp option</td>
<td>Number of IP timestamp option attacks. This option records the time (in Universal Time) when each network device receives the packet during its trip from the point of origin to its destination.</td>
</tr>
</tbody>
</table>
Table 86: show security screen statistics Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP security option</td>
<td>Number of IP security option attacks.</td>
</tr>
<tr>
<td>IP loose source route option</td>
<td>Number of IP loose source route option attacks. This option specifies a partial route list for a packet to take on its journey from source to destination.</td>
</tr>
<tr>
<td>IP strict source route option</td>
<td>Number of IP strict source route option attacks. This option specifies the complete route list for a packet to take on its journey from source to destination.</td>
</tr>
<tr>
<td>IP stream option</td>
<td>Number of stream option attacks. This option provides a way for the 16-bit SATNET stream identifier to be carried through networks that do not support streams.</td>
</tr>
<tr>
<td>ICMP fragment</td>
<td>Number of ICMP fragments. Because ICMP packets contain very short messages, there is no legitimate reason for ICMP packets to be fragmented. If an ICMP packet is so large that it must be fragmented, something is amiss.</td>
</tr>
<tr>
<td>ICMP large packet</td>
<td>Number of large ICMP packets.</td>
</tr>
<tr>
<td>TCP SYN FIN</td>
<td>Number of TCP SYN FIN packets.</td>
</tr>
<tr>
<td>TCP FIN no ACK</td>
<td>Number of TCP FIN flags without the acknowledge (ACK) flag.</td>
</tr>
<tr>
<td>Source session limit</td>
<td>Number of concurrent sessions that can be initiated from a source IP address.</td>
</tr>
<tr>
<td>TCP SYN-ACK-ACK proxy</td>
<td>Number of TCP flags enabled with SYN-ACK-ACK. To prevent flooding with SYN-ACK-ACK sessions, you can enable the SYN-ACK-ACK proxy protection screen option. After the number of connections from the same IP address reaches the SYN-ACK-ACK proxy threshold and SRX Series devices running Junos OS reject further connection requests from that IP address.</td>
</tr>
<tr>
<td>IP block fragment</td>
<td>Number of IP block fragments.</td>
</tr>
<tr>
<td>Destination session limit</td>
<td>Number of concurrent sessions that can be directed to a single destination IP address.</td>
</tr>
<tr>
<td>UDP address sweep</td>
<td>Number of UDP address sweeps.</td>
</tr>
<tr>
<td>IPv6 extension header</td>
<td>Number of packets filtered for the defined IPv6 extension headers.</td>
</tr>
<tr>
<td>IPv6 extension hop by hop option</td>
<td>Number of packets filtered for the defined IPv6 hop-by-hop option types.</td>
</tr>
<tr>
<td>IPv6 extension destination option</td>
<td>Number of packets filtered for the defined IPv6 destination option types.</td>
</tr>
<tr>
<td>IPv6 extension header limit</td>
<td>Number of packets filtered for crossing the defined IPv6 extension header limit.</td>
</tr>
<tr>
<td>IPv6 malformed header</td>
<td>Number of IPv6 malformed headers defined for the intrusion detection service (IDS).</td>
</tr>
<tr>
<td>ICMPv6 malformed packet</td>
<td>Number of ICMPv6 malformed packets defined for the IDS options.</td>
</tr>
</tbody>
</table>
Sample Output

**show security screen statistics zone scrzone**

```
user@host> show security screen statistics zone scrzone

Screen statistics:
IDS attack type                   Statistics
----------                       ----------
ICMP flood                       0
UDP flood                        0
TCP winnuke                       0
TCP port scan                     91
ICMP address sweep               0
TCP sweep                        0
UDP sweep                        0
IP tear drop                     0
TCP SYN flood                     0
IP spoofing                      0
ICMP ping of death               0
IP source route option           0
TCP land attack                   0
TCP SYN fragment                  0
TCP no flag                      0
IP unknown protocol               0
IP bad options                   0
IP record route option           0
IP timestamp option               0
IP security option                0
IP loose source route option      0
IP strict source route option     0
IP stream option                  0
ICMP fragment                     0
ICMP large packet                 0
TCP SYN FIN                       0
TCP FIN no ACK                    0
Source session limit              0
TCP SYN-ACK-ACK proxy            0
IP block fragment                 0
Destination session limit         0
```

Sample Output

**show security screen statistics zone untrust (IPv6)**

```
user@host> show security screen statistics zone untrust

Screen statistics:
IDS attack type                   Statistics
----------                       ----------
ICMP flood                       0
UDP flood                        0
TCP winnuke                       0

IPv6 extension header            0
IPv6 extension hop by hop option  0
IPv6 extension destination option 0
IPv6 extension header limit       0
IPv6 malformed header             0
ICMPv6 malformed packet           0
```
### Sample Output

**show security screen statistics interface ge-0/0/3**

```plaintext
user@host> show security screen statistics interface ge-0/0/3
```

**Screen statistics:**

<table>
<thead>
<tr>
<th>IDS attack type</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICMP flood</td>
<td>0</td>
</tr>
<tr>
<td>UDP flood</td>
<td>0</td>
</tr>
<tr>
<td>TCP winnuke</td>
<td>0</td>
</tr>
<tr>
<td>TCP port scan</td>
<td>91</td>
</tr>
<tr>
<td>ICMP address sweep</td>
<td>0</td>
</tr>
<tr>
<td>TCP sweep</td>
<td>0</td>
</tr>
<tr>
<td>UDP sweep</td>
<td>0</td>
</tr>
<tr>
<td>IP tear drop</td>
<td>0</td>
</tr>
<tr>
<td>TCP SYN flood</td>
<td>0</td>
</tr>
<tr>
<td>IP spoofing</td>
<td>0</td>
</tr>
<tr>
<td>ICMP ping of death</td>
<td>0</td>
</tr>
<tr>
<td>IP source route option</td>
<td>0</td>
</tr>
<tr>
<td>TCP land attack</td>
<td>0</td>
</tr>
<tr>
<td>TCP SYN fragment</td>
<td>0</td>
</tr>
<tr>
<td>TCP no flag</td>
<td>0</td>
</tr>
<tr>
<td>IP unknown protocol</td>
<td>0</td>
</tr>
<tr>
<td>IP bad options</td>
<td>0</td>
</tr>
<tr>
<td>IP record route option</td>
<td>0</td>
</tr>
<tr>
<td>IP timestamp option</td>
<td>0</td>
</tr>
<tr>
<td>IP security option</td>
<td>0</td>
</tr>
<tr>
<td>IP loose source route option</td>
<td>0</td>
</tr>
<tr>
<td>IP strict source route option</td>
<td>0</td>
</tr>
<tr>
<td>IP stream option</td>
<td>0</td>
</tr>
<tr>
<td>ICMP fragment</td>
<td>0</td>
</tr>
<tr>
<td>ICMP large packet</td>
<td>0</td>
</tr>
<tr>
<td>TCP SYN FIN</td>
<td>0</td>
</tr>
<tr>
<td>TCP FIN no ACK</td>
<td>0</td>
</tr>
<tr>
<td>Source session limit</td>
<td>0</td>
</tr>
<tr>
<td>TCP SYN-ACK-ACK proxy</td>
<td>0</td>
</tr>
<tr>
<td>IP block fragment</td>
<td>0</td>
</tr>
<tr>
<td>Destination session limit</td>
<td>0</td>
</tr>
</tbody>
</table>

### Sample Output

**show security screen statistics interface ge-0/0/1 (IPv6)**

```plaintext
user@host> show security screen statistics interface ge-0/0/1
```

**Screen statistics:**

<table>
<thead>
<tr>
<th>IDS attack type</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICMP flood</td>
<td>0</td>
</tr>
<tr>
<td>UDP flood</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 extension header</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 extension hop by hop option</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 extension destination option</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 extension header limit</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 malformed header</td>
<td>0</td>
</tr>
<tr>
<td>ICMPv6 malformed packet</td>
<td>0</td>
</tr>
</tbody>
</table>
Sample Output

show security screen statistics interface ge-0/0/1 node primary

user@host> show security screen statistics interface ge-0/0/1 node primary

node0:

Screen statistics:
IDS attack type                          Statistics
  ICMP flood                             1
  UDP flood                              1
  TCP winnuke                            1
  TCP port scan                          1
  ICMP address sweep                     1
  TCP sweep                              1
  UDP sweep                              1
  IP tear drop                           1
  TCP SYN flood                          1
  IP spoofing                            1
  ICMP ping of death                     1
  IP source route option                  1
  TCP land attack                        1
  TCP SYN fragment                       1
  TCP no flag                            1
  IP unknown protocol                    1
  IP bad options                         1
  IP record route option                  1
  IP timestamp option                    1
  IP security option                     1
  IP loose source route option           1
  IP strict source route option          1
  IP stream option                       1
  ICMP fragment                          1
  ICMP large packet                      1
  TCP SYN FIN                            1
  TCP FIN no ACK                         1
  Source session limit                   1
  TCP SYN-ACK-ACK proxy                  1
  IP block fragment                      1
  Destination session limit              1

Sample Output

show security screen statistics zone trust logical-system all

user@host> show security screen statistics zone trust logical-system all

Logical system: root-logical-system
Screen statistics:
IDS attack type                          Statistics
  ICMP flood                             0
  UDP flood                              0
  TCP winnuke                            0
  TCP port scan                          0
  ICMP address sweep                     0
  TCP sweep                              0
  UDP sweep                              0
IP tear drop                               0
TCP SYN flood                              0
IP spoofing                                 0
ICMP ping of death                          0
IP source route option                      0
TCP land attack                              0
TCP SYN fragment                            0
TCP no flag                                  0
IP unknown protocol                          0
IP bad options                               0
IP record route option                       0
IP timestamp option                          0
IP security option                           0
IP loose source route option                 0
IP strict source route option                0
IP stream option                             0
ICMP fragment                                0
ICMP large packet                            0
TCP SYN FIN                                   0
TCP FIN no ACK                                0
Source session limit                         0
TCP SYN-ACK-ACK proxy                        0
IP block fragment                            0
Destination session limit                    0

Logical system: ls1
Screen statistics:

<table>
<thead>
<tr>
<th>IDS attack type</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP winnuke</td>
<td>0</td>
</tr>
<tr>
<td>TCP port scan</td>
<td>0</td>
</tr>
<tr>
<td>TCP SYN segment sweep</td>
<td>0</td>
</tr>
<tr>
<td>TCP source route option</td>
<td>0</td>
</tr>
<tr>
<td>TCP SYN fragment</td>
<td>0</td>
</tr>
<tr>
<td>TCP no flag</td>
<td>0</td>
</tr>
<tr>
<td>IP unknown protocol</td>
<td>0</td>
</tr>
<tr>
<td>IP bad options</td>
<td>0</td>
</tr>
<tr>
<td>IP record route option</td>
<td>0</td>
</tr>
<tr>
<td>IP timestamp option</td>
<td>0</td>
</tr>
<tr>
<td>IP no TCP</td>
<td>0</td>
</tr>
<tr>
<td>IP loose source route option</td>
<td>0</td>
</tr>
<tr>
<td>IP strict source route option</td>
<td>0</td>
</tr>
<tr>
<td>Destination session limit</td>
<td>0</td>
</tr>
</tbody>
</table>
Logical system: ls2
Screen statistics:

<table>
<thead>
<tr>
<th>IDS attack type</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICMP flood</td>
<td>0</td>
</tr>
<tr>
<td>UDP flood</td>
<td>0</td>
</tr>
<tr>
<td>TCP winnuke</td>
<td>0</td>
</tr>
<tr>
<td>TCP port scan</td>
<td>0</td>
</tr>
<tr>
<td>ICMP address sweep</td>
<td>0</td>
</tr>
<tr>
<td>TCP sweep</td>
<td>0</td>
</tr>
<tr>
<td>UDP sweep</td>
<td>0</td>
</tr>
<tr>
<td>IP tear drop</td>
<td>0</td>
</tr>
<tr>
<td>TCP SYN flood</td>
<td>0</td>
</tr>
<tr>
<td>IP spoofing</td>
<td>0</td>
</tr>
<tr>
<td>ICMP ping of death</td>
<td>0</td>
</tr>
<tr>
<td>IP source route option</td>
<td>0</td>
</tr>
<tr>
<td>TCP land attack</td>
<td>0</td>
</tr>
<tr>
<td>TCP SYN fragment</td>
<td>0</td>
</tr>
<tr>
<td>TCP no flag</td>
<td>0</td>
</tr>
<tr>
<td>IP unknown protocol</td>
<td>0</td>
</tr>
<tr>
<td>IP bad options</td>
<td>0</td>
</tr>
<tr>
<td>IP record route option</td>
<td>0</td>
</tr>
<tr>
<td>IP timestamp option</td>
<td>0</td>
</tr>
<tr>
<td>IP security option</td>
<td>0</td>
</tr>
<tr>
<td>IP loose source route option</td>
<td>0</td>
</tr>
<tr>
<td>IP strict source route option</td>
<td>0</td>
</tr>
<tr>
<td>IP stream option</td>
<td>0</td>
</tr>
<tr>
<td>ICMP fragment</td>
<td>0</td>
</tr>
<tr>
<td>ICMP large packet</td>
<td>0</td>
</tr>
<tr>
<td>TCP SYN FIN</td>
<td>0</td>
</tr>
<tr>
<td>TCP FIN no ACK</td>
<td>0</td>
</tr>
<tr>
<td>Source session limit</td>
<td>0</td>
</tr>
<tr>
<td>TCP SYN-ACK-ACK proxy</td>
<td>0</td>
</tr>
<tr>
<td>IP block fragment</td>
<td>0</td>
</tr>
<tr>
<td>Destination session limit</td>
<td>0</td>
</tr>
</tbody>
</table>

show security screen statistics zone trust tenant TN1

user@host> show security screen statistics zone trust tenant TN1

Screen statistics:

<table>
<thead>
<tr>
<th>IDS attack type</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICMP flood</td>
<td>0</td>
</tr>
<tr>
<td>UDP flood</td>
<td>0</td>
</tr>
<tr>
<td>TCP winnuke</td>
<td>0</td>
</tr>
<tr>
<td>TCP port scan</td>
<td>0</td>
</tr>
<tr>
<td>UDP port scan</td>
<td>0</td>
</tr>
<tr>
<td>ICMP address sweep</td>
<td>0</td>
</tr>
<tr>
<td>TCP sweep</td>
<td>0</td>
</tr>
<tr>
<td>UDP sweep</td>
<td>0</td>
</tr>
<tr>
<td>IP tear drop</td>
<td>0</td>
</tr>
<tr>
<td>TCP SYN flood</td>
<td>0</td>
</tr>
<tr>
<td>SYN flood source</td>
<td>0</td>
</tr>
<tr>
<td>SYN flood destination</td>
<td>0</td>
</tr>
<tr>
<td>IP spoofing</td>
<td>0</td>
</tr>
<tr>
<td>ICMP ping of death</td>
<td>0</td>
</tr>
<tr>
<td>IP source route option</td>
<td>0</td>
</tr>
<tr>
<td>Attack Type</td>
<td>Statistics</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>TCP land attack</td>
<td>0</td>
</tr>
<tr>
<td>TCP SYN fragment</td>
<td>0</td>
</tr>
<tr>
<td>TCP no flag</td>
<td>0</td>
</tr>
<tr>
<td>IP unknown protocol</td>
<td>0</td>
</tr>
<tr>
<td>IP bad options</td>
<td>0</td>
</tr>
<tr>
<td>IP record route option</td>
<td>0</td>
</tr>
<tr>
<td>IP timestamp option</td>
<td>0</td>
</tr>
<tr>
<td>IP security option</td>
<td>0</td>
</tr>
<tr>
<td>IP loose source route option</td>
<td>0</td>
</tr>
<tr>
<td>IP strict source route option</td>
<td>0</td>
</tr>
<tr>
<td>IP stream option</td>
<td>0</td>
</tr>
<tr>
<td>ICMP fragment</td>
<td>0</td>
</tr>
<tr>
<td>ICMP large packet</td>
<td>0</td>
</tr>
<tr>
<td>TCP SYN FIN</td>
<td>0</td>
</tr>
<tr>
<td>TCP FIN no ACK</td>
<td>0</td>
</tr>
<tr>
<td>Source session limit</td>
<td>0</td>
</tr>
<tr>
<td>TCP SYN-ACK-ACK proxy</td>
<td>0</td>
</tr>
<tr>
<td>IP block fragment</td>
<td>0</td>
</tr>
<tr>
<td>Destination session limit</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 extension header</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 extension hop by hop option</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 extension destination option</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 extension header limit</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 malformed header</td>
<td>0</td>
</tr>
<tr>
<td>ICMPv6 malformed packet</td>
<td>0</td>
</tr>
<tr>
<td>IP tunnel summary</td>
<td>0</td>
</tr>
</tbody>
</table>

```
show security screen statistics zone trust tenant all

Logical system: root-logical-system

IDS attack type                  Statistics
ICMP flood                       0
UDP flood                        0
TCP winnuke                      0
TCP port scan                    0
UDP port scan                    0
ICMP address sweep               0
TCP sweep                        0
UDP sweep                        0
IP tear drop                     0
TCP SYN Flood                    0
SYN flood source                 0
SYN flood destination            0
IP spoofing                      0
ICMP ping of death               0
IP source route option           0
TCP land attack                  0
TCP SYN fragment                 0
TCP no flag                      0
IP unknown protocol              0
IP bad options                   0
IP record route option           0
IP timestamp option              0
IP security option               0
IP loose source route option     0
```
### Tenant: TN1

#### Screen statistics:

<table>
<thead>
<tr>
<th>IDS attack type</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP strict source route option</td>
<td>0</td>
</tr>
<tr>
<td>IP stream option</td>
<td>0</td>
</tr>
<tr>
<td>ICMP fragment</td>
<td>0</td>
</tr>
<tr>
<td>ICMP large packet</td>
<td>0</td>
</tr>
<tr>
<td>TCP SYN FIN</td>
<td>0</td>
</tr>
<tr>
<td>TCP FIN no ACK</td>
<td>0</td>
</tr>
<tr>
<td>Source session limit</td>
<td>0</td>
</tr>
<tr>
<td>TCP SYN-ACK-ACK proxy</td>
<td>0</td>
</tr>
<tr>
<td>IP block fragment</td>
<td>0</td>
</tr>
<tr>
<td>Destination session limit</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 extension header</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 extension hop by hop option</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 extension destination option</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 extension header limit</td>
<td>0</td>
</tr>
<tr>
<td>IPv6 malformed header</td>
<td>0</td>
</tr>
<tr>
<td>ICMPv6 malformed packet</td>
<td>0</td>
</tr>
<tr>
<td>IP tunnel summary</td>
<td>0</td>
</tr>
<tr>
<td>Condition</td>
<td>Count</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>IPv6 malformed header</td>
<td>0</td>
</tr>
<tr>
<td>ICMPv6 malformed packet</td>
<td>0</td>
</tr>
<tr>
<td>IP tunnel summary</td>
<td>0</td>
</tr>
</tbody>
</table>
show security softwires

Syntax
show security softwires <softwire-name softwire-name>
<logical-system (all | logical-system-name)>

Release Information
Command introduced in Junos OS Release 10.4. The logical-system option introduced in Junos OS Release 12.1.

Description
Display a summary of information of all the softwire concentrators and details on concentrators with specified name.

Options
- softwire-name softwire-name — Display the details of the specified softwire concentrator.
- logical-system (all | logical-system-name) — Display softwire information for all logical systems or for a specified logical system. This option is only available to the master administrator.

Required Privilege
view

Related Documentation
- Understanding Traffic Processing on Security Devices on page 25

Sample Output

code: user@host> show security softwires

<table>
<thead>
<tr>
<th>Softwire Name</th>
<th>SC Address</th>
<th>Status</th>
<th>Number of SI connected</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC-CSSI-1</td>
<td>3001::1</td>
<td>Connected</td>
<td>2</td>
</tr>
<tr>
<td>SC-CSSI-str00</td>
<td>3100::1</td>
<td>Active</td>
<td>0</td>
</tr>
<tr>
<td>SC-CSSI-str01</td>
<td>3101::1</td>
<td>Inactive</td>
<td>0</td>
</tr>
<tr>
<td>SC-CSSI-str02</td>
<td>3001::1</td>
<td>Connected</td>
<td>2520</td>
</tr>
</tbody>
</table>

code: user@host> show security softwires softwire-name SC-CSSI-1

Name of softwire: SC-CSSI-1
SC status: Connected
SC address: 3001::1
Zone: trust
VR ID: 0

<table>
<thead>
<tr>
<th>SI Address</th>
<th>SI Status</th>
<th>SPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>3001::2</td>
<td>Active</td>
<td>spu-1</td>
</tr>
<tr>
<td>3001::2</td>
<td>Active</td>
<td>spu-21</td>
</tr>
<tr>
<td>SI number: 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

code: user@host> show security softwires logical-system ls-product-design

<table>
<thead>
<tr>
<th>Softwire Name</th>
<th>SC Address</th>
<th>Status</th>
<th>Number of SI connected</th>
</tr>
</thead>
<tbody>
<tr>
<td>sc_1</td>
<td>3000::1</td>
<td>Connected</td>
<td>1</td>
</tr>
</tbody>
</table>
**show security zones**

**Syntax**

```
show security zones
<zone-name>
<all-logical-systems-tenants>
<detail>
<logical-system (logical-system-name | all)>
<root-logical-system>
<tenant (tenant-name | all)>
<terse>
<br type (functional | security)>
```

**Release Information**

Command introduced in Junos OS Release 8.5.  
`tenant` option introduced in Junos OS Release 18.3R1.

**Description**

Displays the information about the security zones. You can define a security zone, which allows you to divide the network into different segments and apply different security options to each segment.

**Options**

- **none**—Displays information about all the security zones configured.
- **zone-name**—(Optional) Displays information about the specified security zone.
- **all-logical-systems-tenants**—(Optional) Displays the information about the security zone of all logical systems and tenant systems.
- **detail**—(Optional) Displays the detail level information about the security zone.
- **logical-system logical-system-name**—(Optional) Displays the information about the security zones of a specified logical system.
- **logical-system all**—(Optional) Displays the information about the security zones of all logical systems.
- **root-logical-system**—(Optional) Displays the information about the security zones of the root logical system.
- **tenant tenant-name**—(Optional) Displays the information about the security zones of a specified tenant system.
- **tenant all**—(Optional) Displays the information about the security zones of all tenant systems.
- **terse**—(Optional) Displays the specified level information about the security zone.
- **type functional**—(Optional) Displays the information for functional zones.
- **type security**—(Optional) Displays the information for security zones.

**Required Privilege**

`view`
Related Documentation

- Security Zones Overview
- Supported System Services for Host Inbound Traffic
- security-zone

List of Sample Output

show security zones on page 649
show security zones abc on page 649
show security zones all-logical-systems-tenants on page 649
show security zones abc detail on page 650
show security zones logical-system LSYS1 on page 650
show security zones logical-system all on page 651
show security zones root-logical-system on page 651
show security zones tenant TSYS1 on page 651
show security zone tenant all on page 652
show security zones terse on page 652
show security zones type security on page 652

Output Fields

Table 87 on page 648 lists the output fields for the show security zones command. Output fields are listed in the approximate order in which they appear.

**Table 87: show security zones Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional zone</td>
<td>Name of the functional zone.</td>
<td>none</td>
</tr>
<tr>
<td>Security zone</td>
<td>Name of the security zone.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Description</td>
<td>Description of the security zone.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Policy configurable</td>
<td>Whether the policy can be configured or not.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Interfaces bound</td>
<td>Number of interfaces in the zone.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Interfaces</td>
<td>List of the interfaces in the zone.</td>
<td>detail</td>
</tr>
<tr>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>Zone</td>
<td>Name of the zone.</td>
<td>terse</td>
</tr>
<tr>
<td>Type</td>
<td>Type of the zone.</td>
<td>terse</td>
</tr>
<tr>
<td>Logical system</td>
<td>Name of the logical system.</td>
<td>detail</td>
</tr>
</tbody>
</table>
Table 87: show security zones Output Fields (continued)

<table>
<thead>
<tr>
<th>Tenant</th>
<th>Name of the tenant system.</th>
<th>Level of Output</th>
</tr>
</thead>
</table>

Sample Output

```
show security zones

user@host> show security zones

Functional zone: management
   Description: This is the management zone.
   Policy configurable: No
   Interfaces bound: 1
   Interfaces:
      ge-0/0/0.0

Security zone: Host
   Description: This is the host zone.
   Send reset for non-SYN session TCP packets: Off
   Policy configurable: Yes
   Interfaces bound: 1
   Interfaces:
      fxp0.0

Security zone: abc
   Description: This is the abc zone.
   Send reset for non-SYN session TCP packets: Off
   Policy configurable: Yes
   Interfaces bound: 1
   Interfaces:
      ge-0/0/1.0

Security zone: def
   Description: This is the def zone.
   Send reset for non-SYN session TCP packets: Off
   Policy configurable: Yes
   Interfaces bound: 1
   Interfaces:
      ge-0/0/2.0

show security zones abc

user@host> show security zones abc

Security zone: abc
   Description: This is the abc zone.
   Send reset for non-SYN session TCP packets: Off
   Policy configurable: Yes
   Interfaces bound: 1
   Interfaces:
      ge-0/0/1.0

show security zones all-logical-systems-tenants

user@host> show security zones all-logical-systems-tenants

Logical system: root-logical-system
```
Security zone: HOST
  Send reset for non-SYN session TCP packets: Off
  Policy configurable: Yes
  Interfaces bound: all
  Interfaces:

Security zone: junos-host
  Send reset for non-SYN session TCP packets: Off
  Policy configurable: Yes
  Interfaces bound: 0
  Interfaces:

Logical system: LSYS1

Security zone: z1
  Send reset for non-SYN session TCP packets: Off
  Policy configurable: Yes
  Interfaces bound: 0
  Interfaces:

Logical system: TSYS1

Security zone: z3a
  Send reset for non-SYN session TCP packets: Off
  Policy configurable: Yes
  Interfaces bound: 0
  Interfaces:

Security zone: z3b
  Send reset for non-SYN session TCP packets: Off
  Policy configurable: Yes
  Interfaces bound: 0
  Interfaces:

Security zone: z3c
  Send reset for non-SYN session TCP packets: Off
  Policy configurable: Yes
  Interfaces bound: 0
  Interfaces:

show security zones abc detail

user@host> show security zones abc detail

Security zone: abc
  Description: This is the abc zone.
  Send reset for non-SYN session TCP packets: Off
  Policy configurable: Yes
  Interfaces bound: 1
  Interfaces:
    ge-0/0/1.0

show security zones logical-system LSYS1

user@host> show security zones logical-system LSYS1

Security zone: z1
Send reset for non-SYN session TCP packets: Off
Policy configurable: Yes
Interfaces bound: 0
Interfaces:

show security zones logical-system all

user@host> show security zones logical-system all

Logical system: root-logical-system

Security zone: HOST
Send reset for non-SYN session TCP packets: Off
Policy configurable: Yes
Interfaces bound: all
Interfaces:

Security zone: junos-host
Send reset for non-SYN session TCP packets: Off
Policy configurable: Yes
Interfaces bound: 0
Interfaces:

Logical system: LSYS1

Security zone: z1
Send reset for non-SYN session TCP packets: Off
Policy configurable: Yes
Interfaces bound: 0
Interfaces:

show security zones root-logical-system

user@host> show security zones root-logical-system

Security zone: HOST
Send reset for non-SYN session TCP packets: Off
Policy configurable: Yes
Interfaces bound: all
Interfaces:

Security zone: junos-host
Send reset for non-SYN session TCP packets: Off
Policy configurable: Yes
Interfaces bound: 0
Interfaces:

show security zones tenant TSYS1

user@host> show security zones tenant TSYS1

Security zone: z3a
Send reset for non-SYN session TCP packets: Off
Policy configurable: Yes
Interfaces bound: 0
Interfaces:
Security zone: z3b
   Send reset for non-SYN session TCP packets: Off
   Policy configurable: Yes
   Interfaces bound: 0
   Interfaces:

Security zone: z3c
   Send reset for non-SYN session TCP packets: Off
   Policy configurable: Yes
   Interfaces bound: 0
   Interfaces:

show security zone tenant all

user@host> show security zone tenant all

Tenant: TSYS1

Security zone: Host
   Send reset for non-SYN session TCP packets: Off
   Policy configurable: Yes
   Interfaces bound: 0
   Interfaces:

Security zone: abc
   Send reset for non-SYN session TCP packets: Off
   Policy configurable: Yes
   Interfaces bound: 0
   Interfaces:xe-0/0/1.0

Security zone: def
   Send reset for non-SYN session TCP packets: Off
   Policy configurable: Yes
   Interfaces bound: 1
   Interfaces:xe-0/0/3.0

show security zones terse

user@host> show security zones terse

<table>
<thead>
<tr>
<th>Zone</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>my-internal</td>
<td>Security</td>
</tr>
<tr>
<td>my-external</td>
<td>Security</td>
</tr>
<tr>
<td>dmz</td>
<td>Security</td>
</tr>
</tbody>
</table>

show security zones type security

user@host> show security zones type security

Security zone: HOST
   Send reset for non-SYN session TCP packets: Off
   Policy configurable: Yes
   Interfaces bound: all
   Interfaces:
<table>
<thead>
<tr>
<th>Security zone: junos-host</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send reset for non-SYN session TCP packets: Off</td>
</tr>
<tr>
<td>Policy configurable: Yes</td>
</tr>
<tr>
<td>Interfaces bound: 0</td>
</tr>
<tr>
<td>Interfaces:</td>
</tr>
</tbody>
</table>
show security zones type

Syntax

```
show security zones type
  (functional | security)
  <detail | terse>
```

Release Information

Command introduced in Junos OS Release 8.5. The Description output field added in Junos OS Release 12.1.

Description

Display information about security zones of the specified type.

Options

- **functional**—Display functional zones.
- **security**—Display security zones.
- **detail | terse**—(Optional) Display the specified level of output.

Required Privilege Level

view

Related Documentation

- Security Zones Overview
- Supported System Services for Host Inbound Traffic
- security-zone

List of Sample Output

- show security zones type functional on page 655
- show security zones type security on page 655
- show security zones type security terse on page 656
- show security zones type security detail on page 656

Output Fields

Table 88 on page 654 lists the output fields for the show security zones type command. Output fields are listed in the approximate order in which they appear.

**Table 88: show security zones type Output Fields**

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security zone</td>
<td>Zone name.</td>
<td>All levels</td>
</tr>
<tr>
<td>Description</td>
<td>Description of the security zone.</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td></td>
<td>detail</td>
</tr>
<tr>
<td>Policy configurable</td>
<td>Whether the policy can be configured or not.</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td></td>
<td>detail</td>
</tr>
</tbody>
</table>
Table 88: show security zones type Output Fields (continued)

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Level of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interfaces bound</td>
<td>Number of interfaces in the zone.</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td></td>
<td>detail</td>
</tr>
<tr>
<td>Interfaces</td>
<td>List of the interfaces in the zone.</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td></td>
<td>detail</td>
</tr>
<tr>
<td>Zone</td>
<td>Name of the zone.</td>
<td>All levels</td>
</tr>
<tr>
<td>Type</td>
<td>Type of the zone.</td>
<td>All levels</td>
</tr>
</tbody>
</table>

Sample Output

show security zones type functional

```
user@host> show security zones type functional

Functional zone: management
  Description: management zone
  Policy configurable: No
  Interfaces bound: 0
  Interfaces:
```

Sample Output

show security zones type security

```
user@host> show security zones type security

Security zone: trust
  Description: trust zone
  Send reset for non-SYN session TCP packets: Off
  Policy configurable: Yes
  Interfaces bound: 1
  Interfaces:
  ge-0/0/0.0

Security zone: untrust
  Description: untrust zone
  Send reset for non-SYN session TCP packets: Off
  Policy configurable: Yes
  Interfaces bound: 1
  Interfaces:
  ge-0/0/1.0

Security zone: junos-host
  Description: junos-host zone
  Send reset for non-SYN session TCP packets: Off
  Policy configurable: Yes
  Interfaces bound: 0
  Interfaces:
```
Sample Output

show security zones type security terse

<table>
<thead>
<tr>
<th>Zone</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>trust</td>
<td>Security</td>
</tr>
<tr>
<td>untrust</td>
<td>Security</td>
</tr>
<tr>
<td>junos-host</td>
<td>Security</td>
</tr>
</tbody>
</table>

Sample Output

show security zones type security detail

Security zone: trust
Description: trust zone
Send reset for non-SYN session TCP packets: Off
Policy configurable: Yes
Interfaces bound: 1
Interfaces:
ge-0/0/0.0

Security zone: untrust
Description: untrust zone
Send reset for non-SYN session TCP packets: Off
Policy configurable: Yes
Interfaces bound: 1
Interfaces:
ge-0/0/1.0

Security zone: junos-host
Description: junos-host zone
Send reset for non-SYN session TCP packets: Off
Policy configurable: Yes
Interfaces bound: 0
Interfaces: